CHAPTER

28

FUEL

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438	Jan 15/2022	

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28-22-11 (cont)		
439	Jan 15/2022	
440	Jan 15/2022	
441	May 15/2023	
442	May 15/2023	
443	May 15/2023	
444	May 15/2023	
28-22-11		
R 601	Sep 15/2023	
602	May 15/2023	
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604	Sep 15/2021	
605	Sep 15/2021	
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28-22-13		
R 401	Sep 15/2023	
R 402	Sep 15/2023	
O 403	Sep 15/2023	
O 404	Sep 15/2023	
O 405	Sep 15/2023	
R 406	Sep 15/2023	
R 407	Sep 15/2023	
R 408	Sep 15/2023	
R 409	Sep 15/2023	
R 410	Sep 15/2023	
R 411	Sep 15/2023	
O 412	Sep 15/2023	
O 413	Sep 15/2023	
R 414	Sep 15/2023	
R 415	Sep 15/2023	
R 416	Sep 15/2023	
R 417	Sep 15/2023	
R 418	Sep 15/2023	
R 419	Sep 15/2023	
O 420	Sep 15/2023	
O 421	Sep 15/2023	
O 422	Sep 15/2023	
R 423	Sep 15/2023	

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Subject/Page	Date	COC
28-22-13 (cont)		
O 424	Sep 15/2023	
R 425	Sep 15/2023	
R 426	Sep 15/2023	
R 427	Sep 15/2023	
R 428	Sep 15/2023	
O 429	Sep 15/2023	
O 430	Sep 15/2023	
O 431	Sep 15/2023	
R 432	Sep 15/2023	
O 433	Sep 15/2023	
R 434	Sep 15/2023	
A 435	Sep 15/2023	
A 436	BLANK	
28-22-13		
R 701	Sep 15/2023	
R 702	Sep 15/2023	
R 703	Sep 15/2023	
R 704	Sep 15/2023	
O 705	Sep 15/2023	
O 706	Sep 15/2023	
R 707	Sep 15/2023	
R 708	Sep 15/2023	
R 709	Sep 15/2023	
R 710	Sep 15/2023	
A 711	Sep 15/2023	
A 712	Sep 15/2023	
28-22-14		
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404	May 15/2023	
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28-22-15		
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403	Sep 15/2021	
28-22-15 (cont)		
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406	May 15/2023	
407	May 15/2023	
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409	May 15/2023	
410	May 15/2023	
411	May 15/2023	
412	Sep 15/2021	
413	Sep 15/2021	
414	Sep 15/2021	
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28-22-15		
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28-22-16		
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402	Sep 15/2021	
403	Sep 15/2021	
404	Sep 15/2021	
405	May 15/2023	
406	Jan 15/2022	
407	Jan 15/2022	
408	BLANK	
28-22-17		
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402	Sep 15/2021	
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404	Sep 15/2022	
405	Jan 15/2022	
406	Jan 15/2022	
407	Jan 15/2022	

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Subject/Page	Date	COC
28-22-17 (cont)		
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410	May 15/2023	
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28-22-18		
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R 402	Sep 15/2023	
R 403	Sep 15/2023	
O 404	Sep 15/2023	
R 405	Sep 15/2023	
R 406	Sep 15/2023	
A 407	Sep 15/2023	
A 408	BLANK	
28-22-21		
401	Sep 15/2021	
402	May 15/2023	
403	Sep 15/2021	
404	Jan 15/2023	
405	Sep 15/2021	
406	Sep 15/2021	
407	Sep 15/2021	
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414	Sep 15/2021	
415	Sep 15/2021	
416	Jan 15/2023	
417	May 15/2023	
418	Sep 15/2021	
419	Sep 15/2021	
420	Sep 15/2021	

Subject/Page	Date	COC
28-22-21 (cont)		
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422	Sep 15/2021	
423	Sep 15/2021	
424	Sep 15/2021	
425	May 15/2023	
426	May 15/2023	
427	Sep 15/2022	
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433	Sep 15/2021	
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438	Sep 15/2021	
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446	May 15/2023	
447	Sep 15/2021	
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449	Sep 15/2022	
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451	Sep 15/2021	
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Subject/Page	Date	COC
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502	Jan 15/2023	
503	Sep 15/2021	
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28-22-21		
R 601	Sep 15/2023	
602	Sep 15/2021	
603	Sep 15/2021	
604	Sep 15/2021	
28-22-41		
401	Sep 15/2021	
R 402	Sep 15/2023	
R 403	Sep 15/2023	
R 404	Sep 15/2023	
O 405	Sep 15/2023	
406	Sep 15/2021	
407	Sep 15/2021	
408	Sep 15/2021	
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419	May 15/2023	
420	May 15/2023	
421	Jan 15/2022	
422	Jan 15/2022	
423	Jan 15/2022	
424	Jan 15/2022	
425	Jan 15/2022	

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Subject/Page	Date	COC
28-22-41 (cont)		
426	Jan 15/2022	
427	Jan 15/2022	
428	Jan 15/2022	
429	Jan 15/2022	
430	Jan 15/2022	
R 431	Sep 15/2023	
R 432	Sep 15/2023	
433	Jan 15/2022	
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439	Jan 15/2022	
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442	Jan 15/2022	
443	Jan 15/2022	
444	BLANK	
28-22-41		
R 501	Sep 15/2023	
R 502	Sep 15/2023	
R 503	Sep 15/2023	
O 504	Sep 15/2023	
O 505	Sep 15/2023	
O 506	Sep 15/2023	
O 507	Sep 15/2023	
O 508	Sep 15/2023	
A 509	Sep 15/2023	
A 510	BLANK	
28-22-43		
R 401	Sep 15/2023	
R 402	Sep 15/2023	
R 403	Sep 15/2023	
O 404	Sep 15/2023	
R 405	Sep 15/2023	
R 406	Sep 15/2023	

Subject/Page	Date	COC
28-22-43 (cont)		
A 407	Sep 15/2023	
A 408	BLANK	
28-22-43		
R 501	Sep 15/2023	
R 502	Sep 15/2023	
R 503	Sep 15/2023	
O 504	Sep 15/2023	
R 505	Sep 15/2023	
O 506	Sep 15/2023	
A 507	Sep 15/2023	
A 508	BLANK	
28-22-51		
R 401	Sep 15/2023	
R 402	Sep 15/2023	
R 403	Sep 15/2023	
O 404	Sep 15/2023	
O 405	Sep 15/2023	
O 406	Sep 15/2023	
O 407	Sep 15/2023	
O 408	Sep 15/2023	
R 409	Sep 15/2023	
O 410	Sep 15/2023	
R 411	Sep 15/2023	
R 412	Sep 15/2023	
28-22-61		
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405	May 15/2023	
406	May 15/2023	
407	Jan 15/2022	
408	Jan 15/2022	
28-22-71		
R 401	Sep 15/2023	
R 402	Sep 15/2023	
R 403	Sep 15/2023	

Subject/Page	Date	COC
28-22-71 (cont)		
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408	Sep 15/2022	
R 409	Sep 15/2023	
R 410	Sep 15/2023	
R 411	Sep 15/2023	
R 412	Sep 15/2023	
28-25-00		
R 501	Sep 15/2023	
R 502	Sep 15/2023	
R 503	Sep 15/2023	
R 504	Sep 15/2023	
O 505	Sep 15/2023	
O 506	Sep 15/2023	
A 507	Sep 15/2023	
A 508	BLANK	
28-25-02		
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412	May 15/2022	
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416	May 15/2023	
417	May 15/2022	
418	May 15/2022	

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Subject/Page	Date	COC
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28-25-02		
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28-25-04		
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28-25-05		
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406	Sep 15/2021	

Subject/Page	Date	COC
28-25-05 (cont)		
407	Sep 15/2021	
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409	May 15/2023	
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28-25-05		
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28-25-06		
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28-25-07		
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403	Sep 15/2021	
404	Sep 15/2021	
405	May 15/2023	
406	May 15/2023	

Subject/Page	Date	COC
28-26-00		
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202	Sep 15/2022	
203	Sep 15/2022	
204	Sep 15/2022	
205	Sep 15/2022	
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223	Sep 15/2021	
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225	Sep 15/2021	
226	Jan 15/2022	
227	Jan 15/2022	
228	Jan 15/2022	
28-26-11		
401	May 15/2023	
402	May 15/2023	
403	Sep 15/2021	
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405	Sep 15/2021	
406	May 15/2023	
407	May 15/2023	

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Subject/Page	Date	COC
28-26-11 (cont)		
408	May 15/2023	
409	May 15/2023	
410	May 15/2023	
411	May 15/2023	
412	May 15/2023	
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28-41-00		
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28-41-21		
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28-41-21		
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R 504	Sep 15/2023	
R 505	Sep 15/2023	
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516	Sep 15/2022	
517	May 15/2023	
518	May 15/2023	
R 519	Sep 15/2023	
28-41-21 (cont)		
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R 521	Sep 15/2023	
R 522	Sep 15/2023	
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28-41-41		
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28-41-42		
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28-41-43		
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403	Sep 15/2021	
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408	Sep 15/2021	
28-41-44		
401	Sep 15/2021	
402	Sep 15/2021	

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Subject/Page	Date	COC
28-41-44 (cont)		
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404	Sep 15/2021	
405	Sep 15/2021	
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407	Sep 15/2021	
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28-41-44		
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624	Sep 15/2021	
625	Sep 15/2021	

Subject/Page	Date	COC
28-41-44 (cont)		
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28-41-61		
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402	Jan 15/2023	
403	Jan 15/2023	
404	Sep 15/2021	
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406	Jan 15/2023	
28-41-81		
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410	Jan 15/2023	
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412	BLANK	
28-42-11		
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R 402	Sep 15/2023	
R 403	Sep 15/2023	
R 404	Sep 15/2023	
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R 406	Sep 15/2023	
R 407	Sep 15/2023	
O 408	Sep 15/2023	
O 409	Sep 15/2023	
R 410	Sep 15/2023	
R 411	Sep 15/2023	
R 412	Sep 15/2023	
R 413	Sep 15/2023	
R 414	Sep 15/2023	
A 415	Sep 15/2023	

Subject/Page	Date	COC
28-42-11 (cont)		
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28-43-00		
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28-43-11		
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28-43-21		
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28-44-11		
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410	Sep 15/2021	

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Subject/Page	Date	COC
28-44-11 (cont)		
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412	Sep 15/2022	
413	Sep 15/2022	
414	Sep 15/2022	
415	Sep 15/2022	
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28-44-11		
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804	Sep 15/2021	
805	Sep 15/2021	
806	Sep 15/2021	

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CHAPTER 28
FUEL

SUBJECT	CHAPTER SECTION SUBJECT	CONF	PAGE	EFFECT
FUEL SYSTEM - MAINTENANCE PRACTICES	28-00-00		201	SIA ALL
Airworthiness Limitation Precautions TASK 28-00-00-910-801			201	SIA ALL
Electrical Bonding Jumpers in the Fuel System - Inspection TASK 28-00-00-200-801			204	SIA ALL
Electrical Bonding Jumpers in the Fuel System - Replacement TASK 28-00-00-960-801			205	SIA ALL
Fuel System Static Bond Path No. 1 Main Tank - Inspection TASK 28-00-00-280-801			210	SIA ALL
Fuel System Static Bond Path No. 2 Main Tank - Inspection TASK 28-00-00-280-802			211	SIA ALL
Fuel System Static Bond Center Tank - Inspection TASK 28-00-00-280-803			212	SIA ALL
Fuel System Fault Current, Left Side - Inspection TASK 28-00-00-760-801			215	SIA ALL
Fuel System Fault Current, Right Side - Inspection TASK 28-00-00-760-802			227	SIA ALL
FUEL SYSTEM - DDG MAINTENANCE PROCEDURES	28-00-00		901	SIA ALL
DDG 28-21-01-01 Refuel Panel Fuel Quantity Indications Inoperative - Preparation TASK 28-00-00-040-801			901	SIA ALL
DDG 28-21-01-02 Fueling Manifold Check Valves Inoperative - Preparation TASK 28-00-00-040-813			902	SIA ALL
DDG 28-21-01-03 Fueling Shutoff Valves Inoperative - Preparation TASK 28-00-00-040-814			905	SIA ALL
DDG 28-22-01 Main Tank Boost Pump Inoperative - Preparation TASK 28-00-00-040-802			905	SIA ALL

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DDG 28-22-02 Center Tank Boost Pump Inoperative - Preparation TASK 28-00-00-040-803			913	SIA ALL
DDG 28-22-02 Center Tank Boost Pump Inoperative - Restoration TASK 28-00-00-440-805			915	SIA ALL
DDG 28-22-05 Crossfeed VALVE OPEN Light Inoperative - Preparation TASK 28-00-00-040-815			917	SIA ALL
DDG 28-22-06 SPAR VALVE CLOSED Lights Inoperative - Preparation TASK 28-00-00-040-816			920	SIA ALL
DDG 28-22-07 Fuel Shutoff Valve Battery and Charger Inoperative - Preparation TASK 28-00-00-040-804			924	SIA ALL
DDG 28-22-07 Fuel Shutoff Valve Battery and Charger Inoperative - Restoration TASK 28-00-00-440-808			924	SIA ALL
DDG 28-25-02 APU Fuel Shutoff Valve Inoperative - Preparation TASK 28-00-00-040-805			924	SIA ALL
DDG 28-25-02 APU Fuel Shutoff Valve Inoperative - Restoration TASK 28-00-00-440-809			928	SIA ALL
DDG 28-41-01 Fuel Quantity Indication System Inoperative - Preparation TASK 28-00-00-040-811			929	SIA ALL
DDG 28-42-01-01 Main Tank LOW PRESSURE Light Systems Inoperative - Preparation TASK 28-00-00-040-806			932	SIA ALL
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Biocide Treatment of Fuel Tanks - Metered Injection Cart TASK 28-10-00-600-802			211	SIA ALL
Microbial Growth Removal - Manual Removal Method TASK 28-10-00-100-801			216	SIA ALL
Microbial Growth Removal - Pressure Washer Method TASK 28-10-00-100-802			219	SIA ALL
FUEL TANKS - MAINTENANCE PRACTICES	28-11-00		201	SIA ALL
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Helitest Leak Detection Procedure TASK 28-11-00-790-803			627	SIA ALL
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External Wires Mounted Near the Forward Wing Spar Inspection TASK 28-11-00-211-802			641	SIA ALL
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Repair of the Secondary Fuel Barrier Sealant TASK 28-11-00-300-804			838	SIA ALL
WING FUEL TANK ACCESS PANELS - REMOVAL/INSTALLATION	28-11-11		401	SIA ALL
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Surge Tank Access Door (533AB, 533CB, 633AB, 633CB) Installation TASK 28-11-11-400-802			431	SIA ALL

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SURGE TANK FUEL SUMP DRAIN VALVE - REMOVAL/INSTALLATION	28-11-21		401	SIA ALL
Surge Tank Fuel Sump Drain Valve Removal TASK 28-11-21-000-801			401	SIA ALL
Surge Tank Fuel Sump Drain Valve Installation TASK 28-11-21-400-801			405	SIA ALL
CENTER TANK ACCESS DOOR - REMOVAL/INSTALLATION	28-11-31		401	SIA ALL
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CENTER TANK SUMP DRAIN VALVE - REMOVAL/INSTALLATION	28-11-41		401	SIA ALL
Sump Drain Valve Removal TASK 28-11-41-000-801			401	SIA ALL
Sump Drain Valve Installation TASK 28-11-41-400-801			405	SIA ALL
MAIN TANK FUEL SUMP DRAIN VALVE - MAINTENANCE PRACTICES	28-11-61		201	SIA ALL
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MAIN TANK FUEL SUMP DRAIN VALVE - REMOVAL/INSTALLATION	28-11-61		401	SIA ALL
Main Tank Fuel Sump Drain Valve Removal TASK 28-11-61-000-801			401	SIA ALL
Main Tank Fuel Sump Drain Valve Installation TASK 28-11-61-400-801			405	SIA ALL

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Fuel Vent Float Valve Removal TASK 28-13-11-000-801			401	SIA ALL
Fuel Vent Float Valve Installation TASK 28-13-11-400-801			405	SIA ALL
AIR VENT SCOOP FLAME ARRESTOR - REMOVAL/INSTALLATION	28-13-31		401	SIA ALL
Flame Arrestor Removal TASK 28-13-31-000-801			401	SIA ALL
Flame Arrestor Installation TASK 28-13-31-400-801			405	SIA ALL
AIR VENT SCOOP FLAME ARRESTOR - INSPECTION/CHECK	28-13-31		601	SIA ALL
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AIR VENT SCOOP FLAME ARRESTOR - CLEANING/PAINTING	28-13-31		701	SIA ALL
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SURGE TANK PRESSURE RELIEF VALVE - REMOVAL/INSTALLATION	28-13-41		401	SIA ALL
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Pressure Relief Valve Installation TASK 28-13-41-400-801			405	SIA ALL
SURGE TANK FLAME ARRESTOR PRESSURE RELIEF VALVE - INSPECTION/CHECK	28-13-41		601	SIA ALL
Pressure Relief Valve - Manual Operation TASK 28-13-41-400-802			601	SIA ALL
Pressure Relief Valve Pressure Check TASK 28-13-41-200-801			608	SIA ALL

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Pressure Fueling System - Test TASK 28-21-00-700-801			501	SIA ALL
PRESSURE FUELING SYSTEM - INSPECTION/CHECK	28-21-00		601	SIA ALL
Refuel Adapter Check TASK 28-21-00-750-801			601	SIA ALL
Refuel Panel Wire Bundle Inspection TASK 28-21-00-211-801			609	SIA ALL
FUELING RECEPTACLE - REMOVAL/INSTALLATION	28-21-11		401	SIA ALL
Fueling Receptacle Removal TASK 28-21-11-000-801			401	SIA ALL
Fueling Receptacle Installation TASK 28-21-11-400-801			405	SIA ALL
FUELING RECEPTACLE - INSPECTION/CHECK	28-21-11		601	SIA ALL
Fueling Receptacle - Bonding Resistance Check TASK 28-21-11-200-801			601	SIA ALL
REFUELING MANIFOLD - REMOVAL/INSTALLATION	28-21-21		401	SIA ALL
Refueling Manifold Removal TASK 28-21-21-000-801			401	SIA ALL
Refueling Manifold Installation TASK 28-21-21-400-801			407	SIA ALL
Refueling Panel Floodlight Replacement TASK 28-21-21-960-801			409	SIA ALL
FUELING CHECK VALVE - REMOVAL/INSTALLATION	28-21-32		401	SIA ALL
Fueling Check Valve Removal TASK 28-21-32-000-801			401	SIA ALL
Fueling Check Valve Installation TASK 28-21-32-400-801			405	SIA ALL

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FUELING BODY OR DEFUEL PORT ASSEMBLY - REMOVAL/INSTALLATION	28-21-41		401	SIA ALL
Fueling Body Assembly or Defueling Port Assembly Removal TASK 28-21-41-000-801			401	SIA ALL
Fueling Body Assembly or Defueling Port Assembly Installation TASK 28-21-41-400-801			405	SIA ALL
FUELING SHUTOFF VALVE - MAINTENANCE PRACTICES	28-21-51		201	SIA ALL
Fueling Shutoff Valve - Maintenance Practices TASK 28-21-51-800-801			201	SIA ALL
FUELING SHUTOFF VALVE - REMOVAL/INSTALLATION	28-21-51		401	SIA ALL
Fueling Shutoff Valve Removal TASK 28-21-51-000-801			401	SIA ALL
Fueling Shutoff Valve Installation TASK 28-21-51-400-801			406	SIA ALL
FUELING SHUTOFF VALVE - INSPECTION/CHECK	28-21-51		601	SIA ALL
Fueling Shutoff Valve - Bonding Resistance Check TASK 28-21-51-200-801			601	SIA ALL
FUELING FLOAT SWITCH - REMOVAL/INSTALLATION	28-21-71		401	SIA ALL
Float Switch Removal TASK 28-21-71-020-801			401	SIA ALL
Float Switch Installation TASK 28-21-71-400-801			423	SIA ALL
FUELING FLOAT SWITCH - INSPECTION/CHECK	28-21-71		601	SIA ALL
Drain Port Inspection TASK 28-21-71-210-801			601	SIA ALL
Fueling Float Switch Inspection and Replacement TASK 28-21-71-210-802			605	SIA ALL

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Fueling Power Control Switch Sensor Magnet Removal TASK 28-21-81-000-801			401	SIA ALL
Fueling Power Control Switch Sensor Magnet Installation TASK 28-21-81-400-801			404	SIA ALL
Fueling Power Control Switch - Sensing Switch Removal TASK 28-21-81-000-802			406	SIA ALL
Fueling Power Control Switch - Sensing Switch Installation TASK 28-21-81-400-802			407	SIA ALL
REFUEL PANEL, P15 - REMOVAL/INSTALLATION	28-21-82		401	SIA ALL
Refuel Panel, P15 Removal TASK 28-21-82-000-801			401	SIA ALL
Refuel Panel, P15 Installation TASK 28-21-82-400-801			406	SIA ALL
ENGINE FUEL FEED SYSTEM - ADJUSTMENT/TEST	28-22-00		501	SIA ALL
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Crossfeed Valve - Functional Test TASK 28-22-00-730-802			509	SIA ALL
Engine Fuel Spar Valve - Electrical Control and Indication Test TASK 28-22-00-710-801			513	SIA ALL
Emergency Fuel Shutoff Battery - Operational Test TASK 28-22-00-720-801			520	SIA ALL
Engine Fuel Spar Valve Installation - Operational Test TASK 28-22-00-720-802			522	SIA ALL
Fuel Scavenge System - Operational Test TASK 28-22-00-720-803			527	SIA ALL

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Fuel Boost Pump Output Pressure - Functional Test TASK 28-22-00-720-804			529	SIA ALL
Center Tank Fuel Boost Pump Auto Shutoff - Functional Test TASK 28-22-00-720-805			537	SIA ALL
Engine Fuel Suction Feed - Operational Test TASK 28-22-00-710-802			551	SIA ALL
Center Tank Fuel Boost Pump Power Failed On - Functional Test TASK 28-22-00-720-806			557	SIA ALL
Pump Reversal - Operational Test TASK 28-22-00-710-803			573	SIA ALL
Fuel Boost Pump - Insulation Resistance Test TASK 28-22-00-760-803			574	SIA ALL
ENGINE FUEL SPAR VALVE - SERVICING	28-22-11		301	SIA ALL
Engine Fuel Spar Valve Electrical Faying Surface Bonds Repair TASK 28-22-11-300-801			301	SIA ALL
ENGINE FUEL SPAR VALVE - REMOVAL/INSTALLATION	28-22-11		401	SIA ALL
Engine Fuel Spar Valve Actuator Removal TASK 28-22-11-000-801			401	SIA ALL
Engine Fuel Spar Valve Actuator Installation TASK 28-22-11-400-801			408	SIA ALL
Engine Fuel Spar Valve - Valve Adapter Removal TASK 28-22-11-000-802			416	SIA ALL
Engine Fuel Spar Valve - Valve Adapter Installation TASK 28-22-11-400-802			424	SIA ALL
Engine Fuel Spar Valve Alignment TASK 28-22-11-820-801			430	SIA ALL
Engine Fuel Spar Valve - Valve Body Removal TASK 28-22-11-000-803			436	SIA ALL
Engine Fuel Spar Valve - Valve Body Installation TASK 28-22-11-400-803			441	SIA ALL

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Engine Fuel Spar Valve Actuator - Bonding Resistance Check TASK 28-22-11-200-801			601	SIA ALL
WATER SCAVENGE JET PUMP - REMOVAL/INSTALLATION	28-22-13		401	SIA ALL
Center Tank Water Scavenge Jet Pump Nozzle Assembly Removal TASK 28-22-13-000-801			401	SIA ALL
Center Tank Water Scavenge Jet Pump Nozzle Assembly Installation TASK 28-22-13-400-801			406	SIA ALL
Main Tank Water Scavenge Jet Pump Nozzle Assembly Removal TASK 28-22-13-000-802			409	SIA ALL
Main Tank Water Scavenge Jet Pump Nozzle Assembly Installation TASK 28-22-13-400-802			414	SIA ALL
Center Tank Water Scavenge Jet Pump Removal TASK 28-22-13-000-803			417	SIA ALL
Center Tank Water Scavenge Jet Pump Installation TASK 28-22-13-400-803			422	SIA ALL
Main Tank Water Scavenge Jet Pump Removal TASK 28-22-13-000-804			426	SIA ALL
Main Tank Water Scavenge Jet Pump Installation TASK 28-22-13-400-804			431	SIA ALL
WATER SCAVENGE JET PUMP - CLEANING/PAINTING	28-22-13		701	SIA ALL
Center Tank Water Scavenge Jet Pump Cleaning TASK 28-22-13-100-801			701	SIA ALL
Main Tank Water Scavenge Jet Pump Cleaning TASK 28-22-13-100-802			707	SIA ALL

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Emergency Fuel Shutoff Battery Installation TASK 28-22-14-400-801			404	SIA ALL
FUEL FEED MANIFOLD AND COUPLINGS - REMOVAL/INSTALLATION	28-22-15		401	SIA ALL
Fuel Line, Fitting and Coupling Removal TASK 28-22-15-000-801			401	SIA ALL
Fuel Line, Fitting and Coupling Installation TASK 28-22-15-400-801			406	SIA ALL
Engine Fuel Feed Tube Bulkhead Fitting Removal TASK 28-22-15-000-802			409	SIA ALL
Engine Fuel Feed Tube Bulkhead Fitting Installation TASK 28-22-15-400-802			415	SIA ALL
Couplings Removal TASK 28-22-15-000-803			421	SIA ALL
Couplings Installation TASK 28-22-15-400-803			430	SIA ALL
FUEL FEED MANIFOLD COUPLINGS - INSPECTION/CHECK	28-22-15		601	SIA ALL
Engine Fuel Feed Manifold - Leak Test TASK 28-22-15-710-801			601	SIA ALL
Engine and APU Fuel Feed, Shroud, Fuel Vent Line and Couplings, and NEADS Lines Dent Criteria - Inspection/Check TASK 28-22-15-700-801			617	SIA ALL
FUEL SCAVENGE FLOAT OPERATED SHUTOFF VALVE - REMOVAL/INSTALLATION	28-22-16		401	SIA ALL
Fuel Scavenge Float Operated Shutoff Valve Removal TASK 28-22-16-000-801			401	SIA ALL

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FUEL SCAVENGE JET PUMP - REMOVAL/INSTALLATION	28-22-17		401	SIA ALL
Fuel Scavenge Jet Pump Nozzle Assembly Removal TASK 28-22-17-020-801			401	SIA ALL
Fuel Scavenge Jet Pump Nozzle Assembly Installation TASK 28-22-17-420-801			404	SIA ALL
Fuel Scavenge Jet Pump Removal TASK 28-22-17-000-801			406	SIA ALL
Fuel Scavenge Jet Pump Installation TASK 28-22-17-400-801			410	SIA ALL
GROUND FAULT INTERRUPTER (GFI) RELAY - REMOVAL/INSTALLATION	28-22-18		401	SIA ALL
Ground Fault Interrupter (GFI) Relay Removal TASK 28-22-18-000-801			401	SIA ALL
Ground Fault Interrupter (GFI) Relay Installation TASK 28-22-18-400-801			405	SIA ALL
ENGINE FUEL CROSSFEED VALVE - REMOVAL/INSTALLATION	28-22-21		401	SIA ALL
Engine Fuel Crossfeed Valve Actuator Removal TASK 28-22-21-000-801			401	SIA ALL
Engine Fuel Crossfeed Valve Actuator Installation TASK 28-22-21-400-801			408	SIA ALL
Engine Fuel Crossfeed Valve - Valve Adapter Removal TASK 28-22-21-000-802			416	SIA ALL
Engine Fuel Crossfeed Valve - Valve Adapter Installation TASK 28-22-21-400-802			425	SIA ALL
Engine Fuel Crossfeed Valve Alignment TASK 28-22-21-820-801			433	SIA ALL

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Engine Fuel Crossfeed Valve - Valve Body Installation TASK 28-22-21-400-803			446	SIA ALL
Rework the Electrical Faying Surface Bonds for the Engine Crossfeed Valve TASK 28-22-21-300-801			448	SIA ALL
ENGINE FUEL CROSSFEED VALVE - INSPECTION/CHECK	28-22-21		601	SIA ALL
Engine Fuel Crossfeed Valve Actuator - Bonding Resistance Check TASK 28-22-21-200-801			601	SIA ALL
ENGINE FUEL CROSSFEED VALVE - ADJUSTMENT/TEST	28-22-21		501	SIA ALL
Crossfeed Valve Operational Test TASK 28-22-21-710-802			501	SIA ALL
FUEL BOOST PUMP - REMOVAL/INSTALLATION	28-22-41		401	SIA ALL
Fuel Boost Pump Motor-Impeller Removal TASK 28-22-41-000-801			401	SIA ALL
Fuel Boost Pump Motor-Impeller Installation TASK 28-22-41-400-801			419	SIA ALL
Fuel Boost Pump and Override Pump Priming TASK 28-22-41-420-801			427	SIA ALL
Fuel Boost Pump Housing Removal TASK 28-22-41-000-802			429	SIA ALL
Fuel Boost Pump Housing Installation TASK 28-22-41-400-802			437	SIA ALL
FUEL BOOST PUMP - ADJUSTMENT/TEST	28-22-41		501	SIA ALL
Fuel Boost Pump - Operational Test TASK 28-22-41-710-801			501	SIA ALL
Ground Fault Interrupter (GFI) - Operational Test TASK 28-22-41-720-801			504	SIA ALL

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Fuel System Module, P5-2 Removal TASK 28-22-43-020-801			401	SIA ALL
Fuel System Module, P5-2 Installation TASK 28-22-43-420-801			405	SIA ALL
FUEL SYSTEM MODULE, P5-2 - ADJUSTMENT/TEST	28-22-43		501	SIA ALL
Fuel System Module, P5-2 - Operational Test TASK 28-22-43-710-801			501	SIA ALL
FUEL BOOST PUMP REMOVAL CHECK VALVE - REMOVAL/INSTALLATION	28-22-51		401	SIA ALL
Removal Check Valve Removal TASK 28-22-51-000-801			401	SIA ALL
Removal Check Valve Installation TASK 28-22-51-400-801			408	SIA ALL
MAIN TANK FUEL BOOST PUMP BYPASS CHECK VALVE - REMOVAL/INSTALLATION	28-22-61		401	SIA ALL
Main Tank Fuel Boost Pump Bypass Check Valve Removal TASK 28-22-61-000-801			401	SIA ALL
Main Tank Fuel Boost Pump Bypass Check Valve Installation TASK 28-22-61-400-801			405	SIA ALL
FUEL BOOST PUMP DISCHARGE CHECK VALVE - REMOVAL/INSTALLATION	28-22-71		401	SIA ALL
Fuel Boost Pump Discharge Check Valve Removal TASK 28-22-71-000-801			401	SIA ALL
Fuel Boost Pump Discharge Check Valve Installation TASK 28-22-71-400-801			408	SIA ALL
APU FUEL FEED SYSTEM - ADJUSTMENT/TEST	28-25-00		501	SIA ALL
APU Fuel Feed System - Operational Test TASK 28-25-00-710-801			501	SIA ALL

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APU Shutoff Valve Actuator Assembly Removal TASK 28-25-02-000-801			401	SIA ALL
APU Shutoff Valve Actuator Assembly Installation TASK 28-25-02-400-801			406	SIA ALL
APU Shutoff Valve Operational Test TASK 28-25-02-710-801			410	SIA ALL
APU Shutoff Valve Body Assembly Removal TASK 28-25-02-000-802			411	SIA ALL
APU Shutoff Valve Body Assembly Installation TASK 28-25-02-400-802			416	SIA ALL
APU FUEL SHUTOFF VALVE - INSPECTION/CHECK	28-25-02		601	SIA ALL
APU Fueling Shutoff Valve Actuator - Bonding Resistance Check TASK 28-25-02-200-801			601	SIA ALL
APU FUEL FEED LINE - REMOVAL/INSTALLATION	28-25-04		401	SIA ALL
APU Fuel Line (No. 1 Tank and Center Tank) Removal TASK 28-25-04-000-801			401	SIA ALL
APU Fuel Feed Line (No. 1 Tank and Center Tank) Installation TASK 28-25-04-400-801			413	SIA ALL
APU Fuel Line (Center Wing Section to APU Firewall) Removal TASK 28-25-04-000-802			416	SIA ALL
APU Fuel Line (Center Wing Section to APU Firewall) Installation TASK 28-25-04-400-802			419	SIA ALL
APU Fuel Line Leak Test (with air) TASK 28-25-04-790-801			421	SIA ALL
APU FUEL FEED LINE SHROUD - REMOVAL/INSTALLATION	28-25-05		401	SIA ALL
Main APU Fuel Feed Line Shroud Removal TASK 28-25-05-000-801			401	SIA ALL

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CHAPTER 28
FUEL

SUBJECT	CHAPTER SECTION SUBJECT	CONF	PAGE	EFFECT
Main APU Fuel Feed Line Shroud Installation TASK 28-25-05-400-801			409	SIA ALL
Aft APU Fuel Feed Line Shroud Removal TASK 28-25-05-000-802			413	SIA ALL
Aft APU Fuel Feed Line Shroud Installation TASK 28-25-05-400-802			415	SIA ALL
APU FUEL FEED LINE SHROUD - ADJUSTMENT/TEST	28-25-05		501	SIA ALL
APU Fuel Line Shroud and Drain Line - Leak Test TASK 28-25-05-790-801			501	SIA ALL
APU CHECK VALVE - REMOVAL/INSTALLATION	28-25-06		401	SIA ALL
APU Check Valve Removal TASK 28-25-06-000-801			401	SIA ALL
APU Check Valve Installation TASK 28-25-06-400-801			406	SIA ALL
APU FUEL FEED LINE SHROUD DRAIN MAST - REMOVAL/INSTALLATION	28-25-07		401	SIA ALL
APU Fuel Feed Line Shroud Drain Mast Removal TASK 28-25-07-020-801			401	SIA ALL
APU Fuel Feed Line Shroud Drain Mast Installation TASK 28-25-07-420-801			405	SIA ALL
DEFUELING - MAINTENANCE PRACTICES	28-26-00		201	SIA ALL
Precautions and Limits for the Defuel Operation TASK 28-26-00-600-801			202	SIA ALL
Fuel Tank Defueling TASK 28-26-00-650-801			204	SIA ALL
Tank to Tank Fuel Transfer TASK 28-26-00-650-802			221	SIA ALL
DEFUELING VALVE - REMOVAL/INSTALLATION	28-26-11		401	SIA ALL
Defueling Valve Handle Removal TASK 28-26-11-010-801			401	SIA ALL
Defueling Valve Handle Installation TASK 28-26-11-400-801			405	SIA ALL

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CHAPTER 28
FUEL

SUBJECT	CHAPTER SECTION SUBJECT	CONF	PAGE	EFFECT
Defueling Valve - Adapter Shaft Removal TASK 28-26-11-010-802			406	SIA ALL
Defueling Valve - Adapter Shaft Installation TASK 28-26-11-410-801			414	SIA ALL
Defueling Valve - Adapter Shaft Alignment TASK 28-26-11-820-801			419	SIA ALL
Defueling Valve - Valve Body Removal TASK 28-26-11-020-801			425	SIA ALL
Defueling Valve - Valve Body Installation TASK 28-26-11-420-801			426	SIA ALL
FUEL QUANTITY INDICATING SYSTEM (FQIS) - ADJUSTMENT/TEST	28-41-00		501	SIA ALL
Fuel Quantity Indicating System - Operational Test TASK 28-41-00-710-801			501	SIA ALL
Fuel Quantity Indicating System (FQIS) with the Fuel Measuring Sticks - Comparison Check TASK 28-41-00-720-801			511	SIA ALL
Fuel Quantity Indicating System - Dry Capacitance Test TASK 28-41-00-730-801			512	SIA ALL
TANK AND COMPENSATOR UNITS - REMOVAL/INSTALLATION	28-41-21		401	SIA ALL
Tank Unit or Compensator Unit - Removal TASK 28-41-21-000-801			401	SIA ALL
Tank Unit or Compensator Unit - Installation TASK 28-41-21-400-801			411	SIA ALL
TANK AND COMPENSATOR UNITS - ADJUSTMENT/TEST	28-41-21		501	SIA ALL
Tank and Compensator Units - Insulation Resistance and Dry Capacitance Check TASK 28-41-21-710-801			501	SIA ALL
Tank and Compensator Units - Wet Capacitance Check TASK 28-41-21-710-802			511	SIA ALL

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CHAPTER 28
FUEL

SUBJECT	CHAPTER SECTION SUBJECT	CONF	PAGE	EFFECT
Tank and Compensator Units - Fuel Quantity Indicating System Health Check TASK 28-41-21-710-803			515	SIA ALL
TANK AND COMPENSATOR UNIT BUSSING PLUG - REMOVAL/INSTALLATION	28-41-41		401	SIA ALL
Bussing Plug Removal TASK 28-41-41-000-801			401	SIA ALL
Bussing Plug Installation TASK 28-41-41-400-801			405	SIA ALL
FQIS SPAR PENETRATION CONNECTOR - REMOVAL/INSTALLATION	28-41-42		401	SIA ALL
FQIS Spar Penetration Connector Removal TASK 28-41-42-020-801			401	SIA ALL
FQIS Spar Penetration Connector Installation TASK 28-41-42-420-801			406	SIA ALL
FQIS TANK-TO-TANK FEED-THROUGH CONNECTOR - REMOVAL/INSTALLATION	28-41-43		401	SIA ALL
FQIS Tank-to-Tank Feed-Through Connector Removal TASK 28-41-43-000-801			401	SIA ALL
FQIS Tank-to-Tank Feed-Through Connector Installation TASK 28-41-43-400-801			405	SIA ALL
FUEL TANK BULKHEAD (SPAR) RECEPTACLE WIRE HARNESS - REMOVAL/INSTALLATION	28-41-44		401	SIA ALL
FQIS Wire Harness Removal TASK 28-41-44-000-801			401	SIA ALL
FQIS Wire Harness Installation TASK 28-41-44-400-801			408	SIA ALL
FUEL TANK BULKHEAD (SPAR) RECEPTACLE WIRE HARNESS - INSPECTION/CHECK	28-41-44		601	SIA ALL
FQIS Wiring and Component Visual Inspection TASK 28-41-44-210-801			601	SIA ALL
FQIS, No. 1 Main Tank - Inspection TASK 28-41-44-280-801			603	SIA ALL

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FUEL

SUBJECT	CHAPTER SECTION SUBJECT	CONF	PAGE	EFFECT
FQIS, No. 2 Main Tank - Inspection TASK 28-41-44-280-802			612	SIA ALL
FQIS, Center Tank - Inspection TASK 28-41-44-280-803			622	SIA ALL
REFUEL QUANTITY INDICATOR - REMOVAL/INSTALLATION	28-41-61		401	SIA ALL
Refuel Quantity Indicator Removal TASK 28-41-61-000-801			401	SIA ALL; AIRPLANES WITHOUT ALOFT AUXILIARY TANK (STC TM-9000-AMMS AND TM-9001-AMMS)
Refuel Quantity Indicator Installation TASK 28-41-61-400-801			405	SIA ALL; AIRPLANES WITHOUT ALOFT AUXILIARY TANK (STC TM-9000-AMMS AND TM-9001-AMMS)
FUEL QUANTITY PROCESSOR UNIT - REMOVAL/INSTALLATION	28-41-81		401	SIA ALL
Fuel Quantity Processor Unit Removal TASK 28-41-81-000-801			401	SIA ALL
Fuel Quantity Processor Unit Installation TASK 28-41-81-400-801			407	SIA ALL
FUEL BOOST PUMP FUEL PRESSURE SWITCH - REMOVAL/INSTALLATION	28-42-11		401	SIA ALL
Fuel Boost Pump Fuel Pressure Switch Removal TASK 28-42-11-000-801			401	SIA ALL
Fuel Boost Pump Fuel Pressure Switch Installation TASK 28-42-11-420-801			410	SIA ALL
FUEL TEMPERATURE INDICATING SYSTEM - ADJUSTMENT/TEST	28-43-00		501	SIA ALL
Fuel Temperature Indicating System Test (Master Thermometer) TASK 28-43-00-710-801			501	SIA ALL
Fuel Temperature Indicator Functional Test (Spare Temperature Indicator) TASK 28-43-00-720-801			507	SIA ALL

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CHAPTER 28
FUEL

SUBJECT	CHAPTER SECTION SUBJECT	CONF	PAGE	EFFECT
Fuel Temperature Indicator Functional Test (Decade Resistor) TASK 28-43-00-710-802			508	SIA ALL
Fuel Temperature Bulb Resistance Test TASK 28-43-00-760-801			510	SIA ALL
FUEL TEMPERATURE BULB - REMOVAL/INSTALLATION	28-43-11		401	SIA ALL
Fuel Temperature Bulb Removal TASK 28-43-11-000-801			401	SIA ALL
Fuel Temperature Bulb Installation TASK 28-43-11-400-801			404	SIA ALL
FUEL TEMPERATURE INDICATOR - REMOVAL/INSTALLATION	28-43-21		401	SIA ALL
Fuel Temperature Indicator Removal TASK 28-43-21-020-801			401	SIA ALL
Fuel Temperature Indicator Installation TASK 28-43-21-020-802			403	SIA ALL
MEASURING STICK - REMOVAL/INSTALLATION	28-44-11		401	SIA ALL
Fuel Measuring Stick Removal TASK 28-44-11-000-801			401	SIA ALL
Fuel Measuring Stick Installation TASK 28-44-11-400-801			408	SIA ALL
Fuel Measuring Stick Mounting Base Removal TASK 28-44-11-000-802			410	SIA ALL
Fuel Measuring Stick Mounting Base Installation TASK 28-44-11-400-802			412	SIA ALL
FUEL MEASURING STICK - REPAIRS	28-44-11		801	SIA ALL
Replacement of the O-Ring Seal Between the Housing and the Base Assembly TASK 28-44-11-360-801			801	SIA ALL

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TASK 28-00-00-910-801

1. 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 Title 14 Code of Federal Regulations (CFR) § 25.981 - Fuel Tank Ignition Prevention, and can be found in the Special Compliance Items/Airworthiness Limitations 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 note after each applicable ALI inspection feature:

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

(b) Inspection features that are ALIs are defined and controlled by Title 14 Code of Federal Regulations (CFR) § 25.981 - Fuel Tank Ignition Prevention, and can be found in Special Compliance Items/Airworthiness Limitations document. These ALIs identify inspection features 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 inspection features 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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(Continued)

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 that the procedures for items identified as CDCCLs are followed.

D. Airworthiness Limitation Instructions (ALIs)

SUBTASK 28-00-00-910-002

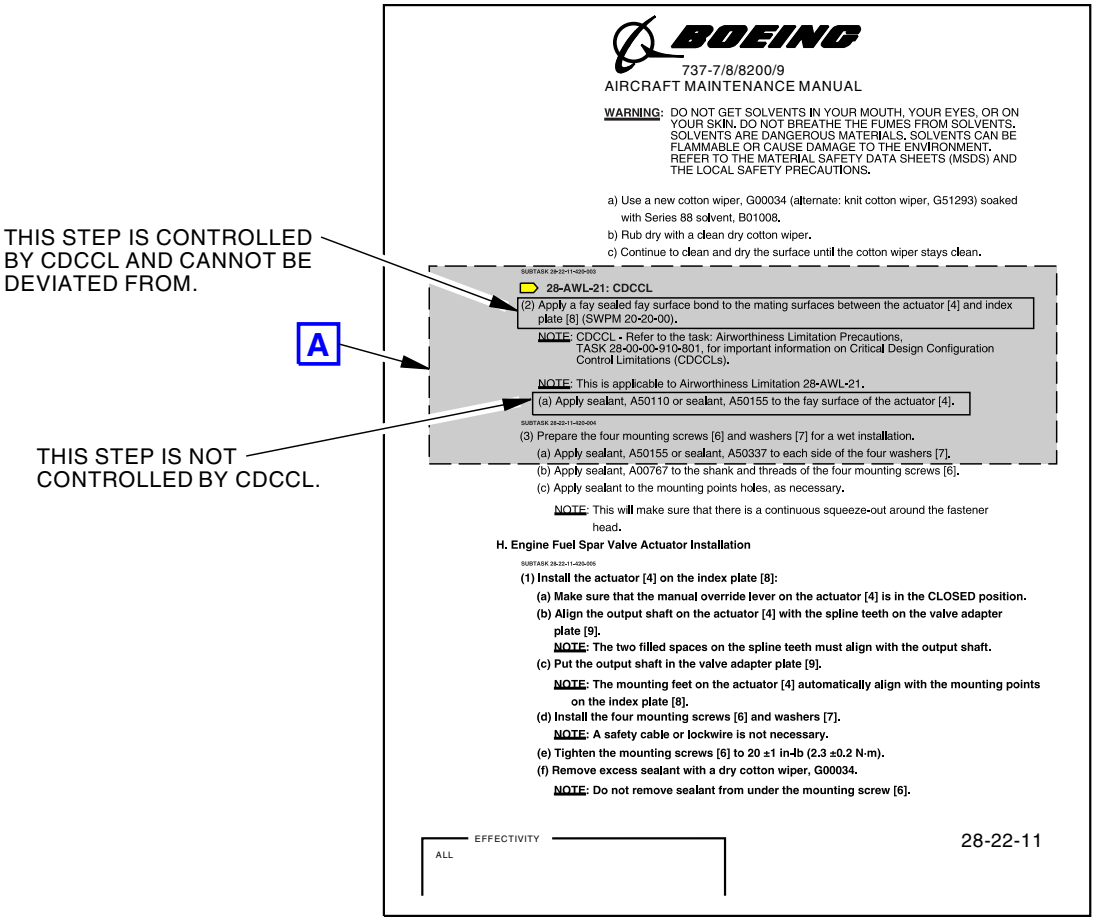
WARNING

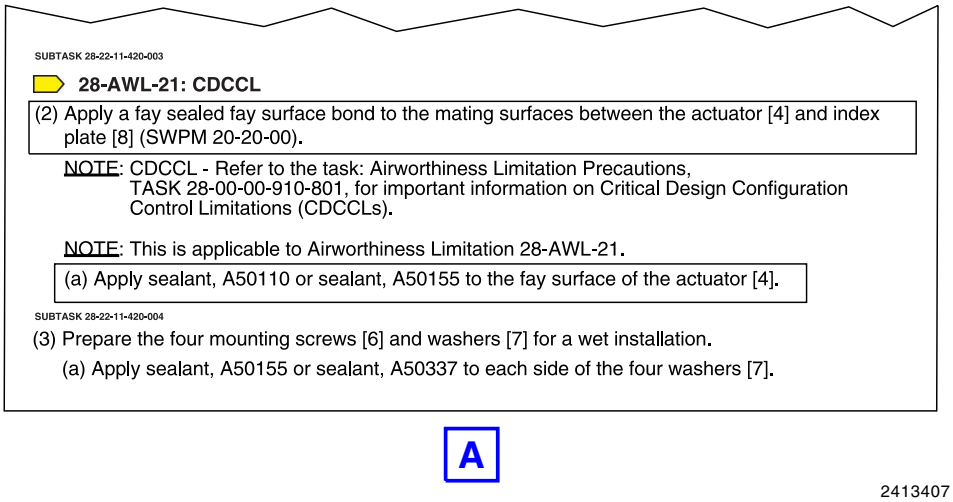
OBEY THE MANUFACTURER'S PROCEDURES WHEN YOU DO MAINTENANCE THAT HAS AN EFFECT ON AN ALI. IF YOU DO NOT OBEY THE PROCEDURES, IT CAN INCREASE THE RISK OF A SOURCE OF FUEL TANK IGNITION. INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR IF THERE IS A FIRE OR EXPLOSION.

(1) Make sure that the procedures for items identified as ALIs are followed.

——— END OF TASK ———

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AMM CDCCL Example
Figure 201/28-00-00-990-801

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TASK 28-00-00-200-801

2. 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, the wire braid of the bonding jumper can lose the tin plating.

(3) When you examine the bonding jumpers, you can see black or brown buildups 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 sulfur compounds. This is not a problem unless the wire braid has broken strands. If the bonding jumper has broken strands, the bonding jumpers must be replaced.

(4) When you examine the bonding jumpers, check 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 BONDING PROCESSES
SWPM 20-20-10	Replacement of Ground Studs and Bonding Jumper Installation

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 in the fuel tank (TASK 28-11-00-910-802).

(a) Remove the applicable access doors for the applicable fuel tank (TASK 28-11-11-000-801, TASK 28-11-31-000-801).

E. Electrical Bonding Jumper in the Fuel System Visual Inspection

SUBTASK 28-00-00-210-001

(1) Visually examine the bonding jumper and clamp for color and deterioration.

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(a) If the bonding jumper is silver in color and is free from black or brown buildups, then the bonding jumper is satisfactory.

(b) If the wire braid on the bonding jumper has black or brown buildups, then examine 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 in the Fuel System 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, repair the electrical bonding path (SWPM 20-20-00 or SWPM 20-20-10).

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 (TASK 28-11-00-410-801).

(a) Install the access doors you removed (TASK 28-11-11-400-801, TASK 28-11-31-400-801).

——— END OF TASK ———

TASK 28-00-00-960-801

3. Electrical Bonding Jumpers in the Fuel System - Replacement

A. General

(1) This task contains steps for the bonding jumpers in the fuel 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
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 BONDING PROCESSES
SWPM 20-20-10	Replacement of Ground Studs and Bonding Jumper Installation

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

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. Prepare for the Replacement

SUBTASK 28-00-00-010-010

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

(a) Remove the applicable access doors for the applicable fuel tank (Main Tank Access Door Removal, TASK 28-11-11-000-801, Center Tank Access Door Removal, TASK 28-11-31-000-801).

F. Electrical Bonding Jumpers in the Fuel System Replacement

SUBTASK 28-00-00-020-001

(1) Remove the bonding jumper.

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

SUBTASK 28-00-00-020-002

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

SUBTASK 28-00-00-020-003

(3) For the bonding jumpers used to bond mechanical equipment or tubing, install the new bonding jumper and hardware (SWPM 20-20-00 or SWPM 20-20-10).

(a) Make sure that the mating surfaces are prepared correctly.

(b) Make sure that the 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.

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G. Electrical Integrity Check of the Fuel System Bond Path

NOTE: SWPM 20-20-00 and SWPM 20-20-10 define the measurement processes necessary for installation of electrical bonding hardware. The fuel system tubing and components frequently include many electrical bonds in series between the component and the primary structure. The measurement of the tubing or component bond is an isolate requirement.

SUBTASK 28-00-00-760-001

(1) For bonding jumper hardware installations, do the resistance measurement for electrical integrity using an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00 or SWPM 20-20-10).

SUBTASK 28-00-00-760-002

(2) For the fuel system tubing or components, do these steps:

(a) Measure the total electrical bonding resistance from the tubing or component, to the adjacent primary structure using an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

(b) Make sure that the electrical bonding resistance is not more than 0.10 ohms (100 milliohms).

H. Put the Airplane Back to Its Usual Condition

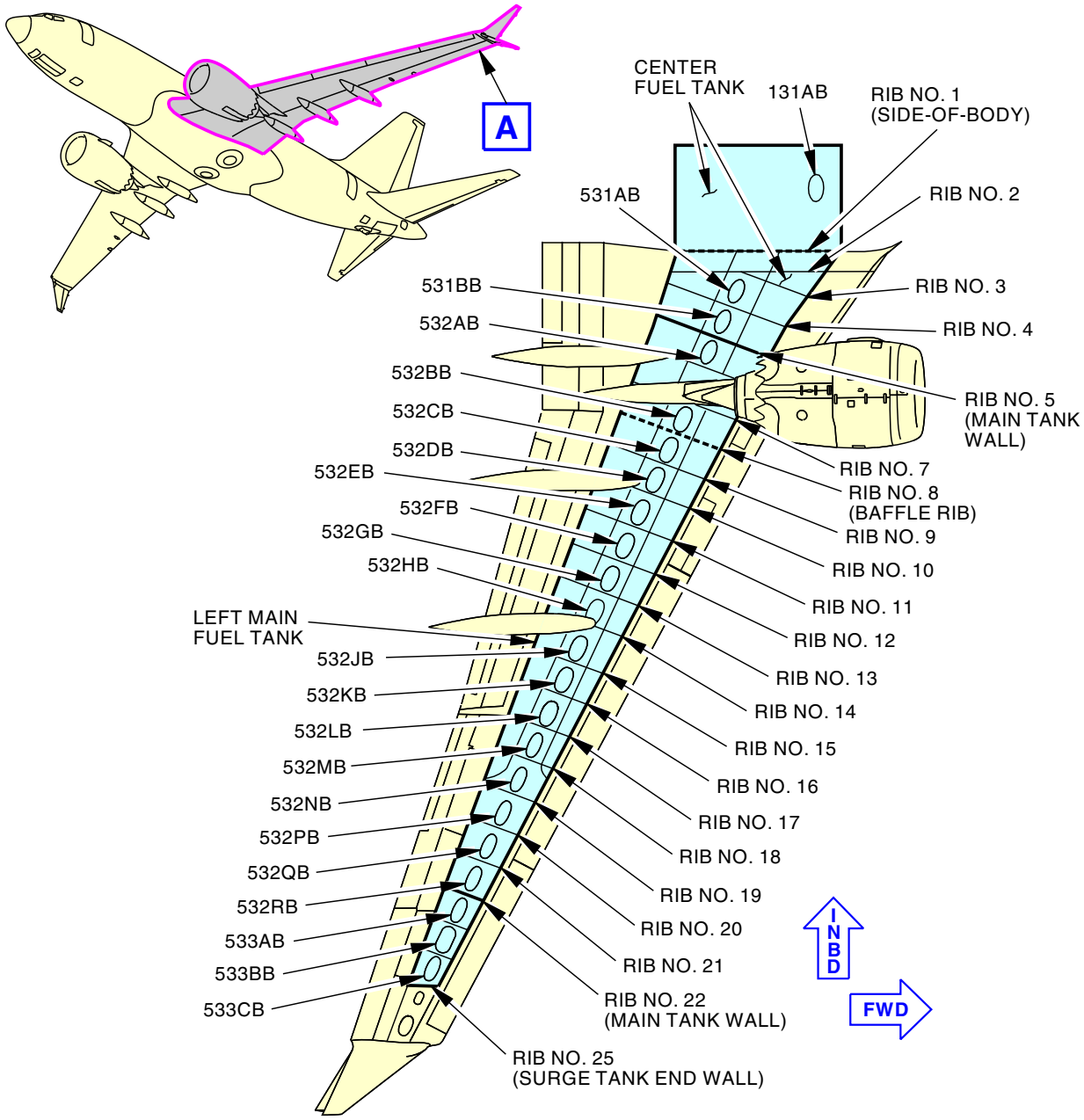
SUBTASK 28-00-00-410-009

(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, Center Tank Access Door - Installation, TASK 28-11-31-400-801).

——— END OF TASK ———

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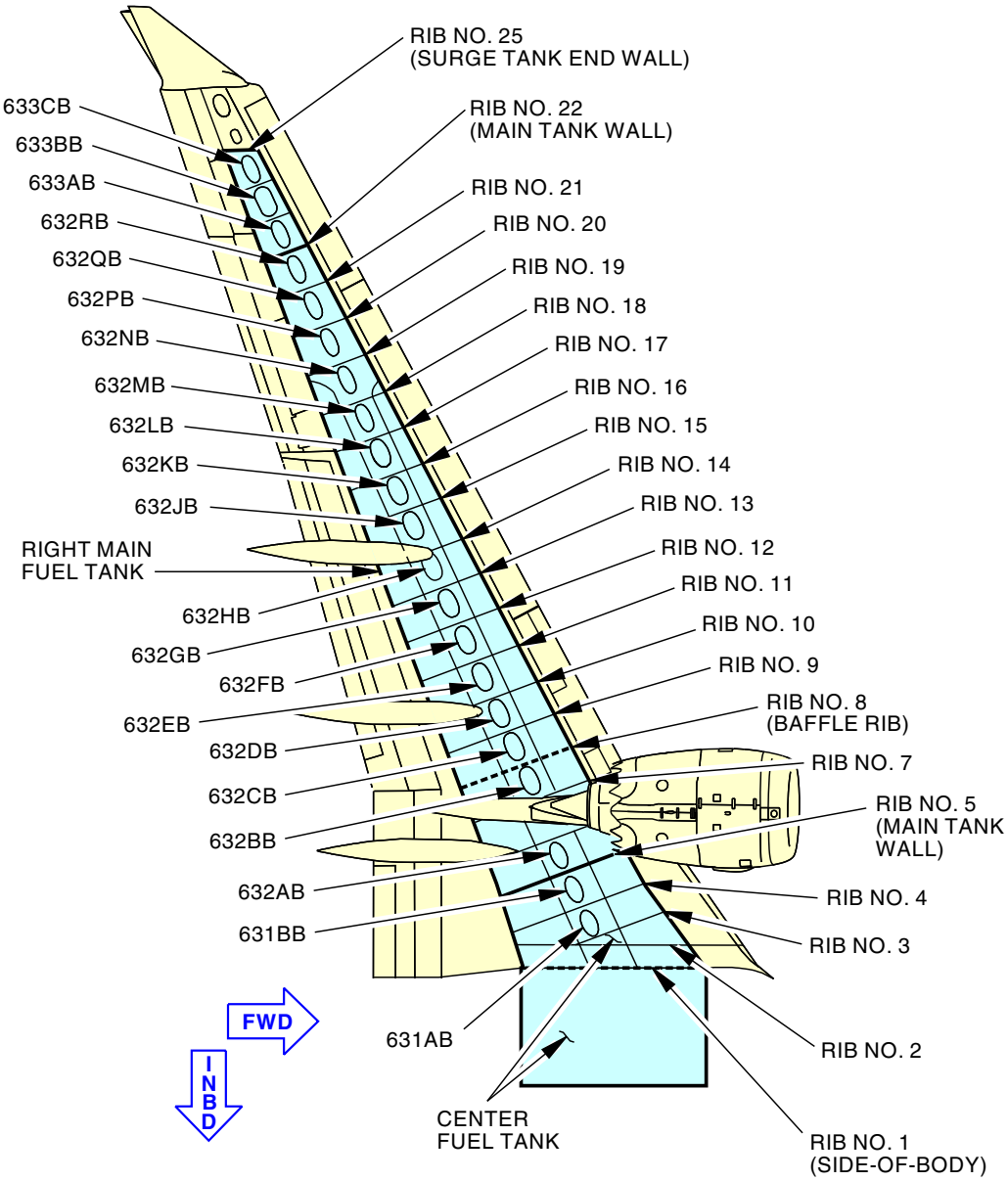
FUEL TANK ACCESS DOORS
(LEFT WING, BOTTOM VIEW)

A

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Fuel Tank - Left Wing
Figure 202/28-00-00-990-802

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FUEL TANK ACCESS DOORS
(RIGHT WING, BOTTOM VIEW)

A

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Fuel Tank - Right Wing
Figure 203/28-00-00-990-803

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TASK 28-00-00-280-801

4. Fuel System Static Bond Path No. 1 Main Tank - Inspection

(Figure 202 or Figure 203)

A. 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)

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
532AB	Main Tank Access Door - Wing Station 216
532BB	Main Tank Access Door - Wing Station 265
532PB	Main Tank Access Door - Wing Station 576

D. Fuel System Static Bond Path No. 1 Main Tank Inspection

SUBTASK 28-00-00-280-003

(1) For the area in the No. 1 main tank between rib No. 5 (inboard tank end) and rib No. 6, do these steps:

(a) Remove this access panel:

(TASK 28-11-11-000-801)

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

(b) For all bonding jumpers between Rib No. 5 and Rib No. 6, do this task: Electrical Bonding Jumpers in the Fuel System - Inspection, TASK 28-00-00-200-801.

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

(TASK 28-11-11-400-801)

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

SUBTASK 28-00-00-280-004

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

(a) Remove this access panel:

(TASK 28-11-11-000-801)

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

(b) 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.

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

(TASK 28-11-11-400-801)

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

SUBTASK 28-00-00-280-005

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

(a) Remove this access panel:

(TASK 28-11-11-000-801)

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

(b) 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.

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

(TASK 28-11-11-400-801)

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

——— END OF TASK ———

TASK 28-00-00-280-802

5. Fuel System Static Bond Path No. 2 Main Tank - Inspection

(Figure 202 or Figure 203)

A. 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)

B. 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

C. Access Panels

Number	Name/Location
632AB	Main Tank Access Door - Wing Station 216
632BB	Main Tank Access Door - Wing Station 265
632PB	Main Tank Access Door - Wing Station 576

D. Fuel System Static Bond Path No. 2 Main Tank Inspection

SUBTASK 28-00-00-280-006

(1) For the area in the No. 2 main tank between rib No. 5 (inboard tank end) and rib No. 6, do these steps:

(a) Remove this access panel:

(TASK 28-11-11-000-801)

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) For all bonding jumpers between Rib No. 5 and Rib No. 6, do this task: Electrical Bonding Jumpers in the Fuel System - Inspection, TASK 28-00-00-200-801

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

(TASK 28-11-11-400-801)

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

SUBTASK 28-00-00-280-007

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

(a) Remove this access panel:

(TASK 28-11-11-000-801)

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

(b) 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.

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

(TASK 28-11-11-400-801)

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

SUBTASK 28-00-00-280-012

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

(a) Remove this access panel:

(TASK 28-11-11-000-801)

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

(b) 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.

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

(TASK 28-11-11-400-801)

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

——— END OF TASK ———

TASK 28-00-00-280-803

6. Fuel System Static Bond Center Tank - Inspection

(Figure 202 or Figure 203)

A. 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)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

B. Location Zones

Zone	Area
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
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. Fuel System Static Bond Center Tank Inspection

SUBTASK 28-00-00-280-013

(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:

(TASK 28-11-31-000-801)

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

(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 an 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:

(TASK 28-11-31-400-801)

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

SUBTASK 28-00-00-280-014

(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:

(TASK 28-11-31-000-801)

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

(b) Go into the opening for:

Number	Name/Location
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:

(TASK 28-11-31-400-801)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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

SUBTASK 28-00-00-280-015

(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:

(TASK 28-11-31-000-801)

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

(b) Go into the opening for:

Number	Name/Location
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:

(TASK 28-11-31-400-801)

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

SUBTASK 28-00-00-280-016

(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:

(TASK 28-11-31-000-801)

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

(b) Go into the opening for:

Number	Name/Location
631AB	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:

(TASK 28-11-31-400-801)

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

SUBTASK 28-00-00-280-017

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

(a) Remove this access panel:

(TASK 28-11-31-000-801)

Number	Name/Location
131AB	Center Tank Access

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) Go into the opening for:

Number	Name/Location
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:

(TASK 28-11-31-400-801)

Number	Name/Location
131AB	Center Tank Access

——— END OF TASK ———

TASK 28-00-00-760-801

7. Fuel System Fault Current, Left Side - Inspection

(Figure 204, Figure 205, Figure 206, Figure 208)

A. References

Reference	Title
27-11-00-820-802	Pogo and Power Control Unit (PCU) Adjustment (P/B 501)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES
SWPM 20-20-10	Replacement of Ground Studs and Bonding Jumper Installation

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659
SPL-1585	Kit - Rigging Pin Part #: F70207-151 Supplier: 81205

C. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5

D. Fuel System Fault Current, Left Side Inspection

SUBTASK 28-00-00-760-003

(1) Do an inspection of the aft fuel boost pump for the No. 1 main tank.

(a) To access the motor impeller of the aft fuel boost pump, go through the applicable left main shock strut door.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) Do a check of the electrical bond between the aft fuel boost pump and the airplane structure with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

1) Make sure that the electrical bond resistance is 0.001 ohm (1 milliohm) or less.

SUBTASK 28-00-00-760-004

(2) Do an inspection of the forward fuel boost pump for the No. 1 main tank.

(a) To access the motor impeller of the forward fuel boost pump, go through the applicable left main shock strut door.

(b) Do a check of the electrical bond between the forward fuel boost pump and the airplane structure with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00, SWPM 20-20-10).

1) Make sure that the electrical bond resistance is 0.001 ohm (1 milliohm) or less.

SUBTASK 28-00-00-760-005

(3) Do an inspection of the left center fuel 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) If you cannot get access to the left center tank fuel boost pump, do the steps that follow:

1) Remove the cotter 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 fuel 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.

(c) Do a check of the electrical bond between the left center fuel boost pump and the airplane structure with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00, SWPM 20-20-10).

1) Make sure that the electrical bond resistance is 0.001 ohm (1 milliohm) or less.

(d) If you removed the pogo [21], then do these steps to install the pogo [21]:

NOTE: Be careful not to change the length of the pogo [21].

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 the bolt [23], washer [22], bushing [24], washer [26], nut [27] and cotter pin [28].

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

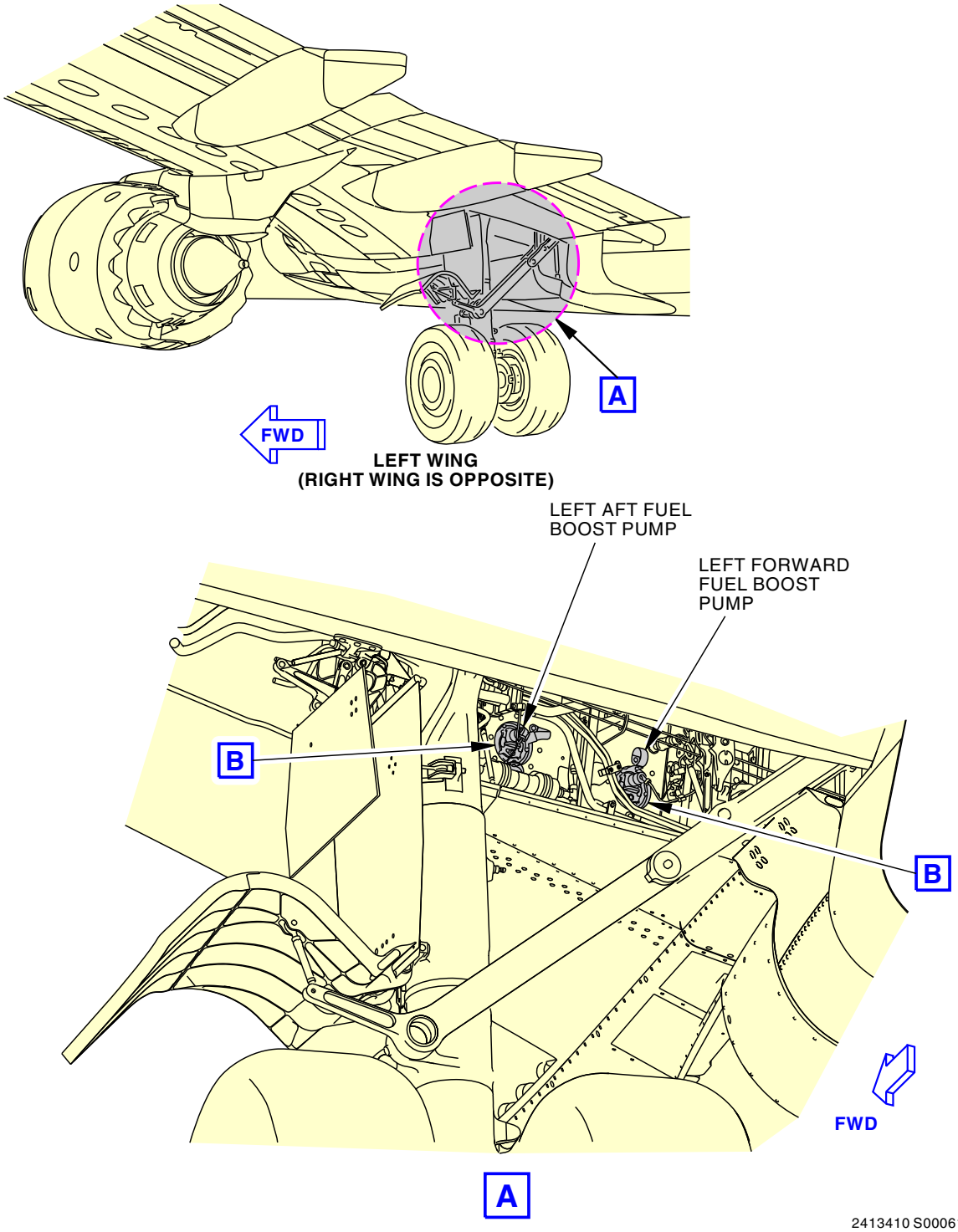
3) Make sure that you can easily install and remove the rig pin A/S-4, from the rigging pin kit, SPL-1585, in the aileron bus drum (TASK 27-11-00-820-802).

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 is not necessary if the length of the pogo [21] did not change while it was removed.

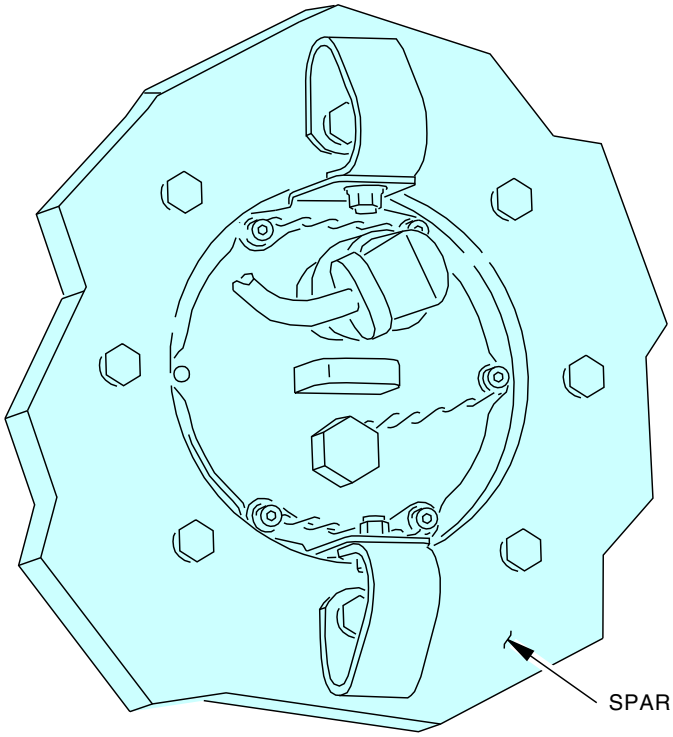
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



No. 1 or 2 Tank Fuel Boost Pump Location
Figure 204/28-00-00-990-804 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



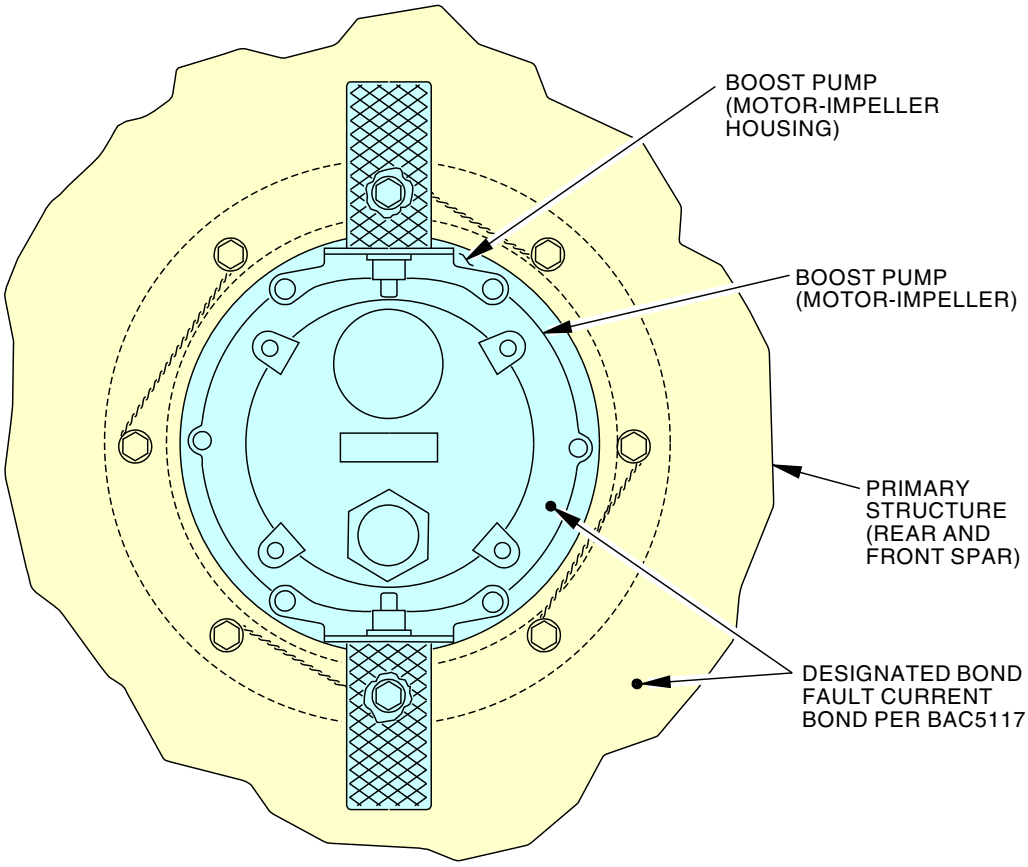
FUEL BOOST PUMP
(EXAMPLE)

B

2413412 S00061532533_V1

No. 1 or 2 Tank Fuel Boost Pump Location
Figure 204/28-00-00-990-804 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



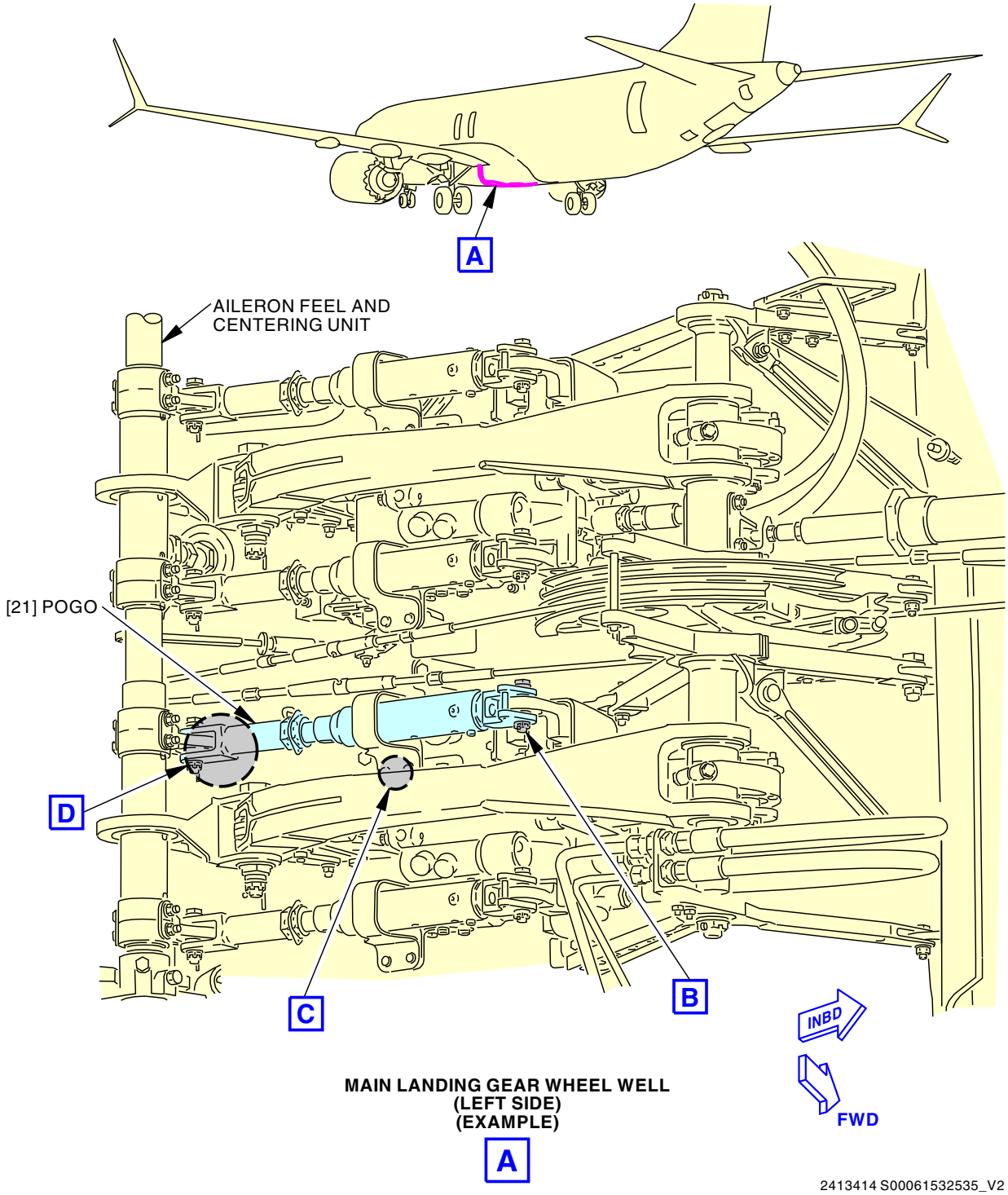
NOTE:

MEASURE RESISTANCE PER BAC5117-4. MEASURE PUMP MOTOR-IMPELLER AT POINTS INDICATED TO THE PRIMARY STRUCTURE <0.001Ω.

2413413 S00061532534_V1

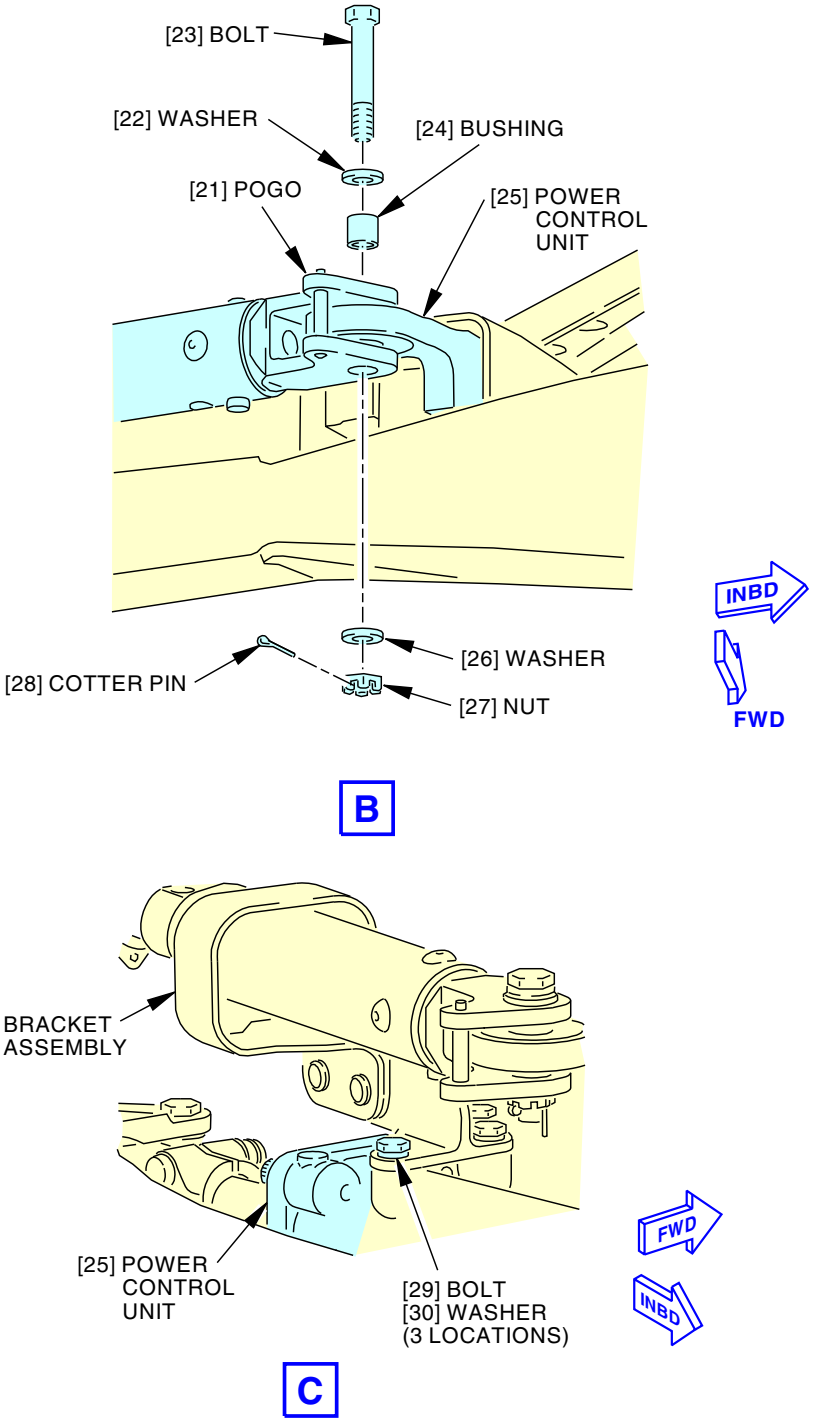
No. 1 or No. 2 Tank Boost Pump Resistance Measurement - Probe Locations
Figure 205/28-00-00-990-805

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Left Center Fuel Boost Pump Access
Figure 206/28-00-00-990-806 (Sheet 1 of 3)

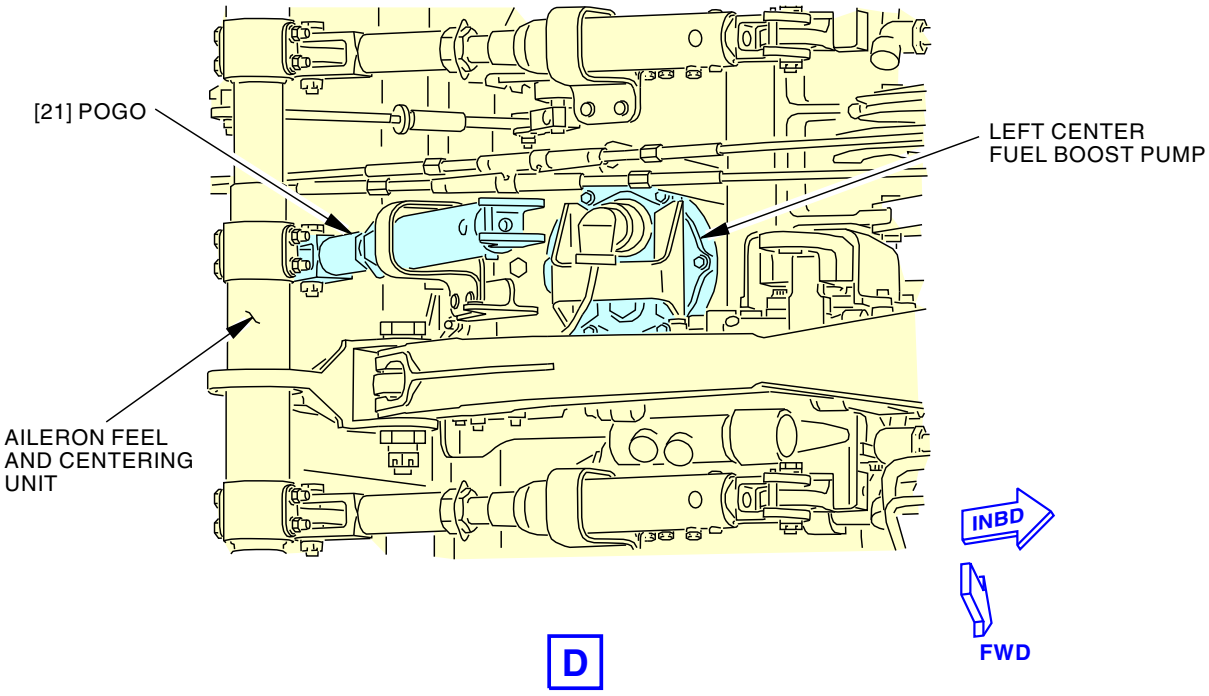
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413415 S00061532536_V1

Left Center Fuel Boost Pump Access
Figure 206/28-00-00-990-806 (Sheet 2 of 3)

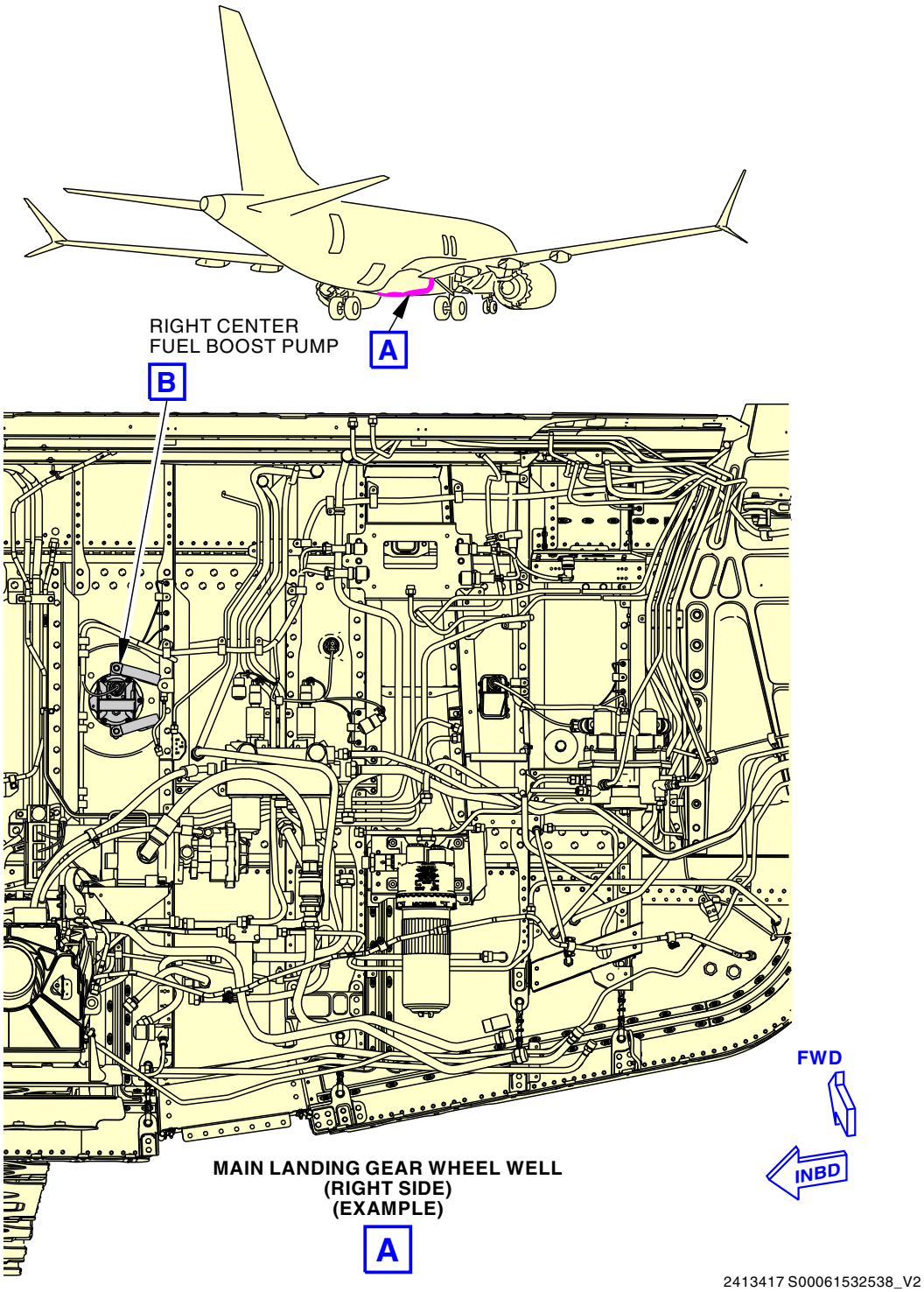
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413416 S00061532537_V1

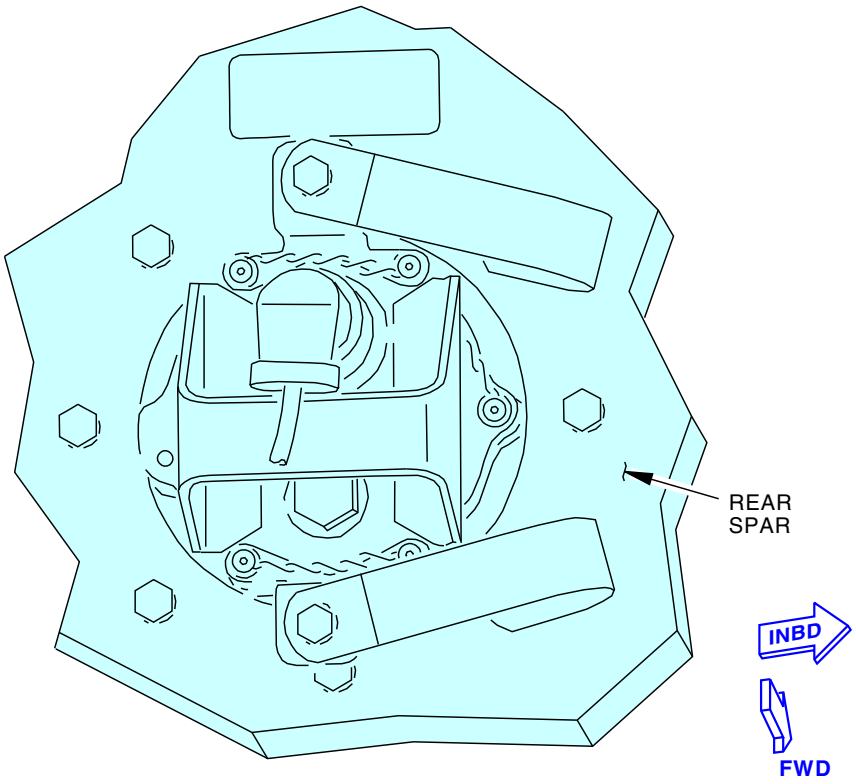
Left Center Fuel Boost Pump Access
Figure 206/28-00-00-990-806 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Right Center Fuel Boost Pump Location
Figure 207/28-00-00-990-807 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



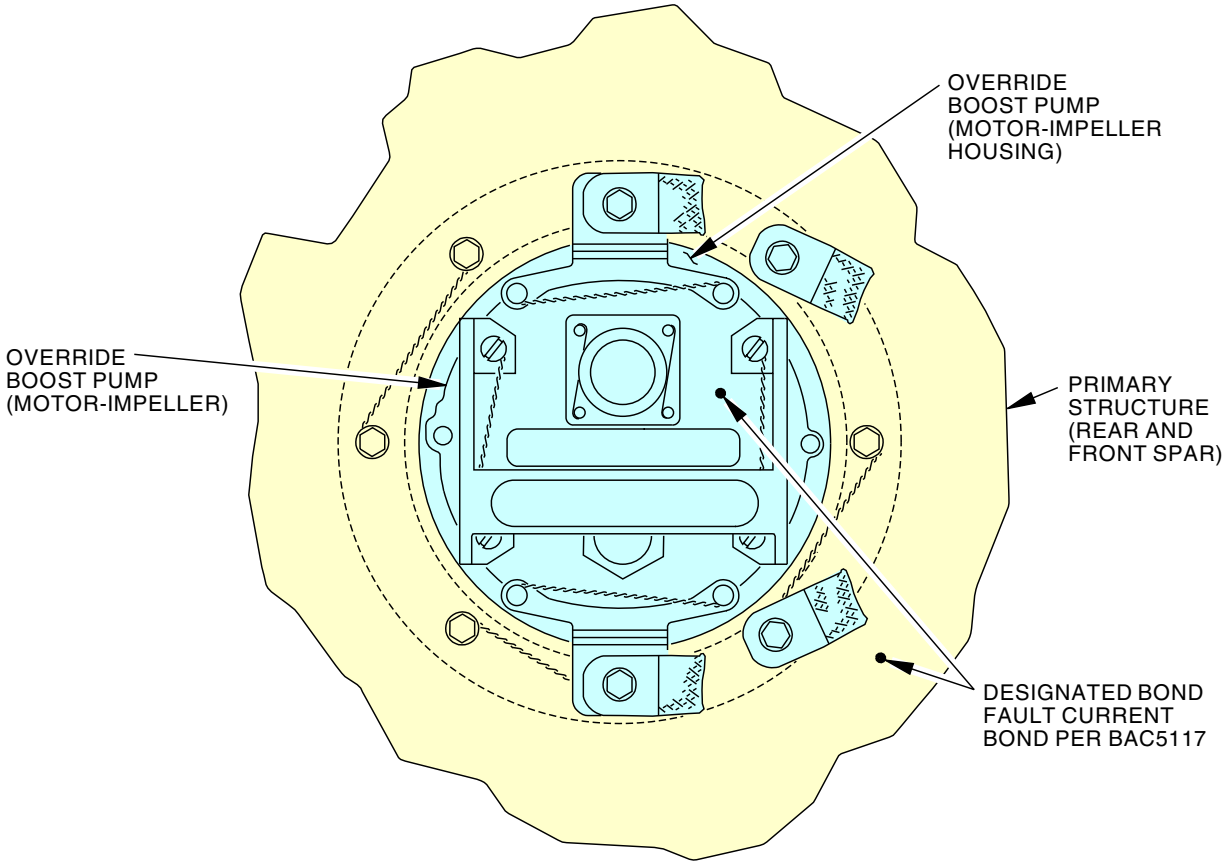
RIGHT CENTER FUEL BOOST PUMP

B

2413418 S00061532539_V1

Right Center Fuel Boost Pump Location
Figure 207/28-00-00-990-807 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



NOTE:

MEASURE RESISTANCE PER BAC5117-4. MEASURE PUMP MOTOR-IMPELLER AT POINTS INDICATED TO THE PRIMARY STRUCTURE <0.001Ω.

2413419 S00061532540_V1

Center Fuel Boost Pump Resistance Measurement - Probe Locations
Figure 208/28-00-00-990-808

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-00-00-760-802

8. Fuel System Fault Current, Right Side - Inspection

(Figure 204, Figure 205, Figure 207, Figure 208)

A. References

Reference	Title
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES
SWPM 20-20-10	Replacement of Ground Studs and Bonding Jumper Installation

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

C. Location Zones

Zone	Area
134	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Right
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5

D. Procedure

SUBTASK 28-00-00-760-006

(1) Do an inspection of the aft fuel boost pump for the No. 2 main tank.

(a) To access the motor impeller of the aft fuel boost pump, go through the applicable right main shock strut door.

(b) Do a check of the electrical bond between the aft fuel boost pump and the airplane structure with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00, SWPM 20-20-10).

1) Make sure that the electrical bond resistance is 0.001 ohm (1 milliohm) or less.

SUBTASK 28-00-00-760-007

(2) Do an inspection of the forward fuel boost pump for the No. 2 main tank.

(a) To access the motor impeller of the forward fuel boost pump, go through the applicable left main shock strut door.

(b) Do a check of the electrical bond between the forward fuel boost pump and the airplane structure with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00, SWPM 20-20-10).

1) Make sure that the electrical bond resistance is 0.001 ohm (1 milliohm) or less.

SUBTASK 28-00-00-760-008

(3) Do an inspection of the right center fuel boost pump.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00, SWPM 20-20-10).

1) Make sure that the electrical bond resistance is 0.001 ohm (1 milliohm) or less.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 Guide (DDG). These tasks prepare the airplane for flight with applicable systems/components 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) DDG 28-21-01-01 Refuel Panel Fuel Quantity Indications Inoperative - Preparation
(2) DDG 28-21-01-02 Fueling Manifold Check Valves Inoperative - Preparation
(3) DDG 28-21-01-03 Fueling Shutoff Valves Inoperative - Preparation
(4) DDG 28-22-01 Main Tank Boost Pump Inoperative - Preparation
(5) DDG 28-22-01 Main Tank Boost Pump Inoperative - Restoration
(6) DDG 28-22-02 Center Tank Boost Pump Inoperative - Preparation
(7) DDG 28-22-02 Center Tank Boost Pump Inoperative - Restoration
(8) DDG 28-22-05 Crossfeed VALVE OPEN Lights Inoperative - Preparation
(9) DDG 28-22-06 SPAR VALVE CLOSED Lights Inoperative - Preparation
(10) DDG 28-22-07 Fuel Shutoff Valve Battery and Charger Inoperative - Preparation
(11) DDG 28-22-07 Fuel Shutoff Valve Battery and Charger Inoperative - Restoration
(12) DDG 28-25-02 APU Fuel Shutoff Valve Inoperative - Preparation
(13) DDG 28-25-02 APU Fuel Shutoff Valve Inoperative - Restoration
(14) DDG 28-41-01 Fuel Quantity Indication System Inoperative - Preparation
(15) DDG 28-42-01-01 Main Tank LOW PRESSURE Light Systems Inoperative - Preparation
(16) DDG 28-42-02-01 Center Tank LOW PRESSURE Light Systems Inoperative - Preparation

TASK 28-00-00-040-801

2. DDG 28-21-01-01 Refuel Panel Fuel Quantity Indications Inoperative - Preparation

(Figure 901)

A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with one or more refuel quantity indicators inoperative.

B. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
621	Right Wing - Leading Edge to Front Spar

C. Refuel Quantity Indication - Alternative Reading

SUBTASK 28-00-00-650-001

(1) In the flight compartment, the MAX Display System (MDS) displays the fuel quantity for all fuel tanks.

NOTE: The MDS displays the fuel quantity with the bad refuel quantity indicator.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-00-00-650-002

(2) If the fuel quantity on the MDS is not available, then refer to TASK 28-00-00-040-811.

——— END OF TASK ———

TASK 28-00-00-040-813

3. DDG 28-21-01-02 Fueling Manifold Check Valves Inoperative - Preparation

(Figure 901)

A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with one or more fueling check valves inoperative.

B. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

C. Access Panels

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

D. Fueling Shutoff Valve Operational Test

SUBTASK 28-00-00-010-002

(1) Open this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-00-00-710-004

(2) On the P15 Refuel Panel, make sure that the associated refuel valve lights operate as follows:

NOTE: The refuel valve lights are PRESS-TO-TEST indicator lights.

(a) For TANK 1, push the TANK 1 refuel valve light.

1) Make sure that the indicator light comes ON and then goes OFF.

(b) For TANK 2, push the TANK 2 refuel valve light.

1) Make sure that the indicator light comes ON and then goes OFF.

(c) For CENTER TANK, push the CENTER TANK refuel valve light.

1) Make sure that the indicator light comes ON and then goes OFF.

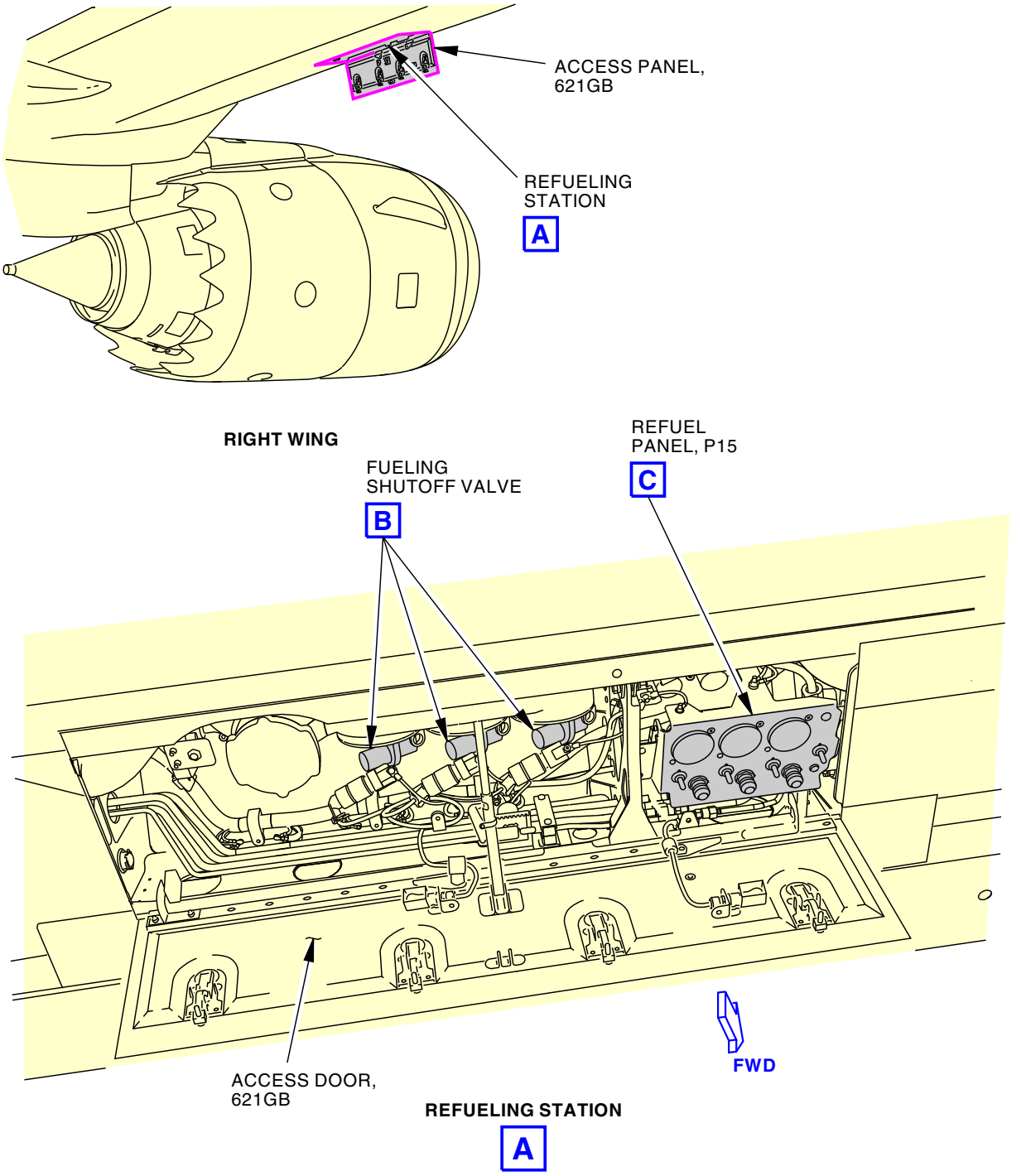
SUBTASK 28-00-00-410-002

(3) Close this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

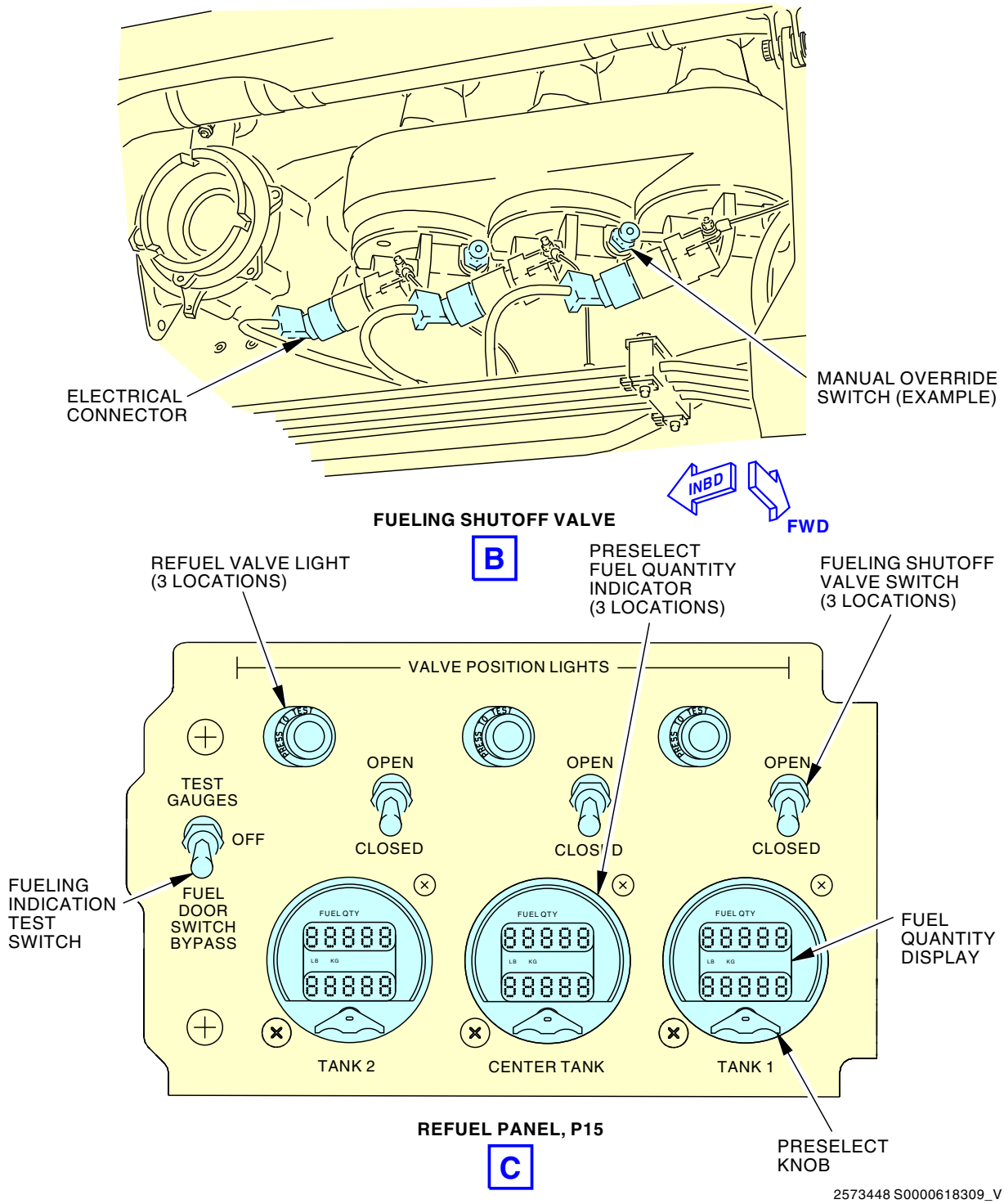
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Pressure Fueling System
Figure 901/28-00-00-990-812 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Pressure Fueling System
Figure 901/28-00-00-990-812 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-00-00-040-814

4. DDG 28-21-01-03 Fueling Shutoff Valves Inoperative - Preparation

(Figure 901)

A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with one or more fueling shutoff valves inoperative.

B. References

Reference	Title
12-11-00-650-806	Pressure Refueling Operation For A Refuel Valve That Does Not Open Electrically (P/B 301)

C. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

D. Manual Pressure Refuel Operation

SUBTASK 28-00-00-710-001

(1) Make sure that the calculated fuel load for the applicable fuel tank is not more than the fuel tank capacity.

NOTE: The pressure fueling system does not calculate fuel that goes into the applicable fuel tank when a fueling shutoff valve does not operate.

SUBTASK 28-00-00-650-003

(2) To refuel the fuel tank with a inoperative fueling shutoff valve, do this task: TASK 12-11-00-650-806.

NOTE: The fueling shutoff valve has a manual override button that bypasses the pressure fueling system. When the manual override button is pressed, the overfill protection is disabled. To prevent fuel spills, you have to close the fueling shutoff valve manually when the calculated fuel load is reached.

——— END OF TASK ———

TASK 28-00-00-040-802

5. DDG 28-22-01 Main Tank Boost Pump Inoperative - Preparation

(Figure 902)

A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with one of the FWD or AFT fuel boost pumps inoperative.

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

C. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door

ECCN 9E991 BOEING PROPRIETARY - See title page for details

D. Prepare for the Deactivation

SUBTASK 28-00-00-010-016

(1) To get access to the P91 and P92 panels, open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

E. Dispatch the Airplane with AFT TANK 1 Fuel Boost Pump Inoperative

SUBTASK 28-00-00-040-001

(1) On the P5-2 Fuel System Module, set the FUEL PUMPS 1 AFT switch to the OFF position.

SUBTASK 28-00-00-420-001

(2) Install an INOP placard on the FUEL PUMPS 1 AFT switch.

SUBTASK 28-00-00-040-002

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(3) Open this circuit breaker and install safety lock:

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

F. Dispatch the Airplane with FWD TANK 1 Fuel Boost Pump Inoperative

SUBTASK 28-00-00-040-008

(1) On the P5-2 Fuel System Module, set the FUEL PUMPS 1 FWD switch to the OFF position.

SUBTASK 28-00-00-420-003

(2) Install an INOP placard on the FUEL PUMPS 1 FWD switch.

SUBTASK 28-00-00-040-009

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(WARNING PRECEDES)

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(3) Open this circuit breaker and install safety lock:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD

G. Dispatch the Airplane with AFT TANK 2 Fuel Boost Pump Inoperative

SUBTASK 28-00-00-040-010

(1) On the P5-2 Fuel System Module, set the FUEL PUMPS 2 AFT switch to the OFF position.

SUBTASK 28-00-00-420-004

(2) Install an INOP placard on the FUEL PUMPS 2 AFT switch.

SUBTASK 28-00-00-040-011

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(3) Open this circuit breaker and install safety lock:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

H. Dispatch the Airplane with FWD TANK 2 Fuel Boost Pump Inoperative

SUBTASK 28-00-00-040-012

(1) On the P5-2 Fuel System Module, set the FUEL PUMPS 2 FWD switch to the OFF position.

SUBTASK 28-00-00-420-005

(2) Install an INOP placard on the FUEL PUMPS 2 FWD switch.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-00-00-040-013

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(3) Open this circuit breaker and install safety lock:

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

I. Put the Airplane Back to Its Usual Condition

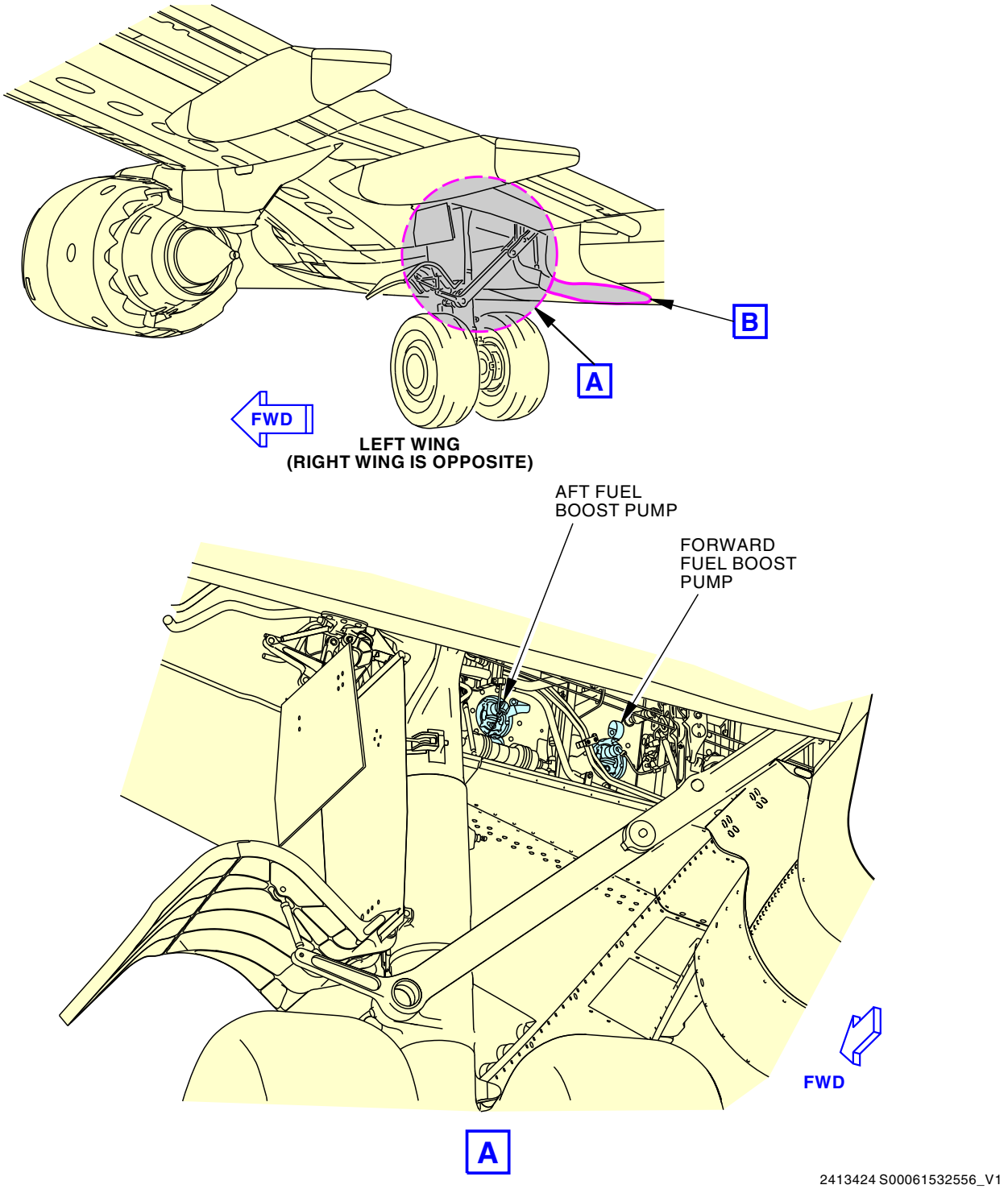
SUBTASK 28-00-00-410-010

(1) Close this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

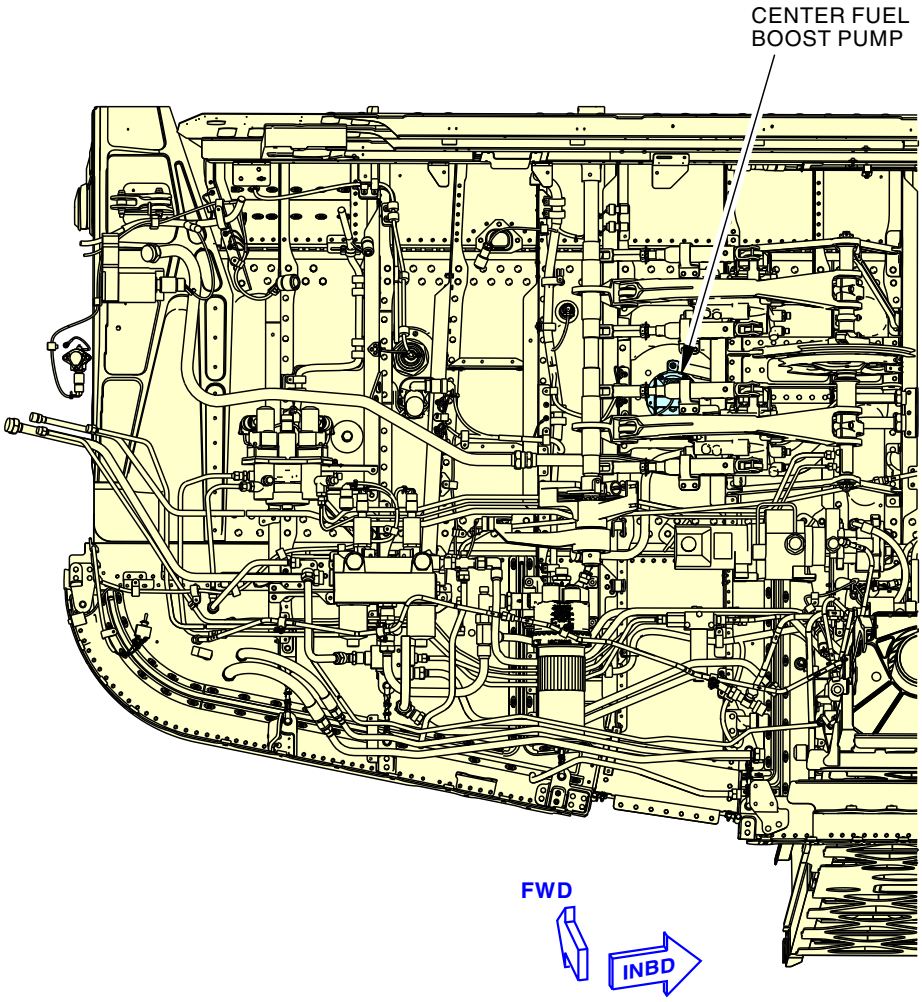
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fuel Boost Pump Locations
Figure 902/28-00-00-990-814 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



MAIN LANDING GEAR WHEEL WELL
(LEFT SIDE IS SHOWN, RIGHT SIDE IS ALMOST THE SAME)

B

2413425 S00061532557_V1

Fuel Boost Pump Locations
Figure 902/28-00-00-990-814 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-00-00-440-804

6. DDG 28-22-01 Main Tank Boost Pump Inoperative - Restoration

(Figure 902)

A. General

(1) This task gives the maintenance steps to put the airplane back to its usual condition after operation with an inoperative FWD or AFT fuel boost pump.

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

C. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door

D. Prepare for the Activation

SUBTASK 28-00-00-010-012

(1) To get access to the P91 and P92 panels, open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

E. AFT TANK 1 Fuel Boost Pump Activation

SUBTASK 28-00-00-020-007

(1) On the P5-2 Fuel System Module, remove the INOP placard from the FUEL PUMPS 1 AFT switch.

SUBTASK 28-00-00-440-006

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(2) Remove the safety lock and close this circuit breaker:

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. FWD TANK 1 Fuel Boost Pump Activation

SUBTASK 28-00-00-020-006

(1) On the P5-2 Fuel System Module, remove the INOP placard from the FUEL PUMPS 1 FWD switch.

SUBTASK 28-00-00-440-005

WARNING WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(2) Remove the safety lock and close this circuit breaker:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD

G. AFT TANK 2 Fuel Boost Pump Activation

SUBTASK 28-00-00-020-005

(1) On the P5-2 Fuel System Module, remove the INOP placard from the FUEL PUMPS 2 AFT switch.

SUBTASK 28-00-00-440-004

WARNING WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(2) Remove the safety lock and close this circuit breaker:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

ECCN 9E991 BOEING PROPRIETARY - See title page for details

H. FWD TANK 2 Fuel Boost Pump Activation

SUBTASK 28-00-00-020-004

(1) On the P5-2 Fuel System Module, remove the INOP placard from the FUEL PUMPS 2 FWD switch.

SUBTASK 28-00-00-440-003

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(2) Remove the safety lock and close this circuit breaker:

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

I. Put the Airplane Back to Its Usual Condition

SUBTASK 28-00-00-410-011

(1) Close this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

END OF TASK

TASK 28-00-00-040-803

7. DDG 28-22-02 Center Tank Boost Pump Inoperative - Preparation

(Figure 902)

A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with one or both of the center tank fuel boost pumps inoperative.

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

C. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door

ECCN 9E991 BOEING PROPRIETARY - See title page for details

D. Prepare for the Deactivation

SUBTASK 28-00-00-010-013

(1) To get access to the P91 and P92 panels, open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

E. Dispatch the Airplane with CTR TANK L Fuel Boost Pump Inoperative

SUBTASK 28-00-00-040-003

(1) On the P5-2 Fuel System Module, set the FUEL PUMPS CTR L switch to the OFF position.

SUBTASK 28-00-00-420-002

(2) Install an INOP placard on the FUEL PUMPS CTR L switch.

SUBTASK 28-00-00-040-004

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(3) Open this circuit breaker and install safety lock:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

F. Dispatch the Airplane with CTR TANK R Fuel Boost Pump Inoperative

SUBTASK 28-00-00-040-014

(1) On the P5-2 Fuel System Module, set the FUEL PUMPS CTR R switch to the OFF position.

SUBTASK 28-00-00-420-006

(2) Install an INOP placard on the FUEL PUMPS CTR R switch.

SUBTASK 28-00-00-040-015

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(WARNING PRECEDES)

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(3) Open this circuit breaker and install safety lock:

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

G. Put the Airplane Back to Its Usual Condition

SUBTASK 28-00-00-410-012

(1) Close this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

END OF TASK

TASK 28-00-00-440-805

8. DDG 28-22-02 Center Tank Boost Pump Inoperative - Restoration

(Figure 902)

A. General

(1) This task gives the maintenance steps to put the airplane back to it's usual condition after operation with one or both center tank fuel boost pumps inoperative.

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

C. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door

D. Prepare for the Activation

SUBTASK 28-00-00-010-014

(1) Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

ECCN 9E991 BOEING PROPRIETARY - See title page for details

E. CTR TANK L Fuel Boost Pump Activation

SUBTASK 28-00-00-440-008

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(1) Remove the safety lock and close this circuit breaker:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

SUBTASK 28-00-00-020-009

(2) On the P5-2 Fuel System Module, remove the INOP placard from the FUEL PUMPS CTR L switch.

F. CTR TANK R Fuel Boost Pump Activation

SUBTASK 28-00-00-440-007

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(1) Remove the safety lock and close this circuit breaker:

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-00-00-020-008

(2) On the P5-2 Fuel System Module, remove the INOP placard from the FUEL PUMPS CTR R switch.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Put the Airplane Back to Its Usual Condition

SUBTASK 28-00-00-410-013

(1) Close this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

——— END OF TASK ———

TASK 28-00-00-040-815

9. DDG 28-22-05 Crossfeed VALVE OPEN Light Inoperative - Preparation

(Figure 903)

A. General

(1) This task gives the maintenance steps which prepares the airplane for flight when the cross feed VALVE OPEN indicator is inoperative on the P5-2 Fuel System Module.

B. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
621	Right Wing - Leading Edge to Front Spar

C. Access Panels

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91
621GB	Refuel Valve Door - Slat Station 125

D. Prepare for the Operational Test

SUBTASK 28-00-00-010-003

(1) Open this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-00-00-710-005

(2) On the P15 Refuel Panel, set the TANK 1, fueling shutoff valve switch to the OPEN position.

SUBTASK 28-00-00-010-004

(3) Open this access panel:

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91

SUBTASK 28-00-00-010-005

(4) Move the defueling valve handle to the open position.

E. Engine Fuel Crossfeed Valve Operational Test

SUBTASK 28-00-00-710-006

(1) Make sure that the engine fuel crossfeed valve opens correctly:

(a) On the P5-2 Fuel System Module, turn the CROSS FEED switch to the open position.

1) In the main landing gear wheel well, make sure that the manual override lever on the engine fuel crossfeed valve moves to the OPEN position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) On the P5-2 Fuel System Module, put the FUEL PUMPS 1 FWD switch to the ON position.

1) Make sure that a minimum of 200 lb (91 kg) of fuel transfers from the No. 1 main tank to the No. 2 main tank.

NOTE: Fuel transfers in approximately 2 minutes.

(c) Put the FUEL PUMPS 1 FWD switch to the OFF position.

SUBTASK 28-00-00-720-001

(2) Make sure that the engine fuel crossfeed valve closes correctly:

(a) Turn the CROSS FEED switch to the closed position.

1) Make sure that the manual override lever on the engine fuel crossfeed valve moves to the CLOSED position.

(b) Put the FUEL PUMPS 1 FWD switch to the ON position.

1) Make sure that no fuel transfers from the No. 1 main tank to the No. 2 main tank.

NOTE: Three minutes is sufficient time to make sure that no fuel transfers.

(c) Put the FUEL PUMPS 1 FWD switch to the OFF position.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 28-00-00-710-007

(1) Put the TANK 1, fueling shutoff switch to the CLOSED position.

SUBTASK 28-00-00-410-003

(2) Close this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-00-00-410-004

(3) Move the defueling valve handle to the closed position.

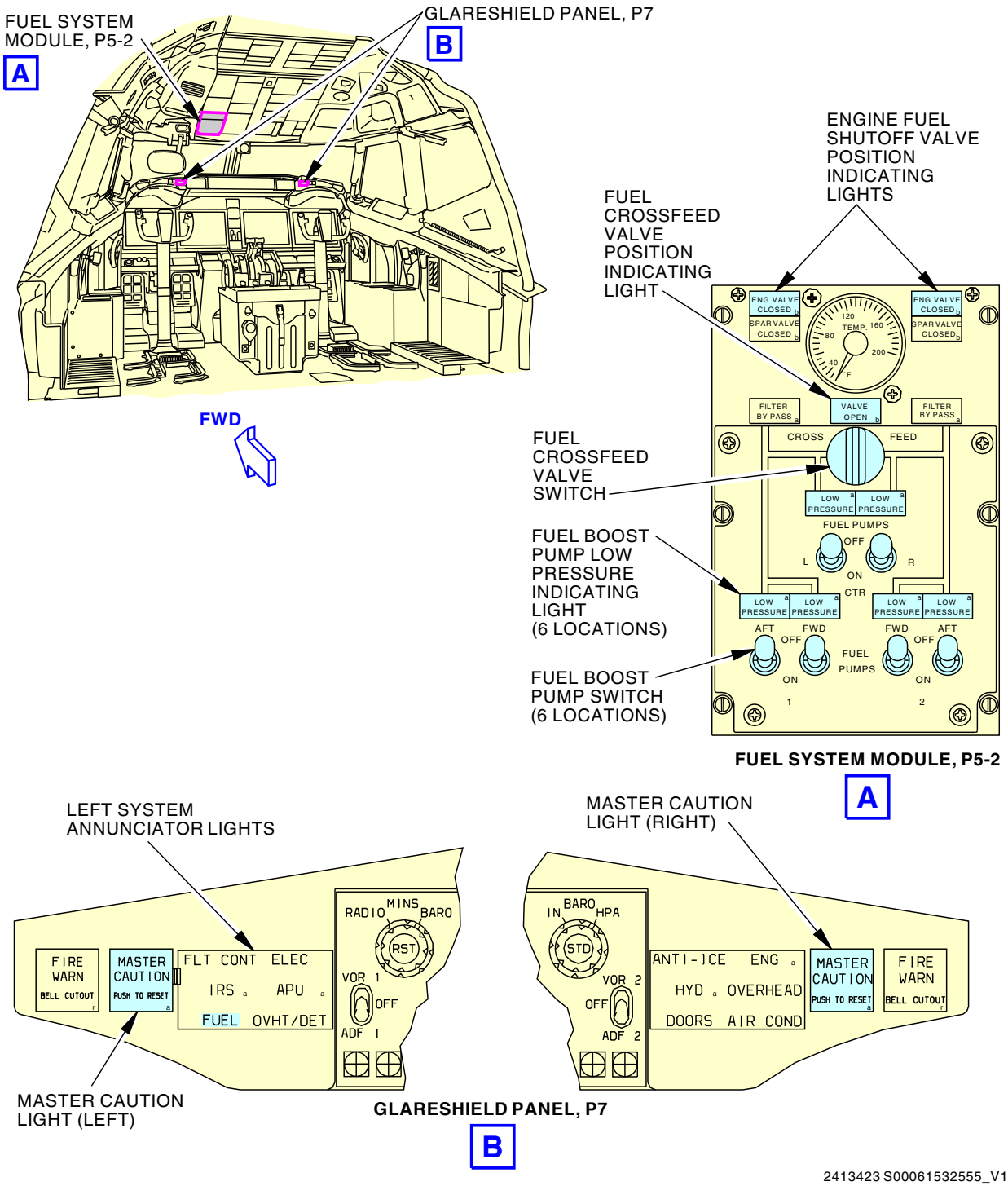
SUBTASK 28-00-00-410-005

(4) Close this access panel:

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413423 S00061532555_V1

Engine Fuel Feed System
Figure 903/28-00-00-990-810

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-00-00-040-816

10. DDG 28-22-06 SPAR VALVE CLOSED Lights Inoperative - Preparation

(Figure 904)

A. General

(1) This task gives the maintenance steps which prepare the airplane for flight when one or both SPAR VALVE CLOSED indicators are inoperative on the P5-2 Fuel System Module.

NOTE: Each flight day, it is necessary to test the applicable Engine Spar Valve. This procedure makes sure that the manual override lever on the engine spar valve actuator moves to the CLOSED position.

B. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

C. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
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 27
621BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27

E. Prepare for the Operational Test

SUBTASK 28-00-00-860-005

(1) On the P10 control stand, make sure that the engine start levers are in the CUTOFF position.

SUBTASK 28-00-00-860-006

(2) On the P5 Overhead Panel, make sure that the ENGINE START 1 and 2 switches are in the OFF position.

SUBTASK 28-00-00-480-001

(3) Put a DO NOT OPERATE tag, STD-858, on the ENGINE START 1 and 2 switches.

SUBTASK 28-00-00-860-008

(4) 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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-00-00-010-007

(5) Open the applicable access panels:

Number	Name/Location
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27
621BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27

F. Engine Fuel Spar Valve Operational Test

SUBTASK 28-00-00-720-002

(1) Test the engine spar valve with the inoperative SPAR VALVE CLOSED indicator, as follows:

(a) Set the applicable engine start lever to the IDLE position.

1) Make sure that the manual override lever on the applicable engine spar valve actuator moved to the OPEN position.

(b) On the P8-1 Fire Control Panel, do these steps:

1) Under the Engine Fire Handle, push the applicable manual override button.

CAUTION DO NOT TURN THE FIRE HANDLE. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

2) Pull the applicable Engine Fire Handle.

a) Make sure that the manual override lever on the applicable engine spar valve actuator moved to the CLOSED position.

CAUTION DO NOT TURN THE FIRE HANDLE. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

3) Push the Engine Fire Handle to the normal position.

a) Make sure that the manual override lever on the applicable engine spar valve actuator moved to the OPEN position.

(c) Set the applicable engine start lever to the CUTOFF position.

1) Make sure that the manual override lever on the applicable engine spar valve actuator moved to the CLOSED position.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 28-00-00-410-008

(1) Close the applicable access panel:

Number	Name/Location
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27
621BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27

SUBTASK 28-00-00-080-001

(2) Remove the DO NOT OPERATE tag, STD-858, from the ENGINE START 1 and 2 switches.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-00-00-860-009

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

CAPT Electrical System Panel, P18-2

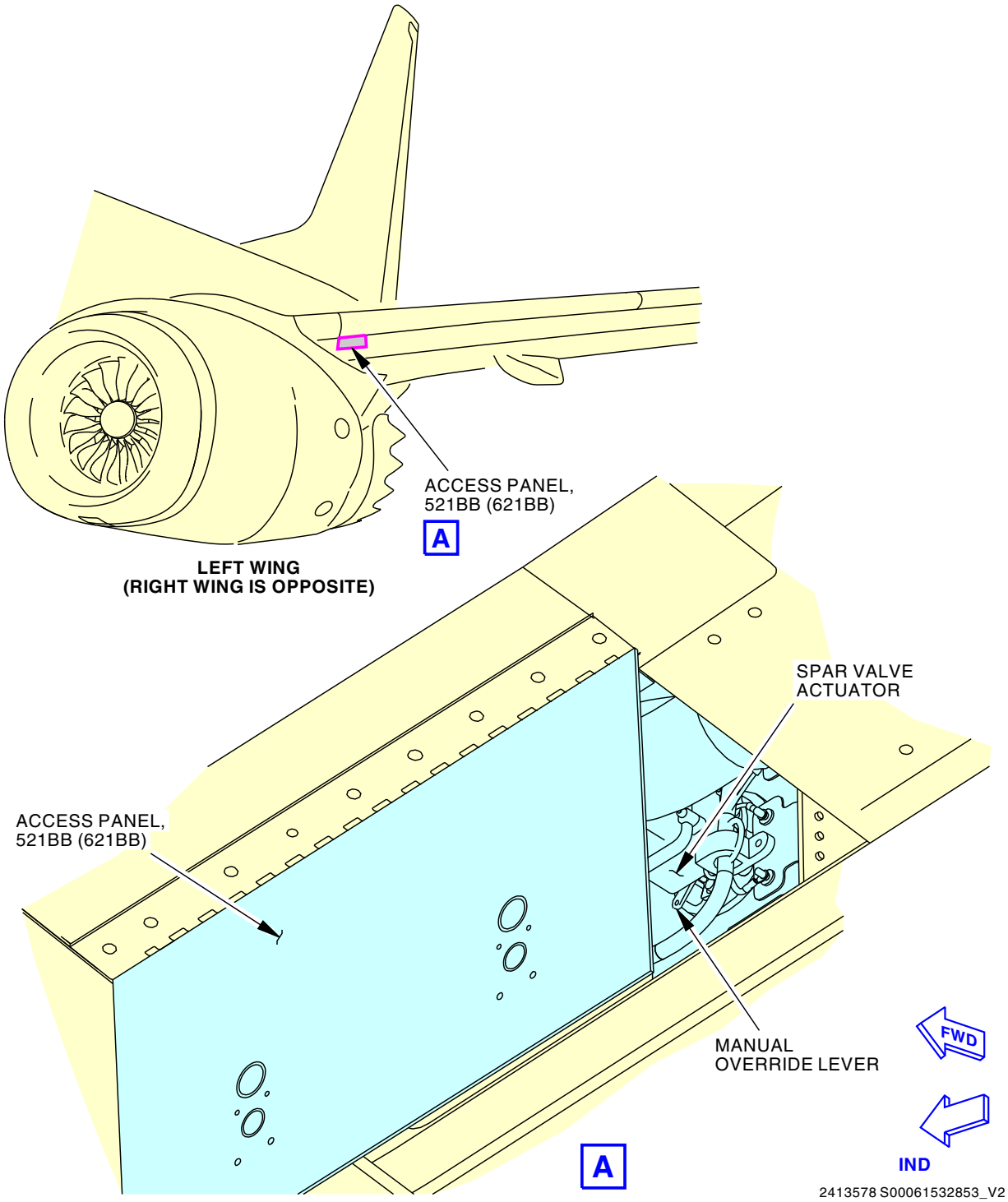
Row	Col	Number	Name
B	8	C01103	ENGINE 1 START VALVE

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Spar Valve Actuator Location
Figure 904/28-00-00-990-815

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-00-00-040-804

11. DDG 28-22-07 Fuel Shutoff Valve Battery and Charger Inoperative - Preparation

A. General

(1) This task gives the maintenance steps which prepare the airplane for flight when the Emergency Fuel Shutoff Battery is inoperative.

B. Location Zones

Zone	Area
212	Flight Compartment - Right

C. Emergency Fuel Shutoff Battery Deactivation

SUBTASK 28-00-00-860-001

(1) Open this circuit breaker and install safety lock:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	4	C01471	FUEL SHUTOFF VALVES PWR PACK

——— END OF TASK ———

TASK 28-00-00-440-808

12. DDG 28-22-07 Fuel Shutoff Valve Battery and Charger Inoperative - Restoration

A. General

(1) This task puts the airplane back to its usual condition after operation with the fuel shutoff valve batter and charger inoperative.

B. Location Zones

Zone	Area
210	Subzone - Control Compartment - Body Station 178.00 to Body Station 259.50
212	Flight Compartment - Right

C. Fuel Shutoff Valve Battery and Charger Activation

SUBTASK 28-00-00-860-002

(1) Remove the safety lock and close this circuit breaker:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
C	4	C01471	FUEL SHUTOFF VALVES PWR PACK

——— END OF TASK ———

TASK 28-00-00-040-805

13. DDG 28-25-02 APU Fuel Shutoff Valve Inoperative - Preparation

(Figure 905, Figure 906)

A. General

(1) This task gives the maintenance steps that prepare the airplane for flight with the Auxiliary Power Unit (APU) Fuel Shutoff Valve (FSOV) inoperative.

(2) This DDG is not approved for ER operations.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

B. References

Reference	Title
20-10-44-400-801	Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

C. Consumable Materials

Reference	Description	Specification
G01912	Lockwire - MS20995NC32, Monel - 0.032 Inch (0.8128 mm) Diameter	NASM20995

D. 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

E. APU Fuel Shutoff Valve Inoperative Preparation

SUBTASK 28-00-00-860-003

(1) On the P5 overhead panel, make sure that the APU master switch is in the OFF position.

SUBTASK 28-00-00-860-010

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

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 28-00-00-480-002

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.

(3) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-00-00-040-005

(4) In the main landing gear wheel well, cap and stow the APU FSOV, as follows:

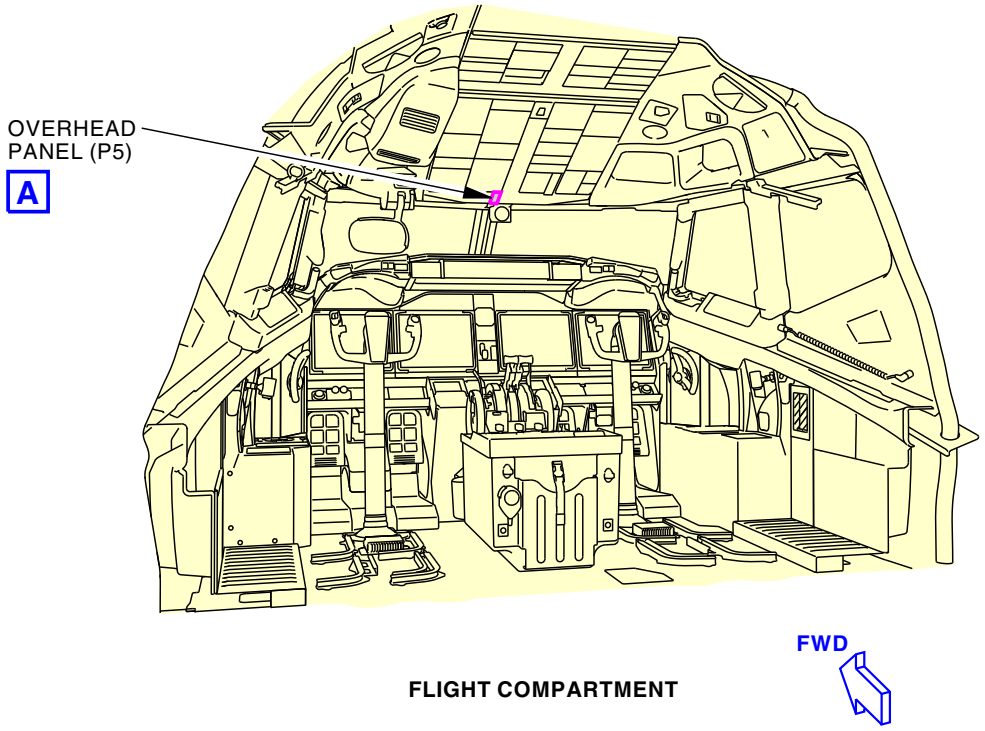
(a) Disconnect, cap, and stow the electrical connector, D920.

(b) Move the manual override handle on the APU FSOV actuator to the CLSD position.

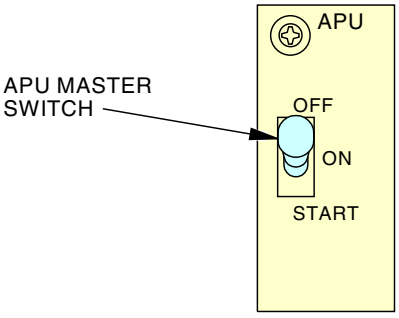
(c) Install MS20995NC32 lockwire, G01912, on the manual override handle (TASK 20-10-44-400-801).

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



FLIGHT COMPARTMENT



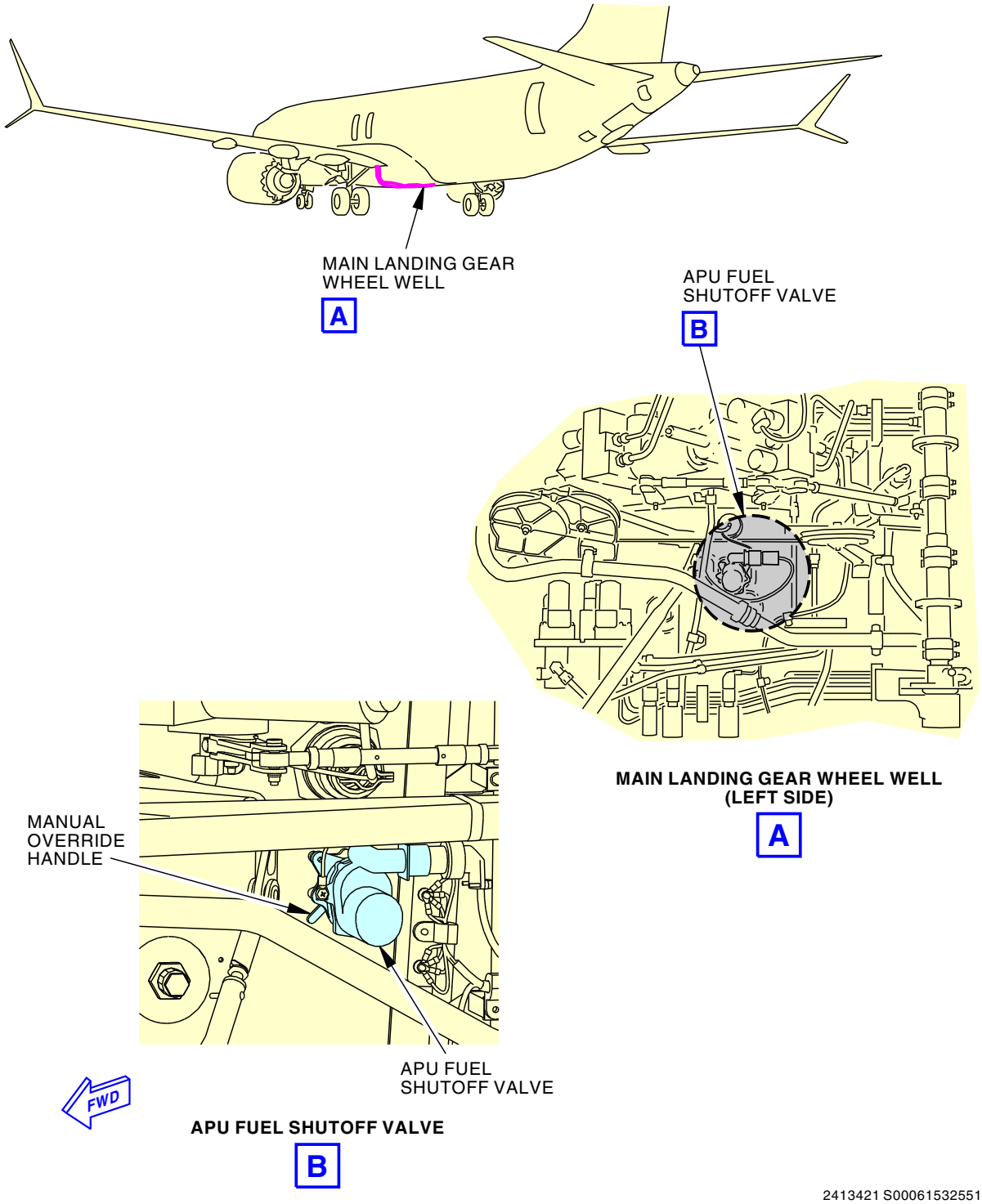
OVERHEAD PANEL (P5)

A

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APU Fuel Feed System
Figure 905/28-00-00-990-809

ECCN 9E991 BOEING PROPRIETARY - See title page for details



APU Fuel Shutoff Valve Location
Figure 906/28-00-00-990-813

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-00-00-440-809

14. DDG 28-25-02 APU Fuel Shutoff Valve Inoperative - Restoration

(Figure 905, Figure 906)

A. General

(1) This task gives the maintenance steps to put the airplane back to its usual condition after operation with the Auxiliary Power Unit (APU) Fuel Shutoff Valve (FSOV) inoperative.

B. References

Reference	Title
20-10-44-000-801	Lockwire, Cotter Pins, and Lockrings - Removal (P/B 401)
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 Inoperative Restoration

SUBTASK 28-00-00-040-006

(1) On the P5 overhead panel, make sure that the APU master switch is in the OFF position.

SUBTASK 28-00-00-480-003

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.

(2) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-00-00-440-002

(3) Do these steps to activate the APU FSOV:

(a) Remove lockwire on the manual override handle located on the APU FSOV actuator (TASK 20-10-44-000-801).

(b) Connect the electrical connector, D920, to the APU FSOV 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

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-00-00-040-811

15. DDG 28-41-01 Fuel Quantity Indication System Inoperative - Preparation

(Figure 907)

A. General

(1) This task gives the maintenance steps which prepare the airplane for flight when a Main Tank Fuel Quantity Indicator (FQI) is inoperative (blank) on the MAX Display System (MDS).

(2) This DDG is not approved for ER operations.

B. References

Reference	Title
12-11-00-650-805	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

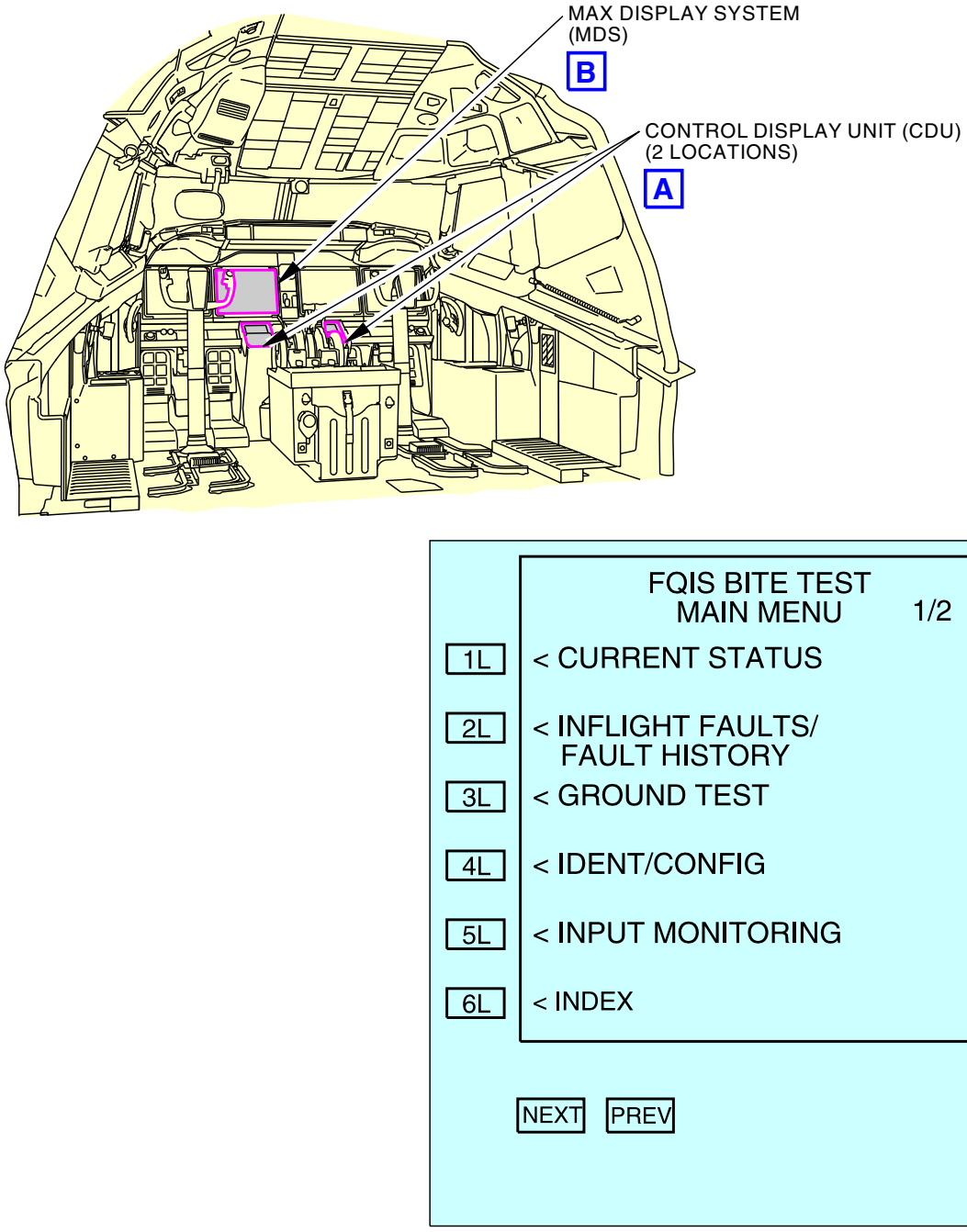
D. Procedure

SUBTASK 28-00-00-650-005

(1) Refuel the applicable fuel tank with the blank fuel display on the MDS (TASK 12-11-00-650-805).

——— END OF TASK ———

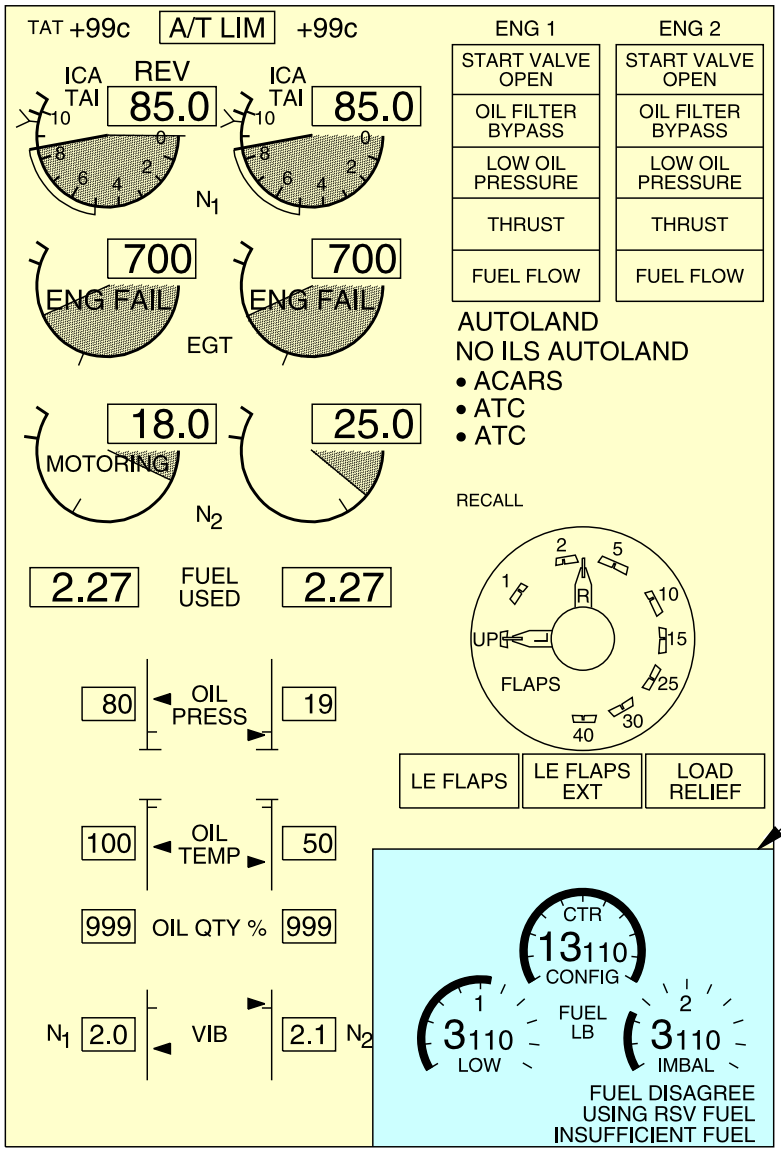
ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Fuel Quantity Indicating System Components
Figure 907/28-00-00-990-811 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



MAX DISPLAY SYSTEM (MDS)

B

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Fuel Quantity Indicating System Components
Figure 907/28-00-00-990-811 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-00-00-040-806

16. DDG 28-42-01-01 Main Tank LOW PRESSURE Light Systems Inoperative - Preparation

A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with one LOW PRESSURE light for the main tank FUEL PUMPS on the P5-2 fuel system module inoperative.

B. Location Zones

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

C. Procedure

SUBTASK 28-00-00-710-008

(1) On the P7 glareshield panel, push the Captain's MASTER CAUTION PUSH TO RESET light.

NOTE: This resets the MASTER CAUTION lights and the system annunciator lights.

(a) Make sure that the Captain's and First Officer's MASTER CAUTION lights go off.

(b) On the P7 glareshield panel, make sure that the FUEL annunciator light goes off on the Captain's system annunciator light.

SUBTASK 28-00-00-040-007

(2) On the P5-2 Fuel System Module, set the following FUEL PUMPS switches for the applicable MAIN TANK to the OFF position:

(a) No. 1 MAIN TANK:

1) FUEL PUMPS 1 AFT

2) FUEL PUMPS 1 FWD

(b) No. 2 MAIN TANK:

1) FUEL PUMPS 2 AFT

2) FUEL PUMPS 2 FWD.

SUBTASK 28-00-00-210-004

(3) Make sure that the Captain's and First Officer's MASTER CAUTION lights come on.

SUBTASK 28-00-00-210-003

(4) Make sure that the FUEL annunciator light comes on.

——— END OF TASK ———

TASK 28-00-00-040-807

17. DDG 28-42-02-01 Center Tank LOW PRESSURE Light Systems Inoperative - Preparation

A. General

(1) This task gives the maintenance steps that prepare the airplane for flight when one or two LOW PRESSURE lights for the center tank are inoperative on the P5-2 Fuel System Module.

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

C. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door

D. DDG 28-42-02-01 Center Tank LOW PRESSURE Light Systems Inoperative - Preparation

SUBTASK 28-00-00-010-015

(1) Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-00-00-860-011

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(2) Open the applicable circuit breaker and install a safety tag:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-00-00-860-012

(3) On the P5-2 fuel system module, set the FUEL PUMPS CTR L and R switches to the OFF position.

SUBTASK 28-00-00-860-013

(4) On the P5 overhead panel, make sure that the ENGINE START 1 and 2 switches are in the OFF position.

SUBTASK 28-00-00-860-014

(5) On the P10 control stand, make sure that the Engine Start Levers are in the CUTOFF position.

SUBTASK 28-00-00-710-014

(6) Do the following steps for an inoperative left center tank fuel boost pump LOW PRESSURE light:

(a) On the P7 glareshield panels, push the Captain's or First Officer's MASTER CAUTION lights.

NOTE: This resets the MASTER CAUTION lights and the system annunciator lights.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Make sure that the Captain's and First Officer's MASTER CAUTION lights go off.
2) Make sure that the FUEL annunciator light goes off on the Captain's system annunciator light panel.

(b) Set the FUEL PUMPS CTR L switch to the ON position.

NOTE: A time delay circuit causes a delay of approximately 10 seconds before the lights come on.

1) Make sure that the Captain's and First Officer's MASTER CAUTION lights and the FUEL annunciator lights come on.

(c) Set the FUEL PUMPS CTR L switch to the OFF position.

SUBTASK 28-00-00-710-015

(7) Do the following steps for an inoperative right center tank fuel boost pump LOW PRESSURE light:

(a) On the P7 glareshield panels, push the Captain's or First Officer's MASTER CAUTION lights.

NOTE: This resets the MASTER CAUTION lights and the system annunciator lights.

1) Make sure that the Captain's and First Officer's MASTER CAUTION lights go off.
2) Make sure that the FUEL annunciator light goes off on the Captain's system annunciator light panel.

(b) Set the FUEL PUMPS CTR R switch to the ON position.

NOTE: A time delay circuit causes a delay of approximately 10 seconds before the lights come on.

1) Make sure that the Captain's and First Officer's MASTER CAUTION lights and the FUEL annunciator lights come on.

(c) Set the FUEL PUMPS CTR R switch to the OFF position.

SUBTASK 28-00-00-860-015

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(8) Remove the safety tag and close the applicable circuit breaker:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-00-00-410-014

(9) Close this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 28-10-00-200-801

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 retest, a biocide treatment and/or physical removal of the growth from the fuel tanks.

(2) These are the accepted microbial test kits:

(a) MICROBMONITOR2 (microbial test kit, COM-4806)

(b) HY-LITE JET A-1 FUEL TEST (luminometer instrument, COM-21126 with fuel test kit consumables, COM-21104)

(c) 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. If re-testing, use the same type of detection kit as the original test.

(4) All time intervals listed in this task are recommendations. There are no MMEL or scheduled maintenance requirements for testing for microbial contamination.

(5) Frequent removal of all water from the airplane sump drains in each fuel tank will help decrease the risk related with microbial growth.

B. References

Reference	Title
12-11-00-680-801	Fuel Tank Sumps - Fuel Sampling (P/B 301)

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-1535	Equipment - Sampling, Fuel Part #: 100-0128-04 Supplier: 99321 Part #: 94-8136 Supplier: 99321 Opt Part #: V799 Supplier: 20661

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Reference	Description
COM-4806	Test Kit - Microbial, Fuel Part #: MicrobMonitor2 Supplier: KG976
COM-21104	HY-LiTE Jet A1 Fuel Test Kit (consumables) Part #: 1.30196.0021 (consumables) Supplier: 08071 Part #: FQS-047 (consumables) Supplier: 40161
COM-21126	HY-LiTE 2 Luminometer (instrument) Part #: 1.30100.0001 (luminometer) Supplier: 08071 Part #: FQS-046A Supplier: 40161 Opt Part #: 1.30100.0221 (luminometer) Supplier: D2186 Opt Part #: 1.30100.0301 (luminometer) Supplier: 08071 Opt Part #: FQS-046 Supplier: 40161
STD-421	Goggles - Eye Protection
STD-1129	Coveralls - Tyvek/Saranex 23-p (Approved Cotton Substitute), No Pockets
STD-6365	Sample Bottle, Glass or Chemical Resistant Plastic
STD-7374	Gloves - Fuel and Solvent Resistant

D. Consumable Materials

Reference	Description	Specification
B00130	Alcohol - Isopropyl	TT-I-735
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

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 28-10-00-280-001

(1) You must wear protective equipment when you clean, sample and test for microbial growth. Protective equipment includes:

(a) Pair of eye protection goggles, STD-421

(b) Clean fuel resistant gloves, STD-7374

(c) Clean protective coverall (approved cotton substitute), STD-1129, or equivalent.

SUBTASK 28-10-00-280-002

(2) Do these steps to clean the fuel sampling equipment, COM-1535:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Mix a solution of one part tap water to three to four parts alcohol, B00130.

(b) Clean the fuel sampling equipment, COM-1535, and sample bottle, STD-6365, (if reused), with the alcohol solution and cotton wipers, G00034.

NOTE: Bottles should be rinsed instead of wiped. Wiping sampling equipment can deposit residual fibers which can be misinterpreted as contamination.

(c) Air dry the fuel sampling equipment, COM-1535, and sample bottle, STD-6365.

(d) Make sure that the fuel sampling equipment, COM-1535, and sample bottle, STD-6365, are free from residual alcohol.

(e) Protect the containers from contamination.

SUBTASK 28-10-00-280-003

(3) Do these steps to clean the sump drain area:

(a) Mix a solution of one part water to three to four parts alcohol, B00130.

(b) Thoroughly clean the exterior area of the fuel sump drain with the alcohol solution and cotton wipers, G00034.

(c) Air dry the sump area.

(d) Repeat for each sump drain

G. Collect the Fuel Sample

SUBTASK 28-10-00-280-004

(1) Make sure that the container for fuel sampling equipment, COM-1535, and the sample bottle, STD-6365, are clean and dry.

SUBTASK 28-10-00-280-005

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

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

(a) Use the fuel sump drain to get a fuel sample:

1) Do this task: Fuel Tank Sumps - Fuel Sampling, TASK 12-11-00-680-801.

(b) Fill the container for the fuel sampling equipment, COM-1535, with approximately one quart (one liter) of fuel.

(c) If it is possible, make sure that the fuel sample has some visible water (free water) and some fuel

(d) Pour the fuel/water from the container into the sample bottle, STD-6365.

(e) Do not add any additives, such as food coloring, to identify the presence of water.

SUBTASK 28-10-00-280-006

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

(a) Install the cover on the sample bottle, STD-6365.

(b) Mark each sample with the date, time, airplane and fuel tank identification.

NOTE: Recording sample fuel temperature at the time of sampling can assist with future troubleshooting.

(c) Protect the fuel samples from contamination.

SUBTASK 28-10-00-280-007

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

(a) Clean the fuel sampling equipment, COM-1535, again before you collect a new sample.

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(b) Make sure to collect a fuel sample from each tank.

H. Microbial Growth Detection Test

SUBTASK 28-10-00-280-008

(1) Test the sample within the timeline provided by the approval microbial test kit instructions.

NOTE: After you collect the fuel sample, microbial growth in the sample will start to change or die. Some kits require testing within six hours.

(a) Use microbial test kit, COM-4806 or luminometer instrument, COM-21126 with fuel test kit consumables, COM-21104 to test the fuel samples.

NOTE: The fuel samples can also be sent to a laboratory for testing. IP385 is the Institute for Petroleum's test for microbial contamination.

(b) Follow all instructions supplied with the microbial test kit.

NOTE: All instructions supplied with the detection kits should be followed closely. It is important to retest if a detection test shows positive for 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.

I. Initial Test Results

SUBTASK 28-10-00-280-011

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

(a) Negligible contamination

(b) Moderate contamination

(c) Heavy contamination

SUBTASK 28-10-00-280-012

(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 28-10-00-280-013

(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.

NOTE: The airplane can continue with usual operations within this timeframe before action is taken.

(b) Repeat the microbial detection test with the same test method.

(c) Confirm the level of microbial contamination.

J. Retest Results

SUBTASK 28-10-00-280-014

(1) If the retest results are 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 28-10-00-280-015

(2) If the retest results are moderate levels of microbial contamination, then do these steps:

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(a) Within 10 days (after receipt of test results) schedule a biocide treatment to kill the microbial growth.

NOTE: The airplane can continue with usual operations within this timeframe before action is taken.

(b) Do the subsequent task for moderate levels of contamination.

SUBTASK 28-10-00-280-016

(3) If the retest results are heavy levels of microbial contamination, then do these steps:

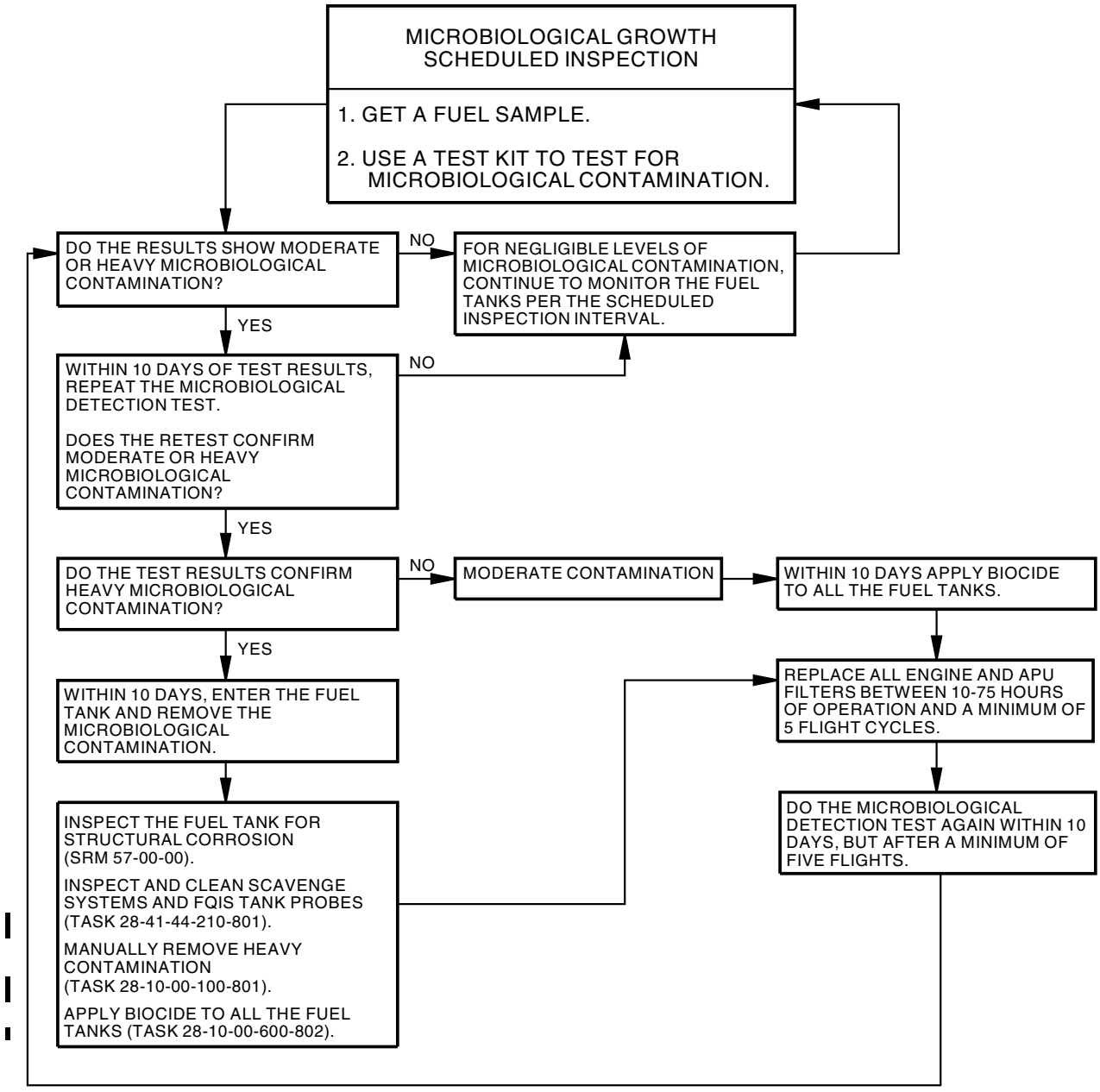
(a) Within 10 days (after receipt of test results) schedule a task to go into the fuel tank(s) to inspect and remove the microbial growth.

NOTE: The airplane can continue with usual operations within this timeframe before action is taken.

(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.

THE RECOMMENDATION TO PERFORM A MICROBIAL CONTAMINATION RETEST AFTER 5 FLIGHT CYCLES IS TO PROVIDE SUFFICIENT FUEL TURNOVER. IF THE AIRPLANE CANNOT PERFORM 5 FLIGHT CYCLES WITHIN 10 DAYS AFTER A BIOCIDE TREATMENT, CONTACT THE TEST KIT MANUFACTURER FOR GUIDANCE ON HOW TO PERFORM TESTS AND INTERPRET RESULTS.

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Microbial Growth - In Fuel Tanks
Figure 201/28-10-00-990-801

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TASK 28-10-00-600-801

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 are 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
28-11-00-410-801	Fuel Tank Closure (P/B 201)
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-G00	Fuel Filter Cartridge Removal (P/B 401)
73-11-02-400-801-G00	Fuel Filter Cartridge Installation (P/B 401)
SRM 57-00-00	WINGS - GENERAL

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

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

CAUTION

MAKE SURE THAT YOU DO NOT ADD MORE THAN THE MAXIMUM CONCENTRATION OF BIOCIDE. DO NOT APPLY BIOCIDE IF YOU USE A PROCEDURE NOT IN THIS AIRCRAFT MAINTENANCE MANUAL. DAMAGE TO THE AIRFRAME AND ENGINES CAN OCCUR IF YOU INCORRECTLY APPLY THE BIOCIDE. BIOCIDE OVERDOSING CAN CAUSE AN ENGINE MALFUNCTION. THIS INCLUDES FAILURE TO START, LOSS OF THRUST, AND THE INABILITY TO CONTROL THRUST AND IN-FLIGHT SHUTDOWNS. IF YOU DO NOT FOLLOW THIS CAUTION, IT CAN CAUSE DAMAGE.

SUBTASK 28-10-00-280-017

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

(a) Do a biocide treatment for all of the fuel tanks (TASK 28-10-00-600-802).

(b) Return the airplane to service.

(c) Perform a minimum of five flights to burn biocide treated fuel through the engines.

(d) After a minimum of 5 flights and a recommended 10 to 75 hours of engine operation, replace these filters:

1) Engine fuel filter cartridge:

- Fuel Filter Cartridge Removal, TASK 73-11-02-000-801-G00
- Fuel Filter Cartridge Installation, TASK 73-11-02-400-801-G00.

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 28-10-00-280-018

(2) Within 10 days and a minimum of five flight cycles after the biocide treatment, do these steps:

NOTE: The recommendation to perform a microbial contamination retest after 5 flight cycles is to provide sufficient fuel turnover. If the airplane cannot perform 5 flight cycles within 10 days after a biocide treatment, contact the test kit manufacturer for guidance on how to perform tests and interpret results.

(a) Get a new fuel sample for each tank.

(b) If the tests results show heavy microbial contamination, do the steps for Treatment of Fuel Tanks with Heavy Levels of Microbial Contamination.

(c) If the test results show moderate, do these steps within 10 days:

1) Do a biocide treatment for all the fuel tanks (TASK 28-10-00-600-802).

2) Completely fill the fuel tanks with biocide treated fuel.

3) Use the maximum soak time:

a) Biobor JF - 72 Hours.

(d) If the tests results show negligible microbial contamination, then continue to test the aircraft at the usual intervals.

NOTE: After biocide treatment, frequent removal of water from the airplane sump drains and testing for microbial growth will help reduce microbial growth.

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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 28-10-00-280-019

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

SUBTASK 28-10-00-280-020

(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 (TASK 28-11-00-910-802 and TASK 28-11-00-910-801).

(c) Make sure that 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)
2) eye protection
3) fuel resistant gloves
4) Saranex suit
5) neoprene boots.

SUBTASK 28-10-00-280-026

(3) Enter the fuel tank (TASK 28-11-00-910-802 and TASK 28-11-00-910-801).

SUBTASK 28-10-00-280-021

(4) 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, convex shapes such as fuel tubing and other surfaces below the water line.

(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 28-10-00-280-022

(5) 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.

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(f) Inside or around fuel system components.

SUBTASK 28-10-00-280-023

(6) Do these steps if you find microbial growth:

(a) Do the applicable task to remove the microbial growth:

- Microbial Growth Removal - Manual Removal Method, TASK 28-10-00-100-801
- Microbial Growth Removal - Pressure Washer Method, TASK 28-10-00-100-802.

(b) Examine the fuel tank structure for corrosion (SRM SUBJECT 57-00-00).

SUBTASK 28-10-00-280-024

(7) Do these steps after you clean the fuel tank:

(a) Do the inspection and cleaning for the remaining tanks that have tested positive for microbial growth.

(b) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

(c) Do a biocide treatment of the fuel tanks (TASK 28-10-00-600-802).

(d) Return the airplane to service.

(e) Within 10 days and a minimum of five flight cycles, get a new fuel/water sample and do the microbial detection test again.

NOTE: This test is necessary to make sure that the microbial growth removal and biocide treatment processes have reduced the level of microbial contamination to a negligible level in all fuel tanks.

NOTE: The biocide treated fuel will be burned through the engines after a minimum of five flights.

(f) After 10 to 75 hours of engine operation, replace these filters:

1) Engine fuel filter cartridge:

- Fuel Filter Cartridge Removal, TASK 73-11-02-000-801-G00
- Fuel Filter Cartridge Installation, TASK 73-11-02-400-801-G00.

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 28-10-00-280-025

(8) Within 10 days and a minimum of five flight cycles after the biocide treatment, do these steps:

NOTE: The recommendation to perform a microbial contamination retest after 5 flight cycles is to provide sufficient fuel turnover. If the airplane cannot perform 5 flight cycles within 10 days after a biocide treatment, contact the test kit manufacturer for guidance on how to perform tests and interpret results.

(a) Get a new fuel sample for each tank.

(b) Do the microbial growth detection test again.

(c) If the tests show that the biocide treatment was not successful, do these steps within 10 days:

1) Do a biocide treatment of all the fuel tanks (TASK 28-10-00-600-802).

2) Completely fill the fuel tanks with biocide treated fuel.

3) Use the maximum soak time:

a) Biobor JF - 72 Hours.

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(d) If the tests show that the biocide treatment was successful, then continue to test the aircraft at the usual intervals.

——— END OF TASK ———

TASK 28-10-00-600-802

4. Biocide Treatment of Fuel Tanks - Metered Injection Cart

A. General

(1) Use this task to add biocide treatment to the fuel tanks.

(2) The adjustable metered injection cart is the only type of injection cart permitted for biocide application. This type of metered injection cart is equipped with an adjustable concentration setting. Only these metered injection carts are recommended for this task:

(a) Hammonds Technical Services' Injection carts

(b) Injection carts meeting the Energy Institutes' standard EI 1566, as listed in the portable biocide injection hydrant cart, COM-1781, are recommended for this task.

(3) 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.

(4) The biocide fuel additive certified by the engine manufacturer is Biobor JF additive, G00452. Follow engine manufacturer guidelines prior to use.

NOTE: Biobor JF has not been approved in some geographic areas. Local regulatory agencies should be consulted with respect to approval status.

(5) Do not mix Biobor JF with any other biocide. Do not apply Biobor JF and any other biocide to the same fuel tank.

(6) Obey all Health and Safety precautions specified by the manufacturer related to the use of biocide.

(7) It is recommended to begin 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, unless it is required to allow the uplift of sufficient volume of treated fuel. Fuel quantity limits are provided in this procedure.

(8) Do not apply undiluted biocide into the airplane fuel tanks. This can result in high concentrations of biocide and can damage equipment and tank structure.

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
12-11-00-680-801	Fuel Tank Sumps - Fuel Sampling (P/B 301)

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-1781	Cart - Hydrant, Portable, Biocide Injection Part #: AC800-1M Supplier: 47186 Part #: AC800-1S Supplier: 47186 Part #: HC600-1P7 (for BIOBOR biocide) Supplier: 47186 Part #: HC800-1S Supplier: 47186 Opt Part #: 69-10-04-999 Supplier: 1X7Q9 Opt Part #: MODEL HC800 Supplier: 47186

D. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G00452	Additive, Fuel - Biobor JF	

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. Biocide Precautions

SUBTASK 28-10-00-620-001

(1) Obey these personnel precautions:

WARNING DO NOT BREATHE FUMES FROM THE BIOCIDE FUEL ADDITIVE, OR TOUCH IT. READ THE MATERIAL SAFETY DATA SHEET (MSDS) FROM THE MANUFACTURER OF THE ADDITIVE. THE ADDITIVE CAN CAUSE INJURIES TO PERSONNEL AND HEALTH PROBLEMS.

(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

SUBTASK 28-10-00-620-002

(2) Obey these biocide additive precautions:

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CAUTION

MAKE SURE THAT YOU DO NOT ADD MORE THAN THE MAXIMUM CONCENTRATION OF BIOCIDE. DO NOT APPLY BIOCIDE IF YOU USE A PROCEDURE NOT IN THIS AIRCRAFT MAINTENANCE MANUAL. DAMAGE TO THE AIRFRAME AND ENGINES CAN OCCUR IF YOU INCORRECTLY APPLY THE BIOCIDE. BIOCIDE OVERDOSING CAN CAUSE AN ENGINE MALFUNCTION. THIS INCLUDES FAILURE TO START, LOSS OF THRUST, AND THE INABILITY TO CONTROL THRUST AND IN-FLIGHT SHUTDOWNS. IF YOU DO NOT FOLLOW THIS CAUTION, IT CAN CAUSE DAMAGE.

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

(b) Do not exceed the maximum allowable concentration of biocide (parts per million [ppm]) in a fuel tank.

(c) Do not uplift fuel overdosed with biocide. Do not overdose the final fuel tank load.

(d) If you exceed the maximum allowable concentration of biocide in a fuel tank and you cannot dilute the concentration with untreated fuel or defuel the tank, then contact Boeing for corrective action.

NOTE: Untreated fuel is defined as fuel that does not contain biocide.

(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) Refer to the biocide manufacturer's documentation, Safety Description Sheet and local agencies for procedures to dispose of the material.

SUBTASK 28-10-00-620-047

(3) Verify injection cart has been calibrated prior to uplifting biocide treated fuel to the aircraft.

SUBTASK 28-10-00-620-048

(4) If the airplane was treated with Kathon FP 1.5, contact Boeing.

SUBTASK 28-10-00-620-049

(5) If you think that biocide was applied incorrectly, send a service request with this information to Boeing for evaluation:

(a) Fuel quantity (volume) in each tank before applying biocide.

(b) Fuel quantity (volume) in each tank after applying biocide.

(c) Total quantity (volume) of fuel biocide applied to each airplane.

(d) Uplift concentration (parts per million volume [ppm (V)]) of biocide applied in each tank.

(e) Final target concentration (ppm (V)) of biocide applied to each tank.

G. Prepare for the Biocide Treatment

SUBTASK 28-10-00-680-001

WARNING

DO NOT BREATHE FUMES FROM THE BIOCIDE FUEL ADDITIVE, OR TOUCH IT. READ THE MATERIAL SAFETY DATA SHEET (MSDS) FROM THE MANUFACTURER OF THE ADDITIVE. THE ADDITIVE CAN CAUSE INJURIES TO PERSONNEL AND HEALTH PROBLEMS.

(1) Sump each fuel tank until no more water drains from the fuel tank (TASK 12-11-00-680-801).

NOTE: Sump all fuel tanks prior to Biocide application, including empty tanks.

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SUBTASK 28-10-00-680-002

(2) Do the following task:

(a) Apply the Biobor JF Biocide to the Fuel Tanks - Metered Injection

H. Apply the Biobor JF Biocide to the Fuel Tanks - Metered Injection

SUBTASK 28-10-00-620-050

(1) Obey the biocide precautions.

SUBTASK 28-10-00-620-040

(2) Plan the refueling operation per Table 201.

Table 201/28-10-00-993-804 Minimum Tank Fuel Volume After Biocide Application

FUEL VOLUME IN AN INDIVIDUAL TANK PRIOR TO BIOCIDE APPLICATION	REQUIRED FUEL VOLUME IN AN INDIVIDUAL TANK AFTER BIOCIDE APPLICATION
Empty as indicated by the Fuel Quantity Indicating System and the tank is not being treated to address confirmed microbial contamination	Minimum 10% Tank Capacity
Empty as indicated by the Fuel Quantity Indicating System and the tank is being treated to address confirmed microbial contamination	Minimum 33% Tank Capacity
Not empty as indicated by the Fuel Quantity Indicating System but less than or equal to 5% Tank Capacity	Minimum 50% Tank Capacity
Greater than 5% but less than or equal to 10% Capacity	Volumetric Shut-Off (VSO) Capacity
Greater than 10% Capacity	Not permitted

NOTE: Fuel tanks are not subject to this table if untreated fuel has not been uplifted or transferred into the fuel tank since the last time this procedure was performed. In this case, if the tank is being treated to address microbial contamination, the required fuel volume in an individual tank after biocide application for an initial treatment is minimum 33% tank capacity and VSO for a second treatment.

(a) If the fuel volume in an individual tank is greater than the desired fuel quantity, defuel the tank to the desired volume.

(b) Do not perform tank-to-tank transfer with fuel that has confirmed microbial contamination.

NOTE: This could cross contaminate the fuel tanks.

SUBTASK 28-10-00-620-042

(3) Make sure that the portable biocide injection hydrant cart, COM-1781, is set to the injection setting to achieve a biocide uplift concentration of 0.2000 ml biocide per liter of fuel (0.0256 fl.oz per US gallon of fuel).

NOTE: This is equivalent to 200 parts per million by volume (ppm (V)).

(a) If the portable biocide injection hydrant cart, COM-1781, injection rate is not set, use the instructions provided with the portable biocide injection hydrant cart to set the injection rate.

NOTE: Locking out the portable biocide injection hydrant cart, COM-1781, after calibration will minimize the risk of applying biocide in excess of the permitted maximum concentration (overdosing).

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SUBTASK 28-10-00-620-043

CAUTION	MAKE SURE THAT YOU DO NOT ADD MORE THAN THE MAXIMUM CONCENTRATION OF BIOCIDE. DO NOT APPLY BIOCIDE IF YOU USE A PROCEDURE NOT IN THIS AIRCRAFT MAINTENANCE MANUAL. DAMAGE TO THE AIRFRAME AND ENGINES CAN OCCUR IF YOU INCORRECTLY APPLY THE BIOCIDE. BIOCIDE OVERDOSING CAN CAUSE AN ENGINE MALFUNCTION. THIS INCLUDES FAILURE TO START, LOSS OF THRUST, AND THE INABILITY TO CONTROL THRUST AND IN-FLIGHT SHUTDOWNS. IF YOU DO NOT FOLLOW THIS CAUTION, IT CAN CAUSE DAMAGE.

(4) Do these steps to treat the fuel tank with biocide:

(a) Make sure that the tank has an appropriate initial fuel volume per the criteria of Table 201.

(b) Open the refuel valve(s) for one tank only (TASK 12-11-00-650-803).

(c) Begin the refuel operation (TASK 12-11-00-650-803).

(d) Using the calibrated portable biocide injection hydrant cart, COM-1781, refuel the tank with Biobor JF treated fuel to the desired fuel load.

(e) Make sure that the tank is filled to the minimum fuel volume per the “REQUIRED FUEL VOLUME IN AN INDIVIDUAL TANK AFTER BIOCIDE APPLICATION” value in Table 201.

(f) Stop the refuel operation (TASK 12-11-00-650-803).

(g) For each tank, record the following quantities:

1) Quantity of fuel in the tank prior to biocide application.

2) Quantity of fuel uplifted into the tank during application.

3) Quantity of fuel in the tank after biocide application.

4) Quantity of biocide consumed during each tank application.

(h) Continue to apply the treated fuel to all fuel tanks.

(i) Add biocide treated fuel to the remaining tanks as necessary.

SUBTASK 28-10-00-620-051

(5) Allow the biocide treatment to soak per Biobor JF soak time of 72 hours.

SUBTASK 28-10-00-620-052

(6) 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.

SUBTASK 28-10-00-620-053

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

SUBTASK 28-10-00-620-054

(8) Review the maintenance records to make sure that the fuel has been dosed correctly.

SUBTASK 28-10-00-620-044

(9) If the tank has been overdosed, contact Boeing, engine and APU OEMs for further instructions.

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I. Post-Biocide Treatment Maintenance Actions

WARNING DO NOT BREATHE FUMES FROM THE BIOCIDE FUEL ADDITIVE, OR TOUCH IT. READ THE MATERIAL SAFETY DATA SHEET (MSDS) FROM THE MANUFACTURER OF THE ADDITIVE. THE ADDITIVE CAN CAUSE INJURIES TO PERSONNEL AND HEALTH PROBLEMS.

SUBTASK 28-10-00-620-025

(1) After the biocide treatment soak time, sump each tank to remove water (TASK 12-11-00-680-801).

——— END OF TASK ———

TASK 28-10-00-100-801

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, TASK 28-10-00-100-802.

(3) It is only necessary to do this task for the fuel tank(s) that have microbial contamination found during the inspection.

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)
28-11-21-000-801	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)
28-11-41-000-801	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 401)
28-11-61-400-801	Main Tank Fuel Sump Drain Valve Installation (P/B 401)
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	Tank Unit or Compensator Unit - Removal (P/B 401)
28-41-21-400-801	Tank Unit or Compensator Unit - Installation (P/B 401)
28-41-44-000-801	FQIS Wire Harness Removal (P/B 401)
SRM 57-00-00	WINGS - GENERAL

C. Tools/Equipment

Reference	Description
STD-134	Brush - Stiff Fiber Bristle
STD-421	Goggles - Eye Protection
STD-3731	Streamer - REMOVE BEFORE FLIGHT
STD-7374	Gloves - Fuel and Solvent Resistant
STD-7377	Boots - Neoprene
STD-7378	Saranex Suit

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D. Consumable Materials

Reference	Description	Specification
B00130	Alcohol - Isopropyl	TT-I-735
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

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. Prepare to Remove the Microbial Growth

SUBTASK 28-10-00-620-029

(1) Do this procedure after you have completed this task: Detection Test for Microbial Growth, TASK 28-10-00-200-801.

SUBTASK 28-10-00-620-030

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 (TASK 28-11-00-910-802).

SUBTASK 28-10-00-620-031

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 28-10-00-620-032

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:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) suit, STD-7378

(b) gloves, STD-7374

(c) eye protection goggles, STD-421

(d) boot, STD-7377

SUBTASK 28-10-00-620-033

(5) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-10-00-020-001

(6) Remove these components for the tank(s) to be inspected and cleaned:

NOTE: Make a component removal record.

(a) Sump drain valve (TASK 28-11-61-000-801, TASK 28-11-21-000-801, TASK 28-11-41-000-801).

(b) FQIS tank units (TASK 28-41-21-000-801)

(c) Fuel scavenge jet pump (TASK 28-22-17-000-801).

SUBTASK 28-10-00-910-001

(7) Put a protective cover on these fuel system components and attach a REMOVE BEFORE FLIGHT streamer, STD-3731:

(a) Fuel pump inlets

(b) Scavenge and water ejector pump inlets

(c) By-pass valve inlets

SUBTASK 28-10-00-160-001

(8) Use the applicable manufacturer's recommendations to inspect and clean these components as necessary:

(a) Fuel scavenge jet pump

(b) Tank units and compensator unit

G. Remove the Microbial Growth - Manual Method

SUBTASK 28-10-00-620-034

(1) Do these steps to remove the microbial growth:

(a) Use a stiff fiber bristle brush, STD-134, to loosen the contamination.

(b) Apply alcohol, B00130, to a cotton wiper, G00034.

(c) Use the minimum quantity of isopropyl alcohol, B00130, that is necessary.

(d) Use the cotton wiper, G00034, to remove the microbial growth.

(e) Put the used cotton wiper, G00034, in a plastic bag to decrease the isopropyl alcohol, B00130, 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 (621 kPa) maximum) to blow a11 material from the inlet screen on the water and fuel scavenge pumps.

SUBTASK 28-10-00-620-035

(2) Do a visual check of the fuel tank structure for corrosion.

(a) If you find corrosion, then repair the damage (SRM SUBJECT 57-00-00).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

H. Put the Airplane Back to Its Usual Condition

SUBTASK 28-10-00-080-001

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

SUBTASK 28-10-00-910-002

(2) Remove the protective covers from these fuel system components:

(a) Fuel pump inlets

(b) Fuel scavenge system inlets

(c) By-pass valve inlets

SUBTASK 28-10-00-410-001

(3) Install these components:

(a) Sump drain valve (TASK 28-11-61-400-801, TASK 28-11-21-400-801, TASK 28-11-41-400-801)

(b) FQIS tank units (TASK 28-41-44-000-801, TASK 28-41-21-400-801)

(c) Fuel scavenge jet pump (TASK 28-22-17-400-801)

SUBTASK 28-10-00-410-002

(4) Install all panels or structure that you removed.

SUBTASK 28-10-00-620-036

(5) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

SUBTASK 28-10-00-620-037

(6) Do this task: Biocide Treatment of Fuel Tanks - Metered Injection Cart, TASK 28-10-00-600-802.

——— END OF TASK ———

TASK 28-10-00-100-802

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 28-10-00-100-801.

(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 Fuel Quantity Indicating System (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.

(4) It is only necessary to do this task for the fuel tank(s) that have microbial contamination found during the inspection.

B. References

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

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(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)
28-11-11-000-802	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 (533AB, 533CB, 633AB, 633CB) 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 401)
28-11-61-400-801	Main Tank Fuel Sump Drain Valve Installation (P/B 401)
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	Tank Unit or Compensator Unit - Removal (P/B 401)
28-41-21-400-801	Tank Unit or Compensator Unit - Installation (P/B 401)
SRM 57-00-00-0G-0	Wings

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-10710	Explosion Proof Vacuum Part #: AV1-55 EX W Supplier: $1354 Part #: EXP1-55 TC TE Supplier: 0YX65 Part #: MDL55 ITEM 23954 Supplier: 05490
STD-126	Brush - Soft-bristle, Non-metallic
STD-1129	Coveralls - Tyvek/Saranex 23-p (Approved Cotton Substitute), No Pockets
STD-1136	Facepiece (Mask) - Particulate Filtering, Disposable (NIOSH N95 approved)
STD-1181	Gloves - Heat Protective
STD-1425	Gloves
STD-3731	Streamer - REMOVE BEFORE FLIGHT
STD-7374	Gloves - Fuel and Solvent Resistant
STD-7377	Boots - Neoprene
STD-7380	Respirator - Half-Mask, Air Purifying (with filters/cartridges)
STD-7386	Hose - Air Supply
STD-7411	Clothing - Waterproof
STD-8424	Washer - Pressure [Hot Water Surface impact requirement (Maximum): - Temperature: 160F (71C) - Pressure: 100 psig (689 kPa) - Flow: 3 gal (11 l) - 5 gal (19 l) per min]

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Reference	Description
STD-8850	Source - Hot Water (max 140 F, 60 C), Regulated (0-100 psig, 6.8 atm)

D. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

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. Hot Water Pressure Washer - Precautions

NOTE: The pressure washer method is not recommended outboard of Wing Station 326.

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, STD-1181

(b) Waterproof outer gloves, STD-1425

(c) waterproof clothing, STD-7411

(d) Full filtering facepiece, STD-1136

(e) Protective gear to protect against breathing or touching microbial growth

(f) A regulated hot water source, 140 F max, 0-100 psig, STD-8850, line that closes automatically when you release it ("deadman" control switch).

SUBTASK 28-10-00-910-003

(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.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-10-00-910-004

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

SUBTASK 28-10-00-160-002

(5) Make sure that 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 28-10-00-910-005

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) Prepare to go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-10-00-020-002

(2) Remove the applicable access doors for the fuel tank in the area that must be cleaned (TASK 28-11-11-000-801, TASK 28-11-11-000-802, TASK 28-11-31-000-801).

SUBTASK 28-10-00-020-003

(3) Remove the necessary fuel tank equipment and support brackets to get access to the area that must be cleaned.

SUBTASK 28-10-00-910-006

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) Half face canister style half-mask respirator, STD-7380 (minimum)

(b) Fuel resistant gloves, STD-7374

(c) coveralls (approved cotton substitute), STD-1129

(d) Neoprene boots, STD-7377.

SUBTASK 28-10-00-020-004

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

NOTE: Make a component removal record.

(a) Sump drain valve (TASK 28-11-61-000-801, TASK 28-11-21-000-801, TASK 28-11-41-000-801)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) FQIS tank units (TASK 28-41-21-000-801)

(c) Fuel scavenge jet pump (TASK 28-22-17-000-801).

SUBTASK 28-10-00-910-007

(6) Put a protective cover on these fuel system components and attach a REMOVE BEFORE FLIGHT streamer, STD-3731:

(a) Fuel pump inlets

(b) Scavenge and water ejector pump inlets

(c) By-pass valve inlets.

SUBTASK 28-10-00-110-001

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

(a) Fuel scavenge jet pump

(b) Tank units and compensator unit.

H. Pressure Wash the Fuel Tank

SUBTASK 28-10-00-110-002

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) Full face canister style half-mask respirator, STD-7380 (minimum)

(b) heat protective gloves, STD-1181

(c) Waterproof outer gloves, STD-1425

(d) waterproof clothing, STD-7411

(e) Full filtering facepiece, STD-1136.

SUBTASK 28-10-00-160-003

(2) Use the pressure washer, STD-8424, 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 a 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 28-10-00-160-004

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

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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 supply hose, STD-7386, 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 supply hose, STD-7386, or a soft-bristle non-metallic brush, STD-126, to make sure that 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 28-10-00-160-005

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

I. Restore the Fuel Tank

SUBTASK 28-10-00-160-006

(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 explosion-proof vacuum, COM-10710, 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 28-10-00-210-001

(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 PROCEDURE 57-00-00-0G-0).

(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 28-10-00-080-002

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

SUBTASK 28-10-00-410-003

(2) Install these components:

(a) Sump drain valve (TASK 28-11-61-400-801, TASK 28-11-21-400-801, TASK 28-11-41-400-801)

(b) FQIS tank units (TASK 28-41-21-400-801)

(c) Fuel scavenge jet pumps (TASK 28-22-17-400-801).

SUBTASK 28-10-00-410-004

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

SUBTASK 28-10-00-080-003

(4) Remove the protective covers from these fuel system components:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Fuel pump inlets

(b) Fuel scavenge system inlets

(c) Bypass valve inlets.

SUBTASK 28-10-00-410-005

(5) Install all panels or tank structure removed for access (TASK 28-11-11-400-801, TASK 28-11-11-400-802, TASK 28-11-31-400-801).

SUBTASK 28-10-00-910-008

(6) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

SUBTASK 28-10-00-210-002

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

SUBTASK 28-10-00-620-038

(8) Do this task: Biocide Treatment of Fuel Tanks - Metered Injection Cart, TASK 28-10-00-600-802.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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
12-11-00 P/B 301	FUEL - SERVICING

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Reference	Title
28-26-00 P/B 201	DEFUELING - MAINTENANCE PRACTICES

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 - Half-Mask, Air Purifying (with filters/cartridges)

D. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

E. Purging and Fuel Tank Entry - Definitions

SUBTASK 28-11-00-910-001

(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 28-11-00-910-002

(2) Approved Persons for Fuel Tank Entry:

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

SUBTASK 28-11-00-910-003

(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 28-11-00-910-004

(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 28-11-00-910-005

(5) Explosion-Proof Equipment:

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(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.

(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 28-11-00-910-006

(6) Fire-Safe Condition:

(a) 10% or less of the lower explosive limit (LEL).

SUBTASK 28-11-00-910-007

(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 or air monitor with Photoionization Detector (PID).

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 201/28-11-00-993-802 Health-Safe Condition

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 28-11-00-910-008

(8) Lower Explosive Limits (LEL):

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(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 28-11-00-910-009

(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 28-11-00-910-010

(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 28-11-00-910-011

(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 28-11-00-910-012

(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 28-11-00-910-013

(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 28-11-00-910-014

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

SUBTASK 28-11-00-910-015

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.

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SUBTASK 28-11-00-910-016

(5) The main, and AUX 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 28-11-00-910-017

(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 28-11-00-910-018

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

G. Purging and Fuel Tank Entry - Electrical Equipment Precautions

SUBTASK 28-11-00-910-019

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 202.

Table 202/28-11-00-993-803 Separation Distance

POWER (EIRP *[1]) OF EQUIPMENT TRANSMITTING RADAR OR RADIO *[2]	MAINTENANCE WITH OPEN FUEL TANKS (PURGED)	MAINTENANCE WITH OPEN FUEL TANKS (NOT PURGED)
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.

*[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 28-11-00-910-020

(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.

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SUBTASK 28-11-00-910-021

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 202 for separation distance requirements.

SUBTASK 28-11-00-910-022

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

SUBTASK 28-11-00-910-023

(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 28-11-00-910-024

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

SUBTASK 28-11-00-910-025

(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 28-11-00-910-026

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

H. Purging and Fuel Tank Entry - Equipment Precautions

SUBTASK 28-11-00-910-027

(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 28-11-00-910-028

(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.

SUBTASK 28-11-00-910-029

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

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SUBTASK 28-11-00-910-030

(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 28-11-00-910-031

(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 28-11-00-910-032

(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 28-11-00-910-033

(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 28-11-00-910-034

(8) Use a combustible gas indicator or air monitor with Photoionization Detector (PID) to monitor the environment inside the fuel tank. The combustible gas indicator or air monitor with PID must be designed for Class I, Division 1 hazardous locations and calibrated for the correct type of jet fuel. The combustible gas indicator or air monitor with PID 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 or air monitor with PID into the fuel tank to monitor the environment where you will do the maintenance.

SUBTASK 28-11-00-910-035

(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.

(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.

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(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 28-11-00-910-036

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

SUBTASK 28-11-00-910-037

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

SUBTASK 28-11-00-910-038

(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 28-11-00-910-039

(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.

SUBTASK 28-11-00-910-040

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:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(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) 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 and can enter the main tanks through the main tank vents. An oxygen level, below heath-safe limits, can exist in the center fuel tank or the main tanks. 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.

(c) 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.

(d) Fully ventilate the applicable fuel tank before you do a fuel tank entry.

(e) Before you go into a fuel tank, open and collar the nitrogen generation system circuit breakers:

Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

(f) You must also install the manual lock bolt into the NGS shutoff valve in the closed position.

(g) Continuously monitor the oxygen sensor (aural alarm and % oxygen) on the combustible gas indicator or air monitor with Photoionization Detector (PID). 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.

(h) An organic vapor filter respirator is helpful for fuel vapor, but will not help you breathe in a low oxygen environment.

(i) 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.

SUBTASK 28-11-00-910-041

(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.

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SUBTASK 28-11-00-910-042

(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 an approved combustible gas indicator or air monitor with Photoionization Detector (PID).

SUBTASK 28-11-00-910-043

(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 28-11-00-910-044

(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.

(e) Use the tank wiring harnesses as handholds.

SUBTASK 28-11-00-910-045

(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.

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SUBTASK 28-11-00-100-001

(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 (FUEL - SERVICING, PAGEBLOCK 12-11-00/301, DEFUELING - MAINTENANCE PRACTICES, 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 (DEFUELING - MAINTENANCE PRACTICES, 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 BEFORE 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 half-mask 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 28-11-00-910-046

(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 28-11-00-910-047

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

(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 an 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 28-11-00-910-048

(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:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 28-11-00-910-049

(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 28-11-00-910-050

(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 28-11-00-910-051

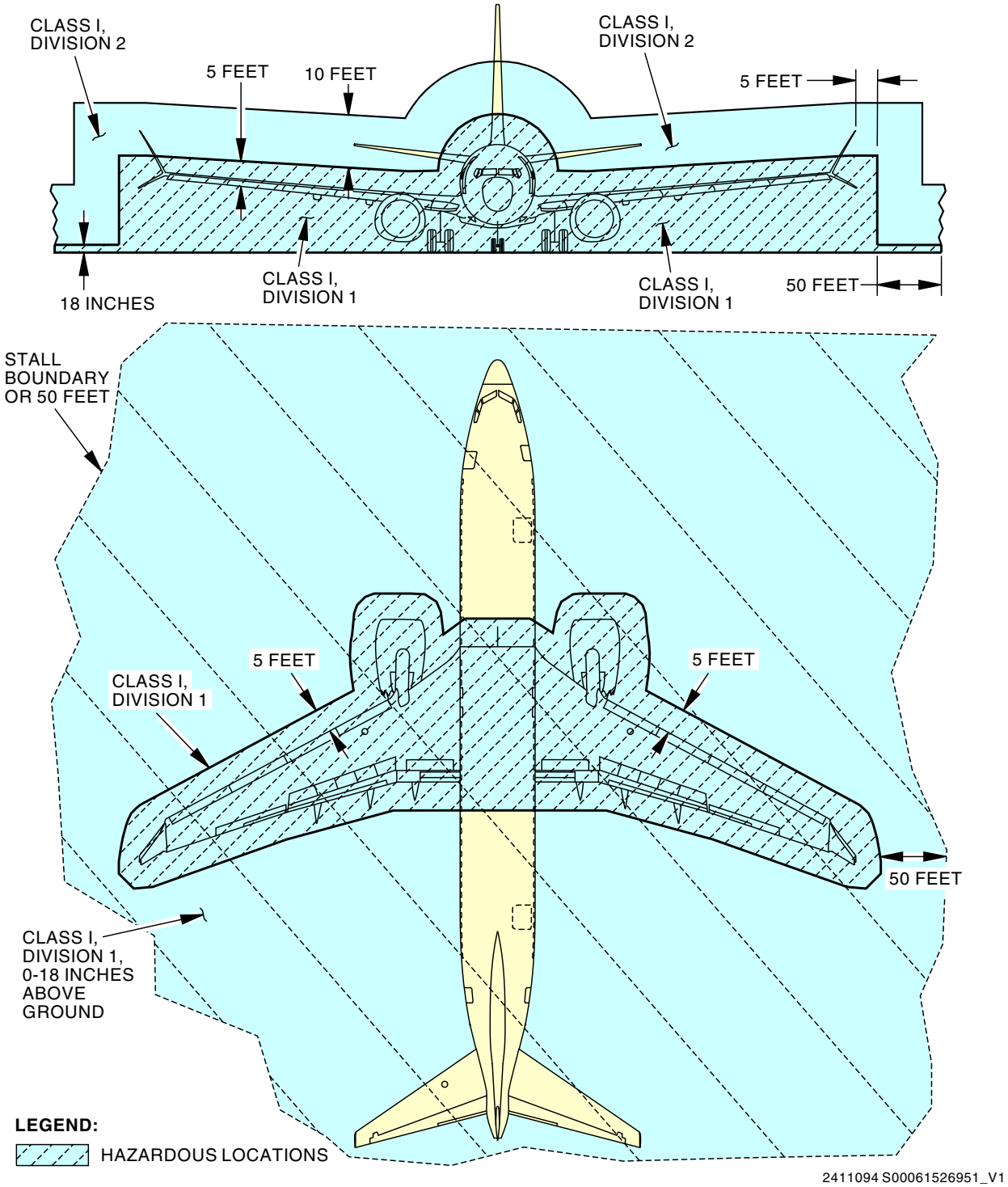
(1) When thunderstorms or lightning are within a 10 mile radius of the immediate area, open fuel tank maintenance procedures should stop. Persons inside of the fuel tanks should get out. Air ducts inside the fuel tanks should be removed and the power for all support equipment should be switched off.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

SUBTASK 28-11-00-910-052

(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.

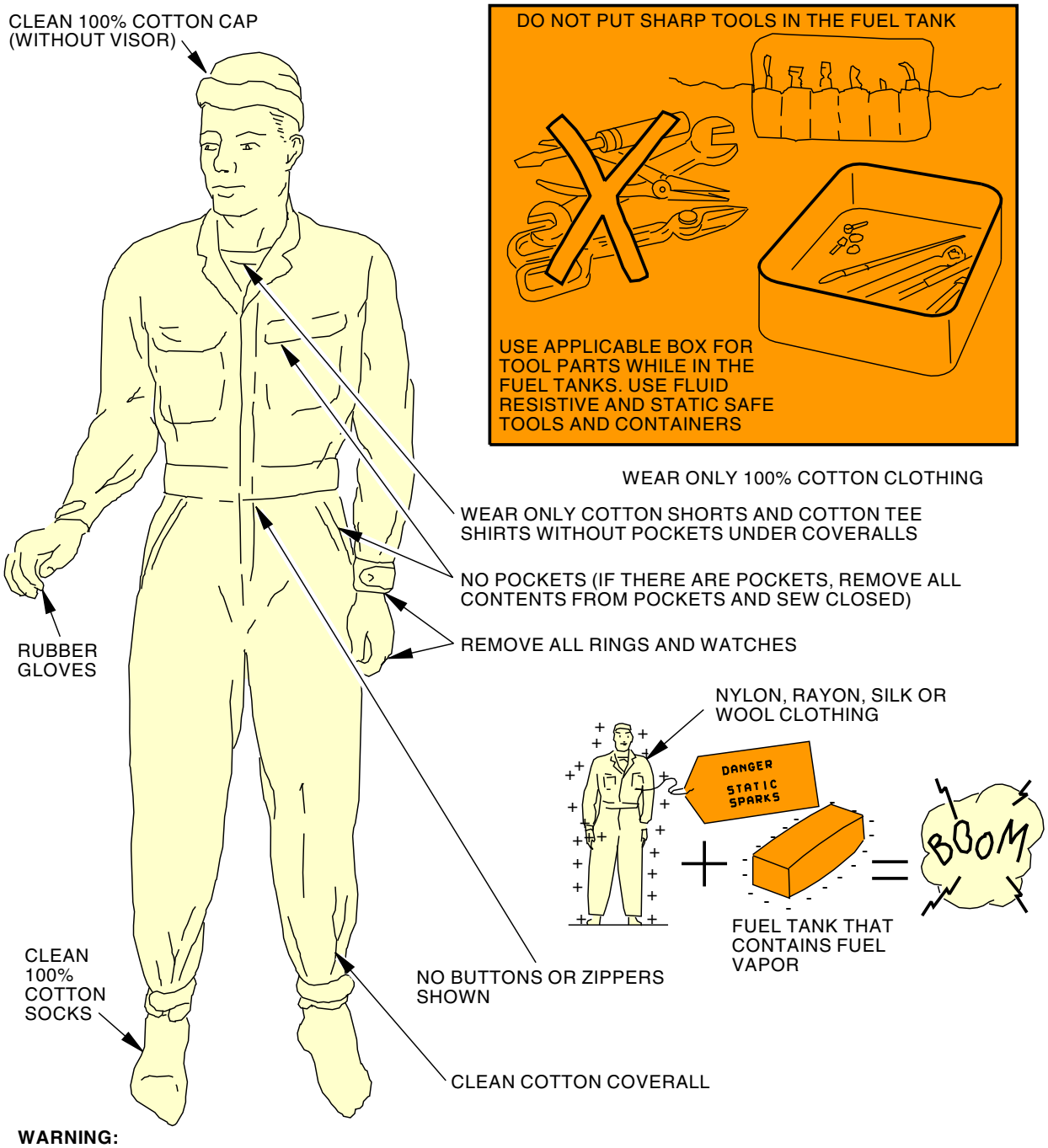
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Hazardous Locations - Open Fuel Tank(s)
Figure 201/28-11-00-990-801

ECCN 9E991 BOEING PROPRIETARY - See title page for details



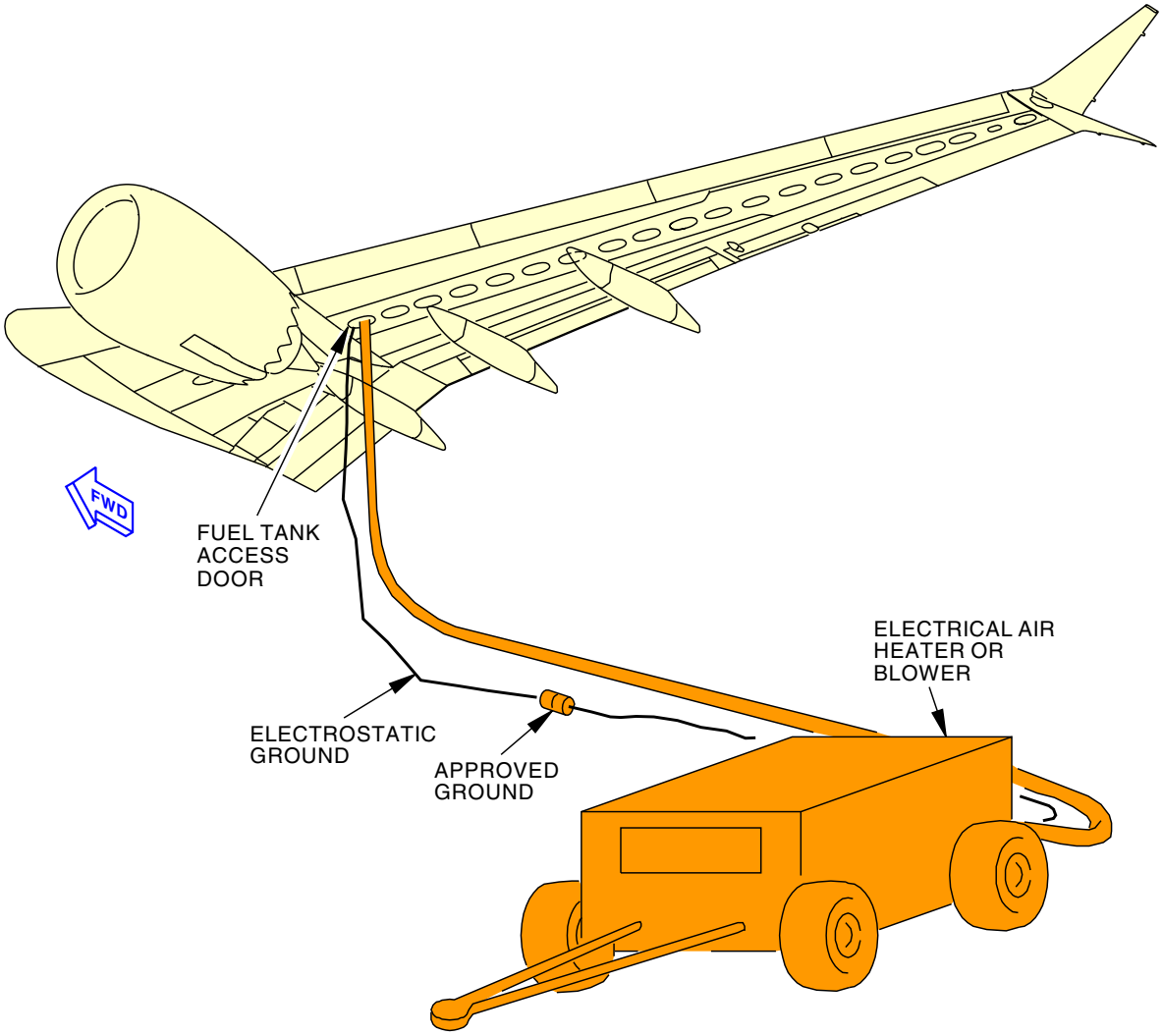
WARNING:

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.

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Fuel Tank Entry Precautions
Figure 202/28-11-00-990-802

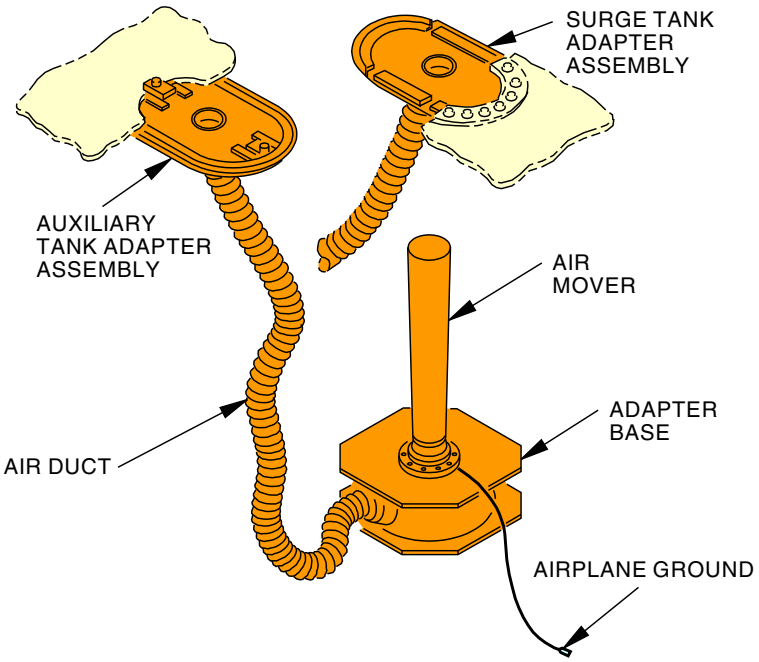
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Tank Ventilation Equipment
Figure 203/28-11-00-990-803 (Sheet 1 of 5)

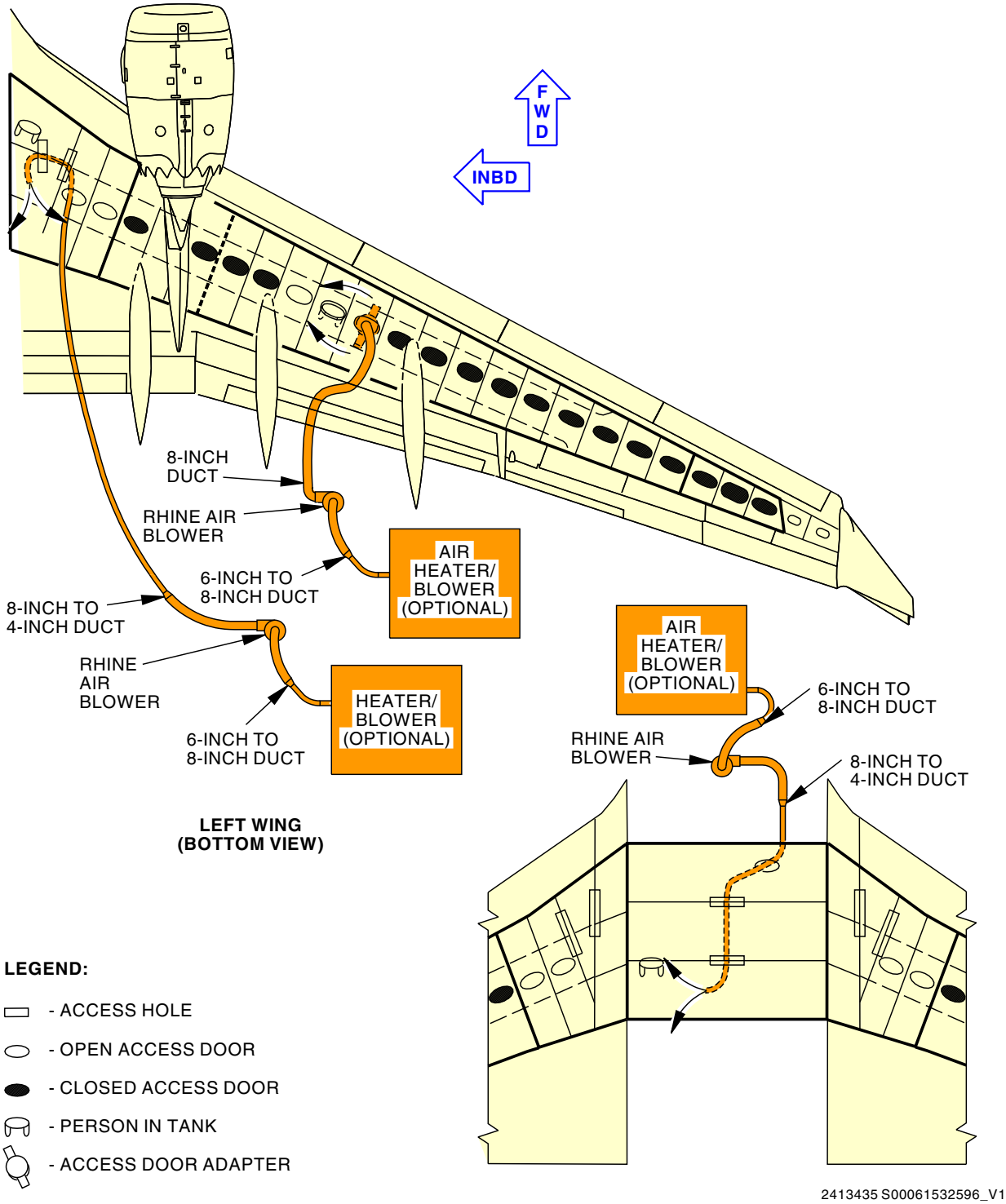
ECCN 9E991 BOEING PROPRIETARY - See title page for details



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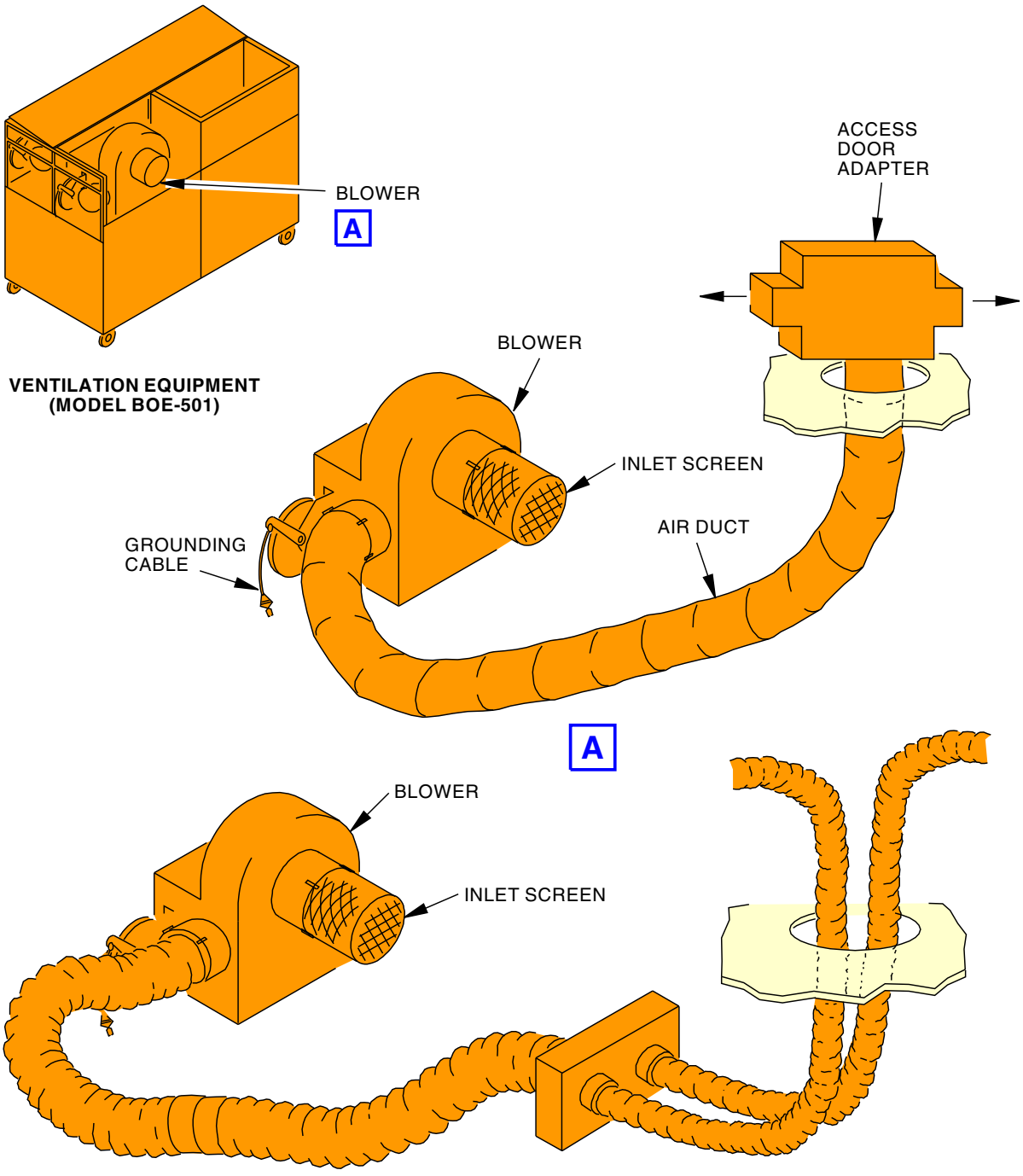
Tank Ventilation Equipment
Figure 203/28-11-00-990-803 (Sheet 2 of 5)

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

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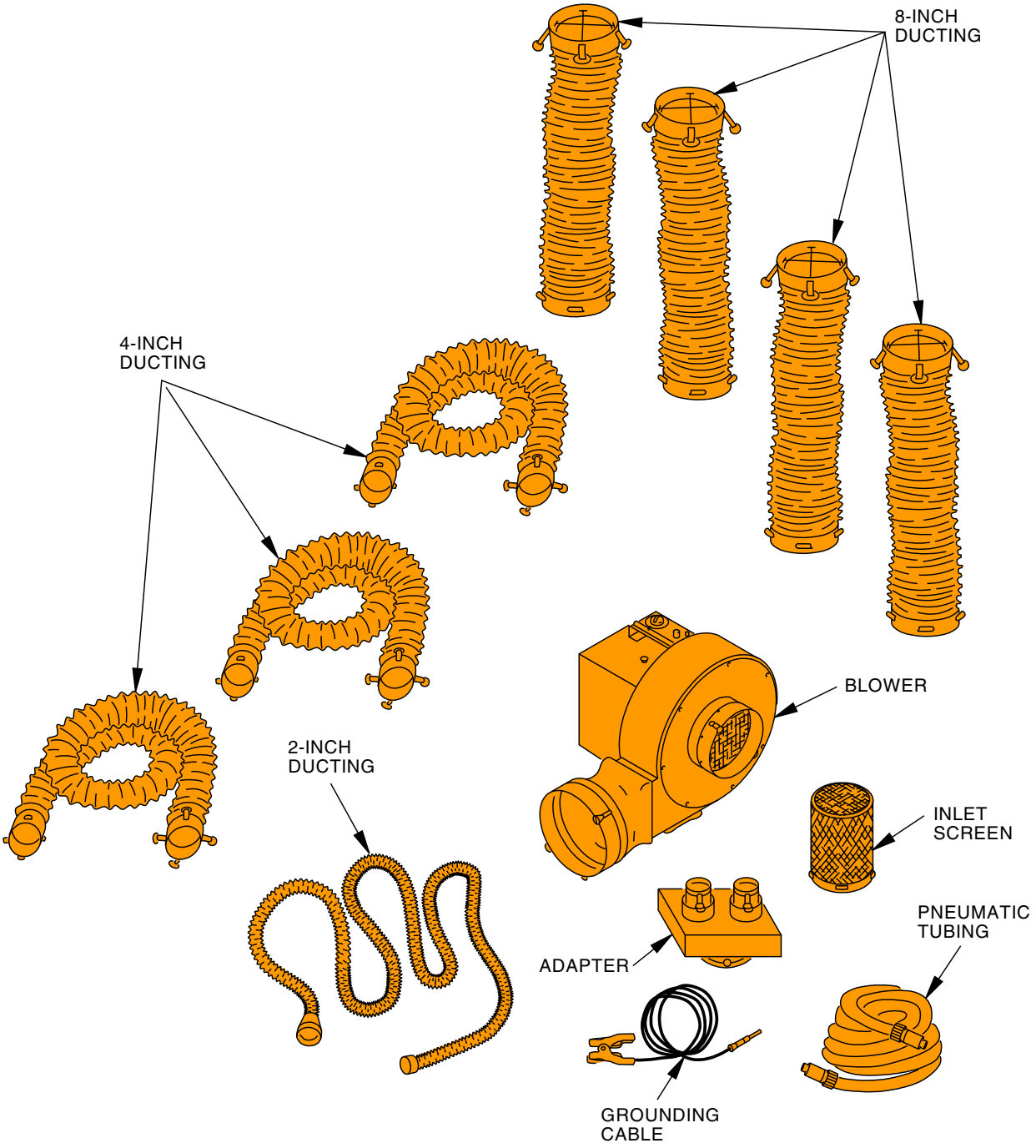


EXAMPLE CONFIGURATION FOR VENTILATION EQUIPMENT (MODEL BOE-501)

2413436 S00061532597_V1

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

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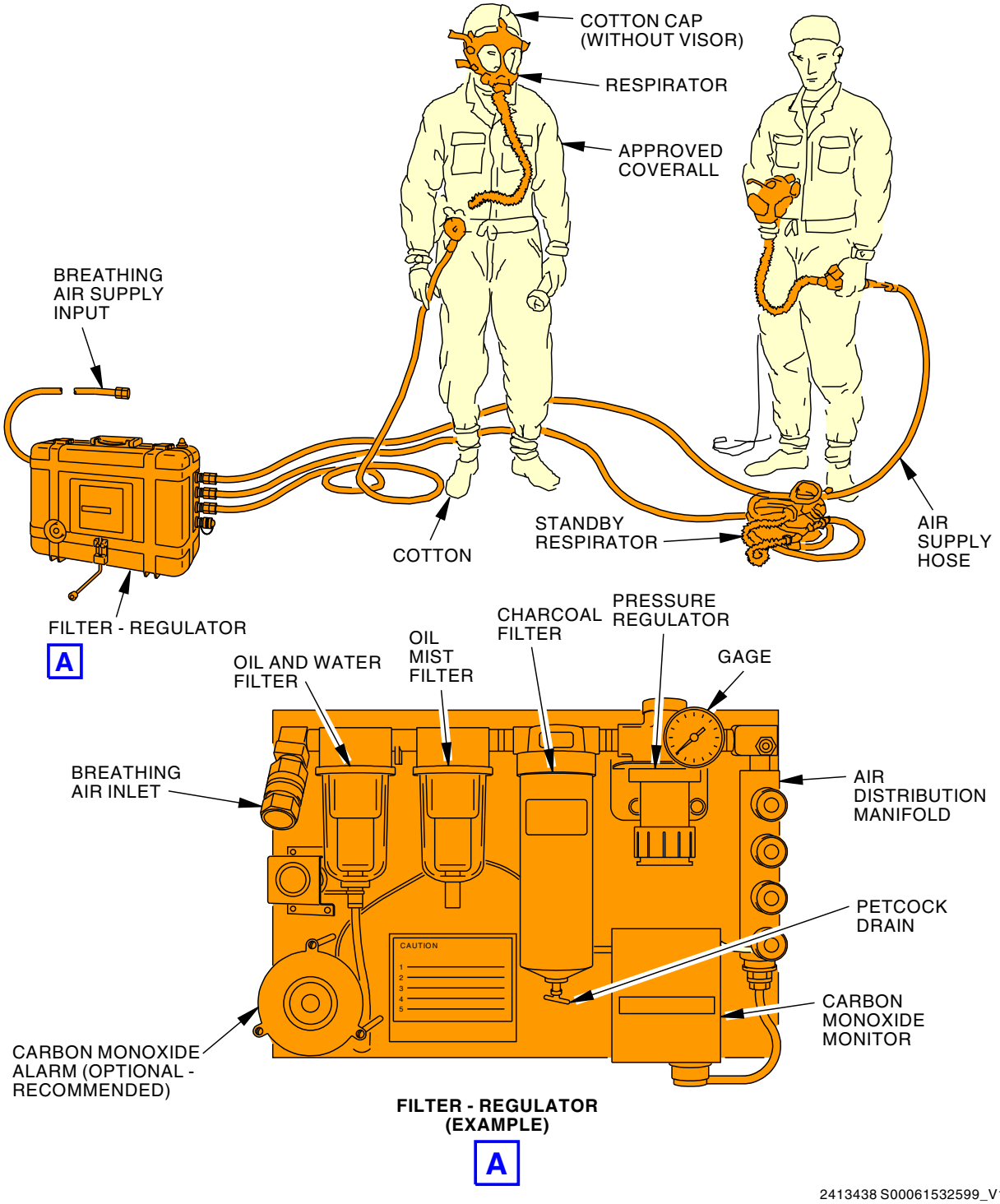


AVAILABLE VENTILATION EQUIPMENT

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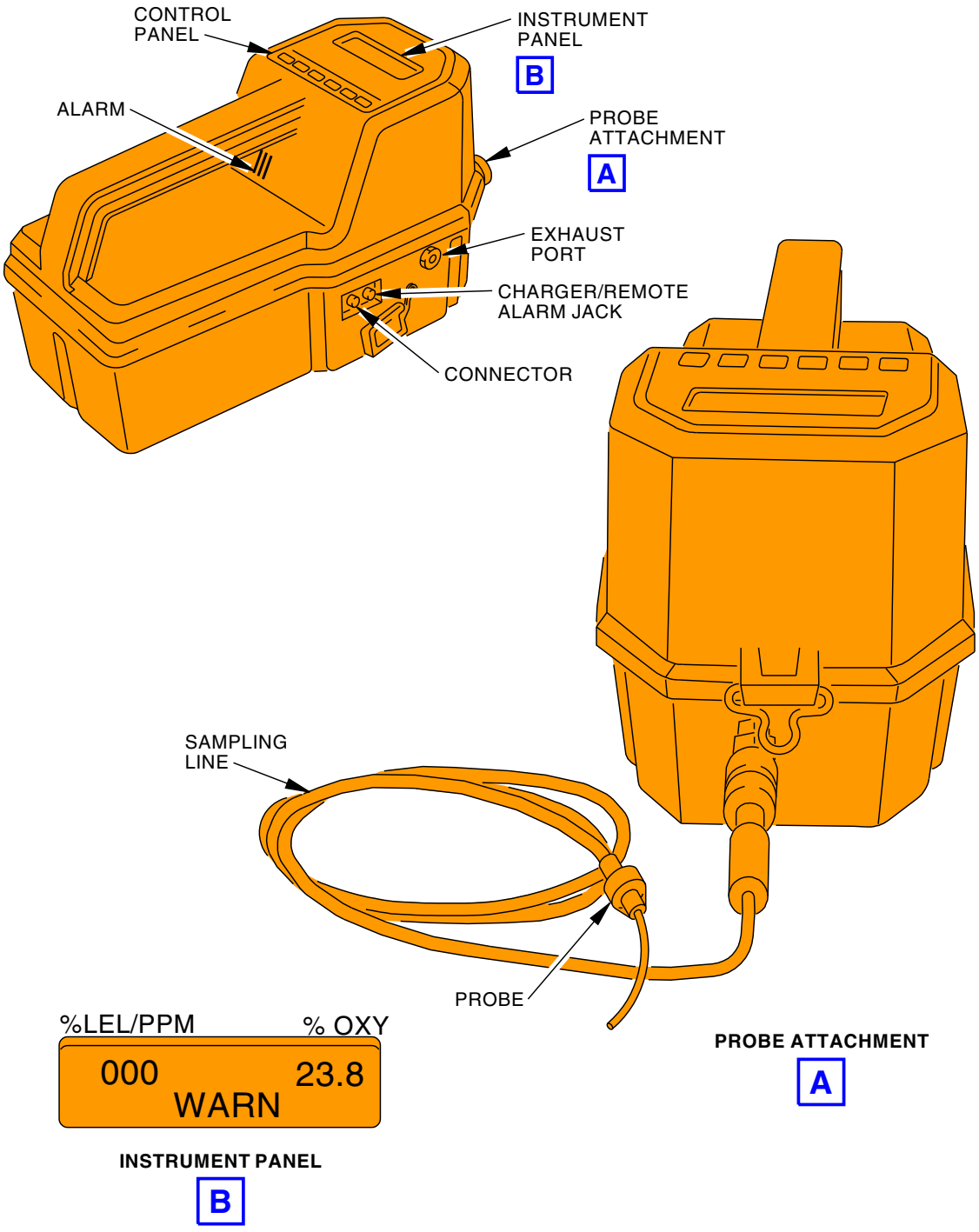
Tank Ventilation Equipment
Figure 203/28-11-00-990-803 (Sheet 5 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



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

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413439 S00061532600_V1

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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, irriation, 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.

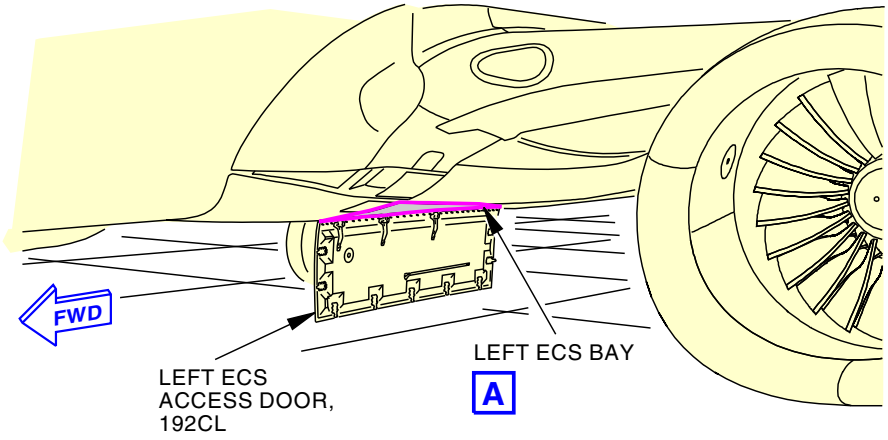
_____ _____

Signature of Supervisor or Designee Date

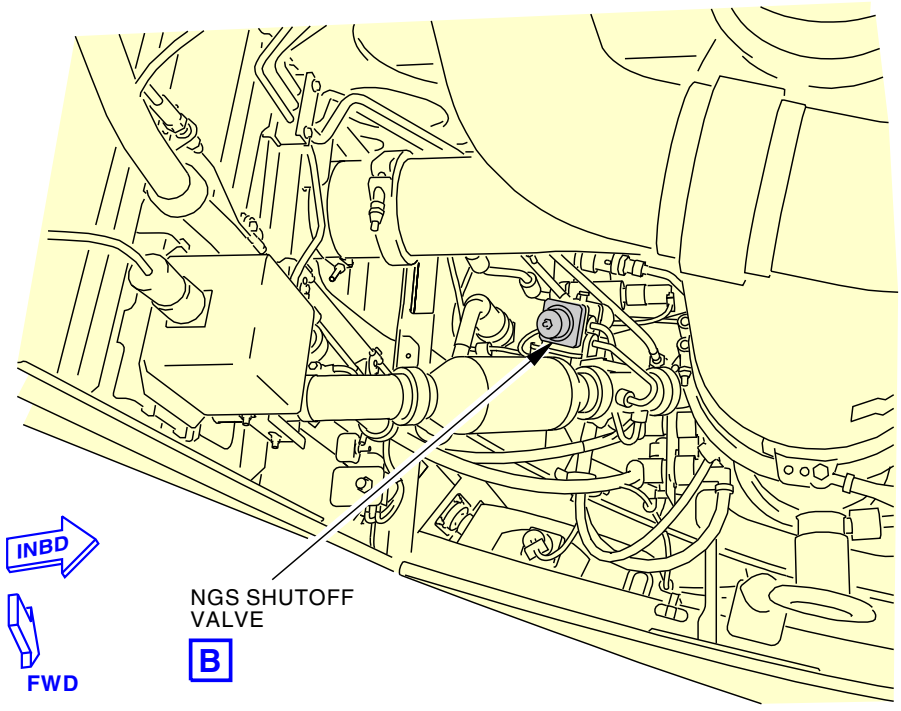
2413440 S00061532601_V1

Fuel Tank Pre-Entry Checklist (Example)
Figure 206/28-11-00-990-806

ECCN 9E991 BOEING PROPRIETARY - See title page for details



(EXAMPLE)



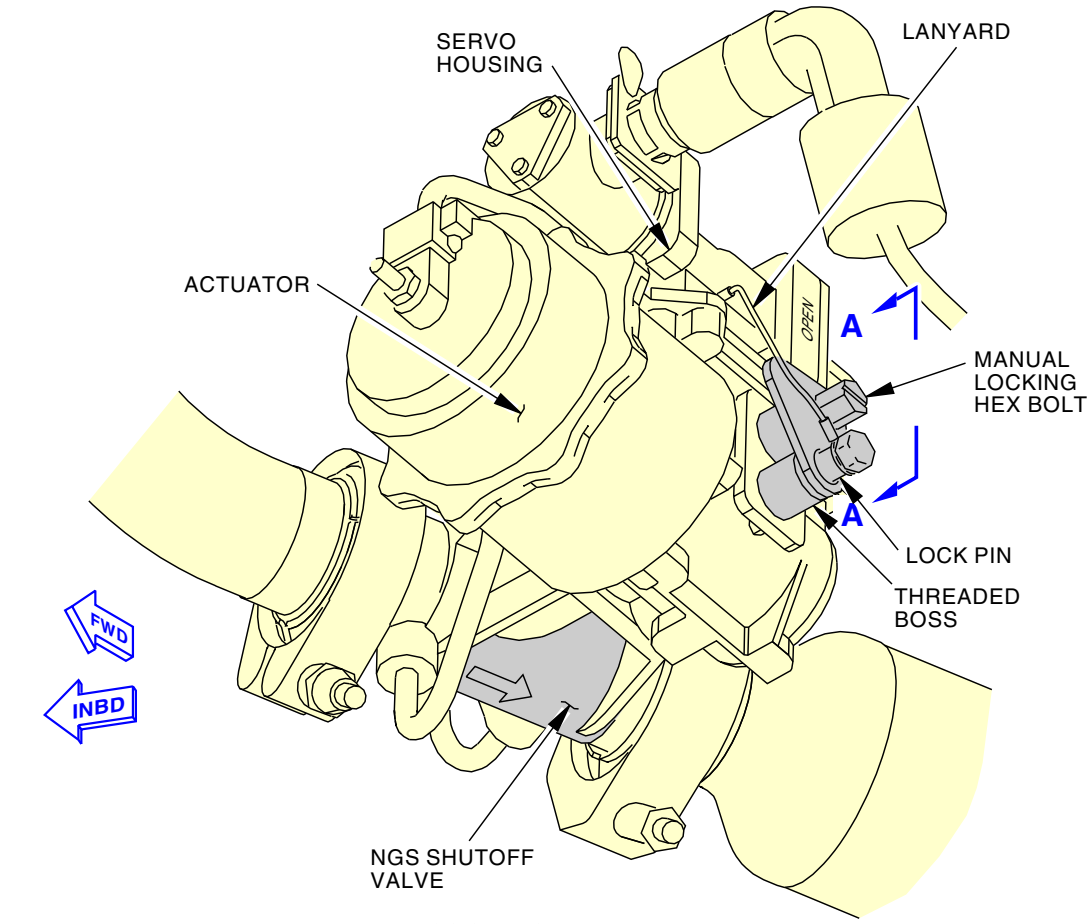
LEFT ECS BAY

A

2413441 S00061532602_V2

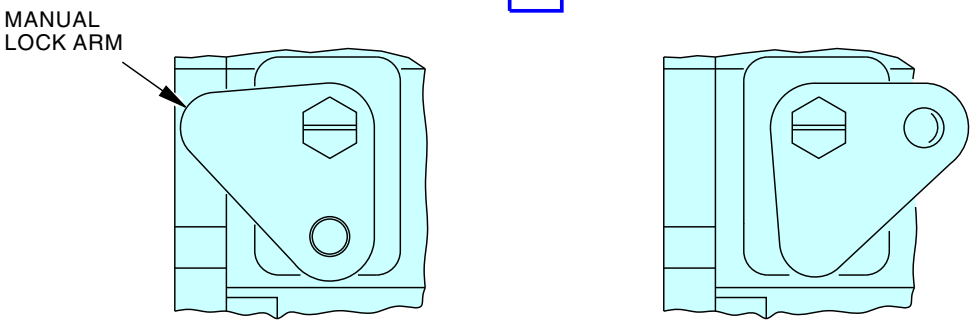
NGS Shutoff Valve Deactivation
Figure 207/28-11-00-990-807 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



NGS SHUTOFF VALVE

B



(CLOSED)

A-A

(OPEN)

A-A

2413442 S00061532603_V1

NGS Shutoff Valve Deactivation
Figure 207/28-11-00-990-807 (Sheet 2 of 2)

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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 that you read and obey the precautions in this task: Purging and Fuel Tank Entry Precautions, TASK 28-11-00-910-801.

(3) An unexpected fuel transfer from the center tank to the No. 1 tank can occur during maintenance.

(a) To prevent fuel transfer from the center tank to the No. 1 tank through the fuel scavenge system, do not have more than 23,000 lb (10,433 kg) of fuel in the center tank when the No. 1 tank is empty for maintenance.

B. References

Reference	Title
06-44-00-800-801	Finding an Access Door or Panel on the Wings (P/B 201)
12-11-00-650-807	Drain the Fuel from the Sumps after Defueling (P/B 301)
20-40-11-910-801	Static Grounding (P/B 201)
24-22-00-860-802	Remove Electrical Power (P/B 201)
24-31-11-000-801-002	Battery Removal (P/B 401)
27-51-00-040-801	Trailing Edge Flap System Deactivation (P/B 201)
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (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)
28-11-31-000-801	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
COM-1768	Alarm - Combustible Gas and Oxygen Opt Part #: 1314 Supplier: ZAV19 Opt Part #: 1314 SMPN Supplier: ZAV19 Opt Part #: 711409 Supplier: 8F723 Opt Part #: 72-0026-49 Supplier: 0HTS3 Opt Part #: 72-6201-10 Supplier: ZAV19

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Reference	Description
COM-7844	Equipment - Communication, Confined Space Part #: 0113-01-041 Supplier: $1363 Part #: 0113-01-045 Supplier: $1363 Part #: 1120-01-050 Supplier: 0V3X2 Part #: 1120-01-055 Supplier: 0V3X2
COM-11427	Equipment - Respiratory Protection Part #: CAB50 Supplier: 8K196 Part #: MAV-5C Supplier: 58501 Part #: SYSTEM #5 Supplier: 58501 Opt Part #: NF-1100A Supplier: 58501 Opt Part #: TRAVELPANEL 50 Supplier: 62170
COM-14039	Gas Detector with Photoionization Detector (PID) Part #: 10165446 Supplier: 55799 Part #: A-ALT5X-DLK021EC010 Supplier: 55799 Part #: MX6-K103R211 Supplier: 65147 Part #: MX6KIT-K103R211 Supplier: 65147 Opt Part #: MX6-K003R211 Supplier: 65147
SPL-1778	Ventilation Equipment, Fuel Tank Part #: A28003-91 Supplier: 81205 Part #: CAN-50 Supplier: 58501 Part #: MAV-1C Supplier: 58501 Part #: SYSTEM #2 Supplier: 58501 Opt Part #: A28003-89 Supplier: 81205 Opt Part #: BOE-501 Supplier: 58501 Opt Part #: MAC-1 Supplier: 58501
SPL-7828	Door Assembly - Purging, Center Integral Wing Fuel Tank Part #: F80145-4 Supplier: 81205
SPL-8436	Protective Ring - Access Door Opening, Wing Lower Panel Part #: C28013-3 Supplier: 81205
STD-420	Gloves - White Cotton
STD-774	Respirator - Full-Face, Air Purifying (with filters/cartridges)
STD-858	Tag - DO NOT OPERATE
STD-1054	Container - Fuel Resistant, 5-Gallon (19-Liter)
STD-1119	Blower - Air, Explosion Proof, 90-100 Cubic Feet per Minute, Includes sufficient hose to reach all areas of Fuel Tanks
STD-1121	Compressor - Air, Portable, Explosion Proof
STD-1123	Source - Breathing Air, 125 PSIG Max Output
STD-1129	Coveralls - Tyvek/Saranex 23-p (Approved Cotton Substitute), No Pockets
STD-1137	Glasses - Safety
STD-7374	Gloves - Fuel and Solvent Resistant
STD-7377	Boots - Neoprene
STD-7380	Respirator - Half-Mask, Air Purifying (with filters/cartridges)
STD-7386	Hose - Air Supply
STD-11392	Fire Extinguisher - 150lb Portable, Carbon Dioxide, Dry Chemical, Halon, or Aqueous Film Forming Foam (AFFF)

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D. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

E. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
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
117A	Electronic Equipment Access Door
192CL	ECS Access Door
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. Prepare the Airplane for Fuel Tank Purging

SUBTASK 28-11-00-940-001

WARNING

OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

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.

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

SUBTASK 28-11-00-650-001

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

SUBTASK 28-11-00-650-002

(3) Drain the fuel tank sumps (TASK 12-11-00-650-807).

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SUBTASK 28-11-00-940-002

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

SUBTASK 28-11-00-480-001

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 28-11-00-480-002

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: Leading Edge Flaps and Slats - Deactivation, TASK 27-81-00-040-801.

SUBTASK 28-11-00-860-020

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.

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

SUBTASK 28-11-00-940-003

(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 28-11-00-860-001

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

(a) Attach the DO NOT OPERATE tags, STD-858 to the fuel pump switches.

SUBTASK 28-11-00-860-019

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

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 28-11-00-010-007

(11) Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

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SUBTASK 28-11-00-860-002

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-11-00-860-004

(13) Open the applicable circuit breakers for the system on that you will do maintenance.

SUBTASK 28-11-00-940-004

(14) 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 28-11-00-860-005

(15) Remove the electrical power from the airplane before you remove the fuel tank access doors (TASK 24-22-00-860-802).

SUBTASK 28-11-00-940-005

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.

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

SUBTASK 28-11-00-860-006

(17) Disconnect these airplane batteries:

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(a) Main (TASK 24-31-11-000-801-002)

(b) Fuel spar valve (TASK 28-22-14-000-801).

SUBTASK 28-11-00-940-006

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

(a) OPEN FUEL TANKS - DO NOT CONNECT

SUBTASK 28-11-00-940-007

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

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

SUBTASK 28-11-00-040-001

(20) Manually close and lock the Nitrogen Generation System (NGS) shutoff valve:

(a) Open this access panel:

Number	Name/Location
192CL	ECS Access Door

(b) Go to the location of the NGS shutoff valve (Figure 207).

(c) Remove the lock pin from the servo housing (Figure 207, View B).

(d) Turn the manual lock arm to the closed position (Figure 207, View A-A).

1) Make sure that the hole on the manual lock arm aligns with the threaded boss.

(e) Install the lock pin on the threaded boss to lock the NGS shutoff valve in the closed position.

H. Prepare the Equipment for Fuel Tank Purging

SUBTASK 28-11-00-910-053

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

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

SUBTASK 28-11-00-940-008

(2) Make sure that one of these fire extinguishers, STD-11392, 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 28-11-00-940-009

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

SUBTASK 28-11-00-860-007

(4) Make sure that all radio or radar equipment is off and locked out if it is closer than the minimum separation distance permitted in Table 202.

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SUBTASK 28-11-00-940-010

(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 28-11-00-480-004

(6) VENTURI TYPE VENTILATION EQUIPMENT;

Prepare the ventilation equipment, SPL-1778, for purging.

(a) Assemble these ventilation equipment, SPL-1778, components (Figure 203):

1) tank adapter assembly (-34)

2) air mover assembly (-94)

3) air supply hose, STD-7386.

(b) Make sure that 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 away from the airplane.

(d) Ground the air mover assembly 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. Example:

1) portable explosion-proof air compressor, STD-1121.

(f) Connect the air compressor to the air mover assembly with the air hose.

(g) Connect a power supply to the air compressor.

SUBTASK 28-11-00-480-005

(7) AIR BLOWER TYPE VENTILATION EQUIPMENT (BOE-501 OR EQUIVALENT);

Prepare the ventilation equipment, SPL-1778, for purging (Figure 203).

(a) Set-up the ventilation blower(s), ventilation equipment, SPL-1778, in an area where the fuel tank entry will be made.

1) Make sure that 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, STD-7386, to the ventilation blower.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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, STD-7386, 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 that you have enough segments to route the air ducts to the maintenance area.

SUBTASK 28-11-00-480-006

(8) HEATER AIR/BLOWER EQUIPMENT;

Prepare the heater/air explosion proof, 90-100 CFM air blower, STD-1119, 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 explosion proof, 90-100 CFM air blower, STD-1119, 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 that 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, STD-7386, to the heater/air blower.

2) If a portable explosion-proof air compressor, STD-1121, 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, STD-7386, from the air compressor to the heater/air blower.

c) Connect the portable air compressor to a power source.

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(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 that you have enough segments to route the air ducts to the maintenance area.

5) Attach the fuel tank door assembly, SPL-7828, to the end of the air duct (Optional).

NOTE: Do not use the air supply until the fuel vapor concentration (indicated by an air monitor with Photo Ionization Detector (PID) or a combustible gas indicator) is less than 25% of the lower explosive limit.

SUBTASK 28-11-00-480-007

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) Prepare an air monitor with PID or combustible gas indicator:

NOTE: An air monitor with PID is the recommended tool.

(a) Do these steps to prepare the gas detector, COM-14039, with PID (Figure 203):

NOTE: Use the instruction manual supplied with the air monitor with PID.

1) Make sure that the air monitor with PID is calibrated for each of these sensors:

a) Oxygen

b) Lower Explosive Limit (LEL)

c) Parts Per Million (PPM) (set the response factor of the PID to the applicable jet fuel).

2) Make sure that the alarm values are set to these limits:

a) 19.5% oxygen by volume

b) 10% of the LEL

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c) 30 PPM.

3) Make sure that the air monitor with PID operates correctly:

a) Zero the air monitor in clean air.

b) Do a functional check (bump test) of the oxygen, LEL and PPM sensors.

4) Put the air monitor with PID on a stand or ladder next to the access door where you will go into the fuel tank.

a) To prevent the accidental movement of the air monitor with PID, safely attach the air monitor with PID to the stand or ladder.

(b) Do these steps to prepare the combustible gas and oxygen alarm, COM-1768 (Figure 205):

NOTE: Use of the combustible gas and oxygen alarm is permitted. The use of the air monitor with PID is recommended.

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.

NOTE: GASTECH GT-series combustible gas indicators correspond to 72-6201-XX optional tool numbers for combustible gas and oxygen alarm, COM-1768.

1) Make sure that the indicator is calibrated for each of these scales:

NOTE: Make sure that 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.

a) Oxygen

b) LEL

c) PPM.

2) Make sure that the calibration on the combustible scales are specific to hexane gas.

3) Make sure that the alarm values are set to these limits:

a) 160 PPM

b) 10% of the LEL

c) 19.5% oxygen by volume.

4) Do these steps to make sure that the combustible gas indicator operates correctly:

a) Make sure that the combustible gas indicator, sampling line, and sampling probe (with dust filter) are clean and not damaged.

b) Put the combustible gas indicator switch to the ON position.

c) Make sure there is enough charge on the battery for the scheduled time in the fuel tank.

d) Let the combustible gas indicator warm-up for 20 minutes before you look at the readings.

e) Adjust the indicator to zero in clean air for these scales:

<1> Oxygen

<2> PPM

<3> LEL.

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f) If there is a negative value during the use of the combustible gas indicator, adjust the combustible gas indicator scale(s) to zero in clean air.

NOTE: Do not turn the combustible gas indicator off before you adjust the scales.

5) Do these steps to do a check of the alarms:

a) To do a check of the oxygen alarm, blow across the probe until the alarm comes on (19.5%).

b) 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.

6) Put the combustible gas indicator on a stand or ladder next to the access door where you will enter the fuel tank.

a) To prevent the accidental movement of the combustible gas indicator, safely attach the combustible gas indicator to the stand or ladder.

I. Fuel Tank Purging

SUBTASK 28-11-00-910-054

WARNING

OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

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

SUBTASK 28-11-00-480-008

(2) VENTURI TYPE VENTILATION EQUIPMENT;

Install the ventilation equipment, SPL-1778 (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 28-11-11-000-801).

2) Install a protective ring, SPL-8436, 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 28-11-11-000-802).

2) Install a protective ring, SPL-8436, around the openings of the surge tank access doors.

3) Install the tank adapter assembly 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).

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2) Install the air mover assembly to one of these center tank access doors:

Number	Name/Location
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 28-11-00-480-009

(3) AIR BLOWER TYPE VENTILATION EQUIPMENT (BOE-501 OR EQUIVALENT);

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-8436, 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 all protective ring, SPL-8436, 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.

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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.

SUBTASK 28-11-00-480-010

(4) After the air supply has operated for approximately 30 minutes, put the sampling line of the gas detector, COM-14039, with PID, or the combustible gas and oxygen alarm, COM-1768 (Figure 205), as far into the fuel tank as possible.

NOTE: The gas detector, COM-14039, with PID is the recommended tool.

NOTE: It is recommended that you take the gas detector, COM-14039, with PID or 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 28-11-00-480-011

(5) Wait one minute for each 1 ft (30.5 cm) of sampling line before you take a reading.

SUBTASK 28-11-00-480-012

(6) If you use a combustible gas and oxygen alarm, COM-1768, convert the values from the GASTECH combustible gas indicator to get the actual value.

(a) Use Table 203 to convert the values on the GASTECH combustible gas indicator to the actual values.

Table 203/28-11-00-993-804 COMBUSTION GAS CALCULATIONS

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

(b) If you use a combustible gas indicator not made by GASTECH follow the manufacturer's instructions to get the actual values.

SUBTASK 28-11-00-480-013

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 gas detector, COM-14039, with PID or 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.

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SUBTASK 28-11-00-480-014

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 28-11-00-480-015

(9) Put the air duct for the heater/air blower in the fuel tank through the tank access opening.

SUBTASK 28-11-00-480-016

(10) Bond the air duct to the airplane structure.

SUBTASK 28-11-00-940-011

(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.

(a) Read the air monitor with PID or combustible gas indicator values every half hour or less.

SUBTASK 28-11-00-940-012

(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 that the air in the fuel tank is in a fire-safe condition again.

SUBTASK 28-11-00-940-013

(13) Go into the fuel tank per the "Fuel Tank Entry" procedure to do maintenance.

J. Fuel Tank Entry

SUBTASK 28-11-00-910-055

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

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

SUBTASK 28-11-00-970-001

(2) Complete the confined space entry permit (if it is a requirement).

SUBTASK 28-11-00-970-002

(3) Use the pre-entry checklist (an example is given in Figure 206).

SUBTASK 28-11-00-480-017

(4) Prepare the half-mask respirators, STD-7380, for fuel tank entry.

(a) Use Table 204 to find out what level of respiratory protection is necessary.

(b) If the fuel tank is in a fire-safe condition, but not a health-safe condition, wear a full-face half-mask respirator, STD-7380, with an attached 125 psig max. output breathing air source, STD-1123.

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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 was previously filled with JP-4 or JET B, wear a full-face half-mask respirator, STD-7380, with an attached 125 psig max. output breathing air source, STD-1123.

NOTE: There is not a health-safe limit for JP-4 or JET B.

(d) If the fuel tank was not previously filled with JP-4 or JET B and the fuel tank is in a health-safe condition, a half-mask respirator, STD-7380, is not required, but a full or half-face half-mask respirator, STD-7380, with an organic vapor filter is recommended.

(e) Connect the subsequent half-mask respirators, STD-7380, to the air supply (Figure 204):

1) One half-mask respirator, STD-7380, for the person who goes into the fuel tank.

2) Two emergency rescue half-mask respirators, STD-7380.

(f) Make sure that air gets to the half-mask respirator, STD-7380.

(g) Make sure that the respirator system (Respiratory Protection, COM-11427, mask, etc.) is clean.

NOTE: When you use the half-mask respirator, STD-7380, you should regularly drain moisture from the filter on the Respiratory Protection, COM-11427. If you drain dirt or oil from the filter, or if the air in the half-mask respirator, STD-7380, smells bad, replace the filter.

(h) Make sure that the emergency air supply and half-mask respirators, STD-7380, operate correctly.

Table 204/28-11-00-993-806 Health Safe Condition

Fuel	Permissible Exposure Level Total Hydrocarbons TWA *[1] (ppm)	Lower Explosive Level (percent)
Aviation Gasoline	300	1.0
Jet A	30	0.7
Jet A-1	30	0.7
JP-5	30	0.7
JP-8	30	0.7

*[1] TWA - Time Weighted Average

SUBTASK 28-11-00-940-014

(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) hearing aid devices or other battery operated equipment.

SUBTASK 28-11-00-940-015

(6) Remove any clothes made of this material:

(a) wool

(b) silk

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(c) nylon

(d) synthetic clothing.

SUBTASK 28-11-00-940-016

(7) Put on these approved protective clothes (Figure 202):

(a) cotton coverall or coverall (approved cotton substitute), STD-1129 (non-sparking zippers or buttons)

(b) clean cotton head cover

(c) approved white cotton gloves, STD-420, or gloves, STD-7374

(d) safety glasses, STD-1137, or full-face respirator, STD-774

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 boots, STD-7377

(f) Put rubber bands around your wrists and ankles to hold clothes tight.

SUBTASK 28-11-00-940-017

(8) Make sure that the person who goes into the fuel tank and the person who watches agree on safety signals.

SUBTASK 28-11-00-940-018

(9) If a confined space communication equipment, COM-7844, is used, attach the system.

(a) Do a check to make sure that the system operates correctly.

SUBTASK 28-11-00-480-018

(10) Put on the necessary respiration protection.

SUBTASK 28-11-00-280-001

(11) Make sure that the half-mask respirator, STD-7380, operates.

SUBTASK 28-11-00-910-056

(12) Do these steps if you are the observer:

(a) Make sure that 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 that you and the person(s) who will go into the tank agree that the checklist items are complete.

(e) Make sure that 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 Respiratory Protection, COM-11427, to make sure that the supplied air system operates correctly.

(g) Keep visual contact with the fuel tank entry location.

(h) Keep in constant communication with the person(s) in the fuel tank.

(i) Look at the combustible gas indicator or air monitor with PID to make sure that the air in the fuel tank is at 10% or less of the lower explosive limit.

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(j) Do not put your head in the fuel tank access hole unless you have the correct half-mask respirator, STD-7380, 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 that person(s) in the fuel tank get out if there is a dangerous condition.

SUBTASK 28-11-00-940-019

(13) Persons with half-mask respirators, STD-7380, must touch the identified airplane ground to release static electricity before they go into the fuel tank.

SUBTASK 28-11-00-480-019

CAUTION

BE CAREFUL WHEN YOU ARE IN THE FUEL TANK. MAKE SURE THAT YOU DO NOT TOUCH THE COMPONENTS WITH YOUR HANDS OR TOOLS. IF YOU DO NOT OBEY, DAMAGE TO COMPONENTS CAN OCCUR.

(14) 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):

Number	Name/Location
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):

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.

SUBTASK 28-11-00-480-020

(15) As an alternate procedure, you can take an additional air monitor with PID or combustible gas indicator into the fuel tank to monitor the environment where you will do the maintenance.

SUBTASK 28-11-00-480-021

(16) 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 28-11-00-940-020

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.

(17) The observer must keep in communication with person(s) in the tank and watch for changes in conditions or a signal of danger.

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SUBTASK 28-11-00-680-001

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 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.

(18) Do these steps to remove any fuel that remains in the fuel tank:

NOTE: In the No. 1 tank, fuel can be trapped in refueling manifold if the drain float valve and check valve stay closed on the end of the refueling manifold. If you want to make sure there is no trapped fuel, put a 5-gallon (19-liter) fuel resistant container, STD-1054, below the check valve and open the check valve by hand. Remove all drained fuel from the tank and close the check valve.

(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.

(d) Count the number of cotton wipers, G00034, as they are removed from the fuel tank.

(e) Make sure that the counts agree.

(f) Make sure that 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 28-11-00-360-001

(19) Do the necessary repair or maintenance procedures.

SUBTASK 28-11-00-080-001

(20) 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) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

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(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-25.

(2) After you do maintenance, do this task to close the fuel tank.

(3) 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)
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
20-50-11 P/B 201	STANDARD TORQUE VALUES - MAINTENANCE PRACTICES
24-31-11-400-801-002	Battery Installation (P/B 401)
27-51-00-440-801	Trailing Edge Flap System Reactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-11-11-400-802	Surge Tank Access Door (533AB, 533CB, 633AB, 633CB) 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)
49-31-21 P/B 401	INLET FUEL FILTER ELEMENT - REMOVAL/INSTALLATION
73-11-02 P/B 401	FUEL FILTER CARTRIDGE - REMOVAL/INSTALLATION

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-10710	Explosion Proof Vacuum Part #: AV1-55 EX W Supplier: $1354 Part #: EXP1-55 TC TE Supplier: 0YX65 Part #: MDL55 ITEM 23954 Supplier: 05490

D. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

E. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
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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F. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door
192CL	ECS Access Door
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

G. Clean the Fuel Tank

SUBTASK 28-11-00-090-001

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. THIS CAN INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(1) Each time you go into a fuel tank, examine the fuel tank very carefully before it is closed.

SUBTASK 28-11-00-200-001

(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 28-11-00-100-002

(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 28-11-00-100-003

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.

SUBTASK 28-11-00-160-001

(6) Use an explosion-proof vacuum, COM-10710, to remove unwanted particles and pieces of used sealant.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

H. 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.

SUBTASK 28-11-00-211-001

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

28-AWL-25: CDCCL

(3) If any maintenance, preventative maintenance, or alteration was done in the fuel tanks, do these checks in the affected areas (this includes the touchpoints during transit to and from the tank access point) where work is done:

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCLs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-25.

28-AWL-25: CDCCL

(a) Make sure that the fillet seals around the periphery of the equipment interface with structure inside the fuel tank are not damaged (peeling off or cracking).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCLs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-25.

28-AWL-25: CDCCL

(b) Make sure that the cap seals installed on the fasteners and fittings inside the fuel tank are not damaged (peeling off or cracking).

NOTE: Not all fasteners and fittings have cap seals. If the fastener or fitting sealant is damaged, there will be residual evidence of a previously installed cap seal on the fasteners and fittings in areas where installation is necessary.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCLs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-25.

SUBTASK 28-11-00-211-003

(4) 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.

SUBTASK 28-11-00-210-001

(5) Do a final inspection of the fuel tank to make sure that you removed all unwanted materials and equipment.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Make sure that the necessary approved persons do an inspection of the tank before it is closed.

SUBTASK 28-11-00-210-002

(6) Do a check of the record to make sure that no unwanted items remain in the tank.

I. Close the Fuel Tank

SUBTASK 28-11-00-090-002

(1) If you used an air duct at the maintenance area, move the air duct to the access door opening.

SUBTASK 28-11-00-410-001

(2) Install these components (if removed):

(a) For torque values refer to: STANDARD TORQUE VALUES - MAINTENANCE PRACTICES, PAGEBLOCK 20-50-11/201.

(b) If removed, install the applicable access panel on rib No. 6 in the No. 1 fuel tank:

(TASK 06-44-00-800-801)

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

(c) If removed, install the applicable access panel on rib No. 6 in the No. 2 tank:

(TASK 06-44-00-800-801)

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

SUBTASK 28-11-00-910-057

(3) Go out of the fuel tank.

SUBTASK 28-11-00-970-003

(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.

SUBTASK 28-11-00-090-003

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 28-11-00-090-004

(6) VENTURI TYPE VENTILATION EQUIPMENT, do these steps:

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(a) Stop the air supply connected to the air mover.

(b) Remove the tank adapter assembly from the opening where you installed it.

(c) Remove the air mover from the adapter base.

(d) Remove the ground from the air mover.

SUBTASK 28-11-00-090-005

(7) AIR BLOWER TYPE VENTILATION EQUIPMENT, do these steps:

(a) Remove the air blower equipment.

(b) Stop the ventilation blower after you remove the air duct from the fuel tank.

1) Remove power from the air blower type ventilation equipment.

(c) Remove the ground from the airplane to the ventilation blower.

SUBTASK 28-11-00-410-002

(8) Install the applicable access doors (TASK 28-11-11-400-801, TASK 28-11-11-400-802,TASK 28-11-31-400-801).

SUBTASK 28-11-00-910-058

(9) Follow approved procedures to clean and return all respiratory equipment.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 28-11-00-440-001

(1) Manually unlock and open the Nitrogen Generation System (NGS) shutoff valve:

(a) Go to the location of the NGS shutoff valve (Figure 207).

(b) Remove the lock pin from the threaded boss (View B, Figure 207).

(c) Install the lock pin back on the servo housing.

(d) Turn the manual lock arm to the open position to unlock the NGS shutoff valve (View A-A, Figure 207).

(e) Close this access panel:

Number	Name/Location
192CL	ECS Access Door

SUBTASK 28-11-00-866-001

(2) Do this task: Trailing Edge Flap System Reactivation, TASK 27-51-00-440-801.

SUBTASK 28-11-00-440-002

(3) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

SUBTASK 28-11-00-860-018

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

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(WARNING PRECEDES)

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-11-00-410-010

(5) Close this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-11-00-860-021

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

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
D	17	C01657	NITROGEN GENERATION CONTROL
E	15	C01680	NGS ALT PWR

SUBTASK 28-11-00-865-002

(7) 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

(8) Connect these airplane batteries:

(a) Main (TASK 24-31-11-400-801-002)

(b) Fuel spar valve (TASK 28-22-14-400-801).

SUBTASK 28-11-00-910-059

(9) Remove all precautionary signs and placards.

SUBTASK 28-11-00-090-006

(10) Remove all support equipment, stands, ladders, ropes etc.

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SUBTASK 28-11-00-650-003

(11) Do these steps for each fuel boost pump for the No. 1 or 2 fuel tank to remove (purge) air from the engine fuel feed system:

NOTE: This step is necessary when tanks are fully drained. If not, it is an optional step.

(a) Refuel the applicable No. 1 or 2 fuel tank to approximately 3000 lb (1361 kg) (TASK 12-11-00-650-803).

(b) Transfer fuel through the refuel system back to the applicable No. 1 or 2 fuel tank, with the fuel boost pump, for approximately 10 minutes.

NOTE: This will remove (purge) air from the engine fuel feed lines.

NOTE: The 10 minute time can be adjusted based upon experience.

(c) Repeat these steps for each fuel boost pump for the No. 1 or No. 2 fuel tank (left forward fuel boost pump (No.1 tank), left aft fuel boost pump (No. 1 tank), right forward fuel boost pump (No. 2 tank), and right aft fuel boost pump (No. 2 tank)).

SUBTASK 28-11-00-900-001

(12) If a major fuel tank repair was done during the fuel tank entry, do these steps:

(a) Schedule the replacement of the engine and Auxiliary Power Unit (APU) fuel filters shortly after major fuel tank repair, approximately 50 flight hours.

(b) Replace the engine and APU fuel filters at the scheduled replacement date (PAGEBLOCK 73-11-02/401 and PAGEBLOCK 49-31-21/401).

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FUEL TANKS - INSPECTION/CHECK

1. General

A. This procedure has these tasks:

(1) An analysis of fuel leak type

(2) An analysis of fuel leak cause

(3) A fuel leak detection procedures

(4) A surge tank access door leak test procedure

(5) A helitest leak detection procedure

(6) A fuel tank closure leak check

(7) A general visual inspection of the fuel tanks

(8) An external wires over the center tank inspection

(9) An external wires mounted near the forward wing spar inspection

(10) An external wires mounted near the rear spar inspection.

B. 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 28-11-00-100-801, Microbial Growth Removal - Manual Removal Method, TASK 28-10-00-100-801, Microbial Growth Removal - Pressure Washer Method, TASK 28-10-00-100-802 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 28-11-00-220-001

(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 1.5 in. (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 in. (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 in. (152.4 mm) wide after the time interval noted above.

(d) A running leak is all fuel leaks that are larger than 6 in. (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

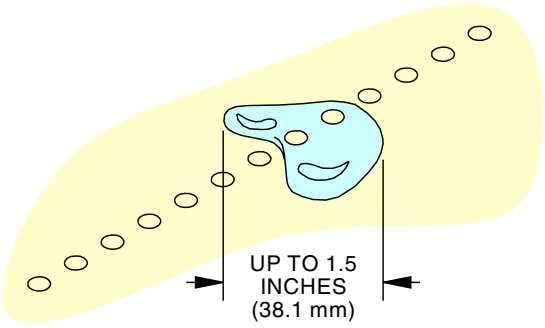
(3) Examine the wet area around the leak source to find the group of the fuel leak.

SUBTASK 28-11-00-790-003

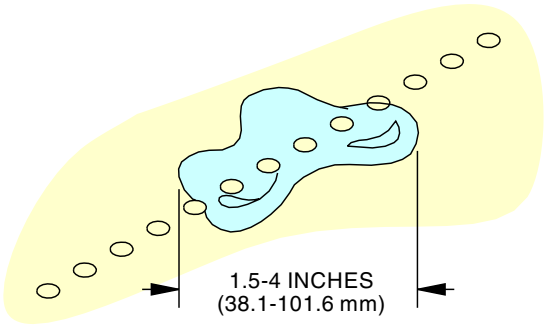
(4) After you examine the leak area, rub the area clean and examine the leak area again.

——— END OF TASK ———

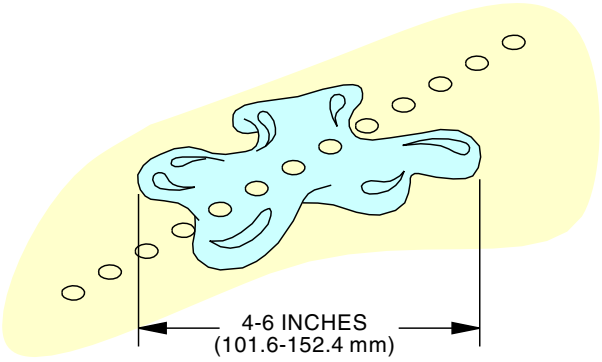
ECCN 9E991 BOEING PROPRIETARY - See title page for details



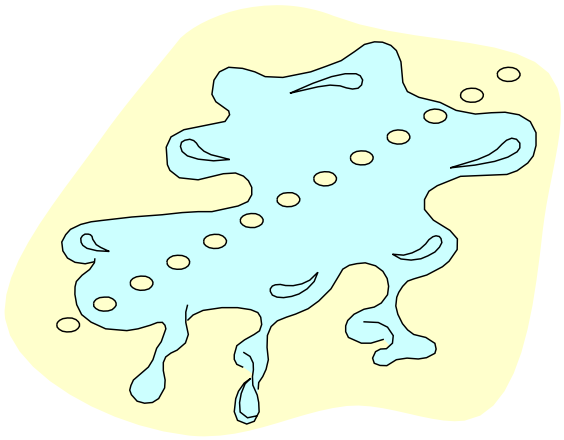
STAIN



SEEP



HEAVY SEEP



RUNNING LEAK

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Fuel Leak Types
Figure 601/28-11-00-990-808

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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.

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Fuel Leak Evaluation
Figure 602/28-11-00-990-809

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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
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 28-11-00-280-002

(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 28-11-00-280-003

(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 28-11-00-280-004

(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 of the manufacturer's instructions.

2) Use a brush to apply a precoat when recommended.

3) Do all of the steps to apply the sealant.

4) Make sure that there are no air bubbles in the sealant.

5) Make sure that you fill all the spaces completely with sealant.

6) Make sure that you do not make an overlap with the sealants.

7) Make sure that the sealant touches all the surfaces.

SUBTASK 28-11-00-280-005

(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 28-11-00-280-006

(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 28-11-00-210-003

(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.

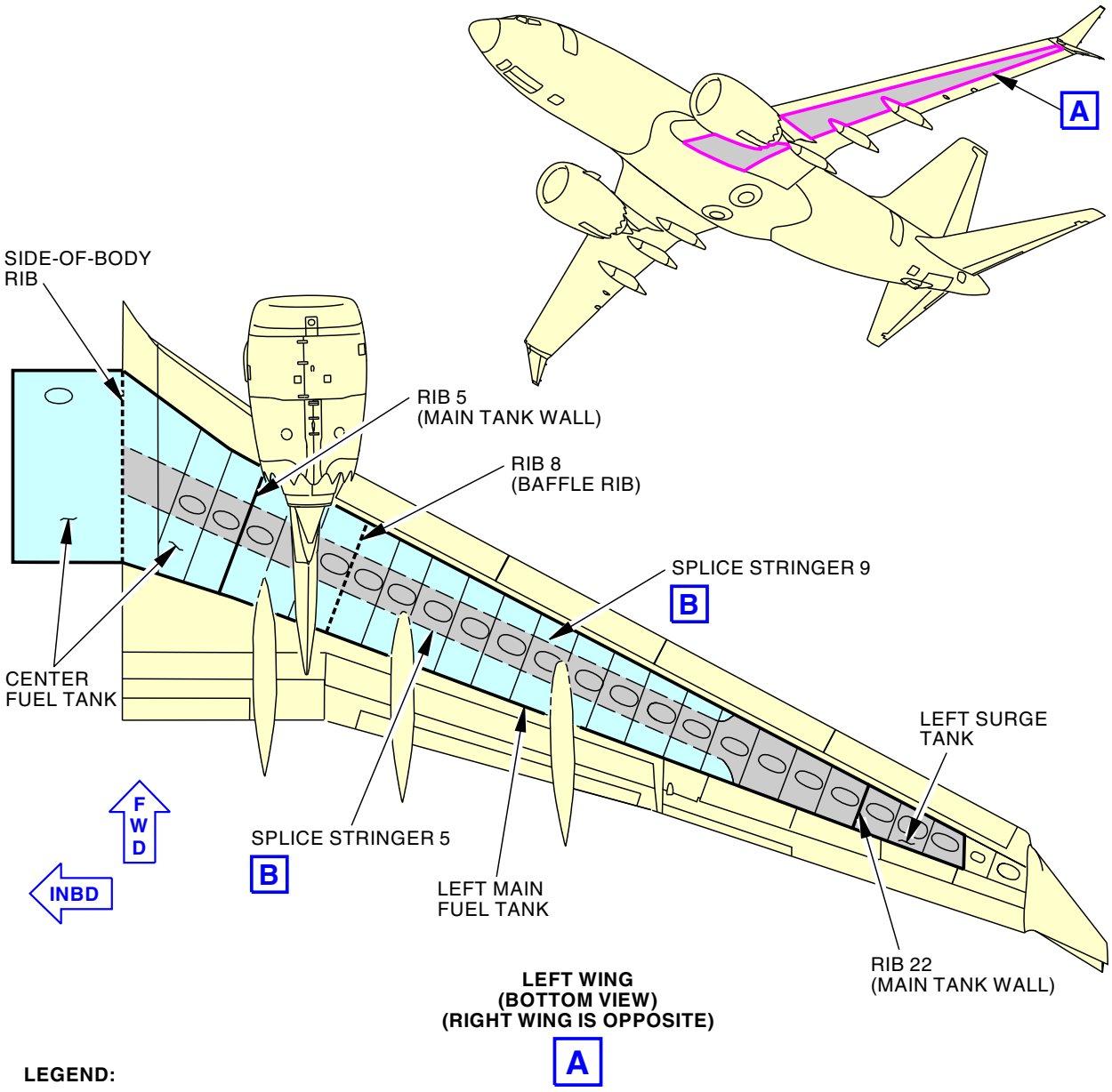
2) If the fastener with the leak is sealed, then the fastener with the subsequent least resistance will leak.

(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 ———

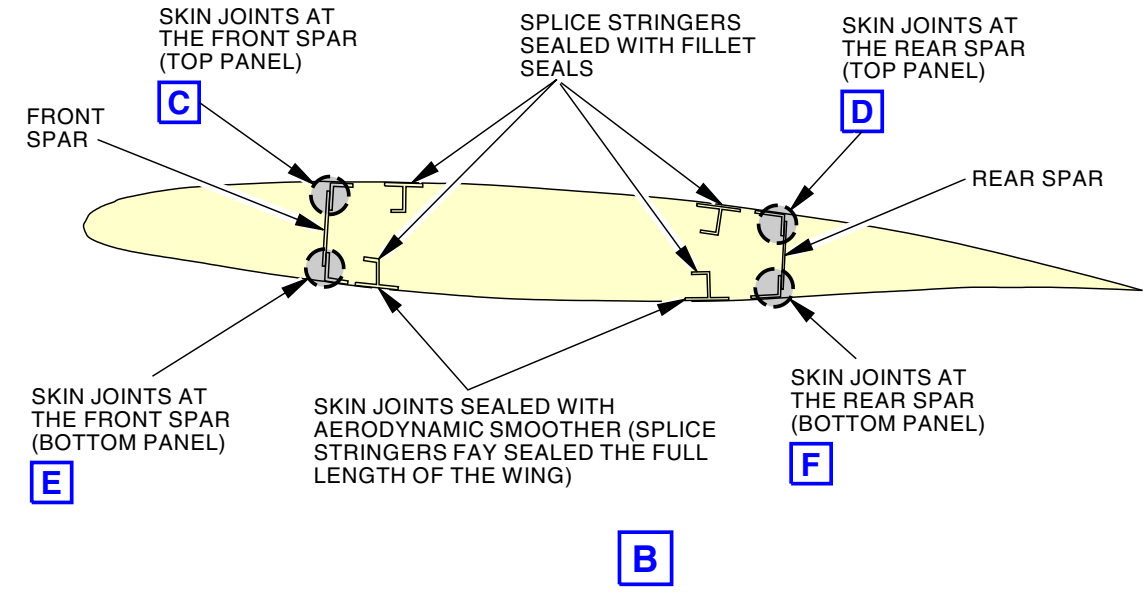
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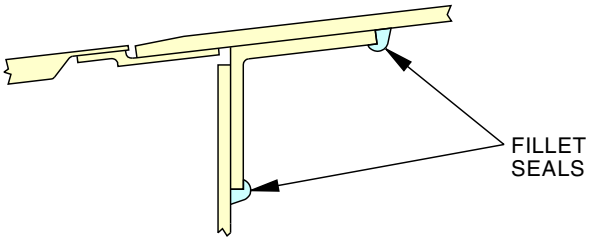


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Skin Joints and Fillet Seals of the Wing
Figure 603/28-11-00-990-810 (Sheet 1 of 2)

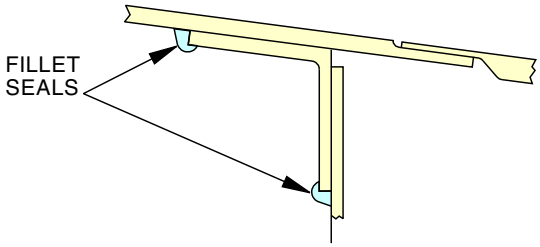
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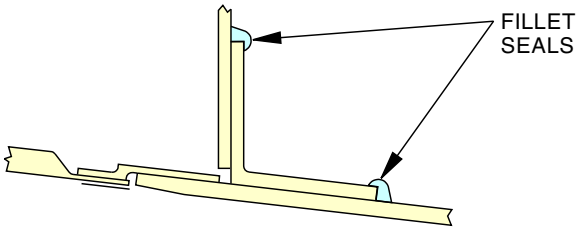
SKIN JOINTS AT THE FRONT SPAR (TOP PANEL)

C



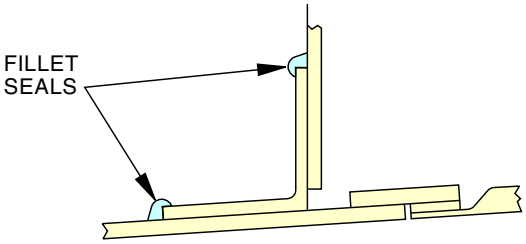
SKIN JOINTS AT THE REAR SPAR (TOP PANEL)

D



SKIN JOINTS AT THE FRONT SPAR (BOTTOM PANEL)

E



SKIN JOINTS AT THE REAR SPAR (BOTTOM PANEL)

F

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Skin Joints and Fillet Seals of the Wing
Figure 603/28-11-00-990-810 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-11-00-790-801

4. Fuel Leak Detection Procedures

(Figure 604, Figure 605, Figure 606, Figure 607, and Figure 608)

A. General

(1) This task has procedures used to find a leak as follows:

NOTE: The procedures recommended to find the leak and the leak paths are the "Find the External Leaks with Talcum Powder" and "Air Pressure and Bubble Solution (Backblowing)" procedures.

(a) A find the external leaks with talcum powder.

(b) An air pressure and bubble solution (backblowing) procedure.

(c) An air bubble hollow bolt procedure.

NOTE: This procedure finds leaks in areas with complex structure.

(d) A dye injection with hollow bolt.

NOTE: This procedure finds leaks in areas with complex structure.

(e) A 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) A 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) A fuel tank access doors.

NOTE: This procedure gives fuel quantities to find access doors that leak.

(h) A leak check.

NOTE: This check fuels the airplane to make sure that 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 (533AB, 533CB, 633AB, 633CB) 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	Leakage Tracing Device, Integral Tank Leakage Test Part #: F71329 Supplier: 81205
SPL-1774	Manometer - Water, Test Equipment Part #: F72951-1 Supplier: 81205
SPL-12783	Test Equipment - Fuel Tank and Vent System Part #: C28008-1 Supplier: 81205
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, 0-150 psig

D. Consumable Materials

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G00091	Compound - Oxygen System Leak Detection - Snoop Leak Detector	MIL-PRF-25567
G50304	Dye - T-100/OS-80 Fluorescent Tracer Dye (Blue-White Color)	BSS7074 (Supersedes BMS10-34)
G50464	Talcum Powder (White)	
G50957	Dye - T-100/OS-31 Fluorescent Tracer Dye (Green Color)	BSS7074 (Supersedes BMS10-34)

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
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. Prepare to Find the Leaks

SUBTASK 28-11-00-650-004

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

SUBTASK 28-11-00-650-005

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

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SUBTASK 28-11-00-010-001

(3) To remove the applicable main tank access doors, do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801.

SUBTASK 28-11-00-010-002

(4) To remove the applicable center tank access doors, do this task: Center Tank Access Door Removal, TASK 28-11-31-000-801.

SUBTASK 28-11-00-010-003

(5) To remove the applicable surge tank access doors, do this task: Surge Tank Access Door Removal, TASK 28-11-11-000-802.

SUBTASK 28-11-00-210-005

(6) Visual Procedure

(a) Examine the area that possibly has 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 A MINIMUM OF ½ IN. (13 MM) FROM THE AIRPLANE STRUCTURE. IF THE AIR HOSE IS TOO NEAR THE AIRPLANE STRUCTURE, DAMAGE TO THE SEALS CAN OCCUR.

(b) Do a check of the fillet seals that possibly have a bad bond.

(c) Rub the edges with a pencil eraser, or supply air at a maximum of 100 psig (689 kPa) and a minimum 0.5 in. (12.7 mm) from seal.

(d) Look at the tank structure for cracks or distortion.

H. 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 28-11-00-160-002

(2) Rub the leak dry with an absorbent cotton wiper, G00034.

SUBTASK 28-11-00-360-002

(3) With a soft-bristle or camel-hair soft bristle brush, STD-123, apply Powder - Talc, G50464, on the area that possibly contains the leak.

SUBTASK 28-11-00-210-004

(4) Look at the area with Powder - Talc, G50464, and see if Powder - Talc, G50464, 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.

I. Air Pressure and Bubble Solution (Backblowing) Procedure

NOTE: This procedure gives good results for leak detection.

SUBTASK 28-11-00-280-007

(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:

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a) An explosion proof flashlight, STD-1081.

b) Non-corrosive soap Snoop Leak Detector compound, G00091, or bubble bath.

c) Marking pen (Berol Filmograph or equivalent).

(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, examine the fillet seal on the nearest splice stringer (Figure 603).

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 A MINIMUM OF ½ IN. (13 MM) FROM THE AIRPLANE STRUCTURE. IF THE AIR HOSE IS TOO NEAR THE AIRPLANE STRUCTURE, DAMAGE TO THE SEALS CAN OCCUR.

(4) The person out of the fuel tank must use a regulated air source, STD-77, with a nozzle to blow air through the external location of the leak (Figure 604).

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(a) If the leak is small, it can be necessary to use the maximum pressure (100 psi (689 kPa)).

(b) If the leak is larger, it is easier to find the leak with less pressure (for example 50 psi (345 kPa)).

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 a check on the full area is done, do a check again on the areas where bubbles were seen to make sure that the leaks are isolated.

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 were found (TASK 28-11-00-300-803).

J. Air Bubble with Hollow Bolt Procedure

(Figure 605, Figure 606)

SUBTASK 28-11-00-280-008

(1) Remove the fastener.

NOTE: Refer to the structural repair manual for fastener removal.

SUBTASK 28-11-00-280-009

(2) Install the hollow bolt assembly.

SUBTASK 28-11-00-700-010

WARNING BLOW INTO THE MANOMETER HOSE AND MAKE SURE THAT THE WATER LEVEL CHANGES. THIS WILL SHOW THAT THE MANOMETER IS FREE OF ALL BLOCKAGES AND OPERATES SAFELY. IF THE MANOMETER IS NOT CLEAR, INJURIES TO PERSONNEL OR DAMAGE TO EQUIPMENT COULD OCCUR.

(3) Apply the noncorrosive soap solution to the area in the fuel tank that has the leak.

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SUBTASK 28-11-00-700-011

CAUTION

DO NOT USE MORE THAN THE SPECIFIED PRESSURE. IF YOU USE MORE PRESSURE, YOU CAN CAUSE DAMAGE TO EQUIPMENT.

(4) Supply air pressure with a regulated air source, STD-3940, to the hollow bolt and look for air bubbles in the fuel tank.

(a) Do not use more than a maximum pressure of 4 psig (28 kPa).

SUBTASK 28-11-00-700-012

(5) Make a mark at the locations where you see air bubbles in the fuel tank.

SUBTASK 28-11-00-700-013

(6) Remove the hollow bolt assembly.

SUBTASK 28-11-00-700-014

(7) Install the fastener.

NOTE: Refer to the structural repair manual for fastener installation.

SUBTASK 28-11-00-700-015

(8) Clean the bubble solution from the fuel tank.

K. Dye Injection with Hollow Bolt Procedure

NOTE: Use this procedure only after you use the Air Bubble with Hollow Bolt Procedure (Figure 605, Figure 606).

SUBTASK 28-11-00-280-010

(1) Remove the fastener.

NOTE: Refer to the structural repair manual for fastener removal.

SUBTASK 28-11-00-280-011

(2) Install the hollow bolt assembly.

SUBTASK 28-11-00-700-016

(3) Connect the leakage tracing device, SPL-1761, to the hollow bolt.

SUBTASK 28-11-00-700-017

(4) Make sure that the dye container, gage, and equipment are monitored while they are in position.

SUBTASK 28-11-00-700-018

(5) Add one of the dyes that follow, through the hollow bolt:

(a) T-100/OS-31 green fluorescent tracer dye, G50957.

(b) T-100/OS-80 blue-white fluorescent tracer dye, G50304.

SUBTASK 28-11-00-700-019

(6) Remove the leakage tracing device, SPL-1761.

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.

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SUBTASK 28-11-00-700-022

(9) Make a mark at the location where the dye was seen first.

SUBTASK 28-11-00-700-023

(10) Use 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 (0.016 liters dye per 100 liters of fuel).

SUBTASK 28-11-00-280-012

(1) Put the leakage tracing device, SPL-1761, in position near external leak (Figure 605).

SUBTASK 28-11-00-790-005

(2) Use the leakage tracing device, SPL-1761, to add one of the dyes that follows, through the external leak:

(a) T-100/OS-31 green fluorescent tracer dye, G50957.

(b) T-100/OS-80 blue-white fluorescent tracer dye, G50304.

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 leakage tracing device, SPL-1761.

SUBTASK 28-11-00-790-009

(6) Use 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 28-11-00-480-022

(1) Do these steps to install the test equipment, SPL-12783 (Figure 607):

(a) Remove the seven screws [1] from this access panel:

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679

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(b) With the seven screws [1] that you removed, install the tank cover assembly C28008-2 over this access panel:

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679

(c) Remove the seven screws [1] from this access panel:

Number	Name/Location
633BB	Surge Tank Access Door - Wing Station 679

(d) With the seven screws [1] that you removed, install the tank cover assembly C28008-3 over this access panel:

Number	Name/Location
633BB	Surge Tank Access Door - Wing Station 679

(e) Make sure that the test equipment, SPL-12783, tank cover assemblies (C28008-2 and C28008-3) have a good seal over the surge tank access doors.

SUBTASK 28-11-00-410-003

(2) Install all other fuel tank access doors that are removed (TASK 28-11-11-400-801 or TASK 28-11-11-400-802).

SUBTASK 28-11-00-480-023

WARNING BLOW INTO THE MANOMETER HOSE AND MAKE SURE THAT THE WATER LEVEL CHANGES. THIS WILL SHOW THAT THE MANOMETER IS FREE OF ALL BLOCKAGES AND OPERATES SAFELY. IF THE MANOMETER IS NOT CLEAR, INJURIES TO PERSONNEL OR DAMAGE TO EQUIPMENT COULD OCCUR.

(3) Connect the water manometer, SPL-1774, assembly to the adapter on the test equipment, SPL-12783, tank cover assembly (C28008-2) (Figure 606).

SUBTASK 28-11-00-780-001

WARNING REMOVE ALL PERSONNEL FROM THE FUEL TANK BEFORE YOU PRESSURIZE IT. DO NOT PRESSURIZE IT TO MORE THAN THE MAXIMUM SAFE PRESSURE OF 5.20 PSI (35.85 KPA). INJURIES TO PERSONNEL CAN OCCUR.

(4) Supply 4.0 psig (27.6 kPa) air pressure to the fuel tank.

SUBTASK 28-11-00-700-025

(5) Apply the bubble solution to the area out of the fuel tank that possibly has the leak.

SUBTASK 28-11-00-210-006

(6) Watch the area that possibly has 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 28-11-00-200-002

(7) Make a mark at the locations where you see bubbles.

SUBTASK 28-11-00-100-004

(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.

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SUBTASK 28-11-00-080-002

(10) Do these steps to remove the test equipment, SPL-12783:

(a) Disconnect the water manometer, SPL-1774, from the test equipment, SPL-12783, surge tank access cover (C28008-2).

(b) To remove the test equipment, SPL-12783, surge tank access cover (C28008-2), do this step:

1) Remove the seven screws [1] that attach the surge tank access cover to this access panel:

Number	Name/Location
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:

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679

(d) Tighten each screw [1] to 35 ±5 in-lb (4 ±1 N·m).

(e) To remove the test equipment, SPL-12783, surge tank cover (C28008-3), do this step:

1) Remove the seven screws [1] that attach the surge tank access cover to this access panel:

Number	Name/Location
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:

Number	Name/Location
633BB	Surge Tank Access Door - Wing Station 679

(g) Tighten each screw [1] to 35 ±5 in-lb (4 ±1 N·m).

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 28-11-00-650-006

(1) Fill the applicable fuel tank to a level which will cover the access door that possibly 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 theses access doors will change due to changes in fuel density and the quantity of expansion space in each main fuel tank.

Table 601/28-11-00-993-807 Fuel Necessary to Cover the Center Tank Access Doors

ACCESS DOORS LEFT/RIGHT	FUEL (LBS)	FUEL (KGS)
131AB	3775	1716
531AB/631AB	14518	6599

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Table 601/28-11-00-993-807 Fuel Necessary to Cover the Center Tank Access Doors (Continued)

ACCESS DOORS LEFT/RIGHT	FUEL (LBS)	FUEL (KGS)
531BB/631BB	20021	9100

Table 602/28-11-00-993-808 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
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 28-11-00-280-013

(2) Examine the access door for leaks using Find External Leaks with Talcum Powder Procedure.

SUBTASK 28-11-00-280-014

(3) Repair or replace the access door as applicable (TASK 28-11-11-400-801 or TASK 28-11-11-400-802).

SUBTASK 28-11-00-790-011

(4) The access doors for the surge tank that contain the vent scoop and pressure relief valve contains a weep hole (Figure 608):

There are these doors:

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.

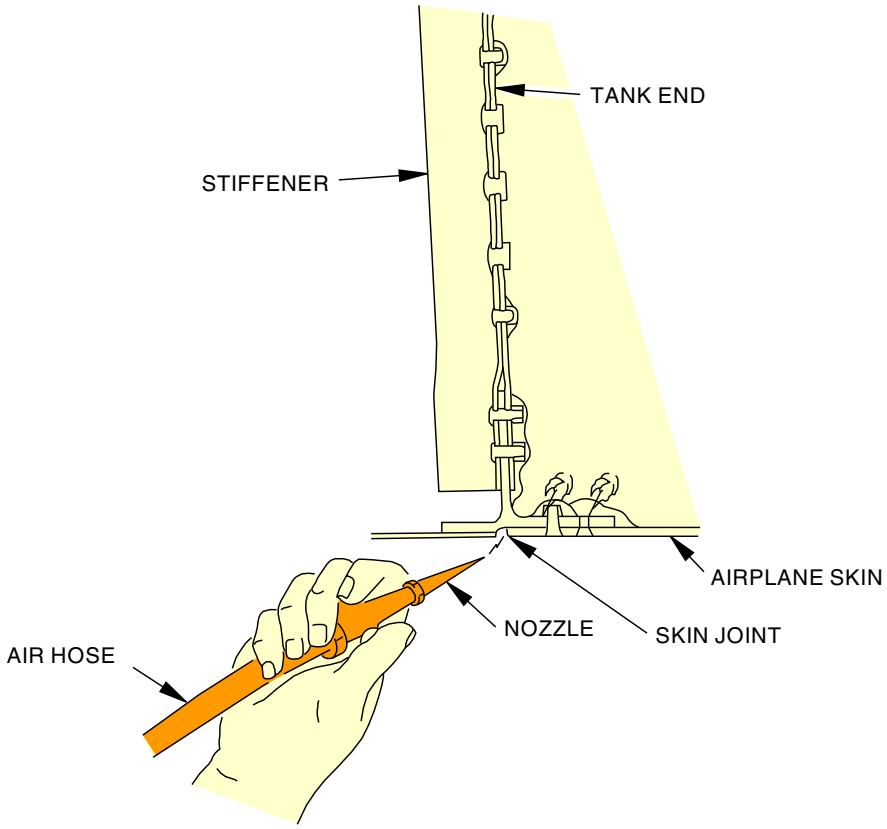
(c) If fuel drips or flows from this weep hole, do these steps:

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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 (533AB, 533CB, 633AB, 633CB) Installation, TASK 28-11-11-400-802.

——— END OF TASK ———

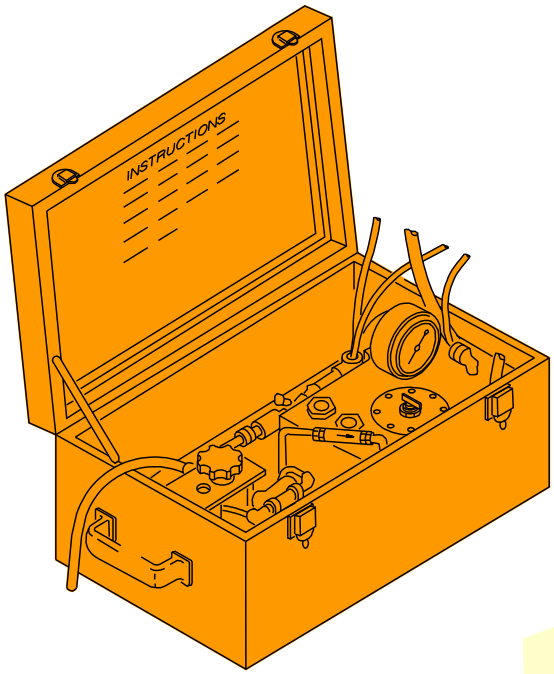
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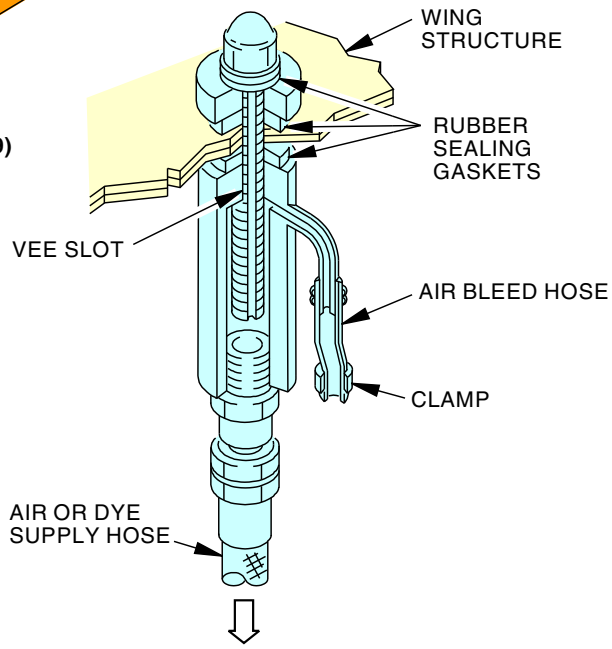
2413447 S00061532614_V1

Backblowing Procedure (Example)
Figure 604/28-11-00-990-811

ECCN 9E991 BOEING PROPRIETARY - See title page for details



LEAK TRACING DEVICE (F71329)



TO THE DYE PRESSURE CONNECTION OF THE SPECIAL LEAK TRACING DEVICE OR AN EQUIVALENT DEVICE 1

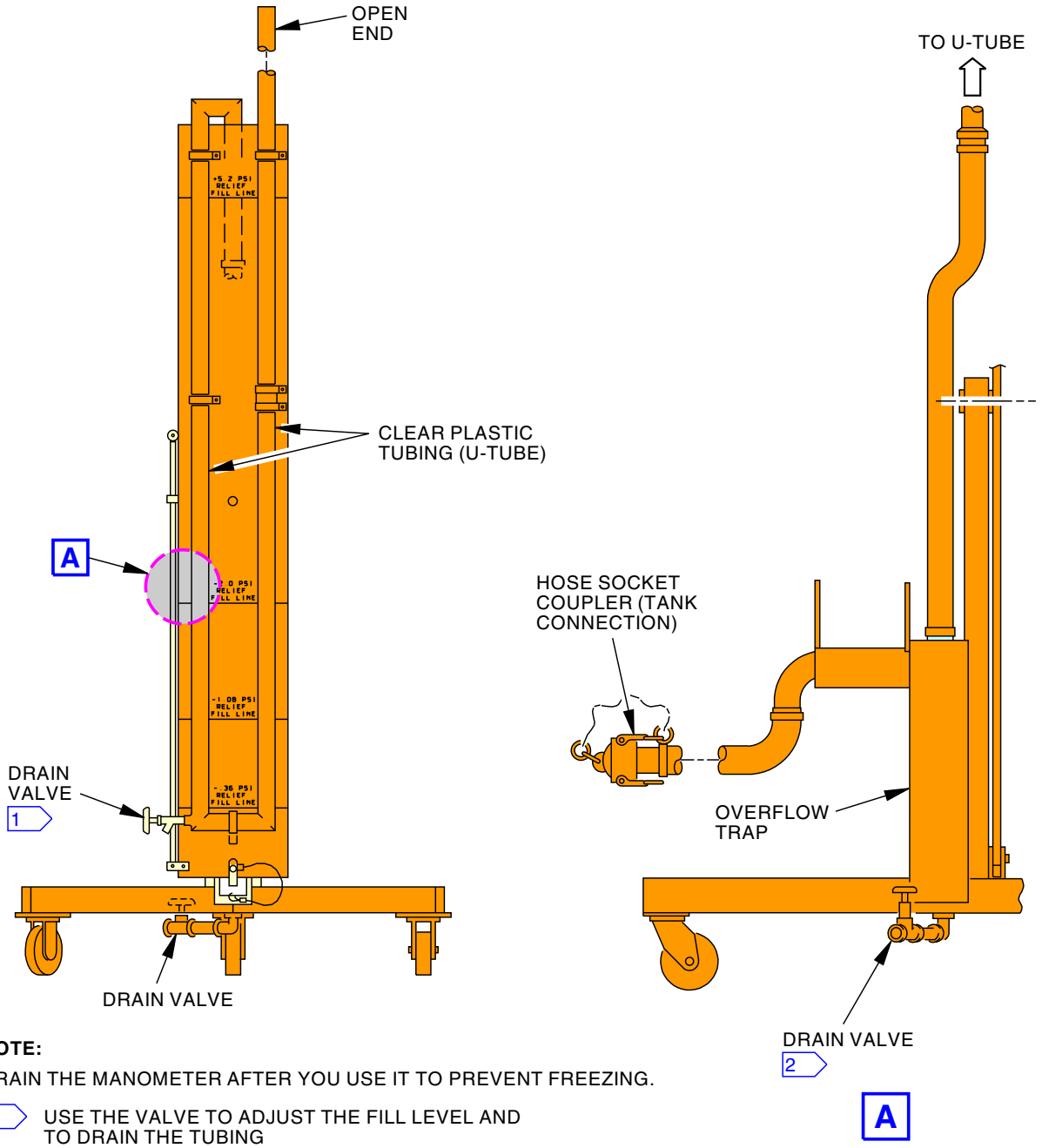
ADAPTER ASSEMBLY - FUEL LEAK TRACING HOLLOW BOLT (F70206-1)

1 MONITOR THE PRESSURE EQUIPMENT CONSTANTLY TO MAKE SURE THE PRESSURE IS NOT MORE THAN THE MAXIMUM SAFE PRESSURE

2413448 S00061532615_V2

Hollow Bolt for Areas With Complex Structure
Figure 605/28-11-00-990-812

ECCN 9E991 BOEING PROPRIETARY - See title page for details



NOTE:

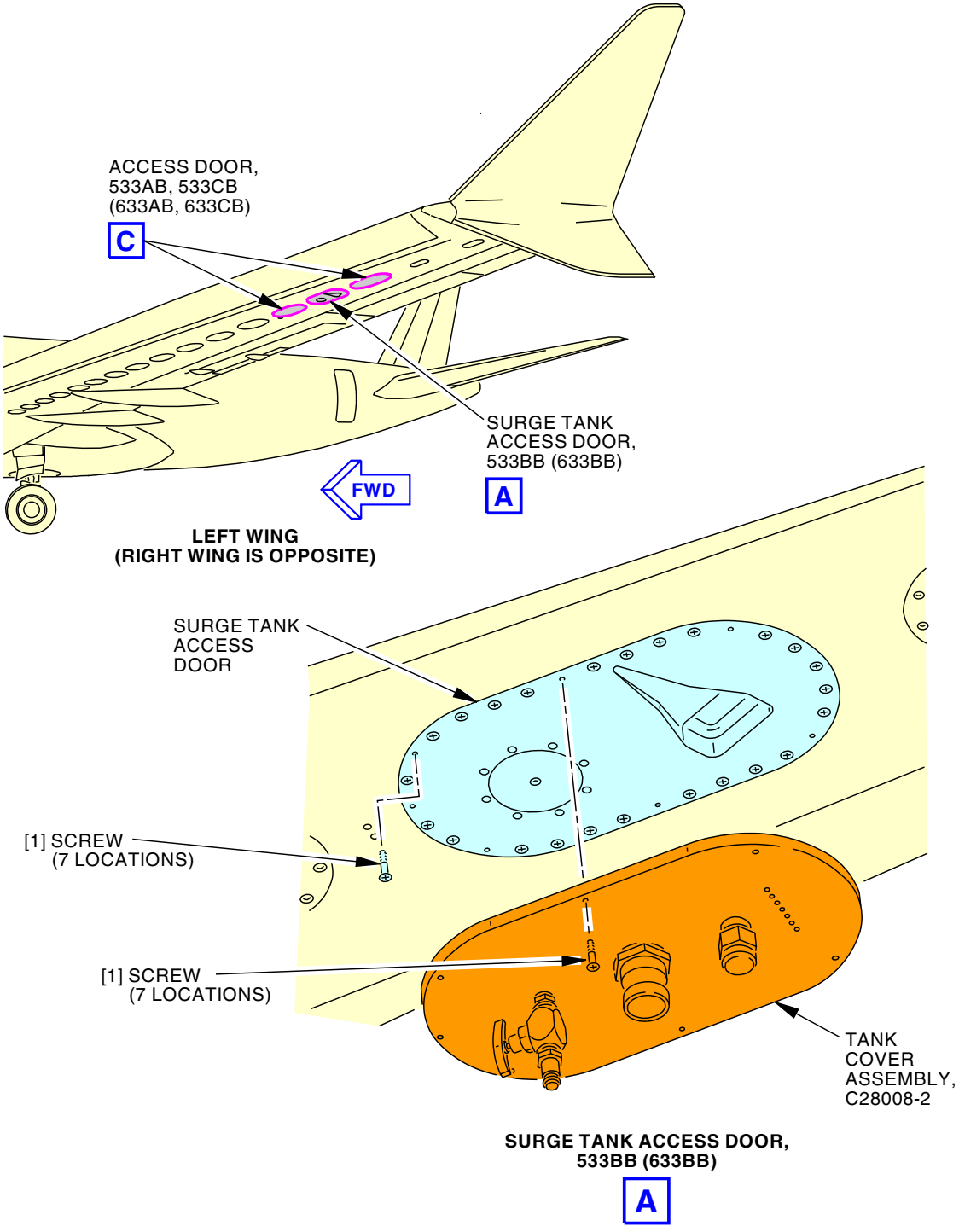
DRAIN THE MANOMETER AFTER YOU USE IT TO PREVENT FREEZING.

1. USE THE VALVE TO ADJUST THE FILL LEVEL AND TO DRAIN THE TUBING
2. USE THE VALVE TO DRAIN THE OVERFLOW TRAP

2413449 S00061532616_V1

Water Manometer Assembly
Figure 606/28-11-00-990-813

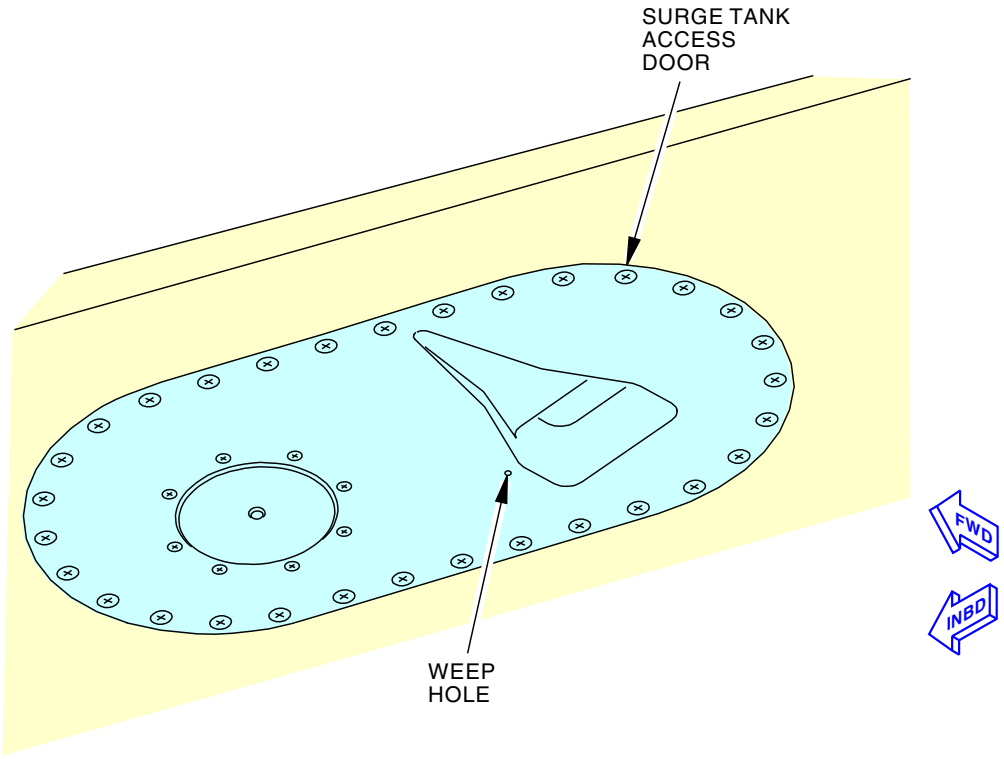
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413450 S00061532617_V1

Integral Fuel Tanks - Inspection/Check
Figure 607/28-11-00-990-814

ECCN 9E991 BOEING PROPRIETARY - See title page for details



WEEP HOLE LOCATION

2413451 S00061532618_V2

Surge Tank Weep Hole
Figure 608/28-11-00-990-815

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-11-00-790-802

5. Surge Tank Access Door Leak Test Procedure

A. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
12-11-00-680-801	Fuel Tank Sumps - Fuel Sampling (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 28-11-00-650-007

(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) (TASK 12-11-00-650-803).

SUBTASK 28-11-00-650-008

(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) (Pressure Refuel Procedure, TASK 12-11-00-650-803).

SUBTASK 28-11-00-860-016

(3) Open the applicable surge tank drain valve (Fuel Tank Sumps - Fuel Sampling, TASK 12-11-00-680-801).

SUBTASK 28-11-00-650-020

(4) With the surge tank sump drain open, slowly fill the main tank until fuel just starts to come out of the surge tank sump drain.

SUBTASK 28-11-00-860-017

(5) Close the applicable surge tank drain valve (Fuel Tank Sumps - Fuel Sampling, TASK 12-11-00-680-801).

SUBTASK 28-11-00-790-012

(6) Open the applicable refuel valve to slowly add 35 ±5 gal (132 ±19 l) of fuel to the applicable main tank (the No. 1 tank or the No. 2 tank) to cover the surge tank access doors with fuel.

NOTE: At a fuel density of 6.7 pounds/U.S. gallon (0.8029 kilograms/liter), 35 ±5 gal (132 ±19 l) is 235 lb (107 kg).

(a) Target adding 30 gal (114 l) to prevent a fuel spill.

NOTE: Fuel will begin to spill from the surge tank vent at 302 ±34 lb (137 ±15 kg).

(b) Push the red Manual Override Button adjacent to the solenoid of the applicable fueling shutoff valve to add fuel beyond the automatic shutoff quantity.

(c) Make sure that you do not exceed the capacity of the surge tank.

1) Adjust the fuel quantity if the fuel density is different.

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SUBTASK 28-11-00-790-013

(7) Let the fuel stay in the surge tank for a minimum of one hour.

SUBTASK 28-11-00-280-015

(8) Do the Find External Leaks with Talcum Powder Procedure for the applicable access door (Fuel Leak Detection Procedures, TASK 28-11-00-790-801).

SUBTASK 28-11-00-790-014

(9) Make sure that there is no leakage from the applicable surge tank access door.

SUBTASK 28-11-00-650-009

(10) 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 (TASK 28-26-00-650-802).

(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 (TASK 28-26-00-650-801).

SUBTASK 28-11-00-650-010

(11) If it is necessary, adjust the fuel quantities in the fuel tanks.

(a) Do one of these tasks: Pressure Refuel Procedure, TASK 12-11-00-650-803 or Tank to Tank Fuel Transfer, TASK 28-26-00-650-802.

——— END OF TASK ———

TASK 28-11-00-790-803

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. 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-6882	Test Kit - Fuel Leak Part #: DET-HE-WK Supplier: 3FM31 Opt Part #: 969-4450 Supplier: 3FM31 Opt Part #: ASM102 Supplier: 1B0F1 Opt Part #: DET-HWK Supplier: 3FM31 Opt Part #: DET-W-40052 Supplier: 3FM31
STD-77	Air Source, Regulated - Dry Filtered, 0-50 psig
STD-551	Knife - Razor
STD-1074	Scissors
STD-8422	Helium - Pressure, Regulated, Supply
STD-11112	Equipment - Ventilation, Positive or Negative

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C. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G00252	Film - Polyethylene Film And Sheeting	ASTM D2103 (Supersedes L-P-512)
G02329	Tape - Aluminum Foil, Pressure Sensitive - Vibration Damping Tape 434	
G50004	Tape - Vacuum Bag Sealant, SM 5126 Tacky Tape	
G50464	Talcum Powder (White)	

D. Procedure

SUBTASK 28-11-00-790-015

(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 Powder - Talc, G50464, 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 28-11-00-790-016

(2) Defuel the tank that has the leak (TASK 28-26-00-650-801 or TASK 28-26-00-650-802).

SUBTASK 28-11-00-860-009

(3) For the tank with the leak, do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

SUBTASK 28-11-00-100-005

(4) Apply regulated air source, STD-77, to a maximum of 50 psig (345 kPa), to the external leak point to force back the fuel faster and to dry the area.

SUBTASK 28-11-00-100-006

(5) Completely clean and dry the external leak point with solvent, B00062 or solvent, B00184, to give the best adhesion of tape.

NOTE: This step is important for successful leak detection.

SUBTASK 28-11-00-480-024

(6) Do one of these two steps:

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(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 fuel leak test kit, COM-6882, to contain the pressure of helium on the outer surface of the tank.

SUBTASK 28-11-00-480-025

(7) Install SM 5126 tacky tape, G50004, around the leak area or the pressure cup.

(a) Work the tape to stick it to the surface.

SUBTASK 28-11-00-480-026

(8) If you build a custom chamber, do these steps:

(a) Use a scissors, STD-1074, to cut a piece of polyethylene film, G00252, to the size of the chamber formed by the SM 5126 tacky tape, G50004.

(b) Set the plastic over the vacuum tape.

(c) Work the plastic to make sure it sticks well to the vacuum tape.

(d) Make sure the chamber is as small as possible.

NOTE: A small chamber can hold more helium pressure than a larger one.

(e) Trim the plastic with a razor knife, STD-551, to follow the outline of the vacuum tape.

SUBTASK 28-11-00-480-027

(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 in. (5 cm) diameter flange 1.5 ±0.5 in. (3.8 ±1.3 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 28-11-00-480-028

(10) If you use a pressure cup, attach the helium injection tube to the cup with the fittings supplied with the kit.

SUBTASK 28-11-00-480-029

(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 28-11-00-480-030

(12) Set up the fuel leak test kit, COM-6882, and purge the lines with helium, STD-8422, to remove air.

NOTE: Refer to the instructions supplied with the kit.

SUBTASK 28-11-00-790-017

(13) Carefully and slowly apply approximately 0.2 psig (1.4 kPa) of helium, STD-8422 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.

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SUBTASK 28-11-00-790-018

(14) Use the ventilation equipment, STD-11112, to draw leaking helium away from the area 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 28-11-00-790-019

(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 28-11-00-790-020

WARNING

KEEP THE DETECTOR AND THE PUMP AWAY FROM THE TANK. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(16) Make sure you keep the fuel leak test kit, COM-6882, detector and the auxiliary pump away from the open fuel tank at all times.

SUBTASK 28-11-00-790-021

(17) Go into the tank with the fuel leak test kit, COM-6882, Visual Probe (intrinsically safe for Class I, Div I areas).

SUBTASK 28-11-00-790-022

(18) Slowly probe 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 28-11-00-790-023

CAUTION

DO NOT LET THE PROBE TOUCH LIQUID FUEL. 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 cotton wiper, G00034, and 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 fuel leak test kit, COM-6882, visual 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 fuel leak test kit, COM-6882, off while it is contaminated with fuel because permanent damage can occur.

SUBTASK 28-11-00-790-024

(20) If you do not find the leak, increase the helium, STD-8422, pressure to 0.6 psig (4.1 kPa), and then to 1.2 psig (8.3 kPa).

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(a) Continue to increase the helium, STD-8422, pressure in similar increments until the leak is found.

NOTE: The compression chamber can hold 3.5 ±1.5 psig (24.1 ±10.4 kPa) maximum. The maximum pressure depends on the size of the chamber. A smaller chamber can hold a larger pressure.

SUBTASK 28-11-00-360-003

(21) When you find the leak, repair it with the applicable repair procedure (TASK 28-11-00-300-803).

SUBTASK 28-11-00-790-025

(22) After the leak repair, do another test of the leak with the fuel leak test kit, COM-6882, equipment before you remove the helium chamber from the outside of the tank.

NOTE: This procedure makes sure the leak was repaired correctly.

SUBTASK 28-11-00-110-001

(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 solvent, B00062 or solvent, B00184.

SUBTASK 28-11-00-790-026

(24) Do this same procedure with the fuel leak test kit, COM-6882, equipment for other leaks.

END OF TASK

TASK 28-11-00-790-804

7. Fuel Tank Closure Leak Check

A. References

Reference	Title
12-11-00-650-803	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 (533AB, 533CB, 633AB, 633CB) Installation (P/B 401)

B. Procedure

SUBTASK 28-11-00-700-028

(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 12-11-00-650-803.

(d) Examine the external leak area regularly for one hour.

NOTE: You can monitor the leak area for a longer time to make sure that the leak repair is OK.

(e) Make sure that there are no leaks in the area of repair.

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1) 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)

NOTE: This procedure is a scheduled maintenance task.

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 28-11-00-210-007

(1) Perform a General Visual Inspection (GVI) of the main and center fuel tank (wing) lower surfaces for obvious leaks, condition, and security.

(a) Make sure that 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 Near the Center Fuel Tank Inspection

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task has one or more steps which are a means to satisfy Airworthiness Limitation Instruction (ALI) requirements. An ALI note will follow the step to which it applies. Any step or sub-step that precedes or follows an ALI identified step is not subject to the ALI requirement.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-01, 28-AWL-29.

(2) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-02 and 28-AWL-28.

(3) This task does a detailed inspection of the wire bundles routed near the center fuel tank.

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B. References

Reference	Title
25-22-00 P/B 401	PASSENGER SEATS - REMOVAL/INSTALLATION
25-27-31-000-801	Raceway - Removal (P/B 401)
25-27-31-400-801	Raceway - Installation (P/B 401)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-22-21-300-801	Rework the Electrical Faying Surface Bonds for the Engine Crossfeed Valve (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)
50-11-02-000-801	Forward Cargo Compartment Aft Bulkhead Liner Removal (P/B 401)
50-11-02-400-801	Forward Cargo Compartment Aft Bulkhead Liner Installation (P/B 401)
52-48-42-400-801	Environmental Control Systems (ECS) Access Door Installation (P/B 401)
53-21-00 P/B 401	PASSENGER CABIN FLOORS - REMOVAL/INSTALLATION
SWPM 20-10-11	WIRING ASSEMBLY AND INSTALLATION CONFIGURATION
SWPM 20-10-12	WIRE HARNESS SUPPORTS
SWPM 20-10-13	REPAIR OF ELECTRICAL WIRE AND CABLE
SWPM 20-10-22	DISASSEMBLY, ASSEMBLY, AND INSTALLATION OF BACS31T SEAL FITTINGS
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Location Zones

Zone	Area
125	Air Conditioning Distribution Bay - Left
126	Air Conditioning Distribution Bay - Right
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
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
192	Lower Wing-To-Body Fairing - Under Wing Box

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E. Access Panels

Number	Name/Location
192CL	ECS Access Door
192CR	ECS Access Door
192DR	ECS High Pressure Access Door

F. Prepare for the Inspection

SUBTASK 28-11-00-010-004

(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 tasks:

SIA 001-014

(a) Remove the seats (PAGEBLOCK 25-22-00/401).

SIA ALL

(b) Remove the raceway (TASK 25-27-31-000-801).

(c) Remove the passenger cabin floors (PAGEBLOCK 53-21-00/401).

(2) To get access to the front spar of the center fuel tank, do this task:

(a) Remove the lining at the aft end of the forward cargo compartment (TASK 50-11-02-000-801).

(3) To get access to the bottom of the center fuel tank, do this task:

(a) Open the applicable ECS doors:

Number	Name/Location
192CL	ECS Access Door
192CR	ECS Access Door
192DR	ECS High Pressure Access Door

(4) To get access to the rear spar of the center fuel tank through the main landing gear wheel well, do this task:

(a) Landing Gear Downlock Pins Installation, TASK 32-00-01-480-801.

G. External Wires Over the Center Fuel Tank Inspection

SUBTASK 28-11-00-211-011

28-AWL-01: ALI

(1) Do a detailed inspection of the wire bundles routed over the center fuel tank and under the main deck floor boards.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-01.

(a) Do the inspection from Station 540 to Station 664 and left and right body buttock line 24.82.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

28-AWL-02: CDCCL

(b) Keep the existing (or newly approved) wire bundle routing, clamping, and sleeving (if installed).

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-02.

28-AWL-01: ALI

28-AWL-02: CDCCL

(c) Look for these items:

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

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-01 and 28-AWL-02.

28-AWL-01: ALI

28-AWL-02: CDCCL

1) Damaged wire bundles, clamps, and sleeving (if installed)

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

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-01 and 28-AWL-02.

28-AWL-01: ALI

28-AWL-02: CDCCL

2) Wire chafing

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

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-01 and 28-AWL-02.

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28-AWL-01: ALI

3) Wire bundles that touch (are in contact with) the surface of the center fuel tank.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-01.

NOTE: This includes the wiring bundle sleeving, which is also not to touch (be in contact with) the surface of the center fuel tank.

28-AWL-02: CDCCL

4) Wire bundles that touch (are in contact with) the fuel tank structure.

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-02.

NOTE: This includes the wiring bundle sleeving, which is also not to touch (be in contact with) the surface of the center fuel tank.

H. External Wires Near the Center Fuel Tank Inspection

SUBTASK 28-11-00-211-004

(1) Do a detailed inspection of the wire bundles near the center fuel tank surface.

NOTE: Removal of the wire bundle sleeving is not necessary, unless damage to the sleeving or wiring can be seen.

(a) Do the inspection if maintenance, preventative maintenance, or alteration is performed within 12 in. (305 mm) of the center fuel tank surface.

(b) Do the inspection in the area where the maintenance was performed.

28-AWL-02: CDCCL

(c) Keep the existing (or newly approved) wire bundle routing, clamping, and sleeving (if installed).

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-02.

28-AWL-02: CDCCL

(d) Look for these items:

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-02.

28-AWL-02: CDCCL

1) Damaged wire bundles, clamps, and sleeving (if installed),

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-02.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

28-AWL-02: CDCCL

2) Wire chafing,

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-02.

28-AWL-02: CDCCL

3) Wire bundles that touch (are in contact with) the fuel tank structure.

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-02.

NOTE: This includes the wiring bundle sleeving, which is also not to touch (be in contact with) the surface of the center fuel tank.

SUBTASK 28-11-00-210-008

(2) If you found a problem, do these steps:

(a) Do the applicable repair (SWPM 20-10-11, SWPM 20-10-13, SWPM 20-10-22).

I. External Wires Over the Environmental Control System (ECS) Bay Inspection

SUBTASK 28-11-00-210-019

(1) Do a detailed inspection of the ECS Bay out-of-tank wire bundles and specified brackets attached directly to the fuel tank structure:

28-AWL-29: ALI

28-AWL-28: CDCCL

(a) In the left ECS Bay, wire bundles W5102, W5104, and W5230 located near airplane stations (STA) 654, STA 637, STA 604, STA 588, and STA 581:

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

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-28 and 28-AWL-29.

28-AWL-29: ALI

28-AWL-28: CDCCL

1) Make sure that the wire bundles are attached with a full cushion saddle clamp.

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

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-28 and 28-AWL-29.

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28-AWL-29: ALI

28-AWL-28: CDCCL

2) Make sure that clamps do not show damage.

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

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-28 and 28-AWL-29.

28-AWL-29: ALI

28-AWL-28: CDCCL

3) Make sure that the wire bundles are attached to two nylon stiffening rods between STA 581 to STA 654.

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

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-28 and 28-AWL-29.

28-AWL-29: ALI

28-AWL-28: CDCCL

(b) In the right ECS Bay, wire bundles W8122 located near STA 654:

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

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-28 and 28-AWL-29.

28-AWL-29: ALI

28-AWL-28: CDCCL

1) Make sure that the wire bundles are attached with a full cushion saddle clamp.

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

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-28 and 28-AWL-29.

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28-AWL-29: ALI

28-AWL-28: CDCCL

2) Make sure that clamps do not show damage.

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

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-28 and 28-AWL-29.

28-AWL-29: ALI

28-AWL-28: CDCCL

3) Make sure that the wire bundles are attached to two nylon stiffening rods between STA 581 to STA 654.

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

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-28 and 28-AWL-29.

28-AWL-29: ALI

28-AWL-28: CDCCL

(c) In the right ECS Bay, wire bundles W6128, W6203, and W6230 located near STA 654, STA 637, STA 621, STA 604, STA 588, and STA 581:

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

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-28 and 28-AWL-29.

28-AWL-29: ALI

28-AWL-28: CDCCL

1) Make sure that the wire bundles are attached with a full cushion saddle clamp.

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

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-28 and 28-AWL-29.

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28-AWL-29: ALI

28-AWL-28: CDCCL

2) Make sure that clamps do not show damage.

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

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-28 and 28-AWL-29.

28-AWL-29: ALI

28-AWL-28: CDCCL

3) Make sure that the wire bundles are attached to two nylon stiffening rods between STA 581 to STA 654.

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

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-28 and 28-AWL-29.

28-AWL-28: CDCCL

(2) If bracket(s) attached to the fuel tank structure are removed, replaced or reinstalled, do these steps:

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-28.

28-AWL-28: CDCCL

(a) Apply a fay sealed fay surface bond between the mating surfaces of the bracket(s) and structure (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-28.

28-AWL-28: CDCCL

(b) Measure the electrical bonding resistance between the bracket(s) and the structure (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-28.

1) Use an intrinsically safe approved bonding meter, COM-1550

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28-AWL-28: CDCCL

2) Make sure the electrical 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-28.

3) If the electrical 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.

(3) If you found a problem, do these steps:

(a) Do the applicable repair (SWPM 20-10-11, SWPM 20-10-12).

NOTE: All fuel tank repairs and changes must be in compliance with 28-AWL-12.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 28-11-00-410-004

(1) For the area on the top of the center fuel tank, do these steps to install the parts that you removed to do the inspection:

(a) Install the passenger cabin floors (PAGEBLOCK 53-21-00/401).

(b) Install the raceway (TASK 25-27-31-400-801).

SIA 001-014

(c) Install the seats (PAGEBLOCK 25-22-00/401).

SIA ALL

(2) For the area at the front spar of the center fuel tank, do this step to install the parts that you removed to do the inspection:

(a) Install the lining at the aft end of the forward cargo compartment (TASK 50-11-02-400-801).

(3) For the area under the center fuel tank, do this step to install the parts that you removed to do the inspection:

(a) Close the Environmental Control System Bay Access Doors (TASK 52-48-42-400-801).

(4) For the area aft of the rear spar, do this step:

(a) Landing Gear Downlock Pins Removal, TASK 32-00-01-080-801.

——— END OF TASK ———

TASK 28-11-00-211-802

10. External Wires Mounted Near the Forward Wing Spar Inspection

A. General

(1) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-02.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(2) This task does a detailed inspection of the wire bundles routed near the forward spars of the left and right wing.

B. References

Reference	Title
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
57-41-02-000-801	Leading Edge Access Panel Removal (P/B 201)
57-41-02-400-801	Leading Edge Access Panel Installation (P/B 201)
SWPM 20-10-11	WIRING ASSEMBLY AND INSTALLATION CONFIGURATION
SWPM 20-10-13	Repair of Electrical Wire and Cable
SWPM 20-10-22	Repair of Seal Fittings

C. Location Zones

Zone	Area
500	Left Wing
511	Left Wing - Leading Edge To Front Spar
521	Left Wing - Leading Edge to Front Spar
600	Right Wing
611	Right Wing - Leading Edge to Front Spar
621	Right Wing - Leading Edge to Front Spar

D. Prepare for the Inspection

SUBTASK 28-11-00-010-005

(1) To get access to the forward wing spar, do these steps:

(a) Remove the applicable leading edge access panels (Leading Edge Access Panel Removal, TASK 57-41-02-000-801).

E. External Wires Mounted Near the Forward Spar Inspection

SUBTASK 28-11-00-211-006

(1) Do a detailed inspection of the wire bundles routed near the forward wing spar:

NOTE: Removal of the wire bundle sleeving is not necessary, unless damage to the sleeving or wiring can be seen.

(a) Do the inspection if maintenance, preventative maintenance, or alteration is performed within 12 in. (305 mm) of the forward wing spar.

(b) Do the inspection in the area where the maintenance was performed.

28-AWL-02: CDCCL

(c) Keep the existing (or newly approved) wire bundle routing, clamping, sleeving (if installed).

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-02.

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28-AWL-02: CDCCL

(d) Look for these items:

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-02.

28-AWL-02: CDCCL

1) Damaged wire bundles, clamps, and sleeving (if installed),

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-02.

28-AWL-02: CDCCL

2) Wire chafing,

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-02.

28-AWL-02: CDCCL

3) Wire bundles that touch (are in contact with) the surface of the fuel tank structure.

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-02.

NOTE: This includes the wiring bundle sleeving, which is also not to touch (be in contact with) the surface of the fuel tank.

SUBTASK 28-11-00-210-020

(2) If you found a problem, do these steps:

(a) Do the applicable repair (SWPM 20-10-11, SWPM 20-10-13, SWPM 20-10-22).

F. Put the Airplane Back to Its Usual Condition

SUBTASK 28-11-00-410-008

(1) For the area of the front wing spar, do these steps to install the parts that you removed to do the inspection:

(a) Install the applicable leading edge access panels (Leading Edge Access Panel Installation, TASK 57-41-02-400-801).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-11-00-211-803

11. External Wires Mounted Near the Rear Spar Inspection

A. General

(1) This task has one or more steps which are a means to satisfy Airworthiness Limitation Instruction (ALI) requirements. An ALI note will follow the step to which it applies. Any step or sub-step that precedes or follows an ALI identified step is not subject to the ALI requirement.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-29.

(2) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-02 and 28-AWL-28.

(3) This task does a detailed inspection of the wire bundles routed near the rear spar of the left and right wing.

B. References

Reference	Title
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-22-21-300-801	Rework the Electrical Faying Surface Bonds for the Engine Crossfeed Valve (P/B 401)
57-50-02-000-801	Inboard Fixed Trailing Edge Lower Panel Removal (P/B 401)
57-50-02-400-801	Inboard Fixed Trailing Edge Lower Panel Installation (P/B 401)
SWPM 20-10-11	WIRING ASSEMBLY AND INSTALLATION CONFIGURATION
SWPM 20-10-12	WIRE HARNESS SUPPORTS
SWPM 20-10-13	Repair of Electrical Wire and Cable
SWPM 20-10-22	Repair of Seal Fittings
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Location Zones

Zone	Area
500	Left Wing

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(Continued)

Zone	Area
550	Subzone - Left Wing: Trailing Edge, Aft of Rear Spar, Inbd of Outboard Trailing Edge Flap
560	Subzone - Left Wing: Trailing Edge , Aft of Rear Spar, Outboard of Inbd Trailing Edge Flap, Inbd of Fixed Trailing Edge
570	Subzone - Left Wing: Fixed Trailing Edge, Outboard of Outboard Flap, Inboard of Wing Tip, Wing Buttock Line 658.17
600	Right Wing
650	Subzone - Right Wing: Trailing Edge, Aft of Rear Spar, Inboard of Outboard Trailing Edge Flap
660	Subzone - Right Wing: Trailing Edge, Aft of Rear Spar, Outboard of Inboard Trailing Edge Flap, Inboard of Fixed Trailing Edge
670	Subzone - Right Wing: Fixed Trailing Edge, Outboard of Outboard Flap, Inboard of Wing Tip, Wing Buttock Line 658.17

E. Prepare for the Inspection

SUBTASK 28-11-00-010-006

(1) To get access to the aft wing spar, do these steps:

(a) Remove the applicable trailing edge access panels (TASK 57-50-02-000-801).

F. External Wires Mounted Near the Aft Spar Inspection

SUBTASK 28-11-00-211-008

(1) Do a detailed inspection of the wire bundles routed near the aft spar on the left and right wing:

NOTE: Removal of the wire bundle sleeving is not necessary, unless damage to the sleeving or wiring can be seen.

(a) Do the inspection if maintenance, preventative maintenance, or alteration is performed within 12 in. (305 mm) of the aft spar on the left and right wing.

(b) Do the inspection in the area where the maintenance was performed.

28-AWL-02: CDCCL

(c) Keep the existing (or newly approved) wire bundle routing, clamping, and sleeving (if installed).

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-02.

28-AWL-02: CDCCL

(d) Look for these items:

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-02.

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28-AWL-02: CDCCL

1) Damaged wire bundles, clamps, and sleeving (if installed),

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-02.

28-AWL-02: CDCCL

2) Wire chafing,

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-02.

28-AWL-02: CDCCL

3) Wire bundles that touch (are in contact with) the surface of the aft spar fuel tank structure.

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-02.

NOTE: This includes the wiring bundle sleeving, which is also not to touch (be in contact with) the surface of the center fuel tank.

SUBTASK 28-11-00-211-009

(2) If you found a problem, do these steps:

(a) Do the applicable repair (SWPM 20-10-11, SWPM 20-10-13, SWPM 20-10-22).

G. External Wire Cushion Clamp in Aft Spar Inspection

SUBTASK 28-11-00-211-010

(1) Do a detailed inspection on the Out-of-Tank wire bundles installed on specified brackets that are mounted directed on fuel tanks:

28-AWL-29: ALI

28-AWL-28: CDCCL

(a) For the right rear spar wire bundle W1034 near wing station (WS) 440:

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

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-28 and 28-AWL-29.

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28-AWL-29: ALI

28-AWL-28: CDCCL

1) Make sure that the wire bundle and Teflon sleeve are attached with a clamp (P/N BACC10NA()) or full cushion clamp.

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

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-28 and 28-AWL-29.

28-AWL-29: ALI

28-AWL-28: CDCCL

2) Make sure that the Teflon sleeve and clamp do not show damage.

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

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-28 and 28-AWL-29.

28-AWL-29: ALI

28-AWL-28: CDCCL

3) Make sure that the Teflon sleeve length extend from WS 425 to WS 451 (between ribs 14 and 15).

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

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-28 and 28-AWL-29.

28-AWL-29: ALI

28-AWL-28: CDCCL

4) Make sure that the wire bundles are attached to two nylon stiffening rods between STA 581 to STA 654.

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

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-28 and 28-AWL-29.

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28-AWL-29: ALI

28-AWL-28: CDCCL

(b) For the left rear spar bundle W1024 located near WS 308 and WS 310:

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

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-28 and 28-AWL-29.

28-AWL-29: ALI

28-AWL-28: CDCCL

1) Make sure that the wire bundle and Teflon sleeve are attached with a clamp (P/N BACC10NA()) or full cushion clamp.

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

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-28 and 28-AWL-29.

28-AWL-29: ALI

28-AWL-28: CDCCL

2) Make sure that the Teflon sleeve and clamp do not show damage.

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

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-28 and 28-AWL-29.

28-AWL-29: ALI

28-AWL-28: CDCCL

3) Make sure that the Teflon sleeve length extends from WS 306 to WS 315.

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

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-28 and 28-AWL-29.

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28-AWL-29: ALI

28-AWL-28: CDCCL

4) Make sure that the wire bundles are attached to two nylon stiffening rods between STA 581 to STA 654.

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

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-28 and 28-AWL-29.

28-AWL-29: ALI

28-AWL-28: CDCCL

(2) If bracket(s) attached to the fuel tank structure are removed, replaced or reinstalled, do these:

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

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-28 and 28-AWL-29.

28-AWL-29: ALI

28-AWL-28: CDCCL

(a) Apply a fay sealed fay surface bond between the mating surfaces of the bracket(s) and structure (SWPM 20-20-00).

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

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-28 and 28-AWL-29.

28-AWL-29: ALI

28-AWL-28: CDCCL

(b) Measure the electrical bonding resistance between the bracket(s) and the structure (SWPM 20-20-00).

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

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-28 and 28-AWL-29.

1) Use an intrinsically safe approved bonding meter, COM-1550.

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28-AWL-29: ALI

28-AWL-28: CDCCL

2) Make sure the electrical bonding resistance is 0.0005 ohm (0.5 milliohm) or less.

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

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-28 and 28-AWL-29.

3) If the electrical 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.

(3) If you found a problem, do these steps:

(a) Do the applicable repair (SWPM 20-10-11, SWPM 20-10-12).

NOTE: All fuel tank repairs and changes must be in compliance with 28-AWL-12.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 28-11-00-410-009

(1) For the area of the front wing spar, do these steps to install the parts that you removed to do the inspection:

(a) Install the applicable leading edge access panels (Inboard Fixed Trailing Edge Lower Panel Installation, TASK 57-50-02-400-801).

——— 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
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
20-40-11-910-801	Static Grounding (P/B 201)
28-10-00-100-801	Microbial Growth Removal - Manual Removal Method (P/B 201)
28-10-00-100-802	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 (533AB, 533CB, 633AB, 633CB) 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

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D. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00068	Alcohol - Denatured, Ethyl (Ethanol)	AMS 3002, MIL-E-51454 Type II
B00102	Abrasive - Aluminum Oxide Coated Cloth	
B00130	Alcohol - Isopropyl	TT-I-735
B00148	Solvent - Methyl Ethyl Ketone (MEK)	ASTM D740
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
C00064	Coating - Aluminum Chemical Conversion	BAC5719 Type II Class A (MIL-DTL-5541 Class 1A)
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	Coating - Chemical Conversion - Bonderite M-CR 600 Aero (Formerly Alodine 600)	BAC5719 Class A, C or D, MIL-DTL-81706 Type I Class 1A or 3
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G00270	Tape - Scotch Flatback Masking 250	ASTM D6123 (Supersedes A-A-883)
G02088	Abrasive - Silicon Carbide, Waterproof Paper	

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 28-11-00-650-011

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

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SUBTASK 28-11-00-650-012

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.

SUBTASK 28-11-00-480-031

WARNING GROUND ALL OF THE EQUIPMENT AND HOSES USED IN THE FUEL TANK. IF YOU DO NOT GROUND ALL OF THE EQUIPMENT AND HOSES, AN EXPLOSION CAN OCCUR.

(3) Connect the hoses and nozzles to an electrical ground (TASK 20-40-11-910-801).

SUBTASK 28-11-00-480-032

(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 28-11-00-160-003

CAUTION MAKE SURE THAT 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 THAT 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 28-11-00-210-009

(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 28-10-00-100-801 or Microbial Growth Removal - Pressure Washer Method, TASK 28-10-00-100-802).

SUBTASK 28-11-00-140-001

(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.

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SUBTASK 28-11-00-120-001

(8) Use wet abrasive, G02088, paper to make all finish areas and adjacent areas you will apply a layer to, rough.

SUBTASK 28-11-00-160-004

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

(9) Use cotton wiper, G00034, soaked in cleaning alcohol, B00068 or alcohol, B00130, and rub all unwanted materials from the applicable surfaces.

SUBTASK 28-11-00-160-005

(10) Use a clean cotton wiper, G00034, to make the surfaces dry.

SUBTASK 28-11-00-160-006

(11) Remove by suction all unwanted materials from the fuel tank.

SUBTASK 28-11-00-370-001

(12) If alodine metal surface treatment is worn or damaged, do the "Alodine Metal Surface Treatment" procedure before you apply the finish.

SUBTASK 28-11-00-390-001

(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 28-11-00-210-010

(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 alcohol, B00068, before you apply the corrosion resistant finish.

SUBTASK 28-11-00-210-011

(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 28-11-00-210-012

(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 28-11-00-210-013

(17) Make sure there is sufficient corrosion resistant material to apply the corrosion resistant finish.

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SUBTASK 28-11-00-950-001

CAUTION MAKE SURE THAT YOU REMOVE ALL MASKING AFTER YOU APPLY THE CORROSION RESISTANT FINISH. MASKING CAN CAUSE A BLOCKAGE OF THE SUCTION INLETS OF THE PUMPS AND PREVENT THE REMOVAL OF THE WATER.

(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 28-11-00-220-002

(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.

G. Alodine Metal Surface Treatment

SUBTASK 28-11-00-370-002

(1) If alodine metal surface treatment is worn or damaged, do the steps that follow before you apply topcoat:

WARNING DO NOT GET THE ALODINE SOLUTION IN YOUR MOUTH, IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES. DO NOT BREATHE THE FUMES FROM THIS MATERIAL. AIR MUST FLOW FREELY THROUGH THE WORK-AREA. USE THE NECESSARY RESPIRATORY PROTECTION. KEEP THIS MATERIAL AWAY FROM SPARKS, FLAME, AND HEAT. THIS MATERIAL IS POISONOUS AND FLAMMABLE AND 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 Bonderite M-CR 600 Aero coating, 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, IN YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. PUT ON PROTECTIVE SPLASH GOGGLES AND GLOVES WHEN YOU USE SOLVENTS. KEEP SOLVENTS AWAY FROM SPARKS, FLAME, AND TEMPERATURES ABOVE THE FLASH POINT. SOLVENTS ARE A POISONOUS AND FLAMMABLE MATERIAL WHICH CAN CAUSE INJURY PERSONS AND DAMAGE TO EQUIPMENT.

2) Clean the surfaces with solvent, B00062 or solvent, B00184.

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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.

H. Apply the Corrosion Resistant Finish (Topcoat)

CAUTION

MAKE SURE THAT 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 THAT THERE IS A GOOD FLOW OF AIR.

SUBTASK 28-11-00-620-001

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) 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 701/28-11-00-993-809 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			

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Table 701/28-11-00-993-809 Corrosion Resistant Mixing Proportions (Continued)

Manufacturer	Component	METHOD OF APPLICATION				
		SPRAY			BRUSH	
		Manufacturer Designation	Parts By Volume	Viscosity Zahn No. 1 72° ± 2° F	Manufacturer Designation	Parts By Volume
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		020-037	0-4
	Base	823-730	4	31-40 seconds	823-730	4
	Activator	910-702	1		910-702	1
	Reducer	020-707	approx 4		020-707	0-4
Products Research (MIL-C-27725)	- - - -	Part A	1	31-40 seconds	Part A	1
	- - - -	Part B	2		Part B	2

SUBTASK 28-11-00-620-002

(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 ±5°F (24 ±3°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 28-11-00-620-003

(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.

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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 28-11-00-110-002

(4) Clean the equipment and tools after you apply the corrosion resistant finish (topcoat).

WARNING

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(a) Clean the equipment with alcohol, B00068 or alcohol, B00130, immediately after use.

(b) Soak the brushes in alcohol, B00068 or alcohol, B00130, immediately after use.

NOTE: Discard the brushes when the bristles become rigid.

SUBTASK 28-11-00-620-004

(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).

(c) Do the solvent, B00062, solvent, B00184, 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 702/28-11-00-993-810 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.

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*[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 28-11-00-410-005

(2) Install all substructure, support brackets, and fuel tank equipment removed for access.

SUBTASK 28-11-00-210-014

(3) Make sure all tools, cotton wiper, G00034, air movers, hoses, and other equipment are removed from the fuel tank.

SUBTASK 28-11-00-410-006

(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 (533AB, 533CB, 633AB, 633CB) Installation, TASK 28-11-11-400-802.

SUBTASK 28-11-00-650-013

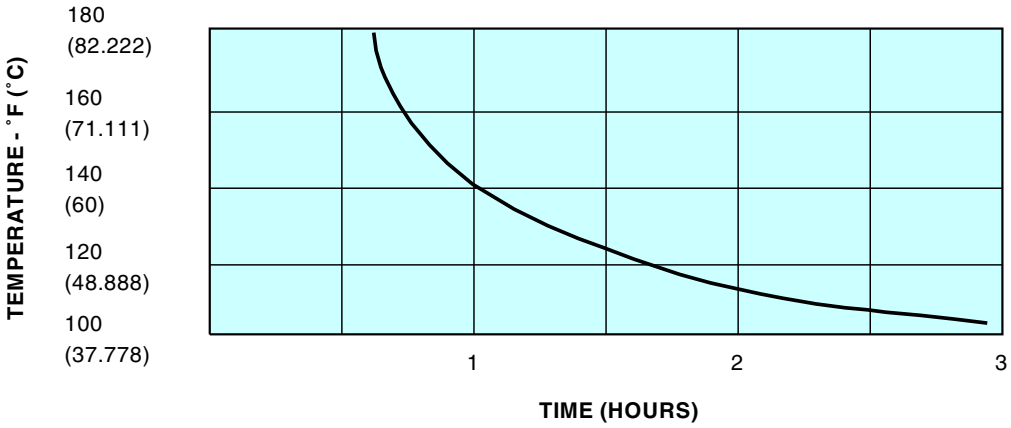
(5) Do this task: Pressure Refuel Procedure, TASK 12-11-00-650-803.

SUBTASK 28-11-00-210-015

(6) Make sure there are no fuel leaks, do this task: Fuel Leak Detection Procedures, TASK 28-11-00-790-801.

——— END OF TASK ———

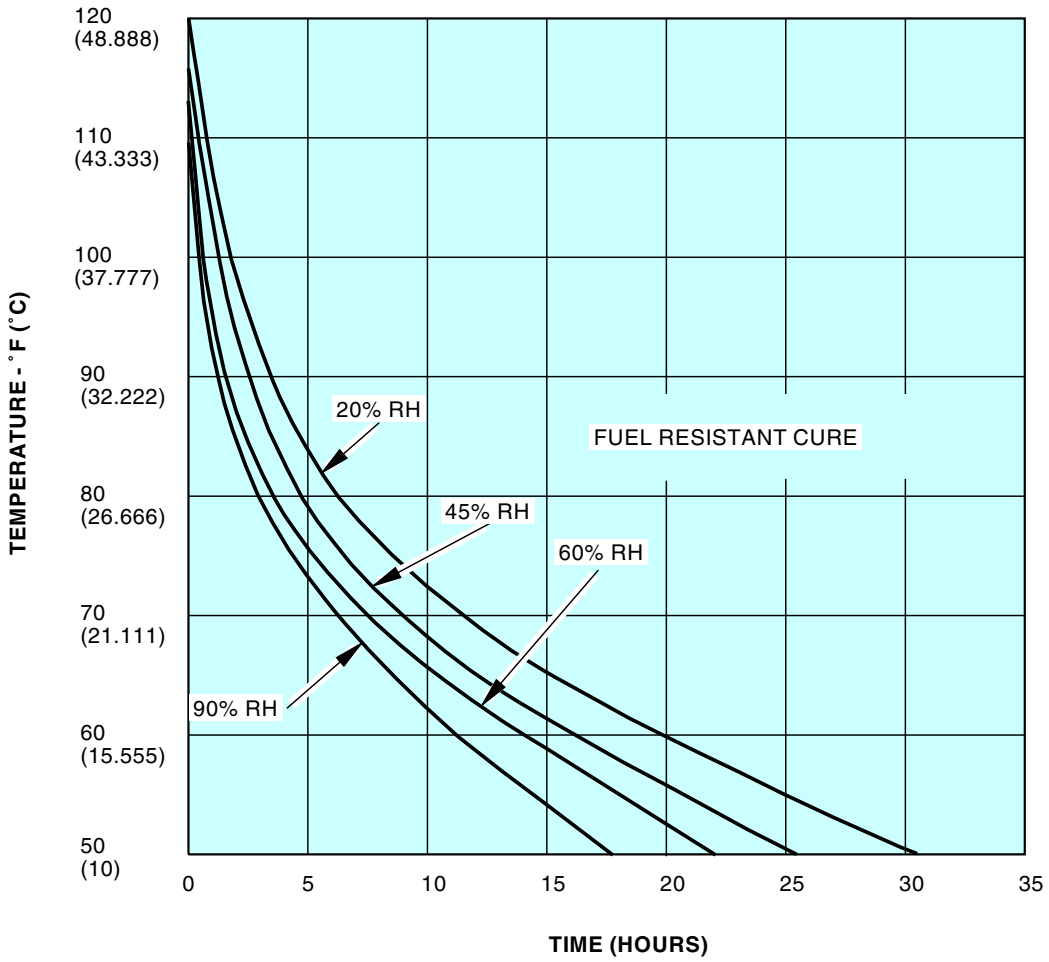
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2413452 S00061532626_V1

Bostik-Finch (BMS 10-20 Type II) Compound Cure Time Versus Temperature
Figure 701/28-11-00-990-816

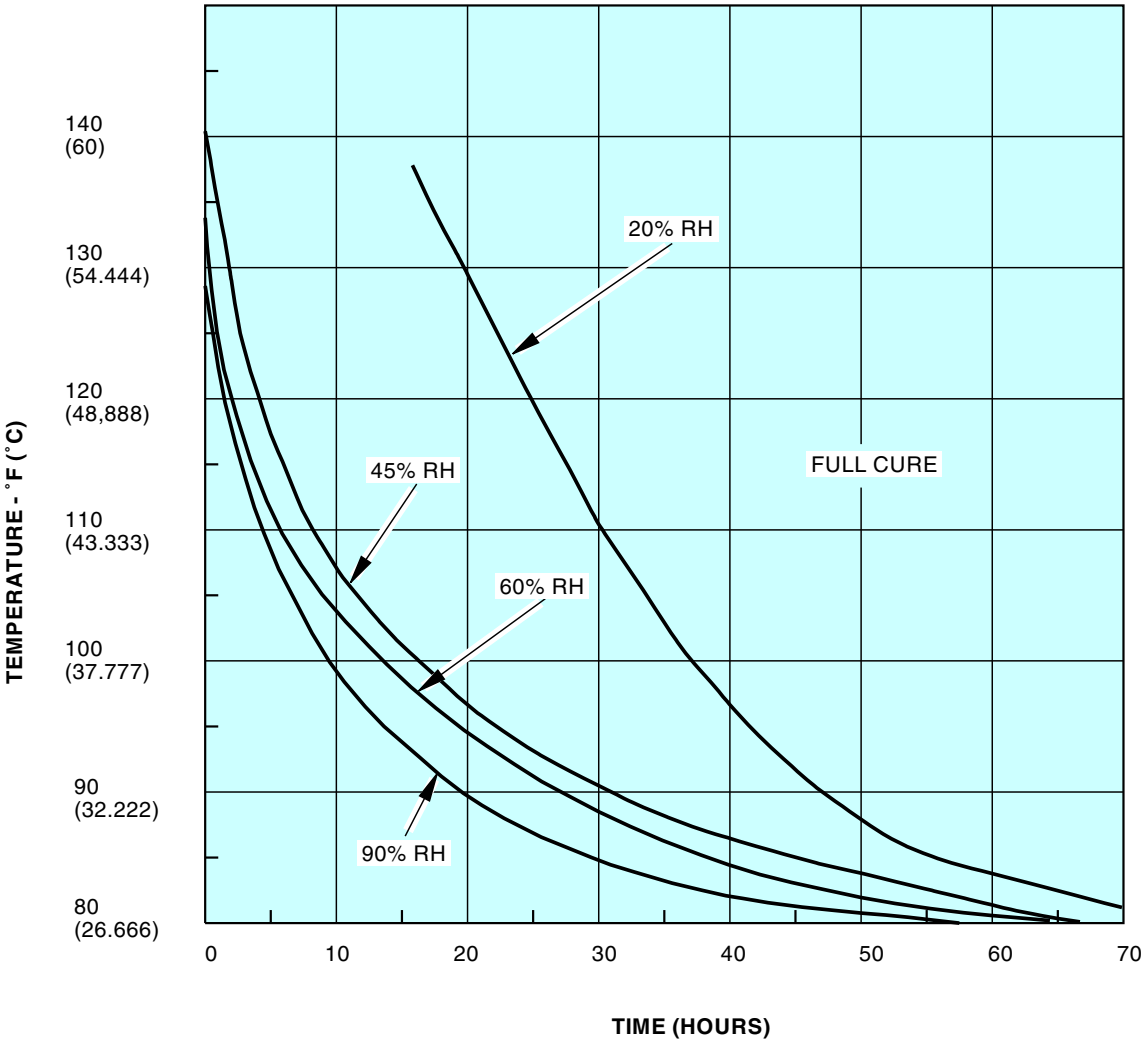
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DeSoto (MIL-C-27725) Compound Fuel Resistant Cure Time Versus Temperature and Relative Humidity (RH)
Figure 702/28-11-00-990-817

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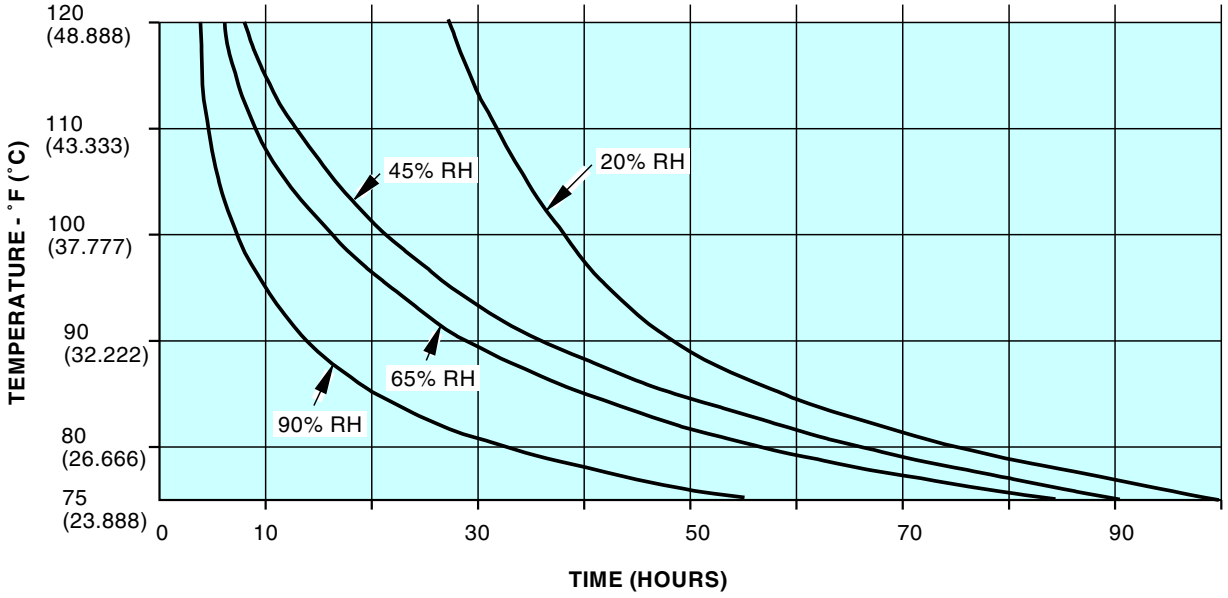


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DeSoto (MIL-C-27725) Compound Full Cure Time Versus Temperature and Relative Humidity (RH)
Figure 703/28-11-00-990-818

ECCN 9E991 BOEING PROPRIETARY - See title page for details

% RELATIVE HUMIDITY (RH)	TEMPERATURE - ˚F (˚C)	
	65 (18.333)	70 (21.111)
20	392	228
45	376	212
65	344	184
90	240	124



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Products Research (MIL-C-27725) Compound Cure Time Versus Temperature and Relative Humidity (RH)
Figure 704/28-11-00-990-819

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-11-00-100-801

3. Clean the Fuel Tanks Contaminated with Red Dye

A. General

(1) Do the procedure that follows if either of these conditions are true:

(a) The dye concentration of red dye is more than 0.41 milligrams per liter fuel per ASTM D7058 or equivalent.

(b) The concentration of red dye is more than 0.28 milligrams per liter as indicated by the JT-100S analyzer or equivalent.

NOTE: Scale on JT-100S or equivalent instruments is calibrated to a solid dye standard. To obtain liquid dye equivalent value, multiply the meter reading by 1.446 (1.446 X 0.28=0.41 mg/l).

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
12-11-00-650-807	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)
71-00-00-910-802-G00	Start the Engine (Selection) (P/B 201)
71-00-00-910-806-G00	Stop the Engine (Usual Engine Stop) (P/B 201)
73-11-02-000-801-G00	Fuel Filter Cartridge Removal (P/B 401)
73-11-02-400-801-G00	Fuel Filter Cartridge Installation (P/B 401)

C. Procedure

SUBTASK 28-11-00-860-011

(1) Do not start or operate the engines or the APU.

SUBTASK 28-11-00-650-014

(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 28-11-00-650-015

(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 12-11-00-650-807.

SUBTASK 28-11-00-020-001

(4) Remove the fuel filter, do this task:Fuel Filter Cartridge Removal, TASK 73-11-02-000-801-G00 .

SUBTASK 28-11-00-020-002

(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 Cartridge Installation, TASK 73-11-02-400-801-G00.

(b) If there is no contamination, install the same filter. To install it, do this task:Fuel Filter Cartridge Installation, TASK 73-11-02-400-801-G00.

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SUBTASK 28-11-00-650-016

(6) Refuel the fuel tanks with new clean fuel. To refuel them, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-803.

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.

SUBTASK 28-11-00-210-016

(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 12-11-00-650-807.

(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: TASK 71-00-00-910-802-G00.

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: TASK 71-00-00-910-806-G00.

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 28-11-00-020-003

(8) After you operate the engine and the APU, remove the fuel filter. To remove it, do this task: Fuel Filter Cartridge Removal, TASK 73-11-02-000-801-G00.

SUBTASK 28-11-00-210-017

(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 Cartridge Installation, TASK 73-11-02-400-801-G00.

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 Cartridge Installation, TASK 73-11-02-400-801-G00 .

3) Apply the full procedure described above again.

SUBTASK 28-11-00-860-012

(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.

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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

(a) 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.

(2) Repair of Sealant Leaks in the Fuel Tank Structure

(a) 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).

(b) 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 28-11-00-300-803).

(3) Repair of the Secondary Fuel Barrier Sealant.

CAUTION MAKE SURE THAT THE SEALANT AND SURFACE FINISH THAT YOU USE IN THE FUEL TANK ARE RECOMMENDED MATERIALS. IF THE MATERIALS DO NOT HAVE APPROVAL TO BE USED WITH EACH OTHER, DAMAGE TO THE FUEL TANK COULD OCCUR.

B. This procedure also contains information on how to prepare, use and cure the sealant materials.

(1) The sealant and finish materials recommended for use in this procedure and in FUEL TANKS - CLEANING/PAINTING, PAGEBLOCK 28-11-00/701 can be used with each other (mutually compatible). For example, you can apply sealant on fully cured corrosion resistant finish for fuel tanks (coating, C00307) or you can apply corrosion resistant finish for fuel tanks (coating, C00307) on sealant with a spray gun or brush.

(2) Remove the old corrosion resistant finish in the area of sealant repair, unless you know the old finish can be used with the new sealant. If you need to remove the finish, remove it to the bare metal.

TASK 28-11-00-300-802

2. Repair of Fuel Tank Corrosion

A. General

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.

(1) To repair fuel tank corrosion, the areas of repair in the fuel tank must be cleaned of corrosion and treated with Alodine. Corrosion resistant finish for fuel tanks (coating, C00307) 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
28-11-00-410-801	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)

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(Continued)

Reference	Title
28-26-00-650-801	Fuel Tank Defueling (P/B 201)

C. Consumable Materials

Reference	Description	Specification
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
C00307	Coating - Corrosion Resistant Finish For Integral Fuel Tanks	BMS10-20 Type II

D. Prepare for the Fuel Tank Repair

SUBTASK 28-11-00-650-017

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

SUBTASK 28-11-00-650-018

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

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

E. Fuel Tank Corrosion Repair

SUBTASK 28-11-00-140-002

(1) Look for corrosion on all structural surfaces of the fuel tank and do the subsequent steps to remove the corrosion.

(a) If there is light surface corrosion, rub the surface with fine abrasive paper or cloth to remove the corrosion.

(b) If you cannot fully remove the corrosion with the abrasive paper or cloth, refer to the Structural Repair Manual.

SUBTASK 28-11-00-110-003

(2) Clean the fuel tank surfaces in the area of repair with solvent, B00184 (Figure 801, Figure 802).

SUBTASK 28-11-00-370-003

(3) 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 28-11-00-390-002

(4) To repair all sealant damaged or removed during corrosion repair, do this task: Repair of Sealant Leaks in the Fuel Tank Structure, TASK 28-11-00-300-803.

SUBTASK 28-11-00-370-004

(5) To apply the corrosion resistant finish for fuel tanks (coating, C00307), do this task: Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801.

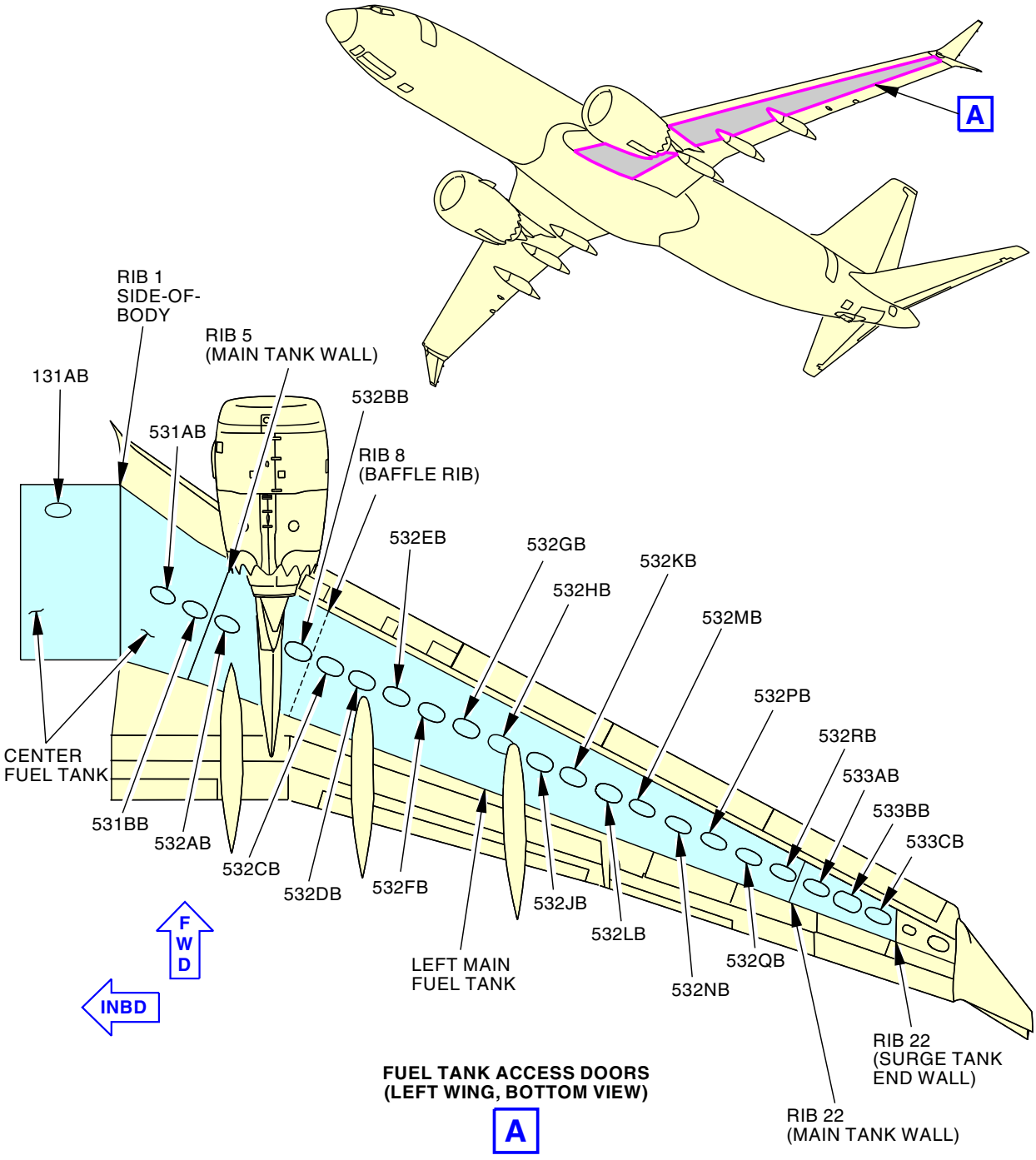
F. Put the Airplane Back to Its Usual Condition

SUBTASK 28-11-00-410-007

(1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

END OF TASK

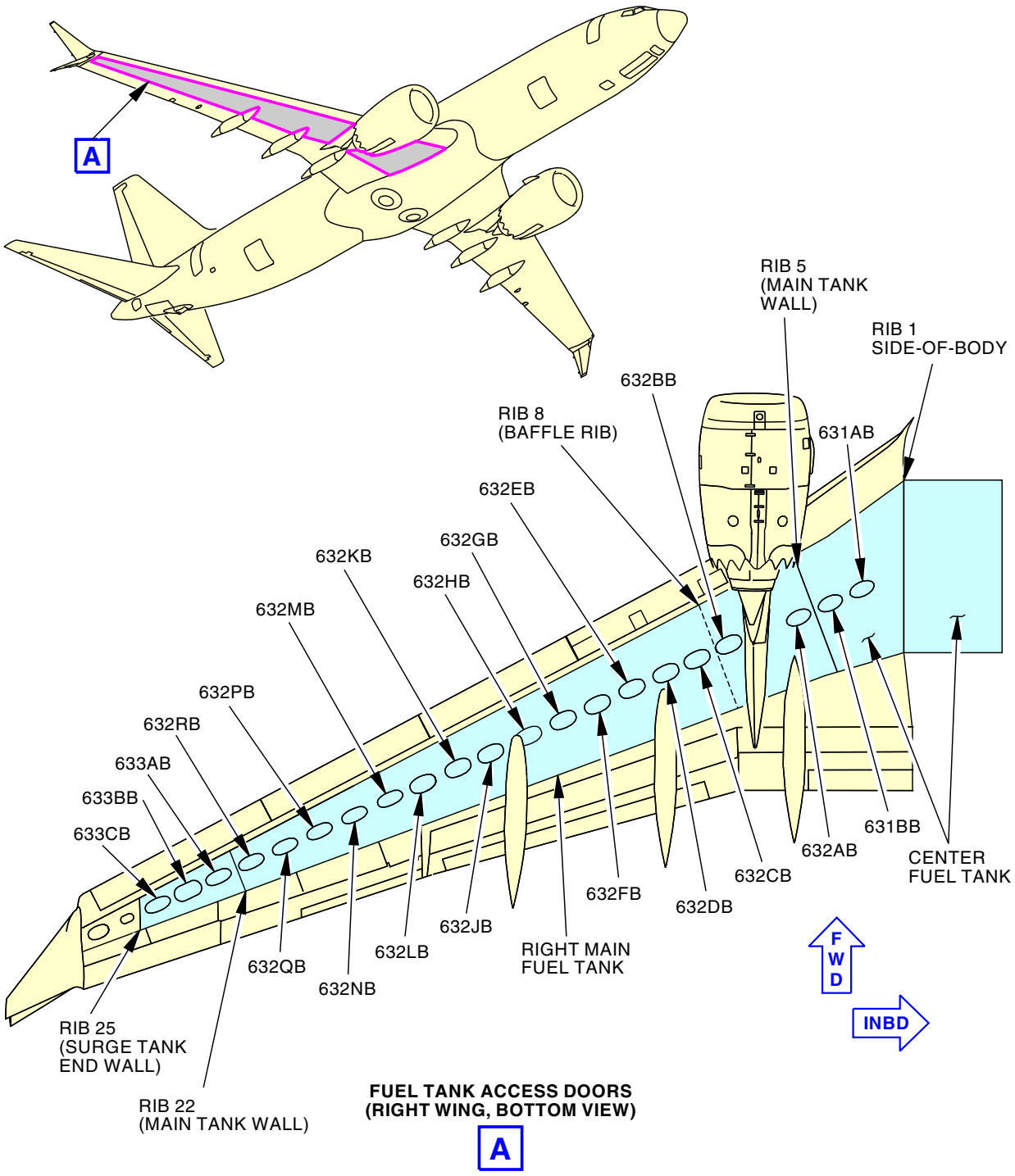
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Fuel Tank - Left Wing
Figure 801/28-11-00-990-820

ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Fuel Tank - Right Wing
Figure 802/28-11-00-990-821

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TASK 28-11-00-300-803

3. Repair of Sealant Leaks in the Fuel Tank Structure

A. General

(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
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)
51-22-00-100-802	Excess Sealant Removal (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-768	Sealant Removal Tool, Non-Metallic Part #: ST982L-9 Supplier: 81205 Part #: ST982LF-9 Supplier: 81205 Part #: ST982LH-A-1 Supplier: 81205
SPL-1762	Temporary Repair Tool - Self-Sealing Rivets, Fuel System Part #: F70230-1 Supplier: 81205 Part #: J28006-1 Supplier: 81205
STD-124	Brush - Stiff Bristle, Non-Metallic
STD-449	Gun - Sealant
STD-809	Spatula
STD-1182	Tool - Seal Cutting, Hardwood or Plastic
STD-9933	Gun, Rivet
STD-10596	Tool - Sealant Fairing

D. 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 - P/S 860 Class B-1/6 Quick Repair Fuel Tank Sealant	AMS-S-83318 Class B
A50110	Sealant - Fuel Tank	BMS5-45 Class B-2
A50153	Sealant - Fuel Tank - Class A-2	BMS5-45 Class A-2
A50155	Sealant - Fuel Tank	BMS5-45 Class C
A50337	Sealant - Fuel Tank	BMS5-45 Class B
A50408	Promoter - Adhesion, PR-148, Conductive Filler	BAC5010 Type 118
A50518	Sealant - Fuel Tank	BMS5-45 Class C-24

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(Continued)

Reference	Description	Specification
A50530	Sealant - PR-1826 Class B-1/2 Rapid Curing Fuel Tank	SAE AMS3277 Class B-1/2
A50574	Promoter - Adhesion, PR-1826AP	
A50582	Sealant - Fuel Tank	BMS5-45 Class C-48
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
B00666	Solvent - Methyl Propyl Ketone	BMS11-9
C00064	Coating - Aluminum Chemical Conversion	BAC5719 Type II Class A (MIL-DTL-5541 Class 1A)
C00307	Coating - Corrosion Resistant Finish For Integral Fuel Tanks	BMS10-20 Type II
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G50381	Abrasive - Aluminum Oxide Paper, 180 Grit	
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 28-11-00-650-019

(1) For the applicable fuel tank, do this task: Fuel Tank Defueling, TASK 28-26-00-650-801.

SUBTASK 28-11-00-860-013

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(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 that you cut the sealant smoothly.

3) When you remove the sealant, be careful so you do not damage the bare metal.

(b) If the fillet seal bond to the finish is good and the finish bond to the tank surface is good, it is not necessary to cut the sealant to the bare metal (Figure 805).

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1) Make sure that you remove all sealant that is loose.

(c) If the bad sealant includes fasteners with fillet seals, do these steps:

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 these steps:

1) Remove the bad sealant from short injection channels with hooked wire and small cutting tools.

NOTE: You must disassemble long injection channels (refer to the Structural Repair Manual). 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 that the injection channel is clean.

NOTE: If air is caught in the injection channel when you apply the sealant, the new sealant cannot fully fill the channel.

3) Be careful not to cause damage to the tank structure when you remove sealant or disassemble parts.

(e) To remove excess sealant, do this task: Excess Sealant Removal, TASK 51-22-00-100-802.

SUBTASK 28-11-00-360-004

(5) For a bad prepack or faying surface seal, do these steps:

(a) Disassemble the structure around the bad sealant (refer to the Structural Repair Manual).

1) If you do not want to disassemble the structure, you can repair the leak if you lift 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 to use this method.

(b) Remove the bad sealant with seal cutting tools, STD-1182, and sealant removal tools, SPL-768.

SUBTASK 28-11-00-150-005

(6) If there is corrosion resistant finish on the surface, remove all the corrosion resistant finish from the sealant repair area unless you know it is coating, C00307, (BMS 10-20, Type II corrosion resistant finish).

(a) Use 180 grit abrasive paper, G50381, and remove the used corrosion resistant finish until either bare metal or sealant shows (in good condition).

(b) Use clean cotton wipers, G00034, soaked with solvent, B00184, or solvent, B00666, to clean all removed corrosion resistant finish surfaces and sealant.

(c) Rub the surface with clean cotton wipers, G00034, until the solvent is dry.

(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 sealant precoat from the repair area unless it is known that the precoat is BMS5-45 sealant, A00767 (or equivalent), material in good condition.

(a) Remove the used sealant precoat with an abrasive pad and solvent, B00184, or solvent, B00666.

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(b) Clean the surface with a clean brush and cotton wiper, G00034, soaked with solvent, B00184, or solvent, B00666.

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 28-11-00-210-018

(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.

SUBTASK 28-11-00-110-004

(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 28-11-00-110-005

(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 28-11-00-110-006

(11) Immediately before you apply the sealant, clean the surface with solvent, B00184, and rub dry with clean cotton wipers, G00034.

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 28-11-00-390-003



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 ±15°F (18 ±9°C).

(a) Keep the sealant for 6 months or less from the manufacturer's date of packaging.

(b) Do a test of sealant that is kept for 6 months or more from the manufacturer's date of packaging.

1) Mix a sample of the sealant base compound and the curing compound in a container, at room temperature.

a) Use an entire 2-part kit or make a 2-part kit.

<1> To make a 2-part kit, use the correct ratio of base compound and curing compound.

<2> Weigh the components to calculate the ratio.

<3> If you use a Semkit, mix the entire Semkit.

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2) Apply a fillet seal (Class B) or brush a thick coating of sealant (Class A) to a sample piece of structure or scrap metal to find the time necessary before a sample of the sealant is not tacky.

a) Use the plastic film in the applicable sealant specification to find the time when the sealant is not tacky (tack-free time).

3) Compare this time with maximum permitted tack-free time given in the applicable sealant specification.

4) If this time is more than the maximum permitted time, discard the sealant.

5) The storage life may be extended only once by a maximum of 3 months.

SUBTASK 28-11-00-390-004

(2) Mix the Sealant Compound:

WARNING MAKE SURE THAT THERE IS A GOOD FLOW OF CLEAN AIR WHEN YOU MIX THE SEALANTS. DO NOT MIX THE SEALANTS IN A CLOSED SPACE IN THE AIRPLANE. DO NOT LET THE SEALANTS TOUCH YOUR SKIN OR EYES. WEAR RUBBER GLOVES AND EYE PROTECTION WHEN YOU MIX THESE MATERIALS. THEY ARE POISONOUS AND CAN CAUSE INJURY TO PERSONS.

(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 that 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.

CAUTION MAKE SURE THAT THERE ARE NO AIR BUBBLES IN THE SEALANT WHEN YOU MIX IT. IF THERE ARE AIR BUBBLES IN THE SEALANT, IT WILL NOT BOND CORRECTLY.

(d) For small repair kits (less than 0.5 lb (0.2 kg)) mix the curing compound and base compound until the sealant is of a constant, equal color with a clean spatula, STD-809, or other applicable tool.

1) Put the sealant in a container cleaned with solvent, B00184, or solvent, B00666.

2) Use immediately after you mix it.

(e) Sealant may be machine-mixed and stored frozen to extend the storage life.

1) Thoroughly mix the accelerator with a machine mixer.

2) Use an entire kit or weigh out the base and accelerator in the correct proportion for mixing.

a) Use the ratio recommended by the manufacturer.

3) Mix the base and accelerator together with a machine mixer.

NOTE: Use either a batch or a continuous mixer recommended by the manufacturer of the sealant.

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4) Make sure the sealant is mixed correctly.

NOTE: The sealant is mixed correctly if it is uniform in color and free from streaks.

5) Immediately after the sealant is mixed, do these steps:

a) Put the mixed BMS5-45 sealant, A00767 (or equivalent), into cartridges.

b) Install caps on both ends of the cartridges.

c) Write the date you mix the sealant, the sealant type, class, supplier, and the expiration date on the cartridges.

d) Put the cartridges in a freezer at a temperature of -40°F (-40°C) or colder.

e) Discard the sealant if it is kept more than 21 days at -40°F (-40°C).

f) Discard the sealant if it is kept more than 7 days at -20°F (-29°C).

SUBTASK 28-11-00-390-005

(3) Sealant application time at 77°F (25°C) and 50% relative humidity (Figure 806):

NOTE: Sealant application time is the maximum length of time you an apply the sealant to the part. Application time starts when mixing or thawing (for frozen sealant) is complete.

(a) BMS5-45 sealant, A00767 - ½ hour

(b) BMS 5-45 Class B-2 sealant, A50110 - 2 hours

(c) BMS5-45 Class C-24 sealant, A50518 - 8 hours

(d) BMS5-45 Class C-48 sealant, A50582 - 12 hours

(e) BMS5-45 Class C-168 sealant, A50155 - 48 hours

(f) P/S 860 B-1/6 sealant, A50084 - 10 minutes

(g) PR-1826 sealant, A50052 Class B-½ - ½ hour.

SUBTASK 28-11-00-390-006

(4) Maximum temperature to apply fay surface sealant:

(a) For sealant, A50110 - 95°F (35°C) maximum

(b) For sealant, A50155 - 100°F (38°C) maximum.

SUBTASK 28-11-00-390-007

(5) Sealant squeeze-out life:

(a) Squeeze-out life is the length of time you can assemble parts with faying surface sealant.

(b) Squeeze-out life starts when mixing or thawing (for frozen sealant) is complete.

(c) You must apply the sealant within the application time and finish the assembly within the squeeze-out life.

(d) The squeeze-out life when measured at 77°F (25°C) and 50% relative humidity for BMS5-45 sealant, A00767, is shown in Figure 806.

SUBTASK 28-11-00-390-008

(6) Sealant cure time:

(a) You must let the BMS 5-45 sealant, A00767 (or equivalent), cure until it is at least tack-free (Figure 806) before you continue maintenance operations in the fuel tank or refuel the fuel tank.

(b) P/S 860 B-1/6 sealant, A50084, can touch fuel after 2 hours and has a cure time of 4 hours.

(c) PR-1826 sealant, A50530, can touch fuel after 2.5 hours and has a cure time of 3 hours.

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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.

CAUTION DO NOT APPLY SEALANT WHEN THE TEMPERATURE OF THE FUEL TANK STRUCTURE IS TOO HOT OR TOO COLD. THE SEALANT WILL NOT CURE CORRECTLY IF THE STRUCTURE TEMPERATURE IS OUT OF RANGE. INCORRECTLY CURED SEALANT CAN CAUSE A FUEL LEAK.

(d) The cure times in (Figure 806) are at a temperature of 77 ±5°F (25 ±3°C) and a relative humidity of 50% ±5%.

1) The best condition would be with a good flow of air in the area.

2) Make sure that the tank and component surfaces are dry.

NOTE: Sealant will not adhere to wet surfaces.

3) If you increase the temperature of the tank structure, the curing time decreases.

a) You can increase the temperature of all the tank structure up to 140°F (60°C).

b) Tack-free and cure times are approximately one-half as long for each 20°F (11°C) increase in temperature.

4) If you increase the humidity of the tank structure, the curing time decreases.

a) Tack-free and cure times decrease between 33%-50% for every 15% increase in relative humidity.

NOTE: Humidity affects polysulfide sealants more than polythioether sealants.

b) You must know the relative humidity at all times during the sealant operations.

<1> If the relative humidity is less than 40%, the cure of the sealant is slower.

<2> For faying and non-faying surface seals, to increase the relative humidity, put or flow warm, moist air above the repair area or over the sealant.

<a> Make sure that 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.

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.

SUBTASK 28-11-00-360-005

(7) To apply a new fillet seal, do these steps:

(a) BMS 5-45 Class B sealant, A00767 (or equivalent), is used to apply all fillet seals after a precoat of BMS 5-45 Class A sealant, A00767 (or equivalent).

1) For Class A, use BMS5-45 Class A-2 sealant, A50153.

2) For Class B, use BMS5-45 Class B-2 sealant, A50110.

3) For Class B over Class A sealing, use BMS5-45 Class B-2 sealant, A50110, with BMS5-45 Class A-2 sealant, A50153.

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(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 BMS 5-45 Class A sealant, A00767 (or equivalent), to the surface with a stiff bristle non-metallic brush, STD-124 (Figure 807).

1) Use a vigorous motion to apply the precoat.

2) Make sure that you apply precoat into all crevices and the full length of the area that you will apply sealant to.

3) Apply the precoat at a width of 0.5 in. (12.7 mm) on each side of seams.

(d) If you let the precoat become tack-free, clean with solvent, B00184, or solvent, B00666, before you apply the fillet seal.

NOTE: It is not necessary to let the precoat cure. A minimum of 15 to 20 minutes, after you apply the precoat, is recommended before you apply the fillet seal.

(e) If you use PR-1826 sealant, A50052, let the PR-1826AP adhesion promoter, A50574, dry for a minimum of 30 minutes before you apply the fillet seal.

1) If the PR-1826AP adhesion promoter, A50574, becomes contaminated or sealant is not applied within 24 hours, it is necessary to remove and re-apply the PR-1826AP adhesion promoter, A50574.

a) Remove the old or contaminated PR-1826AP adhesion promoter, A50574, with an abrasive pad and solvent, B00184, or solvent, B00666.

b) Clean the surface with a stiff bristle non-metallic brush, STD-124, and cotton wiper, G00034, soaked with solvent, B00184, or solvent, B00666.

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.

e) Re-apply the PR-1826AP adhesion promoter, A50574, to the surface.

(f) If you use P/S 860 B-1/6 sealant, A50084, let the PR-148 adhesion promoter, A50408, dry for a minimum 30 minutes before you apply the fillet seal.

1) Remove the old or contaminated PR-148 adhesion promoter, A50408, with an abrasive pad and solvent, B00184, or solvent, B00666.

2) Clean the surface with a stiff bristle non-metallic brush, STD-124, and cotton wiper, G00034, soaked with solvent, B00184, or solvent, B00666.

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.

3) Rub dry with a clean, dry cotton wiper, G00034.

4) Continue to clean and dry the surface until the dry cotton wiper, G00034, stays clean.

5) Re-apply the PR-148 adhesion promoter, A50408, to the surface.

(g) Apply a small first fillet seal of BMS 5-45 Class B sealant, A00767, or equivalent, with the sealant gun, STD-449 (Figure 808).

1) Make sure that there are no air bubbles in the sealant.

NOTE: Air bubbles in the sealant make a path for fuel to leak.

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2) When you use a nozzle tip, point the nozzle tip into the seam, almost perpendicular to the direction of travel.

3) Keep a bead of sealant in front of the nozzle tip.

4) If the seal has a bad bond or air bubbles, do the procedure again.

(h) 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.

(i) If the first fillet seal is tack-free or cured, but is not clean, then it must be cleaned before you apply the second fillet seal.

(j) Apply BMS 5-45 Class B sealant, A00767 (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 are extruding sealant with a nozzle, do the steps that follow to apply the second fillet seal:

a) Cut the nozzle to get the dimensions shown in Figure 810.

b) Put the nozzle at the seam, and push the sealant bead ahead of the nozzle while you move along the seam.

NOTE: Keep the nozzle of the sealing gun near the surface to prevent air bubbles.

c) Make sure the second fillet seal stays at the seam.

2) Remove all air bubbles and fair out re-entrant edges.

(k) Apply corrosion resistant finish (topcoat) if it is necessary.

NOTE: You must apply Alodine and coating, C00307, if bare metal is open to fuel after the repair.

Follow the procedure in this task: Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801.

SUBTASK 28-11-00-390-009

(8) Repair of fastener seals:

(a) Repair self-sealing rivets.

1) Self-sealing rivets are used 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 the Structural Repair Manual.

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 804, Figure 811).

NOTE: Use this procedure for fuel leaks at mechanically sealed rivets only.

<1> Clean the surface of the adapter with emery cloth if it is necessary.

<2> Remove the paint from around the rivet that leaks.

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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.

<3> Clean the surface with solvent, B00184 or solvent, B00666.

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.

<4> Use a cotton-tipped stick to apply a thin layer of Eastman 910 adhesive to the surface of the adapter, Step 1, (Figure 811).

<5> Put the adapter over the center of the rivet and tightly push against the wing surface for 10 seconds, Step 2, (Figure 811).

<6> Release your hold on the adapter.

<7> Do not touch the adapter for 15 minutes.

<8> Remove the screw from the sealant loading port (Figure 804).

<9> Turn the screw in the sealant bleed port until only one more turn will remove it.

<10> Remove the pressure bolt.

<11> Drain all collected fuel.

<12> Install the pressure bolts (approximately 12 turns or 0.5 in. (12.7 mm)).

<13> Put BMS 5-45 Class A sealant, A00767, in the sealant loading port until it comes out of the sealant bleed port, Step 3, (Figure 811).

<14> Install the screw in the sealant loading port.

<15> Tighten the screw in the sealant bleed port.

<16> Torque the pressure bolt to 5 in-lb (0.565 N·m) and hold for 5 minutes.

<17> Hit the sides of the adapter lightly with a small hammer or mallet, Step 4, (Figure 811), to remove the adapter.

<18> Examine the repair for fuel leaks.

<19> If the fuel leak continues, do the procedure again.

<20> If you must replace the self-sealing rivet, refer to the structural repair manual.

<21> Clean the sealant from the wing surface and the adapter with solvent, B00184 or solvent, B00666.

<22> 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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b) Apply sealant to a self-sealing rivet with a temporary repair tool (Figure 812).

<1> Remove paint from around the rivet that leaks with an approved emery cloth.

WARNING

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<2> Clean the temporary repair tool and the wing surface with solvent, B00184 or solvent, B00666.

NOTE: Do not touch the wing surface with your fingers after you clean it.

<3> Make a mark on the wing surface to show the position of the temporary repair tool while it is in use (Figure 812).

<4> Fill the temporary repair rivet sealing tool, SPL-1762, with mixed BMS 5-45 Class A sealant, A00767.

<5> Put the temporary repair tool into a small rivet gun, STD-9933.

<6> 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.

<7> Operate the rivet gun, STD-9933, until sealant is applied around the rivet that leaks.

<8> Examine the repair for fuel leaks.

<9> If the fuel leak continues, do the procedure again.

<10> If you must replace the self-sealing rivet, refer to the structural repair manual.

<11> Clean the sealant from the temporary repair tool and the wing surface with solvent, B00184, or solvent, B00666.

NOTE: Make sure you do not touch the area with the new sealant.

c) Install a Click-Patch.

<1> 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).

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<2> 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.

<3> The subsequent limits apply to Click-Patch repairs:

<4> You can install a Click-Patch only after you make sure there are no structural crack in the applicable area of the fuel leak.

<5> The maximum size of a Click-Patch is 1.25 in. (31.75 mm).

<6> 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.

NOTE: You can use BMS5-45 (sealant, A00767), PR-1826 sealant, A50052, or P/S 860 B-1/6 sealant, A50084.

1) If you use BMS5-45 sealant, A00767, apply a precoat of BMS 5-45 Class A sealant, A00767 (or equivalent), to the fastener and the area 0.5 in. (12.7 mm) in width in all directions from the fastener.

NOTE: PR-148 adhesion promoter, A50408, is required before the use of P/S 860 B-1/6 sealant, A50084, on all surfaces. Adhesion promoter is required before the use of PR-1826 sealant, A50052, on all surfaces. A precoat of BMS5-45, Class A sealant, A00767, is optional before the use of PR-148 adhesion promoter, A50408, and P/S 860 B-1/6 sealant, A50084, or PR-1826AP adhesion promoter, A50574, and sealant.

a) Use a stiff, bristled brush to vigorously apply the precoat on the surfaces and into crevices.

b) Let the precoat dry until it is not tacky.

2) If you use PR-1826 sealant, A50052, apply PR-1826AP adhesion promoter, A50574, and wait 30 minutes before you apply the sealant.

a) If the PR-1826AP adhesion promoter, A50574, becomes contaminated or the sealant is not applied within 24 hours, it is necessary to remove and re-apply the PR-1826AP adhesion promoter, A50574.

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.

<1> Remove the old or contaminated PR-1826AP adhesion promoter, A50574, with an abrasive pad and solvent, B00184, or solvent, B00666.

<2> Clean the surface with a clean brush and cotton wiper, G00034, soaked with solvent, B00184, or solvent, B00666.

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.

<3> Rub dry with a clean, dry cotton wiper, G00034.

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<4> Continue to clean and dry the surface until the dry cotton wiper, G00034, stays clean.

<5> Re-apply PR-1826AP adhesion promoter, A50574, on the surface.

3) If you use P/S 860 B-1/6 sealant, A50084, apply PR-148 adhesion promoter, A50408, and wait 30 minutes before you apply the sealant.

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a) Remove the old or contaminated PR-148 adhesion promoter, A50408, with an abrasive pad and solvent, B00184, or solvent, B00666 .

b) Clean the surface with a clean brush and cotton wiper, G00034, soaked with solvent, B00184, or solvent, B00666.

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.

e) Re-apply PR-148 adhesion promoter, A50408, on the surface.

4) Use a sealing gun or spatula and apply a layer of BMS 5-45 Class B sealant, A00767, P/S 860 B-1/6 sealant, A50084, or PR-1826 sealant, A50052, Class B-1/2 around and on the fastener.

5) Move the sealant with a sealant fairing tool until you get the dimensions shown in (Figure 813) for the fillet seal.

6) Examine the sealant for holes, bubbles, or spaces.

a) If there are holes, bubbles or spaces, use the fairing tool to move the sealant and remove these.

7) Apply corrosion resistant finish (topcoat) (TASK 28-11-00-600-801).

(c) Repair fasteners with metal seal covers.

NOTE: BACC50H and BACC50AJ are the specifications for acceptable 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.

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5) Vigorously apply precoat BMS 5-45 Class A sealant, A00767 (or equivalent), to the area with a stiff, bristle brush.

NOTE: Precoat BMS 5-45 Class A is necessary when you use BMS 5-45 Class B sealant, A50337. Precoat is optional when you use P/S 860 B-1/6 sealant, A50084. PR-148 adhesion promoter, A50408, is required before the use of P/S 860 B-1/6 sealant, A50084. PR-1826AP adhesion promoter, A50574, is used with PR-1826 sealant, A50052. Obey the manufacturers instructions.

a) Apply (brush) 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 BMS 5-45 Class B sealant, A50337, or P/S 860 B-1/6 sealant, A50084, with a sealing gun or a clean spatula (Figure 814).

7) Make sure that 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 cotton wiper, G00034, 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.

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 that 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 28-11-00-390-010

(9) Apply an injection seal.

NOTE: You could lift 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 that you have these tools: pipe cleaners, a sealant fairing tool, and a sealing gun with an injection nozzle attached.

(b) Make sure that the channel to be injected is clean.

(c) Apply a precoat of BMS 5-45 Class A sealant, A00767 (or equivalent), 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.

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1) Make sure you do not seal the channel with the precoat of BMS 5-45 Class A sealant, A00767 (or equivalent).

NOTE: If you seal the channel, it will prevent the flow of the sealant into the channel.

(d) Put BMS 5-45 Class B sealant, A00767 (or equivalent), into one end of the channel and fill until sealant comes out of all other openings (Figure 816).

1) Make sure that there is sufficient sealant in the sealing gun for a full seal.

NOTE: If you stop and start when you apply the seal, air bubbles can get into the seal.

(e) Fill all slots, joggles and channels where continuity of a seal or a block-off seal is necessary.

(f) Fair the ends of the sealant to make a smooth transition to and adjacent fillet seal or the component surface, as applicable.

(g) Remove excess sealant with the sealant fairing tool.

(h) 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 28-11-00-360-006

(10) Apply a prepack seal.

(a) Apply a bead of BMS 5-45 Class B sealant, A50337 (or equivalent), along each corner of the part cavity (Figure 817).

1) Fill all of the cavity with an excess of sealant.

(b) Make sure that you apply sufficient sealant to completely fill the parts.

(c) Assemble the parts in the sealant squeeze-out life (Figure 806).

1) If it is necessary, do this task: Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801.

SUBTASK 28-11-00-360-007

(11) Apply a faying surface seal.

NOTE: The maximum temperature for application of a faying seal is 95°F (35°C) for sealant, A50110, and 100°F (38°C) for sealant, A50155.

(a) Apply a layer of sealant, A50110, Class B-2 or sealant, A50155, Class C to one faying surface with a sealing gun or spatula (Figure 818).

(b) Make sure the sealant covers the surface and is approximately 0.03 in. (0.76 mm) thick (Figure 818).

(c) Assemble the parts in the sealant squeeze-out life (Figure 806).

(d) Use a sealant fairing tool, STD-10596, to smooth the sealant along the joint.

NOTE: You must apply sufficient sealant to make sure that there is continuous extruded sealant on the along the entire length of the joint.

1) If it is necessary, do this task: Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801.

SUBTASK 28-11-00-360-008

(12) Increase the seal plane above the initial seal plane (Figure 819).

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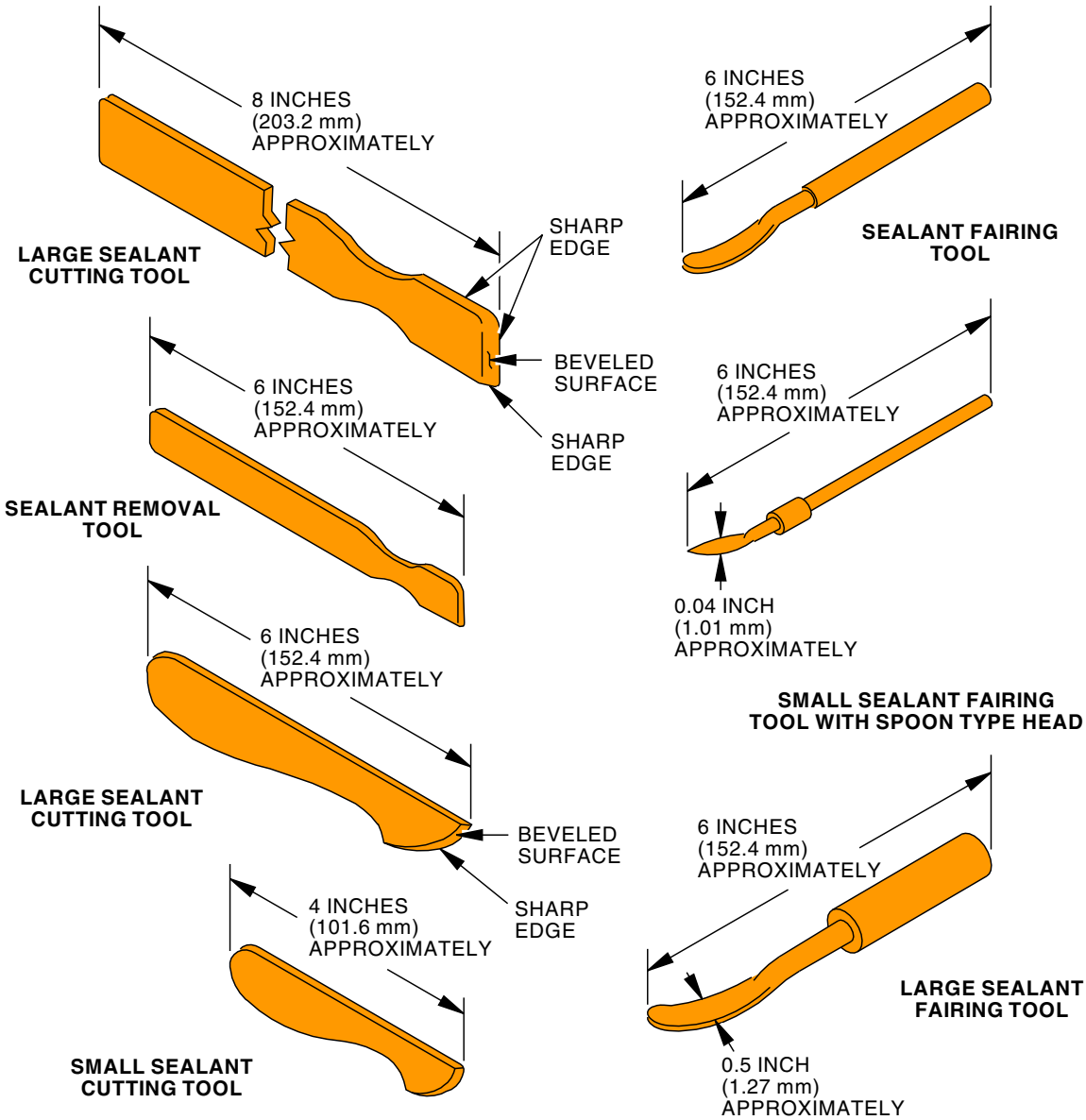
(a) You can replace an injection, prepack, or faying surface seal, or you can increase the seal plane to isolate a bad seal from the fuel.

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 ———

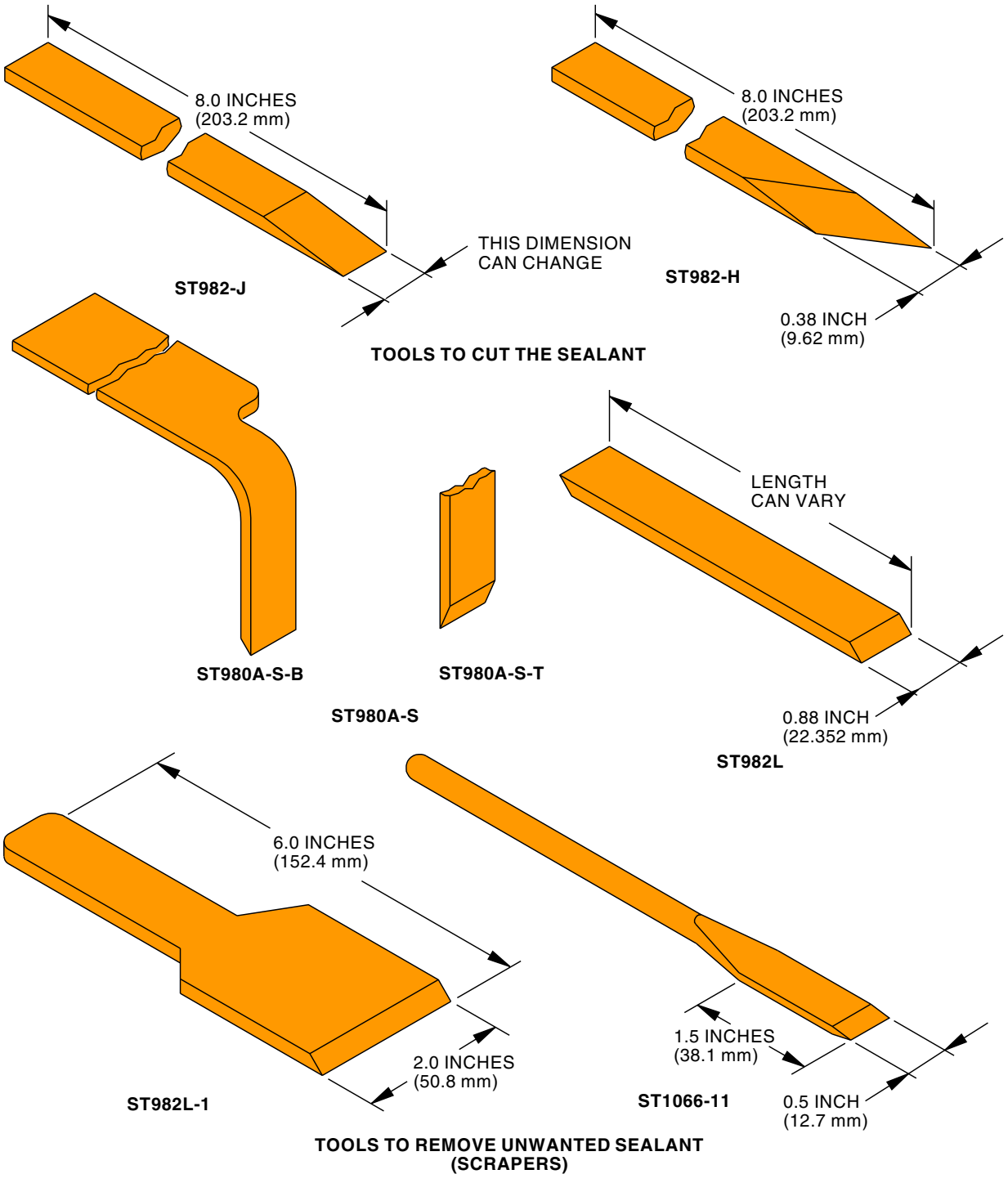
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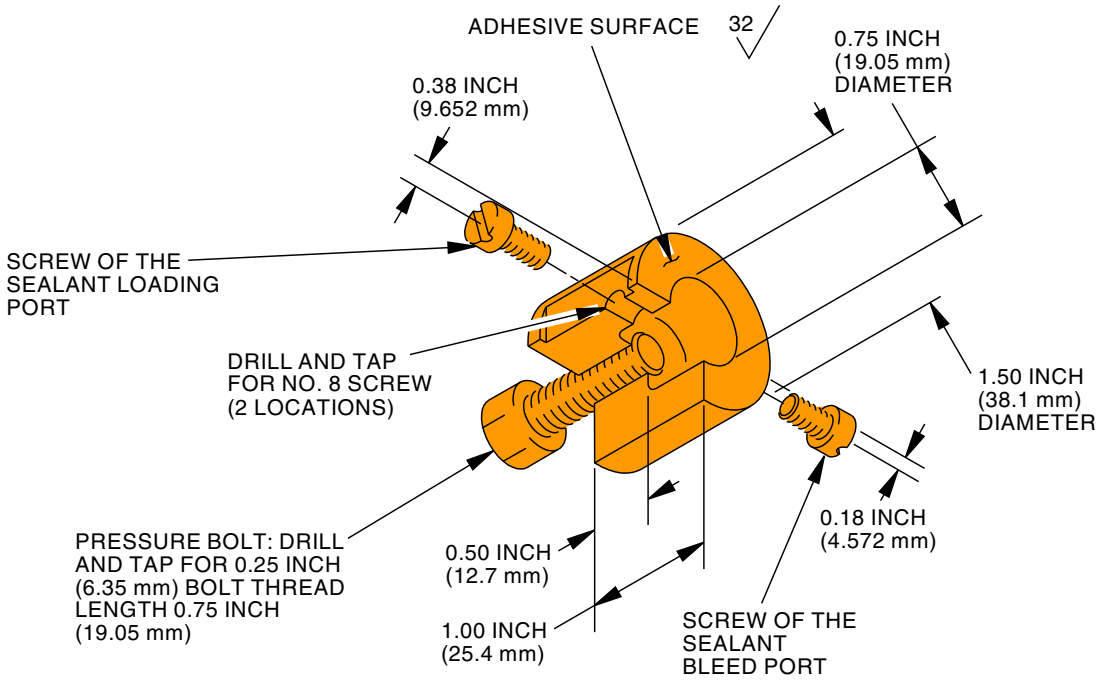
Sealant Removal, Cutting and Fairing Tools
Figure 803/28-11-00-990-822 (Sheet 1 of 2)

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Sealant Removal, Cutting and Fairing Tools
Figure 803/28-11-00-990-822 (Sheet 2 of 2)

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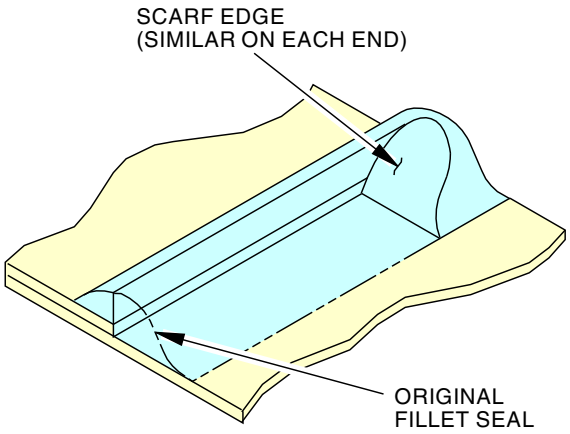


MATERIAL: MILD STEEL CADIUM PLATED

2413460 S00061532638_V1

Sealing Tool for Rivets that Leak
Figure 804/28-11-00-990-823

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413461 S00061532639_V1

Fillet Seal Removal
Figure 805/28-11-00-990-824

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 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
	A-2 (GRADE 3)	2	8	--	8
	B-2 7	1/2	--	--	6
	B-1/2	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 PPG AEROSPACE, MOJAVE, CALIFORNIA.

4 USED TO REPAIR FILLET SEALS OF BMS 5-45. AVAILABLE FROM PPG AEROSPACE, MOJAVE, CALIFORNIA.

5 USED WITH FAYING SURFACE SEALS THAT HAVE A LONG SQUEEZE-OUT LIFE.

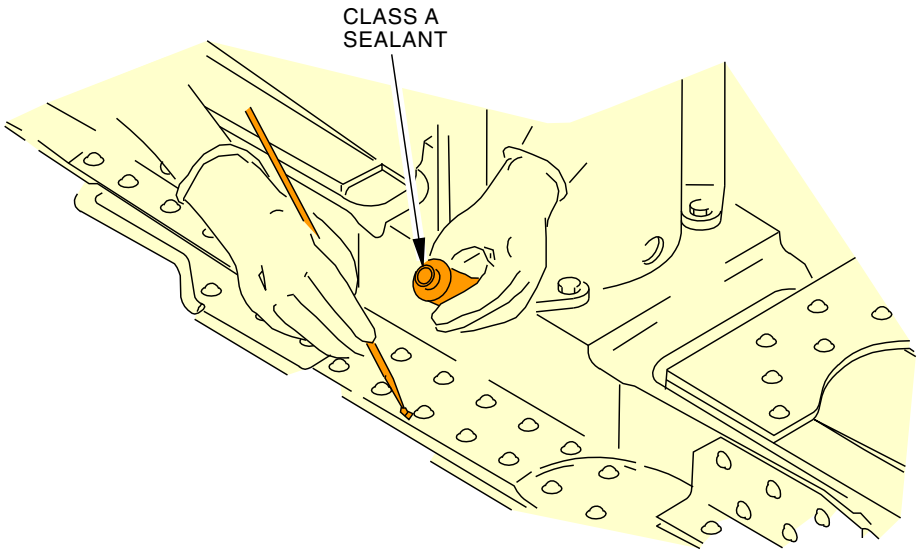
6 PR-1826 PRIMER IS REQUIRED BEFORE THE USE OF PR-1826 SEALANT.

7 MIX BMS 5-45, CLASS B-2 SEALANT WITH A 20:100 ACCELERATOR/BASE RATIO BY WEIGHT OR GET THIS SEALANT PRE-MIXED.

2413462 S00061532640_V3

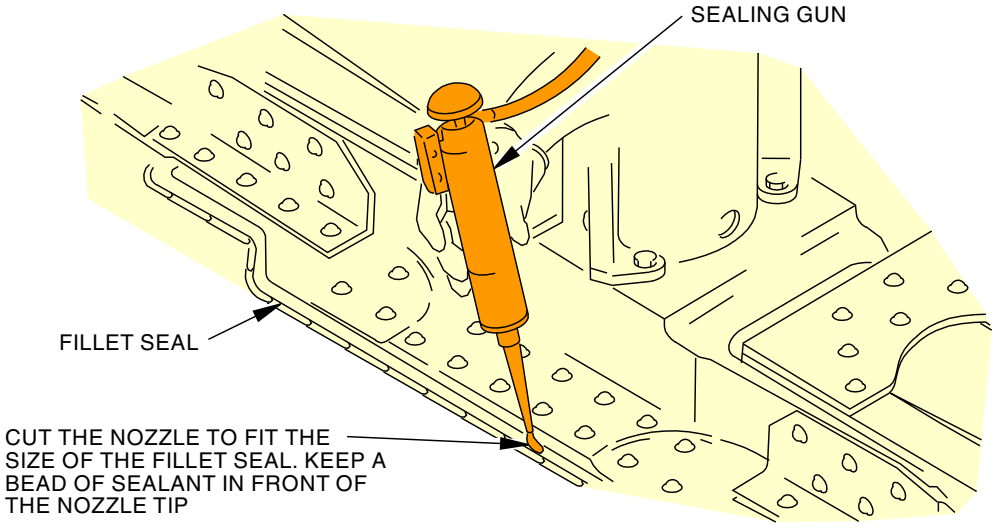
Sealant Usable Time
Figure 806/28-11-00-990-825

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413463 S00061532641_V1

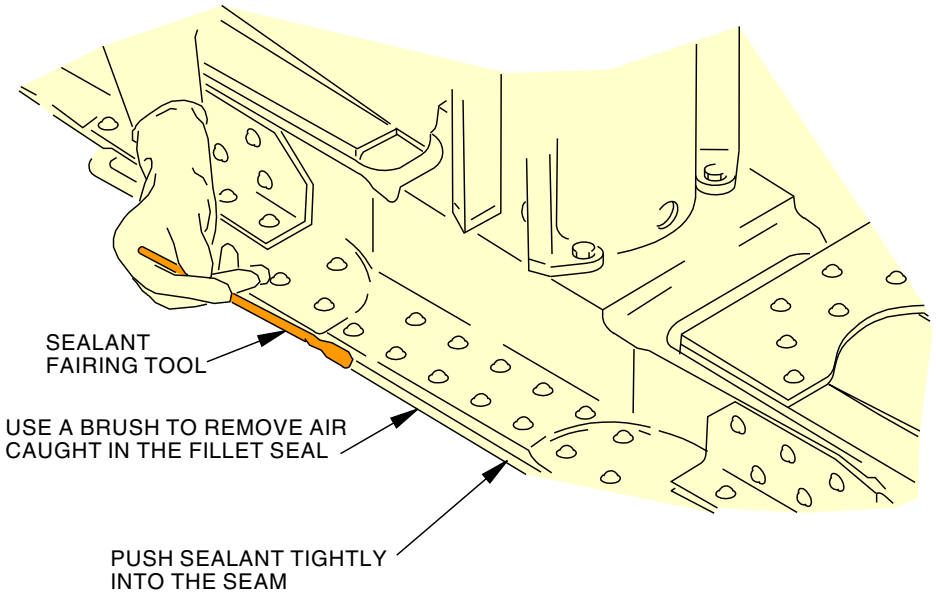
Apply the Precoat
Figure 807/28-11-00-990-826



2413464 S00061532642_V1

Apply a Fillet Seal
Figure 808/28-11-00-990-827

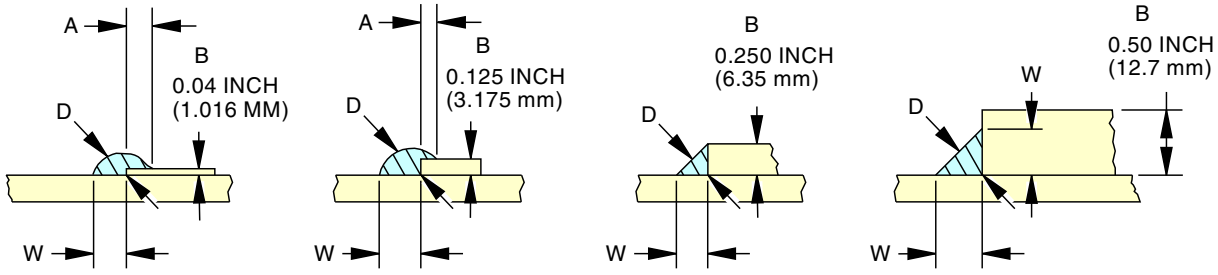
ECCN 9E991 BOEING PROPRIETARY - See title page for details



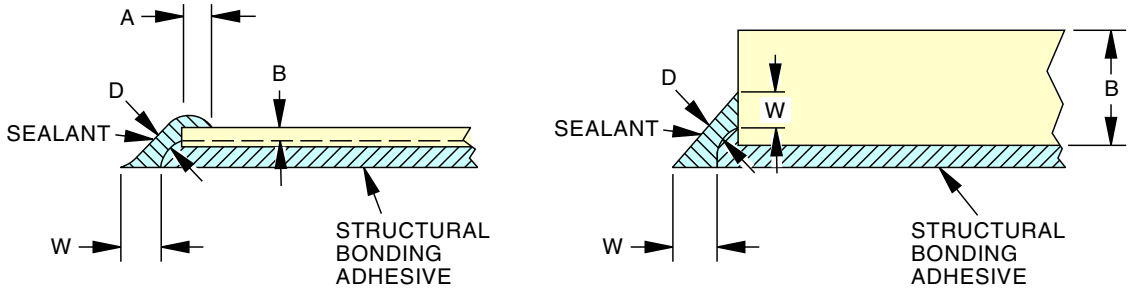
2413465 S00061532643_V1

Push the First Fillet Seal into the Seam
Figure 809/28-11-00-990-828

ECCN 9E991 BOEING PROPRIETARY - See title page for details

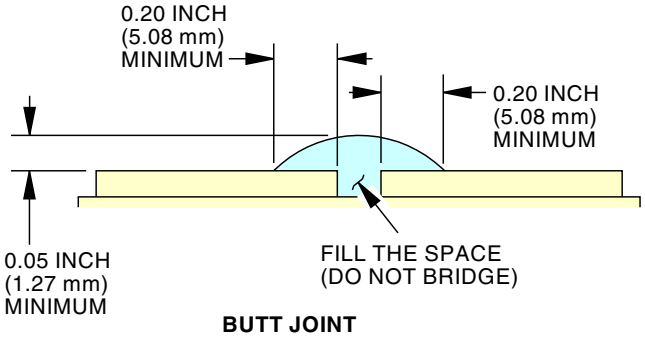


NON-BONDED SURFACES

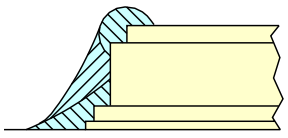


BONDED SURFACES

D = 0.15 INCH (3.83 mm) MINIMUM
W = 0.25-0.50 INCH (6.35-12.7 mm)
A+B = W, EXCEPT A = ZERO WHEN B = 0.25 INCH (6.35 mm) OR MORE



BUTT JOINT

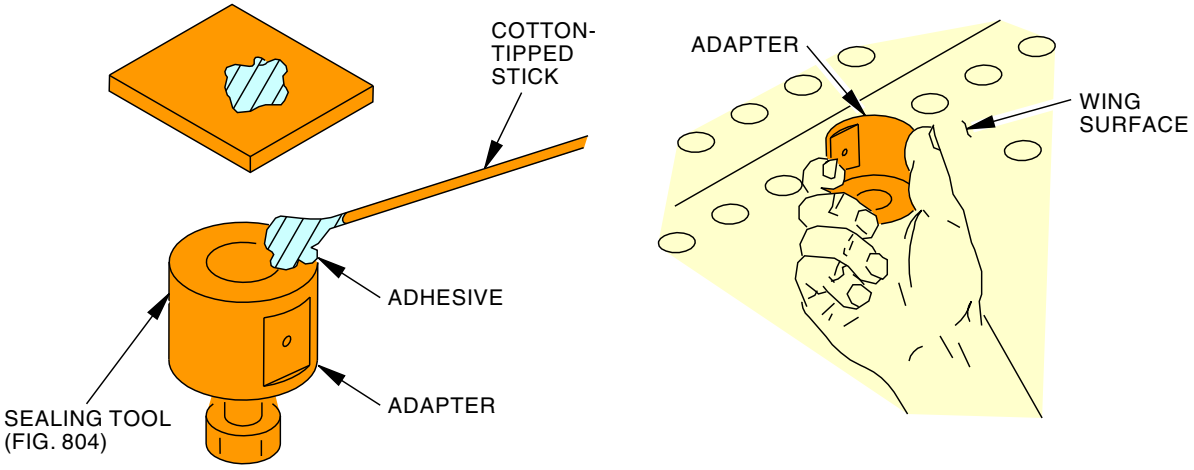


MORE THAN ONE FILLET SEAL

2413466 S00061532644_V1

Fillet Seal and Dimensions of Full Bodied Fillet Seals
Figure 810/28-11-00-990-829

ECCN 9E991 BOEING PROPRIETARY - See title page for details



STEP 1

STEP 2

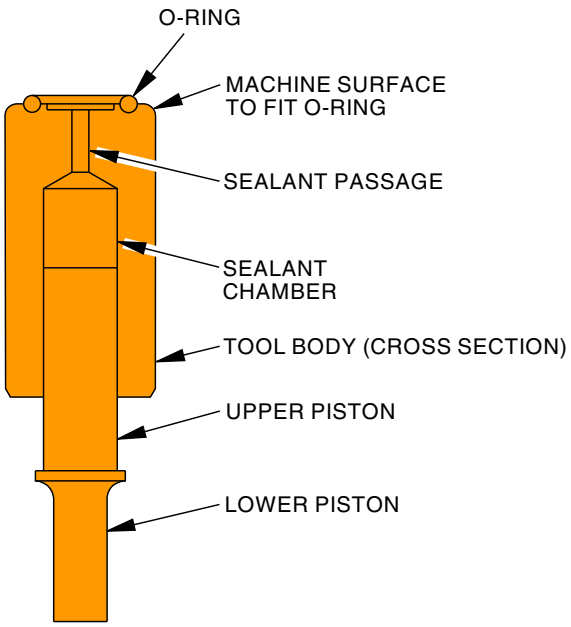
STEP 3

STEP 4

2413467 S00061532645_V1

Temporary Repair of Self-Sealing Rivets
Figure 811/28-11-00-990-830

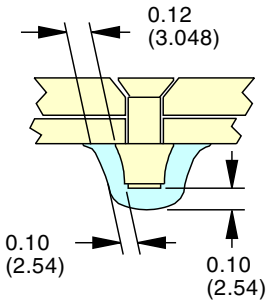
ECCN 9E991 BOEING PROPRIETARY - See title page for details



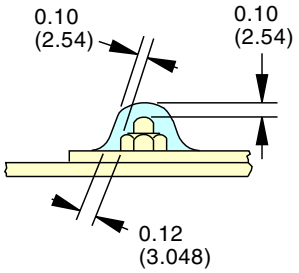
2413468 S00061532646_V1

Temporary Repair Tool (F70230) for Self-Sealing Rivets
Figure 812/28-11-00-990-831

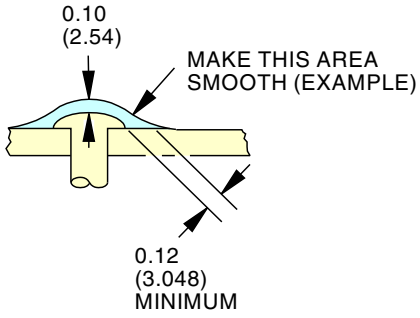
ECCN 9E991 BOEING PROPRIETARY - See title page for details



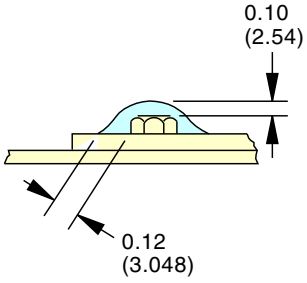
RIVET



BOLT



RIVET



BOLT

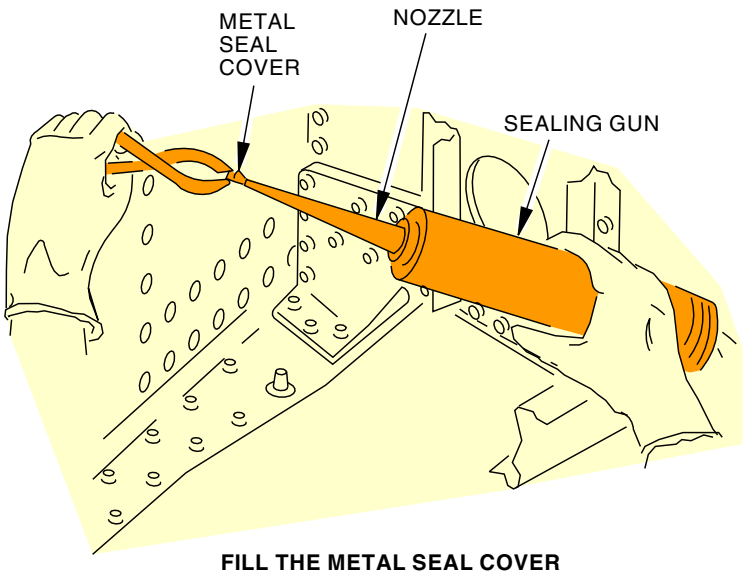
NOTE:

ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESES).

2413469 S00061532647_V1

Dimensions of Fillet Seals (Inches) for Fasteners
Figure 813/28-11-00-990-832

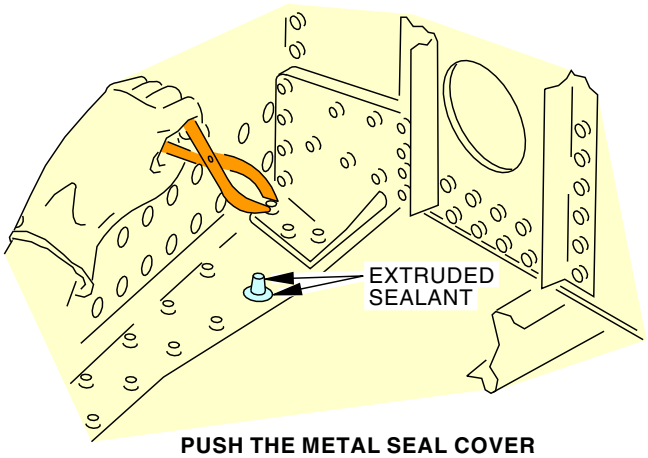
ECCN 9E991 BOEING PROPRIETARY - See title page for details



FILL THE METAL SEAL COVER

NOTE:

THE NOZZLE SIZE DEPENDS ON THE SIZE OF THE METAL SEAL COVER.

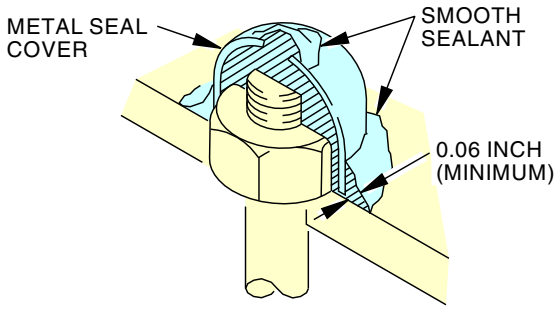


PUSH THE METAL SEAL COVER INTO POSITION

2413470 S00061532648_V1

Metal Seal Cover Installation
Figure 814/28-11-00-990-833

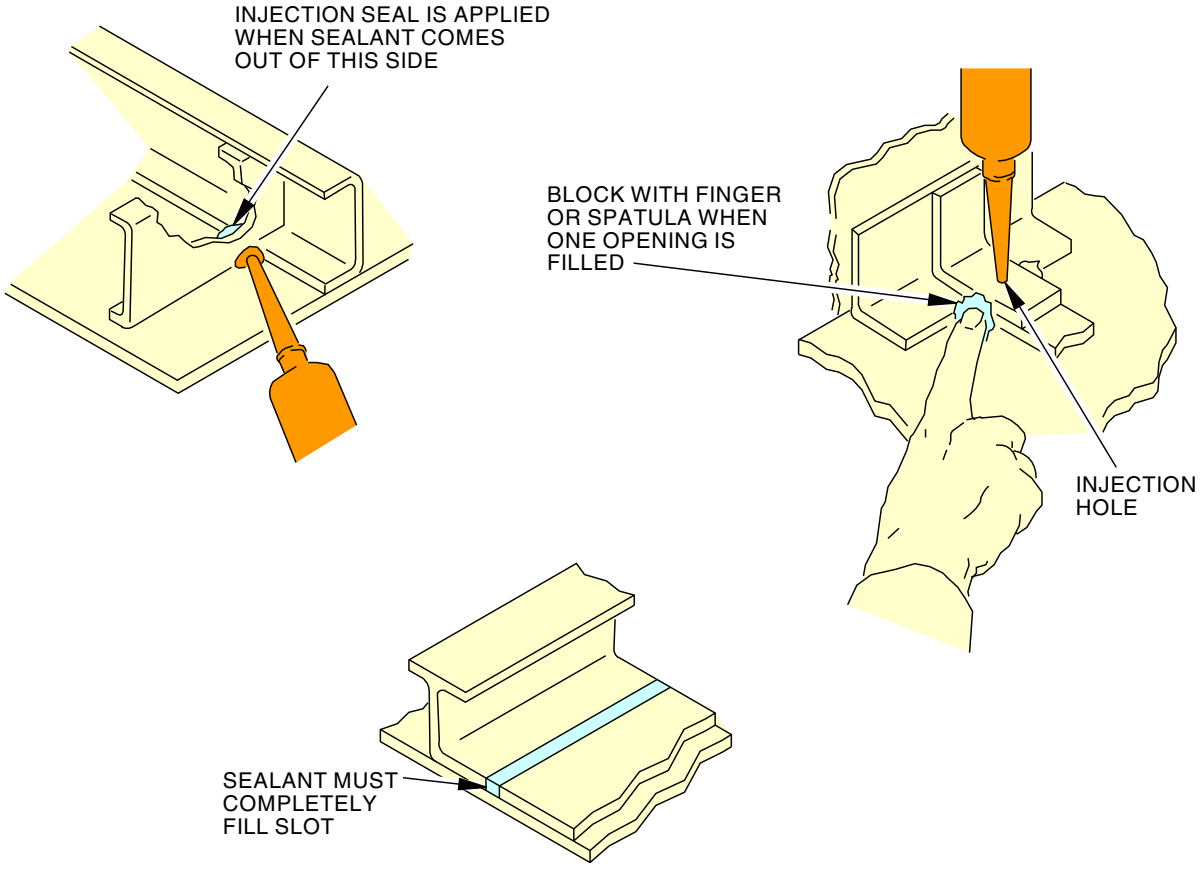
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413471 S00061532649_V1

Installed Metal Seal Cover
Figure 815/28-11-00-990-834

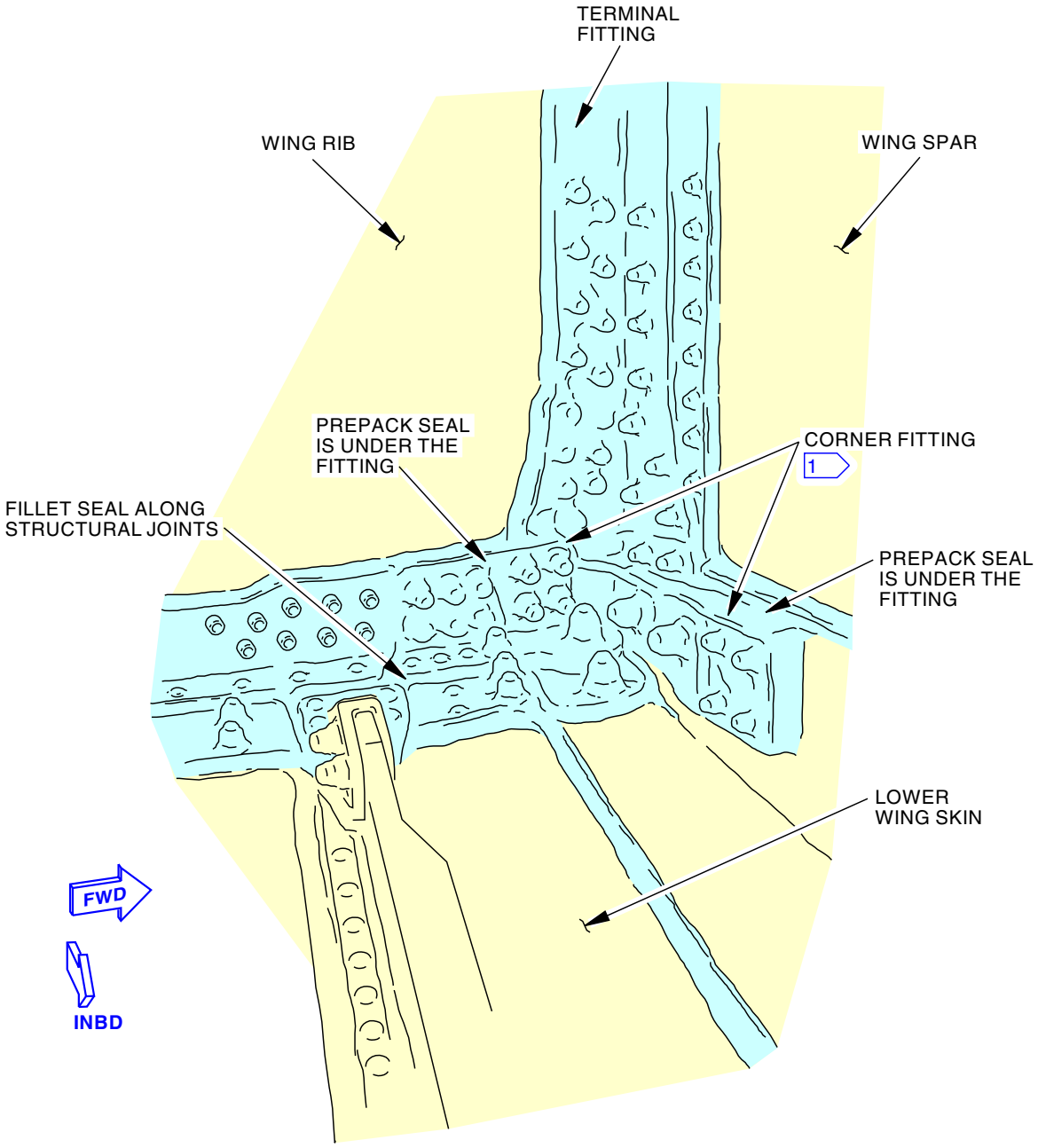
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413472 S00061532650_V1

Apply an Injection Seal
Figure 816/28-11-00-990-835

ECCN 9E991 BOEING PROPRIETARY - See title page for details

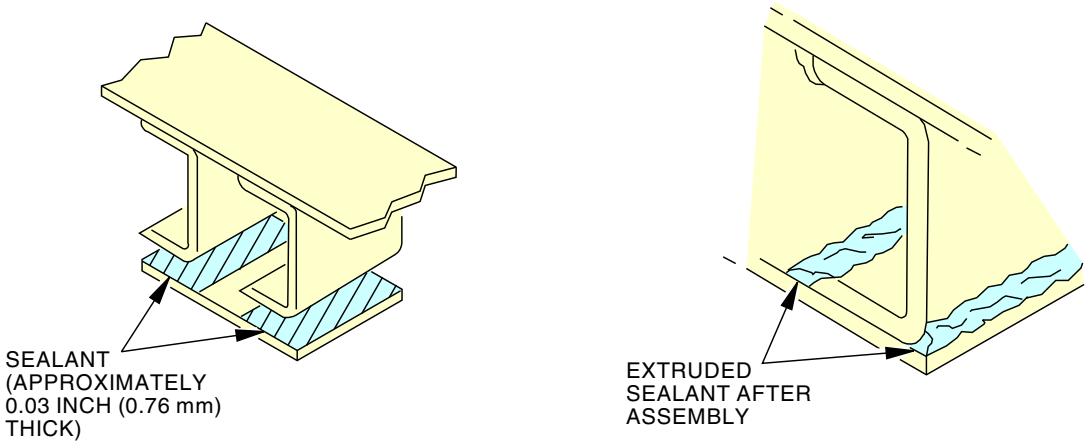


1 THE FITTING MUST BE TEMPORARILY REMOVED AND CLEANED OF USED SEALANT BEFORE YOU APPLY A NEW PREPACK SEAL

2413473 S00061532651_V1

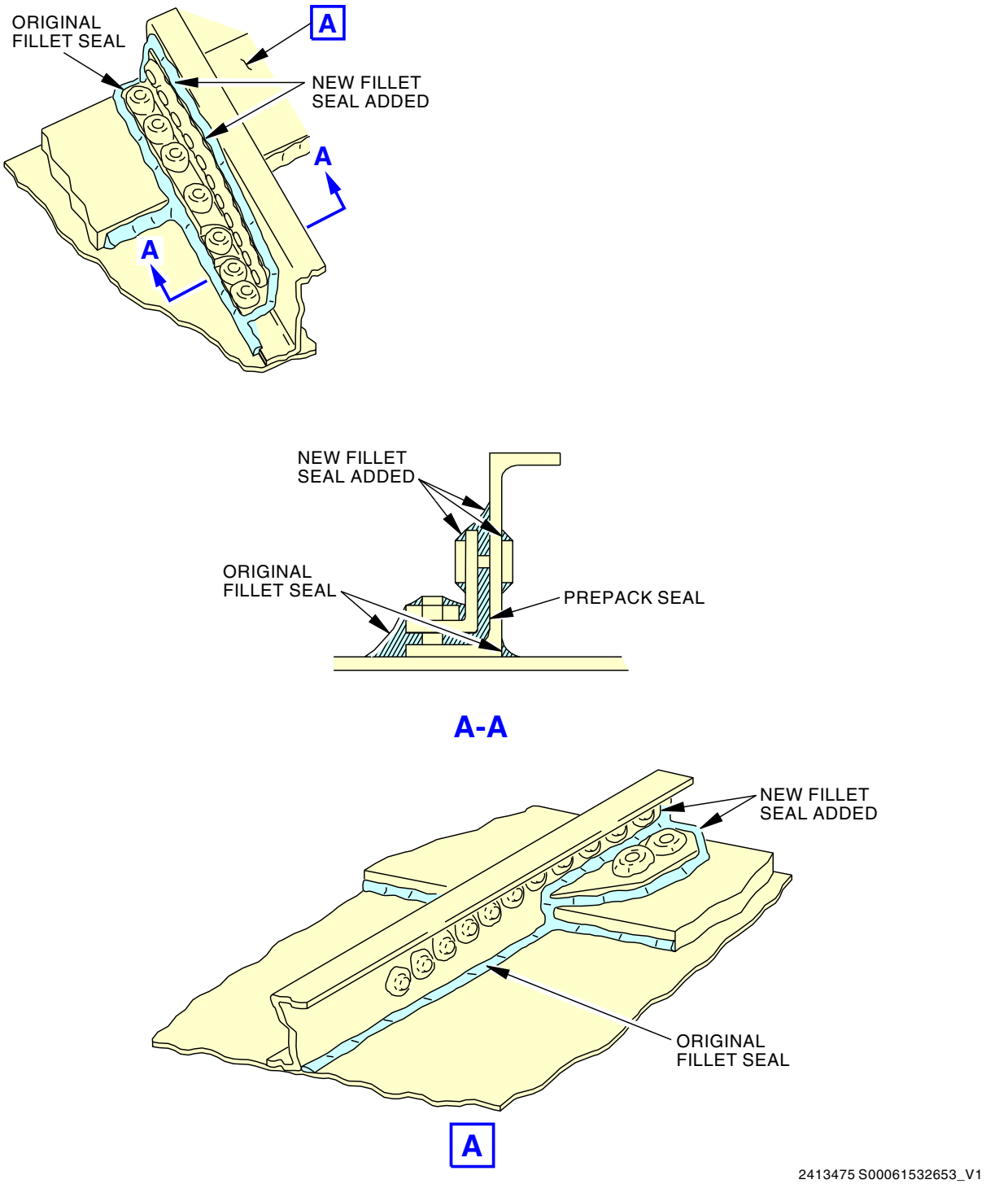
Example of a Combination of Prepack Seal and Fillet Seals
Figure 817/28-11-00-990-836

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Faying Surface Seal
Figure 818/28-11-00-990-837

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Prepack Seal Repair
Figure 819/28-11-00-990-838

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-11-00-300-804

4. 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.

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 Bonderite M-CR 600, Bonderite M-CR 1200, Bonderite M-CR 600RTU, or Bonderite M-CR 1200S Solution (P/B 701)
51-22-00-390-807	Fillet Seals Repair (P/B 201)
51-22-00-390-808	Fastener Seal Application (P/B 201)
51-22-00-390-815	Transition Seal Repair (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 #: 605-023 Supplier: 61325 Opt Part #: 602-814 Supplier: 61325 Opt Part #: 602-816 Supplier: 61325 Opt Part #: 603-693 Supplier: 61325 Opt Part #: 603-694 Supplier: 61325 Opt Part #: 604-285 Supplier: 61325 Opt Part #: 604-299 Supplier: 61325
COM-1596	Probe - Thickness Measurement, Pencil-Type, Model FTA3.3H Part #: 604-142 Supplier: 61325 Opt Part #: 602-128 Supplier: 61325

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(Continued)

Reference	Description
COM-2481	Sealant Removal Tool (meets BSS7384 requirements) Part #: 1-6390-A Supplier: 63318 Part #: 10810 Supplier: $0855 Part #: 10811 Supplier: $0855 Part #: 10812 Supplier: $0855 Part #: 234350 Supplier: 5HCF1 Part #: 235072 Supplier: 5HCF1 Part #: 235073 Supplier: 5HCF1 Part #: 235074 Supplier: 5HCF1 Part #: 235075 Supplier: 5HCF1 Part #: 235076 Supplier: 5HCF1 Part #: 311/03 Supplier: F6892 Part #: 311/14 Supplier: F6892 Part #: 311/25 Supplier: F6892 Part #: 311/37 Supplier: F6892 Part #: AS1 Supplier: $1351 Part #: AS2 Supplier: $1351 Part #: AS3 Supplier: $1351 Part #: DAD5013 Supplier: 7RKH2 Part #: DFD5019 Supplier: 7RKH2 Part #: JNT411B60 Supplier: 3DN12 Part #: JNT411B90 Supplier: 3DN12 Part #: SCD5019 Supplier: 7RKH2 Part #: ST982LF-9 Supplier: 81205 Part #: TS1275-4 Supplier: 22975
STD-1080	Brush - Paint

D. Consumable Materials

Reference	Description	Specification
A00015	Sealant - Secondary Fuel Barrier, 2 Part Polyurethane	BMS5-81 Type II
B00148	Solvent - Methyl Ethyl Ketone (MEK)	ASTM D740
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
C00259	Coating - Chemical And Solvent Resistant Finish, Corrosion Inhibiting Primer	BMS10-11 Type I
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G50077	Abrasive - Aluminum Oxide Paper, 240 grit or finer	
G50078	Abrasive - Aluminum Oxide Paper, 320 grit or finer	

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. Prepare the Surface Area

(Figure 821)

SUBTASK 28-11-00-200-003

CAUTION DO NOT APPLY SEALANT WHEN THE TEMPERATURE OF THE FUEL TANK STRUCTURE IS TOO HOT OR TOO COLD. THE SEALANT WILL NOT CURE CORRECTLY IF THE STRUCTURE TEMPERATURE IS OUT OF RANGE. INCORRECTLY CURED SEALANT CAN CAUSE A FUEL LEAK.

(1) Make sure that these conditions are met in the repair area when you apply sealant, A00015, and primer, C00259:

(a) The air temperature is between 65°F (18°C) and 95°F (35°C).

(b) The relative humidity is below 95 percent.

SUBTASK 28-11-00-150-007

(2) Remove all disbonded or damaged secondary fuel tank barrier sealant, A00015, and primer, C00259 (yellow), with sealant removal tools, COM-2481 (Figure 803).

NOTE: Removal of disbonded material is necessary to make sure new secondary fuel tank barrier sealant, A00015, adheres to existing secondary fuel tank barrier sealant, A00015.

SUBTASK 28-11-00-110-007

(3) Clean a minimum of 1.5 in. (38.1 mm) or more from the edge of the existing secondary fuel barrier sealant, A00015.

(a) Use a clean cotton wiper, G00034, wet with solvent, B00184.

(b) Rub the area dry with a clean, dry cotton wiper, G00034.

SUBTASK 28-11-00-120-002

(4) Lightly sand the existing secondary fuel barrier sealant, A00015, with 240 grit or finer abrasive paper, G50077.

NOTE: Be careful not to sand through the primer to bare metal. If you sand into the bare metal it can damage metal surface treatments that affect structural performance.

(a) If it is necessary, break the edge of the existing secondary fuel barrier sealant, A00015.

(b) Lightly sand the area 0.50 in. (12.70 mm) or more from the edge of the existing secondary fuel barrier sealant, A00015.

SUBTASK 28-11-00-390-014

CAUTION MAKE SURE THAT THE TRANSITION, FILLET AND FASTENER SEALS ARE SMOOTH WITH NO VOIDS OR CRACKS. IF YOU DO NOT OBEY, THE SECONDARY FUEL BARRIER (SFB) SEALANT WILL NOT BOND CORRECTLY AND FUEL LEAKS CAN OCCUR.

(5) If the surface of the seal is not smooth, or if voids or cracks are found, do these steps to repair the seals:

(a) Repair the fillet seals, do this task: Fillet Seals Repair, TASK 51-22-00-390-807.

(b) Repair the transition seals, do this task: Transition Seal Repair, TASK 51-22-00-390-815.

(c) Repair the fastener seals, do this task: Fastener Seal Application, TASK 51-22-00-390-808.

SUBTASK 28-11-00-120-003

(6) If it is necessary, do these steps to reactivate surfaces coated with primer, C00259 (yellow):

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Use a clean cotton wiper, G00034, soaked with solvent, B00184

(b) Rub the area dry with a clean, dry cotton wiper, G00034.

(c) Lightly sand the surface with 320 grit or finer abrasive paper, G50078.

NOTE: Be careful not to sand through the primer to bare metal. If you sand into the bare metal it can damage metal surface treatments that affect structural performance.

SUBTASK 28-11-00-370-005

(7) If it is necessary, do these tasks to refinish bare metal surfaces:

(a) Prepare the Surface to be Painted, TASK 51-21-21-370-801.

(b) Apply Bonderite M-CR 600, Bonderite M-CR 1200, Bonderite M-CR 600RTU, or Bonderite M-CR 1200S Solution, TASK 51-21-41-370-802.

SUBTASK 28-11-00-110-008

(8) Do these steps to final clean the repair area:

(a) Use a clean cotton wiper, G00034, soaked with solvent, B00184.

(b) Rub the area dry with a clean, dry cotton wiper, G00034.

(c) Continue to clean and dry the surface until the cotton wiper, G00034, stays clean.

SUBTASK 28-11-00-370-006

(9) Apply the primer, C00259 (yellow), with a paint brush, STD-1080, up to the edge of the existing secondary fuel barrier sealant, A00015, with the tolerances shown in Figure 821.

(a) Spray application of primer, C00259, can be used for large areas (TASK 28-11-00-600-801).

SUBTASK 28-11-00-390-011

(10) Let the primer, C00259, dry for 30 minutes to 3.5 hours.

G. Repair of the Secondary Fuel Barrier Sealant

SUBTASK 28-11-00-360-009

(1) Do these steps to prepare the secondary fuel barrier sealant, A00015:

(a) Make sure that the base resin and catalyst are each homogeneous, free from lumps or jelled particles.

(b) Make sure that the base resin is clear. If the base resin is cloudy, do these steps:

1) Heat the base resin in an oven at a temperature between 120°F (49°C) and 130°F (54°C) for 60 to 70 minutes.

2) Let the base resin cool to a temperature between 60°F (16°C) and 80°F (27°C) before use.

3) Discard the base resin if it is still cloudy.

(c) At any time when a base container is opened, and the base material will not be used, discard the container.

(d) Before you combine the necessary quantities of base resin and accelerator, stir the base resin and the accelerator, each in its container, to make sure each is homogeneous.

NOTE: Heating can cause the accelerator to form particulates (seeding) and become unstable.

1) After you stir the base resin and the accelerator, let them rest for 10 minutes to help remove trapped nitrogen or air.

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2) Make sure the accelerator has no lumps or particulate matter after you stir it.

NOTE: Particulate matter is a result of seeding and cannot be corrected.

a) Discard the accelerator if there is particulate matter in it.

(e) Slowly mix the accelerator into the base resin in a ratio of 100 parts of base resin to 90 parts of accelerator by weight or by volume.

NOTE: The material is normally supplied in pre-measured kits to give the correct ratio.

SUBTASK 28-11-00-390-012

WARNING

DO NOT GET PRIMER AND SEALANT IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM PRIMER AND SEALANT. PUT ON GOGGLES, AND GLOVES WHEN YOU USE PRIMER AND SEALANT. KEEP PRIMER AND SEALANT AWAY FROM SPARKS, FLAME, AND HEAT. PRIMER AND SEALANT IS POISONOUS AND FLAMMABLE, AND CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(2) Do these steps to apply sealant, A00015:

(a) If it is necessary to make the sealant, A00015, thinner, add solvent, B00148.

NOTE: Do not add thinner other than Methyl Ethyl Ketone.

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°F (18°C).

(c) Make sure that sealant, A00015, that has not been cured does not get colder than 60°F (16°C) until the cured dry-through time (Table 801).

(d) Apply a minimum of two layers of sealant, A00015, with a flat, bristle brush.

NOTE: At 77 ±5°F (25.0 ±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 the sealant, A00015, to overlap the existing secondary fuel barrier sealant by a minimum of 1.0 in. (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.

3) Let the sealant dry (flash-off) a minimum of 15 minutes between layers.

4) Make sure the second layer is applied before it reaches the sealant dry hard time (Table 801)

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CAUTION KEEP THE THICKNESS OF THE APPLIED SEALANT AND THE PRIMER LAYER IN THE LIMITS. IF IT IS TOO THICK, DAMAGE TO EQUIPMENT CAN OCCUR.

5) Make sure that the total thickness of the applied sealant and the primer layer is 0.012 in. (0.30 mm) to 0.017 in. (0.43 mm). (These dimensions include a 0.002 in. (0.05 mm) layer of primer.)

NOTE: In some cases, dry sealant thickness of more than 0.015 in. (0.38 mm) or less than 0.010 in. (0.25 mm) can occur. These conditions are acceptable, but the thickness must not be less than 0.007 in. (0.18 mm) or more than 0.022 in. (0.56 mm). (These dimensions include a 0.002 in. (0.05 mm) layer of primer.)

6) Use a thickness measurement instrument, COM-1595, and thickness measurement probe, COM-1596, to make sure the sealant has the correct thickness.

NOTE: It is not possible to measure the thickness of the sealant layer without the primer layer.

SUBTASK 28-11-00-390-013

(3) Let the sealant dry.

(a) The cure rates of the sealant are shown in this Table 801:

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 801/28-11-00-993-811

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
75 ± 5 deg. F 23.8 ± 2.8 deg. C	50	8	96	24
100 ± 5 deg. F 37.8 ± 2.8 deg. C	18	2.5	36	3.5
125 ± 5 deg. F 51.7 ± 2.8 deg. C	7.5	1.5	15	2.5
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

(4) 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.

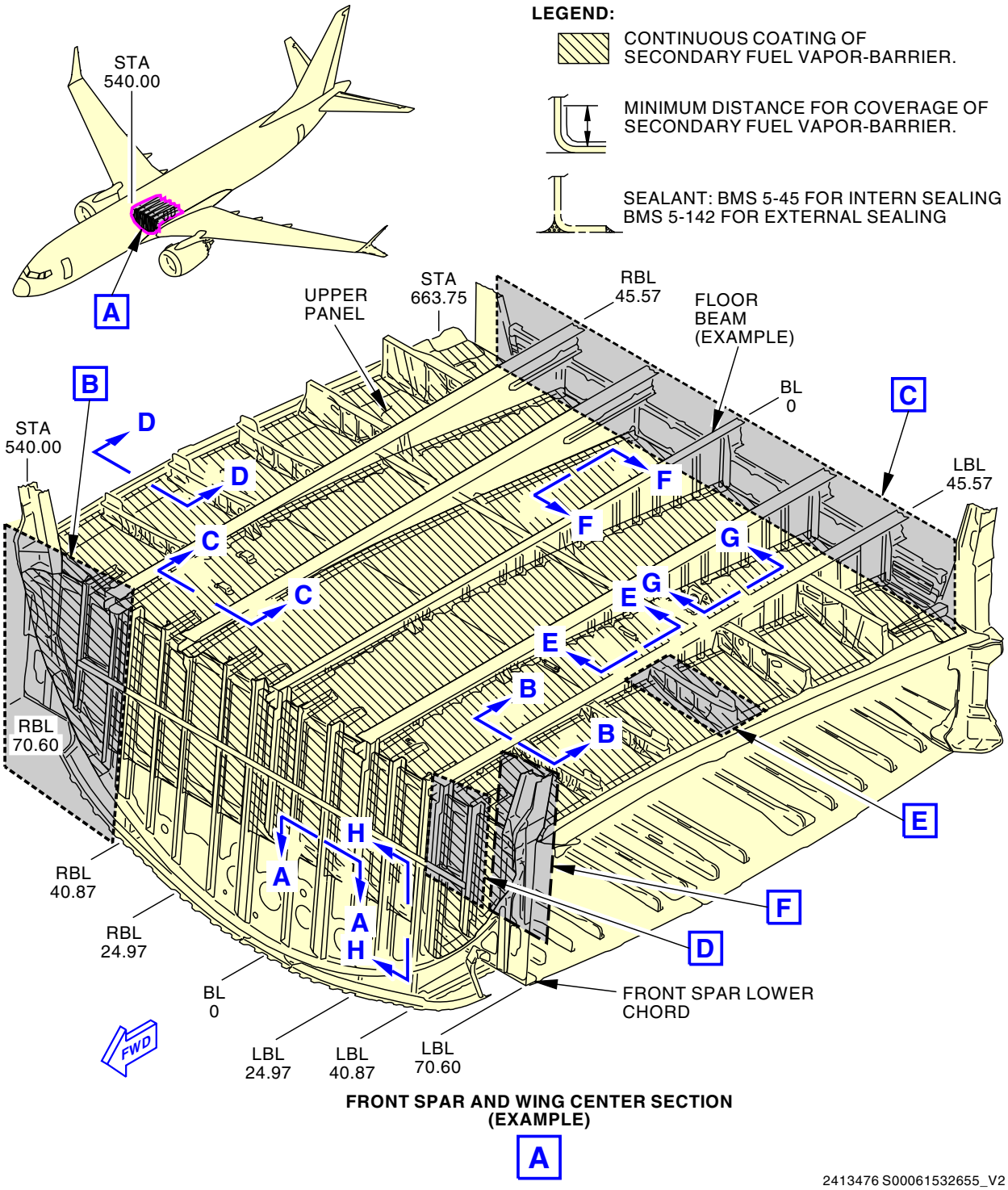
(b) While you put as much pressure on your thumb as possible with your arm, turn your thumb through an angle of 90 degrees in the plane of the barrier.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(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 ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



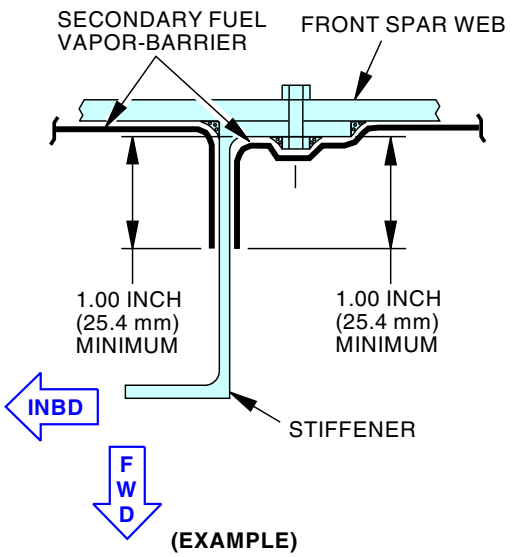
FRONT SPAR AND WING CENTER SECTION (EXAMPLE)

A

2413476 S00061532655_V2

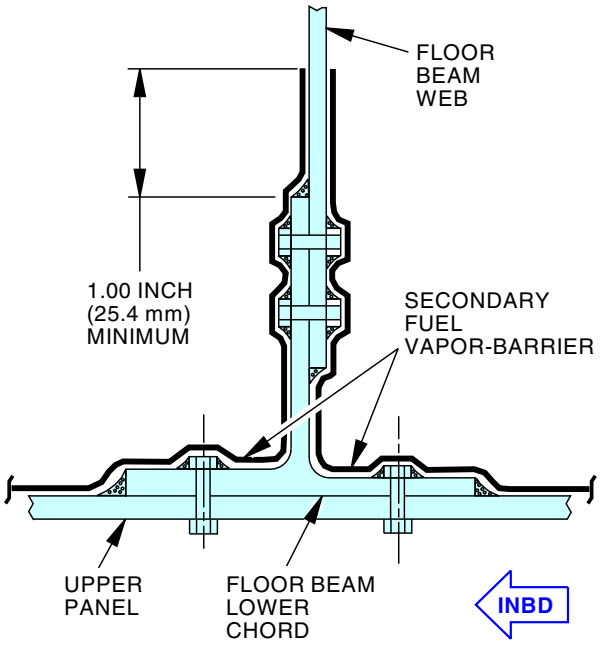
Secondary Fuel Vapor-Barrier
Figure 820/28-11-00-990-839 (Sheet 1 of 10)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



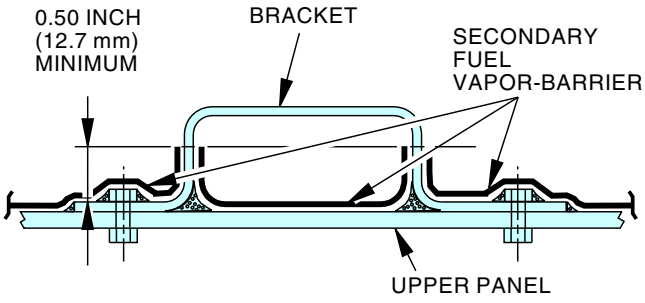
(EXAMPLE)

A-A



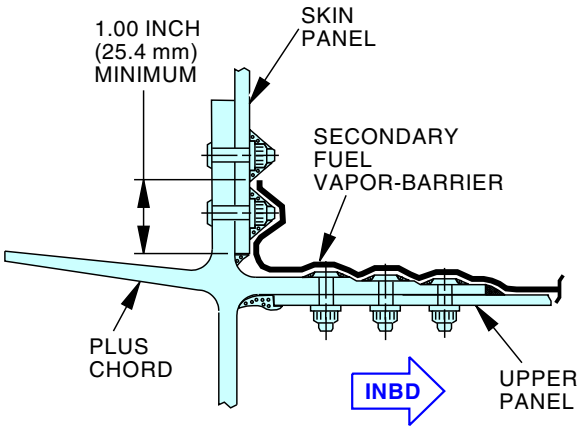
FLOOR BEAM LOWER CHORD TO UPPER PANEL (EXAMPLE, 5 LOCATIONS)

B-B



CLOSED LOOP BRACKET (EXAMPLE, 3 LOCATIONS)

C-C



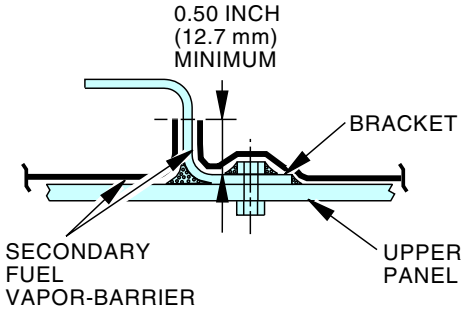
EDGE (EXAMPLE) (RIGHT SIDE IS SHOWN, LEFT SIDE IS EQUIVALENT)

D-D

2413477 S00061532656_V1

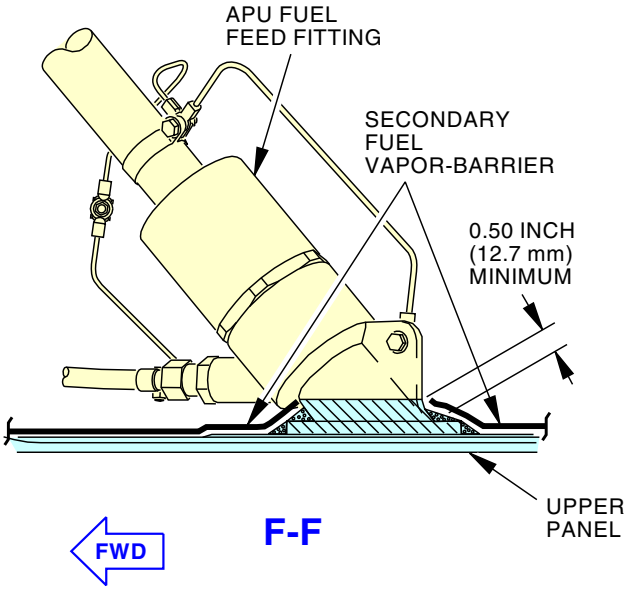
Secondary Fuel Vapor-Barrier
Figure 820/28-11-00-990-839 (Sheet 2 of 10)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

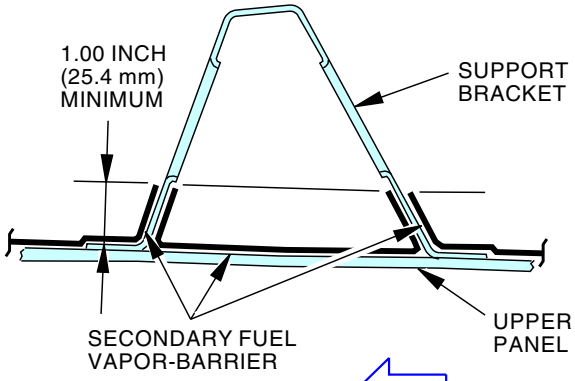


RISER BRACKET
(EXAMPLE, 3 LOCATIONS)

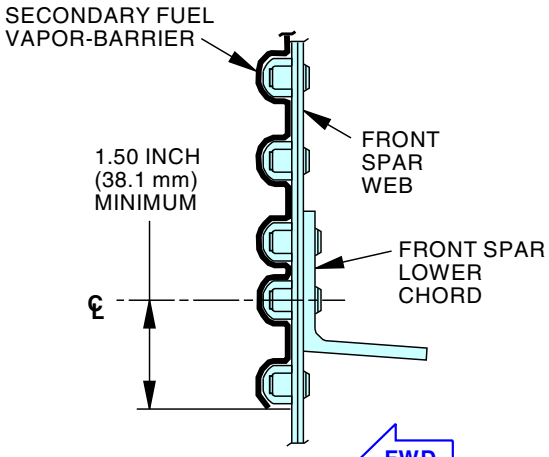
E-E



F-F



G-G

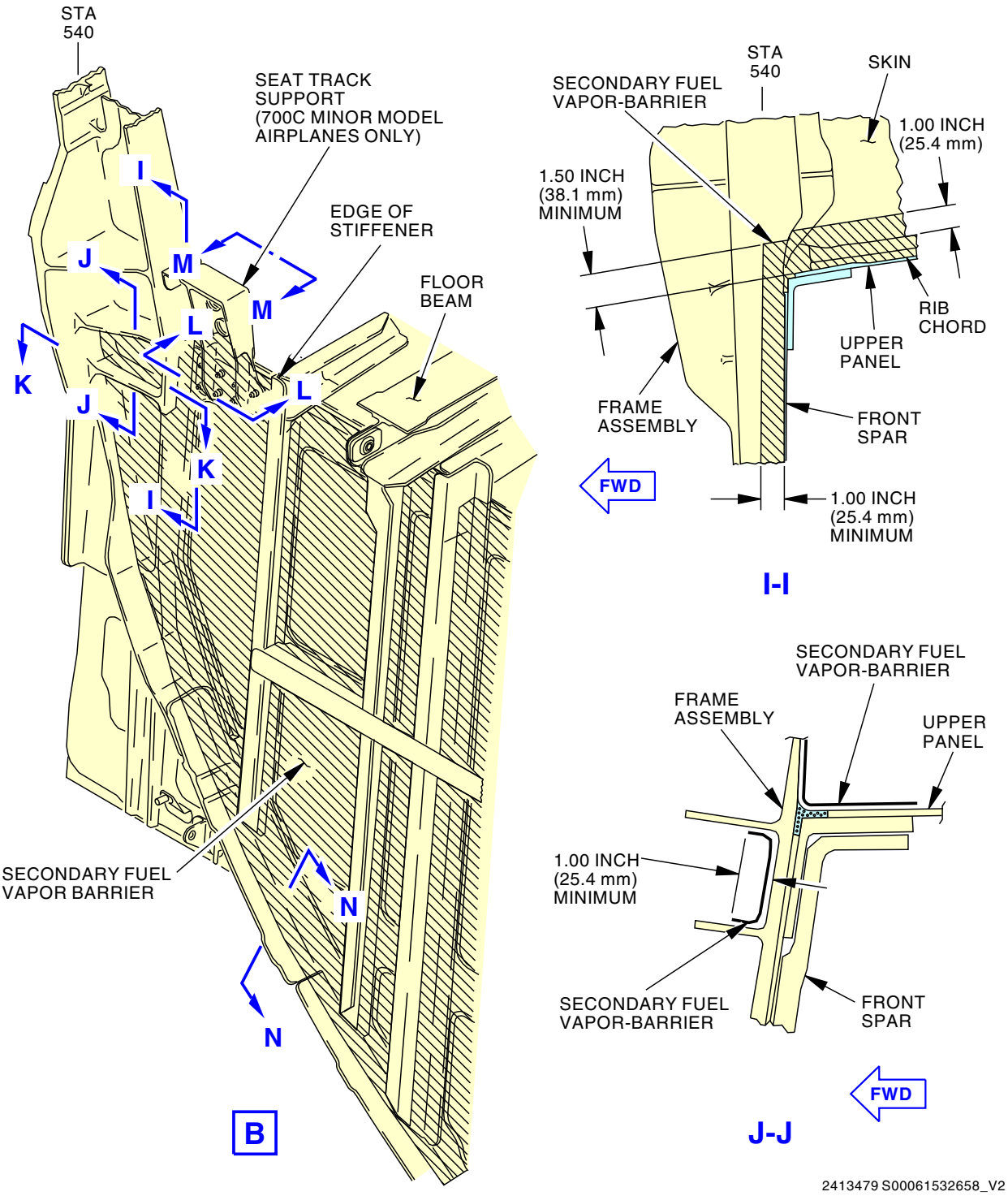


H-H

2413478 S00061532657_V1

Secondary Fuel Vapor-Barrier
Figure 820/28-11-00-990-839 (Sheet 3 of 10)

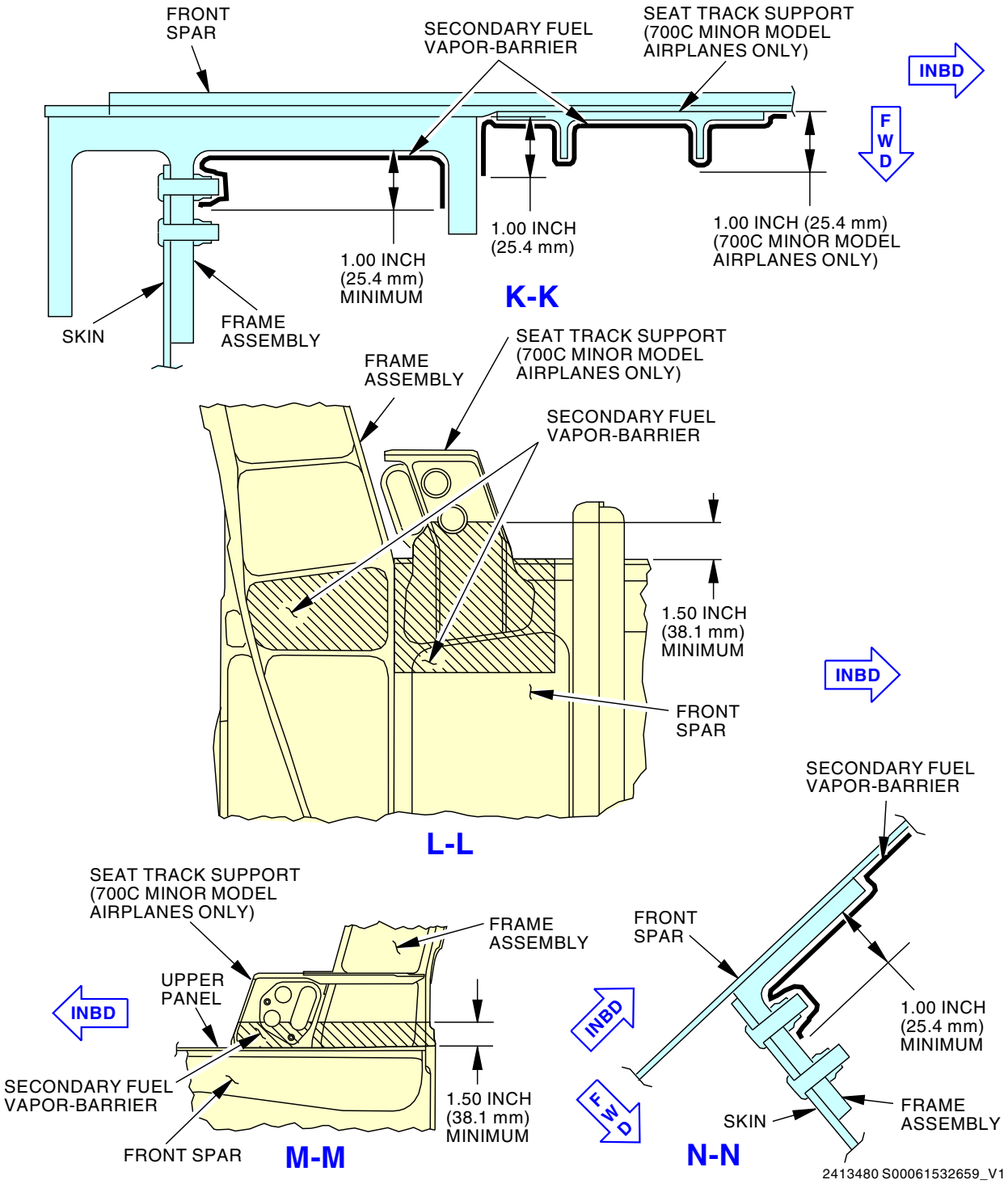
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413479 S00061532658_V2

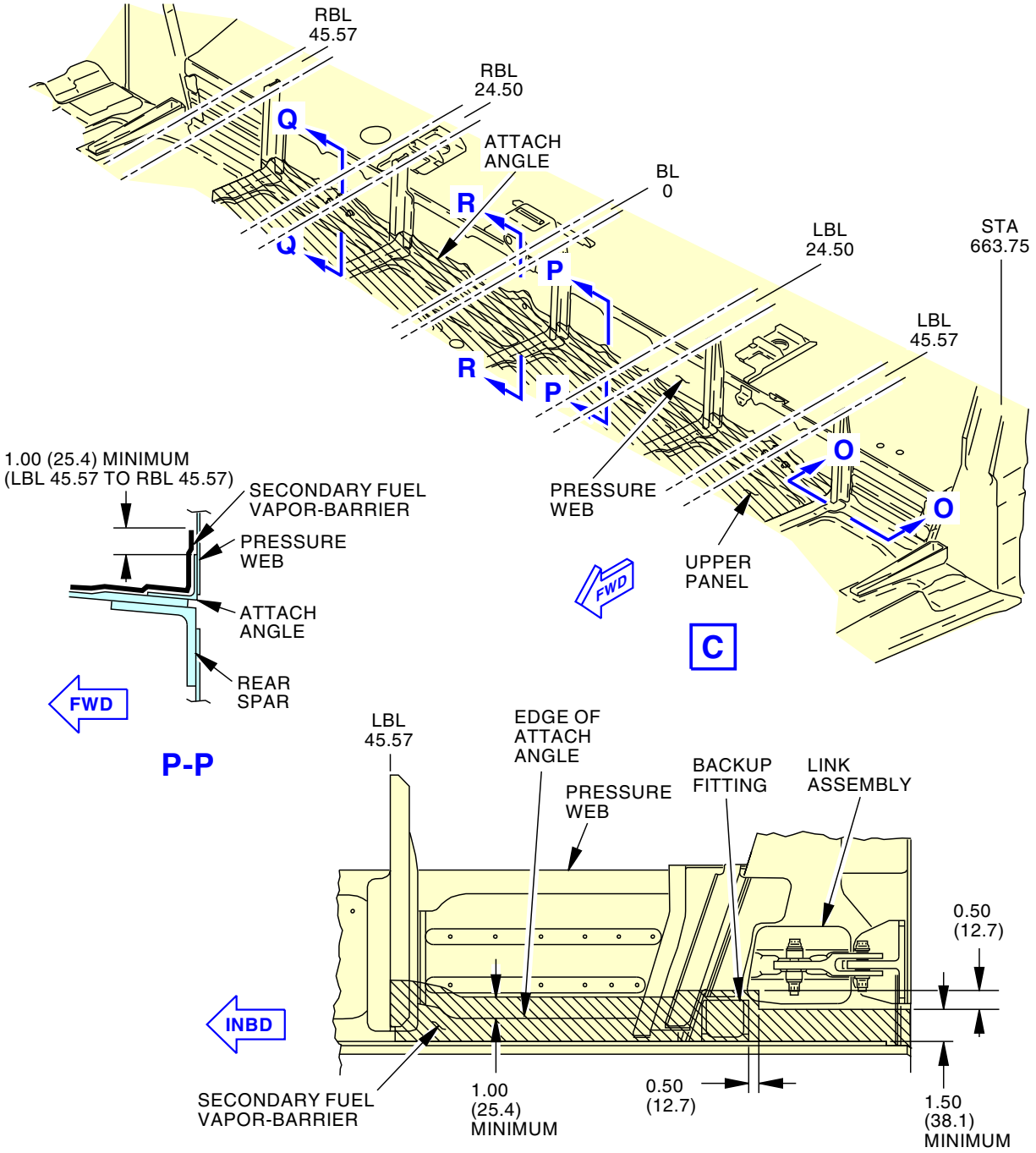
Secondary Fuel Vapor-Barrier
Figure 820/28-11-00-990-839 (Sheet 4 of 10)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Secondary Fuel Vapor-Barrier
Figure 820/28-11-00-990-839 (Sheet 5 of 10)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



NOTE:

ALL DIMENSIONS ARE IN INCHES (MILLIMETERS ARE IN PARENTHESISES).

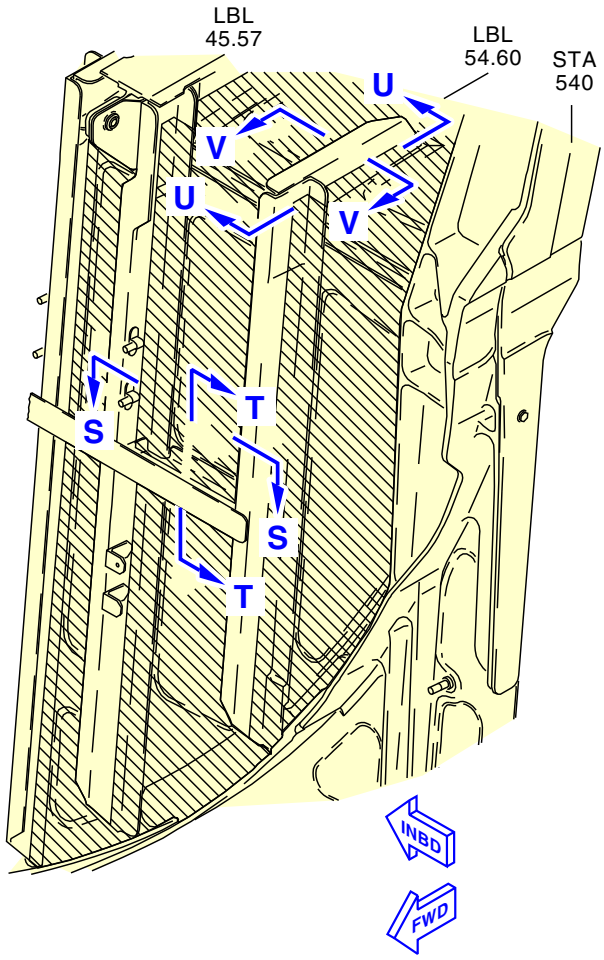
(LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE)

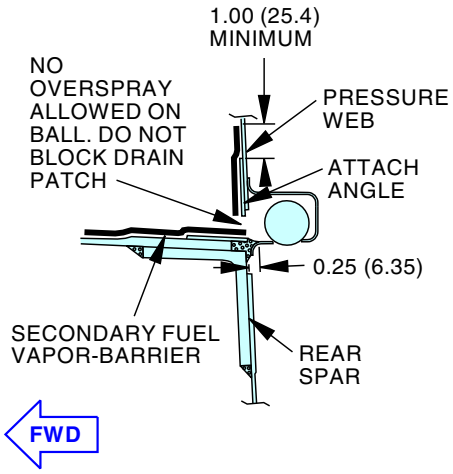
O-O

2413481 S00061532660_V1

Secondary Fuel Vapor-Barrier
Figure 820/28-11-00-990-839 (Sheet 6 of 10)

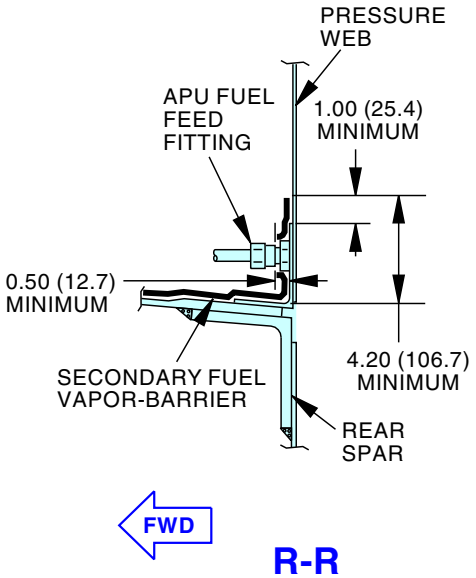
ECCN 9E991 BOEING PROPRIETARY - See title page for details





(EXAMPLE, 2 LOCATIONS)

Q-Q



R-R

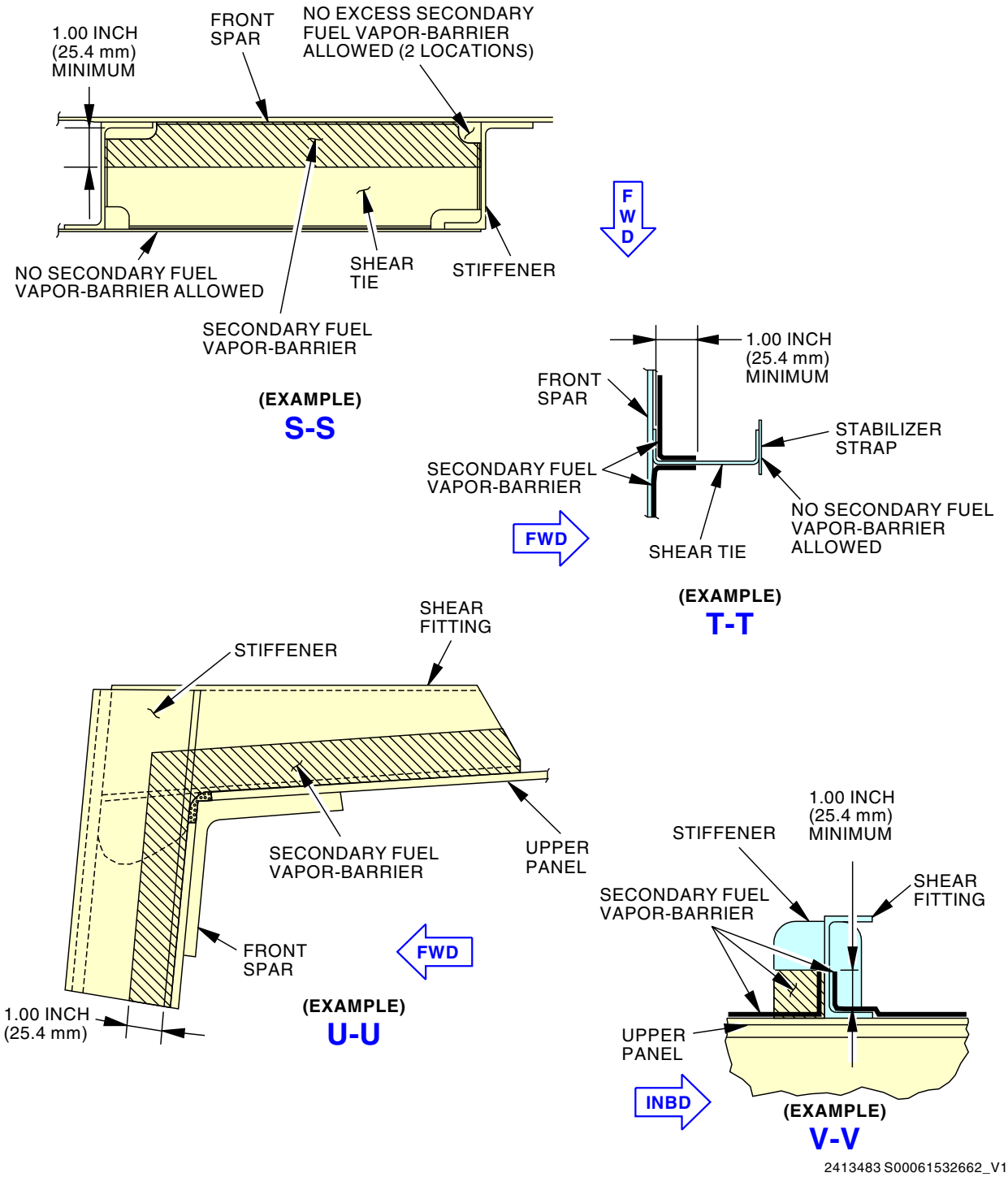
NOTE:

ALL DIMENSIONS ARE IN INCHES
(MILLIMETERS ARE IN PARENTHESISES).

2413482 S00061532661_V2

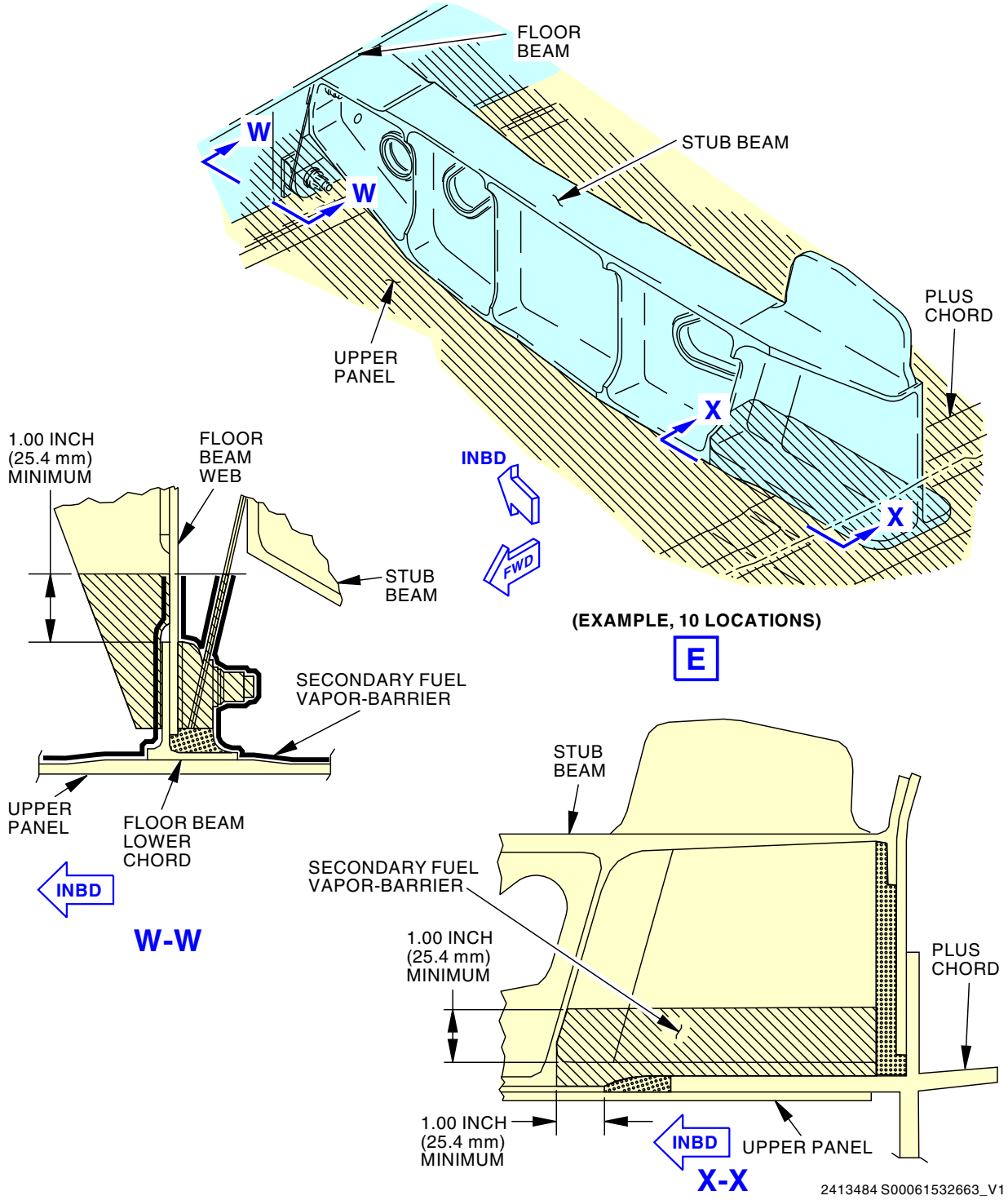
Secondary Fuel Vapor-Barrier
Figure 820/28-11-00-990-839 (Sheet 7 of 10)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



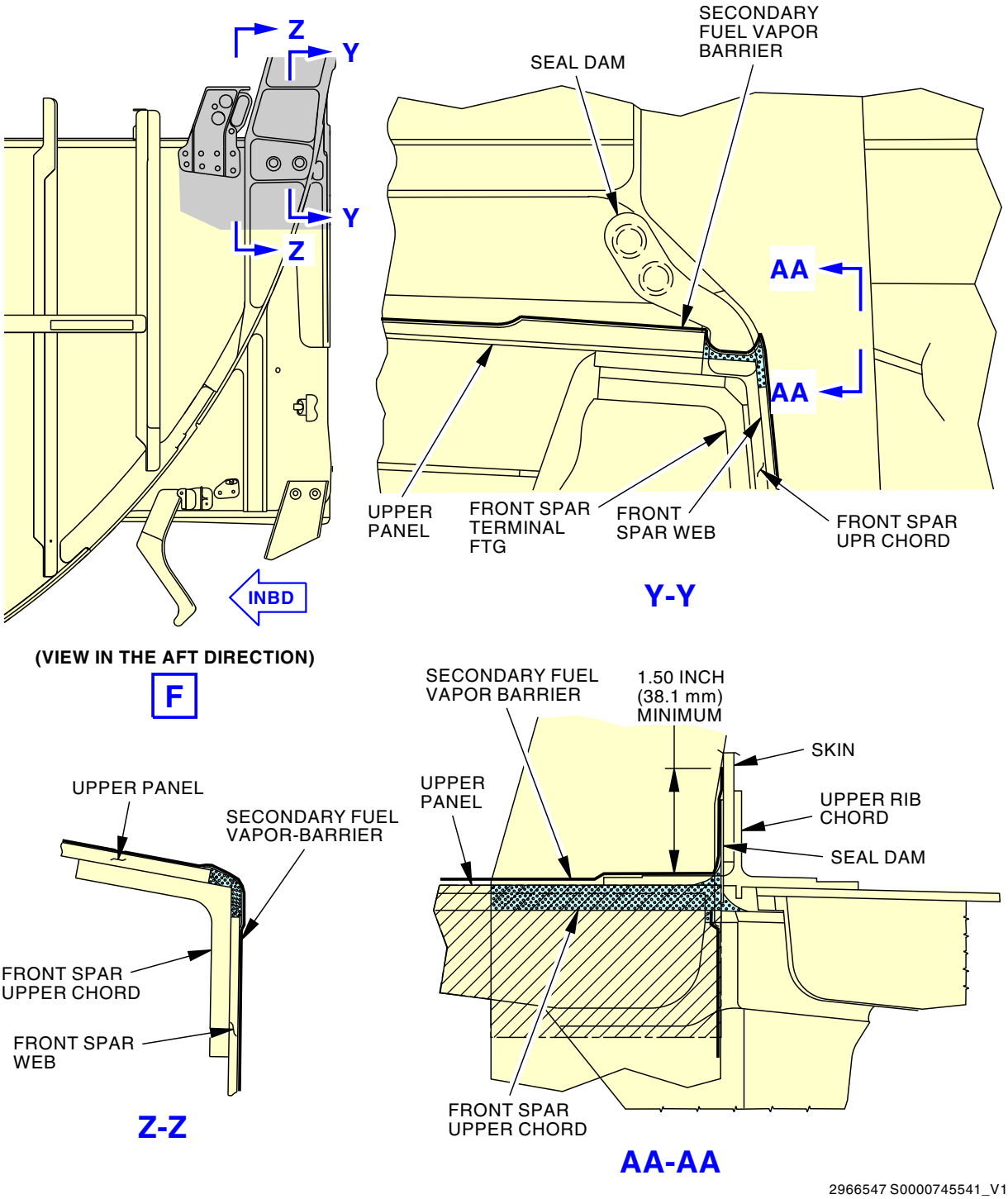
Secondary Fuel Vapor-Barrier
Figure 820/28-11-00-990-839 (Sheet 8 of 10)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



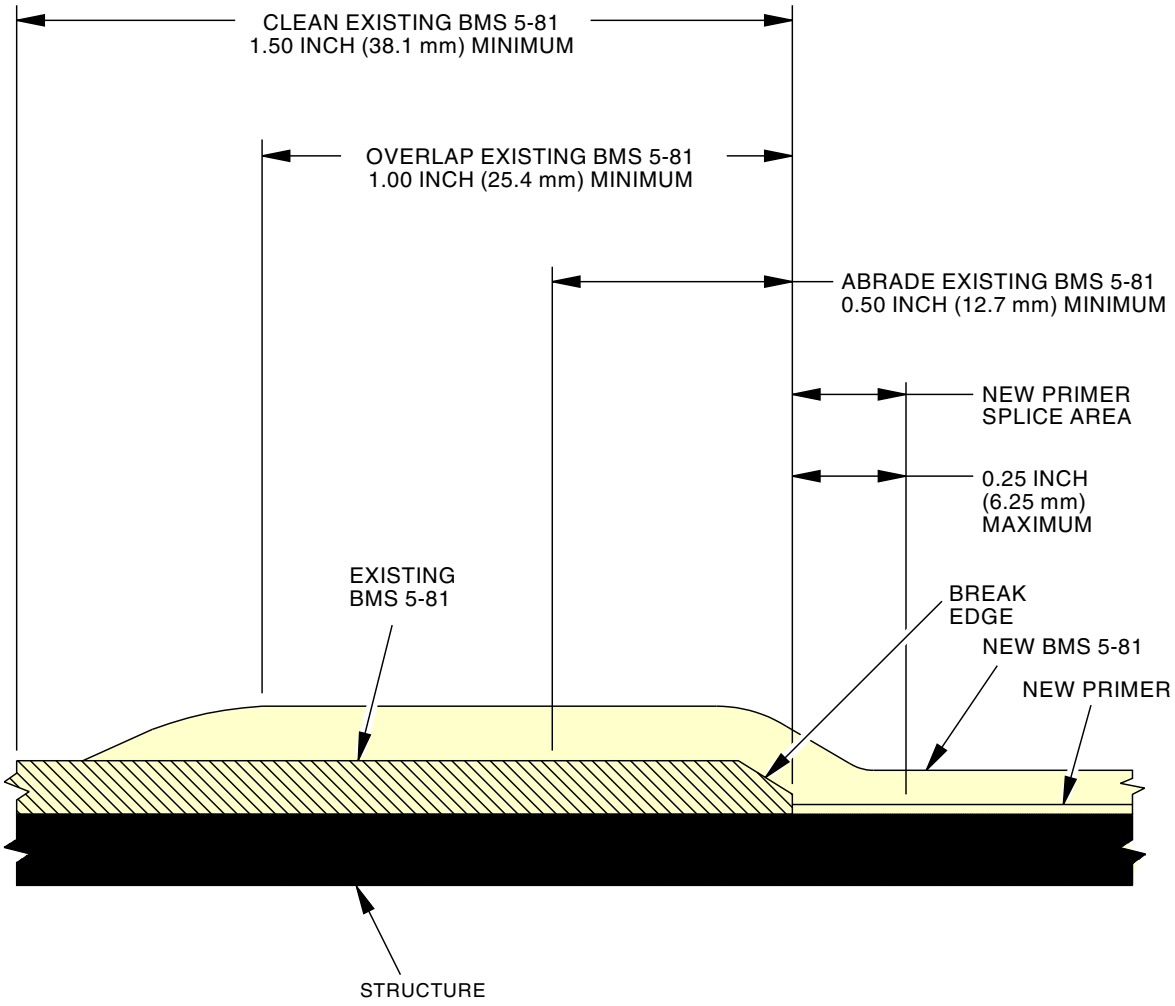
Secondary Fuel Vapor-Barrier
Figure 820/28-11-00-990-839 (Sheet 9 of 10)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Secondary Fuel Vapor-Barrier
Figure 820/28-11-00-990-839 (Sheet 10 of 10)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413485 S00061532664_V1

Splice Surface Area Preparation for Secondary Fuel Barrier
Figure 821/28-11-00-990-840

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 five tasks:

(1) Main tank access door removal

(2) Main tank access door installation

(3) Surge tank access door removal

(4) Surge tank access door (533AB, 533CB, 633AB, 633CB) installation

(5) Surge tank access door (533BB, 633BB) installation.

TASK 28-11-11-000-801

2. Main Tank Access Door Removal

(Figure 401)

A. General

(1) This task gives instructions to remove the Main Tank Access Door.

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)
28-11-00-910-802	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)

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-8436	Protective Ring - Access Door Opening, Wing Lower Panel Part #: C28013-3 Supplier: 81205
STD-3906	Mallet - Rubber

D. Consumable Materials

Reference	Description	Specification
B00083	Solvent - VM&P Naphthas	TT-N-95 Type II, ASTM D-3735 Type III

E. Location Zones

Zone	Area
434	Engine 1 - Aft Strut Fairing
444	Engine 2 - Aft Strut Fairing

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

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

F. Access Panels

Number	Name/Location
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
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

G. Prepare for Main Tank Access Door Removal

SUBTASK 28-11-11-650-001

(1) Defuel the applicable fuel tank (TASK 28-26-00-650-801 or TASK 28-26-00-650-802).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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.

SUBTASK 28-11-11-010-001

(3) Get access to the applicable left main tank access door(s):

Number	Name/Location
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

(4) Get access to the applicable right main tank access door(s):

Number	Name/Location
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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

H. Main Tank Access Door Removal

SUBTASK 28-11-11-010-002

(1) Remove the applicable aft fairing panel on the strut, 434CL or 444CR, to get full access to access doors 532BB and 632BB (TASK 06-43-00-800-801)(Figure 401).

SUBTASK 28-11-11-010-004

(2) Remove the applicable flap support fairing panel 544AB or 644AB, to get full access to doors 532HB and 632HB (TASK 06-44-00-800-801).

SUBTASK 28-11-11-020-001

(3) Hold the clamp ring [5] and remove the mounting bolts [4] for the applicable access door [1], access door [6], or access door [8].

SUBTASK 28-11-11-020-002

(4) Remove the clamp ring [5] and aluminum gasket [3].

(a) Discard the aluminum gasket [3].

NOTE: It is not recommended, but if it is necessary, you may be able to re-use the aluminum gasket [3].

SUBTASK 28-11-11-420-001

CAUTION

DO NOT USE A TOOL TO LIFT THE EDGES OF THE ACCESS DOOR TO THE FUEL TANK. THE LOWER SURFACE OF THE ACCESS DOOR FLANGE AND THE TOP SURFACE OF THE WING SKIN AROUND THE ACCESS DOORS ARE SEAL SURFACES. YOU CAN CAUSE SCRATCHES OR OTHER DAMAGE TO THE SEAL SURFACE.

CAUTION

BE CAREFUL WHEN YOU REMOVE OR INSTALL THE ACCESS DOORS THAT HAVE FUEL MEASURING STICKS. IF THE FUEL MEASURING STICKS TOUCH THE STRINGERS IN THE FUEL TANK, DAMAGE TO THE FUEL MEASURING STICKS CAN OCCUR.

(5) 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, STD-3906 and lightly hit around the main tank access door [1] or access door [8].

SUBTASK 28-11-11-020-003

(6) On the main tank access doors [6] with the fuel measuring sticks [7], push up and put the access doors at an angle so the fuel measuring sticks [7] do not touch the stringers at the top of the fuel tank.

(a) If the main tank access door [6] does not move freely, use a rubber mallet, STD-3906 and lightly hit around the main tank access door [6].

SUBTASK 28-11-11-020-004

CAUTION

BE CAREFUL WHEN YOU REMOVE OR INSTALL THE ACCESS DOORS THAT HAVE FUEL MEASURING STICKS. IF THE FUEL MEASURING STICKS TOUCH THE STRINGERS IN THE FUEL TANK, DAMAGE TO THE FUEL MEASURING STICKS CAN OCCUR.

(7) 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 [7] assemblies that attach to the inner surface of the door:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Table 401/28-11-11-993-801

LEFT MAIN TANK	RIGHT MAIN TANK
532CB	632CB
532FB	632FB
532JB	632JB
532LB	632LB
532NB	632NB
532QB	632QB

SUBTASK 28-11-11-110-001

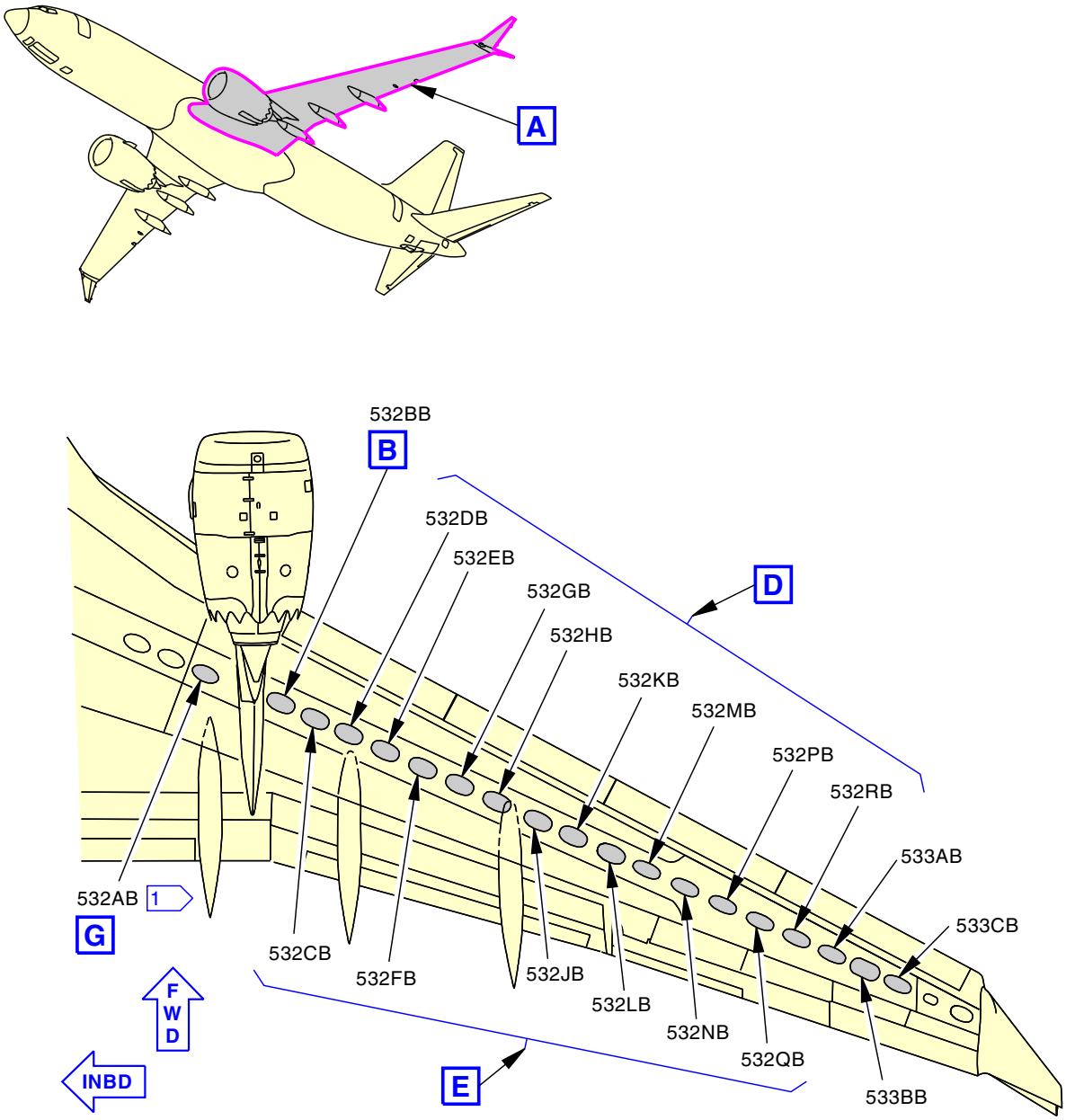
(8) Clean the inner side and the outer side of the access opening with solvent, B00083.

SUBTASK 28-11-11-410-001

(9) Install a protective ring, SPL-8436, in the access door opening.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



FUEL TANK ACCESS DOORS
(LEFT WING IS SHOWN, RIGHT WING IS OPPOSITE)
(BOTTOM VIEW)

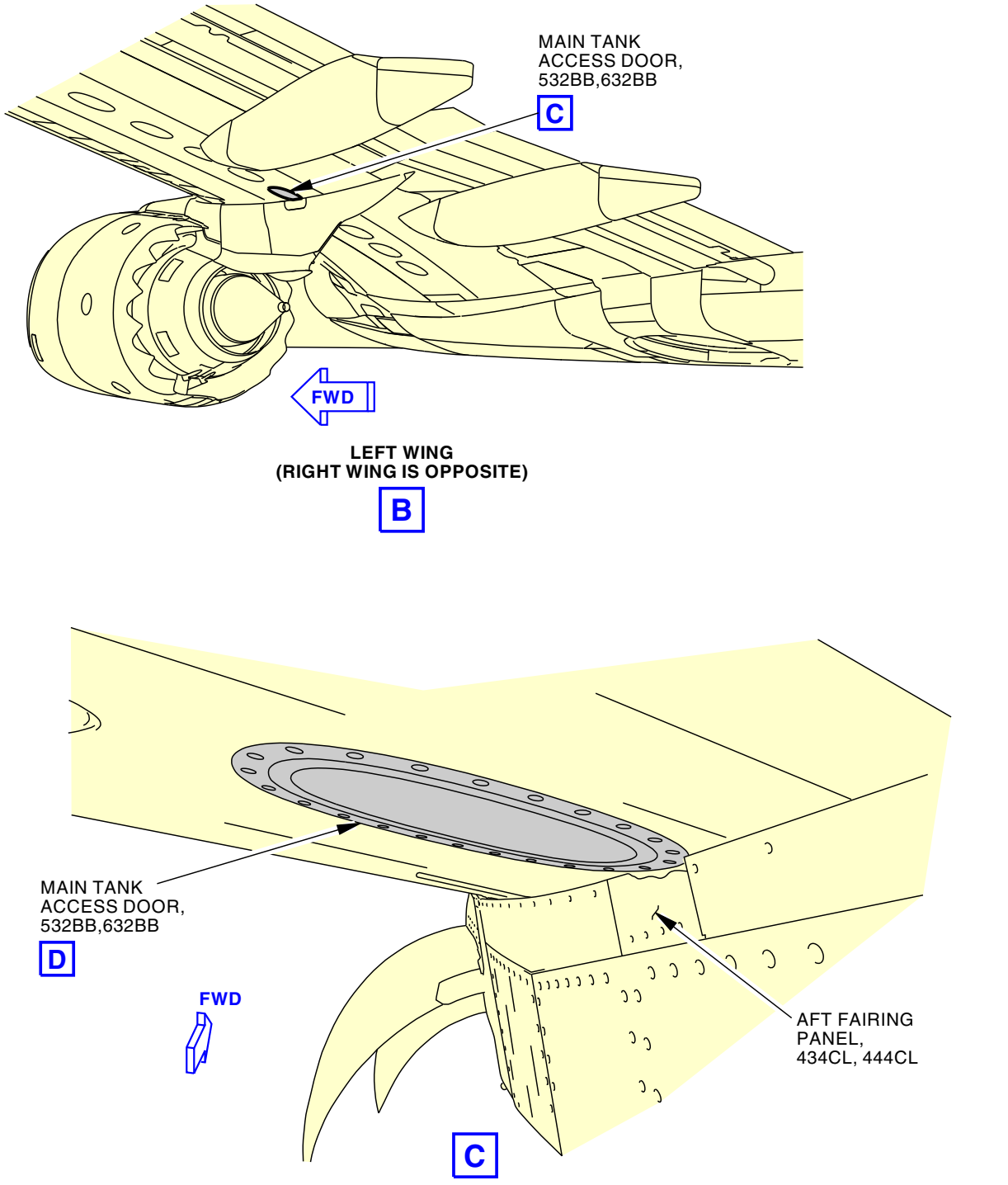
1 HIGH IMPACT RESISTANT ACCESS DOOR

A

2413486 S00061532668_V1

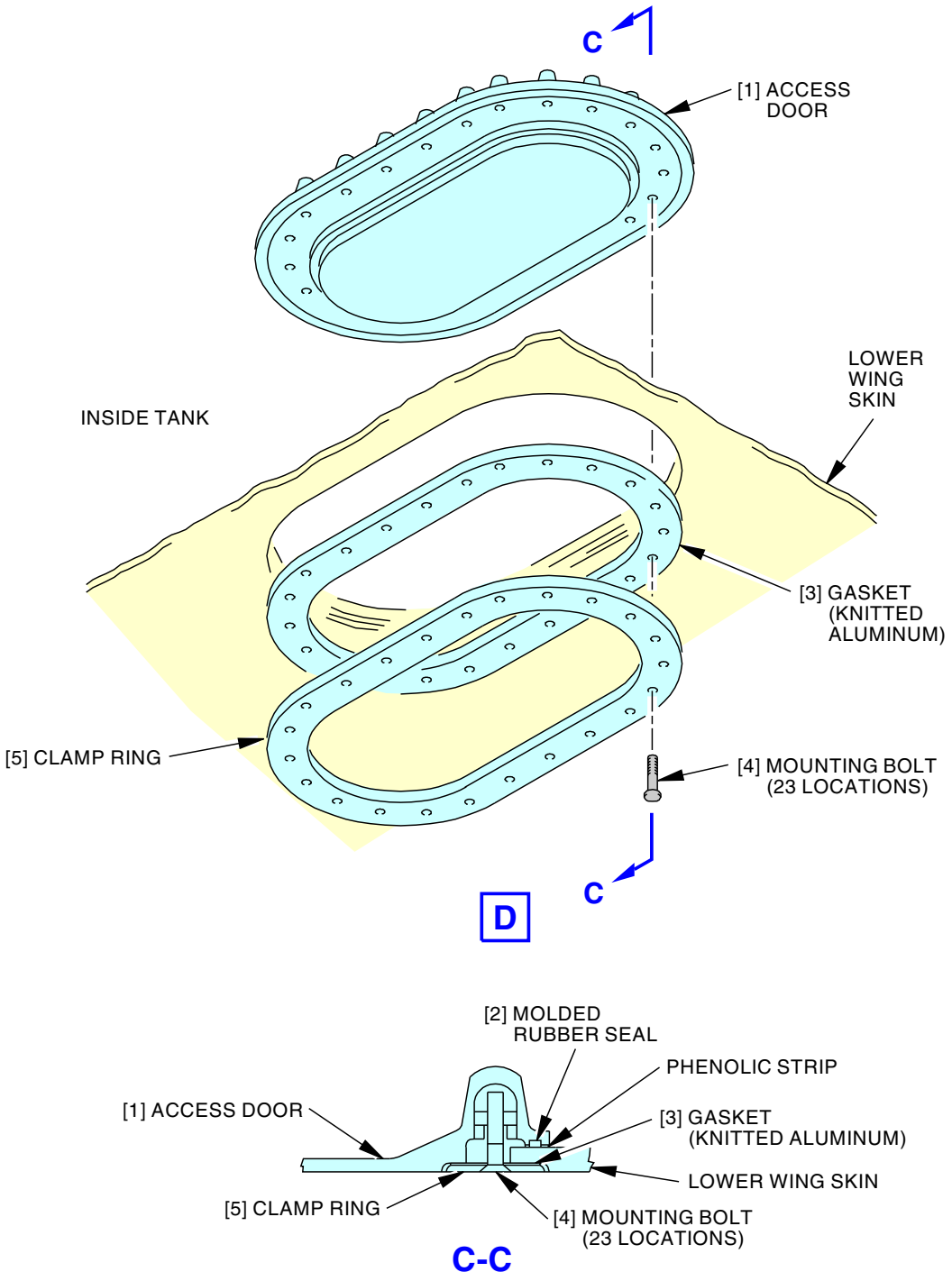
Main Tank Access Door Installation
Figure 401/28-11-11-990-801 (Sheet 1 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



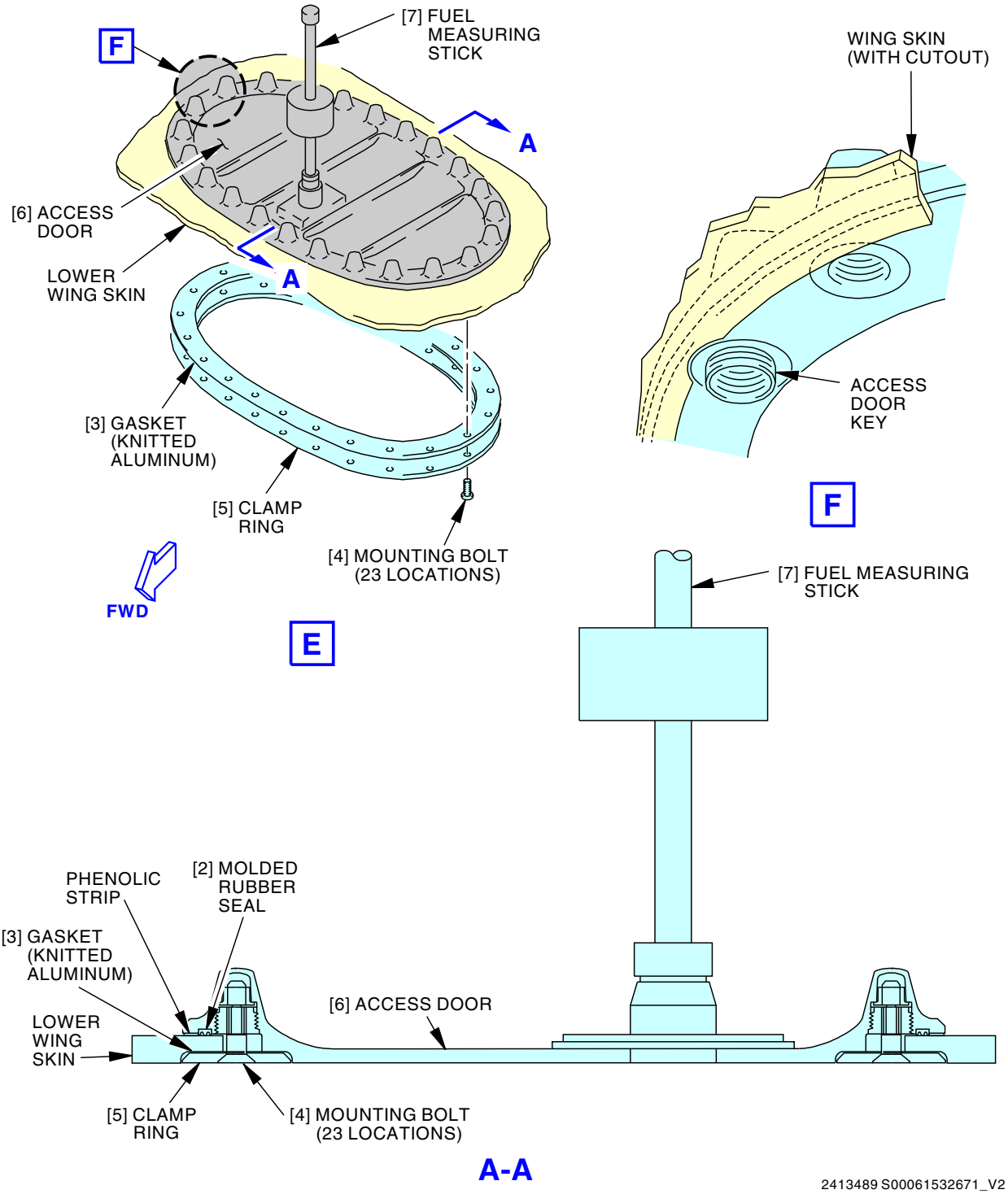
Main Tank Access Door Installation
Figure 401/28-11-11-990-801 (Sheet 2 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



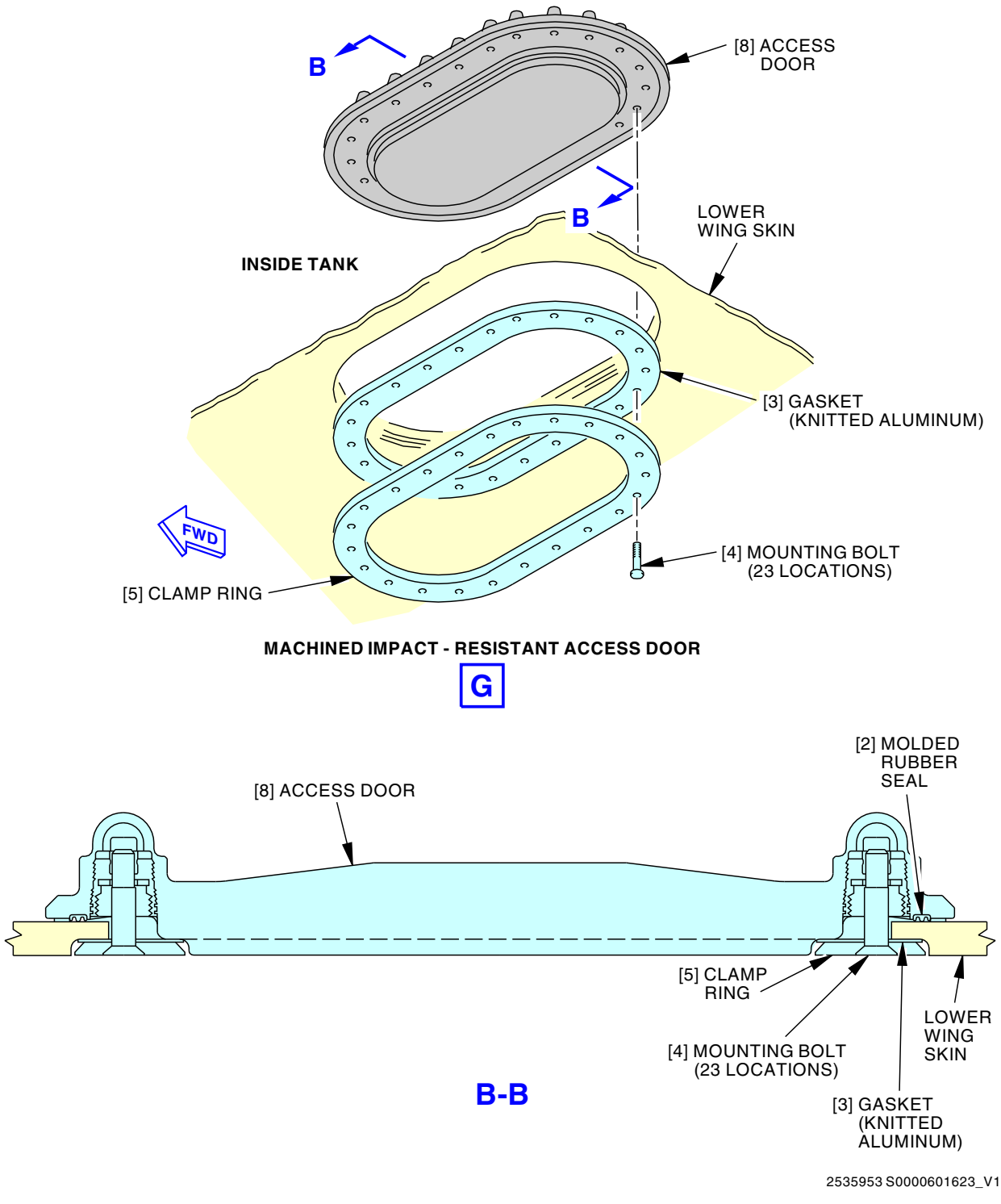
Main Tank Access Door Installation
Figure 401/28-11-11-990-801 (Sheet 3 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Main Tank Access Door Installation
Figure 401/28-11-11-990-801 (Sheet 4 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Main Tank Access Door Installation
Figure 401/28-11-11-990-801 (Sheet 5 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-11-11-400-801

3. Main Tank Access Door Installation

(Figure 401)

A. General

(1) This task gives instructions to install the main tank access door.

(2) This task has one or more steps that are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to that it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

(3) Mobilgrease 33, D50306, is the recommended material for access door gasket installations. Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, can still be used for access door gaskets.

(4) Do not mix Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, and Cor-Ban 27L Compound, G50237. If you replaced a gasket filled with Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, with a gasket filled with Mobilgrease 33, D50306, remove all Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, from the clamp ring and access door structure on the airplane. If you replaced a gasket filled with Mobilgrease 33, D50306, with a gasket filled with Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, remove all Mobilgrease 33, D50306, from the clamp ring and access door structure on the airplane.

(5) These main tank access doors are high impact resistant doors and they must not be replaced with a standard door:

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216
632AB	Main Tank Access Door - Wing Station 216

(6) It is recommended that a new aluminum gasket be used every time you install the main tank access doors.

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)
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-00-790-804	Fuel Tank Closure Leak Check (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)
51-21-72-370-801	BMS10-79 Primer - Application (P/B 701)

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-8436	Protective Ring - Access Door Opening, Wing Lower Panel Part #: C28013-3 Supplier: 81205

D. Consumable Materials

Reference	Description	Specification
A50473	Sealant - Brush (See BAC5000 8.5.3b(1) for instructions to prepare BMS5-95 Type I Class A-2)	BAC5000 Section 8.5.3
A50479	Sealant - P/S 870 Class B-2 Corrosion Inhibitive Sealant	BMS5-95 Class B-2
B00083	Solvent - VM&P Naphthas	TT-N-95 Type II, ASTM D-3735 Type III
B00316	Solvent - Aliphatic Naphtha (For Organic Coatings)	TT-N-95 Type I, ASTM D-3735 Type I
C00175	Primer - Urethane Compatible, Corrosion Resistant	BMS10-79 Type III
C00528	Compound - Corrosion Preventive, Petroleum Hot Application (Soft Film)	MIL-C-11796 Class III
D00504	Grease - Petrolatum	VV-P-236
D50050	Grease - Multipurpose, Helicopter Oscillating Bearing Grease with Calcium Soap Thickener - Aeroshell 14	MIL-G-25537
D50306	Grease - Synthetic Aircraft Grease (Mobilgrease 33)	BMS3-33 Type 1, MIL-PRF-23827 Type 1
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G00251	Abrasive - Mat, Non-Woven, Non-Metallic	A-A-58054
G50237	Compound - Corrosion Inhibiting, Non-drying - Cor-Ban 27L	BMS3-38

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Access door	28-11-11-01-155	SIA ALL
		28-11-11-01-160	SIA ALL
		28-11-11-01-175	SIA ALL
		28-11-11-01-180	SIA ALL
		28-11-11-01-195	SIA ALL
		28-11-11-01-200	SIA ALL
		28-11-11-01-215	SIA ALL
		28-11-11-01-220	SIA ALL
		28-11-11-01-235	SIA ALL
		28-11-11-01-240	SIA ALL
		28-11-11-01-245	SIA ALL
		28-11-11-01-250	SIA ALL

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(Continued)

AMM Item	Description	AIPC Reference	AIPC Effectivity
1 (cont.)		28-11-11-01-265	SIA ALL
		28-11-11-01-270	SIA ALL
		28-11-11-01-275	SIA ALL
		28-11-11-01-280	SIA ALL
		28-11-11-01-295	SIA ALL
		28-11-11-01-300	SIA ALL
3	Aluminum gasket	28-11-11-01-055	SIA ALL
		28-11-11-01-060	SIA ALL
		28-11-11-01-065	SIA ALL
5	Clamp ring	28-11-11-01-085	SIA ALL
		28-11-11-01-105	SIA ALL
6	Access door	28-11-11-01-165	SIA ALL
		28-11-11-01-170	SIA ALL
		28-11-11-01-185	SIA ALL
		28-11-11-01-190	SIA ALL
		28-11-11-01-205	SIA ALL
		28-11-11-01-210	SIA ALL
		28-11-11-01-225	SIA ALL
		28-11-11-01-230	SIA ALL
		28-11-11-01-255	SIA ALL
		28-11-11-01-260	SIA ALL
		28-11-11-01-285	SIA ALL
		28-11-11-01-290	SIA ALL
8	Access door	28-11-11-01-305	SIA ALL
		28-11-11-01-310	SIA ALL

F. 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

G. 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
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

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Number	Name/Location
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
544AB	Flap Support No. 1 Access Panel, Forward Assembly
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
644AB	Flap Support No. 8, Forward Assembly Access Panel

H. Prepare for the Installation

SUBTASK 28-11-11-210-001

(1) Examine the open tank for unwanted objects or material.

SUBTASK 28-11-11-160-001

(2) If there is unwanted objects or material, clean the open tank.

SUBTASK 28-11-11-020-005

(3) Remove the protective ring, SPL-8436, from the access door opening.

SUBTASK 28-11-11-210-002

(4) Do the applicable steps in this task: Fuel Tank Closure, TASK 28-11-00-410-801.

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SUBTASK 28-11-11-210-003

28-AWL-16: CDCCL

(5) Make sure that the areas on the access door [1], access door [6], or access door [8], clamp ring [5] and the lower wing skin electrical faying surfaces are clean and have no visible corrosion.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

(a) If the surface(s) are not clean and have visible corrosion, use solvent, B00083 to clean the surface(s).

SUBTASK 28-11-11-210-004

(6) Make sure that the molded rubber seal [2] is in good condition and secure.

(a) Clean the molded rubber seal [2] with a clean cotton wiper, G00034, moist with solvent, B00316.

(b) Look for areas of deterioration on the molded rubber seal [2].

(c) If there is deterioration, replace the molded rubber seal [2] (TASK 28-11-11-900-801).

(d) Apply a thin layer of grease, D00504, to the molded rubber seal [2].

NOTE: This will prevent damage to the molded rubber seal during subsequent access panel removal. It will also be easier to remove the access panel.

SUBTASK 28-11-11-840-003

(7) To prepare a new clamp ring [5] assembly for installation on the access door 532BB and 632BB or 532HB and 632HB, do these steps to install the provided rub strip:

(a) Use polysulfide sealant, A50473, or P/S 870 Class B-2 sealant, A50479, to bond the rub strip to the clamp ring [5].

1) Make sure that you bond rub strip of the clamp ring [5] to the surface that contacts with fairing.

(b) Trim the rub strip locally as necessary to keep a minimum of 0.00 in. (0.00 mm) clearance to the edge of the clamp ring [5].

(c) Apply one layer of primer, C00175 (TASK 51-21-72-370-801).

I. Prepare the Knitted Aluminum Gasket for the Installation (Recommended Procedure)

SUBTASK 28-11-11-100-002

(1) Clean the clamp ring [5] surface with solvent, B00083.

NOTE: To remove dried corrosion inhibiting compound, use abrasive mat, G00251.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-11-11-210-009

28-AWL-16: CDCCL

(2) Make sure that both sides of the new knitted aluminum gasket [3] are filled with the correct Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237.

NOTE: Do not mix Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, and Cor-Ban 27L Compound, G50237.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

SUBTASK 28-11-11-210-010

(3) Check the manufacturing date (shelf-life) information on the replacement gasket container.

28-AWL-16: CDCCL

(a) If the aluminum gasket [3] is more than five years old from the manufacturing date, do these steps:

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

1) Remove (De-grease) the old Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, from the aluminum gasket [3].

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

a) Vapor degrease the aluminum gasket [3] if you switch from the original grease or anti-corrosion compound to a different gasket filling material.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

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28-AWL-16: CDCCL

2) Refill (Re-impregnate) the aluminum gasket [3] with 0.5 fl-oz (15 ml) to 1 fl-oz (30 ml) of new Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, to make sure that both sides of the aluminum gasket [3] are filled before installation.

NOTE: Do not mix Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, and Cor-Ban 27L Compound, G50237.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

NOTE: If you do not fill the aluminum mesh with the Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, the spaces with no grease or anti-corrosion compound can collect water. Do not apply too much grease or anti-corrosion compound or it can move out to the wing surface.

(b) If the aluminum gasket [3] is less than five years old from the manufacturing date, do these steps:

28-AWL-16: CDCCL

1) Vapor de-grease the aluminum gasket [3] if you switch from the original grease or anti-corrosion compound for a different gasket filling material.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

2) It is not necessary to remove the old grease or anti-corrosion compound if the original grease or anti-corrosion compound did not change.

SUBTASK 28-11-11-860-002

(4) Put a new aluminum gasket [3] carrier tray package face up on a flat surface.

SUBTASK 28-11-11-020-010

(5) Remove the paper cover from the carrier tray.

SUBTASK 28-11-11-860-003

(6) Carefully put the clamp ring [5] on the aluminum gasket [3] (with the countersunk end of the holes face up) so that the clamp ring [5] and aluminum gasket [3] holes align.

SUBTASK 28-11-11-860-004

(7) Push the clamp ring [5] on the aluminum gasket [3] until the clamp ring [5] is tightly against the aluminum gasket [3].

SUBTASK 28-11-11-020-011

(8) Remove the clamp ring [5], aluminum gasket [3], and release strip from the carrier tray as a unit.

SUBTASK 28-11-11-860-005

(9) Put the unit with the aluminum gasket [3] side turned up, on a flat surface.

SUBTASK 28-11-11-020-012

(10) Remove the release strip from the aluminum gasket [3].

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J. Prepare the Knitted Aluminum Gasket for the Installation (Alternate Procedure)

SUBTASK 28-11-11-100-003

(1) Clean the clamp ring [5] surface and aluminum gasket [3] with cotton wiper, G00034, that is moist with solvent, B00083.

NOTE: To remove dried corrosion inhibiting compound, use abrasive mat, G00251.

SUBTASK 28-11-11-210-011

28-AWL-16: CDCCL

(2) Check the used aluminum gasket [3] to make sure that it meets the criteria that follows:

NOTE: A gasket that meets Item (d) but does not meet Items (a) through (c) criteria may be used for a maximum duration of 30 days and then must be replaced with a gasket that meets all the criteria listed below.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

(a) No fastener holes are torn.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

(b) Gasket is not elongated or out of shape.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

(c) Gasket rubber seals around the inner and outer periphery must be a minimum of 0.015 in. (0.4 mm) thick.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

(d) No more than 10% of strands in the layer(s) are broken through in any one area.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

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SUBTASK 28-11-11-640-003

28-AWL-16: CDCCL

(3) Apply 0.5 fl-oz (15 ml) to 1 fl-oz (30 ml) of Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, to both sides of the aluminum gasket [3] to make sure that both sides of the aluminum gasket [3] are filled before installation.

NOTE: Do not mix Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, and Cor-Ban 27L Compound, G50237.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

(a) Vapor degrease the aluminum gasket [3] if you switch from the original grease or anti-corrosion compound to a different gasket filling material.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

(b) Make sure that the layer is continuous on the aluminum gasket [3].

K. Access Door Inspection

SUBTASK 28-11-11-210-005

28-AWL-16: CDCCL

(1) Make sure that there is a phenolic strip positioned around the outermost periphery of the 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 Limitation (CDCCL).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

SUBTASK 28-11-11-210-006

(2) Make sure that there are no cracks in the nut domes of the access door [1], access door [6], or access door [8].

NOTE: Paint flaking or bulging can show cracks in the nut domes of the access door.

(a) To prevent a fuel tank access door nut dome from cracking, make sure that the clamp ring [5] and aluminum gasket [3] holes align.

NOTE: Do not use excessive Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237.

L. Main Tank Access Door Installation

SUBTASK 28-11-11-420-002

(1) On the main tank access doors [1] and access doors [8] without fuel measuring sticks [7], put the access door [1] or access door [8] in the fuel tank and set the door in the opening.

(a) These are the applicable left main tank access door(s):

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

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(Continued)

Number	Name/Location
532BB	Main Tank Access Door - Wing Station 265
532DB	Main Tank Access Door - Wing Station 313
532EB	Main Tank Access Door - Wing Station 337
532GB	Main Tank Access Door - Wing Station 390
532HB	Main Tank Access Door - Wing Station 417
532KB	Main Tank Access Door - Wing Station 470
532MB	Main Tank Access Door - Wing Station 523
532PB	Main Tank Access Door - Wing Station 576
532RB	Main Tank Access Door - Wing Station 629

(b) These are the applicable right main tank access door(s):

Number	Name/Location
632AB	Main Tank Access Door - Wing Station 216
632BB	Main Tank Access Door - Wing Station 265
632DB	Main Tank Access Door - Wing Station 313
632EB	Main Tank Access Door - Wing Station 337
632GB	Main Tank Access Door - Wing Station 390
632HB	Main Tank Access Door - Wing Station 417
632KB	Main Tank Access Door - Wing Station 470
632MB	Main Tank Access Door - Wing Station 523
632PB	Main Tank Access Door - Wing Station 576
632RB	Main Tank Access Door - Wing Station 629

SUBTASK 28-11-11-420-003

CAUTION BE CAREFUL WHEN YOU REMOVE OR INSTALL THE ACCESS DOORS THAT HAVE FUEL MEASURING STICKS. IF THE FUEL MEASURING STICKS TOUCH THE STRINGERS IN THE FUEL TANK, DAMAGE TO THE FUEL MEASURING STICKS CAN OCCUR.

(2) Put the access door [6] in the fuel tank at an angle so the fuel measuring stick [7] does not touch the stringers at the top of the fuel tank and set the door in the opening.

NOTE: Access doors with the fuel measuring sticks have an access door key (View F, Figure 401).

(a) These are the applicable left main tank access door(s):

Number	Name/Location
532CB	Main Tank Access Door - Wing Station 290
532FB	Main Tank Access Door - Wing Station 367
532JB	Main Tank Access Door - Wing Station 443
532LB	Main Tank Access Door - Wing Station 496
532NB	Main Tank Access Door - Wing Station 549
532QB	Main Tank Access Door - Wing Station 602

(b) These are the applicable right main tank access door(s):

Number	Name/Location
632CB	Main Tank Access Door - Wing Station 290
632FB	Main Tank Access Door - Wing Station 367
632JB	Main Tank Access Door - Wing Station 443

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(Continued)

Number	Name/Location
632LB	Main Tank Access Door - Wing Station 496
632NB	Main Tank Access Door - Wing Station 549
632QB	Main Tank Access Door - Wing Station 602

(c) Make sure that the access door key is installed correctly in the lower wing skin.

NOTE: Access doors with the fuel measuring sticks have an access door key (View F, Figure 401).

SUBTASK 28-11-11-100-001

(3) Clean the clamp ring [5] surface with solvent, B00083.

SUBTASK 28-11-11-200-001

(4) Make sure that the clamp ring [5] and aluminum gasket [3] holes align.

NOTE: The holes are not symmetrical.

SUBTASK 28-11-11-640-001

28-AWL-16: CDCCL

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 FASTENERS.

(5) Apply a thin layer of Mobilgrease 33, D50306 (recommended), Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, 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 Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, and Cor-Ban 27L Compound, G50237.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

(a) Make sure that you use the same grease or anti-corrosion material that is on the aluminum gasket [3].

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-11-11-420-004

28-AWL-16: CDCCL

(6) Set and hold the aluminum gasket [3] and the clamp ring [5] in the opening between the outside face of the access door and the wing skin while you install the mounting bolts [4] for the access door [1], access door [6], or access door [8].

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

SUBTASK 28-11-11-420-012

(7) Apply a thin layer of Cor-Ban 27L Compound, G50237 (preferred), or compound, C00528 (alternate), to the threads and shank of the mounting bolts [4].

SUBTASK 28-11-11-420-005

28-AWL-16: CDCCL

(8) Torque the mounting bolts [4] on the access door [1] and access door [6] 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 Limitation (CDCCL).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

NOTE: It is recommended to re-torque the access door mounting bolts within 60 days and again at 12 months after installation if Cor-Ban 27L gaskets are used. This is to reduce clamp-up loss on the access door.

(a) Start at the centerline and torque the mounting bolts [4] equally in both directions (Figure 403).

SUBTASK 28-11-11-220-001

(9) Make sure that the flushness of the mounting bolts [4] are between -0.010 in. (-0.254 mm) to 0.002 in. (0.051 mm).

SUBTASK 28-11-11-420-013

(10) Apply a thin layer of Cor-Ban 27L Compound, G50237 (preferred), or compound, C00528 (alternate), to the threads and shank of the mounting bolts [4].

SUBTASK 28-11-11-420-006

28-AWL-16: CDCCL

(11) Torque the mounting bolts [4] on the machined impact- resistant access door [8] to 65 ±5 in-lb (7 ±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 Limitation (CDCCL).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

NOTE: It is recommended to re-torque the access door mounting bolts within 60 days and again at 12 months after installation if Cor-Ban 27L gaskets are used. This is to reduce clamp-up loss on the access door.

(a) Start at the centerline and torque the mounting bolts [4] equally in both directions (Figure 403).

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SUBTASK 28-11-11-220-002

(12) Make sure that the flushness of the mounting bolts [4] are between -0.010 in. (-0.254 mm) to 0.002 in. (0.051 mm).

SUBTASK 28-11-11-650-002

(13) Refuel the applicable fuel tank (TASK 12-11-00-650-803).

SUBTASK 28-11-11-210-007

(14) To make sure that there are no leaks from the applicable access door [1], access door [6], or access door [8], do this task: Fuel Tank Closure Leak Check, TASK 28-11-00-790-804.

SUBTASK 28-11-11-650-003

(15) 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

(16) For access door [1], 532BB or 632BB, do this step:

(a) Install the applicable access panels:

(TASK 06-43-00-800-801)

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

SUBTASK 28-11-11-410-004

(17) For access door [1], 532HB or 632HB, do this step:

(a) Install the applicable access panels:

(TASK 06-44-00-800-801)

Number	Name/Location
544AB	Flap Support No. 1 Access Panel, Forward Assembly
644AB	Flap Support No. 8, Forward Assembly Access Panel

END OF TASK

TASK 28-11-11-000-802

4. Surge Tank Access Door Removal

(Figure 402)

A. General

(1) This task gives instructions to remove the surge tank access doors.

B. References

Reference	Title
12-11-00-650-807	Drain the Fuel from the Sumps after Defueling (P/B 301)
24-22-00-860-802	Remove Electrical Power (P/B 201)
28-11-00-910-802	Purging and Fuel Tank Entry (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-8436	Protective Ring - Access Door Opening, Wing Lower Panel Part #: C28013-3 Supplier: 81205
STD-3906	Mallet - Rubber

D. Consumable Materials

Reference	Description	Specification
B00083	Solvent - VM&P Naphthas	TT-N-95 Type II, ASTM D-3735 Type III

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
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. Surge Tank Access Precautions

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.

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.

SUBTASK 28-11-11-170-001

(1) For the applicable surge tank, do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

SUBTASK 28-11-11-700-001

(2) Before an access to the applicable surge tank, make sure that the fuel level in the adjacent main wing tank is below 3000 lb (1361 kg).

SUBTASK 28-11-11-700-002

(3) Make sure that all unwanted sources of ignition have been removed from an area within 25 ft (8 m) of the surge tank access panel.

NOTE: Unwanted sources of ignition include: open flames, electrical equipment, frictional hot spots, electromagnetic energy (radio transmitters or radars), static electricity, and lightning.

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SUBTASK 28-11-11-480-001

(4) Put a rope barrier around a 25 ft (8 m) area of the surge tank access panel.

NOTE: The rope barrier must include signs or placards that say: DANGER - OPEN FUEL TANKS.

SUBTASK 28-11-11-700-003

(5) Make sure that the airplane is correctly grounded to an approved ground before you defuel the surge tank or open the access door.

SUBTASK 28-11-11-700-004

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

(6) Before the surge tank access doors are opened, make sure that all electrical power to and from the airplane is removed (TASK 24-22-00-860-802).

(a) Put placards that say that power can not be restored to the airplane until the surge tanks are closed on all power inlets.

SUBTASK 28-11-11-700-005

(7) Make sure that the main and AUX batteries are disconnected.

(a) Put placards that say not to connect batteries until the surge tanks are closed in all disconnected batteries.

SUBTASK 28-11-11-700-006

(8) Make sure that all equipment or materials used in the fuel tanks or roped off area is non-sparking, non-ferrous, and non-static generating or is explosion-proof approved (Class 1, Division 1).

H. Surge Tank Access Door Removal

SUBTASK 28-11-11-650-004

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 (TASK 12-11-00-650-807).

SUBTASK 28-11-11-020-006

(2) Do these steps to remove the applicable access doors [21]:

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) Hold the clamp ring [5] and remove the mounting bolts [4].

(b) Remove the clamp ring [5] and aluminum gasket [3].

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1) Discard the aluminum gasket [3].

NOTE: It is not recommended but, if it is necessary, reuse of the aluminum gasket may be possible.

CAUTION

DO NOT USE A LEVER (PRY BAR) 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, STD-3906, and lightly hit around the access door [21].

(d) Clean the inner side and the outer side of the access opening with solvent, B00083.

(e) Install the protective ring, SPL-8436, in the access door [21] opening.

SUBTASK 28-11-11-020-007

(3) Do these steps to remove the applicable access doors [22]:

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

CAUTION

THE MOUNTING BOLTS HOLD THIS ACCESS DOOR IN ITS POSITION. THE DOOR CAN FALL OUT OF THE OPENING WHEN YOU REMOVE ALL OF THE MOUNTING BOLTS. THIS CAN CAUSE DAMAGE TO THE DOOR.

(a) Loosen and remove the mounting bolts [24].

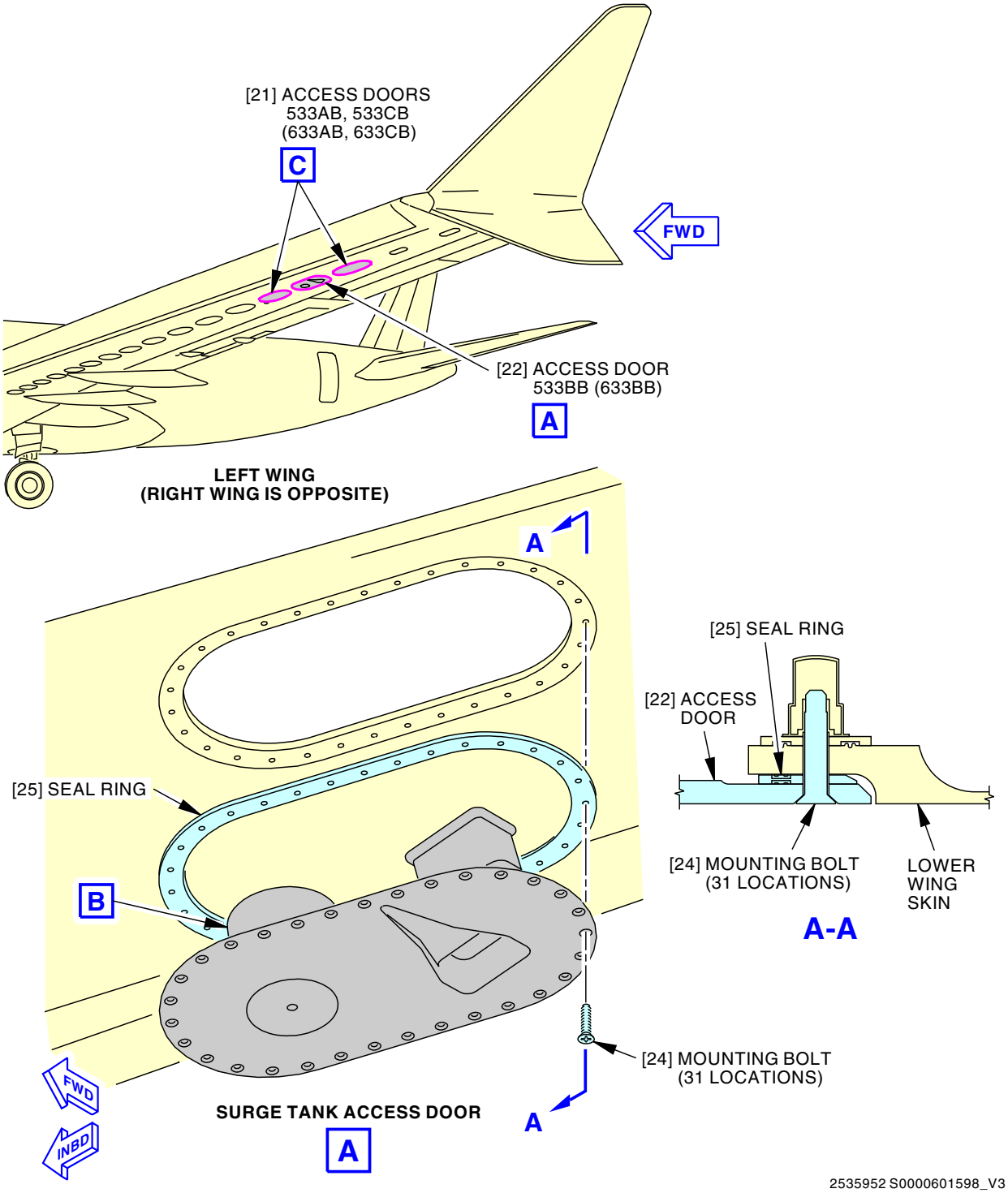
WARNING

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 seal ring [25] from the surge tank.

END OF TASK

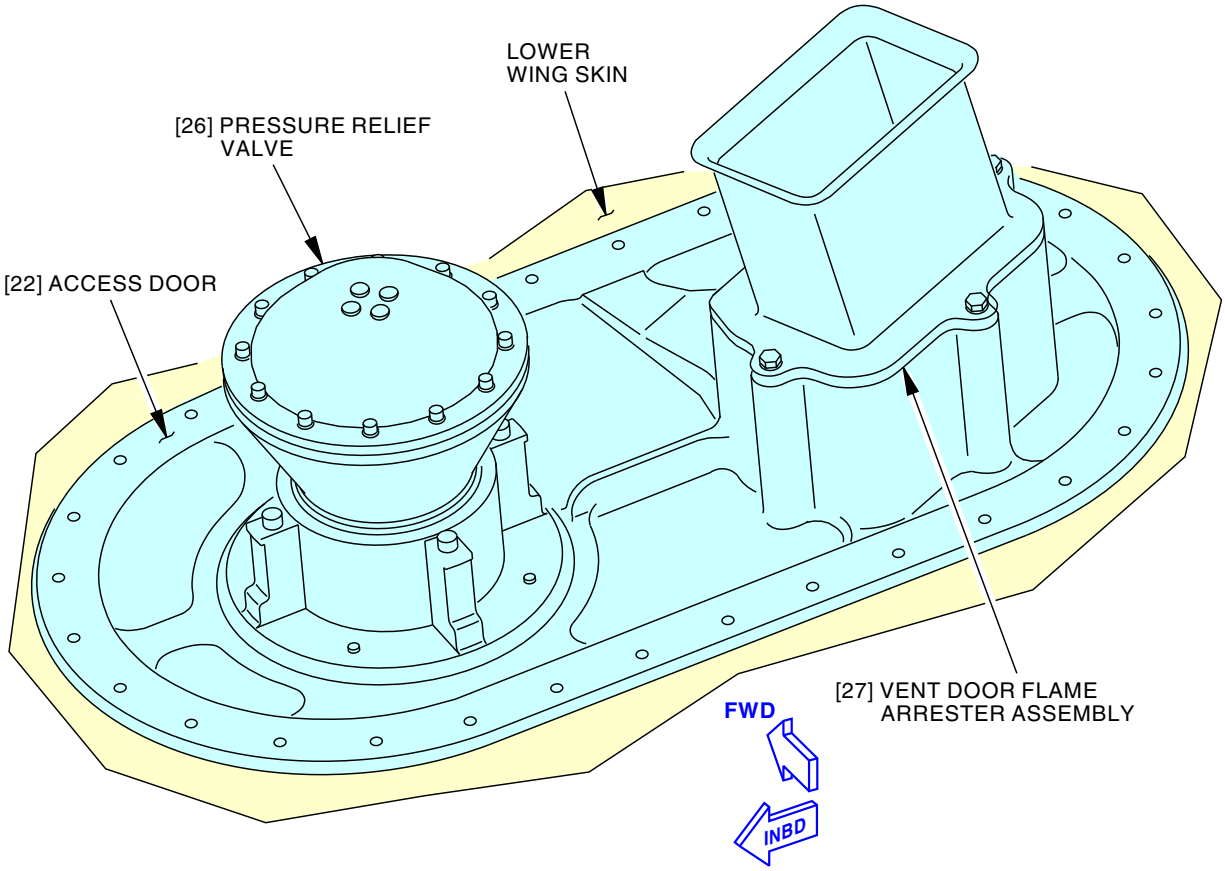
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2535952 S0000601598_V3

Surge Tank Access Door Installation
Figure 402/28-11-11-990-802 (Sheet 1 of 3)

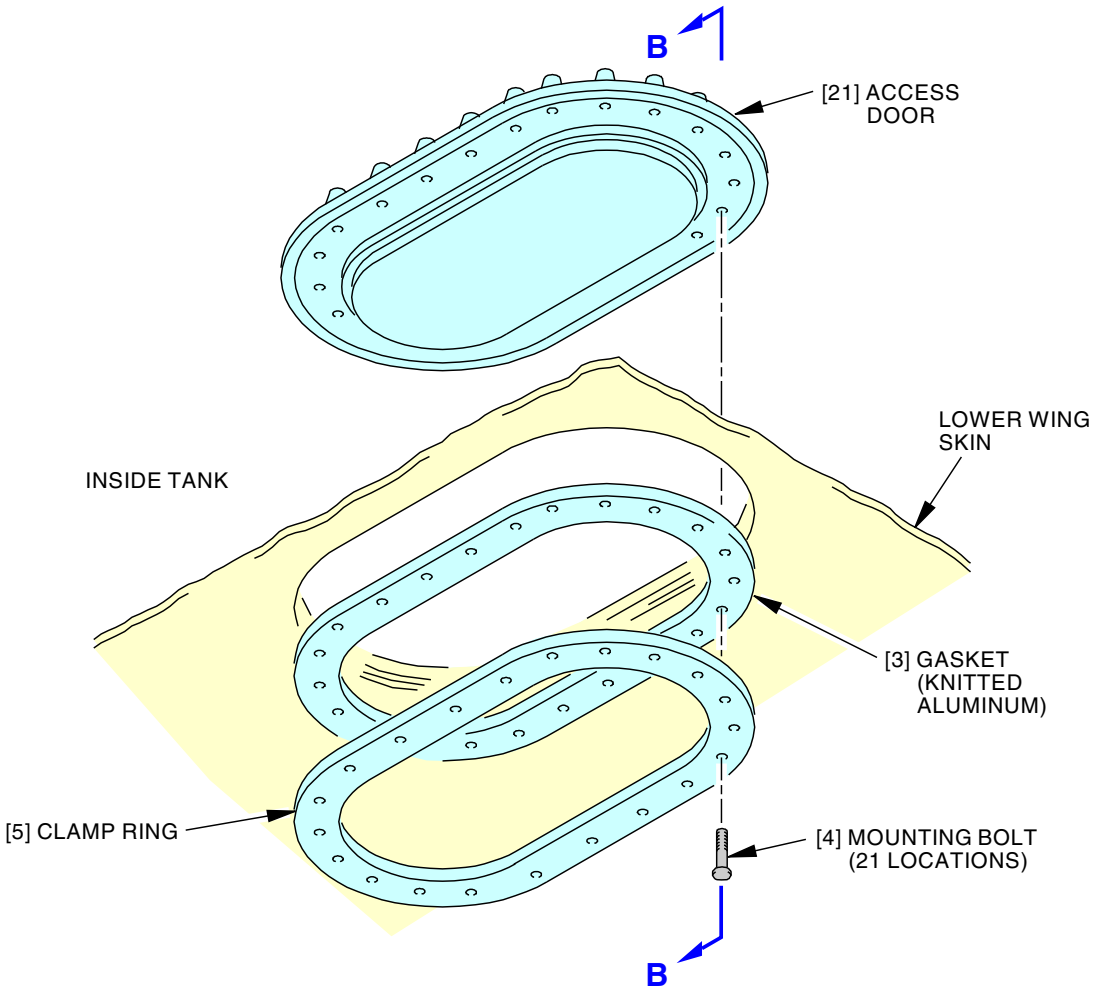
ECCN 9E991 BOEING PROPRIETARY - See title page for details



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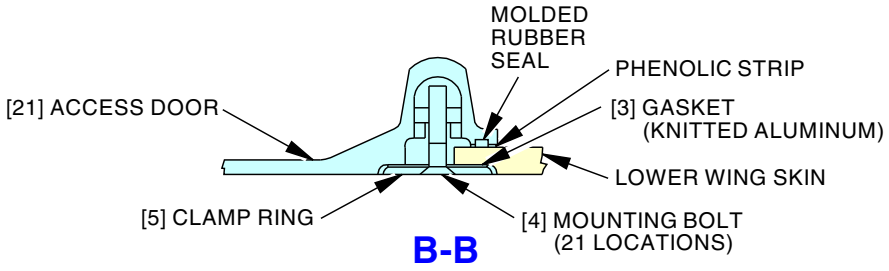
Surge Tank Access Door Installation
Figure 402/28-11-11-990-802 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



ACCESS DOOR, 533AB, 533CB (633AB, 633CB)

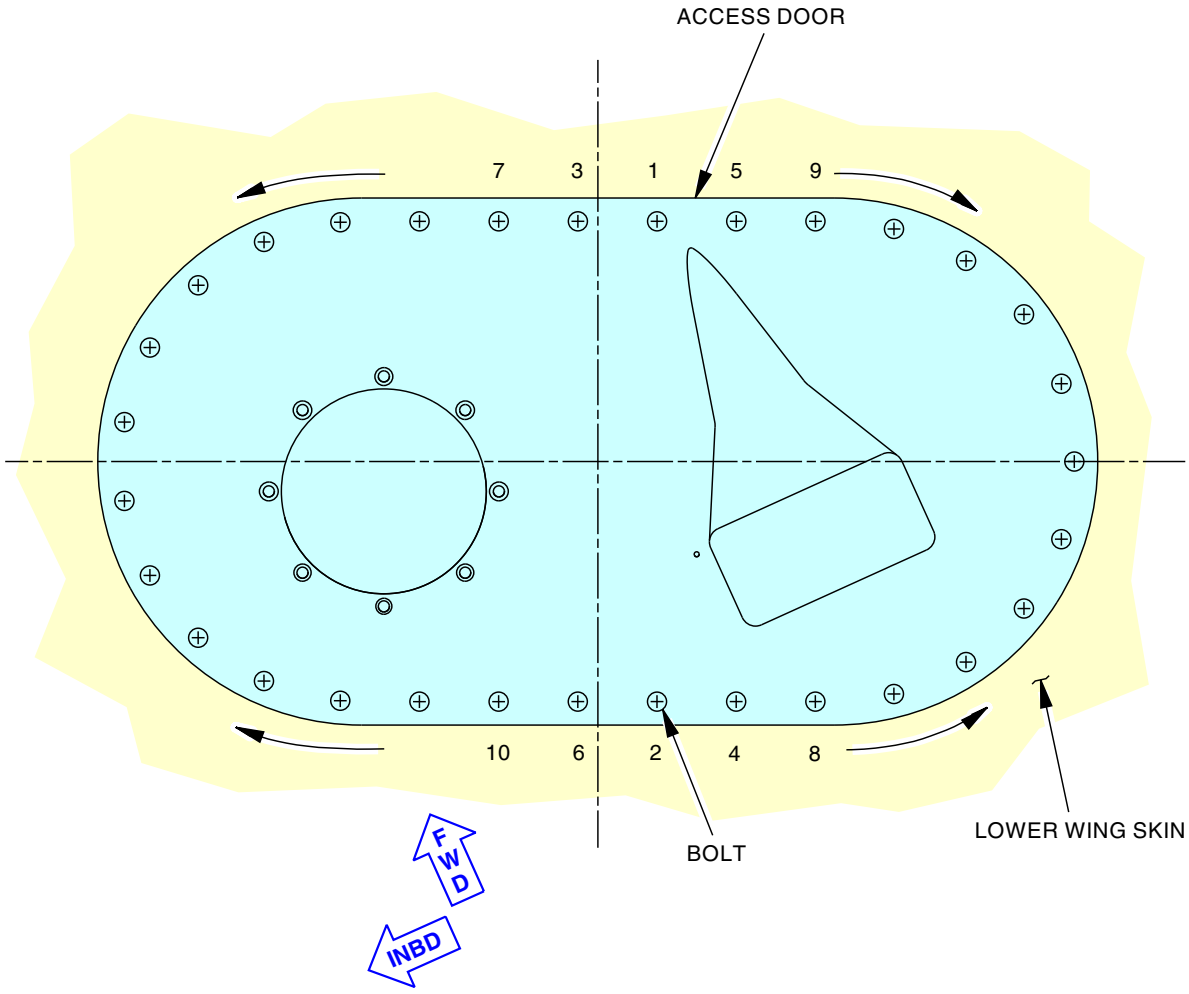
C



2413493 S00061532677_V1

Surge Tank Access Door Installation
Figure 402/28-11-11-990-802 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



NOTE:

TORQUE THE MOUNT BOLTS IN THE SEQUENCE SHOWN BY THE NUMBERS. THIS WILL MAKE SURE THAT 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 FASTENER HOLES.

2413494 S00061532678_V1

Access Panel Mount Bolt Torque Pattern
Figure 403/28-11-11-990-803

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-11-11-400-802

5. Surge Tank Access Door (533AB, 533CB, 633AB, 633CB) Installation

(Figure 402, Figure 403)

A. General

(1) This task has one or more steps that are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to that it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

(2) This task gives the instruction to install the following surge tank access doors:

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

(3) Mobilgrease 33, D50306, is the recommended material for access door gasket installations. Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, can be used for access door gaskets.

(4) Do not mix Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, and Cor-Ban 27L Compound, G50237. If you replaced a gasket filled with Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, with a gasket filled with Mobilgrease 33, D50306, remove all Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, from the clamp ring and the access door structure on the airplane.

(5) It is recommended that a new aluminum gasket be used every time you install the access door.

B. References

Reference	Title
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-00-790-801	Fuel Leak Detection Procedures (P/B 601)
28-11-00-790-802	Surge Tank Access Door Leak Test Procedure (P/B 601)
28-11-11-900-801	Rubber Door Seal - Replacement (P/B 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.

Reference	Description
SPL-8436	Protective Ring - Access Door Opening, Wing Lower Panel Part #: C28013-3 Supplier: 81205

D. Consumable Materials

Reference	Description	Specification
B00083	Solvent - VM&P Naphthas	TT-N-95 Type II, ASTM D-3735 Type III

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Reference	Description	Specification
B00316	Solvent - Aliphatic Naphtha (For Organic Coatings)	TT-N-95 Type I, ASTM D-3735 Type I
C00528	Compound - Corrosion Preventive, Petroleum Hot Application (Soft Film)	MIL-C-11796 Class III
D00504	Grease - Petrolatum	VV-P-236
D50050	Grease - Multipurpose, Helicopter Oscillating Bearing Grease with Calcium Soap Thickener - Aeroshell 14	MIL-G-25537
D50306	Grease - Synthetic Aircraft Grease (Mobilgrease 33)	BMS3-33 Type 1, MIL-PRF-23827 Type 1
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G00251	Abrasive - Mat, Non-Woven, Non-Metallic	A-A-58054
G50237	Compound - Corrosion Inhibiting, Non-drying - Cor-Ban 27L	BMS3-38

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	Aluminum gasket	28-11-11-01-055	SIA ALL
		28-11-11-01-060	SIA ALL
		28-11-11-01-065	SIA ALL

F. 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

G. 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

H. Surge the Surge Tank Access Door Installation

SUBTASK 28-11-11-080-001

(1) Remove the protective ring, SPL-8436, from the access door [21] opening.

SUBTASK 28-11-11-410-005

(2) Do the applicable steps in this task: Fuel Tank Closure, TASK 28-11-00-410-801.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-11-11-210-012

28-AWL-16: CDCCL

(3) Make sure that the areas on the access door [21], clamp ring [5], and the lower wing skin electrical faying surfaces are clean and have no visible corrosion.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

(a) Clean the surface with solvent, B00083, if it is necessary.

SUBTASK 28-11-11-100-004

(4) Make sure that the molded rubber seal is in good condition.

(a) Clean the rubber seal with a clean cotton wiper, G00034, moist with solvent, B00316.

(b) Look for areas of deterioration on the rubber seal.

(c) To replace the molded rubber seal if it is necessary, do this task: Rubber Door Seal - Replacement, TASK 28-11-11-900-801.

(d) 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.

SUBTASK 28-11-11-100-005

28-AWL-16: CDCCL

(5) Use a new knitted aluminum gasket [3] (recommended procedure).

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

NOTE: It is recommended to use a new aluminum gasket every time you install the access door.

28-AWL-16: CDCCL

(a) If a new aluminum gasket [3] is not available, a used aluminum gasket [3] that meets the certain criteria may be installed (alternate procedure).

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

I. Prepare the New Knitted Aluminum Gasket for the Installation (Recommended Procedure)

SUBTASK 28-11-11-100-008

(1) Clean the clamp ring [5] surface with solvent, B00083.

NOTE: To remove dried corrosion inhibiting compound, use abrasive mat, G00251.

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SUBTASK 28-11-11-640-004

28-AWL-16: CDCCL

(2) Make sure that both sides of the new knitted aluminum gasket [3] are filled with the correct Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

(a) Do not mix Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, and Cor-Ban 27L Compound, G50237.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

SUBTASK 28-11-11-200-004

(3) Do a check of the manufacturing date (shelf-life) information on the replacement gasket container.

28-AWL-16: CDCCL

(a) If the aluminum gasket [3] is more than five years old from the manufacturing date, do these steps:

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

1) Remove (De-grease) the old Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, from the aluminum gasket [3].

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

a) Vapor degrease the aluminum gasket [3] if you switch from the original grease or anti-corrosion compound to a different gasket filling material.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

28-AWL-16: CDCCL

2) Refill (Re-impregnate) the aluminum gasket [3] with 0.5 fl-oz (15 ml) to 1 fl-oz (30 ml) of new Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, to make sure that both sides of the aluminum gasket [3] are filled before installation.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

NOTE: If you do not fill the aluminum mesh with the Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, the spaces with no grease or anti-corrosion compound can collect water. Do not apply too much grease or anti-corrosion compound or it can move out to the wing surface.

28-AWL-16: CDCCL

a) Do not mix Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, and Cor-Ban 27L Compound, G50237.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

(b) If the aluminum gasket [3] is less than five years old, then it is not necessary to remove the old grease or anti-corrosion compound.

SUBTASK 28-11-11-410-006

(4) Put a new aluminum gasket [3] carrier tray package face up on a flat surface.

SUBTASK 28-11-11-010-005

(5) Remove the paper cover from the carrier tray.

SUBTASK 28-11-11-210-018

(6) Since the hole locations are symmetrical, carefully put the clamp ring [5] on the aluminum gasket [3] (with the countersunk end of the holes face up) so that the clamp ring [5] and aluminum gasket [3] holes align.

SUBTASK 28-11-11-420-009

(7) Push the clamp ring [5] on the aluminum gasket [3] until the clamp ring [5] is tightly against the aluminum gasket [3].

SUBTASK 28-11-11-020-013

(8) Remove the clamp ring [5], aluminum gasket [3], and release strip from the carrier tray as a unit.

SUBTASK 28-11-11-420-010

(9) Put the unit with the aluminum gasket [3] side turned up, on a flat surface.

SUBTASK 28-11-11-020-014

(10) Remove the release strip from the aluminum gasket [3].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

J. Prepare the Used Knitted Aluminum Gasket for the Installation (Alternate Procedure)

SUBTASK 28-11-11-100-009

(1) Clean the clamp ring [5] surface and aluminum gasket [3] with cotton wiper, G00034, that is moist with solvent, B00083.

NOTE: To remove dried corrosion inhibiting compound, use abrasive mat, G00251.

SUBTASK 28-11-11-420-011

28-AWL-16: CDCCL

(2) A used aluminum gasket [3] that meets the criteria that follows can be installed:

NOTE: A gasket that meets Items (2)(d) but does not meet Items (2)(a) through (2)(c) criteria may be used for a maximum duration of 30 days and then must be replaced with a gasket that meets all the criteria listed below.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

(a) No fastener holes are torn.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

(b) Gasket is not elongated or out of shape.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

(c) Gasket rubber seals around the inner and outer periphery must be a minimum of 0.015 in. (0.4 mm) thick.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

(d) No more than 10% of strands in the layer(s) are broken through in any one area.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-11-11-640-005

28-AWL-16: CDCCL

(3) Apply 0.5 fl-oz (15 ml) to 1 fl-oz (30 ml) of Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, to both sides of the aluminum gasket [3] to make sure that both sides of the aluminum gasket [3] are filled before installation.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

(a) Do not mix Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, and Cor-Ban 27L Compound, G50237.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

(b) Vapor degrease the aluminum gasket [3] if you switch from the original grease or anti-corrosion compound to a different gasket filling material.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

(c) Make sure that the layer is continuous on the aluminum gasket [3].

K. Surge Tank Access Door Inspection

SUBTASK 28-11-11-200-003

28-AWL-16: CDCCL

(1) Make sure that there is a phenolic strip around the outermost periphery of the access door [21] 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 Limitation (CDCCL).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

L. Surge Tank Access Door Installation

SUBTASK 28-11-11-400-001

(1) Put the access door [21] in the fuel tank and set the door in the opening.

SUBTASK 28-11-11-100-007

(2) Clean the clamp ring [5] surface with solvent, B00083.

SUBTASK 28-11-11-210-013

(3) Make sure that the clamp ring [5] and aluminum gasket [3] holes align.

NOTE: The holes are not symmetrical.

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(a) To prevent a fuel tank access door nut dome from cracking, make sure that the clamp ring [5] and aluminum gasket [3] holes align.

NOTE: Do not use excessive Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237.

SUBTASK 28-11-11-390-001

28-AWL-16: CDCCL

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 FASTENERS.

(4) Apply a thin layer of Mobilgrease 33, D50306 (recommended), Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, to the lower surface of the wing skin that touches the aluminum gasket [3] for the access door [21].

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

(a) Do not mix Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, and Cor-Ban 27L Compound, G50237.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

(b) Make sure that you use the same grease or anti-corrosion material that is on the aluminum gasket [3].

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

SUBTASK 28-11-11-420-014

(5) Apply a thin layer of Cor-Ban 27L Compound, G50237 (preferred), or compound, C00528 (alternate), to the threads and shank of the mounting bolts [4].

SUBTASK 28-11-11-400-002

(6) Set and hold the aluminum gasket [3] and clamp ring [5] in the opening between the outside face of the access door [21] and wing skin while you install the mounting bolts [4] for the access door [21].

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SUBTASK 28-11-11-910-001

28-AWL-16: CDCCL

(7) Torque the mounting bolts [4] on the access door [21] 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 Limitation (CDCCL).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

NOTE: It is recommended to re-torque the access door mounting bolts within 60 days and again at 12 months after installation if Cor-Ban 27L gaskets are used. This is to reduce clamp-up loss on the access door.

(a) Start at the centerline and in 17.5 ±2.5 in-lb (2.0 ±0.3 N·m) increments, torque the mounting bolts [4] equally in each direction (Figure 403).

(b) Make sure that the heads of the mounting bolts [4] are flush to the adjacent access door [21] surface within -0.010 in. (-0.254 mm) to 0.002 in. (0.051 mm).

SUBTASK 28-11-11-790-001

(8) To do a leak test for the access door [21], do one of these tasks:

(a) Surge Tank Access Door Leak Test Procedure, TASK 28-11-00-790-802

(b) Fuel Leak Detection Procedures, TASK 28-11-00-790-801.

END OF TASK

TASK 28-11-11-400-803

6. Surge tank Access Door (533BB, 633BB) Installation

(Figure 402 and Figure 403)

A. General

(1) This task has one or more steps that are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-17.

(2) This task gives the instruction to install the following surge tank access doors:

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

B. References

Reference	Title
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-00-790-801	Fuel Leak Detection Procedures (P/B 601)
28-11-00-790-802	Surge Tank Access Door Leak Test Procedure (P/B 601)
28-13-31-400-801	Flame Arrestor Installation (P/B 401)
28-13-41-400-801	Pressure Relief Valve Installation (P/B 401)

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C. Consumable Materials

Reference	Description	Specification
B00083	Solvent - VM&P Naphthas	TT-N-95 Type II, ASTM D-3735 Type III
C00528	Compound - Corrosion Preventive, Petroleum Hot Application (Soft Film)	MIL-C-11796 Class III
G50237	Compound - Corrosion Inhibiting, Non-drying - Cor-Ban 27L	BMS3-38

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 Installation

SUBTASK 28-11-11-400-007

(1) Do the applicable steps in this task: Fuel Tank Closure, TASK 28-11-00-410-801.

G. Surge Tank Access Door Installation

SUBTASK 28-11-11-210-015

(1) Make sure that the areas on the door assembly [22] and wing skin, where the seal ring [25] touches, are clean.

(a) If it is necessary, use solvent, B00083, to clean the surfaces.

SUBTASK 28-11-11-210-016

(2) Make sure that the rubber ring of the seal ring [25] is in good condition.

(a) If it is necessary, replace the seal ring [25].

SUBTASK 28-11-11-400-003

(3) Put the flat surface of the seal ring [25] on the access door [22] with the holes aligned correctly.

(a) Do not apply grease to the seal ring [25].

SUBTASK 28-11-11-210-017

28-AWL-17: CDCCL

(4) Make sure that there is no visible corrosion on the countersinks of the access door fasteners.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCLs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-17.

SUBTASK 28-11-11-400-004

(5) If the pressure relief valve [26] on the access door [22] was removed, install it (TASK 28-13-41-400-801).

SUBTASK 28-11-11-400-006

(6) If the flame arrestor assembly [27] on the access door [22] was removed, install it (TASK 28-13-31-400-801).

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SUBTASK 28-11-11-400-005

CAUTION

MAKE SURE THAT THE SEAL RING IS IN ITS CORRECT POSITION ON THE ACCESS DOOR WITH THE HOLES ALIGNED CORRECTLY. IF YOU INSTALL THE MOLDED RUBBER SEAL INCORRECTLY, FUEL CAN SPILL. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT CAN OCCUR.

(7) Put the access door [22] in the opening of the surge tank.

(a) Make sure that the access door [22] is in the correct orientation (View A, Figure 402).

(b) Apply a thin layer of Cor-Ban 27L Compound, G50237 (preferred), or compound, C00528 (alternate), to the threads and shank of the mounting bolts [24].

28-AWL-17: CDCCL

(c) Install the mounting bolts [24] (conductive fasteners - part number BACB30LH3-10) on the access door [22].

NOTE: No substitution of fastener part number is permitted.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCLs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-17.

28-AWL-17: CDCCL

(d) Tighten the mounting bolts [24] on the access door [22] to a torque of 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 CDCCL.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-17.

1) Start at the centerline and tighten the mounting bolts [24] (conductive fasteners) to 17.5 ±2.5 in-lb (2.0 ±0.3 N·m), equally in each direction. Then tighten again to 17.5 ±2.5 in-lb (2.0 ±0.3 N·m), until reaching the final torque of 35 ±5 in-lb (4 ±1 N·m) (Figure 403).

SUBTASK 28-11-11-211-001

(8) Make sure that the heads of the mounting bolts [24] are flush to the adjacent access door [22] surface within -0.010 in. (-0.254 mm) to 0.002 in. (0.051 mm).

SUBTASK 28-11-11-790-002

(9) Do a leak test for the access door [22], do one of these tasks:

- Surge Tank Access Door Leak Test Procedure, TASK 28-11-00-790-802
- Fuel Leak Detection Procedures, TASK 28-11-00-790-801.

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 (533AB, 533CB, 633AB, 633CB) 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	Sealant Removal Tool (meets BSS7384 requirements) Part #: 1-6390-A Supplier: 63318 Part #: 10810 Supplier: $0855 Part #: 10811 Supplier: $0855 Part #: 10812 Supplier: $0855 Part #: 234350 Supplier: 5HCF1 Part #: 235072 Supplier: 5HCF1 Part #: 235073 Supplier: 5HCF1 Part #: 235074 Supplier: 5HCF1 Part #: 235075 Supplier: 5HCF1 Part #: 235076 Supplier: 5HCF1 Part #: 311/03 Supplier: F6892 Part #: 311/14 Supplier: F6892 Part #: 311/25 Supplier: F6892 Part #: 311/37 Supplier: F6892 Part #: AS1 Supplier: $1351 Part #: AS2 Supplier: $1351 Part #: AS3 Supplier: $1351 Part #: DAD5013 Supplier: 7RKH2 Part #: DFD5019 Supplier: 7RKH2 Part #: JNT411B60 Supplier: 3DN12 Part #: JNT411B90 Supplier: 3DN12 Part #: SCD5019 Supplier: 7RKH2 Part #: ST982LF-9 Supplier: 81205 Part #: TS1275-4 Supplier: 22975
STD-124	Brush - Stiff Bristle, Non-Metallic
STD-197	Container - Plastic, Polyethylene or Polypropylene

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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 - P/S 860 Class B-1/6 Quick Repair Fuel Tank Sealant	AMS-S-83318 Class B
A50153	Sealant - Fuel Tank - Class A-2	BMS5-45 Class A-2
B00068	Alcohol - Denatured, Ethyl (Ethanol)	AMS 3002, MIL-E-51454 Type II
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G00624	Bag - Plastic, General Purpose	
G50078	Abrasive - Aluminum Oxide Paper, 320 grit or finer	
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

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(Continued)

Number	Name/Location
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
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 28-11-11-010-003

(1) Open the applicable access doors:

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

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(Continued)

Number	Name/Location
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
633AB	Surge Tank Access Door - Wing Station 655
633CB	Surge Tank Access Door - Wing Station 703

SUBTASK 28-11-11-020-009

(2) Remove the rubber door seal [1] from the access door fully.

SUBTASK 28-11-11-140-001

CAUTION

BE CAREFUL WHEN YOU REMOVE THE SEAL WITH THE SEALANT REMOVAL TOOL. DAMAGE TO THE PAINT OR PRIMER CAN OCCUR.

(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 28-11-11-120-001

(2) Abrade the bottom surface of the rubber door seal with a 320 grit or finer abrasive paper, G50078, to remove the parting agent.

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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.

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 28-11-11-420-007

(6) Install the rubber door seal in 60 minutes or less

(a) 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.

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I. Rubber Door Seal Replacement

SUBTASK 28-11-11-640-002

(1) Apply the sealant, A50153, to the full width of the seal groove with a stiff bristle non-metallic brush, STD-124.

NOTE: Alternative to sealant, A50153, are sealant, A00767, P/S 860 B-1/6 sealant, A50084, and PR-1826 sealant, A50052.

SUBTASK 28-11-11-420-008

(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).

SUBTASK 28-11-11-780-001

(6) Do not stress the bond line until the sealant is fully cured.

NOTE: The sealant, A50153, 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 28-11-11-410-003

(1) Do the applicable installation procedure:

To install the applicable access doors:

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

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(Continued)

Number	Name/Location
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
633AB	Surge Tank Access Door - Wing Station 655
633CB	Surge Tank Access Door - Wing Station 703

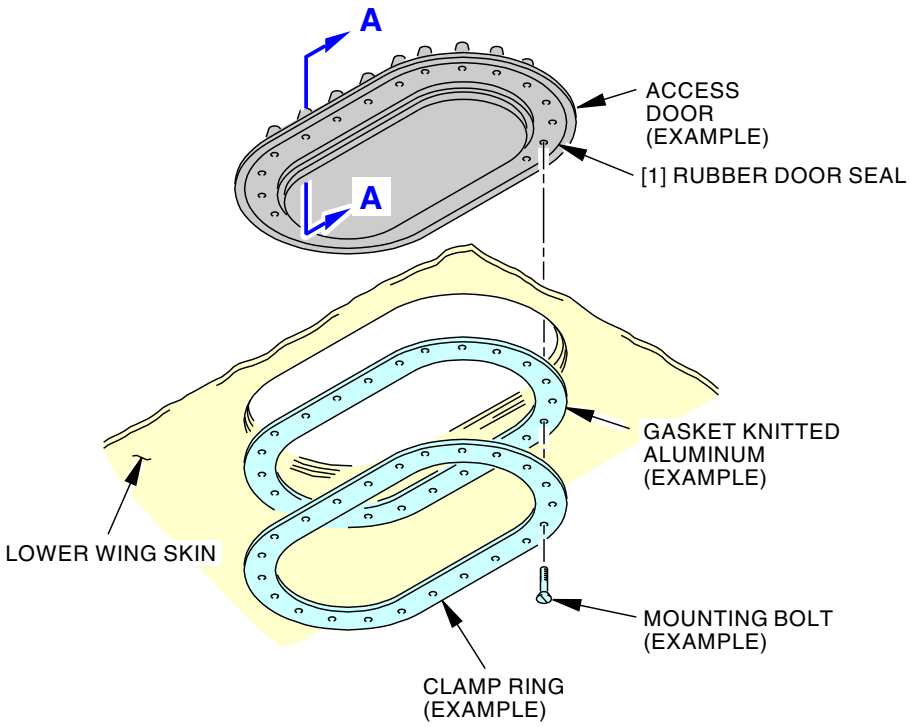
(a) Main Tank Access Door Installation, TASK 28-11-11-400-801.

(b) Center Tank Access Door - Installation, TASK 28-11-31-400-801.

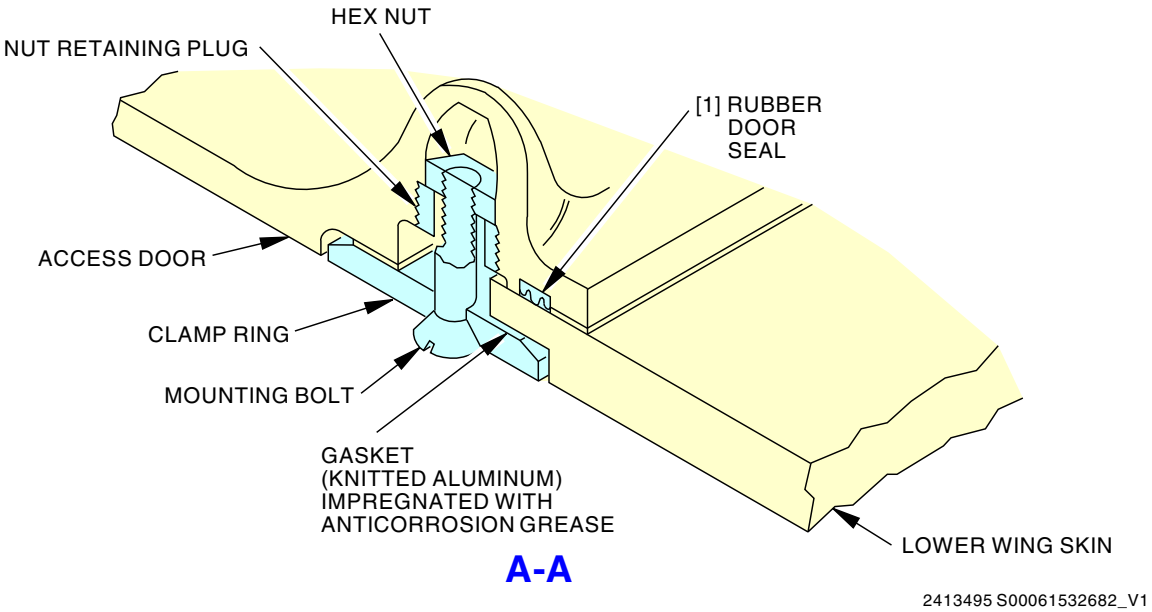
(c) Surge Tank Access Door (533AB, 533CB, 633AB, 633CB) Installation, TASK 28-11-11-400-802.

END OF TASK

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FUEL TANK ACCESS PANEL (EXAMPLE)



Fuel Tank Access Door Repair
Figure 801/28-11-11-990-804

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SURGE TANK FUEL SUMP DRAIN VALVE - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) A task to remove the surge tank fuel sump drain valve [1] for the surge tank.

(2) A task to install the surge tank fuel sump drain valve [1] for the surge tank.

B. The surge tank fuel sump drain valve [1] 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. General

(1) This task gives the instructions to remove the surge tank fuel sump drain valve [1].

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-1764	Adapter - Removal/Installation, Sump Drain Valve Part #: B28001-13 Supplier: 81205 Part #: B28001-18 Supplier: 81205 Opt Part #: SE28-1103 Supplier: 81205
STD-195	Container - 1 Quart, Oil/Fuel Resistant

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. Surge Tank Fuel Sump Drain Valve Removal

SUBTASK 28-11-21-480-001

(1) Do these steps to remove the surge tank fuel sump drain valve [1] from the drain valve assembly.

(a) Hold a 1 quart oil/fuel resistant container, STD-195, below the surge tank fuel sump drain valve [1].

(b) Install an adapter, SPL-1764, into the surge tank fuel sump drain valve [1].

1) Make sure that the hexagonal surfaces of the adapter, SPL-1764, touch the surge tank fuel sump drain valve [1] correctly.

2) Turn the surge tank fuel sump drain valve [1] counterclockwise to loosen it from the drain valve assembly.

(c) Remove the surge tank fuel sump drain valve [1].

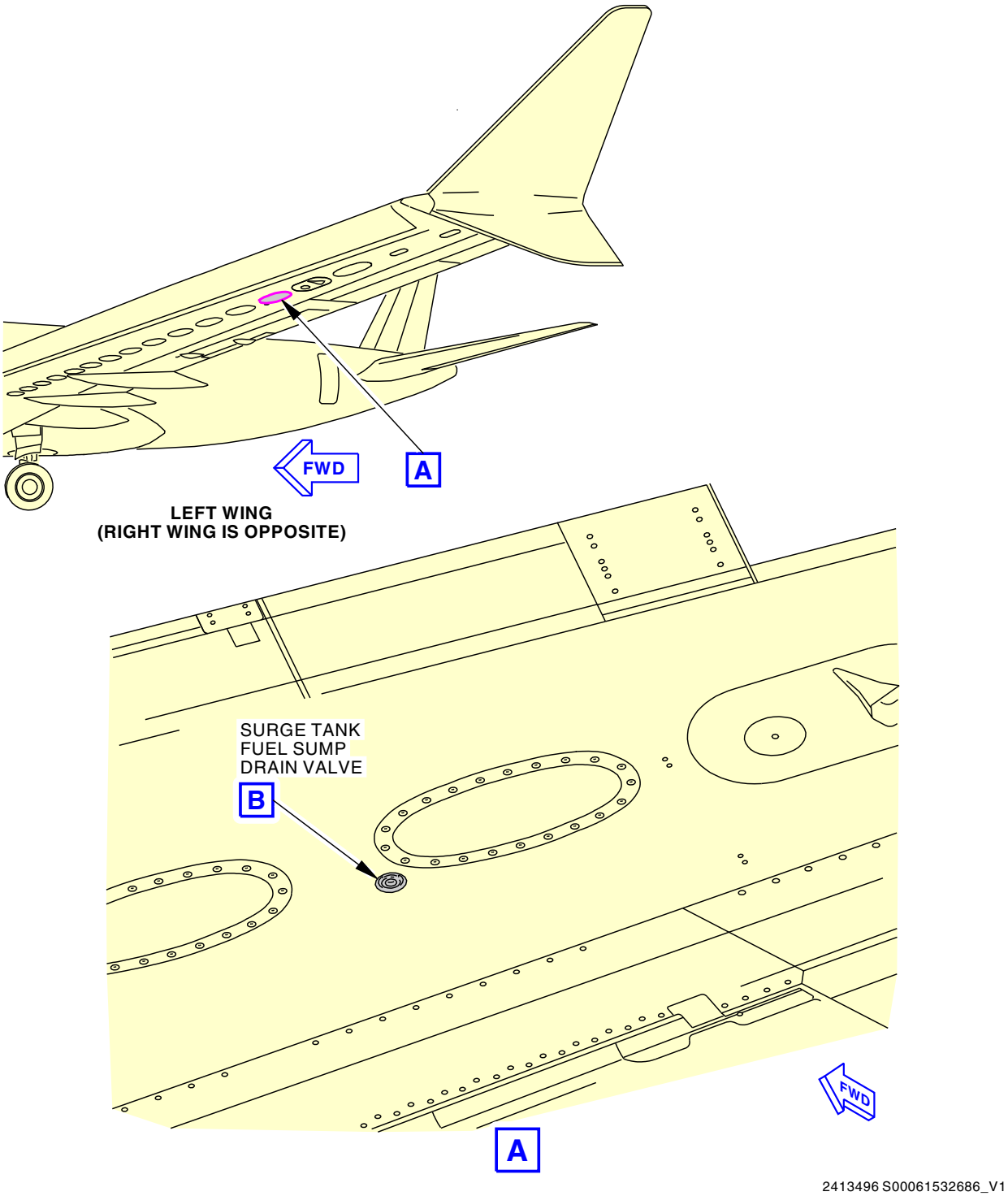
1) Discard the O-ring [2].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(d) If you will not immediately install the surge tank fuel sump drain valve [1], install a protective cover on the openings.

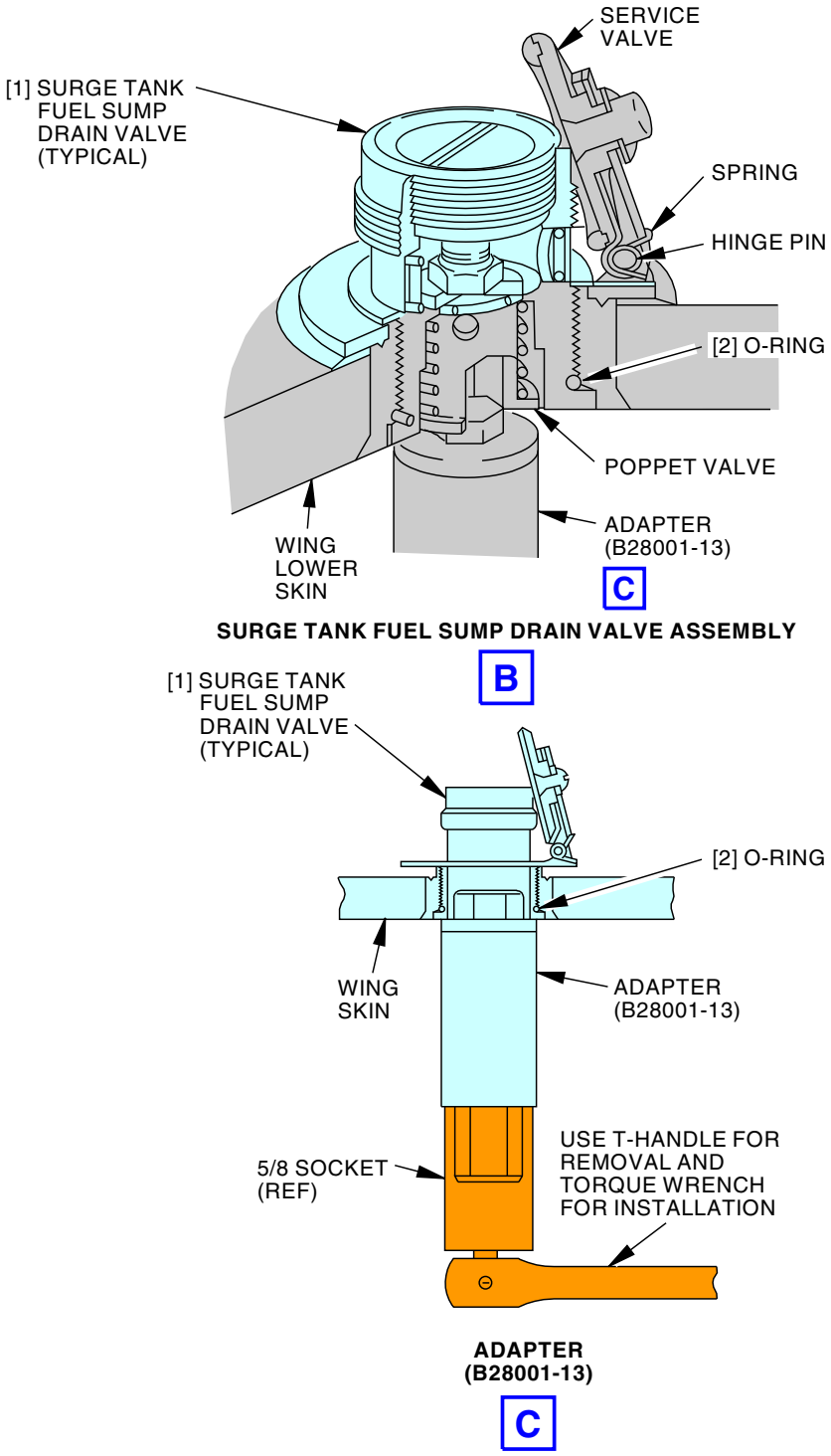
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Surge Tank Fuel Sump Drain Valve Installation
Figure 401/28-11-21-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Surge Tank Fuel Sump Drain Valve Installation
Figure 401/28-11-21-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-11-21-400-801

3. Surge Tank Fuel Sump Drain Valve Installation

(Figure 401)

A. General

(1) This task gives the instructions to install the surge tank fuel sump drain valve [1].

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-1764	Adapter - Removal/Installation, Sump Drain Valve Part #: B28001-13 Supplier: 81205 Part #: B28001-18 Supplier: 81205 Opt Part #: SE28-1103 Supplier: 81205

C. Consumable Materials

Reference	Description	Specification
B00083	Solvent - VM&P Naphthas	TT-N-95 Type II, ASTM D-3735 Type III

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Surge tank fuel sump drain valve	28-11-21-01-010	SIA ALL
2	O-ring	28-11-21-01-055	SIA 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. Surge Tank Fuel Sump Drain Valve Installation

SUBTASK 28-11-21-160-001

(1) Clean the surge tank fuel sump drain valve [1] with 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 [2] with some fuel.

SUBTASK 28-11-21-420-001

(3) Install the O-ring [2] in its position in the groove of the surge tank fuel sump drain valve [1].

SUBTASK 28-11-21-420-002

CAUTION

MAKE SURE THAT YOU PUT THE THREADS OF THE VALVE AND THREADS OF THE BUSHING TOGETHER CORRECTLY. DAMAGE TO THE THREADS CAN OCCUR.

(4) Carefully install the surge tank fuel sump drain valve [1] in the bushing and tighten it with your hand.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-11-21-480-002

(5) Put the adapter, SPL-1764, into the surge tank fuel sump drain valve [1].

(a) Make sure the hexagonal surfaces of the adapter, SPL-1764 touch the mating surfaces of the surge tank fuel sump drain valve [1] correctly.

SUBTASK 28-11-21-420-003

(6) To install a surge tank fuel sump drain valve [1] to the drain valve assembly, do these steps:

(a) Install the surge tank fuel sump drain valve [1] in its position with the drain valve assembly.

(b) Push the adapter, SPL-1764 up to prevent fuel leakage during this procedure.

(c) Tighten the surge tank fuel sump drain valve [1] to a torque of 210 ±10 in-lb (24 ±1 N·m).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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. General

(1) This task gives instructions to remove the Center Tank Access Door.

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)
21-51-07-000-802	Left Pack Conditioned Air Check Valve Sense Line Removal (P/B 401)
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)
47-32-01-000-801	NGS Shutoff Valve Removal (P/B 401)
47-32-02-000-801	Ozone Converter Removal (P/B 401)

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

D. Access Panels

Number	Name/Location
131AB	Center Tank Access
192CL	ECS 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

E. Prepare for Center Tank Access Door Removal

SUBTASK 28-11-31-650-001

(1) Defuel the center fuel tank (TASK 28-26-00-650-801 or TASK 28-26-00-650-802).

SUBTASK 28-11-31-010-005

(2) For access to access door [8]:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Remove this access panel:

Number	Name/Location
192CL	ECS Access Door

(TASK 06-41-00-800-801).

(b) Remove the NGS ozone converter (TASK 47-32-02-000-801).

(c) Remove the NGS shutoff valve (TASK 47-32-01-000-801).

(d) If it is necessary for better access, remove the conditioned air check valve sense line [9] (TASK 21-51-07-000-802).

SUBTASK 28-11-31-010-006

(3) 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 that 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

(b) The access doors for the right center fuel tank are:

Number	Name/Location
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:

Number	Name/Location
131AB	Center Tank Access

SUBTASK 28-11-31-940-001

WARNING OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

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

F. Center Tank Access Door Removal

SUBTASK 28-11-31-020-001

(1) Hold the clamp ring [4] on the access door [1], access door [6], or access door [8] and remove the mounting bolts [3].

SUBTASK 28-11-31-020-002

(2) Remove the clamp ring [4] and the aluminum gasket [2].

(a) Discard the aluminum gasket [2].

NOTE: It is not recommended, but if it is necessary, you may be able to re-use the aluminum gasket [2].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-11-31-020-003

CAUTION	BE CAREFUL WHEN YOU REMOVE OR INSTALL THE ACCESS DOORS THAT HAVE FUEL MEASURING STICKS. IF THE FUEL MEASURING STICKS TOUCH THE STRINGERS IN THE FUEL TANK, DAMAGE TO THE FUEL MEASURING STICKS CAN OCCUR.

CAUTION	DO NOT USE A TOOL TO LIFT THE EDGES OF THE ACCESS DOOR TO THE FUEL TANK. THE LOWER SURFACE OF THE ACCESS DOOR FLANGE AND THE TOP SURFACE OF THE WING SKIN AROUND THE ACCESS DOORS ARE SEAL SURFACES. YOU CAN CAUSE SCRATCHES OR OTHER DAMAGE TO THE SEAL SURFACE.

(3) Push up on the access door [1], access door [6], or access door [8].

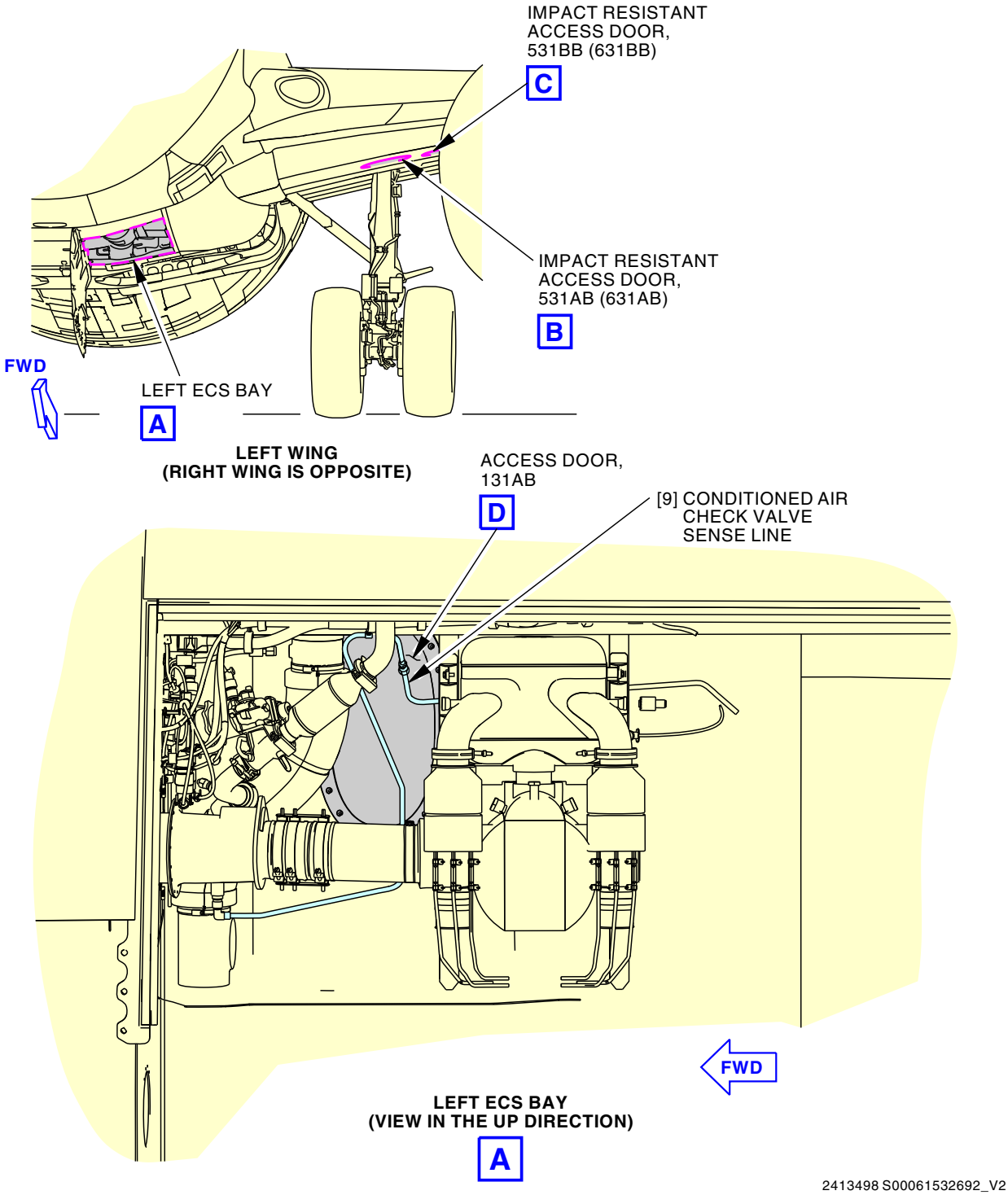
(a) If the access door [1], access door [6], or access door [8] does not move freely, use a rubber mallet and hit lightly around the access door.

SUBTASK 28-11-31-020-004

(4) Remove the access door.

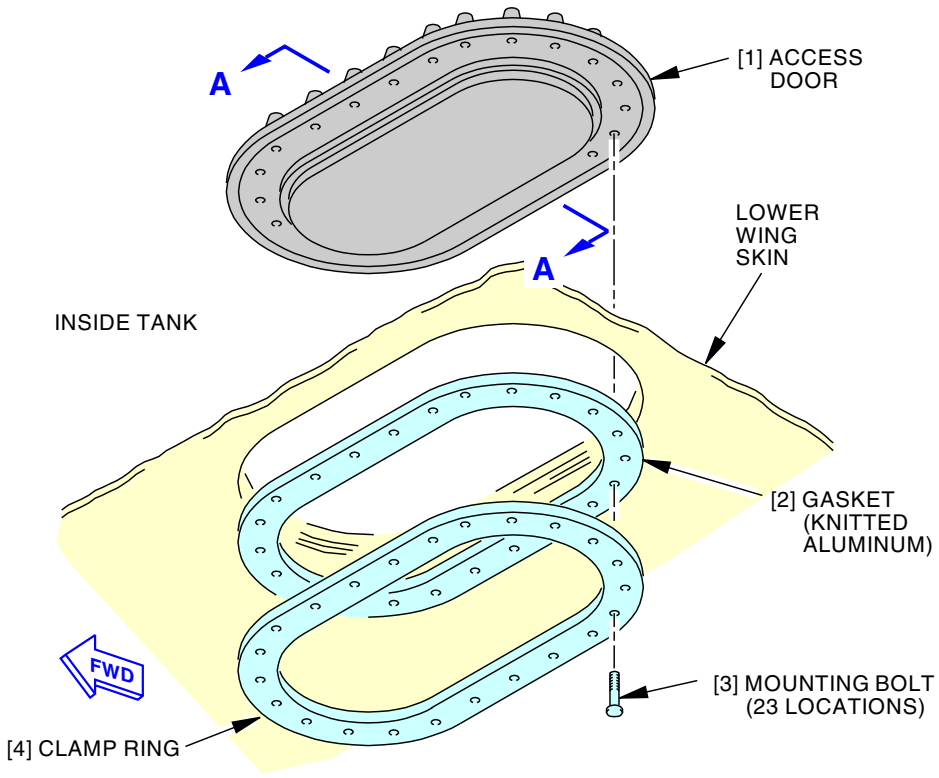
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

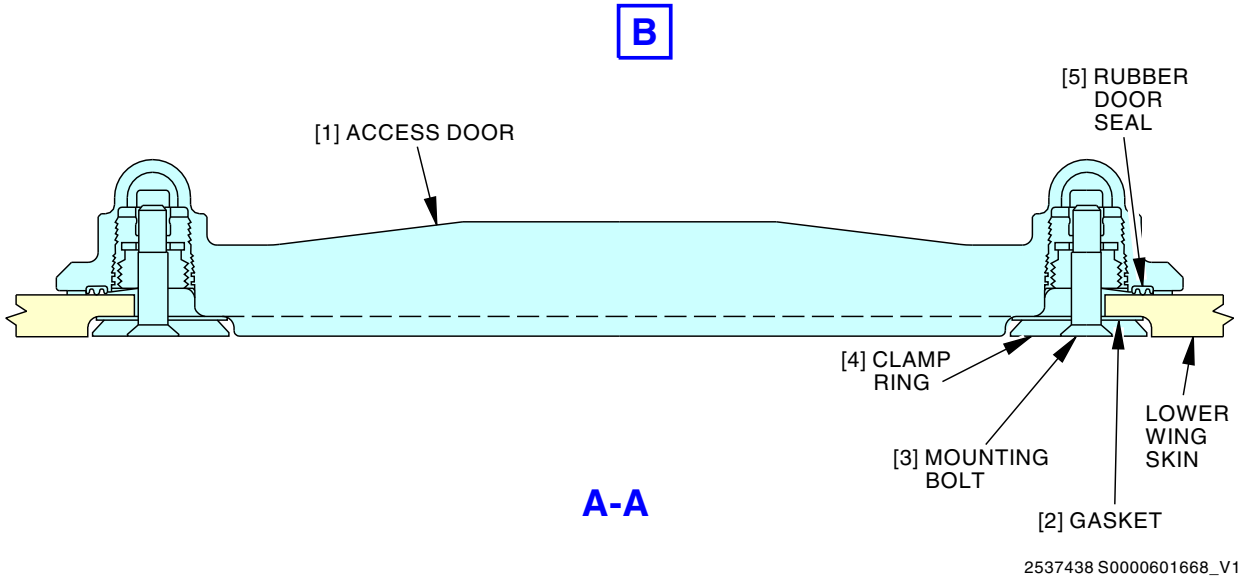


Center Tank Access Door Installation
Figure 401/28-11-31-990-801 (Sheet 1 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

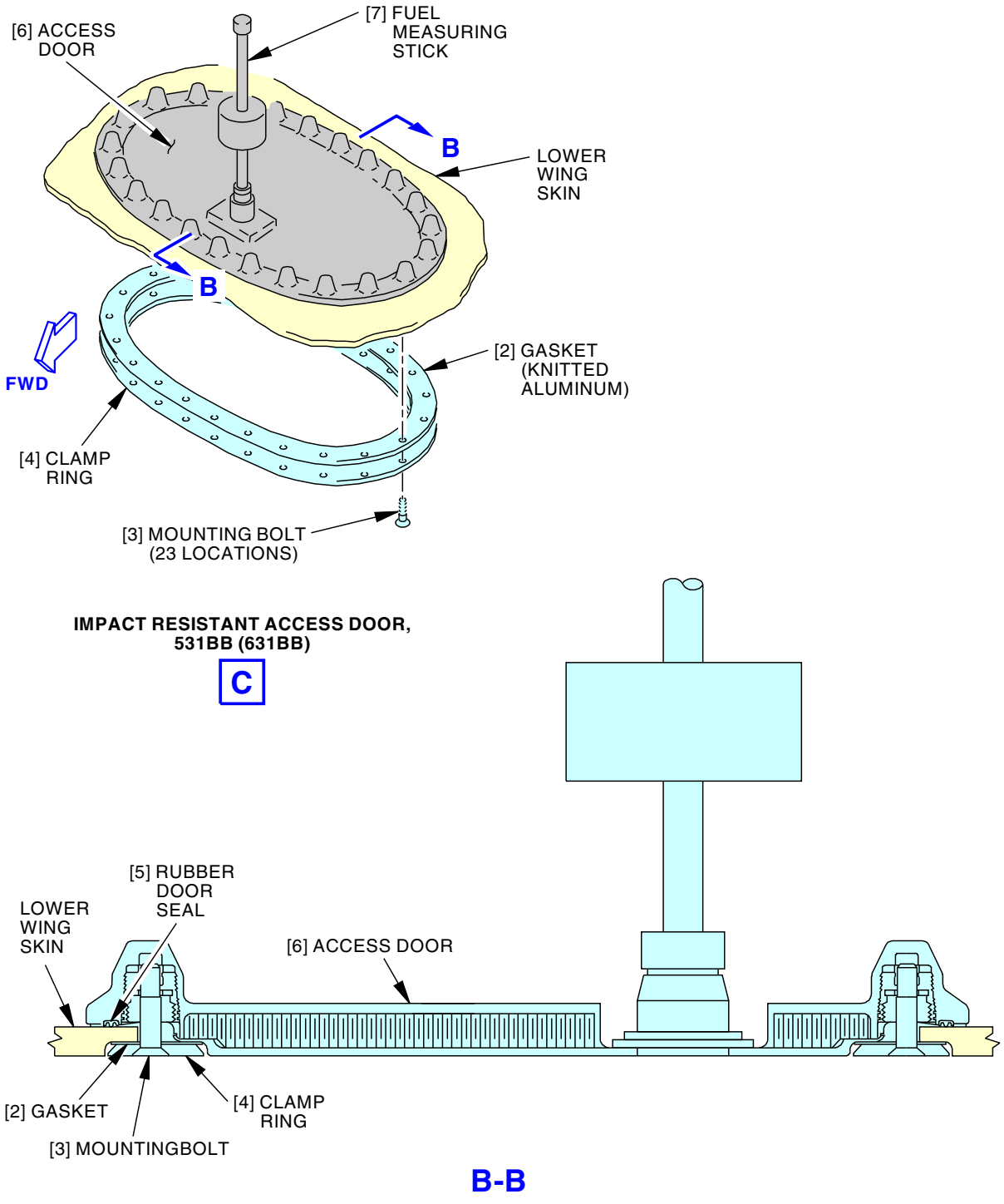


MACHINED IMPACT RESISTANT ACCESS DOOR, 531AB (631AB)



Center Tank Access Door Installation
Figure 401/28-11-31-990-801 (Sheet 2 of 4)

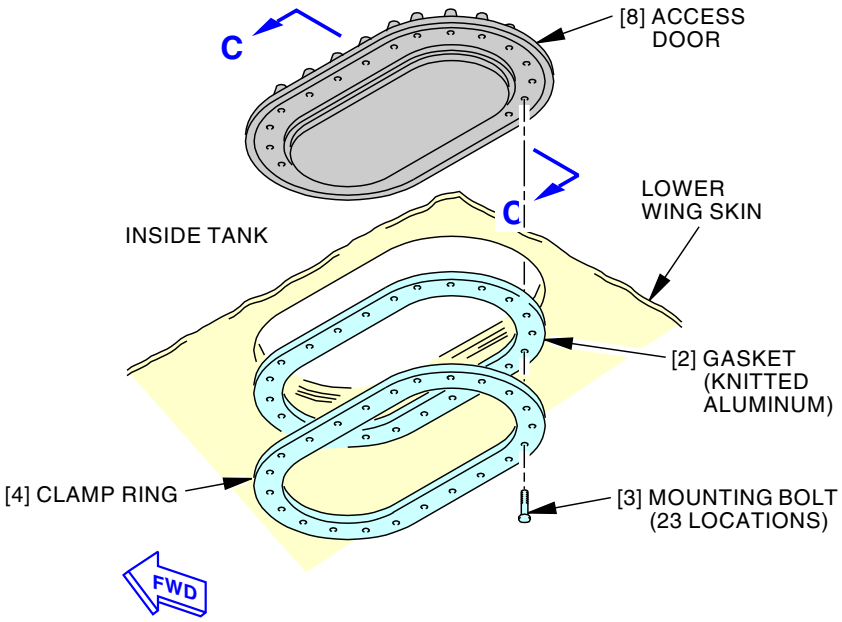
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413500 S00061532694_V1

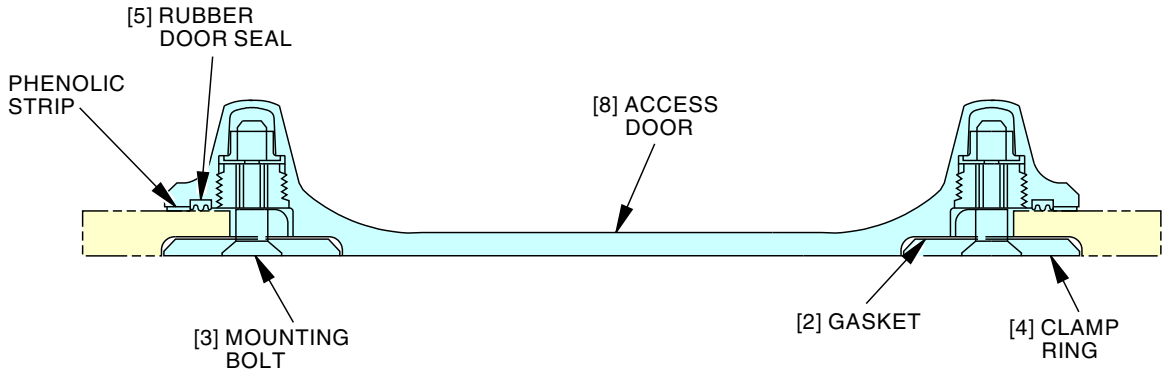
Center Tank Access Door Installation
Figure 401/28-11-31-990-801 (Sheet 3 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



CENTER TANK ACCESS DOOR, 131AB

D

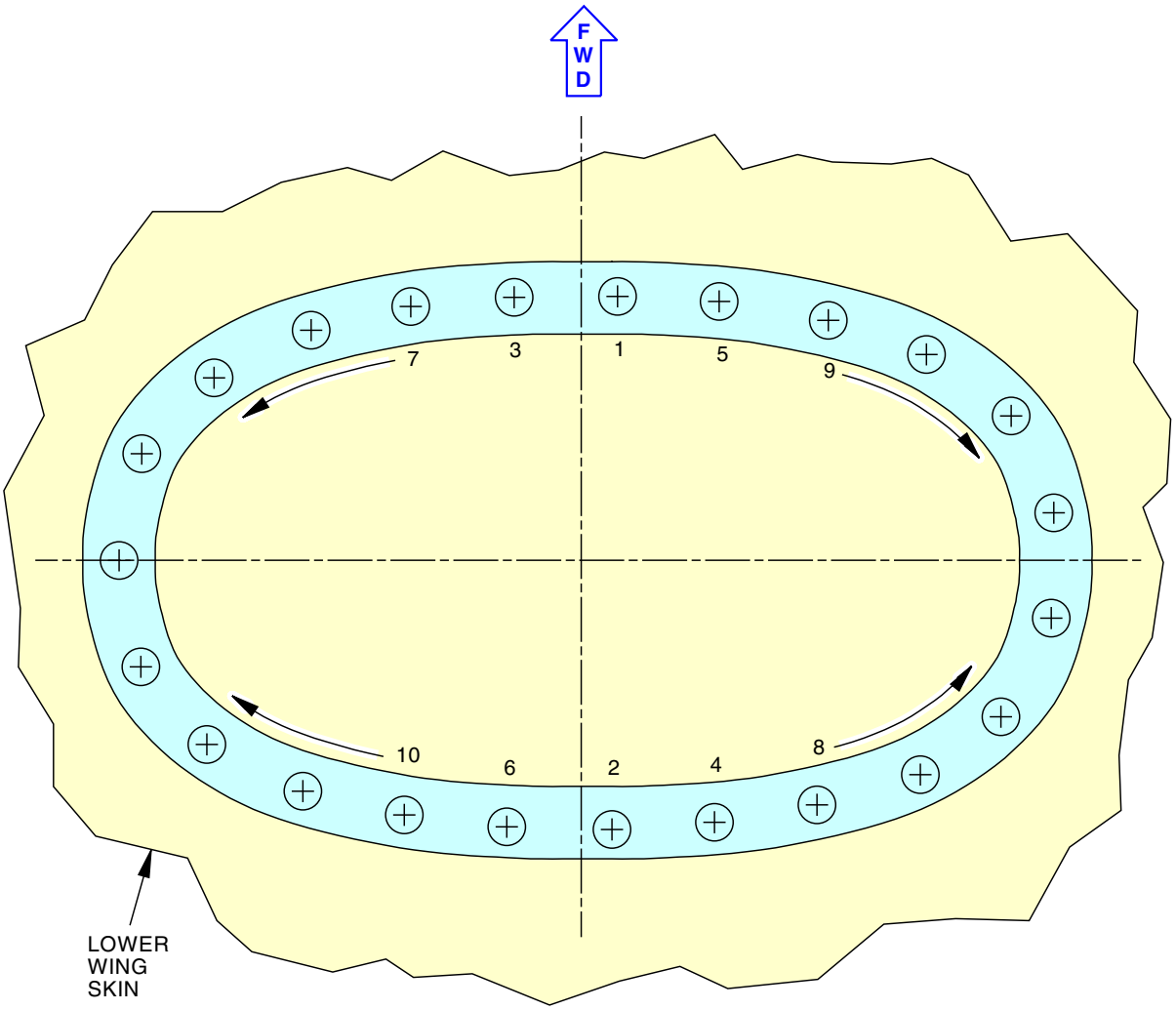


C-C

2413501 S00061532695_V1

Center Tank Access Door Installation
Figure 401/28-11-31-990-801 (Sheet 4 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



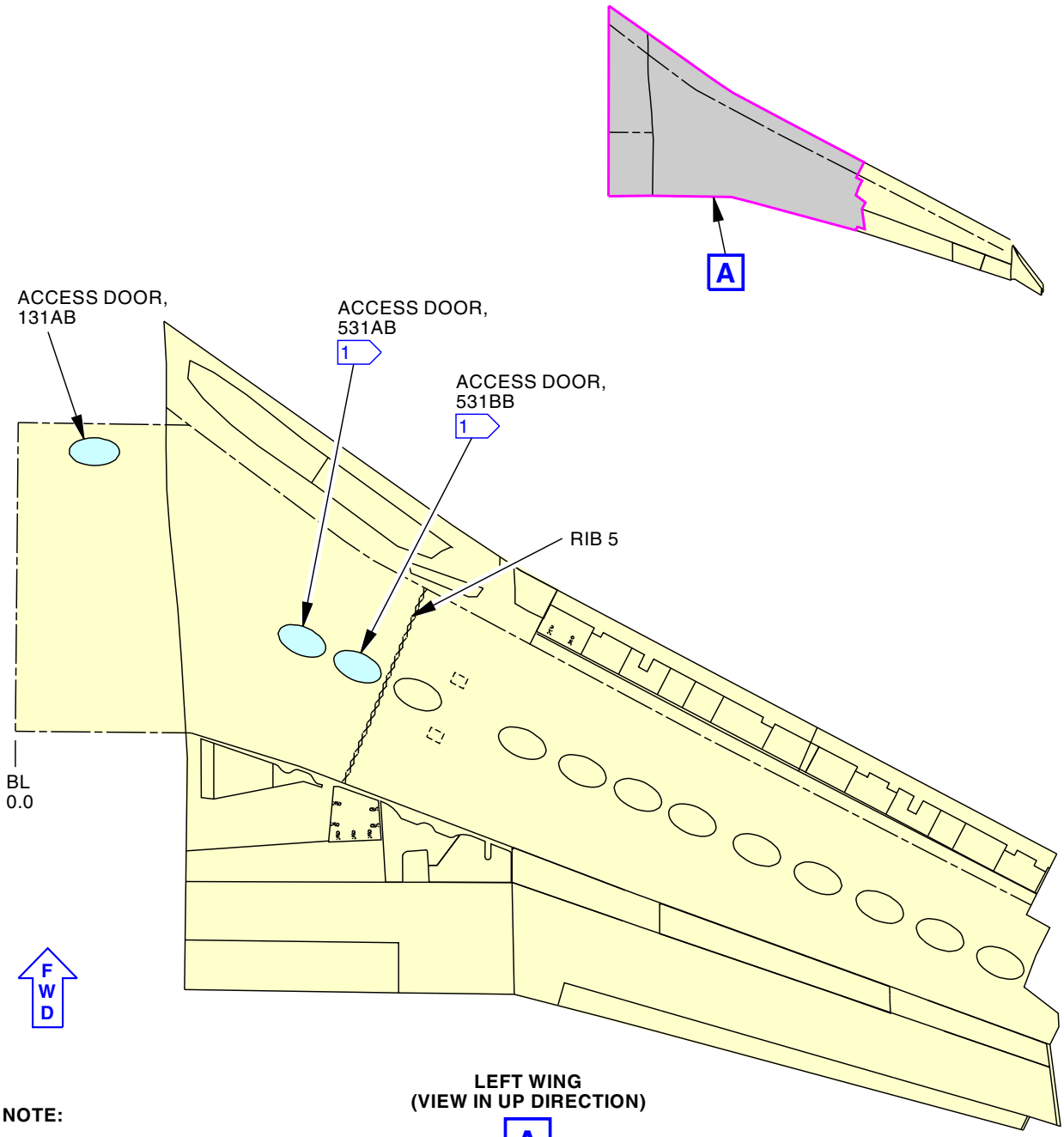
NOTE:

TORQUE THE MOUNT BOLTS IN THE SEQUENCE SHOWN BY THE NUMBERS. THIS WILL MAKE SURE FUEL DOES NOT LEAK AROUND THE ACCESS PANEL.

2413502 S00061532696_V1

Access Panel Mount Bolt Torque Pattern
Figure 402/28-11-31-990-802

ECCN 9E991 BOEING PROPRIETARY - See title page for details



LEFT WING
(VIEW IN UP DIRECTION)

A

NOTE:

THE ENGINE ILLUSTRATION HAS BEEN REMOVED TO PROVIDE CLARITY.

1 HIGH IMPACT RESISTANT ACCESS DOOR

2413503 S00061532697_V1

Center Tank Access Doors - Plan View
Figure 403/28-11-31-990-803

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-11-31-400-801

3. Center Tank Access Door - Installation

(Figure 401, Figure 402)

A. General

(1) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

(2) Mobilgrease 33, D50306, is the recommended material for access door gasket installations. The Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237 (BMS 3-38), can be used for access door gaskets.

(3) Do not mix Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, and Cor-Ban 27L Compound, G50237. If you replaced a Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, filled gasket with a Mobilgrease 33, D50306, filled gasket, remove all Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, from the clamp ring and the access door structure on the airplane.

(4) The center tank access doors shown in Table 401 are 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

(5) It is recommended that a new aluminum gasket [2] be used every time you install the center tank access doors.

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)
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
21-51-07-400-802	Left Pack Conditioned Air Check Valve Sense Line Installation (P/B 401)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-00-790-804	Fuel Tank Closure Leak Check (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)
47-32-01-400-801	NGS Shutoff Valve Installation (P/B 401)
47-32-02-400-801	Ozone Converter Installation (P/B 401)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

C. Consumable Materials

Reference	Description	Specification
B00083	Solvent - VM&P Naphthas	TT-N-95 Type II, ASTM D-3735 Type III
B00316	Solvent - Aliphatic Naphtha (For Organic Coatings)	TT-N-95 Type I, ASTM D-3735 Type I
C00528	Compound - Corrosion Preventive, Petroleum Hot Application (Soft Film)	MIL-C-11796 Class III
D00504	Grease - Petrolatum	VV-P-236
D50050	Grease - Multipurpose, Helicopter Oscillating Bearing Grease with Calcium Soap Thickener - Aeroshell 14	MIL-G-25537
D50306	Grease - Synthetic Aircraft Grease (Mobilgrease 33)	BMS3-33 Type 1, MIL-PRF-23827 Type 1
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G00251	Abrasive - Mat, Non-Woven, Non-Metallic	A-A-58054
G50237	Compound - Corrosion Inhibiting, Non-drying - Cor-Ban 27L	BMS3-38

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Access door	28-11-11-01-325	SIA ALL
		28-11-11-01-330	SIA ALL
2	Aluminum gasket	28-11-11-01-060	SIA ALL
		28-11-11-01-065	SIA ALL
6	Access door	28-11-11-01-315	SIA ALL
		28-11-11-01-320	SIA ALL
8	Access door	28-11-11-01-350	SIA ALL

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	ECS 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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Prepare for Access Door Installation

SUBTASK 28-11-31-410-001

(1) Do the applicable steps in this task: Fuel Tank Closure, TASK 28-11-00-410-801.

SUBTASK 28-11-31-210-001

28-AWL-16: CDCCL

(2) Make sure that the areas on the access door [1], access door [6], or access door [8], clamp ring [4] and the lower wing skin electrical faying surfaces are clean and have no visible corrosion.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCLs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

(a) Use solvent, B00083, to clean the surfaces if it is necessary.

SUBTASK 28-11-31-210-002

(3) Make sure that the rubber door seal [5] is in good condition and secure.

(a) Clean the rubber seal with a clean cotton wiper, G00034, moist with solvent, B00316.

(b) Look for areas of deterioration on the rubber seal.

(c) Replace the rubber door seal [5] if it is necessary (TASK 28-11-11-900-801).

(d) Apply a thin layer of grease, D00504, to the rubber door seal [5].

NOTE: This will prevent damage to the rubber seal during subsequent access panel removal. It will also be easier to remove the access panel.

H. Prepare the Knitted Aluminum Gasket for Installation

SUBTASK 28-11-31-840-001

(1) To prepare a new knitted aluminum gasket [2] for installation (recommended procedure), do these steps:

(a) Clean the clamp ring [4] surface with solvent, B00083.

NOTE: To remove dried corrosion inhibiting compound, use an abrasive mat, G00251.

28-AWL-16: CDCCL

(b) Make sure that both sides of the new knitted aluminum gasket [2] are filled with the correct Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237.

NOTE: Do not mix Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, and Cor-Ban 27L Compound, G50237.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCLs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

(c) Do a check of the manufacturing date (shelf-life) information on the replacement gasket container.

28-AWL-16: CDCCL

1) If the aluminum gasket [2] is more than five years old from the manufacturing date, do these steps:

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCLs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

28-AWL-16: CDCCL

a) Remove (De-grease) the old Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, from the aluminum gasket [2].

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCLs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

<1> Vapor degrease the aluminum gasket [2] if you switch from the original grease or anti-corrosion compound to a different gasket filling material.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCLs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

b) Refill (Re-impregnate) the aluminum gasket [2] with 0.5 fl-oz (15 ml) to 1 fl-oz (30 ml) of new Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, to make sure that both sides of the aluminum gasket [2] are filled before installation.

NOTE: Do not mix Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, and Cor-Ban 27L Compound, G50237.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCLs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

NOTE: If you do not fill the aluminum mesh with the Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, the spaces with no grease or anti-corrosion compound can collect water. Do not apply too much grease or anti-corrosion compound or it can move out to the wing surface.

2) If the aluminum gasket [2] is less than five years old from the manufacturing date, then it is not necessary to remove the old grease or anti-corrosion compound.

(d) Put a new aluminum gasket carrier tray package face up on a flat surface.

(e) Remove the paper cover from the carrier tray.

(f) Since the hole locations are symmetrical, carefully put the clamp ring [4] on the aluminum gasket [2] (with the countersunk end of the holes face up) so that the clamp ring [4] and aluminum gasket [2] holes align.

(g) Push the clamp ring [4] on the aluminum gasket [2] until the clamp ring [4] is tightly against the aluminum gasket [2].

(h) Remove the clamp ring [4], aluminum gasket [2], and release strip from the carrier tray as a unit.

(i) Put the unit, with the aluminum gasket [2] side turned up, on a flat surface.

(j) Remove the release strip from the aluminum gasket [2].

SUBTASK 28-11-31-840-002

(2) To prepare a used knitted aluminum gasket [2] for installation (alternate procedure), do these steps:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Clean the clamp ring [4] surface and aluminum gasket [2] with a cotton wiper, G00034, that is moist with solvent, B00083.

NOTE: To remove dried corrosion inhibiting compound, use an abrasive mat, G00251.

28-AWL-16: CDCCL

(b) A used aluminum gasket [2] that meets the criteria that follows can be installed:

NOTE: A gasket that meets 4) but does not meet 1) through 3) criteria may be used for a maximum duration of 30 days and then must be replaced with a gasket that meets all the criteria listed below.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCLs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

1) No fastener holes are torn.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCLs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

2) Gasket is not elongated or out of shape.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCLs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

3) Gasket rubber seals around the inner and outer periphery must be a minimum of 0.015 in. (0.4 mm) thick.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCLs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

4) No more than 10% of stands in the layer(s) are broken through in any one area.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCLs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

28-AWL-16: CDCCL

(c) Apply 0.5 fl-oz (15 ml) to 1 fl-oz (30 ml) of Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, to both sides of the aluminum gasket [2] to make sure both sides of the aluminum gasket [2] are filled before installation.

NOTE: Do not mix Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, and Cor-Ban 27L Compound, G50237.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCLs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

28-AWL-16: CDCCL

1) Vapor degreases the aluminum gasket [2] if you switch from the original grease or anti-corrosion compound to a different gasket filling material.

   NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCLs.

   NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

2) Make sure that the grease or anti-corrosion compound layer is continuous on the aluminum gasket [2].

I. Inspect the Access Door

SUBTASK 28-11-31-210-003

28-AWL-16: CDCCL

(1) Make sure that there is a phenolic strip around the outermost periphery of the center tank access door, 131AB, 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 CDCCLs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

SUBTASK 28-11-31-210-004

(2) Make sure that there are no cracks in the nut domes of the access door [1], access door [6], or access door [8].

NOTE: Paint flaking or bulging can show cracks in the nut domes of the access door.

J. Install the Access Door

SUBTASK 28-11-31-420-001

CAUTION

BE CAREFUL WHEN YOU REMOVE OR INSTALL THE ACCESS DOORS THAT HAVE FUEL MEASURING STICKS. IF THE FUEL MEASURING STICKS TOUCH THE STRINGERS IN THE FUEL TANK, DAMAGE TO THE FUEL MEASURING STICKS CAN OCCUR.

(1) 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

(2) Clean the clamp ring [4] surface with solvent, B00083.

SUBTASK 28-11-31-210-005

(3) Make sure the clamp ring [4] and aluminum gasket [2] holes align.

NOTE: The holes are not symmetrical.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-11-31-640-001

28-AWL-16: CDCCL

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.

(4) Apply a thin layer 4 of Mobilgrease 33, D50306 (recommended), Aeroshell 14 helicopter grease, D50050, or Cor-Ban 27L Compound, G50237, to the lower surface of the wing skin that touches the aluminum gasket [2] for the access door [1], access door [6], or access door [8].

NOTE: Do not mix Mobilgrease 33, D50306, Aeroshell 14 helicopter grease, D50050, and Cor-Ban 27L Compound, G50237.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCLs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

SUBTASK 28-11-31-420-002

28-AWL-16: CDCCL

(5) Set and hold the aluminum gasket [2] and clamp ring [4] in the opening between the outside face of the access door and wing skin while you install the mounting bolts [3].

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCLs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

SUBTASK 28-11-31-640-003

(6) Apply a thin layer of Cor-Ban 27L Compound, G50237 (preferred), or compound, C00528 (alternate), to the threads and shank of the mounting bolts [3].

SUBTASK 28-11-31-420-003

(7) Start at the centerline and tighten the mounting bolts [3] equally in both directions (Figure 402).

SUBTASK 28-11-31-420-004

28-AWL-16: CDCCL

(8) Tighten the mounting bolts [3] on the access door [8] 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 CDCCLs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

SUBTASK 28-11-31-420-005

28-AWL-16: CDCCL

(9) Tighten the mounting bolts [3] on the access door [1] and access door [6] to 65 ±5 in-lb (7 ±1 N·m).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCLs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-16.

SUBTASK 28-11-31-420-006

(10) Make sure that the flushness of the mounting bolts [3] are between -0.010 in. (-0.254 mm) - 0.002 in. (0.051 mm).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

K. Post-Installation Test

SUBTASK 28-11-31-650-002

(1) Do this task: Pressure Refuel Procedure, TASK 12-11-00-650-803.

SUBTASK 28-11-31-210-006

(2) To make sure that there is no fuel leakage at the applicable access door, do this task: Fuel Tank Closure Leak Check, TASK 28-11-00-790-804.

L. Put the Airplane Back to Its Usual Condition

SUBTASK 28-11-31-650-003

(1) 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

(2) 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:

Number	Name/Location
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:

Number	Name/Location
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:

Number	Name/Location
131AB	Center Tank Access

SUBTASK 28-11-31-410-002

(3) If the access door [8] was removed, do these steps:

(a) If it was removed, install the conditioned air check valve sense line [9] (TASK 21-51-07-400-802).

(b) Install the NGS shutoff valve (TASK 47-32-01-400-801).

(c) Install the NGS ozone converter (TASK 47-32-02-400-801).

(d) Close this access panel:

Number	Name/Location
192CL	ECS Access Door

(TASK 06-41-00-800-801).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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. General

(1) This task gives instructions to remove the Sump Drain Valve.

B. References

Reference	Title
20-10-17-000-801	O-Rings Removal (P/B 401)
20-10-44-000-801	Lockwire, Cotter Pins, and Lockrings - Removal (P/B 401)
36-13-01-000-802	Strut Pneumatic Duct Removal (P/B 401)

C. Location Zones

Zone	Area
139	Keel Beam, (Part) Body Station 540.00 to Body Station 727.00

D. Access Panels

Number	Name/Location
192CL	ECS Access Door
192G	Sump Drain Access Door

E. Sump Drain Valve Removal

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	ECS Access Door

SUBTASK 28-11-41-010-002

(2) Remove the short section of pneumatic duct to get access to the access hole in the left ECS bay (TASK 36-13-01-000-802).

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 [5], washers [6], and nut [7] that attach the bonding jumper to the sump drain valve.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-11-41-010-004

(5) Open this access panel:

Number	Name/Location
192G	Sump Drain Access Door

NOTE: The access door is in the wing to body fairing between the two ECS access doors.

SUBTASK 28-11-41-020-002

(6) Remove the bolts [9] that hold the cover plate [8] 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 [8] (TASK 20-10-44-000-801).

SUBTASK 28-11-41-020-004

(8) Remove the cover plate [8] 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 sump drain valve [1].

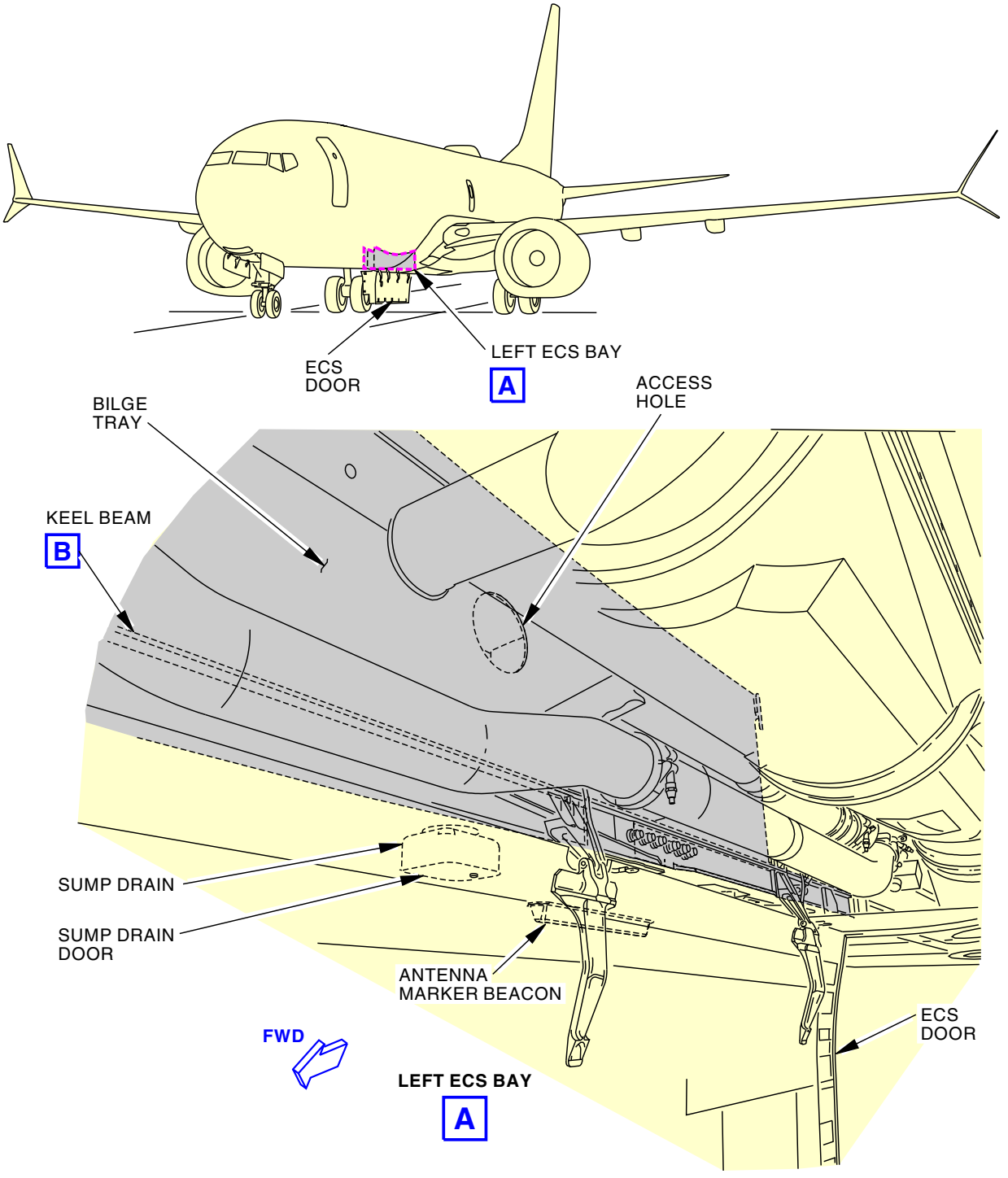
(b) Lower the sump drain valve [1] down in a straight line through the valve door opening to remove it.

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).

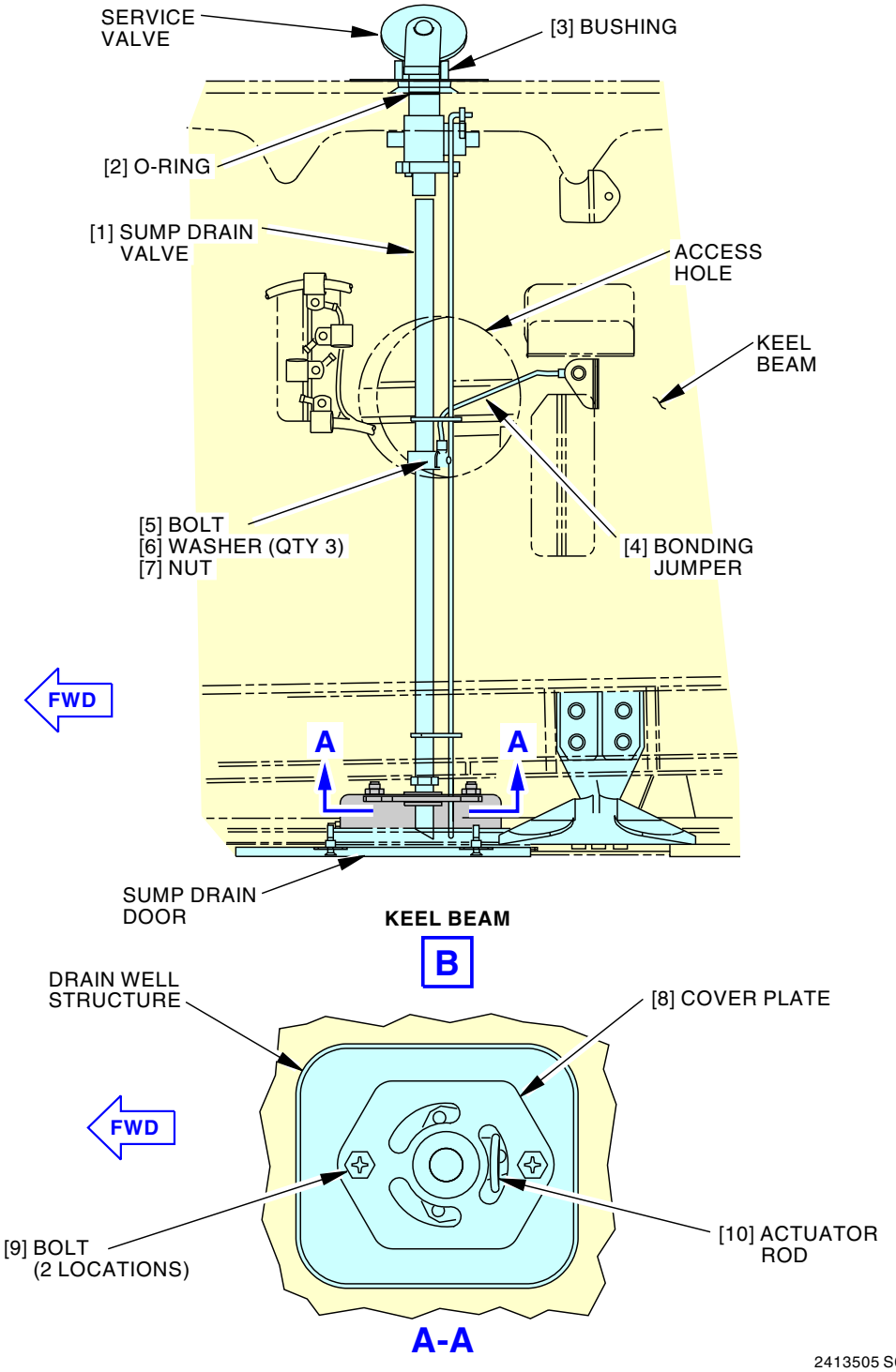
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Center Tank Sump Drain Valve installation
Figure 401/28-11-41-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Center Tank Sump Drain Valve installation
Figure 401/28-11-41-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-11-41-400-801

3. Sump Drain Valve Installation

(Figure 401)

A. General

(1) This task gives instructions to install the Sump Drain Valve.

B. References

Reference	Title
20-10-17-400-801	O-Rings Installation (P/B 401)
20-10-44-400-801	Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401)
20-40-11-760-801	Electrical Bonding (P/B 201)
36-13-01-400-805	Strut Pneumatic Duct Installation (P/B 401)

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Sump drain valve	28-11-41-03-055	SIA ALL
2	O-ring	28-11-41-03-005	SIA ALL

D. Location Zones

Zone	Area
139	Keel Beam, (Part) Body Station 540.00 to Body Station 727.00

E. Access Panels

Number	Name/Location
192CL	ECS Access Door
192G	Sump Drain Access Door

F. Sump Drain Valve Installation

SUBTASK 28-11-41-420-001

(1) Install a new O-ring [2], 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 these access panels:

Number	Name/Location
192CL	ECS Access Door
192G	Sump Drain Access Door

(b) 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.

(c) Turn the sump drain valve clockwise until it is against the bushing [3].

(d) Use a deep socket wrench on the hexagonal fitting at the end of the sump drain valve to tighten the sump drain valve to 60 in-lb (7 N·m) - 75 in-lb (8 N·m).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(e) Make sure the actuator rod [10] 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.

SUBTASK 28-11-41-420-003

(3) Attach the bonding jumper [4] to the sump drain valve [1] with the bolt [5], washer [6], and nut [7] that you removed before.

SUBTASK 28-11-41-420-004

(4) Attach the hexagonal fitting on the sump drain valve to the cover plate [8] 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 that the grommet in the center hole of the cover plate is correctly seated

(b) Attach the cover plate [8] to the drain well structure with the bolts [9] that you removed before.

(c) Make sure that the grommet in the center hole of the cover plate stays correctly seated after installation.

(d) Make sure that the actuator rod [10] goes through one of the three slots in the cover plate [8].

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) Make sure that the electrical bonding resistance is 0.010 ohms or less.

SUBTASK 28-11-41-410-001

(7) Install the section of the pneumatic duct that was removed for access to the keel beam access hole (TASK 36-13-01-400-805).

SUBTASK 28-11-41-410-002

(8) Close this access panel:

Number	Name/Location
192CL	ECS Access Door

SUBTASK 28-11-41-710-001

(9) Make sure that the valve operates correctly.

(a) Pull the actuator rod [10] to open the sump drain valve.

(b) Make sure that 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.

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G. Put the Airplane Back to Its Usual Condition

SUBTASK 28-11-41-410-003

(1) Close this access panel:

Number	Name/Location
192G	Sump Drain Access Door

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

MAIN TANK FUEL SUMP DRAIN VALVE - MAINTENANCE PRACTICES

1. General

A. This procedure has this task:

(1) Primary Drain Seal O-ring Replacement.

TASK 28-11-61-600-801

2. Primary Drain Seal O-ring Replacement

(Figure 201)

A. General

(1) This task contains steps to replace the primary drain seal O-ring on the sump drain valve for the main tank.

B. Consumable Materials

Reference	Description	Specification
D50021	Grease - Molykote 55 O-Ring Grease (Formerly Dow Corning 55 O-Ring Lubricant)	

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. Primary Drain Seal O-ring Replacement

SUBTASK 28-11-61-020-002

(1) Loosen and remove the valve cap [2] and the primary poppet [1] with a socket wrench.

SUBTASK 28-11-61-020-003

(2) Remove the O-ring [3] from the valve cap [2] and the O-ring [4] from the primary poppet [1].

(a) Discard the O-ring [3] and O-ring [4].

SUBTASK 28-11-61-600-001

(3) Put a thin layer of Molykote 55 O-Ring grease, D50021 on the new O-ring [4].

SUBTASK 28-11-61-420-004

(4) Install the new O-ring [4] on the primary poppet [1].

SUBTASK 28-11-61-820-001

(5) Align the primary poppet [1] with the secondary poppet in the valve body.

SUBTASK 28-11-61-420-006

(6) Install the primary poppet [1] in the valve body.

NOTE: A small quantity of fuel leakage can occur.

SUBTASK 28-11-61-600-002

(7) Put a thin layer of Molykote 55 O-Ring grease, D50021 on the new O-ring [3] and the threads valve cap [2].

SUBTASK 28-11-61-420-007

(8) Install the new O-ring [3] on the valve cap [2].

SUBTASK 28-11-61-420-005

(9) Install the valve cap [2] in the valve body.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-11-61-420-008

(10) With the socket wrench, tighten the valve cap [2] to 90 in-lb (10.2 N·m) to 95 in-lb (10.7 N·m).

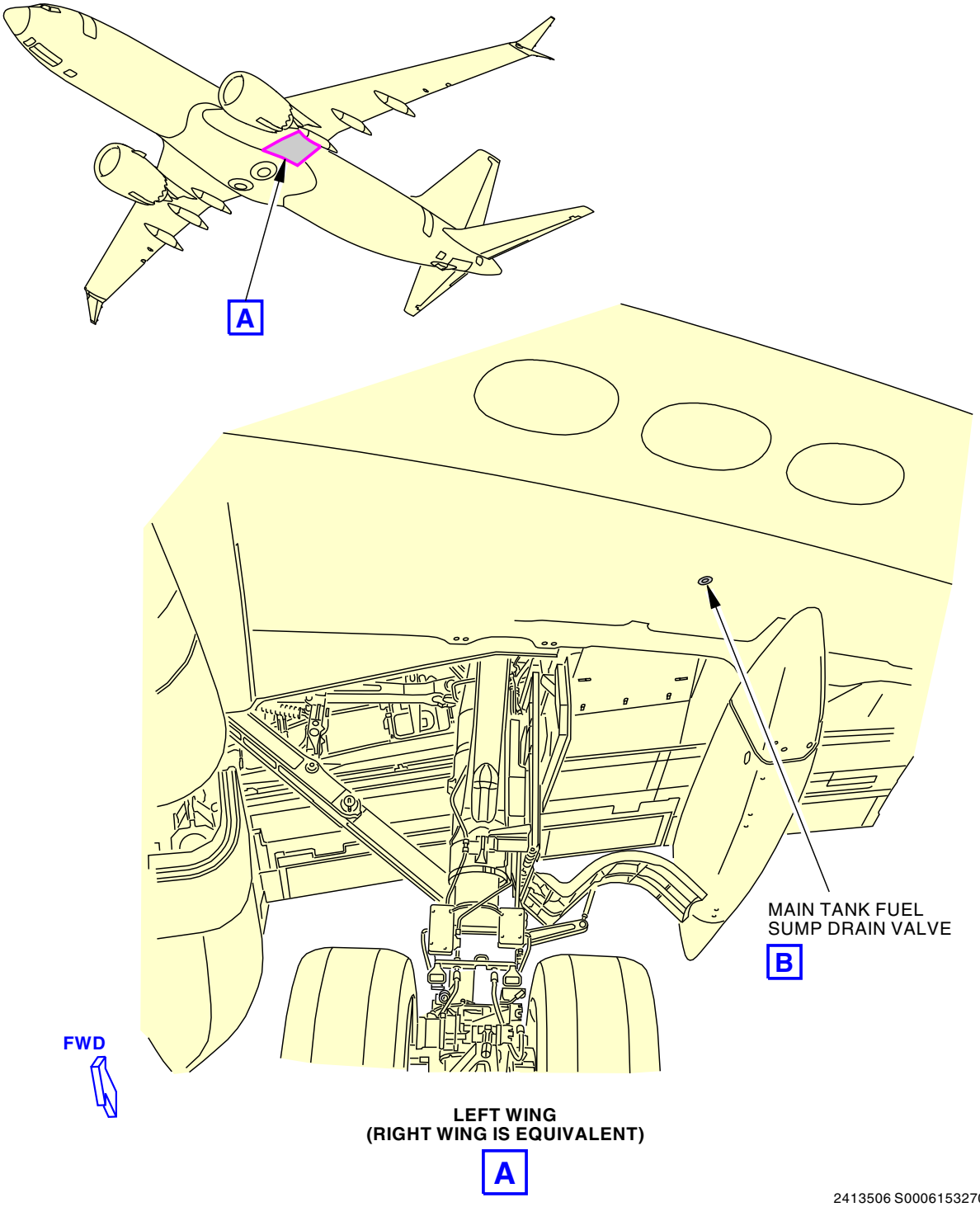
SUBTASK 28-11-61-650-004

(11) Drain a small quantity of fuel from the fuel tank.

(a) Make sure that the sump drain valve operates correctly and has a good seal.

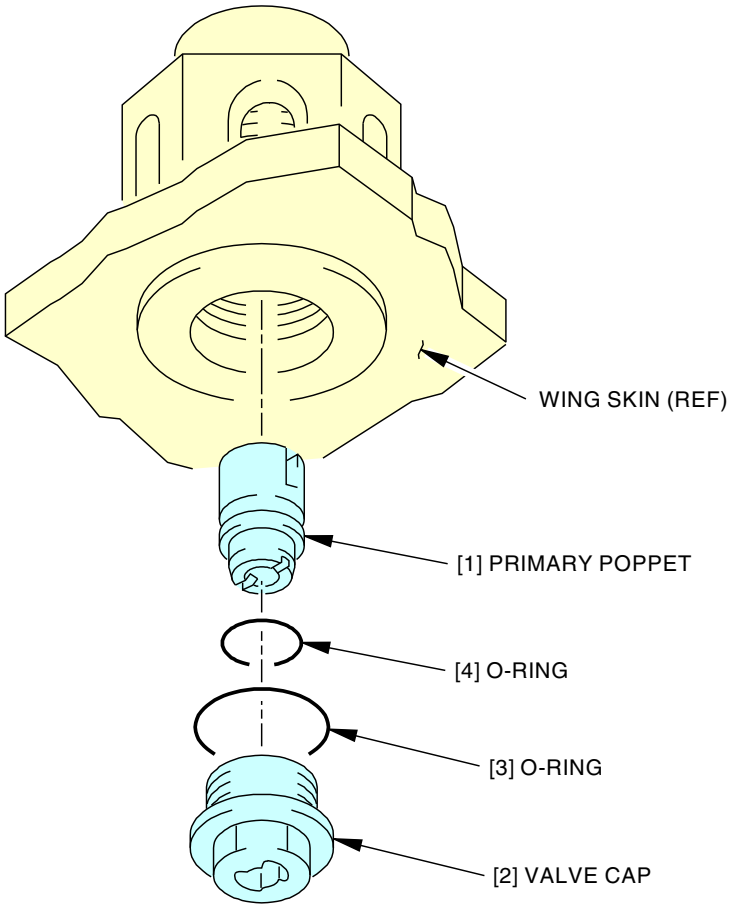
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Main Tank Fuel Sump Drain Valve Primary Drain Seal Replacement
Figure 201/28-11-61-990-802 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



MAIN TANK FUEL SUMP DRAIN VALVE

B

2413509 S00061532713_V1

Main Tank Fuel Sump Drain Valve Primary Drain Seal Replacement
Figure 201/28-11-61-990-802 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

MAIN TANK FUEL SUMP DRAIN VALVE - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) Main Tank Fuel Sump Drain Valve Removal.

(2) Main Tank Fuel Sump Drain Valve Installation.

B. The sump drain valves for the main tanks are installed in shrink-fit bushings in the skin on the bottom of the wing.

TASK 28-11-61-000-801

2. Main Tank Fuel Sump Drain 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)
28-26-00 P/B 201	DEFUELING - MAINTENANCE PRACTICES

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 28-11-61-650-005

(1) Defuel the applicable fuel tank (PAGEBLOCK 28-26-00/201).

SUBTASK 28-11-61-650-001

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 for the applicable fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove the applicable access doors:

(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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

E. Main Tank Fuel Sump Drain Valve Removal

SUBTASK 28-11-61-020-001

CAUTION

HOLD THE VALVE DURING THE REMOVAL (OR USE A SUPPORT TO HOLD THE VALVE). IF YOU LET THE VALVE FALL, IT CAN CAUSE DAMAGE TO EQUIPMENT.

(1) Remove the sump drain valve.

(a) Remove the safety cable or the lockwire between the valve body [4] and the jamnut [1].

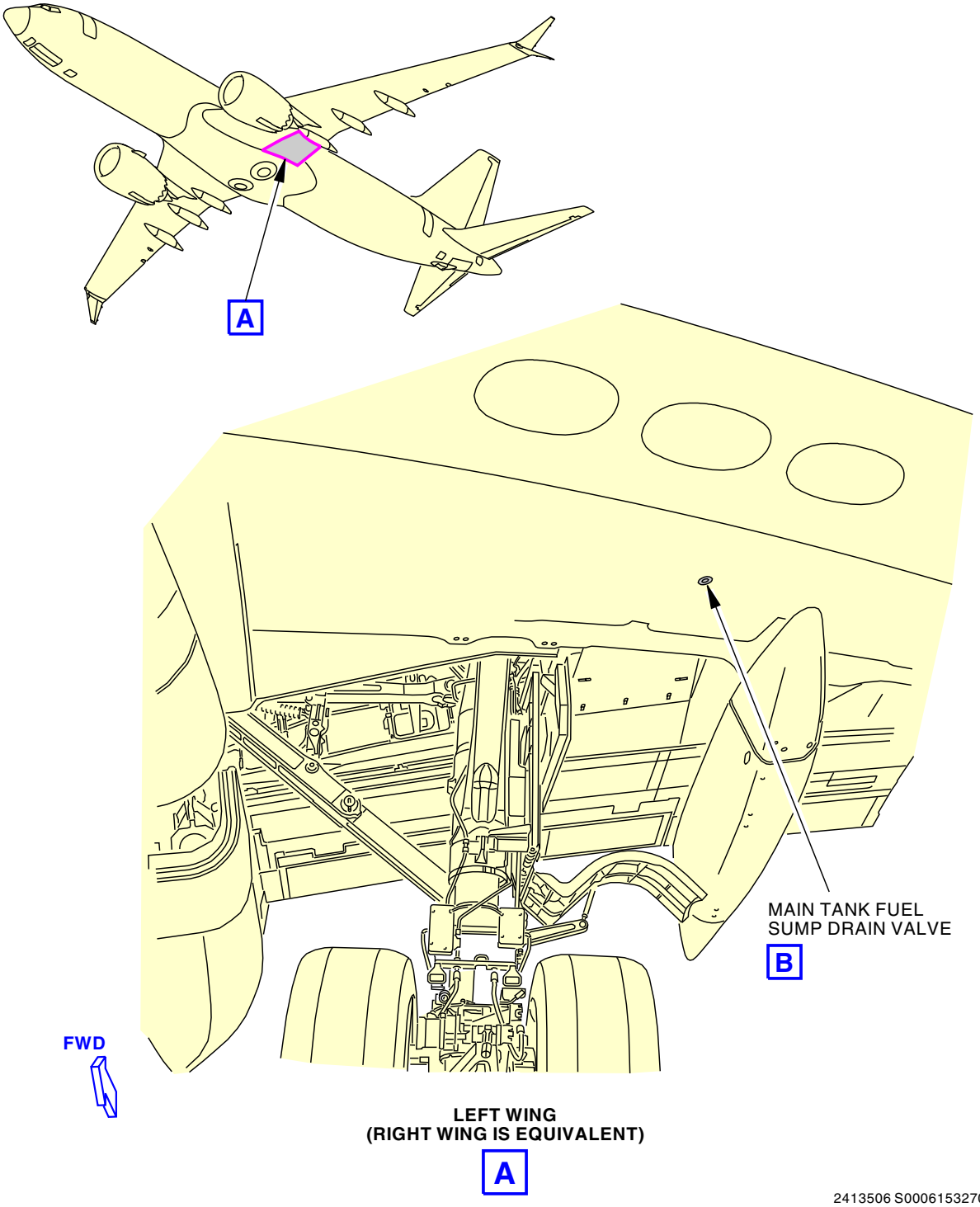
(b) Remove the jamnut [1] and the washer [2] that attach the valve body [4] to the bushing [5].

(c) Remove the valve body [4].

(d) Discard the O-ring [3].

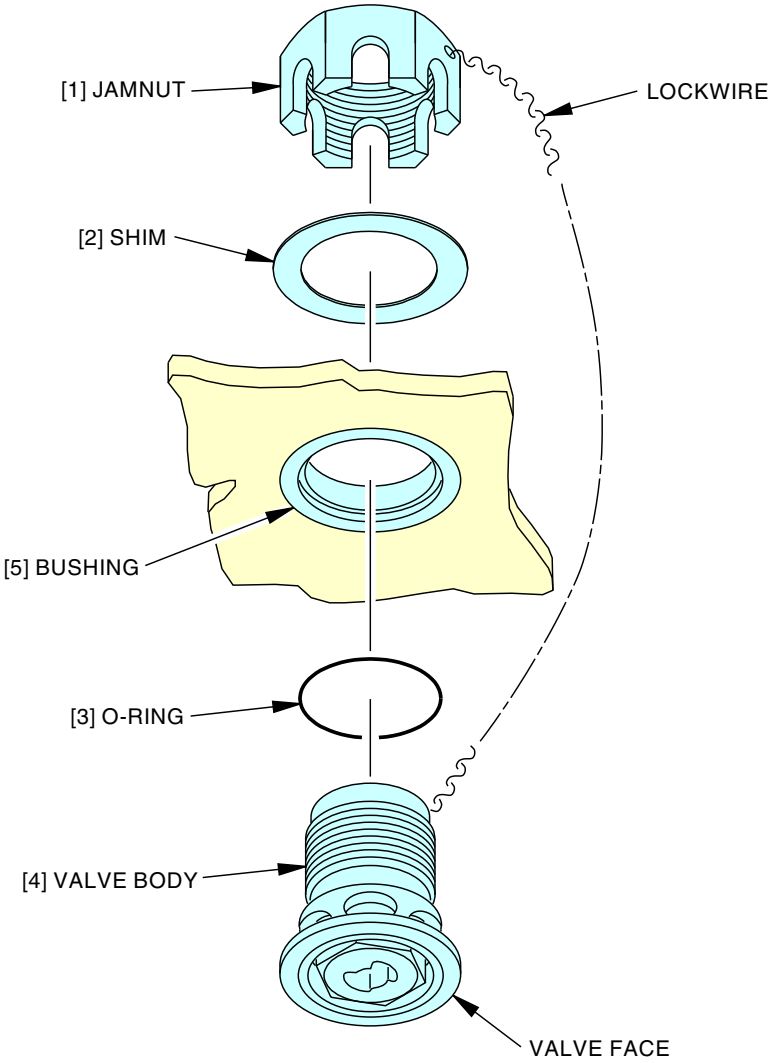
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Main Tank Fuel Sump Drain Valve Installation
Figure 401/28-11-61-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



MAIN TANK FUEL SUMP DRAIN VALVE

B

2413507 S00061532710_V1

Main Tank Fuel Sump Drain Valve Installation
Figure 401/28-11-61-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-11-61-400-801

3. Main Tank Fuel Sump Drain Valve Installation

(Figure 401)

A. References

Reference	Title
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-00-790-804	Fuel Tank Closure Leak Check (P/B 601)
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
SPL-1775	Wrench - Spanner, Fuel Sump Drain Valve Part #: A28012-2 Supplier: 81205 Opt Part #: A28012-1 Supplier: 81205

C. Consumable Materials

Reference	Description	Specification
D00504	Grease - Petrolatum	VV-P-236
G01912	Lockwire - MS20995NC32, Monel - 0.032 Inch (0.8128 mm) Diameter	NASM20995
G50375	Kit - Safety Cable, 321 CRES - 0.032 Inch (0.81 mm) Diameter, (Contains both Cable and Ferrule)	BACC13AT3K, AMS 5689

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	O-ring	28-11-61-01-175	SIA ALL
4	Valve body	28-11-61-01-165	SIA ALL

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

F. Access Panels

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216
632AB	Main Tank Access Door - Wing Station 216

G. Main Tank Fuel Sump Drain Valve Installation

SUBTASK 28-11-61-210-001

(1) Make sure that the seal surfaces of the valve body [4] and the bushing [5] are clean and in a good condition.

SUBTASK 28-11-61-600-003

(2) Lightly coat the new O-ring [3] with grease, D00504.

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SUBTASK 28-11-61-420-001

(3) Install the new O-ring [3] on the valve body [4].

SUBTASK 28-11-61-420-002

(4) Hold up the valve body [4] until the valve body [4] is installed into the bushing [5].

SUBTASK 28-11-61-420-003

(5) Install the sump drain valve.

(a) Go in the fuel tank.

(b) Install the washer [2] and the jamnut [1] that attach the valve body [4] to the bushing [5].

(c) Hold the valve body [4] with the fuel sump drain valve spanner wrench, SPL-1775.

(d) Tighten the jamnut [1] to 14 ft-lb (19.0 N·m) -16 ft-lb (21.7 N·m).

(e) Install safety cable kit, G50375, or MS20995NC32 lockwire, G01912, between the valve body [4] and the jamnut [1].

H. Put the Airplane Back to Its Usual Condition

SUBTASK 28-11-61-410-001

(1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

SUBTASK 28-11-61-410-002

(2) Install these access doors:

(TASK 28-11-11-400-801).

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216
632AB	Main Tank Access Door - Wing Station 216

SUBTASK 28-11-61-790-001

(3) Make sure that there are no fuel leaks (TASK 28-11-00-790-804).

SUBTASK 28-11-61-650-003

(4) Drain a small quantity of fuel from the fuel tank.

(a) Make sure that the sump drain valve operates correctly.

——— END OF TASK ———

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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. General

(1) This task gives instructions to remove the fuel vent float valve.

B. 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)

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
532RB	Main Tank Access Door - Wing Station 629
632RB	Main Tank Access Door - Wing Station 629

E. Prepare for the Removal

SUBTASK 28-13-11-650-001

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.

(1) Do this task for the applicable fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove the applicable access doors:

(TASK 28-11-11-000-801)

Number	Name/Location
532RB	Main Tank Access Door - Wing Station 629
632RB	Main Tank Access Door - Wing Station 629

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

F. Fuel Vent Float Valve Removal

SUBTASK 28-13-11-020-001

(1) Remove the bolts [4], washers [3], and packings [2] that attach the fuel vent float valve [1] to the structure.

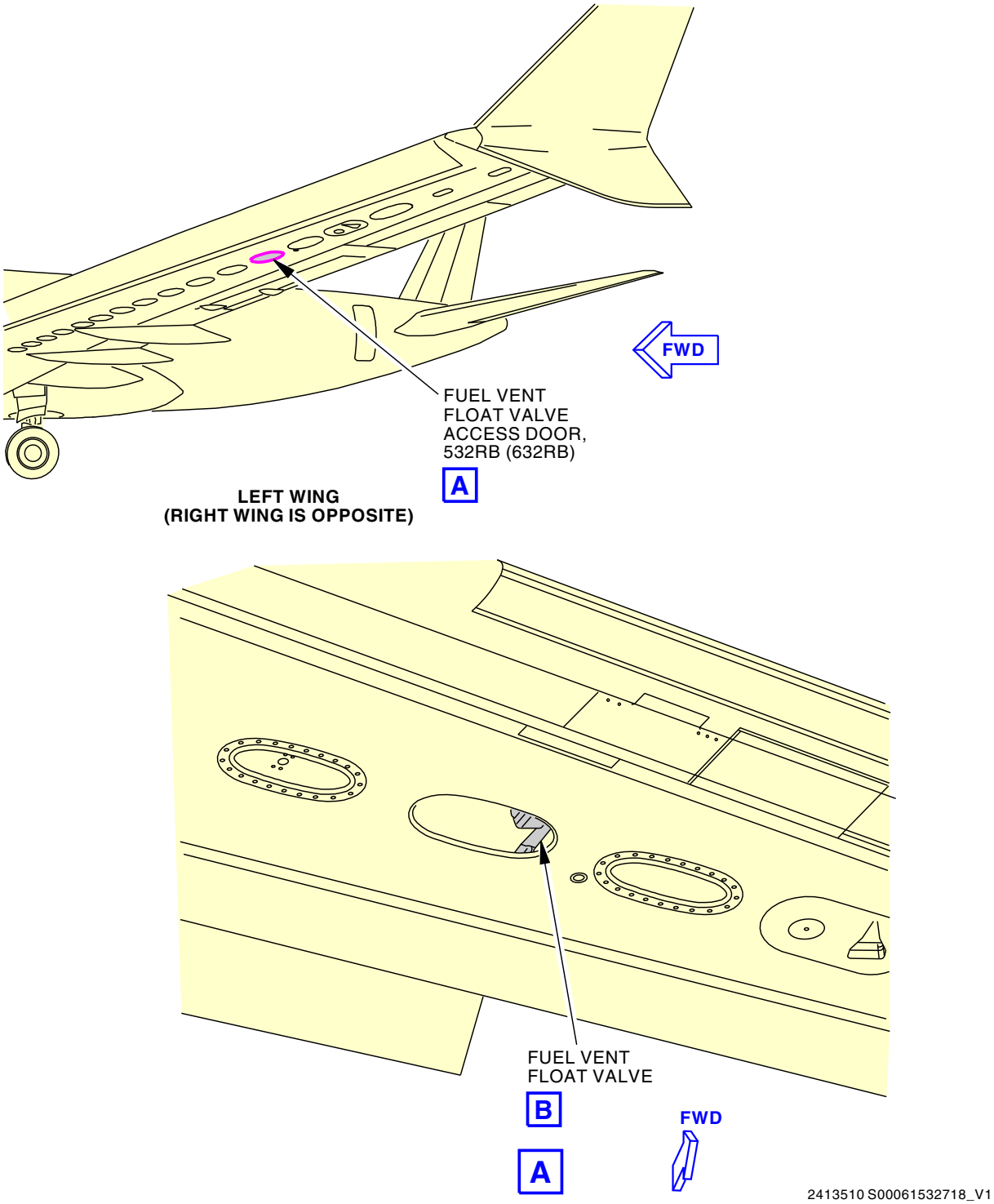
ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-13-11-020-002

(2) Remove the fuel vent float valve [1].

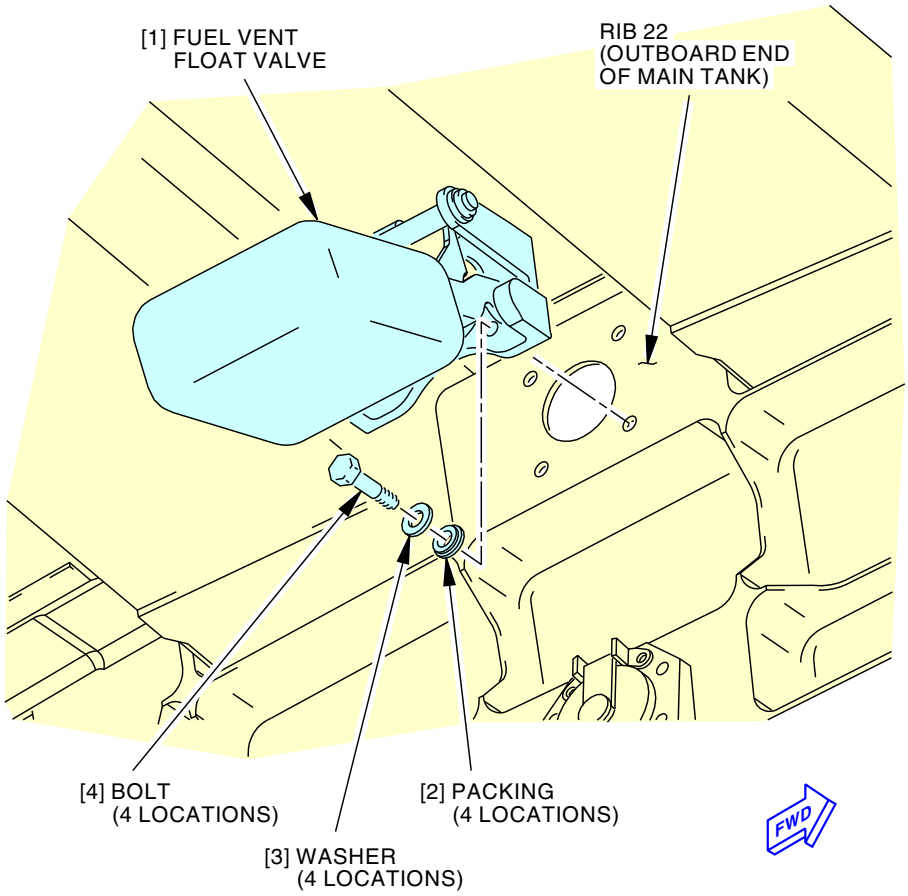
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fuel Vent Float Valve Installation
Figure 401/28-13-11-990-801 (Sheet 1 of 2)

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FUEL VENT FLOAT VALVE

B

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Fuel Vent Float Valve Installation
Figure 401/28-13-11-990-801 (Sheet 2 of 2)

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TASK 28-13-11-400-801

3. Fuel Vent Float Valve Installation

(Figure 401)

A. General

(1) This task gives instructions to install the Fuel Vent Float Valve.

B. References

Reference	Title
28-11-00-600-801	Apply the Corrosion Resistant Finish (Topcoat) (P/B 701)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
C00307	Coating - Corrosion Resistant Finish For Integral Fuel Tanks	BMS10-20 Type II
C50315	Coating - Chemical Conversion - Bonderite M-CR 600 Aero (Formerly Alodine 600)	BAC5719 Class A, C or D, MIL-DTL-81706 Type I Class 1A or 3
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Fuel vent float valve	28-13-11-01A-035	SIA ALL
2	Packing	28-13-11-01A-030	SIA ALL

F. 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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Access Panels

Number	Name/Location
532RB	Main Tank Access Door - Wing Station 629
632RB	Main Tank Access Door - Wing Station 629

H. Prepare for the Installation

SUBTASK 28-13-11-100-001

(1) Clean the fay surfaces of the aluminum fuel vent float valve [1] and the aluminum rib (SWPM 20-20-00 Paragraph 2).

SUBTASK 28-13-11-420-001

(2) Apply a fay sealed fay surface bond to the mating surfaces between the fuel vent float valve [1] and the rib (SWPM 20-20-00 Paragraph 14.D).

I. Fuel Vent Float Valve Installation

SUBTASK 28-13-11-420-002

(1) Hold the fuel vent float valve [1] in the correct position and install the four new packings [2], four washers [3], and four bolts [4] (Figure 401).

(2) Remove excess sealant with a dry cotton wiper, G00034.

SUBTASK 28-13-11-760-001

(3) Measure the electrical bonding resistance between the fuel vent float valve [1] base and the rib with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

(a) Make sure that the electrical bonding resistance is 0.0005 ohms (0.5 milliohms) or less.

SUBTASK 28-13-11-910-001

(4) Manually apply Bonderite M-CR 600 Aero coating, C50315 to the bare metal areas (TASK 28-11-00-600-801).

SUBTASK 28-13-11-910-002

(5) Apply one coat of coating, C00307 to bare metal areas (TASK 28-11-00-600-801).

J. Put the Airplane Back to Its Usual Condition

SUBTASK 28-13-11-410-001

(1) Close the applicable access panel(s):

Number	Name/Location
532RB	Main Tank Access Door - Wing Station 629
632RB	Main Tank Access Door - Wing Station 629

(Main Tank Access Door Installation, TASK 28-11-11-400-801).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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. General

(1) This task gives instructions to remove the flame arrestor located in the surge tank.

B. References

Reference	Title
28-11-11-000-802	Surge Tank Access Door Removal (P/B 401)

C. Tools/Equipment

Reference	Description
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 Removal

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.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 28-13-31-010-001

(3) 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.

G. Flame Arrestor Removal

SUBTASK 28-13-31-150-001

(1) With sealant removal tools, remove the sealant from the area around the mounting flange for the flame arrestor [2].

SUBTASK 28-13-31-020-001

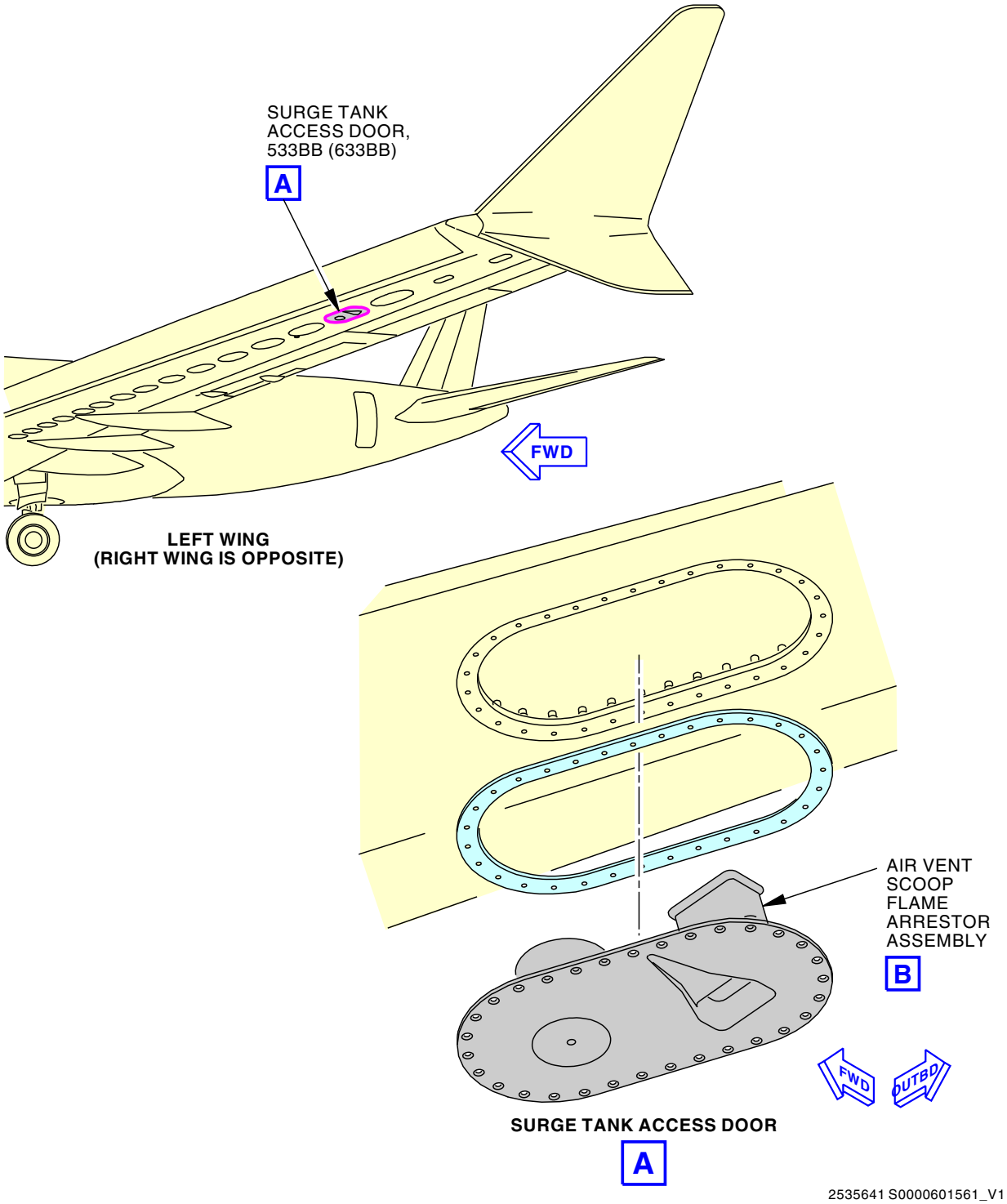
(2) Remove the screws [6] and washers [5] that attach the flame arrestor [2].

SUBTASK 28-13-31-020-002

(3) Remove the flame arrestor [2] from the lower air vent stack [3].

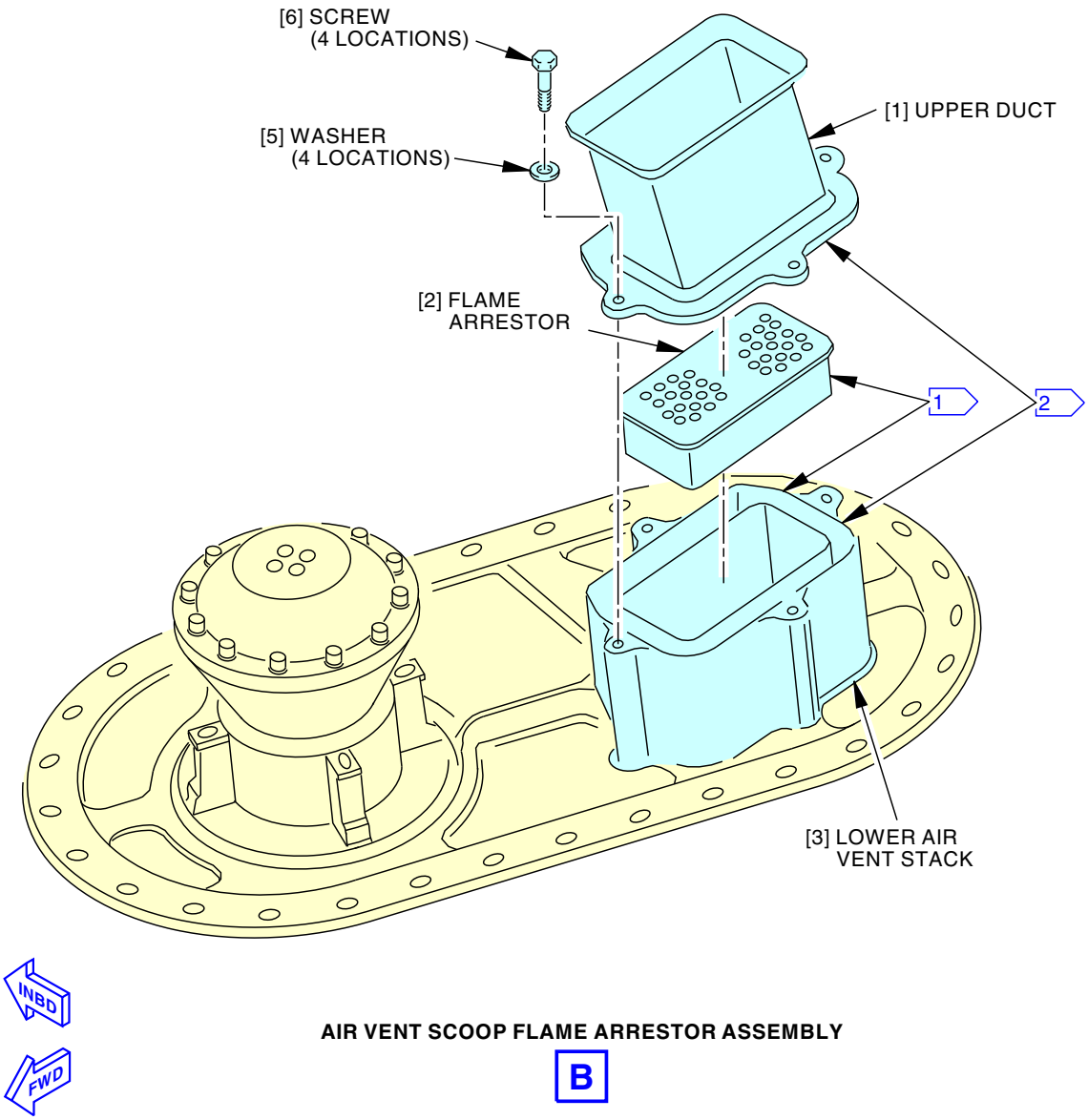
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Air Vent Scoop Flame Arrestor Installation
Figure 401/28-13-31-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



AIR VENT SCOOP FLAME ARRESTOR ASSEMBLY

B

1 THE RESISTANCE FROM THE FLAME ARRESTER 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 Flame Arrestor Installation
Figure 401/28-13-31-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-13-31-400-801

3. Flame Arrestor Installation

(Figure 401)

A. General

(1) For faying surface seal applications:

(a) Inside the fuel tank, use BMS 5-45 Class B-2 sealant, A50110, or BMS 5-45 Class C sealant, A50155.

(b) Outside the fuel tank, use BMS 5-45 Class B-2 sealant, A50110, BMS 5-45 Class C sealant, A50155, BMS 5-95 Class B sealant, A50231, or BMS 5-95 Class C sealant, A50296.

(c) Do not apply a faying surface seal with a temperature higher than 100°F (38°C).

(2) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-17.

B. 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 (533AB, 533CB, 633AB, 633CB) Installation (P/B 401)
28-13-31-100-801	Air Vent Scoop Flame Arrestor - Cleaning (P/B 701)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45
A50110	Sealant - Fuel Tank	BMS5-45 Class B-2
A50155	Sealant - Fuel Tank	BMS5-45 Class C

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Reference	Description	Specification
A50231	Sealant - Pressure And Environmental - Chromate Type	BMS5-95 Class B
A50296	Sealant - Pressure And Environmental - Chromate Type	BMS5-95 Class C
B00148	Solvent - Methyl Ethyl Ketone (MEK)	ASTM D740
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Flame arrestor	28-13-31-01-035	SIA ALL

F. 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

G. Access Panels

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

H. 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 solvent, B00184 or solvent, B00148.

SUBTASK 28-13-31-120-001

(2) If the surge tank access door or upper duct [1] is new, then use an abrasive pad to remove the primer or paint from the faying surfaces of the upper duct [1] and the lower air vent stack [3] until bare metal shows (SWPM 20-20-00).

SUBTASK 28-13-31-210-001

(3) 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).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-13-31-390-001

28-AWL-17: CDCCL

(4) Apply a fay sealed fay surface bond between the mating surfaces of the flame arrestor [2] and the flanges on the lower air vent stack [3] (door) and the upper duct [1] (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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-17.

(a) Use BMS 5-45 Class B-2 sealant, A50110, BMS 5-45 Class C sealant, A50155, BMS 5-95 Class B sealant, A50231, or BMS 5-95 Class C sealant, A50296.

SUBTASK 28-13-31-420-001

(5) Install the flame arrestor [2] on the flange of the lower air vent stack [3].

SUBTASK 28-13-31-390-002

28-AWL-17: CDCCL

(6) Apply a fay sealed fay surface bond between the flange on the lower air vent stack [3] (door) and the flange on the upper duct [1] (TASK 28-11-00-300-803, 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) Use BMS 5-45 Class B-2 sealant, A50110, BMS 5-45 Class C sealant, A50155, BMS 5-95 Class B sealant, A50231, or BMS 5-95 Class C sealant, A50296.

SUBTASK 28-13-31-420-002

(7) Install the upper duct [1] 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

28-AWL-17: CDCCL

(8) Measure the electrical bonding resistance between the flame arrestor [2] and the lower air vent stack [3] (door) (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) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-17: CDCCL

(b) Make sure the electrical bonding resistance is 0.0100 ohm (10.0 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-17.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-13-31-280-002

28-AWL-17: CDCCL

(9) Measure the electrical bonding resistance between the upper duct [1] and the lower air vent stack [3] (door) (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) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-17: CDCCL

(b) Make sure the electrical bonding resistance is 0.0100 ohm (10.0 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-17.

SUBTASK 28-13-31-390-003

(10) After you apply the thin layer of sealant, A00767, apply the sealant, A00767, 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

(11) Install or close the applicable access doors:

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 (533AB, 533CB, 633AB, 633CB) Installation, TASK 28-11-11-400-802.

SUBTASK 28-13-31-860-003

(12) Connect the battery again, if you disconnected it before this step.

SUBTASK 28-13-31-080-001

(13) Remove all the warning signs that you installed before this step.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

AIR VENT SCOOP FLAME ARRESTOR - INSPECTION/CHECK

1. General

A. This procedure has these tasks:

(1) Air Vent Scoop - Bonding Resistance Check

(2) Air Vent Scoop Flame Arrestor Detailed Inspection

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. References

Reference	Title
28-11-11-000-802	Surge Tank Access Door Removal (P/B 401)
28-11-11-400-803	Surge tank Access Door (533BB, 633BB) Installation (P/B 401)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659
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. Prepare for the Check

SUBTASK 28-13-31-862-001

(1) Make sure that the airplane is correctly grounded to an approved and identified ground.

SUBTASK 28-13-31-210-002

(2) Make sure that there is no remaining fuel in the surge tank.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(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.

SUBTASK 28-13-31-010-002

(3) Remove or open the applicable access panels:

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

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

F. Electrical Bonding Measurement

SUBTASK 28-13-31-760-001

(1) Measure the electrical bonding resistance between the upper duct [1] and the door assembly [3] with a intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

(a) Make sure that the resistance is 0.010 ohm (10 milliohms) or less.

SUBTASK 28-13-31-760-002

(2) Measure the electrical bonding resistance between the flame arrestor [2] and the door assembly [3] with a intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

(a) Make sure that the resistance is 0.010 ohm (10 milliohms) or less.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 28-13-31-410-002

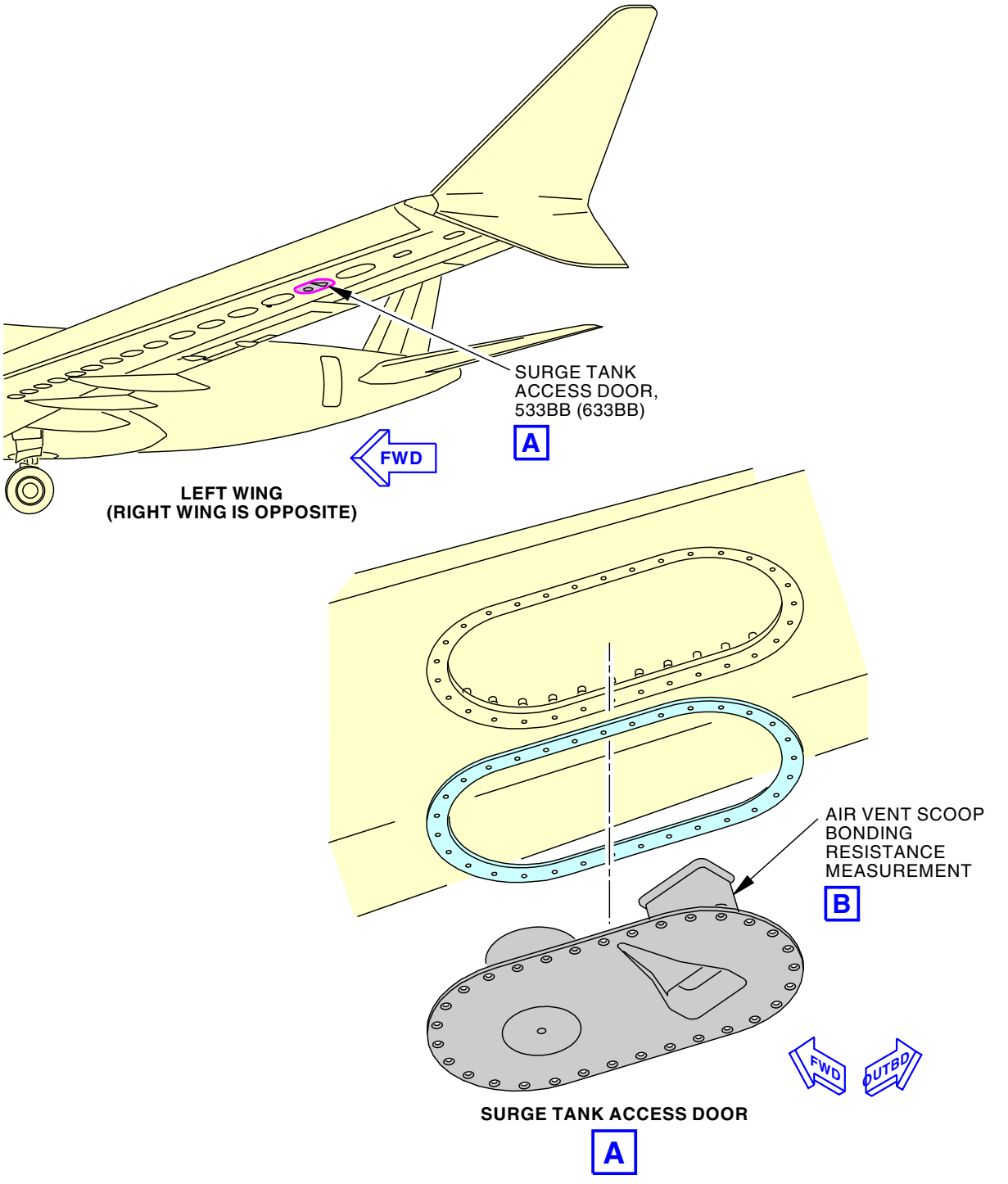
(1) Install or close the applicable access panels:

(Surge tank Access Door (533BB, 633BB) Installation, TASK 28-11-11-400-803)

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

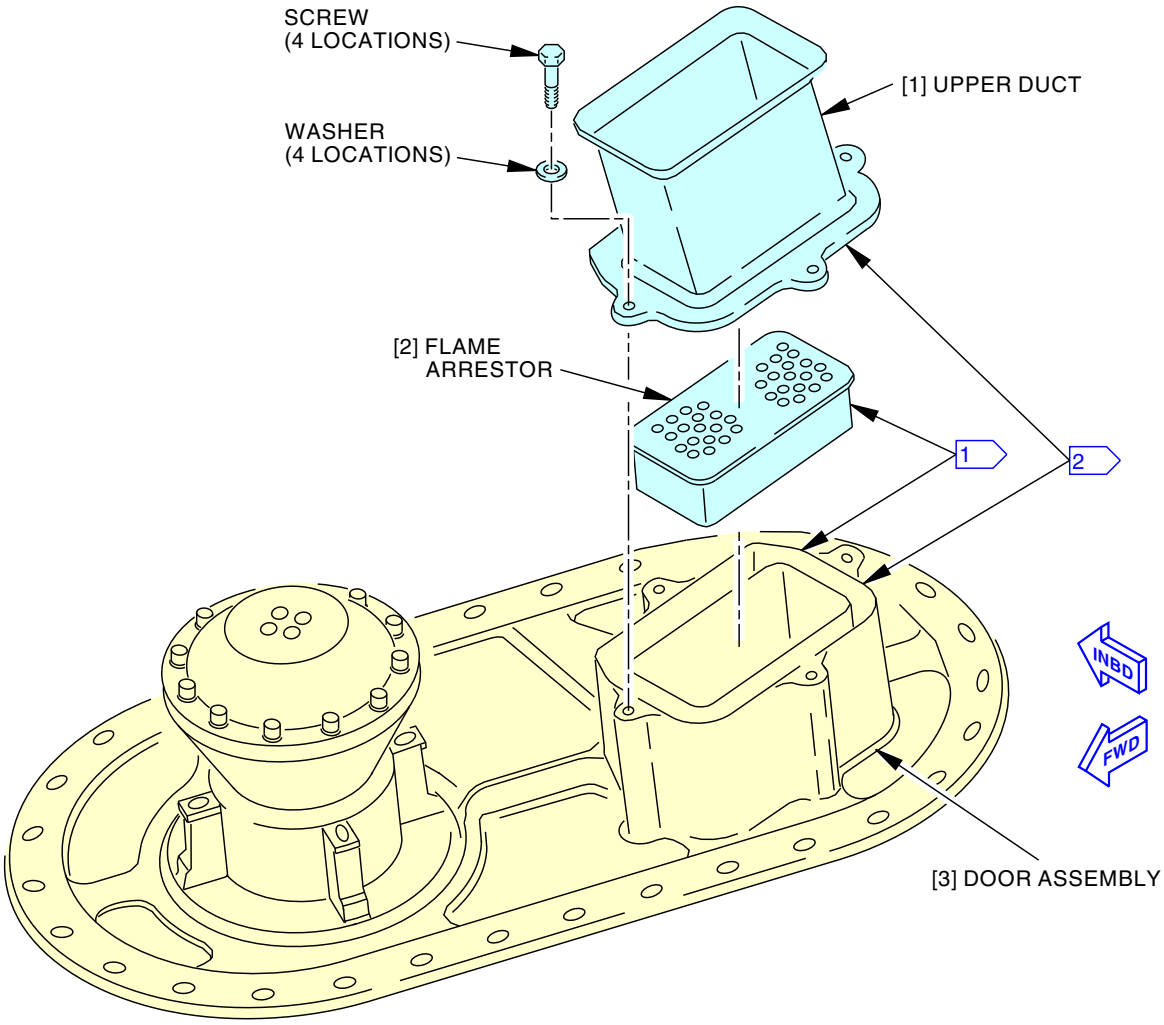
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Air Vent Scoop - Bonding Resistance Measurement
Figure 601/28-13-31-990-802 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



AIR VENT SCOOP BONDING RESISTANCE MEASUREMENT

B

1 THE RESISTANCE FROM THE FLAME ARRESTOR TO THE FLANGE ON THE DOOR ASSEMBLY IS 0.010 OHM OR LESS.

2 THE RESISTANCE FROM THE FLANGE ON THE DOOR ASSEMBLY TO THE FLANGE ON THE UPPER DUCT IS 0.010 OHM OR LESS.

2413515 S00061532730_V1

Air Vent Scoop - Bonding Resistance Measurement
Figure 601/28-13-31-990-802 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-13-31-211-801

3. Air Vent Scoop Flame Arrestor Detailed Inspection

(Figure 602)

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
28-11-11-000-802	Surge Tank Access Door Removal (P/B 401)
28-11-11-400-803	Surge tank Access Door (533BB, 633BB) 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)

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. Prepare for the Inspection

SUBTASK 28-13-31-860-005

(1) Make sure that the airplane is correctly grounded to an approved and identified ground.

SUBTASK 28-13-31-210-006

(2) Make sure that 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.

SUBTASK 28-13-31-010-005

(3) Remove or open the applicable access panels:

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

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

F. Air Vent Scoop Flame Arrestor Detailed Inspection

SUBTASK 28-13-31-211-002

(1) Hold the surge tank access door up to a light and examine the flame arrestor for unwanted particles and blocked holes.

SUBTASK 28-13-31-010-006

(2) If there are unwanted particles or blocked holes, you must clean the flame arrestor.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(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.

(e) If it was removed, install the flame arrestor (TASK 28-13-31-400-801).

G. Put the Airplane Back to Its Usual Condition

SUBTASK 28-13-31-410-004

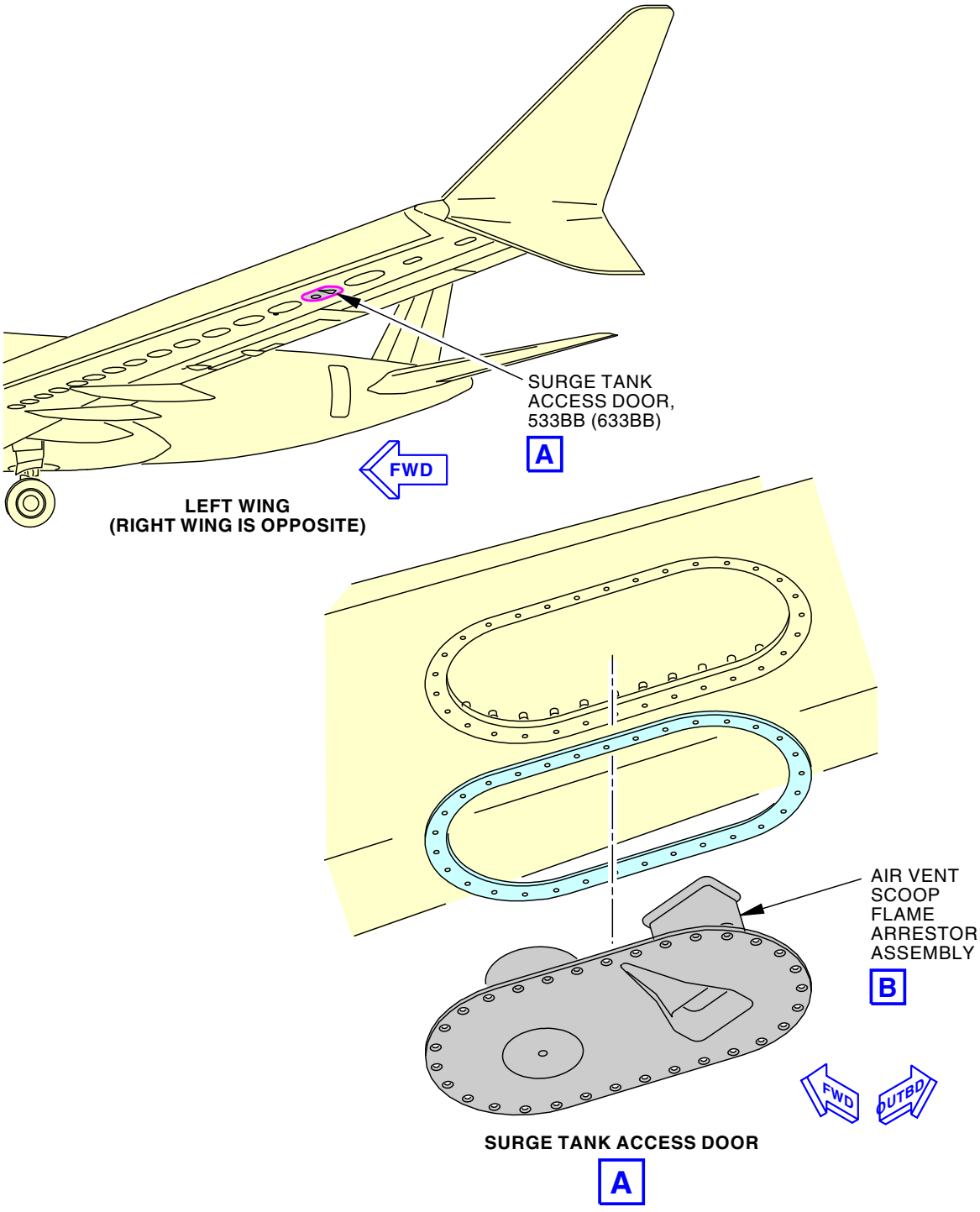
(1) Install or close the applicable access panels:

(Surge tank Access Door (533BB, 633BB) Installation, TASK 28-11-11-400-803)

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

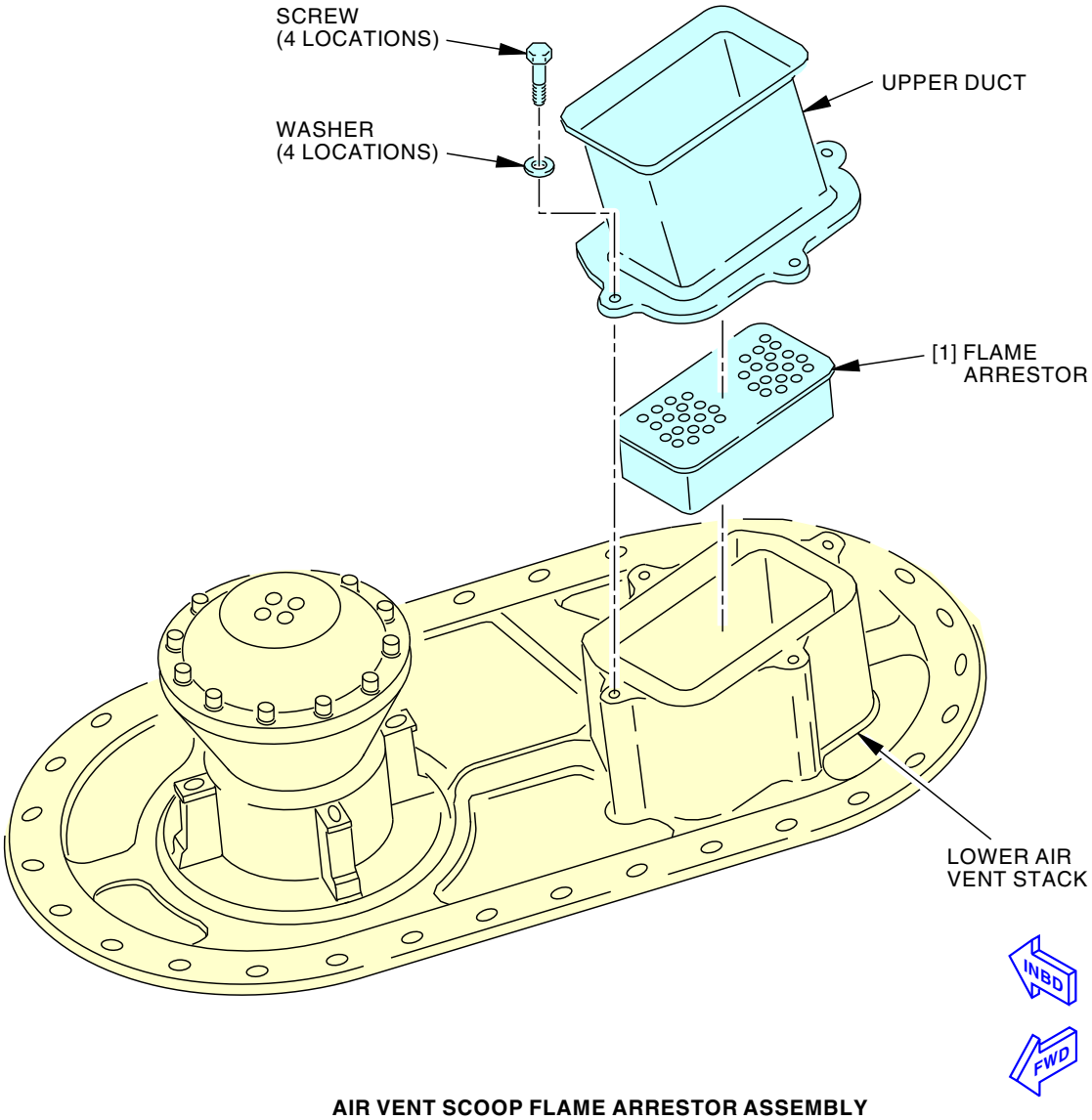
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Air Vent Scoop Flame Arrestor
Figure 602/28-13-31-990-804 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



AIR VENT SCOOP FLAME ARRESTOR ASSEMBLY

B

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Air Vent Scoop Flame Arrestor
Figure 602/28-13-31-990-804 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

AIR VENT SCOOP FLAME ARRESTOR - CLEANING/PAINTING

1. General

A. This procedure has this task:

(1) The cleaning of the air vent scoop flame arrestor.

TASK 28-13-31-100-801

2. Air Vent Scoop Flame Arrestor - Cleaning

(Figure 701)

A. 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 (533AB, 533CB, 633AB, 633CB) 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)

B. Tools/Equipment

Reference	Description
STD-200	Container - Fuel Resistant, 10 gallon (38 l)

C. Consumable Materials

Reference	Description	Specification
B00083	Solvent - VM&P Naphthas	TT-N-95 Type II, ASTM D-3735 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

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 28-13-31-860-004

(1) Make sure that the airplane is correctly grounded to an approved and identified ground.

SUBTASK 28-13-31-210-003

(2) Make sure that 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.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-13-31-010-003

(3) 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 remove the access panel(s), do this task: Surge Tank Access Door Removal, TASK 28-11-11-000-802.

G. Air Vent Scoop Flame Arrestor Cleaning

SUBTASK 28-13-31-211-001

(1) Hold the surge tank access door up to a light and examine the flame arrestor [1] for unwanted particles and blocked holes.

SUBTASK 28-13-31-010-004

(2) If there are unwanted particles or blocked holes, you must clean the flame arrestor [1].

(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 28-13-31-160-001

(3) Clean the surfaces near the access panel opening with a clean cotton wiper, G00034, moist with solvent, B00083.

SUBTASK 28-13-31-160-002

(4) Clean surfaces of access panel which will touch airplane skin with a clean cotton wiper, G00034, moist with solvent, B00083.

SUBTASK 28-13-31-210-004

(5) Examine the open tank for unwanted objects, for example tools, broken pieces of metal, and other unwanted material.

SUBTASK 28-13-31-160-003

(6) Clean the open tank, if it is necessary.

SUBTASK 28-13-31-210-005

(7) If you removed the flame arrestor [1] for this procedure, do this task: Flame Arrestor Installation, TASK 28-13-31-400-801.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 28-13-31-410-003

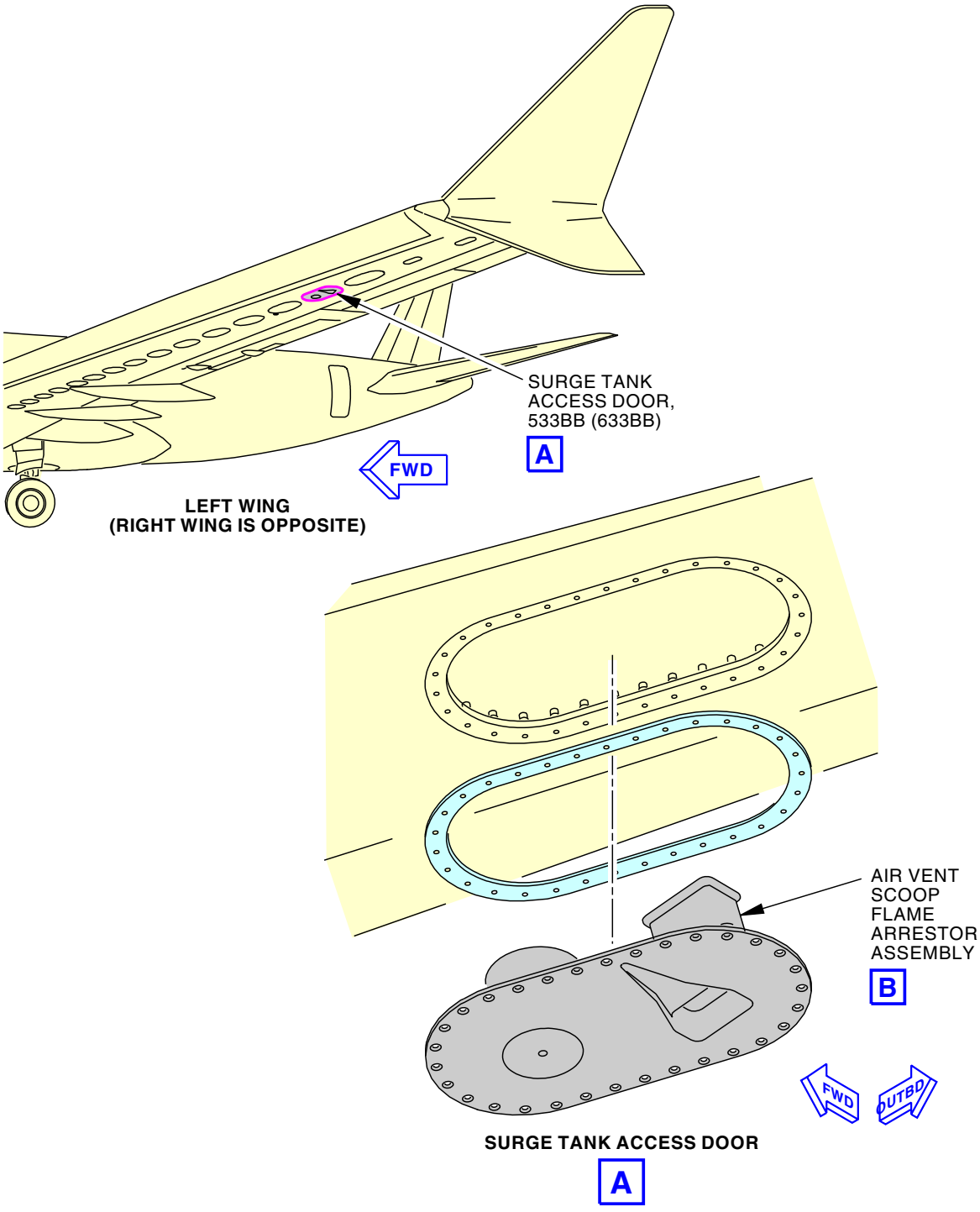
(1) Install or close the applicable access panels:

Number	Name/Location
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 (533AB, 533CB, 633AB, 633CB) Installation, TASK 28-11-11-400-802.

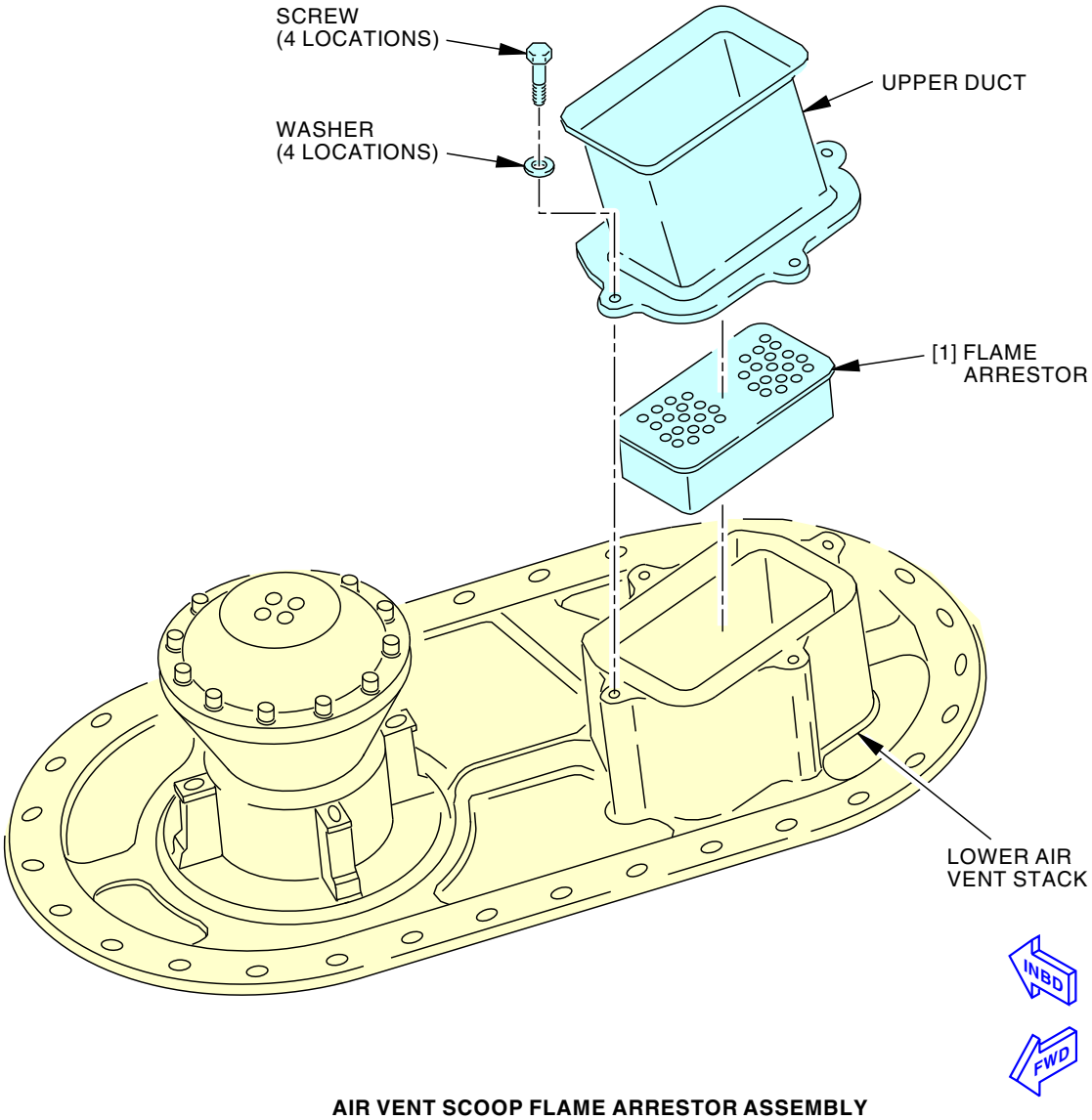
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Air Vent Scoop Flame Arrestor
Figure 701/28-13-31-990-803 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



AIR VENT SCOOP FLAME ARRESTOR ASSEMBLY

B

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Air Vent Scoop Flame Arrestor
Figure 701/28-13-31-990-803 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 pressure relief valve.

B. It is not necessary to remove the pressure relief valve to make sure that the pressure relief valve operates at the correct pressure difference.

TASK 28-13-41-000-801

2. Pressure Relief Valve Removal

(Figure 401)

A. General

(1) This task gives instructions to remove the Pressure Relief Valve.

B. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-11-11-000-802	Surge Tank Access Door Removal (P/B 401)
28-13-41-400-802	Pressure Relief Valve - Manual Operation (P/B 601)

C. Tools/Equipment

Reference	Description
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 Removal

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 the 10 gallon (38 l) fuel resistant container, STD-200.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 pressure relief valve [1] 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 28-11-11-000-802)

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

G. Pressure Relief Valve Removal

SUBTASK 28-13-41-020-001

(1) Remove the mounting bolts [3] that attach the pressure relief valve [1] to the door assembly [4] (Figure 401).

SUBTASK 28-13-41-020-002

(2) Remove the pressure relief valve [1] from the door assembly [4].

SUBTASK 28-13-41-020-003

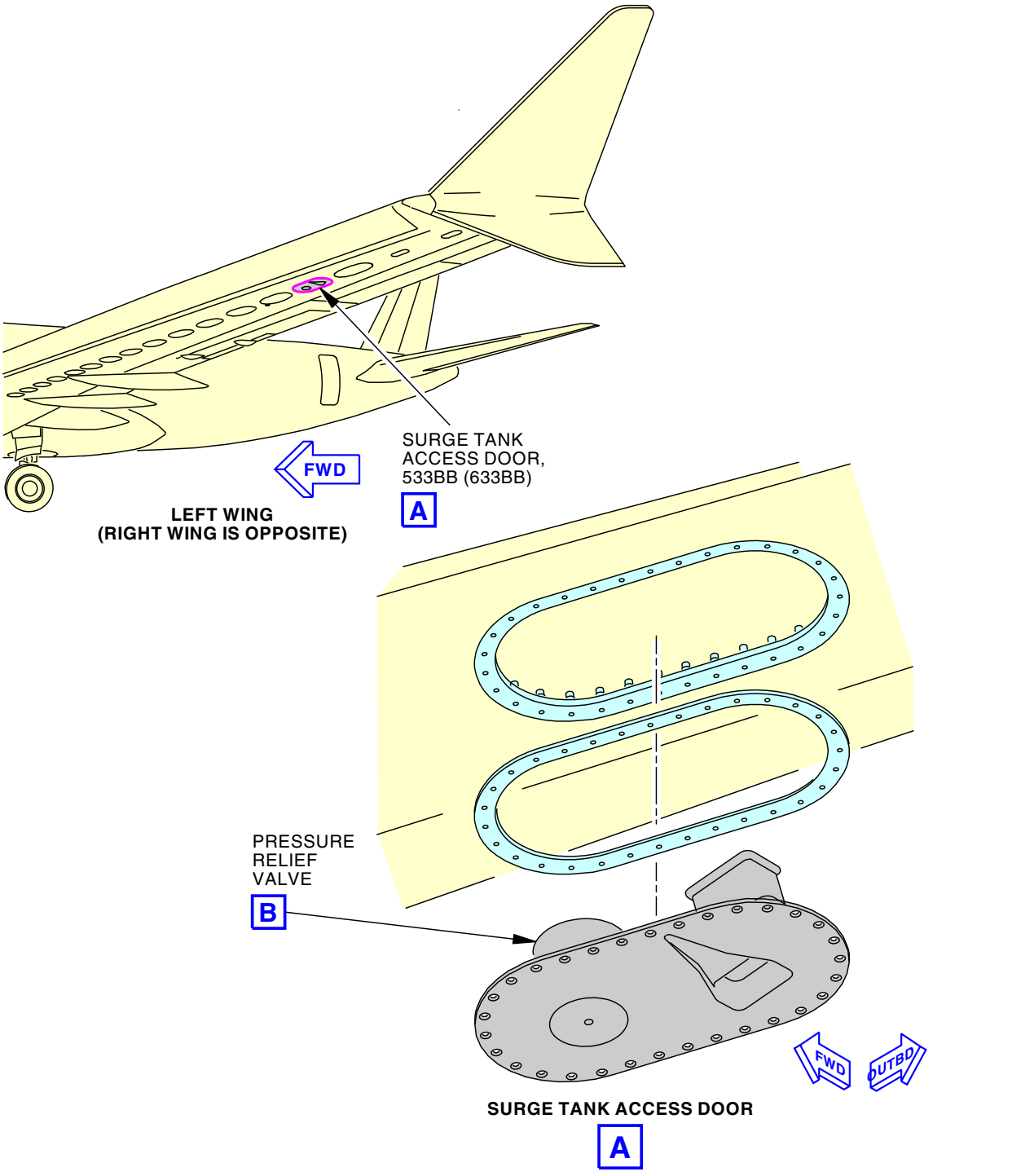
(3) Remove the O-ring seal [2] from the flange groove.

SUBTASK 28-13-41-020-004

(4) Discard the O-ring seal [2].

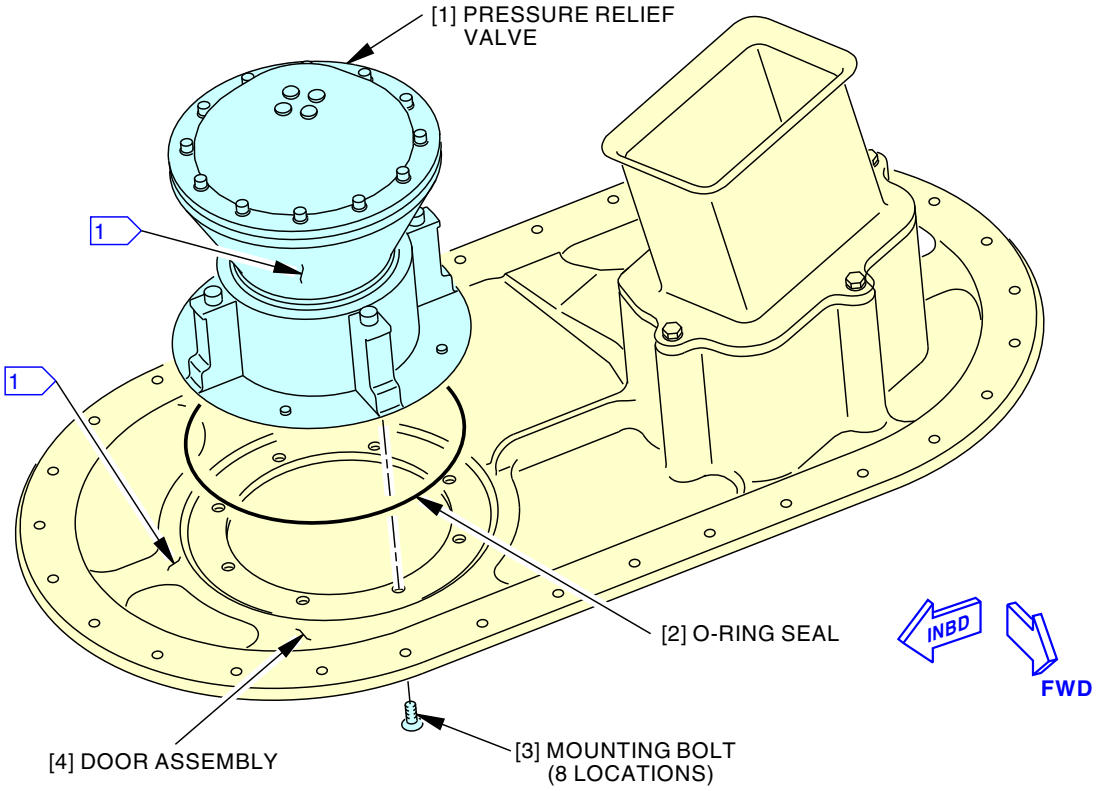
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Surge Tank Pressure Relief Valve Installation
Figure 401/28-13-41-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



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 401/28-13-41-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-13-41-400-801

3. Pressure Relief Valve Installation

(Figure 401)

A. General

(1) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-17.

B. References

Reference	Title
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-11-400-802	Surge Tank Access Door (533AB, 533CB, 633AB, 633CB) 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 BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
B00083	Solvent - VM&P Naphthas	TT-N-95 Type II, ASTM D-3735 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Pressure relief valve	28-13-41-02-025	SIA ALL
2	O-ring seal	28-13-41-02-020	SIA ALL

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. 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

G. Access Panels

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

H. Procedure

SUBTASK 28-13-41-860-002

WARNING MAKE SURE THAT 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 [1] is closed, use a screwdriver to open the pressure relief valve [1] manually (TASK 28-13-41-400-802).

SUBTASK 28-13-41-110-001

28-AWL-17: CDCCL

(2) Install a fay surface bond between the pressure relief valve [1] and 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-17.

(a) Fully clean these surfaces with a clean, cotton wiper, G00034, moist with solvent, B00083, and dry them:

1) The O-ring groove on the pressure relief valve [1]
2) The mating surface of the pressure relief valve [1]
3) The mating surface of the door assembly [4].

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 [1].

SUBTASK 28-13-41-420-002

(4) Put the pressure relief valve [1] in its correct position on the door assembly [4].

SUBTASK 28-13-41-420-003

(5) Attach the pressure relief valve [1] to the door assembly [4] with the eight 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).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-13-41-765-001

28-AWL-17: CDCCL

(7) Measure the electrical bonding resistance between the pressure relief valve [1] and 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-17.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-17: CDCCL

(b) Make sure the electrical bonding resistance is 0.0100 ohm (10.0 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-17.

SUBTASK 28-13-41-410-001

(8) Install the applicable surge tank access door(s):

(TASK 28-11-11-400-802)

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679
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 [1] manually (TASK 28-13-41-400-802).

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 serviceable relief valve is installed.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SURGE TANK FLAME ARRESTOR PRESSURE RELIEF VALVE - INSPECTION/CHECK

1. General

A. 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.

B. 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.

C. 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.

D. 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. Pressure Relief Valve Manual Operation

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.

SUBTASK 28-13-41-440-001

(2) Open the pressure relief valve manually (Figure 601).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Put a small screwdriver into the pressure sense hole on 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) 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.

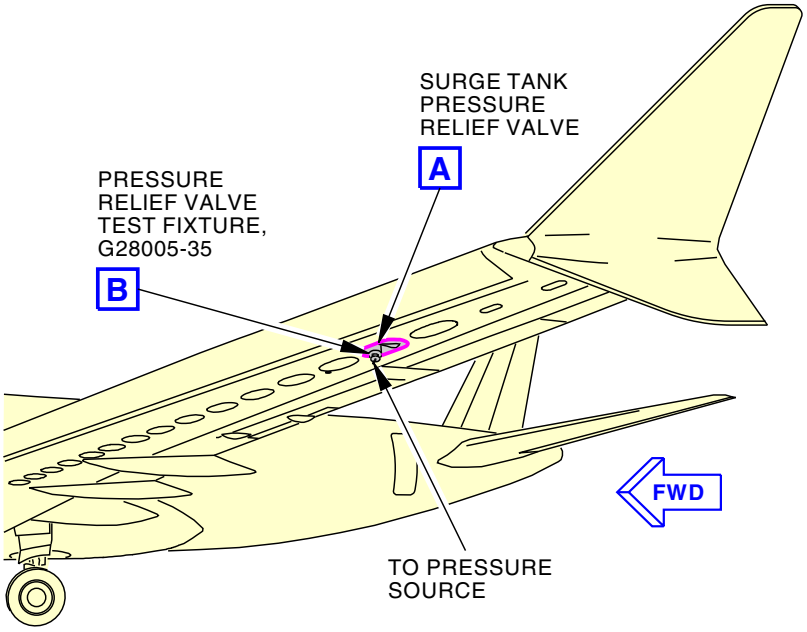
(d) Remove the screwdriver from the pressure sense hole.

SUBTASK 28-13-41-860-004

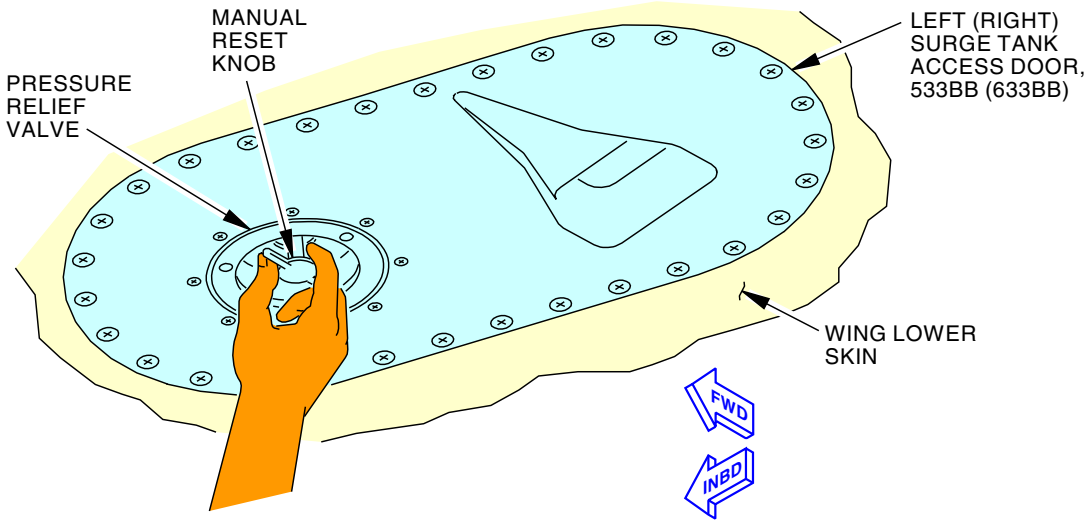
(3) To close the pressure relief valve, pull the T-handle down until the pressure relief valve closes.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



LEFT WING
(RIGHT WING IS OPPOSITE)



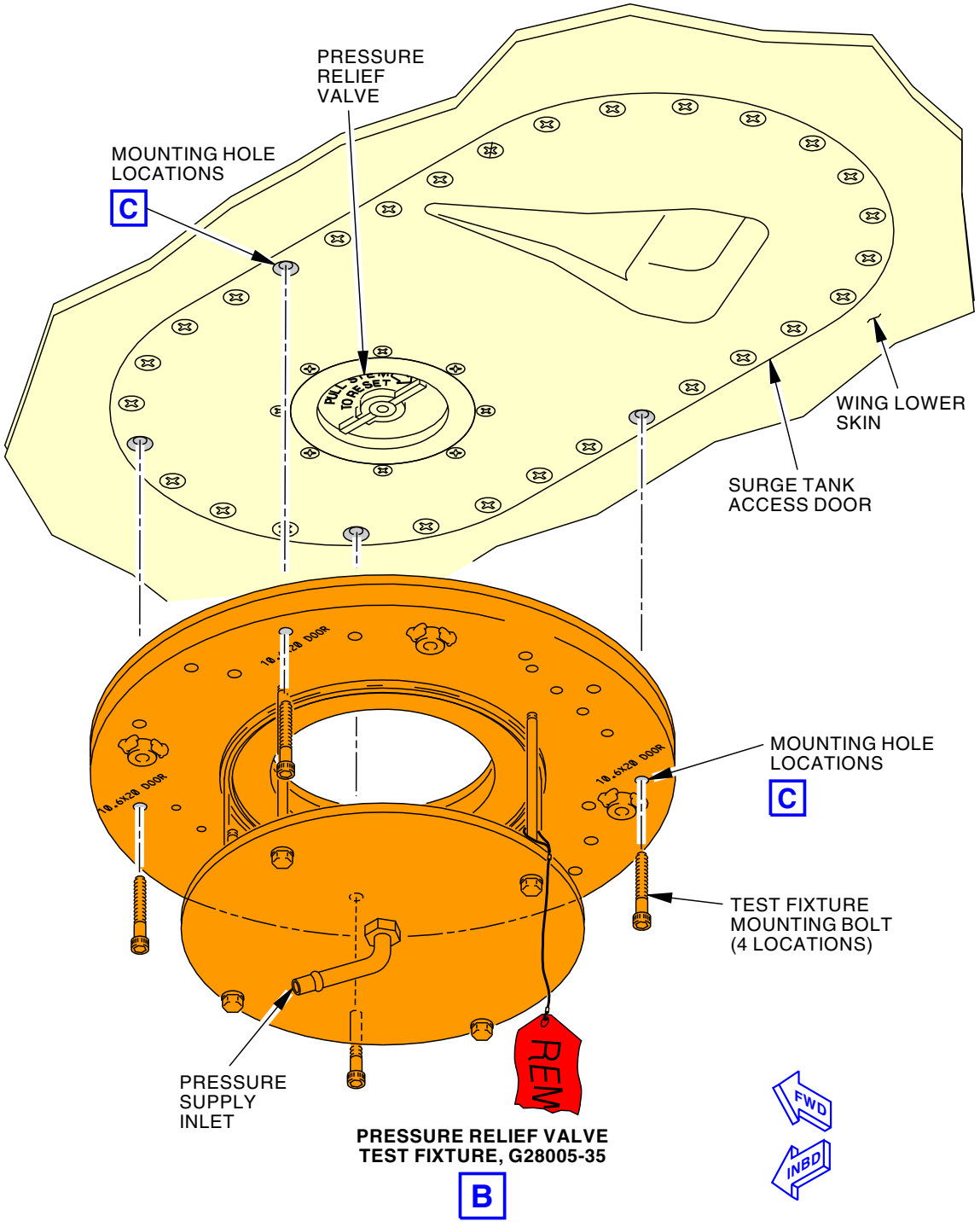
SURGE TANK PRESSURE RELIEF VALVE
(MANUAL RESET)

A

2413520 S00061532743_V1

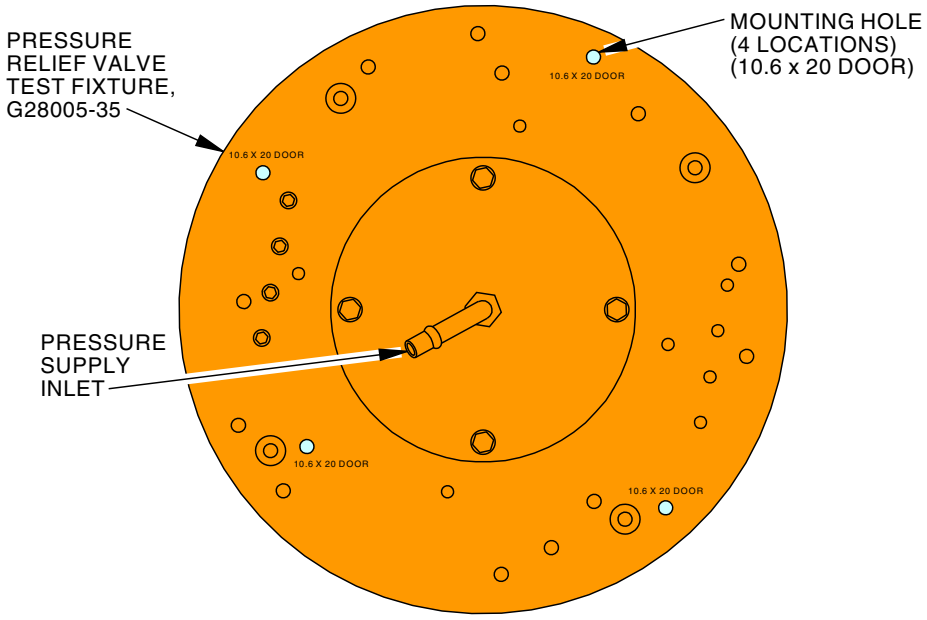
Surge Tank Pressure Relief Valve Inspection with Test Fixture, G28005-35
Figure 601/28-13-41-990-802 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



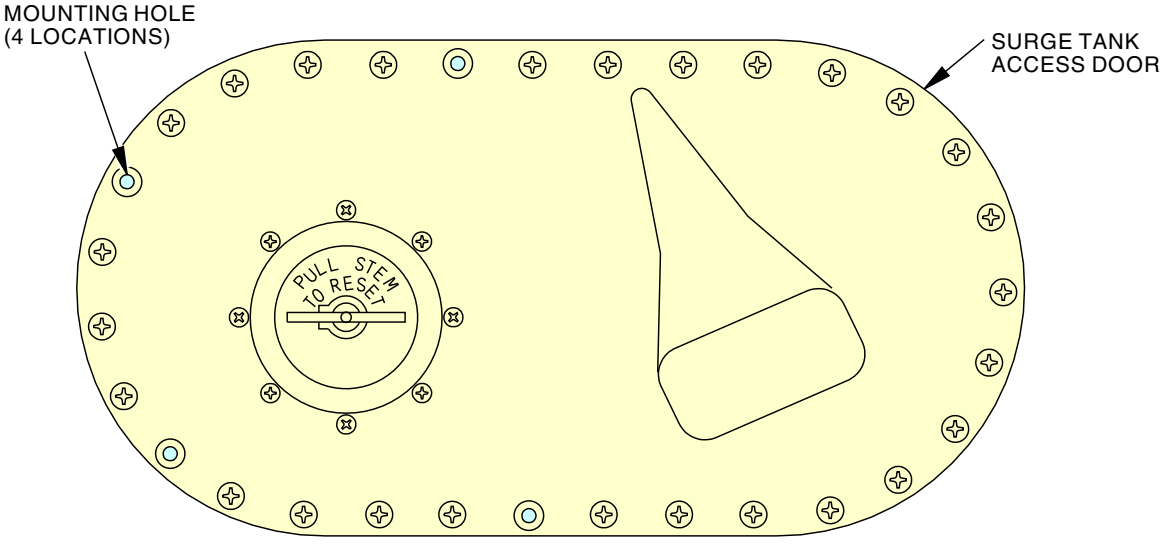
Surge Tank Pressure Relief Valve Inspection with Test Fixture, G28005-35
Figure 601/28-13-41-990-802 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



MOUNTING HOLE LOCATIONS
(TEST FIXTURE, G28005-35)

C



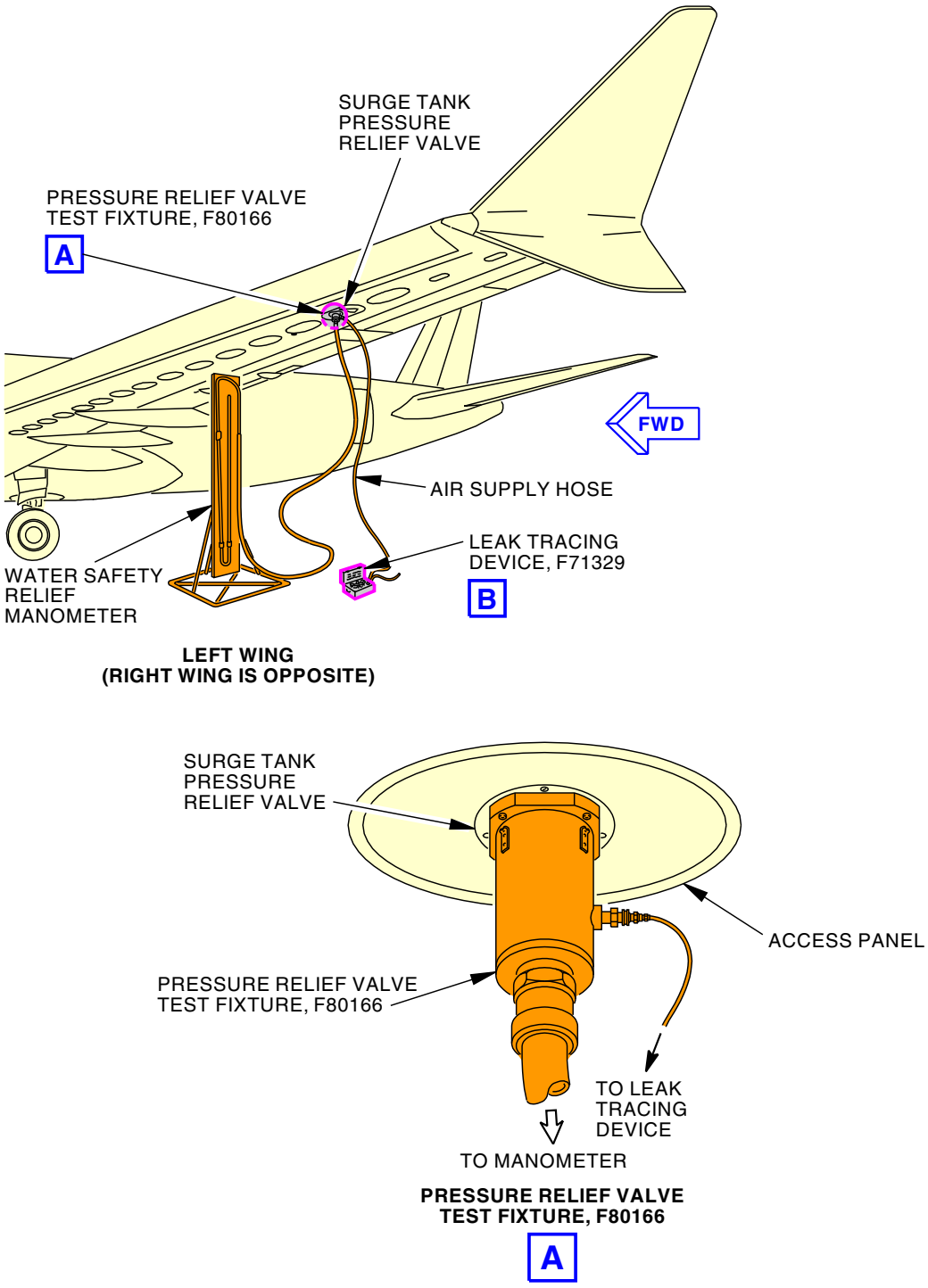
MOUNTING HOLE LOCATIONS
(SURGE TANK ACCESS DOOR)

C

2413522 S00061532745_V1

Surge Tank Pressure Relief Valve Inspection with Test Fixture, G28005-35
Figure 601/28-13-41-990-802 (Sheet 3 of 3)

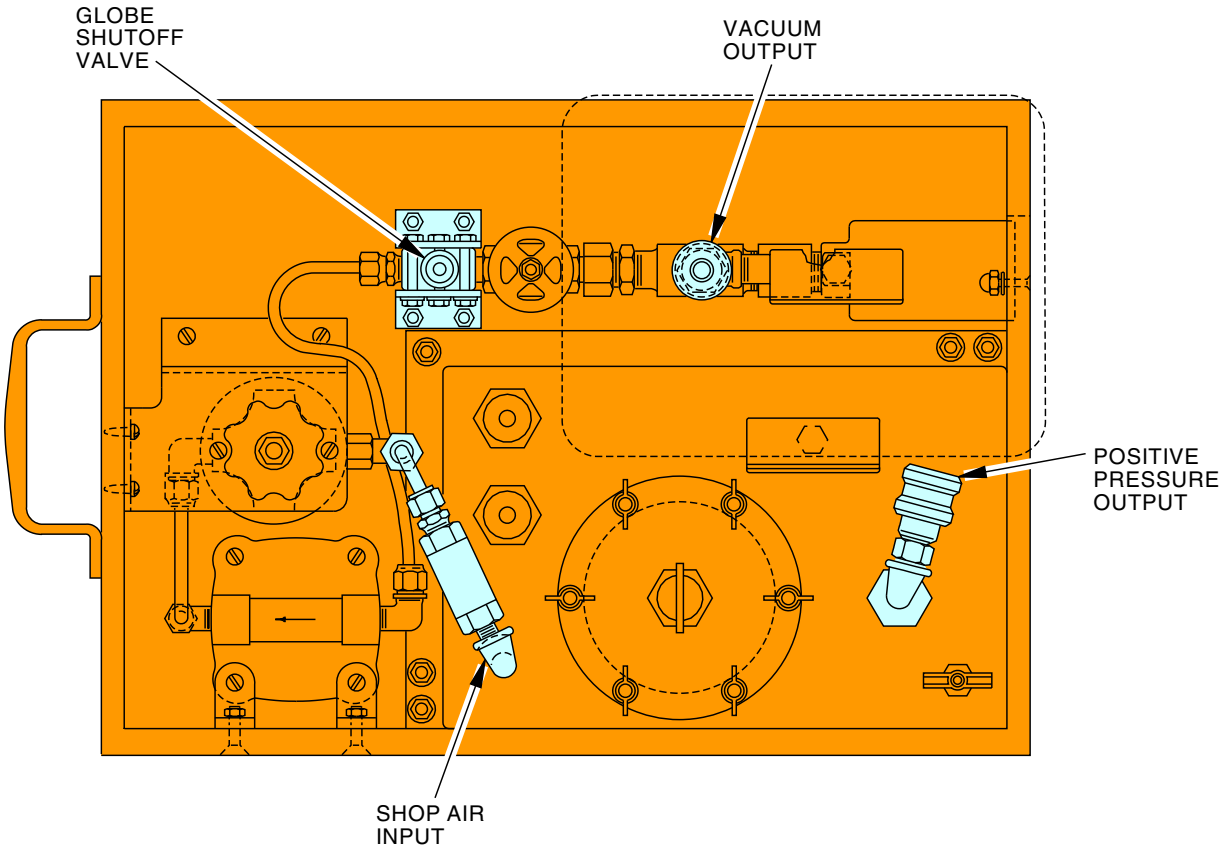
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413523 S00061532746_V1

Surge Tank Pressure Relief Valve Inspection with Test Fixture, F80166
Figure 602/28-13-41-990-803 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



LEAK TRACING DEVICE, F71329

B

2413524 S00061532747_V1

Surge Tank Pressure Relief Valve Inspection with Test Fixture, F80166
Figure 602/28-13-41-990-803 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-13-41-200-801

3. Pressure Relief Valve Pressure Check

(Figure 601, Figure 602)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task gives instructions on how to make sure the pressure relief valve working correctly.

(a) You can use either the valve check equipment, SPL-8420, or the fixture, SPL-3899, to accomplish this pressure check.

B. References

Reference	Title
28-11-11-400-803	Surge tank Access Door (533BB, 633BB) 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
SPL-1761	Leakage Tracing Device, Integral Tank Leakage Test Part #: F71329 Supplier: 81205
SPL-1774	Manometer - Water, Test Equipment Part #: F72951-1 Supplier: 81205
SPL-3899	Fixture - Test, Pressure Relief, Flame Arrestor Surge Tank Part #: F80166-1 Supplier: 81205
SPL-8420	Check Fixture Equipment, Pressure Relief Valve Part #: G28005-35 Supplier: 81205
STD-1084	Gauge - Pressure, 0-10 PSIG (0-69 KPa)
STD-3939	Air Source - Regulated, Dry Filtered, 0 to 10 psig
STD-3944	Vacuum Source, 0 to -3.0 psig

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. Prepare for the Pressure Check

SUBTASK 28-13-41-210-002

(1) Make sure that the pressure relief valve is closed.

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 valve check equipment, SPL-8420, on the relief valve, do these steps (Figure 601):

(a) Remove the four bolts from the applicable access doors:

1) 533BB - Surge Tank Access Door - Wing Station 679.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

2) 633BB - Surge Tank Access Door - Wing Station 679.

(b) Put the valve check equipment, SPL-8420, against the pressure relief valve.

1) Make sure that the O-ring seal is installed in the flange groove of the test fixture.

2) Make sure that the O-ring has a good seal in all positions.

(c) Attach the valve check equipment, SPL-8420, 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.

(d) Connect the regulated 0 to 10 psig air source, STD-3939, to the valve check equipment, SPL-8420.

SUBTASK 28-13-41-420-005

(4) To install the fixture, SPL-3899, do these steps (Figure 602):

(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 fixture, SPL-3899, 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.

(d) Attach the hose of the pressure gauge (0-10 PSIG) (0-69 KPa), STD-1084, or water manometer, SPL-1774, to the adapter fitting at the bottom of the fixture, SPL-3899.

1) If you use the pressure gauge (0-10 PSIG) (0-69 KPa), STD-1084, then make sure it has sufficient accuracy.

2) Make sure that there are no air leaks in the hose or the fittings.

(e) If you use the water manometer, SPL-1774, then do these steps to prepare the manometer to make the measurements:

1) Fill the water manometer, SPL-1774, to 39 in. (99 cm) above the horizontal tube at the base of the water manometer, SPL-1774.

2) Put a mark on the tube, at the level of the water, with a grease pen on the side that connects to the airplane.

3) Put another mark 14 in. (36 cm) below the current mark.

NOTE: This represents a change of 28 in. (71 cm) of water.

4) Place another mark 17.5 in. (44.5 cm) below the original mark.

NOTE: This represents a change of 35 in. (89 cm) of water.

5) Use these values for the test for positive pressure requirements.

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(f) Connect the fixture, SPL-3899, hose assembly to the leakage tracing device, SPL-1761.

NOTE: You use the leakage tracing device, SPL-1761, only to adjust and control the pressure on the relief valve.

1) To put positive pressure on the pressure relief valve, do these steps:

a) Make sure that the globe shutoff valve on the leakage tracing device, SPL-1761, is closed.

b) Connect the hose assembly to the fitting for positive pressure output.

(g) Connect the 0 to 10 psig air source, STD-3939, to the leakage tracing device, SPL-1761, at the fitting for the shop air input.

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 the 0 to 10 psig air source, STD-3939.

(a) Make sure that the pressure relief valve opens at a pressure between 1 psig (6.89 kPa) (27.7 in. (70.4 cm) of water) and 1.25 psig (8.62 kPa) (34.6 in. (87.9 cm) of water).

SUBTASK 28-13-41-080-001

(2) Put the pressure back to 0 psig (0 kPa).

SUBTASK 28-13-41-080-002

(3) Remove the 0 to 10 psig air source, STD-3939.

SUBTASK 28-13-41-080-003

(4) Remove the valve check equipment, SPL-8420, or fixture, SPL-3899.

SUBTASK 28-13-41-440-003

(5) Pull the T-handle to close the relief valve manually (Pressure Relief Valve - Manual Operation, TASK 28-13-41-400-802).

SUBTASK 28-13-41-480-002

(6) Install the applicable test fixture on the pressure relief valve again.

SUBTASK 28-13-41-480-003

(7) If you use the water manometer, SPL-1774, then do these steps to prepare the water manometer, SPL-1774:

(a) Put a mark 34.5 in. (87.6 cm) above the first mark (at the initial water level).

NOTE: A total of 73.5 in. (186.7 cm) above the horizontal tube at the base of the water manometer, SPL-1774. This represents a pressure differential of -69 in. (-175 cm) of water.

(b) Make a second mark 38 in. (97 cm) above the original water level.

NOTE: A total of 77 in. (196 cm) above the horizontal tube at the base of the water manometer, SPL-1774. This represents a pressure differential of -76 in. (-193 cm) of water.

(c) Use these values for the test for negative pressure requirements.

SUBTASK 28-13-41-480-004

(8) If you use the fixture, SPL-3899, then do these steps:

(a) Open the globe shutoff valve on the leakage tracing device, SPL-1761.

(b) Disconnect the hose from the positive pressure output.

(c) Connect the hose to the vacuum output fitting.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-13-41-780-002

(9) Install a vacuum source (0 to -3.0 psig), STD-3944, on the test fixture.

SUBTASK 28-13-41-720-001

(10) Decrease the pressure (increase the suction) on the test fixture until the relief valve opens.

(a) Make sure that the pressure relief valve opens at a pressure between -2.5 psig (-17.24 kPa) (-69.25 in. (-175.90 cm) of water) and -2.75 psig (-18.96 kPa) (-76.18 in. (-193.50 cm) of water).

SUBTASK 28-13-41-700-001

(11) If the pressure check does not pass the first time, do this procedure again a second time.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 28-13-41-860-005

(1) Set the pressure on the vacuum source (0 to -3.0 psig), STD-3944, to 0 psig (0 kPa).

SUBTASK 28-13-41-080-004

(2) Remove the vacuum source (0 to -3.0 psig), STD-3944, from the test fixture.

SUBTASK 28-13-41-080-005

(3) Do these steps to remove the valve check equipment, SPL-8420, if it was installed:

(a) Remove the four bolts of the test fixture from the access door.

1) Store the four bolts in the threaded holes on the valve check equipment, SPL-8420.

(b) Install the four bolts for the applicable access doors (TASK 28-11-11-400-803):

1) 533BB - Surge Tank Access Door - Wing Station 679.

2) 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) Disconnect the pressure gauge (0-10 PSIG) (0-69 KPa), STD-1084, or water manometer, SPL-1774, and leakage tracing device, SPL-1761, from the area.

(b) Remove the fixture, SPL-3899, from the relief valve.

(c) 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.

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. References

Reference	Title
28-11-11-000-802	Surge Tank Access Door Removal (P/B 401)

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(Continued)

Reference	Title
28-11-11-400-802	Surge Tank Access Door (533AB, 533CB, 633AB, 633CB) Installation (P/B 401)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659
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. 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.

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).

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SUBTASK 28-13-41-010-002

(4) Remove the applicable access doors from the surge tank:

(TASK 28-11-11-000-802)

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679
633BB	Surge Tank Access Door - Wing Station 679

F. Electrical Bonding Measurement

SUBTASK 28-13-41-765-002

(1) Measure the electrical bonding resistance between the pressure relief valve [1] and the door assembly [2] with a intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

(a) Make sure the resistance is 0.010 ohm (10 milliohms) or less.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 28-13-41-410-002

(1)

To install this access panel:

(TASK 28-11-11-400-802)

Number	Name/Location
533BB	Surge Tank Access Door - Wing Station 679

or close this access panel:

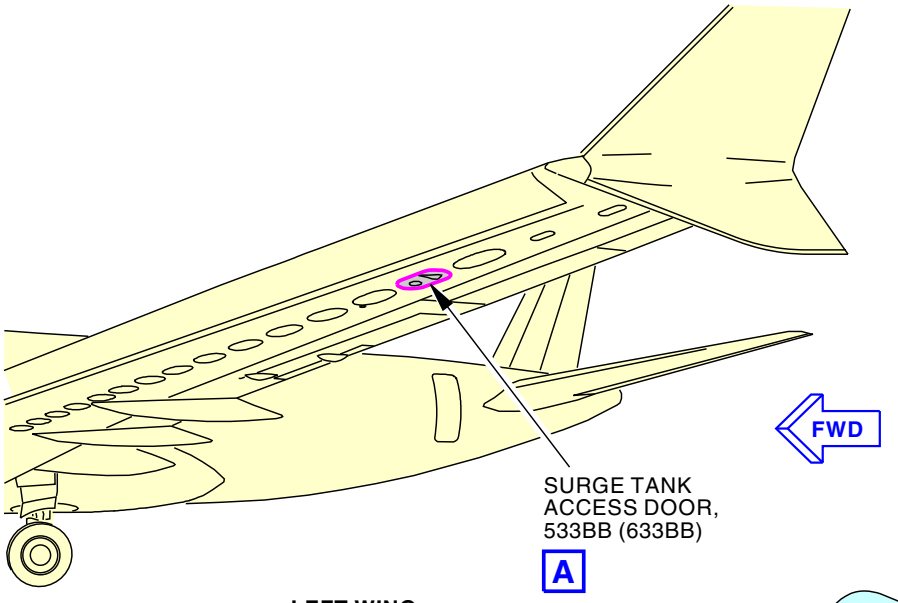
Number	Name/Location
633BB	Surge Tank Access Door - Wing Station 679

SUBTASK 28-13-41-410-003

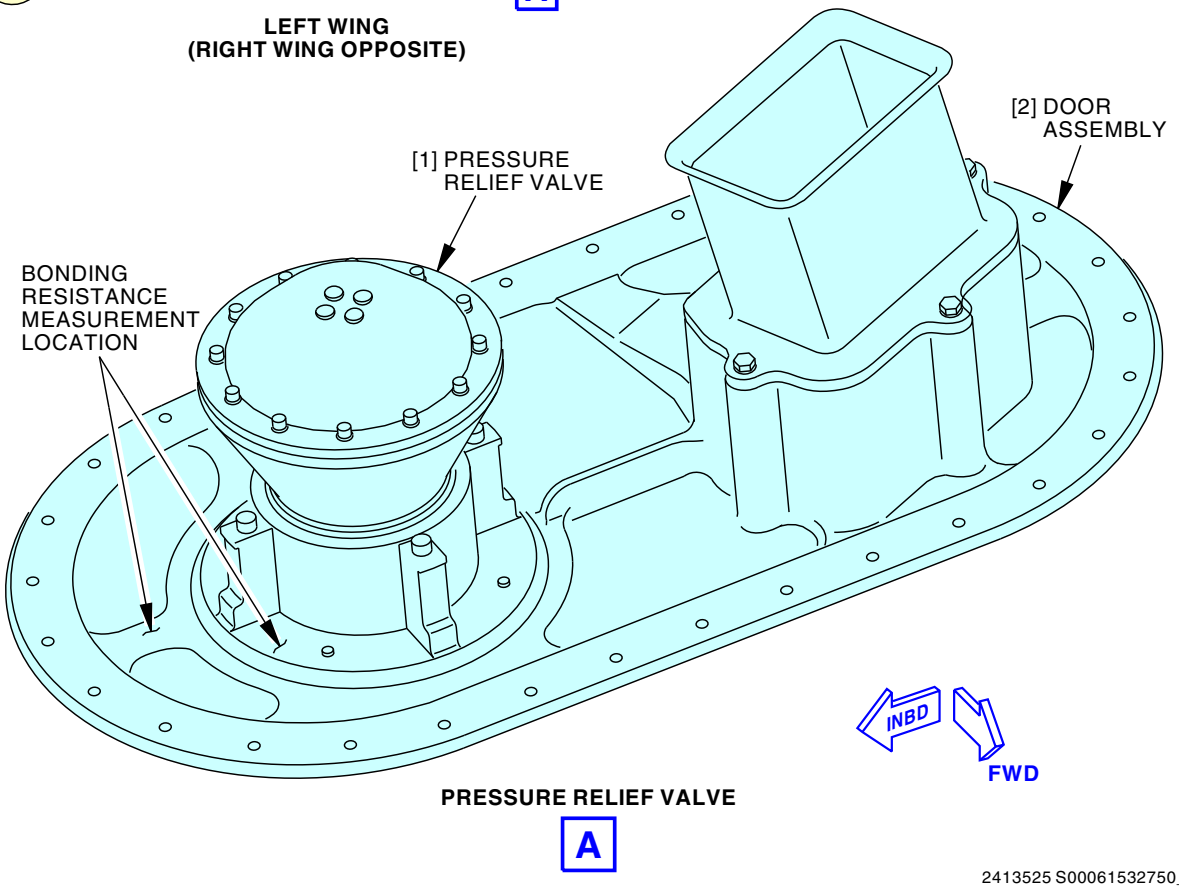
(2) Pull the T-handle to close the pressure relief valve manually (TASK 28-13-41-400-802).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



LEFT WING
(RIGHT WING OPPOSITE)



PRESSURE RELIEF VALVE

A

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Pressure Relief Valve - Bonding Resistance Measurement
Figure 603/28-13-41-990-804

ECCN 9E991 BOEING PROPRIETARY - See title page for details

PRESSURE FUELING SYSTEM - ADJUSTMENT/TEST

1. General

A. This procedure has the task:

(1) A test of the pressure fueling system.

TASK 28-21-00-700-801

2. Pressure Fueling System - Test

(Figure 501)

A. General

(1) This task gives the instructions to do the test the pressure fueling system.

B. References

Reference	Title
20-40-11-760-801	Electrical Bonding (P/B 201)
20-40-11-910-801	Static Grounding (P/B 201)
28-21-11-000-801	Fueling Receptacle Removal (P/B 401)
28-21-11-400-801	Fueling Receptacle Installation (P/B 401)

C. Tools/Equipment

Reference	Description
STD-1054	Container - Fuel Resistant, 5-Gallon (19-Liter)

D. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

E. Access Panels

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

F. Prepare for the Test

SUBTASK 28-21-00-910-001

WARNING YOU MUST ELECTRICALLY GROUND AND BOND THE AIRPLANE BEFORE YOU DO MAINTENANCE ON THE FUEL SYSTEM. IF YOU DO NOT GROUND AND BOND THE AIRPLANE, STATIC ELECTRICITY CAN CAUSE A FIRE OR EXPLOSION.

(1) Make sure that the airplane is grounded correctly (TASK 20-40-11-910-801).

SUBTASK 28-21-00-480-001

(2) Connect a ground 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.

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SUBTASK 28-21-00-760-001

(4) Open this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

G. Pressure Fueling System - Test

SUBTASK 28-21-00-710-001

(1) On the P15 Refuel Panel, make sure that the equipment operates correctly.

(a) Make sure that the floodlights for the refuel nozzle come on.

(b) Make sure that the preselect fuel quantity indicators show the correct fuel quantity.

SUBTASK 28-21-00-710-002

(2) Push each refuel valve light that shows the fueling valve position.

(a) Make sure that each refuel valve light comes on.

NOTE: The refuel valve lights are PRESS-TO-TEST buttons.

SUBTASK 28-21-00-710-003

(3) On the P15 Refuel Panel, hold the fueling indication test switch to the TEST GAUGES position.

NOTE: The test blanks the display on the three indicators for two seconds, then all LED segments go on for two seconds. This sequence continues as long as you hold the fueling indication test switch to the TEST GAUGES position.

If you hold the fueling indication test switch for more than 20 seconds, the test mode times out and the indicators goes back to its usual operating mode. If an internal fault is found during the test, the indicator will show Id FAIL.

(a) Make sure that the three preselect fuel quantity indicators operate correctly.

SUBTASK 28-21-00-710-012

(4) Release the fueling indication test switch.

SUBTASK 28-21-00-210-001

(5) Examine the refuel adapter.

(a) Examine the refuel adapter for damage that can cause the fuel nozzle not to have a good seal.

SUBTASK 28-21-00-710-004

(6) Make sure that the poppet valve in the fueling receptacle operates correctly (Figure 501).

(a) Put a 5-gallon (19-liter) fuel resistant container, STD-1054, below the fueling receptacle.

(b) Push the poppet valve in the fueling receptacle.

1) Make sure that the poppet valve has a good seal.

2) Make sure that it moves freely to open and to close.

SUBTASK 28-21-00-710-005

(7) On the P15 Refuel Panel, make sure that the fueling shutoff valves switches operates as follows:

(a) Set the fueling shutoff valve switch for the No. 1 main tank to the OPEN position.

1) Make sure that the refuel valve light for the No. 1 main tank comes on.

(b) Set the fueling shutoff valve switch for the No. 1 main tank to the CLOSED position.

1) Make sure that the refuel valve light for the No. 1 main tank goes off.

(c) Set the fueling shutoff valve switch for the No. 2 main tank to the OPEN position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Make sure that the refuel valve light for the No. 2 main tank comes on.

(d) Set the fueling shutoff valve switch for the No. 2 main tank to the CLOSED position.

1) Make sure that the refuel valve light for the No. 2 main tank goes off.

(e) Set the fueling shutoff valve switch for the center tank to the OPEN position.

1) Make sure that the refuel valve light for the center tank comes on.

(f) Set the fueling shutoff valve switch for the center tank to the CLOSED position.

1) Make sure that the refuel valve light for the center tank goes off.

SUBTASK 28-21-00-710-006

(8) On the refuel access panel, do a test on the floodlights.

(a) Put a thin steel strip 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 that these floodlights go off:

1) The two floodlights for the refuel nozzle.

2) The floodlight for the refuel panel.

(c) On the P15 Refuel Panel, hold the fueling indication test switch to the FUEL DOOR SWITCH BYPASS position.

(d) Make sure that the lights for the refuel station come on.

(e) Set the fueling indication test switch to the OFF position.

(f) Remove the steel strip on the proximity switch.

(g) Make sure that the distance between the magnet and the proximity switch is 0.08 ±0.02 in. (2.03 ±0.51 mm).

SUBTASK 28-21-00-480-003

WARNING MAKE SURE THAT THERE IS NO TENSION ON THE HOSE. THE HOSE MUST HANG FREELY FROM THE REFUEL ADAPTER, WITH NO FORCE ON IT. TENSION ON THE HOSE CAN CAUSE DAMAGE TO THE FUEL RECEPTACLE AND CAUSE THE HOSE TO DISCONNECT. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(9) Do an inspection of the refuel adapter before you connect the fuel hose nozzle:

(a) Make sure that the refuel adapter is clean, not damaged and there are no fuel leaks.

1) Make sure that the screws, lugs, and slots are not loose or damaged.

(b) If there is a problem with the refuel adapter, replace the fueling receptacle (TASK 28-21-11-000-801 and TASK 28-21-11-400-801).

(c) Attach the nozzle on the fuel hose to the refuel adapter.

1) Open the valve in the nozzle on the fuel hose.

2) Make sure that the nozzle and the refuel adapter have a good seal.

SUBTASK 28-21-00-860-002

(10) Make sure that all of the fueling shutoff valves are closed.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-21-00-790-001

WARNING MAKE SURE THAT THE SOURCE PRESSURE IS LESS THAN THE SPECIFIED PRESSURE. IF THE SOURCE PRESSURE IS TOO HIGH, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(11) Do a leak check of the pressure fueling system during the refuel operation:

(a) Make sure that 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 that the pressure is less than 55 psi (379 kPa).

(d) Make sure that there is no leakage at these locations:

1) The seal between the fuel nozzle and the refuel adapter.

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 that 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 that 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 28-21-00-710-013

(12) On the P15 Refuel Panel, turn the preset knob on TANK 1 to 1800.

SUBTASK 28-21-00-860-003

(13) Set the fueling shutoff valve switch for TANK 1 to the OPEN position.

SUBTASK 28-21-00-650-001

(14) Fill the No. 1 main tank with fuel.

SUBTASK 28-21-00-210-002

(15) Make sure that the fueling operation automatically stops when the top display of the preselect fuel quantity indicator for TANK 1 shows a value between 1700 and 1900.

SUBTASK 28-21-00-710-007

(16) Examine these indicators to make sure that the refuel operation started:

(a) The flowmeter on the fuel truck or the fuel source.

(b) The preselect fuel quantity indicator for the No. 1 main tank.

SUBTASK 28-21-00-650-002

(17) Continue to put fuel in the fuel tank until the fueling float switch closes the fueling shutoff valve.

SUBTASK 28-21-00-860-004

(18) Set the fueling shutoff valve switch for TANK 1 to the CLOSED position.

SUBTASK 28-21-00-860-005

(19) On the P15 Refuel Panel, set the fueling shutoff valve switch for TANK 2 to the OPEN position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-21-00-710-014

(20) Turn the preset knob on TANK 2 to 1800.

SUBTASK 28-21-00-650-003

(21) Fill the No. 2 main tank with fuel.

SUBTASK 28-21-00-710-008

(22) Examine these indicators to make sure that the refuel operation started:

(a) The flowmeter on the fuel truck or the fuel source.

(b) The preselect fuel quantity indicator for the No. 2 main tank.

SUBTASK 28-21-00-710-015

(23) Make sure that the fueling operation automatically stops when the top display of the preselect fuel quantity indicator for TANK 2 shows a value between 1700 and 1900.

SUBTASK 28-21-00-710-009

(24) Continue to put fuel in the fuel tank until the fueling float switch closes the fueling shutoff valve.

SUBTASK 28-21-00-860-006

(25) Set the fueling shutoff valve switch for TANK 2 to the CLOSED position.

SUBTASK 28-21-00-860-007

(26) On the P15 Refuel Panel, set the fueling shutoff valve switch for the CENTER TANK to the OPEN position.

SUBTASK 28-21-00-710-016

(27) Turn the preset knob on the CENTER TANK to 6700.

SUBTASK 28-21-00-650-004

(28) Fill the center tank with fuel.

SUBTASK 28-21-00-210-003

(29) Make sure that the fueling operation automatically stops when the top display of the preselect fuel quantity indicator for the CENTER TANK shows a value between 6600 and 6800.

SUBTASK 28-21-00-710-010

(30) Examine these indicators to make sure that the refuel operation started:

(a) The flowmeter on the fuel truck or the fuel source

(b) The preselect fuel quantity indicator for the No. 2 main tank.

SUBTASK 28-21-00-710-011

(31) Continue to put fuel in the fuel tank until the fueling float switch closes the fueling shutoff valve.

SUBTASK 28-21-00-860-008

(32) Set the fueling shutoff valve switch for the CENTER TANK to the CLOSED position.

H. 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) Remove the fuel hose in this sequence.

(a) Close the valve on the nozzle of the fuel hose.

(b) Disconnect the nozzle from the refuel adapter.

SUBTASK 28-21-00-160-001

(3) Soak up the fuel that fell during the refuel operation if there is some unwanted fuel.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-21-00-080-002

(4) Disconnect the ground cables from the fuel source and the airplane (TASK 20-40-11-910-801).

SUBTASK 28-21-00-080-003

(5) Disconnect the bonding cable between the fueling vehicle and the airplane (TASK 20-40-11-760-801).

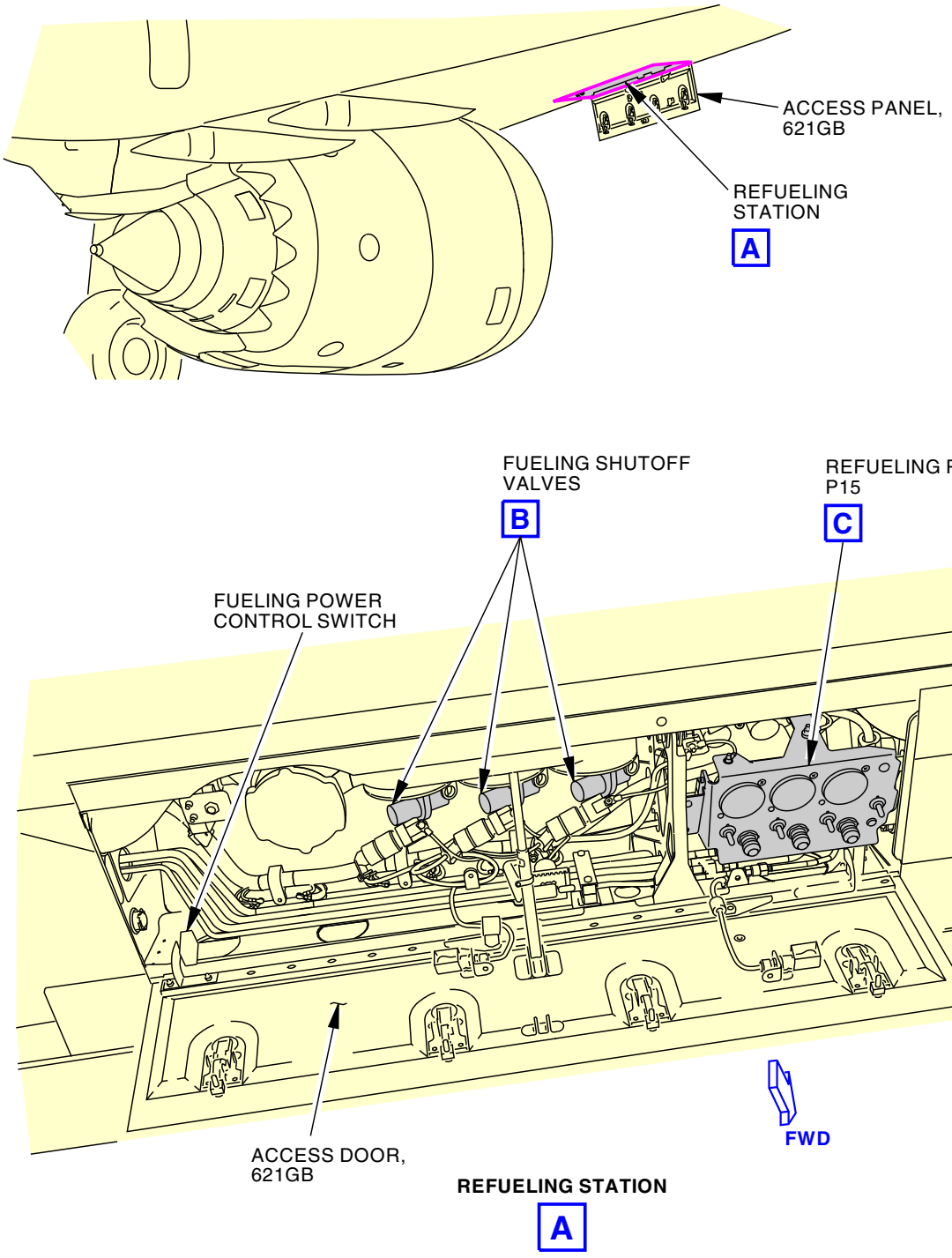
SUBTASK 28-21-00-410-001

(6) Close this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

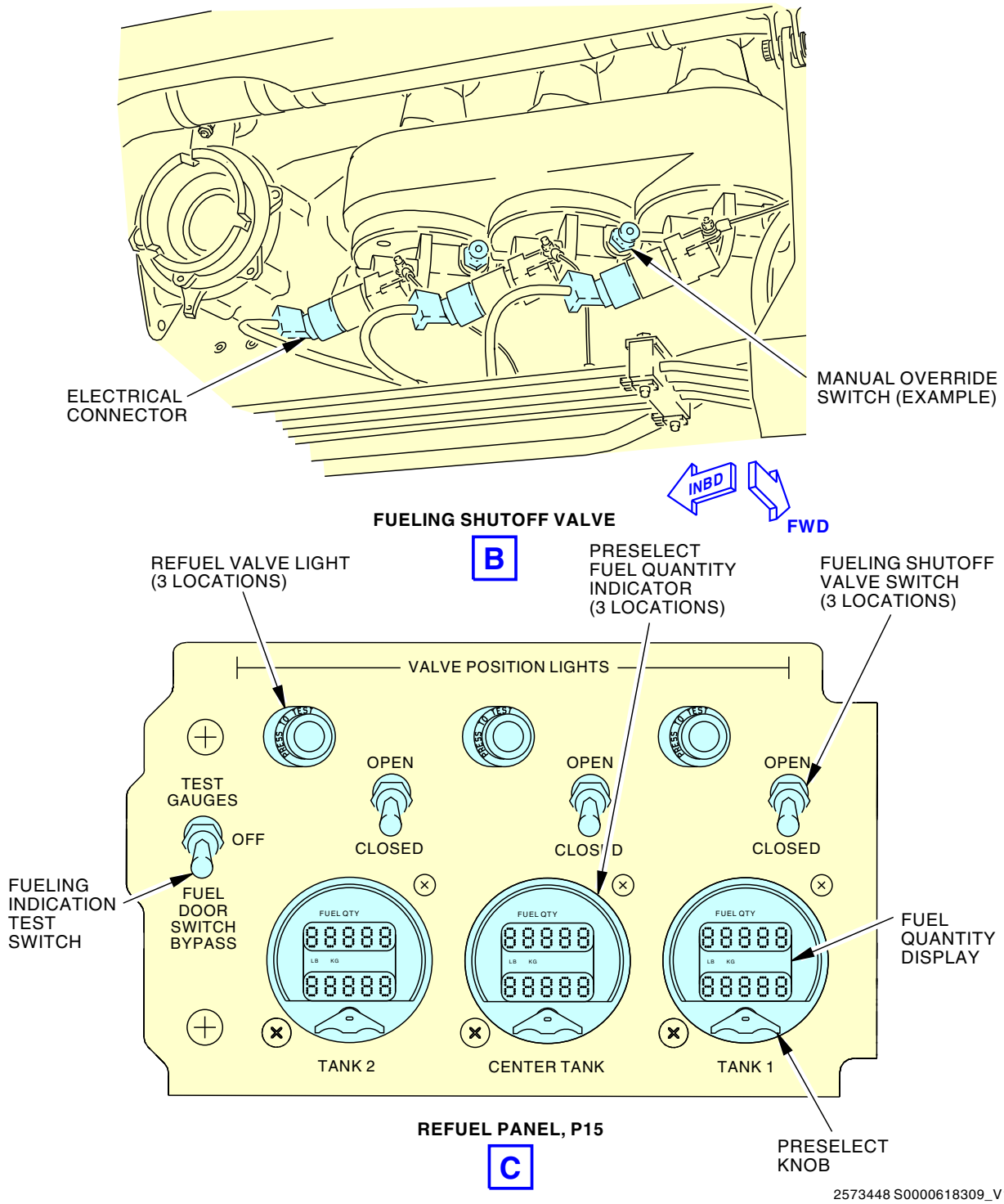
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Pressure Fueling System Test
Figure 501/28-21-00-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Pressure Fueling System Test
Figure 501/28-21-00-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

PRESSURE FUELING SYSTEM - INSPECTION/CHECK

1. General

A. This procedure has these tasks:

(1) Refuel Adapter Check.

(a) If there is fuel leakage or damage at the refuel adapter, it must be replaced.

(2) Refuel Panel Wire Bundle Inspection.

TASK 28-21-00-750-801

2. Refuel 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. 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-8626	Wear Gage - Inlet Adapter Part #: 61657-2 Supplier: 0DT23

C. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

D. Access Panels

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

E. Refuel Adapter Check

SUBTASK 28-21-00-010-001

(1) Open this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-21-00-211-001

(2) Make sure that the refuel adapter is clean and does not have damage.

(a) Examine the refuel adapter to make sure that each of the screws that attach the refuel adapter are not loose, missing or damaged.

(b) Examine the refuel adapter for bent or cracked lugs.

(c) Do a detailed visual examination of the cylinder area in less than 0.5 in. (12.7 mm) circumferentially on each side of each lug for cracks.

NOTE: The examination area includes the inner and outer surfaces of the refuel adapter from the bottom of the adapter flange to the shear groove.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-21-00-750-001

(3) Make sure that the flange of the refuel adapter is in these limits.

NOTE: Use of the wear gage, COM-8626, is recommended to measure these limits (View B, Figure 601).

(a) The thickness of the three lugs of the flange is more than 0.224 in. (5.690 mm) (View C, Figure 601).

(b) The width of the three lugs of the flange is more than 0.425 in. (10.795 mm) (View C, Figure 601).

(c) The three slots of the flange must not be worn such that a pin, oblong with full circular ends of 0.305 in. (7.747 mm) width and 0.250 in. (6.350 mm) thickness, can be put into the slots a depth of 0.120 in. (3.048 mm) (View D, Figure 601).

SUBTASK 28-21-00-220-001

(4) If you use the wear gage, COM-8626, to measure the dimensions of the flange, do these steps:

(a) Measure the dimensions of the slot.

1) Put the gauge on the refuel adapter, near one lug so that the gauge cap and center pin face away from the refuel adapter, toward you.

2) Make sure that the refuel adapter groove in the opposite face of the gauge (the face toward the refuel adapter, away from you) fits on the rim of the refuel adapter and moves smoothly along the rim.

3) There are two lines on the face of the refuel adapter to you to help you line up the groove with the adapter rim.

4) The center pin must extend out of the gage cap to you.

5) Move the gauge around the rim to the opposite lug until the center pin goes into the slot.

a) If the refuel adapter is OK, you will only hear a slight click and only get a slight feeling of resistance when the pin touches the slot. The pin will not move significantly into the slot. The pin will continue to extend from the gauge cap.

b) If the refuel adapter is not OK, you will feel more resistance when the pin enters the slot. The pin will be flush with the gauge cap or lower than the gauge cap.

c) When the pin is in the slot, do a check to make sure that the pin continues to extend from the gauge cap to see if the pin has not significantly entered the slot.

<1> If the pin continues to extend from the gauge cap, then the slot is okay.

<2> If the pin is flush with the gauge cap or lower than the gauge cap, then the slot is not okay. Replace the refuel adapter (“flange”).

6) Do this same check for the other two slots on the refuel adapter (“flange”).

(b) Measure the thickness of the refuel adapter lugs, use the smaller of the two notches provided on the gauge.

1) Try to move the smaller of the two notches across one of the lugs.

2) If the gauge will move fully across the lug, then the lug has less than the minimum thickness.

a) Replace the refuel adapter (“flange”) (TASK 28-21-11-000-801, TASK 28-21-11-400-801).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

3) If the gauge will not move across the lug, then the lug is okay.

a) Do this same check for the other two lugs.

(c) Measure the thickness of the refuel adapter lugs, use the larger of the two notches provided on the gauge.

1) Try to set the gauge onto the lug through the larger notch.

2) If you can set the gauge onto the lug through the larger notch, then the lug has less than the minimum width.

a) Replace the refuel adapter (“flange”) (TASK 28-21-11-000-801, TASK 28-21-11-400-801).

3) If you cannot set the gauge onto the lug through the larger notch, then the lug is okay.

a) Do this same check for the other two lugs.

SUBTASK 28-21-00-960-001

(5) If the flange of the refuel adapter is not in the correct limits, replace the refuel adapter (TASK 28-21-11-000-801, TASK 28-21-11-400-801).

(a) Make sure that a new flange is installed.

F. Put the Airplane Back to Its Usual Condition

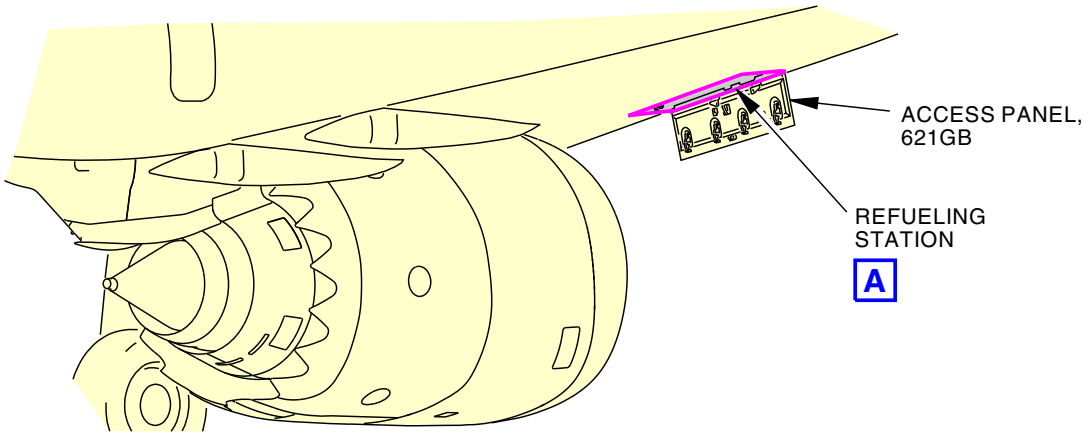
SUBTASK 28-21-00-410-002

(1) Close this access panel:

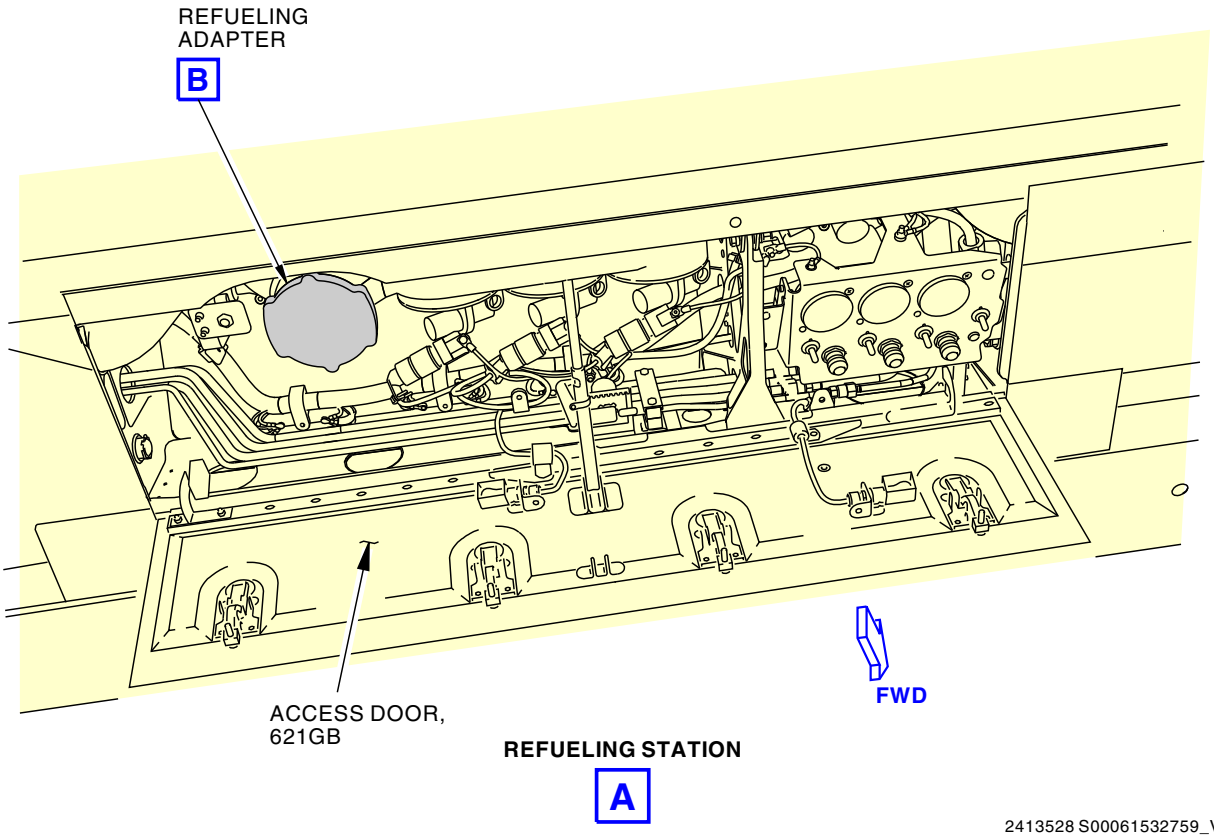
Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



RIGHT WING



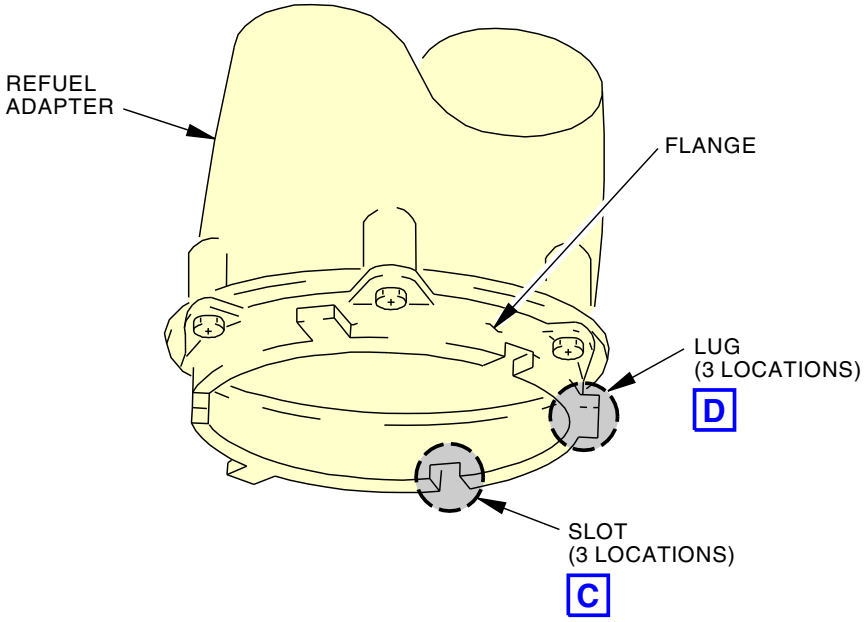
REFUELING STATION

A

2413528 S00061532759_V2

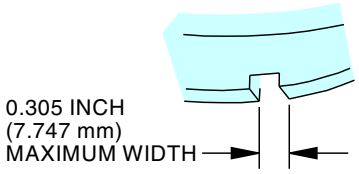
Refuel Adapter Inspection
Figure 601/28-21-00-990-802 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



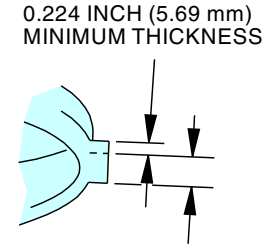
REFUELING ADAPTER
(EXAMPLE)

B



SLOT
(3 LOCATIONS)

C



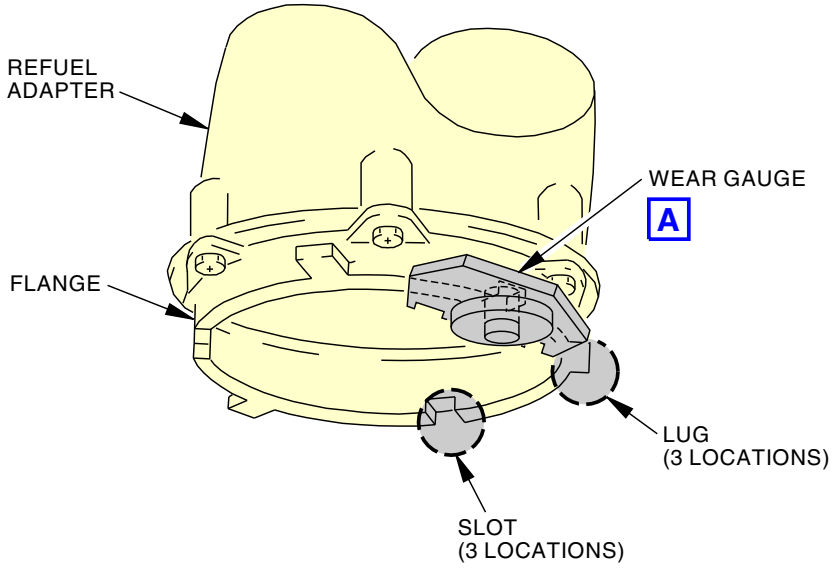
LUG
(3 LOCATIONS)

D

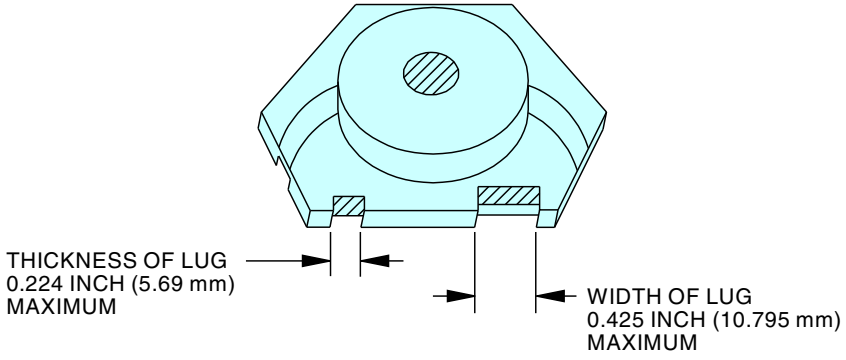
2413529 S00061532760_V1

Refuel Adapter Inspection
Figure 601/28-21-00-990-802 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



**REFUELING ADAPTER
(EXAMPLE)**



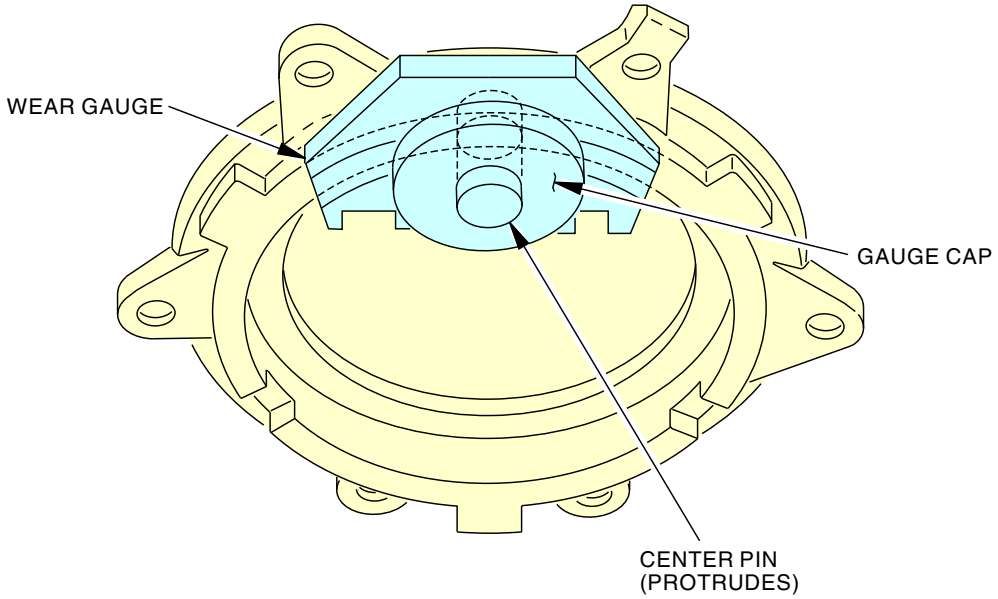
**WEAR GAUGE
(DIMENSIONS)**

A

2413530 S00061532761_V1

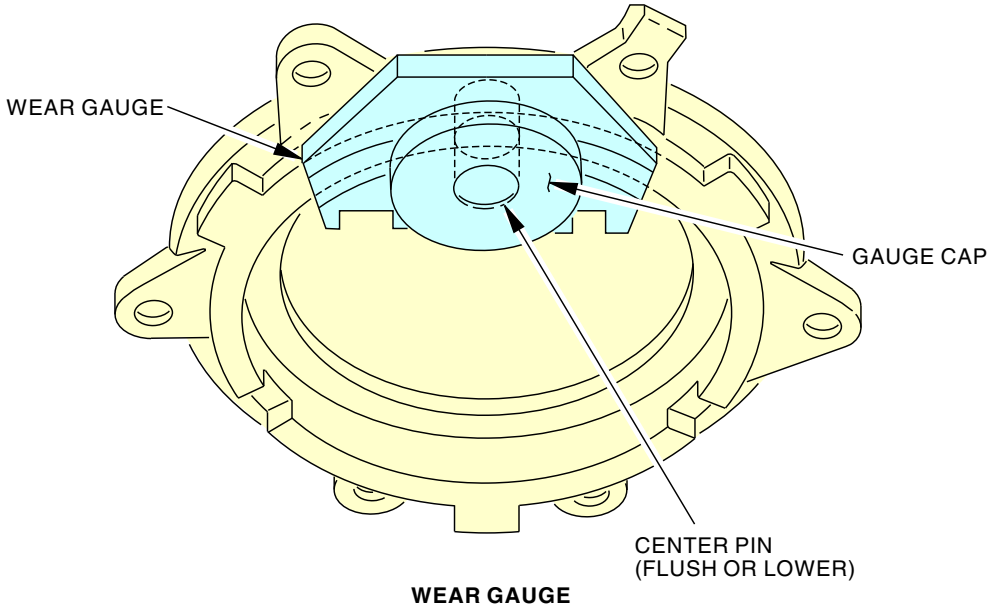
**Refuel Adapter Wear Gauge
Figure 602/28-21-00-990-803 (Sheet 1 of 3)**

ECCN 9E991 BOEING PROPRIETARY - See title page for details



WEAR GAUGE
(SLOT OK)

A



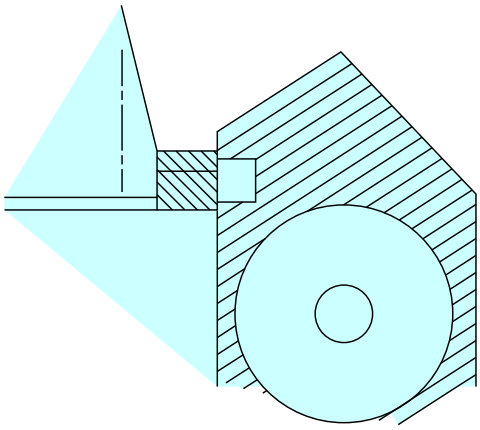
WEAR GAUGE
(SLOT NOT OK)

A

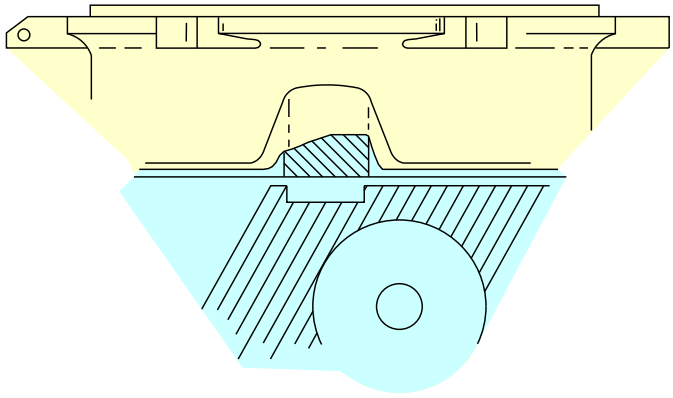
2413531 S00061532762_V1

Refuel Adapter Wear Gauge
Figure 602/28-21-00-990-803 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



CHECKING ADAPTER LUG THICKNESS



CHECKING ADAPTER LUG WIDTH

2413532 S00061532763_V1

Refuel Adapter Wear Gauge
Figure 602/28-21-00-990-803 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-21-00-211-801

3. Refuel Panel Wire Bundle Inspection

A. General

(1) This task gives instructions to do an inspection of the refuel panel wire bundle.

B. References

Reference	Title
28-21-82-000-801	Refuel Panel, P15 Removal (P/B 401)
28-21-82-400-801	Refuel Panel, P15 Installation (P/B 401)
SWPM 20-10-11	WIRING ASSEMBLY AND INSTALLATION CONFIGURATION
SWPM 20-10-13	Repair of Electrical Wire and Cable
SWPM 20-10-18	Standard Wiring Practices Manual

C. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

D. Prepare for the Inspection

SUBTASK 28-21-00-000-001

(1) Remove the P15 Refuel Panel (TASK 28-21-82-000-801).

E. Refuel Panel Wire Bundle Inspection

SUBTASK 28-21-00-211-003

(1) Visually examine the wires in the wire bundle, W0024, to the connector, D4578P.

(a) Look for indications of these types of problems:

1) Chafed wires

2) Damaged wires

3) Arcing

4) Loose wires with too not enough tension.

5) Damage to the contact pins on connector, D4578P, or to the sockets on D4578J.

SUBTASK 28-21-00-211-004

(2) Behind the P15 Refuel Panel and in the wing structure, do a check for marks or indications where wire chafing occurred.

(a) Examine these types of surfaces behind the P15 Refuel Panel and in the wing structure:

1) Flat edges on the rear of the P15 Refuel Panel.

2) Round edges on the backshells of the refuel quantity indicators.

3) Sharp edges or objects in the wing structure behind the P15 Refuel Panel.

SUBTASK 28-21-00-211-005

(3) If you find wires with problems or damage, then repair or replace these wires:

(a) If there is damage to the 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 Refuel Panel and in the wing structure (SWPM 20-10-11).

1) Tie these wires to the main wire bundle, W0024.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

2) Make sure that the wire bundle service loops have sufficient length and slack to permit the P15 Refuel 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 that 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 Refuel 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 more protection, wires that are routed near sharp edges can be wrapped with one more Teflon sleeve.

F. Install the Refuel Panel

SUBTASK 28-21-00-400-001

(1) Install the P15 Refuel Panel (TASK 28-21-82-400-801).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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. General

(1) This task gives the instructions to remove the fueling receptacle [1].

B. References

Reference	Title
24-22-00-860-802	Remove Electrical Power (P/B 201)

C. Tools/Equipment

Reference	Description
STD-195	Container - 1 Quart, 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 Valve Door - Slat Station 125

F. Prepare for the Removal

SUBTASK 28-21-11-010-001

(1) Open this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-21-11-860-001

(2) Make sure that 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 24-22-00-860-802.

G. Fueling Receptacle Removal

SUBTASK 28-21-11-680-001

(1) Drain the remaining fuel from the fueling receptacle [1].

(a) Put 1 quart oil/fuel resistant container, STD-195, below the fueling receptacle [1] to catch the fuel.

(b) Push the poppet valve [5] in the fueling receptacle [1].

(c) Let the fuel drain from the fueling receptacle [1] and the refueling manifold [2].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-21-11-020-001

(2) Remove the mounting screws [3] from the refuel adapter [4].

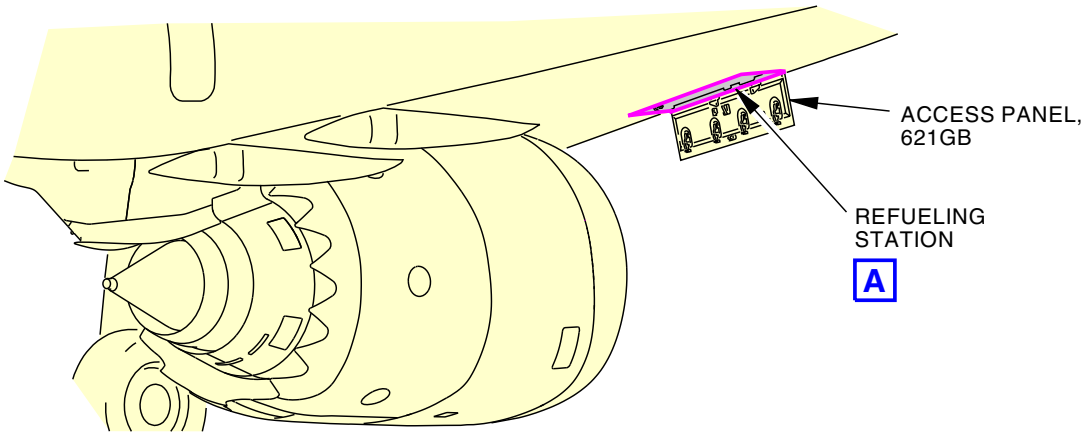
SUBTASK 28-21-11-020-002

(3) Remove the fueling receptacle [1] down in a straight line until the poppet valve [5] is out of the refueling manifold [2].

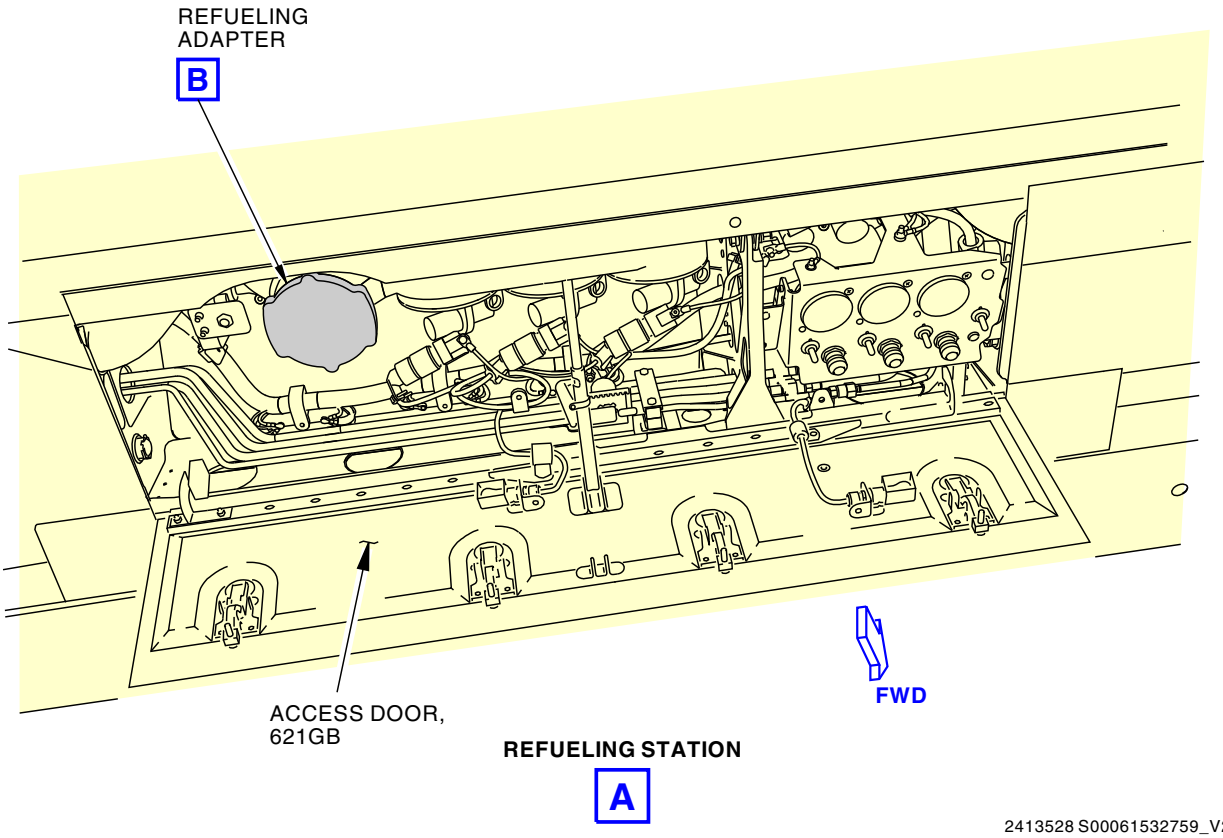
(a) Discard the O-ring [6].

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



RIGHT WING



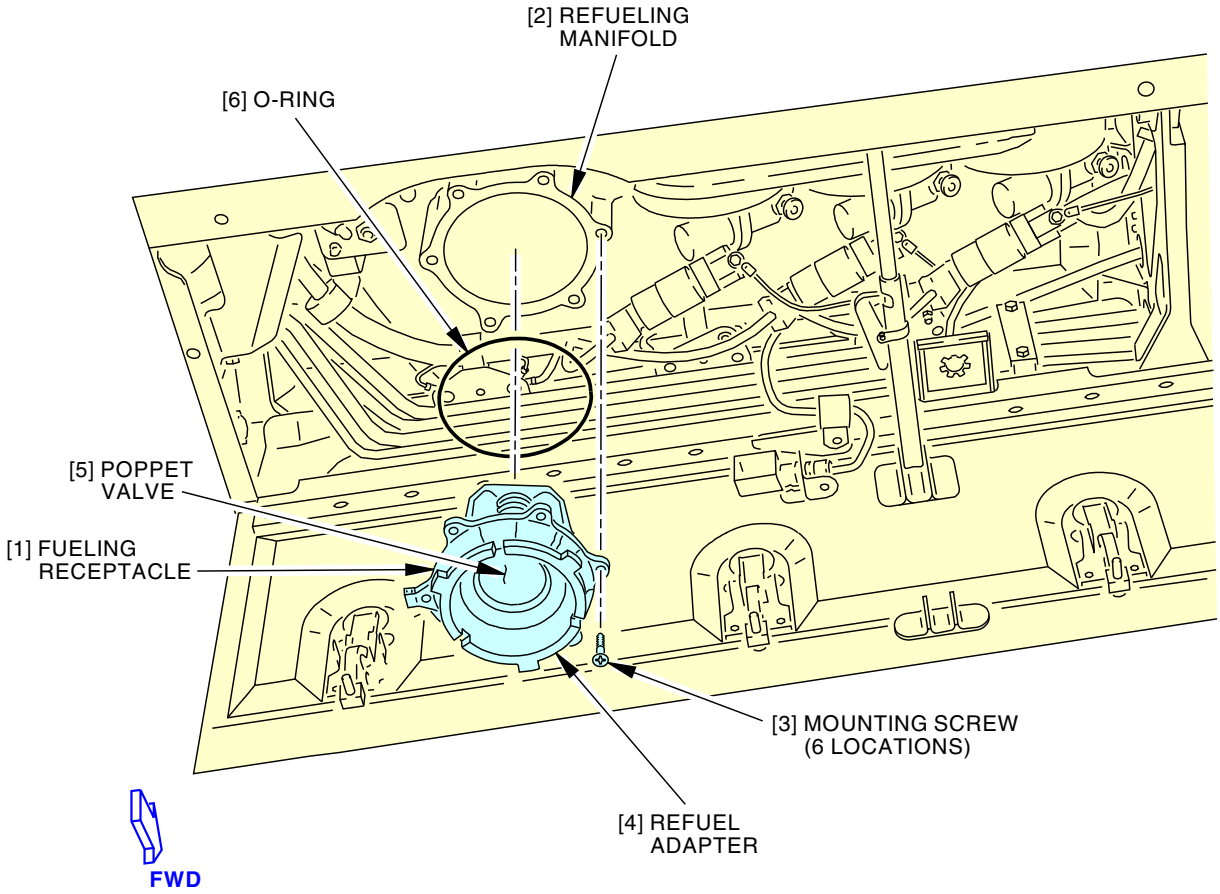
REFUELING STATION

A

2413528 S00061532759_V2

Fueling Receptacle Installation
Figure 401/28-21-11-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



REFUELING ADAPTER

B

2413534 S00061532769_V2

Fueling Receptacle Installation
Figure 401/28-21-11-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-21-11-400-801

3. Fueling Receptacle Installation

(Figure 401)

A. General

(1) This task gives the instructions to install the fueling receptacle [1].

B. Consumable Materials

Reference	Description	Specification
B00083	Solvent - VM&P Naphthas	TT-N-95 Type II, ASTM D-3735 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Fueling receptacle	28-21-11-01-020	SIA ALL
6	O-ring	28-21-11-01-015	SIA ALL

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 Valve Door - Slat Station 125

F. Fueling Receptacle Installation

SUBTASK 28-21-11-210-001

(1) Clean these surfaces with solvent, B00083, and dry with a cotton wiper, G00034:

(a) All of the machined surfaces on the refueling manifold [2].

(b) All of the O-ring [6] grooves on the refueling manifold [2].

(c) All of the machined surfaces on the refuel adapter [4].

(d) All of the O-ring [6] grooves on the refuel adapter [4].

SUBTASK 28-21-11-420-001

(2) Put a new O-ring [6], lightly lubricated with fuel, into the groove on the refuel adapter [4].

SUBTASK 28-21-11-420-002

(3) Put the refuel adapter [4] into the refueling manifold [2].

SUBTASK 28-21-11-420-003

CAUTION

DO NOT LOOSEN THE O-RING OR PUSH IT OUT OF ITS CORRECT SHAPE. IF YOU CAUSE DAMAGE TO THE O-RING, A FUEL LEAK CAN EASILY OCCUR.

(4) Turn the refuel adapter [4] to align the screw holes with the holes in the refueling manifold [2].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-21-11-420-004

(5) Install the mounting screws [3] for the fueling receptacle [1].

(a) Tighten the mounting screws [3] to a torque of 25 ±1 in-lb (2.8 ±0.1 N·m).

(b) Make sure that the flange of the refuel adapter [4] is parallel to the flange of the refueling manifold [2] during this procedure.

SUBTASK 28-21-11-710-001

(6) Make sure that the poppet valve [5] operates correctly.

(a) Push the poppet valve [5] and make sure that the valve opens freely.

(b) Make sure that the poppet valve [5] closes easily when you release it again.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 28-21-11-410-001

(1) Close this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FUELING RECEPTACLE - INSPECTION/CHECK

1. General

A. 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. References

Reference	Title
20-10-51-760-801	Electrical Resistance Specifications in the Fuel Tank Check (P/B 401)
24-22-00-860-802	Remove Electrical Power (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
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659
STD-195	Container - 1 Quart, Oil/Fuel Resistant

C. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

D. Access Panels

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

E. Prepare for the Procedure

SUBTASK 28-21-11-010-002

(1) Open this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-21-11-710-002

(2) Make sure that 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 24-22-00-860-802.

SUBTASK 28-21-11-616-001

(4) Drain the remaining fuel from the fueling receptacle.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Put a 1 quart 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 refueling manifold.

F. Electrical Bonding Measurement

SUBTASK 28-21-11-765-001

(1) Measure the electrical bonding resistance between the fueling receptacle (manifold) and the structure with an intrinsically safe approved bonding meter, COM-1550 (TASK 20-10-51-760-801).

(a) Make sure that the electrical fay surface bonding resistance is less than 0.0025 ohm (2.5 milliohms).

G. Put the Airplane Back to Its Usual Condition

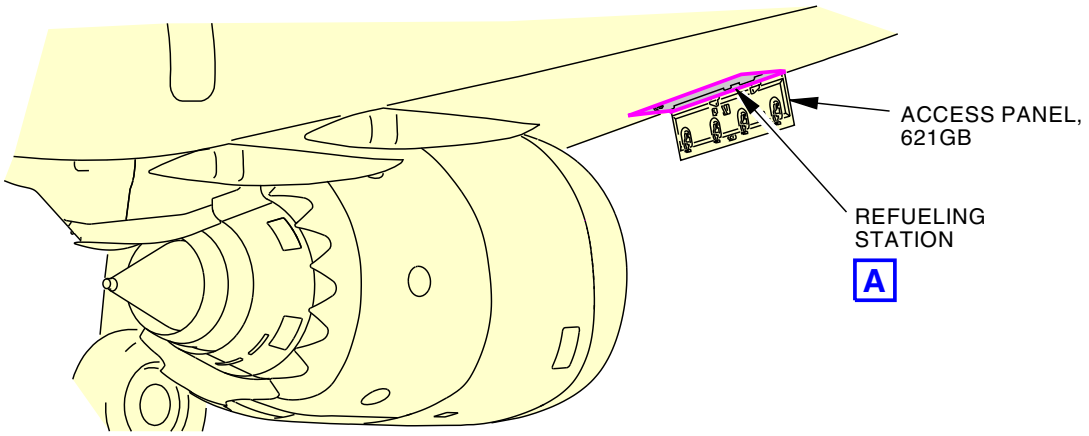
SUBTASK 28-21-11-410-002

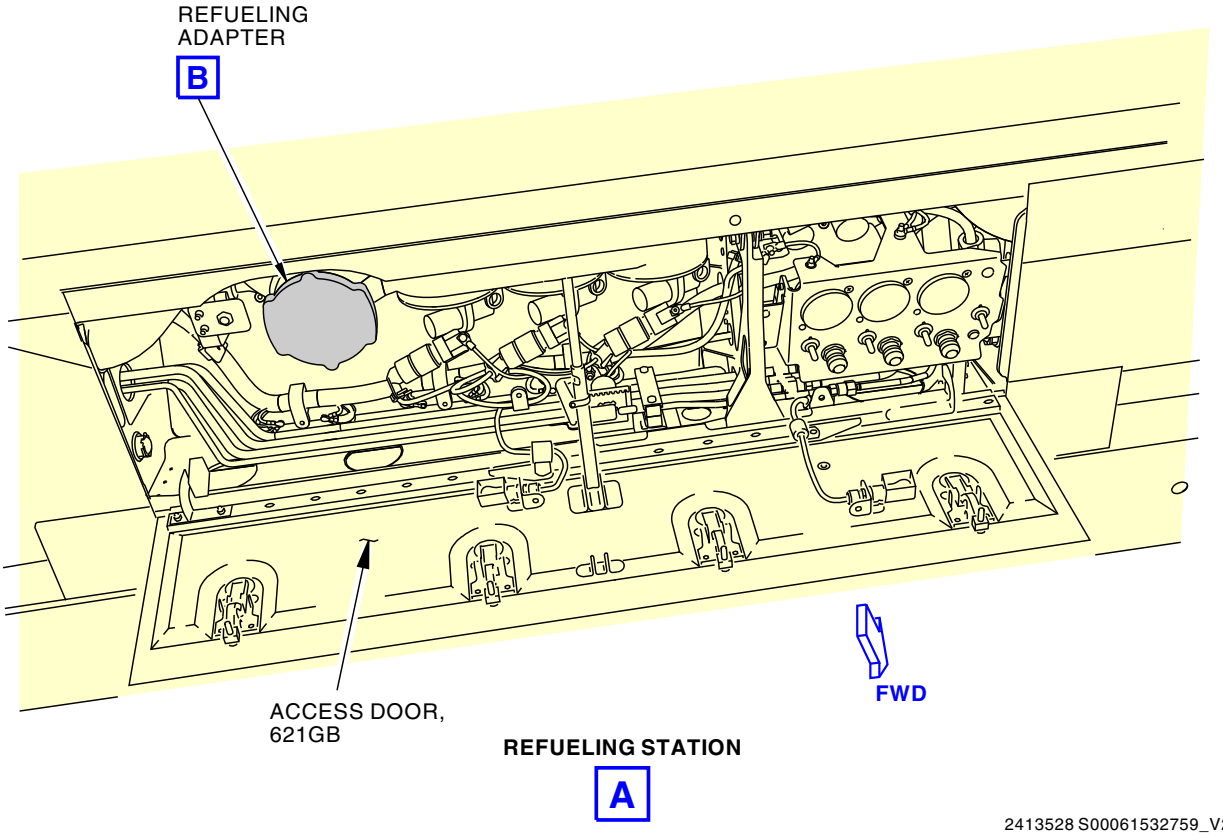
(1) Close this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

——— END OF TASK ———

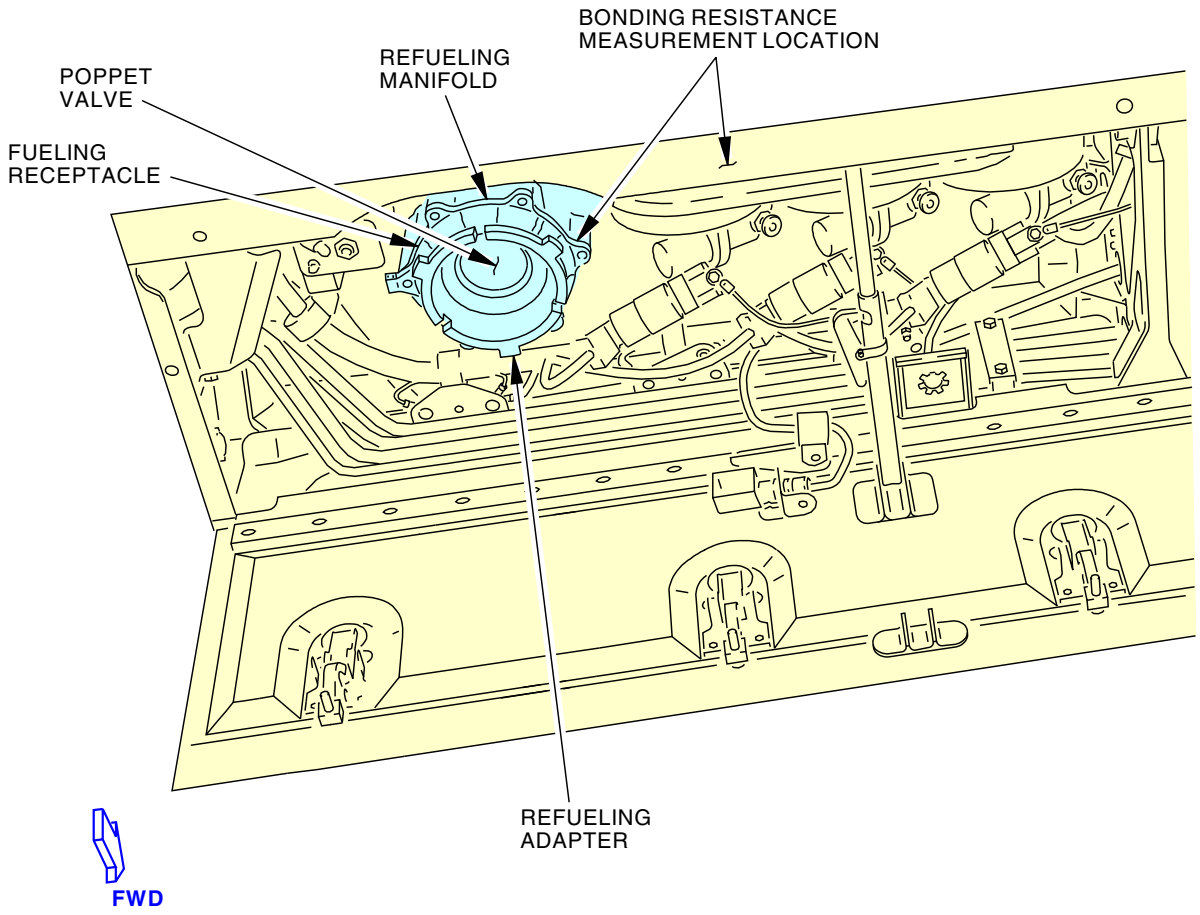
ECCN 9E991 BOEING PROPRIETARY - See title page for details





Fueling Receptacle - Bonding Resistance Measurement
Figure 601/28-21-11-990-802 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



REFUELING ADAPTER

B

2413536 S00061532774_V2

Fueling Receptacle - Bonding Resistance Measurement
Figure 601/28-21-11-990-802 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

REFUELING MANIFOLD - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) A task to remove the refueling manifold.

(2) A task to install the refueling manifold.

(3) A task to replace the refueling panel floodlight.

TASK 28-21-21-000-801

2. Refueling Manifold Removal

(Figure 401)

A. General

(1) This task gives instructions to remove the refueling manifold [21].

B. References

Reference	Title
24-22-00-860-802	Remove Electrical Power (P/B 201)
28-21-11-000-801	Fueling Receptacle Removal (P/B 401)
28-21-51-000-801	Fueling Shutoff Valve Removal (P/B 401)
28-21-82-000-801	Refuel Panel, P15 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)
28-26-11-010-801	Defueling Valve Handle Removal (P/B 401)

C. Tools/Equipment

Reference	Description
STD-195	Container - 1 Quart, 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
621EB	Lower Leading Edge Access Panel - Slat Station 91
621GB	Refuel Valve Door - Slat Station 125

F. Prepare for the Removal

SUBTASK 28-21-21-650-001

WARNING MAKE SURE THAT YOU COMPLETE ALL OF THE DEFUEL SAFETY PROCEDURES BEFORE YOU GO INTO THE FUEL TANK. DAMAGE AND INJURIES TO PERSONS 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 3500 lb (1588 kg).

(a) The No. 2 tank must contain less than 3500 lb (1588 kg) to do this procedure.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-21-21-860-001

(2) Do this task: Remove Electrical Power, TASK 24-22-00-860-802.

SUBTASK 28-21-21-010-001

(3) Open this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

(a) Remove the pins that attach the linkage assemblies to the access door.

SUBTASK 28-21-21-010-002

(4) Remove the P15 refuel panel (TASK 28-21-82-000-801).

SUBTASK 28-21-21-010-008

(5) Disconnect the electrical connector [15] to each of the fueling shutoff valves (three locations).

SUBTASK 28-21-21-010-003

(6) Remove the two bolts to remove the TAI duct shield [5].

SUBTASK 28-21-21-860-002

(7) Do these steps to make sure that the defueling valve is close (TASK 28-26-11-010-801):

(a) Open this access panel:

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91

(b) Make sure that the manual defueling valve is closed.

(c) Close this access panel:

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91

G. Refueling Manifold Removal

SUBTASK 28-21-21-680-001

(1) Drain the fuel from the refueling manifold [21].

(a) Put 1 quart oil/fuel resistant container, STD-195, below the fueling receptacle.

(b) Push the poppet valve in the fueling receptacle.

(c) Let the remaining fuel drain from the fueling receptacle and from the refueling manifold [21].

SUBTASK 28-21-21-010-004

(2) Remove the fueling shutoff valves (TASK 28-21-51-000-801).

NOTE: If you are scheduled to remove the fueling receptacle, refer to the task: Fueling Receptacle Removal, TASK 28-21-11-000-801.

SUBTASK 28-21-21-020-001

(3) Disconnect the screw [8], washers [9], and nut [10] that attach the bonding jumper [11] installed on the aft inboard side of the refueling manifold [21] adjacent to the airplane structure.

(a) Make sure that the bonding jumpers [11] that are installed from the fueling shutoff valves to the refueling manifold [21] are disconnected.

SUBTASK 28-21-21-020-002

(4) Remove the bolts [6] and washers [7] that attach the refueling manifold [21] to the defuel port [22] (three locations).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-21-21-010-005

(5) Carefully move the electrical wiring to one side to permit the removal of the refueling manifold [21].

SUBTASK 28-21-21-020-003

(6) Remove the screws [18], washers [19], and O-rings [20] that attach the refueling manifold [21] to the check valves [23].

SUBTASK 28-21-21-020-004

(7) Hold the refueling manifold [21] up and remove the bolt [2], washer [3], bushing [4], bolt [12], washer [13], and bushing [14] that attach the refueling manifold [21] to the support members for the leading edge.

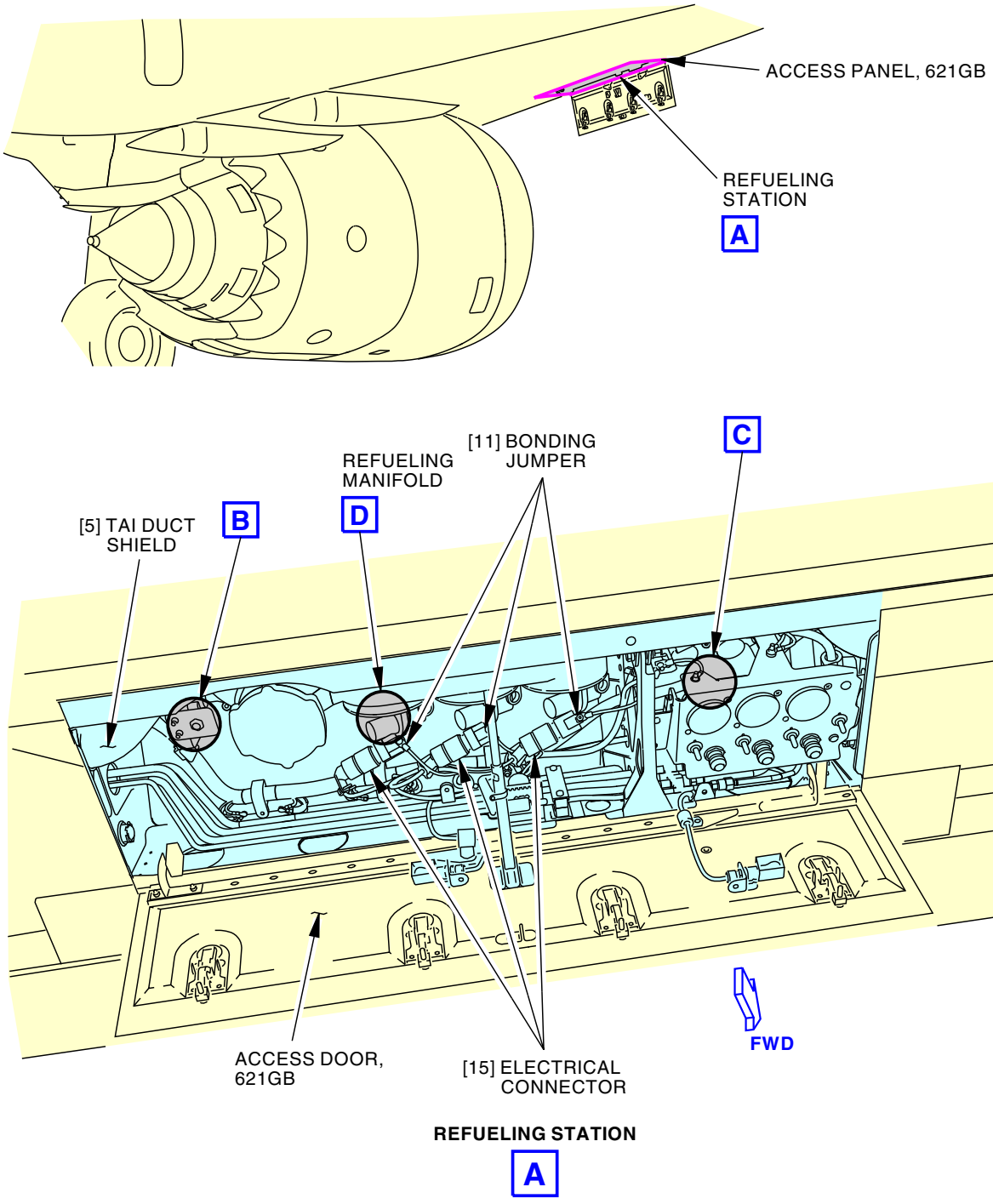
SUBTASK 28-21-21-020-005

(8) Remove the refueling manifold [21] from the airplane.

(a) Discard the O-rings [16] on the check valve [23] and O-ring [17] on the defuel port [22].

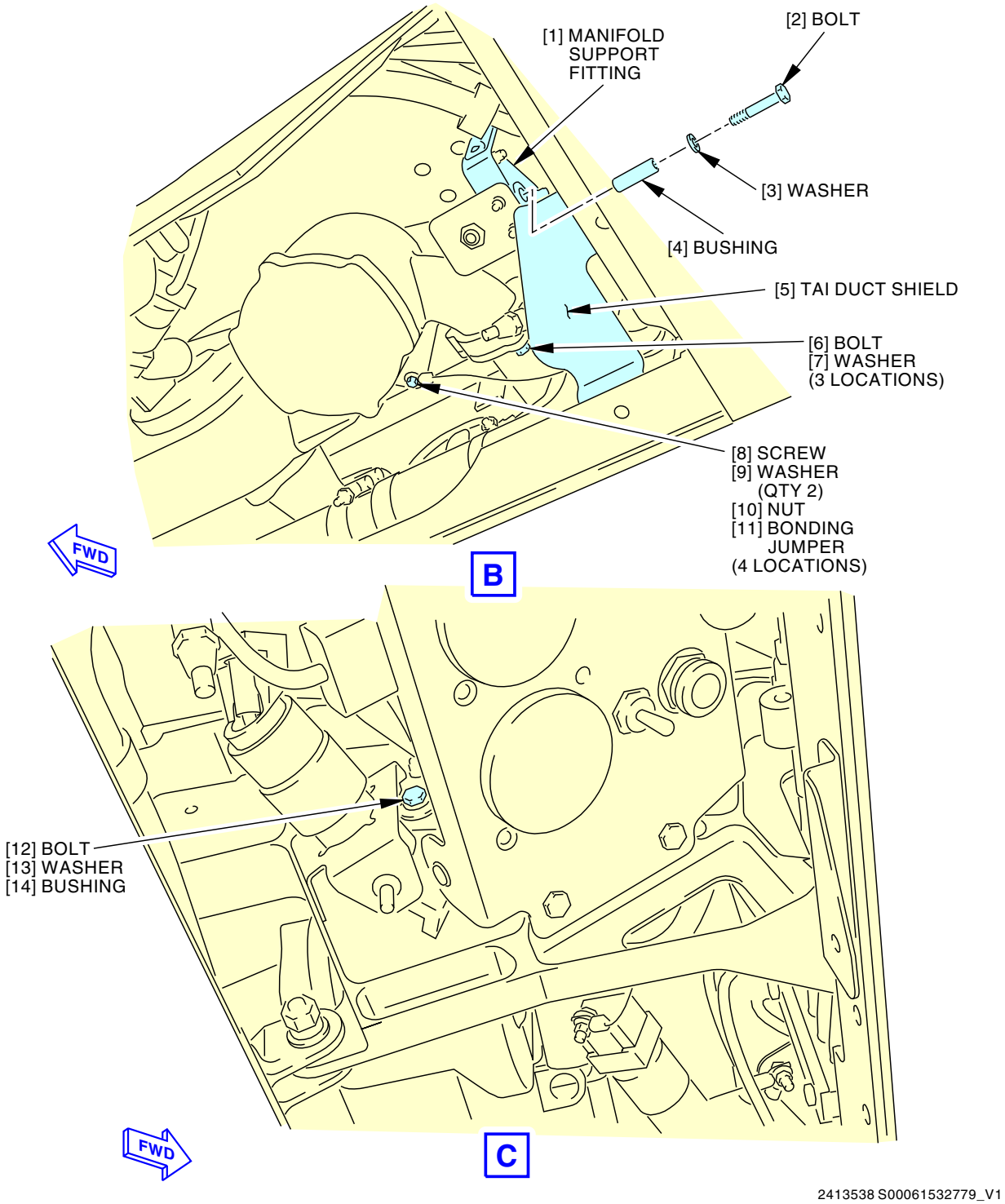
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



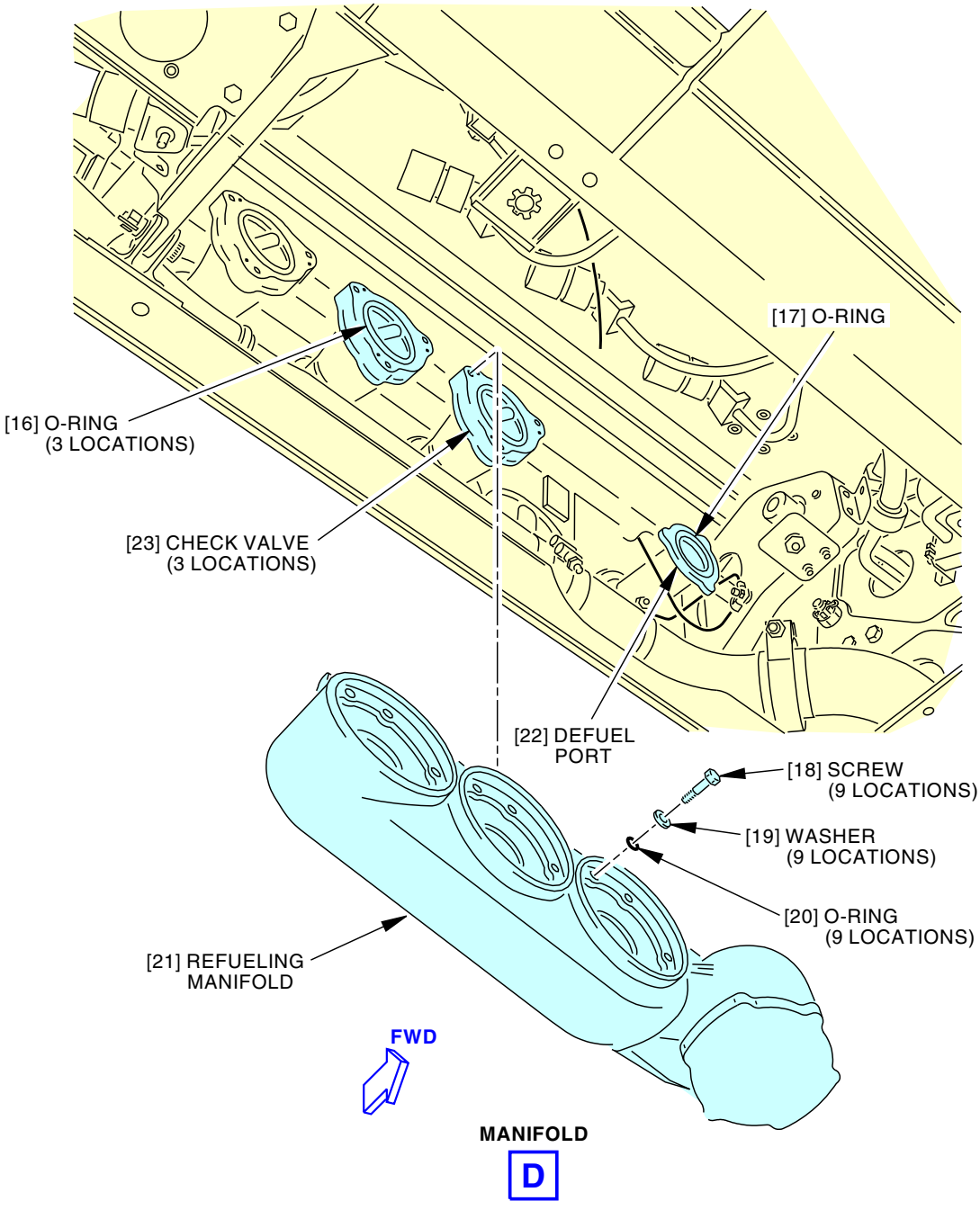
Refueling Manifold Installation
Figure 401/28-21-21-990-801 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Refueling Manifold Installation
Figure 401/28-21-21-990-801 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Refueling Manifold Installation
Figure 401/28-21-21-990-801 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-21-21-400-801

3. Refueling Manifold Installation

(Figure 401)

A. General

(1) This task gives instructions to install the refueling manifold [21].

B. 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	Fueling Shutoff Valve Installation (P/B 401)
28-21-82-400-801	Refuel Panel, P15 Installation (P/B 401)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

C. Consumable Materials

Reference	Description	Specification
B00083	Solvent - VM&P Naphthas	TT-N-95 Type II, ASTM D-3735 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
16	O-ring	28-21-32-01-010	SIA ALL
17	O-ring	28-21-41-01-020	SIA ALL
20	O-ring	28-21-41-01-040	SIA ALL
21	Refueling manifold	28-21-21-01-145	SIA ALL

E. Access Panels

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

F. Refueling Manifold Installation

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 a new O-rings [16] (three locations) and O-ring [17] lightly lubricated with fuel, on the check valves [23] (three locations) and the defuel port [22].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 bolt [2] and bolt [12] with your fingers.

NOTE: Do not install washers or bushings on the support bolts at this time.

SUBTASK 28-21-21-420-003

(4) Engage the screws [18], washers [19], and O-rings [20] that attach the refueling manifold [21] to the check valves [23].

(a) Tighten all of the screws [18] equally (nine locations) to a final torque of 28 ±4 in-lb (3.16 ±0.45 N·m).

SUBTASK 28-21-21-420-004

(5) Engage the bolts [6] and the washers [7] that attach the refueling manifold [21] to the defuel port [22] (three locations).

(a) Tighten all of the bolts [6] equally (three locations) to a final torque of 28 ±4 in-lb (3.16 ±0.45 N·m).

SUBTASK 28-21-21-420-005

(6) To install the bolt [2] and bolt [12], do these steps:

NOTE: Use the bushings to take a good fit between the refueling manifold and the support members for the leading edge when you tighten the bolts.

(a) Install the bolt [2], washer [3], and bushing [4].

(b) Install the bolt [12], washer [13], and bushing [14].

(c) Tighten the bolt [2] and bolt [12] to a final torque of 80 ±8 in-lb (9 ±1 N·m).

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) Install screw [8], washers [9], nut [10], and bonding jumper [11] on the aft inboard side of the refueling manifold [21] adjacent to the airplane structure.

SUBTASK 28-21-21-420-007

(10) Make sure that the bonding jumpers [11] from the fueling shutoff valves to the refueling manifold [21] are connected (three locations).

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

SUBTASK 28-21-21-420-008

(12) Connect the electrical connectors [15] to each of the fueling shutoff valves (three locations).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 P15 refuel panel to cover the manifold support fitting [1] (TASK 28-21-82-400-801).

G. Put the Airplane Back to its Usual Condition

SUBTASK 28-21-21-410-005

(1) Close this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

(a) Install the pins that attach the linkage assemblies to this access panel.

SUBTASK 28-21-21-710-001

(2) Do this task: Pressure Fueling System - Test, TASK 28-21-00-700-801.

SUBTASK 28-21-21-410-006

(3) Make sure this access panel is closed:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

——— END OF TASK ———

TASK 28-21-21-960-801

4. Refueling Panel Floodlight Replacement

(Figure 402)

A. General

(1) This task gives instructions to replace the refueling panel floodlight assembly [30].

B. Consumable Materials

Reference	Description	Specification
A50153	Sealant - Fuel Tank - Class A-2	BMS5-45 Class A-2
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
30	Floodlight assembly	33-40-51-01-005	SIA ALL

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 Valve Door - Slat Station 125

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Refueling Panel Floodlight Replacement

SUBTASK 28-21-21-860-003

(1) Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
A	3	C00032	FUEL FUELING CONT

SUBTASK 28-21-21-010-007

(2) Open this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-21-21-020-006

(3) Remove the conduit nut [24] and wire contact plunger [25].

SUBTASK 28-21-21-020-007

(4) Remove the lock nut [26], lock washer [27], and shipping spacer [28] (if installed).

(a) Discard the shipping spacer [28].

SUBTASK 28-21-21-020-008

(5) Remove the floodlight assembly [30].

SUBTASK 28-21-21-420-010

(6) Put the replacement floodlight assembly [30] through the mounting bracket and turn it until the groove pin engages in the bracket cutout and is flush with the bracket.

SUBTASK 28-21-21-420-011

(7) Install the lock washer [27] and lock nut [26].

(a) Tighten the lock nut [26].

NOTE: Do not over tighten.

(b) Adjust the hood on the floodlight assembly [30] as shown in Figure 402 (Sheet 2).

SUBTASK 28-21-21-160-002

(8) Clean the surfaces that you will seal with cotton wipers, G00034.

SUBTASK 28-21-21-390-001

(9) Apply a thin, narrow brush coat of sealant, A50153, on the top of the exposed threads of the light assembly.

NOTE: Do not get the sealant into the light assembly space where the contact plunger engages the lamp.

NOTE: The amount of time that the sealant is workable varies. For example, BMS5-45 Class A-2 has an application time of 2 hours.

SUBTASK 28-21-21-420-012

(10) Put the wire contact plunger [25] into the floodlight assembly [30] and tighten the conduit nut [24] with your fingers only.

SUBTASK 28-21-21-390-002

(11) Apply a fillet seal with sealant, A50153, on the rear of the conduit nut and fill the space.

NOTE: The cure time for this sealant is 72 hours.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Put the Airplane Back to Its Usual Condition

SUBTASK 28-21-21-410-007

(1) Close this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-21-21-860-004

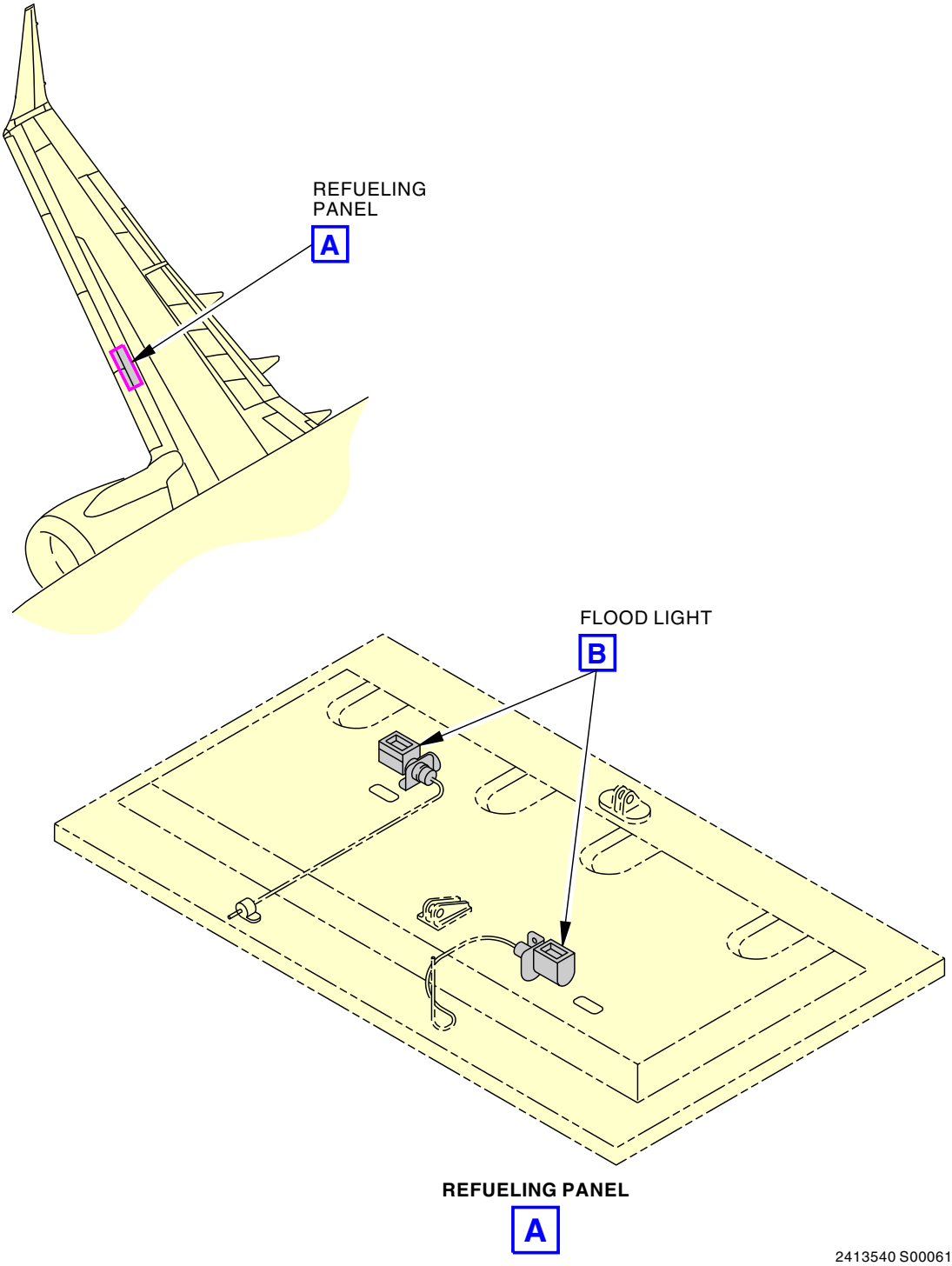
(2) Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
A	3	C00032	FUEL FUELING CONT

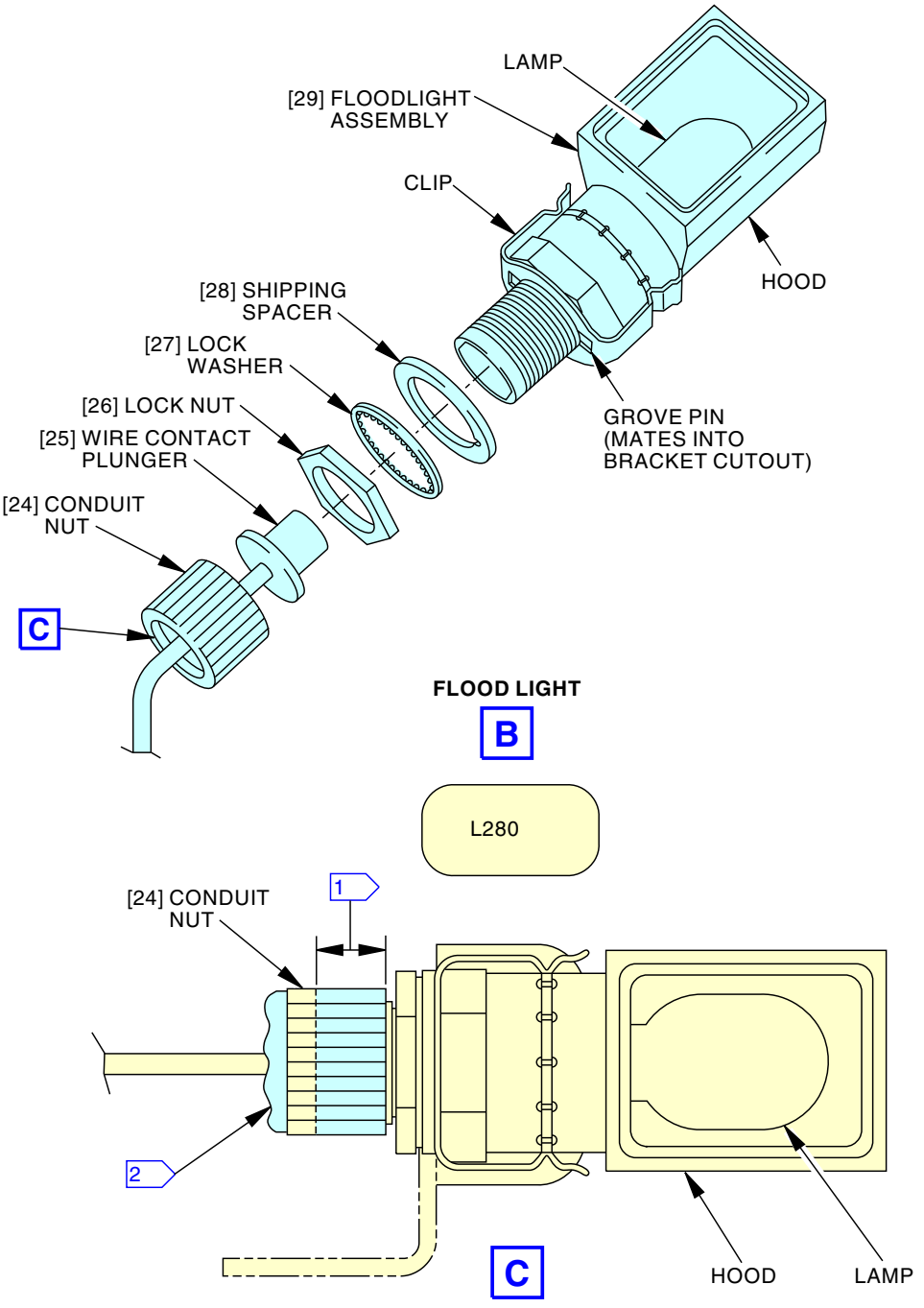
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Refueling Panel Floodlight Installation
Figure 402/28-21-21-990-802 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



1 APPLY SEALANT ON EXPOSED THREADS BEFORE INSTALLING CONDUIT NUT AND CONTACT PLUNGER.

2 APPLY SEALANT

2413541 S00061532784_V1

Refueling Panel Floodlight Installation
Figure 402/28-21-21-990-802 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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. General

(1) This task gives instructions to remove the fueling check valve [2].

B. 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)

C. Tools/Equipment

Reference	Description
STD-195	Container - 1 Quart, Oil/Fuel Resistant

D. Location Zones

Zone	Area
620	Subzone - Right Wing: Leading Edge, Forward of Front Spar, Outboard of Nacelle Strut

E. Prepare for the Removal

SUBTASK 28-21-32-650-001

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 or transfer fuel from the No. 2 main tank to a fuel quantity less than 3,500 lb (1,590 kilograms) (TASK 28-26-00-650-801, TASK 28-26-00-650-802).

(a) The No. 2 main tank must contain less than 3,500 pounds (1,590 kilograms) to do this procedure.

SUBTASK 28-21-32-860-001

(2) Make sure that 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.

F. Fueling Check Valve Removal

SUBTASK 28-21-32-480-001

(1) Put 1 quart oil/fuel resistant container, STD-195, below the fueling check valve [2] to catch the fuel.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-21-32-020-001

(2) Remove the screws [1] that attach the fueling check valve [2].

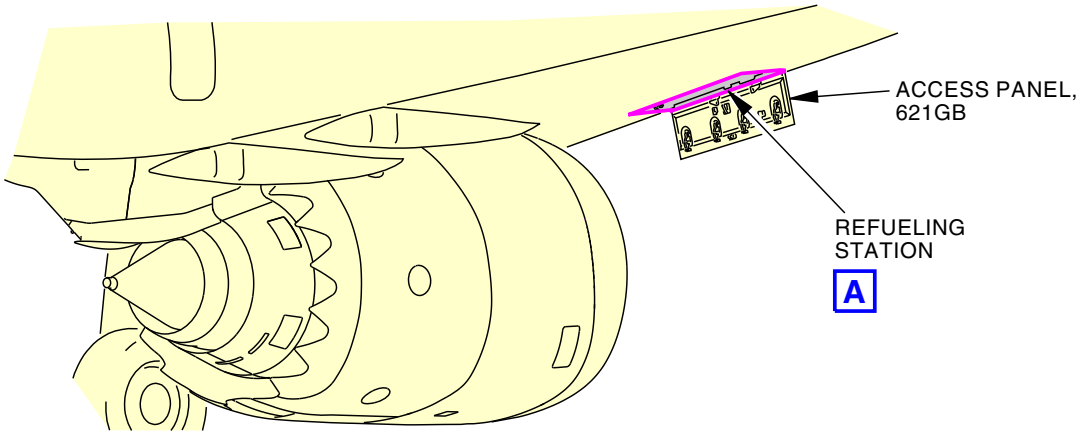
SUBTASK 28-21-32-020-002

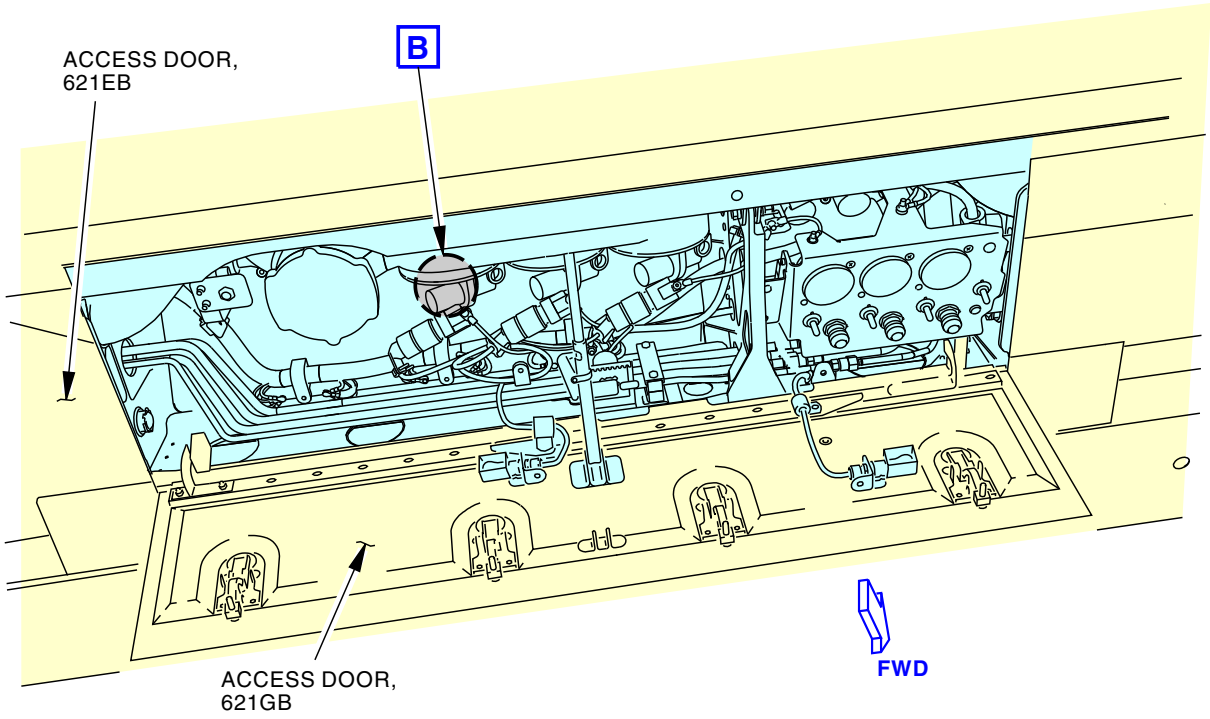
(3) Remove the fueling check valve [2].

(a) Discard the O-ring [3].

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details





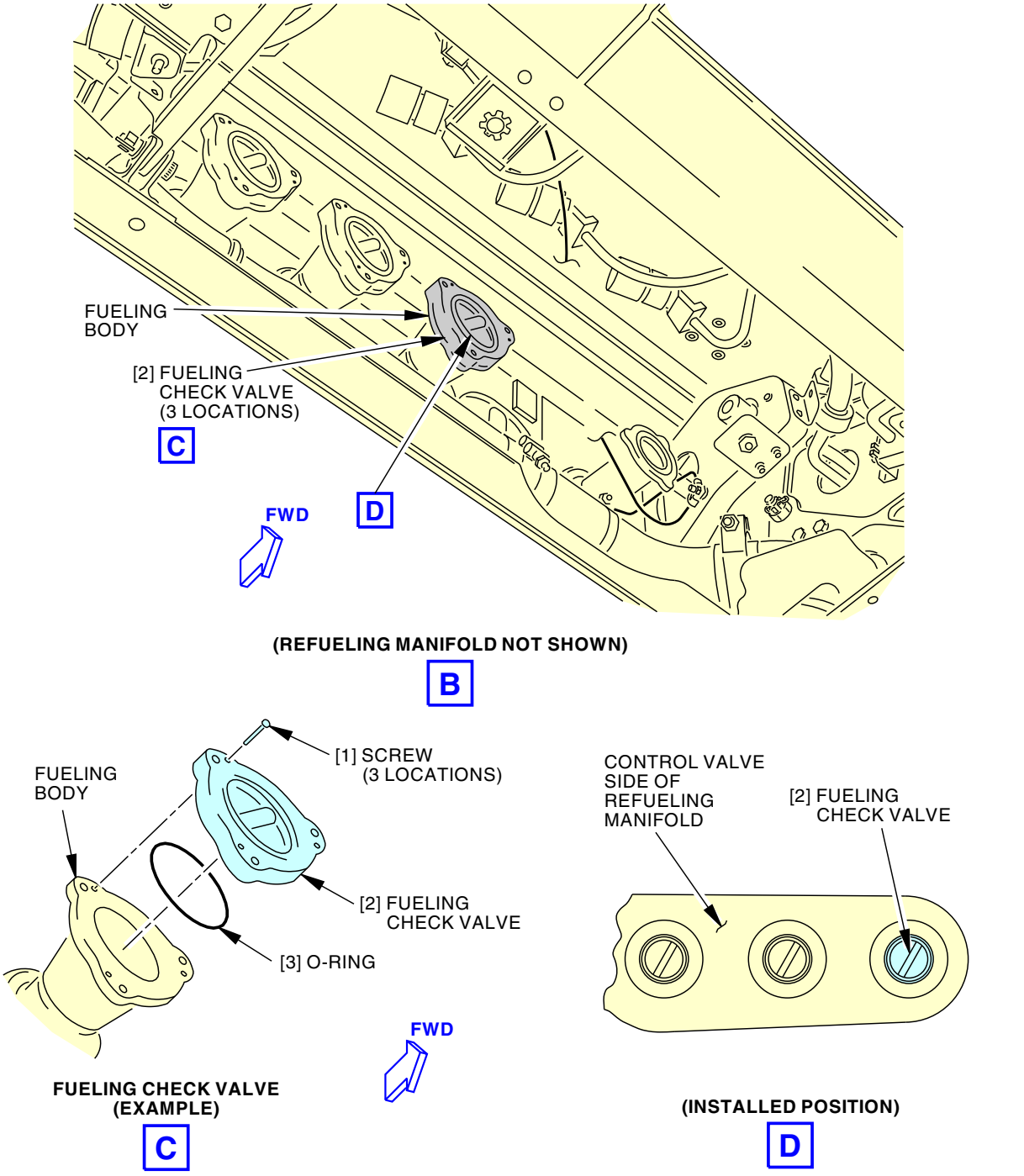
REFUELING STATION

A

2413542 S00061532788_V2

Fueling Check Valve Installation
Figure 401/28-21-32-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fueling Check Valve Installation
Figure 401/28-21-32-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-21-32-400-801

3. Fueling Check Valve Installation

A. General

(1) This task gives instructions to install the fueling check valve [2].

B. 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)

C. Consumable Materials

Reference	Description	Specification
B00083	Solvent - VM&P Naphthas	TT-N-95 Type II, ASTM D-3735 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Fueling check valve	28-21-32-01-015	SIA ALL
3	O-ring	28-21-41-01-065	SIA ALL

E. Location Zones

Zone	Area
620	Subzone - Right Wing: Leading Edge, Forward of Front Spar, Outboard of Nacelle Strut

F. Fueling Check Valve Installation

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 fueling body and fueling check valve [2].

(b) The O-ring [3] groove of the fueling check valve [2].

SUBTASK 28-21-32-420-001

(2) Install a new O-ring [3], lightly lubricated with fuel, on the fueling check valve [2].

NOTE: Make sure that you put the O-ring [3] on the side of the fueling 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 FUELING BODY OR THE ELBOW ASSEMBLY. A FUEL LEAK CAN EASILY OCCUR.

(3) Install the fueling check valve [2].

(a) Put the fueling check valve [2] on the fueling body in its position as shown in View C and D (Figure 401).

(b) Turn the fueling check valve [2] to align the screw [1] holes with the holes in the fueling body.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(c) Install the screws [1] in the fueling check valve [2].

(d) Tighten all of the screws [1] equally to a final torque of 13.0 ±1.0 in-lb (1.5 ±0.1 N·m).

(e) Make sure that the fueling 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 ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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. General

(1) This task gives instructions to remove the fueling body [1] or defueling port [2] assembly.

B. 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)

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. Prepare for the Removal

SUBTASK 28-21-41-650-001

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 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 [1] or defueling port [2] 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.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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:

(TASK 28-11-11-000-801)

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

F. Fueling Body Assembly or Defueling Port Assembly Removal

SUBTASK 28-21-41-020-001

(1) Do these steps to remove the fueling body [1] or defueling port [2] assembly.

NOTE: Two persons are necessary to do this procedure.

(a) One person in the tank must disconnect these parts that attach to the applicable fueling body [1] or defueling port [2] assembly:

1) The fuel line [6] connected to the applicable fueling body [1] or defueling port [2] (TASK 28-22-15-000-801).

2) The mounting nut [5] at the rear of the front spar.

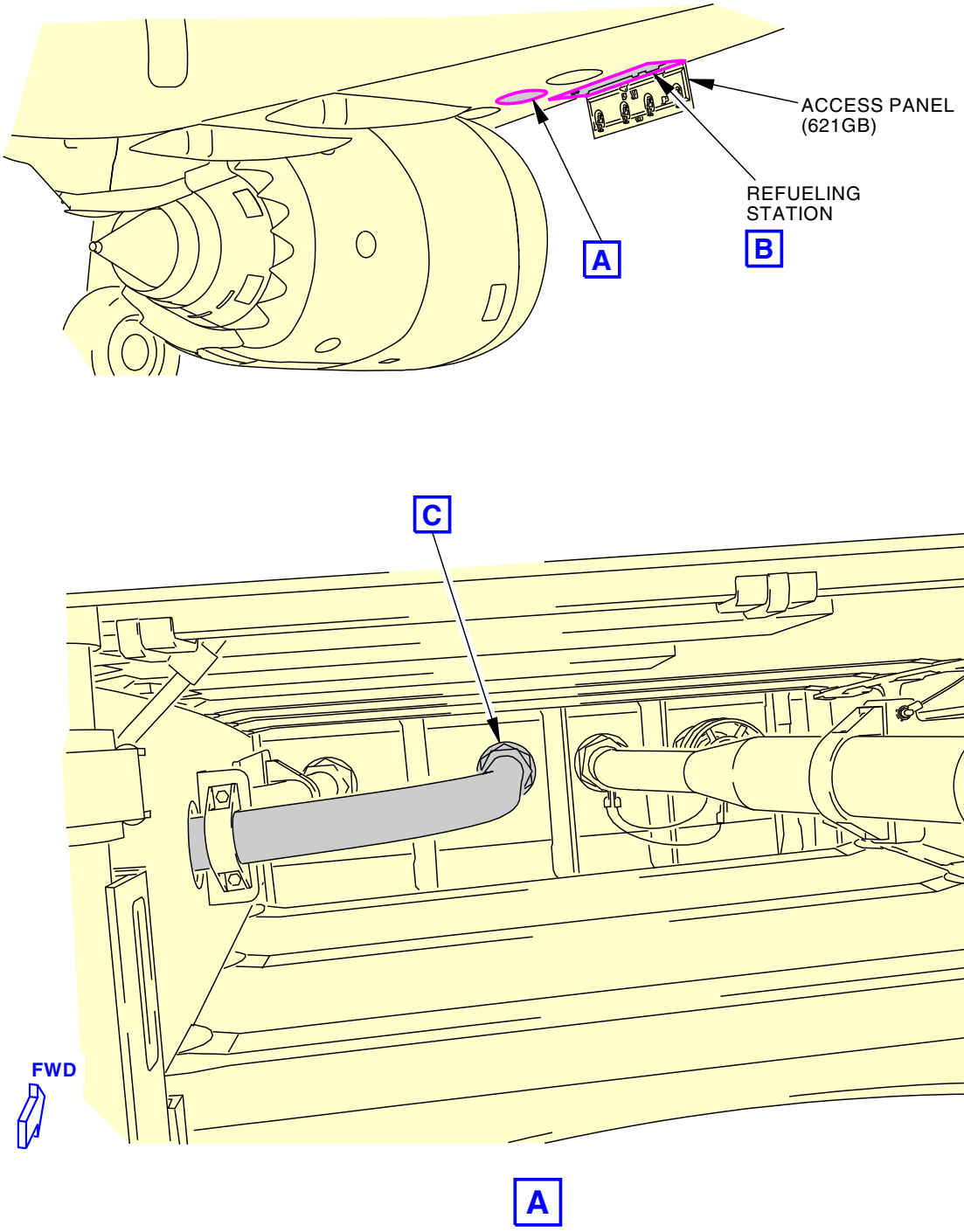
3) The washer [4] at the rear of the front spar.

(b) A second person out of the tank must hold the fueling body [1] or defueling port [2].

(c) Then the second person removes the applicable fueling body [1] or defueling port [2].

——— END OF TASK ———

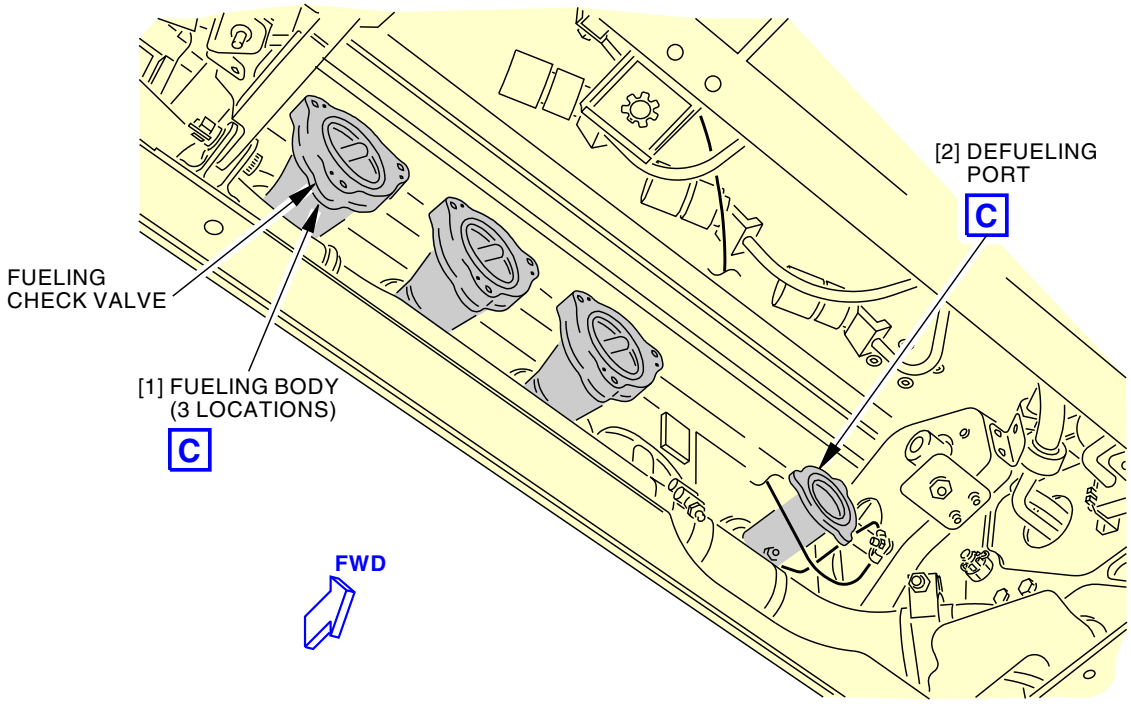
ECCN 9E991 BOEING PROPRIETARY - See title page for details



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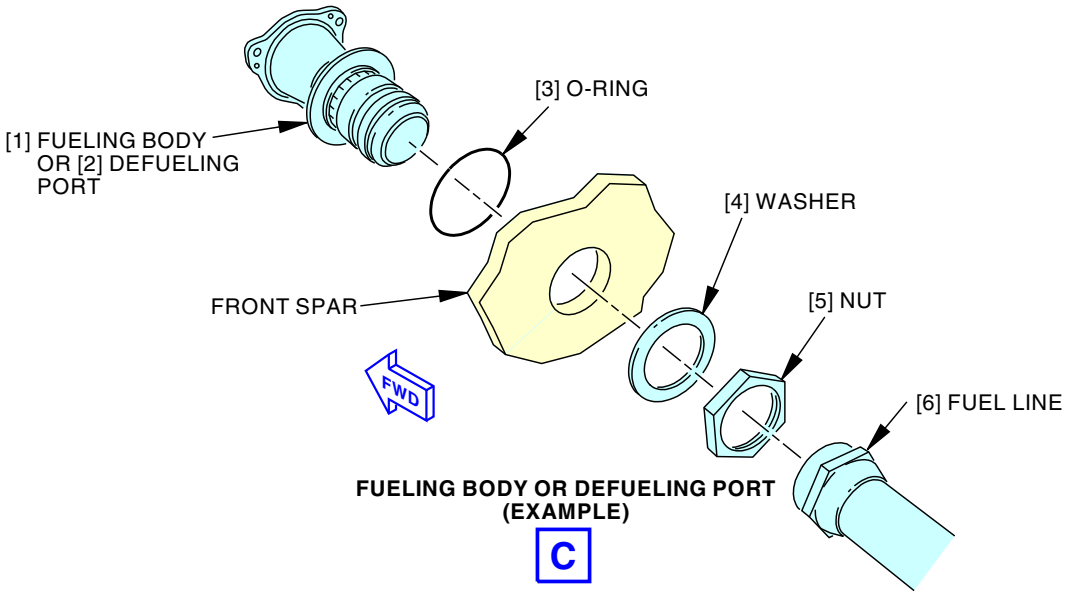
Fueling Body or Defueling Port Installation
Figure 401/28-21-41-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



REFUELING STATION
(FUELING RECEPTACLE MANIFOLD NOT SHOWN)

B



FUELING BODY OR DEFUELING PORT
(EXAMPLE)

C

2413545 S00061532795_V1

Fueling Body or Defueling Port Installation
Figure 401/28-21-41-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-21-41-400-801

3. Fueling Body Assembly or Defueling Port Assembly Installation

(Figure 401)

A. General

(1) This task gives instructions to install the fueling body [1] or defueling port [2] assembly.

B. 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)

C. Consumable Materials

Reference	Description	Specification
B00083	Solvent - VM&P Naphthas	TT-N-95 Type II, ASTM D-3735 Type III
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Fueling body	28-21-41-01-050	SIA ALL
2	Defueling port	28-21-41-01-025	SIA ALL
3	O-ring	28-21-21-01-075	SIA ALL

E. Location Zones

Zone	Area
620	Subzone - Right Wing: Leading Edge, Forward of Front Spar, Outboard of Nacelle Strut

F. Access Panels

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

G. Fueling Body Assembly or Defueling Port Assembly Installation

SUBTASK 28-21-41-160-001

(1) Clean these surfaces with solvent, B00083, and dry with a cotton wiper, G00034:

(a) The O-ring [3] groove of the fueling body [1] or defueling port [2] 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 [1] or the defueling port [2].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-21-41-020-002

CAUTION

DO NOT LOOSEN THE O-RING OR PUSH IT OUT OF ITS CORRECT SHAPE. IF YOU CAUSE DAMAGE TO THE O-RING, A FUEL LEAK CAN EASILY OCCUR.

(3) Install the fueling body [1] or defueling port [2] assembly in its position.

NOTE: Two persons are necessary to do this procedure.

(a) One person out of the tank must put the fueling body [1] or defueling port [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 [1] or the defueling port [2]:

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] manually.

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 [1] or defueling port [2] to a torque of 900 ±45 in-lb (102 ±5 N·m).

SUBTASK 28-21-41-420-003

(7) Attach the applicable fuel line [6] to the fueling body [1] or defueling port [2] (TASK 28-22-15-400-801).

H. Fueling Body Assembly or Defueling Port Assembly Installation Test

SUBTASK 28-21-41-410-003

(1) Install this access panel:

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

(TASK 28-11-11-400-801).

SUBTASK 28-21-41-710-001

(2) Do this task: Pressure Fueling System - Test, TASK 28-21-00-700-801.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FUELING SHUTOFF VALVE - MAINTENANCE PRACTICES

1. General

A. This procedure has one task:

(1) Fueling shutoff valve maintenance practices.

TASK 28-21-51-800-801

2. Fueling Shutoff Valve - Maintenance Practices

A. General

(1) This task includes steps to clean residue from the shutoff valve exterior.

(2) The shutoff valve may not work properly due to debris.

B. References

Reference	Title
28-21-00-700-801	Pressure Fueling System - Test (P/B 501)
28-21-51-000-801	Fueling Shutoff Valve Removal (P/B 401)
28-21-51-400-801	Fueling Shutoff Valve Installation (P/B 401)

C. Consumable Materials

Reference	Description	Specification
B50073	Alcohol - Isopropyl	ASTM D 770
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

D. Access Panels

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

E. Prepare for the Procedure

SUBTASK 28-21-51-010-003

(1) Open this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-21-51-860-009

(2) Make sure that all fueling shutoff valve switches at the fueling station are in the CLOSE position.

SUBTASK 28-21-51-860-010

(3) 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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Procedure

SUBTASK 28-21-51-100-003

(1) Clean the shutoff fueling valves:

(a) Use a spray bottle with alcohol, B50073 and apply it to the fueling shutoff valves and manual override switches.

(b) Clean the fueling shutoff valves and manual override switches.

(c) Rub the surfaces dry with a cotton wiper, G00034.

(d) Repeat the process until completely cleaned or most residue is removed.

SUBTASK 28-21-51-860-011

(2) 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 28-21-51-710-004

(3) Make sure the shutoff valve opens and closes normally by pressing the manual override switch. Do this task: Pressure Fueling System - Test, TASK 28-21-00-700-801.

SUBTASK 28-21-51-900-001

(4) Replace the shutoff valves if they do not move freely. Do the following tasks:

- Fueling Shutoff Valve Removal, TASK 28-21-51-000-801
- Fueling Shutoff Valve Installation, TASK 28-21-51-400-801

G. Put the Airplane Back to Its Usual Condition

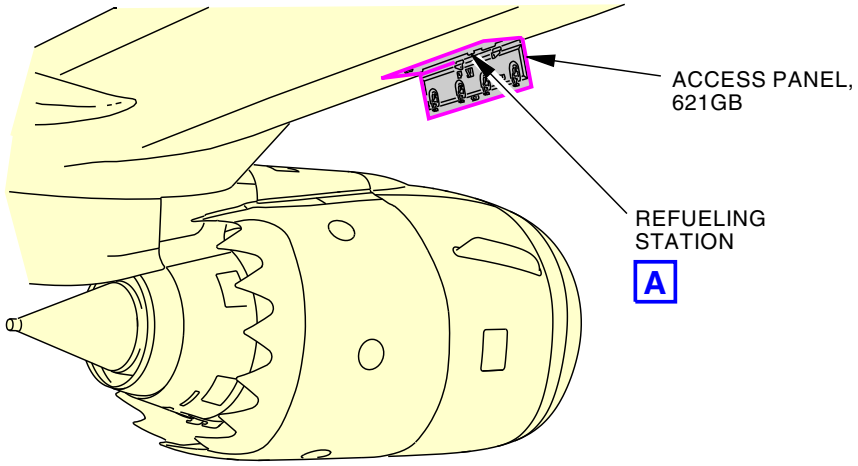
SUBTASK 28-21-51-410-003

(1) Close this access panel:

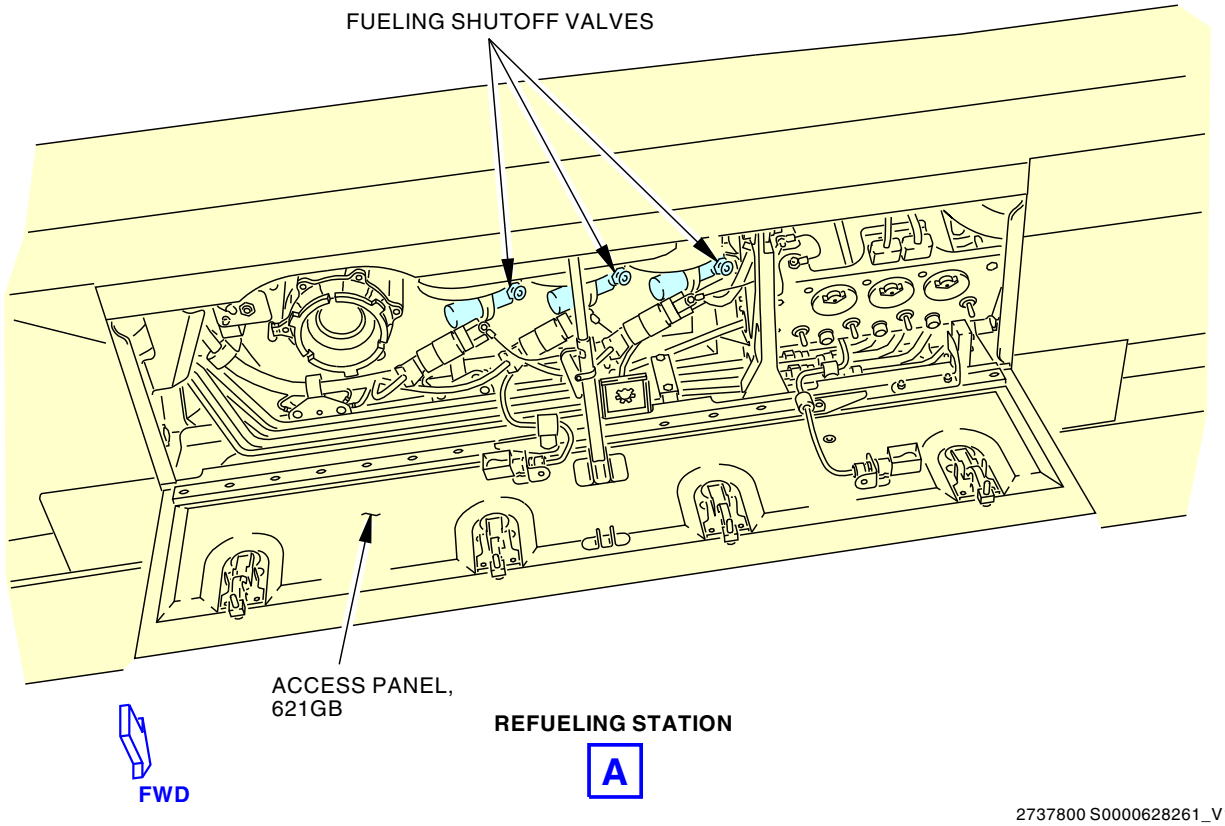
Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



RIGHT WING



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Fueling Shutoff Valve Maintenance
Figure 201/28-21-51-990-803

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FUELING SHUTOFF VALVE - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) Fueling Shutoff Valve Removal

(2) Fueling Shutoff Valve Installation.

B. There are three fueling shutoff valves installed on the refueling manifold. Each fuel tank uses a different fueling shutoff valve. The procedures are equivalent for the three fueling shutoff valves.

TASK 28-21-51-000-801

2. Fueling Shutoff Valve Removal

(Figure 401)

A. General

(1) This task gives instructions to remove the fueling shutoff valve.

B. 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)

C. Tools/Equipment

Reference	Description
STD-195	Container - 1 Quart, Oil/Fuel Resistant

D. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

E. Access Panels

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91
621GB	Refuel Valve Door - Slat Station 125

F. Prepare for the Removal

SUBTASK 28-21-51-650-001

(1) Defuel or transfer fuel from the No. 2 main tank until the fuel tank contains less than 3500 lb (1588 kg) (TASK 28-26-00-650-801 or TASK 28-26-00-650-802).

SUBTASK 28-21-51-010-001

(2) Open these access panels:

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-21-51-860-001

(3) Make sure that the defueling valve is in the CLOSED position.

SUBTASK 28-21-51-860-002

(4) On the P15 refuel panel, make sure that the three fueling shutoff valve switches are in the CLOSED position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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
A	6	C00397	FUEL QTY 1

SUBTASK 28-21-51-680-001

(6) Drain fuel from the fueling receptacle, as follows:

(a) Put a 1 quart oil/fuel resistant container, STD-195, below the fueling receptacle to catch fuel.

(b) Push the poppet valve in the fueling receptacle.

(c) Let the remaining fuel drain from the fueling receptacle and refueling manifold.

SUBTASK 28-21-51-020-001

(7) 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 that the correct the electrical connector is installed to the correct fueling shutoff valve.

G. Fueling Shutoff Valve Removal

SUBTASK 28-21-51-020-002

(1) Remove the nut [9], washers [10], trimmed washer [12], screw [11], and bonding jumper [3] from the fueling shutoff valve [2].

SUBTASK 28-21-51-860-005

(2) Put the container below the fueling shutoff valve [2] to catch fuel.

SUBTASK 28-21-51-020-003

(3) Hold the fueling shutoff valve [2] and remove the bolts [6], washers [7], backup rings [5], and O-rings [4] from the fueling shutoff valve [2].

(a) Discard the O-rings [4] and backup rings [5].

SUBTASK 28-21-51-020-004

(4) Remove the fueling shutoff valve [2] from the refueling manifold.

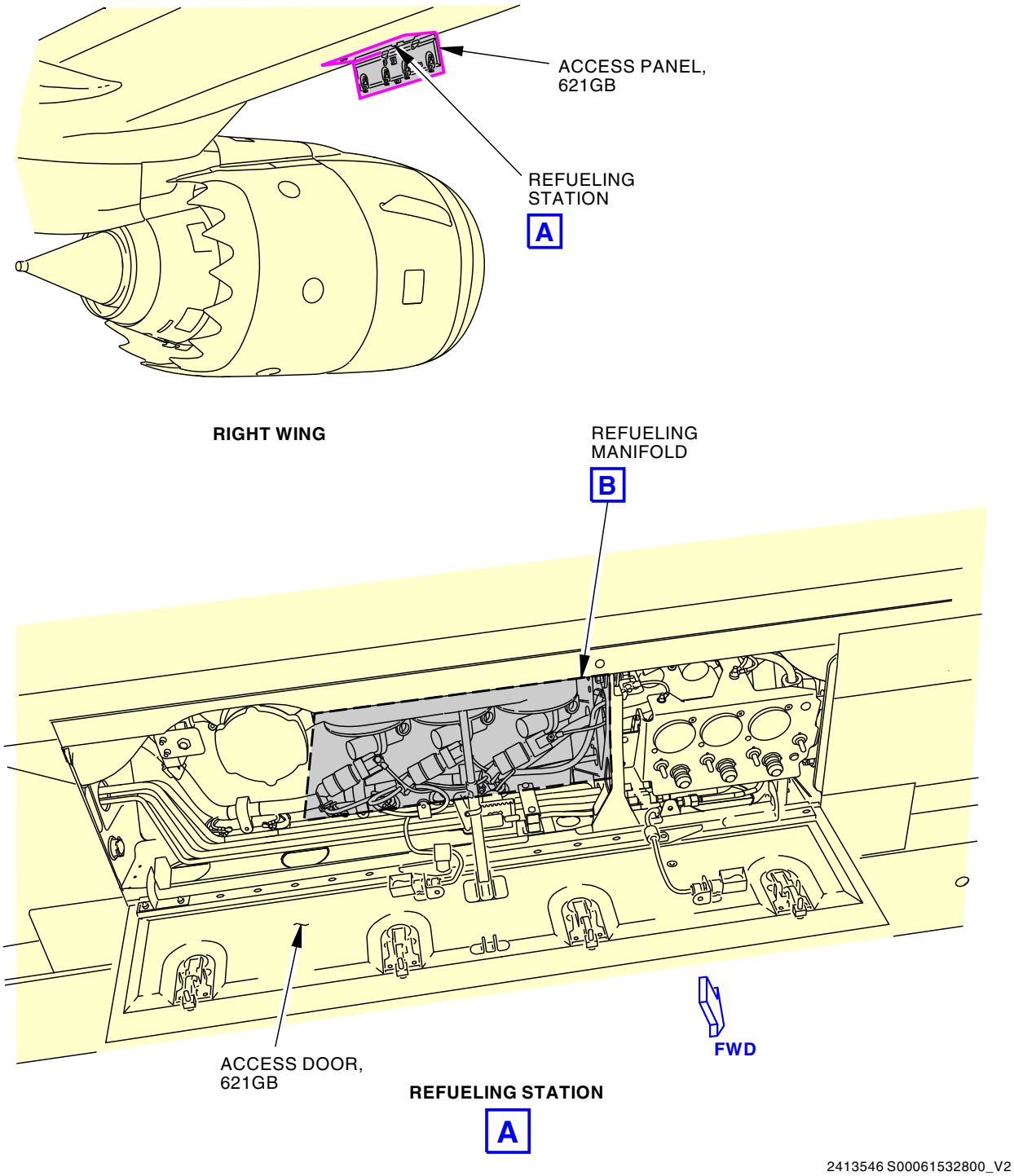
SUBTASK 28-21-51-020-005

(5) Remove the O-ring [1] from the fueling shutoff valve [2].

(a) Discard the O-ring [1].

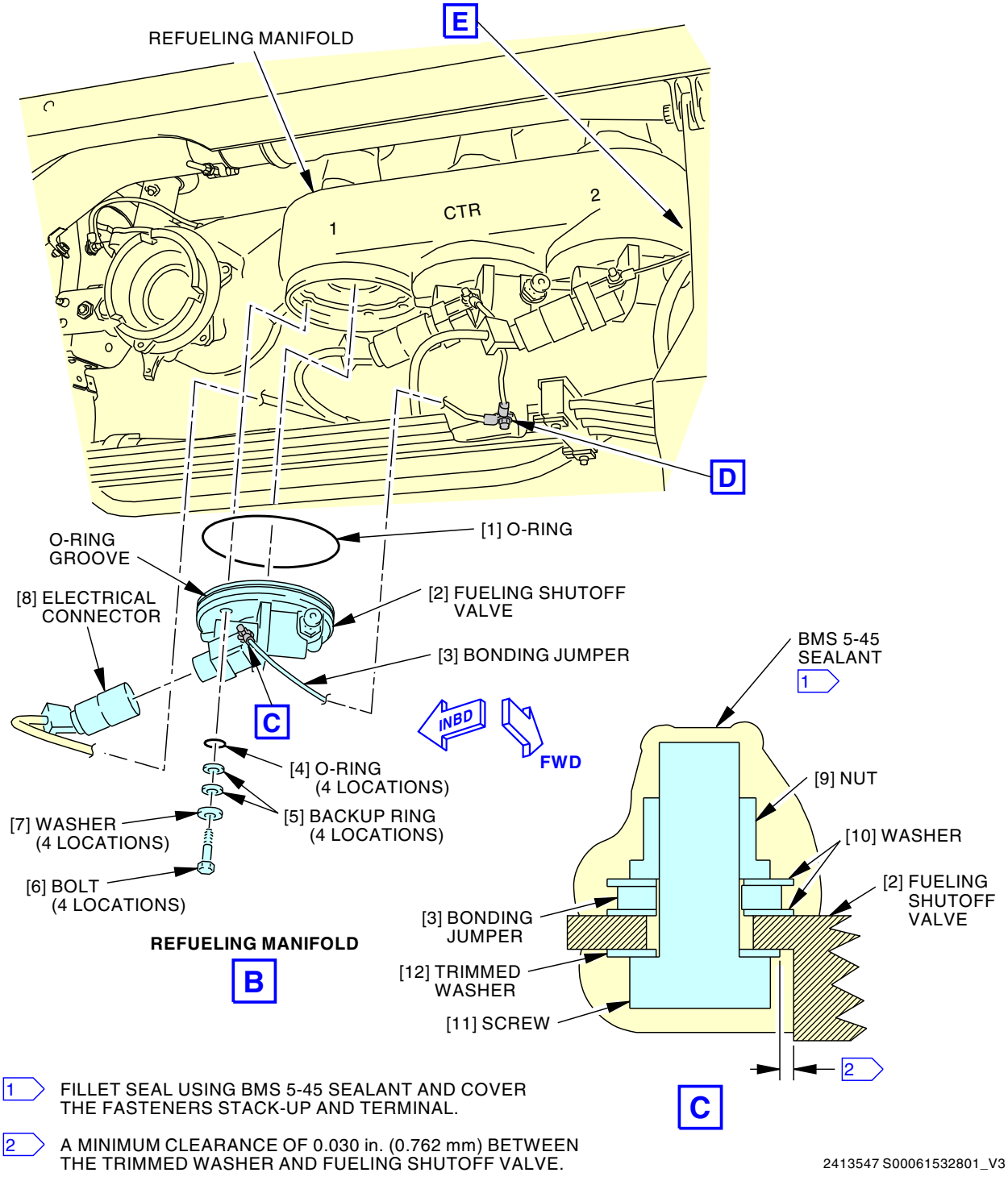
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



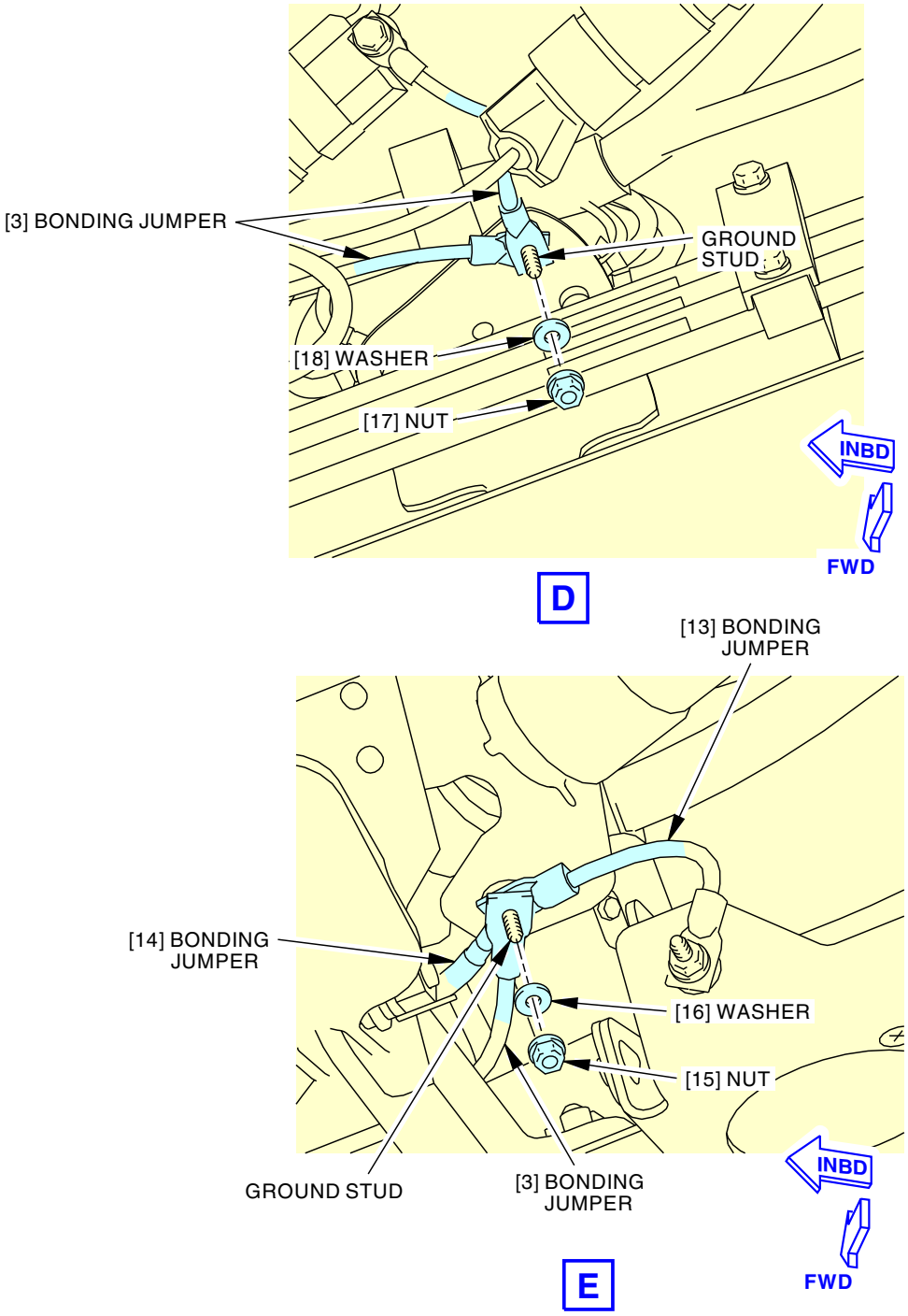
Fueling Shutoff Valve Installation
Figure 401/28-21-51-990-801 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fueling Shutoff Valve Installation
Figure 401/28-21-51-990-801 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fueling Shutoff Valve Installation
Figure 401/28-21-51-990-801 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-21-51-400-801

3. Fueling Shutoff Valve Installation

(Figure 401)

A. General

(1) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-35.

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
20-40-11-760-801	Electrical Bonding (P/B 201)
20-40-11-910-801	Static Grounding (P/B 201)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES
SWPM 20-20-10	REPLACEMENT OF GROUND STUDS AND BONDING JUMPER INSTALLATION

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45
A50337	Sealant - Fuel Tank	BMS5-45 Class B
B00148	Solvent - Methyl Ethyl Ketone (MEK)	ASTM D740
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
D00652	Lubricant - O-Ring - Parker Super-O-Lube	
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

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(Continued)

Reference	Description	Specification
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	O-ring	28-21-51-01-035	SIA ALL
2	Fueling shutoff valve	28-21-51-01-030	SIA ALL
4	O-ring	28-21-51-01-025	SIA ALL
5	Backup ring	28-21-51-01-020	SIA ALL

F. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

G. Access Panels

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91
621GB	Refuel Valve Door - Slat Station 125

H. Prepare for the Installation

SUBTASK 28-21-51-860-007

28-AWL-35: CDCCL

(1) Measure the electrical bonding resistance between pin 1 on the electrical connector [8] and structure (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-35.

(a) Use an intrinsically safe approved bonding meter, COM-1550 to measure the bonding resistance.

28-AWL-35: CDCCL

(b) Make sure that the electrical bonding resistance is 0.0100 ohm (10.0 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-35.

SUBTASK 28-21-51-400-001

(2) If the bonding jumper [3], bonding jumper [14], and bonding jumper [13] are not installed on the ground stud on the bracket, do these steps:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

28-AWL-35: CDCCL

(a) Clean the fay surfaces of the terminals on the bonding jumper [3], bonding jumper [13], bonding jumper [14], nut [15], washer [16], and aluminum ground stud (SWPM 20-20-10).

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-35.

(b) Install the bonding jumper [3], bonding jumper [13], bonding jumper [14], washer [16], and nut [15] on the ground stud.

(c) Tighten the nut [15] to 36.5 ±3.5 in-lb (4.1 ±0.4 N·m).

(d) Measure the electrical bonding resistance between the bonding jumper [3] and structure (SWPM 20-20-10).

1) Use an intrinsically safe approved bonding meter, COM-1550.

2) Make sure that the electrical bonding resistance is 0.0010 ohm (1.0 milliohm) or less.

(e) Measure the electrical bonding resistance between the bonding jumper [13] and structure (SWPM 20-20-10).

1) Use an intrinsically safe approved bonding meter, COM-1550.

2) Make sure that the electrical bonding resistance is 0.0010 ohm (1.0 milliohm) or less.

(f) Measure the electrical bonding resistance between the bonding jumper [14] and structure (SWPM 20-20-10).

1) Use an intrinsically safe approved bonding meter, COM-1550.

2) Make sure that the electrical bonding resistance is 0.0010 ohm (1.0 milliohm) or less.

28-AWL-35: CDCCL

(g) Apply a fillet seal between the ground stud and bracket (SWPM 20-20-10, Paragraph 5).

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-35.

SUBTASK 28-21-51-400-002

(3) If the two bonding jumpers [3] are not installed on the ground stud on the structure, do these steps:

28-AWL-35: CDCCL

(a) Apply a fay surface bond to the terminals on the two bonding jumpers [3], nut [17], washer [18], and aluminum ground stud (SWPM 20-20-10).

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-35.

(b) Install the two bonding jumpers [3], washer [18], and nut [17] on the ground stud.

(c) Tighten the nut [17] to 36.5 ±3.5 in-lb (4.1 ±0.4 N·m).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(d) Measure the electrical bonding resistance between each bonding jumper [3] and structure (SWPM 20-20-10).

1) Use an intrinsically safe approved bonding meter, COM-1550.

2) Make sure that the electrical bonding resistance is 0.0010 ohm (1.0 milliohm) or less.

28-AWL-35: CDCCL

(e) Apply a fillet seal between the ground stud and structure (SWPM 20-20-10, Paragraph 5).

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-35.

SUBTASK 28-21-51-100-002

28-AWL-35: CDCCL

(4) Clean the fay surfaces of the refueling manifold and fueling shutoff valve [2] (SWPM 20-20-00, Paragraph 2).

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-35.

SUBTASK 28-21-51-640-001

(5) Lightly lubricate a thin layer of Parker Super-O-Lube lubricant, D00652, on the new O-ring [1].

SUBTASK 28-21-51-420-011

(6) Install the O-ring [1] on the fueling shutoff valve [2].

SUBTASK 28-21-51-390-002

28-AWL-35: CDCCL

(7) Apply a fay surface bond to the surfaces of the refueling manifold and the fueling shutoff valve [2] (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-35.

(a) Use sealant, A00767.

SUBTASK 28-21-51-420-002

(8) Put the washers [7], new backup rings [5], and new O-rings [4] on the bolts [6].

I. Fueling Shutoff Valve Installation

SUBTASK 28-21-51-420-004

(1) Hold the fueling shutoff valve [2] on the refueling manifold.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-21-51-420-012

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.

(2) Turn the fueling shutoff valve [2] until the bolt holes align with the holes in the refueling manifold.

SUBTASK 28-21-51-420-001

(3) Install the bolts [6] to secure the fueling shutoff valve [2] to the refueling manifold.

SUBTASK 28-21-51-420-013

(4) Tighten the bolts [6] to 28.5 ±3.5 in-lb (3.2 ±0.4 N·m).

SUBTASK 28-21-51-860-008

28-AWL-35: CDCCL

(5) Measure the electrical bonding resistance between the fueling shutoff valve [2] and the refueling manifold (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-35.

(a) Use an intrinsically safe approved bonding meter, COM-1550 to measure the electrical bonding resistance.

28-AWL-35: CDCCL

(b) Make sure that the electrical 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-35.

SUBTASK 28-21-51-100-001

(6) Do these steps to prepare the bonding jumper [3] and fueling shutoff valve [2] for installation:

28-AWL-35: CDCCL

(a) Apply a fay surface bond to the surfaces of the fasteners, the bonding jumper [3] and the aluminum bonding tab on the fueling shutoff valve [2] (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-35.

1) Use Cleaning Procedure 5 to clean the bonding tab fay surfaces, the terminal on the bonding jumper [3], and the fasteners.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

a) Use a new cotton wiper, G00034 or knit cotton wiper, G51293 soaked with solvent, B00184 or solvent, B00148.

b) Use a new cotton wiper to dry the surfaces.

c) Continue to clean and dry the surfaces until the cotton wiper shows clean.

SUBTASK 28-21-51-420-008

(7) Connect the bonding jumper [3] to the fueling shutoff valve [2].

(a) Install the screw [11], trimmed washer [12], washer [10], bonding jumper [3], washer [10], and nut [9] on the bonding tab on the fueling shutoff valve [2].

(b) Make sure that the trimmed edge on the trimmed washer [12] is in the direction closest to the solenoid housing.

SUBTASK 28-21-51-420-015

(8) Tighten the screw [11] to 31 ±3 in-lb (3.5 ±0.3 N·m).

(a) Make sure that a gap of 0.030 in. (0.762 mm) is between the trimmed washer [12] and fueling shutoff valve [2].

SUBTASK 28-21-51-420-010

28-AWL-35: CDCCL

(9) Measure the electrical bonding resistance between the solenoid bonding tab on the fueling shutoff valve [2] and the structure (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-35.

(a) Use an intrinsically safe approved bonding meter, COM-1550 to measure the electrical bonding resistance.

28-AWL-35: CDCCL

(b) Make sure that the bonding resistance is 0.0010 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-35.

SUBTASK 28-21-51-390-001

28-AWL-35: CDCCL

(10) Apply a fillet seal to the base of the bonding tab, the terminal on the bonding jumper [3], and screw [11] (SWPM 20-20-00, Paragraph 14).

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-35.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Use sealant, A50337.

SUBTASK 28-21-51-420-009

(11) Connect the electrical connector [8] to the fueling shutoff valve [2].

(a) If more than one fueling shutoff valve [2] is installed, make sure that the correct electrical connector [8] is installed on the correct fueling shutoff valve [2].

1) Remove the identification tags from the electrical connectors [8].

J. Fueling Shutoff Valve Installation Test

SUBTASK 28-21-51-910-001

WARNING YOU MUST ELECTRICALLY GROUND AND BOND THE AIRPLANE BEFORE YOU DO MAINTENANCE ON THE FUEL SYSTEM. IF YOU DO NOT GROUND AND BOND THE AIRPLANE, STATIC ELECTRICITY CAN CAUSE A FIRE OR EXPLOSION.

(1) Make sure that the airplane is grounded correctly (TASK 20-40-11-910-801).

SUBTASK 28-21-51-480-001

(2) Connect a ground cable from the fueling source and other fuel equipment being used for tank maintenance to an approved and identified static ground.

SUBTASK 28-21-51-480-002

(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 28-21-51-860-006

(4) 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 28-21-51-710-001

(5) Do one of these tasks with 500 lb (227 kg) of fuel to make sure that the fuel shutoff valves operate correctly:

(a) Tank to Tank Fuel Transfer, TASK 28-26-00-650-802.

(b) Pressure Refuel Procedure, TASK 12-11-00-650-803.

1) Do the Stop the Refuel Operation to make sure that the fueling stops when the fueling shutoff valve [2] is in CLOSE position (TASK 12-11-00-650-803).

K. Put the Airplane Back to Its Usual Condition

SUBTASK 28-21-51-080-001

(1) Disconnect the ground cables from the fuel source and airplane (TASK 20-40-11-910-801).

SUBTASK 28-21-51-080-002

(2) Disconnect the bonding cable between the fueling vehicle and airplane (TASK 20-40-11-760-801).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-21-51-410-001

(3) Close these access panels:

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91
621GB	Refuel Valve Door - Slat Station 125

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FUELING SHUTOFF VALVE - INSPECTION/CHECK

1. General

A. 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. References

Reference	Title
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES
SWPM 20-20-10	REPLACEMENT OF GROUND STUDS AND BONDING JUMPER INSTALLATION

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

C. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

D. Access Panels

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

E. Prepare for the Procedure

SUBTASK 28-21-51-010-002

(1) Open this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-21-51-710-002

(2) Make sure that the manual defueling valve is closed.

SUBTASK 28-21-51-710-003

(3) Make sure that all the fueling shutoff valve switches at the fueling station are in the closed position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-21-51-865-001

(4) 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 28-21-51-862-001

(5) Disconnect the electrical connector from the fueling shutoff valve (three locations).

F. Electrical Bonding Measurement

SUBTASK 28-21-51-760-001

28-AWL-35: CDCCL

(1) Measure the electrical bonding resistance between pin 1 on the electrical connector and structure (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-35.

(a) Use an intrinsically safe approved bonding meter, COM-1550 to measure the electrical bonding resistance.

28-AWL-35: CDCCL

(b) Make sure that the electrical bonding resistance is 0.0100 ohm (10.0 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-35.

SUBTASK 28-21-51-760-002

28-AWL-35: CDCCL

(2) Measure the electrical bonding resistance between the fueling shutoff valve and the refueling manifold (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-35.

(a) Use an intrinsically safe approved bonding meter, COM-1550 to measure the electrical bonding resistance.

28-AWL-35: CDCCL

(b) Make sure that the electrical 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-35.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-21-51-765-001

28-AWL-35: CDCCL

(3) Measure the electrical bonding resistance between the fueling shutoff valve solenoid bonding tab and the structure (three locations) (SWPM 20-20-00, SWPM 20-20-10).

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-35.

(a) Use an intrinsically safe approved bonding meter, COM-1550 to measure the electrical bonding resistance.

28-AWL-35: CDCCL

(b) Make sure that the electrical bonding resistance is 0.0010 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-35.

G. 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

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

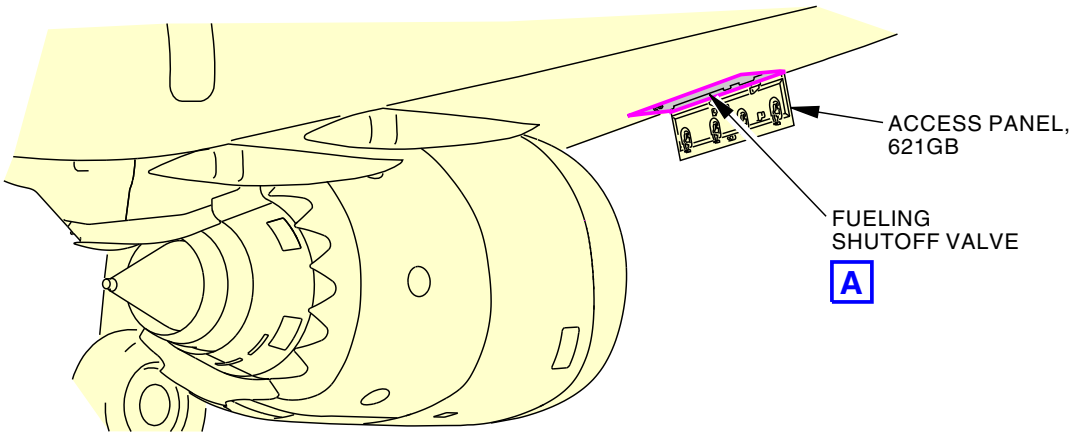
SUBTASK 28-21-51-410-002

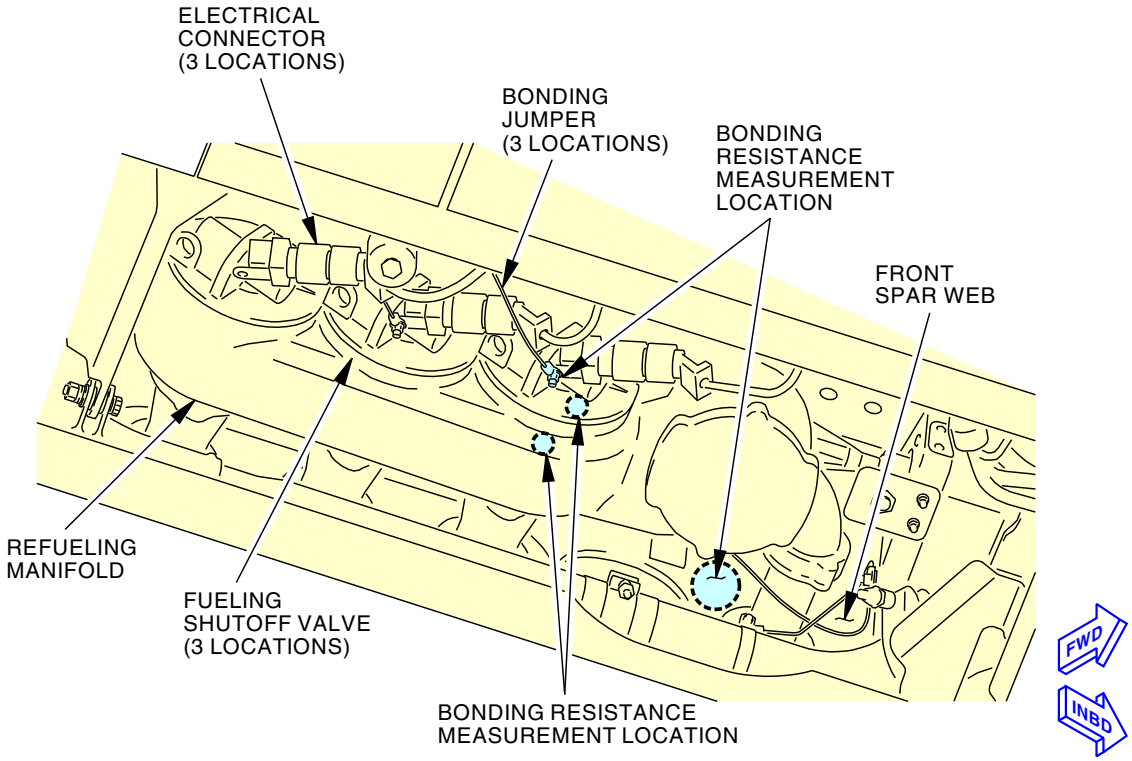
(3) Close this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details





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Fueling Shutoff Valve - Bonding Resistance Measurement
Figure 601/28-21-51-990-802

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FUELING FLOAT SWITCH - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) A task to remove the float switch in each fuel tank.

(2) A task to install the float switch in each fuel tank.

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.

D. In the No. 1 and No. 2 tanks, the float switch conduit must be replaced if the float switch is replaced. The float switch and conduit for the No. 1 or No. 2 tanks are supplied as one assembly. In the center tank, the conduit may be removed if necessary, however, the conduit liner must be replaced each time that the float switch is replaced.

E. 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.

F. The convoluted tube assembly is referred to as the liner in this procedure.

TASK 28-21-71-020-801

2. Float Switch Removal

(Figure 401, Figure 402, Figure 403)

A. General

(1) This task gives instructions to remove the Float Switch.

(2) In the No. 1 and No. 2 tanks, the float switch conduit must be replaced if the float switch is replaced. The float switch and conduit for the No. 1 or No. 2 tanks are supplied as one assembly. In the center tank, the conduit may be removed if necessary, however, the conduit liner must be replaced each time that the float switch is replaced.

B. 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)
28-11-11-000-801	Main Tank Access Door Removal (P/B 401)
28-11-31-000-801	Center Tank Access Door Removal (P/B 401)

C. Location Zones

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

D. Access Panels

Number	Name/Location
131AB	Center Tank Access
521TB	Lower Leading Edge Access Panel - Slat Station 347
532PB	Main Tank Access Door - Wing Station 576
621SB	Lower Leading Edge Access Panel - Slat Station 328
632PB	Main Tank Access Door - Wing Station 576

E. Prepare for the Removal

SUBTASK 28-21-71-860-001

WARNING MAKE SURE THAT PERSONNEL AND EQUIPMENT STAY AWAY FROM THE LEADING EDGE 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.

(1) Do this task: Leading Edge Flaps and Slats Extension, TASK 27-81-00-860-803.

WARNING MAKE SURE TO INSTALL THE LEADING EDGE FLAP AND SLAT ACTUATORS LOCKOUT SET TO PREVENT ACCIDENTAL OPERATION OF THE LEADING EDGE FLAPS AND SLATS. THE LEADING EDGE FLAPS AND SLATS CAN MOVE QUICKLY. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(a) Do this task: Leading Edge Flap and Slat Locks Installation, TASK 27-81-00-480-801.

SUBTASK 28-21-71-650-001

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) Prepare to go into the applicable fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-21-71-860-002

(3) Make sure that the fueling shutoff valves at the refuel station are closed.

SUBTASK 28-21-71-860-003

(4) 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 28-21-71-010-001

(5) Do these steps to get access to the float switches:

(a) To get access to the float switch in the No. 1 tank (TASK 28-11-11-000-801).

Remove this access panel:

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

(b) To get access to the float switch in the No. 2 tank (TASK 28-11-11-000-801).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Remove this access panel:

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

(c) To get access to the float switch in the center tank (TASK 28-11-31-000-801).

Remove this access panel:

Number	Name/Location
131AB	Center Tank Access

SUBTASK 28-21-71-010-002

(6) Do these steps to get access to the front spar connections of the float switches:

NOTE: Access to the center tank front spar connection is done by extending the Leading Edge Flaps to the full extend position.

(a) To get access to the front spar connection for the No. 1 tank float switch.

Open this access panel:

Number	Name/Location
521TB	Lower Leading Edge Access Panel - Slat Station 347

(b) To get access to the front spar connection for the No. 2 tank float switch.

Open this access panel:

Number	Name/Location
621SB	Lower Leading Edge Access Panel - Slat Station 328

F. No. 1 or No. 2 Tank Fueling Float Switch and Conduit Removal

(Figure 401)

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 that the wire has a sufficient length for a new splice.

(b) Put a tag on the wires to identify them.

SUBTASK 28-21-71-020-003

(3) Do these steps to remove the float switch [31] and conduit [1] (Figure 401):

NOTE: It is necessary to remove the conduit each time that you remove the float switch.

(a) Remove and discard the lockwire [5], lockwire [8] and lockwire [13] before you remove the conduit [1] from the spar (Figure 401).

(b) Loosen and remove the coupling ring [7] to permit the float switch cable to move freely.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(c) With one person in the tank and one person out of the tank, loosen and remove the bolts [4], nuts [9], washers [17], washers [19], washers [20] and packings [18] that attach the retainer [10] to the front spar.

NOTE: This step protects the retainer from damage while you loosen the conduit mounting nut [6].

1) Pull the retainer [10] back from the front spar.

(d) From inside the tank, loosen the conduit captive nut [12] from the bulkhead union [2].

(e) From outside the tank, loosen and remove the conduit mounting nut [6] and washer [3] from the bulkhead union [2].

(f) Remove the bulkhead union [2] and O-ring [16] from the front spar.

(g) Disconnect the bonding jumper [33] from the ground stud of the float switch [31].

(h) Disconnect the bonding jumper [32] from the conduit [1].

(i) Remove and discard the lockwire [35] and lockwire [37] before you remove the conduit [1] and the float switch [31] (Figure 401).

(j) Loosen the conduit captive nut [34] from the float switch [31].

(k) Loosen the mounting nut [36] for the float switch [31].

(l) Separate the float switch [31] from the conduit [1] and from the conduit liner [15] sufficiently to remove the float switch [31] and the conduit [1] from the bracket [38].

(m) Move the switch out to the side of the bracket [38].

(n) Pull the remaining wiring through the front spar opening and remove the float switch [31], conduit [1] and retainer [10] from the tank as a unit.

G. Center Tank Fueling Float Switch Removal

(Figure 402, Figure 403)

SUBTASK 28-21-71-020-004

(1) Prepare to cut the wires that go to the float switch [83] (Figure 402).

(a) Go out of the fuel tank.

(b) Separate the wires that go to the float switch [83] from the wire bundle, forward of the wing front spar.

(c) Find the splice in the wires that go to the float switch [83].

SUBTASK 28-21-71-020-005

(2) Cut the wires at a good point adjacent to the splice.

(a) Make sure that the wire has a sufficient length for a new splice.

(b) Put a tag on the wires to identify them.

SUBTASK 28-21-71-020-006

(3) Loosen and remove the drain port assembly [56] to permit the float switch electrical cable [64] to move freely (Figure 402).

SUBTASK 28-21-71-020-007

CAUTION

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 [83] in the center tank (Figure 402):

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Remove and discard the lockwire [86] and lockwire [93] before you remove the float switch [83].

(b) Loosen the conduit captive nut [95] from the float switch [83].

(c) Loosen the mounting nut [98] from the float switch [83].

(d) Remove the two screws [89], washers [90], washers [91], nuts [92], screw [88], washers [87] and nut [84] that attach the mounting bracket [99] to the spanwise beam bracket [85].

(e) Hold the float switch [83] with its attaching parts and do not let it fall while you pull the wires for the float switch out of the conduit [94].

(f) Make loops in the wire to make the wire and the float switch easy to move.

(g) Remove the float switch [83] from the fuel tank.

1) If you are scheduled to install a different float switch [83], separate the float switch from the mounting bracket [99].

2) Keep the mounting bracket [99] for subsequent installation of the float switch.

(h) Pull the formed section of the conduit liner [65] forward out of the conduit [62] with needle-nose pliers or a similar tool.

(i) Cut off the formed end of the conduit liner [65].

NOTE: This step makes it easier to pull the conduit liner out of the conduit from inside the tank.

(j) From inside the tank, pull the conduit liner [65] out of the conduit [94] from the end that was attached to the float switch [83].

(k) Remove the conduit liner [65] from the fuel tank.

1) Discard the liner [65].

SUBTASK 28-21-71-020-008

(5) If it is necessary to remove the conduit [94] for the float switch [83] wiring in the center tank, do these steps (Figure 402, Figure 403):

(a) Remove and discard the lockwire [54], lockwire [57] and lockwire [63] before you remove the conduit from the front spar (Figure 402).

(b) With one person in the tank and one person out of the tank, loosen and remove the bolts [53], nuts [58], washers [67], washers [69], washers [70], and packings [68] that attach the retainer [59] to the front spar (Figure 402).

NOTE: This step protects the retainer from damage while you loosen the conduit mounting nut [55].

1) Pull the retainer [59] back from the front spar.

(c) Loosen the screw [124], nut [125] and washers [126] from the clamp [127] to disconnect the bonding jumper [123] (Figure 403).

(d) Loosen and remove the screw [119], nut [120] and washers [121] that attach the clamp [122] (Figure 403).

(e) Loosen and remove the screw [129], nut [132], washers [128] and washers [133] that attach the clamp [130] (Figure 403).

(f) Remove the clamp [130] and spacers [131] (Figure 403).

(g) Loosen the bulkhead conduit captive nut [60] from the bulkhead union [51] (Figure 402).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(h) Loosen the screws [113], washers [112], washers [117] and nuts [118] from the clamps [115] to disconnect the bonding jumper [114] (Figure 403).

(i) Cut the lockwire [111] and loosen the conduit captive nut [116] (Figure 403).

(j) Disconnect conduit [62] (forward section) from conduit [94] (aft section) (Figure 403).

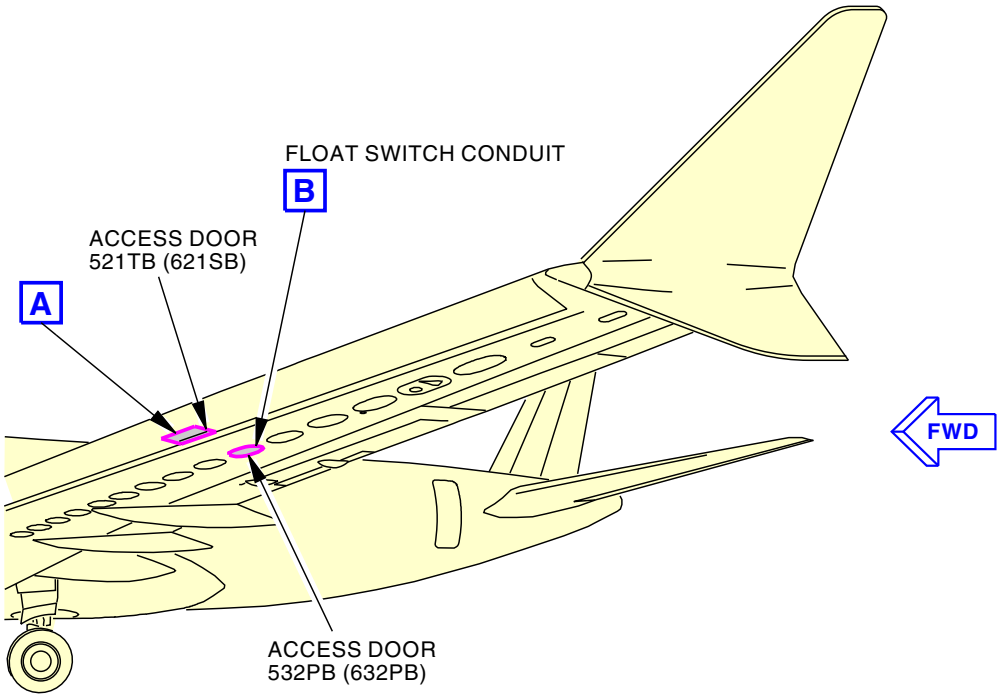
(k) Remove conduit [62] (forward section), conduit [94] (aft section) and retainer [59] (Figure 403).

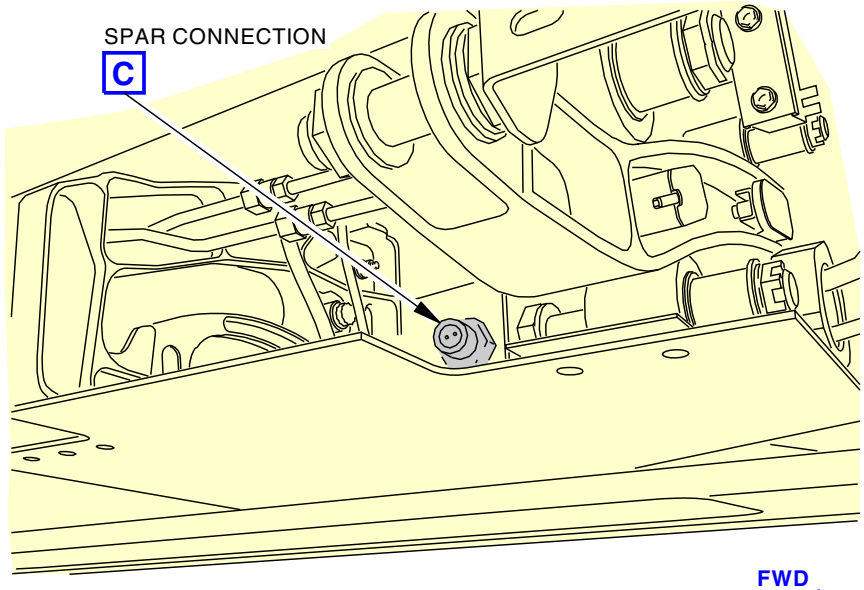
(l) Loosen and remove the conduit mounting nut [55] and washer [52] from the bulkhead union [51] (Figure 402).

(m) Remove the bulkhead union [51] and O-ring [66] from the front spar (Figure 402).

——— END OF TASK ———

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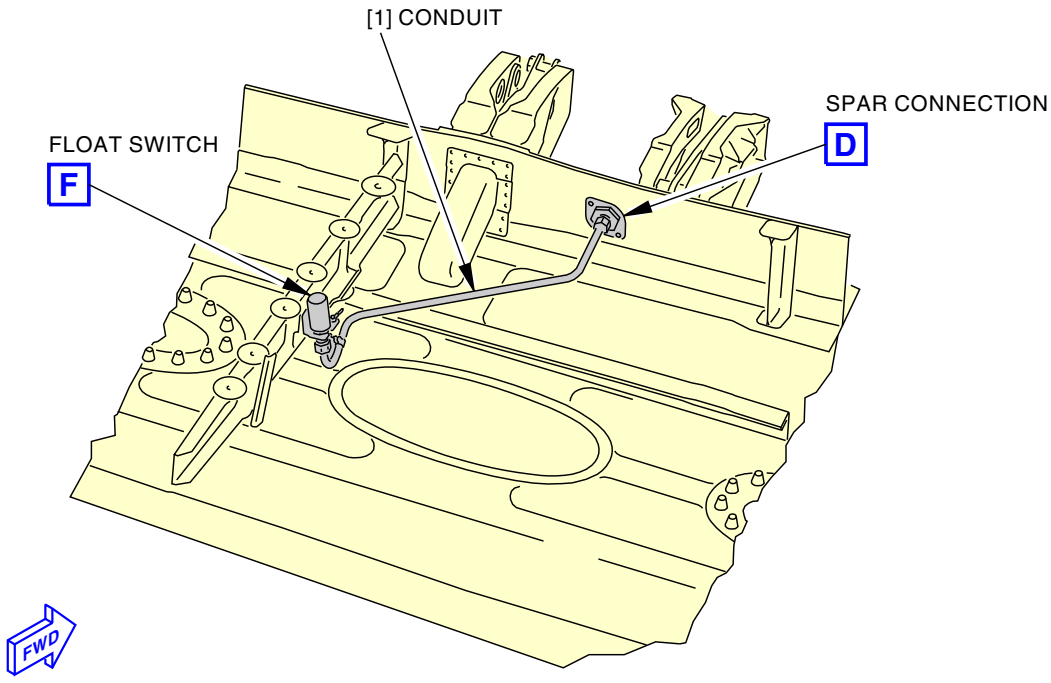
TANK NO. 1 (LEFT WING)
(TANK NO. 2 (RIGHT WING) IS EQUIVALENT)

A

2413549 S00061532809_V1

Main Fuel Tank Float Switch and Conduit Installation
Figure 401/28-21-71-990-801 (Sheet 1 of 6)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



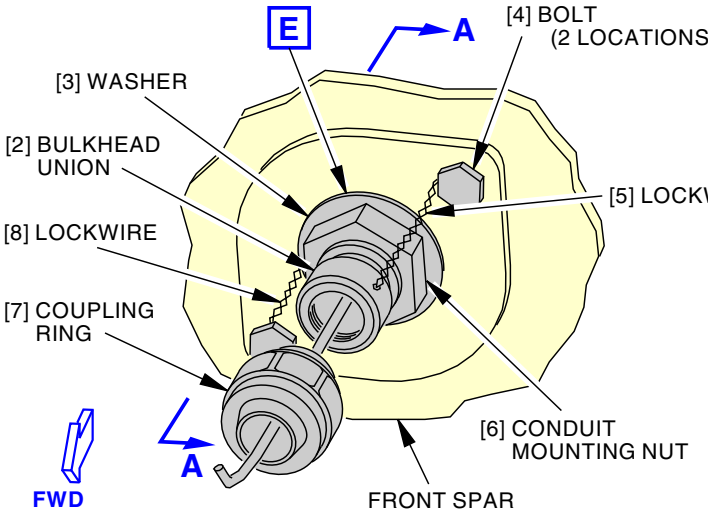
FLOAT SWITCH CONDUIT
(MAIN TANK 1 IS SHOWN, MAIN TANK 2 IS EQUIVALENT)

B

2413553 S00061532813_V1

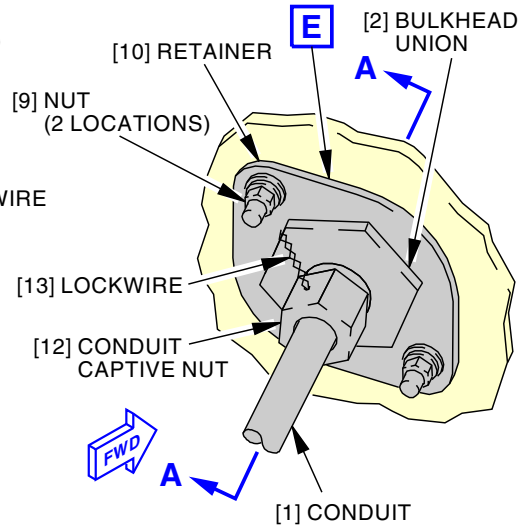
Main Fuel Tank Float Switch and Conduit Installation
Figure 401/28-21-71-990-801 (Sheet 2 of 6)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



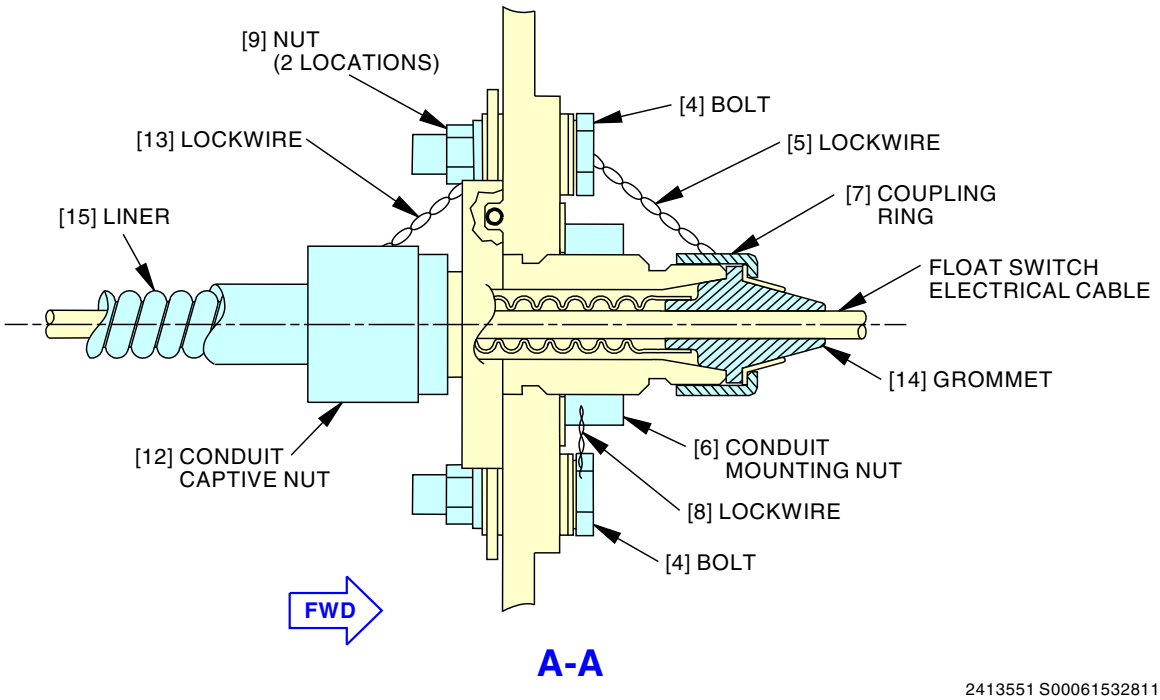
SPAR CONNECTION
(MAIN TANK, ASSEMBLED, OUT TANK)

C



SPAR CONNECTION
(MAIN TANK, ASSEMBLED, IN TANK)

D

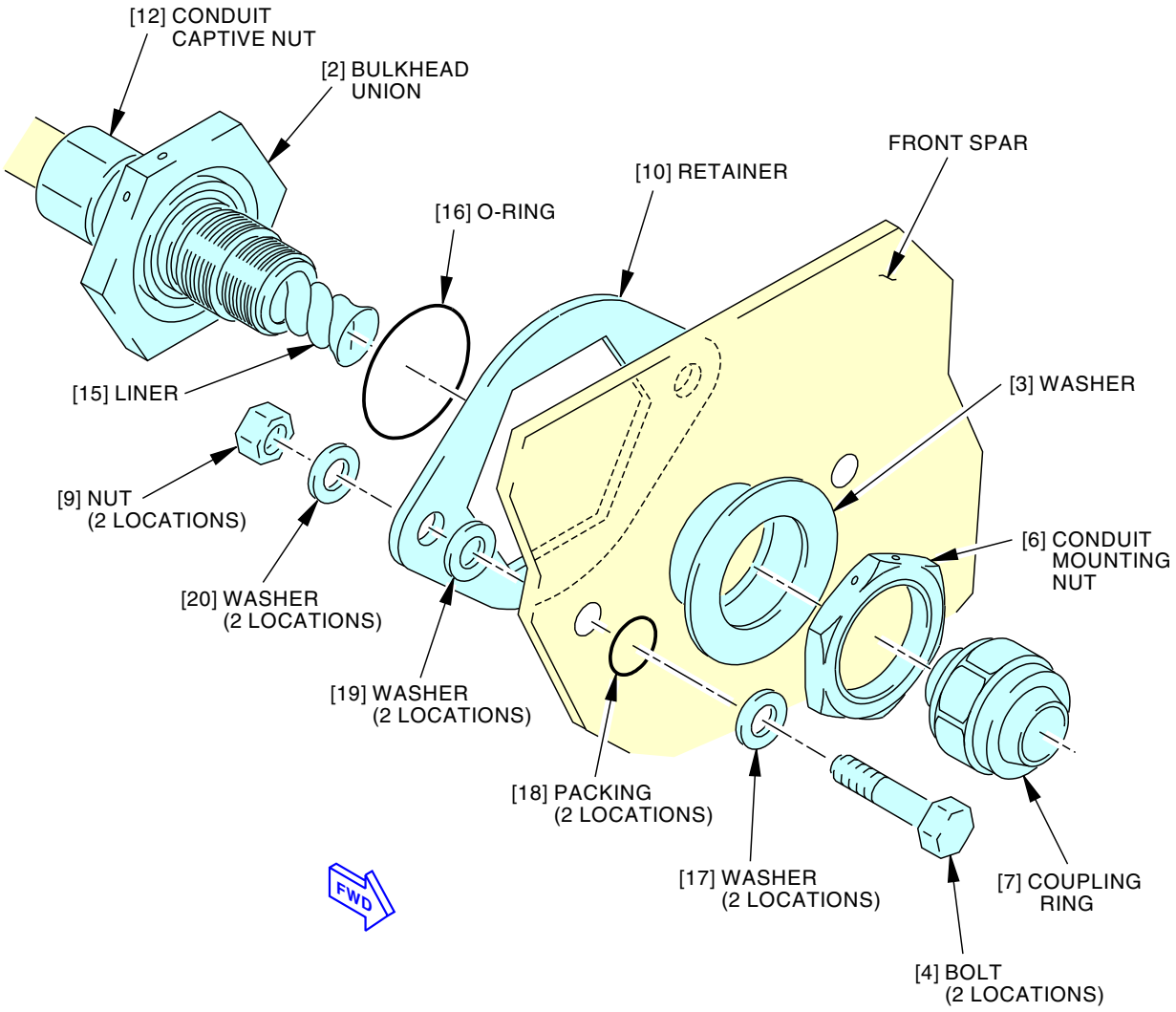


A-A

2413551 S00061532811_V2

Main Fuel Tank Float Switch and Conduit Installation
Figure 401/28-21-71-990-801 (Sheet 3 of 6)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



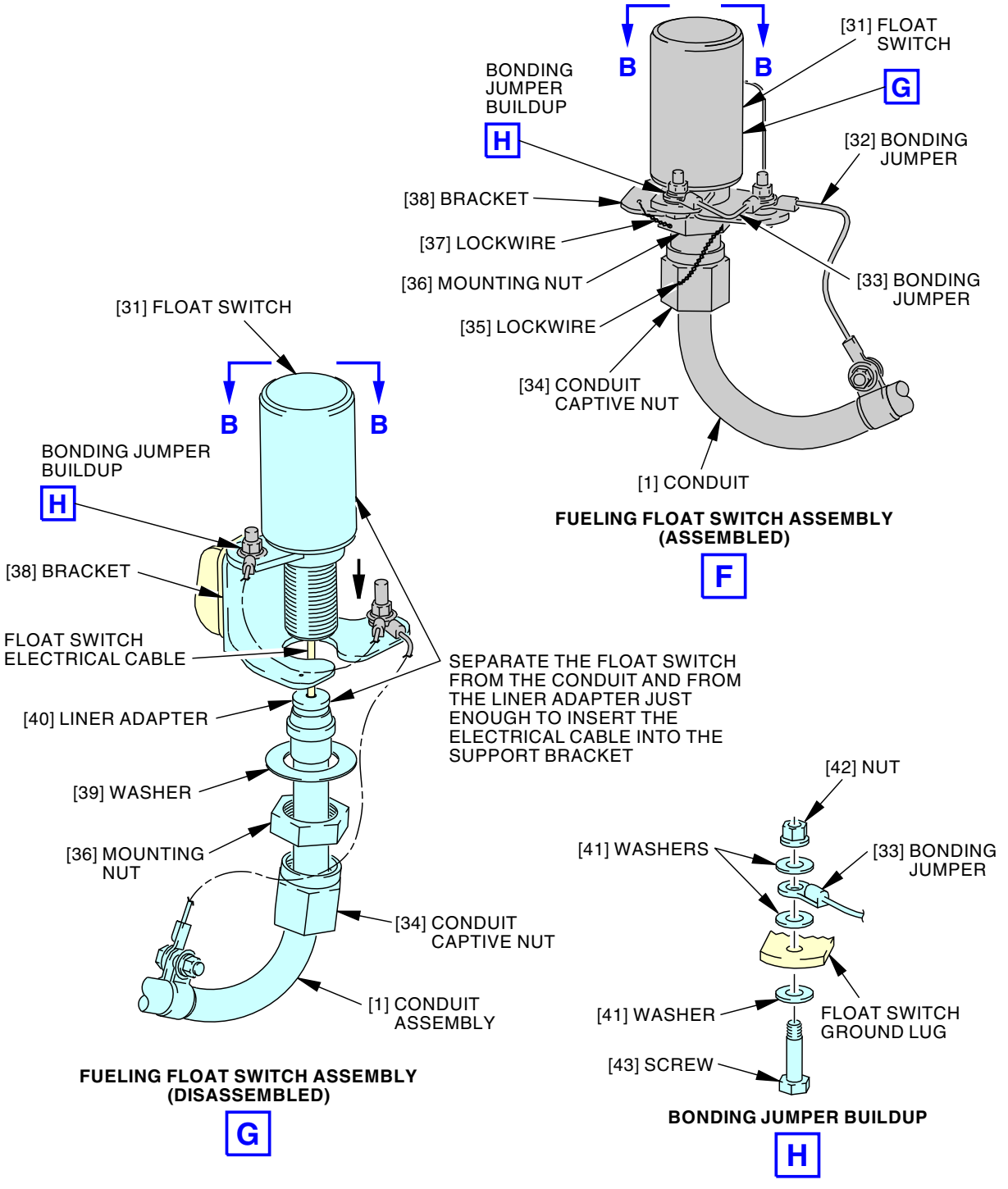
SPAR CONNECTION (DISASSEMBLED)

E

2413556 S00061532816_V1

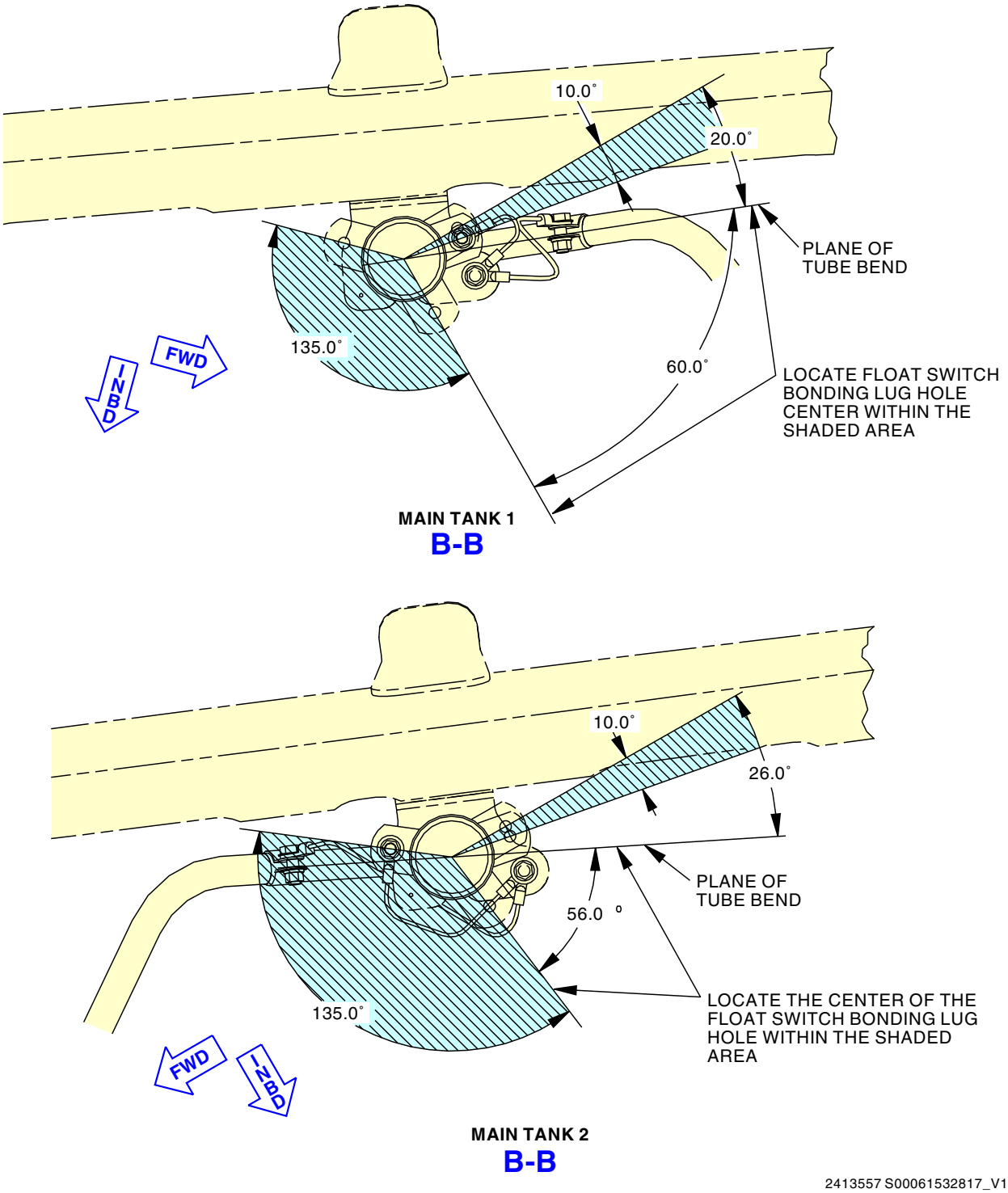
Main Fuel Tank Float Switch and Conduit Installation
Figure 401/28-21-71-990-801 (Sheet 4 of 6)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



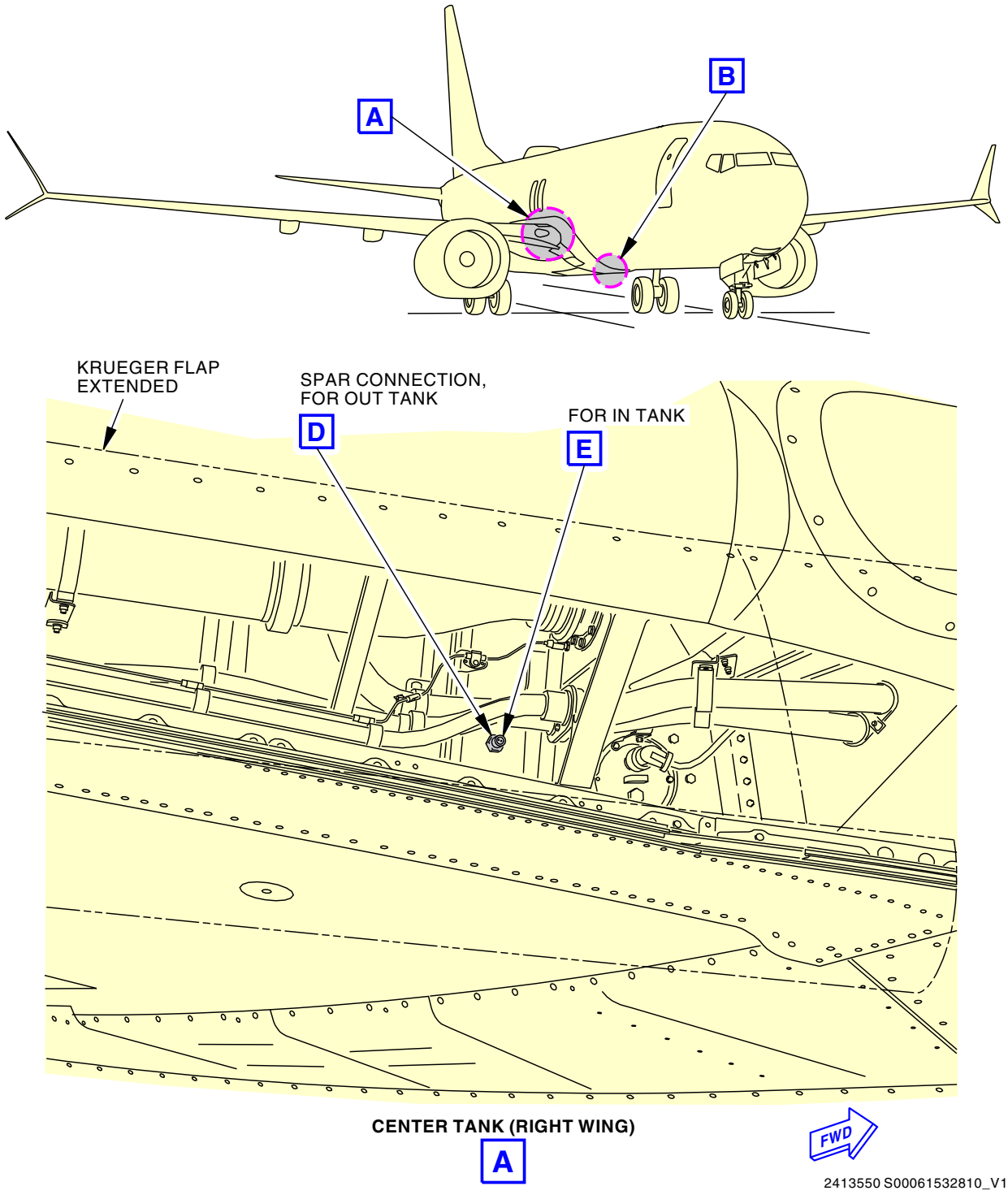
Main Fuel Tank Float Switch and Conduit Installation
Figure 401/28-21-71-990-801 (Sheet 5 of 6)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



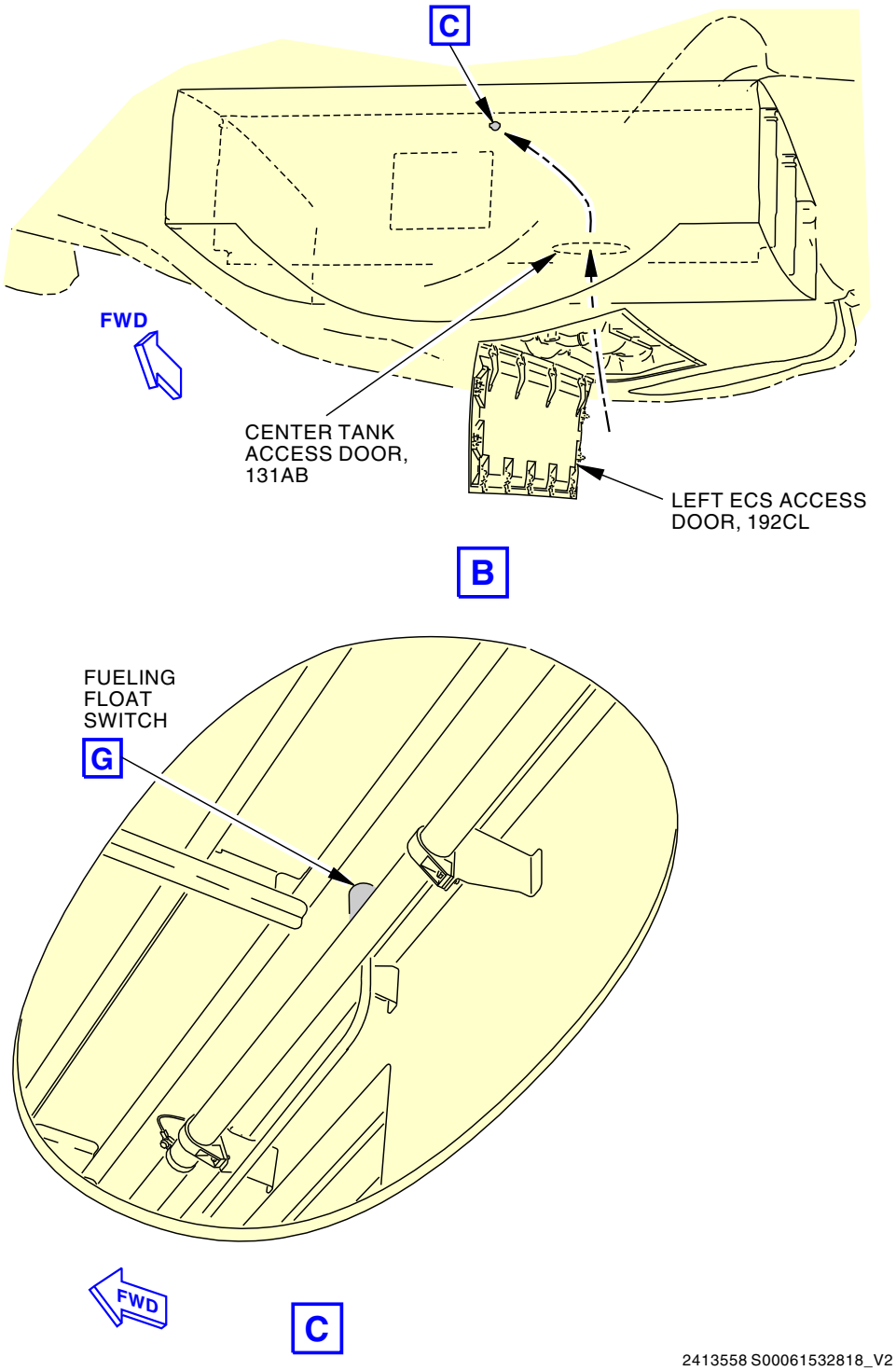
Main Fuel Tank Float Switch and Conduit Installation
Figure 401/28-21-71-990-801 (Sheet 6 of 6)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



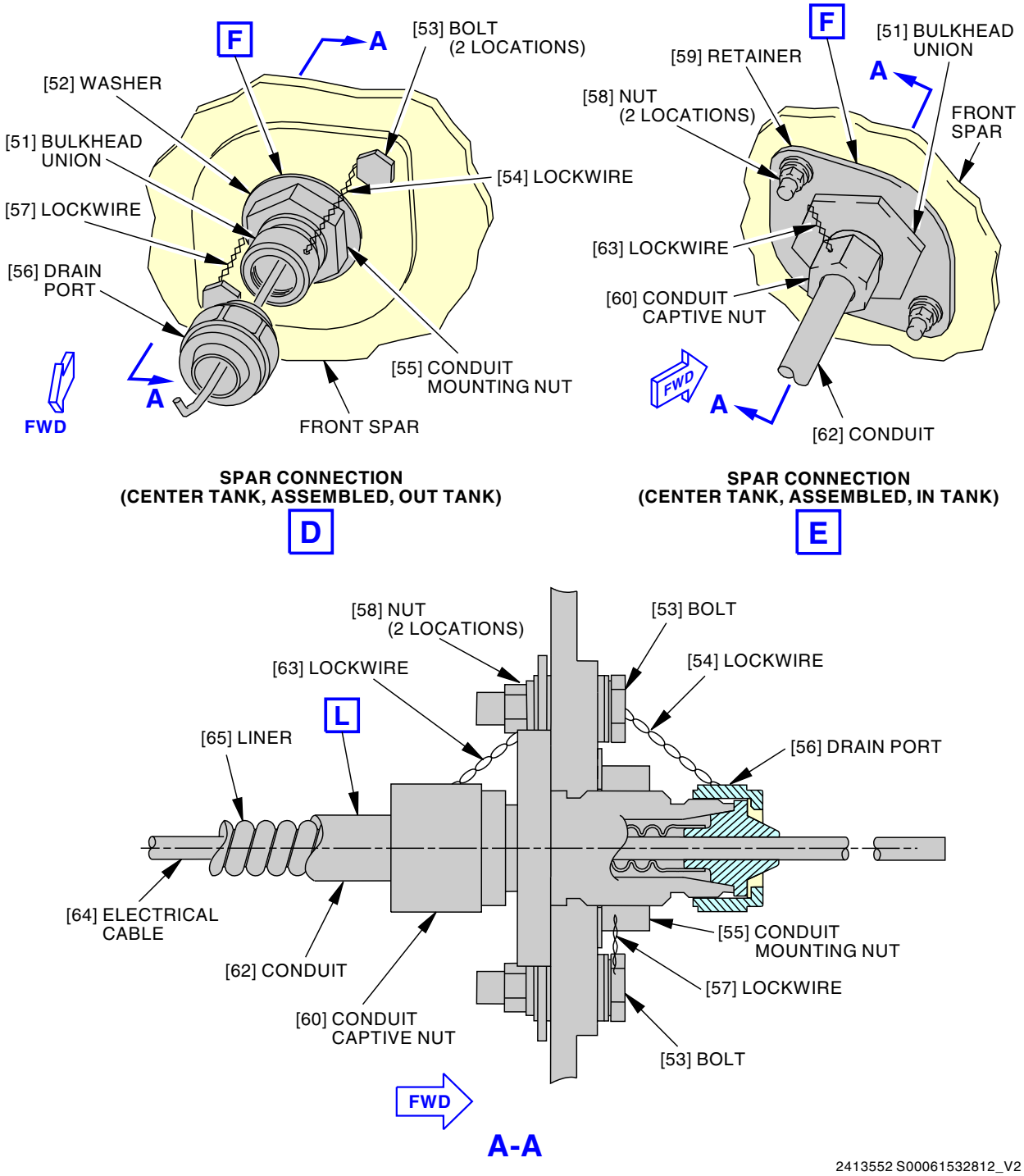
Center Fuel Tank Float Switch Installation
Figure 402/28-21-71-990-802 (Sheet 1 of 7)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



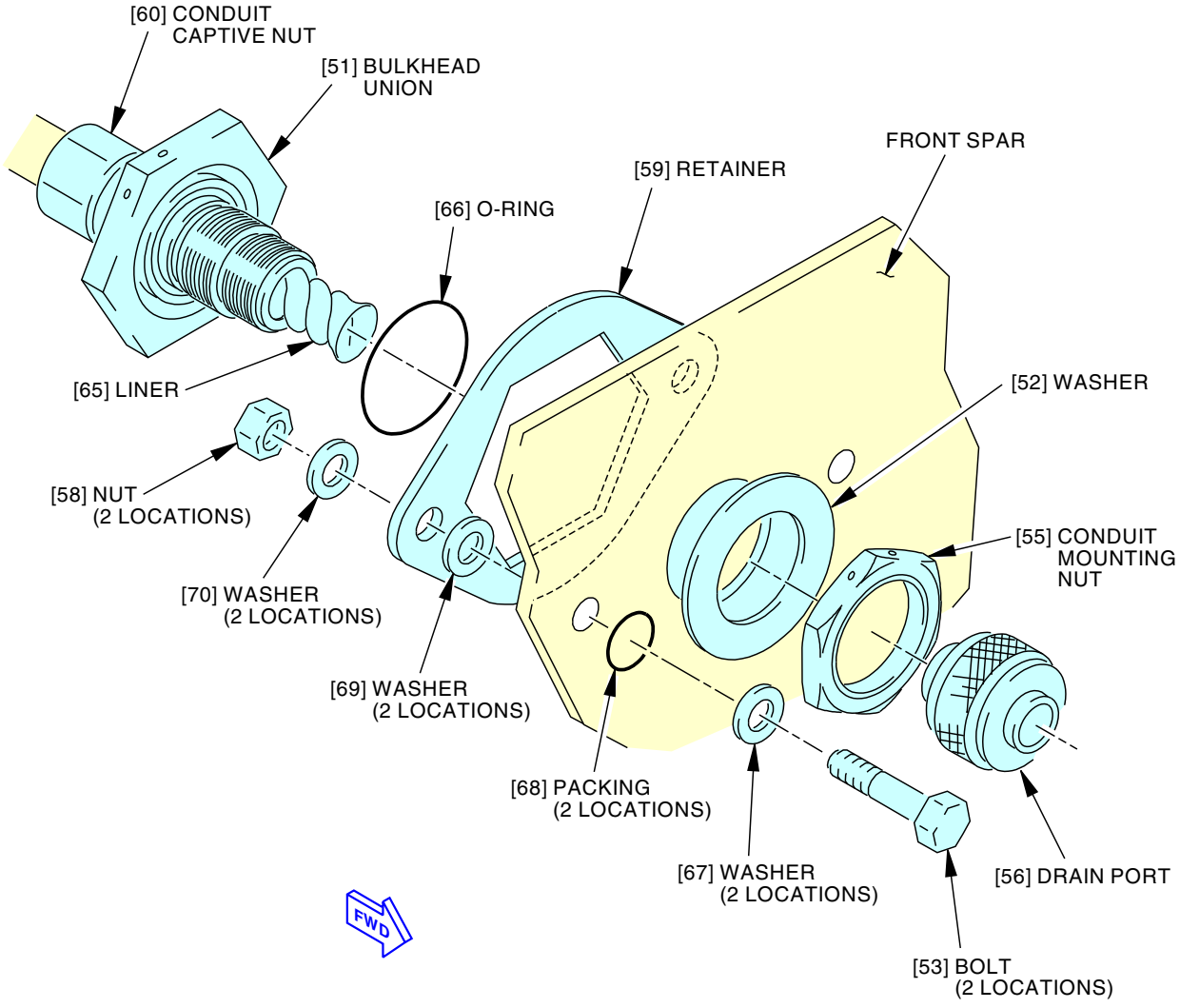
Center Fuel Tank Float Switch Installation
Figure 402/28-21-71-990-802 (Sheet 2 of 7)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Center Fuel Tank Float Switch Installation
Figure 402/28-21-71-990-802 (Sheet 3 of 7)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



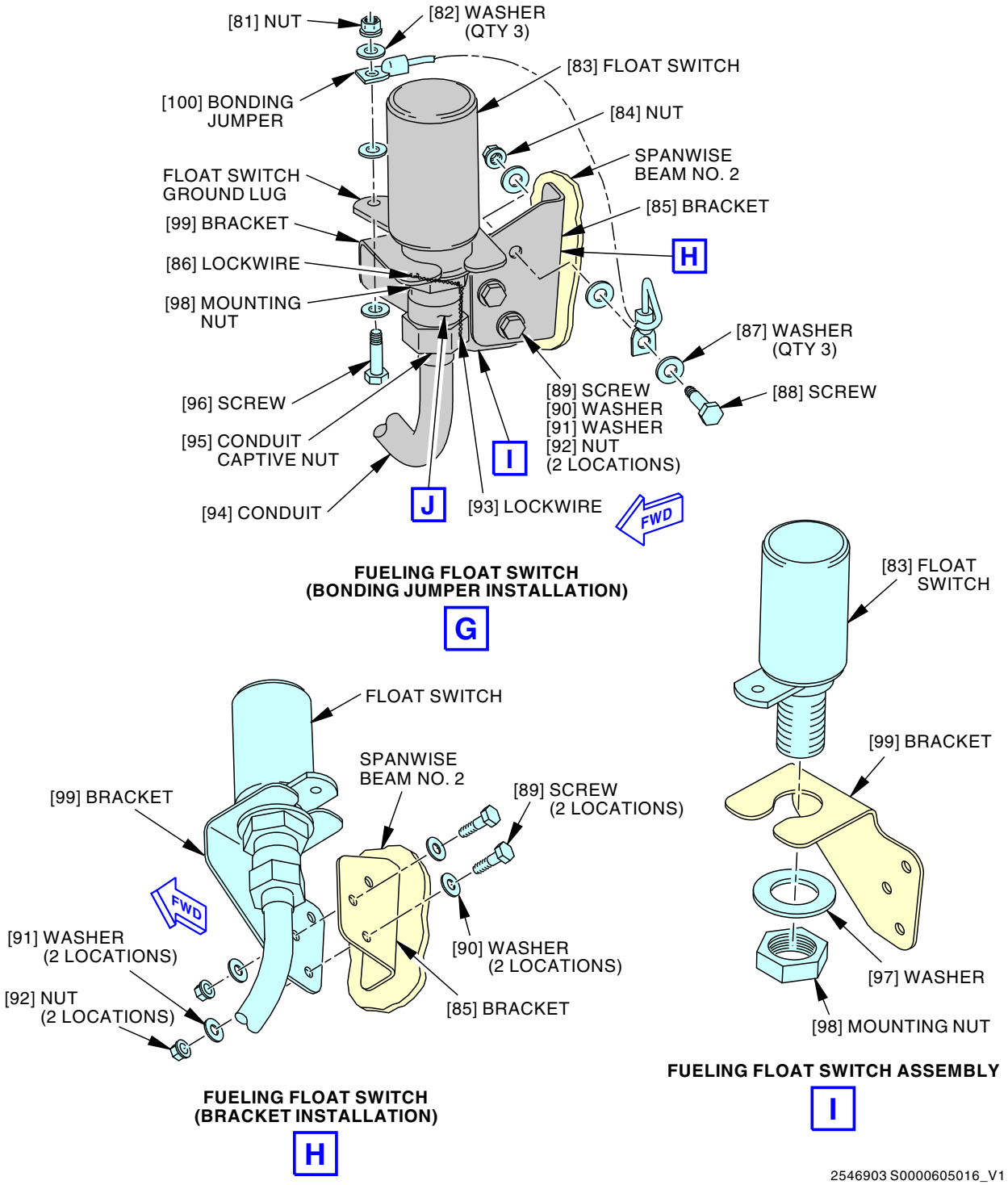
BULKHEAD FITTING (DISASSEMBLED)

F

2413567 S00061532827_V1

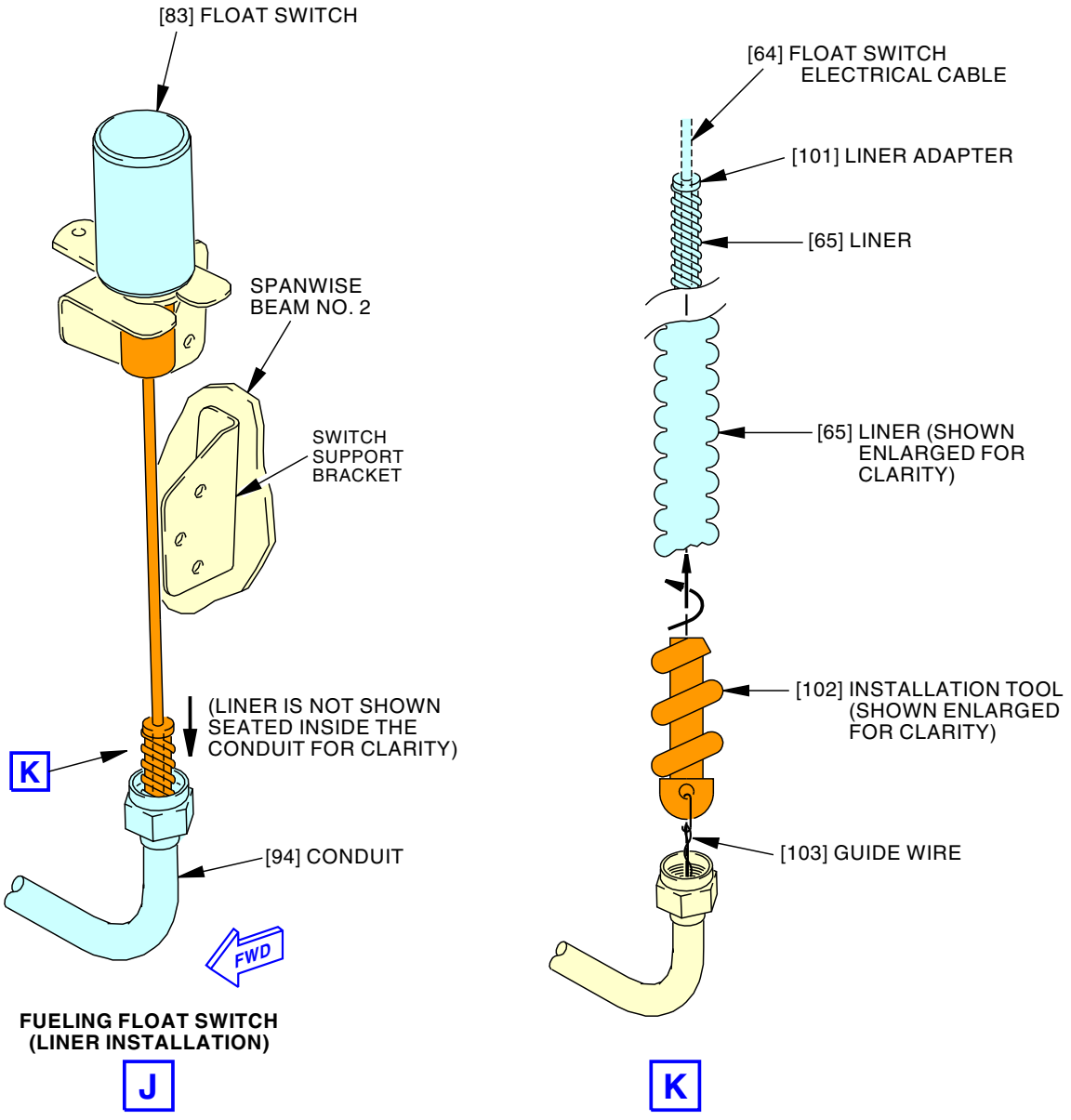
Center Fuel Tank Float Switch Installation
Figure 402/28-21-71-990-802 (Sheet 4 of 7)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Center Fuel Tank Float Switch Installation
Figure 402/28-21-71-990-802 (Sheet 5 of 7)

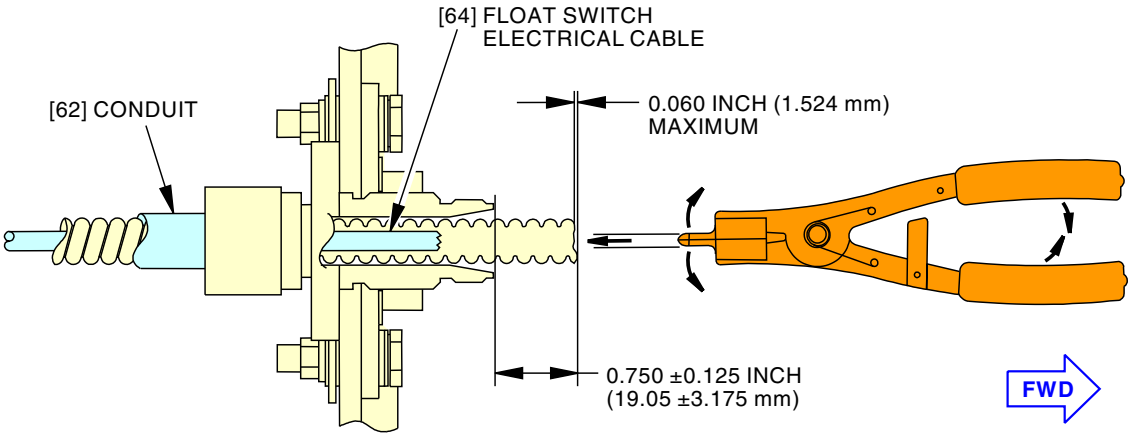
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413560 S00061532820_V1

Center Fuel Tank Float Switch Installation
Figure 402/28-21-71-990-802 (Sheet 6 of 7)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



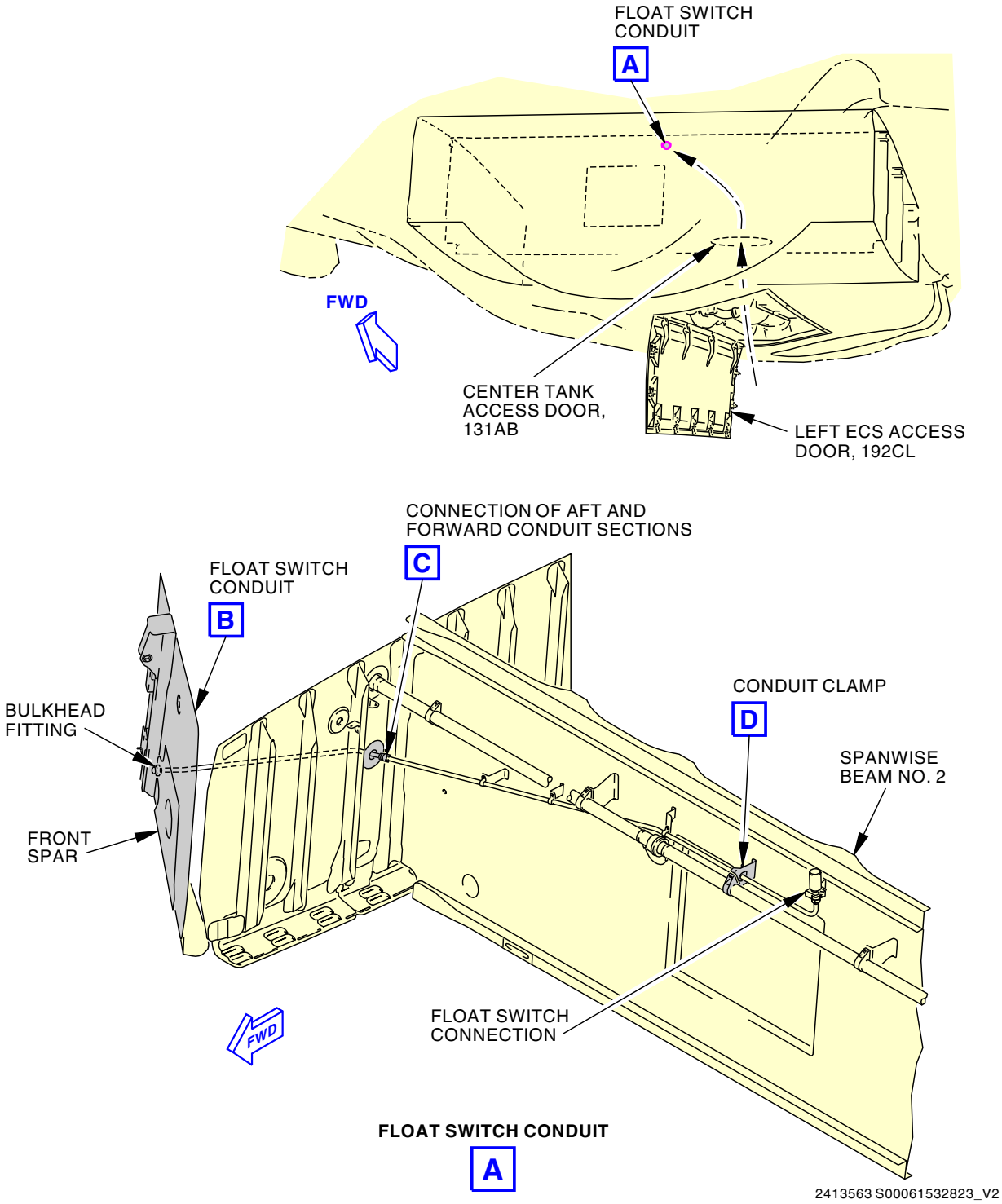
(LINER TRIMMING AND FORMING)

L

2413562 S00061532822_V1

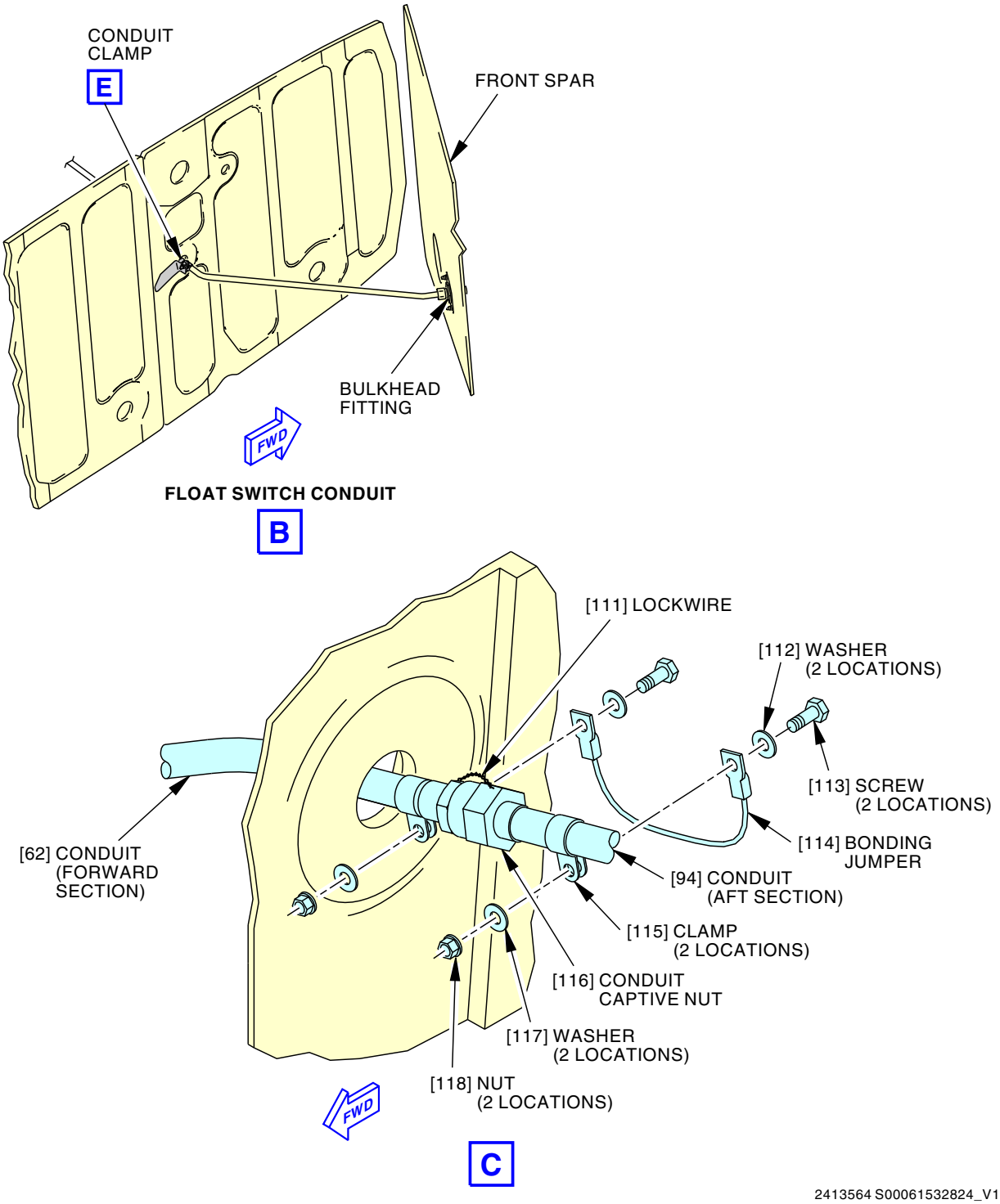
Center Fuel Tank Float Switch Installation
Figure 402/28-21-71-990-802 (Sheet 7 of 7)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



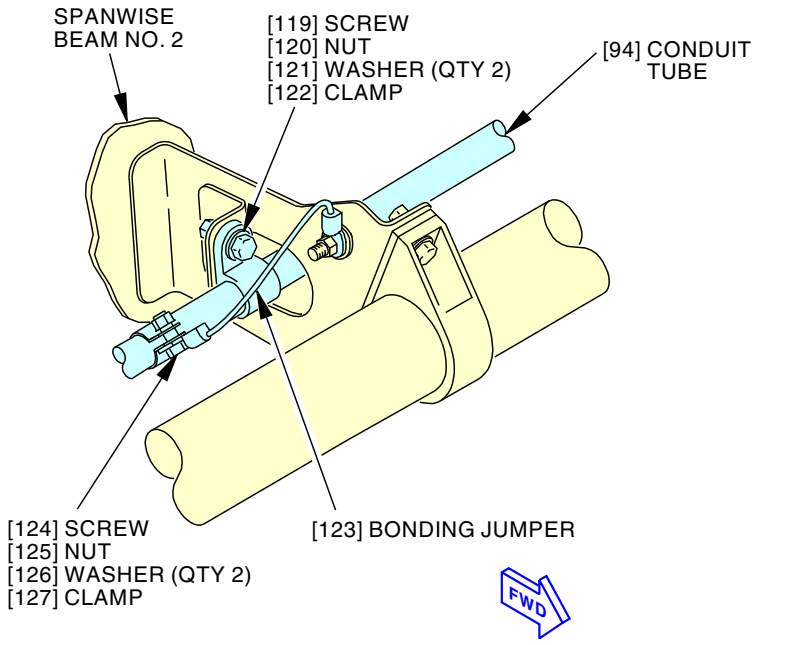
Center Fuel Tank Float Switch Conduit Installation
Figure 403/28-21-71-990-803 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



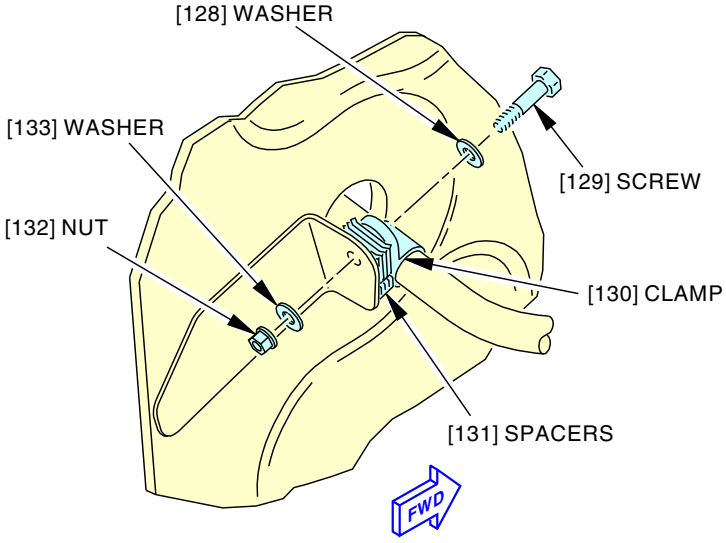
Center Fuel Tank Float Switch Conduit Installation
Figure 403/28-21-71-990-803 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



CONDUIT CLAMP

D



CONDUIT CLAMP

E

2413565 S00061532825_V1

Center Fuel Tank Float Switch Conduit Installation
Figure 403/28-21-71-990-803 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-21-71-400-801

3. Float Switch Installation

(Figure 401, Figure 402, Figure 403)

A. General

(1) In the No. 1 and No. 2 tanks, the float switch conduit must be replaced if the float switch is replaced. The float switch and conduit for the No. 1 or No. 2 tanks are supplied as one assembly. In the center tank, the conduit may be removed if necessary, however, the conduit liner must be replaced each time that the float switch is replaced.

(2) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-15.

B. References

Reference	Title
20-10-44-400-801	Lockwire, Cotter Pins, and Lockrings - 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)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-21-00-700-801	Pressure Fueling System - Test (P/B 501)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES
SWPM 20-20-10	REPLACEMENT OF GROUND STUDS AND BONDING JUMPER INSTALLATION
SWPM 20-30-12	ASSEMBLY OF SPLICES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659
SPL-4325	Test Equipment - Float Switch Conduit - 737 With Center Tank Type II Switch Part #: C28012-1 Supplier: 81205

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Reference	Description
SPL-5674	Adapter - Wire Puller Part #: 21A00355 Supplier: 07418
SPL-5675	Pliers - Spreader, Conduit Flare Part #: 04E00063 Supplier: 07418

D. Consumable Materials

Reference	Description	Specification
A00247	Sealant - Pressure And Environmental - Chromate Type	BMS5-95
A50231	Sealant - Pressure And Environmental - Chromate Type	BMS5-95 Class B
A50337	Sealant - Fuel Tank	BMS5-45 Class B
D00504	Grease - Petrolatum	VV-P-236
G00150	Tape - Nitto P-421 NAT (Formerly Permacel) PTFE Film Tape	
G01912	Lockwire - MS20995NC32, Monel - 0.032 Inch (0.8128 mm) Diameter	NASM20995
G50152	Tape - Flat Braided Lacing, Nomex, Hydraulic Fluid Resistant, Max 260 degrees C	BMS13-54 Type III Grade D Class 1 Finish C
G50177	Lockwire - MS20995N32, Inconel - 0.032 Inch (0.8128 mm) Diameter	NASM20995
G50347	Lockwire - MS20995NC32, Monel - 0.032 Inch (0.8128 mm) Diameter	NASM20995
G50710	Tube - Flexible, Flame-Retardant, Adhesive-Lined, Polyolefin Heat-Shrinkable Tubing (Tyco Electronics DWP-125)	

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Conduit	28-21-71-01-130	SIA ALL
		28-21-71-02-130	SIA ALL
16	O-ring	28-21-71-01-085	SIA ALL
		28-21-71-02-085	SIA ALL
18	Packing	28-21-71-01-075	SIA ALL
		28-21-71-02-075	SIA ALL
31	Float switch	28-21-71-01-090	SIA ALL
		28-21-71-02-090	SIA ALL
62	Conduit	28-21-71-03-080	SIA ALL
65	Liner	28-21-71-03-165	SIA ALL
66	O-ring	28-21-71-03-150	SIA ALL
68	Packing	28-21-71-03-145	SIA ALL
83	Float switch	28-21-71-03-170	SIA ALL
		28-21-71-03-185	SIA ALL

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

AMM Item	Description	AIPC Reference	AIPC Effectivity
94	Conduit	28-21-71-03-065	SIA 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
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

G. Access Panels

Number	Name/Location
131AB	Center Tank Access
521TB	Lower Leading Edge Access Panel - Slat Station 347
532PB	Main Tank Access Door - Wing Station 576
621SB	Lower Leading Edge Access Panel - Slat Station 328
632PB	Main Tank Access Door - Wing Station 576

H. No. 1 or No. 2 Tank Float Switch and Conduit Assembly Installation Procedure

(Figure 401)

SUBTASK 28-21-71-420-001

28-AWL-15: CDCCL

(1) Use a new float switch [31] and conduit [1] (float switch assembly).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCL.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-15.

SUBTASK 28-21-71-420-002

(2) For the float switch in the No. 1 or No. 2 tank, separate the float switch [31] from the conduit [1] and from the liner adapter [40] sufficiently to slide the float switch cable into the bracket slot (Figure 401).

NOTE: Separate the float switch [31] from the conduit [1] just enough to slip the float switch cable into the bracket [38] slot, while keeping the liner [15] from sliding out of the conduit [1]. Too much separation can cause the loss of moisture seal in the conduit [1].

SUBTASK 28-21-71-420-003

(3) Put the electrical cable for the float switch [31] into the slot on the float switch bracket [38].

SUBTASK 28-21-71-640-001

(4) Lubricate new O-ring [16] with grease, D00504, and install it on the bulkhead union [2].

SUBTASK 28-21-71-420-004

(5) Put the bulkhead union [2] with the O-ring [16] and retainer [10] into the hole in the front spar.

(a) Make sure that the liner [15] extends out of the bulkhead union [2] sufficiently to be attached to the coupling ring [7] subsequently.

SUBTASK 28-21-71-420-005

(6) Install the float switch mounting nut [36] and the washer [39].

(a) Tighten the mounting nut [36] with your hand only.

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SUBTASK 28-21-71-420-006

(7) Install the conduit captive nut [34].

(a) Tighten the conduit captive nut [34] with your hand only.

SUBTASK 28-21-71-420-007

(8) From outside the tank, install the washer [3] and the conduit mounting nut [6] on the bulkhead union [2].

(a) Tighten the conduit mounting nut [6] on to the bulkhead union [2] with your hand only.

SUBTASK 28-21-71-420-008

(9) Put the retainer [10] in its correct position to align the mounting holes on the retainer [10] with the bolt holes in the front spar.

(a) Do not install the retainer [10] yet, because the installation torque that you will apply to the bulkhead union [2] could break the retainer if it is installed.

SUBTASK 28-21-71-420-009

(10) Inside the tank, turn the bulkhead union [2] to mate with the retainer [10] when it is in its position for installation.

SUBTASK 28-21-71-420-010

(11) Outside the tank, torque the conduit mounting nut [6] to 360 ±18 in-lb (41 ±2 N·m).

SUBTASK 28-21-71-420-011

(12) Do these steps to install the retainer [10]:

(a) Outside the tank, install the two bolts [4], washers [17] and new packings [18] that go through the holes in the front spar for the retainer [10].

(b) Inside the tank, install the two washers [19], washers [20] and nuts [9] that hold the retainer [10] in its position.

SUBTASK 28-21-71-420-012

(13) Inside the tank, turn the float switch [31] so that the center of the float switch bonding lug hole is within the shaded area shown in view B-B (Figure 401) in a position that causes the minimum torsional load on the float switch cable.

NOTE: Do not turn the float switch [31] too much, it can cause the float switch to separate from the electrical cable sooner than necessary.

SUBTASK 28-21-71-420-013

28-AWL-15: CDCCL

(14) Do these steps to tighten the parts that attach the float switch [31]:

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCL.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-15.

(a) Torque the float switch mounting nut [36] to 280 ±14 in-lb (32 ±2 N·m).

28-AWL-15: CDCCL

(b) Torque the conduit captive nut [34] for the float switch [31] to 280 ±14 in-lb (32 ±2 N·m).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCL.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-15.

(c) Torque the bulkhead conduit captive nut [12] to 280 ±14 in-lb (32 ±2 N·m).

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28-AWL-15: CDCCL

(d) Loosen the conduit captive nut [34] for the float switch [31] sufficiently to relax the torque temporarily.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCL.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-15.

(e) Loosen the bulkhead conduit captive nut [12] sufficiently to relax the torque temporarily.

(f) The final torque for each of these nuts must be witnessed and written in the maintenance records for the airplane:

28-AWL-15: CDCCL

1) Torque the conduit captive nut [34] for the float switch [31] to 280 ±14 in-lb (32 ±2 N·m).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCL.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-15.

2) Torque the bulkhead conduit captive nut [12] to 280 ±14 in-lb (32 ±2 N·m).

3) Make sure that the final torque for each of these nuts is written in the maintenance records.

SUBTASK 28-21-71-420-014

(15) Outside of the tank, install the coupling ring [7] on the end of the bulkhead union [2].

(a) Make sure that the grommet [14] end of the coupling ring [7] is firmly installed inside the clear liner [15].

(b) Torque the coupling ring [7] to 35 ±3 in-lb (4 ±0 N·m).

SUBTASK 28-21-71-420-015

(16) Do these steps to install the bonding jumpers [33]:

(a) Install the electrostatic bonding jumper [33] on the ground lug for the float switch [31] with the screw [43], washers [41] and nut [42].

1) Choose a bonding jumper [33] whose length will prevent too much loose bonding jumper after the bonding jumper is installed.

(b) Install the other end of the electrostatic bonding jumper [33] on the ground lug on the switch bracket [38].

1) Adjust the bonding jumper [33] lug position as necessary to remove the loose part of the bonding jumper.

(c) Install the electrostatic bonding jumper [32] on the ground lug on the switch support bracket [38].

(d) Install the other end of the electrostatic bonding jumper [32] on the conduit with the clamp, screw [43], washers [41], and nut [42].

1) Adjust the bonding jumper [32] lug position as necessary to remove the loose part of the bonding jumper.

SUBTASK 28-21-71-760-001

(17) Measure the resistance from the float switch [31] round lug to the primary structure of the wing rib (SWPM 20-20-00 and SWPM 20-20-10).

(a) Use an intrinsically safe approved bonding meter, COM-1550.

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(b) Make sure that the resistance is less than 0.010 ohm (10 milliohms).

SUBTASK 28-21-71-765-001

(18) Measure the resistance from the conduit [1] to the primary structure of the wing rib (SWPM 20-20-00).

(a) Use an intrinsically safe approved bonding meter, COM-1550.

(b) Make sure that the resistance is less than 0.010 ohm (10 milliohms).

SUBTASK 28-21-71-765-002

(19) Measure the resistance between the terminal of the bonding jumper [32] and the bracket [38] (SWPM 20-20-00 and SWPM 20-20-10).

(a) Make sure that the resistance is less than 0.0010 ohm (1 milliohm).

SUBTASK 28-21-71-765-003

(20) At the other end of the bonding jumper [32], measure the resistance from the terminal of the bonding jumper [32] to the conduit [1] (SWPM 20-20-00 and SWPM 20-20-10).

(a) Use an intrinsically safe approved bonding meter, COM-1550.

(b) Make sure that the resistance is less than 0.0015 ohm (1.5 milliohms).

SUBTASK 28-21-71-420-016

28-AWL-15: CDCCL

(21) Install MS20995NC32 lockwire, G01912 in these locations (Figure 401) (Lockwire, Cotter Pins, and Lockrings - Installation, TASK 20-10-44-400-801):

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCL.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-15.

28-AWL-15: CDCCL

(a) Inside the tank, install lockwire [37] MS20995NC32 lockwire, G01912 from the mounting nut [36] for the float switch [31] to the float switch bracket [38].

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCL.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-15.

28-AWL-15: CDCCL

(b) Inside the tank, install lockwire [35] MS20995NC32 lockwire, G01912 from the mounting nut [36] to the conduit captive nut [34].

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCL.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-15.

(c) Inside the tank, install lockwire [13] MS20995NC32 lockwire, G50347 from the bulkhead conduit captive nut [12] to the bulkhead union [2].

(d) Outside the tank, install lockwire [8] MS20995NC32 lockwire, G50347 from the conduit mounting nut [6] to the bolt [4].

(e) Outside the tank, install lockwire [5] MS20995NC32 lockwire, G50347 from the coupling ring [7] to the bolt [4].

(f) Outside the tank, apply a fillet seal of sealant, A50231, or sealant, A50337, around the flange of the bolts [4].

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SUBTASK 28-21-71-420-017

(22) Do these steps to splice the float switch [31] electrical cable to the airplane wire harness:

(a) Cut the float switch [31] 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) Use the sleeve material DWP-125 heat-shrink tube, G50710.

(c) Cut the sleeve to a minimum of 3 in. (76 mm) longer than the length of the splice (this allows for 1.5 in. (38.1 mm) on each side of the splice).

(d) Slide the sleeve over one of the wires.

(e) Splice the float switch [31] electrical cable to the airplane wire harness with the applicable crimp tool (SWPM 20-30-12).

(f) Apply sealant, A00247, to the splice and each end of the splice.

NOTE: Make sure that the splice has a full layer of sealant on it.

(g) Move the sleeve, filled with sealant, A00247, to the center of the splice.

NOTE: Make sure that there are no air bubbles in the sleeve.

(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) Record the splice number on the sleeve.

(j) Put two layers of Nitto P-421 tape, G00150, over the splice to prevent damage from water and fuel.

(k) Use the lockstitch to tie a knot with tape, G50152, approximately 0.25 in. (6.35 mm) from each end of the sleeve.

(l) Remove the tags from the wires.

I. Center Tank Float Switch Installation Procedure

(Figure 402, Figure 403)

SUBTASK 28-21-71-420-018

28-AWL-15: CDCCL

(1) Use a new float switch [83] and liner [65] system.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCL.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-15.

SUBTASK 28-21-71-420-019

(2) Install the float switch [83] in the bracket [99] with the float switch mounting nut [98] and washer [97] (Figure 402).

(a) Leave the mounting nut [98] loose to permit the float switch [83] to align itself with the position where the torsional load is.

NOTE: This permits the float switch [83] to turn to the position that keeps the torsional load on the electrical cable [64] to a minimum during subsequent steps.

SUBTASK 28-21-71-420-020

(3) If it is necessary to put the conduit [62] (forward section) and conduit [94] into their positions, do these steps (Figure 402, Figure 403):

(a) Apply grease, D00504, to the threads of conduit [62] and conduit [94].

(b) Put the conduit [62] (forward section) and conduit [94] (aft section) into their positions.

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(c) Attach conduit [62] (forward section) to conduit [94] with conduit captive nut [116].

1) Hand-tighten this connection.

(d) Attach conduit [62] (forward section) to the front spar bulkhead union [51].

SUBTASK 28-21-71-420-021

WARNING INSTALL A NEW LINER EACH TIME THAT YOU REPLACE THE CONDUIT. INSTALL A NEW LINER EACH TIME THAT YOU REPLACE THE FLOAT SWITCH. THE LINER KEEPS THE WIRING AWAY FROM THE FUEL. IF YOU IGNORE THESE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(4) Do these steps to install the liner [65] and the electrical cable [64] in the conduit [94] (Figure 402):

(a) Put the installation tool [102] wire puller adapter, SPL-5674, into the non-ferrule end of the liner [65].

(b) Attach a guide wire [103] (10 ft (3 m) long) to the installation tool [102] wire puller adapter, SPL-5674.

(c) At the end of the conduit [94] adjacent to the float switch [83], push the guide wire [103] through the conduit [94] until the guide wire comes out of the far end of the conduit [62] at the front spar.

(d) Insert the electrical cable [64] for the float switch [83] into the ferrule end of the liner [65] until it touches the installation tool [102] wire puller adapter, SPL-5674, at the other end of the liner [65].

(e) Put the liner [65] and the float switch electrical cable [64] into the open end of the conduit [94] as a single unit.

(f) Pull on the guide wire [103] and push on the liner [65] and electrical cable [64] together.

(g) Turn the liner [65] as necessary to make it easier to put the liner and electrical cable [64] into the conduit [94].

(h) Continue to put the liner [65] and electrical cable [64] into the conduit [94] until the liner [65] adapter is seated inside the conduit [94].

(i) Remove the installation tool [102] wire puller adapter, SPL-5674 and guide wire [103].

1) If it is necessary, discard the guide wire [103].

SUBTASK 28-21-71-640-002

(5) Lubricate new O-ring [66] with grease, D00504, and install it on the bulkhead union [51] (Figure 402).

SUBTASK 28-21-71-420-022

(6) Put the bulkhead union [51] with the O-ring [66] and retainer [59] into the hole in the front spar (Figure 402).

(a) Make sure that the liner [65] extends out of the bulkhead union [51] sufficiently to be attached to the drain port assembly [56] subsequently.

SUBTASK 28-21-71-420-023

(7) From outside the tank, install the washer [52] and the conduit mounting nut [55] on the bulkhead union [51] (Figure 402).

(a) Tighten the conduit mounting nut [55] on to the bulkhead union [51] with your hand only.

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SUBTASK 28-21-71-420-024

(8) Put the retainer [59] in its correct position to align the mounting holes on the retainer [59] with the bolt holes in the front spar (Figure 402).

(a) Do not install the retainer [59] yet, because the installation torque that you will apply to the bulkhead union [51] could break the retainer if it is installed.

SUBTASK 28-21-71-420-025

(9) Inside the tank, turn the bulkhead union [51] to mate with the retainer [59] when it is in its position for installation (Figure 402).

SUBTASK 28-21-71-420-026

(10) Outside the tank, torque the conduit mounting nut [55] to 360 ±18 in-lb (41 ±2 N·m) (Figure 402).

SUBTASK 28-21-71-420-027

(11) Do these steps to install the retainer [59] (Figure 402):

(a) Outside the tank, install the two bolts [53], washers [67] and new packings [68] that go through the holes in the front spar for the retainer [59].

(b) Inside the tank, install the two washers [69], washers [70] and nuts [58] that hold the retainer [59] in its position.

SUBTASK 28-21-71-420-028

(12) Do these steps to trim and flare the end of the liner [65] (Figure 402).

NOTE: Be careful not to damage the electrical cable [64].

(a) Make sure that 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 [65] that extends out of the front spar bulkhead union [51] so the liner adapter is seated firmly inside the conduit [62].

(c) Pull the float switch electrical cable [64] back out of the liner [65] just sufficiently so that the end of the electrical cable is inside the bulkhead union [51].

(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 bulkhead union [51] when the liner adapter is firmly seated inside the conduit [62].

(e) With the pliers, SPL-5675, flare the liner [65].

1) Form the cut end of the liner [65] to accept the shoulder of the drain port assembly.

2) After you form the cut end of the liner [65], the edge perimeter of the liner [65] must be even to within 0.060 in. (1.524 mm).

(f) Push the float switch electrical cable [64] out past the trimmed end of the liner [65].

(g) Pull any extra electrical cable [64] out through the liner [65].

SUBTASK 28-21-71-420-029

(13) Install the bracket [99] and float switch [83] that you assembled before in its position on spanwise beam No. 2 with only the two lower sets of screws [89], washers [90], washers [91] and nut [92] (Figure 402).

SUBTASK 28-21-71-760-002

(14) Measure the resistance from the bracket to spanwise beam No. 2.

(a) Make sure that the resistance is less than 0.010 ohm (10 milliohms).

SUBTASK 28-21-71-420-030

(15) Do these steps for the installation of the conduit [94] (Figure 403):

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(a) Align the conduit so the conduit [94] can be connected to the float switch [83].

(b) Make sure that the conduit [94] lines up with positions of the clamps to be installed in the subsequent two steps.

(c) Loosely install the clamp [122], screw [119], washers [121] and nut [120].

(d) Loosely install the clamp [130], screw [129], washer [128], washer [133], nut [132] and spacers [131] (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 28-21-71-420-032

28-AWL-15: CDCCL

(16) Do these steps to complete the float switch [83] installation (Figure 402):

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCL.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-15.

(a) Apply grease, D00504, to the threads of the conduit captive nut [95].

(b) Torque the float switch mounting nut [98] to 280 ±14 in-lb (32 ±2 N·m).

28-AWL-15: CDCCL

(c) Torque the conduit captive nut [95] to 280 ±14 in-lb (32 ±2 N·m).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCL.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-15.

28-AWL-15: CDCCL

(d) Loosen the conduit captive nut [95] again to relax the torque.

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCL.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-15.

(e) The final torque for each of these nuts must be witnessed and written in the maintenance records for the airplane:

28-AWL-15: CDCCL

1) Torque the conduit captive nut [95] again to 280 ±14 in-lb (32 ±2 N·m).

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCL.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-15.

2) Make sure that the final torque for each of these nuts is written in the maintenance records.

SUBTASK 28-21-71-420-033

(17) Do these steps to complete the conduit installation (Figure 402, Figure 403):

(a) Torque the conduit captive nut [116] at the conduit join to 280 ±14 in-lb (32 ±2 N·m).

(b) Torque the bulkhead conduit captive nut [60] at the front spar bulkhead union [51] to 280 ±14 in-lb (32 ±2 N·m).

(c) Loosen the conduit captive nut [116] at the front spar again to relax the torque.

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(d) Loosen the conduit captive nut [60] again to relax the torque.

(e) The final torque for each of these nuts must be witnessed and written in the maintenance records for the airplane:

1) Torque the conduit captive nut [116] at the conduit join to 280 ±14 in-lb (32 ±2 N·m).

2) Torque the conduit captive nut [60] at the front spar bulkhead union [51] to 280 ±14 in-lb (32 ±2 N·m).

3) Make sure that the final torques on these conduit captive nuts are written in the maintenance records.

(f) Install the clamp [130].

1) Add or remove spacers [131] as necessary to remove pre-load in the conduit.

2) Make sure that the minimum clearance between the conduit and structure at the attach point is 0.1 in. (2.5 mm).

(g) Install the electrostatic bonding jumper [123] from the bracket to the conduit clamp [127] with screw [124], washers [126] and nut [125].

(h) Measure the resistance from terminal of bonding jumper [123] to the bracket structure to which the bonding jumper is attached (SWPM 20-20-00 or SWPM 20-20-10).

1) Use an intrinsically safe approved bonding meter, COM-1550.

2) For each bonding jumper [123], the resistance must be less than 0.0010 ohm (1 milliohm).

(i) Measure the resistance from conduit [94] to spanwise beam No. 2 (SWPM 20-20-00).

1) Use an intrinsically safe approved bonding meter, COM-1550.

2) Make sure that the resistance is less than 0.010 ohm (10 milliohms).

(j) Measure the resistance from the terminal of the bonding jumper [123] and conduit [94] (SWPM 20-20-00 or SWPM 20-20-10).

1) Use an intrinsically safe approved bonding meter, COM-1550.

2) Make sure that the resistance is less than 0.0015 ohm (1.5 milliohms).

(k) Measure the resistance from the refueling tube to spanwise beam No. 2 (SWPM 20-20-00).

1) Use an intrinsically safe approved bonding meter, COM-1550.

2) Make sure that the resistance from the refueling tube to spanwise beam No. 2 is less than 0.010 ohm (10 milliohms).

(l) Install the electrostatic bonding jumper [114] onto clamps [115] with screws [113], washers [112], washers [117] and nuts [118].

(m) Measure the resistance from each terminal of bonding jumper [114] to the conduit [94] (aft section) and conduit [62] (forward section) (SWPM 20-20-00 or SWPM 20-20-10).

1) Use an intrinsically safe approved bonding meter, COM-1550.

2) Make sure that the resistance is less than 0.0015 ohm (1.5 milliohms).

(n) Measure the resistance from both conduit [62] (forward section) and conduit [94] (aft section) to side of body rib (SWPM 20-20-00).

1) Use an intrinsically safe approved bonding meter, COM-1550.

2) Make sure that the resistance is less than 0.030 ohm (30 milliohms).

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SUBTASK 28-21-71-420-034

(18) At the front spar, cut the electrical cable [64] 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 28-21-71-420-035

(19) Do these steps to complete the installation of the float switch [83] (Figure 402):

(a) Clean the bonding surface on the float switch [83] ground lug.

(b) Clean the bonding surface on the float switch bracket [85].

(c) Install the electrostatic bonding jumper [100] on the float switch [83] ground lug with the screw [96], nut [81] and washers [82].

(d) Install the other end of the electrostatic bonding jumper [100] on the float switch bracket [85] with the screw [88], nut [84] and washers [87].

SUBTASK 28-21-71-760-003

(20) Measure the resistance from the float switch lug to spanwise beam no. 2 (SWPM 20-20-00 or SWPM 20-20-10).

(a) Use an intrinsically safe approved bonding meter, COM-1550.

(b) Make sure that the resistance is less than 0.010 ohm (10 milliohms).

SUBTASK 28-21-71-420-040

28-AWL-15: CDCCL

(21) Install MS20995N32 lockwire, G50177 in these locations (TASK 20-10-44-400-801) (Figure 402):

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCL.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-15.

28-AWL-15: CDCCL

(a) Install lockwire [86] MS20995N32 lockwire, G50177 from the bracket [99] to the float switch mounting nut [98].

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCL.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-15.

28-AWL-15: CDCCL

(b) Install lockwire [93] MS20995N32 lockwire, G50177 from the mounting nut [98] to the conduit captive nut [95].

NOTE: CDCCL - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important information on CDCCL.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-15.

SUBTASK 28-21-71-020-009

(22) Install MS20995NC32 lockwire, G50347 in these locations (TASK 20-10-44-400-801) (Figure 402, Figure 403):

(a) Install lockwire [63] MS20995NC32 lockwire, G50347 from the bulkhead conduit captive nut [60] to the bulkhead union [51].

(b) Install lockwire [111] MS20995NC32 lockwire, G50347 from the conduit captive nut [116] at the conduit join to the fitting on the conduit [62] (forward section).

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SUBTASK 28-21-71-790-001

(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). The gage must have an accuracy of ±0.5 psig (3.4 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 that 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 that the pressure is ±0.5 psig (3.45 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 28-21-71-210-001

(24) Before you install the drain port assembly [56], make sure it is witnessed that the liner [65] is installed in the conduit.

NOTE: The liner [65] is important to the safety of the float switch installation. This is the last step where a person can make sure that it is installed and document that fact.

(a) Make sure that the installation of the liner [65] in the conduit is written in the maintenance records for the airplane.

SUBTASK 28-21-71-420-037

(25) Do these steps to install the drain port assembly [56] (Figure 402):

(a) Put the float switch electrical cable [64] into the hole in the drain port assembly [56].

(b) Slide the drain port assembly [56] along the electrical cable [64] to the front spar bulkhead union [51].

(c) Install the drain port assembly [56] on the front spar bulkhead union [51].

NOTE: Make sure that the drain port shoulder is seated inside the liner [65].

(d) Torque the drain port assembly [56] to 10 ±1 in-lb (1 ±0 N·m).

(e) Install lockwire [54] MS20995NC32 lockwire, G50347 from the drain port assembly [56] to the bolt [53] (TASK 20-10-44-400-801) (Figure 402).

(f) Install lockwire [57] MS20995NC32 lockwire, G50347 from the conduit mounting nut [55] to the bolt [53] (TASK 20-10-44-400-801) (Figure 402).

(g) Outside the tank, apply a fillet seal of sealant, A50231, or sealant, A50337, around the flange of the bolts [53].

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SUBTASK 28-21-71-420-038

(26) Do these steps to splice the float switch electrical cable [64] to the airplane wire harness:

(a) Cut the electrical cable [64] 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) Use the sleeve material DWP-125 heat-shrink tube, G50710.

(c) Cut the sleeve to a minimum of 3 in. (76 mm) longer than the length of the splice.

NOTE: This lets there be 1.5 in. (38.1 mm) on each side of the splice.

(d) Slide the sleeve over one of the wires.

(e) Splice the float switch electrical cable [64] to the airplane wire harness with the applicable crimp tool (SWPM 20-30-12).

(f) Apply sealant, A00247, to the splice and each end of the splice.

NOTE: Make sure that the splice has a full layer of sealant on it.

(g) Move the sleeve, filled with sealant, A00247, to the center of the splice.

NOTE: Make sure that there are no air bubbles in the sleeve.

(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) Record the splice number on the sleeve.

(j) Put two layers of Nitto P-421 tape, G00150, over the splice to prevent damage from water and fuel.

(k) Use the lockstitch to tie a knot with tape, G50152, approximately 0.25 in. (6.35 mm) from each end of the sleeve.

(l) Remove the tags from the wires.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 28-21-71-410-001

(1) Install the access panels that you removed to get access to the fuel tank.

(a) For the No. 1 tank (Main Tank Access Door Installation, TASK 28-11-11-400-801).

Install this access panel:

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

(b) For the No. 2 tank (Main Tank Access Door Installation, TASK 28-11-11-400-801).

Install this access panel:

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

(c) For the center tank (Center Tank Access Door - Installation, TASK 28-11-31-400-801).

Install this access panel:

Number	Name/Location
131AB	Center Tank Access

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SUBTASK 28-21-71-860-005

(2) 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 28-21-71-650-002

(3) Fill the tank with fuel and make sure that the float switch stops the refuel operation correctly (TASK 28-21-00-700-801).

SUBTASK 28-21-71-790-002

(4) With fuel in the tank, do a check for fuel leakage at the bulkhead fitting for the conduit.

(a) No leakage is permitted.

(b) Balance the fuel tanks once checks are complete.

SUBTASK 28-21-71-410-002

(5) Close the access panels that you removed to get access to the front spar connections of the float switches.

(a) For the No. 1 tank float switch:

Close this access panel:

Number	Name/Location
521TB	Lower Leading Edge Access Panel - Slat Station 347

(b) For the No. 2 tank float switch:

Close this access panel:

Number	Name/Location
621SB	Lower Leading Edge Access Panel - Slat Station 328

SUBTASK 28-21-71-080-001

WARNING REMOVE THE LOCK FROM LEADING EDGE FLAP ACTUATOR CAREFULLY TO PREVENT ACCIDENTAL OPERATION OF THE LEADING EDGE FLAPS. THE LEADING EDGE FLAPS CAN MOVE QUICKLY. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(6) 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 PERSONNEL AND EQUIPMENT STAY AWAY FROM THE LEADING EDGE 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.

(7) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FUELING FLOAT SWITCH - INSPECTION/CHECK

1. General

A. This procedure has three 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

(3) A task to make sure that the fueling float switch assembly in the main tanks and the fueling float switch and liner system in the center tank is inspected for wire chaffing.

B. If the fueling float switch assembly is removed from the No. 1 and/or No. 2 main fuel tank, a new fueling float switch assembly must be installed.

C. If the fueling float switch and liner system is removed from the center fuel tank, a new fueling float switch and liner system must be installed.

D. The fueling float switch is referred to as the float switch in this procedure.

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	Lockwire, Cotter Pins, and Lockrings - 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 28-21-71-020-010

(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 28-21-71-210-002

(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.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-21-71-210-003

(3) Make sure there is no indication of fuel leakage from the conduit.

SUBTASK 28-21-71-210-004

(4) Make sure a liner (clear convoluted plastic tube) is installed in the conduit.

SUBTASK 28-21-71-420-039

(5) Do these steps to re-install the drain port:

(a) Slide the drain port assembly along the electrical cable to the front spar bulkhead union.

(b) Install the drain port on the front spar bulkhead union.

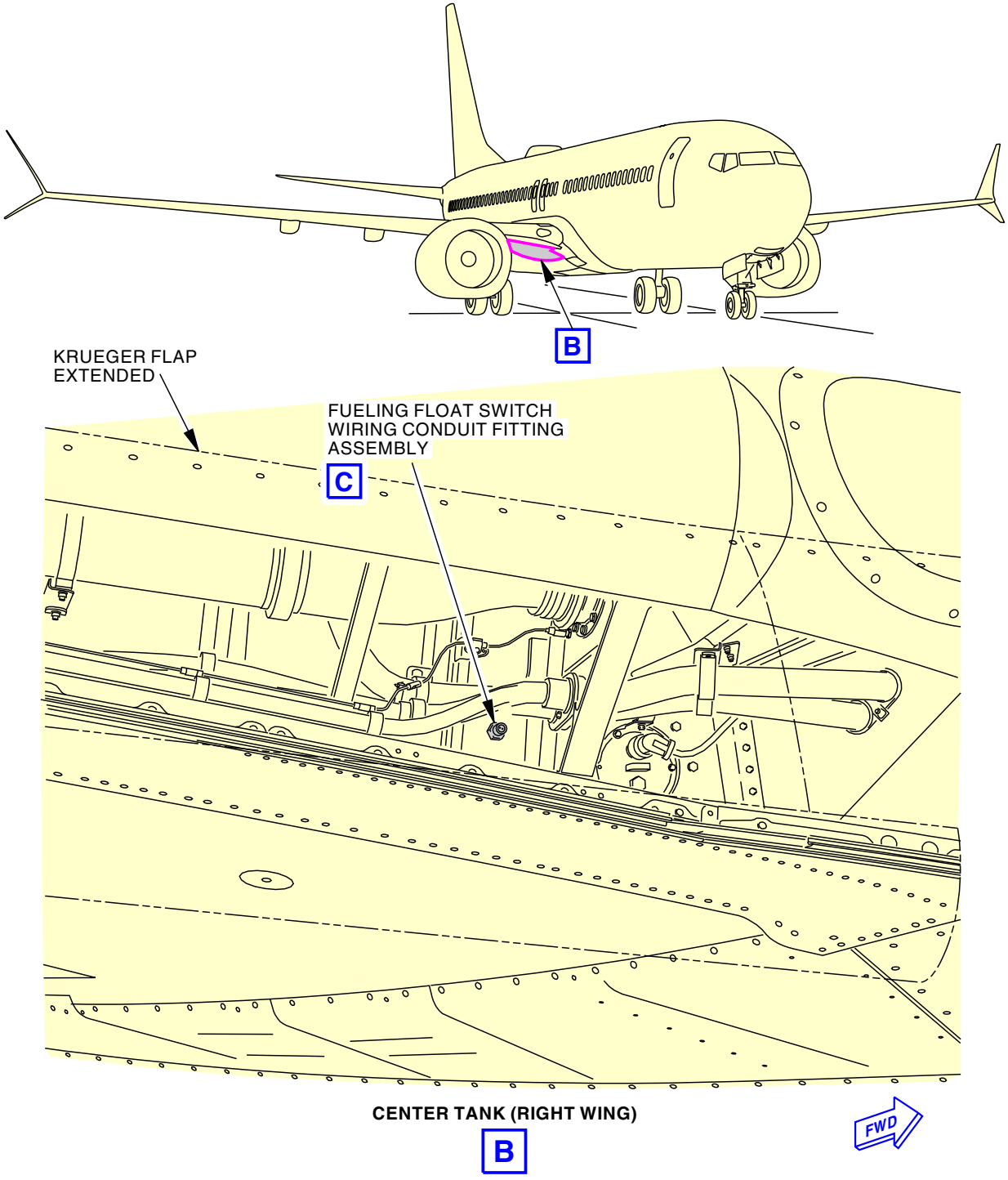
NOTE: Make sure the drain port shoulder is seated inside the formed liner.

(c) Tighten the drain port to a torque of 10 ±1 in-lb (12 ±2 kg-cm).

(d) Install lockwire from the coupling nut to the bolt (TASK 20-10-44-400-801).

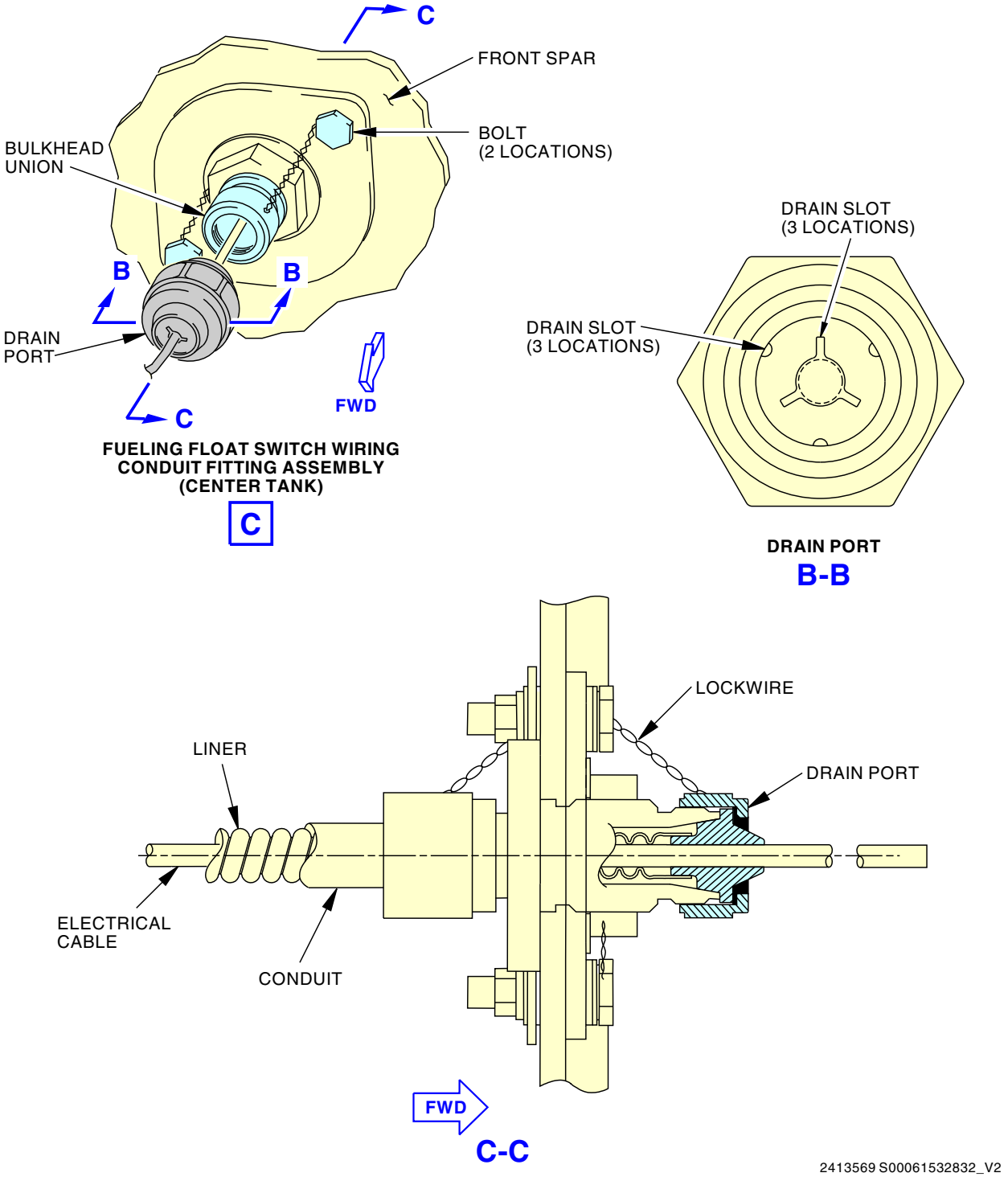
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Center Fueling Float Switch Wiring Conduit Inspection (Type II)
Figure 601/28-21-71-990-805 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Center Fueling Float Switch Wiring Conduit Inspection (Type II)
Figure 601/28-21-71-990-805 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-21-71-210-802

3. Fueling Float Switch Inspection and Replacement

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task has one or more steps which are a means to satisfy Airworthiness Limitation Instruction (ALI) requirements. An ALI note will follow the step to which it applies. Any step or sub-step that precedes or follows an ALI identified step is not subject to the ALI requirement.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-34.

(2) This task gives instruction for the inspection of the float switch assembly in the No. 1 and No. 2 main fuel tanks, and the float switch and liner system in the center wing tank.

(3) The float switch assembly in the main fuel tanks and the float switch and liner system in the center fuel tank are not repairable.

(4) Boeing requests that the removed float switch and conduit assembly, the float switch and liner system, and any recorded data be submitted to the Boeing Company for engineering analysis. Send the parts and data to the following address:

(a) The Boeing Company, Attention: Manager, Lightning / HIRF, Mail Code: MC 2J-51, Bldg 11–14N, 2925 S. 112th St. Tukwilla, WA 98108, USA.

B. References

Reference	Title
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-21-71-020-801	Float Switch Removal (P/B 401)
28-21-71-400-801	Float Switch 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
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 for Float Switch and Conduit Assembly in the No. 1 and No. 2 Main Fuel Tanks Inspection

SUBTASK 28-21-71-211-001

28-AWL-34: ALI

(1) Do these steps to inspect the float switch wiring for chaffing:

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-34.

28-AWL-34: ALI

(a) Do this task to remove the float switch and conduit assembly from the No. 1 or No. 2 main fuel tank: Float Switch Removal, TASK 28-21-71-020-801.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-34.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) Inspect the float switch wiring and liner for visible signs of chaffing.

1) After visual inspection of removed float switch and conduit assembly, return to the Boeing Company for examination and data collection.

28-AWL-34: ALI

(c) Do this task to install a new float switch and conduit assembly in the No. 1 or No. 2 main fuel tank: Float Switch Installation, TASK 28-21-71-400-801.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-34.

E. Procedure for Float Switch and Liner System in the Center Fuel Tank Inspection

SUBTASK 28-21-71-211-002

28-AWL-34: ALI

(1) Do these steps to inspect the float switch wiring for chaffing:

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-34.

28-AWL-34: ALI

(a) Do this task to remove the float switch and liner system from the center fuel tank: Float Switch Removal, TASK 28-21-71-020-801.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-34.

(b) Inspect the float switch wiring and liner for visible signs of chaffing.

1) After visual inspection of removed float switch and liner system, return to the Boeing Company for examination and data collection.

28-AWL-34: ALI

(c) Do this task to install a new float switch and liner system in the center fuel tank: Float Switch Installation, TASK 28-21-71-400-801.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-34.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FUELING POWER CONTROL SWITCH - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) Fueling Power Control Switch Sensor Magnet Removal

(2) Fueling Power Control Switch Sensor Magnet Installation

(3) Fueling Power Control Switch - Sensing Switch Removal

(4) Fueling Power Control Switch - Sensing Switch Installation.

TASK 28-21-81-000-801

2. Fueling Power Control Switch Sensor Magnet Removal

(Figure 401)

A. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

B. Access Panels

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

C. Prepare for the Removal

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

WARNING MAKE SURE THAT AN EXTERNAL POWER SUPPLY IS NOT CONNECTED TO THE AIRCRAFT. IF EXTERNAL POWER IS ON, 28 VDC POWER WILL BE AVAILABLE AT THE REFUEL POWER CONTROL SWITCH. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(2) Open this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

D. Fueling Power Control Switch Sensor Magnet Removal

SUBTASK 28-21-81-020-001

(1) Remove the shear bolt [9], nut [5], and washer [6] from the magnet bracket [10].

SUBTASK 28-21-81-020-005

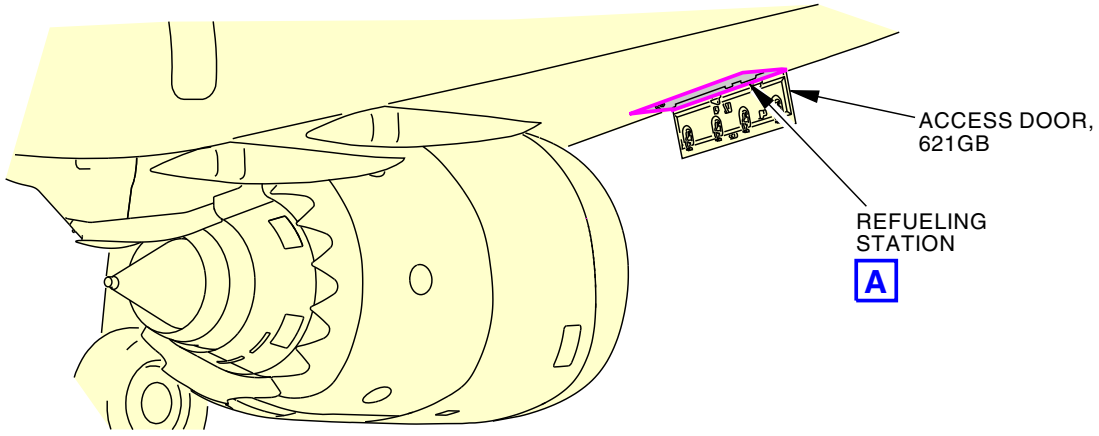
(2) Remove the bolt [7], washer [6], bonding jumper [8], and nut [5] from the magnet bracket [10].

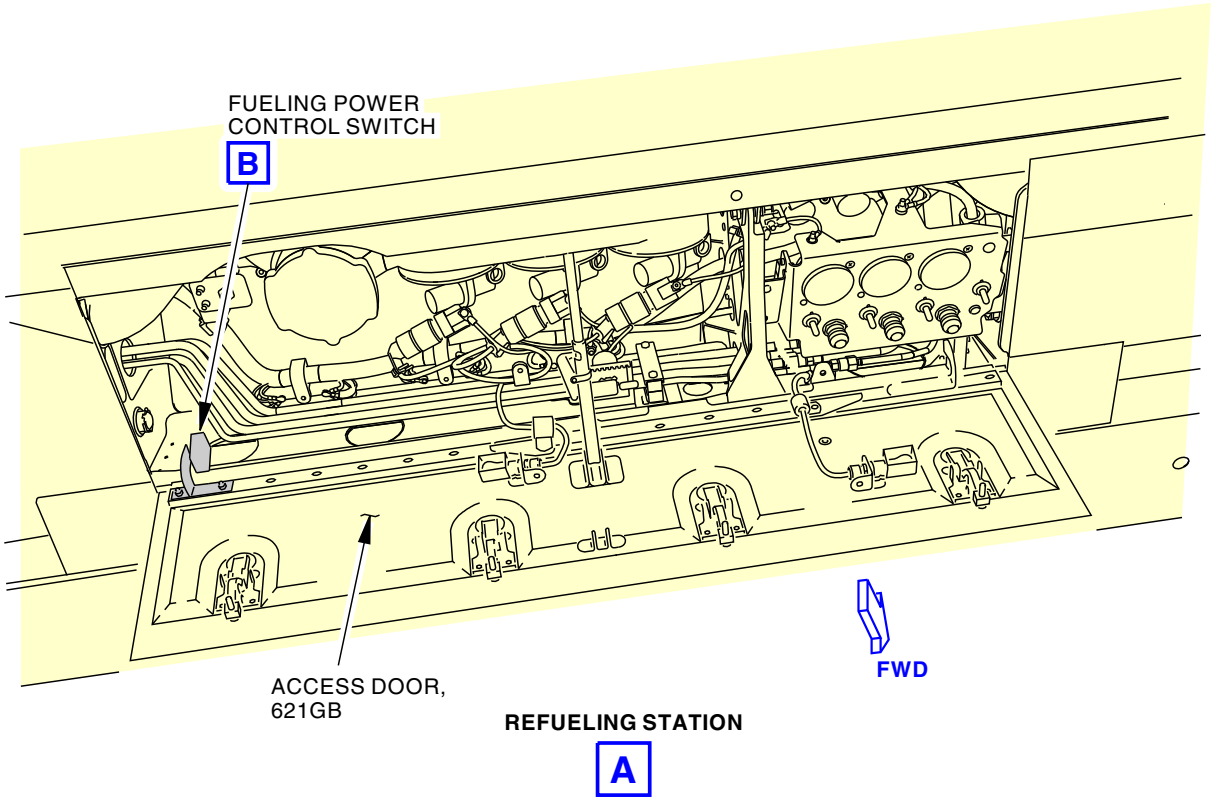
SUBTASK 28-21-81-020-006

(3) Remove the magnet bracket [10] with the sensor magnet [11].

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

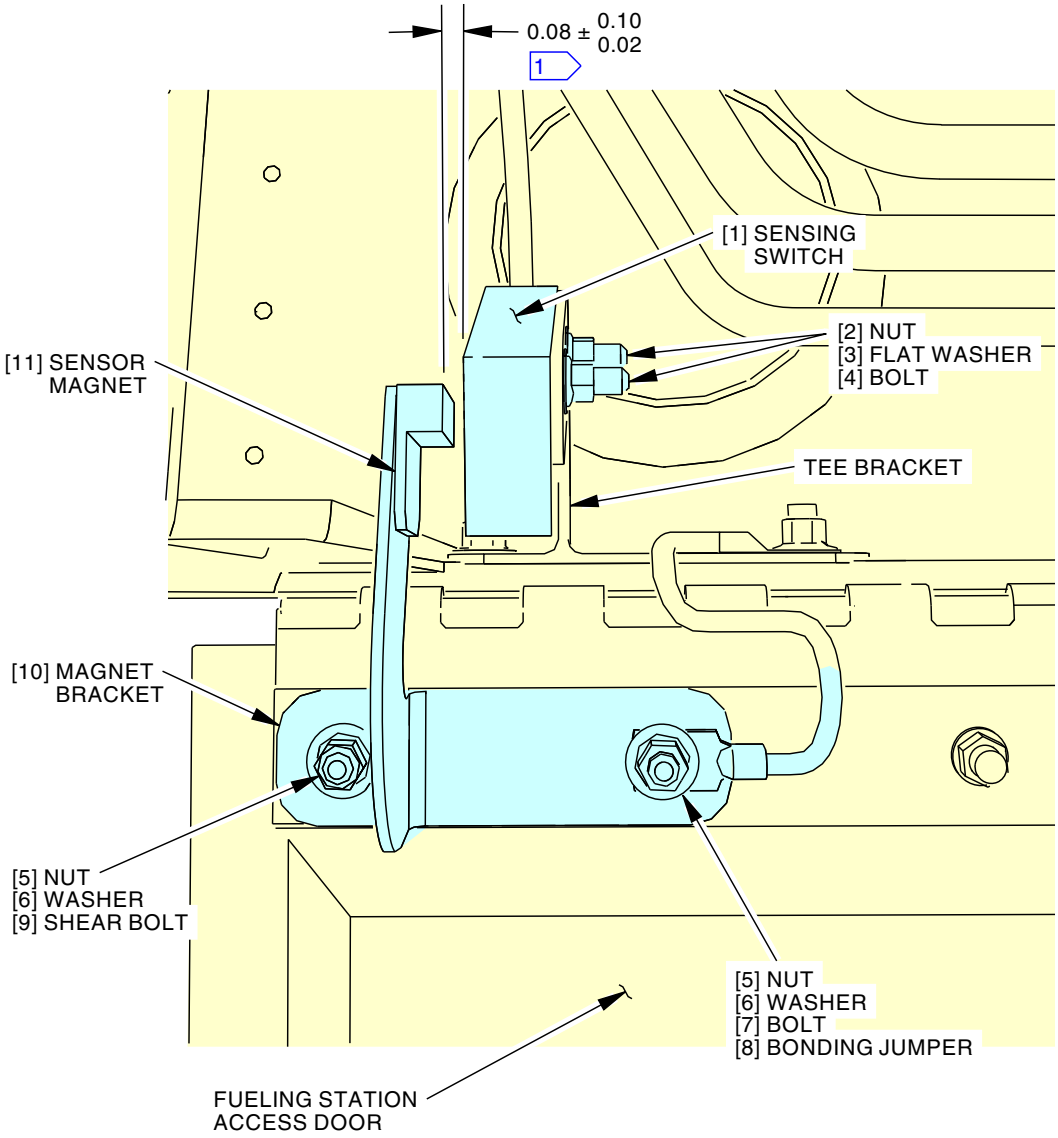




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Fueling Power Control Switch Installation
Figure 401/28-21-81-990-801 (Sheet 1 of 2)

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NOTE:

1 USE A NON-MAGNETIC FEELER GAGE.

Fueling Power Control Switch Installation
Figure 401/28-21-81-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-21-81-400-801

3. Fueling Power Control Switch Sensor Magnet Installation

(Figure 401)

A. References

Reference	Title
SWPM 20-20-00 Paragraph 14.E	Category 6 Fillet Sealed Fay Surface Bond
SWPM 20-20-00, Paragraph 2	CLEANING OF FAY SURFACES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

C. Consumable Materials

Reference	Description	Specification
A50231	Sealant - Pressure And Environmental - Chromate Type	BMS5-95 Class B
A50337	Sealant - Fuel Tank	BMS5-45 Class B
A50359	Sealant - Low Density, Non-Chromate Type	BMS5-142 Type II Class B
C00064	Coating - Aluminum Chemical Conversion	BAC5719 Type II Class A (MIL-DTL-5541 Class 1A)
C00259	Coating - Chemical And Solvent Resistant Finish, Corrosion Inhibiting Primer	BMS10-11 Type I
C00700	Coating - Protective Enamel (BAC 707 Gray Color, Gloss)	BMS10-60 Type I

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
11	Sensor magnet	28-21-81-01-030	SIA ALL

E. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

F. Access Panels

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

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G. Fueling Power Control Switch Sensor Magnet Installation

WARNING

MAKE SURE THAT AN EXTERNAL POWER SUPPLY IS NOT CONNECTED TO THE AIRCRAFT. IF EXTERNAL POWER IS ON, 28 VDC POWER WILL BE AVAILABLE AT THE REFUEL POWER CONTROL SWITCH. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

SUBTASK 28-21-81-860-005

(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	4	C01441	FUEL FUELING IND

SUBTASK 28-21-81-120-001

(2) Clean the fay surfaces of the bonding jumper [8] and the aluminum magnet bracket [10] (SWPM 20-20-00, Paragraph 2).

SUBTASK 28-21-81-390-001

(3) Manually apply coating, C00064 to the abraded surface on the magnet bracket [10].

SUBTASK 28-21-81-390-002

(4) Apply one coat of primer, C00259 to the abraded surface on the magnet bracket [10].

SUBTASK 28-21-81-820-002

(5) Align the holes on the magnet bracket [10] with the fueling station access door.

NOTE: The sensor magnet [11] and magnet bracket [10] are one assembly.

SUBTASK 28-21-81-420-001

(6) Install the bolt [7], magnet bracket [10], bonding jumper [8], washer [6], and nut [5] on the fueling station access door.

SUBTASK 28-21-81-420-002

(7) Install the shear bolt [9], washer [6], and nut [5] on the magnet bracket [10] and fueling station access door.

SUBTASK 28-21-81-820-001

(8) Align the sensor magnet [11], on the magnet bracket [10], and sensing switch [1] with a non-magnetic feeler gage.

NOTE: The clearance must be 0.08 +0.10 / -0.02 in. (2.03 +2.54 / -0.51 mm) at all the positions of the access door between the open and closed positions.

SUBTASK 28-21-81-860-002

(9) 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

(10) Fully open the access door below.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Open this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

(b) Make sure that the fueling panel floodlights come on.

NOTE: This makes sure that the sensor magnet is aligned.

SUBTASK 28-21-81-420-003

(11) Tighten the nut [5].

SUBTASK 28-21-81-420-004

(12) Tighten the nut [5] with the bonding jumper [8] to 31.5 ±3.5 in-lb (3.6 ±0.4 N·m).

SUBTASK 28-21-81-760-001

(13) Measure the electrical bonding resistance between the bonding jumper [8] and magnet bracket [10] with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00 Paragraph 14.E).

(a) Make sure that the electrical bonding resistance is 0.0010 ohm (1.0 milliohms) or less.

SUBTASK 28-21-81-390-003

(14) Apply coating, C00700 to the surface.

SUBTASK 28-21-81-390-004

(15) Apply a fillet seal of sealant, A50359, sealant, A50231, or sealant, A50337 between the nut [5] and magnet bracket [10].

H. Put the Airplane Back to Its Usual Condition

SUBTASK 28-21-81-410-001

(1) Close this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

——— END OF TASK ———

TASK 28-21-81-000-802

4. Fueling Power Control Switch - Sensing Switch Removal

(Figure 401)

A. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

B. Access Panels

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

C. Prepare for the Removal

SUBTASK 28-21-81-860-003

(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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-21-81-010-002

WARNING MAKE SURE THAT AN EXTERNAL POWER SUPPLY IS NOT CONNECTED TO THE AIRCRAFT. IF EXTERNAL POWER IS ON, 28 VDC POWER WILL BE AVAILABLE AT THE REFUEL POWER CONTROL SWITCH. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(2) Open this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-21-81-020-003

(3) Remove the nut [5], washer [6], bonding jumper [8], and bolt [7] from the magnet bracket [10].

D. Fueling Power Control Switch - Sensing Switch Removal

SUBTASK 28-21-81-020-002

(1) Remove the hot pigtail wire for the sensing switch [1] at splice location SP280.

SUBTASK 28-21-81-020-004

(2) Remove the two bolts [4], flat washers [3], and nuts [2] from the tee bracket.

SUBTASK 28-21-81-160-001

(3) Remove the sensing switch [1] from the tee bracket.

END OF TASK

TASK 28-21-81-400-802

5. Fueling Power Control Switch - Sensing Switch Installation

(Figure 401)

A. References

Reference	Title
SWPM 20-20-00 Paragraph 14.E	Category 6 Fillet Sealed Fay Surface Bond
SWPM 20-20-00, Paragraph 2	CLEANING OF FAY SURFACES
SWPM 20-30-12	Assembly of Splices
WDM 28-44-11	D000534466

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

ECCN 9E991 BOEING PROPRIETARY - See title page for details

C. Consumable Materials

Reference	Description	Specification
A50231	Sealant - Pressure And Environmental - Chromate Type	BMS5-95 Class B
A50337	Sealant - Fuel Tank	BMS5-45 Class B
A50359	Sealant - Low Density, Non-Chromate Type	BMS5-142 Type II Class B
C00064	Coating - Aluminum Chemical Conversion	BAC5719 Type II Class A (MIL-DTL-5541 Class 1A)
C00259	Coating - Chemical And Solvent Resistant Finish, Corrosion Inhibiting Primer	BMS10-11 Type I
C00700	Coating - Protective Enamel (BAC 707 Gray Color, Gloss)	BMS10-60 Type I

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Sensing switch	28-21-81-01-070	SIA ALL

E. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

F. Access Panels

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

G. Fueling Power Control Switch - Sensing Switch Installation

SUBTASK 28-21-81-860-006

WARNING MAKE SURE THAT AN EXTERNAL POWER SUPPLY IS NOT CONNECTED TO THE AIRCRAFT. IF EXTERNAL POWER IS ON, 28 VDC POWER WILL BE AVAILABLE AT THE REFUEL POWER CONTROL SWITCH. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(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	4	C01441	FUEL FUELING IND

SUBTASK 28-21-81-160-002

(2) Align the holes on the sensing switch [1] to the tee bracket holes.

SUBTASK 28-21-81-420-005

(3) Install the two bolts [4], flat washers [3], and nuts [2] to attach the sensing switch [1] to the tee bracket.

SUBTASK 28-21-81-420-006

(4) Splice the hot pigtail wire for the sensing switch [1] to W1664-1035-20 wire at splice location SP280 in the flammable leakage zone (SWPM 20-30-12, WDM 28-44-11).

(a) Trim back excess pigtail wire length.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-21-81-120-002

(5) Clean the fay surfaces of the bonding jumper [8] and the aluminum magnet bracket [10] (SWPM 20-20-00, Paragraph 2).

SUBTASK 28-21-81-390-005

(6) Manually apply coating, C00064 to the abraded surface on the magnet bracket [10].

SUBTASK 28-21-81-390-006

(7) Apply one coat of primer, C00259 to the abraded surface on the magnet bracket [10].

SUBTASK 28-21-81-420-007

(8) Install the bolt [7], bonding jumper [8], washer [6], and the nut [5] on the magnet bracket [10] and fueling station access door.

SUBTASK 28-21-81-820-003

(9) Align the sensor magnet [11], on the magnet bracket [10], and sensing switch [1] with a non-magnetic feeler gage.

NOTE: The clearance must be 0.08 +0.10 / -0.02 in. (2.03 +2.54 / -0.51 mm) at all the positions of the access door between the open and closed positions.

SUBTASK 28-21-81-860-004

(10) 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 28-21-81-710-002

(11) Fully open the access door below.

(a) Open this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

(b) Make sure that the fueling panel floodlights come on.

NOTE: This makes sure that the sensor magnet is aligned.

SUBTASK 28-21-81-420-008

(12) Tighten the nut [5] to 31.5 ±3.5 in-lb (3.6 ±0.4 N·m).

SUBTASK 28-21-81-760-002

(13) Measure the electrical bonding resistance between the bonding jumper [8] and magnet bracket [10] with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00 Paragraph 14.E).

(a) Make sure that the electrical bonding resistance is 0.0010 ohm (1.0 milliohms) or less.

SUBTASK 28-21-81-390-007

(14) Apply coating, C00700 to the surface.

SUBTASK 28-21-81-390-008

(15) Apply a fillet seal of sealant, A50359, sealant, A50231, or sealant, A50337 between the nut [5] and magnet bracket [10].

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H. Put the Airplane Back to Its Usual Condition

SUBTASK 28-21-81-010-003

(1) Close this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

REFUEL PANEL, P15 - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) Refuel Panel, P15 Removal

(2) Refuel Panel, P15 Installation.

TASK 28-21-82-000-801

2. Refuel Panel, P15 Removal

(Figure 401)

A. General

(1) This task gives you instructions to remove the P15 Refuel Panel.

B. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

C. Access Panels

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

D. Prepare for the Removal

SUBTASK 28-21-82-860-001

(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
A	5	C00398	FUEL QTY 2
A	6	C00397	FUEL QTY 1

SUBTASK 28-21-82-010-001

(2) Open this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-21-82-020-002

(3) Disconnect the electrical connector [7] from the structure.

E. P15 Refuel Panel Removal

SUBTASK 28-21-82-020-003

(1) Remove the nut [1] and washer [9] to disconnect the bonding jumper [8] from the refuel panel [2].

SUBTASK 28-21-82-020-004

(2) Remove the refuel panel [2], as follows:

(a) Remove the two bolts [4] and washers [3].

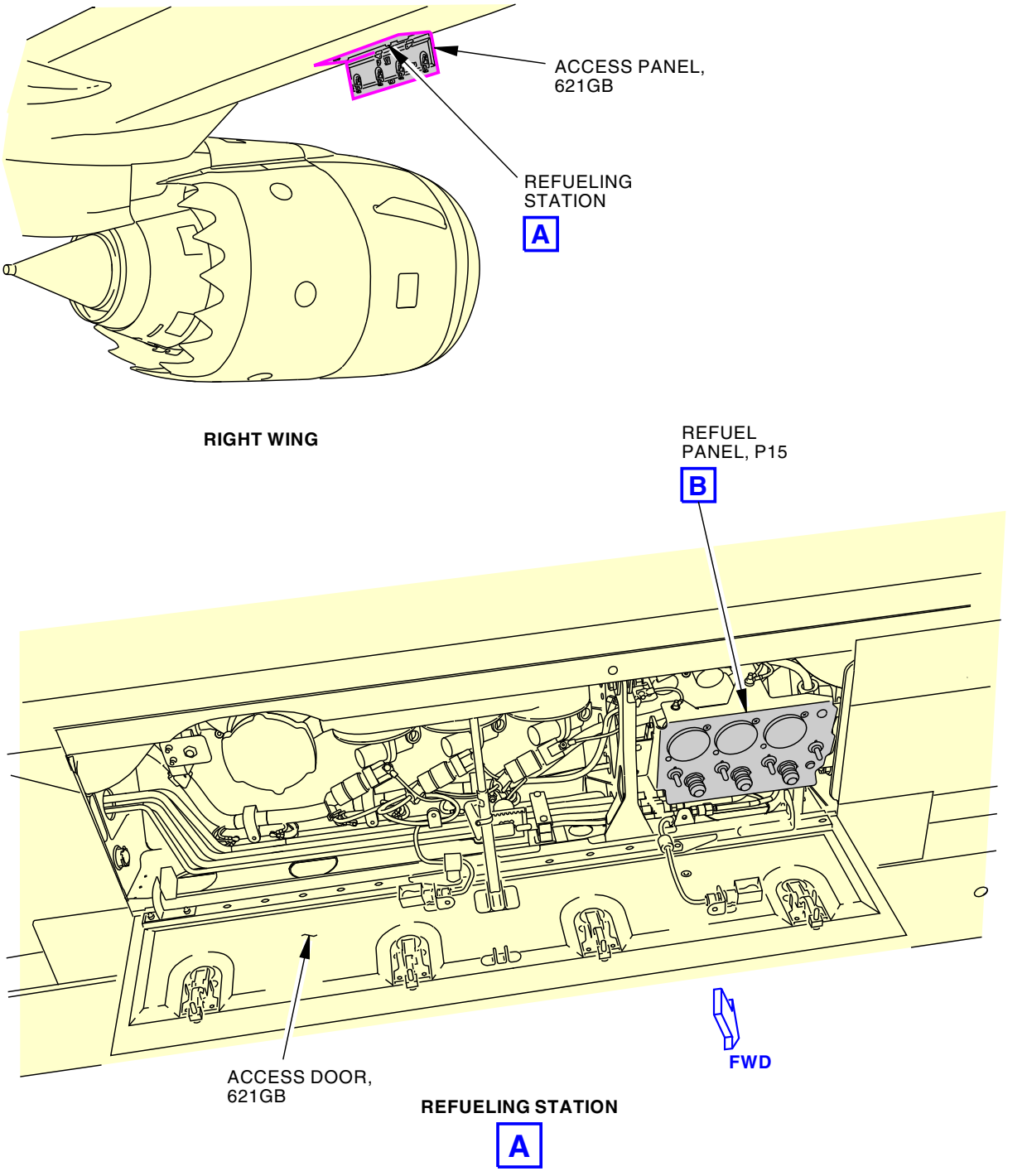
(b) Remove the two bolts [5] and washers [3].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(c) Remove the refuel panel [2] from the refueling station.

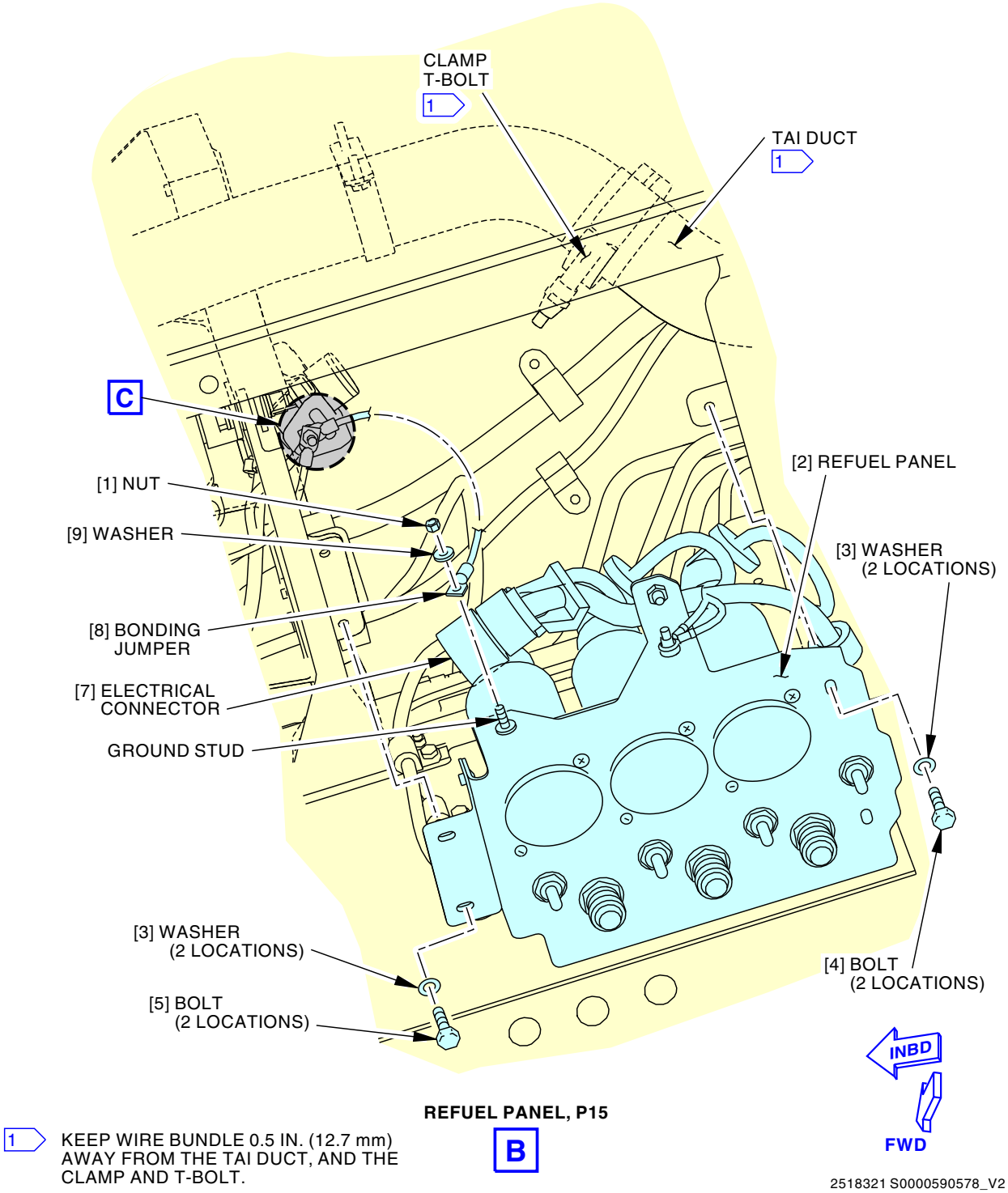
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



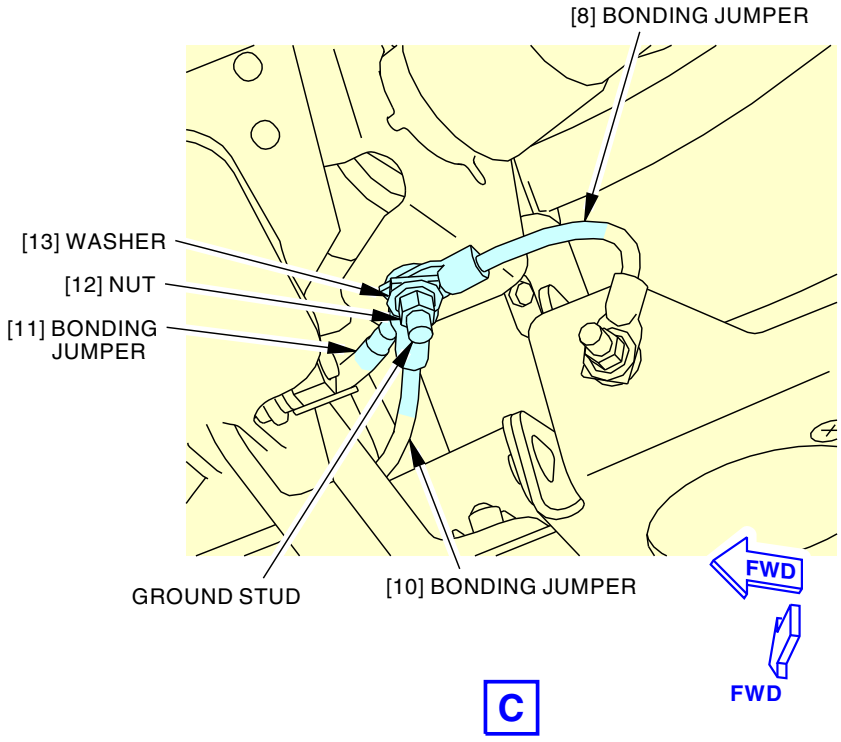
P15 Refuel Panel Installation
Figure 401/28-21-82-990-801 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



P15 Refuel Panel Installation
Figure 401/28-21-82-990-801 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



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P15 Refuel Panel Installation
Figure 401/28-21-82-990-801 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-21-82-400-801

3. Refuel Panel, P15 Installation

(Figure 401)

A. General

(1) This task gives the instructions to install the P15 Refuel Panel.

B. References

Reference	Title
28-21-00-211-801	Refuel Panel Wire Bundle Inspection (P/B 601)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES
SWPM 20-20-10	REPLACEMENT OF GROUND STUDS AND BONDING JUMPER INSTALLATION

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659
STD-4406	Brush - Bristle, Soft, Natural

D. Consumable Materials

Reference	Description	Specification
A50110	Sealant - Fuel Tank	BMS5-45 Class B-2
A50155	Sealant - Fuel Tank	BMS5-45 Class C
B00148	Solvent - Methyl Ethyl Ketone (MEK)	ASTM D740
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Refuel panel	28-21-82-01-050	SIA ALL

F. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Access Panels

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

H. Prepare for the Installation

SUBTASK 28-21-82-420-006

(1) If the bonding jumper [8], bonding jumper [10], and bonding jumper [11] are not installed on the ground stud on the bracket, do these steps:

(a) Clean the nut [12], washer [13], and the terminals on the bonding jumper [8], bonding jumper [10], and bonding jumper [11] (SWPM 20-20-10).

(b) Install the bonding jumper [8], bonding jumper [10], bonding jumper [11], washer [13], and nut [12] on the ground stud.

(c) Tighten the nut [12] to 36.5 ±3.5 in-lb (4.1 ±0.4 N·m).

(d) Measure the electrical bonding resistance between the bonding jumper [8] and structure with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-10).

1) Make sure that the electrical bonding resistance is 0.0010 ohm (1.0 milliohm) or less.

(e) Measure the electrical bonding resistance between the bonding jumper [10] and structure with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-10).

1) Make sure that the electrical bonding resistance is 0.0010 ohm (1.0 milliohm) or less.

(f) Measure the electrical bonding resistance between the bonding jumper [11] and structure with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-10).

1) Make sure that the electrical bonding resistance is 0.0010 ohm (1.0 milliohm) or less.

(g) Apply a fillet seal between the ground stud and bracket SWPM 20-20-10, Paragraph 5).

SUBTASK 28-21-82-211-001

(2) Visually examine the wire bundle behind the refuel panel [2] (TASK 28-21-00-211-801).

SUBTASK 28-21-82-760-001

(3) Measure the electrical bonding resistance between the ground stud and the refuel panel [2] with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

(a) Make sure that the electrical bonding resistance is less than 0.001 ohms (1 milliohm).

SUBTASK 28-21-82-100-001

(4) Do these steps to prepare the bonding jumper [8] and the ground stud for installation:

(a) Clean the fay surfaces of the bonding jumper [8] and the aluminum ground stud on the refuel panel [2] (SWPM 20-20-00, SWPM 20-20-10):

1) Use Cleaning Procedure 5 to clean the nut [1], washer [9], ground stud threads and head, and the terminal contact surfaces on the bonding jumper [8].

a) Remove the sealant with a brush, STD-4406.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

> **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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

b) Use a new cotton wiper, G00034 or knit cotton wiper, G51293 made moist with solvent, B00184 or solvent, B00148.

c) Use a dry cotton wiper to clean the surfaces.

d) Continue to clean and dry the surface until the cotton wiper shows clean.

2) Final clean the fay surfaces of the nut [1], washer [9], ground stud threads and head, and the terminal contact surfaces on the bonding jumper [8].

> **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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

a) Use a new cotton wiper, G00034 or knit cotton wiper, G51293 soaked with solvent, B00184 or solvent, B00148.

b) Use a dry cotton wiper to clean the surface.

c) Continue to clean and dry the surface until the cotton wiper shows clean.

SUBTASK 28-21-82-390-001

(5) Apply sealant, A50110 or sealant, A50155 to the threads and shank on the ground stud, the terminal on the bonding jumper [8], washer [9], and nut [1] (SWPM 20-20-10, Paragraph 4).

I. P15 Refuel Panel Installation

SUBTASK 28-21-82-420-001

(1) Hold the refuel panel [2] near the bonding jumper [8].

SUBTASK 28-21-82-420-002

(2) Install the bonding jumper [8], washer [9], and nut [1] on the refuel panel [2].

(a) Tighten the nut [1] to 31 ±3 in-lb (3.5 ±0.3 N·m).

SUBTASK 28-21-82-210-001

(3) Make sure that the sealant has a continuous squeeze-out between the ground stud and nut [1].

SUBTASK 28-21-82-390-002

(4) Apply sealant, A50110 or sealant, A50155 to the ground stud head and the structure (SWPM 20-20-10, Paragraph 4).

SUBTASK 28-21-82-760-002

(5) Measure the electrical bonding resistance between the refuel panel [2] and the airplane structure with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-10).

(a) Make sure that the electrical bonding resistance is less than 0.0010 ohms (1.0 milliohm).

SUBTASK 28-21-82-420-003

(6) Connect the electrical connector [7].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-21-82-820-001

(7) Align, and then hold the refuel panel [2] with the structure.

SUBTASK 28-21-82-420-004

(8) Install the two bolts [4] and washers [3] to secure the refuel panel [2] to the structure.

SUBTASK 28-21-82-420-005

(9) Install the two bolts [5] and washers [3] to secure the refuel panel [2] to the structure.

SUBTASK 28-21-82-210-002

(10) Make sure that the wire bundle has a 0.5 in. (12.7 mm) clearance from the TAI duct.

SUBTASK 28-21-82-210-003

(11) Make sure that the wire bundle has a 0.5 in. (12.7 mm) clearance from the clamp and T-bolt.

J. P15 Refuel Panel Installation Test

SUBTASK 28-21-82-860-002

(1) 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 28-21-82-710-001

(2) Push each refuel valve light.

(a) Make sure that each refuel valve light comes on.

NOTE: The refuel valve lights are PRESS-TO-TEST buttons.

SUBTASK 28-21-82-710-002

(3) On the P15 Refuel Panel, hold the fueling indication test switch to the TEST GAUGES position.

(a) Make sure that the three refuel quantity indicators operate correctly.

NOTE: The test blanks the display on the three refuel quantity indicators for two seconds, then all LED segments go on for two seconds. This sequence continues as long as you hold the fueling indication test switch to the TEST GAUGES position.

If you hold the fueling indication test switch for more than 20 seconds, the test mode times out and the refuel quantity indicators goes back to its usual operating mode. If an internal fault is found during the test, the indicator will show Ind FAIL.

SUBTASK 28-21-82-860-003

(4) Release the fueling indication test switch.

SUBTASK 28-21-82-710-003

(5) On the P15 Refuel Panel, make sure that the fueling shutoff valve switches operates as follows:

(a) Set the fueling shutoff valve switch for the No. 1 main tank to the OPEN position.

1) Make sure that the refuel valve light for the No. 1 main tank comes on.

(b) Set the fueling shutoff valve switch for the No. 1 main tank to the CLOSED position.

1) Make sure that the refuel valve light for the No. 1 main tank goes off.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(c) Set the fueling shutoff valve switch for the No. 2 main tank to the OPEN position.

1) Make sure that the refuel valve light for the No. 2 main tank comes on.

(d) Set the fueling shutoff valve switch for the No. 2 main tank to the CLOSED position.

1) Make sure that the refuel valve light for the No. 2 main tank goes off.

(e) Set the fueling shutoff valve switch for the center tank to the OPEN position.

1) Make sure that the refuel valve light for the center tank comes on.

(f) Set the fueling shutoff valve switch for the center tank to the CLOSED position.

1) Make sure that the refuel valve light for the center tank goes off.

K. Put the Airplane Back to Its Usual Condition

SUBTASK 28-21-82-860-004

(1) Close this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

ENGINE FUEL FEED SYSTEM - ADJUSTMENT/TEST

1. General

A. This procedure has these tasks for the engine fuel feed system:

(1) Engine Fuel Feed Pumps - Functional Test
(2) Crossfeed Valve - Operational Test
(3) Engine Fuel Spar Valve - Electrical Control and Indication Test
(4) Emergency Fuel Shutoff Battery - Operational Test
(5) Engine Fuel Spar Valve Installation - Operational Test
(6) Fuel Scavenge System - Operational Test
(7) Fuel Boost Pump Output Pressure - Functional Test
(8) Center Tank Fuel Boost Pump Auto Shutoff - Functional Test
(9) Engine Fuel Suction Feed - Operational Test
(10) Center Tank Fuel Boost Pump Power Failed On - Functional Test
(11) Pump Reversal - Operational Test
(12) Fuel Boost Pump - Insulation Resistance Test

TASK 28-22-00-730-801

2. Engine Fuel Feed Pumps - Functional Test

(Figure 501, Figure 502, Figure 503)

A. General

(1) This task checks the fuel boost pumps in the No. 1 main tank, No. 2 main tank, and the center tank. Each fuel boost pump is tested to make sure that enough fuel pressure causes the applicable low pressure indicating light to go off. This task does not test the minimum fuel pressure to the engines.

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)

C. 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

D. Prepare for the Test

SUBTASK 28-22-00-860-001

(1) In the flight compartment, set the switches to the positions shown in Table 501.

Table 501/28-22-00-993-801 Fuel Pump and Crossfeed Valve Test

SWITCH/CONTROL	POSITION	LOCATION
Fuel CROSS FEED Valve	Closed	P5-2 Fuel System Module

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Table 501/28-22-00-993-801 Fuel Pump and Crossfeed Valve Test (Continued)

SWITCH/CONTROL	POSITION	LOCATION
FUEL PUMPS 1 AFT	OFF	P5-2 Fuel System Module
FUEL PUMPS 1 FWD	OFF	P5-2 Fuel System Module
FUEL PUMPS CTR L	OFF	P5-2 Fuel System Module
FUEL PUMPS CTR R	OFF	P5-2 Fuel System Module
FUEL PUMP 2 AFT	OFF	P5-2 Fuel System Module
FUEL PUMP 2 FWD	OFF	P5-2 Fuel System Module
APU Fire Handle	NORMAL	P8 Aisle Stand
Engine 1 Fire Handle	NORMAL	P8 Aisle Stand
Engine 2 Fire Handle	NORMAL	P8 Aisle Stand
Engine 1 Start Lever	CUTOFF	P10 Control Stand
Engine 2 Start Lever	CUTOFF	P10 Control Stand

SUBTASK 28-22-00-650-001

(2) Make sure that the fuel quantities in the fuel tanks are as follows:

(a) No. 1 main tank - 500 lb (227 kg) (or more)

(b) No. 2 main tank - 500 lb (227 kg) (or more)

(c) Center tank - 1000 lb (454 kg) (or more)

(d) If it is necessary, refuel the fuel tanks, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-803.

E. Fuel Boost Pumps - Control and Indication Test

SUBTASK 28-22-00-860-004

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) Immediately set the applicable FUEL PUMPS switch to the OFF position when the LOW PRESSURE light stays on for 15 seconds or more.

SUBTASK 28-22-00-210-001

(2) On the P5-2 Fuel System Module, make sure that the LOW PRESSURE lights are on for these switches:

(a) FUEL PUMPS 1 FWD

(b) FUEL PUMPS 1 AFT

(c) FUEL PUMPS 2 FWD

(d) FUEL PUMPS 2 AFT.

SUBTASK 28-22-00-860-005

(3) Set the FUEL PUMPS 1 FWD switch to the ON position.

(a) Make sure that the LOW PRESSURE light goes off.

SUBTASK 28-22-00-860-006

(4) Set the FUEL PUMPS 1 FWD switch to the OFF position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Make sure that the LOW PRESSURE light comes on.

SUBTASK 28-22-00-860-007

(5) Set the FUEL PUMPS 1 AFT switch to the ON position.

(a) Make sure that the LOW PRESSURE light goes off.

SUBTASK 28-22-00-860-008

(6) Set the FUEL PUMPS 1 AFT switch to the OFF position.

(a) Make sure that the LOW PRESSURE light comes on.

SUBTASK 28-22-00-860-009

(7) Set the FUEL PUMPS 2 FWD switch to the ON position.

(a) Make sure that the LOW PRESSURE light goes off.

SUBTASK 28-22-00-860-010

(8) Set the FUEL PUMPS 2 FWD switch to the OFF position.

(a) Make sure that the LOW PRESSURE light comes on.

SUBTASK 28-22-00-860-011

(9) Set the FUEL PUMPS 2 AFT switch to the ON position.

(a) Make sure that the LOW PRESSURE light goes off.

SUBTASK 28-22-00-860-012

(10) Set the FUEL PUMPS 2 AFT switch to the OFF position.

(a) Make sure that the LOW PRESSURE light comes on.

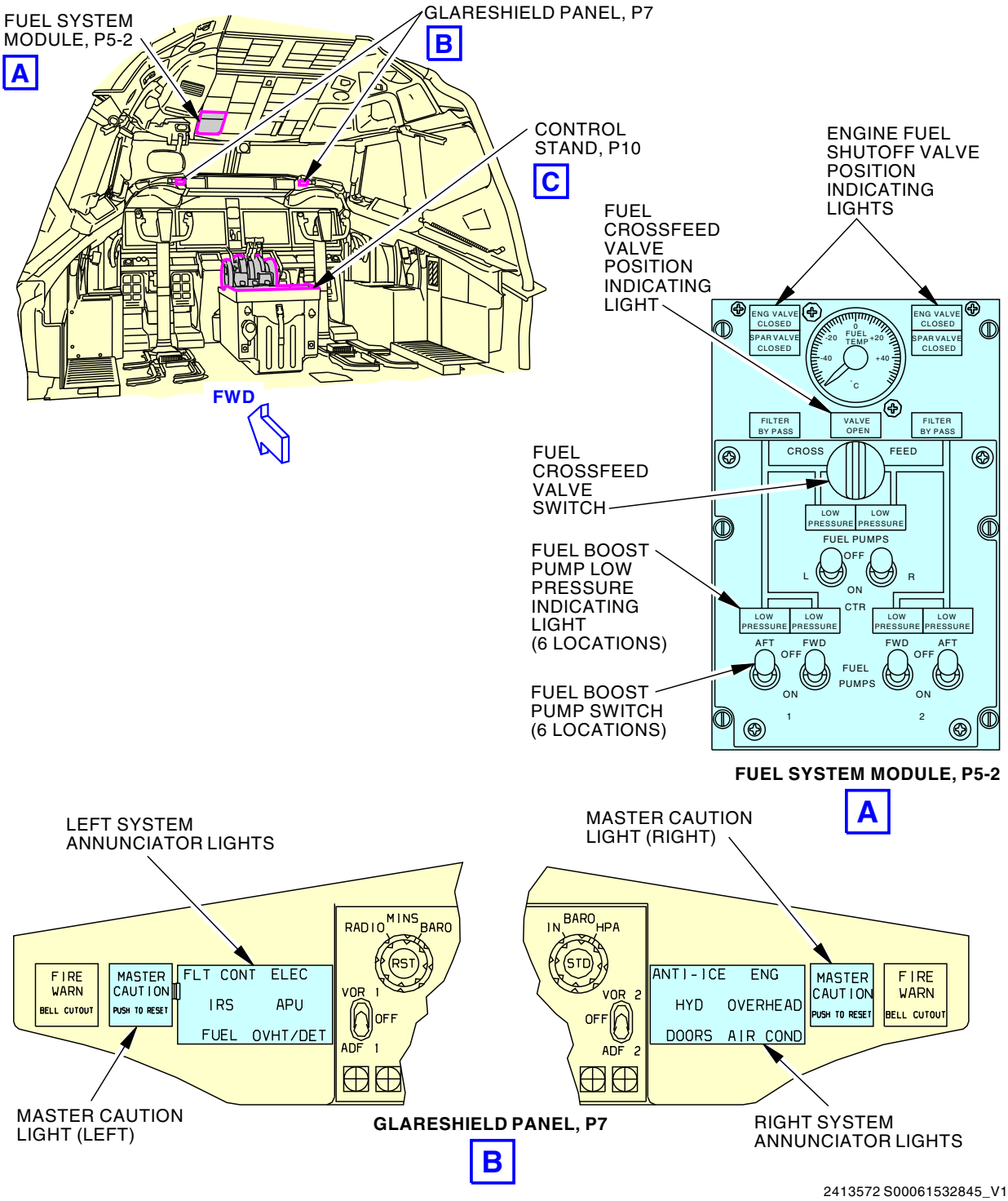
SUBTASK 28-22-00-720-001

(11) Test the fuel boost pumps in the center tank.

(a) Do this task: Center Tank Fuel Boost Pump Auto Shutoff - Functional Test, TASK 28-22-00-720-805.

——— END OF TASK ———

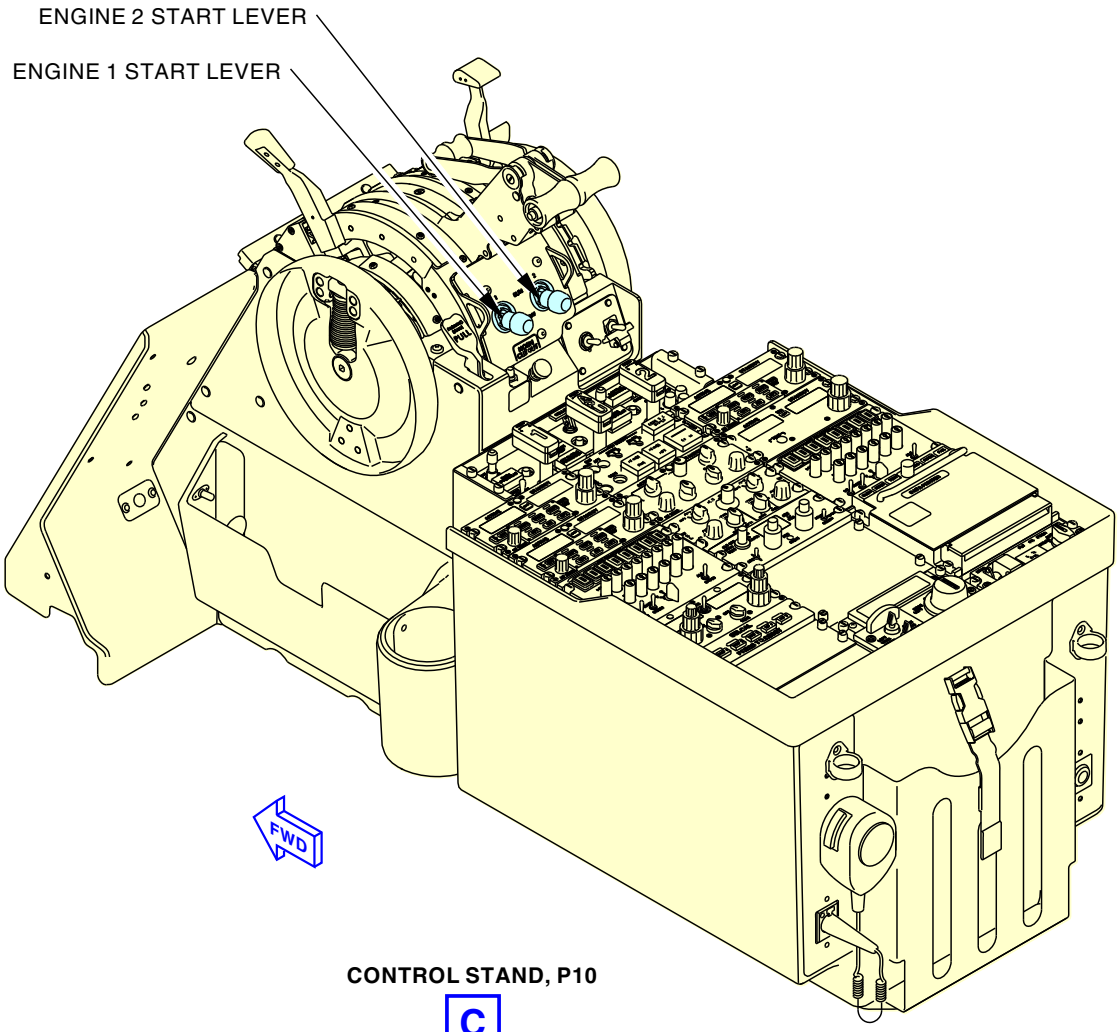
ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Engine Fuel Feed System
Figure 501/28-22-00-990-801 (Sheet 1 of 2)

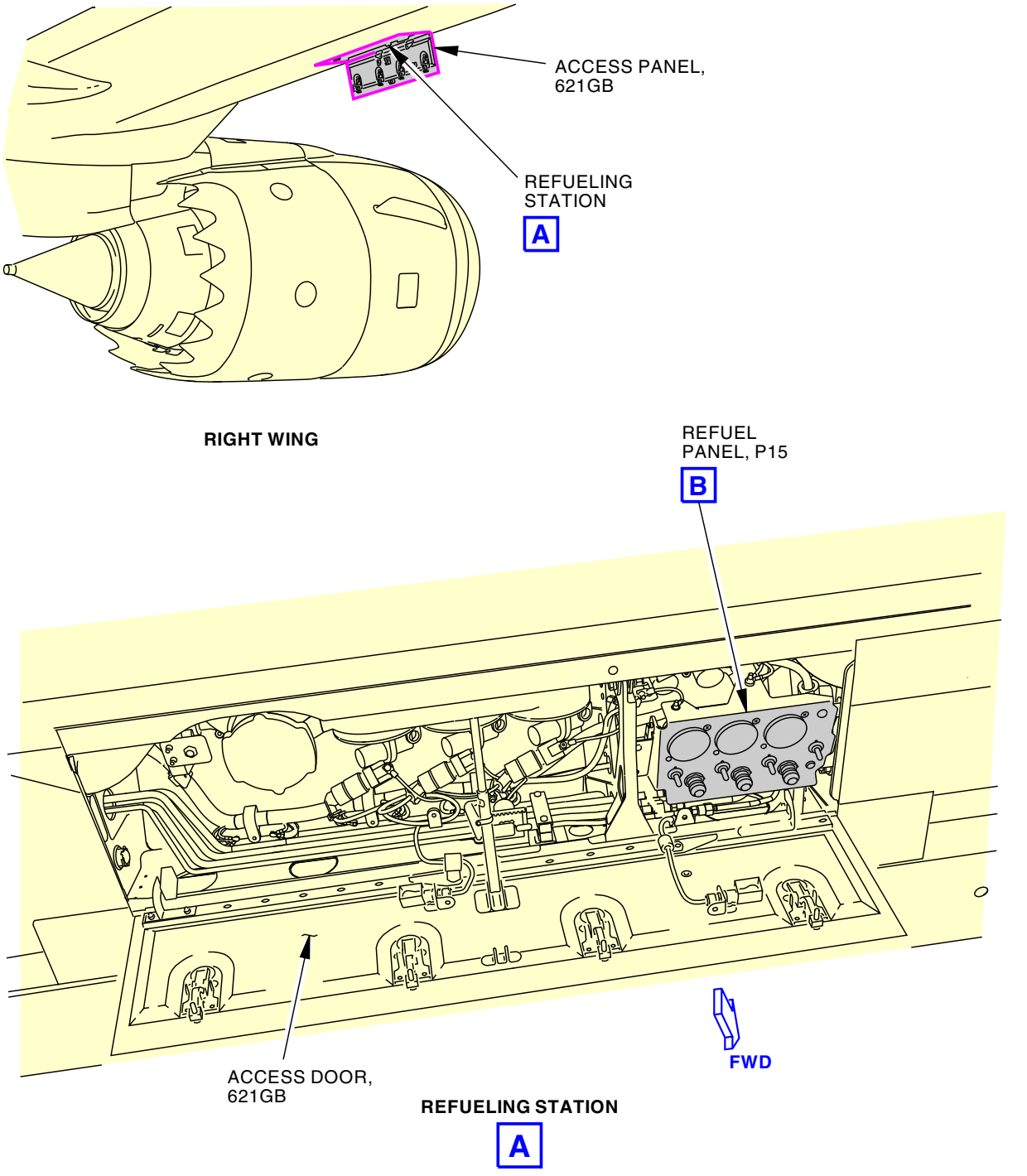
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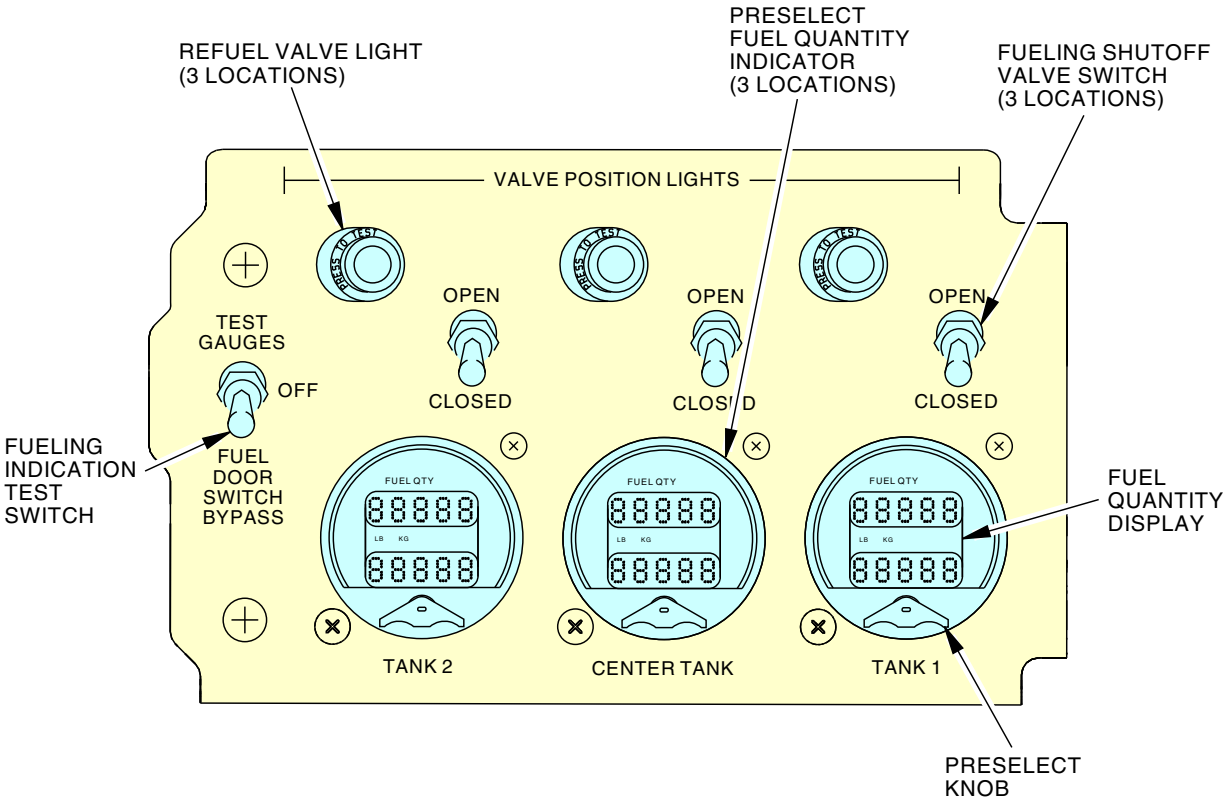
Engine Fuel Feed System
Figure 501/28-22-00-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Refueling Station Location
Figure 502/28-22-00-990-802 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



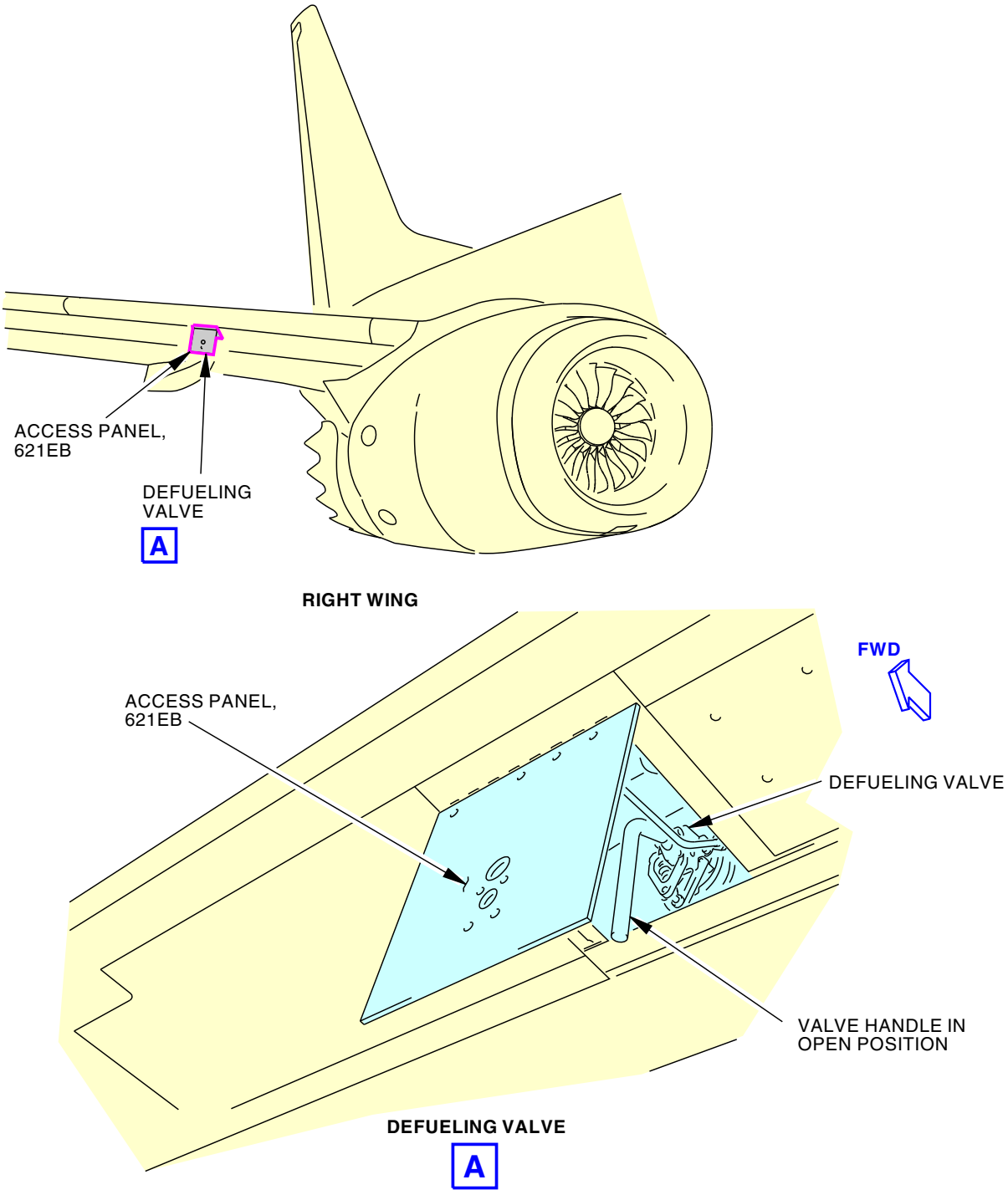
REFUEL PANEL, P15

B

2563930 S0000612581_V1

Refueling Station Location
Figure 502/28-22-00-990-802 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Defueling Valve Location
Figure 503/28-22-00-990-803

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-00-730-802

3. Crossfeed Valve - Functional Test

(Figure 501, Figure 502, Figure 503, Figure 504)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task does the functional test of the crossfeed valve.

(2) The preselect fuel quantity indicator is referred to as the refuel quantity indicator in this procedure.

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)

C. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
211	Flight Compartment - Left
212	Flight Compartment - Right
621	Right Wing - Leading Edge to Front Spar

D. Access Panels

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91
621GB	Refuel Valve Door - Slat Station 125

E. Prepare for the Test

SUBTASK 28-22-00-860-013

(1) In the flight compartment, make sure that the switches are set to the positions shown in Table 502.

Table 502/28-22-00-993-815 Fuel Pump and Crossfeed Valve Test

SWITCH/CONTROL	POSITION	LOCATION
Fuel CROSS FEED Valve	Closed	P5-2 Fuel System Module
FUEL PUMPS 1 AFT	OFF	P5-2 Fuel System Module
FUEL PUMPS 1 FWD	OFF	P5-2 Fuel System Module
FUEL PUMPS CTR L	OFF	P5-2 Fuel System Module
FUEL PUMPS CTR R	OFF	P5-2 Fuel System Module
FUEL PUMP 2 AFT	OFF	P5-2 Fuel System Module
FUEL PUMP 2 FWD	OFF	P5-2 Fuel System Module
APU Fire Handle	NORMAL	P8 Aisle Stand
Engine 1 Fire Handle	NORMAL	P8 Aisle Stand
Engine 2 Fire Handle	NORMAL	P8 Aisle Stand
Engine 1 Start Lever	CUTOFF	P10 Control Stand

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Table 502/28-22-00-993-815 Fuel Pump and Crossfeed Valve Test (Continued)

SWITCH/CONTROL	POSITION	LOCATION
Engine 2 Start Lever	CUTOFF	P10 Control Stand

SUBTASK 28-22-00-650-002

(2) Make sure that the fuel quantities in the fuel tanks are as follows:

(a) Make sure that there is 2000 lb (907 kg) of fuel (or more) in the No. 1 main tank.

(b) Make sure that there is 2000 lb (907 kg) of fuel (or more) in the No. 2 main tank.

(c) To refuel the fuel tanks, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-803.

F. Engine Fuel Crossfeed Valve Test

NOTE: Put a person in the flight compartment to operate the fuel boost pumps and to monitor the fuel quantity and LOW PRESSURE indicators.

SUBTASK 28-22-00-860-016

(1) Open this access panel:

(Figure 502)

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-22-00-860-017

(2) On the P15 Refuel Panel, set the fueling shutoff valve switch to the OPEN position for the No. 2 main tank.

SUBTASK 28-22-00-860-018

(3) Open this access panel:

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91

SUBTASK 28-22-00-860-019

(4) Move the defuel valve handle to the open position (Figure 503).

SUBTASK 28-22-00-860-020

(5) On the P5-2 Fuel System Module, turn the CROSS FEED switch to the open position.

(a) The VALVE OPEN light for the crossfeed valve comes on bright while the valve goes from the closed position to the open position.

(b) Make sure that the VALVE OPEN light for the crossfeed valve dims after the crossfeed valve opens.

SUBTASK 28-22-00-860-021

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.

(6) Immediately set the applicable FUEL PUMPS switch to the OFF position if the LOW PRESSURE light comes on and stays on.

SUBTASK 28-22-00-860-022

(7) On the P5-2 Fuel System Module, set the FUEL PUMPS 1 FWD switch to the ON position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Make sure that a minimum of 200 lb (91 kg) of fuel is transferred from the No.1 main tank to the No. 2 main tank.

NOTE: The fuel transfers in approximately 2 minutes.

SUBTASK 28-22-00-860-023

(8) Set the FUEL PUMPS 1 FWD switch to the OFF position.

SUBTASK 28-22-00-860-024

(9) Turn the CROSS FEED switch to the closed position.

(a) The VALVE OPEN light for the crossfeed valve goes from dim to bright while the valve goes from the open position to the closed position.

(b) Make sure that the VALVE OPEN light for the crossfeed valve goes off after the crossfeed valve closes.

SUBTASK 28-22-00-860-025

(10) Set the FUEL PUMPS 1 FWD switch to the ON position.

(a) Make sure that fuel does not transfer, as shown on the refuel quantity indicators, from the No. 1 main tank to the No. 2 main tank.

NOTE: Approximately 3 minutes is sufficient to make sure that there is no fuel transfer.

SUBTASK 28-22-00-860-026

(11) Set the FUEL PUMPS 1 FWD switch to the OFF position.

SUBTASK 28-22-00-860-027

(12) Set the fueling shutoff valve switch for the No. 2 main tank to the CLOSED position.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-00-410-006

(1) Close this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-22-00-410-007

(2) Move the defuel valve handle to the closed position.

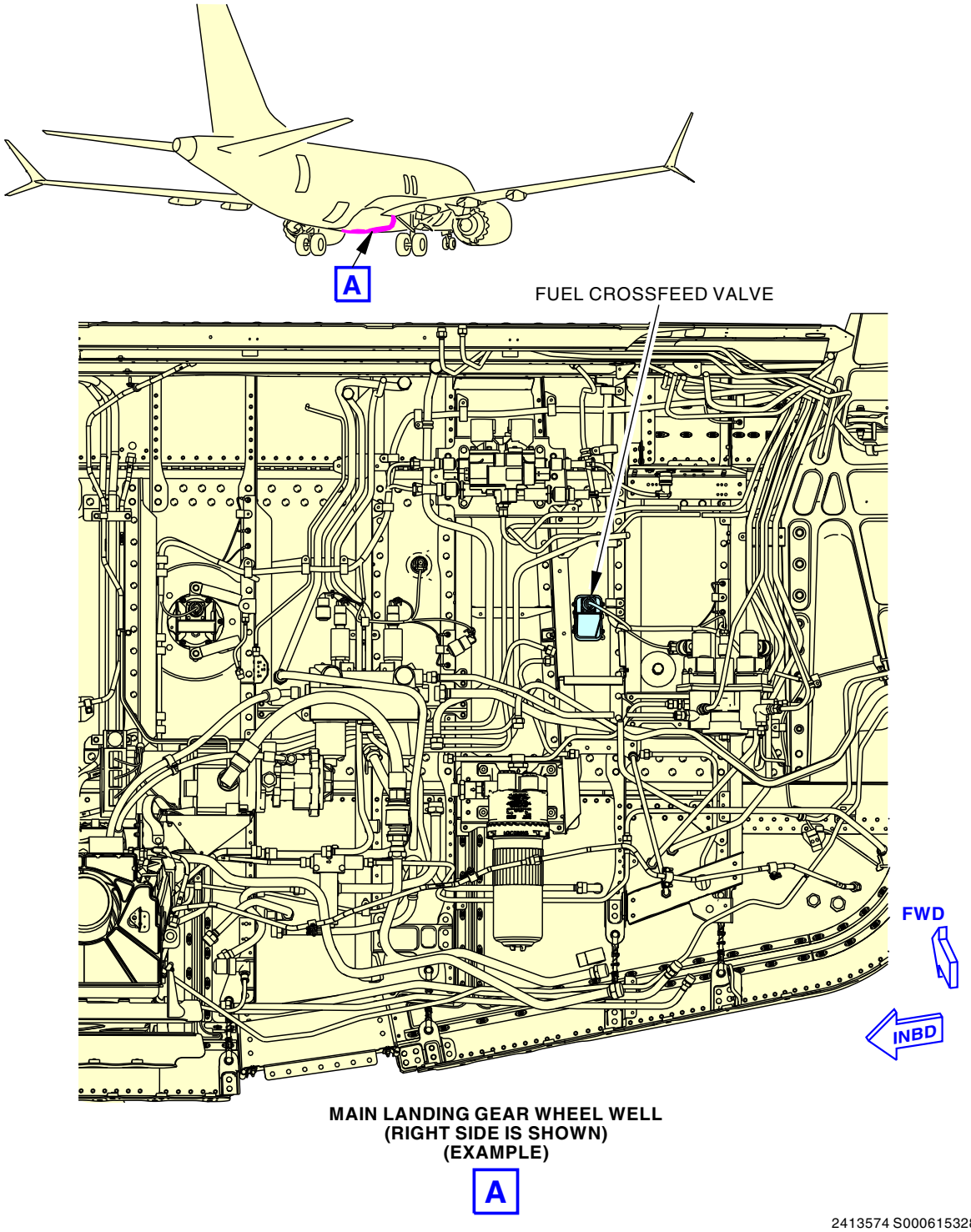
SUBTASK 28-22-00-410-008

(3) Close this access panel:

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



**MAIN LANDING GEAR WHEEL WELL
(RIGHT SIDE IS SHOWN)
(EXAMPLE)**

2413574 S00061532847_V2

**Crossfeed Valve Location
Figure 504/28-22-00-990-804**

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 indication and electrical controls for the left and right engine fuel spar valves.

B. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

C. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
426	Engine 2 - Thrust Reverser, Right

D. Spar Valve Electrical Control and Indication Test

SUBTASK 28-22-00-860-030

(1) In the flight compartment, make sure that the switches are set to the position shown in Table 503.

Table 503/28-22-00-993-819 Engine Fuel Spar Valve Test

SWITCH/CONTROL	POSITION	LOCATION
Fuel CROSS FEED Valve	Closed	P5-2 Fuel System Module
FUEL PUMPS 1 AFT	OFF	P5-2 Fuel System Module
FUEL PUMPS 1 FWD	OFF	P5-2 Fuel System Module
FUEL PUMPS CTR L	OFF	P5-2 Fuel System Module
FUEL PUMPS CTR R	OFF	P5-2 Fuel System Module
FUEL PUMP 2 AFT	OFF	P5-2 Fuel System Module
FUEL PUMP 2 FWD	OFF	P5-2 Fuel System Module
APU Fire Handle	NORMAL	P8 Aisle Stand
Engine 1 Fire Handle	NORMAL	P8 Aisle Stand
Engine 2 Fire Handle	NORMAL	P8 Aisle Stand
Engine 1 Start Lever	CUTOFF	P10 Control Stand
Engine 2 Start Lever	CUTOFF	P10 Control Stand

SUBTASK 28-22-00-760-001

(2) Test the two redundant wires that supply power to close the left fuel spar valve:

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1
C	6	C01472	FUEL SHUTOFF VALVES BUS

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) Disconnect connector D788 from the left fuel spar valve actuator.

(c) Do this check for 0 VDC power (2.0 VDC maximum) at the left fuel spar valve:

Table 504/28-22-00-993-802

D788		D788
pin 5	- - - - - - - - - - - - - - - - - - -	pin 7
pin 6	- - - - - - - - - - - - - - - - - - -	pin 7

(d) Do a check for an open circuit between these pins:

Table 505/28-22-00-993-803

D788		D788	RESISTANCE
pin 5	- - - - - - - - - - - - - - - - - - -	pin 6	5 ohms or less

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1
C	6	C01472	FUEL SHUTOFF VALVES BUS

(f) Do this check for 28 VDC power (26.0 VDC minimum, 30.0 VDC maximum) at the left fuel spar valve:

Table 506/28-22-00-993-804

D788		D788
pin 5	- - - - - - - - - - - - - - - - - - -	pin 7
pin 6	- - - - - - - - - - - - - - - - - - -	pin 7

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1
C	6	C01472	FUEL SHUTOFF VALVES BUS

(h) Connect the connector D788 to the left spar valve actuator.

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1
C	6	C01472	FUEL SHUTOFF VALVES BUS

SUBTASK 28-22-00-760-002

(3) Test the two redundant wires that supply power to close the right 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
C	6	C01472	FUEL SHUTOFF VALVES BUS

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) Disconnect connector D790 from the right spar valve actuator.

(c) Do this check for 0 VDC power (2.0 VDC maximum) at the right fuel spar valve:

Table 507/28-22-00-993-805

D790		D790
pin 5	- - - - - - - - - - - - - - - - - - -	pin 7
pin 6	- - - - - - - - - - - - - - - - - - -	pin 7

(d) Do a check for an open circuit between these pins:

Table 508/28-22-00-993-806

D790		D790	RESISTANCE
pin 5	- - - - - - - - - - - - - - - - - - -	pin 6	5 ohms or less

(e) 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
C	6	C01472	FUEL SHUTOFF VALVES BUS

(f) Do this check for 28 VDC power (26.0 VDC minimum, 30.0 VDC maximum) at the right fuel spar valve:

Table 509/28-22-00-993-807

D790		D790
pin 5	- - - - - - - - - - - - - - - - - - -	pin 7
pin 6	- - - - - - - - - - - - - - - - - - -	pin 7

(g) 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
C	6	C01472	FUEL SHUTOFF VALVES BUS

(h) Connect the connector D790 to the right spar valve actuator.

(i) 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
C	6	C01472	FUEL SHUTOFF VALVES BUS

SUBTASK 28-22-00-720-002

(4) Do these steps to test the left engine spar valve:

(a) On the P5 Overhead Panel, set the ENGINE START 1 and 2 switches to the OFF position.

(b) Put DO NOT OPERATE tags, STD-858, on the ENGINE START 1 and 2 switches.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT
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
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

(d) On the P10 Aisle Stand, set the Engine 1 Start Lever to the IDLE position.

1) Engine 1 SPAR VALVE CLOSED light comes on bright while the valve changes from the closed position to the open position.
2) Make sure that the engine 1 SPAR VALVE CLOSED light goes off after the left engine spar valve opens.
3) Make sure that the manual override lever for the left engine spar valve is in the OPEN position.



CAUTION

DO NOT TURN THE FIRE HANDLE. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

(e) On the P8-1 Fire Control Panel, do these steps:

1) Push the manual override button.
2) Pull the engine 1 fire handle.
   a) Engine 1 SPAR VALVE CLOSED light comes on bright while the valve changes from the open position to the closed position.
   b) Make sure that the engine 1 SPAR VALVE CLOSED light dims after the left engine spar valve closes.
   c) Make sure that the manual override lever for the left engine spar valve is in the CLOSED position.



CAUTION

DO NOT TURN THE FIRE HANDLE. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

(f) Push the engine 1 fire handle to the normal position.

1) Make sure that the engine 1 SPAR VALVE CLOSED light comes on bright while the valve changes from the closed position to the open position.
2) Make sure that the engine 1 SPAR VALVE CLOSED light goes off after the left engine spar valve opens.

(g) Set the Engine 1 Start Lever to the CUTOFF position.

1) Make sure that the engine 1 SPAR VALVE CLOSED light comes on bright while the valve changes from the open position to the closed position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

2) Make sure that the engine 1 SPAR VALVE CLOSED light dims after the left engine spar valve closes.

(h) Remove the DO-NOT-OPERATE tags from the ENGINE START 1 and 2 switches.

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

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT
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
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

SUBTASK 28-22-00-720-003

(5) Do these steps to test the right engine spar valve:

(a) Make sure that the ENGINE START 1 and 2 switches are in the OFF position.

(b) Put DO NOT OPERATE tags, STD-858, on the ENGINE START 1 and 2 switches.

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

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT
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
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

(d) Set the Engine 2 Start Lever to the IDLE position.

1) Engine 2 SPAR VALVE CLOSED light comes on bright while the valve changes from the closed position to the open position.

2) Make sure that the engine 2 SPAR VALVE CLOSED light goes off after the right engine spar valve opens.

3) Make sure that the manual override lever for the right engine spar valve is in the OPEN position.

CAUTION

DO NOT TURN THE FIRE HANDLE. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

(e) On the P8-1 Fire Control Panel, do these steps:

1) Push the manual override button.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

2) Pull the engine 2 fire handle.
   a) Engine 2 SPAR VALVE CLOSED light comes on bright while the valve changes from the open position to the closed position.
   b) Make sure that the engine 2 SPAR VALVE CLOSED light dims after the right engine spar valve closes.
   c) Make sure that the manual override lever for the right engine spar valve is in the CLOSED position.

CAUTION

DO NOT TURN THE FIRE HANDLE. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

(f) Push the engine 2 fire handle to the normal position.
   1) Engine 2 SPAR VALVE CLOSED light comes on bright while the valve changes from the closed position to the open position.
   2) Make sure that the engine 2 SPAR VALVE CLOSED light goes off after the right engine spar valve opens.

(g) Set the Engine 2 Start Lever to the CUTOFF position.
   1) Engine 2 SPAR VALVE CLOSED light comes on bright while the valve changes from the open position to the closed position.
   2) Make sure that the engine 2 SPAR VALVE CLOSED light dims after the right engine spar valve closes.

(h) Remove the DO-NOT-OPERATE tags from the ENGINE START 1 and 2 switches.

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

CAPT Electrical System Panel, P18-2

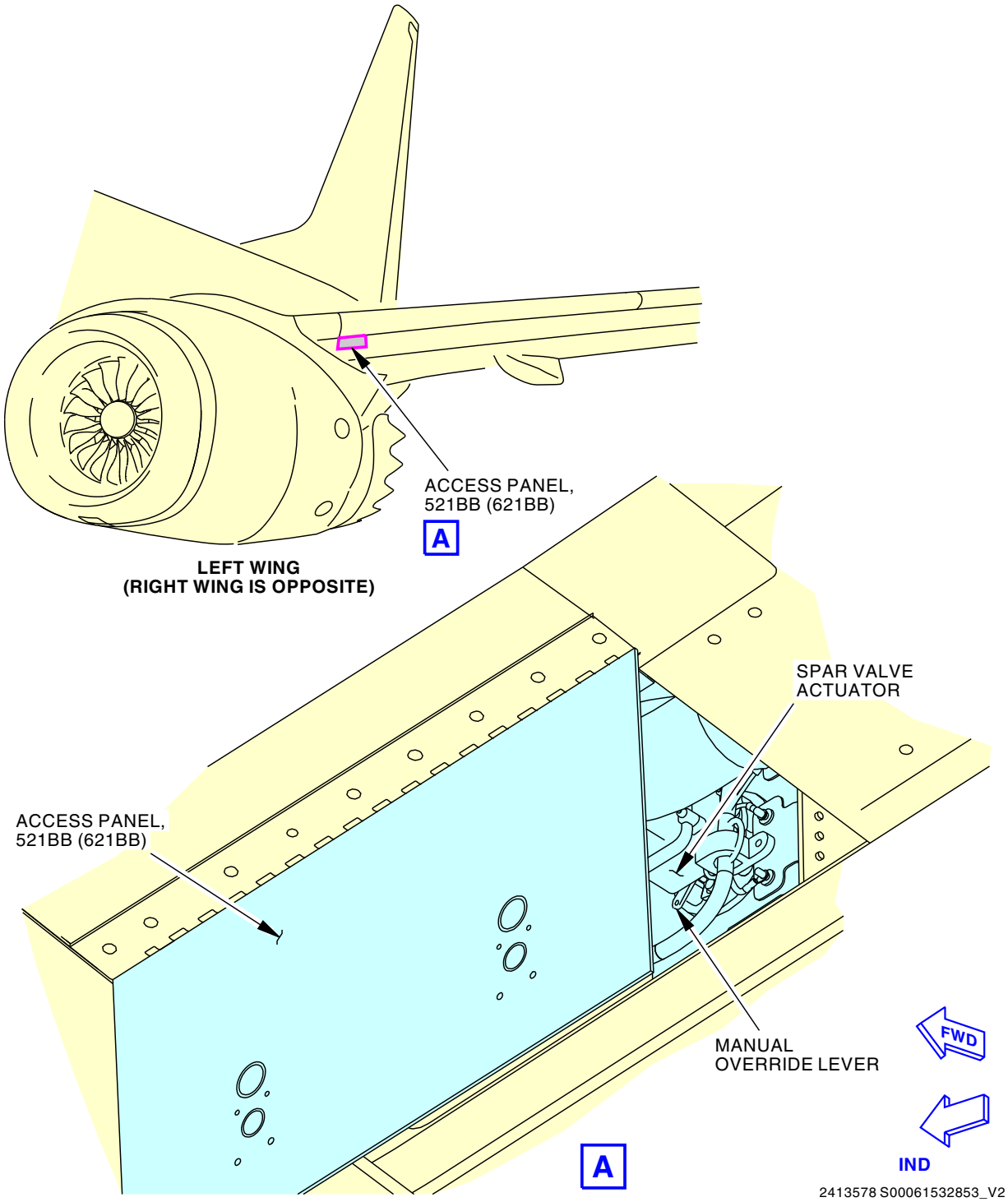
Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT
B	8	C01103	ENGINE 1 START VALVE

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Spar Valve Actuator Location
Figure 505/28-22-00-990-805

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-00-720-801

5. Emergency Fuel Shutoff Battery - Operational Test

(Figure 501, Figure 505)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This procedure tests the emergency fuel shutoff battery for the conditions that follows:

(a) Battery is charged.

(b) Diode R669 and wiring are correct (WDM 28-21-21).

(2) When the diode or wiring is damaged, the emergency fuel shutoff battery will discharge with no warning shown in the flight deck compartment.

(3) Test the left engine fuel spar valve, the right engine fuel spar valve is not necessary.

B. References

Reference	Title
WDM 28-21-21	D000534467

C. Location Zones

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

D. Access Panels

Number	Name/Location
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27

E. Prepare for the Test

SUBTASK 28-22-00-860-031

(1) In the flight compartment, make sure that the switches are set to the positions shown in Table 510.

Table 510/28-22-00-993-808 Fuel Shutoff Valve Battery Test

SWITCH/CONTROL	POSITION	LOCATION
Fuel CROSS FEED Valve	Closed	P5-2 Fuel System Module
FUEL PUMPS 1 AFT	OFF	P5-2 Fuel System Module
FUEL PUMPS 1 FWD	OFF	P5-2 Fuel System Module
FUEL PUMPS CTR L	OFF	P5-2 Fuel System Module
FUEL PUMPS CTR R	OFF	P5-2 Fuel System Module
FUEL PUMP 2 AFT	OFF	P5-2 Fuel System Module
FUEL PUMP 2 FWD	OFF	P5-2 Fuel System Module
ENGINE START 1	OFF	P5 Overhead Panel
ENGINE START 2	OFF	P5 Overhead Panel
APU Fire Handle	NORMAL	P8 Aisle Stand
Engine 1 Fire Handle	NORMAL	P8 Aisle Stand
Engine 2 Fire Handle	NORMAL	P8 Aisle Stand

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Table 510/28-22-00-993-808 Fuel Shutoff Valve Battery Test (Continued)

SWITCH/CONTROL	POSITION	LOCATION
Engine 1 Start Lever	CUTOFF	P10 Control Stand
Engine 2 Start Lever	CUTOFF	P10 Control Stand

SUBTASK 28-22-00-010-001

(2) Open this access panel:

Number	Name/Location
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27

SUBTASK 28-22-00-440-001

(3) Make sure that power is applied to the charger system to charge the battery for a minimum of 60 minutes.

(a) Use the Battery Switch and Ground Power Switch in the flight deck.

NOTE: The Ground Service Switch on the Flight attendant Panel will not energize the 28V DC Bus 2 Sec 2 which is necessary to charge the battery.

F. Fuel Shutoff Valve Battery Test

SUBTASK 28-22-00-860-033

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

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT
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
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

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 28-22-00-710-001

(2) On the P10 Control Stand, set the Engine 1 Start Lever to the IDLE position.

(a) Make sure that the engine 1 SPAR VALVE CLOSED light comes on bright while the valve changes from the closed position to the open position.

(b) Make sure that the engine 1 SPAR VALVE CLOSED light goes off after the left engine fuel spar valve opens.

(c) Make sure that the manual override lever for the left engine fuel spar valve is in the OPEN position.

SUBTASK 28-22-00-710-002

(3) Set the Engine 1 Start Lever to the CUTOFF position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Make sure that the engine 1 SPAR VALVE CLOSED light comes on bright while the valve changes from the open position to the closed position.

(b) Make sure that the engine 1 SPAR VALVE CLOSED light dims after the left engine fuel spar valve closes.

(c) Make sure that the manual override lever for the left engine fuel spar valve is in the CLOSED position.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-00-410-002

(1) Close this access panel:

Number	Name/Location
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27

SUBTASK 28-22-00-860-034

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

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT
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
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

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 28-22-00-720-802

6. Engine Fuel Spar Valve Installation - Operational Test

(Figure 501, Figure 503, and Figure 506)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task includes the steps to do engine fuel spar valve installation operational check.

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
28-22-11 P/B 401	ENGINE FUEL SPAR VALVE - REMOVAL/INSTALLATION
71-00-00-800-804-G00	Power Plant Test Reference Table (P/B 501)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)

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C. Tools/Equipment

Reference	Description
STD-201	Container - Fuel Resistant, 5 U.S.-Gal (19 l)

D. Consumable Materials

Reference	Description	Specification
D00504	Grease - Petrolatum	VV-P-236
G50065 [CP8006]	Cable, Safety, Stainless Steel, 0.032 inch (0.8 mm) Diameter	M50 TF 9 CL-A

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Preformed packing	73-11-03-01-030	SIA ALL

F. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
413	Engine 1 - Fan Cowl, Left
423	Engine 2 - Fan Cowl, Left

G. Prepare for the Test

SUBTASK 28-22-00-860-035

(1) In the flight compartment, make sure that the switches are set to the positions shown in Table 511.

Table 511/28-22-00-993-809 Test Switch Position

SWITCH/CONTROL	POSITION	LOCATION
Fuel CROSS FEED Valve	Closed	P5-2 Fuel System Module
FUEL PUMPS 1 AFT	OFF	P5-2 Fuel System Module
FUEL PUMPS 1 FWD	OFF	P5-2 Fuel System Module
FUEL PUMPS CTR L	OFF	P5-2 Fuel System Module
FUEL PUMPS CTR R	OFF	P5-2 Fuel System Module
FUEL PUMP 2 AFT	OFF	P5-2 Fuel System Module
FUEL PUMP 2 FWD	OFF	P5-2 Fuel System Module
ENGINE START 1	OFF	P5 Overhead Panel
ENGINE START 2	OFF	P5 Overhead Panel
APU Fire Handle	NORMAL	P8 Aisle Stand
Engine 1 Fire Handle	NORMAL	P8 Aisle Stand
Engine 2 Fire Handle	NORMAL	P8 Aisle Stand
Engine 1 Start Lever	CUTOFF	P10 Control Stand
Engine 2 Start Lever	CUTOFF	P10 Control Stand

SUBTASK 28-22-00-650-003

(2) Make sure that the fuel quantities in the fuel tanks are as follows:

(a) No. 1 main tank – 2000 lb (907 kg) minimum

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(b) No. 2 main tank – 2000 lb (907 kg) minimum

(c) To refuel the fuel tanks, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-803.

SUBTASK 28-22-00-860-166

WARNING BE CAREFUL WHEN YOU DO WORK ON THE ENGINE PARTS AFTER THE ENGINE IS STOPPED. THE ENGINE PARTS CAN STAY HOT FOR ALMOST ONE HOUR. DO NOT TOUCH HOT PARTS WITHOUT APPLICABLE GLOVES. HOT PARTS CAN CAUSE INJURIES TO PERSONNEL.

WARNING DO NOT LET ENGINE FUEL STAY ON YOUR SKIN. IF YOU GET FUEL ON YOUR SKIN, REMOVE IT IMMEDIATELY WITH SOAP AND WATER. THE FUEL IS POISONOUS AND CAN BE ABSORBED INTO YOUR BODY.

(3) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

SUBTASK 28-22-00-680-001

(4) Drain the fuel supply line:

(a) Put a 5 U.S.-gal (19 l) fuel resistant container, STD-201, below the fuel filter bowl.

(b) Remove the drain plug [3] from the fuel filter bowl [1].

1) Cut and remove the safety wire from the drain plug [3].

2) Remove the drain plug [3] from the fuel filter bowl [1].

3) Let the fuel drain.

4) Remove and discard the preformed packing [2] from the groove of the drain plug [3].

(c) If the fuel continues to drain after 5 gal (19 l), do these steps:

1) Install the drain plug [3] to stop the fuel flow.

NOTE: The engine fuel spar valve can still be open.

2) Replace the engine fuel spar valve (PAGEBLOCK 28-22-11/401).

H. Engine Fuel Spar Valve and Valve Adapter Test

NOTE: Put a person in the flight compartment to operate the fuel boost pumps and to monitor the fuel quantity and LOW PRESSURE indicators.

SUBTASK 28-22-00-210-002

(1) Monitor the fuel leakage from the inlet fuel line until the drops per minute is constant.

(a) Make a written record of the drops/minute.

SUBTASK 28-22-00-860-039

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.

(2) Immediately set the applicable FUEL PUMPS switch to the OFF position if the LOW PRESSURE light comes on and stays on.

SUBTASK 28-22-00-860-040

(3) On the P5-2 Fuel System Module, set the FUEL PUMPS 1 AFT and FUEL PUMPS 2 AFT switches to the ON position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Make sure that the fuel drops per minute do not increase from the left and right fuel inlet lines.

SUBTASK 28-22-00-860-041

(4) Set the FUEL PUMPS 1 AFT and FUEL PUMPS 2 AFT switches to the OFF position.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-00-420-002

(1) Install the drain plug [3].

(a) Make sure that the drain plug [3] and fuel filter bowl [1] mating faces are clean and clear of unwanted materials.

(b) Lubricate a new preformed packing [2] with grease, D00504.

(c) Install the new preformed packing [2] onto the drain plug [3].

(d) Install the drain plug [3] in the fuel filter bowl [1].

(e) Tighten the drain plug [3] to 140 in-lb (15.8 N·m) - 150 in-lb (16.9 N·m).

(f) Install the cable, G50065 [CP8006], on the drain plug [3].

SUBTASK 28-22-00-860-167

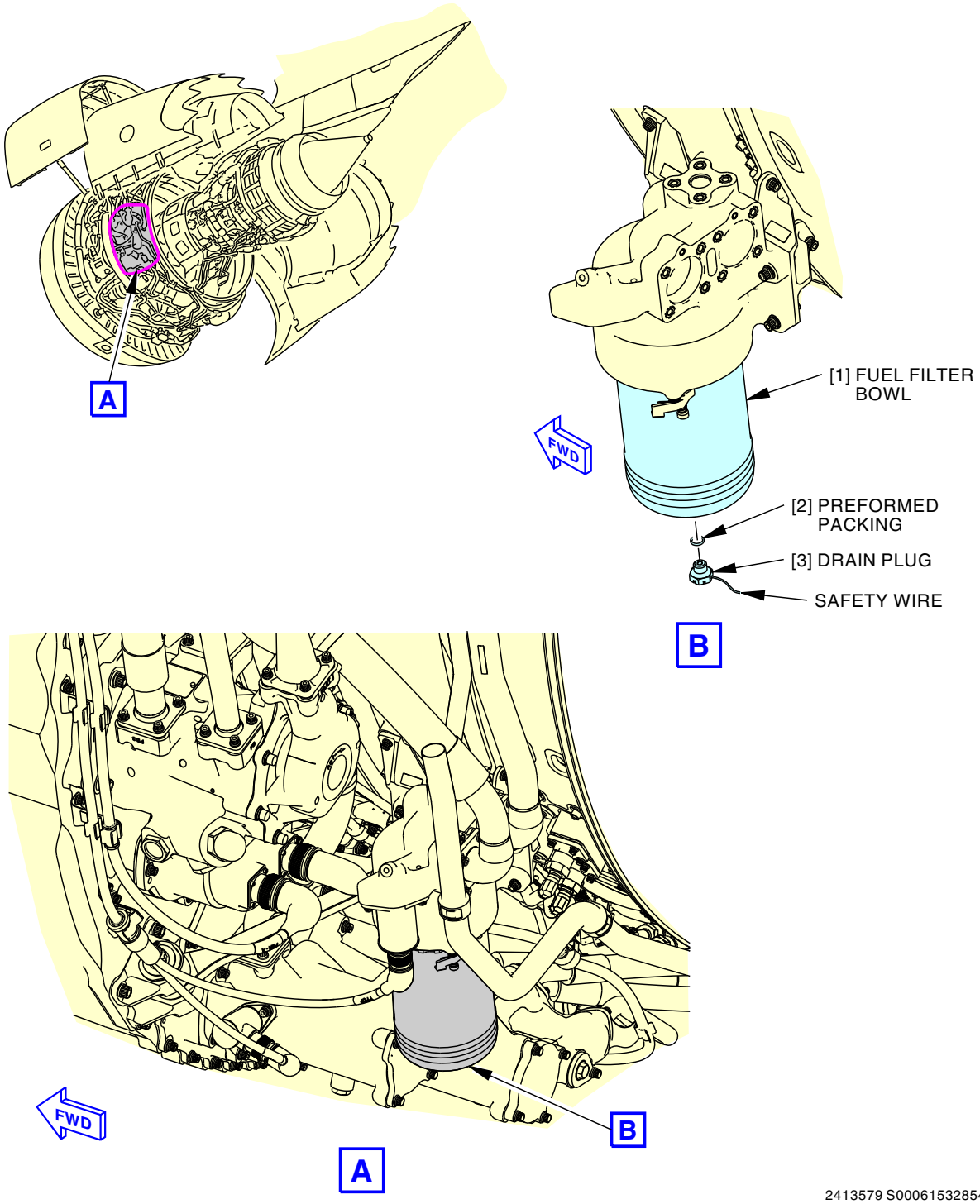
(2) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

SUBTASK 28-22-00-710-009

(3) Do the test(s) that are given in the Power Plant Test Reference Table (TASK 71-00-00-800-804-G00).

——— END OF TASK ———

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Fuel Filter Drain Location
Figure 506/28-22-00-990-806

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-00-720-803

7. Fuel Scavenge System - Operational Test

(Figure 501)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) The fuel scavenge system has a motive flow inlet in the center tank, a jet pump driven by the No. 1 forward fuel boost pump, and a float valve in the No. 1 main tank.

(2) This procedure makes sure that 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
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)

C. Location Zones

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

D. Prepare for the Test

SUBTASK 28-22-00-860-044

(1) Make sure that the switches are in the positions shown in Table 512.

Table 512/28-22-00-993-818 Fuel Scavenge System Test

SWITCH/CONTROL	POSITION	LOCATION
Fuel CROSS FEED Valve	Closed	P5-2 Fuel System Module
FUEL PUMPS 1 AFT	OFF	P5-2 Fuel System Module
FUEL PUMPS 1 FWD	OFF	P5-2 Fuel System Module
FUEL PUMPS CTR L	OFF	P5-2 Fuel System Module
FUEL PUMPS CTR R	OFF	P5-2 Fuel System Module
FUEL PUMP 2 AFT	OFF	P5-2 Fuel System Module
FUEL PUMP 2 FWD	OFF	P5-2 Fuel System Module
APU Fire Handle	NORMAL	P8 Aisle Stand
Engine 1 Fire Handle	NORMAL	P8 Aisle Stand
Engine 2 Fire Handle	NORMAL	P8 Aisle Stand
Engine 1 Start Lever	CUTOFF	P10 Control Stand
Engine 2 Start Lever	CUTOFF	P10 Control Stand

SUBTASK 28-22-00-650-004

(2) Make sure that these fuel tanks have the fuel quantities as follows:

(a) No. 1 main tank – 100 lb (45 kg) - 4100 lb (1860 kg).

NOTE: The fuel level is below the fuel scavenge float valve and above the aft fuel boost pump inlet.

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(b) Center tank – 500 lb (227 kg) - 6800 lb (3084 kg).

NOTE: The fuel level is sufficient for the center tank to scavenge fuel. Also, the fuel level is low enough to prevent the increase of the scavenge fuel flow rate.

E. Fuel Scavenge System Test

SUBTASK 28-22-00-860-047

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) Immediately set the applicable FUEL PUMPS switch to the OFF position if the LOW PRESSURE light comes on and stays on.

SUBTASK 28-22-00-860-048

(2) Do these steps to operate the fuel scavenge system:

(a) On the P5-2 Fuel System Module, make sure that the LOW PRESSURE light is on for the FUEL PUMPS 1 FWD switch.

(b) On the P5-2 Fuel System Module, set the FUEL PUMPS 1 FWD switch to the ON position.

1) Make sure that the LOW PRESSURE light goes off (approximately 15 seconds), for the FUEL PUMPS 1 FWD switch.

(c) Operate the forward fuel boost pump for 30 minutes maximum.

NOTE: Continue until a minimum 110 lb (50 kg) of fuel transfers to the No. 1 main tank.

(d) Make sure that the fuel quantity for the No. 1 main tank increases by a minimum of 110 lb (50 kg) in 30 minutes.

(e) Make sure that the fuel quantity for the center tank decreases by a minimum of 110 lb (50 kg) in 30 minutes.

SUBTASK 28-22-00-860-049

(3) Set the FUEL PUMPS 1 FWD switch to the OFF position.

SUBTASK 28-22-00-650-005

(4) Refuel the No. 1 main tank with 6000 lb (2722 kg) of fuel (TASK 12-11-00-650-803).

NOTE: This step closes the fuel scavenge float shutoff valve.

SUBTASK 28-22-00-860-050

(5) Set the FUEL PUMPS 1 FWD switch to the ON position.

(a) Operate the forward fuel boost pump for 30 minutes.

(b) Make sure that the fuel quantity for the No. 1 main tank does not increase.

(c) Make sure that the fuel quantity for the center tank does not decrease.

SUBTASK 28-22-00-860-051

(6) Set the FUEL PUMPS 1 FWD switch to the OFF position.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-00-650-006

(1) To refuel the fuel tanks, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-803.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-00-720-804

8. Fuel Boost Pump Output Pressure - Functional Test

(Figure 506 and Figure 507)

A. General

(1) This task measures the output pressure from each fuel boost pump. To measure the output pressure, a pressure gage is attached to the fuel filter bowl on one of the engines. When the fuel boost pumps supplies more than or less than the usual amount, the fuel boost pump is not operating correctly.

(2) This functional test will also make sure that the engine spar valve operates correctly and does not leak.

B. References

Reference	Title
28-22-11 P/B 401	ENGINE FUEL SPAR VALVE - REMOVAL/INSTALLATION
28-22-41 P/B 401	FUEL BOOST PUMP - REMOVAL/INSTALLATION
71-00-00-800-804-G00	Power Plant Test Reference Table (P/B 501)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Tools/Equipment

Reference	Description
STD-201	Container - Fuel Resistant, 5 U.S.-Gal (19 l)
STD-1224	Hose - Fluid Drain, No.6 Braided Hose with 0.5625-18 Threaded Nuts (For Fluid Drain Tap Connections)
STD-11739	Gauge - Pressure - 0-50 psig +/- 1% accuracy with hose and fittings

D. Consumable Materials

Reference	Description	Specification
D00504	Grease - Petrolatum	VV-P-236

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Preformed packing	73-11-03-01-030	SIA ALL

F. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
211	Flight Compartment - Left
212	Flight Compartment - Right
411	Engine 1 - Engine
421	Engine 2 - Engine

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G. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

H. Prepare for the Test

SUBTASK 28-22-00-940-001

(1) Prepare the pressure gauge, STD-11739, the bleed valve, and the No. 6 braided fluid drain hose, STD-1224, for the test.

SUBTASK 28-22-00-860-052

(2) Make sure that the APU is not operating.

SUBTASK 28-22-00-860-053

(3) Make sure that the fuel quantities in the fuel tanks are as follows:

(a) No. 1 main tank – 2000 lb (907 kg)

(b) No. 2 main tank – 2000 lb (907 kg)

(c) Center tank – 14,000 lb (6350 kg).

SUBTASK 28-22-00-860-054

(4) In the flight compartment, set the switches to the position shown in Table 513:

Table 513/28-22-00-993-810 Initial Switch Positions

SWITCH/CONTROL	POSITION	LOCATION
Fuel CROSS FEED Valve	Closed	P5-2 Fuel System Module
FUEL PUMPS 1 AFT	OFF	P5-2 Fuel System Module
FUEL PUMPS 1 FWD	OFF	P5-2 Fuel System Module
FUEL PUMPS CTR L	OFF	P5-2 Fuel System Module
FUEL PUMPS CTR R	OFF	P5-2 Fuel System Module
FUEL PUMP 2 AFT	OFF	P5-2 Fuel System Module
FUEL PUMP 2 FWD	OFF	P5-2 Fuel System Module
ENGINE START 1	OFF	P5 Overhead Panel
ENGINE START 2	OFF	P5 Overhead Panel
APU	OFF	P5 Overhead Panel
Engine 1 Start Lever	CUTOFF	P10 Control Stand
Engine 2 Start Lever	CUTOFF	P10 Control Stand

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-00-860-055

(5) 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

SUBTASK 28-22-00-010-007

(6) Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-22-00-860-171

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(7) Make sure that these circuit breakers are closed:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

SUBTASK 28-22-00-410-010

(8) Close this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-22-00-860-057

(9) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

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WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

SUBTASK 28-22-00-680-002

(10) Drain the fuel supply line:

(a) Put a 5 U.S.-gal (19 l) fuel resistant container, STD-201, below the fuel filter bowl.

(b) Remove the drain plug [3] from the fuel filter bowl [1].

1) Cut and remove the safety wire from the drain plug [3].

2) Remove the drain plug [3] from the fuel filter bowl [1].

3) Let the fuel drain.

4) Remove and discard the preformed packing [2] from the groove of the drain plug [3].

(c) If the fuel continues to drain after 5 gal (19 l), do these steps:

1) Install the drain plug [3] to stop the fuel flow.

NOTE: The engine fuel spar valve can still be open.

2) Replace the engine fuel spar valve (PAGEBLOCK 28-22-11/401).

SUBTASK 28-22-00-210-003

(11) Monitor the fuel leakage from the inlet fuel line until the drops per minute is constant.

(a) Record the drops per minute.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-00-860-058

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.

(12) Immediately set the applicable FUEL PUMPS switch to the OFF position if the LOW PRESSURE light comes on and stays on.

NOTE: Put a person in the flight compartment to operate the fuel boost pumps and to monitor the fuel quantity and LOW PRESSURE indicators.

SUBTASK 28-22-00-860-059

(13) On the P5-2 Fuel System Module, set the FUEL PUMPS 1 AFT and FUEL PUMPS 2 AFT switches to the ON position.

(a) Make sure that the fuel drops per minute do not increase from the left and right fuel inlet line.

(b) If the fuel drop rate per minute increases, replace the engine fuel spar valve (PAGEBLOCK 28-22-11/401).

NOTE: It is possible that the engine fuel spar valve is open because of a damaged adapter shaft or valve body.

SUBTASK 28-22-00-860-060

(14) Set the FUEL PUMPS 1 AFT and FUEL PUMPS 2 AFT switches to the OFF position.

I. Fuel Boost Pump Output Pressure Test

SUBTASK 28-22-00-480-001

(1) Attach the No. 6 braided fluid drain hose, STD-1224, to the fuel filter bowl.

NOTE: Use a .5625-18 UNJF or .5625-18 UNF fitting.

SUBTASK 28-22-00-480-002

(2) Attach the pressure gauge, STD-11739, to the No. 6 braided fluid drain hose, STD-1224.

SUBTASK 28-22-00-860-061

(3) On the P5-2 Fuel System Module, turn the CROSS FEED switch to the open position.

SUBTASK 28-22-00-860-062

(4) On the P10 Control Stand, set the Engine 1 Start Lever or Engine 2 Start Lever to the RUN position.

SUBTASK 28-22-00-720-004

(5) Test each fuel boost pump (six locations):

NOTE: Test the six fuel boost pumps, one at a time.

(a) Open the bleed valve on the pressure gauge, STD-11739, until fuel drains from fluid drain hose.

(b) Close the bleed valve.

(c) Record the pressure shown on the pressure gage as the Pump OFF pressure.

(d) On the P5-2 Fuel System Module, set the applicable FUEL PUMPS switch to the ON position.

(e) Open the bleed valve and drain fuel for approximately 10 seconds.

(f) Close the bleed valve.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(g) After approximately 20 seconds, examine the pressure gage to make sure that the pressure is stable.

(h) Record the pressure shown on the pressure gage as the Pump ON pressure.

(i) Set the applicable FUEL PUMPS switch to the OFF position.

(j) Open the bleed valve to release pressure in the fuel line.

J. Fuel Boost Pump Output Pressure Calculation

SUBTASK 28-22-00-970-001

(1) Calculate the output pressure for each fuel boost pump:

(a) Output pressure (low) = Pump ON - Pump OFF

(b) Output pressure (high) = Pump ON + Pump OFF.

SUBTASK 28-22-00-970-002

(2) Do these steps for the forward and aft fuel boost pumps:

NOTE: The fuel boost pumps for the No. 1 and No. 2 main tanks.

(a) If the calculated output pressure (low) is less than 12 psig (83 kPa), then replace the applicable fuel boost pump (PAGEBLOCK 28-22-41/401).

(b) If the calculated output pressure (high) is greater than 24 psig (165 kPa), then replace the applicable fuel boost pump (PAGEBLOCK 28-22-41/401).

SUBTASK 28-22-00-970-003

(3) Do this step for the center fuel boost pumps:

(a) If the calculated output pressure (low) is less than 28 psig (193 kPa), then replace the applicable fuel boost pump (PAGEBLOCK 28-22-41/401).

K. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-00-860-063

(1) Make sure that these fuel boost pump switches are in the OFF position:

(a) FUEL PUMPS 1 FWD

(b) FUEL PUMPS 1 AFT

(c) FUEL PUMPS 2 FWD

(d) FUEL PUMPS 2 AFT

(e) FUEL PUMPS CTR L

(f) FUEL PUMPS CTR R.

SUBTASK 28-22-00-860-064

(2) On the P10 Control Stand, set the Engine 1 Start Lever or Engine 2 Start Lever to the CUTOFF position.

SUBTASK 28-22-00-860-065

(3) On the P5-2 Fuel System Module, turn the CROSS FEED to the closed position.

SUBTASK 28-22-00-080-001

(4) Remove the No. 6 braided fluid drain hose, STD-1224, from the fuel filter bowl.

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 28-22-00-410-003

(5) Install the drain plug [3].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Make sure that the drain plug [3] and fuel filter bowl [1] mating faces are clean and clear of unwanted materials.

(b) Lubricate a new preformed packing [2] with grease, D00504.

(c) Install the new preformed packing [2] onto the drain plug [3].

(d) Install the drain plug [3] in the fuel filter bowl [1].

(e) Tighten the drain plug [3] to 140 in-lb (15.8 N·m) - 150 in-lb (16.9 N·m).

(f) Install the safety wire on the drain plug [3].

SUBTASK 28-22-00-860-066

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 these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

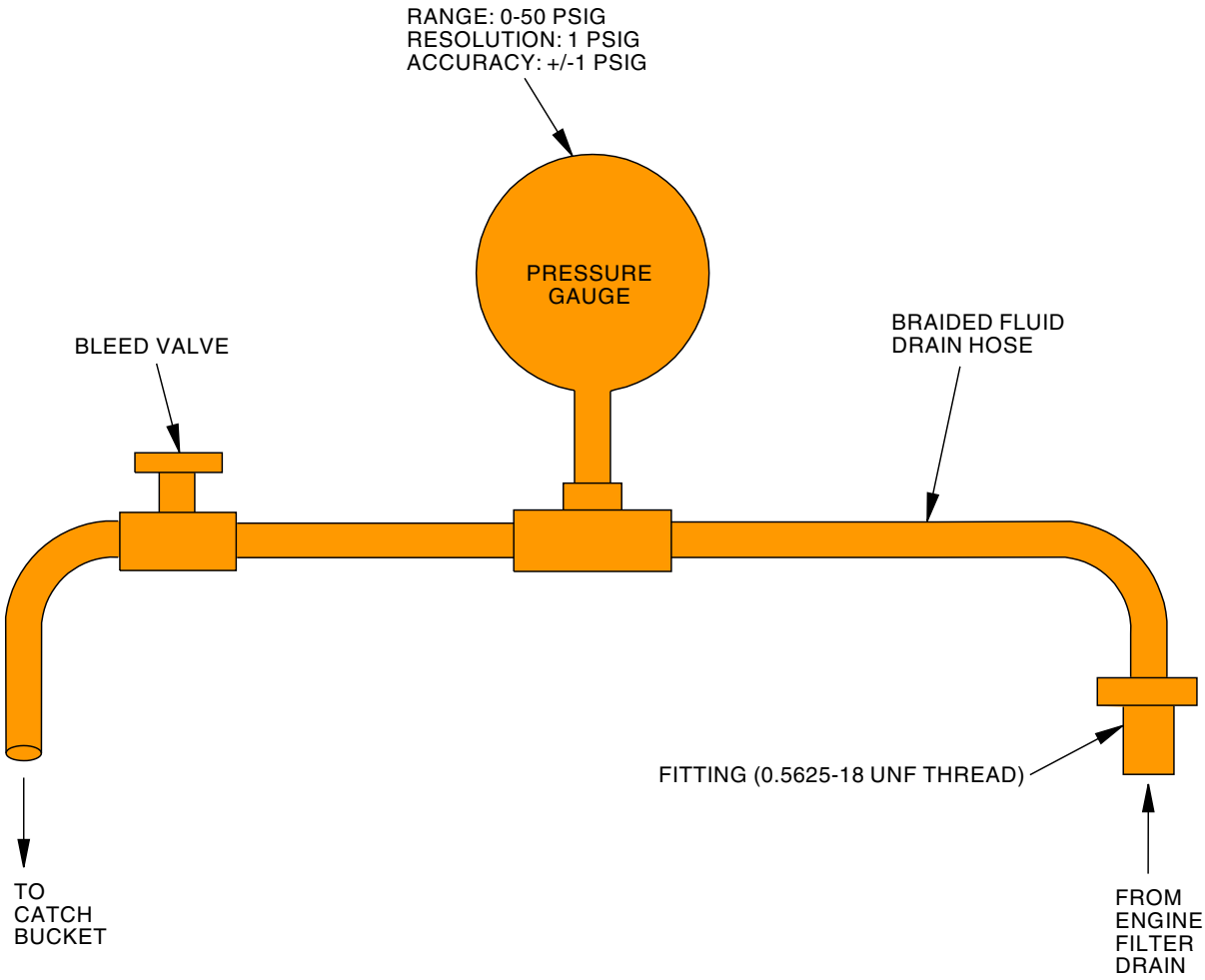
(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 28-22-00-720-021

(7) Do the test(s) that are given in the Power Plant Test Reference Table (TASK 71-00-00-800-804-G00).

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Fuel Boost Pump Output Pressure Test - Required Equipment
Figure 507/28-22-00-990-807

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-00-720-805

9. Center Tank Fuel Boost Pump Auto Shutoff - Functional Test

(Figure 501, Figure 508)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task has one or more steps which are a means to satisfy Airworthiness Limitation Instruction (ALI) requirements. An ALI note will follow the step to which it applies. Any step or sub-step that precedes or follows an ALI identified step is not subject to the ALI requirement.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-19.

(2) This task test the auto shutoff circuits for the left and right center fuel boost pumps.

(3) This test can be completed with two different power sources. The primary power source is the APU. When no APU power is available, use ground power.

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
24-22-00-860-803	Supply External Power (P/B 201)
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
117A	Electronic Equipment Access Door

F. Prepare for the Test (APU Power)

SUBTASK 28-22-00-650-007

(1) Make sure that the fuel quantity in the center tank is 2000 lb (907 kg) minimum.

(a) To refuel the fuel tank, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-803.

SUBTASK 28-22-00-860-165

(2) Make sure that the defuel valve handle is in the closed position.

SUBTASK 28-22-00-860-068

(3) Make sure that these circuit breakers are closed:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	6	C04005	FUEL CROSS FEED VALVE IND

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(Continued)

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	7	C00361	FUEL CROSS FEED VALVE CONT
B	12	C00132	MASTER CAUTION ANNUNCIATOR BUS 1
B	13	C00131	MASTER CAUTION ANNUNCIATOR BAT
C	3	C01637	BOOST PMP CTR TNK L AUTO SHUT OFF-DC
C	6	C01472	FUEL SHUTOFF VALVES BUS
C	7	C01638	BOOST PMP CTR TNK R AUTO SHUT OFF-DC
C	11	C01275	MASTER CAUTION ANNUNCIATOR CONT 1
D	7	C01659	AT S-O/UCPO BST PMP CTR TNK L AC
E	7	C01658	FUEL AT S-O/UCPO BST PMP CTR TNK R AC
E	11	C00313	INDICATOR MASTER DIM SECT 1
F	12	C00318	INDICATOR MASTER DIM SECT 6

SUBTASK 28-22-00-010-009

(4) Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-22-00-860-172

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(5) Make sure that these circuit breakers are closed:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-22-00-860-069

(6) On the P5-2 Fuel System Module, turn the CROSSFEED switch to the closed position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-00-860-070

(7) On the P5-2 Fuel System Module, set the FUEL PUMPS CTR L and R switches to the OFF position.

NOTE: This resets the auto shutoff circuit.

SUBTASK 28-22-00-860-071

(8) Start the APU (TASK 49-11-00-860-801).

SUBTASK 28-22-00-860-072

(9) On the P5-4 AC System, Generator and APU Module, set the left APU/APU GEN switch to the ON position.

SUBTASK 28-22-00-860-073

(10) On the P5-4 AC System, Generator and APU Module, set the GRD PWR switch to the OFF position.

SUBTASK 28-22-00-860-074

(11) On the P5-4 AC System, Generator and APU Module, set the BUS TRANSFER switch to the OFF position.

(a) Make sure that the TRANSFER BUS OFF light for GEN1 is off.

(b) Make sure that the TRANSFER BUS OFF light for GEN2 is on.

(c) Make sure that the RIGHT APU/APU GEN switch is set to the ON position.

G. Prepare for the Test (Ground Power)

SUBTASK 28-22-00-650-008

(1) Make sure that the fuel quantity in the center tank is 2000 lb (907 kg) minimum.

(a) To refuel the fuel tank, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-803.

SUBTASK 28-22-00-860-163

(2) Make sure that the defuel valve handle is in the closed position.

SUBTASK 28-22-00-860-075

(3) 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
C	3	C01637	BOOST PMP CTR TNK L AUTO SHUT OFF-DC
C	7	C01638	BOOST PMP CTR TNK R AUTO SHUT OFF-DC
F	12	C00318	INDICATOR MASTER DIM SECT 6

SUBTASK 28-22-00-010-010

(4) Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-00-860-173

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(5) Make sure that these circuit breakers are closed:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-22-00-860-076

(6) On the P5-2 Fuel System Module, turn the CROSSFEED switch to the closed position.

SUBTASK 28-22-00-860-164

(7) On the P5-2 Fuel System Module, set the FUEL PUMPS CTR L and R switches to the OFF position.

NOTE: This resets the auto shutoff circuit.

SUBTASK 28-22-00-860-078

WARNING

SET THE WXR SWITCH TO TEST BEFORE YOU SUPPLY POWER TO THE AIRCRAFT. RADIATION CAN CAUSE INJURIES TO PERSONNEL.

(8) On the P8 Aft Electronics Panel, set the WXR switch to the TEST position on the weather radar control panel.

SUBTASK 28-22-00-860-079

(9) Supply external power (TASK 24-22-00-860-803).

SUBTASK 28-22-00-860-080

(10) On the P5-4 AC System, Generator and APU Module, set the GRD PWR switch to the ON position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

H. Left Center Fuel Boost Pump - Auto Shutoff Test

SUBTASK 28-22-00-860-081

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(1) Do these steps:

(a) Make sure that these circuit breakers are closed:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
F	5	C03002	XFR BUS 1 SECT 2
F	6	C00815	MAIN BUS 1

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

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
F	5	C03012	XFR BUS 2 SECT 2
F	6	C00817	MAIN BUS 2

SUBTASK 28-22-00-860-083

(2) Make sure that the FUEL PUMPS CTR L and R switches are in the OFF position on the P5-2 Fuel System Module.

SUBTASK 28-22-00-720-006

(3) On the P7 glareshield panel, push the left MASTER CAUTION light.

NOTE: This resets the master caution lights and the system annunciator lights.

(a) Make sure that the left and right MASTER CAUTION lights are off.

(b) On the P7 glareshield panel, make sure that the FUEL annunciator light is off on the left system annunciator light.

(c) On the P5-2 Fuel System Module, make sure that the LOW PRESSURE light is off for the left and right center fuel boost pumps.

SUBTASK 28-22-00-860-084

28-AWL-19: ALI

(4) Set the FUEL PUMPS CTR L switch to the ON position.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-19.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

28-AWL-19: ALI

(a) Make sure that the LOW PRESSURE light goes on briefly then off for the left center fuel boost pump.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-19.

SUBTASK 28-22-00-720-007

(5) On the P61-8 Fuel Test Panel, do these steps:

(a) Lift the left switch guard.

(b) Push and hold the left toggle switch to the L FUEL TEST AUTO SHUTOFF position for 5 seconds and then release the toggle switch.

(c) Make sure that the LOW PRESSURE light stays off for the left center fuel boost pump.

SUBTASK 28-22-00-720-008

(6) Use a stopwatch, STD-836, for the following steps:

(a) Set the stopwatch, STD-836 to zero.

(b) Lift the left switch guard.

28-AWL-19: ALI

(c) Push and hold the left toggle switch to the L FUEL TEST AUTO SHUTOFF position and start the stopwatch, STD-836.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-19.

1) Make sure that the left and right MASTER CAUTION lights are off.

2) Make sure that the FUEL annunciator light is off on the left system annunciator lights.

3) Make sure that the LOW PRESSURE light is off for the left center fuel boost pump.

28-AWL-19: ALI

(d) When the LOW PRESSURE light comes on for the left center fuel boost pump, stop the stopwatch, STD-836 and release the left toggle switch.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-19.

28-AWL-19: ALI

1) Make sure that the LOW PRESSURE light stays on for the left center fuel boost pump.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-19.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

28-AWL-19: ALI

2) Make sure that the stopwatch, STD-836 stopped in 15 ±2 seconds.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-19.

SUBTASK 28-22-00-280-001

28-AWL-19: ALI

(7) In the main landing gear wheel well, listen and make sure that the left center fuel boost pump does not operate.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-19.

SUBTASK 28-22-00-860-085

(8) Set the FUEL PUMPS CTR L switch to the OFF position.

(a) Make sure that the LOW PRESSURE light goes off for the left center fuel boost pump.

SUBTASK 28-22-00-720-019

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(9) 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

SUBTASK 28-22-00-860-086

(10) Set the FUEL PUMPS CTR L and R switches to the ON position.

(a) Make sure that the LOW PRESSURE lights goes on briefly then off for the center fuel boost pumps.

SUBTASK 28-22-00-720-009

(11) Use a stopwatch, STD-836 for the following steps:

(a) Set the stopwatch, STD-836 to zero.

(b) Lift the left switch guard.

(c) Push and hold the left toggle switch to the L FUEL TEST AUTO SHUTOFF position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Make sure that the left and right MASTER CAUTION lights stays off.
2) Make sure that the FUEL annunciator light stays off on the left system annunciator lights.
3) Make sure that the LOW PRESSURE light stays off for the left center fuel boost pump.

(d) When the LOW PRESSURE light comes on for the left center fuel boost pump (approximately 15 seconds), start the stopwatch, STD-836 and release the left toggle switch.

(e) When the left and right MASTER CAUTION lights and the FUEL annunciator lights come on, stop the stopwatch, STD-836.

1) Make sure that the stopwatch, STD-836 stopped in 10 ±2 seconds.

SUBTASK 28-22-00-860-087

(12) Set the FUEL PUMPS CTR L and R switches to the OFF position.

(a) Make sure that the LOW PRESSURE lights are off for the center fuel boost pumps.

SUBTASK 28-22-00-860-168

(13) On the P61-8 Fuel Test Panel, close the guard of the test switch to the L/R AUTO SHUTOFF position.

SUBTASK 28-22-00-720-010

(14) Push the MASTER CAUTION light.

NOTE: This resets the master caution lights and the system annunciator lights.

I. Right Center Fuel Boost Pump - Auto Shutoff Test

SUBTASK 28-22-00-860-082

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(1) Do these steps:

(a) Make sure that these circuit breakers are closed:

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
F	5	C03012	XFR BUS 2 SECT 2
F	6	C00817	MAIN BUS 2

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
F	5	C03002	XFR BUS 1 SECT 2
F	6	C00815	MAIN BUS 1

SUBTASK 28-22-00-720-011

(2) Make sure that the FUEL PUMPS CTR L and R switches are in the OFF position on the P5-2 Fuel System Module.

SUBTASK 28-22-00-720-012

(3) On the P7 glareshield panel, push the left MASTER CAUTION light.

NOTE: This resets the master caution lights and the system annunciator lights.

(a) Make sure that the left and right MASTER CAUTION lights are off.

(b) On the P7 glareshield panel, make sure that the FUEL annunciator light is off on the left system annunciator light.

(c) On the P5-2 Fuel System Module, make sure that the LOW PRESSURE light is off for the right center fuel boost pump.

SUBTASK 28-22-00-860-088

28-AWL-19: ALI

(4) Set the FUEL PUMPS CTR R switch to the ON position.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-19.

28-AWL-19: ALI

(a) Make sure that the LOW PRESSURE light goes on briefly then off for the right center fuel boost pump.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-19.

SUBTASK 28-22-00-720-013

(5) On the P61-8 Fuel Test Panel, do these steps:

(a) Lift the right switch guard.

(b) Push and hold the right toggle switch to the FUEL TEST AUTO SHUTOFF R position for 5 seconds and then release the toggle switch.

(c) Make sure that the LOW PRESSURE light stays off for the right center fuel boost pump.

SUBTASK 28-22-00-720-014

(6) Use a stopwatch, STD-836, for the following steps:

(a) Set the stopwatch, STD-836, to zero.

(b) Lift the right switch guard.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

28-AWL-19: ALI

(c) Push and hold the right toggle switch to the FUEL TEST AUTO SHUTOFF R position and start the stopwatch, STD-836.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-19.

1) Make sure that the left and right MASTER CAUTION lights are off.

2) Make sure that the FUEL annunciator light is off on the left system annunciator lights.

3) Make sure that the LOW PRESSURE light is off for the right center fuel boost pump.

28-AWL-19: ALI

(d) When the LOW PRESSURE light for the right center fuel boost pump comes on, stop the stopwatch, STD-836 and release the right toggle switch.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-19.

28-AWL-19: ALI

1) Make sure that the LOW PRESSURE light stays on for the right center fuel boost pump.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-19.

28-AWL-19: ALI

2) Make sure that the stopwatch, STD-836, stopped in 15 ±2 seconds.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-19.

SUBTASK 28-22-00-280-002

28-AWL-19: ALI

(7) In the main landing gear wheel well, listen and make sure that the right center fuel boost pump does not operate.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-19.

SUBTASK 28-22-00-860-089

(8) Set the FUEL PUMPS CTR R switch to the OFF position.

(a) Make sure that the LOW PRESSURE light goes off for the right center fuel boost pump.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-00-720-020

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
F	5	C03002	XFR BUS 1 SECT 2
F	6	C00815	MAIN BUS 1

SUBTASK 28-22-00-860-090

(10) Set the FUEL PUMPS CTR L and R switches to the ON position.

(a) Make sure that the LOW PRESSURE lights goes on briefly then off for the center fuel boost pumps.

SUBTASK 28-22-00-720-015

(11) Use a stopwatch, STD-836 for the following steps:

(a) Set the stopwatch, STD-836, to zero.

(b) Lift the right switch guard.

(c) Push and hold the right toggle switch to the FUEL TEST AUTO SHUTOFF R position.

1) Make sure that the LOW PRESSURE light stays off for the right center fuel boost pump.

2) Make sure that the left and right MASTER CAUTION lights stays off.

3) Make sure that the FUEL annunciator light stays off on the left system annunciator lights.

(d) When the LOW PRESSURE light comes on for the right center fuel boost pump (approximately 15 seconds), start the stopwatch, STD-836 and release the right toggle switch.

(e) When the left and right MASTER CAUTION lights and the FUEL annunciator lights come on, stop the stopwatch, STD-836.

1) Make sure that the stopwatch, STD-836 stopped in 10 ±2 seconds.

SUBTASK 28-22-00-860-091

(12) Set the FUEL PUMPS CTR L and R switches to the OFF position.

(a) Make sure that the LOW PRESSURE lights are off for the center fuel boost pump.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-00-860-169

(13) On the P61-8 Fuel Test Panel, close the guard of the test switch to the L/R AUTO SHUTOFF position.

SUBTASK 28-22-00-720-016

(14) Push the MASTER CAUTION light.

NOTE: This resets the master caution lights and the system annunciator lights.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-00-710-003

(1) For APU power, do these steps:

(a) On the P5-4 AC System, Generator and APU Module, set the right APU/APU GEN switch to the ON position.

1) Make sure that the TRANSFER BUS OFF light is off for GEN2.

2) Make sure that the TRANSFER BUS OFF light is off for GEN1.

(b) Set the BUS TRANSFER switch to the AUTO position.

1) Make sure that the TRANSFER BUS OFF light is off for GEN2.

2) Make sure that the TRANSFER BUS OFF light is off for GEN1.

(c) Set the left and right APU/APU GEN switches to the OFF position.

(d) Set the GRD PWR switch to the ON position.

(e) Shutdown the APU (TASK 49-11-00-860-802).

SUBTASK 28-22-00-710-004

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(2) For ground power, do these steps:

(a) On the P5-4 AC System, Generator and APU Module, set the GRD PWR switch to the OFF position.

(b) 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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
F	5	C03002	XFR BUS 1 SECT 2
F	6	C00815	MAIN BUS 1

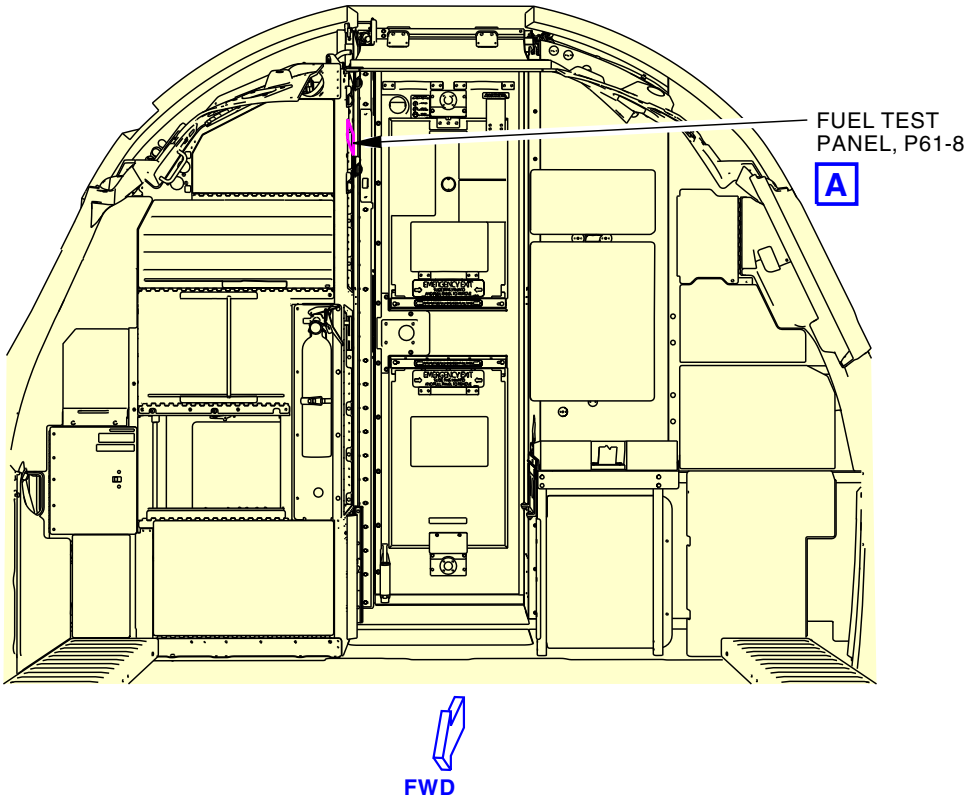
SUBTASK 28-22-00-410-012

(3) Close this access panel:

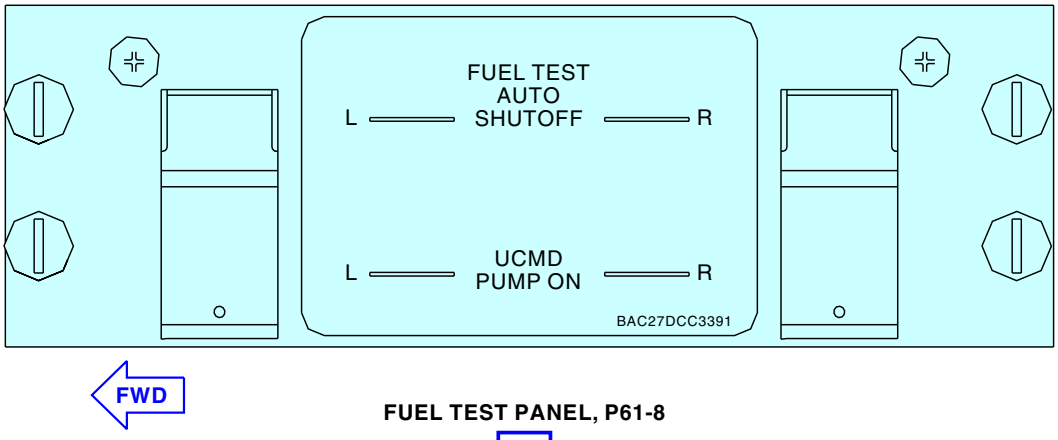
Number	Name/Location
117A	Electronic Equipment Access Door

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



FLIGHT COMPARTMENT



FUEL TEST PANEL, P61-8

A

2413581 S00061532861_V1

Fuel Test Panel, P61-8
Figure 508/28-22-00-990-808

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-00-710-802

10. Engine Fuel Suction Feed - Operational Test

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This procedure checks the suction feed for each engine. To pass, each engine needs to operate at idle power for 2 to 5 minutes without the fuel boost pumps running.

(2) This task has one or more steps which are a means to satisfy Airworthiness Limitation Instruction (ALI) requirements. An ALI note will follow the step to which it applies. Any step or sub-step that precedes or follows an ALI identified step is not subject to the ALI requirement.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
28-00-00-910-801	Airworthiness Limitation Precautions (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)
71-00-00-800-801-G00	Engine Ground Safety Precautions (P/B 201)
71-00-00-910-802-G00	Start the Engine (Selection) (P/B 201)
71-00-00-910-806-G00	Stop the Engine (Usual Engine Stop) (P/B 201)
IFIM and do the applicable procedure(s)	Interactive Fault Isolation Manual

C. Location Zones

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

D. Engine Fuel Suction Feed - Engine No. 1 Test

SUBTASK 28-22-00-210-008

28-AWL-101: ALI

(1) Make sure that the fuel quantities in the fuel tanks are as follows:

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

NOTE: Unwanted fuel can be transferred to the No. 2 main tank.

28-AWL-101: ALI

(a) No. 1 main tank – 1870 lbs (850 kg) - 2080 lbs (940 kg)

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

28-AWL-101: ALI

(b) Center tank – 0 lb (0 kg) - 3000 lbs (1360 kg)

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

(c) To refuel, defuel, or transfer fuel.

1) Do this task: Pressure Refuel Procedure, TASK 12-11-00-650-803.

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

3) Do this task: Tank to Tank Fuel Transfer, TASK 28-26-00-650-802.

SUBTASK 28-22-00-860-141

28-AWL-101: ALI

(2) On the P5-2 Fuel System Module, turn the CROSS FEED switch to the closed position.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

SUBTASK 28-22-00-860-142

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.

(3) Immediately set the applicable FUEL PUMPS switch to the OFF position if the LOW PRESSURE light comes on and stays on.

NOTE: Put a person in the flight compartment to operate the fuel boost pumps and to monitor the fuel quantity and LOW PRESSURE indicators.

SUBTASK 28-22-00-860-143

(4) On the P5-2 Fuel System Module, set the FUEL PUMPS 1 AFT and FUEL PUMPS 1 FWD switches to the ON position.

SUBTASK 28-22-00-710-007

(5) Test engine 1 fuel suction feed.

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.

(a) Obey all the safety precautions around the running engines (TASK 71-00-00-800-801-G00).

(b) Start engine 1 (TASK 71-00-00-910-802-G00).

NOTE: The APU can be used to start engine 1, when the fuel tanks have enough fuel.

(c) Set the electrical power source to the engine generators.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

28-AWL-101: ALI

(d) On the P5 Overhead Panel, set the APU master switch to the OFF position.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

28-AWL-101: ALI

(e) For a minimum of 2 minutes, run engine 1 at idle power with the applicable fuel boost pump set to the ON position.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

NOTE: It is recommended to operate the engine at idle power for 5 minutes.

(f) Make a record of the initial engine parameters (N1, N2, and fuel flow).

1) Initial Values: N1_____ N2_____ Fuel Flow_____

NOTE: Record the initial values after 2 minutes minimum (5 minutes recommended).

28-AWL-101: ALI

(g) Set these fuel boost pump switches to the OFF position:

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

28-AWL-101: ALI

1) FUEL PUMPS 1 AFT

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

28-AWL-101: ALI

2) FUEL PUMPS 1 FWD

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

28-AWL-101: ALI

(h) Make sure that engine 1 continues to operate for a minimum of 5 minutes.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

(i) Make a record of the final engine parameters (N1, N2, and fuel flow).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Final Values: N1_____ N2_____ Fuel Flow_____

NOTE: Record the final values after a minimum of 5 minutes.

28-AWL-101: ALI

(j) Make sure that the final engine parameters did not decay compared to the initial engine parameters.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

NOTE: The differences between the final and initial engine parameters are almost the same.

SUBTASK 28-22-00-860-144

(6) Set the FUEL PUMPS 1 AFT and FUEL PUMPS 1 FWD switches to the ON position.

SUBTASK 28-22-00-040-001

(7) Shutdown engine 1 (TASK 71-00-00-910-806-G00).

SUBTASK 28-22-00-810-001

(8) If the engine parameters decayed and the test failed, go to IFIM and do the applicable procedure(s).

E. Engine Fuel Suction Feed - Engine No. 2 Test

SUBTASK 28-22-00-210-009

28-AWL-101: ALI

(1) Make sure that the fuel quantities in the fuel tanks are as follows:

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

NOTE: Unwanted fuel can be transferred to the No. 1 main tank.

28-AWL-101: ALI

(a) No. 2 main tank – 1870 lbs (850 kg) - 2080 lbs (940 kg)

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

28-AWL-101: ALI

(b) Center tank – 0 lb (0 kg) - 3000 lbs (1360 kg)

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

(c) To refuel, defuel, or transfer fuel.

1) Do this task:Pressure Refuel Procedure, TASK 12-11-00-650-803.

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

3) Do this task:Tank to Tank Fuel Transfer, TASK 28-26-00-650-802.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-00-860-145

28-AWL-101: ALI

(2) On the P5-2 Fuel System Module, turn the CROSS FEED switch to the closed position.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

SUBTASK 28-22-00-860-146

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.

(3) Immediately set the applicable FUEL PUMPS switch to the OFF position if the LOW PRESSURE light comes on and stays on.

NOTE: Put a person in the flight compartment to operate the fuel boost pumps and to monitor the fuel quantity and LOW PRESSURE indicators.

SUBTASK 28-22-00-860-147

(4) On the P5-2 Fuel System Module, set the FUEL PUMPS 2 AFT and FUEL PUMPS 2 FWD switches to the ON position.

SUBTASK 28-22-00-710-008

(5) Test engine 2 fuel suction feed.

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.

(a) Obey all the safety precautions around the running engines (TASK 71-00-00-800-801-G00).

(b) Start engine 2 (TASK 71-00-00-910-802-G00).

NOTE: The APU can be used to start engine 2, when the fuel tanks have enough fuel.

(c) Set the electrical power source to the engine generators.

28-AWL-101: ALI

(d) On the P5 Overhead Panel, set the APU master switch to the OFF position.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

28-AWL-101: ALI

(e) For a minimum of 2 minutes, run engine 2 at idle power with the applicable fuel boost pump set to the ON position.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

NOTE: It is recommended to operate the engine at idle power for 5 minutes.

(f) Make a record of the initial engine parameters (N1, N2, and fuel flow).

1) Initial Values: N1_____ N2_____ Fuel Flow_____

NOTE: Record the initial values after 2 minutes minimum (5 minutes recommended).

28-AWL-101: ALI

(g) Set these fuel boost pump switches to the OFF position:

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

28-AWL-101: ALI

1) FUEL PUMPS 2 AFT

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

28-AWL-101: ALI

2) FUEL PUMPS 2 FWD

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

28-AWL-101: ALI

(h) Make sure that engine 2 continues to operate for a minimum of 5 minutes.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

(i) Make a record of the final engine parameters (N1, N2, and fuel flow).

1) Final Values: N1_____ N2_____ Fuel Flow_____

NOTE: Record the final values after a minimum of 5 minutes.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

28-AWL-101: ALI

(j) Make sure that the final engine parameters did not decay compared to the initial engine parameters.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-101.

NOTE: The differences between the final and initial engine parameters are almost the same.

SUBTASK 28-22-00-860-148

(6) Set the FUEL PUMPS 2 AFT and FUEL PUMPS 2 FWD switches to the ON position.

SUBTASK 28-22-00-040-002

(7) Shutdown engine 2 (TASK 71-00-00-910-806-G00).

SUBTASK 28-22-00-810-002

(8) If the engine parameters decayed and the test failed, go to IFIM and do the applicable procedure(s).

——— END OF TASK ———

TASK 28-22-00-720-806

11. Center Tank Fuel Boost Pump Power Failed On - Functional Test

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task has one or more steps which are a means to satisfy Airworthiness Limitation Instruction (ALI) requirements. An ALI note will follow the step to which it applies. Any step or sub-step that precedes or follows an ALI identified step is not subject to the ALI requirement.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

(2) This task tests the two secondary fuel boost pump relays, R962 and R963.

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
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.

Reference	Description
COM-1322	Multimeter (Analog / Digital with sufficient internal voltage to measure long cable distances) Part #: 117 Supplier: 89536 Part #: 260-8XPI Supplier: 55026 Part #: FLUKE 289 Supplier: 89536 Opt Part #: MODEL 8 MK7 Supplier: 00426
COM-14383	Probe - Multimeter, Insulated, Slim Reach Part #: TP38 Supplier: 3S701

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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 28-22-00-860-092

(1) Make sure that these fuel tanks contain the subsequent fuel quantity as follows:

(a) No. 1 main tank – 0 lb (0 kg) - 7000 lb (3182 kg)

(b) No. 2 main tank – 0 lb (0 kg) - 7000 lb (3182 kg)

(c) Center tank – 3000 lb (1364 kg) minimum

SUBTASK 28-22-00-650-015

(2) If necessary, refuel the fuel tanks (TASK 12-11-00-650-803).

SUBTASK 28-22-00-860-093

(3) On the P5-2 Fuel System Module, set these switches to the OFF position:

(a) FUEL PUMPS 1 AFT

(b) FUEL PUMPS 1 FWD

(c) FUEL PUMPS 2 AFT

(d) FUEL PUMPS 2 FWD

(e) FUEL PUMPS CTR L

(f) FUEL PUMPS CTR R.

SUBTASK 28-22-00-860-094

(4) 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
C	11	C01275	MASTER CAUTION ANNUNCIATOR CONT 1
D	7	C01659	AT S-O/UCPO BST PMP CTR TNK L AC
E	7	C01658	FUEL AT S-O/UCPO BST PMP CTR TNK R AC
E	11	C00313	INDICATOR MASTER DIM SECT 1
F	12	C00318	INDICATOR MASTER DIM SECT 6

SUBTASK 28-22-00-010-002

(5) Get access to the secondary fuel boost pump relays for the center tank, R962 and R963 (Figure 509).

(a) Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

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(b) To get access to relay R962, remove the floor panel at station 371 LBL 35.

(c) To get access to relay R963, remove the floor panel at station 361 RBL 36.

SUBTASK 28-22-00-860-174

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(6) Make sure that these circuit breakers are closed:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT
F	5	C03002	XFR BUS 1 SECT 2

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

G. Left Center Tank - Secondary Fuel Boost Pump Relay Test

WARNING

MAKE SURE THAT YOU ARE CAREFUL WHEN YOU MEASURE VOLTAGE. ELECTRICAL POWER CAN CAUSE INJURIES.

SUBTASK 28-22-00-860-095

(1) On the P5-4 AC System, Generator and Auxiliary Power Unit (APU) Module, set the GRD PWR switch to the ON position.

SUBTASK 28-22-00-860-096

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(WARNING PRECEDES)

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(2) Make sure that this circuit breaker is closed:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
F	5	C03002	XFR BUS 1 SECT 2

SUBTASK 28-22-00-860-097

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
F	5	C03012	XFR BUS 2 SECT 2
F	6	C00817	MAIN BUS 2

SUBTASK 28-22-00-860-098

(4) On the P5-2 Fuel System Module, set the FUEL PUMPS CTR L switch to the ON position.

(a) Make sure that the LOW PRESSURE indication light for the left center fuel boost pump comes on and then goes off.

SUBTASK 28-22-00-760-003

(5) Measure the secondary fuel boost pump relay, R962 (referred to as the secondary relay R962), AC voltage between terminals A1, A2, B1, B2, C1, C2 and case ground.

(a) Use multimeter, COM-1322 equipped with Insulated Probes, COM-14383.

(b) Make sure that the voltage is between 105-125 VAC.

SUBTASK 28-22-00-860-099

(6) Set the FUEL PUMPS CTR L switch to the OFF position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-00-760-004

(7) Measure the secondary relay R962 AC voltage between terminals A1, A2, B1, B2, C1, C2 and case ground.

NOTE: To read the lowest AC voltage, set the multimeter, COM-1322 to the lowest AC voltage range and have it read the full scale range. Use the Lo-Z setting, which reduces the voltage from AC coupling by loading down the open circuit.

(a) Use multimeter, COM-1322 equipped with Insulated Probes, COM-14383 to minimize AC voltage noise pickup.

(b) Make sure that the voltage is less than 10 VAC.

SUBTASK 28-22-00-760-005

(8) Measure the secondary relay R962 AC voltage between terminals X1, X2, and case ground.

NOTE: Do not use the Lo-Z function to measure the voltage. The Lo-Z low input impedance can put a load on the open relay coil, giving an erroneous reading or energize the relay.

(a) Use multimeter, COM-1322 equipped with Insulated Probes, COM-14383.

(b) Make sure that the voltage is between 105-125 VAC.

SUBTASK 28-22-00-860-100

28-AWL-23: ALI

(9) Set the FUEL PUMPS CTR L switch to the ON position.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

28-AWL-23: ALI

(a) Make sure that the LOW PRESSURE indication light for the left center fuel boost pump comes on and then goes off.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

SUBTASK 28-22-00-860-160

28-AWL-23: ALI

(10) Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
D	7	C01659	AT S-O/UCPO BST PMP CTR TNK L AC

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-00-760-006

28-AWL-23: ALI

(11) Measure the secondary relay R962 AC voltage between terminals A2, B2, C2 and case ground.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

(a) Use multimeter, COM-1322 equipped with Insulated Probes, COM-14383.

28-AWL-23: ALI

(b) Make sure that the voltage is between 107-120 VAC.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

SUBTASK 28-22-00-760-007

28-AWL-23: ALI

(12) Measure the secondary relay R962 AC voltage between terminals A1, B1, C1 and case ground.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

NOTE: To read the lowest AC voltage, set the multimeter, COM-1322 to the lowest AC voltage range and have it read the full scale range. Use the Lo-Z setting, which reduces the voltage from AC coupling by loading down the open circuit.

(a) Use multimeter, COM-1322 equipped with Insulated Probes, COM-14383.

28-AWL-23: ALI

(b) Make sure that the voltage is 10 VAC or less.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

SUBTASK 28-22-00-760-008

(13) Measure the secondary relay R962 AC voltage between terminals X1, X2 and case ground.

NOTE: To read the lowest AC voltage, set the multimeter, COM-1322 to the lowest AC voltage range and have it read the full scale range. Use the Lo-Z setting, which reduces the voltage from AC coupling by loading down the open circuit.

(a) Use multimeter, COM-1322 equipped with Insulated Probes, COM-14383.

(b) Make sure that the voltage is 10 VAC or less.

SUBTASK 28-22-00-860-102

(14) Set the FUEL PUMPS CTR L switch to the OFF position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-00-860-103

(15) Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
D	7	C01659	AT S-O/UCPO BST PMP CTR TNK L AC

SUBTASK 28-22-00-860-104

28-AWL-23: ALI

(16) Set the FUEL PUMPS CTR L switch to the ON position.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

28-AWL-23: ALI

(a) Make sure that the LOW PRESSURE indication light for the left center fuel boost pump comes on and then goes off.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

SUBTASK 28-22-00-760-009

(17) Measure the secondary relay R962 AC voltage between terminals X1, X2 and case ground.

(a) Use multimeter, COM-1322 equipped with Insulated Probes, COM-14383.

(b) Make sure that terminal X1 voltage is between 105-125 VAC.

(c) Make sure that terminal X2 voltage is less than 10 VAC.

SUBTASK 28-22-00-710-005

28-AWL-23: ALI

(18) On the P61-8 Fuel Test Panel, push and hold the L FUEL TEST AUTO SHUTOFF switch.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

SUBTASK 28-22-00-710-006

28-AWL-23: ALI

(19) Release the L FUEL TEST AUTO SHUTOFF switch when the LOW PRESSURE indication light for the left center fuel boost pump comes on.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

NOTE: The LOW PRESSURE light comes on after approximately 15 seconds.

SUBTASK 28-22-00-760-010

(20) Measure the secondary relay R962 AC voltage between terminals A1, B1, C1 and case ground.

NOTE: To read the lowest AC voltage, set the multimeter, COM-1322 to the lowest AC voltage range and have it read the full scale range. Use the Lo-Z setting, which reduces the voltage from AC coupling by loading down the open circuit.

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(a) Use multimeter, COM-1322 equipped with Insulated Probes, COM-14383.

(b) Make sure that the voltage is 10 VAC or less.

SUBTASK 28-22-00-760-011

28-AWL-23: ALI

(21) Measure the secondary relay R962 AC voltage between terminals A2, B2, C2 and case ground.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

NOTE: To read the lowest AC voltage, set the multimeter, COM-1322 to the lowest AC voltage range and have it read the full scale range. Use the Lo-Z setting, which reduces the voltage from AC coupling by loading down the open circuit.

(a) Use multimeter, COM-1322 equipped with Insulated Probes, COM-14383.

28-AWL-23: ALI

(b) Make sure that the voltage is 10 VAC or less.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

SUBTASK 28-22-00-760-012

28-AWL-23: ALI

(22) Measure the secondary relay R962 AC voltage between terminals X1, X2 and case ground.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

NOTE: Do not use the Lo-Z function to measure the voltage. The Lo-Z low input impedance can put a load on the open relay coil, giving an erroneous reading or energize the relay.

(a) Use multimeter, COM-1322 equipped with Insulated Probes, COM-14383.

28-AWL-23: ALI

(b) Make sure that the voltage is between 107-120 VAC.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

SUBTASK 28-22-00-860-105

(23) Set the FUEL PUMPS CTR L switch to the OFF position.

SUBTASK 28-22-00-860-106

(24) Set the FUEL PUMPS CTR L switch to the ON position.

(a) Make sure that the LOW PRESSURE indication light for the left center fuel boost pump comes on and then goes off.

SUBTASK 28-22-00-860-107

(25) Set the FUEL PUMPS CTR L switch to the OFF position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-00-860-108

(26) Set the GRD PWR switch to the OFF position.

SUBTASK 28-22-00-860-109

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(27) 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

H. Right Center Tank - Secondary Fuel Boost Pump Relay Test

SUBTASK 28-22-00-860-110

WARNING

MAKE SURE THAT YOU ARE CAREFUL WHEN YOU MEASURE VOLTAGE. ELECTRICAL POWER CAN CAUSE INJURIES.

(1) On the P5-4 AC System, Generator and APU Module, set the GRD PWR switch to the ON position.

SUBTASK 28-22-00-860-111

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(WARNING PRECEDES)

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(2) Make sure that these circuit breakers are closed:

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
F	5	C03012	XFR BUS 2 SECT 2
F	6	C00817	MAIN BUS 2

SUBTASK 28-22-00-860-112

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(3) Open this circuit breaker and install safety tag:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
F	5	C03002	XFR BUS 1 SECT 2

SUBTASK 28-22-00-860-113

(4) On the P5-2 Fuel System Module, set the FUEL PUMPS CTR R switch to the ON position.

(a) Make sure that the LOW PRESSURE indication light for the right center fuel boost pump comes on and then goes off.

SUBTASK 28-22-00-760-013

(5) Measure the secondary fuel boost pump relay, R963 (referred to as the secondary relay R963), AC voltage between terminals A1, A2, B1, B2, C1, C2 and case ground.

(a) Use multimeter, COM-1322 equipped with Insulated Probes, COM-14383.

(b) Make sure that the voltage is between 105 - 125 VAC.

SUBTASK 28-22-00-860-114

(6) Set the FUEL PUMPS CTR R switch to the OFF position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-00-760-014

(7) Measure the secondary relay R963 AC voltage between terminals A1, A2, B1, B2, C1, C2 and case ground.

NOTE: To read the lowest AC voltage, set the multimeter, COM-1322 to the lowest AC voltage range and have it read the full scale range. Use the Lo-Z setting, which reduces the voltage from AC coupling by loading down the open circuit.

(a) Use multimeter, COM-1322 equipped with Insulated Probes, COM-14383 to minimize AC voltage noise pickup.

(b) Make sure that the voltage is less than 10 VAC.

SUBTASK 28-22-00-760-015

(8) Measure the secondary relay R963 AC voltage between terminals X1, X2 and case ground.

NOTE: Do not use the Lo-Z function to measure the voltage. The Lo-Z low input impedance can put a load on the open relay coil, giving an erroneous reading or energize the relay.

(a) Use multimeter, COM-1322 equipped with Insulated Probes, COM-14383.

(b) Make sure that the voltage is between 105-125 VAC.

SUBTASK 28-22-00-860-115

28-AWL-23: ALI

(9) Set the FUEL PUMPS CTR R switch to the ON position.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

28-AWL-23: ALI

(a) Make sure that the LOW PRESSURE indication light for the right center fuel boost pump comes on and then goes off.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

SUBTASK 28-22-00-860-116

28-AWL-23: ALI

(10) Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
E	7	C01658	FUEL AT S-O/UCPO BST PMP CTR TNK R AC

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-00-760-016

28-AWL-23: ALI

(11) Measure the secondary relay R963 AC voltage between terminals A2, B2, C2 and case ground.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

(a) Use a multimeter, COM-1322 equipped with Insulated Probes, COM-14383.

28-AWL-23: ALI

(b) Make sure that the voltage is between 107-120 VAC.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

SUBTASK 28-22-00-760-017

28-AWL-23: ALI

(12) Measure the secondary relay R963 AC voltage between terminals A1, B1, C1 and case ground.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

NOTE: To read the lowest AC voltage, set the multimeter, COM-1322 to the lowest AC voltage range and have it read the full scale range. Use the Lo-Z setting, which reduces the voltage from AC coupling by loading down the open circuit.

(a) Use a multimeter, COM-1322 equipped with Insulated Probes, COM-14383.

28-AWL-23: ALI

(b) Make sure that the voltage is 10 VAC or less.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

SUBTASK 28-22-00-760-018

(13) Measure the secondary relay R963 AC voltage between terminals X1, X2 and case ground.

NOTE: To read the lowest AC voltage, set the multimeter, COM-1322 to the lowest AC voltage range and have it read the full scale range. Use the Lo-Z setting, which reduces the voltage from AC coupling by loading down the open circuit.

(a) Use a multimeter, COM-1322 equipped with Insulated Probes, COM-14383.

(b) Make sure that the voltage is 10 VAC or less.

SUBTASK 28-22-00-860-117

(14) Set the FUEL PUMPS CTR R switch to the OFF position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-00-860-118

(15) Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
E	7	C01658	FUEL AT S-O/UCPO BST PMP CTR TNK R AC

SUBTASK 28-22-00-860-119

28-AWL-23: ALI

(16) Set the FUEL PUMPS CTR R switch to the ON position.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

28-AWL-23: ALI

(a) Make sure that the LOW PRESSURE indication light for the right center fuel boost pump comes on and then goes off.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

SUBTASK 28-22-00-760-019

(17) Measure the secondary relay R963 AC voltage between terminals X1, X2 and case ground.

(a) Use multimeter, COM-1322 equipped with Insulated Probes, COM-14383.

(b) Make sure that the terminal X1 voltage is between 105-125 VAC.

(c) Make sure that the terminal X2 voltage is less than 10 VAC.

SUBTASK 28-22-00-720-017

28-AWL-23: ALI

(18) On the P61-8 Fuel Test Panel, push and hold the FUEL TEST AUTO SHUTOFF R switch.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

SUBTASK 28-22-00-720-018

28-AWL-23: ALI

(19) Release the FUEL TEST AUTO SHUTOFF R test switch when the LOW PRESSURE indication light for the right center fuel boost pump comes on.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

NOTE: The LOW PRESSURE light comes on after approximately 15 seconds.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-00-760-020

28-AWL-23: ALI

(20) Measure the secondary relay R963 AC voltage between terminals A2, B2, C2 and case ground.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

NOTE: To read the lowest AC voltage, set the multimeter, COM-1322 to the lowest AC voltage range and have it read the full scale range. Use the Lo-Z setting, which reduces the voltage from AC coupling by loading down the open circuit.

(a) Use multimeter, COM-1322 equipped with Insulated Probes, COM-14383.

28-AWL-23: ALI

(b) Make sure that the voltage is 10 VAC or less.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

SUBTASK 28-22-00-760-021

(21) Measure the secondary relay R963 AC voltage between terminals A1, B1, C1 and case ground.

NOTE: To read the lowest AC voltage, set the multimeter, COM-1322 to the lowest AC voltage range and have it read the full scale range. Use the Lo-Z setting, which reduces the voltage from AC coupling by loading down the open circuit.

(a) Use multimeter, COM-1322 equipped with Insulated Probes, COM-14383.

(b) Make sure that the voltage is 10 VAC or less.

SUBTASK 28-22-00-760-022

28-AWL-23: ALI

(22) Measure the secondary relay R963 AC voltage between terminals X1, X2 and case ground.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

NOTE: Do not use the Lo-Z function to measure the voltage. The Lo-Z low input impedance can put a load on the open relay coil, giving an erroneous reading or energize the relay.

(a) Use multimeter, COM-1322 equipped with Insulated Probes, COM-14383.

28-AWL-23: ALI

(b) Make sure that the voltage is between 107-120 VAC.

NOTE: ALI - Refer to the task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801, for important Information on ALIs.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-23.

SUBTASK 28-22-00-860-120

(23) Set the FUEL PUMPS CTR R switch to the OFF position.

SUBTASK 28-22-00-860-121

(24) Set the FUEL PUMPS CTR R switch to the ON position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Make sure that the LOW PRESSURE indication light for the right center fuel boost pump comes on and then goes off.

SUBTASK 28-22-00-860-122

(25) Set the FUEL PUMPS CTR R switch to the OFF position.

SUBTASK 28-22-00-860-123

(26) Set the GRD PWR switch to the OFF position.

SUBTASK 28-22-00-860-124

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(27) Remove the safety tag and close this circuit breaker:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
F	5	C03002	XFR BUS 1 SECT 2

I. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-00-410-004

(1) Install the applicable floor panel at station 371 LBL 35 and station 361 RBL 36.

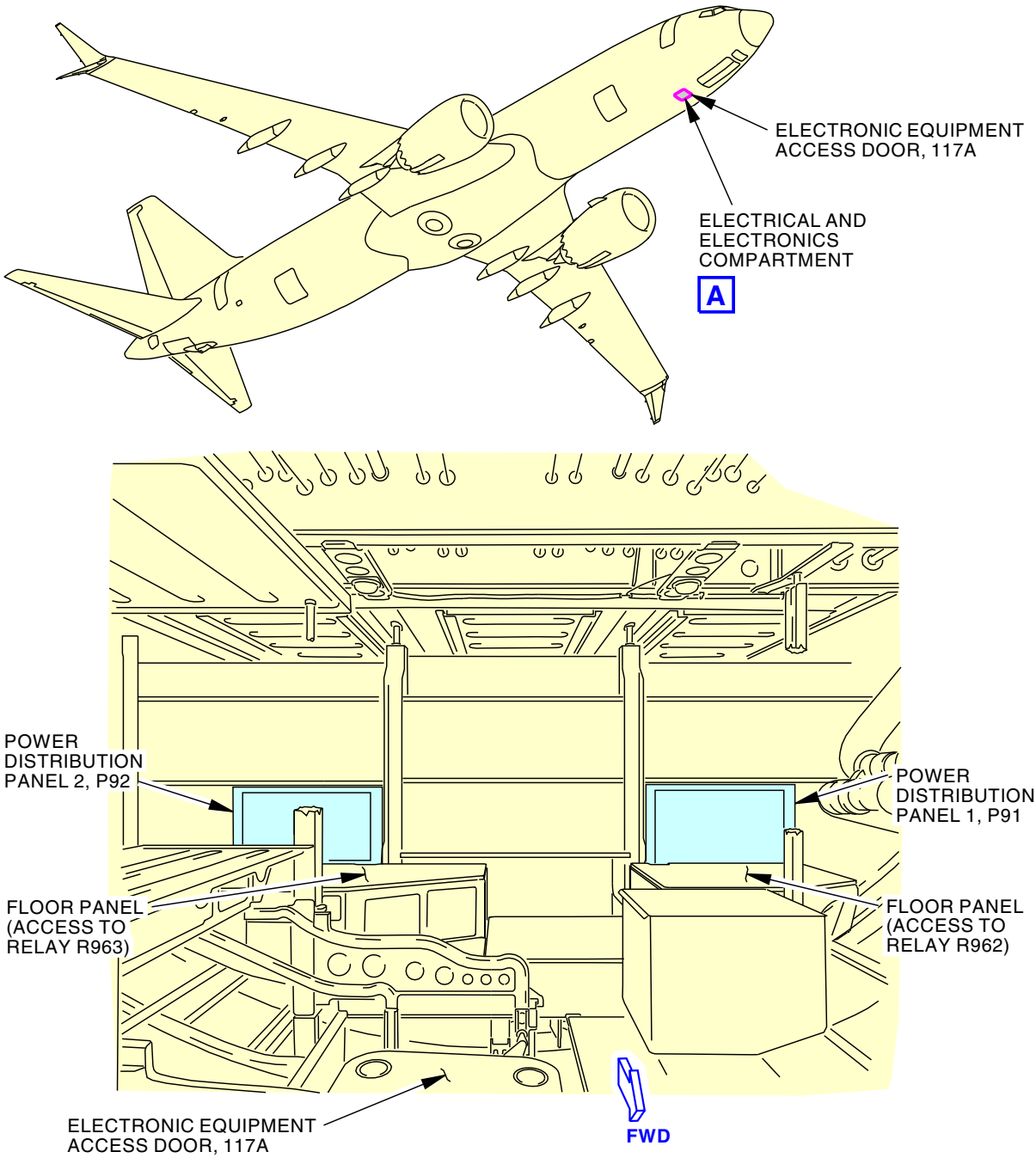
SUBTASK 28-22-00-410-005

(2) Close this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Center Tank Fuel Boost Pump Power Failed On - Functional Test
Figure 509/28-22-00-990-809

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-00-710-803

12. Pump Reversal - Operational Test

A. General

(1) Do this task after a secondary fuel boost pump relay (R962 or R963) has been removed or replaced.

B. References

Reference	Title
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)
WDM 28-23-11	FUEL BOOST PUMPS

C. Location Zones

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

D. Pump Reversal Operational Test - Left Center Fuel Boost Pump Test

SUBTASK 28-22-00-970-004

(1) Record the initial fuel quantity in the center tank.

SUBTASK 28-22-00-650-011

(2) Prepare to transfer fuel from the center tank to the No. 1 main tank (TASK 28-26-00-650-802).

SUBTASK 28-22-00-860-149

(3) On the P5-2 Fuel System Module, set the FUEL PUMPS CTR L switch to the ON position.

(a) Operate the left center fuel boost pump for 2 minutes.

SUBTASK 28-22-00-860-150

(4) After 2 minutes, set the FUEL PUMPS CTR L switch to the OFF position.

SUBTASK 28-22-00-970-005

(5) Record the final fuel quantity in the center tank.

SUBTASK 28-22-00-970-009

(6) Calculate the fuel quantity that transferred from the center tank to the No. 1 main tank.

(a) Subtract the initial fuel quantity from the final fuel quantity.

(b) Make sure that the calculated difference is more than 400 lb (181 kg).

(c) If the calculated difference is less than 400 lb (181 kg), make sure that the wiring to relay R962 is connected (WDM 28-23-11).

E. Pump Reversal Operational Test - Right Center Fuel Boost Pump Test

SUBTASK 28-22-00-970-006

(1) Record the initial fuel quantity in the center tank.

SUBTASK 28-22-00-650-013

(2) Prepare to transfer fuel from the center tank to the No. 2 main tank (TASK 28-26-00-650-802).

SUBTASK 28-22-00-860-151

(3) On the P5-2 Fuel System Module, set the FUEL PUMPS CTR R switch to the ON position.

(a) Operate the left center fuel boost pump for 2 minutes.

SUBTASK 28-22-00-860-152

(4) After 2 minutes, set the FUEL PUMPS CTR R switch to the OFF position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-00-970-007

(5) Record the final fuel quantity in the center tank.

SUBTASK 28-22-00-970-008

(6) Calculate the fuel quantity that transferred from the center tank to the No. 2 main tank.

(a) Subtract the initial fuel quantity from the final fuel quantity.

(b) Make sure that the calculated difference is more than 400 lb (181 kg).

(c) If the calculated difference is less than 400 lb (181 kg), make sure that the wiring to relay R963 is connected (WDM 28-23-11).

——— END OF TASK ———

TASK 28-22-00-760-803

13. Fuel Boost Pump - Insulation Resistance Test

A. General

(1) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-18.

(2) This task does an insulation resistance test of the fuel boost pump(s).

(3) If this task is done because a circuit breaker or GFI has opened for a fuel boost pump, you must complete and pass this test before you reset the circuit breaker or GFI.

(4) 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 P/B 301	FUEL - SERVICING
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)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-22-41 P/B 401	FUEL BOOST PUMP - REMOVAL/INSTALLATION
28-22-41-000-801	Fuel Boost Pump Motor-Impeller Removal (P/B 401)
28-22-41-400-801	Fuel Boost Pump Motor-Impeller Installation (P/B 401)
28-22-41-710-801	Fuel Boost Pump - Operational Test (P/B 501)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)
SWPM 20-60-01	Cleaning of Electrical Connectors

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659
COM-10724	Megohmmeter (10-50 VDC, 50-100 VDC, 100-500 VDC, 500-1090 VDC, 50 k Ohms - 200 T Ohms, +/-3% Basic Accuracy) Part #: 1864-9700 Supplier: 62015

D. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
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

E. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door

F. Prepare for the Insulation Resistance Test

SUBTASK 28-22-00-860-153

(1) Do these steps if they were not done before:

WARNING

MAKE SURE THAT PERSONNEL AND EQUIPMENT STAY AWAY FROM THE LEADING EDGE 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) For the forward fuel boost pumps, do this task: Leading Edge Flaps and Slats Extension, TASK 27-81-00-860-803.

WARNING

MAKE SURE TO INSTALL THE LEADING EDGE FLAP AND SLAT ACTUATORS LOCKOUT SET TO PREVENT ACCIDENTAL OPERATION OF THE LEADING EDGE FLAPS AND SLATS. THE LEADING EDGE FLAPS AND SLATS CAN MOVE QUICKLY. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(b) For the forward fuel boost pumps, do this task: Leading Edge Flap and Slat Locks Installation, TASK 27-81-00-480-801.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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.

(c) For the center tank fuel boost pumps, make sure the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-22-00-010-008

(2) Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-22-00-860-154

WARNING WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(3) Make sure the circuit breaker(s) for the applicable pump(s) are open and install safety tag(s):

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-22-00-650-014

(4) Refuel the center or the No. 1 or No. 2 fuel tank, as applicable (PAGEBLOCK 12-11-00/301).

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.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(c) For the center tank fuel boost pumps, refuel the center fuel tank to 14,000 lb (6350 kg) minimum.

G. Fuel Boost Pump Wire Terminal Assembly Inspection

NOTE: It is necessary to do these procedures at the applicable fuel boost pump: Fuel Boost Pump Wire Terminal Assembly Inspection, Fuel Boost Pump Continuity Check, Initial Insulation Resistance Test, and the Final Insulation Resistance Test.

SUBTASK 28-22-00-010-006

(1) Go to the applicable fuel boost pump location (TASK 28-22-41-000-801).

NOTE: Do the applicable steps in the task to get access to the fuel boost pump.

SUBTASK 28-22-00-210-010

(2) Do a visual inspection of the wire terminal assembly.

NOTE: Also do these visual inspections at the airplane side of the wire terminal assembly and repair as necessary.

(a) Look for these conditions:

1) Indication that fuel has leaked from the wire terminal assembly.

2) Indication that the terminal assembly or wire insulation is discolored because of too much heat.

a) Clean the wire bundle caps (SWPM 20-60-01).

3) Indication of damage to the wire terminal assembly, for example:

a) bulges

b) bent flanges

c) broken screws

d) medium to heavy corrosion damage

SUBTASK 28-22-00-760-040

(3) If the visual check shows the fuel boost pump is okay, do this procedure: Fuel Boost Pump Continuity Check.

SUBTASK 28-22-00-760-041

(4) If the visual check shows that the fuel boost pump is not okay, do these steps:

(a) Replace the motor impeller for applicable fuel boost pump (PAGEBLOCK 28-22-41/401).

(b) Do the continuity/resistance checks for the replacement fuel boost pump.

1) Start with this procedure: Fuel Boost Pump Continuity Check.

H. Fuel Boost Pump Continuity Check

SUBTASK 28-22-00-020-003

(1) Disconnect the electrical connector from the motor impeller of the fuel boost pump.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-00-760-042

WARNING MAKE SURE THAT THE METER USED TO MEASURE BONDING JUMPER CONTINUITY IS RESISTANT TO EXPLOSION. IF NOT, IT IS POSSIBLE THAT AN EXPLOSION OR FIRE CAN OCCUR.

(2) Use an intrinsically safe approved bonding meter, COM-1550, to measure the resistance between pin 4 of the electrical connector and the bonding jumper on the fuel boost pump.

NOTE: The measurement between pin 4 and the bonding jumper is a continuity check, not a bonding resistance check.

SUBTASK 28-22-00-760-043

(3) If the resistance is more than 5 ohms, do these steps:

(a) Replace the applicable motor impeller (PAGEBLOCK 28-22-41/401).

(b) Do the continuity/resistance checks for the replacement fuel boost pump.

1) Start with this procedure: Fuel Boost Pump Continuity Check.

I **I. Initial Insulation Resistance Test**

SUBTASK 28-22-00-480-005

(1) Use the instructions given with the megohmmeter, COM-10724, to calibrate the equipment.

28-AWL-18: CDCCL

(a) Make sure the megohmmeter, COM-10724, has 10 VDC and 500 VDC voltage supply options with a maximum short circuit current of 5 milliamperes.

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-18.

SUBTASK 28-22-00-760-048

(2) RESISTANCE TEST WITH THE FUEL BOOST PUMP REMOVED FROM THE AIRPLANE;

Do these steps to do a test of the insulation resistance:

(a) Remove the motor impeller (TASK 28-22-41-000-801).

(b) Do this procedure on the removed pumps, within two hours: Final Insulation Resistance Test.

SUBTASK 28-22-00-760-047

(3) RESISTANCE TEST WITH THE FUEL BOOST PUMP INSTALLED ON THE AIRPLANE;

Do these steps to do a test of the insulation resistance (initial test):

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 fuel boost pump with low insulation resistance. The results of the 10 VDC test will tell you if it is safe to the 500 VDC test with the fuel boost pump installed.

(a) Disconnect the electrical connector from the motor impeller.

(b) Do these steps to connect the megohmmeter, COM-10724, for the 10 VDC test:

NOTE: Keep the leads that connect to the pump connector pins as short as possible (3 ft (1 m) or less) to prevent problems with the resistance measurements.

1) Connect the megohmmeter, COM-10724, into a grounded receptacle.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

a) Make sure the ground strap is connected from the grounded receptacle to the + UNKNOWN terminal.

NOTE: This makes sure the megohmmeter, COM-10724, is grounded.

2) Connect the + UNKNOWN probe to the pump connector pin ground (pin 4).

3) Connect the - UNKNOWN probe to the pump connector pin 1.

4) Set the multiplier dial to the lowest range (100K).

28-AWL-18: CDCCL

5) Set the TEST VOLTAGE switches to 10V.

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-18.

6) Set the measure switch to the MEASURE position.

(c) Do these steps to measure the resistance at the fuel boost 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.

28-AWL-18: CDCCL

2) Measure the resistance between the case ground (pin 4) and the pump 3 phase power circuit pin (pin 1) on the pump electrical connector.

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-18.

NOTE: If the fuel boost pump resistance is very high, the megohmmeter, COM-10724, 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.

3) Make a record of the resistance measured between pin 4 and pin 1.

4) Set the function switch to the DISCHARGE position.

28-AWL-18: CDCCL

5) Do these steps again to measure the resistance between the case ground (pin 4) and the remaining 3 phase power circuit pins on the pump connector (pin 2 and pin 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-18.

(d) Do an analysis of the test results:

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28-AWL-18: CDCCL

1) If each resistance measured between the case ground (pin 4) and the 3 phase power circuit pins on the pump connector (pins 1, 2 and 3) is 1 megohm or more, do this procedure: Final Insulation Resistance Check.

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-18.

2) If any resistance measured between pin 4 and pins 1, 2, and 3 is less than 1 megohm, do these steps:

a) Replace the motor impeller (PAGEBLOCK 28-22-41/401).

b) Do the continuity/resistance checks again for the replacement fuel boost pump.

<1> Start with this procedure: Fuel Boost Pump Continuity Check.

J. Final Insulation Resistance Test

SUBTASK 28-22-00-760-046

(1) Do these steps to connect the megohmmeter, COM-10724, for the 500 VDC check:

NOTE: Keep the leads that connect to the pump connector pins as short as possible (3 ft (1 m) or less) to prevent problems with the resistance measurements.

NOTE: The megohmmeter, COM-10724, must have a 500 VDC voltage supply option.

(a) Calibrate the megohmmeter, COM-10724, if it is necessary.

1) Connect the megohmmeter, COM-10724, 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, COM-10724, is grounded.

2) Connect the + UNKNOWN probe to the pump connector pin ground (pin 4).

3) Connect the - UNKNOWN probe to the pump connector pin 1.

4) Set the multiplier dial to the lowest range (1M).

28-AWL-18: CDCCL

5) Set the TEST VOLTAGE switches to 500V.

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-18.

6) Set the measure switch to the MEASURE position.

SUBTASK 28-22-00-760-045

(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 multiplier switch setting.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

28-AWL-18: CDCCL

(b) Measure the resistance between the case ground (pin 4) and the 3 phase power circuit pin (pin1) on the pump electrical connector.

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-18.

NOTE: If the pump resistance is very high, the megohmmeter, COM-10724, 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.

(c) Make a record of the resistance measured between pin 4 and pin 1.

(d) Set the function switch to the DISCHARGE position.

28-AWL-18: CDCCL

(e) Do these steps again to measure the resistance between the case ground (pin 4) and the remaining 3 phase power circuit pins on the pump connector (pin 2 and pin 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-18.

SUBTASK 28-22-00-760-044

(3) Do an analysis of the test results:

28-AWL-18: CDCCL

(a) Make sure each resistance measured between the case ground (pin 4) and the 3 phase power circuit pins on the pump connector (pins 1, 2, and 3) is 5 megohms or more.

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-18.

1) If the insulation resistance test is satisfactory, do these steps:

a) If the motor impeller was removed for the test, re-install the motor impeller (TASK 28-22-41-400-801).

b) If the motor impeller was not removed for the test, connect the electrical connector for the motor impeller and do an operational test (TASK 28-22-41-710-801).

(b) If any resistance measured between pin 4 and pins 1, 2, and 3 is less than 5 megohms, do these steps:

1) Replace the motor impeller (PAGEBLOCK 28-22-41/401).

2) Do the continuity/resistance checks again for the replacement pump.

a) Start with this procedure: Fuel Boost Pump Continuity Check.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

K. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-00-860-155

WARNING REMOVE THE LOCK FROM LEADING EDGE FLAP ACTUATOR CAREFULLY TO PREVENT ACCIDENTAL OPERATION OF THE LEADING EDGE FLAPS. THE LEADING EDGE FLAPS CAN MOVE QUICKLY. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(1) For the forward fuel boost pumps, do this task: Leading Edge Flap and Slat Locks Removal, TASK 27-81-00-080-801.

SUBTASK 28-22-00-860-156

WARNING MAKE SURE THAT PERSONNEL AND EQUIPMENT STAY AWAY FROM THE LEADING EDGE 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) For the forward fuel boost pumps, do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 28-22-00-860-158

WARNING WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(3) Remove the safety tags(s) and close the circuit breaker(s) for the applicable pump(s):

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-00-410-011

(4) Close this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

ENGINE FUEL SPAR VALVE - SERVICING

1. General

A. This procedure has this task:

(1) Engine Fuel Spar Valve Electrical Faying Surface Bonds Repair.

TASK 28-22-11-300-801

2. Engine Fuel Spar Valve Electrical Faying Surface Bonds Repair

A. General

(1) This task contains these procedures:

(a) Faying Surface Bond - Actuator to Index Plate Repair

(b) Faying Surface Bond - Index Plate to Adapter Plate Repair

(c) Faying Surface Bond - Adapter Plate to Front Spar Repair

(d) Bonding Jumper Bond Repair.

(2) The spar valve faying surface buildup has more than one faying surface bond. The procedures in the tasks that follow will check each faying surface bond and isolate the defective faying surface bond.

(3) The motor-operated valve has two electrical bonding paths:

(a) From the upper housing on the actuator through the bonding jumper to the stiffener.

(b) From the upper housing on 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.

1) The actuator is divided in two sections, the upper and lower housing. The two housing sections are separated by an electrical faying surface that cannot be repaired. When measuring the electrical bonding, measure from the upper housing section on the actuator.

(4) When the electrical bonding resistance is more than the maximum resistance: disassemble the components, repair the faying surface bond, assemble the components, and measure the electrical bonding resistance. Continue to repair the faying surface bonds until the electrical bonding resistance is less than the maximum allowed resistance value.

B. References

Reference	Title
28-22-11-000-801	Engine Fuel Spar Valve Actuator Removal (P/B 401)
28-22-11-000-802	Engine Fuel Spar Valve - Valve Adapter Removal (P/B 401)
28-22-11-400-801	Engine Fuel Spar Valve Actuator Installation (P/B 401)
28-22-11-400-802	Engine Fuel Spar Valve - Valve Adapter Installation (P/B 401)
28-22-11-820-801	Engine Fuel Spar Valve Alignment (P/B 401)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES
SWPM 20-20-10	Replacement of Ground Studs and Bonding Jumper Installation
SWPM 20-20-10 Paragraph 4.C	Category 1 Unsealed and Category 6 Fillet Sealed Pre-Installed Ground Stud Assembly

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.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Reference	Description
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659
STD-4406	Brush - Bristle, Soft, Natural

D. Consumable Materials

Reference	Description	Specification
A50337	Sealant - Fuel Tank	BMS5-45 Class B
B00148	Solvent - Methyl Ethyl Ketone (MEK)	ASTM D740
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G50398	Pad - Adbrasive, Scotch-Brite Type S, Abrasive Pad	
G50492	Pad - 3M Scotch Brite 7448 Ultra Fine Pad	MIL-A-9962A Type III Grade AAA
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

E. Location Zones

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

F. Faying Surface Bond - Actuator to Index Plate Repair

NOTE: This procedure repairs the faying surface bond between the upper housing on the actuator and the front spar. When the initial measured electrical bonding resistance is more than 0.004 ohm (4.0 milliohms), repair the faying surface bond. This is done with the bonding jumper and 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 28-22-11-010-001

(1) Remove the actuator (TASK 28-22-11-000-801).

SUBTASK 28-22-11-760-001

(2) Check the bonding path from the index plate to structure:

NOTE: This isolates the problem with the faying surface bond.

(a) Remove the sealant from one contact surface on the index plate.

(b) Use Cleaning Procedure 1 to manually clean the contact surface on the index plate fay surface.

1) Prepare the index plate fay surface at the mount hole.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

2) Use a very fine Scotch-Brite Type S pad, G50398 or an ultra-fine Scotch-Brite 7448 pad, G50492.

3) Move the pad in a circular movement while you press with your thumb.

(c) Measure the electrical bonding resistance between the contact surface on the index plate (bare metal surface) and the front spar (SWPM 20-20-00).

1) Make sure that the electrical bonding resistance is 0.00050 ohm (0.50 milliohms) or less.

(d) If the bonding resistance is not satisfactory, do this procedure: Faying Surface Bond - Index Plate to Adapter Plate Repair.

SUBTASK 28-22-11-410-001

(3) Install the actuator (TASK 28-22-11-400-801).

NOTE: This task repairs the faying surface bond.

SUBTASK 28-22-11-760-002

(4) During installation, measure the electrical bonding resistance between the upper housing of the actuator and the front spar with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00, SWPM 20-20-10).

(a) Disconnect the electrical connector and bonding jumper from the actuator.

(b) Make sure that the bonding resistance is 0.0030 ohm (3.0 milliohms) or less.

NOTE: Make sure that the bonding jumper does not touch the actuator while measuring the bonding resistance.

(c) If the bonding resistance is not satisfactory, do the steps in the procedure until the resistance is satisfactory.

G. Faying Surface Bond - Index Plate to Adapter Plate Repair

NOTE: This procedure repairs the faying surface bond between the index plate and the adapter plate. When the initial measured electrical bonding resistance is more than 0.002 ohm (2.0 milliohms), repair the faying surface bond. The bonding measurement is done with the actuator removed.

SUBTASK 28-22-11-010-002

(1) Remove the index plate (TASK 28-22-11-400-802).

SUBTASK 28-22-11-760-003

(2) Check the bonding path from the adapter plate to the front spar:

NOTE: This isolates the problem with the faying surface bond.

(a) Remove the sealant from one serrated contact surface on the valve adapter assembly.

(b) Use Cleaning Procedure 1 to manually clean the contact surface fay surface on the valve adapter assembly.

NOTE: Protect the alignment reference mark when you clean the valve adapter asembly.

1) Use a very fine Scotch-Brite Type S pad, G50398 or an Scotch-Brite 7448 pad, G50492.

2) Move the pad back and forth while you press with your thumb.

(c) Measure the electrical bonding resistance between the serrated contact surface on the valve adapter assembly and front spar with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Make sure that the electrical 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 0.00050 ohm (0.50 milliohms).

(d) If the bonding resistance is not satisfactory, do this procedure: Faying Surface Bond - Adapter Plate to Front Spar Repair.

SUBTASK 28-22-11-410-002

(3) Install the index plate:

NOTE: The two tasks that follow will align the engine fuel spar valve, repair the faying surface, and install the index plate.

(a) Align the spar valve (TASK 28-22-11-820-801).

(b) Install the index plate (TASK 28-22-11-400-802).

1) During installation, measure the electrical bonding resistance between the index plate and the front spar with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00):

a) Make sure that the bonding resistance is 0.0020 ohm (2.0 milliohms) or less.

2) If the bonding resistance is not satisfactory, then repeat the steps in this procedure.

H. Faying Surface Bond - Adapter Plate to Front Spar Repair

NOTE: This procedure repairs the faying surface bond between the adapter plate and the front spar. When the initial measured electrical bonding resistance is more than 0.0015 ohm (1.5 milliohms), repair the faying surface bond.

SUBTASK 28-22-11-010-003

(1) Remove the valve adapter (TASK 28-22-11-000-802).

NOTE: Fuel tank entry is necessary to repair the faying surface of the valve adapter.

SUBTASK 28-22-11-410-003

(2) Install the valve adapter (TASK 28-22-11-400-802).

NOTE: This step repairs the faying surface bond and re-installs the valve adapter.

(a) During installation, measure the electrical bonding resistance between the valve adapter and the front spar with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

1) Make sure that the electrical bonding resistance is 0.00050 ohm (0.50 milliohm) or less.

(b) If the bonding resistance is not satisfactory, then repeat the steps in this procedure.

I. Bonding Jumper Bond Repair

NOTE: This procedure repairs the faying surface bond between the structure and the bonding jumper. When the initial measured electrical bonding resistance is more than 0.0015 ohm (1.5 milliohms), repair the faying surface bond between the loose end of the bonding jumper terminal and the front spar.

SUBTASK 28-22-11-020-001

(1) Remove the sealant from the bonding jumper terminal attached to the structure.

SUBTASK 28-22-11-020-002

(2) Remove the nut, washer, and bonding jumper.

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SUBTASK 28-22-11-160-001

(3) Do these steps to prepare the bonding jumper and the bracket for installation:

(a) Remove the sealant with a or a dry cotton wiper, G00034.

(b) Clean the fay surfaces of the bonding jumper and the aluminum ground stud (SWPM 20-20-10):

1) Use Cleaning Procedure 5 to clean the nut, washer, and the terminal contact surface on the bonding jumper.

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

a) Use a cotton wiper, G00034 or knit cotton wiper, G51293 made moist with solvent, B00184 or solvent, B00148.

b) Use a new cotton wiper to dry the surfaces.

c) Continue to clean and dry the surface until the cotton wiper shows clean.

2) Use Cleaning Procedure 5 to clean the ground stud threads and head of the ground stud assembly.

a) Remove old sealant with a brush, STD-4406.

b) Use a dry cotton wiper, G00034 or knit cotton wiper, G51293 to clean the surface.

3) Final clean the fay surfaces of the ground stud threads and head of the ground stud assembly.

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

a) Use a cotton wiper, G00034 and knit cotton wiper, G51293 soaked with solvent, B00184 or solvent, B00148.

b) Use a new cotton wiper to dry the surfaces.

c) Continue to clean and dry the surface until the cotton wiper shows clean.

SUBTASK 28-22-11-420-001

(4) Install the bonding jumper, washer, and nut on the ground stud.

SUBTASK 28-22-11-420-002

(5) Tighten the nut to 32 ±3 in-lb (3.6 ±0.4 N·m).

SUBTASK 28-22-11-760-004

(6) Measure the electrical bonding resistance between the loose end of the bonding jumper and the front spar with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-10).

(a) Make sure that the electrical bonding resistance is 0.0010 ohm (1.0 milliohms) or less.

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(b) If the bonding resistance is not satisfactory, do the steps in this procedure until the resistance is correct.

SUBTASK 28-22-11-390-001

(7) Apply a fillet seal of sealant, A50337 to the ground stud, the terminal on the bonding jumper, and nut (SWPM 20-20-10 Paragraph 4.C).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

ENGINE FUEL 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) Engine Fuel Spar Valve Actuator Removal

(2) Engine Fuel Spar Valve Actuator Installation

(3) Engine Fuel Spar Valve - Valve Adapter Removal

(4) Engine Fuel Spar Valve - Valve Adapter Installation

(5) Engine Fuel Spar Valve - Valve Body Removal

(6) Engine Fuel Spar Valve - Valve Body Installation.

TASK 28-22-11-000-801

2. Engine Fuel Spar Valve Actuator Removal

(Figure 401)

A. General

(1) This task gives instructions to remove the Actuator of the Spar Valve.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (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.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Reference	Description
COM-2481	Sealant Removal Tool (meets BSS7384 requirements) Part #: 1-6390-A Supplier: 63318 Part #: 10810 Supplier: $0855 Part #: 10811 Supplier: $0855 Part #: 10812 Supplier: $0855 Part #: 234350 Supplier: 5HCF1 Part #: 235072 Supplier: 5HCF1 Part #: 235073 Supplier: 5HCF1 Part #: 235074 Supplier: 5HCF1 Part #: 235075 Supplier: 5HCF1 Part #: 235076 Supplier: 5HCF1 Part #: 311/03 Supplier: F6892 Part #: 311/14 Supplier: F6892 Part #: 311/25 Supplier: F6892 Part #: 311/37 Supplier: F6892 Part #: AS1 Supplier: $1351 Part #: AS2 Supplier: $1351 Part #: AS3 Supplier: $1351 Part #: DAD5013 Supplier: 7RKH2 Part #: DFD5019 Supplier: 7RKH2 Part #: JNT411B60 Supplier: 3DN12 Part #: JNT411B90 Supplier: 3DN12 Part #: SCD5019 Supplier: 7RKH2 Part #: ST982LF-9 Supplier: 81205 Part #: TS1275-4 Supplier: 22975

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 27
621BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27

F. Prepare for the Removal

SUBTASK 28-22-11-860-001

WARNING DO THE DEACTIVATION PROCEDURE FOR THE LEADING EDGE FLAPS AND SLATS. THE FLAPS AND SLATS MOVE QUICKLY. INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

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

SUBTASK 28-22-11-862-001

(2) For the left spar valve, open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1
B	5	C00540	FUEL SPAR VALVE IND

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-11-862-002

(3) For the right spar valve, 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	5	C00540	FUEL SPAR VALVE IND

SUBTASK 28-22-11-010-004

(4) Open the applicable access panel(s):

Number	Name/Location
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27
621BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27

G. Engine Fuel Spar Valve Actuator Removal

SUBTASK 28-22-11-010-005

(1) Move the actuator [4] manual override lever to the fully CLOSED position.

SUBTASK 28-22-11-010-006

(2) Disconnect the electrical connector [5] from the actuator [4].

SUBTASK 28-22-11-010-007

(3) Remove the sealant from the bonding jumper [3] fasteners and the bonding jumper [3] tab.

(a) Use sealant removal tool, COM-2481 or equivalent.

SUBTASK 28-22-11-010-008

(4) Remove the screw [1], washers [2], nut [11], and bonding jumper [3] from the bonding tab on the actuator [4].

SUBTASK 28-22-11-010-009

(5) Remove the mounting screws [6] and washers [7] from the actuator [4].

SUBTASK 28-22-11-010-010

(6) Carefully disassemble the actuator [4] from the index plate [8].

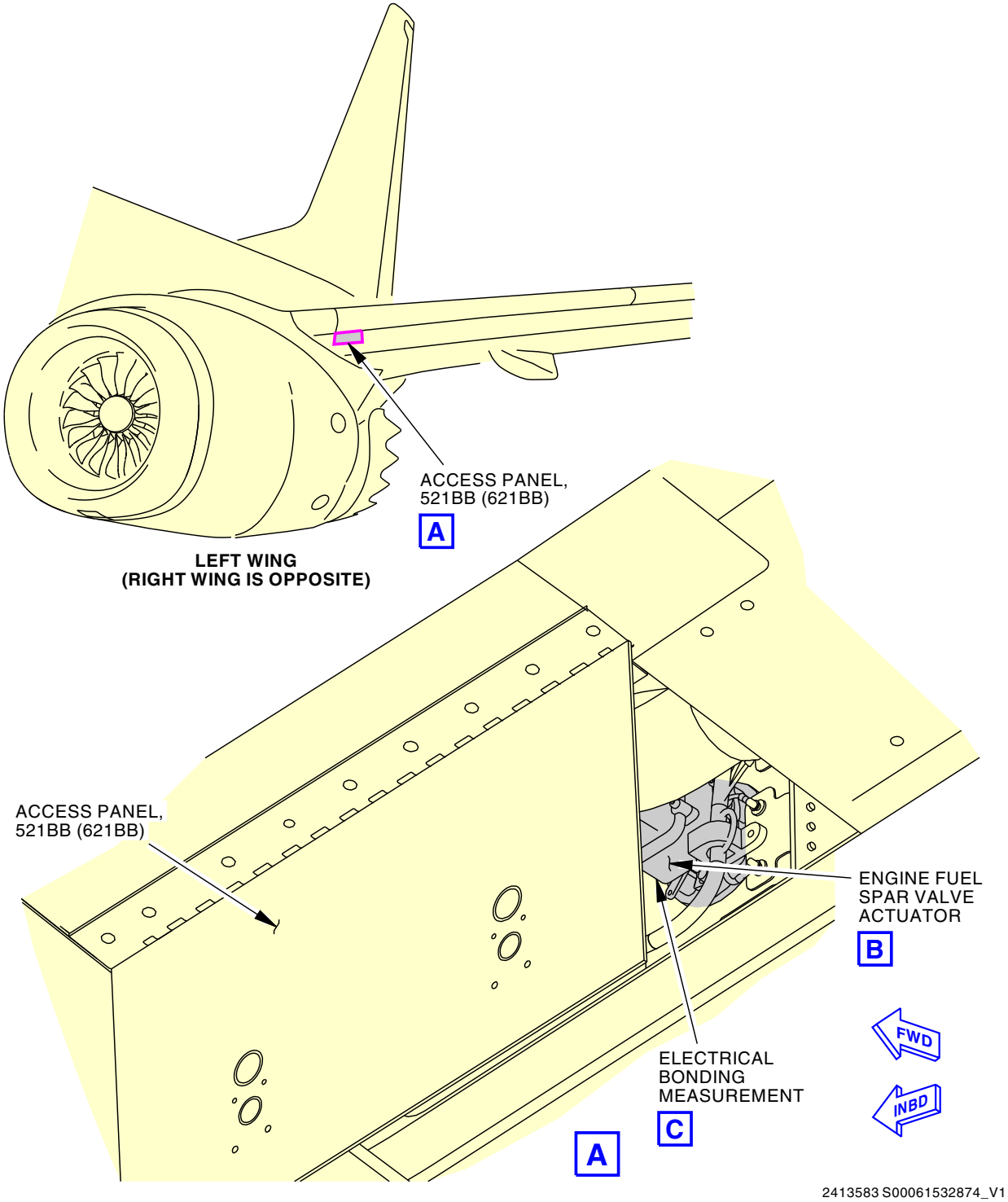
NOTE: The actuator [4] and index plate [8] are bonded together with sealant.

SUBTASK 28-22-11-010-011

(7) Remove the actuator [4].

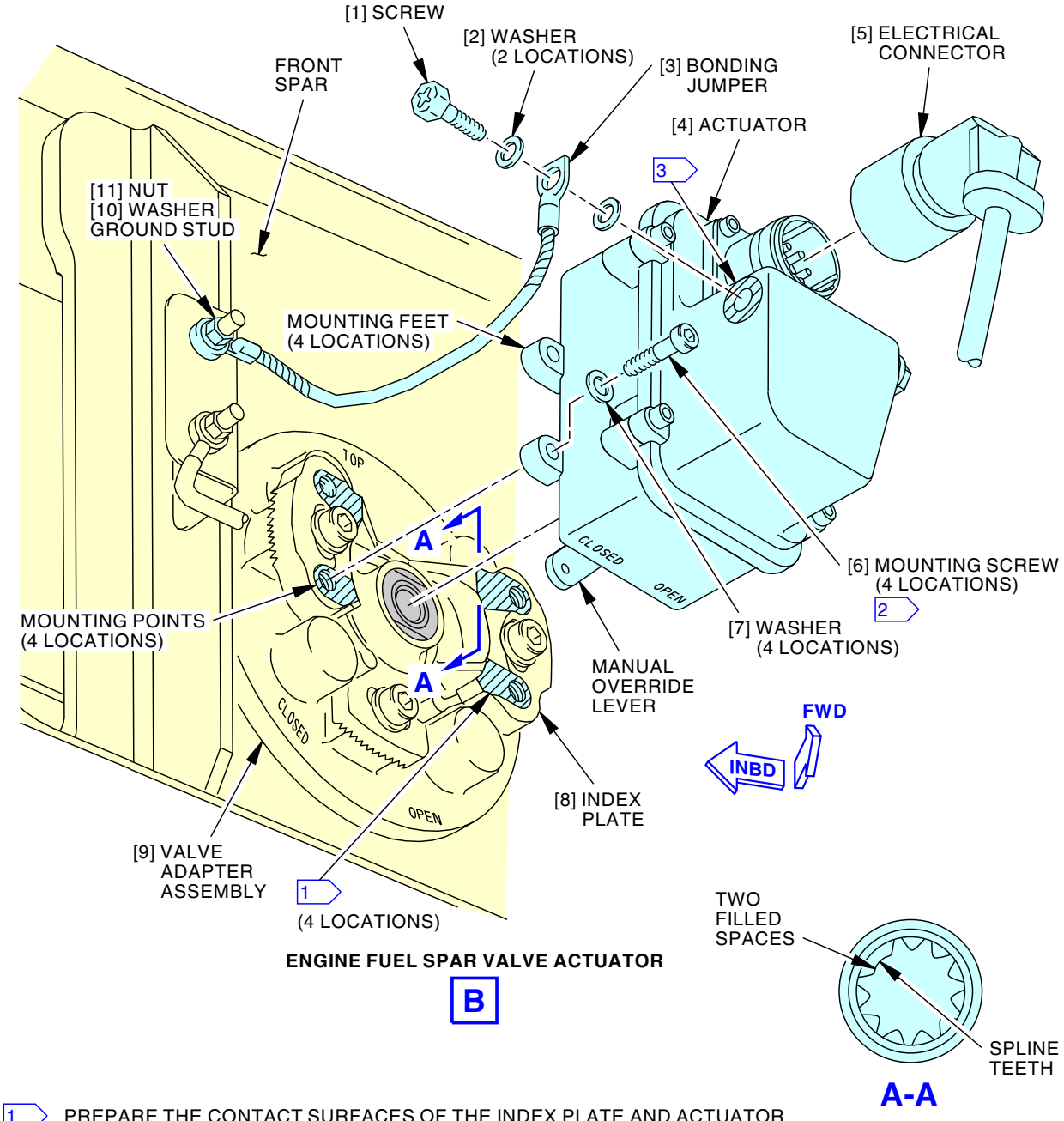
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Engine Fuel Spar Valve Actuator Installation
Figure 401/28-22-11-990-801 (Sheet 1 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



ENGINE FUEL SPAR VALVE ACTUATOR

B

1 PREPARE THE CONTACT SURFACES OF THE INDEX PLATE AND ACTUATOR FEET (4 LOCATIONS) WITH A FAY SEALED FAY SURFACE BOND (SWPM 20-20-00).

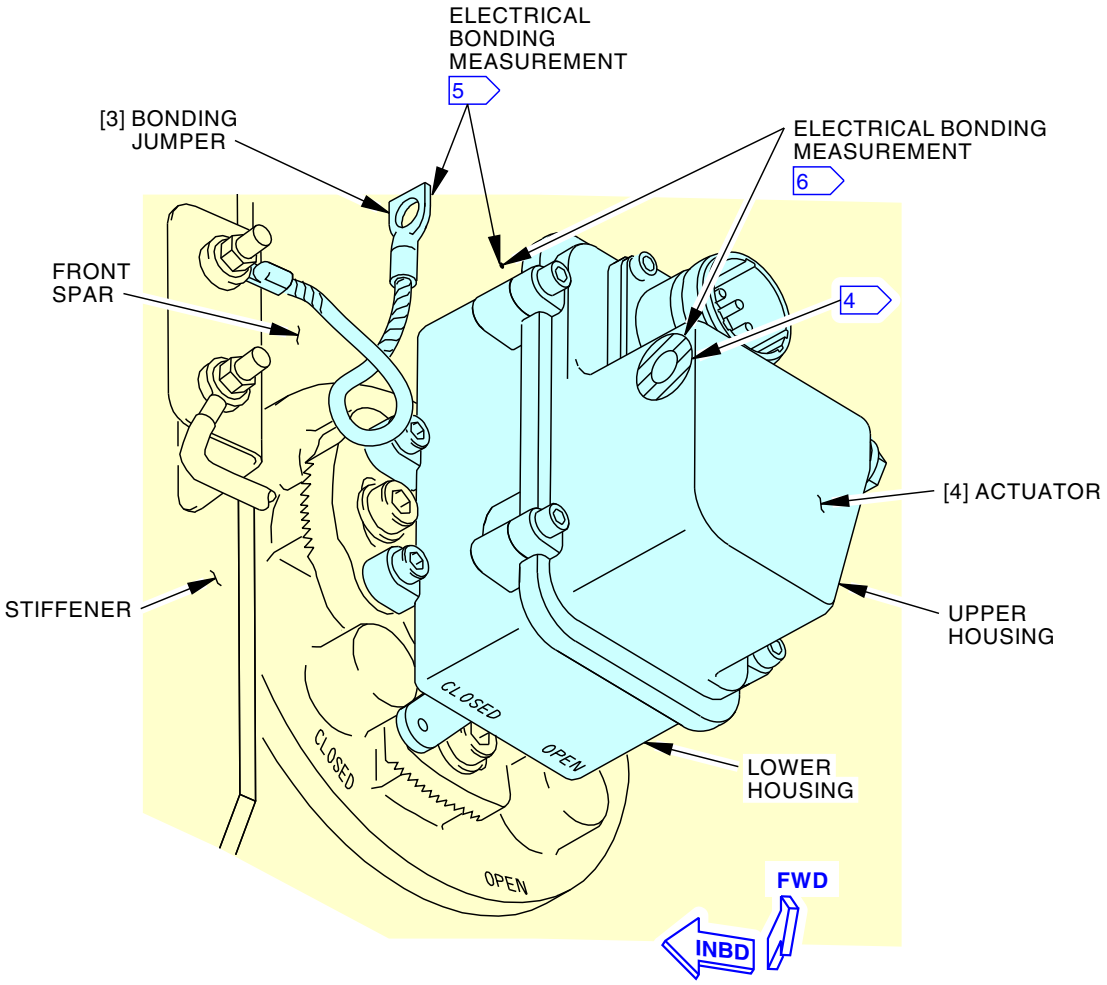
2 APPLY SEALANT TO THE SHANK AND THREADS OF THE MOUNTING SCREWS.

3 CLEAN THE CONTACT SURFACES OF THE ACTUATOR AND BONDING JUMPER. AFTER ELECTRICAL BONDING MEASUREMENT, APPLY A CAP SEAL TO THE BONDING JUMPER ASSEMBLY.

2413584 S00061532875_V1

Engine Fuel Spar Valve Actuator Installation
Figure 401/28-22-11-990-801 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



ELECTRICAL BONDING MEASUREMENT
(BONDING JUMPER DISCONNECTED)

C

4 BARE METAL CONTACT SURFACE OF THE ACTUATOR AT THE BONDING JUMPER INSTALLATION.

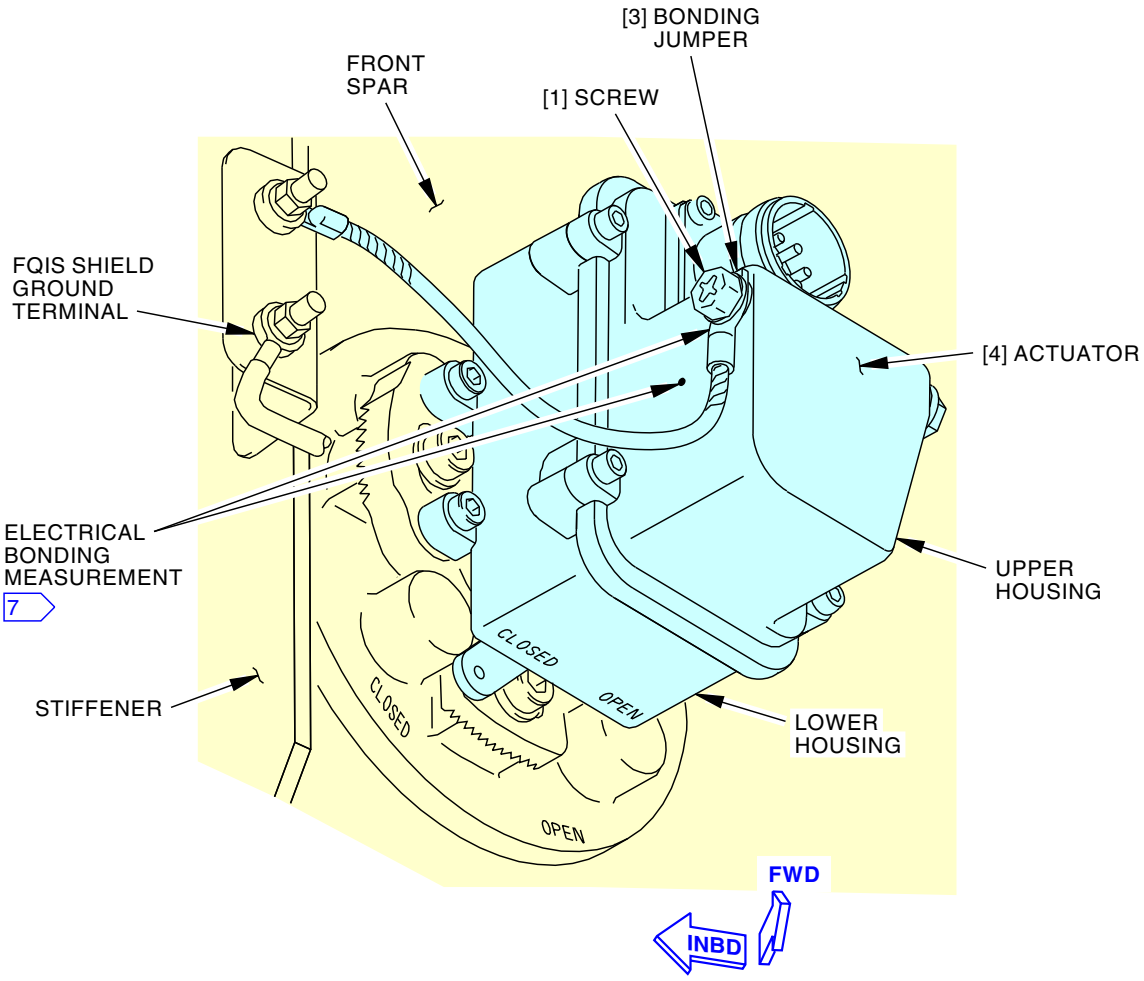
5 MEASURE FROM THE BONDING JUMPER (LOOSE END) TO THE FRONT SPAR.

6 MEASURE FROM THE ACTUATOR TO THE FRONT SPAR.

2413585 S00061532876_V1

Engine Fuel Spar Valve Actuator Installation
Figure 401/28-22-11-990-801 (Sheet 3 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



ELECTRICAL BONDING MEASUREMENT (BONDING JUMPER CONNECTED)

C

7 MEASURE FROM THE BONDING JUMPER (ATTACHED) TO THE ACTUATOR.

2413586 S00061532877_V1

Engine Fuel Spar Valve Actuator Installation
Figure 401/28-22-11-990-801 (Sheet 4 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-11-400-801

3. Engine Fuel Spar Valve Actuator Installation

(Figure 401)

A. General

(1) The engine fuel spar valve actuator is referred to as the actuator in this task.

(2) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (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)
28-22-11-300-801	Engine Fuel Spar Valve Electrical Faying Surface Bonds Repair (P/B 301)
51-21-41-370-802	Apply Bonderite M-CR 600, Bonderite M-CR 1200, Bonderite M-CR 600RTU, or Bonderite M-CR 1200S Solution (P/B 701)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES
SWPM 20-20-10	REPLACEMENT OF GROUND STUDS AND BONDING JUMPER INSTALLATION

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Reference	Description
COM-2481	Sealant Removal Tool (meets BSS7384 requirements) Part #: 1-6390-A Supplier: 63318 Part #: 10810 Supplier: $0855 Part #: 10811 Supplier: $0855 Part #: 10812 Supplier: $0855 Part #: 234350 Supplier: 5HCF1 Part #: 235072 Supplier: 5HCF1 Part #: 235073 Supplier: 5HCF1 Part #: 235074 Supplier: 5HCF1 Part #: 235075 Supplier: 5HCF1 Part #: 235076 Supplier: 5HCF1 Part #: 311/03 Supplier: F6892 Part #: 311/14 Supplier: F6892 Part #: 311/25 Supplier: F6892 Part #: 311/37 Supplier: F6892 Part #: AS1 Supplier: $1351 Part #: AS2 Supplier: $1351 Part #: AS3 Supplier: $1351 Part #: DAD5013 Supplier: 7RKH2 Part #: DFD5019 Supplier: 7RKH2 Part #: JNT411B60 Supplier: 3DN12 Part #: JNT411B90 Supplier: 3DN12 Part #: SCD5019 Supplier: 7RKH2 Part #: ST982LF-9 Supplier: 81205 Part #: TS1275-4 Supplier: 22975
COM-4746	Handle - Sealant Removal Tool Part #: 310/1 (for SkyScraper) Supplier: F6892 Part #: SHR0272-T (for PnJ scraper) Supplier: 7RKH2 Part #: ST982LH-F-3 (for ST982LF-9) Supplier: 81205 Opt Part #: SHW0215 (for PnJ scraper) Supplier: 7RKH2

D. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45
A50155	Sealant - Fuel Tank	BMS5-45 Class C
A50337	Sealant - Fuel Tank	BMS5-45 Class B
C00064	Coating - Aluminum Chemical Conversion	BAC5719 Type II Class A (MIL-DTL-5541 Class 1A)
C00307	Coating - Corrosion Resistant Finish For Integral Fuel Tanks	BMS10-20 Type II
C50033	Coating - Chemical Conversion - Bonderite M-CR 1200S Aero (Formerly Alodine 1200)	BAC5719 Class A, C or D, MIL-DTL-81706 Type I Class 1A or 3
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

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E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
4	Actuator	28-22-11-01-060	SIA ALL
		28-22-11-02-060	SIA ALL

F. Location Zones

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

G. Access Panels

Number	Name/Location
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27
621BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27

H. Prepare for the Installation

SUBTASK 28-22-11-100-001

(1) Do these steps to prepare the actuator [4] and the index plate [8] for installation:

(a) Use sealant removal tool, COM-2481, and sealant removal tool handle, COM-4746 (or equivalent), to remove the sealant from the index plate [8] and the actuator [4].

SUBTASK 28-22-11-420-003

28-AWL-21: CDCCL

(2) Apply a fay sealed fay surface bond to the mating surfaces between the actuator [4] and index plate [8] (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-21.

SUBTASK 28-22-11-420-004

(3) Prepare the four mounting screws [6] and washers [7] for a wet installation.

(a) Apply sealant, A50155 or sealant, A50337 to each side of the four washers [7].

(b) Apply sealant, A00767 to the shank and threads of the four mounting screws [6].

(c) Apply sealant to the mounting point holes, as necessary.

NOTE: This will make sure that there is a continuous squeeze-out around the fastener head.

I. Engine Fuel Spar Valve Actuator Installation

SUBTASK 28-22-11-420-005

(1) Install the actuator [4] on the index plate [8]:

(a) Make sure that the manual override lever on the actuator [4] is in the CLOSED position.

(b) Align the output shaft on the actuator [4] with the spline teeth on the valve adapter plate [9].

NOTE: The two filled spaces on the spline teeth must align with the output shaft.

(c) Put the output shaft in the valve adapter plate [9].

NOTE: The mounting feet on the actuator [4] automatically align with the mounting points on the index plate [8].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(d) Install the four mounting screws [6] and washers [7].

NOTE: A safety cable or lockwire is not necessary.

(e) Tighten the mounting screws [6] to 20 ±1 in-lb (2.3 ±0.2 N·m).

(f) Remove excess sealant with a dry cotton wiper, G00034.

NOTE: Do not remove sealant from under the mounting screw [6].

(g) Make sure that the sealant is continuously squeezed out along the edges of the contact surfaces. If gaps, bubbles or voids show in the sealant, disassemble and apply more sealant.

(h) Make a fillet seal.

(i) Make sure that the sealant is flushed with the mating part edges.

(j) Remove all unnecessary sealant.

SUBTASK 28-22-11-765-001

28-AWL-21: CDCCL

(2) Measure the electrical bonding resistance between the upper housing of the actuator [4] and the front spar (SWPM 20-20-10).

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.

28-AWL-21: CDCCL

(a) Measure the electrical bonding resistance with the bonding jumper [3] and the electrical connector [5] disconnected.

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.

NOTE: Make sure that the bonding jumper [3] does not touch the actuator [4].

(b) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-21: CDCCL

(c) If the actuator [4], index plate [8] and valve adapter plate [9] were removed, make sure that the electrical bonding resistance is 0.0030 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 electrical bonding resistance is more than 0.0030 ohm (3.0 milliohms), do the applicable procedure in this task: Engine Fuel Spar Valve Electrical Faying Surface Bonds Repair, TASK 28-22-11-300-801.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

28-AWL-21: CDCCL

(d) If the actuator [4] and index plate [8] were removed, make sure that the electrical bonding resistance is 0.0040 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

1) If the electrical bonding resistance is more than 0.0040 ohm (4.0 milliohms), do the applicable procedure in this task: Engine Fuel Spar Valve Electrical Faying Surface Bonds Repair, TASK 28-22-11-300-801.

28-AWL-21: CDCCL

(e) If only the actuator [4] was removed, make sure the electrical bonding resistance is 0.0040 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

1) If the electrical bonding resistance is more than 0.0040 ohm (4.0 milliohms), do the applicable procedure in this task: Engine Fuel Spar Valve Electrical Faying Surface Bonds Repair, TASK 28-22-11-300-801.

SUBTASK 28-22-11-100-002

28-AWL-21: CDCCL

(3) If the terminal of the bonding jumper [3] is disconnected from the stiffener, install the bonding jumper [3] with a fay surface bond between the stiffener and the terminal of bonding jumper [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-21.

SUBTASK 28-22-11-420-006

(4) If the terminal of the bonding jumper [3] is disconnected from the stiffener, install the bonding jumper [3]:

(a) Install the bonding jumper [3], washer [10], and nut [11] on the ground stud.

(b) Tighten the nut [11] to 31 ±3 in-lb (3.5 ±0.3 N·m).

SUBTASK 28-22-11-765-002

28-AWL-21: CDCCL

(5) Measure the electrical bonding resistance between the loose end of the bonding jumper [3] and the front spar (SWPM 20-20-10).

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.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

28-AWL-21: CDCCL

(b) Make sure that the electrical 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.

(c) If the electrical bonding resistance is more than 0.0015 ohm (1.5 milliohms), do the applicable procedure in this task: Engine Fuel Spar Valve Electrical Faying Surface Bonds Repair, TASK 28-22-11-300-801.

SUBTASK 28-22-11-390-002

(6) If the bonding jumper [3] was disconnected from the stiffener, apply a fillet seal to the ground stud, terminal on the bonding jumper [3], and nut [11] (SWPM 20-20-10):

28-AWL-21: CDCCL

(a) Apply a fillet seal of sealant, A50337 to the terminal of the bonding jumper [3] at the stiffener (SWPM 20-20-10).

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.

SUBTASK 28-22-11-100-003

(7) Do these steps to prepare the bonding jumper [3] and the actuator [4] for installation:

(a) Apply a fay surface bond between the surfaces of the actuator [4], and bonding jumper [3] (SWPM 20-20-00):

SUBTASK 28-22-11-420-025

28-AWL-21: CDCCL

(8) If the bonding jumper is attached to the stiffener, measure the resistance between the loose end of the bonding jumper [3] and the spar (SWPM 20-20-10).

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.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-21: CDCCL

(b) Make sure that the electrical bonding resistance is 0.0020 ohm (2.0 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.

(c) If the electrical bonding resistance is more than 0.0020 ohm (2.0 milliohms), do the applicable procedure in this task: Engine Fuel Spar Valve Electrical Faying Surface Bonds Repair, TASK 28-22-11-300-801.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

28-AWL-21: CDCCL

(9) Apply a fay surface bond between the mating surfaces of the actuator [4] and the terminal of the bonding jumper [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-21.

SUBTASK 28-22-11-420-009

(10) Tighten the screw [1] to 23 ±2 in-lb (2.6 ±0.2 N·m).

SUBTASK 28-22-11-765-003

28-AWL-21: CDCCL

(11) Measure the electrical bonding resistance between the upper housing of the actuator [4] and the attached terminal of the bonding jumper [3] (SWPM 20-20-10).

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.

NOTE: Do not measure the bonding resistance from the screw [1].

(a) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-21: CDCCL

(b) Make sure that the electrical bonding resistance is 0.0010 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 electrical bonding resistance is more than 0.0010 ohm (1.0 milliohm), do the applicable procedure in this task: Engine Fuel Spar Valve Electrical Faying Surface Bonds Repair, TASK 28-22-11-300-801.

SUBTASK 28-22-11-390-003

28-AWL-21: CDCCL

(12) Apply a fillet seal between the mating surfaces of the actuator [4] and the terminal of the bonding jumper [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-21.

28-AWL-21: CDCCL

(13) Apply a cap seal on the screw [1], and the terminal lug of the bonding jumper [3] attached to the actuator [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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

(a) Apply sealant, A50337 to the fay surfaces to the area around the bonding jumper [3].

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SUBTASK 28-22-11-916-001

(14) Apply protective finishes with coating, C00064 or coating, C00307 to the bare metal areas on the front spar (TASK 28-11-00-600-801).

NOTE: Apply protective coating to the area where the finish was removed from the electrical bonding probe touching the surface.

SUBTASK 28-22-11-916-002

(15) Apply Bonderite M-CR 1200S Aero coating, C50033 to areas that have bare metal on the actuator [4] (TASK 51-21-41-370-802).

NOTE: Apply the protective coating to the actuator [4] where the electrical bonding probe removed the finish and bare metal areas around the bonding jumper [3] that is not covered with sealant.

SUBTASK 28-22-11-430-001

(16) Connect the electrical connector [5] to the actuator [4].

J. Spar Valve Actuator Operational Test

SUBTASK 28-22-11-865-001

(1) For the left spar valve actuator, remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1
B	5	C00540	FUEL SPAR VALVE IND

SUBTASK 28-22-11-865-002

(2) For the right spar valve actuator, 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	5	C00540	FUEL SPAR VALVE IND

SUBTASK 28-22-11-710-001

(3) For the applicable actuator [4], do this task: Engine Fuel Spar Valve - Electrical Control and Indication Test, TASK 28-22-00-710-801.

K. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-11-410-004

(1) Close these access panels:

Number	Name/Location
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27
621BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27

SUBTASK 28-22-11-860-002

(2) Activate the leading edge flaps and slats (TASK 27-81-00-440-801).

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-11-000-802

4. Engine Fuel Spar Valve - Valve Adapter Removal

(Figure 402)

A. General

(1) The engine fuel spar valve - valve adapter is referred to as the valve adapter in this task.

(2) The valve adapter and shaft assembly connect the actuator to the valve body. The valve adapter assembly consists of these components:

(a) Index plate

(b) Adapter plate (adapter shaft attached)

(c) Adapter shaft (with U-joint connection).

B. 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)

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	Sealant Removal Tool (meets BSS7384 requirements) Part #: 1-6390-A Supplier: 63318 Part #: 10810 Supplier: $0855 Part #: 10811 Supplier: $0855 Part #: 10812 Supplier: $0855 Part #: 234350 Supplier: 5HCF1 Part #: 235072 Supplier: 5HCF1 Part #: 235073 Supplier: 5HCF1 Part #: 235074 Supplier: 5HCF1 Part #: 235075 Supplier: 5HCF1 Part #: 235076 Supplier: 5HCF1 Part #: 311/03 Supplier: F6892 Part #: 311/14 Supplier: F6892 Part #: 311/25 Supplier: F6892 Part #: 311/37 Supplier: F6892 Part #: AS1 Supplier: $1351 Part #: AS2 Supplier: $1351 Part #: AS3 Supplier: $1351 Part #: DAD5013 Supplier: 7RKH2 Part #: DFD5019 Supplier: 7RKH2 Part #: JNT411B60 Supplier: 3DN12 Part #: JNT411B90 Supplier: 3DN12 Part #: SCD5019 Supplier: 7RKH2 Part #: ST982LF-9 Supplier: 81205 Part #: TS1275-4 Supplier: 22975

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Reference	Description
COM-4746	Handle - Sealant Removal Tool Part #: 310/1 (for SkyScraper) Supplier: F6892 Part #: SHR0272-T (for PnJ scraper) Supplier: 7RKH2 Part #: ST982LH-F-3 (for ST982LF-9) Supplier: 81205 Opt Part #: SHW0215 (for PnJ scraper) Supplier: 7RKH2

D. Location Zones

Zone	Area
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
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
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27
532BB	Main Tank Access Door - Wing Station 265
621BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27
632BB	Main Tank Access Door - Wing Station 265

F. Prepare for the Removal

SUBTASK 28-22-11-650-001

(1) Defuel or transfer fuel from the applicable main tank (TASK 28-26-00-650-801, TASK 28-26-00-650-802).

SUBTASK 28-22-11-010-012

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(2) Do this task for the applicable fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove the applicable access door(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

SUBTASK 28-22-11-860-003

(3) Open these access panels:

Number	Name/Location
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27
621BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27

SUBTASK 28-22-11-010-013

(4) Remove the applicable actuator [4] (TASK 28-22-11-000-801).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-11-010-014

(5) Remove the sealant from the adapter plate edge with sealant removal tool, COM-2481 and sealant removal tool handle, COM-4746 or equivalent.

G. Engine Fuel Spar Valve - Valve Adapter Removal

SUBTASK 28-22-11-010-015

(1) Remove the valve adapter plate [9] from the front spar:

(a) Remove the sealant from the four bolts [26].

(b) Remove the four bolts [26] and washers [27].

(c) Disengage the adapter shaft from the valve body [21].

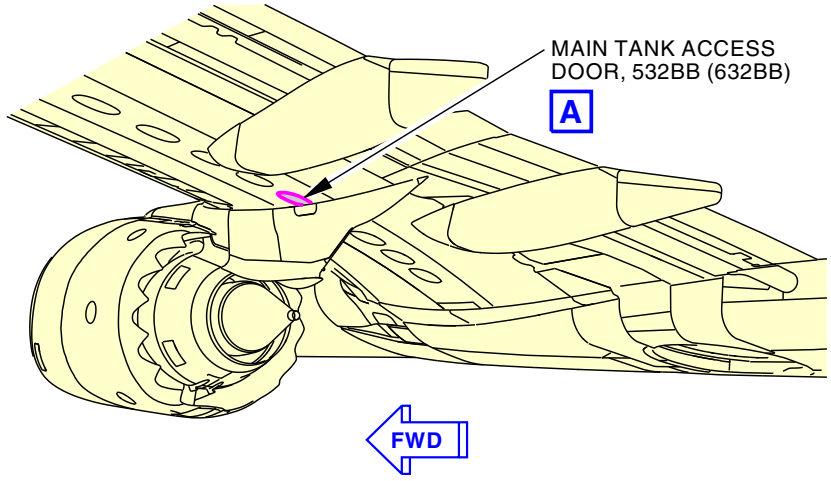
SUBTASK 28-22-11-010-016

(2) Remove the valve adapter plate [9].

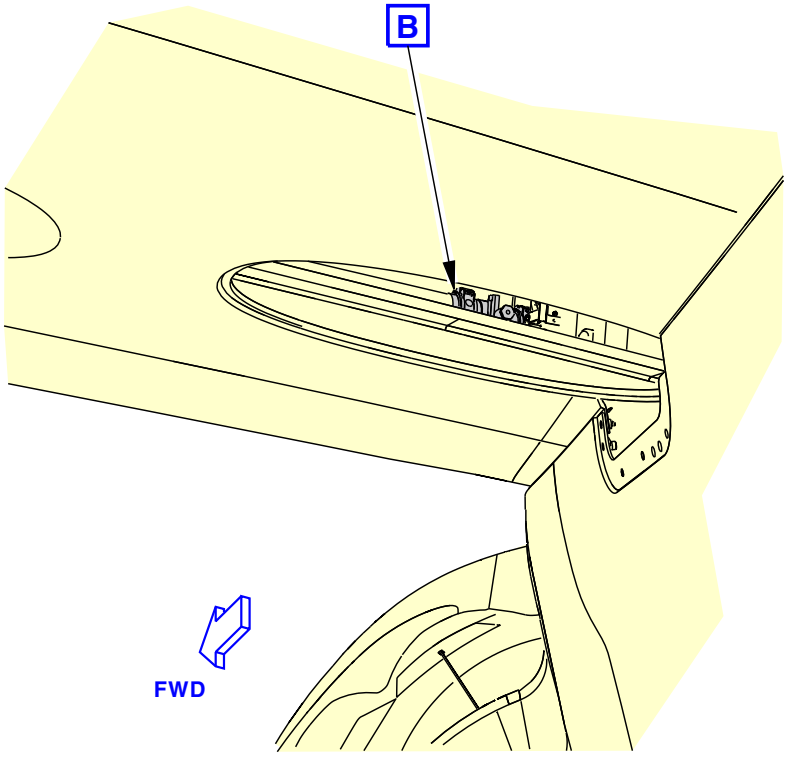
NOTE: An additional person is necessary to help remove the valve adapter plate [9] to keep the valve adapter plate [9] from dropping.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



LEFT WING
(RIGHT WING IS EQUIVALENT)



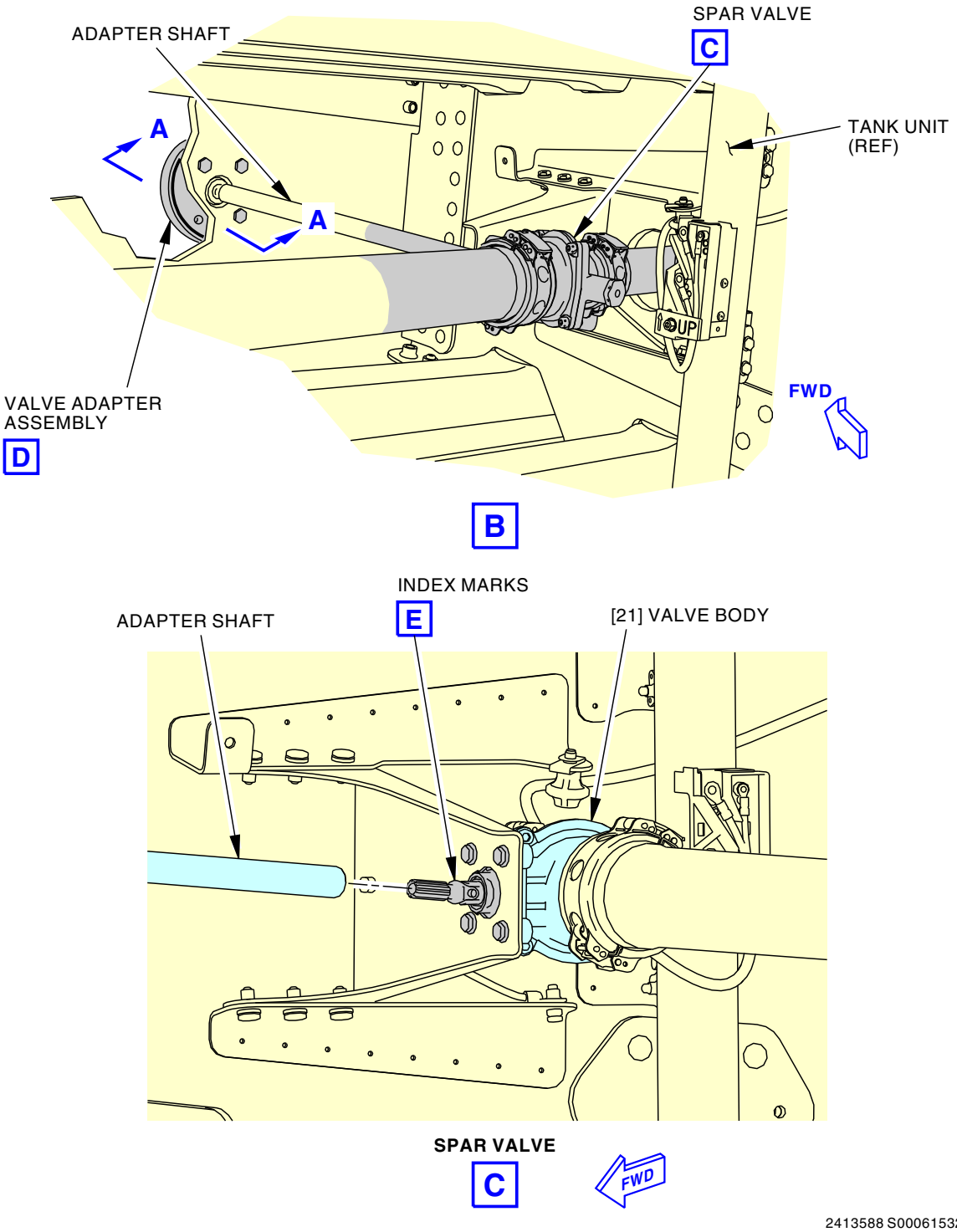
MAIN TANK ACCESS DOOR, 532BB (632BB)

A

2413587 S00061532880_V2

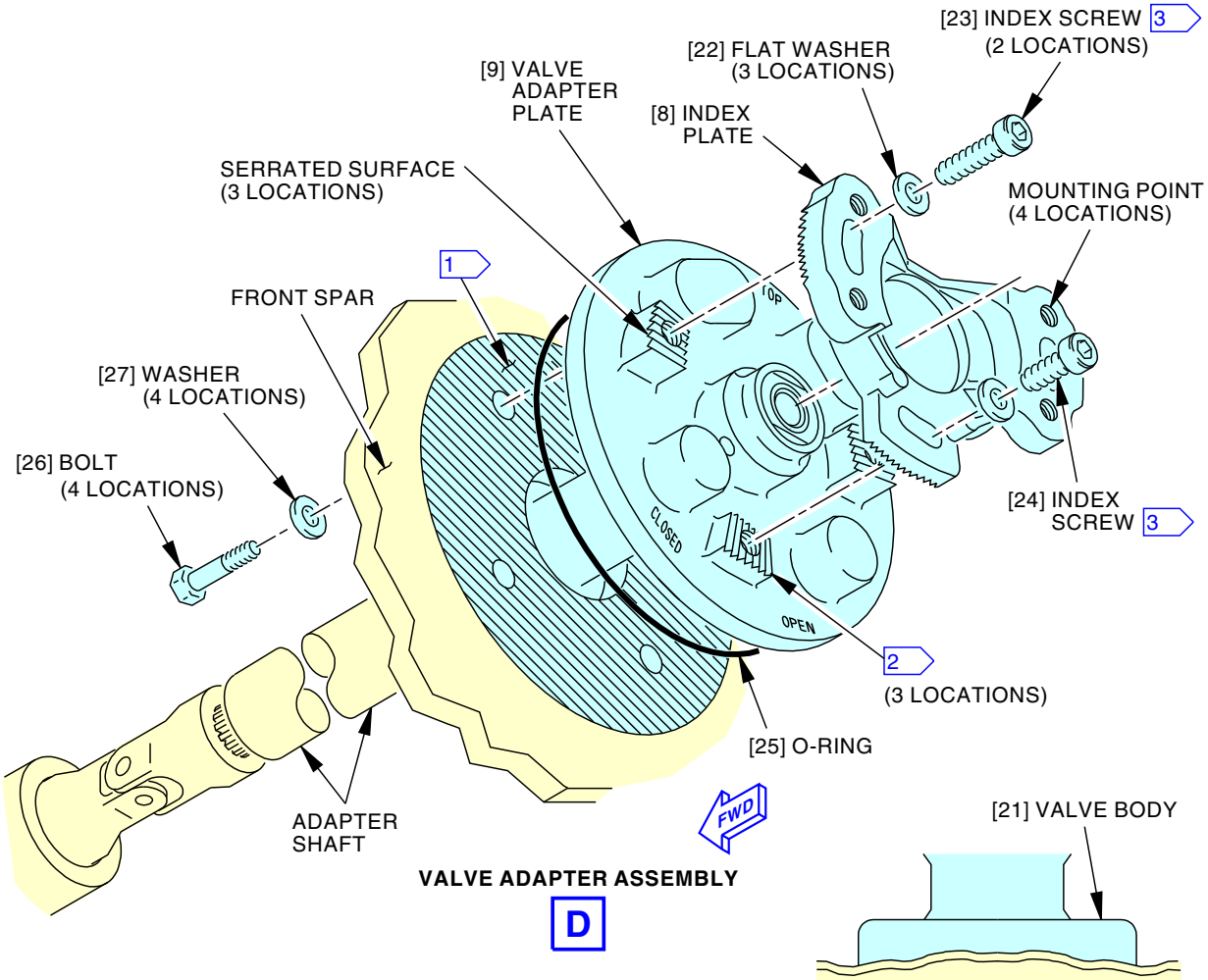
Spar Valve Adapter Installation
Figure 402/28-22-11-990-802 (Sheet 1 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



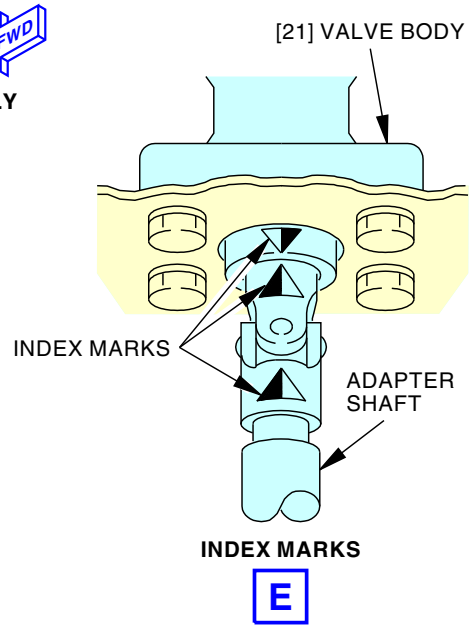
Spar Valve Adapter Installation
Figure 402/28-22-11-990-802 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



VALVE ADAPTER ASSEMBLY

D



INDEX MARKS

E

NOTE:

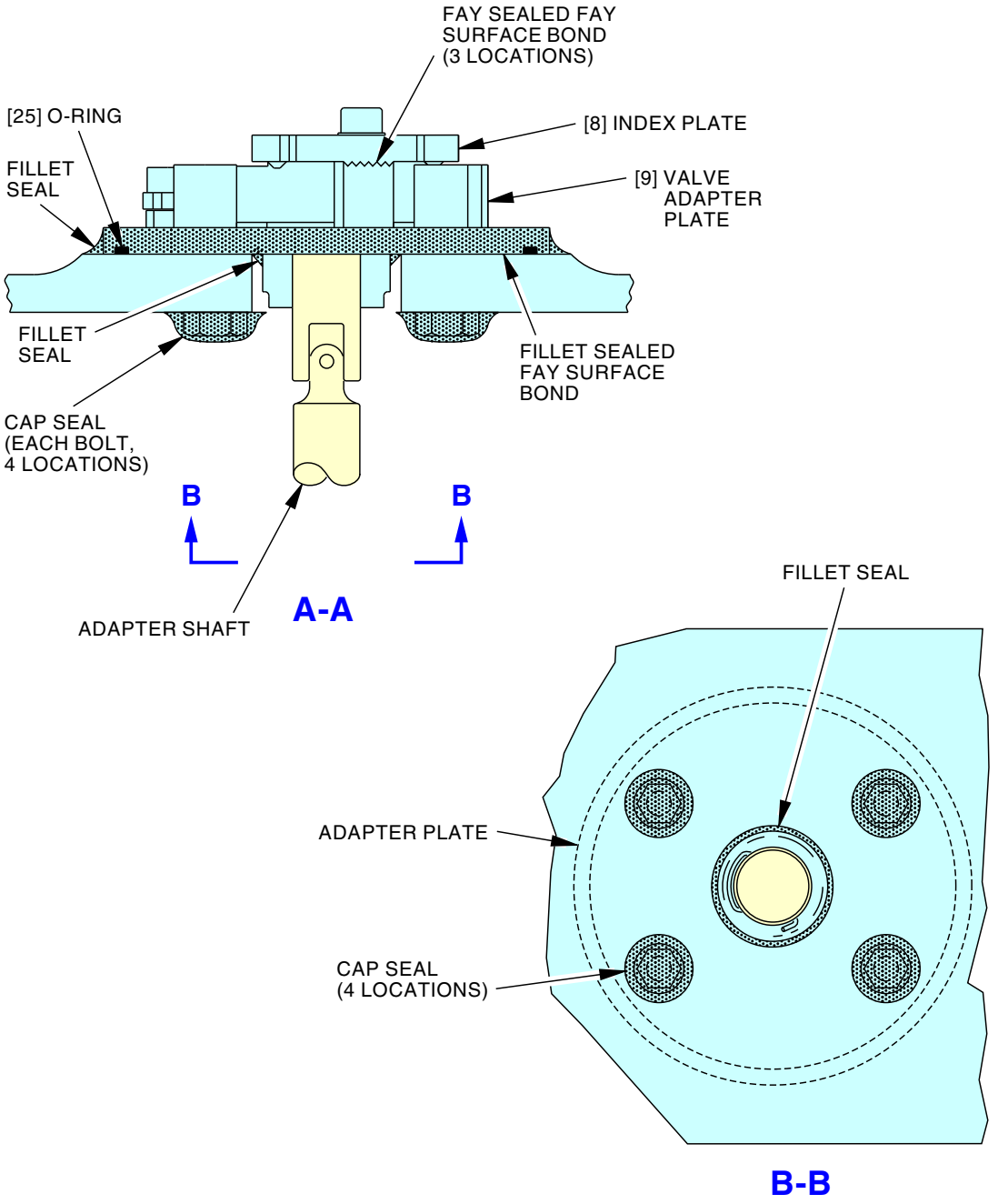
LEFT VALVE ADAPTER ASSEMBLY IS SHOWN. RIGHT VALVE ADAPTER ASSEMBLY HAS INSTALLED 180˚ UPSIDE DOWN, COMPARED TO THE LEFT SIDE. THE "TOP" MARKING ON VALVE ADAPTER PLATE IS POINTED TO THE BOTTOM.

1. PREPARE AND INSTALL THE VALVE ADAPTER TO THE FRONT SPAR WITH A FILLET SEALED FAY SURFACE BOND (SWPM 20-20-00).
2. PREPARE AND INSTALL THE SERRATED CONTACT SURFACES OF THE VALVE ADAPTER AND INDEX PLATE WITH A FAY SEAL FAY SURFACE BOND (3 LOCATIONS) (SWPM 20-20-00).
3. APPLY SEALANT TO THE SHANK AND THREADS OF THE FASTENERS DURING THE INSTALLATION.

2413589 S00061532882_V3

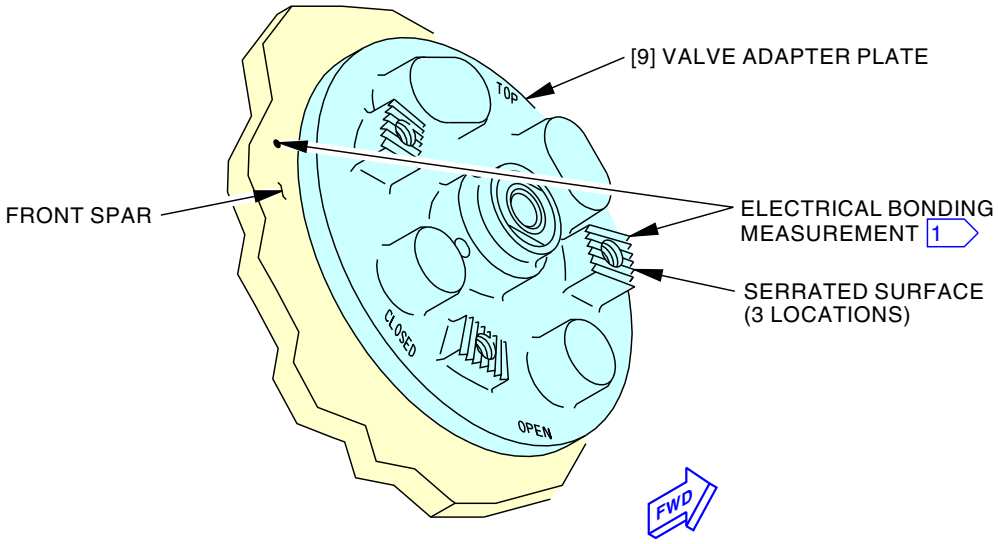
Spar Valve Adapter Installation
Figure 402/28-22-11-990-802 (Sheet 3 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

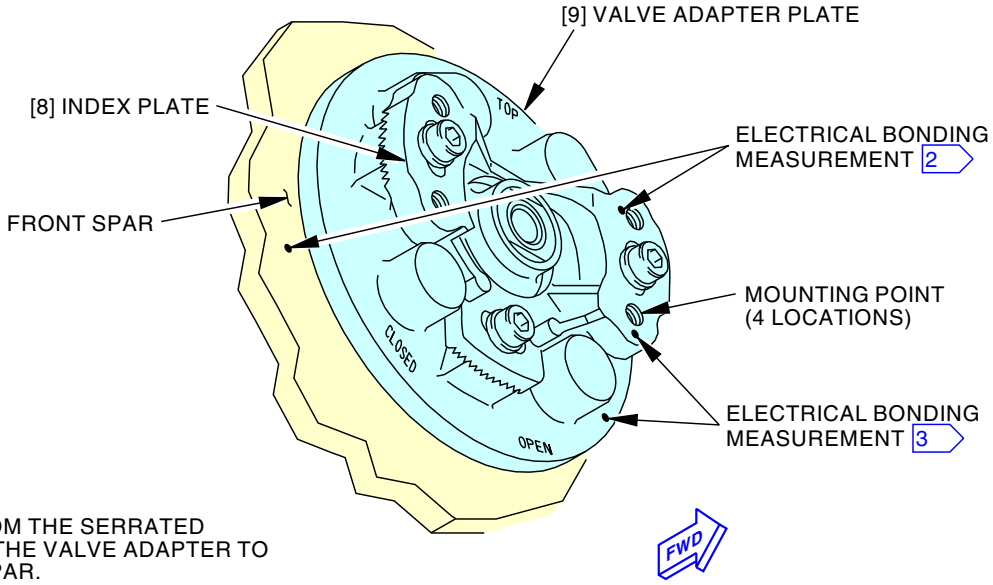


Spar Valve Adapter Installation
Figure 402/28-22-11-990-802 (Sheet 4 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



VALVE ADAPTER ELECTRICAL BONDING MEASUREMENT



INDEX PLATE ELECTRICAL BONDING MEASUREMENT

NOTE:

1. MEASURE FROM THE SERRATED SURFACE ON THE VALVE ADAPTER TO THE FRONT SPAR.
2. MEASURE FROM ONE OF THE MOUNTING POINTS ON THE INDEX PLATE TO THE FRONT SPAR.
3. MEASURE FROM ONE OF THE MOUNTING POINTS ON THE INDEX PLATE TO THE VALVE ADAPTER.

2413591 S00061532884_V2

Engine Fuel Spar Valve Resistance Measurement - Probe Locations
Figure 403/28-22-11-990-807

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-11-400-802

5. Engine Fuel Spar Valve - Valve Adapter Installation

(Figure 402, Figure 403)

A. General

(1) The engine fuel spar valve - valve adapter is referred to as the valve adapter in this task.

(2) The valve adapter and shaft assembly connect the actuator to the valve body. The valve adapter assembly consists of these components:

(a) Index plate

(b) Adapter plate (adapter shaft attached)

(c) Adapter shaft (with U-joint connection).

(3) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
20-10-34-110-802	Clean Bare, Clad, or Plated Metal with Solvent (P/B 701)
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)
28-11-11-400-801	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)
28-22-00-720-802	Engine Fuel Spar Valve Installation - Operational Test (P/B 501)
28-22-11-300-801	Engine Fuel Spar Valve Electrical Faying Surface Bonds Repair (P/B 301)
51-22-00-160-801	Prepare For Sealing (P/B 201)
51-22-00-390-806	Fillet Seal Application (P/B 201)
51-22-00-390-808	Fastener Seal Application (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Reference	Description
COM-1550	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
A50110	Sealant - Fuel Tank	BMS5-45 Class B-2
A50153	Sealant - Fuel Tank - Class A-2	BMS5-45 Class A-2
A50155	Sealant - Fuel Tank	BMS5-45 Class C
A50231	Sealant - Pressure And Environmental - Chromate Type	BMS5-95 Class B
A50337	Sealant - Fuel Tank	BMS5-45 Class B
C50315	Coating - Chemical Conversion - Bonderite M-CR 600 Aero (Formerly Alodine 600)	BAC5719 Class A, C or D, MIL-DTL-81706 Type I Class 1A or 3
D00504	Grease - Petrolatum	VV-P-236
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G01912	Lockwire - MS20995NC32, Monel - 0.032 Inch (0.8128 mm) Diameter	NASM20995
G51372	Kit - Safety Cable, 321 CRES - 0.035 +/-0.003 Inch (1.0 mm) Diameter, (Contains both Cable and Ferrule), 12 Inches Long	BACC13AT3K

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
9	Valve adapter plate	28-22-11-01-070	SIA ALL
		28-22-11-02-070	SIA ALL
25	O-ring	28-22-11-01-100	SIA ALL
		28-22-11-02-100	SIA ALL

F. Location Zones

Zone	Area
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
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

G. Access Panels

Number	Name/Location
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Number	Name/Location
532BB	Main Tank Access Door - Wing Station 265
621BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27
632BB	Main Tank Access Door - Wing Station 265

H. Prepare for Installation

SUBTASK 28-22-11-110-001

(1) Do these steps to prepare the valve adapter plate [9] and the front spar for installation:

(a) Remove the sealant from the front spar, do this task: Clean Bare, Clad, or Plated Metal with Solvent, TASK 20-10-34-110-802.

SUBTASK 28-22-11-760-005

28-AWL-21: CDCCL

(2) Apply a fay sealed fay surface bond between the valve adapter plate [9] and the front spar, outside the fuel tank (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-21.

I. Valve Adapter Installation

SUBTASK 28-22-11-640-001

(1) Apply a thin layer of grease, D00504 on the new O-ring [25].

SUBTASK 28-22-11-420-010

(2) Put the O-ring [25] in the groove of the valve adapter plate [9].

SUBTASK 28-22-11-430-002

(3) Put the adapter shaft through the hole in the front spar.

SUBTASK 28-22-11-420-011

(4) Install the valve adapter plate [9]:

(a) Make sure that the index marks on the valve body [21] align with the adapter shaft.

NOTE: A small misalignment of the index marks is permitted.

(b) Engage the adapter shaft spline with the spline on the valve body [21].

1) Make sure that the shoulder on the valve adapter plate [9] does not bind in the front spar opening.

(c) Install the four bolts [26] and washers [27] to secure the valve adapter plate [9].

(d) Tighten the bolts [26] to 65 in-lb (7.3 N·m).

SUBTASK 28-22-11-420-012

(5) Apply sealant to the four bolts [26], as follows:

(a) Clean the surface areas to be sealed (TASK 51-22-00-160-801).

(b) Apply sealant, A50153 brushcoat to the surfaces and area around the four bolts [26].

28-AWL-21: CDCCL

(c) In the fuel tank, apply a cap seal with sealant, A50337 to the four bolts [26] (TASK 51-22-00-390-808).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-11-420-013

28-AWL-21: CDCCL

(6) On the inside of the tank, apply a fillet seal around the edge of the hole and the stationary part of the valve adapter plate [9] (Fillet Seal Application, TASK 51-22-00-390-806).

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.

(a) Clean the surface areas to be sealed (TASK 51-22-00-160-801).

(b) Apply sealant, A50153 brushcoat to the around the edge of the hole and the stationary part of the valve adapter plate [9].

(c) Make sure that the sealant does not touch the adapter shaft or other parts of the valve adapter plate [9] that turn.

SUBTASK 28-22-11-420-014

(7) On the outside of the tank, apply a fillet seal around the periphery of the valve adapter plate [9] and the front spar (TASK 51-22-00-390-806) (View A-A).

(a) Use sealant, A50110 or sealant, A50155 to apply the fillet seal.

SUBTASK 28-22-11-765-004

28-AWL-21: CDCCL

(8) Measure the electrical bonding resistance between one of the raised serrated surfaces of the valve adapter plate [9] (bare metal surface) and the front spar (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-21.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-21: CDCCL

(b) Make sure that the electrical 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

(c) If the electrical bonding resistance is more than 0.0005 ohm (0.5 milliohm), then do the applicable steps in this task: Engine Fuel Spar Valve Electrical Faying Surface Bonds Repair, TASK 28-22-11-300-801.

SUBTASK 28-22-11-760-006

28-AWL-21: CDCCL

(9) Measure the electrical bonding resistance between the index plate [8] and the valve adapter plate [9] (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-21.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

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28-AWL-21: CDCCL

(b) Make sure the electrical 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

(c) If the electrical bonding resistance is more than 0.0005 ohm (0.5 milliohm), then do the applicable procedure in this task: Engine Fuel Spar Valve Electrical Faying Surface Bonds Repair, TASK 28-22-11-300-801.

SUBTASK 28-22-11-820-001

(10) Do an alignment of the valve body [21] and adapter shaft (TASK 28-22-11-820-801).

SUBTASK 28-22-11-020-003

(11) Remove the index plate [8] from the valve adapter plate [9].

(a) Remove the lockwires from the two index screws [23] and index screw [24].

(b) Remove the two index screws [23] and flat washers [22].

(c) Remove the index screw [24] and flat washer [22].

(d) Carefully disassemble the index plate [8] from the valve adapter plate [9].

NOTE: The two plates are bonded with faying surface sealant.

SUBTASK 28-22-11-390-004

28-AWL-21: CDCCL

(12) Apply a fay sealed fay surface bond with sealant, A50110 or sealant, A50155 to the serrated mating surfaces on the index plate [8] (three locations) and the valve adapter plate [9] (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-21.

NOTE: Protect the alignment reference mark when you clean the valve adapter plate [9].

SUBTASK 28-22-11-420-015

(13) Do a wet installation of the index screws [23], index screw [24], and flat washers [22].

(a) Apply sealant, A50231 or sealant, A50337 to each side of the three flat washers [22].

(b) Apply sealant to the shank and threads for the two index screws [23] and index screw [24].

1) Use sealant, A50231 or sealant, A50337 for the wet installation of the index bolts.

(c) Apply sealant, A50231 or sealant, A50337 in the holes on the index plate [8] as necessary to create a continuous squeeze-out around the fastener heads.

SUBTASK 28-22-11-420-016

(14) Install the index plate [8]:

(a) Align the reference marks between the index plate [8] and valve adapter plate [9].

(b) Install the two index screws [23] and flat washers [22].

(c) Install the index screw [24] and flat washer [22].

(d) Tighten the two index screws [23] and index screw [24] to 22 ±1 in-lb (2.5 ±0.1 N·m).

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(e) Make sure that the sealant has a continuous squeeze-out along the edges of the contact surfaces.

1) If there are gaps, bubbles or voids in the sealant squeeze out, disassemble and apply more sealant.

(f) Shape the squeezed out sealant into a fillet seal (TASK 51-22-00-390-806).

(g) As an option, remove excess sealant with a dry cotton wiper, G00034.

NOTE: Do not remove the sealant below the index screws.

SUBTASK 28-22-11-765-005

(15) Measure the electrical bonding resistance between one of the mounting points on the index plate [8] and the valve adapter plate [9] (SWPM 20-20-00).

(a) Use an intrinsically safe approved bonding meter, COM-1550.

(b) If you installed the valve adapter plate [9], make sure that the electrical bonding resistance is 0.001 ohm (1.0 milliohm) or less.

(c) If the electrical bonding resistance is more than 0.001 ohm (1.0 milliohm), do the applicable procedure in this task: Engine Fuel Spar Valve Electrical Faying Surface Bonds Repair, TASK 28-22-11-300-801.

(d) If you did not install the valve adapter plate [9], make sure the electrical bonding resistance is 0.002 ohm (2.0 milliohms) or less.

(e) If the electrical bonding resistance is more than 0.002 ohm (2.0 milliohms), do the applicable procedure in this task: Engine Fuel Spar Valve Electrical Faying Surface Bonds Repair, TASK 28-22-11-300-801.

SUBTASK 28-22-11-420-017

(16) Install MS20995NC32 lockwire, G01912 or safety cable kit, G51372 from the two index screws [23] to the index plate [8].

SUBTASK 28-22-11-420-018

(17) Install MS20995NC32 lockwire, G01912 or safety cable kit, G51372 from the index screw [24] to the index plate [8].

SUBTASK 28-22-11-790-001

(18) Install the actuator [4] (TASK 28-22-11-400-801).

SUBTASK 28-22-11-370-001

(19) Apply protective finish Bonderite M-CR 600 Aero coating, C50315 to the bare areas on the front spar (Apply the Corrosion Resistant Finish (Topcoat), TASK 28-11-00-600-801).

NOTE: Apply protective finish to the front spar bare areas not covered by the fillet seal and where the electrical bonding probe removed the finish.

J. Spar Valve Operational Tests

NOTE: The tests that follow will make sure that the engine fuel spar valve electrical operation and index plate [8] alignment are correct, and that no fuel leaks from the front spar.

SUBTASK 28-22-11-860-004

(1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

(a) Install the applicable access doors:

(TASK 28-11-11-400-801).

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

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

SUBTASK 28-22-11-760-007

(2) Do these tests for the applicable engine fuel spar valve:

(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 actuator [4].

(b) Engine Fuel Spar Valve Installation - Operational Test, TASK 28-22-00-720-802.

SUBTASK 28-22-11-790-002

(3) Do this leak check if you have replaced the valve adapter plate [9]:

NOTE: The leak check is only necessary if you replaced the valve adapter plate [9] or entered the fuel tank. It is not necessary if you have replaced or aligned the index plate [8] for adjustment purposes only.

(a) Refuel the applicable fuel tank to a minimum of 4400 lb (1996 kg) to check for leaks at the front spar (TASK 12-11-00-650-803).

(b) Make sure there are no fuel leaks at the valve adapter plate [9] on the front spar.

K. Put the Airplane Back to the Usual Condition

SUBTASK 28-22-11-410-005

(1) Close the applicable access panel(s):

Number	Name/Location
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27
621BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27

——— END OF TASK ———

TASK 28-22-11-820-801

6. Engine Fuel Spar Valve Alignment

(Figure 402, Figure 404)

A. General

(1) This task has two options to align the adapter shaft:

(a) Engine Fuel Spar Valve Alignment (Alignment Tool with Handle)

(b) Engine Fuel Spar Valve Alignment (Alignment Tool with Wrench).

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-1587	Wrench - Torque, 30 in-lbs (4 N-m) Part #: TE3FUA Supplier: 55719
SPL-1771	Alignment Equipment, Fuel Shutoff Valve Part #: B28009-1 Supplier: 81205

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C. Location Zones

Zone	Area
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
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. Prepare for the Procedure

SUBTASK 28-22-11-010-017

(1) Remove the actuator [4] (TASK 28-22-11-000-801).

SUBTASK 28-22-11-020-004

(2) Remove the index plate [8] from the valve adapter plate [9].

(a) Remove the lockwires from the two index screws [23] and index screw [24].

(b) Remove the two index screws [23] and flat washers [22].

(c) Remove the index screw [24] and flat washer [22].

(d) Carefully disassemble the index plate [8] from the adapter plate.

NOTE: The two plates are bonded with faying surface sealant.

SUBTASK 28-22-11-480-001

(3) Install the alignment tool [43] (valve alignment equipment, SPL-1771) in the valve adapter plate [9], as follows:

(a) Position and align the serrated surfaces on the index plate [8] with the valve adapter plate [9].

(b) Loosely install the index screw [24] and flat washer [22] in the index plate [8].

(c) Install the alignment tool [43].

(d) Align the alignment tool [43] guide pins with the index screw holes and attach to the index plate [8].

(e) Make sure that the spline on the alignment tool [43] engages with the shaft spline.

E. Engine Fuel Spar Valve Alignment (Alignment Tool with Handle)

SUBTASK 28-22-11-820-002

(1) To align the adapter shaft on the valve adapter plate [9], do these steps:

NOTE: This procedure finds the point where the internal valve butterfly engages the valve seal. The torque necessary to turn the shaft increases when the butterfly engages the seal and decreases when the butterfly continues to turn. When you find the seal edge, turn the valve shaft to the opposite direction to center the butterfly on the seal.

(a) Align the handle in the counterclockwise position.

(b) Carefully turn the alignment tool handle clockwise until the torque necessary to turn the handle increases.

(c) If you cannot find where the torque increases, move the adapter shaft counterclockwise to its initial position.

(d) Turn the alignment tool [43] clockwise until the toque necessary to turn the handle increases, then immediately stop turning the handle.

(e) If you cannot find where the torque increases, go to the next procedure.

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(f) Read the scale indicator on the alignment tool [43].

NOTE: This is the point where the valve butterfly starts to engage the edge of the seal.

(g) Turn the handle 13 degrees clockwise to center the valve seal.

NOTE: If you turn the handle more than 13 degrees, do not turn the handle counterclockwise. Start the procedure again with the handle in the counterclockwise position.

SUBTASK 28-22-11-480-002

(2) Tighten the lockscrew [42] to keep the alignment tool [43] in its position on the valve adapter plate [9].

NOTE: The lockscrew [42] keeps the adapter shaft calibrated while the index plate [8] is aligned.

SUBTASK 28-22-11-480-003

(3) Turn the index plate [8] until the actuator mounting holes in the index plate [8] align with the alignment screws [41].

SUBTASK 28-22-11-480-004

(4) Install the two alignment screws [41] to secure the index plate [8] to the valve adapter plate [9].

SUBTASK 28-22-11-820-003

(5) Tighten the index screw [24].

SUBTASK 28-22-11-080-001

(6) Disengage the two alignment screws [41].

SUBTASK 28-22-11-080-002

(7) Loosen the lockscrew [42].

SUBTASK 28-22-11-080-003

(8) Carefully remove the alignment tool [43].

SUBTASK 28-22-11-930-001

(9) Use a fine point felt pen to apply a reference mark between the index plate [8] and the valve adapter plate [9] at one of the serrated attachment points.

F. Engine Fuel Spar Valve Alignment (Alignment Tool with Wrench)

SUBTASK 28-22-11-820-004

(1) To align the adapter shaft on the valve adapter plate [9], do these steps:

NOTE: A torque wrench (30 in-lbs), COM-1587 is necessary to do this procedure.

(a) Align the handle in the counterclockwise position.

(b) Put the torque wrench (30 in-lbs), COM-1587 in the base of the handle.

(c) Carefully turn the torque wrench (30 in-lbs), COM-1587, on the alignment tool handle, clockwise until the torque necessary to turn the handle increases.

(d) Write down the maximum torque that you applied, while you turned the torque wrench (30 in-lbs), COM-1587 in the clockwise position.

(e) Align the adapter shaft back to the initial counterclockwise position.

(f) Turn the torque wrench (30 in-lbs), COM-1587 clockwise at approximately the same rate.

(g) Stop at the position where the torque increases to approximately two-thirds of the maximum torque that you wrote.

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(h) Read the scale indicator on the alignment tool [43].

NOTE: This is the point where the valve butterfly starts to engage the edge of the seal.

(i) Turn the torque wrench (30 in-lbs), COM-1587 13 degrees clockwise to center the valve seal.

NOTE: If you turn the handle more than 13 degrees, do not turn the handle counterclockwise. Start the procedure again with the handle in the counterclockwise position.

SUBTASK 28-22-11-480-005

(2) Tighten the lockscrew [42] to keep the alignment tool [43] in its position on the valve adapter plate [9].

NOTE: The lockscrew [42] keeps the adapter shaft calibrated while the index plate [8] is aligned.

SUBTASK 28-22-11-820-005

(3) Turn the index plate [8] until the actuator mounting holes in the index plate [8] align with the alignment screws [41].

SUBTASK 28-22-11-820-006

(4) Install the two alignment screws [41] to secure the index plate [8] to the valve adapter plate [9].

SUBTASK 28-22-11-480-006

(5) Tighten the index screw [24].

SUBTASK 28-22-11-080-004

(6) Disengage the two alignment screws [41].

SUBTASK 28-22-11-080-005

(7) Loosen the lockscrew [42].

SUBTASK 28-22-11-080-006

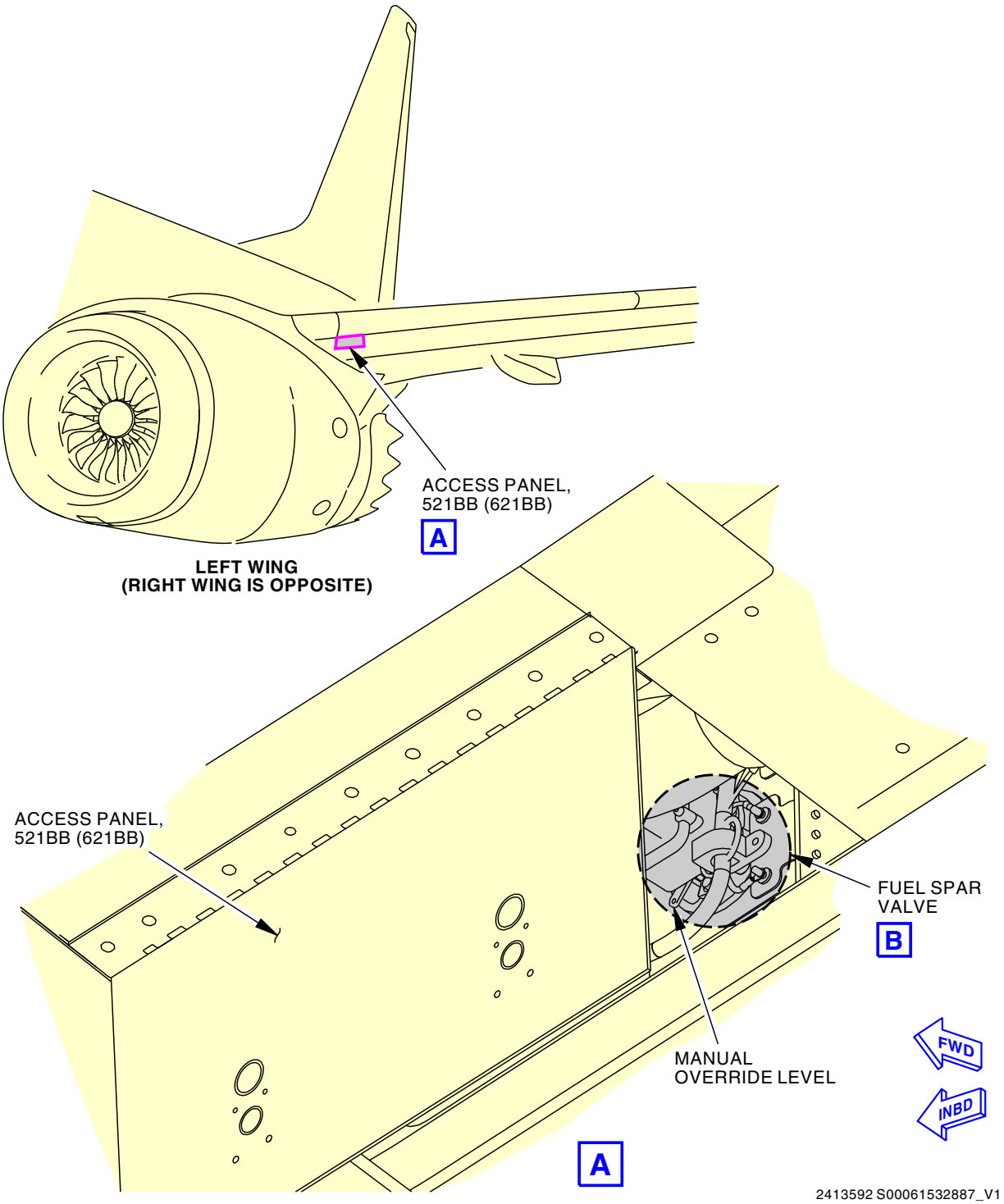
(8) Carefully remove the alignment tool [43].

SUBTASK 28-22-11-930-002

(9) Use a fine point felt pen to apply a reference mark between the index plate [8] and the valve adapter plate [9] at one of the serrated attachment points.

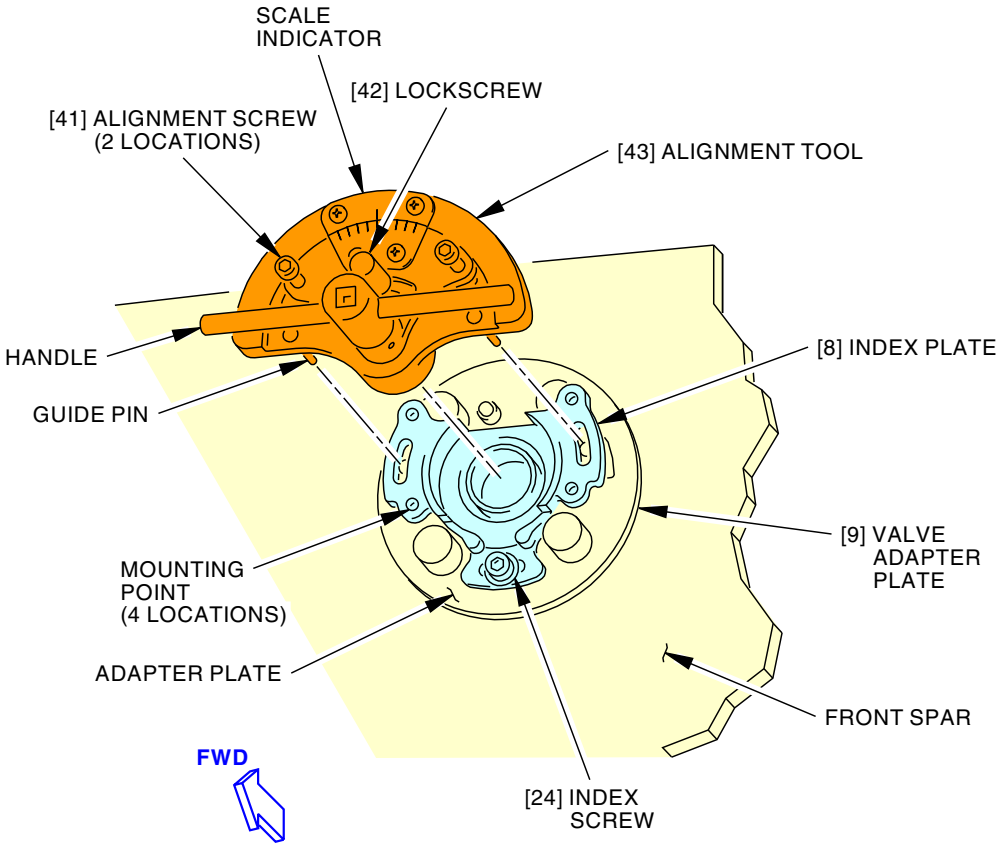
——— END OF TASK ———

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Engine Fuel Spar Valve Alignment
Figure 404/28-22-11-990-803 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Engine Fuel Spar Valve Alignment
Figure 404/28-22-11-990-803 (Sheet 2 of 2)

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TASK 28-22-11-000-803

7. Engine Fuel Spar Valve - Valve Body Removal

(Figure 405)

A. General

(1) The objective of the task is to provide instructions to remove the valve body.

B. References

Reference	Title
24-22-00-860-802	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)
28-22-15-000-803	Couplings 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)
73-11-02-000-801-G00	Fuel Filter Cartridge Removal (P/B 401)

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
532BB	Main Tank Access Door - Wing Station 265
632BB	Main Tank Access Door - Wing Station 265

E. Prepare for the Removal

SUBTASK 28-22-11-860-005

(1) On the P8 Aisle Stand, set the Engine Start Levers to the CUTOFF position.

SUBTASK 28-22-11-650-002

(2) Defuel or transfer fuel from the applicable main tank (TASK 28-26-00-650-801 or TASK 28-26-00-650-802).

SUBTASK 28-22-11-860-006

(3) Make sure that the APU master switch, on the P5 Overhead Panel, is in the OFF position.

SUBTASK 28-22-11-860-007

(4) Do these steps to make sure that 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, the applicable HPSOV is closed when the applicable engine fuel spar valve is open.

(a) Make sure that Engine Start Levers are in the CUTOFF position.

(b) Make sure that ENGINE START 1 and 2 switches are in the OFF position on the P5 Overhead Panel.

(c) Put a DO-NOT-OPERATE placard on the ENGINE START 1 and 2 switches.

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(d) Open the applicable 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) Make sure that the fuel crossfeed VALVE OPEN light is off, on the P5-2 Fuel System Module.

(f) Set the applicable Engine Start Lever to the IDLE position.

NOTE: This opens the applicable engine fuel spar valve.

(g) Make sure that the applicable SPAR VALVE CLOSED light goes off, on the P5-2 Fuel System Module.

SUBTASK 28-22-11-860-008

(5) Make sure that the defueling valve handle is in the CLOSED position.

SUBTASK 28-22-11-860-009

WARNING REMOVE ELECTRICAL POWER BEFORE YOU DISCONNECT THE FUEL, HYDRAULIC, AND ELECTRICAL LINES. INJURIES TO PERSONNEL CAN OCCUR.

(6) Make sure that electrical power has been removed (TASK 24-22-00-860-802).

SUBTASK 28-22-11-650-003

(7) Drain fuel from the fuel supply line (TASK 73-11-02-000-801-G00).

SUBTASK 28-22-11-860-010

(8) Manually turn the manual override lever on the actuator [4] to the CLOSED position.

(a) On the P8 Aisle Stand, set the Engine Start Levers to the CUTOFF position.

SUBTASK 28-22-11-650-004

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(9) Do this task for the applicable fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove the applicable access doors:

(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

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SUBTASK 28-22-11-860-011

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.

(10) Go into the fuel tank (TASK 28-11-00-910-802).

F. Valve Body Removal

SUBTASK 28-22-11-020-005

(1) Disconnect the clamshell coupling [52] (TASK 28-22-15-000-803).

(a) Discard the two O-rings [53].

SUBTASK 28-22-11-020-006

(2) Disconnect the clamshell coupling [54] (TASK 28-22-15-000-803).

(a) Discard the two O-rings [56].

SUBTASK 28-22-11-020-007

(3) Hold the valve body [21] and remove the four screws [58] and washers [57].

SUBTASK 28-22-11-020-008

(4) Disengage the valve body [21] from the adapter shaft.

(a) Do not let the adapter shaft fall and cause damage.

NOTE: Temporarily attach the adapter shaft to the structure or put soft material on or below the adapter shaft.

SUBTASK 28-22-11-020-009

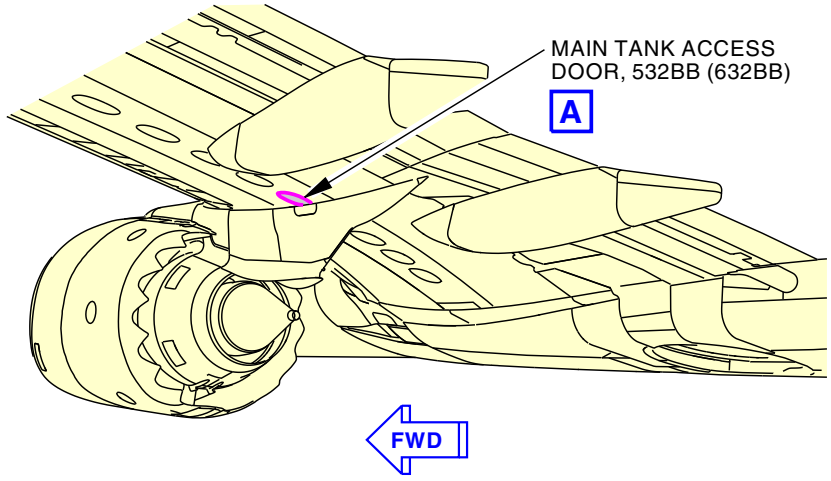
(5) Remove the valve body [21].

SUBTASK 28-22-11-480-007

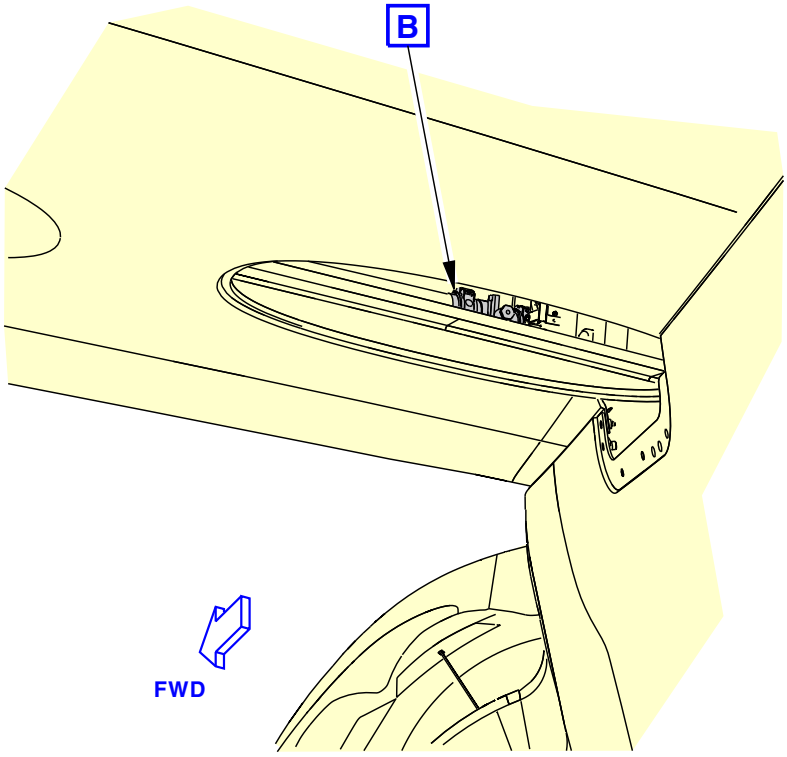
(6) Put covers on the open ends of the engine fuel line [51] and engine fuel line [55] to keep unwanted materials out.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



LEFT WING
(RIGHT WING IS EQUIVALENT)



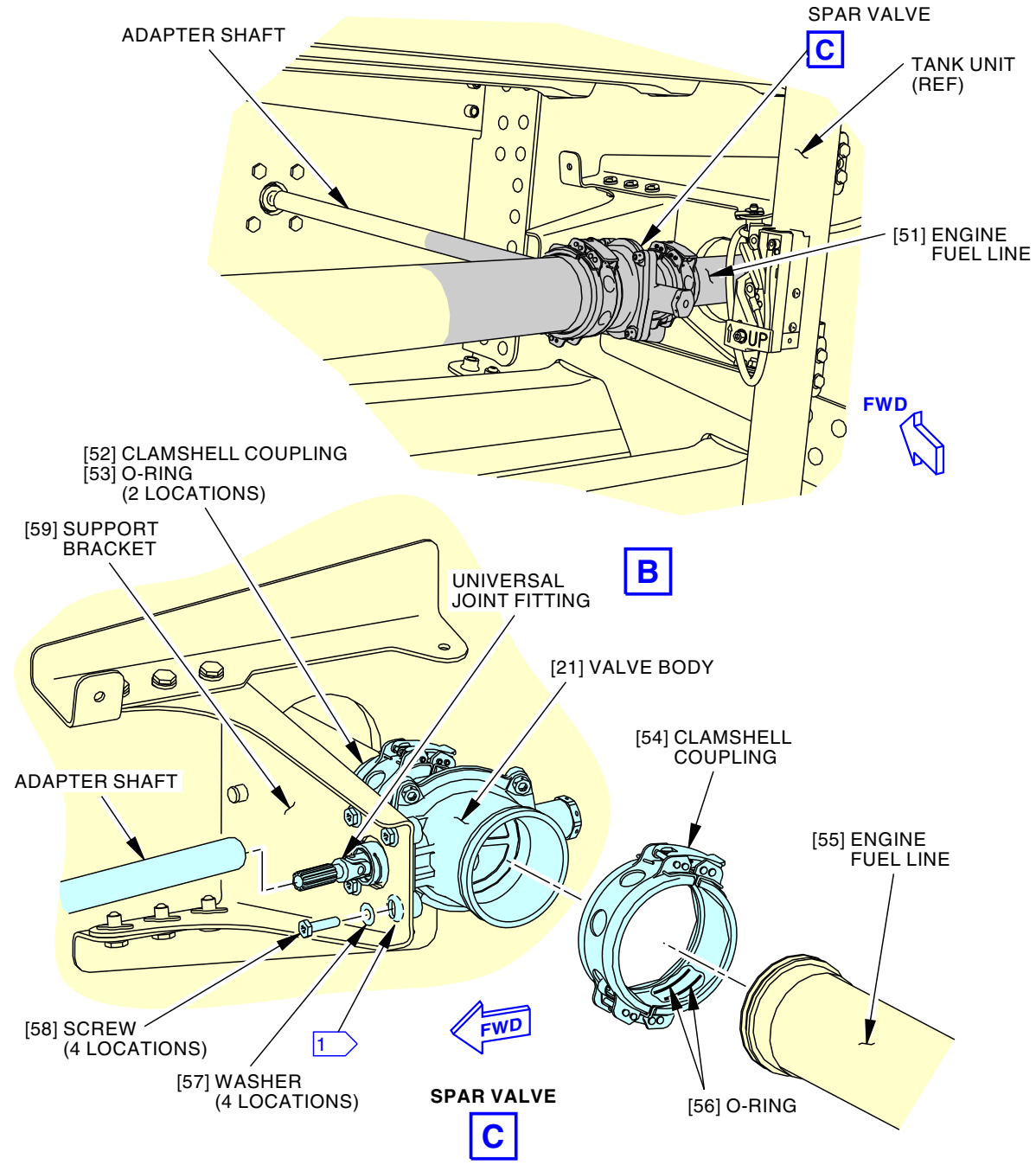
MAIN TANK ACCESS DOOR, 532BB (632BB)

A

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Valve Body Installation
Figure 405/28-22-11-990-804 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



1 PREPARE THE AREA AROUND THE FASTENER HOLES AND THE CONTACT SURFACES OF THE VALVE BODY FOR AN UNSEALED ELECTRICAL FAYING SURFACE BOND (SWPM 20-20-00).

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Valve Body Installation
Figure 405/28-22-11-990-804 (Sheet 2 of 2)

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TASK 28-22-11-400-803

8. Engine Fuel Spar Valve - Valve Body Installation

(Figure 405)

A. General

(1) The objective of the task is to provide instructions to install the valve body.

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
24-22-00-860-801	Supply Electrical Power (P/B 201)
24-22-00-860-802	Remove Electrical Power (P/B 201)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-22-00-710-802	Engine Fuel Suction Feed - Operational Test (P/B 501)
28-22-00-720-802	Engine Fuel Spar Valve Installation - Operational Test (P/B 501)
28-22-15-400-803	Couplings Installation (P/B 401)
28-22-15-710-801	Engine Fuel Feed Manifold - Leak Test (P/B 601)
71-00-00-910-808-G00	Dry Motor Procedure (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
21	Valve body	28-22-11-01-110	SIA ALL

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(Continued)

AMM Item	Description	AIPC Reference	AIPC Effectivity
21 (cont.)		28-22-11-02-110	SIA ALL

F. 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

G. Access Panels

Number	Name/Location
532BB	Main Tank Access Door - Wing Station 265
632BB	Main Tank Access Door - Wing Station 265

H. Prepare for the Installation

SUBTASK 28-22-11-860-012

(1) Make sure that the manual override lever on the actuator [4] is in the CLOSED position.

SUBTASK 28-22-11-080-007

(2) Remove the covers from the engine fuel lines [51] and engine fuel line [55].

SUBTASK 28-22-11-110-002

(3) Do these steps to prepare the support bracket [59] and the valve body [21] for installation:

(a) Clean the fay surfaces of the aluminum support bracket [59] and the aluminum valve body [21] (SWPM 20-20-00):

1) Use Cleaning Procedure 5 to clean the support bracket fay surfaces at each fastener hole.

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

a) Use a new cotton wiper, G00034 or knit cotton wiper, G51293 soaked with solvent, B00062 or solvent, B00184.

b) Use a new cotton wiper to dry the surfaces.

c) Continue to clean and dry the surface until the cotton wiper shows clean.

2) Use Cleaning Procedure 5 to clean the valve body fay surfaces.

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

a) Use a new cotton wiper, G00034 or knit cotton wiper, G51293 soaked with solvent, B00062 or solvent, B00184.

b) Use a new cotton wiper to dry the surfaces.

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c) Continue to clean and dry the surface until the cotton wiper shows clean.

I. Valve Body Installation

SUBTASK 28-22-11-420-019

(1) Turn the universal joint fitting, on the valve body [21], until the index mark aligns with the adapter shaft.

NOTE: A small misalignment of the index marks is satisfactory.

SUBTASK 28-22-11-420-020

(2) Align the valve body [21] with the adapter shaft.

SUBTASK 28-22-11-210-001

(3) Make sure that TOP shows on the top of the valve body [21].

SUBTASK 28-22-11-080-008

(4) Remove items used for protection of the adapter shaft.

(a) Do not let the adapter shaft fall and cause damage.

SUBTASK 28-22-11-420-021

(5) Engage the universal joint fitting on the valve body [21] into the adapter shaft.

SUBTASK 28-22-11-820-007

(6) Align the valve body [21] with the support bracket [59].

SUBTASK 28-22-11-420-022

(7) Install the four screws [58] and washers [57].

SUBTASK 28-22-11-220-001

(8) Measure the bonding resistance between the valve body [21] and the support bracket [59] with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

(a) Make sure that the measured resistance is below the maximum bonding resistance (SWPM 20-20-00).

SUBTASK 28-22-11-420-023

(9) Connect the clamshell coupling [52] between the valve body [21] and the engine fuel lines [51] (TASK 28-22-15-400-803).

(a) Install the two O-rings [53].

SUBTASK 28-22-11-420-024

(10) Connect the clamshell coupling [54] between the valve body [21] and the engine fuel line [55] (TASK 28-22-15-400-803).

(a) Install the two O-rings [56].

SUBTASK 28-22-11-860-013

(11) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

(a) Close these access doors:

(TASK 28-11-11-400-801)

Number	Name/Location
532BB	Main Tank Access Door - Wing Station 265
632BB	Main Tank Access Door - Wing Station 265

J. Valve Body Installation Test

SUBTASK 28-22-11-860-014

(1) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.

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SUBTASK 28-22-11-860-015

(2) Remove the applicable 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 28-22-11-710-002

(3) Do one of these tests:

(a) Do a leak test of the engine fuel feed manifold.

1) Do this task: Engine Fuel Feed Manifold - Leak Test, TASK 28-22-15-710-801.

2) On the P5 Overhead Panel, remove the DO-NOT-OPERATE placards from the ENGINE START 1 and 2 switches.

3) Do this task: Engine Fuel Spar Valve Installation - Operational Test, TASK 28-22-00-720-802.

CAUTION DO NOT MOTOR THE ENGINE BEFORE VERIFYING THAT THE FUEL SPAR VALVE IS IN THE OPEN POSITION AND FUEL BOOST PUMP PRESSURE IS APPLIED TO THE FUEL PUMP INLET. THE FUEL PUMP AND THE HYDRO MECHANICAL UNIT ARE FUEL LUBRICATED, ZERO FUEL PRESSURE CAN CAUSE DAMAGE TO THE FUEL PUMP AND THE HYDRO MECHANICAL UNIT.

4) If it is necessary to dry motor the engine, apply the boost pump pressure to the fuel pump inlet (TASK 71-00-00-910-808-G00).

(b) Do an operational test for the engine fuel suction feed system.

NOTE: When you do this test, you must first do a leak check of the engine fuel spar valve that was replaced.

1) On the P5 Overhead Panel, remove the DO-NOT-OPERATE placards from the ENGINE START 1 and 2 switches.

2) Do this task: Engine Fuel Spar Valve Installation - Operational Test, TASK 28-22-00-720-802.

3) Do this task: Engine Fuel Suction Feed - Operational Test, TASK 28-22-00-710-802.

K. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-11-650-005

(1) Refuel the applicable main tank (TASK 12-11-00-650-803).

SUBTASK 28-22-11-860-016

(2) Remove electrical power when necessary (TASK 24-22-00-860-802).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

ENGINE FUEL SPAR VALVE - INSPECTION/CHECK

1. General

A. This procedure has this task for the engine fuel spar valve system:

(1) Engine Fuel Spar Valve Actuator - Bonding Resistance Check.

TASK 28-22-11-200-801

2. Engine Fuel Spar Valve Actuator - Bonding Resistance Check

(Figure 601)

A. General

(1) The engine fuel spar valve actuator is referred to as the actuator in this task.

B. References

Reference	Title
28-22-00-710-801	Engine Fuel Spar Valve - Electrical Control and Indication Test (P/B 501)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES
SWPM 20-20-10	Replacement of Ground Studs and Bonding Jumper Installation

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

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 27
621BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27

F. Prepare for the Bonding Resistance Check

SUBTASK 28-22-11-865-003

(1) For the left spar valve, open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	5	C00540	FUEL SPAR VALVE IND

SUBTASK 28-22-11-865-004

(2) For the right spar valve, 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	5	C00540	FUEL SPAR VALVE IND

SUBTASK 28-22-11-010-018

(3) Open the applicable access panels:

Number	Name/Location
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27
621BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27

G. Electrical Bonding Measurement

SUBTASK 28-22-11-710-003

(1) On the actuator, move the manual override lever to the CLOSED position.

SUBTASK 28-22-11-862-003

(2) Disconnect the electrical connector from the actuator.

SUBTASK 28-22-11-765-006

(3) Measure the electrical bonding resistance between the actuator (at the electrical connector flange) and the front spar with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00 and SWPM 20-20-10).

(a) Make sure that the electrical bonding resistance is 0.005 ohm (5.0 milliohms) or less.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-11-861-002

(1) Connect the electrical connector to the actuator.

SUBTASK 28-22-11-410-006

(2) Close the applicable access panels:

Number	Name/Location
521BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27
621BB	Engine Fuel Valve Shutoff Access Panel - Slat Station 27

SUBTASK 28-22-11-865-005

(3) 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
B	5	C00540	FUEL SPAR VALVE IND

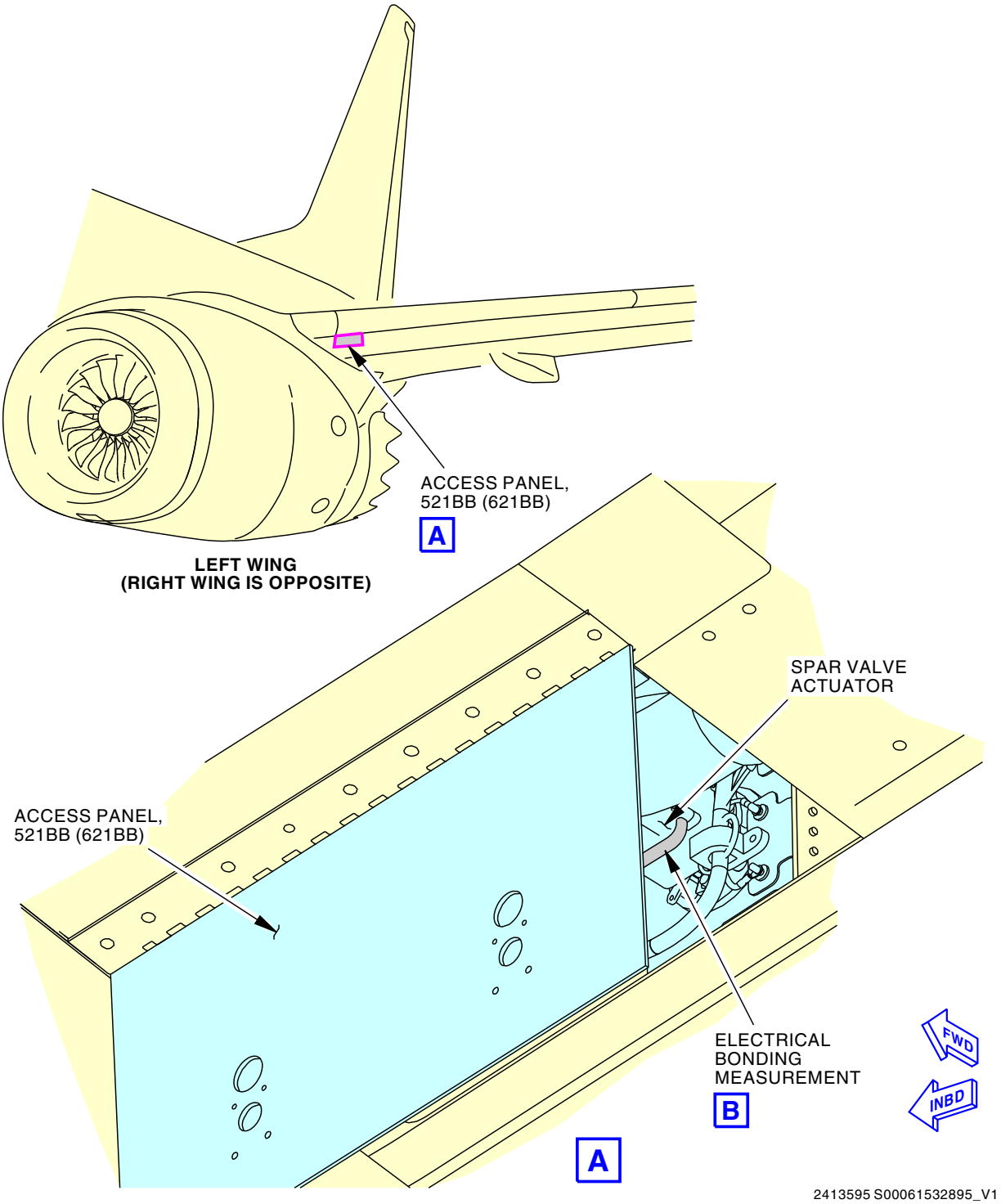
ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-11-760-008

(4) Do this task: Engine Fuel Spar Valve - Electrical Control and Indication Test, TASK 28-22-00-710-801.

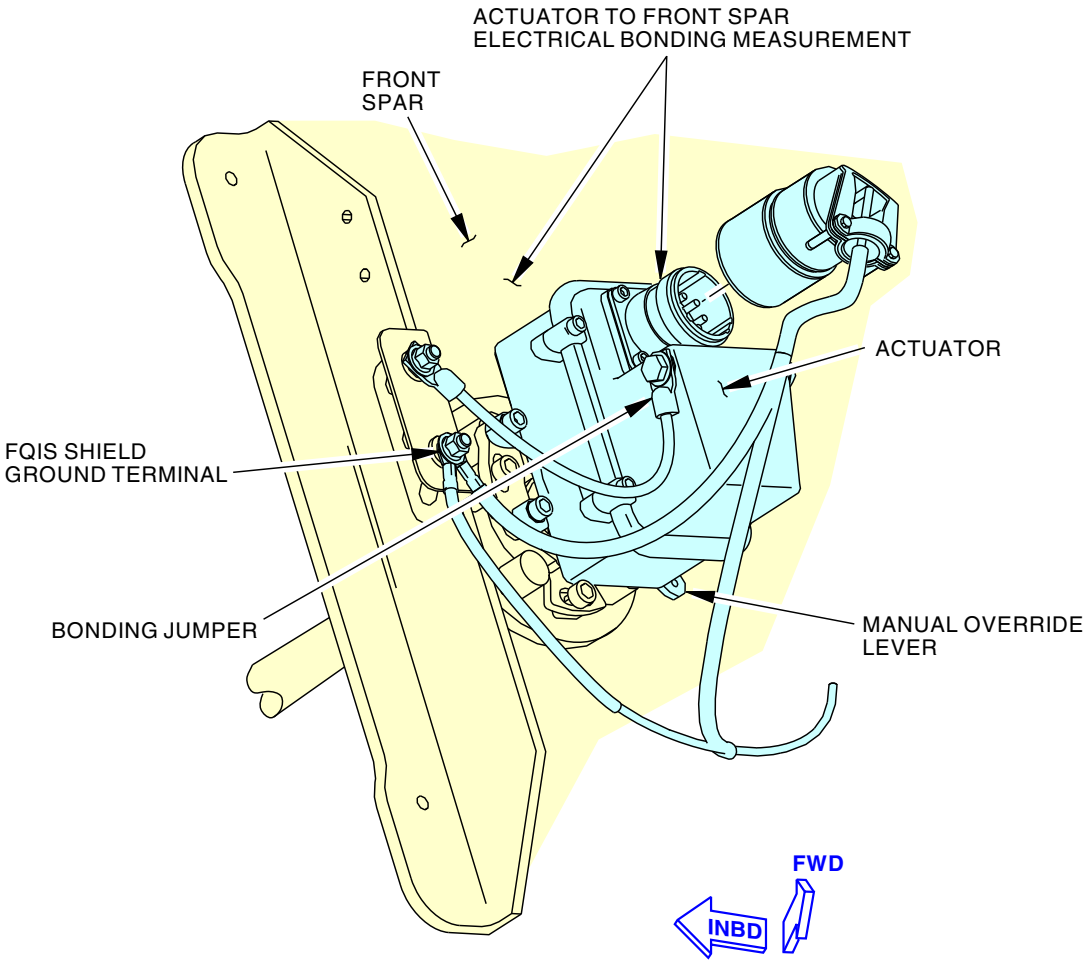
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Engine Fuel Spar Valve Actuator - Bonding Resistance Check
Figure 601/28-22-11-990-806 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



ELECTRICAL BONDING MEASUREMENT

B

2413596 S00061532896_V1

Engine Fuel Spar Valve Actuator - Bonding Resistance Check
Figure 601/28-22-11-990-806 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

WATER SCAVENGE JET PUMP - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) A removal of the Center Tank Water Scavenge Jet Pump Nozzle Assembly

(2) An installation of the Center Tank Water Scavenge Jet Pump Nozzle Assembly

(3) A removal of the Main Tank Water Scavenge Jet Pump Nozzle Assembly

(4) An installation of the Main Tank Water Scavenge Jet Pump Nozzle Assembly

(5) A removal of the Center Tank Water Scavenge Jet Pump

(6) An installation of the Center Tank Water Scavenge Jet Pump

(7) A removal of the Main Tank Water Scavenge Jet Pump

(8) An installation of the Main Tank Water Scavenge Jet Pump.

B. There is one water scavenge jet pump in each main tank.

C. There are two water scavenge jet pumps in the center tank.

TASK 28-22-13-000-801

2. Center Tank Water Scavenge Jet Pump Nozzle Assembly Removal

(Figure 401)

A. General

(1) This task gives instructions to remove the center tank water scavenge jet pump nozzle assembly.

(2) The center tank water scavenge jet pump nozzle assembly is referred to as the nozzle assembly in this task.

B. References

Reference	Title
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

C. Tools/Equipment

Reference	Description
STD-6646	Container - Fuel Resistant

D. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
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. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door

F. Prepare for the Removal

SUBTASK 28-22-13-860-001

(1) On the P5-2 Fuel System Module, set the FUEL PUMPS CTR L and R switches to the OFF position.

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SUBTASK 28-22-13-860-022

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.

(2) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-22-13-010-014

(3) Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-22-13-860-002

WARNING WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-22-13-480-001

(5) Put a fuel resistant container, STD-6646, below the nozzle assembly [4].

G. Center Tank Water Scavenge Jet Pump Nozzle Assembly Removal

SUBTASK 28-22-13-020-002

(1) Remove the safety cable [1] (or lockwire) from the nozzle assembly [4].

SUBTASK 28-22-13-010-001

(2) Remove the nozzle assembly [4]:

NOTE: The nozzle assembly consists of a pump nozzle and nozzle plug that are removed as one unit.

(a) Remove the nozzle assembly [4] and O-ring [3] from the pump housing [2].

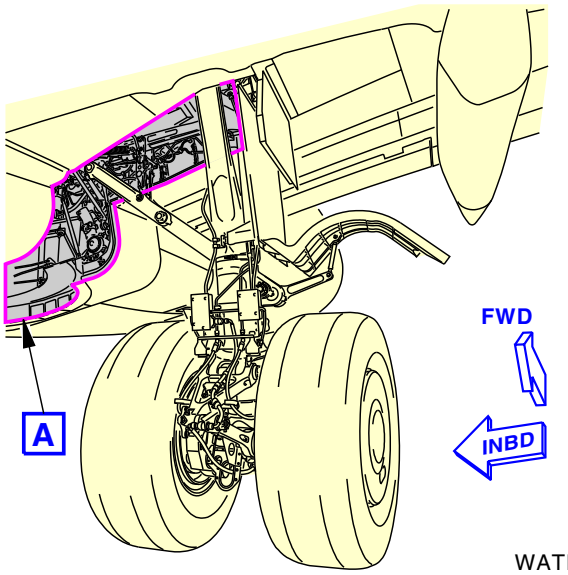
NOTE: The internal check valve in the pump housing closes to prevent fuel spills.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

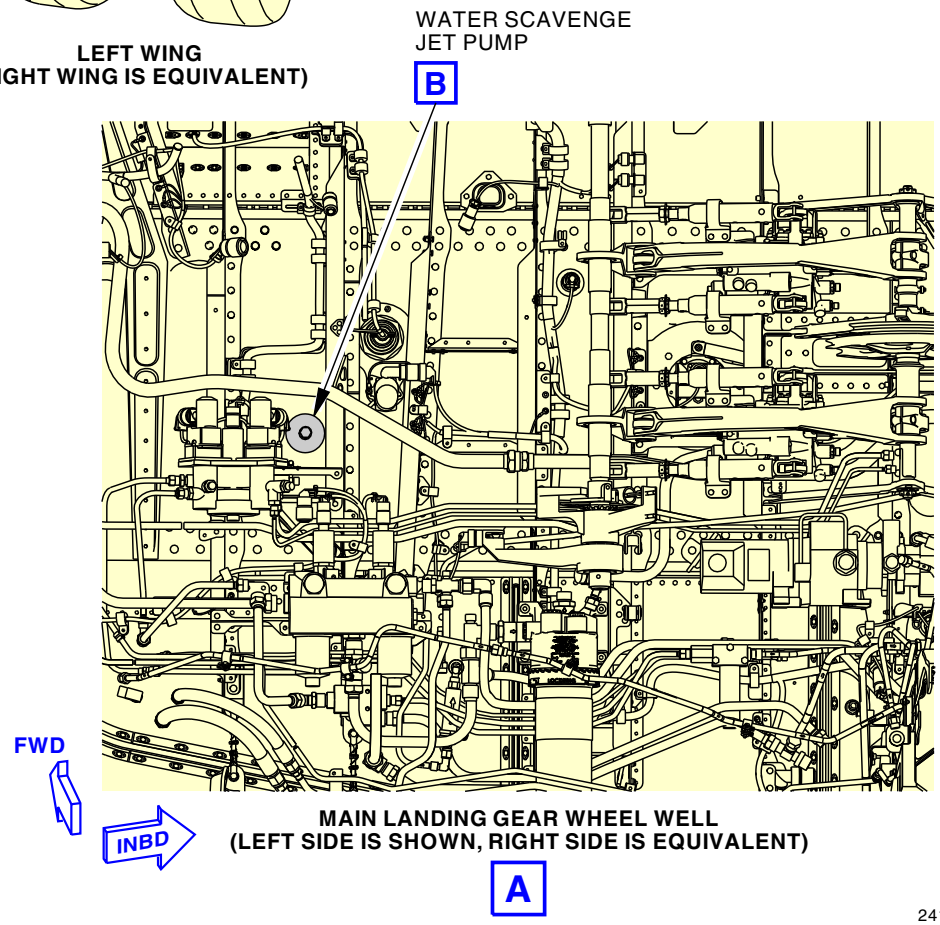
(b) Discard the O-ring [3].

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



LEFT WING
(RIGHT WING IS EQUIVALENT)

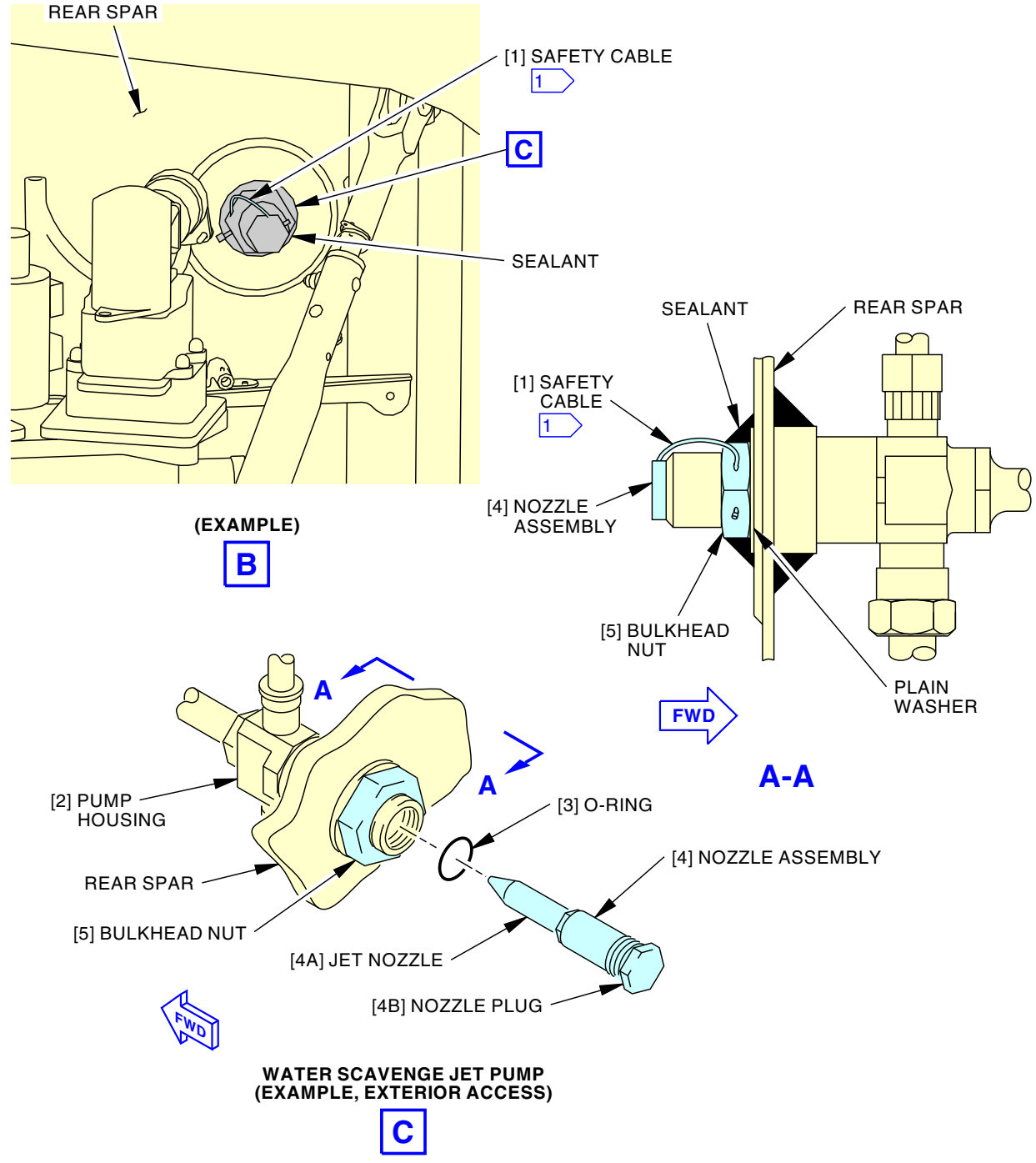


MAIN LANDING GEAR WHEEL WELL
(LEFT SIDE IS SHOWN, RIGHT SIDE IS EQUIVALENT)

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Center Tank Water Scavenge Jet Pump Nozzle Assembly Installation
Figure 401/28-22-13-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



1 SAFETY CABLE PREFERRED, LOCKWIRE ALTERNATE

2413598 S00061532901_V1

Center Tank Water Scavenge Jet Pump Nozzle Assembly Installation
Figure 401/28-22-13-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-13-400-801

3. Center Tank Water Scavenge Jet Pump Nozzle Assembly Installation

(Figure 401)

A. General

(1) This task gives instructions to install the center tank water scavenge jet pump nozzle assembly.

(2) The center tank water scavenge jet pump nozzle assembly is referred to as the nozzle assembly in this task.

B. References

Reference	Title
20-10-34-110-802	Clean Bare, Clad, or Plated Metal with Solvent (P/B 701)
20-10-44-400-801	Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401)
51-22-00-390-806	Fillet Seal Application (P/B 201)

C. Consumable Materials

Reference	Description	Specification
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142 Type II
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
B50226	Solvent - Citra-Safe	
D00504	Grease - Petrolatum	VV-P-236
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G50347	Lockwire - MS20995NC32, Monel - 0.032 Inch (0.8128 mm) Diameter	NASM20995
G51372	Kit - Safety Cable, 321 CRES - 0.035 +/-0.003 Inch (1.0 mm) Diameter, (Contains both Cable and Ferrule), 12 Inches Long	BACC13AT3K

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	O-ring	28-22-13-01-097	SIA ALL
4A	Jet nozzle	28-22-13-01-098	SIA ALL
		28-22-13-05-158	SIA ALL
		28-22-13-06-158	SIA ALL
4B	Nozzle plug	28-22-13-01-096	SIA ALL
		28-22-13-05-156	SIA ALL
		28-22-13-06-156	SIA ALL

E. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door

G. Prepare for the Installation

SUBTASK 28-22-13-100-001

(1) Do these steps to prepare the nozzle assembly [4] and the rear spar for installation:

(a) Remove the sealant from the rear spar, do this task: Clean Bare, Clad, or Plated Metal with Solvent, TASK 20-10-34-110-802.

(b) Clean the bulkhead nut and the fay surfaces on the aluminum pump housing [2].

1) Clean the surface beyond the area to be sealed to prevent contamination.

2) Use a new cotton wiper, G00034, made wet a citra-safe solvent, B50226 or solvent, B00184.

3) Dry the area with a clean cotton wiper, G00034.

4) Continue to clean and dry the surface until the cotton wiper shows clean.

SUBTASK 28-22-13-211-005

(2) Examine the pump housing [2] for these conditions:

(a) jet nozzle [4A]

1) Nicks or scratches on the conical taper

2) Nicks or scratches on the orifice tip

3) Worn surface areas through the anodize finish.

(b) nozzle plug [4B]

1) Crossed, stripped or damaged threads

2) Nicks or scratches on the packing groove

3) Wear on the hex head

4) Worn surface areas through the anodize finish.

SUBTASK 28-22-13-900-001

(3) If the nozzle plug [4B] is damaged or worn, replace it.

(a) Remove the jet nozzle [4A] from the nozzle plug [4B].

(b) Screw the new jet nozzle [4A] in the nozzle plug [4B].

(c) Tighten the nozzle plug [4B] to 71 ±4 in-lb (8.0 ±0.5 N·m).

SUBTASK 28-22-13-900-002

(4) If the jet nozzle [4A] is damaged or worn, replace it.

(a) Remove the jet nozzle [4A] from the nozzle plug [4B].

(b) Screw the new jet nozzle [4A] in the nozzle plug [4B].

(c) Tighten the nozzle plug [4B] to 71 ±4 in-lb (8.0 ±0.5 N·m).

SUBTASK 28-22-13-640-001

(5) Apply a thin layer of grease, D00504 to the new O-ring [3].

SUBTASK 28-22-13-420-005

(6) Install the O-ring [3] on the nozzle assembly [4].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

H. Center Tank Water Scavenge Jet Pump Nozzle Assembly Installation

SUBTASK 28-22-13-420-006

(1) Install the nozzle assembly [4] in the pump housing [2].

SUBTASK 28-22-13-420-007

(2) Tighten the nozzle assembly [4] to 160 ±5 in-lb (18.1 ±0.6 N·m).

SUBTASK 28-22-13-420-008

(3) Install safety cable [1] between the nozzle assembly [4] and bulkhead nut [5] (TASK 20-10-44-400-801).

NOTE: The safety cable kit, G51372 is preferred to MS20995NC32 lockwire, G50347 for the safety cable.

SUBTASK 28-22-13-390-001

(4) Apply sealant, A02315 between the rear spar and nozzle assembly [4] (TASK 51-22-00-390-806).

I. Center Tank Water Scavenge Jet Pump Nozzle Assembly Installation Test

SUBTASK 28-22-13-860-015

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-22-13-410-015

(2) Close this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-22-13-860-016

(3) On the P5-2 Fuel System Module, set the applicable FUEL PUMPS CTR L or R switch to the ON position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-13-210-003

(4) Look for leakage at the pump housing [2].

(a) If leakage occurs, repeat this procedure.

SUBTASK 28-22-13-860-017

(5) Set the FUEL PUMPS CTR L or R switch to the OFF position.

——— END OF TASK ———

TASK 28-22-13-000-802

4. Main Tank Water Scavenge Jet Pump Nozzle Assembly Removal

(Figure 402)

A. General

(1) This task gives instructions to remove the main tank water scavenge jet pump nozzle assembly.

(2) The main tank water scavenge jet pump nozzle assembly is referred to as the nozzle assembly in this task.

B. References

Reference	Title
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

C. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
551	Left Wing - Rear Spar To Landing Gear Support Beam
651	Right Wing - Rear Spar to Landing Gear Support Beam

D. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door
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

E. Prepare for the Removal

SUBTASK 28-22-13-860-003

(1) On the P5-2 Fuel System Module, set these switches to the OFF position:

(a) FUEL PUMPS 1 AFT

(b) FUEL PUMPS 1 FWD

(c) FUEL PUMPS 2 AFT

(d) FUEL PUMPS 2 FWD.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-13-480-006

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.

(2) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-22-13-010-015

(3) Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-22-13-860-004

WARNING WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(4) Open the applicable circuit breakers and install safety tags:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

SUBTASK 28-22-13-010-009

(5) 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

F. Main Tank Water Scavenge Jet Pump Nozzle Assembly Removal

SUBTASK 28-22-13-020-003

(1) Remove the safety cable [1] (or lockwire) from the nozzle assembly [4].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-13-010-002

(2) Remove the nozzle assembly [4]:

NOTE: The nozzle assembly consists of a pump nozzle and nozzle plug that are removed as one unit.

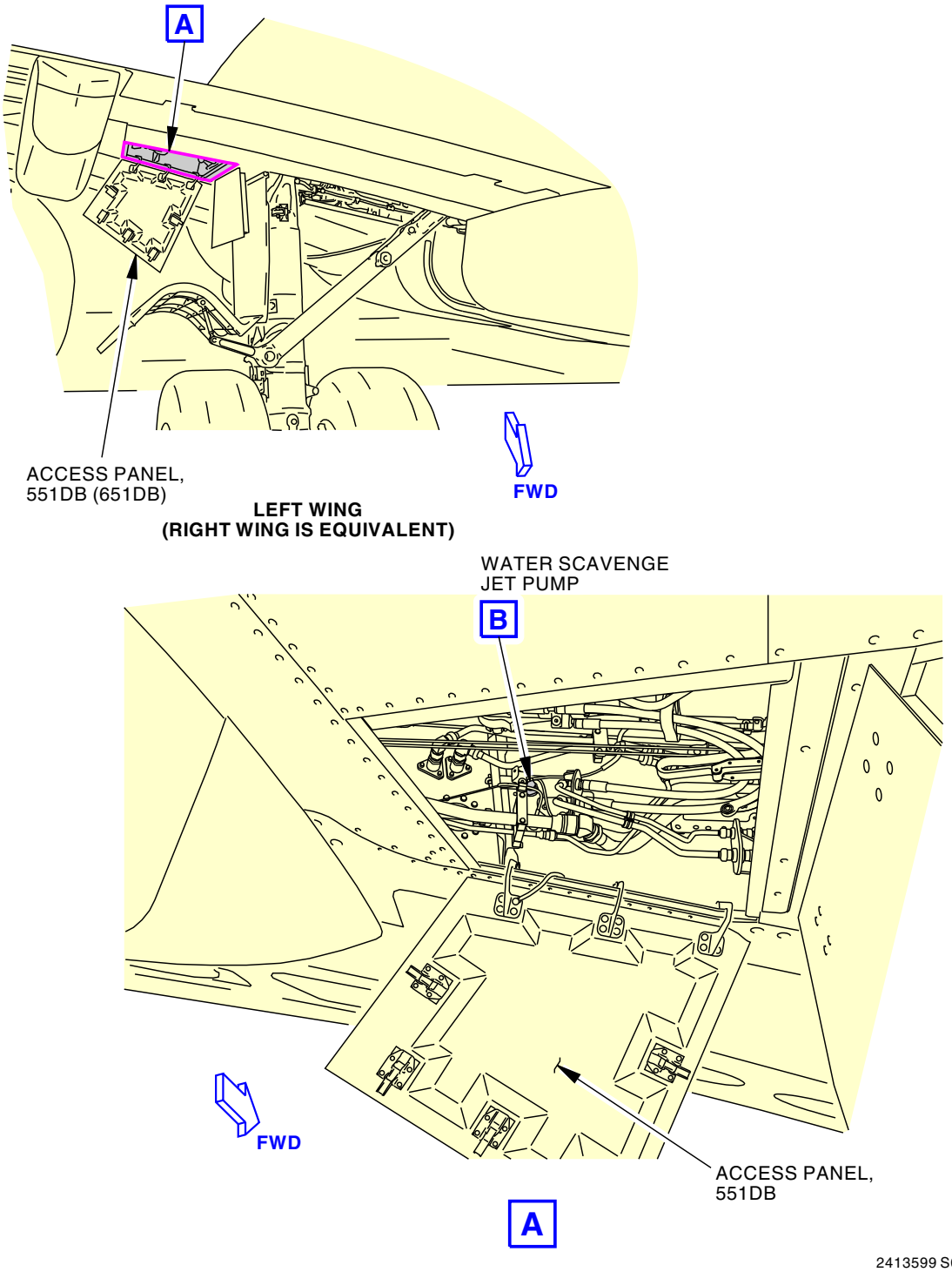
(a) Remove the nozzle assembly [4] and O-ring [5] from the pump housing [2].

NOTE: An internal check valve in the pump housing closes to prevent fuel spills.

(b) Discard the O-ring [5].

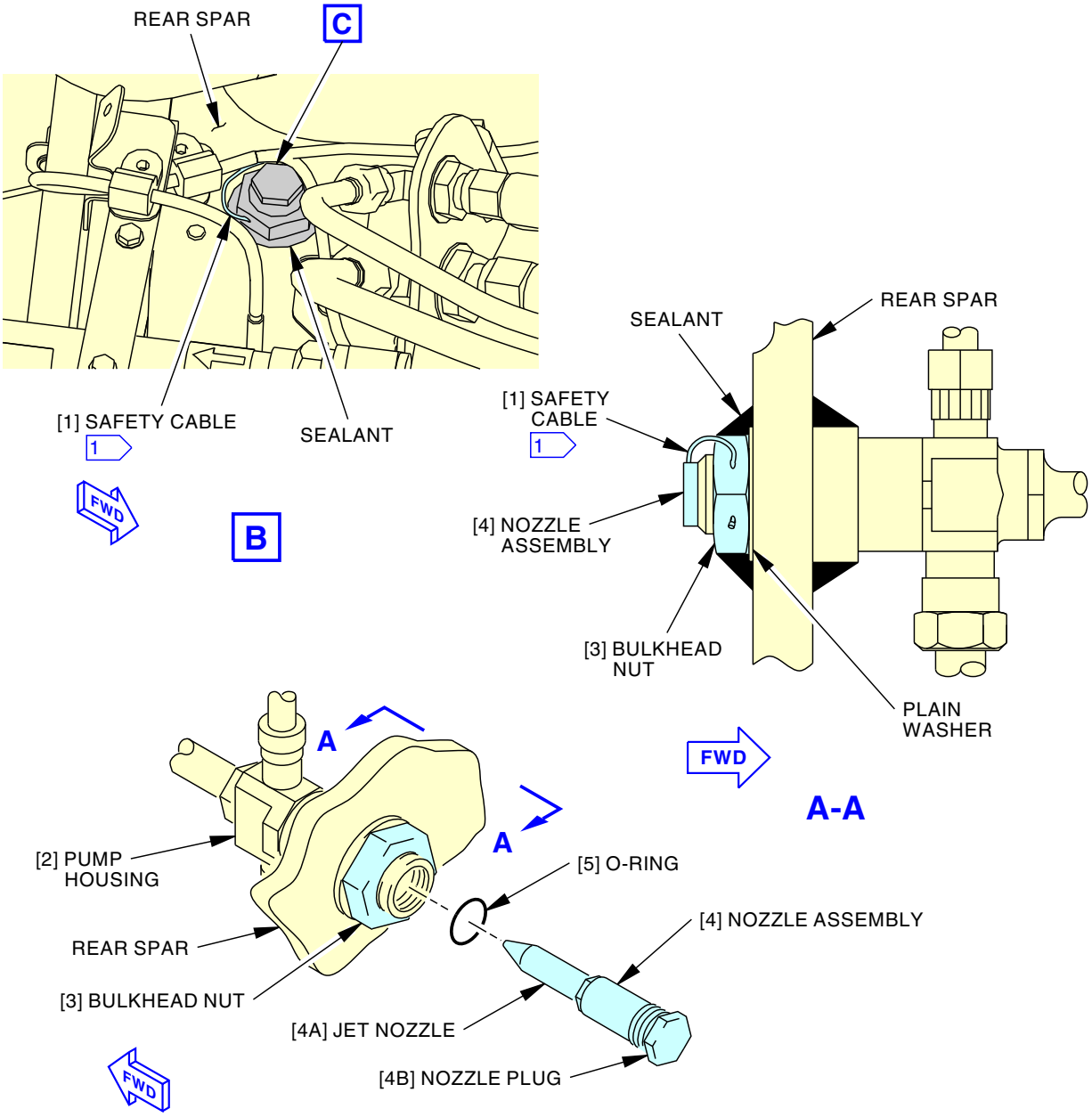
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Main Tank Water Scavenge Jet Pump Nozzle Assembly Installation
Figure 402/28-22-13-990-802 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



WATER SCAVENGE JET PUMP (EXAMPLE, EXTERIOR ACCESS)

C

1 SAFETY CABLE PREFERRED, LOCKWIRE ALTERNATE

2413600 S00061532905_V1

Main Tank Water Scavenge Jet Pump Nozzle Assembly Installation
Figure 402/28-22-13-990-802 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-13-400-802

5. Main Tank Water Scavenge Jet Pump Nozzle Assembly Installation

(Figure 402)

A. General

(1) This task gives instructions to install the main tank water scavenge jet pump nozzle assembly.

(2) The main tank water scavenge jet pump nozzle assembly is referred to as the nozzle assembly in this task.

B. References

Reference	Title
20-10-34-110-802	Clean Bare, Clad, or Plated Metal with Solvent (P/B 701)
20-10-44-400-801	Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401)
51-22-00-390-806	Fillet Seal Application (P/B 201)

C. Consumable Materials

Reference	Description	Specification
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142 Type II
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
B50226	Solvent - Citra-Safe	
D00504	Grease - Petrolatum	VV-P-236
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G50347	Lockwire - MS20995NC32, Monel - 0.032 Inch (0.8128 mm) Diameter	NASM20995
G51372	Kit - Safety Cable, 321 CRES - 0.035 +/-0.003 Inch (1.0 mm) Diameter, (Contains both Cable and Ferrule), 12 Inches Long	BACC13AT3K

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
4A	Jet nozzle	28-22-13-01-098	SIA ALL
		28-22-13-05-158	SIA ALL
		28-22-13-06-158	SIA ALL
4B	Nozzle plug	28-22-13-01-096	SIA ALL
		28-22-13-05-156	SIA ALL
		28-22-13-06-156	SIA ALL
5	O-ring	28-22-13-05-157	SIA ALL
		28-22-13-06-157	SIA ALL

E. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
551	Left Wing - Rear Spar To Landing Gear Support Beam
651	Right Wing - Rear Spar to Landing Gear Support Beam

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door
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

G. Prepare for the Installation

SUBTASK 28-22-13-100-002

(1) Do these steps to prepare the nozzle assembly [4] and rear spar for installation:

(a) Remove the sealant from the rear spar, do this task: Clean Bare, Clad, or Plated Metal with Solvent, TASK 20-10-34-110-802.

(b) Clean the bulkhead nut [3] and the fay surfaces on the aluminum pump housing [2].

1) Clean the surface beyond the area to be sealed to prevent contamination.

2) Use a new cotton wiper, G00034, made wet with citra-safe solvent, B50226 or solvent, B00184.

3) Dry the area with a clean cotton wiper, G00034.

4) Continue to clean and dry the surface until the cotton wiper shows clean.

SUBTASK 28-22-13-211-006

(2) Examine the pump housing [2] for these conditions:

(a) jet nozzle [4A]

1) Nicks or scratches on the conical taper

2) Nicks or scratches on the orifice tip

3) Worn surface areas through the anodize finish.

(b) nozzle plug [4B]

1) Crossed, stripped or damaged threads

2) Nicks or scratches on the packing groove

3) Wear on the hex head

4) Worn surface areas through the anodize finish.

SUBTASK 28-22-13-900-003

(3) If the nozzle plug [4B] is damaged or worn, replace it.

(a) Remove the jet nozzle [4A] from the nozzle plug [4B].

(b) Screw the new jet nozzle [4A] in the nozzle plug [4B].

(c) Tighten the nozzle plug [4B] to 71 ±4 in-lb (8.0 ±0.5 N·m).

SUBTASK 28-22-13-900-004

(4) If the jet nozzle [4A] is damaged or worn, replace it.

(a) Remove the jet nozzle [4A] from the nozzle plug [4B].

(b) Screw the new jet nozzle [4A] in the nozzle plug [4B].

(c) Tighten the nozzle plug [4B] to 71 ±4 in-lb (8.0 ±0.5 N·m).

SUBTASK 28-22-13-640-002

(5) Apply a thin layer of grease, D00504 to the new O-ring [5].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-13-420-009

(6) Install the O-ring [5] on the nozzle assembly [4].

H. Main Tank Water Scavenge Jet Pump Nozzle Assembly Installation

SUBTASK 28-22-13-420-010

(1) Install the nozzle assembly [4] in the pump housing [2].

SUBTASK 28-22-13-420-011

(2) Tighten the nozzle assembly [4] to 160 ±5 in-lb (18.1 ±0.6 N·m).

SUBTASK 28-22-13-420-012

(3) Install a safety cable [1] between the nozzle assembly [4] and the bulkhead nut [3] (TASK 20-10-44-400-801).

NOTE: The safety cable kit, G51372 is preferred to MS20995NC32 lockwire, G50347 for the safety cable.

SUBTASK 28-22-13-390-002

(4) Apply sealant, A02315 between the rear spar and nozzle assembly [4] (TASK 51-22-00-390-806).

I. Main Tank Water Scavenge Jet Pump Nozzle Assembly Installation Test

SUBTASK 28-22-13-860-018

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

SUBTASK 28-22-13-410-016

(2) Close this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-13-860-019

(3) On the P5-2 Fuel System Module, set the FUEL PUMPS 1 AFT or FUEL PUMPS 2 AFT switch to the ON position.

SUBTASK 28-22-13-210-004

(4) Look for leakage at the pump housing [2].

(a) If leakage occurs, repeat this procedure.

SUBTASK 28-22-13-860-020

(5) Set the FUEL PUMPS 1 AFT or FUEL PUMPS 2 AFT switch to the OFF position.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-13-410-003

(1) Close 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

——— END OF TASK ———

TASK 28-22-13-000-803

6. Center Tank Water Scavenge Jet Pump Removal

(Figure 401, Figure 403)

A. General

(1) This task gives instructions to remove the center tank water scavenge jet pump.

(2) The center tank water scavenge jet pump nozzle assembly is referred to as the nozzle assembly in this task.

B. 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)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

C. Tools/Equipment

Reference	Description
STD-7423	Cover - Protective Tube

D. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

E. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door
131AB	Center Tank Access

F. Prepare for the Removal

SUBTASK 28-22-13-480-007

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.

(1) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-22-13-840-001

(2) Defuel or transfer fuel from the center tank and No. 1 main tank (TASK 28-26-00-650-801 or TASK 28-26-00-650-802).

SUBTASK 28-22-13-860-005

(3) On the P5-2 Fuel System Module, set the FUEL PUMPS CTR L and R switches to the OFF position.

SUBTASK 28-22-13-010-017

(4) Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-22-13-860-006

WARNING WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-13-010-010

(6) Remove the nozzle assembly [4] (TASK 28-22-13-000-801).

SUBTASK 28-22-13-840-002

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(7) Do this task for the center tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access door:

(TASK 28-11-31-000-801)

Number	Name/Location
131AB	Center Tank Access

G. Center Tank Water Scavenge Jet Pump Removal

SUBTASK 28-22-13-020-004

(1) Remove the bulkhead nut [5] and plain washer [18] from the pump housing [2], from out of the fuel tank.

SUBTASK 28-22-13-010-011

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-22-13-020-005

(3) Remove the sealant from the rear spar and pump housing [2], in the fuel tank.

SUBTASK 28-22-13-020-006

(4) Disconnect the B-nut [12] between the motive flow line [11] and the pump housing [2].

SUBTASK 28-22-13-020-007

(5) Disconnect the B-nut [16] between the scavenge inlet line [15] and the pump housing [2].

SUBTASK 28-22-13-020-008

(6) Disconnect the B-nut [13] between the outlet line [14] and the pump housing [2].

SUBTASK 28-22-13-020-009

(7) Remove the pump housing [2].

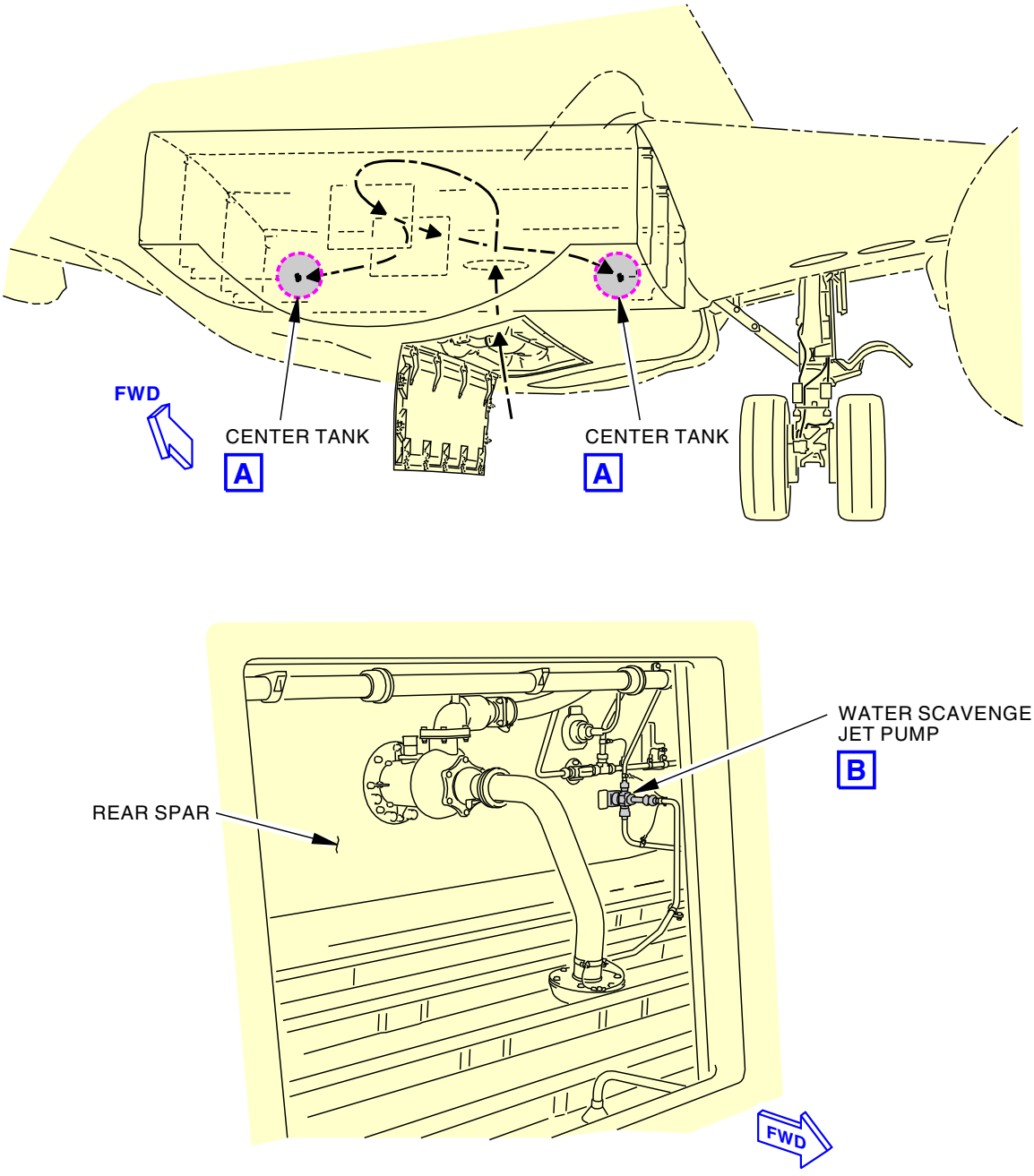
(a) Discard the O-ring [17].

SUBTASK 28-22-13-480-002

(8) Install protective covers, STD-7423, on the open fuel lines to keep unwanted materials out.

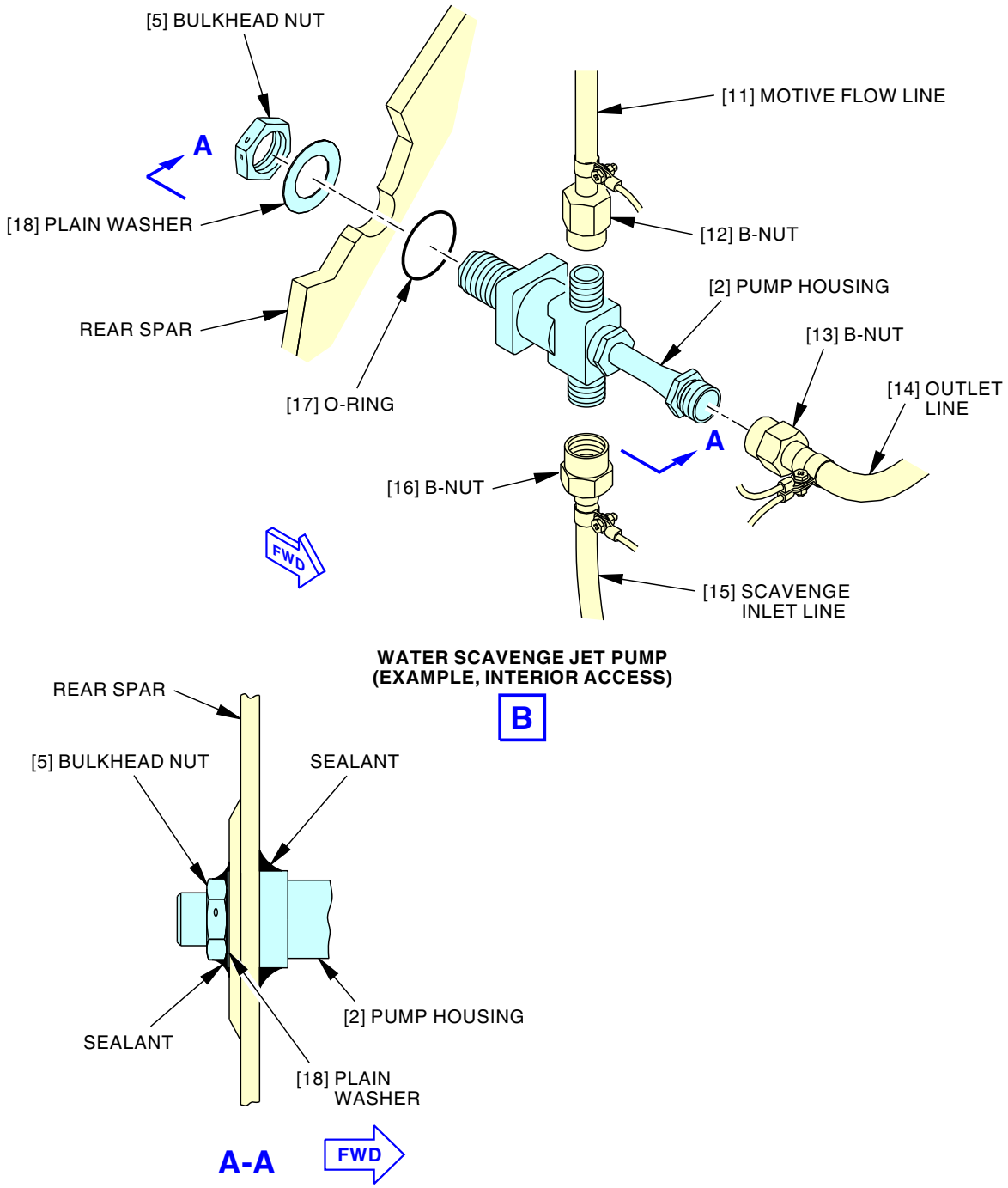
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Center Tank Water Scavenge Jet Pump Installation
Figure 403/28-22-13-990-803 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Center Tank Water Scavenge Jet Pump Installation
Figure 403/28-22-13-990-803 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-13-400-803

7. Center Tank Water Scavenge Jet Pump Installation

(Figure 403)

A. General

(1) This task gives instructions to install the center tank water scavenge jet pump.

B. References

Reference	Title
20-10-34-110-802	Clean Bare, Clad, or Plated Metal with Solvent (P/B 701)
20-10-51-400-801	Flareless Tubing Assembly Installation (P/B 401)
28-11-00-300-803	Repair of Sealant Leaks in the Fuel Tank Structure (P/B 801)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-22-41-710-801	Fuel Boost Pump - Operational Test (P/B 501)
51-22-00-390-806	Fillet Seal Application (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142 Type II
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
C50315	Coating - Chemical Conversion - Bonderite M-CR 600 Aero (Formerly Alodine 600)	BAC5719 Class A, C or D, MIL-DTL-81706 Type I Class 1A or 3
D00504	Grease - Petrolatum	VV-P-236
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G50398	Pad - Adbrasive, Scotch-Brite Type S, Abrasive Pad	

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(Continued)

Reference	Description	Specification
G50492	Pad - 3M Scotch Brite 7448 Ultra Fine Pad	MIL-A-9962A Type III Grade AAA
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Pump housing	28-22-13-01-095	SIA ALL
		28-22-13-05-155	SIA ALL
		28-22-13-06-155	SIA ALL
17	O-ring	28-22-13-01-100	SIA ALL
		28-22-13-05-160	SIA ALL
		28-22-13-06-160	SIA ALL

F. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
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

G. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door
131AB	Center Tank Access

H. Prepare for the Installation

SUBTASK 28-22-13-100-003

(1) Do these steps to prepare the pump housing [2] and rear spar for installation:

(a) Remove the sealant from the rear spar, do this task: Clean Bare, Clad, or Plated Metal with Solvent, TASK 20-10-34-110-802.

NOTE: Sealant is on the inner and outer side of the rear spar.

(b) Clean the fay surfaces of the aluminum pump housing [2] and aluminum rear spar (SWPM 20-20-00):

1) Use Cleaning Procedure 1 to manually clean the rear spar (dry side) fay surface.

a) Use a very fine Scotch-Brite Type S pad, G50398 or an ultra fine Scotch-Brite 7448 pad, G50492.

b) Move the pad in a circular movement while you press with your thumb.

2) Use Cleaning Procedure 1 to manually clean the rear spar (wet side) fay surface.

a) Use an abrasive pad to clean the fay surface on the pump housing [2].

b) Move the pad in a circular movement while you press with your thumb.

3) Use Cleaning Procedure 5 to clean the pump housing [2] fay surface.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

a) Use a new cotton wiper, G00034 or knit cotton wiper, G51293 soaked with solvent, B00062 or solvent, B00184.

b) Use the new cotton wiper to dry the surface.

c) Continue to clean and dry the surface until the cotton wiper shows cleans.

4) Final clean the rear spar fay surfaces.

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a) Use a new cotton wiper, G00034 or knit cotton wiper, G51293 soaked with solvent, B00062 or solvent, B00184.

b) Rub dry with a clean dry cotton wiper.

c) Continue to clean and dry the surface until the cotton wiper shows clean.

(c) Manually apply Bonderite M-CR 600 Aero coating, C50315 to the fay surface on the rear spar.

SUBTASK 28-22-13-080-001

(2) Remove the protective covers from the open fuel lines.

I. Center Tank Water Scavenge Jet Pump Installation

SUBTASK 28-22-13-640-003

(1) Lubricate a new O-ring [17] with a thin layer of grease, D00504.

SUBTASK 28-22-13-420-013

(2) Install the O-ring [17] on the pump housing [2].

SUBTASK 28-22-13-820-001

(3) Align the pump housing [2] in position on the rear spar.

SUBTASK 28-22-13-420-014

(4) Install the plain washer [18] and bulkhead nut [5] to attach the pump housing [2] to the rear spar.

(a) Make sure that the motive flow line [11] and scavenge inlet line [15] align with the pump housing [2].

SUBTASK 28-22-13-420-015

(5) Tighten the bulkhead nut [5] to 360 ±20 in-lb (40.7 ±2.3 N·m).

SUBTASK 28-22-13-760-001

(6) Measure the electrical bonding resistance between the pump housing [2] and rear spar with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

(a) Make sure that the electrical bonding resistance is 0.00050 ohm (0.50 milliohms) or less.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-13-410-004

(7) Connect the B-nut [12] between the motive flow line [11] and the pump housing [2] (TASK 20-10-51-400-801).

SUBTASK 28-22-13-410-005

(8) Connect the B-nut [16] between the scavenge inlet line [15] and the pump housing [2] (TASK 20-10-51-400-801).

SUBTASK 28-22-13-410-006

(9) Connect the B-nut [13] between the outlet line [14] and the pump housing [2] (TASK 20-10-51-400-801).

SUBTASK 28-22-13-390-003

(10) Apply a fillet seal of sealant, A00767, between the pump housing [2] and the rear spar (wet side) (TASK 28-11-00-300-803).

SUBTASK 28-22-13-410-007

(11) Install the nozzle assembly [4] (TASK 28-22-13-400-801).

SUBTASK 28-22-13-410-008

(12) Apply a fillet seal of sealant, A02315, between the bulkhead nut [5] and the rear spar (dry side) (TASK 51-22-00-390-806).

J. Center Tank Water Scavenge Jet Pump Installation Test

SUBTASK 28-22-13-390-004

(1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

(a) Install this access panel:

(TASK 28-11-31-400-801)

Number	Name/Location
131AB	Center Tank Access

SUBTASK 28-22-13-410-009

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-22-13-410-017

(3) Close this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-22-13-710-001

(4) Do the fuel boost pump operational test for the center tank (TASK 28-22-41-710-801).

(a) Look for leakage at the pump housing [2].

(b) If leakage occurs around the pump housing [2], repeat this procedure.

——— END OF TASK ———

TASK 28-22-13-000-804

8. Main Tank Water Scavenge Jet Pump Removal

(Figure 402, Figure 404)

A. General

(1) This task gives instructions to remove the main tank water scavenge jet pump.

(2) The main tank water scavenge jet pump nozzle assembly is referred to as the nozzle assembly in this task.

B. 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)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

C. Tools/Equipment

Reference	Description
STD-7423	Cover - Protective Tube

D. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - 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
117A	Electronic Equipment Access Door
532AB	Main Tank Access Door - Wing Station 216
632AB	Main Tank Access Door - Wing Station 216

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Prepare for the Removal

SUBTASK 28-22-13-480-003

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.

(1) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-22-13-840-003

(2) Defuel or transfer fuel from the applicable main tank (TASK 28-26-00-650-801 or TASK 28-26-00-650-802).

SUBTASK 28-22-13-860-007

(3) On the P5-2 Fuel System Module, set the FUEL PUMPS 1 AFT or FUEL PUMPS 2 AFT switches to the OFF position.

SUBTASK 28-22-13-010-016

(4) Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-22-13-860-008

WARNING WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(5) Open the applicable circuit breakers and install safety tags:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

SUBTASK 28-22-13-010-013

(6) Remove the nozzle assembly [4] (TASK 28-22-13-000-802).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-13-840-004

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(7) Do this task for the center tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove the applicable access door:

(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

G. Main Tank Water Scavenge Jet Pump Removal

SUBTASK 28-22-13-020-010

(1) Remove the bulkhead nut [5] and plain washer [18] from the pump housing [2] (dry side).

SUBTASK 28-22-13-480-004

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-22-13-020-011

(3) Remove the sealant from the rear spar and pump housing [2] (wet side).

SUBTASK 28-22-13-020-012

(4) Disconnect the B-nut [12] between the motive flow line [11] and the pump housing [2].

SUBTASK 28-22-13-020-013

(5) Disconnect the B-nut [16] between the scavenge inlet line [15] and the pump housing [2].

SUBTASK 28-22-13-020-014

(6) Disconnect the B-nut [13] between the outlet line [14] and the pump housing [2].

SUBTASK 28-22-13-020-015

(7) Remove the pump housing [2].

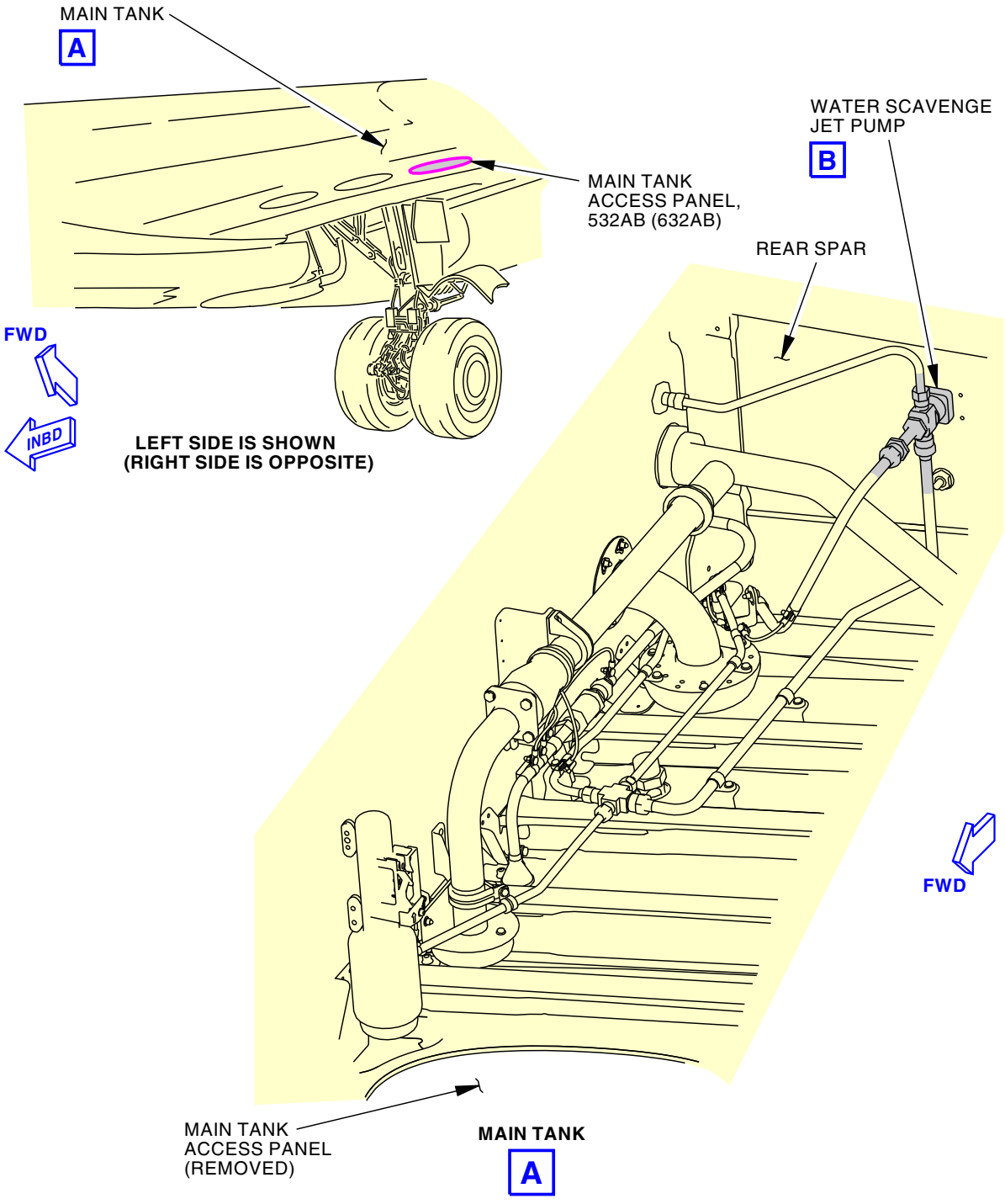
(a) Discard the O-ring [17].

SUBTASK 28-22-13-480-005

(8) Install protective covers, STD-7423, on the open fuel lines to keep unwanted materials out.

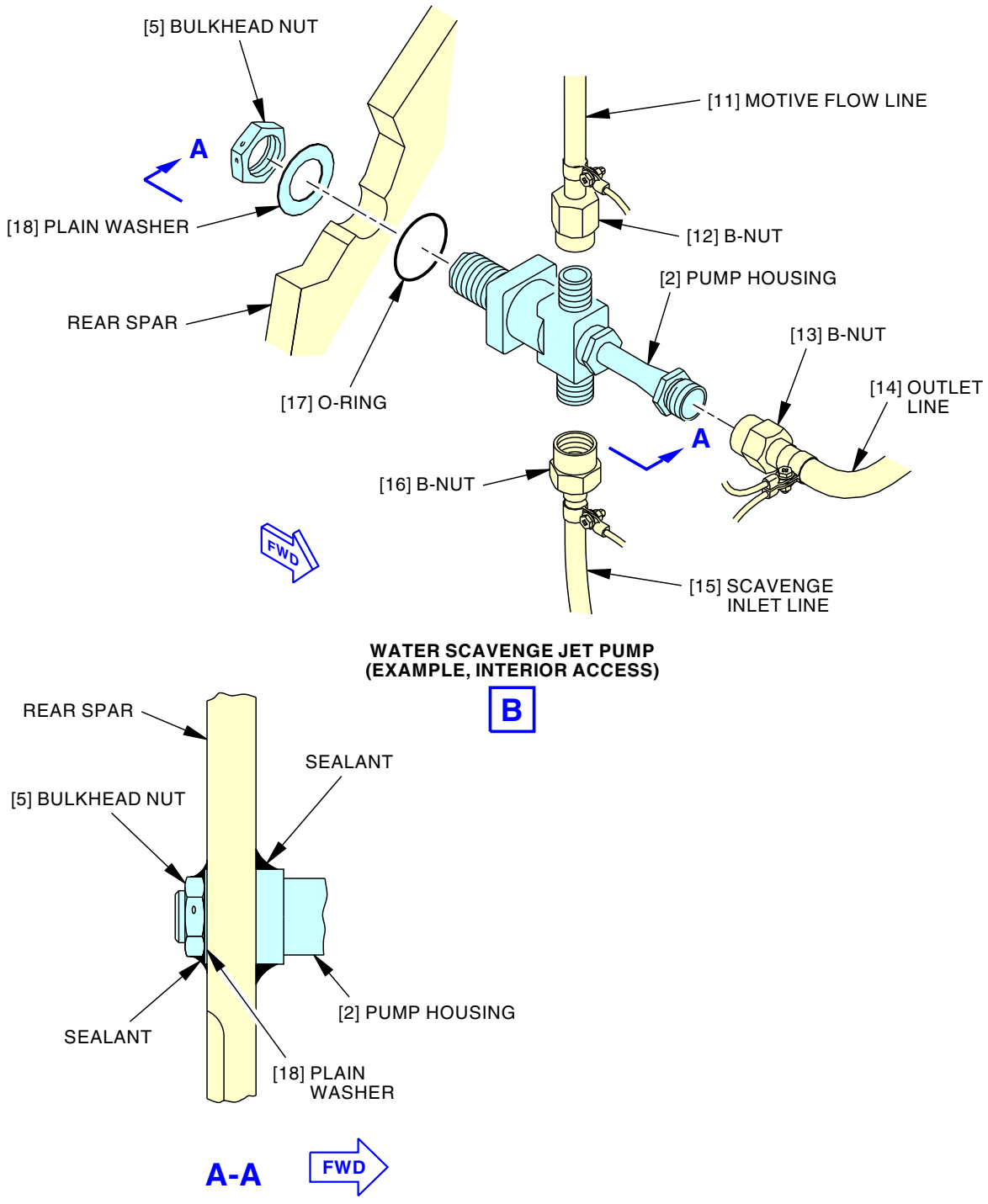
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Main Tank Water Scavenge Jet Pump Installation
Figure 404/28-22-13-990-804 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Main Tank Water Scavenge Jet Pump Installation
Figure 404/28-22-13-990-804 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-13-400-804

9. Main Tank Water Scavenge Jet Pump Installation

(Figure 404)

A. General

(1) This task gives instructions to install the main tank water scavenge jet pump.

B. References

Reference	Title
20-10-34-110-802	Clean Bare, Clad, or Plated Metal with Solvent (P/B 701)
20-10-51-400-801	Flareless Tubing Assembly Installation (P/B 401)
28-11-00-300-803	Repair of Sealant Leaks in the Fuel Tank Structure (P/B 801)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-22-41-710-801	Fuel Boost Pump - Operational Test (P/B 501)
51-22-00-390-806	Fillet Seal Application (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142 Type II
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
C50315	Coating - Chemical Conversion - Bonderite M-CR 600 Aero (Formerly Alodine 600)	BAC5719 Class A, C or D, MIL-DTL-81706 Type I Class 1A or 3
D00504	Grease - Petrolatum	VV-P-236
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G50398	Pad - Adbrasive, Scotch-Brite Type S, Abrasive Pad	

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(Continued)

Reference	Description	Specification
G50492	Pad - 3M Scotch Brite 7448 Ultra Fine Pad	MIL-A-9962A Type III Grade AAA
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Pump housing	28-22-13-01-095	SIA ALL
		28-22-13-05-155	SIA ALL
		28-22-13-06-155	SIA ALL
17	O-ring	28-22-13-01-100	SIA ALL
		28-22-13-05-160	SIA ALL
		28-22-13-06-160	SIA ALL

F. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - 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

G. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door
532AB	Main Tank Access Door - Wing Station 216
632AB	Main Tank Access Door - Wing Station 216

H. Prepare for the installation

SUBTASK 28-22-13-100-004

(1) Do these steps to prepare the applicable pump housing [2] and rear spar for installation:

(a) Remove the sealant from the rear spar, do this task: Clean Bare, Clad, or Plated Metal with Solvent, TASK 20-10-34-110-802.

NOTE: Sealant is on the inner and outer side of the rear spar.

(b) Clean the fay surfaces of the aluminum pump housing [2] and aluminum rear spar (SWPM 20-20-00):

1) Use Cleaning Procedure 1 to manually clean the rear spar (dry side) fay surface.

a) Use a very fine Scotch-Brite Type S pad, G50398 or an ultra fine Scotch-Brite 7448 pad, G50492.

b) Move the pad in a circular movement while you press with your thumb.

2) Use Cleaning Procedure 1 to manually clean the rear spar (wet side) fay surface.

a) Use an abrasive pad to clean the fay surface on the pump housing [2].

b) Move the pad in a circular movement while you press with your thumb.

3) Use Cleaning Procedure 5 to clean the pump housing [2] fay surface.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

> **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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

a) Use a new cotton wiper, G00034 or knit cotton wiper, G51293 soaked with solvent, B00062 or solvent, B00184.

b) Use the new cotton wiper to dry the surface.

c) Continue to clean and dry the surface until the cotton wiper shows cleans.

4) Final clean the rear spar fay surfaces.

> **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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

a) Use a new cotton wiper, G00034 or knit cotton wiper, G51293 soaked with solvent, B00062 or solvent, B00184.

b) Rub dry with a clean dry cotton wiper.

c) Continue to clean and dry the surface until the cotton wiper shows clean.

(c) Manually apply Bonderite M-CR 600 Aero coating, C50315 to the fay surface on the rear spar.

SUBTASK 28-22-13-080-002

(2) Remove the protective covers from the open fuel lines.

I. Main Tank Water Scavenge Jet Pump Installation

SUBTASK 28-22-13-640-004

(1) Lubricate the new O-ring [17] with a thin layer of grease, D00504.

SUBTASK 28-22-13-420-016

(2) Install the O-ring [17] on the pump housing [2].

SUBTASK 28-22-13-820-002

(3) Align the pump housing [2] in position on the rear spar.

SUBTASK 28-22-13-420-017

(4) Install the plain washer [18] and bulkhead nut [5] to attach the pump housing [2] to the rear spar.

(a) Make sure that the motive flow line [11] and scavenge inlet line [15] align with the pump housing [2].

SUBTASK 28-22-13-420-018

(5) Tighten the bulkhead nut [5] to 360 ±20 in-lb (40.7 ±2.3 N·m).

SUBTASK 28-22-13-760-002

(6) Measure the electrical bonding resistance between the pump housing [2] and rear spar with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

(a) Make sure that the electrical bonding resistance is 0.00050 ohm (0.50 milliohms) or less.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-13-410-010

(7) Connect the B-nut [12] between the motive flow line [11] and the pump housing [2] (TASK 20-10-51-400-801).

SUBTASK 28-22-13-410-011

(8) Connect the B-nut [16] between the scavenge inlet line [15] and the pump housing [2] (TASK 20-10-51-400-801).

SUBTASK 28-22-13-410-012

(9) Connect the B-nut [13] between the outlet line [14] and the pump housing [2] (TASK 20-10-51-400-801).

SUBTASK 28-22-13-390-005

(10) Apply a fillet seal of sealant, A00767, between the pump housing [2] and the rear spar (wet side) (TASK 28-11-00-300-803).

SUBTASK 28-22-13-410-013

(11) Install the nozzle assembly [4] (TASK 28-22-13-400-802).

SUBTASK 28-22-13-390-006

(12) Apply a fillet seal of sealant, A02315, between the bulkhead nut [5] and the rear spar (dry side) (TASK 51-22-00-390-806).

J. Main Tank Water Scavenge Jet Pump Installation Test

SUBTASK 28-22-13-410-014

(1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

(a) Install the applicable access panels:

(TASK 28-11-11-400-801)

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216
632AB	Main Tank Access Door - Wing Station 216

SUBTASK 28-22-13-860-021

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

SUBTASK 28-22-13-410-018

(3) Close this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-22-13-710-002

(4) Do the fuel boost pump operational test for the applicable main tank (TASK 28-22-41-710-801).

NOTE: The aft fuel boost pump operates the water scavenge jet pump.

(a) Look for leakage at the pump housing [2].

(b) If leakage occurs around the pump housing [2], repeat this procedure.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

WATER SCAVENGE JET PUMP - CLEANING/PAINTING

1. General

A. This procedure has these tasks:

(1) Center Tank Water Scavenge Jet Pump Cleaning

(2) Main Tank Water Scavenge Jet Pump Cleaning

B. The water scavenge jet pump operates continuously while the related fuel boost pump operates. These are the four fuel boost pumps that operate the water scavenge jet pumps: left and right center fuel boost pump, and aft fuel boost pump in the No. 1 and No. 2 main tank. Regular inspections are necessary to make sure that there is no pump blockage.

TASK 28-22-13-100-801

2. Center Tank Water Scavenge Jet Pump Cleaning

(Figure 701)

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
28-22-13-000-801	Center Tank Water Scavenge Jet Pump Nozzle Assembly Removal (P/B 401)
28-22-13-400-801	Center Tank Water Scavenge Jet Pump Nozzle Assembly Installation (P/B 401)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

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. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
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. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Prepare for the Cleaning

SUBTASK 28-22-13-860-023

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.

(1) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-22-13-860-009

(2) On the P5-2 Fuel System Module, make sure that the FUEL PUMPS CTR L and R switches are in the OFF position.

SUBTASK 28-22-13-010-018

(3) Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-22-13-860-010

WARNING WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-22-13-010-006

(5) Remove the center tank water jet pump nozzle assembly (TASK 28-22-13-000-801).

G. Center Tank Water Scavenge Jet Pump Nozzle Assembly Cleaning

SUBTASK 28-22-13-010-007

(1) Remove the jet nozzle [1] from the nozzle plug [2].

SUBTASK 28-22-13-210-001

(2) Make sure that the holes on the jet nozzle [1] are clean and have no blockage.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-13-110-001

WARNING KEEP THE CLEANING SOLUTIONS AWAY FROM SPARKS, FLAMES, AND HEAT. CLEANING SOLUTIONS ARE FLAMMABLE, AND CAN CAUSE INJURIES TO PERSONNEL.

CAUTION DO NOT USE ABRASIVE MATERIALS. ABRASIVE MATERIALS WILL CAUSE DAMAGE TO THIS COMPONENT.

(3) If necessary, clean the nozzle plug [2] and jet nozzle [1], as follows:

(a) Clean the nozzle plug [2] and jet nozzle [1] with solvent, B00074, or equivalent.

(b) For harder grit, use a soft bristle brush, STD-123.

(c) Dry the nozzle plug [2] and jet nozzle [1] with moisture-free compressed air or nitrogen.

SUBTASK 28-22-13-420-001

(4) Install the jet nozzle [1] into the nozzle plug [2].

SUBTASK 28-22-13-420-002

(5) Tighten the nozzle plug [2] to 71 ±4 in-lb (8.0 ±0.5 N·m).

H. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-13-410-001

(1) Install the center tank water jet pump nozzle assembly (TASK 28-22-13-400-801).

SUBTASK 28-22-13-860-011

WARNING WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

ECCN 9E991 BOEING PROPRIETARY - See title page for details

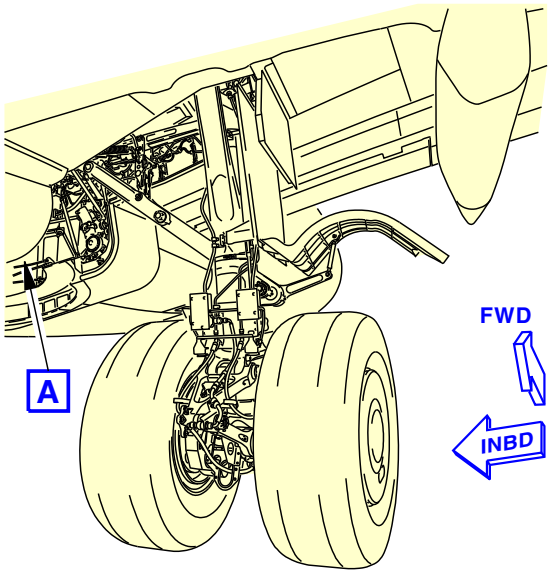
SUBTASK 28-22-13-410-019

(3) Close this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

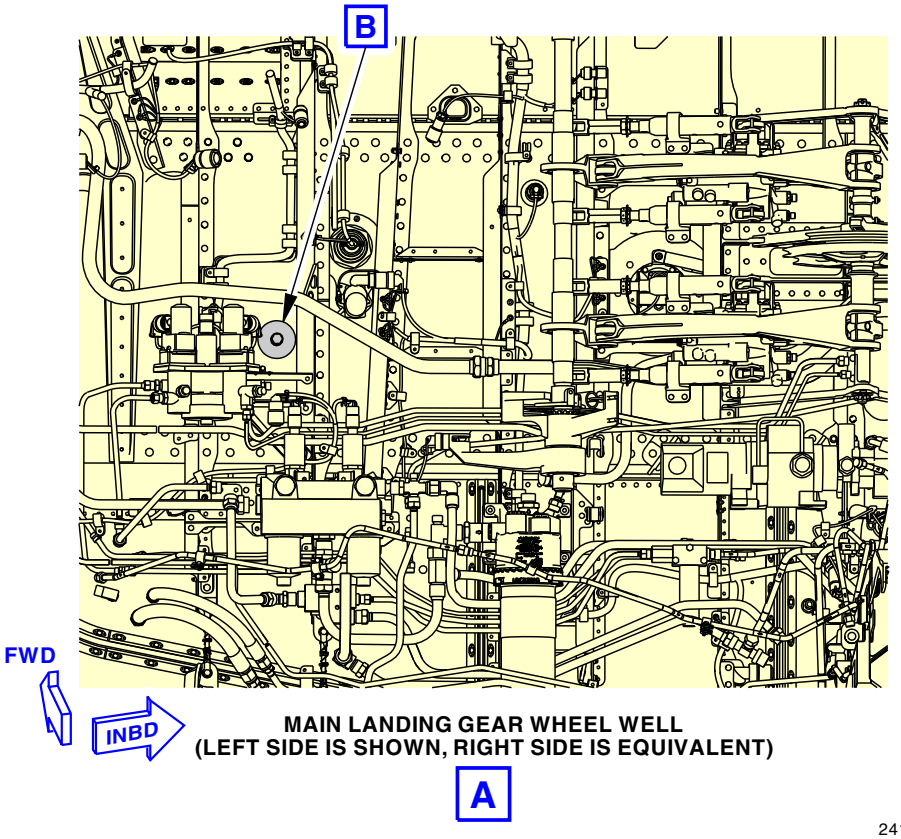
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



LEFT WING
(RIGHT WING IS EQUIVALENT)

WATER SCAVENGE
JET PUMP

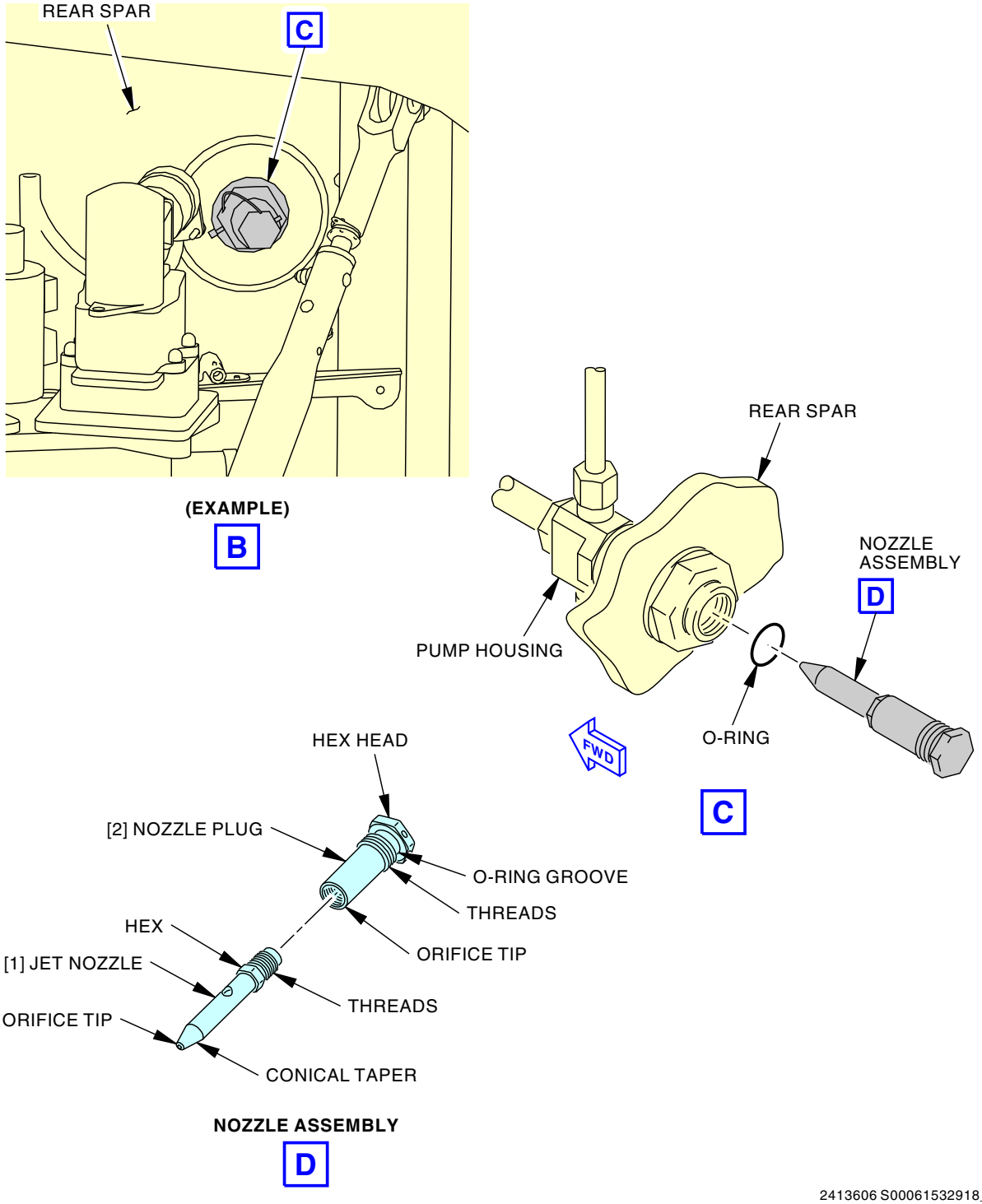


MAIN LANDING GEAR WHEEL WELL
(LEFT SIDE IS SHOWN, RIGHT SIDE IS EQUIVALENT)

2413605 S00061532917_V1

Center Tank Water Scavenge Jet Pump Cleaning
Figure 701/28-22-13-990-805 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413606 S00061532918_V1

Center Tank Water Scavenge Jet Pump Cleaning
Figure 701/28-22-13-990-805 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-13-100-802

3. Main Tank Water Scavenge Jet Pump Cleaning

(Figure 702)

NOTE: This procedure is a scheduled maintenance task.

A. References

Reference	Title
28-22-13-000-802	Main Tank Water Scavenge Jet Pump Nozzle Assembly Removal (P/B 401)
28-22-13-400-802	Main Tank Water Scavenge Jet Pump Nozzle Assembly Installation (P/B 401)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

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. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
551	Left Wing - Rear Spar To Landing Gear Support Beam
651	Right Wing - Rear Spar to Landing Gear Support Beam

E. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door
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. Prepare for the Cleaning

SUBTASK 28-22-13-860-024

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.

(1) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-22-13-860-012

(2) On the P5-2 Fuel System Module, make sure that the following fuel boost pump switches are in the OFF position:

(a) FUEL PUMPS 1 AFT

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) FUEL PUMPS 2 AFT.

SUBTASK 28-22-13-010-019

(3) Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-22-13-860-013

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(4) Open the applicable circuit breakers and install safety tags:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

SUBTASK 28-22-13-010-004

(5) 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

SUBTASK 28-22-13-010-008

(6) Remove the main tank water jet pump nozzle assembly (TASK 28-22-13-000-802).

G. Main Tank Water Scavenge Jet Pump Nozzle Assembly Cleaning

SUBTASK 28-22-13-020-001

(1) Remove the jet nozzle [1] from the nozzle plug [2].

SUBTASK 28-22-13-210-002

(2) Make sure that the holes on the jet nozzle [1] are clean and have no blockage.

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SUBTASK 28-22-13-110-002

WARNING KEEP THE CLEANING SOLUTIONS AWAY FROM SPARKS, FLAMES, AND HEAT. CLEANING SOLUTIONS ARE FLAMMABLE, AND CAN CAUSE INJURIES TO PERSONNEL.

CAUTION DO NOT USE ABRASIVE MATERIALS. ABRASIVE MATERIALS WILL CAUSE DAMAGE TO THIS COMPONENT.

(3) If necessary, clean the nozzle plug [2] and jet nozzle [1], as follows:

(a) Clean the nozzle plug [2] and jet nozzle [1] with solvent, B00074, or equivalent.

(b) For harder grit, use a soft bristle brush, STD-123.

(c) Dry the nozzle plug [2] and jet nozzle [1] with moisture-free compressed air or nitrogen.

SUBTASK 28-22-13-420-003

(4) Install the jet nozzle [1] into the nozzle plug [2].

SUBTASK 28-22-13-420-004

(5) Tighten the nozzle plug [2] to 71 ±4 in-lb (8.0 ±0.5 N·m).

H. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-13-410-002

(1) Install the main tank water scavenge jet pump nozzle assembly (TASK 28-22-13-400-802).

SUBTASK 28-22-13-860-014

WARNING WHEN YOU INSTALL AN ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) UNIT, MAKE SURE THE COMPONENT AND MOUNT RACK TOUCH EACH OTHER. THEN REMOVE THE ELECTROSTATIC DISCHARGE (ESD) DUST CAPS. THIS LETS THE UNIT RELEASE THE ELECTROSTATIC DISCHARGE. THIS WILL PREVENT INJURY TO PERSONS AND DAMAGE TO THE UNIT ELECTRICAL CONNECTORS.

WARNING DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

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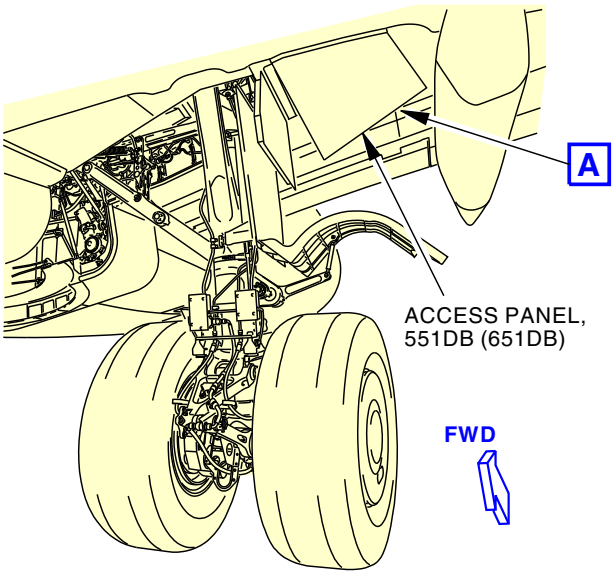
SUBTASK 28-22-13-010-005

(3) Close these access panels:

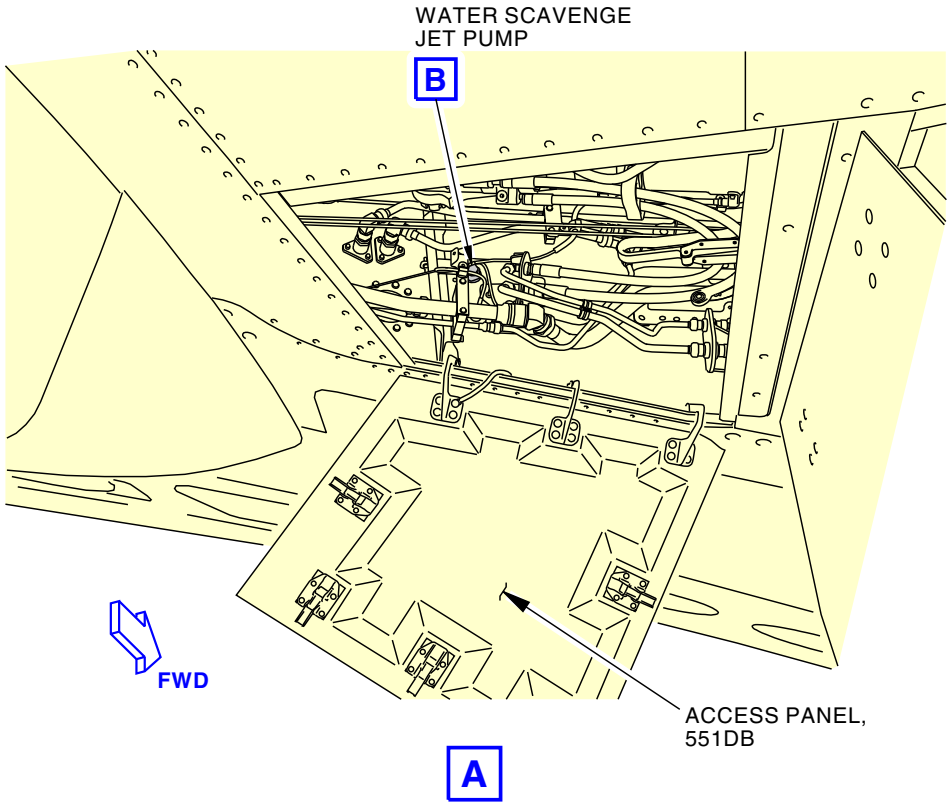
Number	Name/Location
117A	Electronic Equipment Access Door
551DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel
651DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



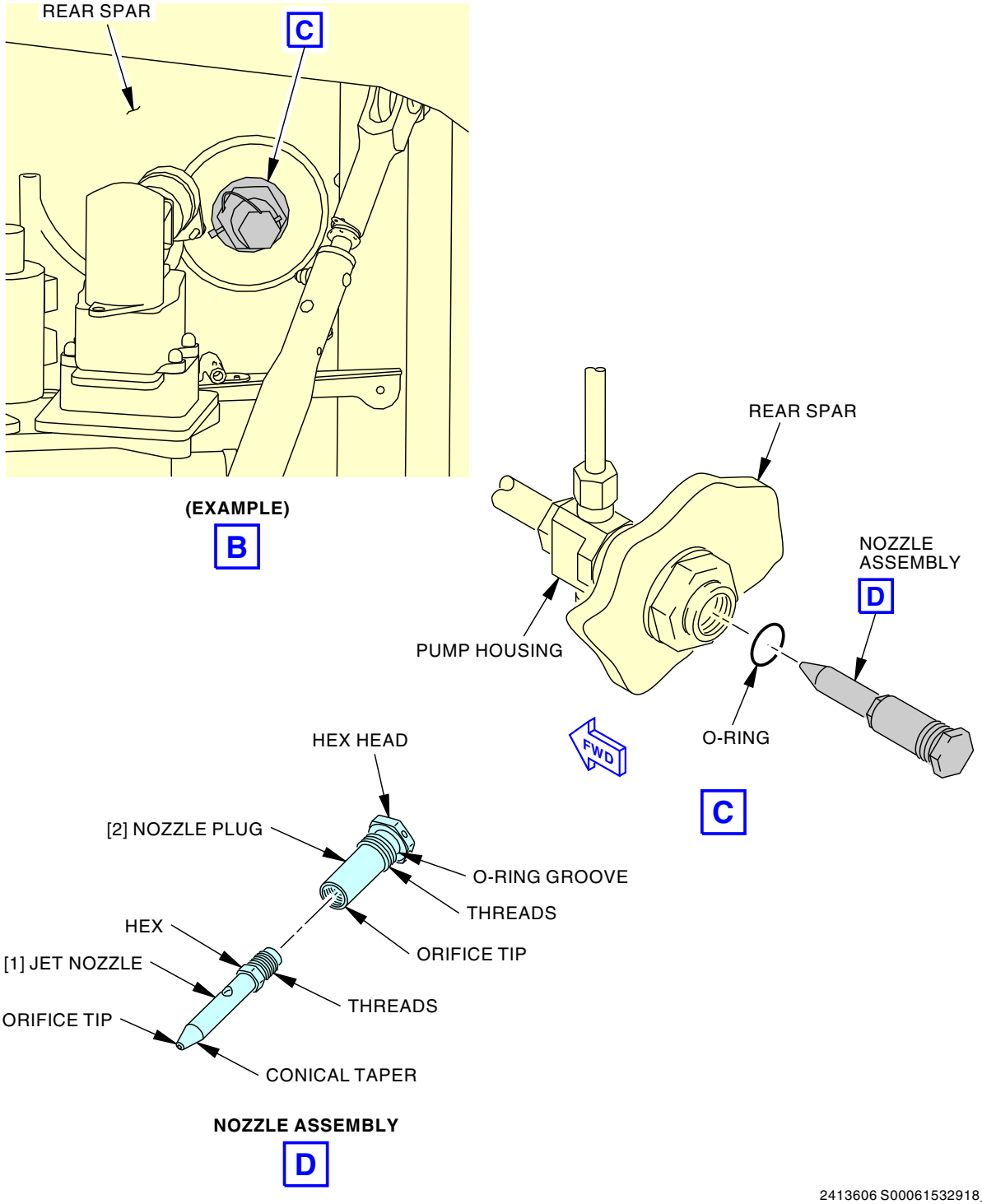
LEFT WING
(RIGHT WING IS EQUIVALENT)



2413607 S00061532920_V1

Main Tank Water Scavenge Jet Pump Cleaning
Figure 702/28-22-13-990-806 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413606 S00061532918_V1

Main Tank Water Scavenge Jet Pump Cleaning
Figure 702/28-22-13-990-806 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

EMERGENCY FUEL SHUTOFF BATTERY - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) A removal of the emergency fuel shutoff battery

(2) An installation of the emergency fuel shutoff battery.

TASK 28-22-14-000-801

2. Emergency Fuel Shutoff Battery Removal

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task gives instructions to remove the emergency fuel shutoff battery.

(2) The battery and charger system is not a Boeing supplied part. Refer to the Component Maintenance Manual for the battery and charger system instructions for disassembly.

B. References

Reference	Title
25-11-01-000-801	Captain and First Officer Seat Removal (P/B 401)
25-11-03-000-801	Log Book Holder and Stowage Box Removal (P/B 401)

C. Location Zones

Zone	Area
212	Flight Compartment - Right

D. Prepare for the Removal

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 28-22-14-020-005

(2) If it is necessary, do this task: Log Book Holder and Stowage Box Removal, TASK 25-11-03-000-801.

SUBTASK 28-22-14-020-006

(3) If it is necessary, remove the first officer's seat, do this task: Captain and First Officer Seat Removal, TASK 25-11-01-000-801.

SUBTASK 28-22-14-020-001

(4) Open the P6-5 F/O Electrical System Panel, on the right side of the flight compartment, behind the first officer's seat.

E. Emergency Fuel Shutoff Battery Removal

SUBTASK 28-22-14-020-002

(1) Disconnect the electrical connector [3].

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SUBTASK 28-22-14-020-003

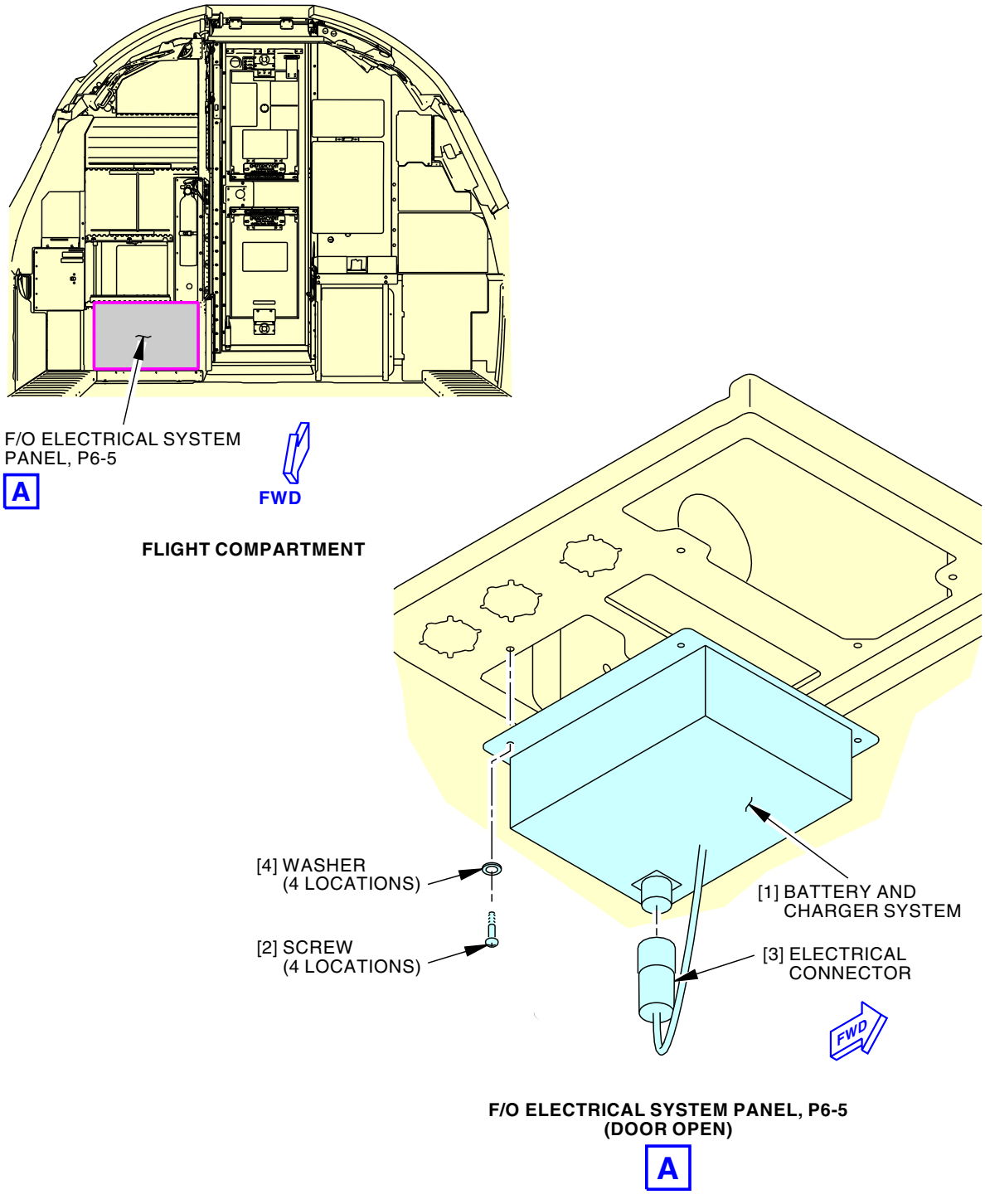
(2) Remove the screws [2] and washers [4] that attach the battery and charger system [1] to the top of the stowage bin.

SUBTASK 28-22-14-020-004

(3) Remove the battery and charger system [1].

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Emergency Fuel Shutoff Battery Installation
Figure 401/28-22-14-990-801

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-14-400-801

3. Emergency Fuel Shutoff Battery Installation

(Figure 401)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task gives instructions to install the emergency fuel shutoff battery.

(2) The battery and charger system is not a Boeing supplied part. Refer to the Component Maintenance Manual for the battery and charger system instructions for assembly.

B. References

Reference	Title
25-11-01-400-801	Captain and First Officer Seat Installation (P/B 401)
25-11-03-400-801	Log Book Holder and Stowage Box Installation (P/B 401)
28-22-00-720-801	Emergency Fuel Shutoff Battery - Operational Test (P/B 501)

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Battery and charger system	28-22-14-01A-005	SIA ALL

D. Location Zones

Zone	Area
212	Flight Compartment - Right

E. Emergency Fuel Shutoff Battery Installation

SUBTASK 28-22-14-420-001

(1) Align the battery and charger system [1] in its position.

SUBTASK 28-22-14-420-002

(2) Install the screws [2] and washers [4].

SUBTASK 28-22-14-420-003

(3) Connect the electrical connector [3] to the battery and charger system [1].

SUBTASK 28-22-14-410-001

(4) Close the P6-5 F/O Electrical System Panel.

F. Emergency Fuel Shutoff Battery Installation Test

SUBTASK 28-22-14-860-002

(1) 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

(2) Charge the battery and charger system [1] for one hour.

SUBTASK 28-22-14-710-001

(3) Test the engine fuel spar valve (TASK 28-22-00-720-801).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-14-420-004

(1) If the stowage box was removed, do this task: Log Book Holder and Stowage Box Installation, TASK 25-11-03-400-801.

SUBTASK 28-22-14-420-005

(2) If it is removed, install the first officer's seat, do this task: Captain and First Officer Seat Installation, TASK 25-11-01-400-801.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FUEL FEED MANIFOLD AND COUPLINGS - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) Fuel Line, Fitting and Coupling Removal

(2) Fuel Line, Fitting and Coupling Installation

(3) Engine Fuel Feed Tube Bulkhead Fitting Removal

(4) Engine Fuel Feed Tube Bulkhead Fitting Installation

(5) Couplings Removal

(6) Couplings Installation.

B. This procedure has example procedures to remove and install the fuel feed lines and fittings.

C. There are five types of coupling fittings: a flexible full coupling, flexible half coupling, a rigid coupling, self-bonding flexible coupling (with a tie strap), and self-bonding flexible coupling (without a tie strap).

D. 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).

TASK 28-22-15-000-801

2. Fuel Line, Fitting and Coupling Removal

(Figure 401)

A. General

(1) This task gives instructions to remove the fuel lines, fittings, and couplings.

B. 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)
28-26-00-650-801	Fuel Tank Defueling (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
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

D. Prepare for the Removal

SUBTASK 28-22-15-650-001

(1) Defuel all fuel tanks (TASK 28-26-00-650-801).

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SUBTASK 28-22-15-010-003

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 for the applicable fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802

(a) Remove the applicable main tank access doors (TASK 28-11-11-000-801).

(b) Remove the applicable center tank access doors (TASK 28-11-31-000-801).

SUBTASK 28-22-15-860-007

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) Go into the fuel tank (TASK 28-11-00-910-802).

E. Fuel Line, Fitting and Coupling Removal

SUBTASK 28-22-15-020-001

(1) To remove the single bonding jumper clamp (Figure 401).

(a) Remove the screw [1], washer [2], bonding jumper [3], bonding jumper clamp [6], washer [4], and nut [5] to disconnect the bonding jumper [3] from the bonding jumper clamp [6].

(b) Remove the bonding jumper clamp [6] from the fuel line.

SUBTASK 28-22-15-020-007

(2) To remove the double bonding jumper clamp (Figure 401).

(a) Remove the screw [1], washer [2], bonding jumper [3], bonding jumper clamp [6], bonding jumper [7], washer [4], nut [5] to disconnect the bonding jumper [3] and bonding jumper [7] from the bonding jumper clamp [6].

(b) Remove the bonding jumper clamp [6] from the fuel line.

SUBTASK 28-22-15-020-002

(3) To remove a loop clamp (Figure 402).

(a) Remove the screw [11], washer [13], and nut [14] to disconnect the loop clamp [12] from the structure.

SUBTASK 28-22-15-020-008

(4) To remove a double loop clamp (Figure 402).

(a) Remove the screw [11], washer [13], and nut [14] to disconnect the small loop clamp [15] from the large loop clamp [16].

SUBTASK 28-22-15-020-009

(5) To remove a self-bonding saddle clamp assembly (Figure 402).

(a) Remove the two screws [11] and washers [13].

(b) Remove the self-bonding saddle clamp top [19] from the fuel line and self-bonding saddle clamp base [18].

(c) Remove the self-bonding saddle clamp base [18] from the bracket.

(d) Remove the clip-on nut [17].

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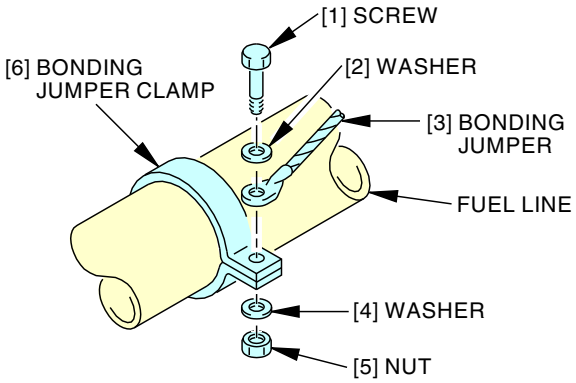
SUBTASK 28-22-15-020-003

(6) To remove the applicable coupling, do this task: Couplings Removal, TASK 28-22-15-000-803.

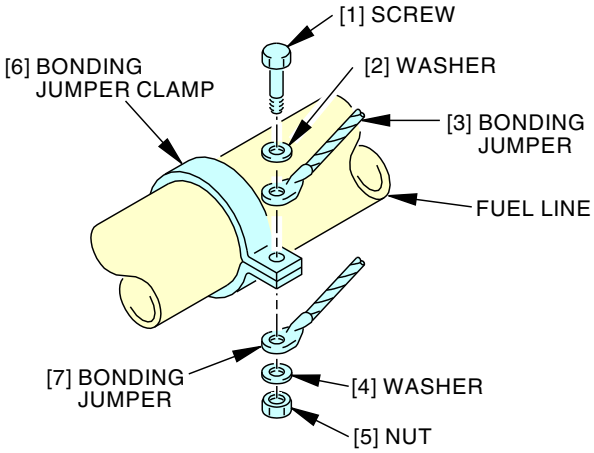
NOTE: These are different couplings used in the fuel system: flexible half coupling, flexible full coupling, rigid coupling, and self-bonding flexible coupling.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



SINGLE BONDING JUMPER CLAMP (EXAMPLE)

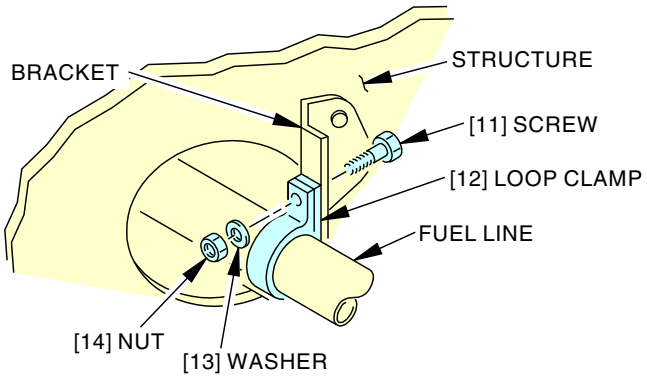


DOUBLE BONDING JUMPER CLAMP (EXAMPLE)

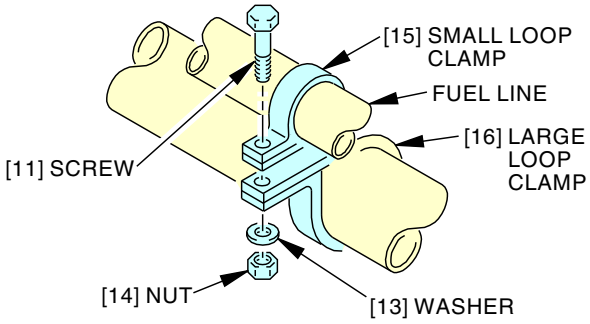
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Bonding Jumper Clamp Installation
Figure 401/28-22-15-990-801

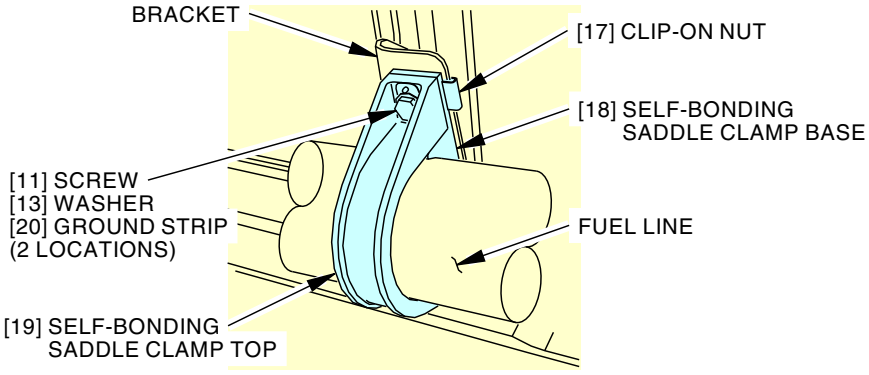
ECCN 9E991 BOEING PROPRIETARY - See title page for details



LOOP CLAMP (EXAMPLE)



DOUBLE LOOP CLAMP (EXAMPLE)



SELF-BONDING SADDLE CLAMP ASSEMBLY (EXAMPLE)

2413611 S00061532931_V1

Fuel Feed Manifold and Couplings Installation
Figure 402/28-22-15-990-802

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-15-400-801

3. Fuel Line, Fitting and Coupling Installation

(Figure 401)

A. General

(1) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-11.

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-22-00-710-802	Engine Fuel Suction Feed - Operational Test (P/B 501)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

E. Fuel Line, Fitting and Coupling Installation

SUBTASK 28-22-15-420-010

(1) To install the applicable coupling, do this task: Couplings Installation, TASK 28-22-15-400-803.

NOTE: These are different couplings used in the fuel system: flexible half coupling, flexible full coupling, rigid coupling, and self-bonding flexible coupling.

SUBTASK 28-22-15-400-017

(2) Tighten the clamps on the fuel line to the structure or support brackets as follows (Figure 402):

(a) To install a loop clamp.

1) Put the loop clamp [12] on the fuel line.
2) Align the loop clamp [12] with the bracket.
3) Install the screw [11], washer [13], and nut [14] to attach the loop clamp [12] to the bracket.

(b) To install a double loop clamp.

1) Put the large loop clamp [16] on the tubing.
2) Put the small loop clamp [15] on the fuel line.
3) Align the large loop clamp [16] with the small loop clamp [15].
4) Install the screw [11], washer [13], and nut [14] to attach the large loop clamp [16] to the small loop clamp [15].

(c) To install the self-bonding saddle clamp assembly.

1) Install and then align the holes on the clip-on nuts [17] and bracket.
2) Make sure that the ground strips [20] are installed on the self-bonding saddle clamp top [19].
3) Align the fuel line, self-bonding saddle clamp base [18] and self-bonding saddle clamp top [19] with the bracket.
4) Install the two screws [11] and washers [13].

SUBTASK 28-22-15-420-005

(3) 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

(4) Make sure that the fuel line does not touch the structure.

SUBTASK 28-22-15-210-002

(5) Make sure that 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 28-22-15-420-006

(6) To install a single bonding jumper clamp (Figure 401).

(a) Clean the fay surfaces of the aluminum fuel line, aluminum bonding jumper clamp [6], and the terminal of the bonding jumper [3] (SWPM 20-20-00, Paragraph 8).

(b) Install the bonding jumper clamp [6] on the fuel line.

(c) Install the screw [1], washer [2], bonding jumper [3], washer [4], and nut [5] on the bonding jumper clamp [6].

(d) Tighten the nut [5] to 31.5 ±3.5 in-lb (3.6 ±0.4 N·m).

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(e) Measure the electrical bonding resistance between the terminal on the bonding jumper [3] and the fuel line with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00, Paragraph 21).

1) Make sure that the measured resistance is less than the maximum bonding resistance as specified in SWPM 20-20-00, Paragraph 21.

SUBTASK 28-22-15-400-018

(7) To install a double bonding jumper clamp (Figure 401).

(a) Clean the fay surfaces of the aluminum fuel line, aluminum bonding jumper clamp [6], the terminal of the bonding jumper [3], and the terminal of the bonding jumper [7] (SWPM 20-20-00, Paragraph 8).

(b) Install the bonding jumper clamp [6] on the fuel line.

(c) Install the screw [1], washer [2], bonding jumper [3], bonding jumper [7], washer [4], and nut [5] on the bonding jumper clamp [6].

(d) Tighten the nut [5] (SWPM 20-20-00, Paragraph 8).

(e) Measure the electrical bonding resistance between the terminal on the bonding jumper [3] and the fuel line with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00, Paragraph 21).

1) Make sure that the measured resistance is less than the maximum bonding resistance as specified in SWPM 20-20-00, Paragraph 21.

(f) Measure the electrical bonding resistance between the terminal on the bonding jumper [7] and the fuel line with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00, Paragraph 21).

1) Make sure that the measured resistance is less than the maximum bonding resistance as specified in SWPM 20-20-00, Paragraph 21.

SUBTASK 28-22-15-420-007

28-AWL-11: CDCCL

(8) If the self-bonding saddle clamp assembly in the fuel tank was removed from the first fuel line that mates with the bulkhead fitting on the front spar, install the self-bonding saddle clamp (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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-11.

SUBTASK 28-22-15-220-001

28-AWL-11: CDCCL

(9) For the first fuel tube in the fuel tank that mates with the bulkhead fitting, if the self-bonding saddle clamp was removed or replaced, measure the electrical bonding resistance between the structure (wing rib) in the fuel tank and the fuel tube (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-11.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

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28-AWL-11: CDCCL

(b) Make sure that the electrical bonding resistance is 0.100 ohm (100.0 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-11.

SUBTASK 28-22-15-200-003

(10) For all other fuel lines that are replaced, measure the electrical bonding resistance between the fuel lines and the airplane structure.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

(b) Make sure the electrical bonding resistance between the fuel lines and the airplane structure are 0.0100 ohm (10.0 milliohms) or less.

F. Fuel Line, Fitting and Coupling Installation Test

SUBTASK 28-22-15-080-001

(1) Remove all tools and equipment from the fuel tank.

SUBTASK 28-22-15-410-001

(2) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

(a) Install the applicable access doors (TASK 28-11-11-400-801, TASK 28-11-31-400-801).

SUBTASK 28-22-15-710-001

(3) Do the Engine Fuel Suction Feed Operational Test (TASK 28-22-00-710-802).

G. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-15-650-002

(1) Refuel the fuel tanks (TASK 12-11-00-650-803).

END OF TASK

TASK 28-22-15-000-802

4. Engine Fuel Feed Tube Bulkhead Fitting Removal

(Figure 403)

A. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)
28-22-15-700-801	Engine and APU Fuel Feed, Shroud, Fuel Vent Line and Couplings, and NEADS Lines Dent Criteria - Inspection/Check (P/B 601)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)

B. Location Zones

Zone	Area
430	Subzone - Engine 1, Nacelle Strut
440	Subzone - Engine 2, Nacelle Strut
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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

C. Access Panels

Number	Name/Location
521AT	Outbd Leading Edge - Gap Cover Access
532AB	Main Tank Access Door - Wing Station 216
532AZ	Main Tank Inner Access at Rib 6
621AT	Outbd Leading Edge - Gap Cover Access
632AB	Main Tank Access Door - Wing Station 216
632AZ	Main Tank Inner Access at Rib 6

D. Prepare for the Removal

SUBTASK 28-22-15-860-008

(1) Defuel the center tank and main tanks (TASK 28-26-00-650-801).

SUBTASK 28-22-15-010-004

(2) Remove the applicable access panels:

Number	Name/Location
521AT	Outbd Leading Edge - Gap Cover Access
621AT	Outbd Leading Edge - Gap Cover Access

SUBTASK 28-22-15-010-005

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) Do this task for the applicable fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove the applicable access doors:

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216
532AZ	Main Tank Inner Access at Rib 6
632AB	Main Tank Access Door - Wing Station 216
632AZ	Main Tank Inner Access at Rib 6

SUBTASK 28-22-15-860-009

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.

(4) Go into the fuel tank (TASK 28-11-00-910-802).

E. Bulkhead Fitting Removal

SUBTASK 28-22-15-150-001

(1) Remove the sealant.

SUBTASK 28-22-15-020-010

(2) Remove the safety cable (lockwire) from the coupling nut [61].

SUBTASK 28-22-15-020-011

(3) Remove the coupling nut [61], two retaining rings [70], and O-ring [62] from the body [69].

(a) Discard the O-ring [62].

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SUBTASK 28-22-15-210-006

(4) Inspect the retaining rings [70] and coupling nut [61] for wear (TASK 28-22-15-700-801).

(a) Replace these components as necessary.

SUBTASK 28-22-15-020-012

(5) Remove the nut [65] from the body [69].

SUBTASK 28-22-15-020-013

(6) Remove the bulkhead nut [67] and plain washer [68] from the body [69].

SUBTASK 28-22-15-020-014

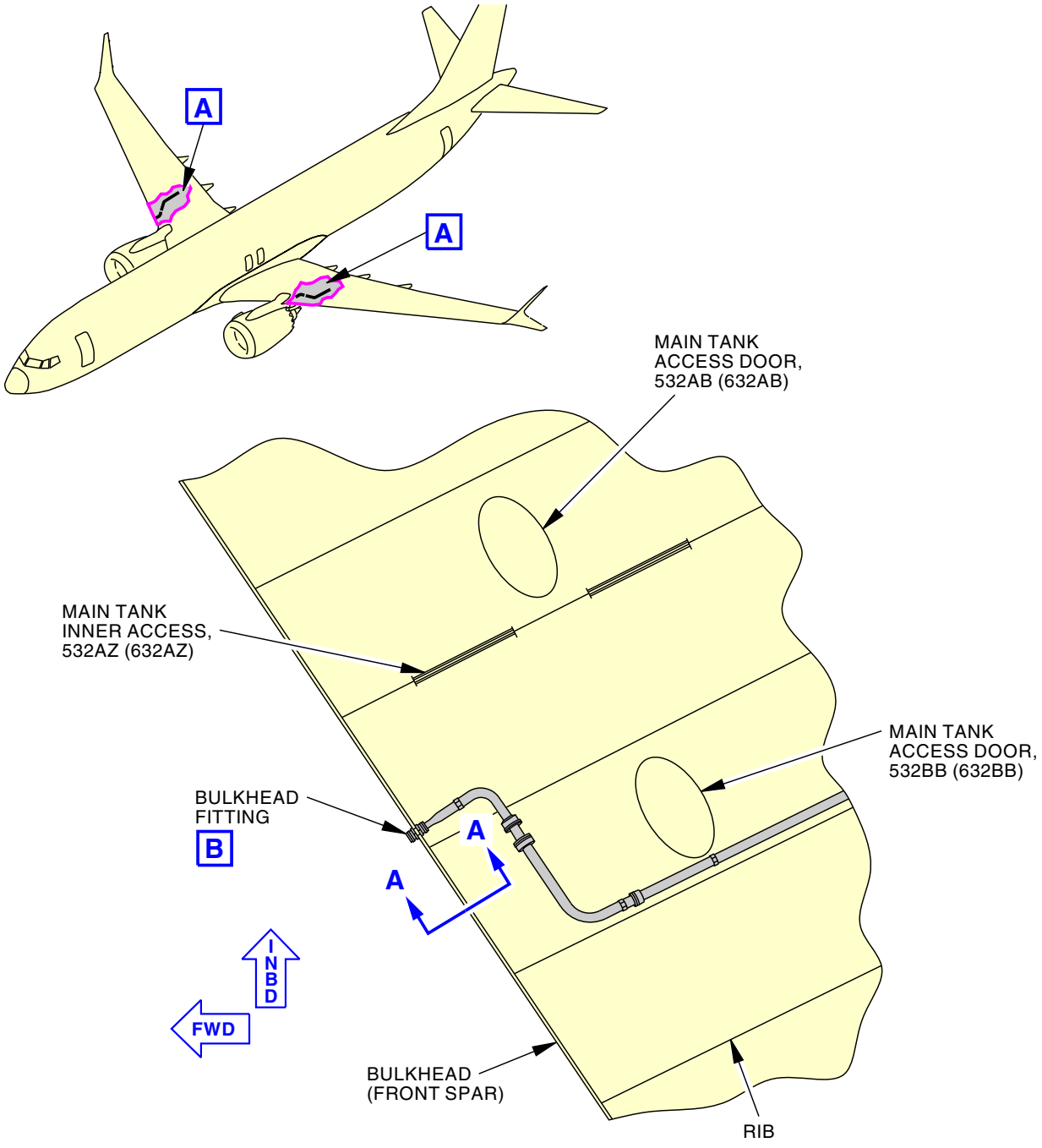
(7) Remove the body [69] from the bulkhead.

SUBTASK 28-22-15-020-015

(8) Discard the O-ring [64].

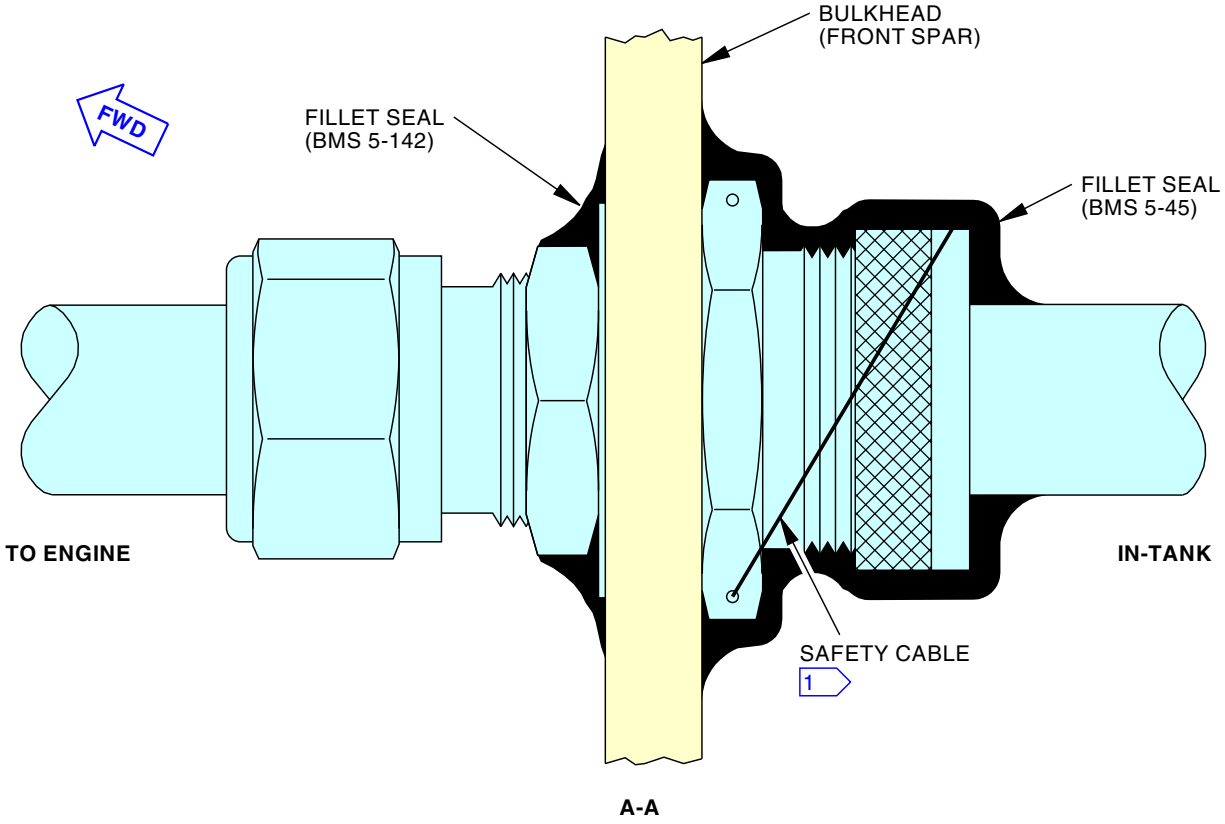
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Engine Fuel Feed Tube Bulkhead Fitting Installation
Figure 403/28-22-15-990-811 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

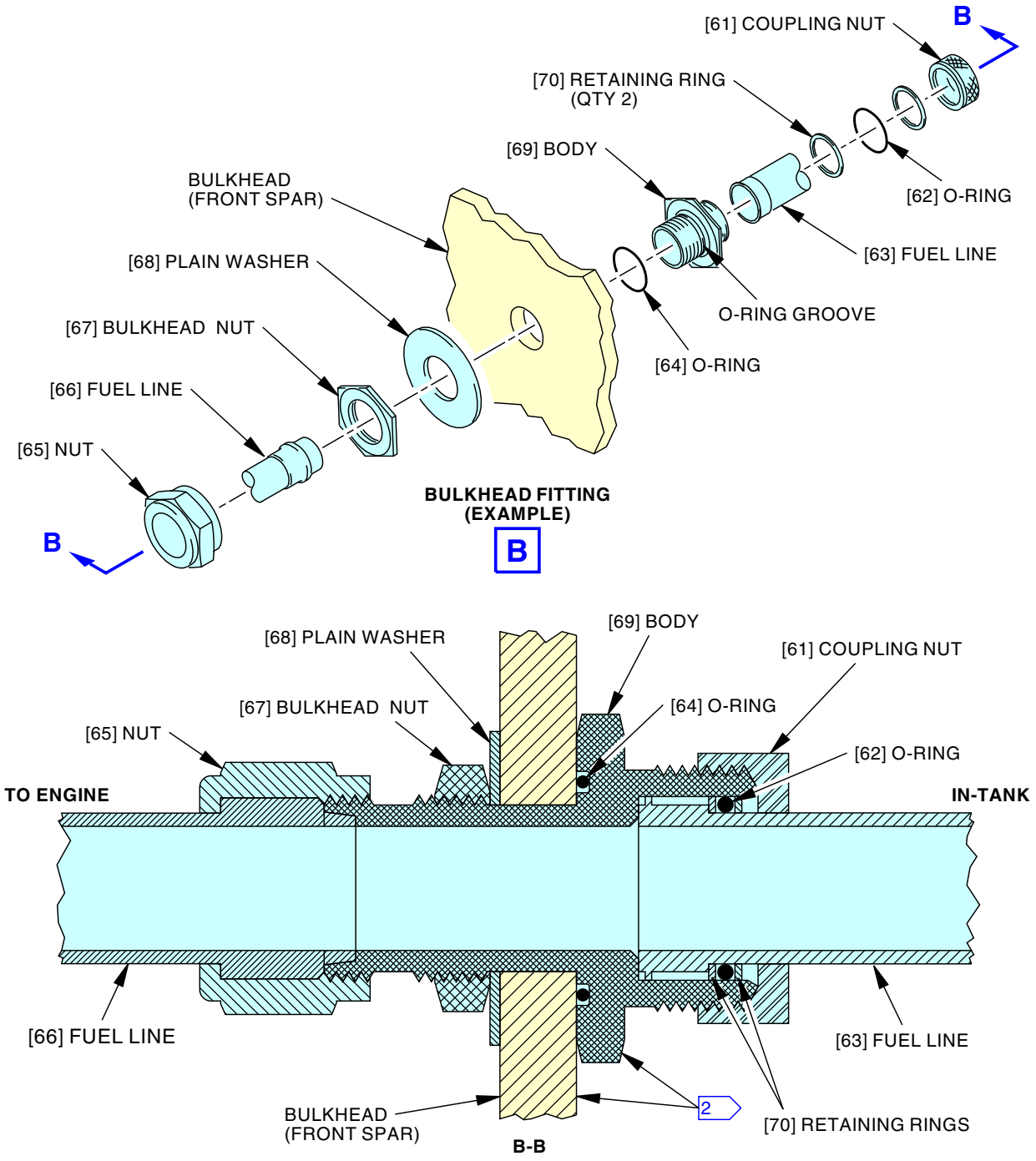


1 SAFETY CABLE PREFERRED, LOCKWIRE ALTERNATE.

2413617 S00061532937_V1

Engine Fuel Feed Tube Bulkhead Fitting Installation
Figure 403/28-22-15-990-811 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



1 MEASURE THE BONDING RESISTANCE BETWEEN THE BODY THREADS AND BULKHEAD.

2413618 S00061532938_V1

Engine Fuel Feed Tube Bulkhead Fitting Installation
Figure 403/28-22-15-990-811 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-15-400-802

5. Engine Fuel Feed Tube Bulkhead Fitting Installation

(Figure 403)

A. General

(1) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-11.

B. References

Reference	Title
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-22-00-710-802	Engine Fuel Suction Feed - Operational Test (P/B 501)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES
SWPM 20-20-00 Paragraph 9	Electrical Bonding - Tube Bulkhead Fitting Installations
SWPM 20-20-00, Paragraph 2	CLEANING OF FAY SURFACES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142 Type II
C00862	Coating - Chemical Conversion - Bonderite M-CR 600 Aero (Formerly Alodine 600)	BAC5719 Class A, C or D, MIL-DTL-81706 Type I Class 1A or 3
D00504	Grease - Petrolatum	VV-P-236
G50078	Abrasive - Aluminum Oxide Paper, 320 grit or finer	

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(Continued)

Reference	Description	Specification
G50347	Lockwire - MS20995NC32, Monel - 0.032 Inch (0.8128 mm) Diameter	NASM20995
G51372	Kit - Safety Cable, 321 CRES - 0.035 +/-0.003 Inch (1.0 mm) Diameter, (Contains both Cable and Ferrule), 12 Inches Long	BACC13AT3K

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
62	O-ring	28-22-61-01-395	SIA ALL
		28-22-61-10-400	SIA ALL
64	O-ring	28-22-61-01-400	SIA ALL
		28-22-61-10-405	SIA ALL

F. Location Zones

Zone	Area
430	Subzone - Engine 1, Nacelle Strut
440	Subzone - Engine 2, Nacelle Strut
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

G. Access Panels

Number	Name/Location
521AT	Outbd Leading Edge - Gap Cover Access
532AB	Main Tank Access Door - Wing Station 216
532AZ	Main Tank Inner Access at Rib 6
621AT	Outbd Leading Edge - Gap Cover Access
632AB	Main Tank Access Door - Wing Station 216
632AZ	Main Tank Inner Access at Rib 6

H. Prepare for the Installation

SUBTASK 28-22-15-400-001

(1) Loosely connect the self-bonding saddle clamp assembly for the fuel lines to the support brackets (Figure 402).

I. Bulkhead Fitting Installation

SUBTASK 28-22-15-120-001

28-AWL-11: CDCCL

(1) Apply a fay surface bond between the body [69] (bulkhead fitting) and the front spar 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-11.

(a) Clean and remove the finish from the threads and surfaces on the body [69] (SWPM 20-20-00, SWPM 20-20-00 Paragraph 9).

(b) Polish the flange of the body [69].

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1) Remove the anodic surface finish with 320 grit or finer abrasive paper, G50078, to make a flat bare metal surface all the way around the mating surface (SWPM 20-20-00).

2) Remove a minimum quantity of material.

(c) Clean the wing front spar web area, wet and dry sides (SWPM 20-20-00, Paragraph 2).

1) Remove contamination and dirt from the contact areas of the front spar.

2) Clean the surrounding surface to prepare for applying alodine and sealant.

(d) Polish the fay surface area of the front spar web at the mating surface of the flange of the body [69] with 320 grit or finer abrasive paper, G50078.

1) Remove a minimum quantity of material.

NOTE: The anodic surface finish is less than 0.0001 in. (0.0025 mm).

2) Polish and clean to a minimum of 0.0625 in. (1.59 mm) diameter more than the spar fitting on the dry side.

3) 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.

(e) Apply Bonderite M-CR 600 Aero coating, C00862, to the abraded surfaces on the front spar (wet and dry side).

SUBTASK 28-22-15-640-001

(2) Apply a thin layer of grease, D00504, to the new O-ring [64].

SUBTASK 28-22-15-400-002

(3) Put the O-ring [64] in the O-ring groove on the body [69].

SUBTASK 28-22-15-400-003

(4) Put the body [69] in its position in the bulkhead.

SUBTASK 28-22-15-400-004

(5) Install the bulkhead nut [67] (jam nut) and plain washer [68] on the body [69] (dry side).

NOTE: A second person is necessary to hold the body and fuel line [63] in the fuel tank.

(a) Tighten the bulkhead nut [67] to 750 ±75 in-lb (85 ±9 N·m).

SUBTASK 28-22-15-200-001

28-AWL-11: CDCCL

(6) Measure the electrical bonding resistance between the bulkhead fitting and the front spar in the fuel tank (View B-B, Figure 403) (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-11.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

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28-AWL-11: CDCCL

(b) Make sure that the electrical 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-11.

SUBTASK 28-22-15-400-005

(7) Put the coupling nut [61] on the ferrule of the fuel line [63].

SUBTASK 28-22-15-400-006

CAUTION

DO NOT TWIST THE RETAINING RING OUT OF SHAPE. IF YOU TWIST THE RETAINING RING, FUEL LEAKS AT THE FITTING WILL OCCUR.

(8) Put a retaining ring [70] on the ferrule to hold the coupling nut [61] on the fuel line [63].

SUBTASK 28-22-15-600-001

(9) Apply a thin layer of petrolatum grease, D00504, to the new O-ring [62].

SUBTASK 28-22-15-400-007

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 TO PREVENT FUEL LEAKS.

(10) Install the O-ring [62] on the ferrule on the fuel line [63].

SUBTASK 28-22-15-400-008

CAUTION

DO NOT TWIST THE RETAINING RING OUT OF SHAPE. IF YOU TWIST THE RETAINING RING, FUEL LEAKS AT THE FITTING WILL OCCUR.

(11) Put the second retaining ring [70] on the ferrule of the fuel line [63].

SUBTASK 28-22-15-400-009

(12) Align the fuel line [63] with the body [69].

SUBTASK 28-22-15-400-010

CAUTION

DO NOT USE TOOLS TO TIGHTEN THE FITTINGS. DAMAGE TO THE FITTING COMPONENTS COULD OCCUR. THE ADJACENT FITTINGS COULD BECOME LOOSE.

(13) Manually tighten the coupling nut [61] to connect the fuel line [63] to the body [69].

SUBTASK 28-22-15-400-011

(14) Loosen the coupling nut [61] one turn, and then manually tighten the coupling nut [61].

SUBTASK 28-22-15-400-012

(15) Install the safety cable kit, G51372, or MS20995NC32 lockwire, G50347, between the coupling nut [61] and body [69].

SUBTASK 28-22-15-400-013

(16) Install the nut [65], as follows:

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(a) Align the fuel line [66] with the body [69].

(b) Connect the nut [65] on the body [69].

(c) Tighten the nut [65] to 750 ±38 in-lb (85 ±5 N·m).

(d) Loosen the nut [65] to relieve tension in the fuel line [66].

(e) Tighten the nut [65] to 750 ±38 in-lb (85 ±5 N·m) to connect the fuel line [66].

SUBTASK 28-22-15-390-001

28-AWL-11: CDCCL

(17) Apply sealant, encapsulating the first fuel tube coupling to the fitting interface in the fuel tank (View A-A, 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-11.

(a) Use sealant, A00767.

(b) Seal to a minimum thickness of 0.10 in. (2.54 mm).

(c) Seal to a minimum of 0.1875 in. (4.7625 mm) diameter more than the spar fitting on the front spar web.

SUBTASK 28-22-15-390-002

28-AWL-11: CDCCL

(18) Apply sealant, encapsulating the fitting to the tank wall interface in the tank (View A-A, 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-11.

(a) Use sealant, A00767.

(b) Make sure that the sealant extends to the flat dimension of the coupling nut [61] and at least two threads of the bulkhead fitting.

SUBTASK 28-22-15-390-003

28-AWL-11: CDCCL

(19) Apply a fillet seal between the bulkhead nut [67] (jam nut) and the front spar outside the tank (View A-A, 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-11.

(a) Use sealant, A02315, to apply the fillet seal.

(b) Seal to a minimum of 0.1875 in. (4.7625 mm) diameter more than the bulkhead nut [67] (jam nut) on the other side of the front spar web.

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SUBTASK 28-22-15-400-016

28-AWL-11: CDCCL

(20) Install a self-bonding saddle clamp [71] between the first fuel tube mating with the bulkhead fitting and structure in the fuel tank (TASK 28-22-15-400-801).

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-11.

SUBTASK 28-22-15-200-002

28-AWL-11: CDCCL

(21) If the tube self-bonding saddle clamp [71] was removed and reinstalled or replaced, measure the electrical bonding resistance from the structure to the first fuel tube mating with the bulkhead fitting in the fuel tank (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-11.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-11: CDCCL

(b) Make sure that the electrical bonding resistance is 0.100 ohm (100 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-11.

J. Engine Fuel Feed Tube Bulkhead Fitting Installation Test

SUBTASK 28-22-15-410-006

(1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

(a) Close the applicable access panels:

(TASK 28-11-11-400-801)

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216
532AZ	Main Tank Inner Access at Rib 6
632AB	Main Tank Access Door - Wing Station 216
632AZ	Main Tank Inner Access at Rib 6

SUBTASK 28-22-15-710-004

(2) Do the Engine Fuel Suction Feed Operational Test (TASK 28-22-00-710-802).

K. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-15-410-007

(1) Close the applicable access panels:

Number	Name/Location
521AT	Outbd Leading Edge - Gap Cover Access
621AT	Outbd Leading Edge - Gap Cover Access

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-15-000-803

6. Couplings Removal

(Figure 404, Figure 405, Figure 406, Figure 407, and Figure 408)

A. General

(1) This task includes the steps to remove these couplings from fluid transfer tubes and ducts:

(a) Flexible half coupling

(b) Flexible full coupling

(c) Rigid coupling

(d) Self-Bonding Flexible Coupling (Without Tie Strap)

(e) Self-Bonding Flexible Coupling (With Tie Strap).

B. References

Reference	Title
28-22-15-700-801	Engine and APU Fuel Feed, Shroud, Fuel Vent Line and Couplings, and NEADS Lines Dent Criteria - Inspection/Check (P/B 601)

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 Removal

SUBTASK 28-22-15-010-006

(1) Get access to the applicable coupling.

E. Flexible Half Coupling Removal

(Figure 404)

SUBTASK 28-22-15-020-016

CAUTION

HOLD THE ADJACENT TUBE WHEN YOU REMOVE THE COUPLING. IF YOU DO NOT HOLD THE TUBE, YOU CAN CAUSE DAMAGE TO EQUIPMENT.

(1) To remove a flexible half coupling.

(a) Remove the safety cable or lockwire from the flexible half coupling.

(b) Loosen the coupling nut [31].

(c) Remove the retaining rings [32] and O-ring [33].

1) Discard the O-ring [33].

(d) Inspect the retaining rings [32] and coupling nut [31] for wear (TASK 28-22-15-700-801).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Flexible Full Coupling Removal

(Figure 405)

SUBTASK 28-22-15-020-017

CAUTION

HOLD THE ADJACENT TUBE WHEN YOU REMOVE THE COUPLING. IF YOU DO NOT HOLD THE TUBE, YOU CAN CAUSE DAMAGE TO EQUIPMENT.

(1) To remove a flexible full coupling.

(a) Remove the safety cable or lockwire from the flexible full coupling.

(b) Loosen the coupling nut [42].

(c) Move the coupling nut [42] away from the ferrule.

(d) Move the coupling [41] away from the ferrule.

(e) Remove the retainer halves [47], retaining rings [46], and O-rings [45].

1) Discard the O-rings [45].

(f) Inspect the retaining rings [46], retainer halves [47], coupling [41], and coupling nut [42] for wear (TASK 28-22-15-700-801).

G. Rigid Coupling Removal

(Figure 406)

SUBTASK 28-22-15-020-018

CAUTION

HOLD THE ADJACENT TUBE WHEN YOU REMOVE THE COUPLING. IF YOU DO NOT HOLD THE TUBE, YOU CAN CAUSE DAMAGE TO EQUIPMENT.

(1) To remove the rigid coupling.

(a) Remove the safety cable or lockwire from the rigid coupling.

(b) Loosen the coupling nut [51].

(c) Remove the retaining ring [54] and O-ring [55].

1) Discard the O-ring [55].

(d) Inspect the retaining ring [54] and coupling nut [51] for wear (TASK 28-22-15-700-801).

H. Self-Bonding Flexible Coupling (Without Tie Strap) Removal

(Figure 407)

SUBTASK 28-22-15-020-019

CAUTION

HOLD THE ADJACENT TUBE WHEN YOU REMOVE THE COUPLING. IF YOU DO NOT HOLD THE TUBE, YOU CAN CAUSE DAMAGE TO EQUIPMENT.

(1) For a self-bonding flexible coupling installed without a tie strap:

(a) Lift the two latches at the same time to disengage the coupling body [94].

(b) Remove the coupling body [94].

(c) Remove the sleeve [92] from the ferrules.

1) Discard the O-rings [91].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(d) Examine the coupling body [94] and the sleeve [92] for worn areas or damage.

1) Replace these components if it is necessary.

I. Self-Bonding Flexible Coupling (With Tie Strap) Removal

(Figure 408)

SUBTASK 28-22-15-020-020

CAUTION

HOLD THE ADJACENT TUBE WHEN YOU REMOVE THE COUPLING. IF YOU DO NOT HOLD THE TUBE, YOU CAN CAUSE DAMAGE TO EQUIPMENT.

(1) For a self-bonding flexible coupling installed with a tie strap:

(a) Cut the tie strap and remove it from the coupling body [83].

(b) Lift the two latches at the same time to disengage the coupling body [83].

(c) Remove the coupling body [83].

(d) Remove the sleeve [84] from the ferrules.

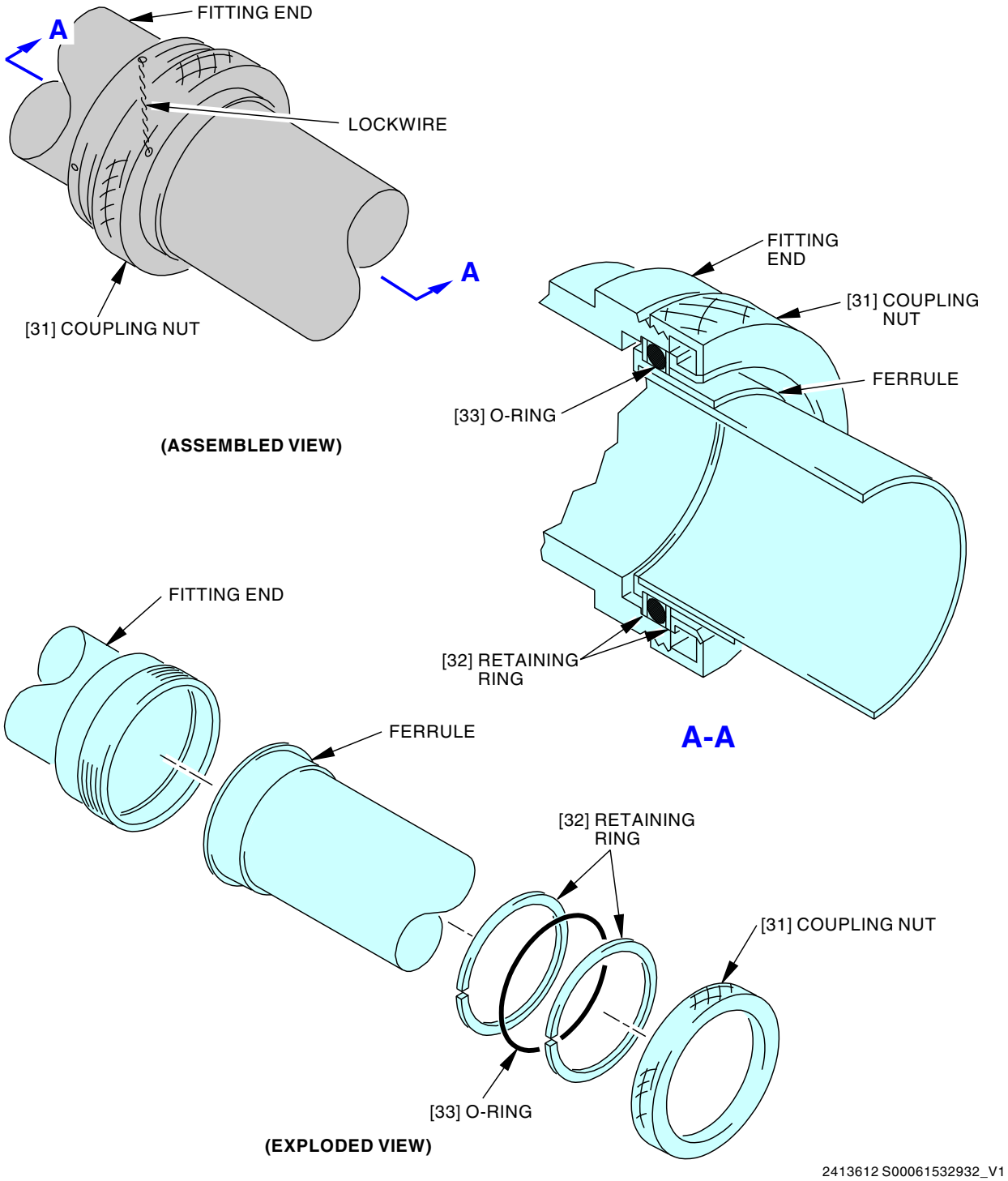
1) Discard the O-rings [81].

(e) Examine the coupling body [83] and the sleeve [84] for worn areas or damage.

1) Replace these components if it is necessary.

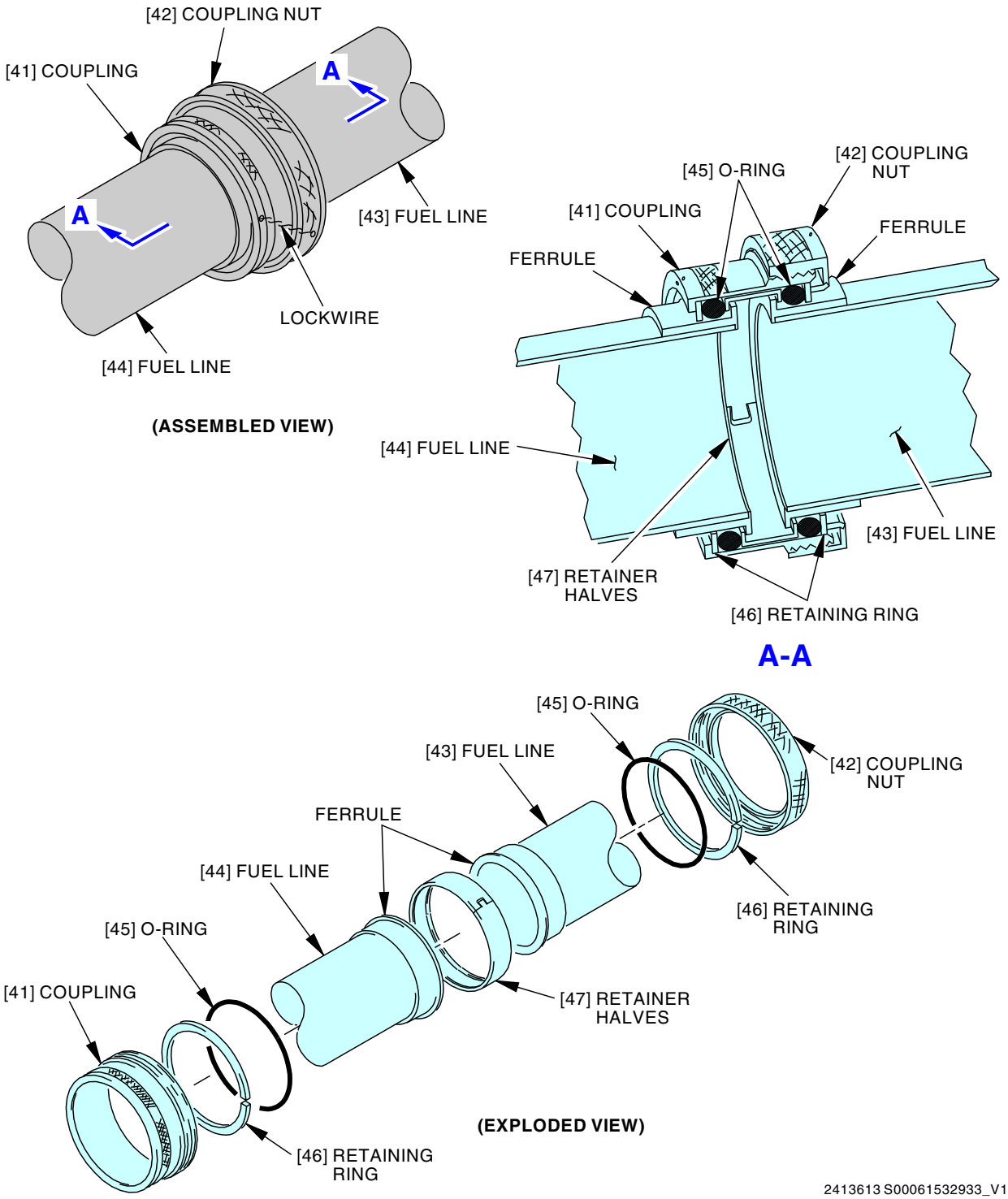
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



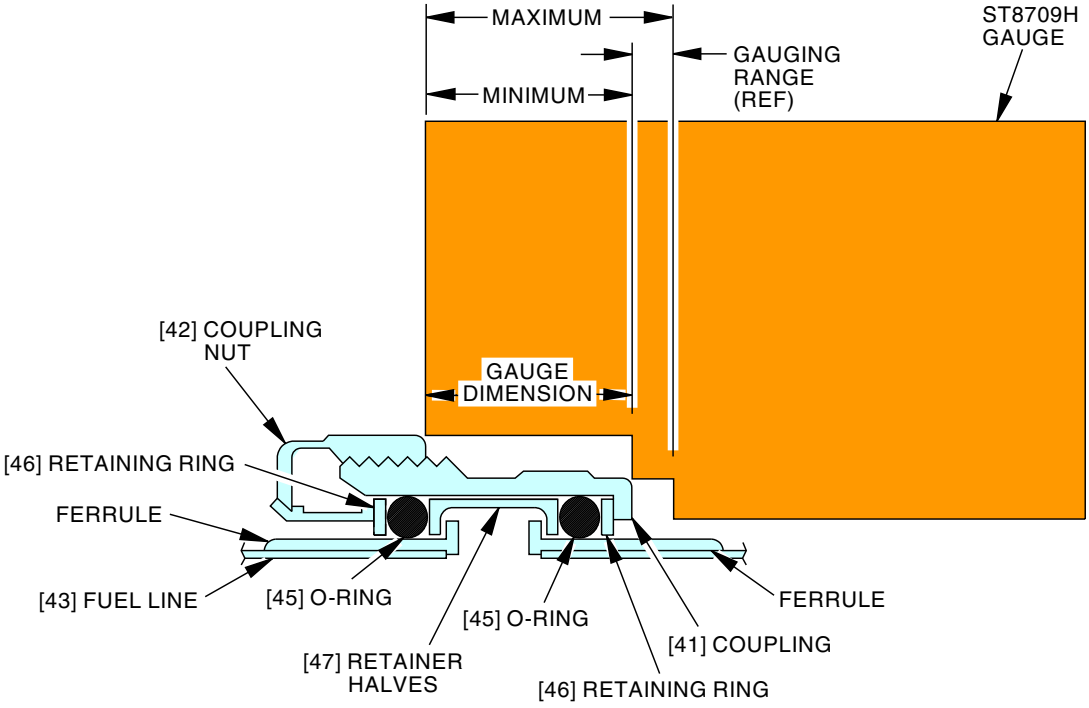
Flexible Half Coupling Installation
Figure 404/28-22-15-990-812

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Flexible Full Coupling Installation
Figure 405/28-22-15-990-813 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



FLEXIBLE FULL COUPLING WITH GAUGE

NOTE:

GO/NO-GO GAUGE IS FOR WIGGINS BACC42R COUPLINGS.

ST8709H-X USAGE

TUBE DIA.	BACC42R SIZE	MAXIMUM GAUGE (IN.) 1	MINIMUM GAUGE (IN.) 1	ST8709H GAUGE NO.
1/2	08	0.590	0.470	-1
5/8	10	0.590	0.470	-1
3/4	12	0.690	0.550	-2
1	16	0.750	0.600	-3
1 1/4	20	0.750	0.600	-3
1 1/2	24	0.930	0.760	-4
1 3/4	28	0.930	0.760	-4
2	32	0.930	0.760	-4

ST8709H-X USAGE (CONT.)

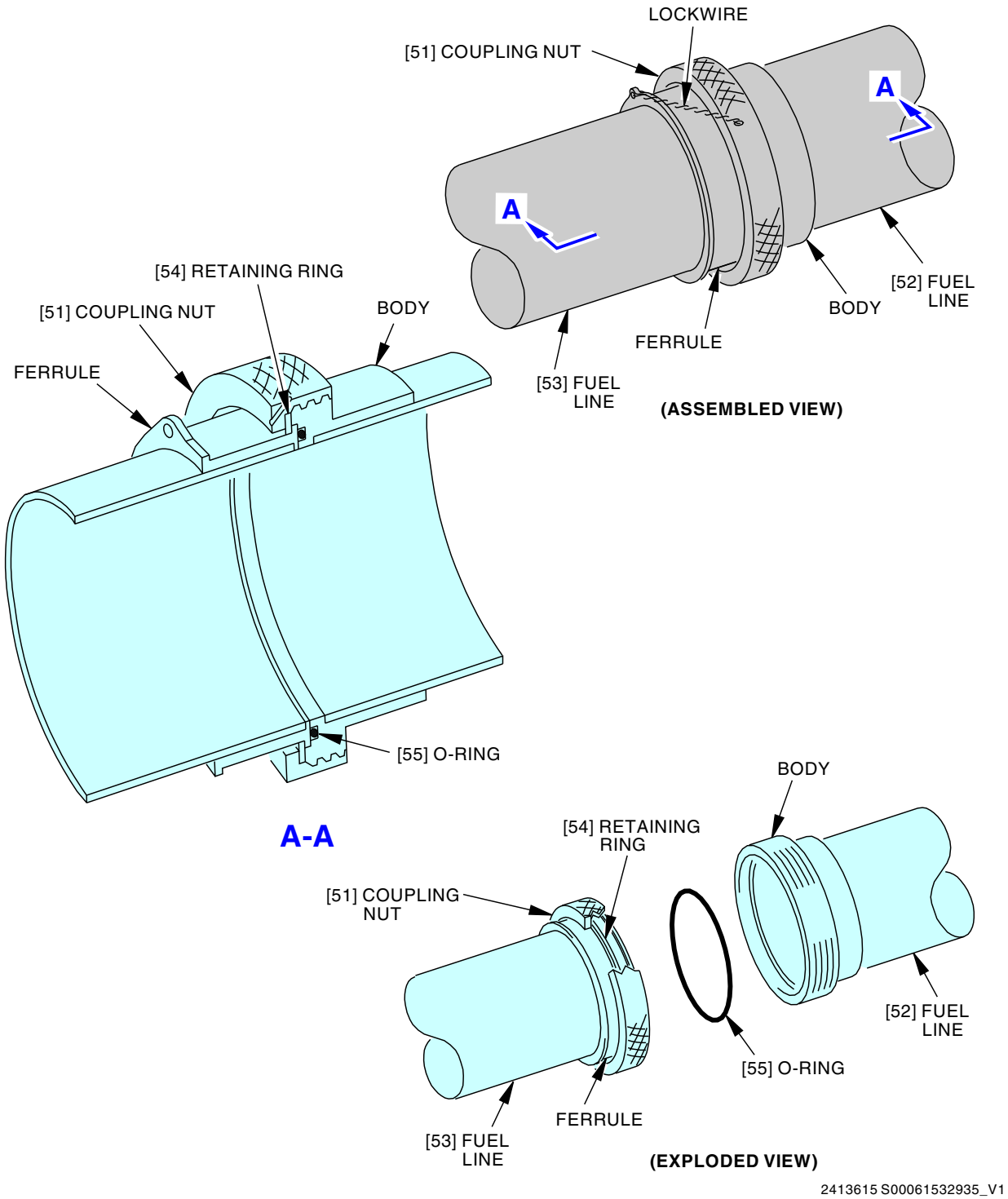
TUBE DIA.	BACC42R SIZE	MAXIMUM GAUGE (IN.) 1	MINIMUM GAUGE (IN.) 1	ST8709H GAUGE NO.
2 1/4	36	0.930	0.760	-4
2 1/2	40	0.930	0.760	-4
3	48	0.930	0.760	-4
3 1/2	56	1.030	0.880	-5
4	64	1.030	0.880	-5
4 1/2	72	1.160	0.990	-6
5	80	1.390	1.220	-7
5 1/2	88	1.390	1.220	-7

1 DIMENSIONAL REQUIREMENTS TO ASSEMBLE THE FLEXIBLE FULL COUPLING

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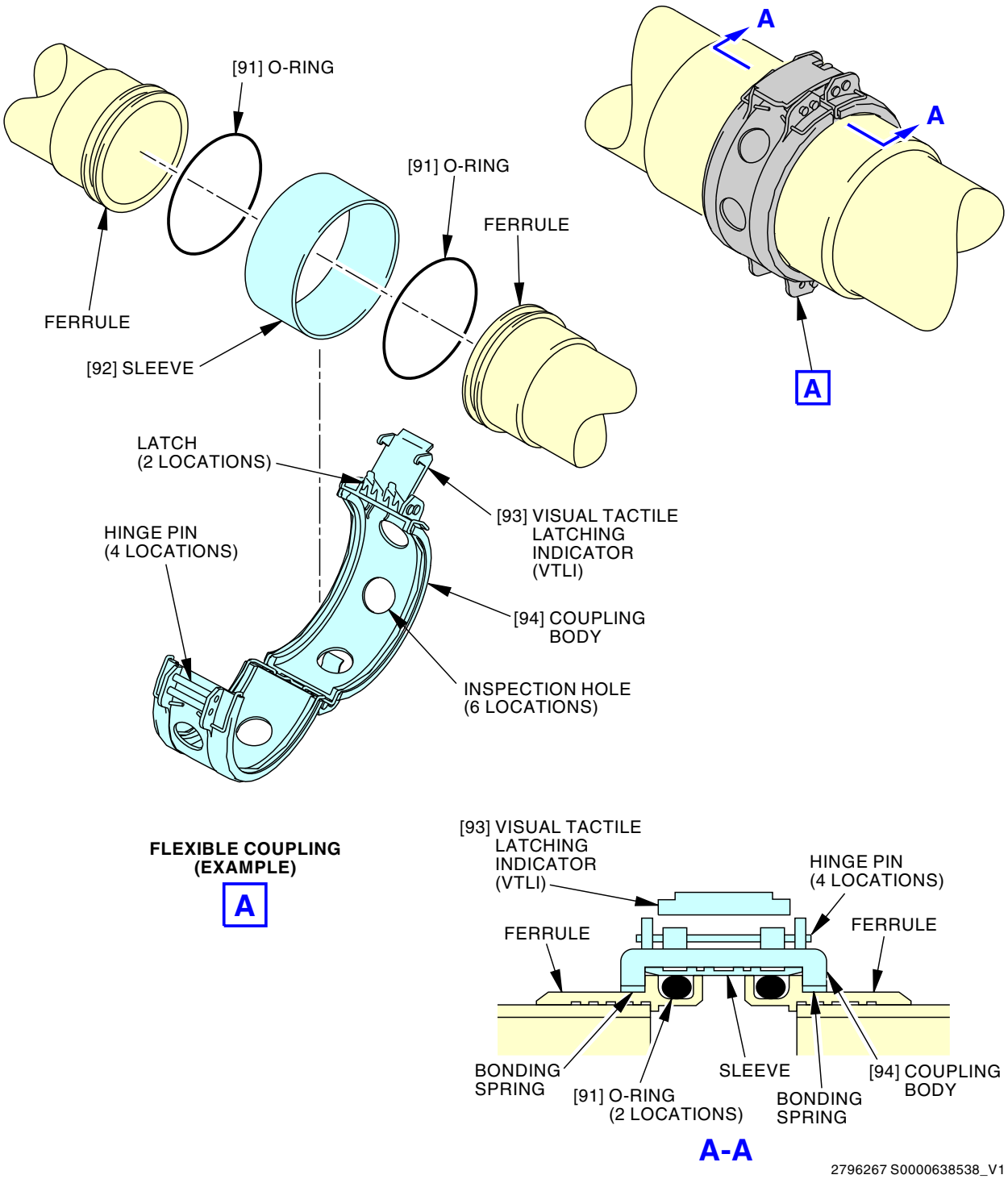
Flexible Full Coupling Installation
Figure 405/28-22-15-990-813 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



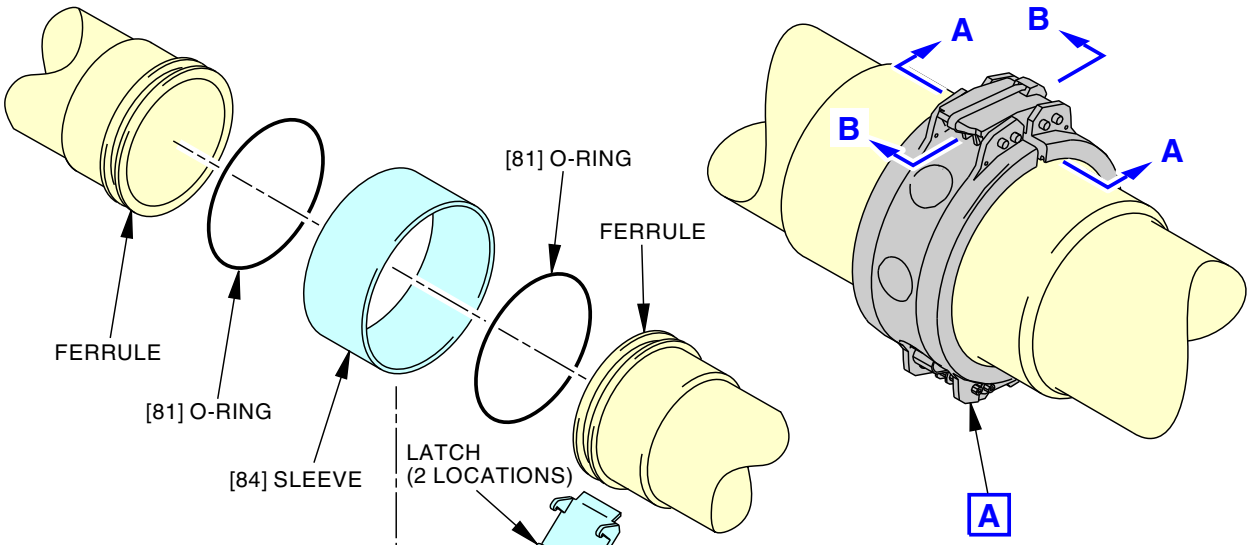
Rigid Coupling Installation
Figure 406/28-22-15-990-814

ECCN 9E991 BOEING PROPRIETARY - See title page for details



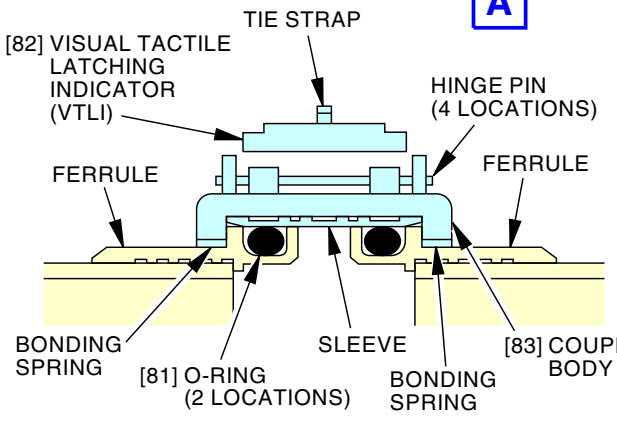
Self-Bonding Flexible Coupling (Without Tie Strap) Installation
Figure 407/28-22-15-990-815

ECCN 9E991 BOEING PROPRIETARY - See title page for details

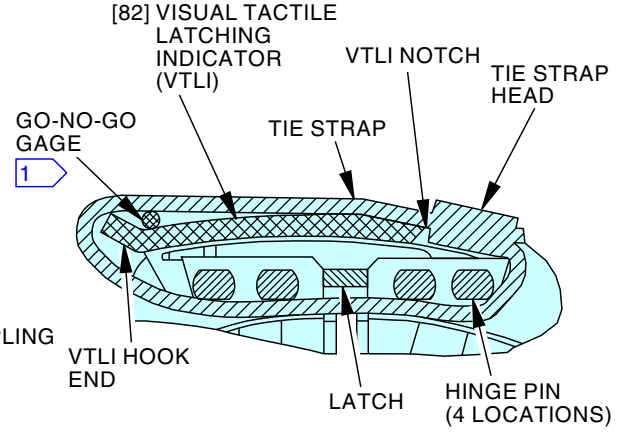


FLEXIBLE COUPLING (EXAMPLE)

A



A-A



B-B

1 USE A GO-NO-GO GAGE WHEN YOU DO NOT USE A TIE STRAP TOOL.

2796268 S0000638537_V1

Self-Bonding Flexible Coupling (With Tie Strap) Installation
Figure 408/28-22-15-990-816

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-15-400-803

7. Couplings Installation

(Figure 404, Figure 405, Figure 406, Figure 407, and Figure 408)

A. General

(1) This task includes the steps to install these couplings to fluid transfer tubes and ducts:

(a) Flexible half coupling

(b) Flexible full coupling

(c) Rigid coupling

(d) Self-Bonding Flexible Coupling (Without Tie Strap)

(e) Self-Bonding Flexible Coupling (With Tie Strap).

B. References

Reference	Title
20-10-44-400-801	Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659
COM-3923	Tool - Installation, Tie Strap Part #: GS2B-E Supplier: 06383 Part #: GS4H-E Supplier: 06383 Part #: GTS-E Supplier: 06383 Part #: PPTS Supplier: 06383 Opt Part #: GS2B Supplier: 06383 Opt Part #: GS2BL Supplier: 06383 Opt Part #: GS4H Supplier: 06383 Opt Part #: GTS Supplier: 06383
SPL-7464	Gage - Go/No-Go, Fuel Wiggins Coupling (BACC42R); X indicates gage number -1 to -7 Part #: ST8709H-X Supplier: 81205
STD-13259	Gage - Wire, 0.098 in. dia. nominal to 0.101 in. dia. max.

D. Consumable Materials

Reference	Description	Specification
D00504	Grease - Petrolatum	VV-P-236
G50347	Lockwire - MS20995NC32, Monel - 0.032 Inch (0.8128 mm) Diameter	NASM20995

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(Continued)

Reference	Description	Specification
G51074	Strap - Plastic, Wire Harness Tie, Self-locking, 7.25 Inches (184.15 mm) Long	BACS38W1
G51372	Kit - Safety Cable, 321 CRES - 0.035 +/-0.003 Inch (1.0 mm) Diameter, (Contains both Cable and Ferrule), 12 Inches Long	BACC13AT3K

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
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. Flexible Half Coupling Installation

(Figure 404)

SUBTASK 28-22-15-420-011

(1) Install the flexible half coupling on the fuel line, as follows:

(a) Put the coupling nut [31] on the fuel line with a ferrule.

CAUTION

DO NOT TWIST THE RETAINING RING OUT OF SHAPE. IF YOU TWIST THE RETAINING RING, FUEL LEAKS AT THE FITTING WILL OCCUR.

(b) Put a retaining ring [32] on the ferrule.

(c) Apply a thin layer of grease, D00504, on the new O-ring [33].

(d) Put the O-ring [33] on the ferrule.

CAUTION

DO NOT TWIST THE RETAINING RING OUT OF SHAPE. IF YOU TWIST THE RETAINING RING, FUEL LEAKS AT THE FITTING WILL OCCUR.

(e) Put the second retaining ring [32] on the ferrule.

(f) Align the ferrule with the fitting end.

CAUTION

DO NOT USE TOOLS TO TIGHTEN THE FITTINGS. DAMAGE TO THE FITTING COMPONENTS COULD OCCUR. THE ADJACENT FITTINGS COULD BECOME LOOSE.

(g) Manually tighten the coupling nut [31] to the fitting end.

SUBTASK 28-22-15-420-012

(2) Install a safety cable kit, G51372 or MS20995NC32 lockwire, G50347 between the coupling nut [31] and the ferrule (TASK 20-10-44-400-801).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Flexible Full Coupling Installation

(Figure 405)

SUBTASK 28-22-15-420-013

(1) Install a flexible full coupling on the fuel line, as follows:

(a) Put the coupling nut [42] on the fuel line [43].

(b) Put the coupling [41] on the fuel line [44].

CAUTION DO NOT TWIST THE RETAINING RING OUT OF SHAPE. IF YOU TWIST THE RETAINING RING, FUEL LEAKS AT THE FITTING WILL OCCUR.

(c) Put one retaining ring [46] on the ferrule of fuel line [44] and fuel line [43].

(d) Apply a thin layer of grease, D00504, to the new O-rings [45].

CAUTION DO NOT TWIST THE RETAINING RING OUT OF SHAPE. IF YOU TWIST THE RETAINING RING, FUEL LEAKS AT THE FITTING WILL OCCUR.

(e) Put one O-ring [45] on each ferrule.

(f) Align the ferrules of fuel line [44] and fuel line [43].

1) Make sure that the ferrules have a clearance of 0.12 ±0.03 in. (3.05 ±0.76 mm).

(g) Install the retainer halves [47] together on the ferrules to connect fuel line [44] and fuel line [43].

CAUTION DO NOT USE TOOLS TO TIGHTEN THE FITTINGS. DAMAGE TO THE FITTING COMPONENTS COULD OCCUR. THE ADJACENT FITTINGS COULD BECOME LOOSE.

(h) Manually tighten the coupling nut [42] to the coupling [41].

1) Measure the gauge dimension on the Go/No-Go Gage, SPL-7464 tool to make sure that the flexible full coupling is in the gauging range.

NOTE: The flexible full coupling can catch and feel tight when the coupling nut [42] is not fully installed. The Go/No-Go Gage, SPL-7464, shows a coupling nut [42] that is not installed correctly.

SUBTASK 28-22-15-420-014

(2) Install a safety cable kit, G51372 or MS20995NC32 lockwire, G50347 between the coupling nut [42] and coupling [41] (TASK 20-10-44-400-801).

H. Rigid Coupling Installation

(Figure 406)

SUBTASK 28-22-15-020-021

(1) Loosen the adjacent clamps and couplings before you install the rigid coupling.

NOTE: This prevents a preload on the rigid coupling.

SUBTASK 28-22-15-420-015

(2) Install the rigid coupling as follows:

(a) Put the coupling nut [51] on the ferrule of the fuel line [53].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

CAUTION

DO NOT TWIST THE RETAINING RING OUT OF SHAPE. IF YOU TWIST THE RETAINING RING, FUEL LEAKS AT THE FITTING WILL OCCUR.

(b) Put the retaining ring [54] on the ferrule to hold the coupling nut [51] on the fuel line [53].

(c) Align the fuel line [52] and fuel line [53].

NOTE: The fuel lines must align correctly to prevent fuel leaks.

(d) Apply a thin layer of grease, D00504, to the new O-ring [55].

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 TO PREVENT FUEL LEAKS.

1) Install the O-ring [55] in the groove of the body on the fuel line [52].

CAUTION

DO NOT APPLY FORCE TO THE TUBE TO TRY TO ALIGN THE TUBE ENDS. TOO MUCH FORCE CAN CAUSE DAMAGE TO THE TUBES.

(e) Make sure that the fuel line [52] and fuel line [53] align correctly.

1) Make sure that the ferrule is parallel to the coupling body.

2) Adjust and tighten the adjacent clamps and couplings.

CAUTION

DO NOT USE TOOLS TO TIGHTEN THE FITTINGS. DAMAGE TO THE FITTING COMPONENTS COULD OCCUR. THE ADJACENT FITTINGS COULD BECOME LOOSE.

(f) Manually tighten the coupling nut [51] on the body until the coupling nut [51] is tight against the body.

SUBTASK 28-22-15-420-016

(3) Install a safety cable kit, G51372 or MS20995NC32 lockwire, G50347 between the coupling nut [51] and ferrule (TASK 20-10-44-400-801).

I. Self-Bonding Flexible Coupling (Without Tie Strap) Installation

(Figure 407)

SUBTASK 28-22-15-100-001

(1) Prepare a coupling body [94] for the installation of a self-bonding flexible coupling (SWPM 20-20-00):

(a) Clean the mating surfaces of these components:

1) The bonding springs on the coupling body [94].

2) The external mating surfaces of the ferrules.

3) The bonding surfaces of the sleeve [92].

SUBTASK 28-22-15-420-017

(2) Install the coupling body [94] as follows:

(a) Apply a thin layer of grease, D00504, to the two O-rings [91].

1) Install the two O-rings [91] in the grooves of the ferrules.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) Apply a thin layer of grease, D00504, to the inner side of the sleeve [92].

1) Install the sleeve [92] on one of the O-rings [91].

(c) Make sure that the tubes align correctly.

1) If the two ferrules are male, the angle between the center lines of the tubes cannot be more than 4°arc (0 rad).

2) If one ferrule is female, the angle between the center lines of the tubes cannot be more than 2°arc (0 rad).

(d) Move the sleeve [92] on top of the two O-rings [91].

NOTE: A small movement from side to side can help the entry of the second O-ring [91].

(e) Install the coupling body [94] on the sleeve [92].

1) Put the open coupling body [94] on the sleeve [92].

2) Close the coupling body [94].

3) Make sure that the two latches engage correctly on the hinge pins.

4) Make sure that the coupling body [94] engages correctly on the ferrules.

5) Look through the inspection holes in the coupling body [94] to make sure that the sleeve [92] is installed correctly.

6) Manually turn the coupling body [94] to make sure that you installed it correctly.

SUBTASK 28-22-15-760-003

(3) Measure the electrical bonding resistance across the flexible coupling for the tube-to-tube, tube-to-component, or tube-to-isolator assembly with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

(a) For a coupling body [94] that connects to an isolator, put the probe on the ferrule of the isolator.

(b) Make sure that the bonding resistance is 1.0 ohm or less.

NOTE: The probe distance between the coupling and tube is approximately 0.25 in. (6.35 mm).

J. Self-Bonding Flexible Coupling (With Tie Strap) Installation

(Figure 408)

SUBTASK 28-22-15-100-002

(1) Prepare a coupling body [83] for the installation of a self-bonding flexible coupling (SWPM 20-20-00):

(a) Clean the mating surfaces of these components:

1) The bonding springs on the coupling body [83].

2) The external mating surfaces of the ferrules.

3) The bonding surfaces of the sleeve [84].

SUBTASK 28-22-15-420-018

(2) Install the coupling body [83] as follows:

(a) Apply a thin layer of grease, D00504, to the two O-rings [81].

1) Install the two new O-rings [81] in the grooves of the ferrules.

(b) Apply a thin layer of grease, D00504, to the inner side of the sleeve [84].

1) Install the sleeve [84] on one of the O-rings [81].

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(c) Make sure that the tubes align correctly.

1) If the two ferrules are male, the angle between the center lines of the tubes cannot be more than 4°arc (0 rad).

2) If one ferrule is female, the angle between the center lines of the tubes cannot be more than 2°arc (0 rad).

(d) Move the sleeve [84] on top of the two O-rings [81].

NOTE: A small movement from side to side can help the entry of the second O-ring [81].

(e) Install the coupling body [83] on the sleeve [84].

1) Put the open coupling body [83] in its position on the sleeve [84].

a) If possible, put the coupling body [83] on the sleeve [84] with the notch of the visual tactile latching indicator (VTLI) [82] near you.

NOTE: This will help the installation of the tie strap.

2) Close the coupling body [83].

3) Make sure that the two latches engage correctly on the hinge pin.

4) Put the visual tactile latching indicator (VTLI) [82] to the closed position.

5) Make sure that the visual tactile latching indicator (VTLI) [82] engages correctly on the hinge pin.

6) Make sure that the coupling body [83] engages correctly on the ferrules.

7) Look through the inspection holes in the coupling body [83] to make sure that the sleeve [84] is installed correctly.

SUBTASK 28-22-15-420-019

CAUTION

MAKE SURE THAT YOU PUT THE STRAP IN THE CENTER LUGS BELOW ALL FOUR HINGE PINS. THE STRAP CAN MOVE ABOVE THE SECOND SET OF PINS. THESE WILL CAUSE THE VTLI TO BECOME UNSTABLE AND DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Install the tie strap, G51074on the coupling body [83], as follows:

(a) Put the end of the new tie strap, G51074, around the visual tactile latching indicator (VTLI) [82] and below the four hinge pins of the coupling body [83].

(b) Put the end of the tie strap, G51074, over the visual tactile latching indicator (VTLI) [82] and into the head of the tie strap, G51074.

1) Make sure that the head of the tie strap, G51074, is on the same side with the notch in the visual tactile latching indicator (VTLI) [82].

SUBTASK 28-22-15-420-020

CAUTION

DO NOT USE MORE THAN THE NECESSARY TENSION TO TIGHTEN THE STRAP ON THE COUPLING. TOO MUCH TENSION CAN CUT THE STRAP TOO SHORT AND CAUSE IT TO COME OFF DURING FLEX COUPLING MOTION OR WHEN EXPOSED TO AIRPLANE NORMAL VIBRATION. DAMAGE TO EQUIPMENT CAN OCCUR.

(4) Tighten the tie strap with the tie strap installation tool, COM-3923 as follows:

NOTE: This is the preferred procedure.

(a) Adjust the tension setting of the tie strap.

1) Adjust the dial to MIN.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

2) Adjust the fine adjust to 1.

(b) Put the end of the tie strap, G51074, in the tie strap installation tool, COM-3923.

(c) Tighten the tie strap, G51074, with the tie strap installation tool, COM-3923.

1) Make sure that the head of the tie strap, G51074, is in the notch of the visual tactile latching indicator (VTLI) [82].

2) Make sure that the head of the tie strap, G51074, is not the tallest part of the coupling installation.

SUBTASK 28-22-15-420-021

CAUTION

DO NOT USE MORE THAN THE NECESSARY TENSION TO TIGHTEN THE STRAP ON THE COUPLING. TOO MUCH TENSION CAN CUT THE STRAP TOO SHORT AND CAUSE IT TO COME OFF DURING FLEX COUPLING MOTION OR WHEN EXPOSED TO AIRPLANE NORMAL VIBRATION. DAMAGE TO EQUIPMENT CAN OCCUR.

(5) Tighten the tie strap without the tie strap installation tool, COM-3923, as follows:

NOTE: The installed components or structure can prevent the operation of the tool. This is an alternate procedure.

(a) Put the go-no-go gage, STD-13259, between the tie strap, G51074, and near the VTLI hook end.

(b) Tighten the tie strap, G51074, with your hand until the tie strap, G51074, touches the go-no-go gage, STD-13259.

1) Make sure that the head of the tie strap, G51074, is in the notch of the visual tactile latching indicator (VTLI) [82].

2) Make sure that the head of the tie strap, G51074, is not the tallest part of the coupling installation.

(c) Make sure that the go-no-go gage, STD-13259, is tight between the tie strap, G51074, and the visual tactile latching indicator (VTLI) [82].

(d) Remove the go-no-go gage, STD-13259.

SUBTASK 28-22-15-420-022

(6) Cut the loose end of the tie strap, G51074.

(a) Make sure that the cut end of the tie strap, G51074, is not more than 0.05 in. (1.27 mm) from the head of the tie strap, G51074.

(b) Make sure that the end of the tie strap, G51074, does not have sharp edges.

(c) Make sure that a minimum of 2 teeth show after the tooth engaged in the tie strap, G51074.

SUBTASK 28-22-15-420-023

(7) Manually turn the coupling body [83] to make sure that you installed it correctly.

SUBTASK 28-22-15-760-004

(8) Measure the electrical bonding resistance across the flexible coupling for the tube-to-tube, tube-to-component, or tube-to-isolator assembly with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

(a) For a coupling body that connects to an isolator, put the probe on the ferrule of the isolator.

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(b) Make sure that the bonding resistance is 1.0 ohm or less.

NOTE: The probe distance between the coupling and tube is approximately 0.25 in. (6.35 mm).

END OF TASK

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FUEL FEED MANIFOLD COUPLINGS - INSPECTION/CHECK

1. General

A. This procedure contains these tasks:

(1) Engine Fuel Feed Manifold - Leakage Test

(2) Engine and APU Fuel Feed, Shroud, Fuel Vent Line and Couplings, and NEADS Lines 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 leak test is a positive pressure test of the engine fuel feed manifold. This task isolates leakage in the engine fuel feed manifold.

(2) It is necessary to defuel the applicable fuel tank when there is a leak.

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
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)
28-22-11-000-801	Engine Fuel Spar Valve Actuator Removal (P/B 401)
28-22-11-000-803	Engine Fuel Spar Valve - Valve Body Removal (P/B 401)
28-22-11-400-801	Engine Fuel Spar Valve Actuator Installation (P/B 401)
28-22-11-400-803	Engine Fuel Spar Valve - Valve Body Installation (P/B 401)
28-22-11-820-801	Engine Fuel Spar Valve Alignment (P/B 401)
28-22-15-000-801	Fuel Line, Fitting and Coupling Removal (P/B 401)
28-22-15-400-801	Fuel Line, Fitting and Coupling Installation (P/B 401)
28-22-21-000-801	Engine Fuel Crossfeed Valve Actuator Removal (P/B 401)
28-22-21-000-803	Engine Fuel Crossfeed Valve - Valve Body Removal (P/B 401)
28-22-21-400-801	Engine Fuel Crossfeed Valve Actuator Installation (P/B 401)
28-22-21-400-803	Engine Fuel Crossfeed Valve - Valve Body Installation (P/B 401)
28-22-21-820-801	Engine Fuel Crossfeed Valve Alignment (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)
71-00-00-800-804-G00	Power Plant Test Reference Table (P/B 501)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

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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	Test Equipment - Fuel Manifold Part #: C28014-1 Supplier: 81205
STD-201	Container - Fuel Resistant, 5 U.S.-Gal (19 l)
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
D00504	Grease - Petrolatum	VV-P-236

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Preformed packing	73-11-03-01-030	SIA ALL

F. 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

G. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

H. Prepare for the Test

SUBTASK 28-22-15-650-003

(1) Defuel each main tank until the fuel is below the spar valves (TASK 28-26-00-650-801 or TASK 28-26-00-650-802).

SUBTASK 28-22-15-650-004

(2) On the P5 Overhead Panel, make sure that the APU master switch is in the OFF position.

(a) Get access to the APU fuel shutoff valve through the left main landing gear wheel well.

(b) Make sure that the red manual override lever shows that the valve is closed.

NOTE: If the APU fuel shutoff valve is not closed, the valve can be inoperative.

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SUBTASK 28-22-15-650-005

(3) Make sure that the engine fuel valves are in the correct positions, as follows:

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 tanks. For this test, the two HPSOV are closed when the two engine fuel spar valves are open.

(a) On the P10 Control Stand, make sure that the Engine Start Levers are in the CUTOFF position.

(b) On the P5 Overhead Panel, make sure that the ENGINE START 1 and 2 switches are in the OFF position.

(c) Put a DO NOT OPERATE tag, STD-858, on the ENGINE START 1 and 2 switches.

(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 P5-2 Fuel System Module, turn the CROSSFEED switch to the open position.

1) On the P5-2 Fuel System Module, make sure that the fuel crossfeed VALVE OPEN light comes on bright while the valve goes from the closed position to the open position.

2) Make sure that the fuel crossfeed VALVE OPEN light dims in 6 seconds.

(f) Put the Engine Start Levers to the IDLE position.

NOTE: This opens the engine fuel spar valves.

(g) On the P5-2 Fuel System Module, make sure that the left and right SPAR VALVE CLOSED lights goes off.

SUBTASK 28-22-15-860-001

(4) Make sure that the defueling valve handle is in the CLOSED position.

SUBTASK 28-22-15-010-002

(5) Do these tasks in sequence to safely open the left and right thrust reversers on the applicable engine:

WARNING DO THE DEACTIVATION PROCEDURE FOR THE THRUST REVERSER TO PREVENT THE OPERATION OF THE THRUST REVERSER. ACCIDENTAL OPERATION OF THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

(a) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(b) Open the applicable left or right fan cowl panels (TASK 71-11-04-010-801-G00).

1) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1

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(Continued)

Number	Name/Location
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Open the applicable left or right thrust reversers (TASK 78-31-00-010-801-G00).

1) Open these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

SUBTASK 28-22-15-680-002

(6) Drain the fuel supply line:

(a) Put a 5 U.S.-gal (19 l) fuel resistant container, STD-201, below the fuel filter bowl.

NOTE: Have an extra 5 U.S.-gal (19 l) fuel resistant container, STD-201, in case it is necessary.

(b) Remove the drain plug [3] from the fuel filter bowl [1].

1) Cut and remove the safety wire from the drain plug [3].

2) Remove the drain plug [3] from the fuel filter bowl [1].

3) Let the fuel drain.

4) Remove and discard the preformed packing [2] from the groove of the drain plug [3].

SUBTASK 28-22-15-420-009

(7) Install the drain plug [3].

(a) Make sure that the drain plug [3] and fuel filter bowl [1] mating faces are clean and clear of unwanted materials.

(b) Lubricate a new preformed packing [2] with grease, D00504.

(c) Install the new preformed packing [2] onto the drain plug [3].

(d) Install the drain plug [3] in the fuel filter bowl [1].

(e) Tighten the drain plug [3] to 140 in-lb (15.8 N·m) - 150 in-lb (16.9 N·m).

(f) Install the safety wire on the drain plug [3].

SUBTASK 28-22-15-020-006

(8) Disconnect the fuel supply hose for the left and right engines at the disconnect panel (Figure 601).

SUBTASK 28-22-15-480-001

(9) Connect the fuel manifold test equipment, SPL-1776, to each engine fuel supply line (Figure 603).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

I. Engine Fuel Feed Manifold - Leak Test

SUBTASK 28-22-15-480-002

(1) Close the bleed valve on the fuel manifold test equipment, SPL-1776, at the right engine.

SUBTASK 28-22-15-780-001

(2) Use the regulator to apply 40 ±2 psig (276 ±14 kPa) air pressure to the fuel supply line at the left engine.

(a) Make sure that the air pressure is stable.

(b) Close the shutoff valve on the fuel manifold test equipment, SPL-1776, at the left engine to hold a pressure of 40 ±2 psig (276 ±14 kPa).

SUBTASK 28-22-15-970-001

(3) Record the initial air pressure.

SUBTASK 28-22-15-860-004

(4) Wait 10 minutes.

SUBTASK 28-22-15-970-002

(5) Record the final air pressure.

SUBTASK 28-22-15-860-003

(6) Make sure that the air pressure did not decrease 1.5 psi (10.3 kPa) or more.

(a) If the air pressure did not decrease more than 1.5 psi (10.3 kPa) after 10 minutes, the fuel feed manifold has no leaks.

1) Do this procedure: Put the Airplane Back to Its Usual Condition.

(b) If the air pressure decreases more than 1.5 psi (10.3 kPa) in 10 minutes, there is a leak in the fuel feed manifold.

1) Do this procedure: Engine Fuel Feed Manifold - Leak Location Test.

J. Engine Fuel Feed Manifold - Leak Location Test

SUBTASK 28-22-15-790-001

(1) To find the general location of the fuel manifold leak, isolate the fuel feed manifold at the right spar valve, as follows (Figure 604):

(a) Close the right spar valve.

1) On the P10 Control Stand, put the Engine 2 Start Lever to the CUTOFF position.

(b) Do this procedure: Engine Fuel Feed Manifold - Leak Test.

1) If the air 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.

2) If the air pressure decreases more than 1.5 psi (10.3 kPa) in 10 minutes, continue.

SUBTASK 28-22-15-790-003

(2) Isolate the fuel feed manifold at the fuel crossfeed valve, as follows:

(a) On the P5-2 Fuel System Module, turn the CROSSFEED switch to the closed position.

(b) Do this procedure: Engine Fuel Feed Manifold - Leak Test.

(c) If the air pressure does not decrease by more than 1.0 psi (6.9 kPa) in 10 minutes, the leak is between the fuel crossfeed valve and the right spar valve.

(d) If the air pressure decreases more than 1.0 psi (6.9 kPa) in 10 minutes, continue.

SUBTASK 28-22-15-860-005

(3) Isolate the fuel feed manifold at the left spar valve, as follows:

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(a) Close the left spar valve.

1) On the P10 Control Stand, put the Engine 1 Start Lever to the CUTOFF position.

(b) Open the right spar valve.

1) On the P10 Control Stand, put the Engine 2 Start Lever to the IDLE or RUN position.

(c) On the P5-2 Fuel System Module, turn the CROSSFEED switch to the open position.

(d) Do this procedure: Engine Fuel Feed Manifold - Leak Test with the following conditions.

NOTE: Because of the thermal relief feature on the fuel spar valves when in the closed position, the spar valve is to be pressurized from the airplane side of the valve, rather than the engine side, for this procedure.

1) Use the regulator to apply 40 ±2 psig (276 ±14 kPa) air pressure to the fuel supply line at the right engine

2) Open the bleed valve on the fuel manifold test equipment, SPL-1776, at the left engine supply line.

(e) If the air pressure does not decrease by more than 1.0 psi (6.9 kPa) in 10 minutes, the leak is between the left spar valve and the left engine fuel valve.

(f) If the air pressure decreases more than 1.0 psi (6.9 kPa) in 10 minutes, the leak is between the left spar valve and the test equipment on the left engine.

SUBTASK 28-22-15-360-001

(4) If there is a leak, do these steps:

(a) Turn the CROSSFEED valve to the open position.

(b) Open the left and right fuel spar valves.

(c) Open the bleed valve on the fuel manifold test equipment, SPL-1776, to drain fuel and release the air pressure from the fuel supply line.

(d) Remove the two fuel manifold test equipment, SPL-1776, from the fuel supply line.

(e) Connect the fuel supply hose to the engine fuel supply line (Figure 601).

(f) Defuel the applicable fuel tank (TASK 28-26-00-650-801).

(g) At the disconnect panel, disconnect the fuel supply hose for the No. 1 and No. 2 engine (Figure 601).

(h) Connect the fuel manifold test equipment, SPL-1776, to each engine fuel supply line (Figure 603).

SUBTASK 28-22-15-360-002

(5) Find the correct location of the leak:

NOTE: The leak test found the general location of the leak.

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.

(a) Do this task for the applicable fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

1) Remove the applicable fuel tank access doors (TASK 28-11-11-000-801, TASK 28-11-31-000-801).

(b) Pressurize the fuel feed manifold at the inlet line for the left engine.

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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.

(c) Go in 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 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 TO PREVENT FUEL LEAKS.

(e) If a coupling has a leak, remove and install the coupling.

1) Do this task: Fuel Line, Fitting and Coupling Removal, TASK 28-22-15-000-801.

2) Do this task: Fuel Line, Fitting and Coupling Installation, TASK 28-22-15-400-801.

(f) If a fuel line has a leak or is damaged, remove and then install a new fuel line.

1) Do this task: Fuel Line, Fitting and Coupling Removal, TASK 28-22-15-000-801.

2) Do this task: Fuel Line, Fitting and Coupling Installation, TASK 28-22-15-400-801.

SUBTASK 28-22-15-790-002

(6) 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 passed.

K. Right Fuel Spar Valve - Leak Test

SUBTASK 28-22-15-790-004

(1) To do a test of the right spar valve, put the valves to these positions:

NOTE: The valve must be electrically commanded to the open or closed position.

(a) On the P5 Overhead Panel, put the APU master switch to the OFF position.

1) Get access to the APU fuel shutoff valve through the left main landing gear wheel well.

2) Make sure that the red manual override lever shows that the valve is closed.

NOTE: If the APU fuel shutoff valve is not closed, the valve can be inoperative.

(b) On the P5-2 Fuel System Module, turn the CROSSFEED switch to the open position.

(c) On the P10 Control Stand, put the Engine 1 Start Lever to the IDLE or RUN position.

(d) On the P10 Control Stand, put the Engine 2 Start Lever to the CUTOFF position.

(e) Make sure that the defuel valve is in the closed position.

SUBTASK 28-22-15-780-002

(2) Use the regulator to apply 40 ±2 psig (276 ±14 kPa) air pressure to the fuel supply line at the left engine.

(a) Make sure that the air pressure is stable.

(b) Close the shutoff valve on the fuel manifold test equipment, SPL-1776, at the left engine to hold a pressure of 40 ±2 psig (276 ±14 kPa).

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SUBTASK 28-22-15-970-003

(3) Record the initial air pressure.

SUBTASK 28-22-15-860-006

(4) Wait 10 minutes.

SUBTASK 28-22-15-970-004

(5) Record the final air pressure.

SUBTASK 28-22-15-790-005

(6) Make sure that the pressure is 40 psig (276 kPa) on the pressure gauge for the left engine pressure check equipment.

(a) If the pressure decreases, find the section of the leak: Engine Fuel Feed Manifold - Leak Test.

SUBTASK 28-22-15-790-006

(7) Make sure that the outlet pressure at the right engine disconnect is 0 psig (0 kPa).

SUBTASK 28-22-15-790-007

(8) If the outlet pressure is more than 0 psig (0 kPa), there is a leak in the right spar valve.

NOTE: The leak can be caused by the valve body, the actuator, or the adapter shaft is not aligned.

(a) Align the right fuel spar valve (Engine Fuel Spar Valve Alignment, TASK 28-22-11-820-801).

1) Do the right fuel spar valve - leak test procedure.

(b) If the leak test is not correct, replace the right fuel spar actuator:

1) Do this task: Engine Fuel Spar Valve Actuator Removal, TASK 28-22-11-000-801.

2) Do this task: Engine Fuel Spar Valve Actuator Installation, TASK 28-22-11-400-801.

3) Do the right fuel spar valve - leak test procedure.

(c) If the leak test is not correct, replace the right valve body:

1) Do this task: Engine Fuel Spar Valve - Valve Body Removal, TASK 28-22-11-000-803.

2) Do this task: Engine Fuel Spar Valve - Valve Body Installation, TASK 28-22-11-400-803.

3) Do the right fuel spar valve - leak test procedure.

L. Fuel Crossfeed Valve - Leak Test

SUBTASK 28-22-15-710-002

(1) To do a test of the fuel crossfeed valve, put the valves to these positions:

NOTE: The valves must be electrically commanded to the open or closed position.

(a) On the P5 Overhead Panel, put the APU master switch to the OFF position.

1) Get access to the APU fuel shutoff valve through the left main landing gear wheel well.

2) Make sure that the red manual override lever shows that the valve is closed.

NOTE: If the APU fuel shutoff valve is not closed, the valve can be inoperative.

(b) On the P5-2 Fuel System Module, turn the CROSSFEED switch to the closed position.

(c) On the P10 Control Stand, put the Engine 1 Start Lever to the IDLE or RUN position.

(d) On the P10 Control Stand, put the Engine 2 Start Lever to the IDLE or RUN position.

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(e) Make sure that the defuel valve is in the closed position.

SUBTASK 28-22-15-790-008

(2) Use the regulator to apply 40 ±2 psig (276 ±14 kPa) air pressure to the fuel supply line at the left engine.

(a) Make sure that the air pressure is stable.

(b) Close the shutoff valve on the fuel manifold test equipment, SPL-1776, at the left engine to hold a pressure of 40 ±2 psig (276 ±14 kPa).

SUBTASK 28-22-15-970-005

(3) Record the initial air pressure.

SUBTASK 28-22-15-970-006

(4) Wait 10 minutes.

SUBTASK 28-22-15-970-007

(5) Record the final air pressure.

SUBTASK 28-22-15-790-009

(6) Make sure that the pressure is 40 psig (276 kPa) on the pressure gauge for the left engine pressure check equipment.

(a) If the pressure decreases, find the section of the leak: Engine Fuel Feed Manifold - Leak Test procedure.

SUBTASK 28-22-15-790-010

(7) Make sure that the outlet pressure at the right engine disconnect is 0 psig (0 kPa).

SUBTASK 28-22-15-790-011

(8) If the outlet pressure is more than 0 psig (0 kPa), there is a leak in the fuel crossfeed valve.

NOTE: The leak can be caused by the valve body, the actuator, or the adapter shaft is not aligned.

(a) Align the fuel crossfeed valve (Engine Fuel Crossfeed Valve Alignment, TASK 28-22-21-820-801).

1) Do the Fuel Crossfeed Valve - Leak Test procedure.

(b) If the leak test is not correct, replace the actuator:

1) Do this task: Engine Fuel Crossfeed Valve Actuator Removal, TASK 28-22-21-000-801.

2) Do this task: Engine Fuel Crossfeed Valve Actuator Installation, TASK 28-22-21-400-801.

3) Do the Fuel Crossfeed Valve - Leak Test procedure.

(c) If the leak test is not correct, replace the valve body:

1) Do this task: Engine Fuel Crossfeed Valve - Valve Body Removal, TASK 28-22-21-000-803.

2) Do this task: Engine Fuel Crossfeed Valve - Valve Body Installation, TASK 28-22-21-400-803.

3) Do the Fuel Crossfeed Valve - Leak Test procedure.

M. Left Fuel Spar Valve - Leak Test

SUBTASK 28-22-15-710-003

(1) To do a test of the left spar valve, put the valves to these positions:

NOTE: The valves must be electrically commanded to the open or closed position.

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(a) On the P5 Overhead Panel, put the APU master switch to the OFF position.

1) Get access to the APU fuel shutoff valve through the left main landing gear wheel well.

2) Make sure that the red manual override lever shows that the valve is closed.

NOTE: If the APU fuel shutoff valve is not closed, the valve can be inoperative.

(b) On the P5-2 Fuel System Module, turn the CROSSFEED switch to the open position.

(c) On the P10 Control Stand, put the Engine 1 Start Lever to the CUTOFF position.

(d) On the P10 Control Stand, put the Engine 2 Start Lever to the IDLE or RUN position.

(e) Make sure that the defuel valve is in the closed position.

SUBTASK 28-22-15-790-012

(2) Use the regulator to apply 40 ±2 psig (276 ±14 kPa) air pressure to the fuel supply line at the right engine.

(a) Make sure that the air pressure is stable.

(b) Close the shutoff valve on the fuel manifold test equipment, SPL-1776, at the right engine to hold a pressure of 40 ±2 psig (276 ±14 kPa).

SUBTASK 28-22-15-970-008

(3) Record the initial air pressure.

SUBTASK 28-22-15-970-009

(4) Wait 10 minutes.

SUBTASK 28-22-15-970-010

(5) Record the final air pressure.

SUBTASK 28-22-15-790-013

(6) Make sure that the pressure is 40 psig (276 kPa) on the pressure gauge for the right engine pressure check equipment.

(a) If the pressure decreases, find the section of the leak: Engine Fuel Feed Manifold - Leak Test.

SUBTASK 28-22-15-790-014

(7) Make sure that the outlet pressure at the left engine disconnect is 0 psig (0 kPa).

SUBTASK 28-22-15-790-015

(8) If the outlet pressure is more than 0 psig (0 kPa), there is a leak in the left spar valve.

NOTE: The leak can be caused by the valve body, the actuator, or the adapter shaft is not aligned.

(a) Align the left fuel spar valve (TASK 28-22-11-820-801).

1) Do the left fuel spar valve leak test procedure.

(b) If the leak test is not correct, replace the left fuel spar valve actuator:

1) Do this task: Engine Fuel Spar Valve Actuator Removal, TASK 28-22-11-000-801.

2) Do this task: Engine Fuel Spar Valve Actuator Installation, TASK 28-22-11-400-801.

3) Do the left fuel spar valve leak test procedure.

(c) If the leak test is not correct, replace the left valve body:

1) Do this task: Engine Fuel Spar Valve - Valve Body Removal, TASK 28-22-11-000-803.

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2) Do this task: Engine Fuel Spar Valve - Valve Body Installation, TASK 28-22-11-400-803.

3) Do the left fuel spar valve leak test procedure.

N. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-15-410-003

(1) Remove the fuel manifold test equipment, SPL-1776, from the engine fuel supply line, as follows:

(a) Open the bleed valve on the fuel manifold test equipment, SPL-1776, to drain fuel and release the air pressure from the fuel supply line.

NOTE: Fuel can spill from the fuel supply line when the fuel has not been drained.

(b) Remove the two fuel manifold test equipment, SPL-1776, from the fuel supply line.

(c) Connect the left and right engine fuel supply hose to the fuel supply line (Figure 601).

(d) On the P5 Overhead Panel, turn the CROSSFEED switch to the closed position.

(e) On the P10 Control Stand, put the Engine Start Levers to the CUTOFF position.

NOTE: This closes the fuel spar valves.

(f) On the P5 Overhead Panel, make sure that the two SPAR VALVE CLOSED lights are dim.

SUBTASK 28-22-15-760-002

(2) 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 28-22-15-410-004

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.

(3) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

(a) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

1) Close these access panels:

Number	Name/Location
415	Left Thrust Reverser, Engine 1
416	Right Thrust Reverser, Engine 1
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 28-22-15-650-006

(4) On the P5 Overhead Panel, remove the DO-NOT-OPERATE placards from the ENGINE START 1 and 2 switches.

SUBTASK 28-22-15-650-007

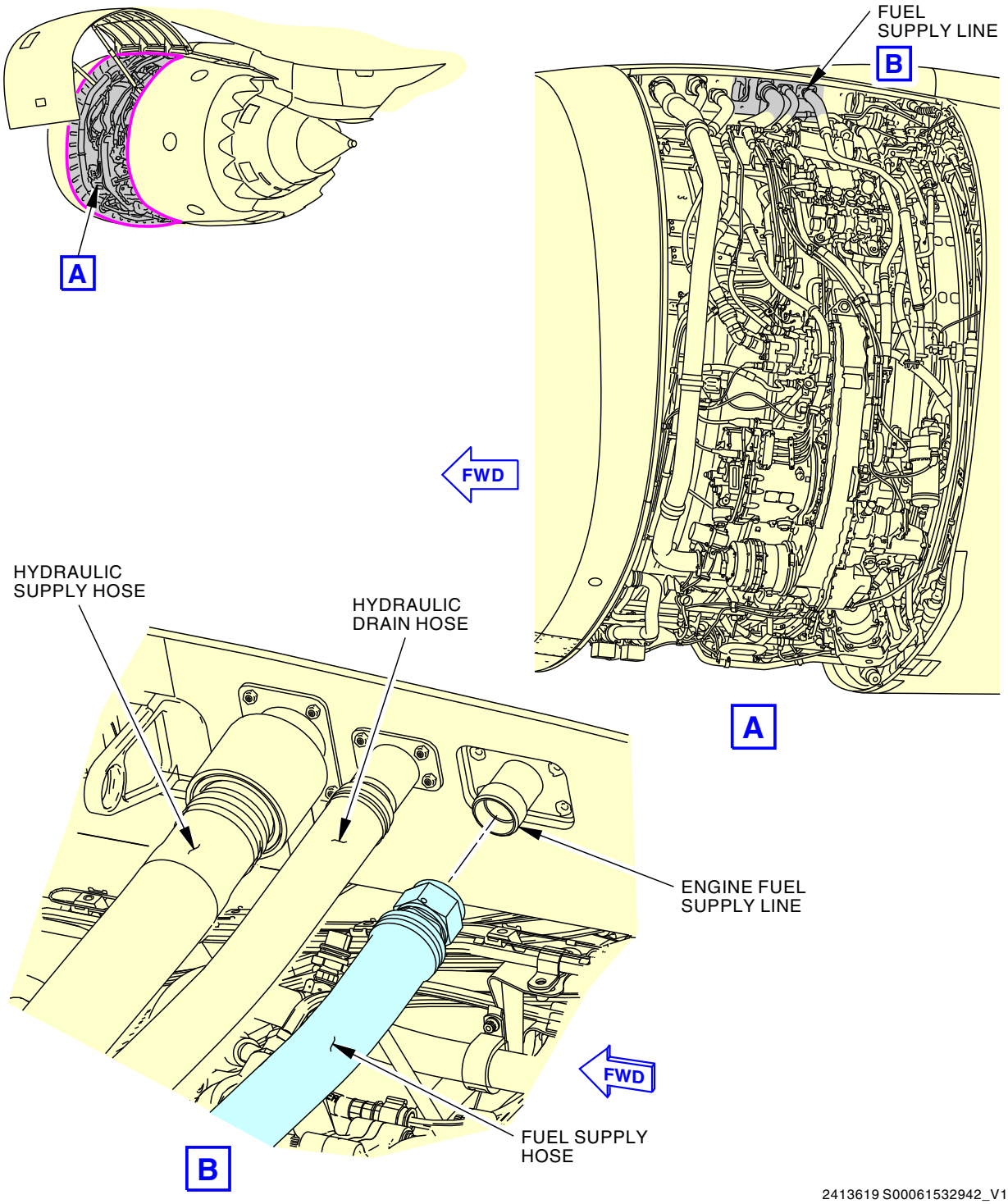
(5) Fuel the fuel tanks (TASK 12-11-00-650-803).

SUBTASK 28-22-15-700-001

(6) Do a leak check of the main fuel supply line (TASK 71-00-00-800-804-G00).

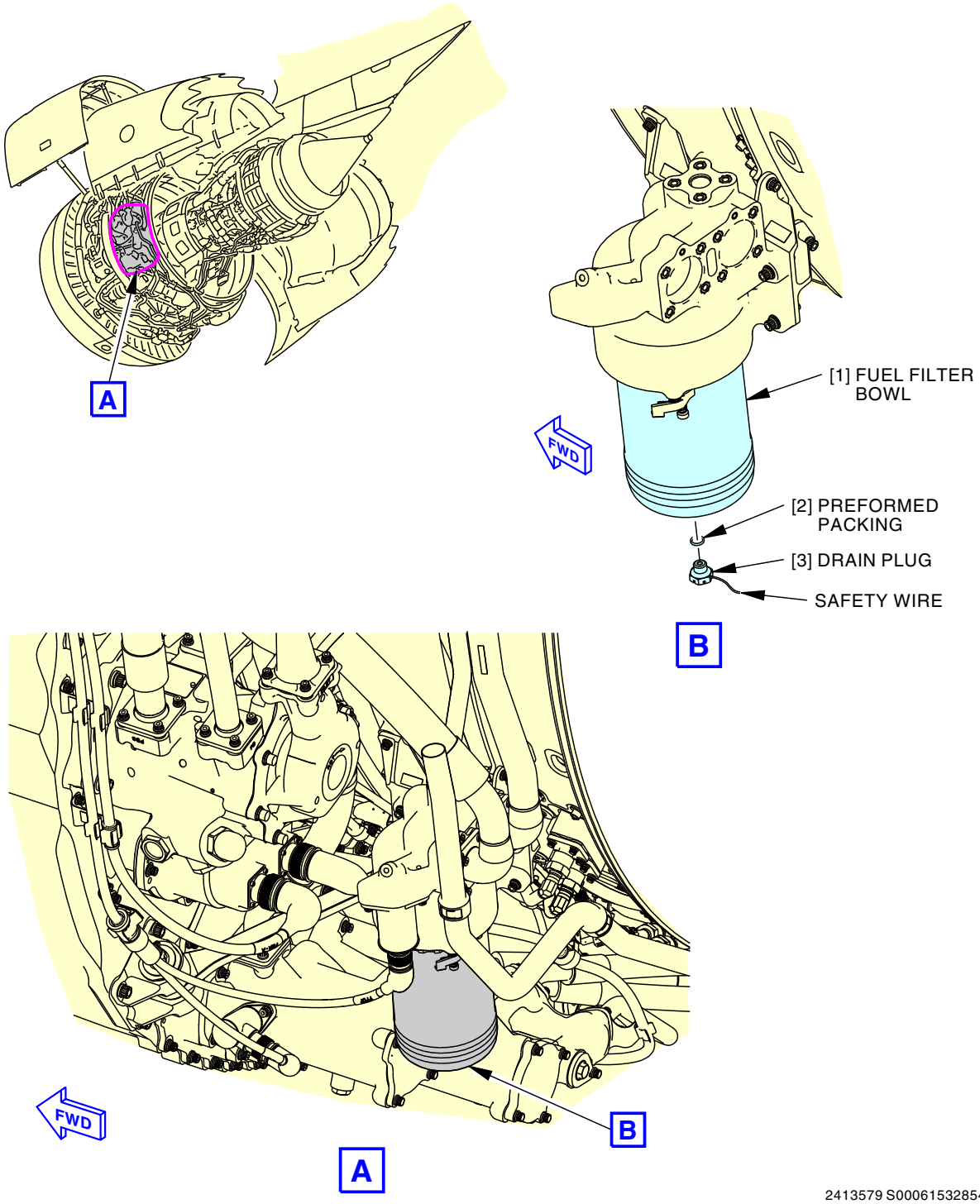
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



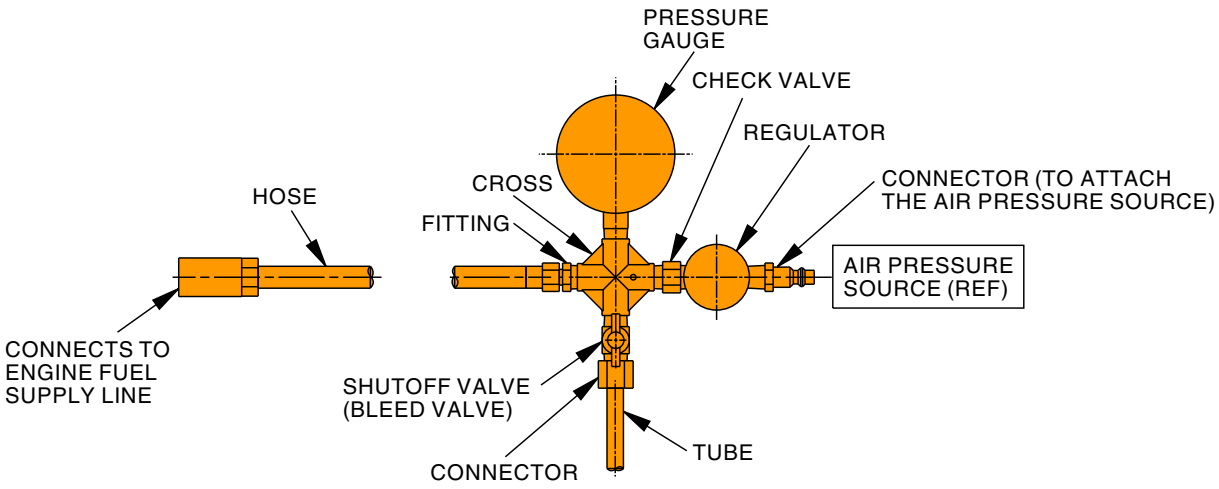
Fuel Supply Line Disconnect for Fuel-Feed Manifold Pressure Check
Figure 601/28-22-15-990-807

ECCN 9E991 BOEING PROPRIETARY - See title page for details

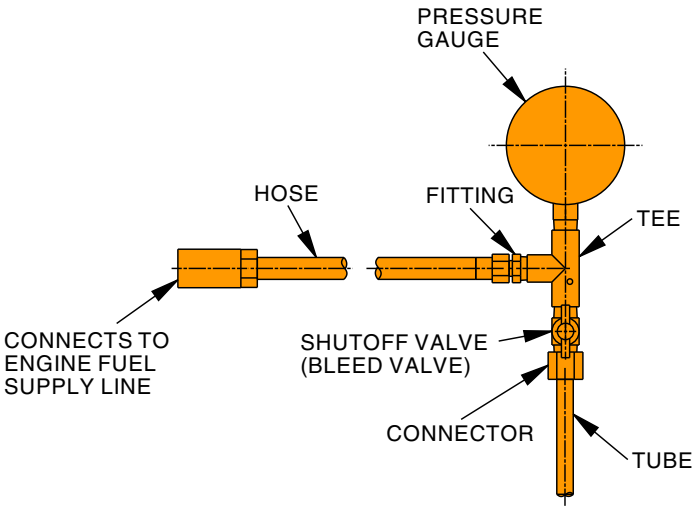


Fuel Filter Drain Location
Figure 602/28-22-15-990-808

ECCN 9E991 BOEING PROPRIETARY - See title page for details



PRESSURE CHECK EQUIPMENT - LEFT FUEL SUPPLY LINE

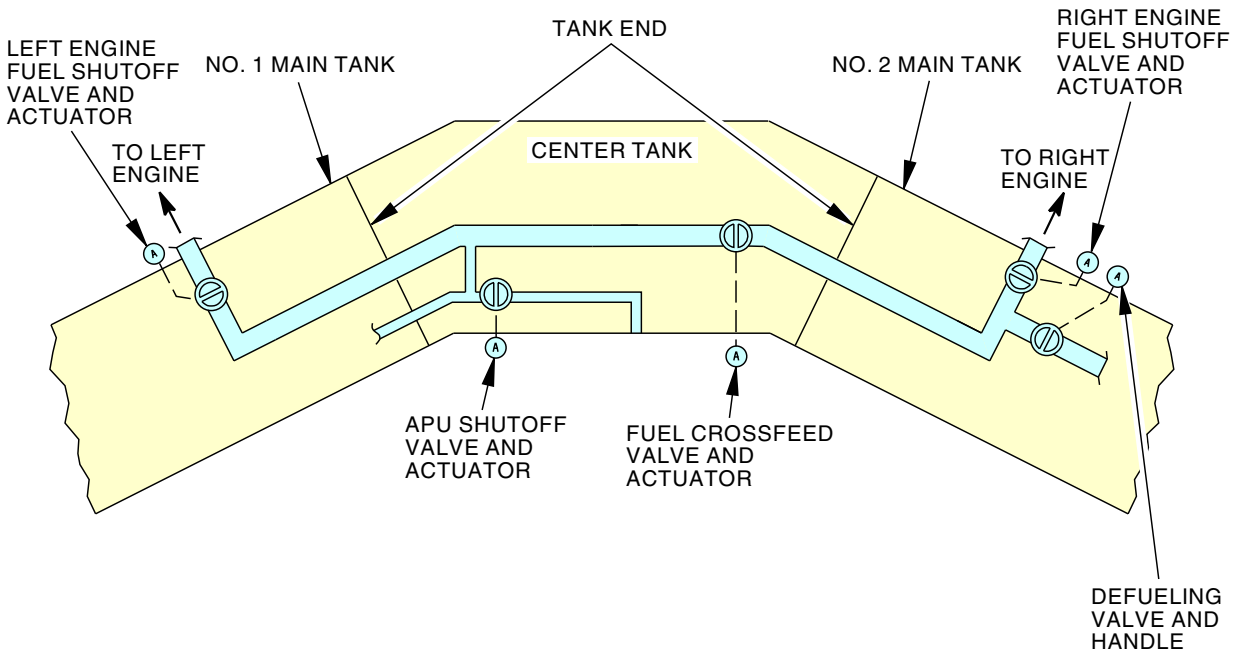


PRESSURE CHECK EQUIPMENT - RIGHT FUEL SUPPLY LINE

2413621 S00061532944_V1

Pressure Check Equipment
Figure 603/28-22-15-990-809

ECCN 9E991 BOEING PROPRIETARY - See title page for details



LEGEND:

VALVE BODY
A ACTUATOR

2413622 S00061532945_V1

Fuel Feed Manifold - Simplified Schematic
Figure 604/28-22-15-990-810

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-15-700-801

3. Engine and APU Fuel Feed, Shroud, Fuel Vent Line and Couplings, and NEADS Lines Dent Criteria - Inspection/Check

A. General

(1) The inspection criteria apply to:

(a) Engine fuel feed lines

(b) Pressure refueling lines

(c) APU shroud

(d) Fuel vent lines and related couplings

(e) NEADS lines.

(2) The engine fuel feed lines, pressure refueling lines, APU shrouds, and fuel vent lines are referred to as fuel lines in this task.

B. References

Reference	Title
20-10-51-000-801	Flareless Tubing Assembly Removal (P/B 401)
28-22-15-000-801	Fuel Line, Fitting and Coupling Removal (P/B 401)

C. Fuel Lines Inspection

SUBTASK 28-22-15-210-003

(1) Visually examine all fuel lines to make sure that they are tightly and correctly attached.

SUBTASK 28-22-15-420-008

(2) Adjust incorrectly attached fuel lines.

SUBTASK 28-22-15-210-004

(3) Visually examine all fuel lines for damage and then make sure that the damage is permitted.

(a) Do an inspection for cracks.

1) Make sure that there are no cracks.

(b) Do an inspection for dents.

NOTE: Dents are areas that are pushed in the fuel line.

1) All dents must have an area that is large compared to the depth of the dent.

2) A dent cannot decrease the diameter of the fuel line by more than 2.5 percent.

3) For several dents, the total dent depth (some dents depths added together) in a section, five times the fuel line diameter long, must not be more than 10 percent of the fuel line diameter.

4) Dents are not permitted near the fuel line flanges. The minimum dent distance is the diameter of the fuel line.

5) The dents in the fuel line must not have an area of more than 0.125 in^2 (80.6 mm^2).

6) For dents in the outer part of a fuel line bend, the dent depth must be 0.015 in. (0.38 mm) or less.

(c) Do an inspection for nicks.

1) The nicks in the fuel line must have a rounded bottom.

2) For nicks in the fuel line, the nick depth must be 0.004 in. (0.102 mm) or less.

3) If the nick has burrs, remove all burrs from the nicks.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(d) Do an inspection for fretting.

1) Fretting must have a maximum depth of 0.004 in. (0.102 mm) or less.

(e) Do an inspection for scoring.

1) If some small scoring are found, you can make the scoring smooth, for these conditions:

a) The scoring must not be on the outer part of a bend.

b) You must not remove more than 0.004 in. (0.102 mm) of metal.

(f) Do an inspection for fuel lines with a cross section that is not fully circular (oval fuel lines).

1) Calculate the percent ovality with this formula:

percent ovality = [(OD Max - OD Min) ÷ (OD Nominal)] X 100%

a) OD Max is the maximum outer diameter of the fuel line

b) OD Min is the minimum outer diameter of the fuel line

c) OD Nominal is the outer diameter of the fuel line at a position where the fuel line is circular or almost circular.

2) The calculated percent ovality must not be more than 10 percent.

3) The calculated percent ovality must be more than 5 percent for fuel lines with a diameter of more than 2 in. (51 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 Table 601.

Table 601/28-22-15-993-801 Allowable Wrinkle Height

Fuel Line Diameter (inch (mm))	Maximum Wrinkle Height (inch (mm))
less than 1.00 in. (25.4 mm)	0.020 in. (0.508 mm)
1.00 in. (25.40 mm) to 1.99 in. (50.55 mm)	0.030 in. (0.762 mm)
2.00 in. (50.8 mm) to 2.99 in. (75.95 mm)	0.040 in. (1.016 mm)
3.00 in. (76.2 mm) or more	0.050 in. (1.270 mm)

SUBTASK 28-22-15-350-001

(4) Repair or replace all fuel lines that have damage that is not permitted (TASK 20-10-51-000-801, TASK 28-22-15-000-801).

D. Coupling Inspection

SUBTASK 28-22-15-210-005

(1) Visually examine all couplings for external indications of damage and make sure that the damage is permitted, as follows:

(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 in. (0.102 mm).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(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 in. (0.102 mm).

3) Remove all the burrs around the nick.

(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

(2) Replace couplings that have damage that is not permitted (TASK 28-22-15-000-801).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FUEL SCAVENGE FLOAT OPERATED SHUTOFF VALVE - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) Fuel Scavenge Float Operated Shutoff Valve Removal

(2) Fuel Scavenge Float Operated Shutoff Valve Installation.

TASK 28-22-16-000-801

2. Fuel Scavenge Float Operated Shutoff Valve Removal

(Figure 401)

A. General

(1) This task gives instructions to remove the fuel scavenge float operated shutoff valve.

(2) The fuel scavenge float operated shutoff valve is referred to as shutoff valve in this task.

B. 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)

C. Location Zones

Zone	Area
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
532BB	Main Tank Access Door - Wing Station 265

E. Prepare for the Removal

SUBTASK 28-22-16-650-001

(1) Defuel or transfer fuel from the No. 1 main tank (TASK 28-26-00-650-802 or TASK 28-26-00-650-801).

SUBTASK 28-22-16-940-001

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 for the No. 1 main tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Open this access door:

(TASK 28-11-11-000-801)

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-16-480-001

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.

(3) Go into the fuel tank (TASK 28-11-00-910-802).

F. Fuel Scavenge Float Operated Shutoff Valve Removal

SUBTASK 28-22-16-020-001

(1) Remove the screw [1], washer [2], washer [4], and nut [3] that attaches the shutoff valve [7] and bonding jumper [6] to the support bracket.

SUBTASK 28-22-16-020-002

(2) Remove the three screws [1], six washers [2], and three nuts [3] that attaches the shutoff valve [7] to the support bracket.

SUBTASK 28-22-16-020-003

(3) Loosen the coupling nut [5] to disconnect the shutoff valve [7] from the fuel scavenge tube.

SUBTASK 28-22-16-480-002

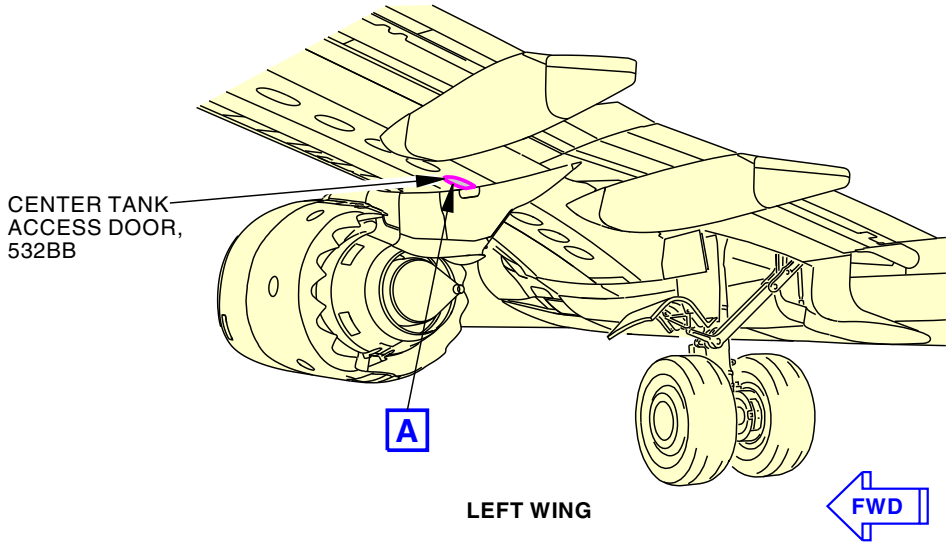
(4) Remove the shutoff valve [7].

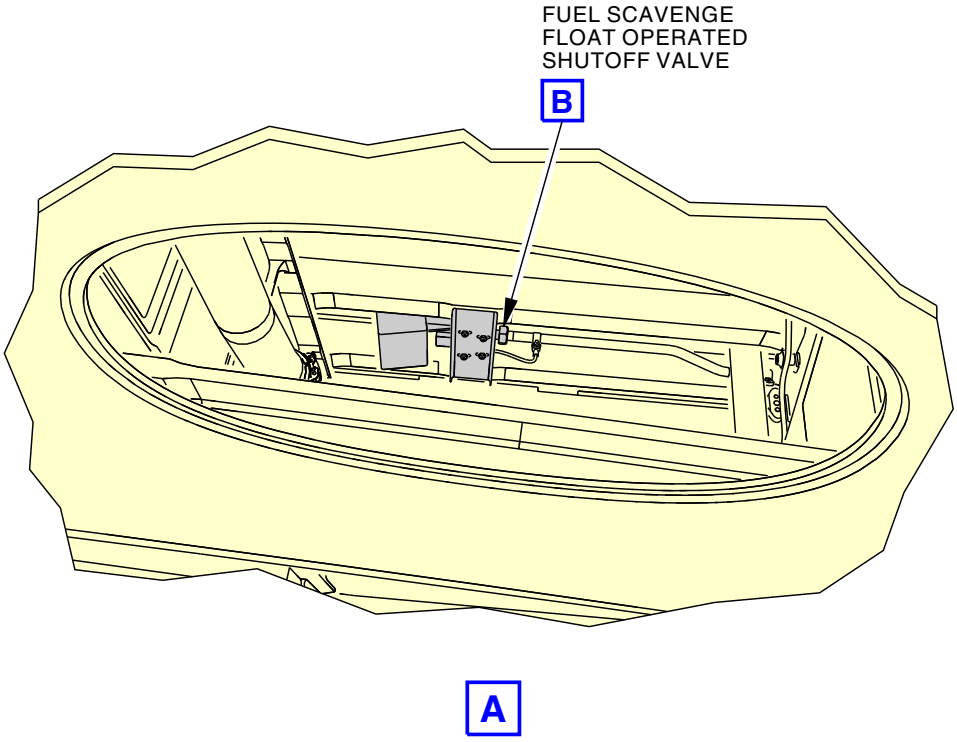
SUBTASK 28-22-16-020-004

(5) Put a cap on the open end of the fuel scavenge tube.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

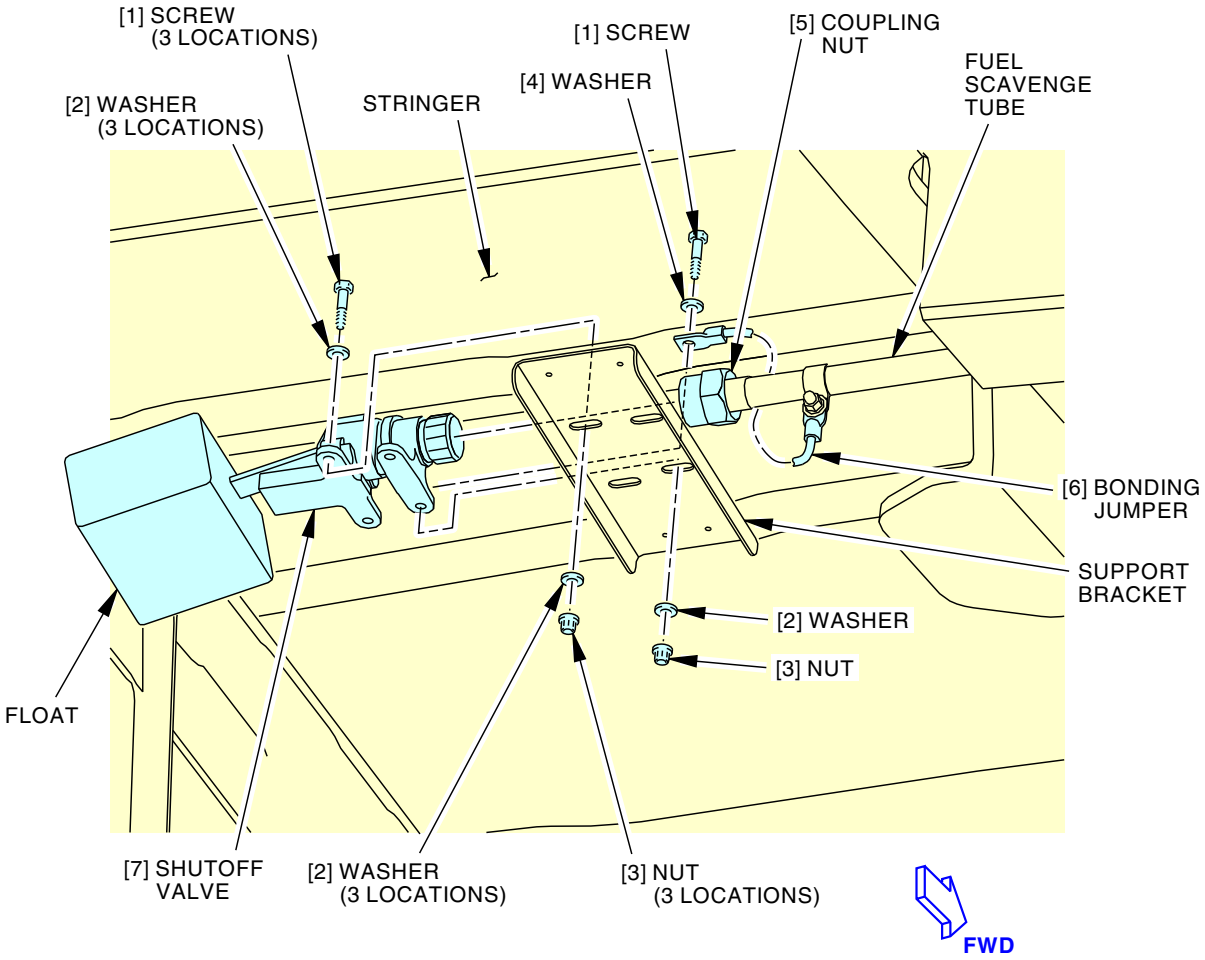




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Fuel Scavenge Float Operated Shutoff Valve Installation
Figure 401/28-22-16-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



FUEL SCAVENGE FLOAT OPERATED SHUTOFF VALVE

B

2413624 S00061532951_V1

Fuel Scavenge Float Operated Shutoff Valve Installation
Figure 401/28-22-16-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-16-400-801

3. Fuel Scavenge Float Operated Shutoff Valve Installation

(Figure 401)

A. General

(1) This task gives instructions to install the fuel scavenge float operated shutoff valve.

(2) The fuel scavenge float operated shutoff valve is referred to as shutoff valve in this task.

B. References

Reference	Title
20-10-51-000-801	Flareless Tubing Assembly Removal (P/B 401)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-22-00-720-803	Fuel Scavenge System - Operational Test (P/B 501)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
7	Shutoff valve	28-22-16-01-035	SIA ALL

F. Location Zones

Zone	Area
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Access Panels

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

H. Fuel Scavenge Float Operated Shutoff Valve Installation

SUBTASK 28-22-16-100-001

(1) Do these steps to prepare the shutoff valve [7] and support plate for installation:

(a) Clean the fay surfaces of the aluminum shutoff valve [7] and aluminum support plate (SWPM 20-20-00):

1) Use Cleaning Procedure 5 to clean the fay surfaces on the shutoff valve [7].

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

a) Use a new cotton wiper, G00034 or knit cotton wiper, G51293 soaked with solvent, B00062 or solvent, B00184.

b) Use a new cotton wiper to dry the surfaces.

c) Continue to clean and dry the surfaces until the cotton wiper shows clean.

2) Use Cleaning Procedure 5 to clean the terminal fay surface on the bonding jumper [6].

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

a) Use a new cotton wiper, G00034 (alternate: knit cotton wiper, G51293) soaked with solvent, B00062 or solvent, B00184.

b) Use a new cotton wiper to dry the surfaces.

c) Continue to clean and dry the surfaces until the cotton wiper shows clean.

3) Use Cleaning Procedure 5 to clean the support plate fay surface.

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

a) Use a new cotton wiper, G00034 (alternate: knit cotton wiper, G51293) soaked with solvent, B00062 or solvent, B00184.

b) Use a new cotton wiper to dry the surfaces.

c) Continue to clean and dry the surfaces until the cotton wiper shows clean.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-16-080-001

(2) Remove the cap on the open end of the fuel scavenge tube.

SUBTASK 28-22-16-420-001

(3) Loosely install the three screws [1], six washers [2], three nuts [3] and shutoff valve [7] to the support bracket.

SUBTASK 28-22-16-820-001

(4) Align the shutoff valve [7] with the fuel scavenge tube.

SUBTASK 28-22-16-420-002

(5) Tighten the coupling nut [5] to secure the shutoff valve [7] to the fuel scavenge tube (TASK 20-10-51-000-801).

SUBTASK 28-22-16-420-003

(6) Tighten the three screws [1].

SUBTASK 28-22-16-420-004

(7) Install the screw [1], washer [2], washer [4], bonding jumper [6], and nut [3] to secure the shutoff valve [7] to the support bracket.

SUBTASK 28-22-16-760-001

(8) Measure the electrical bonding resistance between the shutoff valve [7] and bonding jumper [6] with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

(a) Make sure that the electrical bonding resistance is 0.001 ohm (1.0 milliohms) or less.

I. Fuel Scavenge Float Operated Shutoff Valve Installation Test

SUBTASK 28-22-16-410-001

(1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

(a) Install this access door:

(TASK 28-11-11-400-801)

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

SUBTASK 28-22-16-700-001

(2) Do the operational test for the fuel scavenge system (TASK 28-22-00-720-803).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FUEL SCAVENGE JET PUMP - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) Fuel Scavenge Jet Pump Nozzle Assembly Removal

(2) Fuel Scavenge Jet Pump Nozzle Assembly Installation

(3) Fuel Scavenge Jet Pump Removal

(4) Fuel Scavenge Jet Pump Installation.

TASK 28-22-17-020-801

2. Fuel Scavenge Jet Pump Nozzle Assembly Removal

(Figure 401)

A. General

(1) The fuel scavenge jet pump nozzle assembly is referred to as the nozzle assembly in this task.

(2) The objective of the task is to provide instructions to remove the nozzle assembly.

B. References

Reference	Title
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

C. Location Zones

Zone	Area
551	Left Wing - Rear Spar To Landing Gear Support Beam

D. Prepare for the Removal

SUBTASK 28-22-17-480-001

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.

(1) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-22-17-010-001

(2) Get access to the fuel scavenge jet pump on the aft side of the rear spar.

E. Nozzle Assembly Removal

SUBTASK 28-22-17-010-002

(1) Remove the safety cable (or lockwire) from the nozzle assembly [2].

SUBTASK 28-22-17-020-001

(2) Remove the nozzle assembly [2] as follows:

NOTE: The nozzle assembly [2] consists of a pump plug and pump nozzle that are removed as one unit.

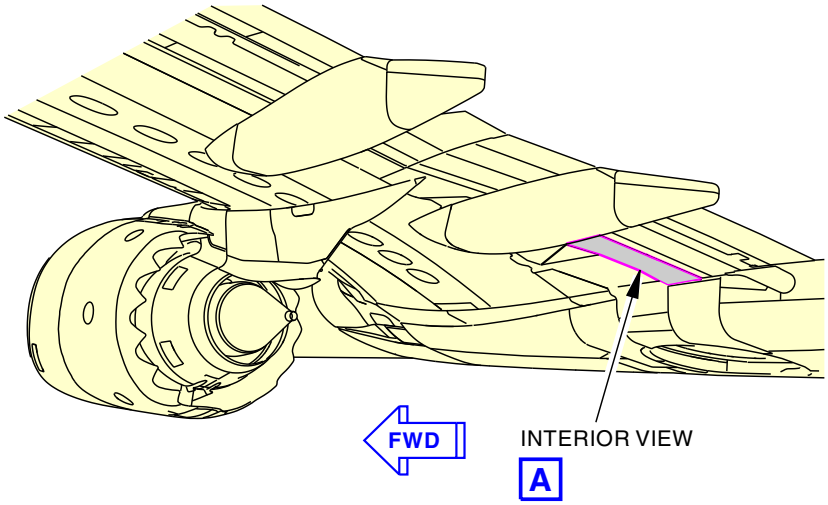
(a) Remove the nozzle assembly [2] and O-ring [3] from the pump housing [1].

NOTE: An internal check valve in the pump housing [1] prevents fuel spills.

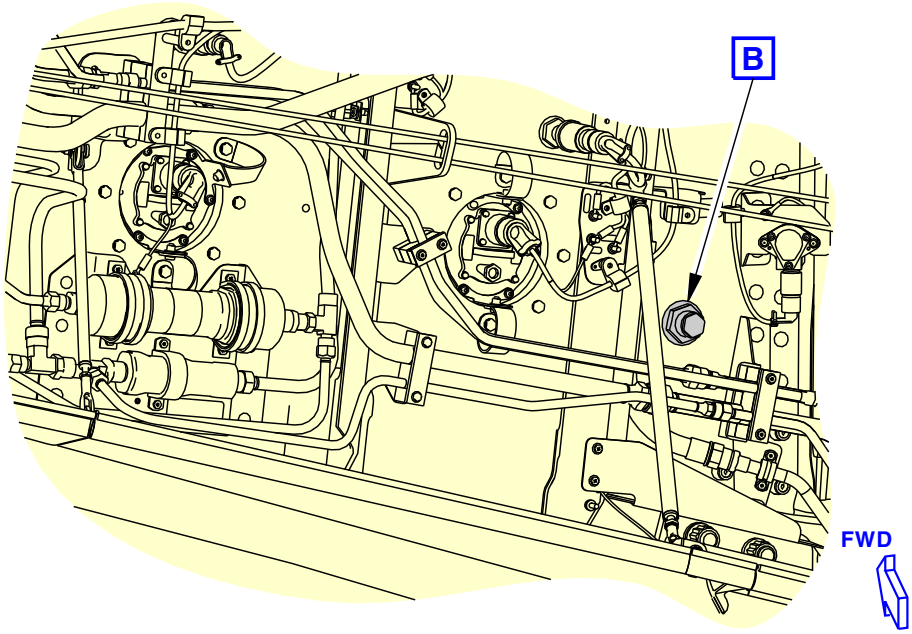
(b) Discard the O-ring [3].

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



LEFT WING
(RIGHT WING IS EQUIVALENT)

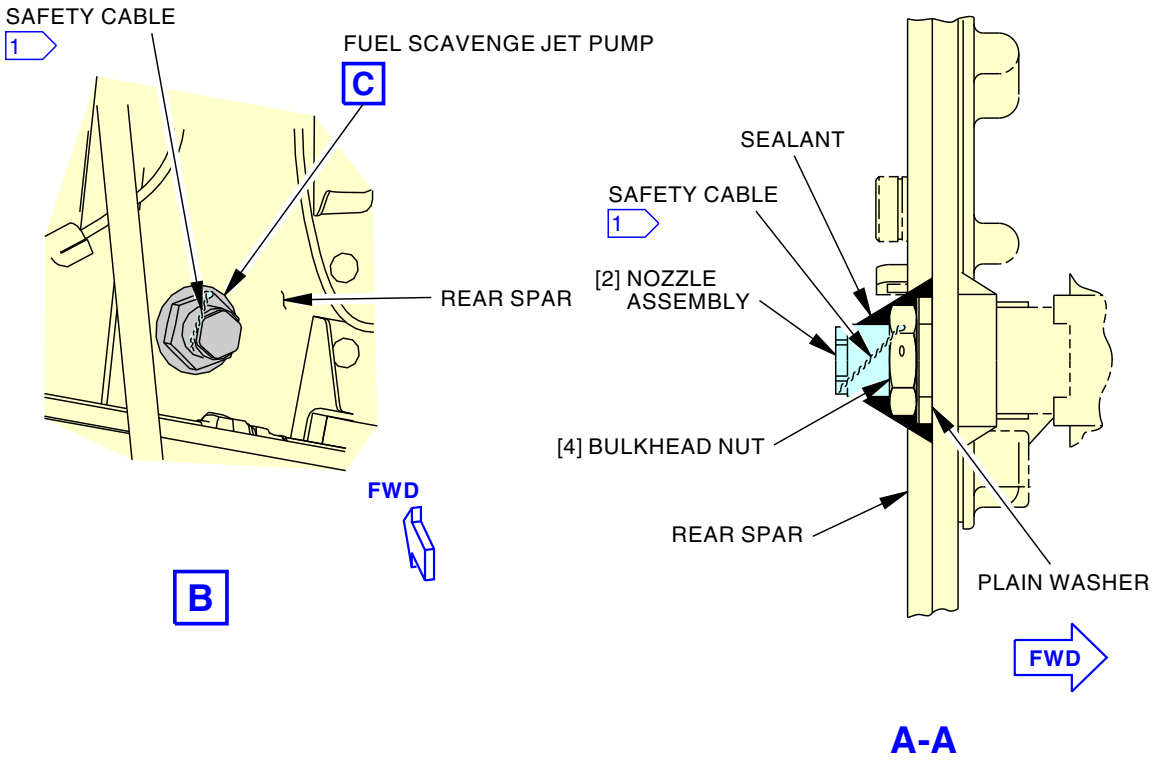


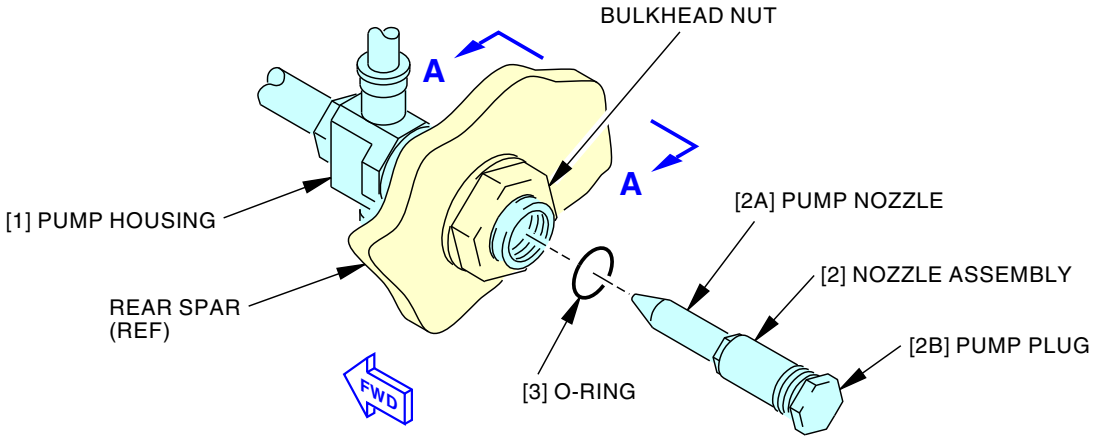
INTERIOR VIEW
A

2413625 S00061532956_V1

Fuel Scavenge Jet Pump Nozzle Assembly Installation
Figure 401/28-22-17-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details





FUEL SCAVENGE JET PUMP

1 SAFETY CABLE PREFERRED, LOCKWIRE ALTERNATE.

C

2413626 S00061532957_V2

Fuel Scavenge Jet Pump Nozzle Assembly Installation
Figure 401/28-22-17-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-17-420-801

3. Fuel Scavenge Jet Pump Nozzle Assembly Installation

(Figure 401)

A. General

(1) The fuel scavenge jet pump nozzle assembly is referred to as the nozzle assembly in this task.

(2) The objective of the task is to provide instructions to install the nozzle assembly.

B. References

Reference	Title
20-10-34-110-802	Clean Bare, Clad, or Plated Metal with Solvent (P/B 701)
20-10-44-400-801	Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401)
51-22-00-390-806	Fillet Seal Application (P/B 201)

C. Consumable Materials

Reference	Description	Specification
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142 Type II
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
B50226	Solvent - Citra-Safe	
D00504	Grease - Petrolatum	VV-P-236
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G50375	Kit - Safety Cable, 321 CRES - 0.032 Inch (0.81 mm) Diameter, (Contains both Cable and Ferrule)	BACC13AT3K, AMS 5689

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	O-ring	28-22-17-01-147	SIA ALL

E. Location Zones

Zone	Area
551	Left Wing - Rear Spar To Landing Gear Support Beam

F. Prepare for the Installation

SUBTASK 28-22-17-100-001

(1) Do these step to prepare the nozzle assembly [2] and the rear spar for installation:

(a) Remove the sealant from the rear spar, do this task: Clean Bare, Clad, or Plated Metal with Solvent, TASK 20-10-34-110-802.

(b) Clean the fasteners and the fay surfaces of the aluminum pump housing [1].

NOTE: Clean the surface beyond the area to be sealed to prevent contamination.

1) Use a new cotton wiper, G00034, made wet with a citra-safe solvent, B50226 (alternate: solvent, B00184).

2) Dry the area with a clean cotton wiper, G00034.

SUBTASK 28-22-17-210-001

(2) Examine the nozzle assembly [2] for these conditions:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) pump nozzle [2A]

1) Nicks or scratches on the conical taper

2) Nicks or scratches on the orifice tip

3) Worn surface areas through the anodize finish.

(b) pump plug [2B]

1) Crossed, stripped or damaged threads

2) Nicks or scratches on the packing groove

3) Wear on the hex head

4) Worn surface areas through the anodize finish.

SUBTASK 28-22-17-960-001

(3) If the pump plug [2B] is damaged or worn, replace it.

(a) Remove the pump nozzle [2A] from the pump plug [2B].

(b) Screw the new pump nozzle [2A] in the pump plug [2B].

(c) Tighten the pump plug [2B] to 90 ±5 in-lb (10.2 ±0.6 N·m).

SUBTASK 28-22-17-960-002

(4) If the pump nozzle [2A] is damaged or worn, replace it.

(a) Remove the pump nozzle [2A] from the pump plug [2B].

(b) Screw the new pump plug [2B] in the pump nozzle [2A].

(c) Tighten the pump plug [2B] to 90 ±5 in-lb (10.2 ±0.6 N·m).

SUBTASK 28-22-17-640-001

(5) Apply a thin layer of petrolatum grease, D00504, to the new O-ring [3].

SUBTASK 28-22-17-420-001

(6) Install the O-ring [3] on the nozzle assembly [2].

G. Fuel Scavenge Jet Pump Nozzle Assembly Installation

SUBTASK 28-22-17-420-002

(1) Install the nozzle assembly [2] and O-ring [3] in the pump housing [1].

NOTE: The nozzle assembly [2] consists of a pump plug [2B] and pump nozzle [2A] that are remove as one unit.

SUBTASK 28-22-17-420-003

(2) Tighten the nozzle assembly [2] to 200 ±10 in-lb (22.6 ±1.1 N·m).

SUBTASK 28-22-17-420-004

(3) Install safety cable kit, G50375 (alternate: lockwire) between the nozzle assembly [2] and the bulkhead nut (TASK 20-10-44-400-801).

SUBTASK 28-22-17-420-005

(4) Apply sealant, A02315, between the rear spar and pump housing [1] (TASK 51-22-00-390-806).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-17-000-801

4. Fuel Scavenge Jet Pump Removal

(Figure 401)

A. General

(1) The objective of the task is to provide instructions to remove the fuel scavenge jet pump.

B. 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)
28-22-15-000-803	Couplings 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

Reference	Description
STD-7423	Cover - Protective Tube

D. Location Zones

Zone	Area
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
551	Left Wing - Rear Spar To Landing Gear Support Beam

E. Access Panels

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

F. Prepare for the Removal

SUBTASK 28-22-17-020-002

(1) Remove the nozzle assembly [2] (TASK 28-22-17-020-801).

SUBTASK 28-22-17-650-001

(2) Defuel or transfer fuel from the center tank and No. 1 main tank (TASK 28-26-00-650-801 or TASK 28-26-00-650-802).

SUBTASK 28-22-17-480-002

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.

(3) Prepare the center tank for entry, do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

SUBTASK 28-22-17-010-003

(4) Open this access panel:

(TASK 28-11-31-000-801)

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Fuel Scavenge Jet Pump Removal

SUBTASK 28-22-17-020-003

(1) Remove the bulkhead nut [4] and plain washer [20] from the pump housing [1], from out of the fuel tank.

SUBTASK 28-22-17-940-001

(2) Go into the center tank.

SUBTASK 28-22-17-120-001

(3) Remove the sealant from the rear spar and pump housing [1] in the fuel tank.

SUBTASK 28-22-17-020-004

(4) Disconnect the rigid coupling [13] from the pump housing [1] (TASK 28-22-15-000-803).

(a) Discard the O-ring [14].

SUBTASK 28-22-17-020-005

(5) Disconnect the coupling nut [18] from the pump housing [1].

SUBTASK 28-22-17-020-006

(6) Disconnect the coupling nut [15] from the pump housing [1].

SUBTASK 28-22-17-020-007

(7) Remove the pump housing [1].

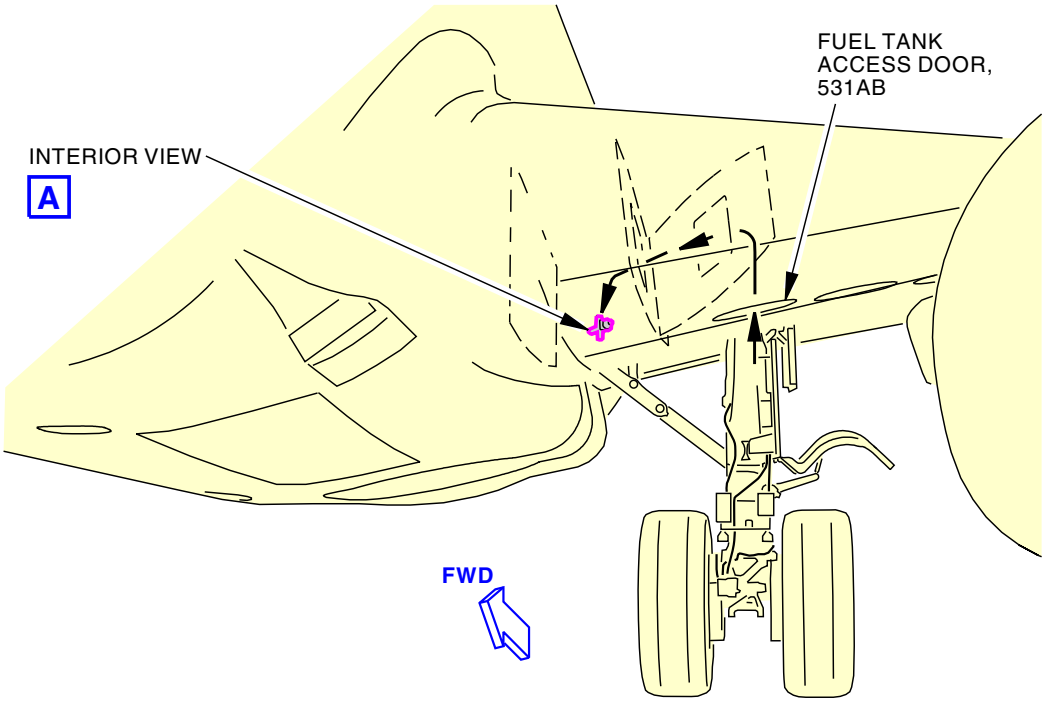
(a) Discard the O-ring [19].

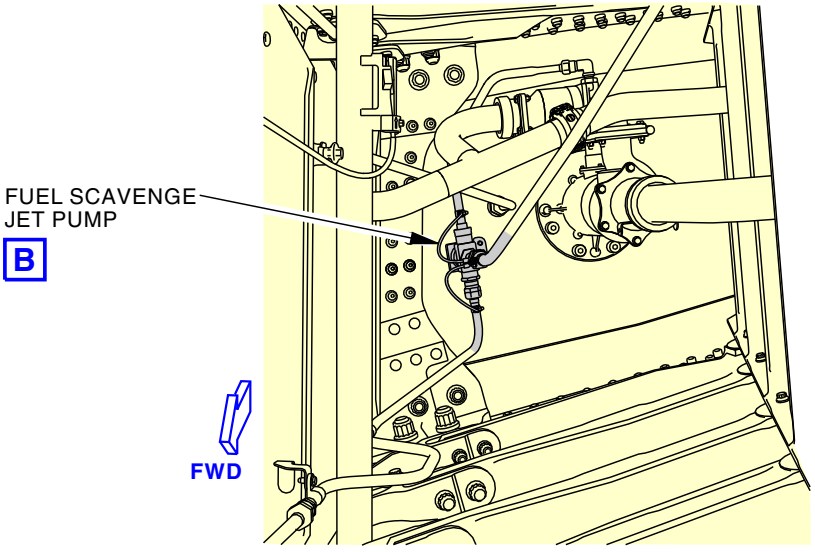
SUBTASK 28-22-17-480-003

(8) Install protective covers, STD-7423, on the open fuel lines to keep unwanted materials out.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



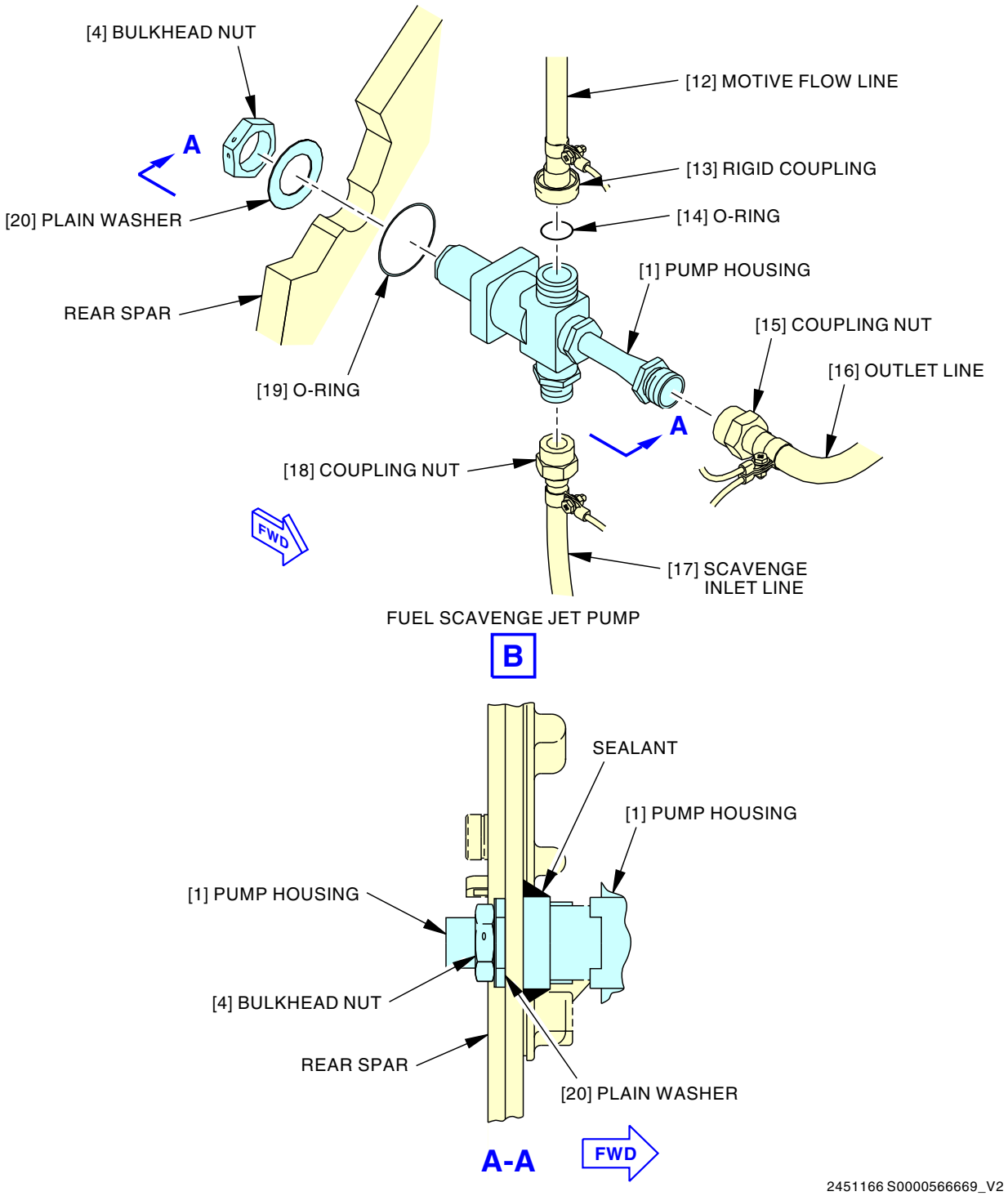


INTERIOR VIEW
A

2451141 S0000566668_V1

Fuel Scavenge Jet Pump Installation
Figure 402/28-22-17-990-802 (Sheet 1 of 2)

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Fuel Scavenge Jet Pump Installation
Figure 402/28-22-17-990-802 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-17-400-801

5. Fuel Scavenge Jet Pump Installation

(Figure 401)

A. General

(1) The objective of the task is to provide instructions to install the pump housing.

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
20-10-34-110-802	Clean Bare, Clad, or Plated Metal with Solvent (P/B 701)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-22-00-720-803	Fuel Scavenge System - Operational Test (P/B 501)
28-22-15-400-803	Couplings Installation (P/B 401)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142 Type II
B00130	Alcohol - Isopropyl	TT-I-735
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
C50315	Coating - Chemical Conversion - Bonderite M-CR 600 Aero (Formerly Alodine 600)	BAC5719 Class A, C or D, MIL-DTL-81706 Type I Class 1A or 3
D00504	Grease - Petrolatum	VV-P-236
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

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E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
14	O-ring	28-22-17-01-140	SIA ALL

F. Location Zones

Zone	Area
511	Left Wing - Leading Edge To Front Spar
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5

G. Access Panels

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

H. Prepare for the Installation

SUBTASK 28-22-17-100-002

(1) Do these steps to prepare the pump housing [1] and rear spar for installation:

(a) Remove the sealant from the rear spar, do this task: Clean Bare, Clad, or Plated Metal with Solvent, TASK 20-10-34-110-802.

NOTE: Sealant is on the inner and outer side of the rear spar.

(b) Clean the fay surfaces of the aluminum pump housing [1] and the aluminum rear spar (SWPM 20-20-00):

1) Use Cleaning Procedure 1 to manually clean the rear spar.

a) Use an abrasive pad to clean the fay surface on the rear spar.

b) Move the pad in a circular movement while you press with your thumb.

2) Use Cleaning Procedure 5 to clean the pump assembly fay surface and the fasteners.

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

a) Use a new cotton wiper, G00034 (alternate: knit cotton wiper, G51293) made moist with alcohol, B00130 or solvent, B00184.

b) Use a new cotton wiper to dry the surfaces.

c) Continue to clean and dry the surface until the cotton wiper stays clean.

3) Final clean the fay surfaces of the rear spar.

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

a) Use a new cotton wiper, G00034 (alternate: knit cotton wiper, G51293) made moist with solvent, B00184 or alcohol, B00130.

b) Rub dry with a clean dry cotton wiper.

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c) Continue to clean and dry the surface until the cotton wiper stays clean.

(c) Manually apply Bonderite M-CR 600 Aero coating, C50315, to the fay surface on the rear spar.

SUBTASK 28-22-17-080-001

(2) Remove the protective covers from the opened fuel lines.

I. Fuel Scavenge Jet Pump Installation

SUBTASK 28-22-17-640-002

(1) Apply a thin layer of grease, D00504, to the new O-ring [19].

SUBTASK 28-22-17-420-006

(2) Install the O-ring [19] onto the pump housing [1].

SUBTASK 28-22-17-820-001

(3) Align the pump housing [1] in position on the rear spar.

SUBTASK 28-22-17-420-007

(4) Install the plain washer [20] and bulkhead nut [4] to attach the pump housing [1] to the rear spar.

(a) Make sure that the motive flow line [12] and scavenge inlet line [17] align correctly.

(b) Tighten the bulkhead nut [4] to 425 in-lb (48 N·m) - 480 in-lb (54 N·m).

SUBTASK 28-22-17-860-001

(5) Measure the bonding resistance between the base on the pump housing [1] and the rear spar with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

(a) Make sure that the measured resistance is not more than the maximum bonding resistance value (SWPM 20-20-00).

SUBTASK 28-22-17-640-003

(6) Apply a thin layer of grease, D00504, to the new O-ring [14].

SUBTASK 28-22-17-420-008

(7) Connect the rigid coupling [13] and O-ring [14] to the pump housing [1] (TASK 28-22-15-400-803).

SUBTASK 28-22-17-420-009

(8) Connect the coupling nut [18] to the pump housing [1].

(a) Tighten the coupling nut [18] to 280 ±14 in-lb (32 ±2 N·m).

SUBTASK 28-22-17-420-010

(9) Connect the coupling nut [15] to the pump housing [1].

(a) Tighten the coupling nut [15] to 360 ±18 in-lb (41 ±2 N·m).

SUBTASK 28-22-17-390-001

(10) Apply a fillet seal of sealant, A00767, between the pump housing [1] and the rear spar (in the fuel tank).

SUBTASK 28-22-17-020-008

(11) Install the nozzle assembly [2] (TASK 28-22-17-420-801).

SUBTASK 28-22-17-010-004

(12) Apply a fillet seal of sealant, A02315, between the pump housing [1] and the rear spar (out of the fuel tank).

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J. Fuel Scavenge Jet Pump Installation Test

SUBTASK 28-22-17-410-001

(1) Close this access panel:

(TASK 28-11-31-400-801)

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

SUBTASK 28-22-17-710-001

(2) Do this task: Fuel Scavenge System - Operational Test, TASK 28-22-00-720-803.

SUBTASK 28-22-17-650-002

(3) Do this task: Pressure Refuel Procedure, TASK 12-11-00-650-803.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

GROUND FAULT INTERRUPTER (GFI) RELAY - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) Ground Fault Interrupter (GFI) Relay Removal

(2) Ground Fault Interrupter (GFI) Relay Installation.

B. There are six ground fault interrupter (GFI) relays for the fuel boost pumps. The R19, R20, and R54 GFI relays are located in the P91 power distribution panel. The R18, R21, and R55 GFI relays are located in the P92 power distribution panel.

TASK 28-22-18-000-801

2. Ground Fault Interrupter (GFI) Relay Removal

(Figure 401)

A. General

(1) This task gives instructions to remove the applicable GFI relay.

B. References

Reference	Title
24-22-00-860-802	Remove Electrical Power (P/B 201)

C. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
123	Forward Cargo Compartment - Left
124	Forward Cargo Compartment - Right

D. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door

E. Prepare for the Removal

SUBTASK 28-22-18-860-001

(1) On the P5-2 Fuel System Module, set these switches to the OFF position:

(a) FUEL PUMPS 1 AFT

(b) FUEL PUMPS 1 FWD

(c) FUEL PUMPS 2 AFT

(d) FUEL PUMPS 2 FWD

(e) FUEL PUMPS CTR L

(f) FUEL PUMPS CTR R.

SUBTASK 28-22-18-860-002

WARNING REMOVE ELECTRICAL POWER BEFORE YOU REMOVE OR INSTALL COMPONENTS IN THE POWER DISTRIBUTION PANELS. THERE ARE HIGH VOLTAGES THAT CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(2) Remove electrical power (TASK 24-22-00-860-802).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-18-860-003

(3) Open this access door:

Number	Name/Location
117A	Electronic Equipment Access Door

F. GFI Relay Removal

SUBTASK 28-22-18-860-004

(1) Make sure that all power warning lights on the P91 or P92 power distribution panels are off.

SUBTASK 28-22-18-010-001

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(2) Open the applicable power distribution panel, P91 or P92.

NOTE: The GFI relays are located on the upper left corner of the open panel.

(a) The GFI relays in the P91 panel:

1) R19, Forward Fuel Boost Pump - No. 1 Main Tank
2) R20, Aft Fuel Boost Pump - No. 2 Main Tank
3) R54, Left Center Fuel Boost Pump - Center Tank.

(b) The GFI relays in the P92 panel:

1) R18, Aft Fuel Boost Pump - No. 1 Main Tank
2) R21, Forward Fuel Boost Pump - No. 2 Main Tank
3) R55, Right Center Fuel Boost Pump - Center Tank.

SUBTASK 28-22-18-860-005

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(WARNING PRECEDES)

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(3) Open the applicable circuit breakers and install safety tags:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-22-18-020-001

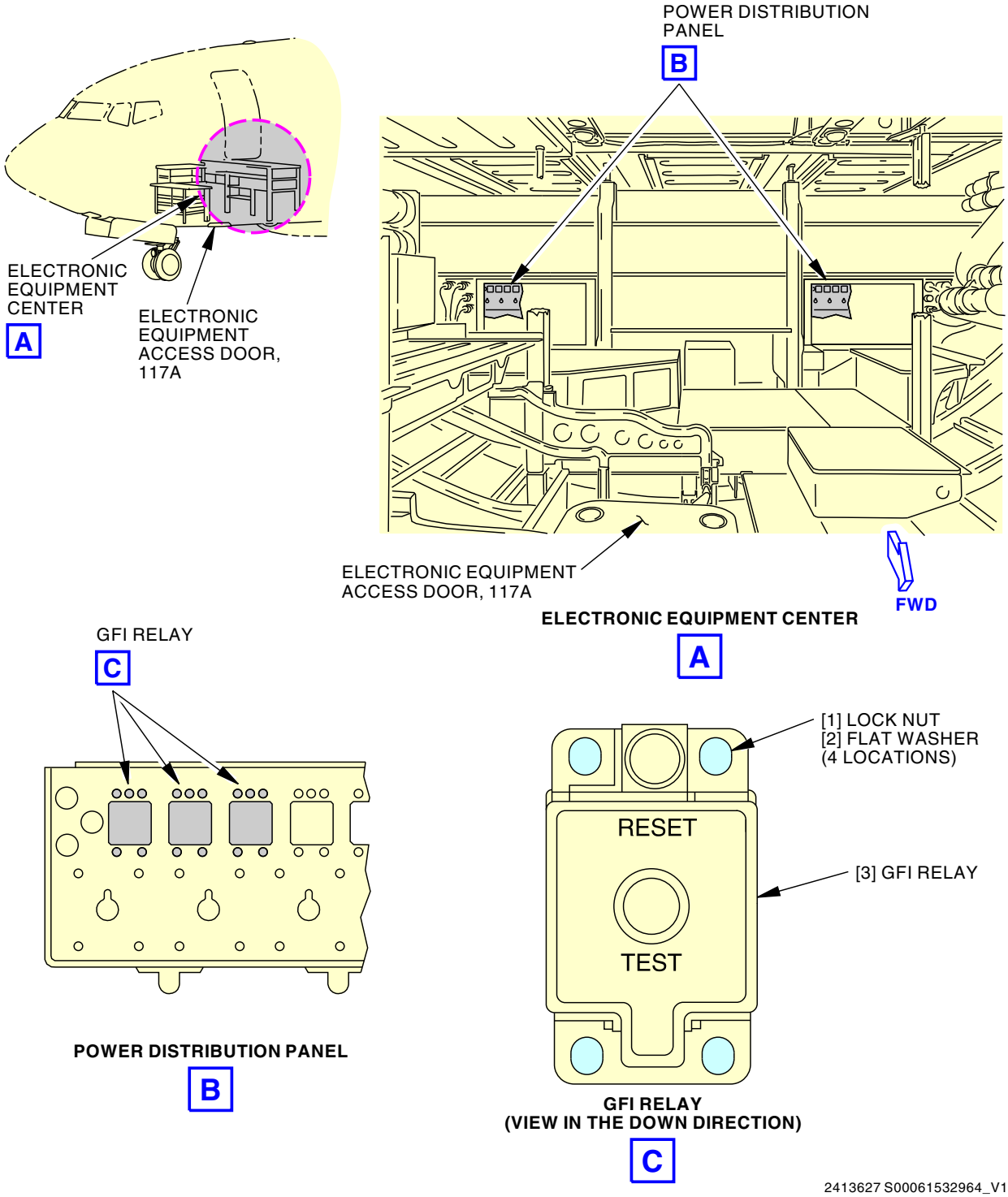
(4) Remove the four lock nuts [1] and flat washers [2] from the GFI relay [3].

SUBTASK 28-22-18-020-002

(5) Remove the GFI relay [3].

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Ground Fault Interrupter (GFI) Relay Installation
Figure 401/28-22-18-990-801

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-18-400-801

3. Ground Fault Interrupter (GFI) Relay Installation

(Figure 401)

A. General

(1) This task gives instructions to install the GFI relay.

B. References

Reference	Title
28-22-41-720-801	Ground Fault Interrupter (GFI) - Operational Test (P/B 501)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

C. Consumable Materials

Reference	Description	Specification
B00130	Alcohol - Isopropyl	TT-I-735
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

D. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
123	Forward Cargo Compartment - Left
124	Forward Cargo Compartment - Right

E. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door

F. GFI Relay Installation

SUBTASK 28-22-18-160-001

(1) Use a clean cotton wiper, G00034 moist with alcohol, B00130 to clean the contact surface of the mounting hardware and bonding surface of the GFI relay [3].

SUBTASK 28-22-18-420-001

(2) Align the GFI relay [3] in the mounting socket on the power distribution panel.

SUBTASK 28-22-18-420-002

(3) Install the four flat washers [2] and lock nuts [1] to secure the GFI relay [3] to the power distribution panel.

SUBTASK 28-22-18-420-003

(4) Tighten the four lock nuts [1] to 6 in-lb (0.7 N·m) - 7 in-lb (0.8 N·m).

SUBTASK 28-22-18-760-001

(5) Measure the electrical bonding resistance between the GFI relay [3] mounting flange to a point on the panel cross member that is a distance of 1 in. (2.54 cm) or more from the point on the GFI relay [3] mounting flange (SWPM 20-20-00).

(a) Make sure that the resistance is 0.0025 ohm (2.5 milliohms) or less.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. GFI Relay Installation Test

SUBTASK 28-22-18-860-006

WARNING WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-22-18-720-001

(2) Do this task: Ground Fault Interrupter (GFI) - Operational Test, TASK 28-22-41-720-801.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-18-860-007

WARNING WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(1) Close the applicable power distribution panel.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-18-860-008

(2) Close this access door:

Number	Name/Location
117A	Electronic Equipment Access Door

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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) Engine Fuel Crossfeed Valve Actuator Removal

(2) Engine Fuel Crossfeed Valve Actuator Installation

(3) Engine Fuel Crossfeed Valve - Valve Adapter Removal

(4) Engine Fuel Crossfeed Valve - Valve Adapter Installation

(5) Engine Fuel Crossfeed Valve Alignment

(6) Engine Fuel Crossfeed Valve - Valve Body Removal

(7) Engine Fuel Crossfeed Valve - Valve Body Installation

TASK 28-22-21-000-801

2. Engine Fuel Crossfeed Valve Actuator Removal

(Figure 401)

A. General

(1) This task gives instructions to remove the engine fuel crossfeed valve actuator [15].

B. References

Reference	Title
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.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Reference	Description
COM-2481	Sealant Removal Tool (meets BSS7384 requirements) Part #: 1-6390-A Supplier: 63318 Part #: 10810 Supplier: $0855 Part #: 10811 Supplier: $0855 Part #: 10812 Supplier: $0855 Part #: 234350 Supplier: 5HCF1 Part #: 235072 Supplier: 5HCF1 Part #: 235073 Supplier: 5HCF1 Part #: 235074 Supplier: 5HCF1 Part #: 235075 Supplier: 5HCF1 Part #: 235076 Supplier: 5HCF1 Part #: 311/03 Supplier: F6892 Part #: 311/14 Supplier: F6892 Part #: 311/25 Supplier: F6892 Part #: 311/37 Supplier: F6892 Part #: AS1 Supplier: $1351 Part #: AS2 Supplier: $1351 Part #: AS3 Supplier: $1351 Part #: DAD5013 Supplier: 7RKH2 Part #: DFD5019 Supplier: 7RKH2 Part #: JNT411B60 Supplier: 3DN12 Part #: JNT411B90 Supplier: 3DN12 Part #: SCD5019 Supplier: 7RKH2 Part #: ST982LF-9 Supplier: 81205 Part #: TS1275-4 Supplier: 22975

D. Location Zones

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

E. Prepare for the Removal

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 CONT

SUBTASK 28-22-21-480-003

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.

(2) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-22-21-010-001

(3) Go to the crossfeed valve location on the rear spar in the main landing gear wheel well (right side) (View A, Figure 401).

SUBTASK 28-22-21-420-001

(4) On the crossfeed valve actuator [15], move the manual override lever [9] to the CLOSED position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Engine Fuel Crossfeed Valve Actuator Removal

SUBTASK 28-22-21-420-002

(1) Disconnect the electrical connector [1] from the crossfeed valve actuator [15].

SUBTASK 28-22-21-140-001

(2) Remove the sealant from the bonding jumper [13] and fasteners at the crossfeed valve actuator [15] attachment location.

(a) Use sealant removal tool, COM-2481, or equivalent.

SUBTASK 28-22-21-420-003

(3) Remove the screw [14], two washers [12], and bonding jumper [13] from the crossfeed valve actuator [15].

SUBTASK 28-22-21-420-004

(4) Remove the four mounting screws [3] and washers [4].

SUBTASK 28-22-21-420-005

(5) Carefully disassemble the crossfeed valve actuator [15] from the index plate [5].

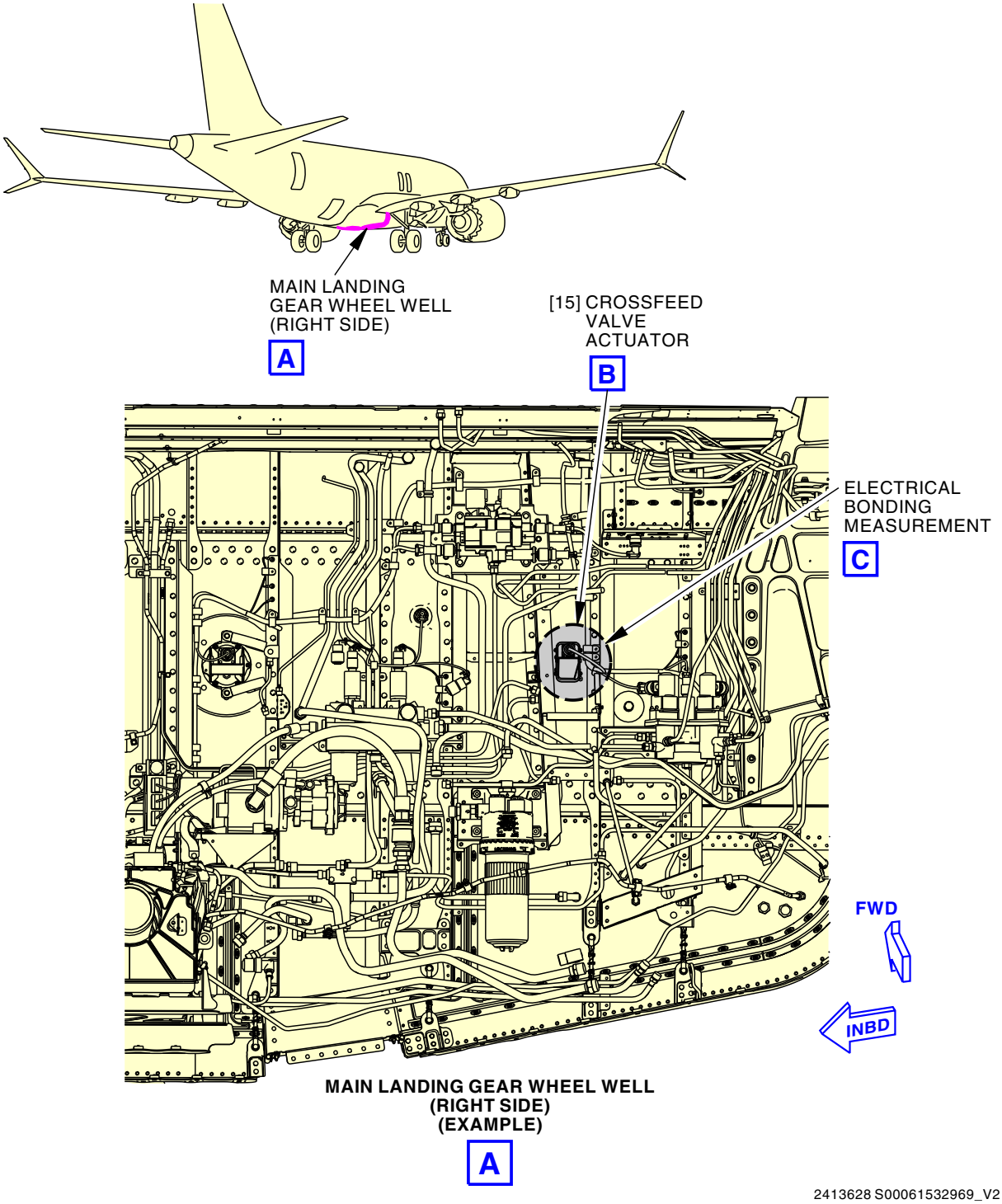
NOTE: The crossfeed valve actuator [15] and index plate [5] are bonded together with sealant.

SUBTASK 28-22-21-420-006

(6) Remove the crossfeed valve actuator [15].

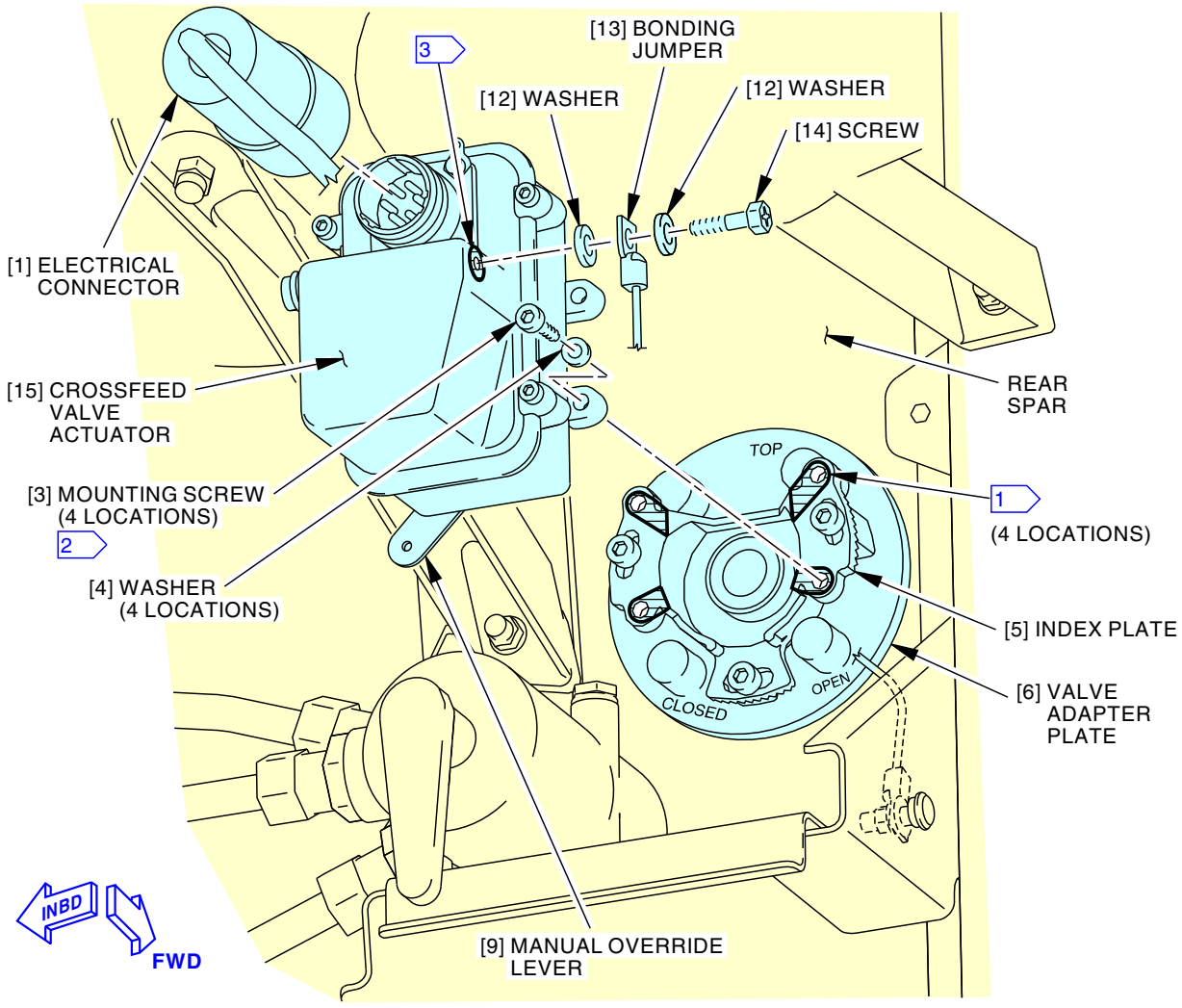
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Crossfeed Valve Actuator Installation
Figure 401/28-22-21-990-801 (Sheet 1 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



CROSSFEED VALVE ACTUATOR INSTALLATION

B

1 PREPARE AND INSTALL THE CONTACT SURFACES OF THE INDEX PLATE AND ACTUATOR FOOTPADS (4 LOCATIONS) WITH A FAY SEALED FAY SURFACE BOND (SWPM 20-20-00).

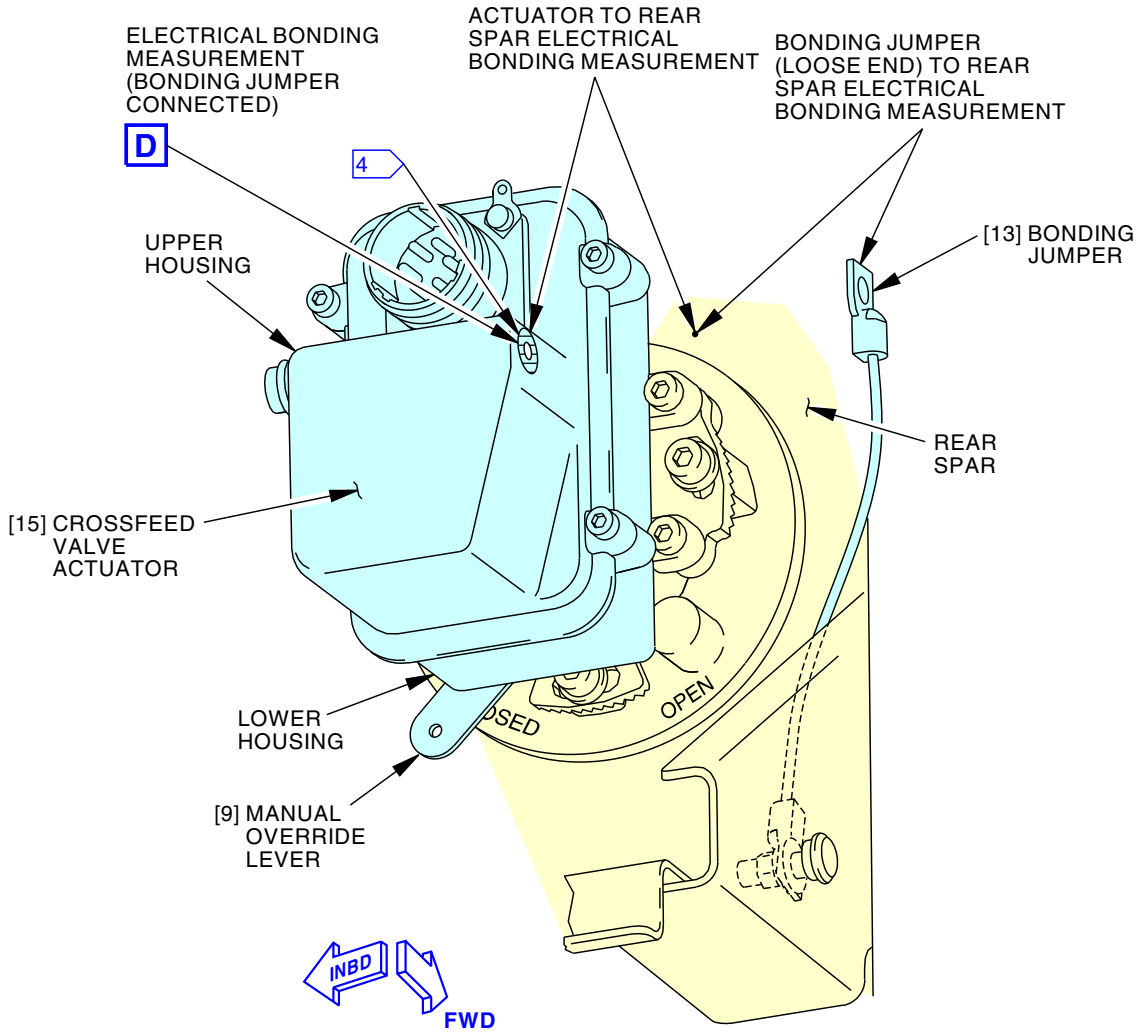
2 APPLY SEALANT TO THE SHANK AND THREADS OF THE MOUNTING SCREWS.

3 CLEAN THE CONTACT SURFACES OF THE ACTUATOR AND BONDING JUMPER. AFTER ELECTRICAL BONDING MEASUREMENT, APPLY A CAP SEAL TO THE BONDING JUMPER SCREW.

2413629 S00061532970_V1

Crossfeed Valve Actuator Installation
Figure 401/28-22-21-990-801 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



ELECTRICAL BONDING MEASUREMENT (BONDING JUMPER DISCONNECTED)

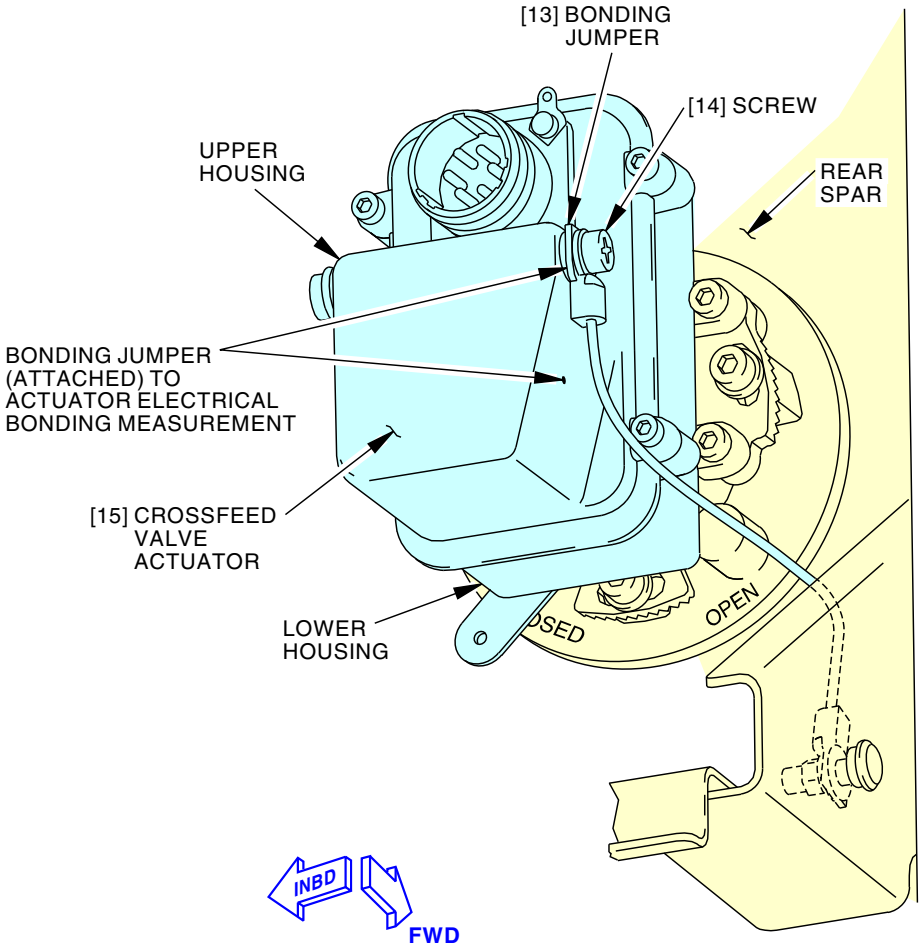
C

4 BARE METAL CONTACT SURFACE OF THE ACTUATOR AT THE BONDING JUMPER INSTALLATION.

2413630 S00061532971_V1

Crossfeed Valve Actuator Installation
Figure 401/28-22-21-990-801 (Sheet 3 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



ELECTRICAL BONDING MEASUREMENT (BONDING JUMPER CONNECTED)

D

2413631 S00061532972_V1

Crossfeed Valve Actuator Installation
Figure 401/28-22-21-990-801 (Sheet 4 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-21-400-801

3. Engine Fuel Crossfeed Valve Actuator Installation

(Figure 401)

A. General

(1) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, do this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

B. References

Reference	Title
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)
28-22-21-710-802	Crossfeed Valve Operational Test (P/B 501)
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 Bonderite M-CR 600, Bonderite M-CR 1200, Bonderite M-CR 600RTU, or Bonderite M-CR 1200S Solution (P/B 701)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES
SWPM 20-20-10	REPLACEMENT OF GROUND STUDS AND BONDING JUMPER INSTALLATION

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Reference	Description
COM-2481	Sealant Removal Tool (meets BSS7384 requirements) Part #: 1-6390-A Supplier: 63318 Part #: 10810 Supplier: $0855 Part #: 10811 Supplier: $0855 Part #: 10812 Supplier: $0855 Part #: 234350 Supplier: 5HCF1 Part #: 235072 Supplier: 5HCF1 Part #: 235073 Supplier: 5HCF1 Part #: 235074 Supplier: 5HCF1 Part #: 235075 Supplier: 5HCF1 Part #: 235076 Supplier: 5HCF1 Part #: 311/03 Supplier: F6892 Part #: 311/14 Supplier: F6892 Part #: 311/25 Supplier: F6892 Part #: 311/37 Supplier: F6892 Part #: AS1 Supplier: $1351 Part #: AS2 Supplier: $1351 Part #: AS3 Supplier: $1351 Part #: DAD5013 Supplier: 7RKH2 Part #: DFD5019 Supplier: 7RKH2 Part #: JNT411B60 Supplier: 3DN12 Part #: JNT411B90 Supplier: 3DN12 Part #: SCD5019 Supplier: 7RKH2 Part #: ST982LF-9 Supplier: 81205 Part #: TS1275-4 Supplier: 22975
COM-4746	Handle - Sealant Removal Tool Part #: 310/1 (for SkyScraper) Supplier: F6892 Part #: SHR0272-T (for PnJ scraper) Supplier: 7RKH2 Part #: ST982LH-F-3 (for ST982LF-9) Supplier: 81205 Opt Part #: SHW0215 (for PnJ scraper) Supplier: 7RKH2
STD-123	Brush - Soft Bristle

D. Consumable Materials

Reference	Description	Specification
A50110	Sealant - Fuel Tank	BMS5-45 Class B-2
A50155	Sealant - Fuel Tank	BMS5-45 Class C
A50231	Sealant - Pressure And Environmental - Chromate Type	BMS5-95 Class B
A50296	Sealant - Pressure And Environmental - Chromate Type	BMS5-95 Class C
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00148	Solvent - Methyl Ethyl Ketone (MEK)	ASTM D740
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
C00064	Coating - Aluminum Chemical Conversion	BAC5719 Type II Class A (MIL-DTL-5541 Class 1A)
C00307	Coating - Corrosion Resistant Finish For Integral Fuel Tanks	BMS10-20 Type II

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Reference	Description	Specification
C50033	Coating - Chemical Conversion - Bonderite M-CR 1200S Aero (Formerly Alodine 1200)	BAC5719 Class A, C or D, MIL-DTL-81706 Type I Class 1A or 3
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
15	Crossfeed valve actuator	28-22-21-01-050	SIA ALL

F. Location Zones

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

G. Engine Fuel Crossfeed Valve Actuator Installation

SUBTASK 28-22-21-490-001

WARNING MAKE SURE THAT YOU INSTALL THE GROUND LOCK ASSEMBLIES ON THE LANDING GEAR. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR IF YOU DO NOT INSTALL THE GROUND LOCK ASSEMBLIES.

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 that the ground locks are installed on the landing gear (TASK 32-00-01-480-801).

SUBTASK 28-22-21-110-001

(2) Remove the old sealant and clean the new crossfeed valve actuator [15], index plate [5], and the fasteners (if reused):

(a) Use sealant removal tool, COM-2481, and sealant removal tool handle, COM-4746 (or equivalent), to remove the old sealant.

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

(b) To remove the remaining sealant, grease, oil, dirt, and other contamination from the components, use one of these brushes/pads soaked with solvent, B00184 or solvent, B00148:

1) soft bristle brush, STD-123

2) cotton wiper, G00034.

SUBTASK 28-22-21-110-002

(3) Do these steps to prepare the crossfeed valve actuator [15] and index plate [5] for a fay sealed fay surface bond (SWPM 20-20-00, SWPM 20-20-10):

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 solvent, B00062 or solvent, B00184.

This, in turn, causes and places stress at the CV joints and differential output shaft bearings. The result is a prominent “clicking” and, worse, rear-end vibrations.

(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.

28-AWL-21: CDCCL

(d) Apply a fay sealed fay surface bond to the mating surfaces between the crossfeed valve actuator [15] and the index plate [5] (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-21.

1) Use BMS 5-45 Class B-2 sealant, A50110, BMS 5-45 Class C sealant, A50155, BMS 5-95 Class B sealant, A50231, or BMS 5-95 Class C sealant, A50296, for the faying surface seal that is outside the tank.

2) Make sure that 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].

1) Use BMS 5-45 Class B-2 sealant, A50110, BMS 5-45 Class C sealant, A50155, BMS 5-95 Class B sealant, A50231, or BMS 5-95 Class C sealant, A50296 for the wet installation of the mounting screws [3].

2) Make sure that the sealant applied to the fasteners is approximately 0.060 in. (1.524 mm) thick.

SUBTASK 28-22-21-420-007

(4) Do these steps to install the crossfeed valve actuator [15] to the index plate [5]:

(a) Make sure that the manual override lever [9] on the crossfeed valve actuator [15] is in the CLOSED position.

(b) Align the actuator output shaft with the valve adapter plate [6].

(c) Make sure that the two spaces for teeth on the valve adapter plate [6] align with the crossfeed valve actuator [15] output shaft.

(d) Put the crossfeed valve actuator [15] output shaft into the valve adapter plate [6].

NOTE: The mounting feet on the crossfeed valve actuator [15] automatically align with the mounting points on the index plate [5].

(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).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(g) Make sure that 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 that the sealant that remains is flush with the mating part edges.

SUBTASK 28-22-21-765-001

28-AWL-21: CDCCL

(5) Before the bonding jumper [13] and the electrical connector [1] is attached, measure the electrical bonding resistance between the upper housing of the crossfeed valve actuator [15] and the rear spar (SWPM 20-20-10) (View C).

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.

(a) Make sure that the bonding jumper [13] does not touch the crossfeed valve actuator [15] during the bonding measurement.

(b) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-21: CDCCL

(c) If the crossfeed valve actuator [15], index plate [5], and valve adapter plate [6] were removed, make sure that the electrical bonding resistance is 0.0030 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 electrical bonding resistance is more than 0.0030 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.

28-AWL-21: CDCCL

(d) If the crossfeed valve actuator [15] and index plate [5] were removed, make sure the electrical bonding resistance is 0.0040 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

1) If the electrical bonding resistance is more than 0.0040 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.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

28-AWL-21: CDCCL

(e) If only the crossfeed valve actuator [15] was removed, make sure the electrical bonding resistance is 0.0040 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

1) If the electrical bonding resistance is more than 0.0040 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.

SUBTASK 28-22-21-390-001

28-AWL-21: CDCCL

(6) If the terminal of the bonding jumper [13] is disconnected from the stiffener, install the bonding jumper [13] with a fay surface bond between the stiffener and the terminal of the bonding jumper [13] (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-21.

SUBTASK 28-22-21-765-002

28-AWL-21: CDCCL

(7) Before the bonding jumper [13] is attached to the crossfeed valve actuator [15], measure the electrical bonding resistance between the loose end of the bonding jumper [13] and the rear spar (SWPM 20-20-10) (View C).

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.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-21: CDCCL

(b) Make sure that the electrical 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 electrical 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.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

28-AWL-21: CDCCL

(8) If the terminal of the bonding jumper [13] is disconnected from the stiffener, apply a fillet seal to the terminal of the bonding jumper [13] at the stiffener (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-21.

SUBTASK 28-22-21-420-008

28-AWL-21: CDCCL

(9) If the terminal of the bonding jumper [13] was not disconnected from the stiffener, measure the resistance between the loose end of the bonding jumper [13] and the rear spar (SWPM 20-20-10).

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.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-21: CDCCL

(b) Make sure the electrical bonding resistance is 0.0020 ohm (2.0 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 electrical bonding resistance is more than 0.0020 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 28-22-21-420-032

28-AWL-21: CDCCL

(10) Apply a fay surface bond between the crossfeed valve actuator [15] and the terminal of the bonding jumper [13] (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-21.

SUBTASK 28-22-21-400-001

(11) Install the bonding jumper [13] to the crossfeed valve actuator [15] with the screw [14] and two washers [12].

(a) Tighten the screw [14] to 35 in-lb (4 N·m).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-21-765-003

28-AWL-21: CDCCL

(12) Measure the electrical bonding resistance between the upper housing of the crossfeed valve actuator [15] and the attached terminal of the bonding jumper [13] (SWPM 20-20-10) (View D).

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.

(a) Do not touch the screw [14] when you make the bonding measurement.

(b) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-21: CDCCL

(c) Make sure the electrical bonding resistance is 0.0010 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 electrical bonding resistance is more than 0.0010 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.

SUBTASK 28-22-21-390-004

28-AWL-21: CDCCL

(13) Apply a fillet seal between the terminal of the bonding jumper [13] and the crossfeed valve actuator [15].

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.

SUBTASK 28-22-21-390-002

28-AWL-21: CDCCL

(14) Apply a cap seal over the screw [14] and the terminal lug of the bonding jumper [13] attached to the crossfeed valve actuator [15].

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.

(a) Use BMS 5-45 Class B-2 sealant, A50110, BMS 5-45 Class C sealant, A50155, BMS 5-95 Class B sealant, A50231, or BMS 5-95 Class C sealant, A50296 to apply the cap seal.

SUBTASK 28-22-21-916-001

(15) 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:

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1) Alodine 600 coating, C00064

2) BMS 10-20 coating, C00307.

SUBTASK 28-22-21-916-002

(16) Do this task to apply Bonderite M-CR 1200S Aero coating, C50033, to any bare metal areas of the crossfeed valve actuator [15]: Apply Bonderite M-CR 600, Bonderite M-CR 1200, Bonderite M-CR 600RTU, or Bonderite M-CR 1200S Solution, TASK 51-21-41-370-802.

NOTE: Re-apply the protective coating to the crossfeed valve 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 28-22-21-410-001

(17) Connect the electrical connector [1] to the crossfeed valve actuator [15].

H. 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

Row	Col	Number	Name
B	7	C00361	FUEL CROSS FEED VALVE CONT

SUBTASK 28-22-21-760-001

(2) Do this task: Crossfeed Valve Operational Test, TASK 28-22-21-710-802.

I. Put the Airplane Back to the Usual Condition

SUBTASK 28-22-21-090-001

WARNING DO THE APPLICABLE PROCEDURE TO REMOVE THE LANDING-GEAR DOWNLOCK PINS INSTALLED ON THE LANDING GEAR. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR IF THE LANDING GEAR OPERATES WITHOUT WARNING.

(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 ———

TASK 28-22-21-000-802

4. Engine Fuel Crossfeed Valve - Valve Adapter Removal

(Figure 402)

A. General

(1) This task gives instructions to remove the engine fuel crossfeed valve adapter plate [6].

(2) The valve adapter plate [6] and shaft assembly (valve adapter) is used to connect the actuator to the crossfeed valve body [21]. The valve adapter plate [6] consists of these components:

(a) index plate [5]

(b) Adapter plate

(c) Adapter shaft (with U-joint connection).

B. References

Reference	Title
28-11-00-910-802	Purging and Fuel Tank Entry (P/B 201)

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(Continued)

Reference	Title
28-11-31-000-801	Center Tank Access Door 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.

Reference	Description
COM-2481	Sealant Removal Tool (meets BSS7384 requirements) Part #: 1-6390-A Supplier: 63318 Part #: 10810 Supplier: $0855 Part #: 10811 Supplier: $0855 Part #: 10812 Supplier: $0855 Part #: 234350 Supplier: 5HCF1 Part #: 235072 Supplier: 5HCF1 Part #: 235073 Supplier: 5HCF1 Part #: 235074 Supplier: 5HCF1 Part #: 235075 Supplier: 5HCF1 Part #: 235076 Supplier: 5HCF1 Part #: 311/03 Supplier: F6892 Part #: 311/14 Supplier: F6892 Part #: 311/25 Supplier: F6892 Part #: 311/37 Supplier: F6892 Part #: AS1 Supplier: $1351 Part #: AS2 Supplier: $1351 Part #: AS3 Supplier: $1351 Part #: DAD5013 Supplier: 7RKH2 Part #: DFD5019 Supplier: 7RKH2 Part #: JNT411B60 Supplier: 3DN12 Part #: JNT411B90 Supplier: 3DN12 Part #: SCD5019 Supplier: 7RKH2 Part #: ST982LF-9 Supplier: 81205 Part #: TS1275-4 Supplier: 22975
COM-4746	Handle - Sealant Removal Tool Part #: 310/1 (for SkyScraper) Supplier: F6892 Part #: SHR0272-T (for PnJ scraper) Supplier: 7RKH2 Part #: ST982LH-F-3 (for ST982LF-9) Supplier: 81205 Opt Part #: SHW0215 (for PnJ scraper) Supplier: 7RKH2

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 Removal

SUBTASK 28-22-21-650-001

(1) Defuel the center fuel tank (TASK 28-26-00-650-801).

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SUBTASK 28-22-21-860-001

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 28-22-21-650-002

(3) Drain and purge the center fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-22-21-010-002

(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. Engine Fuel Crossfeed Valve Adapter Removal

SUBTASK 28-22-21-020-001

(1) Do these steps on the outside of the fuel tank:

(a) Do this task: Engine Fuel Crossfeed Valve Actuator Removal, TASK 28-22-21-000-801.

(b) Use a sealant removal tool to remove the old sealant from the periphery of the adapter plate (View A-A, Figure 402).

1) Use sealant removal tool, COM-2481, and sealant removal tool handle, COM-4746, or equivalent.

SUBTASK 28-22-21-020-002

WARNING DO THE PURGING AND FUEL-TANK ENTRY PROCEDURE. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Go into the center tank and do these steps:

(a) Go to the valve adapter plate [6] location (View B, Figure 402).

(b) Remove the old sealant from the four bolts [26] and the valve adapter plate [6] rear spar penetration (View A-A, Figure 402).

(c) Remove the four bolts [26] and the washers [27] to disconnect the valve adapter plate [6].

(d) Disengage the adapter shaft that attached to the valve adapter plate [6] and crossfeed valve body [21] (View C, Figure 402).

SUBTASK 28-22-21-020-003

(3) Go out of the tank and remove the valve adapter plate [6] from the rear spar.

H. Remove the Index Plate

NOTE: Do these steps if you will reuse the valve adapter plate [6] and the attached index plate [5] or if you need to remove the index plate [5] to align the crossfeed valve body [21]. If the task is to discard the old valve adapter plate [6] and install a new valve adapter plate [6], it is not necessary to disassemble the index plate [5].

SUBTASK 28-22-21-020-004

(1) Do these steps to remove the index plate [5] from the valve adapter plate [6] (View D, Figure 402):

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Remove the lockwire from the two index screws [23] and index screw [24].

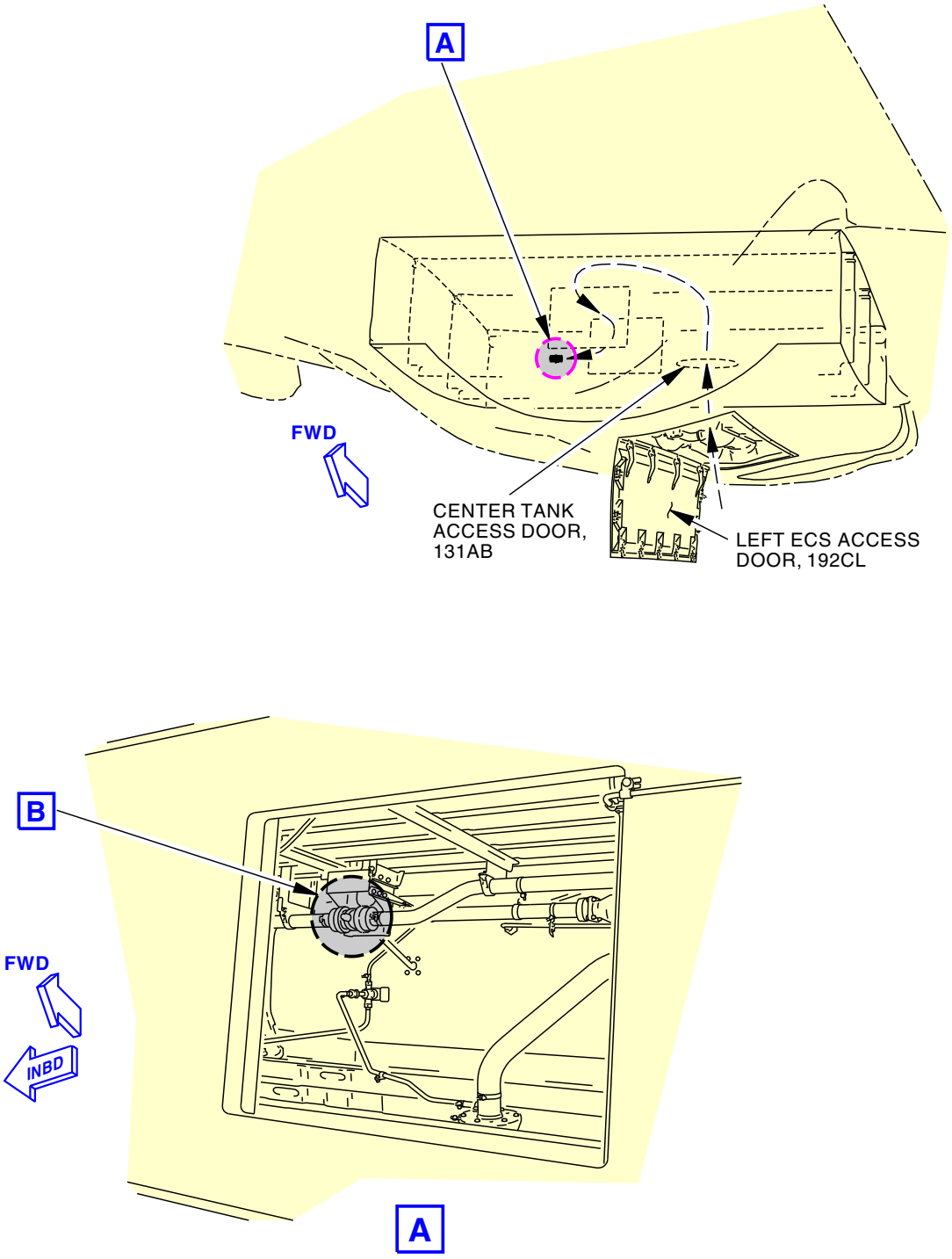
(b) Remove index screws [23], index screw [24], and the washers [22].

(c) Carefully disassemble the index plate [5] from the valve adapter plate [6].

NOTE: The two plates are bonded with faying surface sealant.

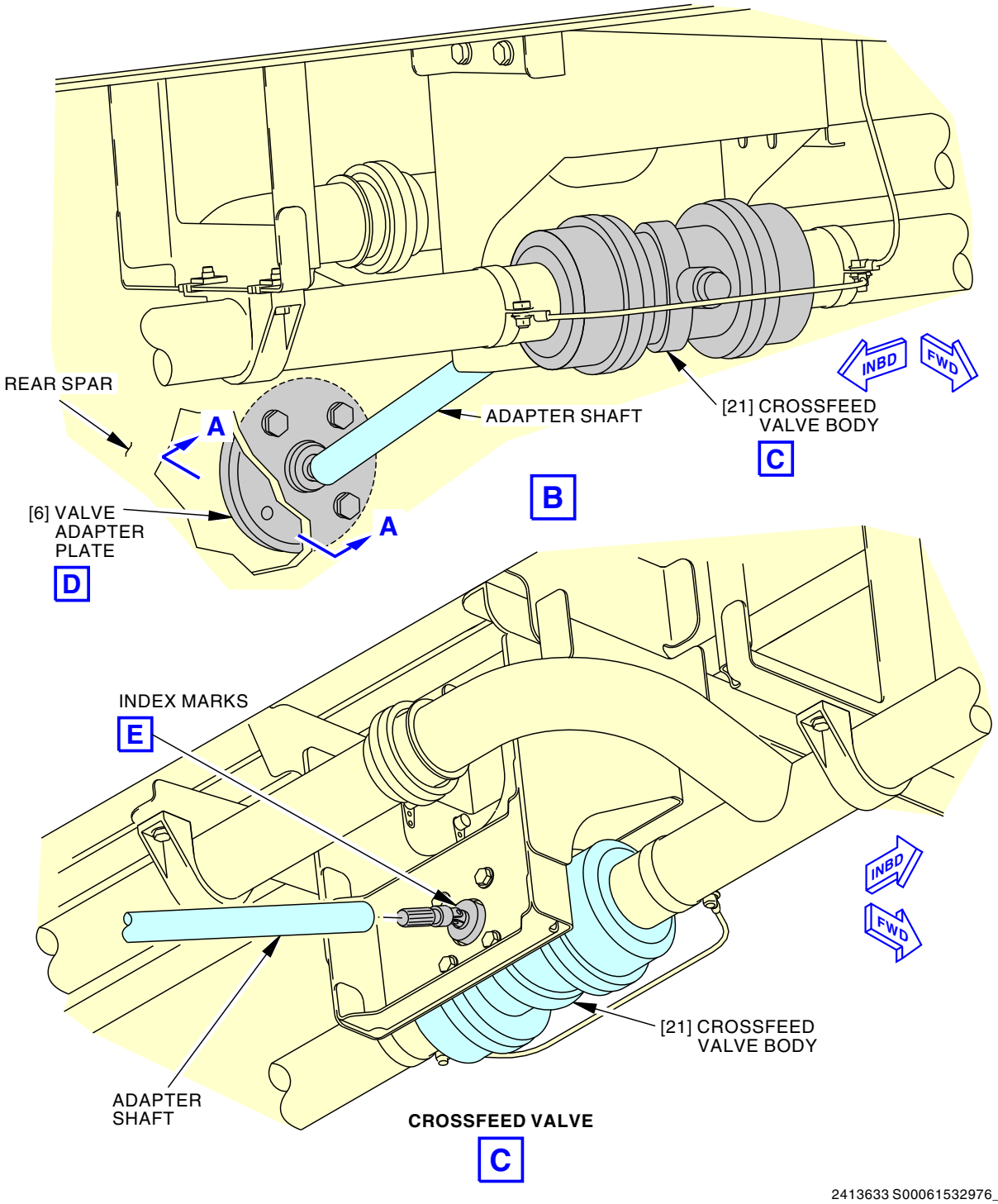
——— END OF TASK ———

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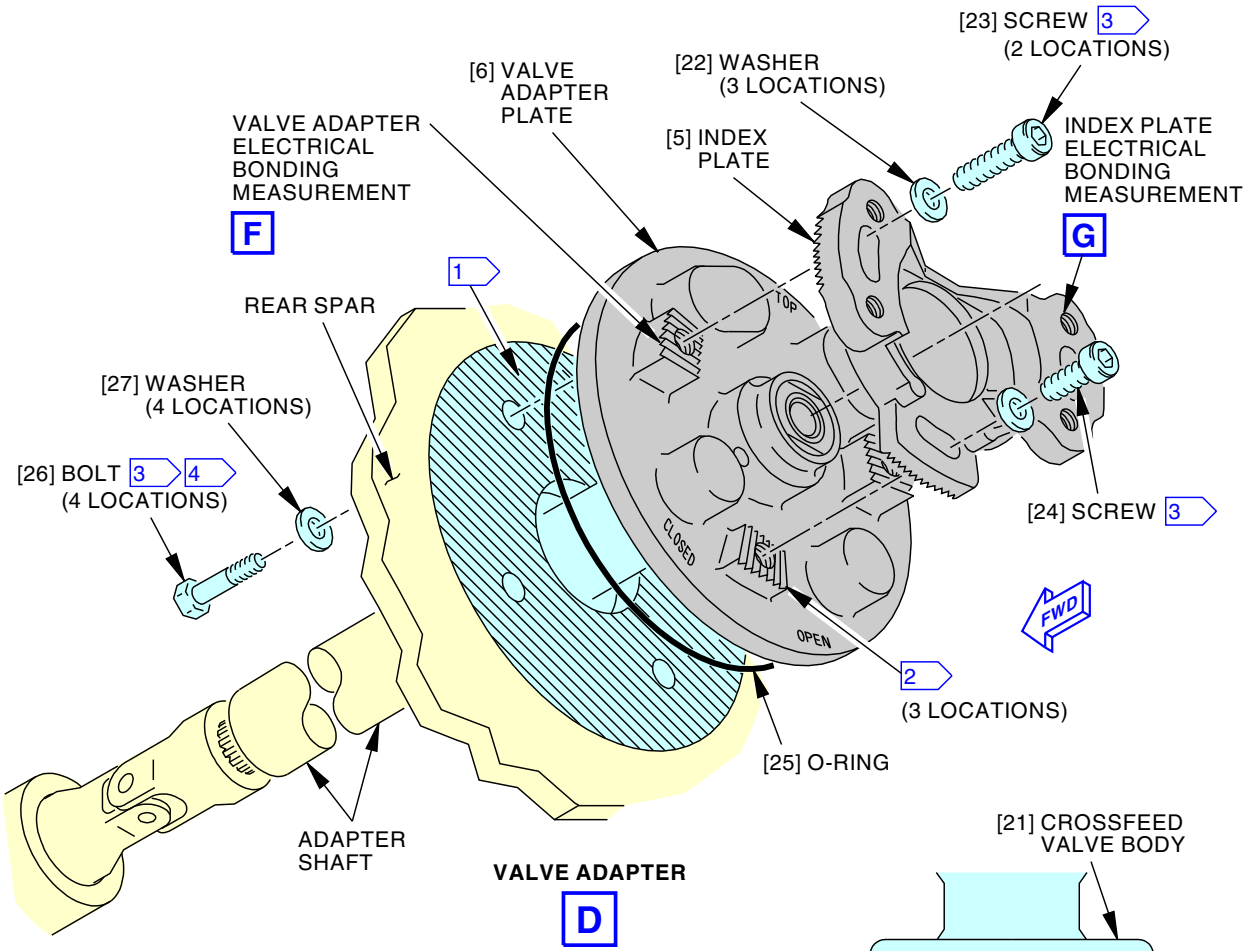
Crossfeed Valve Adapter Installation
Figure 402/28-22-21-990-802 (Sheet 1 of 5)

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Crossfeed Valve Adapter Installation
Figure 402/28-22-21-990-802 (Sheet 2 of 5)

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1 PREPARE AND INSTALL THE VALVE ADAPTER TO THE REAR SPAR WITH A FILLET SEAL FAY SURFACE BOND (SWPM 20-20-00).

2 PREPARE AND INSTALL THE SERRATED CONTACT SURFACES OF THE VALVE ADAPTER AND INDEX PLATE WITH A FAY SEALED FAY SURFACE BOND (3 LOCATIONS) (SWPM 20-20-00).

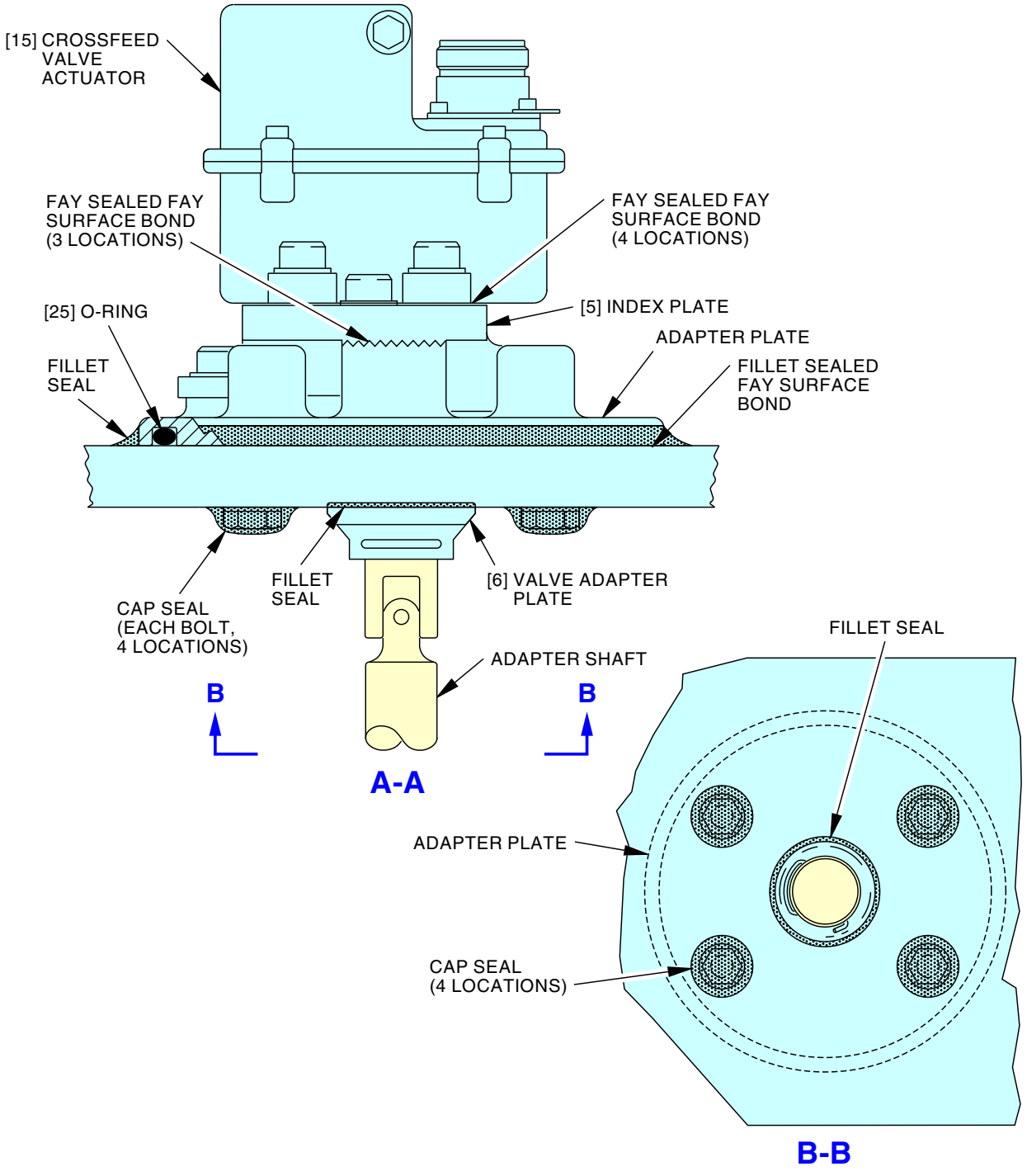
3 APPLY SEALANT TO THE SHANK AND THREADS OF THE FASTENERS DURING THE INSTALLATION.

4 AFTER INSTALLATION, APPLY A CAP SEAL TO THE HEAD OF THE FASTENERS.

2413634 S00061532977_V1

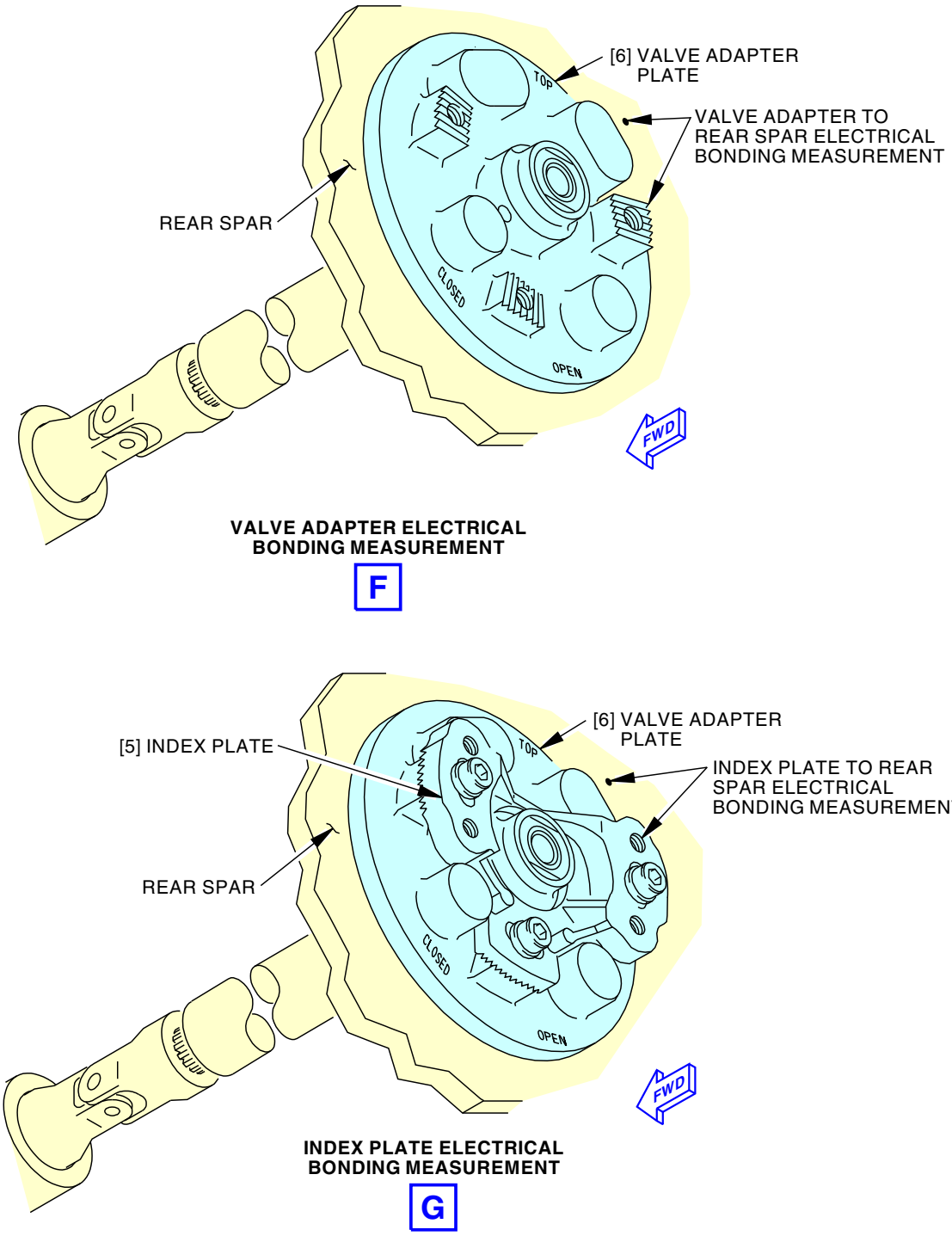
Crossfeed Valve Adapter Installation
Figure 402/28-22-21-990-802 (Sheet 3 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Crossfeed Valve Adapter Installation
Figure 402/28-22-21-990-802 (Sheet 4 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Crossfeed Valve Adapter Installation
Figure 402/28-22-21-990-802 (Sheet 5 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-21-400-802

5. Engine Fuel Crossfeed Valve - Valve Adapter Installation

(Figure 402)

A. General

(1) This task has these procedures:

(a) Install the valve adapter plate [6]

(b) Install the index plate [5]

(c) Crossfeed Valve Operational Tests

(d) Put the Airplane Back to the Usual Condition.

(2) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
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)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-22-00-730-802	Crossfeed Valve - Functional Test (P/B 501)
28-22-21-710-802	Crossfeed Valve Operational Test (P/B 501)
32-00-01-080-801	Landing Gear Downlock Pins Removal (P/B 201)
51-22-00-390-806	Fillet Seal Application (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

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(Continued)

Reference	Description
COM-2481	Sealant Removal Tool (meets BSS7384 requirements) Part #: 1-6390-A Supplier: 63318 Part #: 10810 Supplier: $0855 Part #: 10811 Supplier: $0855 Part #: 10812 Supplier: $0855 Part #: 234350 Supplier: 5HCF1 Part #: 235072 Supplier: 5HCF1 Part #: 235073 Supplier: 5HCF1 Part #: 235074 Supplier: 5HCF1 Part #: 235075 Supplier: 5HCF1 Part #: 235076 Supplier: 5HCF1 Part #: 311/03 Supplier: F6892 Part #: 311/14 Supplier: F6892 Part #: 311/25 Supplier: F6892 Part #: 311/37 Supplier: F6892 Part #: AS1 Supplier: $1351 Part #: AS2 Supplier: $1351 Part #: AS3 Supplier: $1351 Part #: DAD5013 Supplier: 7RKH2 Part #: DFD5019 Supplier: 7RKH2 Part #: JNT411B60 Supplier: 3DN12 Part #: JNT411B90 Supplier: 3DN12 Part #: SCD5019 Supplier: 7RKH2 Part #: ST982LF-9 Supplier: 81205 Part #: TS1275-4 Supplier: 22975
COM-4746	Handle - Sealant Removal Tool Part #: 310/1 (for SkyScraper) Supplier: F6892 Part #: SHR0272-T (for PnJ scraper) Supplier: 7RKH2 Part #: ST982LH-F-3 (for ST982LF-9) Supplier: 81205 Opt Part #: SHW0215 (for PnJ scraper) Supplier: 7RKH2
STD-123	Brush - Soft Bristle

D. Consumable Materials

Reference	Description	Specification
A50110	Sealant - Fuel Tank	BMS5-45 Class B-2
A50155	Sealant - Fuel Tank	BMS5-45 Class C
A50231	Sealant - Pressure And Environmental - Chromate Type	BMS5-95 Class B
A50296	Sealant - Pressure And Environmental - Chromate Type	BMS5-95 Class C
A50337	Sealant - Fuel Tank	BMS5-45 Class B
B00130	Alcohol - Isopropyl	TT-I-735
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
B00666	Solvent - Methyl Propyl Ketone	BMS11-9
C00064	Coating - Aluminum Chemical Conversion	BAC5719 Type II Class A (MIL-DTL-5541 Class 1A)
C00307	Coating - Corrosion Resistant Finish For Integral Fuel Tanks	BMS10-20 Type II
D00504	Grease - Petrolatum	VV-P-236

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(Continued)

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
6	Valve adapter plate	28-22-21-01-060	SIA ALL
25	O-ring	28-22-21-01-095	SIA ALL

F. Location Zones

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

G. Access Panels

Number	Name/Location
131AB	Center Tank Access

H. Valve Adapter Installation

SUBTASK 28-22-21-140-002

(1) Remove the old sealant and clean the rear spar, valve adapter plate [6], index plate [5], and the fasteners (if re-used).

(a) Use sealant removal tool, COM-2481, and sealant removal tool handle, COM-4746 (or equivalent), to remove 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 plate [6] and index plate [5] (SWPM 20-20-00).

WARNING DO NOT GET SOLVENTS IN YOUR MOUTH, EYES, OR SKIN. DO NOT BREATHE FUMES FROM SOLVENTS. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS AND LOCAL REQUIREMENTS FOR PROPER HANDLING. SOLVENTS ARE HAZARDOUS MATERIALS AND MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT.

(c) To remove the remaining sealant, grease, oil, dirt, and other contamination from the components, use one of these brushes/pads soaked with solvent, B00184, or solvent, B00666:

1) soft bristle brush, STD-123

2) cotton wiper, G00034.

SUBTASK 28-22-21-110-003

(2) Do these steps to prepare the valve adapter plate [6] and the rear spar for a fay sealed fay surface bond (View D, Figure 402):

WARNING DO NOT GET SOLVENTS IN YOUR MOUTH, EYES, OR SKIN. DO NOT BREATHE FUMES FROM SOLVENTS. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS AND LOCAL REQUIREMENTS FOR PROPER HANDLING. SOLVENTS ARE HAZARDOUS MATERIALS AND MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT.

(a) Final clean the contact surfaces of the valve adapter plate [6] and the rear spar with a cotton wiper, G00034, soaked with alcohol, B00130, or solvent, B00184.

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(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 28-22-21-390-003

28-AWL-21: CDCCL

(3) Apply a fay sealed fay surface bond between the valve adapter plate [6] and the rear spar outside the tank (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-21.

SUBTASK 28-22-21-420-009

(4) 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 new O-ring [25] in the O-ring groove of the valve adapter plate [6].

(c) Put the adapter shaft attached to the valve adapter plate [6] through the hole in the rear spar.

(d) Make sure that the shoulder of the valve adapter plate [6] does not bind in the opening of the rear spar.

SUBTASK 28-22-21-410-002

WARNING

DO THE PURGING AND FUEL-TANK ENTRY PROCEDURE. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(5) Go into the center tank to the valve adapter plate [6] location (TASK 28-11-00-910-802) (View A, Figure 402).

SUBTASK 28-22-21-420-010

(6) Do these steps to install the valve adapter plate [6]:

(a) Make sure that the index marks on the body of the crossfeed valve body [21] are aligned (View E, Figure 402).

NOTE: A small misalignment of the index marks is satisfactory.

(b) Engage the adapter shaft of the valve adapter plate [6] with the crossfeed valve body [21] (View C, Figure 402).

(c) Apply sealant to the shank and the threads of the four bolts [26].

1) Use sealant, A50110, for the wet installation of the bolts [26].

2) Make sure that 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 plate [6].

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SUBTASK 28-22-21-420-011

28-AWL-21: CDCCL

(7) On the inside of the tank, apply a cap seal to each of the four bolts [26] (TASK 51-22-00-390-806) (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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

(a) Use sealant, A50110, to apply the cap seal.

SUBTASK 28-22-21-420-012

28-AWL-21: CDCCL

(8) On the inside of the tank, apply a fillet seal around the edge of the hole and the stationary part of the valve adapter plate [6] (TASK 51-22-00-390-806) (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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

(a) Make sure that the sealant does not touch the adapter shaft or other parts of the valve adapter plate [6] that turn.

(b) Use sealant, A50110, to apply the fillet seal.

SUBTASK 28-22-21-420-013

(9) On the outside of the tank, apply a fillet seal around the periphery of the valve adapter plate [6] and the spar (TASK 51-22-00-390-806) (View A-A, Figure 402).

(a) Use sealant, A50110, to apply the fillet seal.

SUBTASK 28-22-21-765-004

28-AWL-21: CDCCL

(10) On the outside of the fuel tank, measure the electrical bonding resistance between one of the raised serrated surfaces of the valve adapter plate [6] and the rear spar (View F) (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-21.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-21: CDCCL

(b) Make sure the electrical 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

1) If the electrical 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.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-21-410-003

(11) Do this task to close the fuel tank: Fuel Tank Closure, TASK 28-11-00-410-801.

(a) Install this access panel:

Number	Name/Location
131AB	Center Tank Access

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

SUBTASK 28-22-21-820-001

(12) Do this task: Engine Fuel Crossfeed Valve Alignment, TASK 28-22-21-820-801.

I. Install the Index Plate

SUBTASK 28-22-21-820-002

(1) Do this procedure after you have correctly aligned and marked the alignment position of the index plate [5] and adapter plate per this task: Engine Fuel Crossfeed Valve Alignment, TASK 28-22-21-820-801.

SUBTASK 28-22-21-020-005

(2) Remove the index plate [5] from the valve adapter plate [6].

SUBTASK 28-22-21-110-004

(3) Do these steps to prepare the index plate [5] and the valve adapter plate [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 plate [6] for the electrical bond.

WARNING DO NOT GET SOLVENTS IN YOUR MOUTH, EYES, OR SKIN. DO NOT BREATHE FUMES FROM SOLVENTS. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS AND LOCAL REQUIREMENTS FOR PROPER HANDLING. SOLVENTS ARE HAZARDOUS MATERIALS AND MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT.

(b) Final clean the contact surfaces with a cotton wiper, G00034, soaked with alcohol, B00130, or solvent, B00184.

(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.

28-AWL-21: CDCCL

(e) Apply a fay sealed fay surface bond between the serrated mating surfaces of the index plate [5] (three locations) and the valve adapter plate [6].

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 BMS 5-45 Class B-2 sealant, A50110, BMS 5-45 Class C sealant, A50155, BMS 5-95 Class B sealant, A50231, or BMS 5-95 Class C sealant, A50296, for the faying surface seal that is outside the tank.

2) Make sure that 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].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Use sealant, A50337 (BMS 5-45 Class B), for the wet installation of the index screws.

2) Make sure that the sealant applied to the fasteners is approximately 0.060 in. (1.524 mm) thick.

SUBTASK 28-22-21-420-014

(4) Do these steps to install the index plate [5]:

(a) Align the index plate [5] and the valve adapter plate [6] with the alignment reference mark that you made during the crossfeed valve alignment procedure.

(b) Install the two longer index screws [23] and washers [22] in the top index mounting hole positions.

(c) Install the shorter index screw [24] and washer [22] in the bottom index mounting hole location (6 o'clock position).

(d) Tighten the index screws to 22 ±1 in-lb (2.5 ±0.1 N·m).

(e) Make sure that 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 51-22-00-390-806).

(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 28-22-21-765-005

(5) Measure the electrical bonding resistance between one of the crossfeed valve actuator [15] feet contact surfaces on the index plate [5] (bare metal surface) and the rear spar (View G, Figure 402).

(a) Use an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

(b) Make sure that the electrical bonding resistance is 0.002 ohm (2.0 milliohms) or less.

1) If the electrical 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 28-22-21-760-002

28-AWL-21: CDCCL

(6) Measure the electrical bonding resistance between the index plate [5] and the valve adapter plate [6] (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-21.

(a) Use an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

28-AWL-21: CDCCL

(b) Make sure the electrical 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-21.

1) If the electrical 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 28-22-21-420-015

(7) Lockwire the two top two screws [23] and the bottom screw [24] to the index plate [5].

SUBTASK 28-22-21-420-016

(8) Do this task: Engine Fuel Crossfeed Valve Actuator Installation, TASK 28-22-21-400-801.

SUBTASK 28-22-21-370-001

(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 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.

J. Crossfeed Valve Operational Tests

NOTE: These tests will make sure that the valve adapter plate electrical operation is correct, the valve adapter plate alignment is correct, and that there are no fuels leaks through the rear spar.

SUBTASK 28-22-21-760-003

(1) Do these tasks:

(a) Crossfeed Valve Operational Test, TASK 28-22-21-710-802.

NOTE: This test is done when you install the crossfeed 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 plate [6]:

NOTE: The leak check is only necessary if you have done a fuel tank entry and replaced the valve adapter plate. It is not necessary if you have replaced or aligned the index plate for adjustment purposes only.

(a) Refuel the center fuel tank to a minimum of 13,000 lb (5897 kg) (TASK 12-11-00-650-803).

NOTE: This is the fuel quantity necessary to make sure that there are no leaks at the rear spar.

(b) Make sure that there are no fuel leaks at the valve adapter plate [6] installation on the rear spar.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(c) Make sure that there are no fuel leaks at this access door:

Number	Name/Location
131AB	Center Tank Access

K. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-21-090-002

WARNING MAKE SURE THE LANDING GEAR DOWNLOCK PINS ARE REMOVED, BEFORE THE LANDING GEAR CONTROL LEVER CAN BE MOVED TO THE UP POSITION. DAMAGE TO EQUIPMENT AND INJURIES TO PERSONNEL CAN OCCUR.

WARNING DO THE APPLICABLE PROCEDURE TO REMOVE THE LANDING-GEAR-DOWNLOCK PINS INSTALLED ON THE LANDING GEAR. PERSONNEL INJURY AND DAMAGE TO EQUIPMENT CAN OCCUR IF YOU OPERATE THE LANDING GEAR BEFORE YOU REMOVE THE DOWNLOCK PINS.

(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

TASK 28-22-21-820-801

6. Engine Fuel Crossfeed Valve Alignment

(Figure 403)

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.

Reference	Description
COM-1587	Wrench - Torque, 30 in-lbs (4 N-m) Part #: TE3FUA Supplier: 55719
SPL-1771	Alignment Equipment, Fuel Shutoff Valve Part #: B28009-1 Supplier: 81205

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 28-22-21-490-002

WARNING MAKE SURE THAT YOU INSTALL THE GROUND LOCK ASSEMBLIES ON THE LANDING GEAR. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR IF YOU DO NOT INSTALL THE GROUND LOCK ASSEMBLIES.

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-21-010-003

(2) Go to the crossfeed valve location on the rear spar in the main landing gear wheel well (right side) (View A, Figure 403).

SUBTASK 28-22-21-010-004

(3) If not done previously, do this task: Engine Fuel Crossfeed Valve Actuator Removal, TASK 28-22-21-000-801.

SUBTASK 28-22-21-010-005

(4) If not done previously, remove the index plate [5] from the valve adapter plate [6].

E. Crossfeed Valve Alignment

SUBTASK 28-22-21-820-003

(1) Do these steps to install the alignment tool [64] (valve alignment equipment, SPL-1771) in the valve adapter plate [6] (View B, Figure 403):

(a) Position the index plate [5] and align the serrated surfaces of the index plate [5] and valve adapter plate [6].

(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 that the spline on the alignment tool [64] engages with the spline on the shaft.

SUBTASK 28-22-21-820-004

(2) Do these steps to align the valve adapter plate [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.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(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 28-22-21-820-005

(3) Do these steps to align the valve adapter plate [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.

(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 28-22-21-820-006

(4) Tighten the lockscrew [63] on the alignment tool [64] to keep the tool in its position on the valve adapter plate [6].

SUBTASK 28-22-21-820-007

(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 28-22-21-820-008

(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 28-22-21-820-009

(7) Tighten the bottom index screw [66].

SUBTASK 28-22-21-820-010

(8) Carefully remove the two alignment screws [61].

SUBTASK 28-22-21-820-011

(9) Loosen the lockscrew [63] and carefully remove the alignment tool [64].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-21-820-012

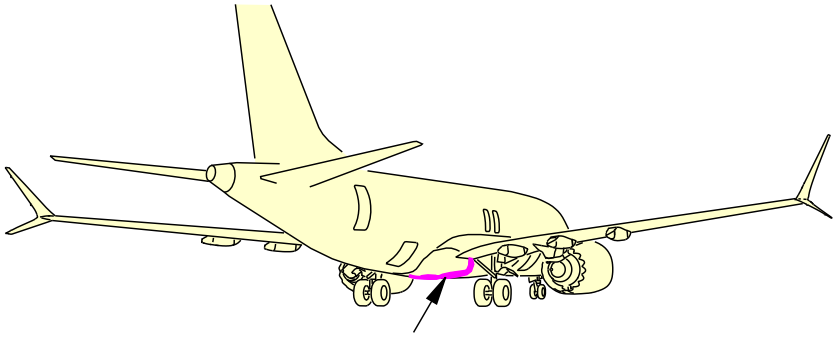
(10) Use a fine point felt pen to apply a reference mark between the index plate [5] and the valve adapter plate [6] at one of the serrated attachment points.

SUBTASK 28-22-21-420-017

(11) Continue with the index plate installation procedure in this task: Engine Fuel Crossfeed Valve - Valve Adapter Installation, TASK 28-22-21-400-802.

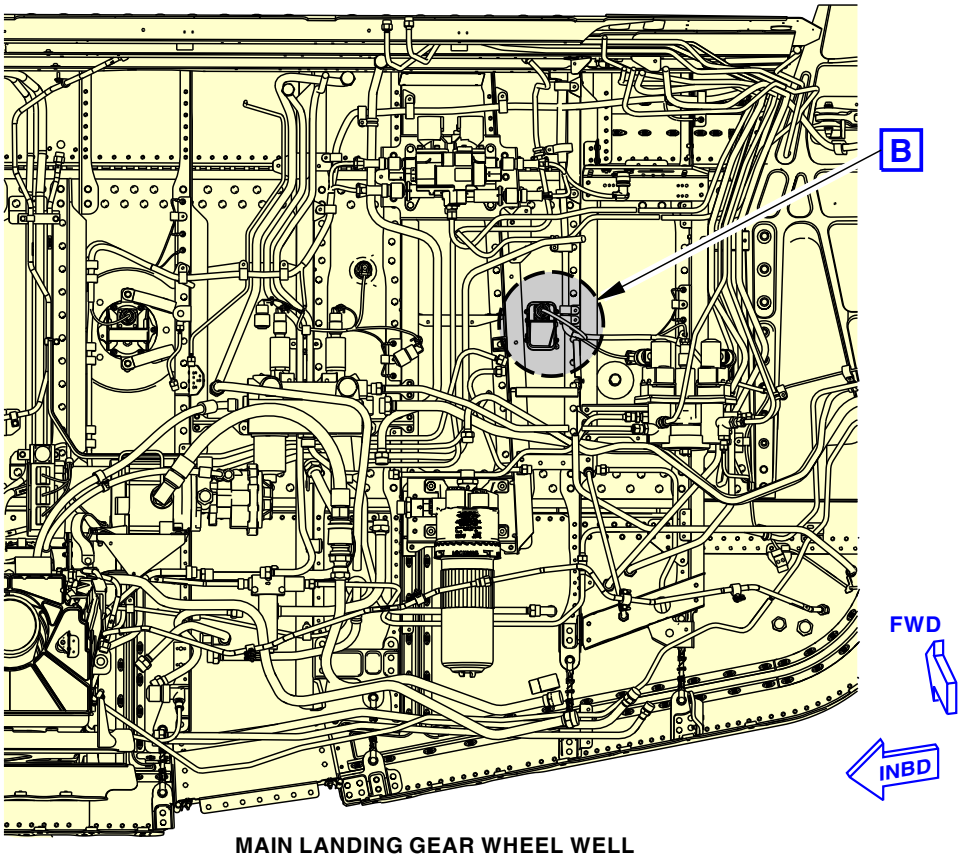
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



MAIN LANDING
GEAR WHEEL WELL
(RIGHT SIDE)

A



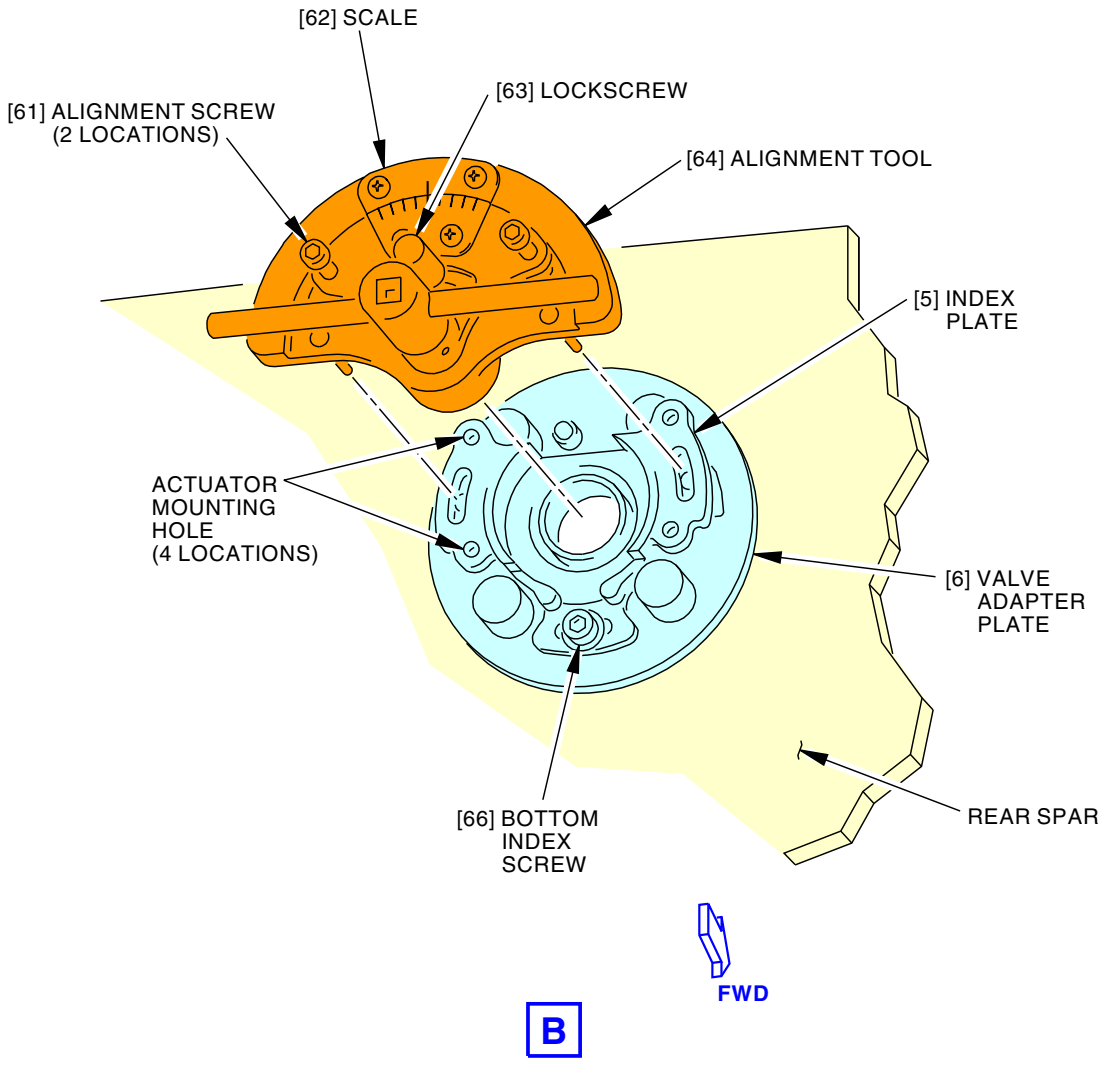
**MAIN LANDING GEAR WHEEL WELL
(RIGHT SIDE)
(EXAMPLE)**

A

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**Crossfeed Valve Alignment
Figure 403/28-22-21-990-803 (Sheet 1 of 2)**

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413638 S00061532983_V1

Crossfeed Valve Alignment
Figure 403/28-22-21-990-803 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-21-000-803

7. Engine Fuel Crossfeed Valve - Valve Body Removal

(Figure 404)

A. General

(1) This task gives instructions to remove the engine fuel crossfeed valve body [21].

B. 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)
28-22-15-000-803	Couplings Removal (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)

C. Tools/Equipment

Reference	Description
STD-77	Air Source, Regulated - Dry Filtered, 0-50 psig
STD-200	Container - Fuel Resistant, 10 gallon (38 l)

D. Location Zones

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right
413	Engine 1 - Fan Cowl, Left
423	Engine 2 - Fan Cowl, Left

E. Access Panels

Number	Name/Location
131AB	Center Tank Access

F. Prepare for the Removal

SUBTASK 28-22-21-650-003

(1) Defuel the center, No. 1 and No. 2 fuel tanks (TASK 28-26-00-650-801).

SUBTASK 28-22-21-650-004

(2) To reduce the quantity of fuel that drains from fuel lines while in the center tank, you can do these steps to drain the fuel supply line for the left and right engines (optional) (Figure 405):

(a) Do these steps to make sure that the engine fuel valves (spar and crossfeed) are in the correct positions:

1) Make sure that the engine start levers on the control stand are in the CUTOFF position.

2) Make sure that the engine START switches are in the OFF position on the overhead panel, P5.

3) Put a DO-NOT-OPERATE placard on the left and right engine START switches on the overhead panel, P5.

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4) 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

5) On the fuel system panel, P5, set the CROSSFEED switch to the open position.

6) Make sure that 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.

7) Move the engine start levers on the control stand, P10, to the IDLE position.

NOTE: This opens the fuel spar valves.

8) On the forward overhead panel, P5, make sure that the two SPAR VALVE CLOSED lights are off.

WARNING

BE CAREFUL WHEN YOU DO WORK ON THE ENGINE PARTS AFTER YOU STOP THE ENGINE. THE ENGINE PARTS CAN STAY HOT FOR ALMOST 1 HOUR. DO NOT TOUCH HOT PARTS WITHOUT APPLICABLE GLOVES. HOT PARTS CAN CAUSE INJURIES TO PERSONNEL.

WARNING

DO NOT LET THE ENGINE FUEL STAY ON YOUR SKIN. FUEL IS POISONOUS AND CAN CAUSE INJURY.

(b) Do this task: TASK 71-11-04-010-801-G00.

(c) Put a 10 gallon (38 l) fuel resistant container, STD-200, below each fuel filter drain plug.

(d) Do the applicable steps in this task to remove the drain plug from the fuel filter:

(e) Let the fuel drain into the 10 gallon (38 l) fuel resistant container, STD-200.

(f) Apply air pressure at the left engine to remove the trapped fuel in the fuel line [31].

1) Supply air pressure with a regulated air source, STD-77, to a maximum of 40 psi (276 kPa), to the left engine fuel filter drain hole.

2) Let the remaining fuel drain completely into the 10 gallon (38 l) fuel resistant container, STD-200, at the right engine fuel filter drain hole.

(g) Do the applicable steps in this task to install the drain plug on the fuel filter:

(h) Do this task: TASK 71-11-04-410-801-G00.

(i) Put the fuel crossfeed switch, on the overhead panel, P5, to the CLOSED position.

(j) Put the engine start levers on the control stand, P10, to the CUTOFF position.

NOTE: This closes the fuel spar valves.

(k) On the forward overhead panel, P5, make sure that the two SPAR VALVE CLOSED lights are dim.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(l) 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

(m) Remove the DO-NOT-OPERATE placards from the left and right engine START switches, on the overhead panel, P5.

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.

(3) Do the fuel tank purging and entry procedure for the center tank (TASK 28-11-00-910-802).

(a) Remove the center tank access door:

Number	Name/Location
131AB	Center Tank Access

(TASK 28-11-31-000-801).

G. Engine Fuel Crossfeed Valve Body Removal

SUBTASK 28-22-21-010-006

WARNING DO THE PURGING AND FUEL-TANK ENTRY PROCEDURE. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Go into the center fuel tank to the crossfeed valve location (TASK 28-11-00-910-802) (View A, Figure 404).

SUBTASK 28-22-21-480-001

(2) Put a 10 gallon (38 l) fuel resistant container, STD-200, below the crossfeed valve body [21] to collect fuel.

SUBTASK 28-22-21-020-006

(3) Disconnect the two flexible full couplings [32] from each side of the crossfeed valve body [21] (TASK 28-22-15-000-803) (View B, Figure 404).

SUBTASK 28-22-21-020-007

(4) 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, Figure 404).

SUBTASK 28-22-21-020-008

(5) Disengage the crossfeed valve body [21] from the adapter shaft attached to the valve adapter plate [6] (View C, Figure 404).

SUBTASK 28-22-21-020-009

(6) Remove the crossfeed valve body [21].

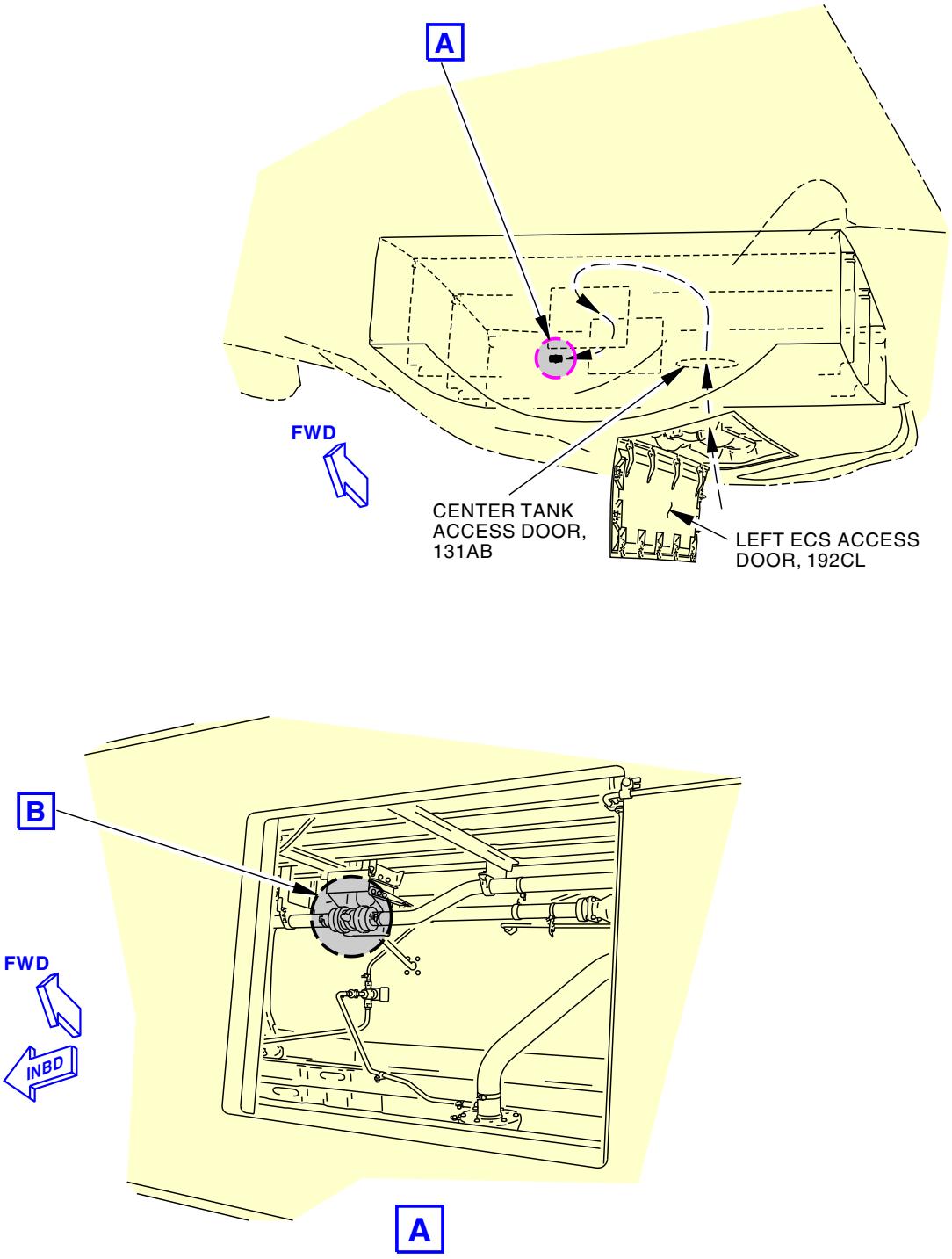
ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-21-480-002

(7) Put the covers on the openings in the fuel line [31] to keep unwanted materials out.

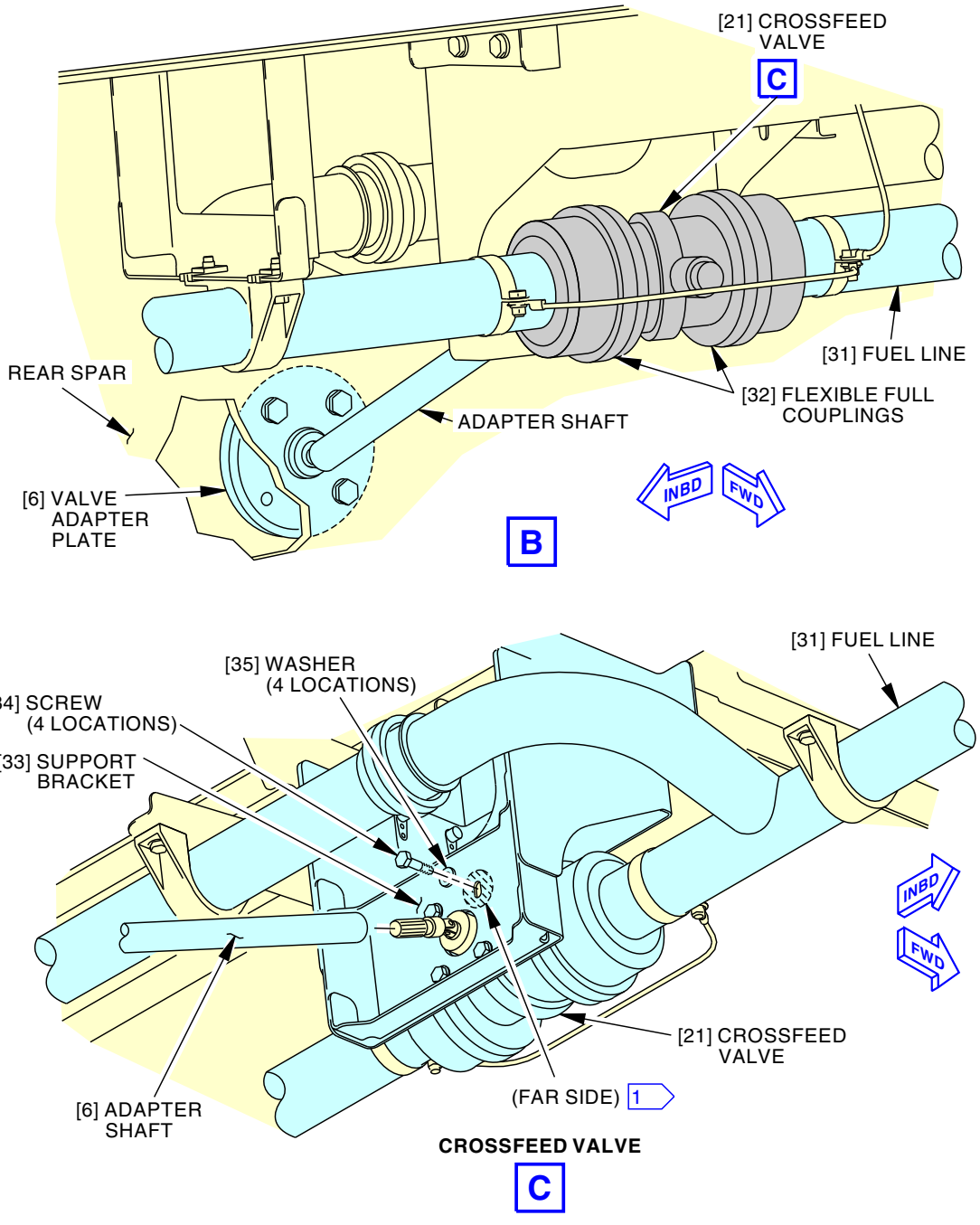
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Crossfeed Valve Body Installation
Figure 404/28-22-21-990-804 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

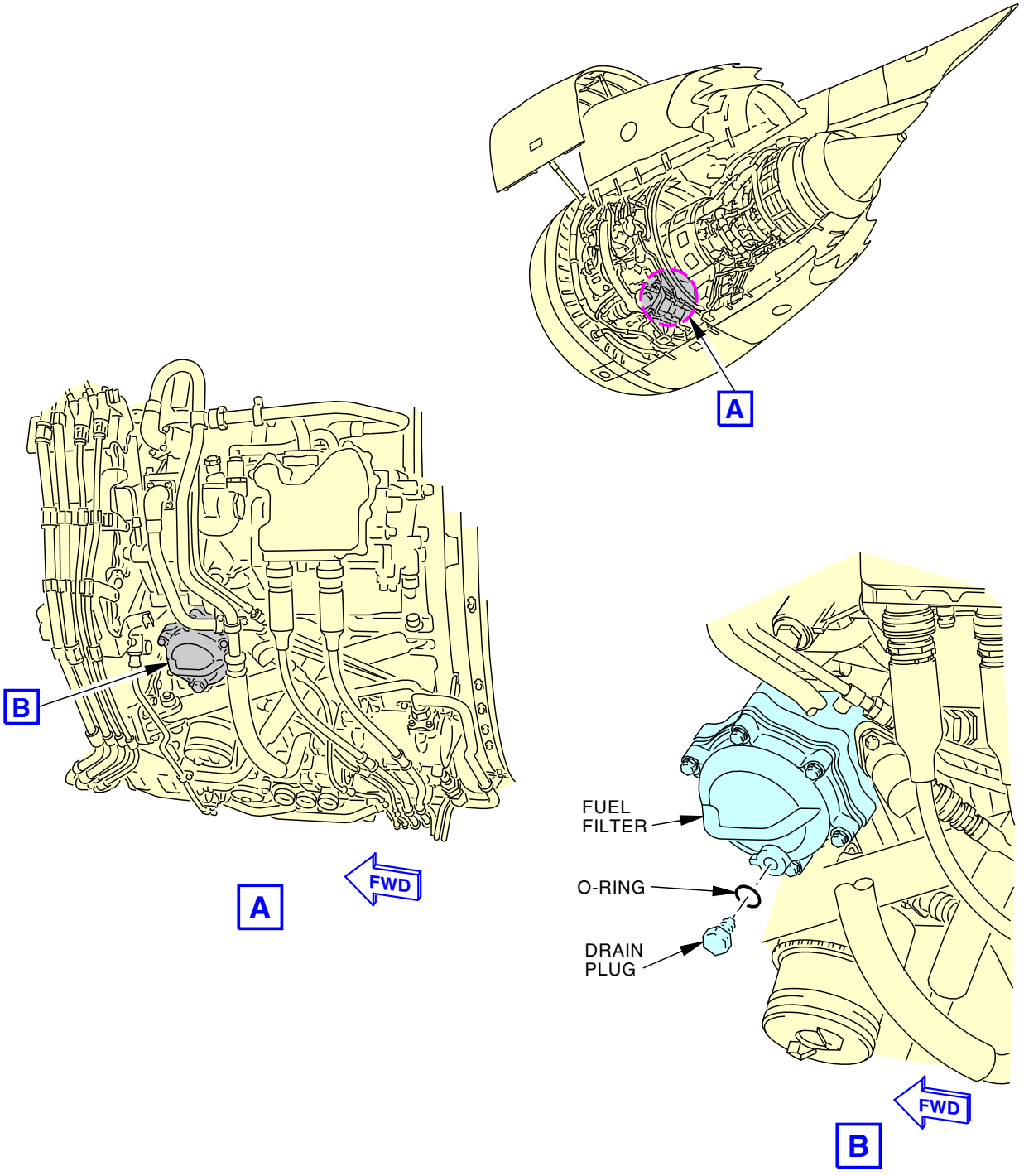


1 PREPARE THE AREA AROUND THE INBOARD TOP FASTENER HOLE AND THE CONTACT SURFACE OF THE VALVE BODY FOR AN UNSEALED ELECTRICAL FAYING SURFACE BOND (SWPM 20-20-00).

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Crossfeed Valve Body Installation
Figure 404/28-22-21-990-804 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fuel Filter Drain Location
Figure 405/28-22-21-990-805

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-21-400-803

8. Engine Fuel Crossfeed Valve - Valve Body Installation

(Figure 404)

A. 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)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-22-00-710-802	Engine Fuel Suction Feed - Operational Test (P/B 501)
28-22-00-730-802	Crossfeed Valve - Functional Test (P/B 501)
28-22-15-400-803	Couplings Installation (P/B 401)
28-22-15-710-801	Engine Fuel Feed Manifold - Leak Test (P/B 601)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

C. Consumable Materials

Reference	Description	Specification
B00130	Alcohol - Isopropyl	TT-I-735
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
21	Crossfeed valve body	28-22-21-01-100	SIA ALL

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Engine Fuel Crossfeed Valve Body Installation

SUBTASK 28-22-21-010-007

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.

(1) Go into the center wing tank to the crossfeed valve location (TASK 28-11-00-910-802).

SUBTASK 28-22-21-020-010

(2) Remove the covers from the fuel lines [31].

SUBTASK 28-22-21-110-005

(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, Figure 404):

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 alcohol, B00130 or solvent, B00184.

(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 28-22-21-420-018

(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 28-22-21-420-019

(5) Put the crossfeed valve body [21] into position.

SUBTASK 28-22-21-210-001

WARNING INSTALL THE VALVE WITH THE TOP SIDE OF THE VALVE POINTED UP. THERE IS A STENCIL OF THE WORD TOP ON THE TOP SIDE. IF YOU INSTALL THE VALVE BODY INCORRECTLY, IT CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(6) Make sure that "TOP" shows on the top of the crossfeed valve body [21].

SUBTASK 28-22-21-420-020

(7) Engage the universal joint fitting on the crossfeed valve body [21] into the valve adapter plate [6].

SUBTASK 28-22-21-420-021

(8) Align the crossfeed valve body [21] with the support bracket [33].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-21-420-022

(9) Engage the crossfeed valve body [21] with the adapter shaft attached to the valve adapter plate [6].

SUBTASK 28-22-21-420-023

(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 28-22-21-765-006

(11) Measure the bonding resistance between the crossfeed valve body [21] and the airplane structure with an electrical intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

(a) Make sure that the bonding resistance is 0.010 ohm (10 milliohms) or less.

SUBTASK 28-22-21-420-024

(12) Connect the two flexible full couplings [32] between the crossfeed valve body [21] and the fuel line [31] (TASK 28-22-15-400-803).

SUBTASK 28-22-21-410-004

(13) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

SUBTASK 28-22-21-410-005

(14) Install this access panel:

Number	Name/Location
131AB	Center Tank Access

(TASK 28-11-31-400-801).

SUBTASK 28-22-21-710-001

(15) Do one of these tasks:

(a) Do a test of the engine fuel feed manifold for leakage (TASK 28-22-15-710-801).

(b) Do an operational test for the engine fuel suction feed system (TASK 28-22-00-710-802).

SUBTASK 28-22-21-710-002

(16) Do this task: Crossfeed Valve - Functional Test, TASK 28-22-00-730-802.

——— END OF TASK ———

TASK 28-22-21-300-801

9. 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 - crossfeed valve actuator [15] to index plate [5]

(b) Rework the Faying Surface Bond - index plate [5] to valve adapter plate [6]

(c) Rework the Faying Surface Bond - valve adapter plate [6] 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 crossfeed valve actuator [15] through the bonding jumper [13] to the airplane structure.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) The second bonding path is from the upper housing crossfeed valve actuator [15] to the bare metal surface of the rear spar. The bond path is through the bare metal faying surfaces of the crossfeed valve actuator [15] (at the mounting feet), index plate [5], and valve adapter plate [6] to the bare metal surface of the rear spar.

NOTE: The crossfeed valve actuator [15] 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 that the measurement is done on the upper housing section of the crossfeed valve actuator [15].

(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.

B. References

Reference	Title
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES
SWPM 20-20-10	REPLACEMENT OF GROUND STUDS AND BONDING JUMPER INSTALLATION

C. Consumable Materials

Reference	Description	Specification
A50337	Sealant - Fuel Tank	BMS5-45 Class B
B00130	Alcohol - Isopropyl	TT-I-735
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

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 401),

(Figure 402)

NOTE: Do the steps in this procedure if the measurement for the electrical bonding resistance between the upper housing crossfeed valve actuator [15] and the rear spar is more than 0.004 ohm (4.0 milliohms). The measurement is done with the bonding jumper [13] and the electrical connector disconnected from the crossfeed valve actuator [15].

NOTE: This is the repair bonding resistance value. The valve adapter installation bonding resistance value is 0.003 ohm (3.0 milliohm).

SUBTASK 28-22-21-010-008

(1) Do this task: Engine Fuel Crossfeed Valve Actuator Removal, TASK 28-22-21-000-801.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-21-765-007

(2) Do these steps to check the index plate [5] to rear spar bonding path:

NOTE: These steps will tell you if the crossfeed valve actuator [15] to index plate [5] faying surface bond is the cause of the problem, or if the index plate [5] to valve adapter plate [6] 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) (View G, Figure 402).

(c) Make sure that 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 28-22-21-420-025

(3) Do this task: Engine Fuel Crossfeed Valve Actuator Installation, TASK 28-22-21-400-801.

NOTE: This task will rework the faying surface bond and re-install the crossfeed valve actuator [15].

SUBTASK 28-22-21-765-008

(4) During the installation, do a check of the electrical bonding resistance between the upper housing crossfeed valve actuator [15] and rear spar (SWPM 20-20-00, SWPM 20-20-10) (View C, Figure 401):

(a) Do this measurement with the bonding jumper [13] and the electrical connector [1] disconnected.

(b) Make sure that the bonding jumper [13] does not touch the crossfeed valve actuator [15] during the bonding measurement.

(c) Make sure that the bonding resistance is 0.004 ohm (4.0 milliohms) or less.

NOTE: This is the repair bonding resistance value. The valve adapter plate [6] 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 crossfeed valve actuator [15] (TASK 28-22-21-400-801).

SUBTASK 28-22-21-710-003

(5) If you have replaced the valve adapter plate [6] or adjusted the index plate [5], then continue with the steps in this task: Crossfeed Valve Operational Tests (TASK 28-22-21-400-802).

F. Rework the Faying Surface Bond - Index Plate to Adapter Plate

(Figure 402)

NOTE: Do the steps in this procedure if the measurement for the electrical bonding resistance between the index plate [5] and the rear spar is more than 0.002 ohm (2.0 milliohms). The measurement is done with the crossfeed valve actuator [15] removed.

SUBTASK 28-22-21-020-011

(1) Do this task: Remove the index plate [5] (TASK 28-22-21-000-801).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-21-765-009

(2) Do these steps to check the valve adapter plate [6] to rear spar bonding path:

NOTE: These steps will tell you if the index plate [5] to valve adapter plate [6] faying surface bond is the cause of the problem, or if the valve adapter plate [6] 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 plate [6].

(b) Measure the bonding resistance between the serrated contact surface on the valve adapter plate [6] and the rear spar (SWPM 20-20-00) (View F, Figure 402).

(c) Make sure that the bonding resistance is 0.0015 ohm (1.5 milliohms) or less.

NOTE: This is the repair bonding resistance value. The valve adapter plate [6] 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 - valve adapter plate [6] to rear spar.

(e) If the bonding resistance is satisfactory, then continue with the subsequent steps.

SUBTASK 28-22-21-420-026

(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 [5].

(a) Do this task: Engine Fuel Crossfeed Valve Alignment, TASK 28-22-21-820-801.

(b) Do this procedure: Install the index plate [5] (Engine Fuel Crossfeed Valve - Valve Adapter Installation, TASK 28-22-21-400-802).

SUBTASK 28-22-21-765-010

(4) During the installation, check the electrical bonding resistance between the index plate [5] and the rear spar (SWPM 20-20-00) (View G, Figure 402):

(a) Make sure that 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 28-22-21-400-802)

SUBTASK 28-22-21-710-004

(5) After you install the index plate [5], do this procedure: Crossfeed Valve Operational Tests (TASK 28-22-21-400-802).

G. Rework the Faying Surface Bond - Adapter Plate to Rear Spar

(Figure 402)

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 28-22-21-020-012

(1) Do this procedure: Remove the Valve Adapter (TASK 28-22-21-000-802).

NOTE: A fuel tank entry is necessary to rework the faying surface of the valve adapter.

SUBTASK 28-22-21-420-027

(2) Do this procedure: Install the Valve Adapter (TASK 28-22-21-400-802).

NOTE: These steps will rework the faying surface, and re-install the valve adapter.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-21-765-011

(3) During the installation, check the electrical bonding resistance between the valve adapter plate [6] and the rear spar (SWPM 20-20-00) (View F, Figure 402).

(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 plate [6] (TASK 28-22-21-400-802).

SUBTASK 28-22-21-420-028

(4) After you install the valve adapter plate [6], do this procedure: Install the index plate [5] (TASK 28-22-21-400-802).

H. Rework the Bonding Jumper Bond

(Figure 401)

NOTE: Do the steps in this procedure if the measurement for the electrical bonding resistance between the bonding jumper [13] terminal and the rear spar is more than 0.0015 ohm (1.5 milliohms). The measurement is done with the bonding jumper [13] disconnected from the crossfeed valve actuator [15].

SUBTASK 28-22-21-020-013

(1) Remove the sealant from the bonding jumper [13] terminal attached to the structure.

SUBTASK 28-22-21-420-029

(2) Remove the nut, two washers, and the bonding jumper [13].

SUBTASK 28-22-21-420-030

(3) Do these steps to install the bonding jumper [13] to the structure:

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

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 alcohol, B00130 or solvent, B00184.

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 [13] 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 [13] and the rear spar (SWPM 20-20-10) (View C, Figure 401).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Make sure that the bonding resistance is 0.0015 ohm (1.5 milliohms) or less.

(e) Apply a cap seal of sealant, A50337, (BMS 5-45 Class B) over the nut and the terminal of the bonding jumper [13].

SUBTASK 28-22-21-420-031

(4) Continue with this task: Engine Fuel Crossfeed Valve Actuator Installation, TASK 28-22-21-400-801.

SUBTASK 28-22-21-710-005

(5) If you have replaced the valve adapter plate [6] or adjusted the index plate [5], then continue with the steps in this procedure: Crossfeed Valve Operational Tests (TASK 28-22-21-400-802).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

ENGINE FUEL CROSSFEED VALVE - INSPECTION/CHECK

1. General

A. 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. References

Reference	Title
28-22-21-710-802	Crossfeed Valve Operational Test (P/B 501)
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 BONDING PROCESSES
SWPM 20-20-10	Replacement of Ground Studs and Bonding Jumper Installation

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

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 28-22-21-490-003

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 CONT

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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).

E. Electrical Bonding Measurement

SUBTASK 28-22-21-710-006

(1) Move the manual override lever to the fully CLOSED position.

SUBTASK 28-22-21-862-002

(2) Disconnect the electrical connector from the actuator.

SUBTASK 28-22-21-765-012

(3) Measure the electrical bonding resistance between the crossfeed valve actuator (at the connector flange) and the spar with a intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00, SWPM 20-20-10) (View B).

(a) Make sure the bonding resistance is 0.005 ohm (5.0 milliohms) or less.

F. 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

Row	Col	Number	Name
B	7	C00361	FUEL CROSS FEED VALVE CONT

SUBTASK 28-22-21-710-007

(3) Do this task: Crossfeed Valve Operational Test, TASK 28-22-21-710-802

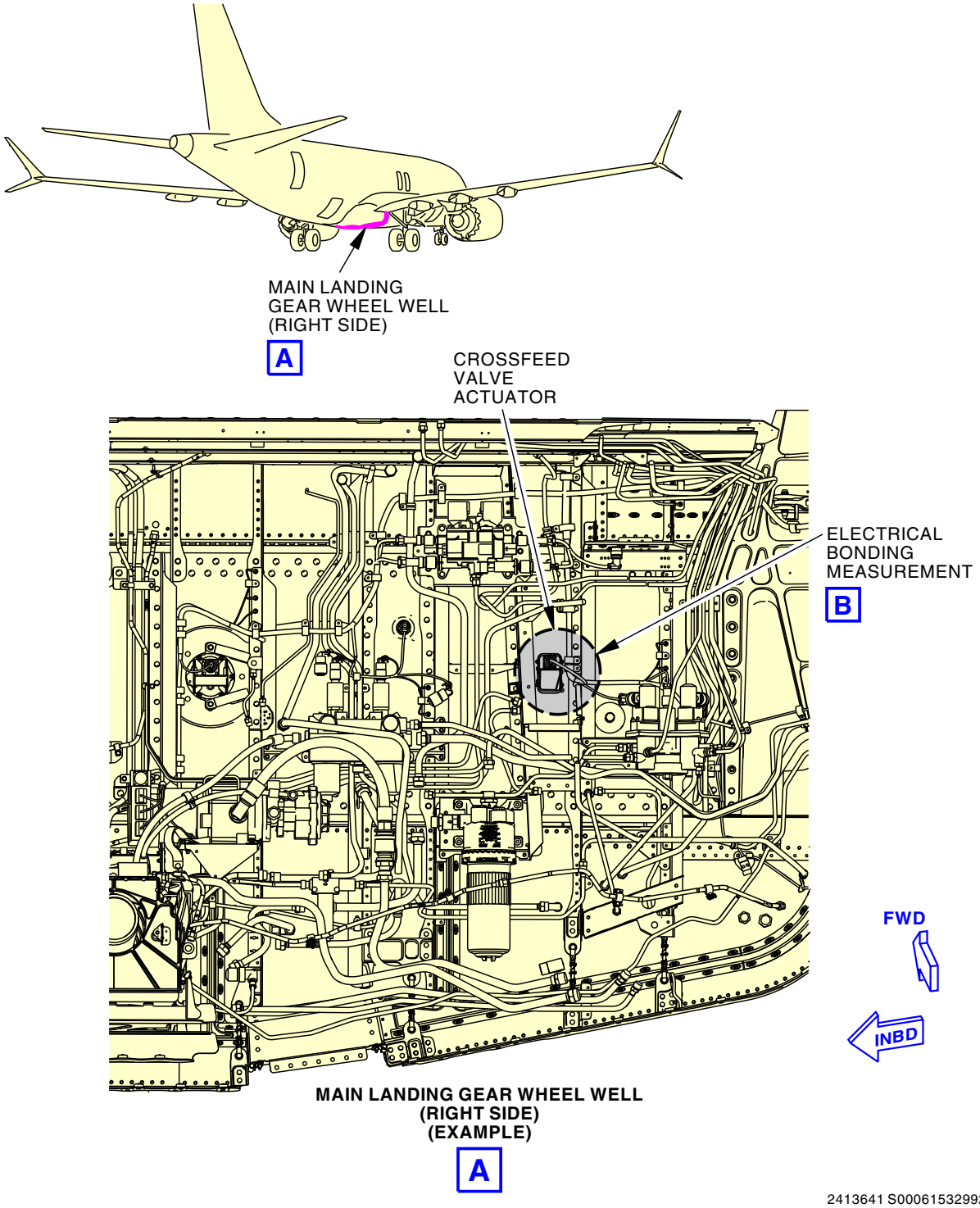
SUBTASK 28-22-21-090-003

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.

(4) Remove the ground locks installed on the landing gear if they are not needed for other tasks (TASK 32-00-01-080-801).

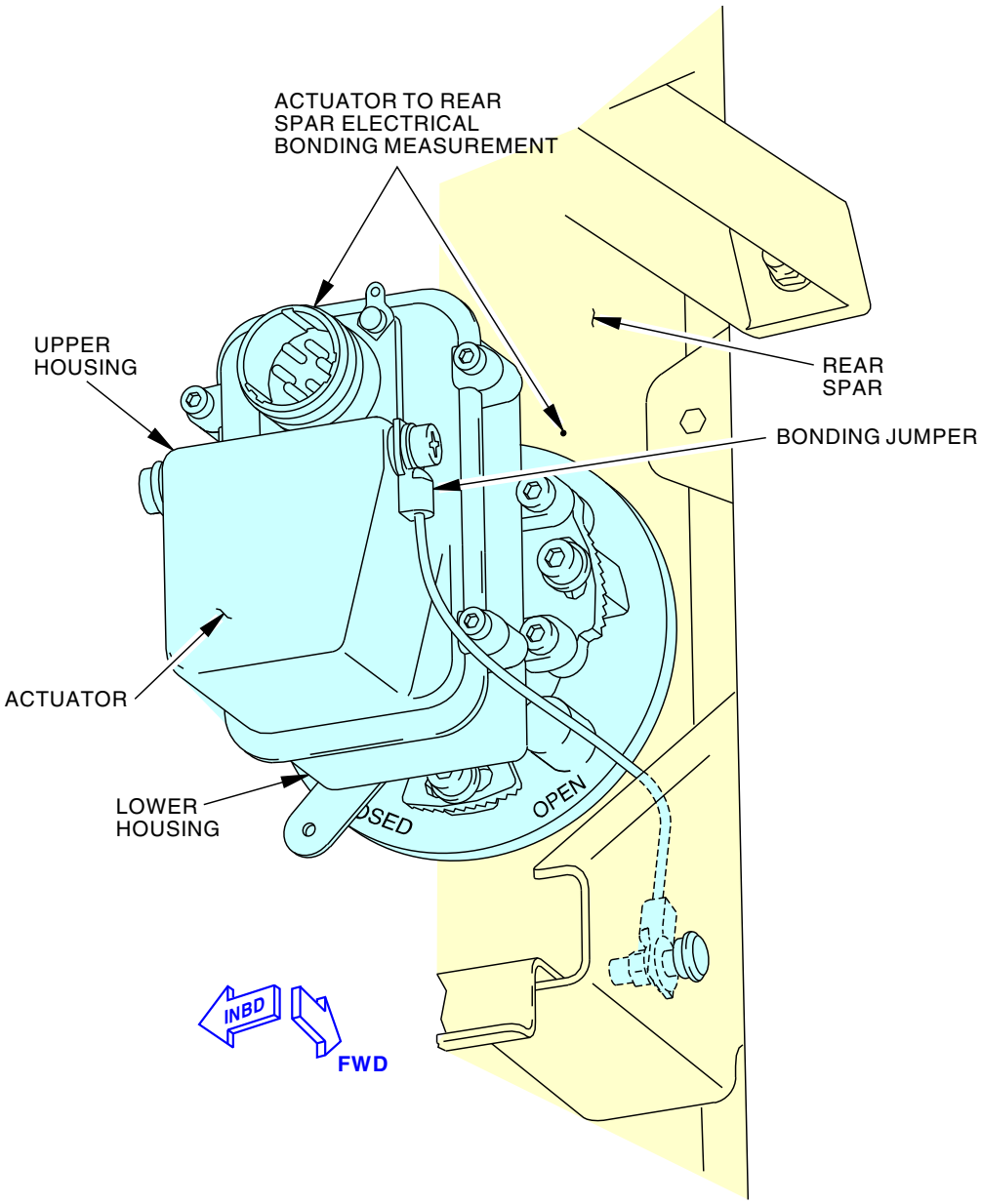
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Engine Fuel Crossfeed Valve Actuator - Bonding Resistance Check
Figure 601/28-22-21-990-807 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



ELECTRICAL BONDING MEASUREMENT

B

2413642 S00061532993_V1

Engine Fuel Crossfeed Valve Actuator - Bonding Resistance Check
Figure 601/28-22-21-990-807 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

ENGINE FUEL CROSSFEED VALVE - ADJUSTMENT/TEST

1. General

A. This procedure contains this task:

(1) Crossfeed Valve Operational Test.

TASK 28-22-21-710-802

2. Crossfeed Valve Operational Test

(Figure 501)

A. Location Zones

Zone	Area
132	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Right

B. Crossfeed Valve Operational Test

SUBTASK 28-22-21-860-007

(1) Set the CROSSFEED VALVE switch on the forward overhead panel, P5, to the OPEN position.

SUBTASK 28-22-21-210-006

(2) Make sure that 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 28-22-21-210-007

(3) Make sure that the manual override lever [9] for the crossfeed valve is in the OPEN position.

SUBTASK 28-22-21-860-008

(4) Set the CROSSFEED VALVE switch on the forward overhead panel, P5, to the CLOSED position.

SUBTASK 28-22-21-210-008

(5) Make sure that 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.

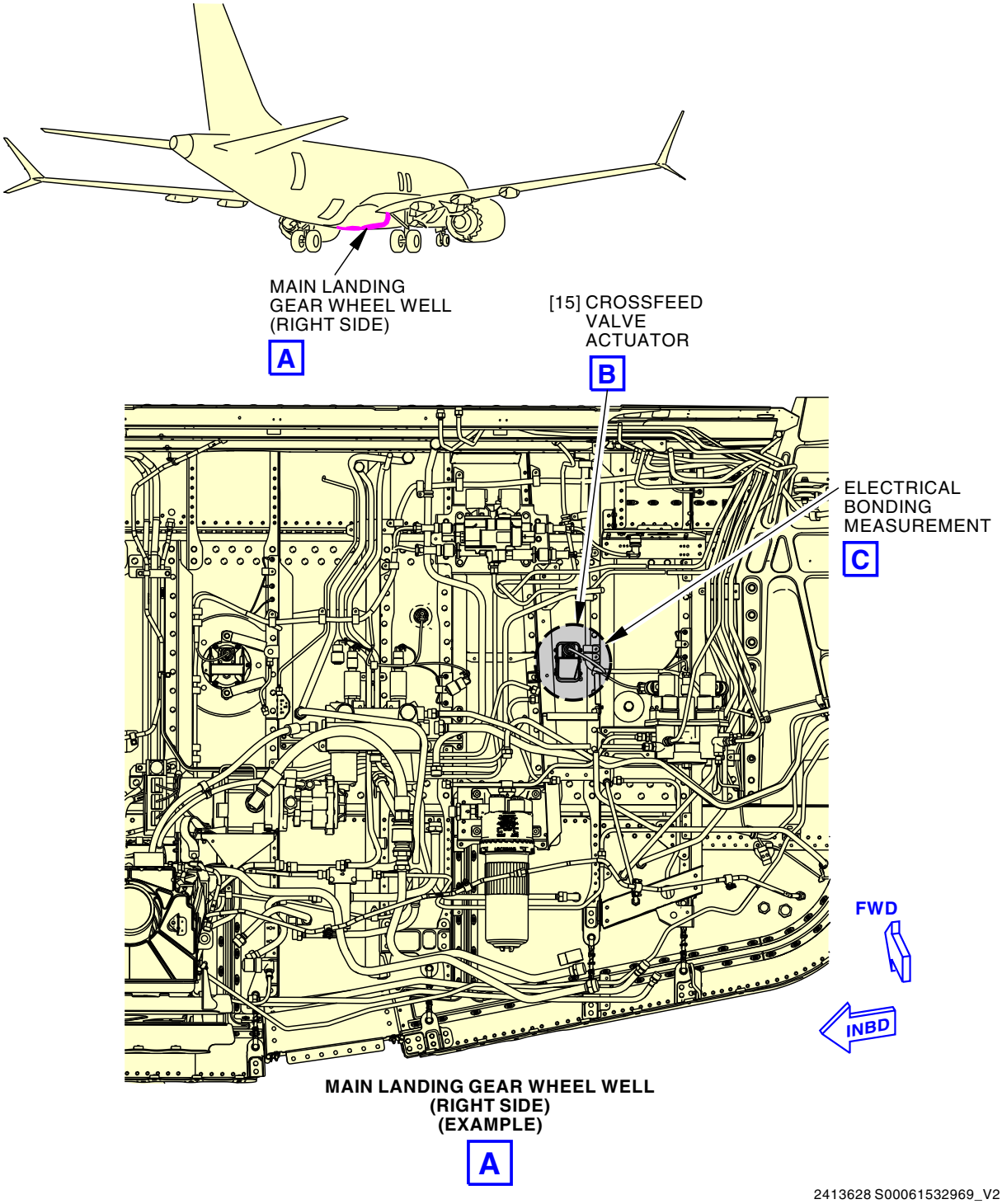
(b) The position indication light goes off to show the crossfeed valve is closed.

SUBTASK 28-22-21-210-009

(6) Make sure that the manual override lever [9] for the crossfeed valve is in the CLOSED position.

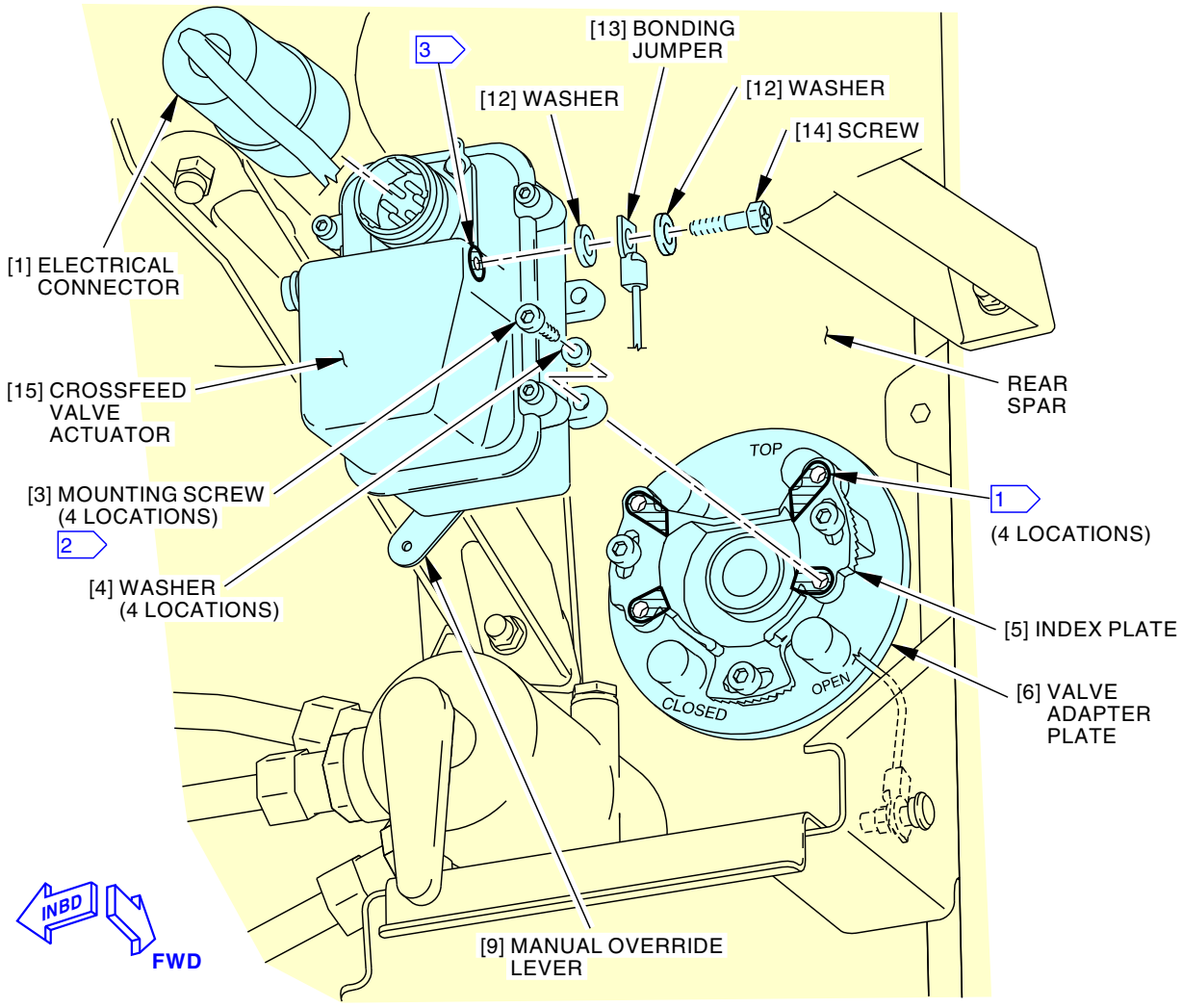
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Crossfeed Valve Actuator Installation
Figure 501/28-22-21-990-808 (Sheet 1 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



CROSSFEED VALVE ACTUATOR INSTALLATION

B

1 PREPARE AND INSTALL THE CONTACT SURFACES OF THE INDEX PLATE AND ACTUATOR FOOTPADS (4 LOCATIONS) WITH A FAY SEALED FAY SURFACE BOND (SWPM 20-20-00).

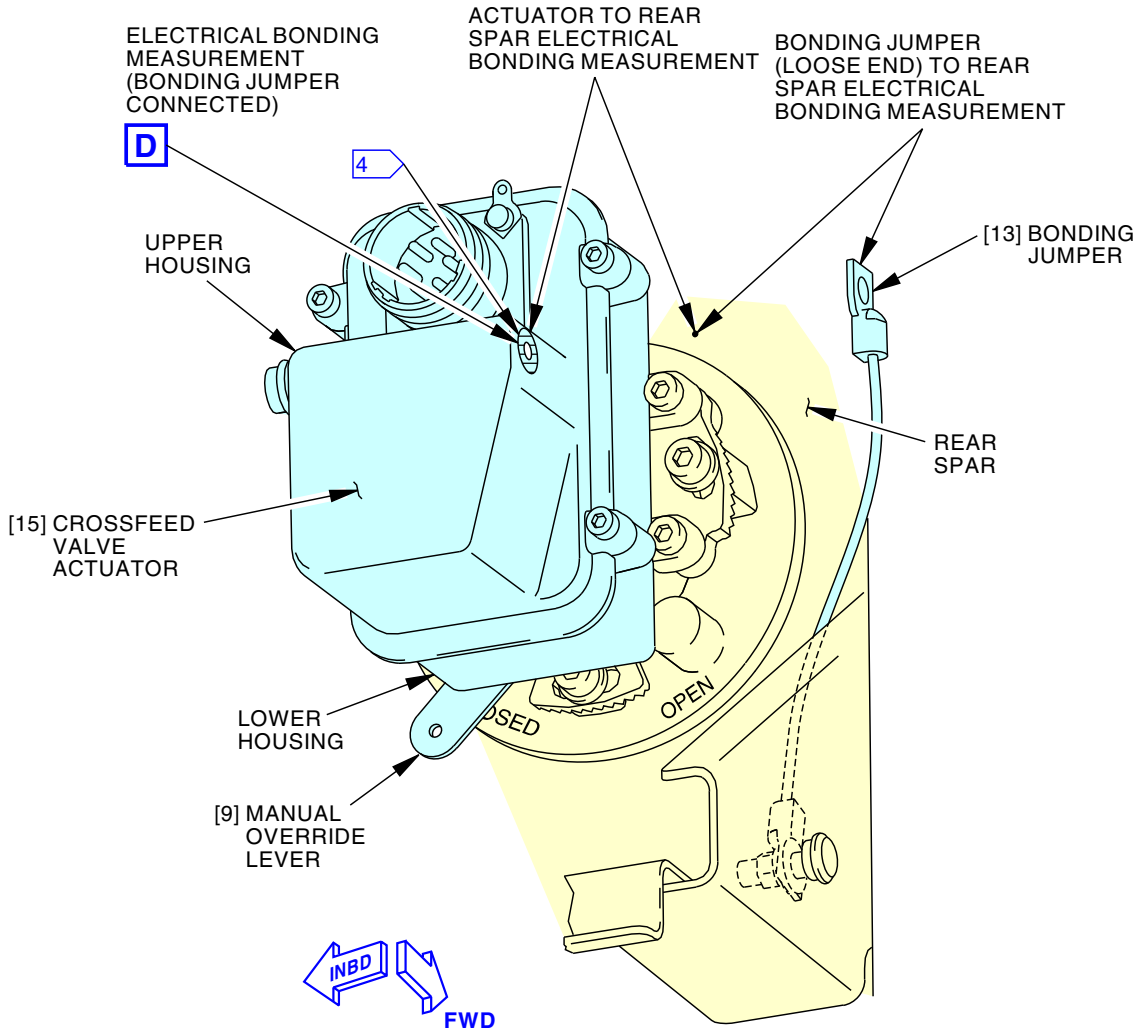
2 APPLY SEALANT TO THE SHANK AND THREADS OF THE MOUNTING SCREWS.

3 CLEAN THE CONTACT SURFACES OF THE ACTUATOR AND BONDING JUMPER. AFTER ELECTRICAL BONDING MEASUREMENT, APPLY A CAP SEAL TO THE BONDING JUMPER SCREW.

2413629 S00061532970_V1

Crossfeed Valve Actuator Installation
Figure 501/28-22-21-990-808 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



ELECTRICAL BONDING MEASUREMENT (BONDING JUMPER DISCONNECTED)

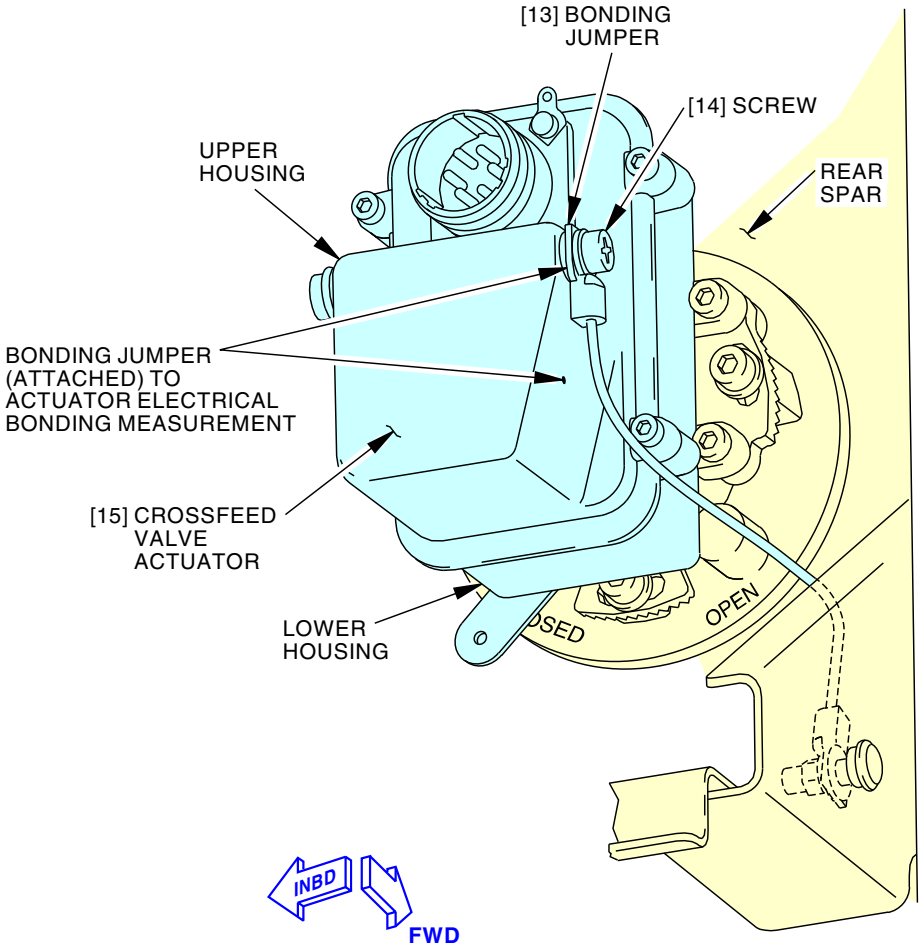
C

4 BARE METAL CONTACT SURFACE OF THE ACTUATOR AT THE BONDING JUMPER INSTALLATION.

2413630 S00061532971_V1

Crossfeed Valve Actuator Installation
Figure 501/28-22-21-990-808 (Sheet 3 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



ELECTRICAL BONDING MEASUREMENT (BONDING JUMPER CONNECTED)

D

2413631 S00061532972_V1

Crossfeed Valve Actuator Installation
Figure 501/28-22-21-990-808 (Sheet 4 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FUEL BOOST PUMP - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) Fuel Boost Pump Motor-Impeller Removal

(2) Fuel Boost Pump Motor-Impeller Installation

(3) Fuel Boost Pump and Override Pump Priming

(4) Fuel Boost Pump Housing Removal

(5) Fuel Boost Pump Housing Installation.

B. The fuel system consists of these fuel boost pumps:

(1) Left, Forward and Aft Fuel Boost Pumps

(2) Right, Forward and Aft Fuel Boost Pumps

(3) Left and Right Center Fuel Boost Pumps.

C. The left and right forward fuel boost pumps are installed on the inboard rear spar forward of each main landing gear door. The left and right aft fuel boost pumps are installed outboard of the left and right forward fuel boost pumps. The left and right center fuel boost pumps are installed on the rear spar of the center section of the center tank. To get access to the left center fuel boost pump, remove the pogo which is part of the aileron control unit linkage in the left wheel well.

D. Each fuel boost pump has four parts: the motor-impeller, housing, discharge check valve and a removal check valve.

E. The fuel tank must be defueled to remove the housing, discharge check valve, and the removal check valve. To remove the motor-impeller, the fuel tanks do not have to be defueled.

F. To replace the removal check valve, do these tasks:

(1) Removal Check Valve Removal, TASK 28-22-51-000-801

(2) Removal Check Valve Installation, TASK 28-22-51-400-801.

G. To replace the discharge check valve, do these tasks:

(1) Fuel Boost Pump Discharge Check Valve Removal, TASK 28-22-71-000-801

(2) Fuel Boost Pump Discharge Check Valve Installation, TASK 28-22-71-400-801.

TASK 28-22-41-000-801

2. Fuel Boost Pump Motor-Impeller Removal

(Figure 401, Figure 402, Figure 403, Figure 404, Figure 405, Figure 406)

A. General

(1) The fuel boost pump motor-impeller is referred to as the motor-impeller in this task.

(2) This task gives instructions to remove the motor-impeller.

B. References

Reference	Title
27-11-00-860-801	Pressure from the Aileron Hydraulic Systems A and B - Deactivation (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)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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-1769	Puller - Fuel Pump Part #: B28003-1 Supplier: 81205
STD-4049	Container - Fuel Resistant, 1 Gallon (4 Liter)

D. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
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
551	Left Wing - Rear Spar To Landing Gear Support Beam
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
651	Right Wing - Rear Spar to Landing Gear Support Beam

E. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door

F. Prepare for the Removal

SUBTASK 28-22-41-480-001

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.

(1) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-22-41-010-001

(2) To access the applicable motor-impeller [8] for the forward or aft fuel boost pumps, go through the left or right main shock strut door.

SUBTASK 28-22-41-010-002

(3) To access the applicable motor-impeller [8] for the center tank fuel boost pump, do these steps:

(a) Access the right center fuel boost pump in the right wheel well.

(b) Access the left center fuel boost pump, do these additional steps (Figure 404):

1) Deactivate the aileron hydraulic system (TASK 27-11-00-860-801).

2) Remove the cotter pin [28], castellated nut [27], plain washer [26], plain bushing [24], countersunk washer [22], and hex bolt [23] to disconnect the pogo assembly [21] from the power control unit [25].

NOTE: Be careful not to change the length of the pogo assembly [21] or it will need to be adjusted after installation.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

3) Remove the three bolts [29] and washers [30] to disconnect the bracket assembly from the power control unit [25].

4) Pull the pogo assembly [21] away from the rear spar.

NOTE: The bolt that attaches the pogo assembly [21] to the aileron feel and centering unit does not need to be removed.

SUBTASK 28-22-41-010-006

(4) Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-22-41-860-001

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(5) Do these steps for the applicable tanks:

(a) For the No. 1 main tank, do these steps:

1) For the aft fuel boost pump, open this circuit breaker and install safety tag:

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

2) For the forward fuel boost pump, open this circuit breaker and install safety tag:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD

(b) For the No. 2 main tank, do these steps:

1) For the aft fuel boost pump, open this circuit breaker and install safety tag:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

2) For the forward fuel boost pump, open this circuit breaker and install safety tag:

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

(c) For the center tank, do these steps:

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1) For the left center fuel boost pump, open this circuit breaker and install safety tag:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

2) For the right center fuel boost pump, open this circuit breaker and install safety tag:

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

G. Fuel Boost Pump Motor-Impeller Removal

SUBTASK 28-22-41-020-001

(1) Disconnect the electrical connector [3] from the motor-impeller [8].

SUBTASK 28-22-41-020-002

(2) Remove the lockwires from the cap screws [10] and drain plug [7].

SUBTASK 28-22-41-480-002

(3) Put a 1 gallon (4 l) fuel resistant container, STD-4049 below the motor-impeller [8] to collect fuel.

SUBTASK 28-22-41-020-003

(4) Loosen, but do not remove the drain plug [7].

SUBTASK 28-22-41-020-004

(5) Remove the two bonding jumpers [2]:

(a) Remove the sealant around the hex screw [4] and nut [6] at each bonding clip [1].

(b) Remove the hex screw [4], three washers [5], nut [6], and bonding jumper [2] from each of the bonding clips [1].

SUBTASK 28-22-41-020-005

(6) Remove the two cap screws [10] and washers [9], at the 1 O'clock and 7 O'clock positions, from the housing [14].

SUBTASK 28-22-41-480-003

(7) Install two MS35275-250 screws at the 1 O'clock and 7 O'clock position on the housing [14].

SUBTASK 28-22-41-020-006

(8) Remove the three cap screws [10], washers [9], and two bonding clips [1] from the housing [14].

SUBTASK 28-22-41-020-007

(9) Pull the motor-impeller [8] out 0.6 in. (15.2 mm) (or to the MS35275-250 screws) from the housing [14].

NOTE: This allows the removal check valve to close.

(a) For fuel boost pumps in the No. 1 and No. 2 main tanks, pull the motor-impeller [8] with the puller, SPL-1769.

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SUBTASK 28-22-41-020-008

WARNING

DO NOT LET FUEL SPILL. WHEN YOU REMOVE THE DRAIN PLUG, A SMALL QUANTITY OF FUEL WILL COME OUT OF THE MOTOR/IMPELLER UNIT. IF THERE IS A CONTINUOUS FLOW OF FUEL, THE VALVE IS NOT CLOSED. FUEL CAN CAUSE A FIRE OR AN EXPLOSION. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(10) Remove the drain plug [7].

SUBTASK 28-22-41-650-001

(11) If fuel continuously drains:

NOTE: The removal check valve did not close.

(a) Install the drain plug [7].

(b) Install the motor-impeller [8].

(c) Defuel the applicable fuel tanks (TASK 28-26-00-650-801).

NOTE: Defuel the No. 1 main tank for the forward or aft fuel boost pump. Defuel the center tank and the No. 1 main tank for the left center fuel boost pump. Defuel the center tank and the No. 2 main tank for the right center fuel boost pump. Defuel the No. 2 main tank for the forward or aft fuel boost pump.

SUBTASK 28-22-41-020-009

(12) Remove and discard the O-ring [15].

SUBTASK 28-22-41-080-001

(13) After the fuel drains from the motor-impeller [8], remove the two MS35275-250 screws.

SUBTASK 28-22-41-020-010

CAUTION

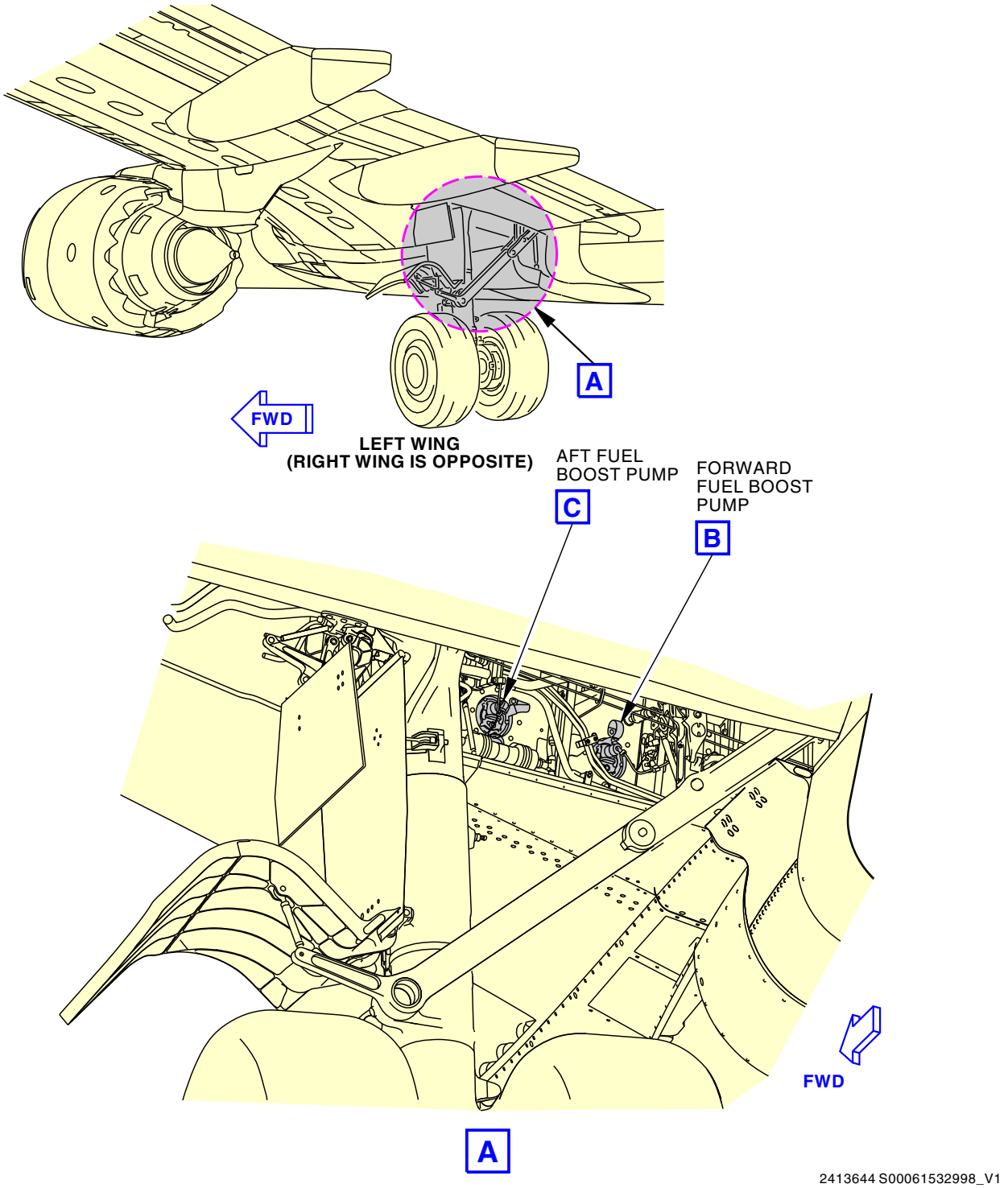
QUICKLY REPLACE THE MOTOR IMPELLER TO PREVENT FUEL DROPS INTO THE HOUSING. DAMAGE TO EQUIPMENT CAN OCCUR.

(14) Remove the motor-impeller [8] from the housing [14].

(a) Discard the O-ring [11], O-ring [12], and O-ring [13].

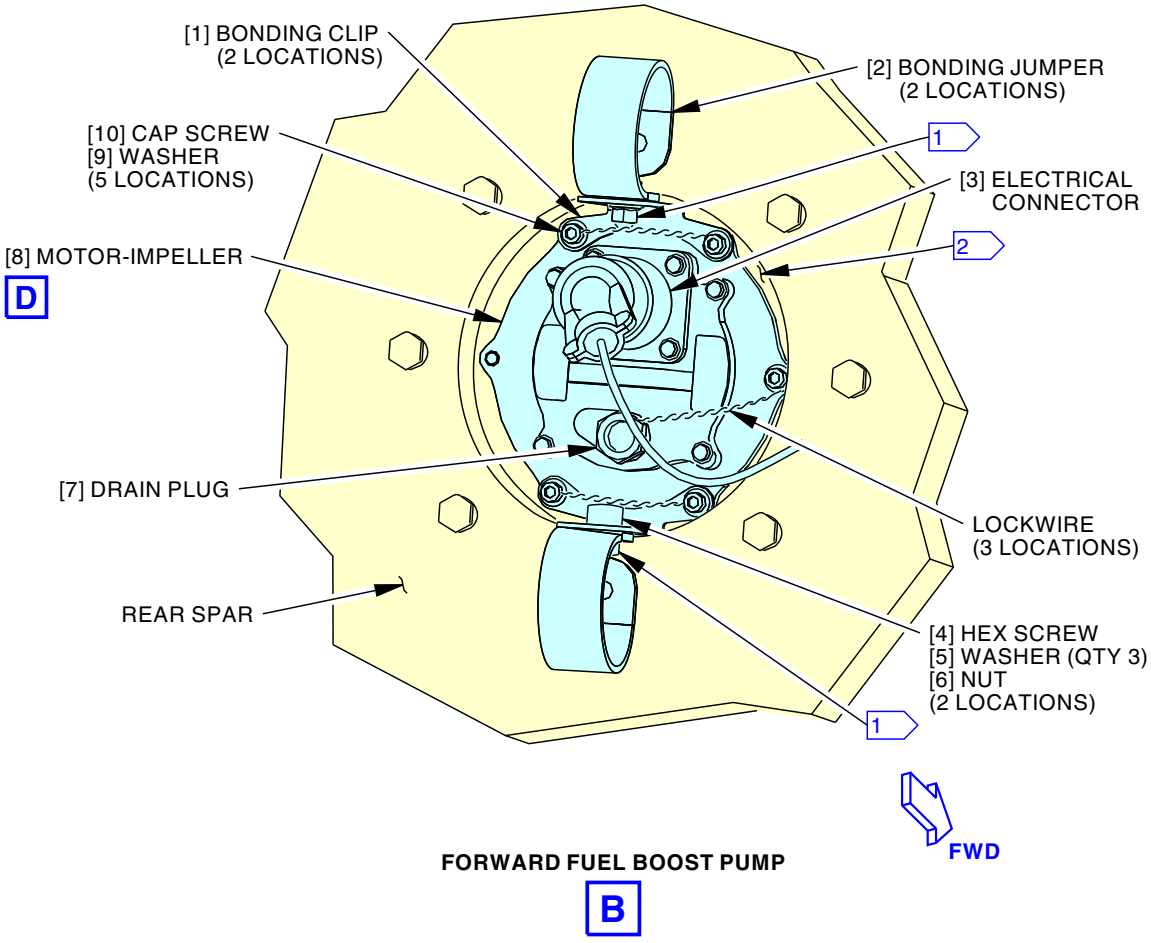
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Main Tanks - Forward or Aft Fuel Boost Pump Installation
Figure 401/28-22-41-990-801 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



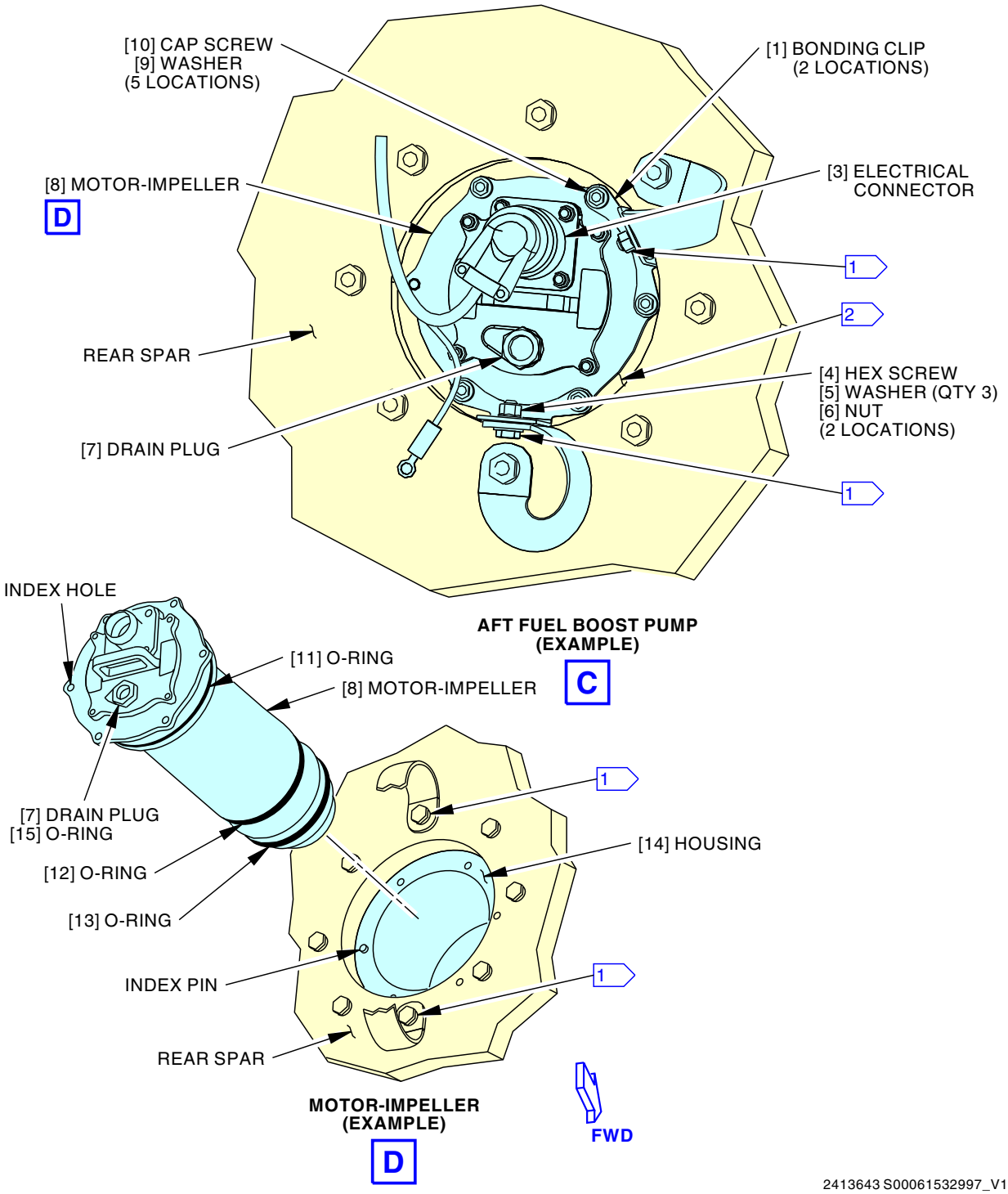
1 FAY SEAL WITH BMS5-45

2 CORROSION PREVENTIVE FILLET SEAL (AROUND COMPLETE PERIMETER OF HOUSING)

2413645 S00061532999_V1

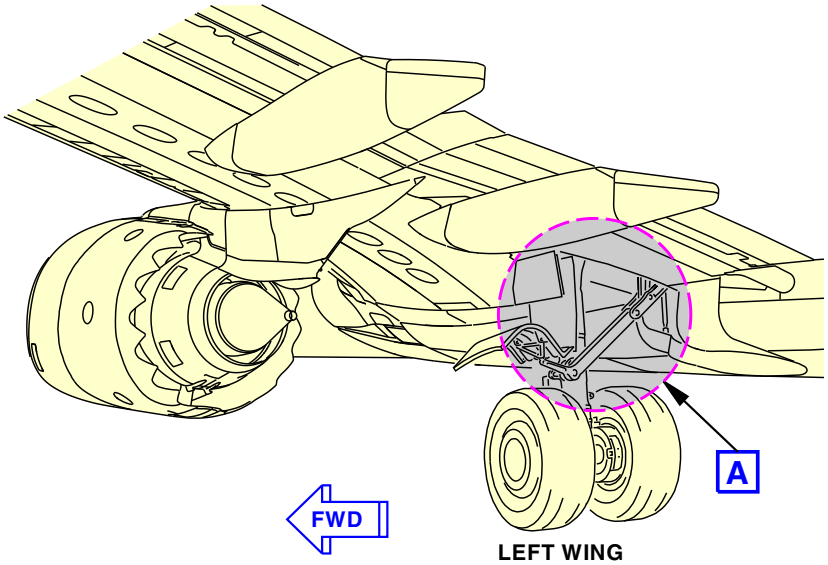
Main Tanks - Forward or Aft Fuel Boost Pump Installation
Figure 401/28-22-41-990-801 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

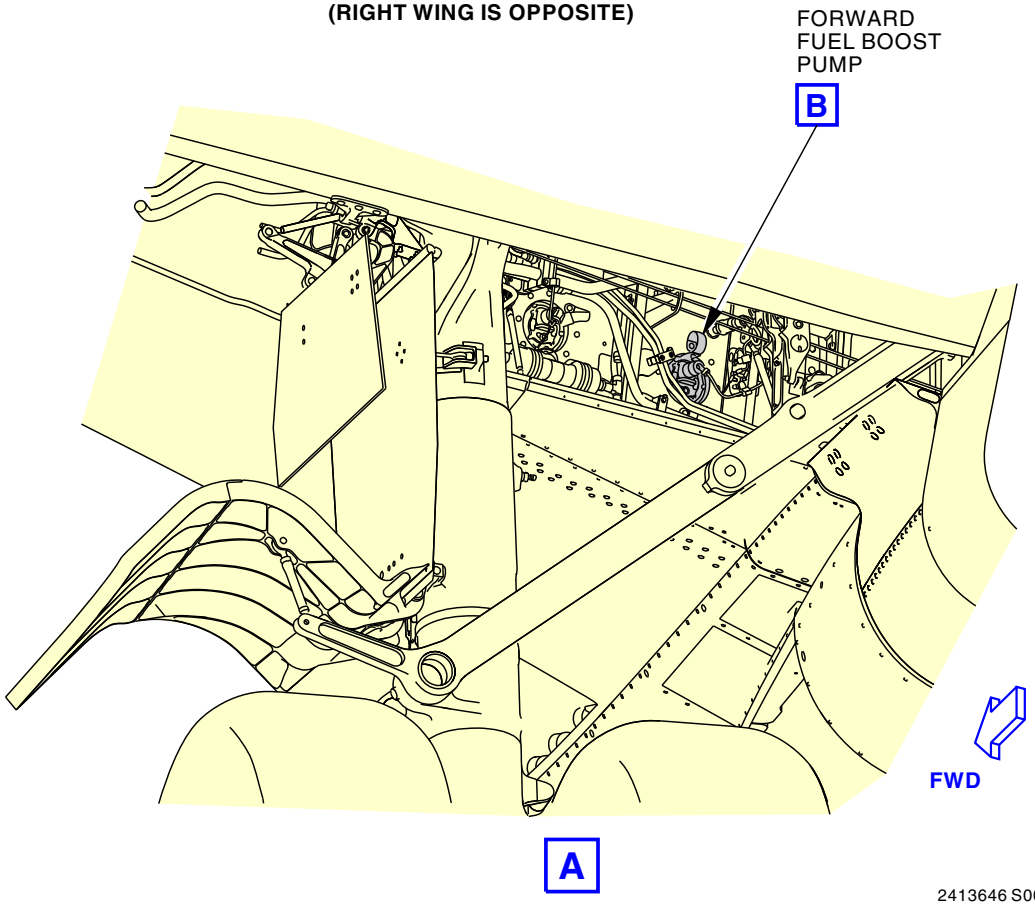


Main Tanks - Forward or Aft Fuel Boost Pump Installation
Figure 401/28-22-41-990-801 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



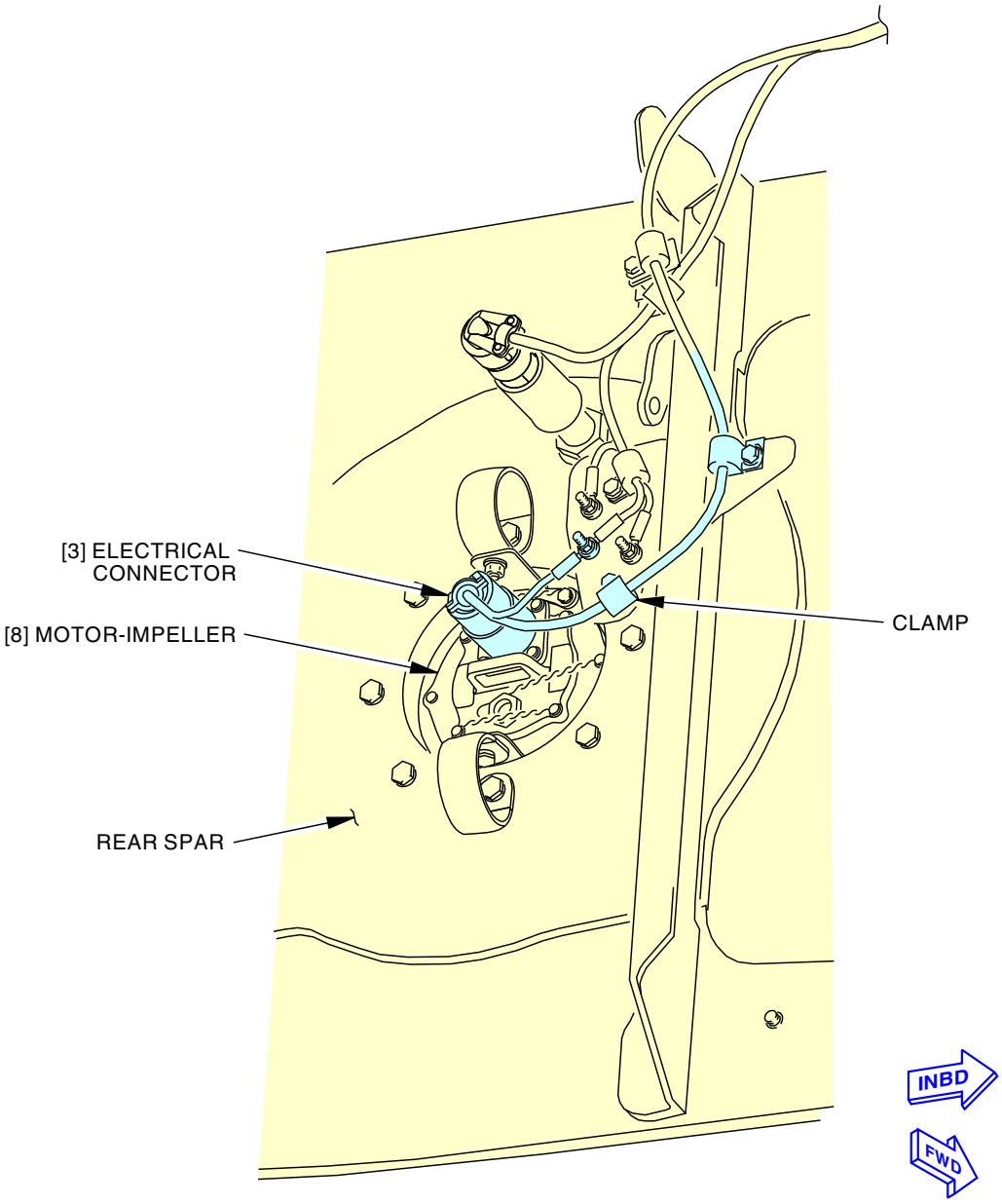
LEFT WING
(RIGHT WING IS OPPOSITE)



2413646 S00061533000_V1

Main Tanks - Forward Fuel Boost Pump - Wiring Check
Figure 402/28-22-41-990-802 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



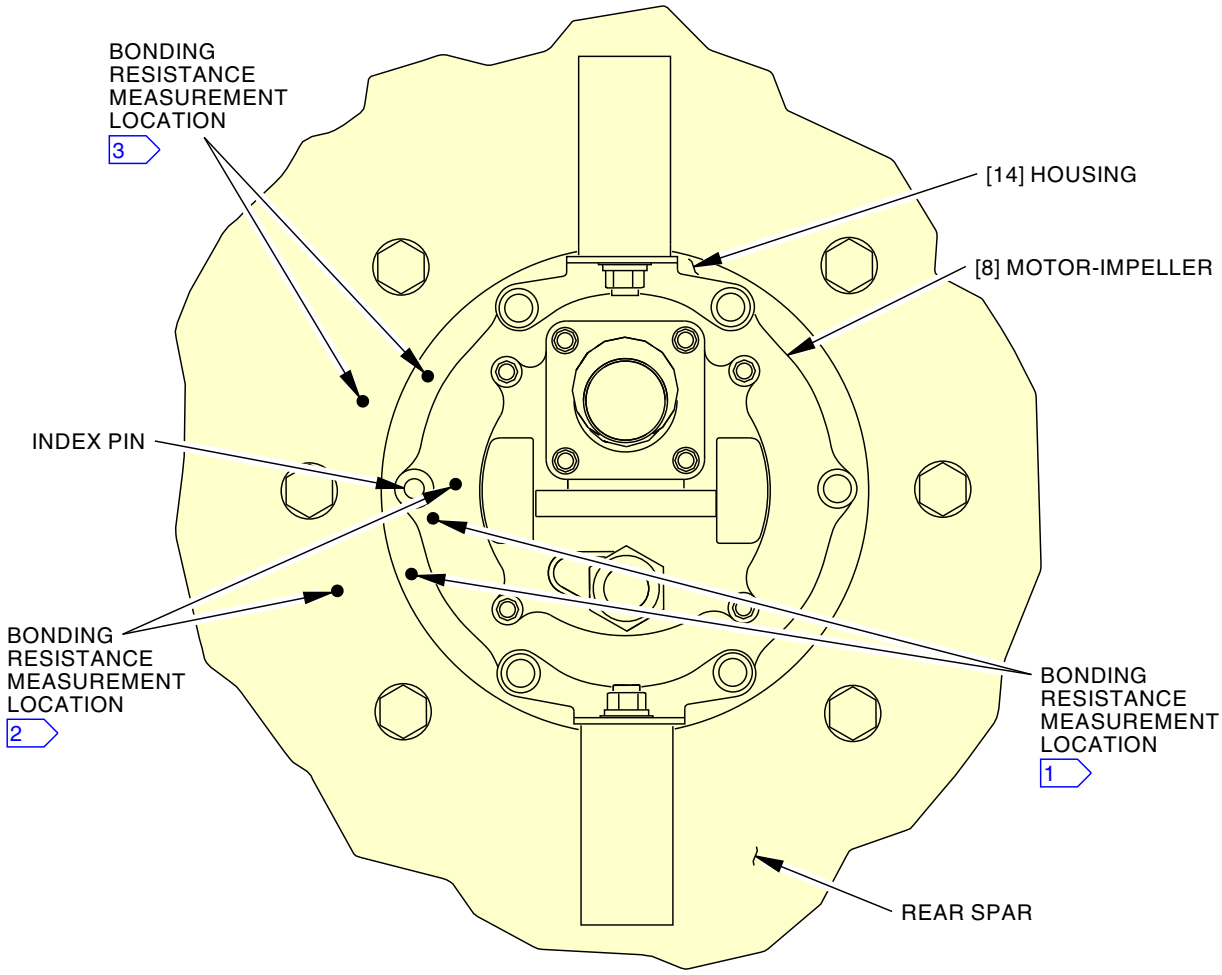
FORWARD FUEL BOOST PUMP

B

2413647 S00061533001_V1

Main Tanks - Forward Fuel Boost Pump - Wiring Check
Figure 402/28-22-41-990-802 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



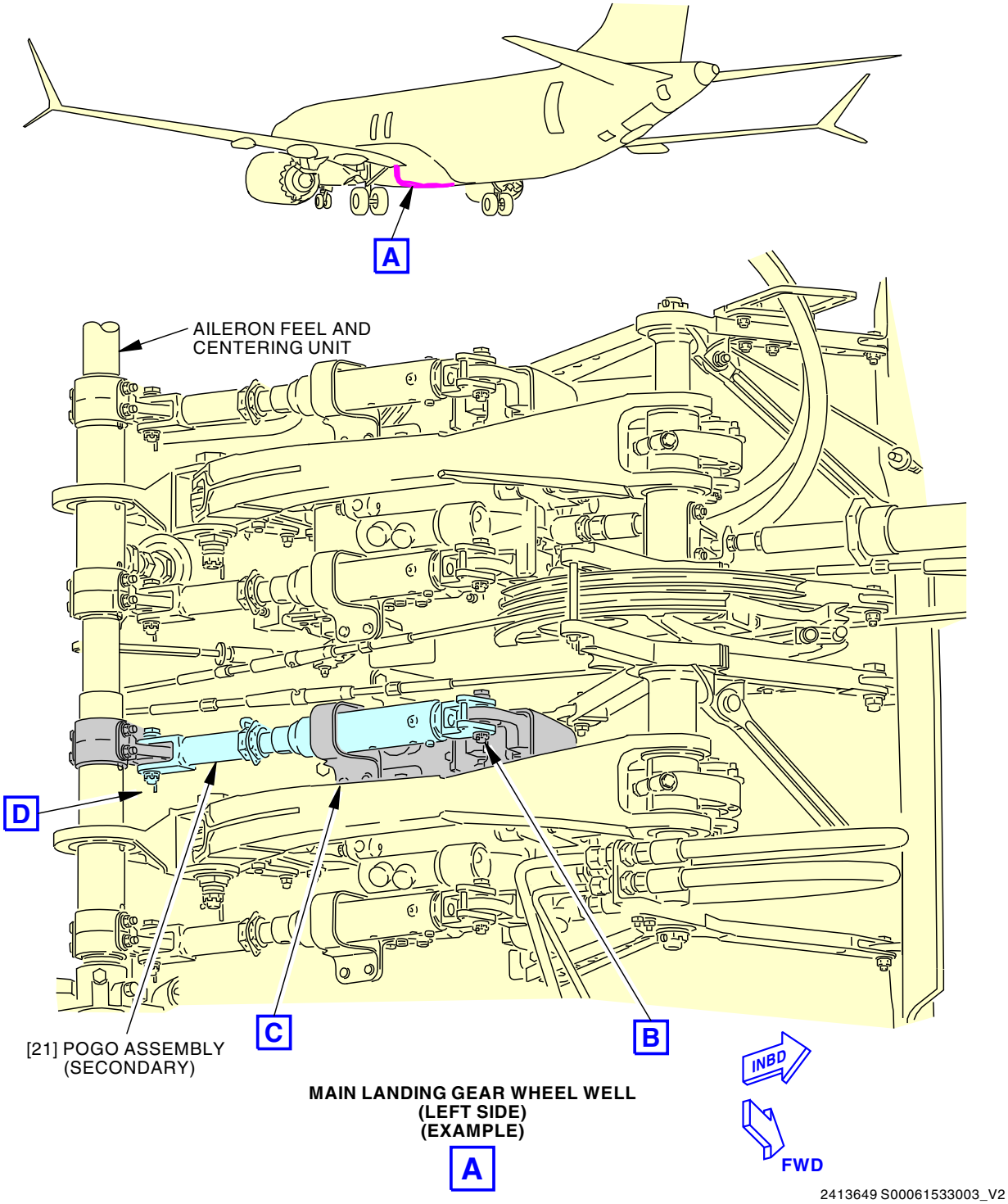
PROBE LOCATION
(EXAMPLE)

1. BONDING RESISTANCE BETWEEN THE HOUSING AND MOTOR-IMPELLER.
2. BONDING RESISTANCE BETWEEN THE REAR SPAR AND MOTOR-IMPELLER.
3. BONDING RESISTANCE BETWEEN THE HOUSING AND REAR SPAR.

2413648 S00061533002_V1

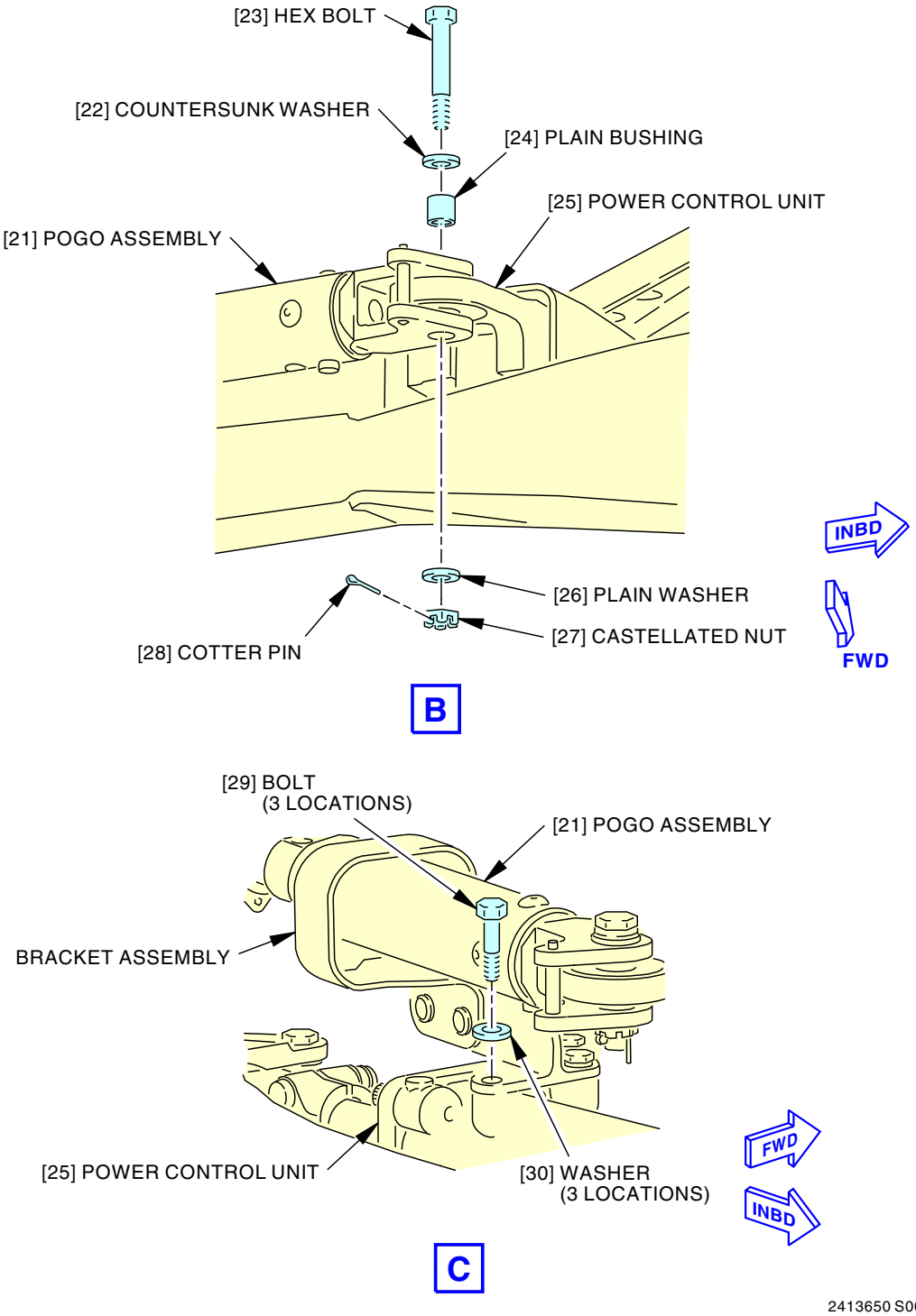
Main Tanks - Fuel Boost Pump Resistance Measurement - Probe Locations
Figure 403/28-22-41-990-803

ECCN 9E991 BOEING PROPRIETARY - See title page for details



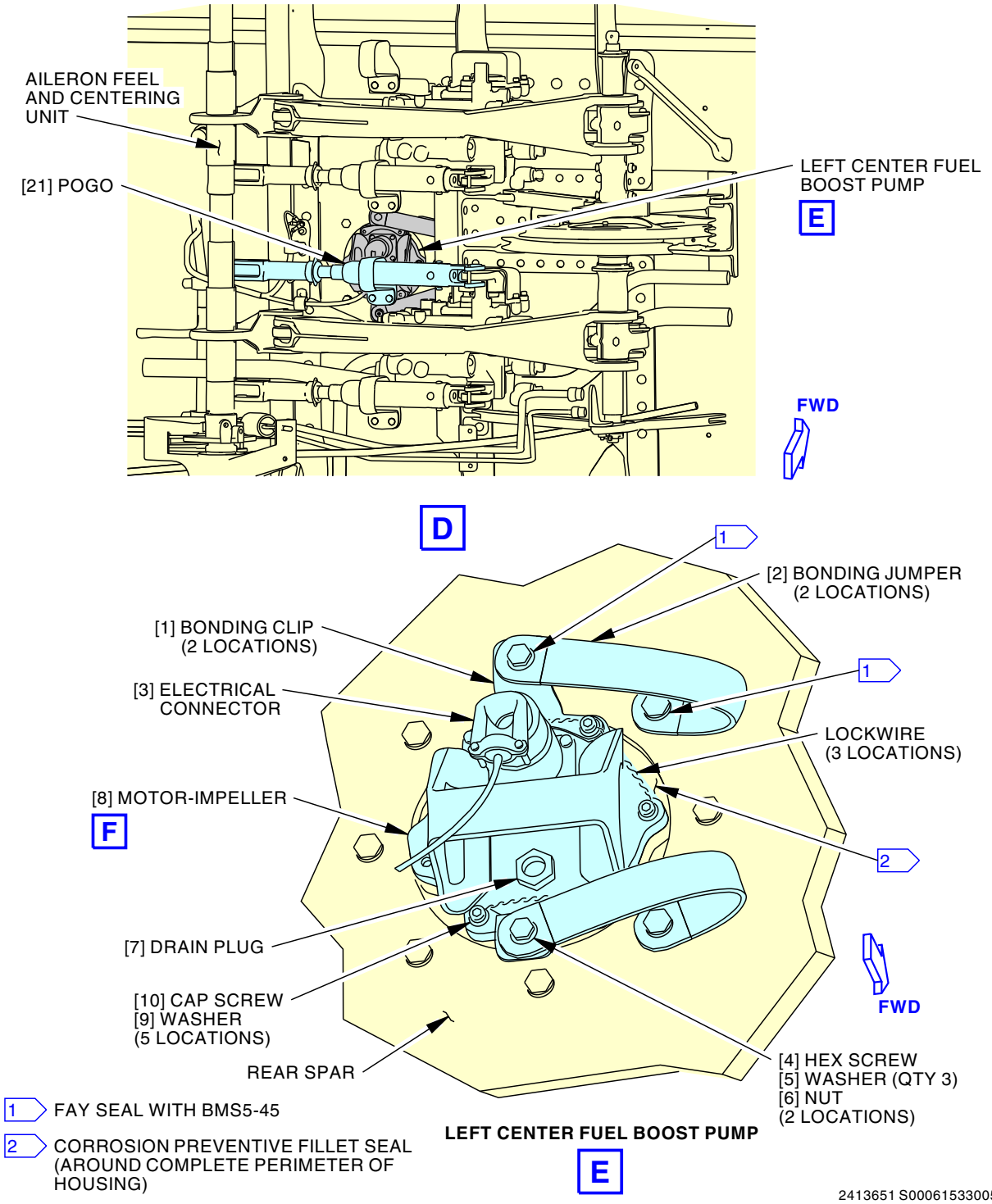
Center Tank - Left Center Fuel Boost Pump Installation
Figure 404/28-22-41-990-804 (Sheet 1 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



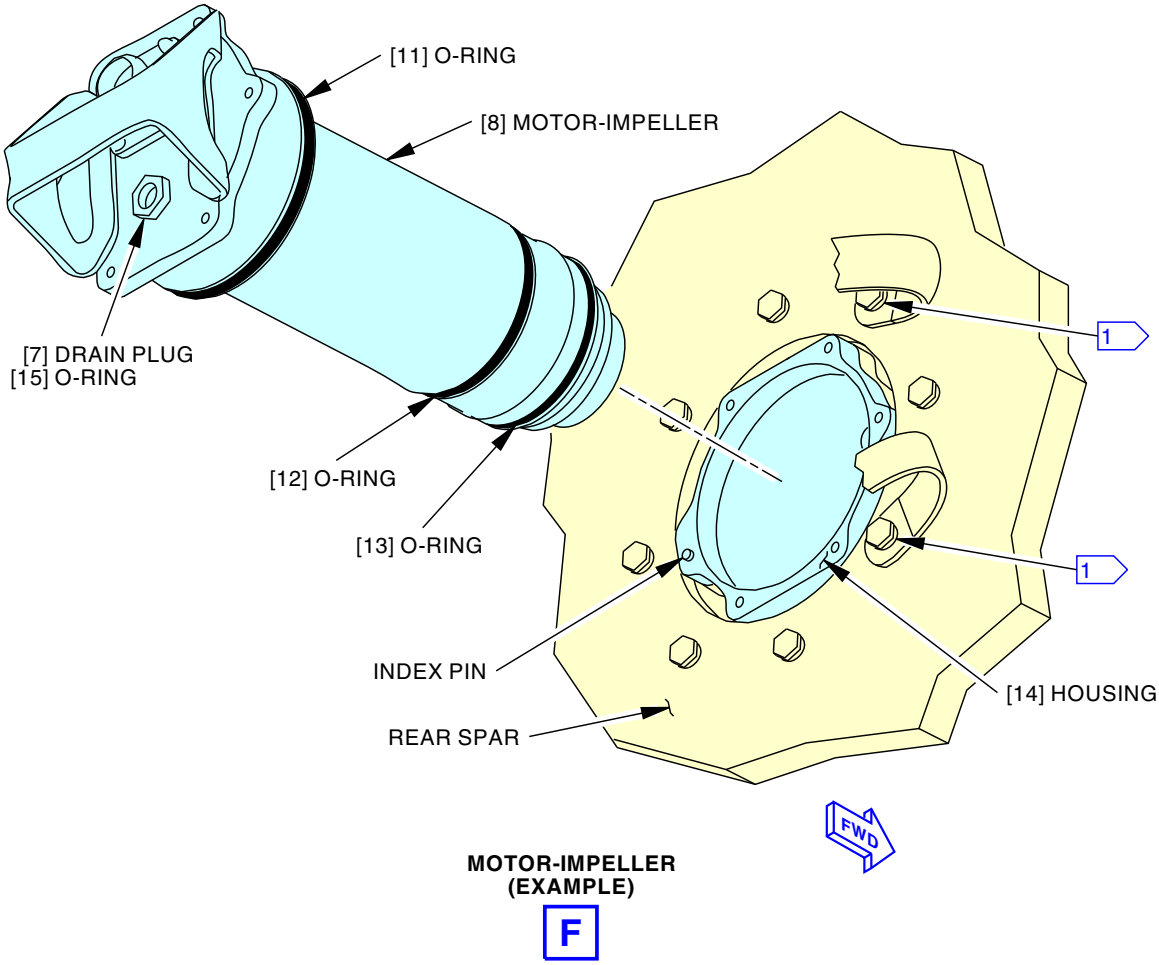
Center Tank - Left Center Fuel Boost Pump Installation
Figure 404/28-22-41-990-804 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Center Tank - Left Center Fuel Boost Pump Installation
Figure 404/28-22-41-990-804 (Sheet 3 of 4)

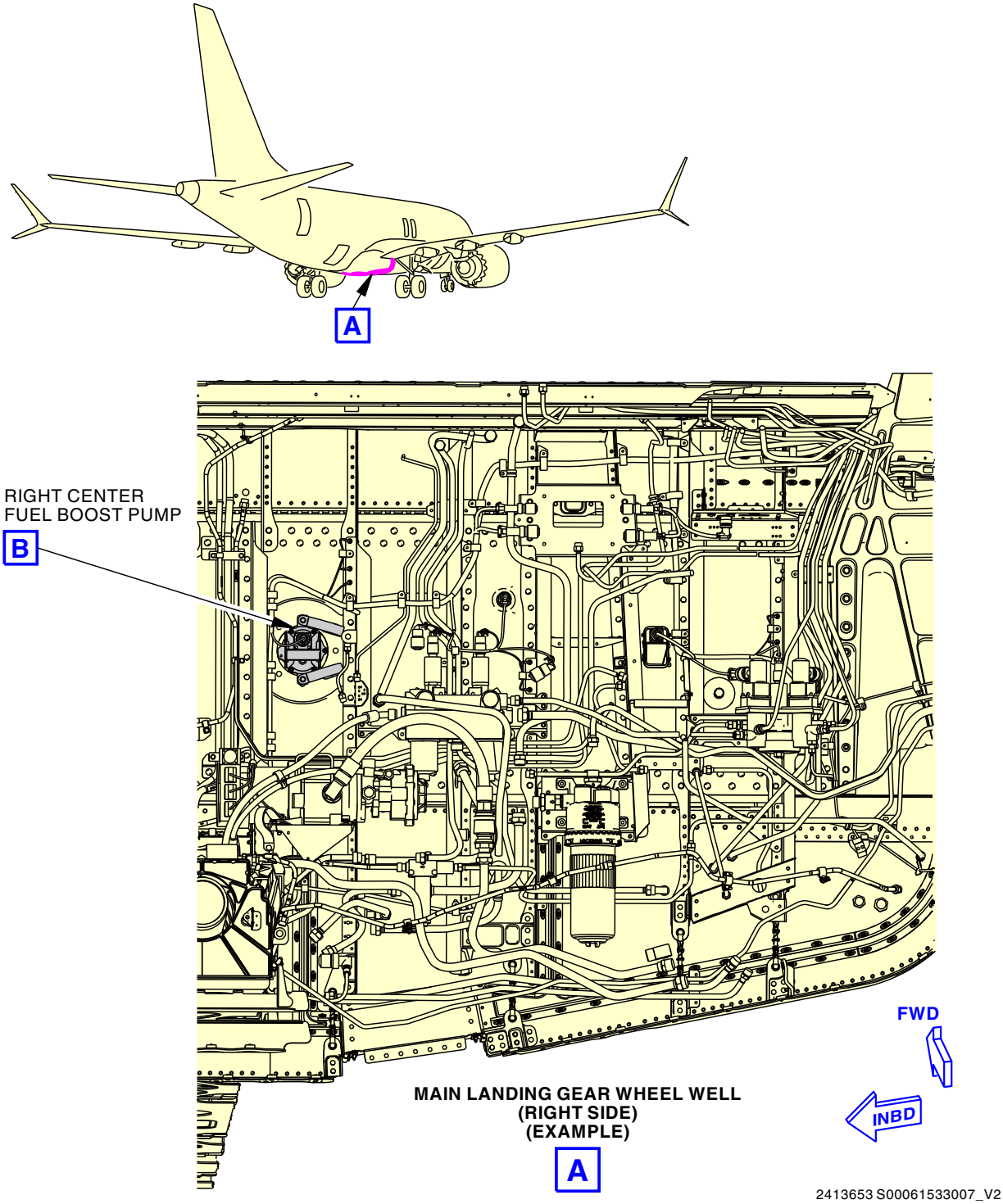
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2463497 S0000570718_V1

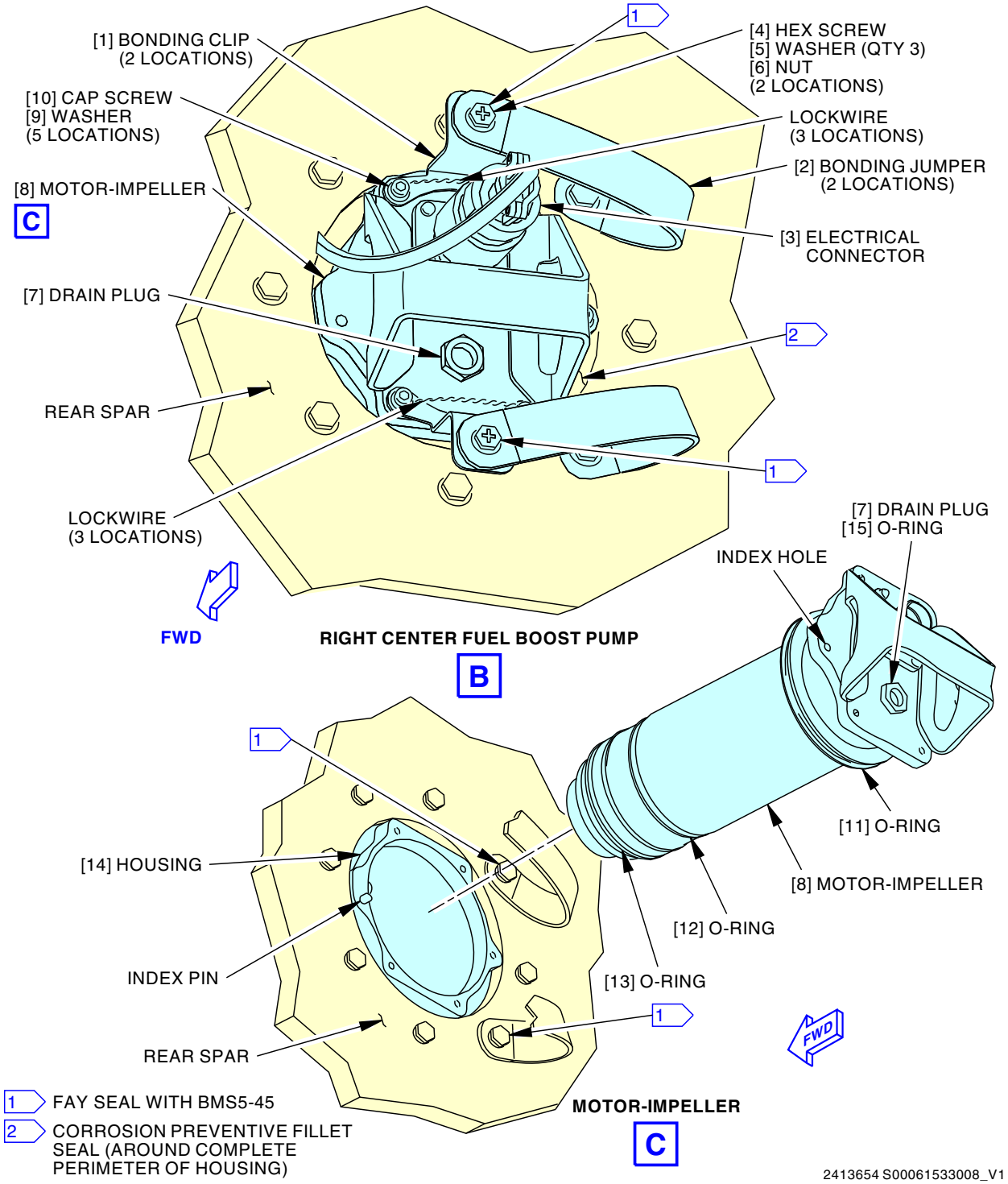
Center Tank - Left Center Fuel Boost Pump Installation
Figure 404/28-22-41-990-804 (Sheet 4 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



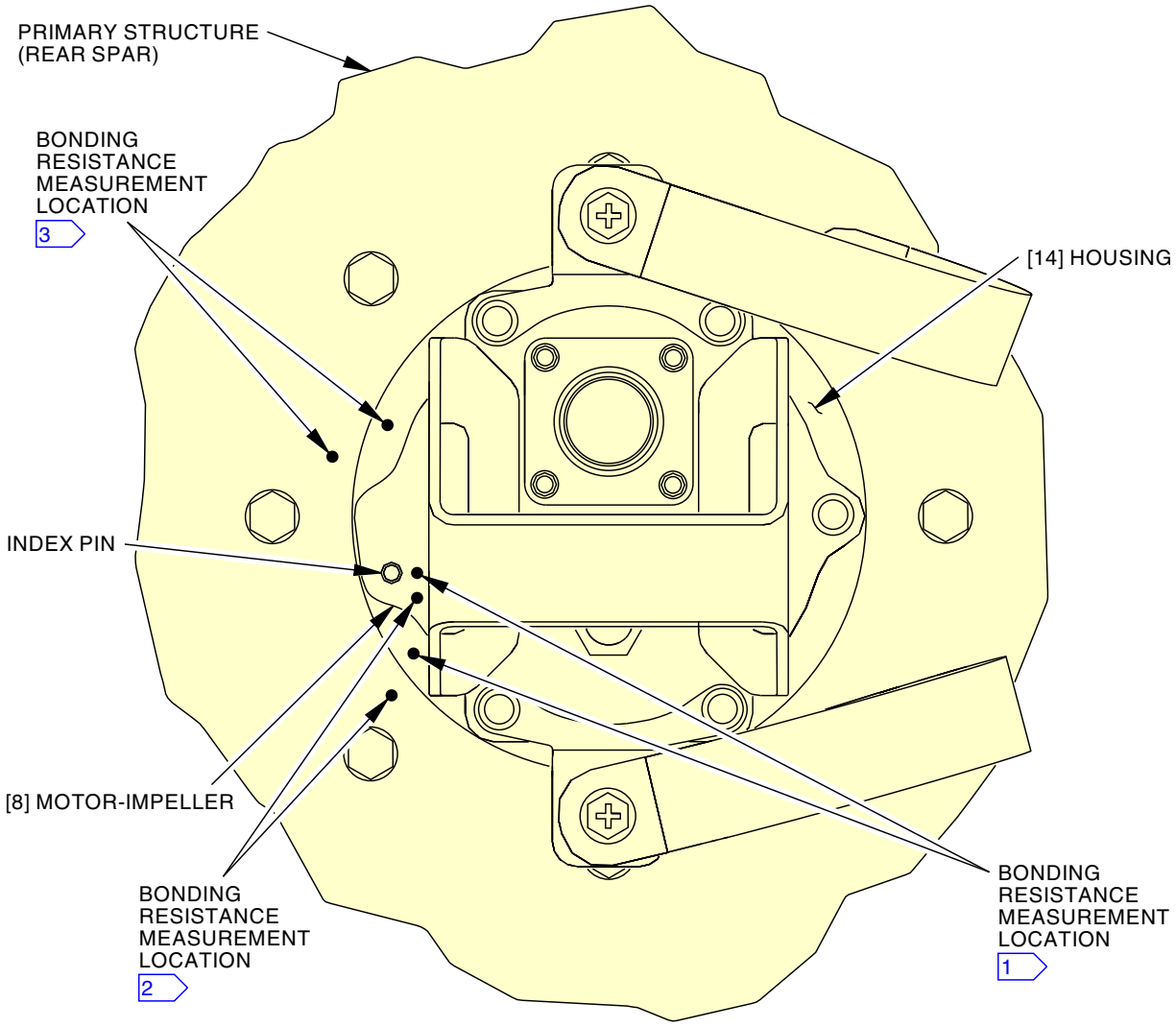
Center Tank - Right Center Fuel Boost Pump Installation
Figure 405/28-22-41-990-806 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Center Tank - Right Center Fuel Boost Pump Installation
Figure 405/28-22-41-990-806 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



PROBE LOCATION
(EXAMPLE)

1 BONDING RESISTANCE BETWEEN THE HOUSING AND MOTOR-IMPELLER.
2 BONDING RESISTANCE BETWEEN THE REAR SPAR AND MOTOR-IMPELLER.
3 BONDING RESISTANCE BETWEEN THE HOUSING AND REAR SPAR.

2413652 S00061533006_V1

Center Tank - Center Fuel Boost Pump Resistance Measurement - Probe Locations
Figure 406/28-22-41-990-805

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-41-400-801

3. Fuel Boost Pump Motor-Impeller Installation

(Figure 401, Figure 402, Figure 403, Figure 404, Figure 405, Figure 406)

A. General

(1) The fuel boost pump motor-impeller is referred to as the motor-impeller in this task.

(2) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-14.

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
20-10-34-110-802	Clean Bare, Clad, or Plated Metal with Solvent (P/B 701)
24-22-00-860-804	Remove External Power (P/B 201)
27-11-00-820-802	Pogo and Power Control Unit (PCU) Adjustment (P/B 501)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-22-41-710-801	Fuel Boost Pump - Operational Test (P/B 501)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659
SPL-1585	Kit - Rigging Pin Part #: F70207-151 Supplier: 81205

D. Consumable Materials

Reference	Description	Specification
A50110	Sealant - Fuel Tank	BMS5-45 Class B-2
A50155	Sealant - Fuel Tank	BMS5-45 Class C
C00862	Coating - Chemical Conversion - Bonderite M-CR 600 Aero (Formerly Alodine 600)	BAC5719 Class A, C or D, MIL-DTL-81706 Type I Class 1A or 3
D00504	Grease - Petrolatum	VV-P-236

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Reference	Description	Specification
D00633	Grease - Aircraft General Purpose	BMS3-33
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G00291	Tape - Aluminum Foil, 3M 425	AMS-T-23397 / L-T-80
G01912	Lockwire - MS20995NC32, Monel - 0.032 Inch (0.8128 mm) Diameter	NASM20995
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
8	Motor-impeller	28-22-41-01-115	SIA ALL
		28-22-41-02-155	SIA ALL
		28-22-41-02-340	SIA ALL
11	O-ring	28-22-41-01-170	SIA ALL
		28-22-41-02-170	SIA ALL
		28-22-41-02-355	SIA ALL
12	O-ring	28-22-41-01-165	SIA ALL
		28-22-41-02-175	SIA ALL
		28-22-41-02-360	SIA ALL
13	O-ring	28-22-41-01-160	SIA ALL
		28-22-41-02-180	SIA ALL
		28-22-41-02-365	SIA ALL
15	O-ring	28-22-41-01-155	SIA ALL
		28-22-41-02-190	SIA ALL
		28-22-41-02-375	SIA ALL
28	Cotter pin	27-11-71-01-115	SIA 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
551	Left Wing - Rear Spar To Landing Gear Support Beam
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
651	Right Wing - Rear Spar to Landing Gear Support Beam

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Prepare for the Installation

SUBTASK 28-22-41-480-005

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.

(1) If the downlock pins are not installed, do this task: Landing Gear Downlock Pins Installation, TASK 32-00-01-480-801.

SUBTASK 28-22-41-420-001

(2) Make sure that the wire bundle for the forward or aft fuel boost pump has the clamp installed (Figure 402).

NOTE: The clamp prevents the wire bundle from chafing.

SUBTASK 28-22-41-640-001

(3) Apply a thin layer of grease, D00504 to the new O-ring [15].

SUBTASK 28-22-41-420-002

(4) Install the O-ring [15] on the drain plug [7].

SUBTASK 28-22-41-420-003

(5) Install the drain plug [7] on the motor-impeller [8].

SUBTASK 28-22-41-420-004

(6) Tighten the drain plug [7] to 45 ±5 in-lb (5.1 ±0.6 N·m).

H. Fuel Boost Pump Motor-Impeller Installation

SUBTASK 28-22-41-100-001

(1) Do these steps to prepare the motor-impeller [8], housing [14], and rear spar for installation:

(a) Remove the sealant from the rear spar, do this task: Clean Bare, Clad, or Plated Metal with Solvent, TASK 20-10-34-110-802.

28-AWL-14: CDCCL

(b) Apply a fay surface bond between the mating surfaces of the motor-impeller [8] end-cap and the pump housing [14] (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-14.

(c) Apply chemical conversion coating to the abraded fayed surfaces:

1) Apply 3M 425 Aluminum Foil Tape, G00291, around all surfaces that do not require chemical conversion.

2) Manually apply Bonderite M-CR 600 Aero coating, C00862, to the contact surfaces with a clean cotton wiper, G00034.

NOTE: Keep the surfaces wet, until a perceptible color develops. Color change takes about 2-3 minutes.

3) Air dry at room temperature.

NOTE: The maximum drying air temperature is 130°F (54°C).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-41-640-002

(2) Apply a thin layer of grease, D00504, to the new O-ring [11], new O-ring [12], and new O-ring [13].

SUBTASK 28-22-41-420-005

(3) Install the O-ring [11], O-ring [12], and O-ring [13] in the grooves of the motor-impeller [8].

SUBTASK 28-22-41-650-002

(4) Put 0.5 pt (0.24 l) to 1 pt (0.47 l) of fuel, G02272, into the two smaller slots in the upper side of the motor-impeller [8].

SUBTASK 28-22-41-980-001

(5) Turn the motor-impeller [8] to make sure that fuel touches the internal parts.

SUBTASK 28-22-41-820-001

(6) Align the index hole on the motor-impeller [8] with the index pin on the housing [14].

SUBTASK 28-22-41-420-006

(7) Put the motor-impeller [8] into the housing [14].

NOTE: Be careful not to damage the O-ring [11], O-ring [12], and O-ring [13] when you put the motor-impeller [8] into the housing [14].

SUBTASK 28-22-41-420-007

(8) Install a cap screw [10] and washer [9] in the mounting hole.

NOTE: Do not install in a mounting hole where the bonding clips [1] will be installed.

SUBTASK 28-22-41-100-002

(9) Do these steps to prepare the motor-impeller [8] and bonding clips [1] for installation:

(a) Remove the masking on the bonding clips [1].

NOTE: Only new bonding clips [1] have masking installed.

(b) If the bonding clip [1] is attached to the terminal of the bonding jumper [2], remove the bonding clip [1] from the terminal of the bonding jumper [2].

28-AWL-14: CDCCL

(c) Apply a fay sealed fay surface bond between the mating surfaces of the end-cap on the motor-impeller [8] and each bonding clip [1] (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-14.

SUBTASK 28-22-41-400-001

(10) Install the cap screws [10], washers [9], and bonding clips [1] on the motor-impeller [8].

SUBTASK 28-22-41-860-004

28-AWL-14: CDCCL

(11) Measure the electrical bonding resistance between the end-cap of the motor-impeller [8], and the pump housing [14] (Figure 403 and 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-14.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

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28-AWL-14: CDCCL

(b) Make sure that the electrical 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-14.

SUBTASK 28-22-41-200-001

28-AWL-14: CDCCL

(12) Measure the electrical bonding resistance between the end-cap of the pump motor-impeller [8] and the rear spar (structure) (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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-14.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-14: CDCCL

(b) Make sure that the electrical 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-14.

SUBTASK 28-22-41-860-005

28-AWL-14: CDCCL

(13) Measure the electrical bonding resistance between the end-cap of the motor-impeller [8] and each bonding clip [1] (Figure 403, 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-14.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-14: CDCCL

(b) Make sure that the electrical bonding resistance is 0.0005 (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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-14.

SUBTASK 28-22-41-380-001

(14) Apply Bonderite M-CR 600 Aero coating, C00862 to the abraded fayed surfaces:

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SUBTASK 28-22-41-390-007

28-AWL-14: CDCCL

(15) If the bonding jumpers [2] are removed from the structure, apply a fay sealed fay surface bond between each terminal of the bonding jumper [2], washer [55], and the structure (rear spar) (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-14.

SUBTASK 28-22-41-400-002

(16) Install the terminals of the bonding jumpers [2], mounting bolts [56], and washers [55] to the rear spar (structure).

SUBTASK 28-22-41-200-003

(17) If the bonding jumpers [2] were removed from the structure, do this step:

28-AWL-14: CDCCL

(a) Prior to attaching the terminal of the bonding jumpers [2] to the bonding clips [1], measure the electrical bonding resistance between the loose end terminals of the bonding jumpers [2] and the rear spar (structure).

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.

1) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-14: CDCCL

2) Make sure that the electrical 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-14.

SUBTASK 28-22-41-200-002

(18) If the bonding jumpers [2] are not removed from the rear spar (structure), do this step:

28-AWL-14: CDCCL

(a) Prior to attaching the terminal of the bonding jumpers [2] to the bonding clips [1], measure the electrical bonding resistance between the loose end terminals of the bonding jumpers [2] and the rear spar (structure).

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.

1) Use an intrinsically safe approved bonding meter, COM-1550.

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28-AWL-14: CDCCL

2) Make sure that the electrical bonding resistance is 0.0010 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-14.

SUBTASK 28-22-41-390-002

28-AWL-14: CDCCL

(19) Apply a fay sealed fay surface bond between the terminal of the bonding jumper [2] and bonding clip [1] (two locations) (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-14.

SUBTASK 28-22-41-420-009

(20) Install the hex screws [4], washers [5], the terminals of the bonding jumpers [2], and the nuts [6] to each two bonding clips [1].

SUBTASK 28-22-41-200-004

28-AWL-14: CDCCL

(21) Make sure that the two bonding jumpers [2] are installed between the end-cap of the motor-impeller [8] and the structure.

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 28-22-41-860-006

28-AWL-14: CDCCL

(22) Measure the electrical bonding resistance between the end-cap of the motor-impeller [8] and the airplane structure (Figure 403, 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-14.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-14: CDCCL

(b) Make sure that the electrical bonding 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.

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SUBTASK 28-22-41-390-006

(23) Apply sealant, A50110 (alternate: sealant, A50155) to the bare fay surface on each bonding clip [1].

NOTE: For corrosion protection, use sufficient sealant on the bare areas.

SUBTASK 28-22-41-420-010

(24) Install the MS20995NC32 lockwire, G01912 between the cap screw [10] and drain plug [7].

NOTE: Put the lockwire on the cap screw [10] near the 3 O'clock position.

SUBTASK 28-22-41-420-029

(25) Install the MS20995NC32 lockwire, G01912 on the four cap screws [10].

SUBTASK 28-22-41-420-011

(26) Connect the electrical connector [3] to the motor-impeller [8].

I. Fuel Boost Pump Motor-Impeller Installation Test

SUBTASK 28-22-41-650-003

(1) Refuel the fuel tanks for the applicable fuel boost pump (TASK 12-11-00-650-803).

(a) If it is not possible to refuel the fuel tanks to the specified quantity, do one of the alternative procedures to prime the boost pump (TASK 28-22-41-420-801).

(b) Forward or aft fuel boost pumps, left wing:

1) No. 1 main tank – 500 lb (227 kg) minimum

(c) Forward or aft fuel boost pumps, right wing:

1) No. 2 main tank – 500 lb (227 kg) minimum

(d) Left or right center fuel boost pumps:

1) Center tank – 14,000 lb (6350 kg) minimum

SUBTASK 28-22-41-710-001

(2) For the applicable fuel boost pump, do this task: Fuel Boost Pump - Operational Test, TASK 28-22-41-710-801.

SUBTASK 28-22-41-210-002

(3) Make sure that there are no fuel leaks at the fuel boost pump.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-41-410-001

(1) For the left center fuel boost pump, install the pogo assembly [21] (Figure 404):

NOTE: Be careful not to change the length of the pogo assembly [21].

(a) Connect the bracket assembly to the power control unit [25] with three bolts [29] and washers [30].

(b) Apply grease, D00633 to the mating surfaces on the pogo assembly [21] and power control unit [25]

(c) Connect the pogo assembly [21] to the power control unit [25] with a hex bolt [23], countersunk washer [22], plain bushing [24], plain washer [26], castellated nut [27] and new cotter pin [28].

NOTE: Install with the hex bolt [23] and plain bushing [24] head up.

(d) Make sure that the rigging pin A/S-4, from the rigging pin kit, SPL-1585, can easily be removed and installed in the aileron bus drum (TASK 27-11-00-820-802).

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(e) If the rig pin A/S-4 cannot be removed and installed, do this task: Pogo and Power Control Unit (PCU) Adjustment, TASK 27-11-00-820-802.

NOTE: The pogo assembly [21] length changed.

SUBTASK 28-22-41-860-007

(2) Remove electrical power, if necessary (TASK 24-22-00-860-804).

——— END OF TASK ———

TASK 28-22-41-420-801

4. Fuel Boost Pump and Override Pump Priming

(Figure 401, Figure 404, Figure 405)

A. General

(1) This task primes the fuel boost pump without adding a large quantity of fuel into the applicable fuel tank.

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
20-10-44-400-801	Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401)
28-22-41-710-801	Fuel Boost Pump - Operational Test (P/B 501)

C. Tools/Equipment

Reference	Description
STD-1054	Container - Fuel Resistant, 5-Gallon (19-Liter)

D. Consumable Materials

Reference	Description	Specification
G02272	Fuel - Turbine, Aviation (Grades JP-4, JP-5, JP-5/JP-8ST)	MIL-DTL-5624

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
551	Left Wing - Rear Spar To Landing Gear Support Beam
651	Right Wing - Rear Spar to Landing Gear Support Beam

F. Fuel Boost Pump and Override Pump Priming

SUBTASK 28-22-41-650-004

(1) Refuel the center or the No.1 and No. 2 fuel tank, as applicable (Pressure Refuel Procedure, TASK 12-11-00-650-803).

NOTE: These are the minimum fuel quantities to make sure that the fuel boost pumps are primed correctly.

(a) No. 1 main tank – 500 lb (227 kg) minimum

(b) No. 2 main tank – 500 lb (227 kg) minimum

(c) Center tank – 14,000 lb (6350 kg) minimum.

SUBTASK 28-22-41-710-006

(2) For the applicable fuel boost pump, do this task: Fuel Boost Pump - Operational Test, TASK 28-22-41-710-801.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) If the fuel boost pump is satisfactory, you primed the fuel boost pump correctly and no more steps are necessary.

(b) If the fuel boost pump is not satisfactory, then do the Fuel Boost Pump and Override Pump Priming Alternative 1.

G. Fuel Boost Pump and Override Pump Priming Alternative 1

SUBTASK 28-22-41-640-003

(1) Prime the fuel boost pump through the drain hole on the motor-impeller [8]:

(a) Remove the drain plug [7] from the applicable motor-impeller [8].

(b) Put approximately 1.5 pt (0.7 l) of fuel, G02272 into the drain hole.

SUBTASK 28-22-41-420-012

(2) Install the drain plug [7] on the motor-impeller [8].

SUBTASK 28-22-41-420-013

(3) Tighten the drain plug [7] to 45 ±5 in-lb (5 ±1 N·m).

SUBTASK 28-22-41-710-002

(4) For the applicable fuel boost pump, do this task: Fuel Boost Pump - Operational Test, TASK 28-22-41-710-801.

(a) If the fuel boost pump is satisfactory, then install the lockwire between the drain plug [7] and cap screw [10] (TASK 20-10-44-400-801).

NOTE: You primed the fuel boost pump correctly and no more steps are necessary.

(b) If the fuel boost pump is not satisfactory, then do the Fuel Boost Pump and Override Pump Priming Alternative 2.

H. Fuel Boost Pump and Override Pump Priming Alternative 2

SUBTASK 28-22-41-010-003

(1) Remove the motor-impeller [8] (TASK 28-22-41-000-801).

(a) Remove the drain plug [7].

(b) Put the motor-impeller [8] in a 5-gallon (19-liter) fuel resistant container, STD-1054 of fuel, G02272.

NOTE: Keep the electrical connector on the motor-impeller [8] above the fuel.

(c) Install the drain plug [7].

SUBTASK 28-22-41-410-002

(2) Install the motor-impeller [8]:

(a) Hold the motor-impeller [8] in the correct direction with the open fuel slot on the top.

NOTE: This makes sure that the fuel does not drain from the motor-impeller [8] before installation.

(b) Make sure that the electrical connector on the motor-impeller [8] has no fuel.

(c) Immediately install the motor-impeller [8] (TASK 28-22-41-400-801).

(d) Tighten the drain plug [7] to 45 ±5 in-lb (5 ±1 N·m).

SUBTASK 28-22-41-710-003

(3) For the fuel boost pump, do this task: Fuel Boost Pump - Operational Test, TASK 28-22-41-710-801.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Install the lockwire between the drain plug [7] and cap screw [10] (TASK 20-10-44-400-801).

NOTE: You primed the fuel boost pump correctly and no more steps are necessary.

——— END OF TASK ———

TASK 28-22-41-000-802

5. Fuel Boost Pump Housing Removal

(Figure 407)

A. General

(1) The fuel boost pump housing is referred to as the housing in this task.

(2) This task gives instruction to remove the housing.

B. References

Reference	Title
20-10-51-000-801	Flareless Tubing Assembly Removal (P/B 401)
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)
28-22-15-000-803	Couplings Removal (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-42-11-000-801	Fuel Boost Pump Fuel Pressure Switch Removal (P/B 401)
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
551	Left Wing - Rear Spar To Landing Gear Support Beam
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
651	Right Wing - Rear Spar to Landing Gear Support Beam

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

E. Prepare for the Removal

SUBTASK 28-22-41-480-004

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.

(1) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-22-41-650-005

(2) Defuel the center tank (TASK 28-26-00-650-801).

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SUBTASK 28-22-41-650-006

(3) Defuel the No. 1 main tank for the following fuel boost pumps (TASK 28-26-00-650-801):

(a) Left forward fuel boost pump

(b) Left aft fuel boost pump

(c) Left center fuel boost pump.

SUBTASK 28-22-41-650-007

(4) Defuel the No. 2 main tank for the following fuel boost pumps (TASK 28-26-00-650-801):

(a) Right forward fuel boost pump

(b) Right aft fuel boost pump

(c) Right center fuel boost pump.

SUBTASK 28-22-41-860-008

(5) On the P5-2 Fuel System Module, turn the CROSS FEED switch to the closed position.

(a) Make sure that the VALVE OPEN light goes off for the fuel crossfeed valve.

SUBTASK 28-22-41-650-008

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(6) Do this task for the applicable fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Access the forward or aft fuel boost pump for the No. 1 main tank, open this access door:

(TASK 28-11-31-000-801)

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

(b) Access the forward or aft fuel boost pump for the No. 2 main tank, remove this access door:

(TASK 28-11-31-000-801)

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

(c) Access the applicable center fuel boost pump, remove this access door:

(TASK 28-11-31-000-801)

Number	Name/Location
131AB	Center Tank Access

SUBTASK 28-22-41-010-004

(7) Remove the motor-impeller [8] from the housing [14] (TASK 28-22-41-000-801).

SUBTASK 28-22-41-860-009

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.

(8) Go into the fuel tank (TASK 28-11-00-910-802).

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F. Fuel Boost Pump Housing Removal

SUBTASK 28-22-41-020-011

(1) Disconnect the scavenge pump pressure line [48] from the elbow [47] (TASK 20-10-51-000-801).

NOTE: The forward fuel boost pump on the right wing does not have a scavenge pump pressure line [48].

SUBTASK 28-22-41-020-012

(2) Disconnect the pressure switch line [49]:

(a) Disconnect the rigid coupling assembly [63] (TASK 28-22-15-000-803).

1) Remove and discard the O-ring [62].

(b) Make sure that fuel has drained from the pressure switch line [49].

NOTE: This prevents the collection of water in the pressure switch line [49]. Water can freeze and cause damage to the pressure switch line [49]. To prevent this type of damage, the pressure switch line [49] can be loosened at the pressure switch (TASK 28-42-11-000-801). A flush may be necessary to remove all water from the pressure switch line [49].

SUBTASK 28-22-41-020-013

(3) Disconnect the discharge check valve [41] from the housing [14]:

(a) Remove the four screws [67], washers [66], and nuts [61] from the discharge check valve [41].

(b) Remove the O-rings [65] and pressure switch plate adapter [64].

1) Discard the O-rings [65].

SUBTASK 28-22-41-020-014

(4) Disconnect the removal check valve [43] from the housing [14]:

(a) Remove the six screws [44], washers [45], and nuts [46] from the removal check valve [43].

(b) Remove the O-ring [42].

(c) Discard the O-ring [42].

SUBTASK 28-22-41-020-015

(5) Fuel boost pumps in the No. 1 or No. 2 main tank, disconnect the discharge port line from the discharge port.

(a) Disconnect the flexible full coupling [50] (TASK 28-22-15-000-803).

1) Remove and discard the O-rings [52].

SUBTASK 28-22-41-020-022

CAUTION

DO NOT USE METAL TOOLS. METAL TOOLS CAN CAUSE DAMAGE TO THE PART YOU WILL DO WORK ON OR ADJACENT PARTS.

(6) Remove the fillet seal from the edge of the housing [14].

SUBTASK 28-22-41-020-016

(7) Remove the safety cables or lockwires from the mounting bolts [56] and mounting bolts [57].

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SUBTASK 28-22-41-020-017

(8) Remove the mounting bolt [57], bonding jumper [2], washer [58], and flat washer [59] (two locations).

NOTE: The housing and center tank are held together with a fay seal. A non-metallic tool may be necessary to help remove the housing.

SUBTASK 28-22-41-020-018

(9) Hold the housing [14] from the fuel side of the rear spar.

SUBTASK 28-22-41-020-019

(10) Remove the six mounting bolts [56] and washers [55].

SUBTASK 28-22-41-020-020

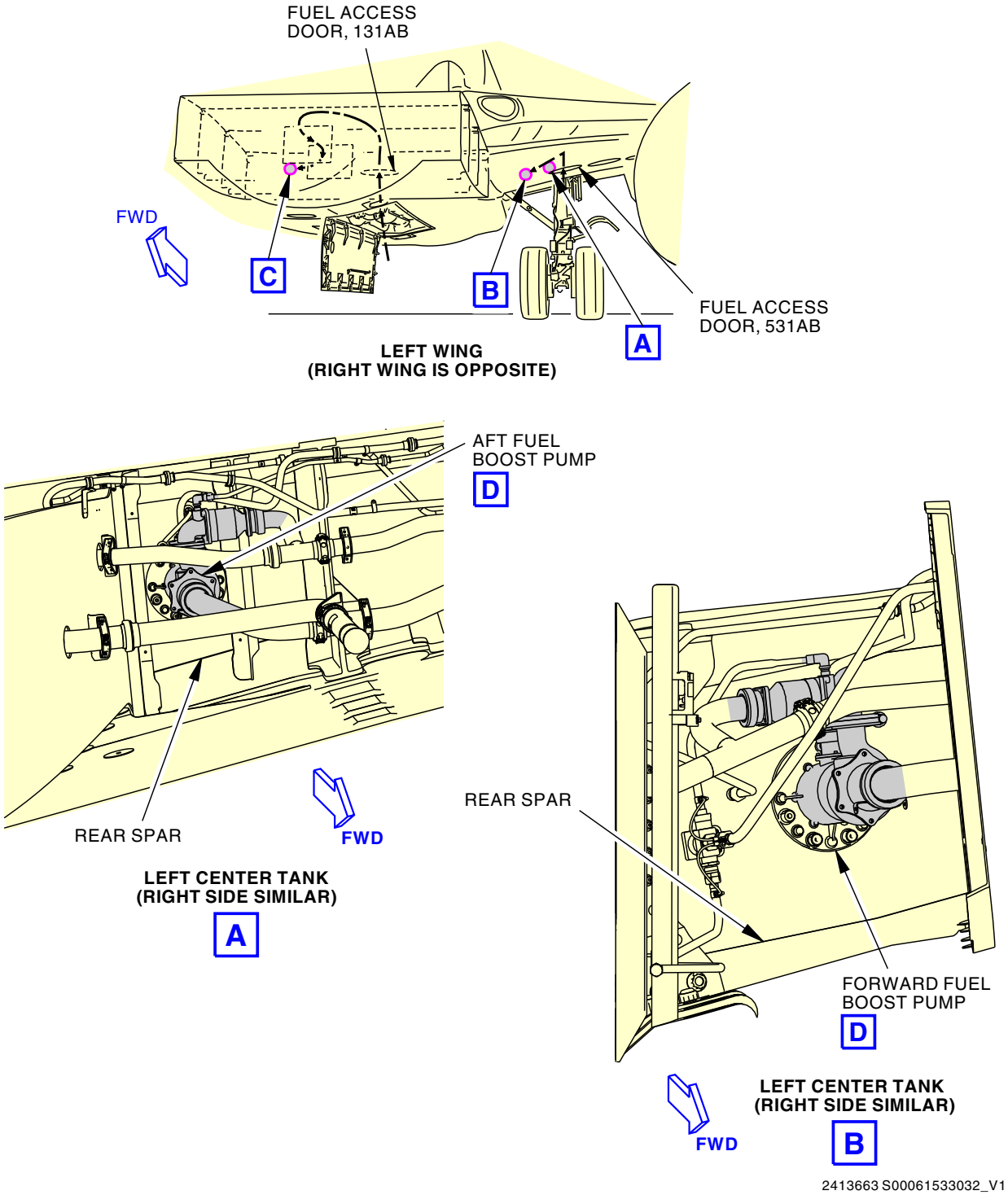
(11) Remove the Gask-O-Seal [60].

SUBTASK 28-22-41-020-021

(12) Remove the housing [14] from the center tank.

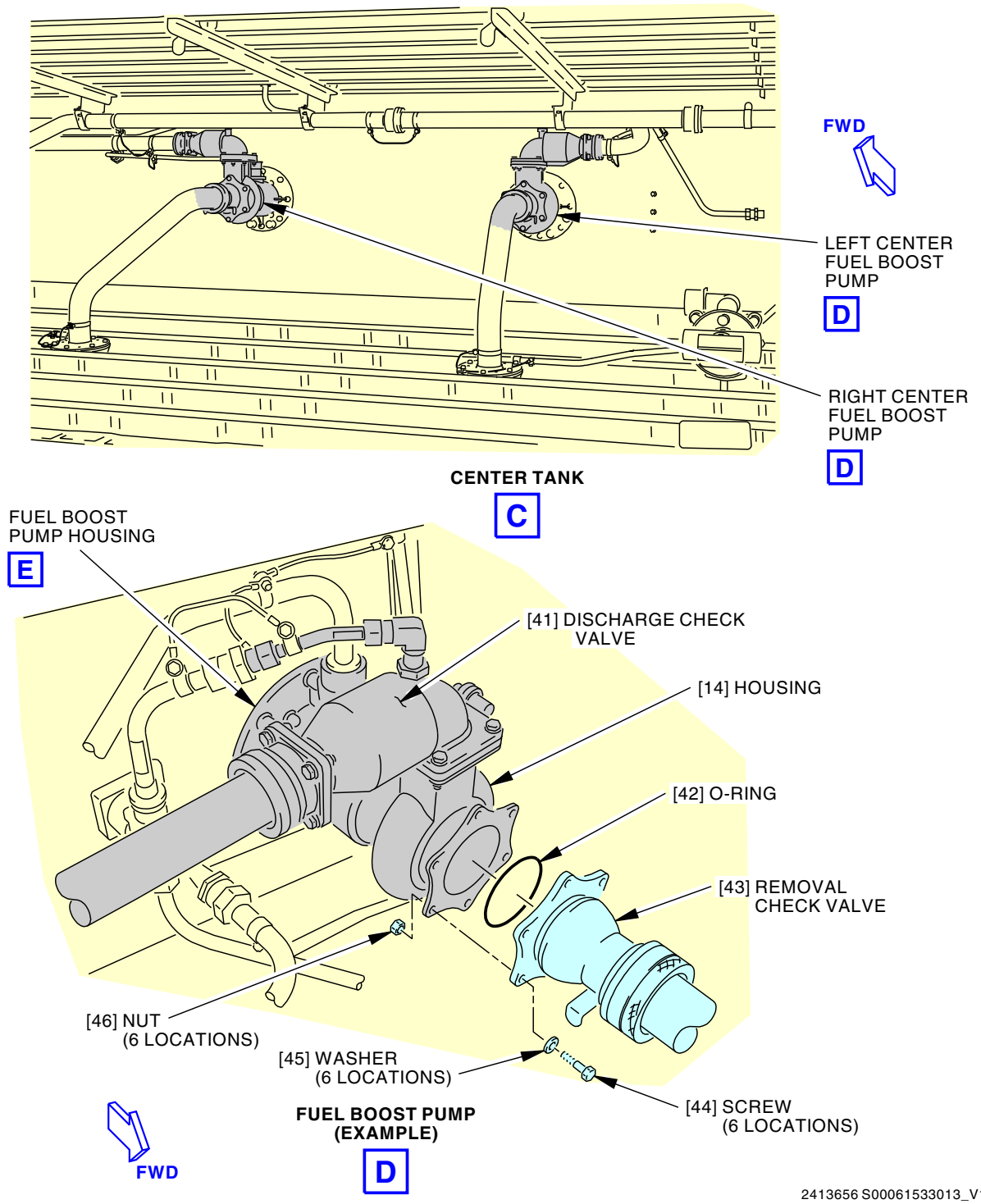
——— END OF TASK ———

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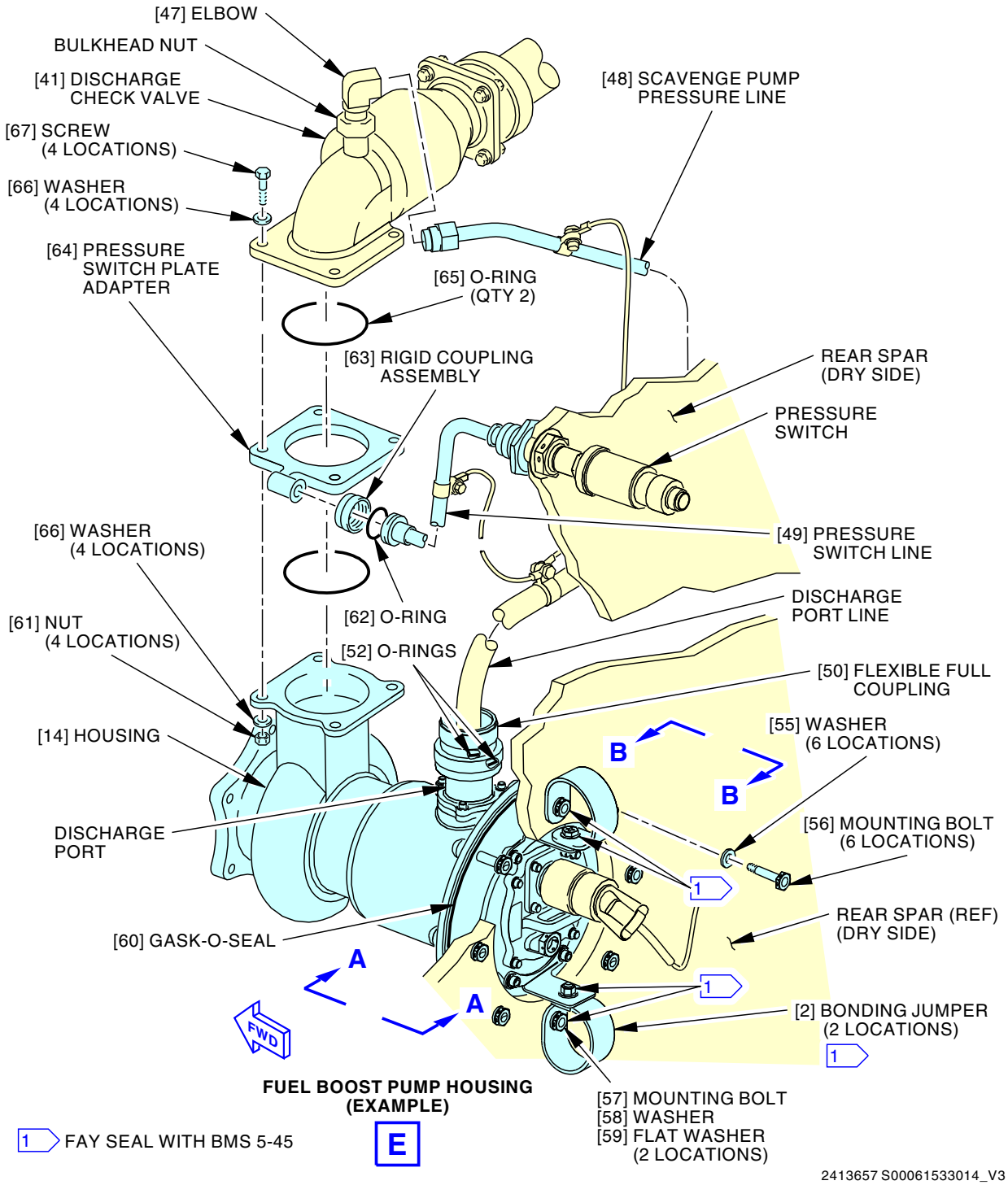
Fuel Boost Pump Housing Installation
Figure 407/28-22-41-990-807 (Sheet 1 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



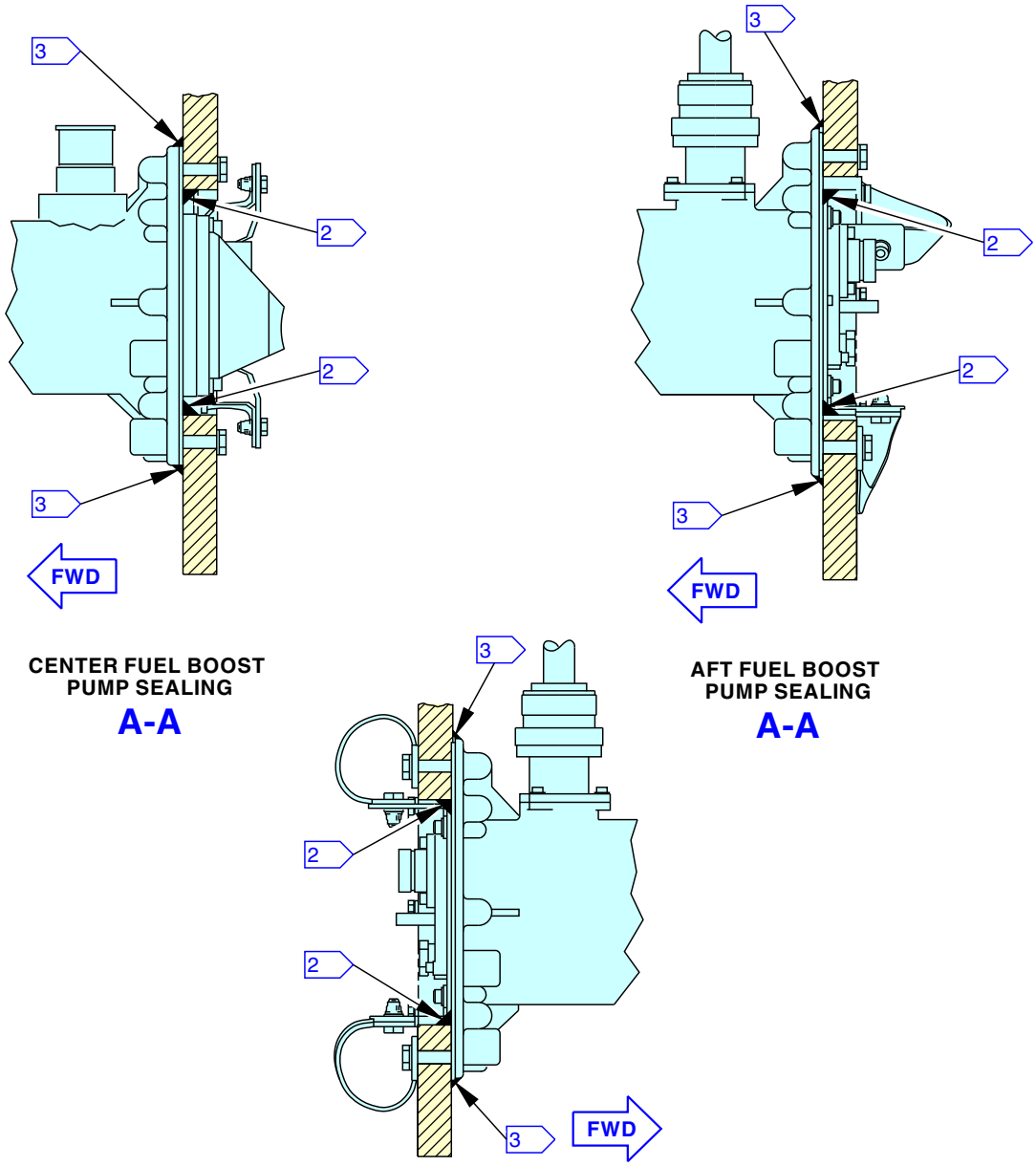
Fuel Boost Pump Housing Installation
Figure 407/28-22-41-990-807 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fuel Boost Pump Housing Installation
Figure 407/28-22-41-990-807 (Sheet 3 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2 FILLET SEAL WITH BMS 5-142 OR BMS 5-45
3 FILLET SEAL WITH BMS 5-45

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Fuel Boost Pump Housing Installation
Figure 407/28-22-41-990-807 (Sheet 4 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-41-400-802

6. Fuel Boost Pump Housing Installation

(Figure 407)

A. General

(1) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-14.

(2) The fuel boost pump housing is referred to as the housing in this task.

(3) This task gives instruction to install the housing.

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
20-10-17-400-801	O-Rings Installation (P/B 401)
20-10-44-400-801	Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401)
20-10-51-400-801	Flareless Tubing Assembly Installation (P/B 401)
24-22-00-860-801	Supply Electrical Power (P/B 201)
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)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-22-15-400-803	Couplings Installation (P/B 401)
51-22-00-390-806	Fillet Seal Application (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES
SWPM 20-20-10	REPLACEMENT OF GROUND STUDS AND BONDING JUMPER INSTALLATION

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Reference	Description	Specification
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142 Type II
A50153	Sealant - Fuel Tank - Class A-2	BMS5-45 Class A-2
A50155	Sealant - Fuel Tank	BMS5-45 Class C
A50337	Sealant - Fuel Tank	BMS5-45 Class B
D00504	Grease - Petrolatum	VV-P-236

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
14	Housing	28-22-41-01-175	SIA ALL
		28-22-41-02-405	SIA ALL
60	Gask-O-Seal	28-22-41-01-100	SIA ALL
		28-22-41-02-315	SIA ALL
62	O-ring	28-22-41-01-020	SIA ALL
		28-22-41-02-070	SIA ALL
65	O-ring	28-22-71-01-065	SIA ALL
		28-22-71-02-070	SIA ALL
		28-22-71-02-270	SIA 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
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
531	Left Wing - Center Fuel Tank, Rib 1 to Rib 5
551	Left Wing - Rear Spar To Landing Gear Support Beam
631	Right Wing - Center Fuel Tank, Rib 1 to Rib 5
651	Right Wing - Rear Spar to Landing Gear Support Beam

G. 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

H. Fuel Boost Pump Housing Installation

SUBTASK 28-22-41-100-004

28-AWL-14: CDCCL

(1) Apply a fay surface bond between the pump housing [14], the Gask-O-Seal [60] (gasket), and the rear spar (structure) inside the tank (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-14.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-41-820-002

(2) Align the housing [14] with the rear spar.

SUBTASK 28-22-41-420-014

(3) Put the Gask-O-Seal [60] (gasket) between the housing [14] and rear spar.

SUBTASK 28-22-41-420-015

(4) Apply sealant, A50337 (sealant, A50155, alternate) to wet install the mounting bolts [56] and washers [55] (six locations).

SUBTASK 28-22-41-860-010

28-AWL-14: CDCCL

(5) Measure the electrical bonding resistance between the pump housing [14] and the rear spar (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-14.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-14: CDCCL

(b) Make sure that the electrical bonding resistance is 0.0010 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-14.

SUBTASK 28-22-41-420-016

28-AWL-14: CDCCL

(6) Apply a fay sealed fay surface bond between the terminal of the bonding jumper [2], flat washer [59], and the structure (rear spar) (SWPM 20-20-10).

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 28-22-41-420-017

(7) Install the first bonding jumper [2] on the rear spar:

(a) Install the mounting bolt [57], washer [58], the terminal of the bonding jumper [2], and the flat washer [59] on the rear spar.

NOTE: The washer [58] is installed between the mounting bolt [57] and the terminal of the bonding jumper.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-41-760-001

28-AWL-14: CDCCL

(8) Measure the electrical bonding resistance between the loose end of the bonding jumper [2] terminal and the rear spar (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-14.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-14: CDCCL

(b) Make sure that the electrical 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-14.

SUBTASK 28-22-41-420-018

28-AWL-14: CDCCL

(9) Apply a fay sealed fay surface bond between the terminal of the bonding jumper [2], flat washer [59], and the structure (rear spar) (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-14.

SUBTASK 28-22-41-420-019

(10) Install the second bonding jumper [2] on the rear spar:

(a) Install the mounting bolt [57], washer [58], the terminal of the bonding jumper [2], and flat washer [59] on the rear spar (SWPM 20-20-10).

NOTE: The washer [58] is installed between the mounting bolt [57] and bonding jumper.

SUBTASK 28-22-41-760-002

28-AWL-14: CDCCL

(11) Measure the electrical bonding resistance between the loose end of the bonding jumper [2] terminal and the rear spar (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-14.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-14: CDCCL

(b) Make sure that the electrical 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-14.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-41-420-020

(12) Install the safety cables or lockwires on the six mounting bolts [56] and two mounting bolts [57] (TASK 20-10-44-400-801).

SUBTASK 28-22-41-390-003

(13) Apply a cap seal of sealant, A00767 (sealant, A02315, alternate) to the six mounting bolts [56].

SUBTASK 28-22-41-390-004

(14) Apply sealants between the housing [14] and the rear spar in the tank:

NOTE: Use sufficient sealant to cover un-primed areas of the structure for corrosion protection.

(a) Apply a thin, narrow brushcoat of sealant, A50153, around the perimeter of the housing [14] in the tank (TASK 28-11-00-300-803).

NOTE: To prevent contamination, replace the brush and sealant containers in 6 in. (15 cm) intervals.

28-AWL-14: CDCCL

(b) Apply a fillet seal around the entire perimeter of the gasket (Gask-O-Seal [60]), the pump housing [14], and the rear spar (structure) in the tank (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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-14.

SUBTASK 28-22-41-390-005

28-AWL-14: CDCCL

(15) Apply a fillet seal around the perimeter of the pump housing [14] and the rear spar (structure) out of the tank (TASK 51-22-00-390-806).

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 28-22-41-100-006

(16) Apply a fay surface bond between the mating surfaces of the housing [14] and the removal check valve [43] (SWPM 20-20-00).

SUBTASK 28-22-41-420-021

(17) Connect the removal check valve [43] to the housing [14]:

(a) Lubricate the O-ring [42] with a thin layer of grease, D00504.

(b) Install the O-ring [42] in the groove of the flange on the removal check valve [43].

(c) Align the flanges of the removal check valve [43] and housing [14].

(d) Install the six screws [44], washers [45], and nuts [46].

SUBTASK 28-22-41-100-007

(18) Apply a fay surface bond between the mating surfaces of the housing [14], pressure switch plate adapter [64], and the discharge check valve [41] (SWPM 20-20-00).

SUBTASK 28-22-41-420-022

(19) Connect the discharge check valve [41]:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Put the new O-ring [65] in the groove of the discharge check valve [41] (TASK 20-10-17-400-801).

(b) Put the new O-ring [65] in the groove of the pressure switch plate adapter [64] (TASK 20-10-17-400-801).

(c) Put the pressure switch plate adapter [64] between the housing [14] and the discharge check valve [41].

NOTE: The port faces the pressure switch line.

(d) Align the pressure switch plate adapter [64] with the housing [14] and discharge check valve [41].

(e) Install the four screws [67], washers [66], and nuts [61].

SUBTASK 28-22-41-760-003

(20) Measure the electrical bonding resistance between the pressure switch plate adapter [64] and the housing [14] (SWPM 20-20-00).

(a) Use an intrinsically safe approved bonding meter, COM-1550.

(b) Make sure that the measured resistance is not more than the maximum bonding resistance value.

SUBTASK 28-22-41-760-004

(21) Measure the electrical bonding resistance between the discharge check valve [41] and the pressure switch plate adapter [64] (SWPM 20-20-00).

(a) Use an intrinsically safe approved bonding meter, COM-1550.

(b) Make sure that the measured resistance is not more than the maximum bonding resistance value.

SUBTASK 28-22-41-420-023

(22) Connect the scavenge pump pressure line [48] to the elbow [47] (TASK 20-10-51-400-801).

NOTE: The forward fuel boost pump on the right wing does not have a elbow or a scavenge pump pressure line.

SUBTASK 28-22-41-420-024

(23) Install the rigid coupling assembly [63] to attach the pressure switch line [49] to the pressure switch plate adapter [64] (TASK 28-22-15-400-803).

NOTE: Do not install the safety cable or lockwire on the rigid coupling assembly.

(a) Install the new O-ring [62].

SUBTASK 28-22-41-420-025

(24) Install the safety cable or lockwire between the rigid coupling assembly [63] and bulkhead nut on the discharge check valve [41] (TASK 20-10-44-400-801):

(a) Aft fuel boost pump, left wing

(b) Forward fuel boost pump, right wing

(c) Left center fuel boost pump, center tank

(d) Right center fuel boost pump, center tank.

SUBTASK 28-22-41-420-026

(25) Install the safety cable or lockwire between the rigid coupling assembly [63] and the screw [44] for these locations (TASK 20-10-44-400-801):

(a) Aft fuel boost pump, right wing

(b) Forward fuel boost pump, left wing.

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SUBTASK 28-22-41-420-027

(26) Install the safety cable or lockwire between the bulkhead nut and screw on the discharge check valve [41] for these locations (TASK 20-10-44-400-801):

(a) Aft fuel boost pump, right wing

(b) Forward fuel boost pump, left wing.

SUBTASK 28-22-41-420-028

(27) Forward or aft fuel boost pumps, connect the discharge port line to the discharge port on the housing [14].

(a) Install the flexible full coupling [50] on the discharge port line (TASK 28-22-15-400-803).

I. Installation Test

SUBTASK 28-22-41-410-003

(1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

(a) Install the applicable access doors:

(TASK 28-11-31-400-801)

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

SUBTASK 28-22-41-650-009

(2) Refuel the fuel tanks for the applicable fuel boost pump (TASK 12-11-00-650-803).

(a) Forward or aft fuel boost pumps, left wing:

1) No. 1 main tank – 500 lb (227 kg) minimum.

(b) Forward or aft fuel boost pumps, right wing:

1) No. 2 main tank – 500 lb (227 kg) minimum.

(c) Left or right center fuel boost pumps:

1) Center tank – 14,000 lb (6350 kg) minimum.

SUBTASK 28-22-41-210-003

(3) Make sure that the area around the housing [14] has no fuel leaks.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-41-410-004

(1) Install the fuel boost pump motor-impeller (TASK 28-22-41-400-801).

SUBTASK 28-22-41-860-011

(2) Supply electrical power, if necessary (TASK 24-22-00-860-801).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FUEL BOOST PUMP - ADJUSTMENT/TEST

1. General

A. This procedure has these tasks for the fuel boost pump system:

(1) Fuel Boost Pump - Operational Test

(2) Ground Fault Interrupter (GFI) - Operational Test

TASK 28-22-41-710-801

2. Fuel Boost Pump - Operational Test

A. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)

B. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
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
117A	Electronic Equipment Access Door

D. Prepare for the Test

SUBTASK 28-22-41-860-030

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(1) Do these steps for the applicable tanks:

(a) For the No. 1 main tank, do these steps:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) For the aft fuel boost pump, remove the safety tags and close these circuit breakers:

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

2) For the forward fuel boost pump, remove the safety tags and close these circuit breakers:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD

(b) For the No. 2 main tank, do these steps:

1) For the aft fuel boost pump, remove the safety tags and close these circuit breakers:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

2) For the forward fuel boost pump, remove the safety tags and close these circuit breakers:

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

(c) For the center tank, do these steps:

1) For the left center fuel boost pump, remove the safety tags and close these circuit breakers:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

2) For the right center fuel boost pump, remove the safety tags and close these circuit breakers:

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-22-41-410-005

(2) Close this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-22-41-650-010

(3) Make sure that the fuel tanks, for the applicable fuel boost pump, have the minimum fuel quantity (Table 501).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Table 501/28-22-41-993-805 Fuel Tank - Minimum Fuel Quantity

FUEL TANK	FUEL QUANTITY
Center Tank	1000 lb (454 kg)
No. 1 Main Tank	500 lb (227 kg)
No. 2 Main Tank	500 lb (227 kg)

(a) To refuel the fuel tanks, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-803.

E. Fuel Boost Pump Test

NOTE: To operate the fuel boost pumps, a person must be in the flight compartment. This person must continuously monitor the fuel quantity and the low pressure indication for the applicable fuel tank.

SUBTASK 28-22-41-860-016

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.

(1) Immediately set the applicable FUEL PUMPS switch to the OFF position if the LOW PRESSURE light comes on and stays on.

SUBTASK 28-22-41-860-017

(2) On the P5-2 Fuel System Module, set the applicable fuel boost pump switch to the ON position (Table 502).

Table 502/28-22-41-993-806 Fuel Boost Pump - Fuel Tank Location

FUEL BOOST PUMP LOCATION	FUEL TANK	SWITCH/CONTROL
Aft Fuel Boost Pump	No. 1 Main Tank	FUEL PUMPS AFT 1
Forward Fuel Boost Pump	No. 1 Main Tank	FUEL PUMPS FWD 1
Left Center Fuel Boost Pump	Center Tank	FUEL PUMPS CTR L
Right Center Fuel Boost Pump	Center Tank	FUEL PUMPS CTR R
Aft Fuel Boost Pump	No. 2 Main Tank	FUEL PUMPS AFT 2
Forward Fuel Boost Pump	No. 2 Main Tank	FUEL PUMPS FWD 2

SUBTASK 28-22-41-280-001

(3) Make sure that the applicable fuel boost pump operates.

NOTE: A person can hear the fuel boost pump while it operates.

SUBTASK 28-22-41-210-004

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) Make sure that the applicable LOW PRESSURE light on the P5-2 module goes off.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-41-860-018

(5) Set the applicable FUEL PUMPS switch to the OFF position.

SUBTASK 28-22-41-280-002

(6) Make sure that the applicable fuel boost pump does not operate.

SUBTASK 28-22-41-210-005

(7) For the forward or aft fuel boost pumps, make sure that the applicable LOW PRESSURE light comes on.

SUBTASK 28-22-41-210-006

(8) For the left or right center fuel boost pumps, make sure that the applicable LOW PRESSURE light stays off.

——— END OF TASK ———

TASK 28-22-41-720-801

3. Ground Fault Interrupter (GFI) - Operational Test

(Figure 501)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task has one or more steps which are a means to satisfy Airworthiness Limitation Instruction (ALI) requirements. An ALI note will follow the step to which it applies. Any step or sub-step that precedes or follows an ALI identified step is not subject to the ALI requirement.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-20.

B. References

Reference	Title
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 the Test

SUBTASK 28-22-41-010-005

(1) Get access to Power Distribution Panel 1, P91, or Power Distribution Panel 2, P92.

SUBTASK 28-22-41-860-020

(2) On the P5-2 Fuel System Module, set these switches to the OFF position:

(a) FUEL PUMPS 1 AFT

(b) FUEL PUMPS 1 FWD

(c) FUEL PUMPS CTR L

(d) FUEL PUMPS CTR R

(e) FUEL PUMPS 2 AFT

(f) FUEL PUMPS 2 FWD

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-41-650-011

(3) Make sure that these fuel tanks for the applicable fuel boost pump has the minimum fuel quantity shown in Table 503.

Table 503/28-22-41-993-804 Fuel Tank - Minimum Fuel Quantity

FUEL TANK	FUEL QUANTITY
Center Tank	1000 lb (454 kg)
No. 1 Main Tank	500 lb (227 kg)
No. 2 Main Tank	500 lb (227 kg)

E. Ground Fault Interrupter (GFI) Test

NOTE: To operate the fuel boost pumps, a person must be in the flight compartment. This person must continuously monitor the fuel quantity and the low pressure indication for the applicable fuel tank.

SUBTASK 28-22-41-860-022

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) Immediately set the applicable FUEL PUMPS switch to the OFF position if the LOW PRESSURE light comes on and stays on.

SUBTASK 28-22-41-860-023

(2) Put the applicable fuel boost pump switch to the ON position on the P5-2 module (Table 504).

Table 504/28-22-41-993-802 Fuel Boost Pump - Fuel Tank Location

FUEL BOOST PUMP LOCATION	FUEL TANK	SWITCH/CONTROL
Aft Fuel Boost Pump	No. 1 Main Tank	FUEL PUMPS AFT 1
Forward Fuel Boost Pump	No. 1 Main Tank	FUEL PUMPS FWD 1
Left Center Fuel Boost Pump	Center Tank	FUEL PUMPS CTR L
Right Center Fuel Boost Pump	Center Tank	FUEL PUMPS CTR R
Aft Fuel Boost Pump	No. 2 Main Tank	FUEL PUMPS AFT 2
Forward Fuel Boost Pump	No. 2 Main Tank	FUEL PUMPS FWD 2

(a) Make sure that the applicable fuel boost pump operates.

NOTE: A person can hear the fuel boost pump while it operates.

SUBTASK 28-22-41-210-007

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.

(3) Make sure that the LOW PRESSURE light goes off for the applicable fuel boost pump.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-41-860-024

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(4) Push the applicable TEST button on the GFI relay to test the fuel boost pump (Table 505).

NOTE: The GFI relays are found in the P91 and P92 panels.

NOTE: When an electrical fault occurs, the GFI circuit relays in the P91 and P92 panel detects the fault and opens the circuit. The RESET button on the top of the GFI relay shows a narrow white band when the circuit opens. The TEST button on the top of the GFI, when pressed, will also show the narrow white band.

NOTE: Use a finger to press the TEST button throughout this task to prevent damage to the relay.

Table 505/28-22-41-993-803 Fuel Boost Pump - Relay Location

FUEL BOOST PUMP LOCATION	FUEL TANK	RELAY	RELAY PANEL LOCATION
Aft Fuel Boost Pump	No. 1 Main Tank	R18	Power Distribution Panel 2, P92
Forward Fuel Boost Pump	No. 1 Main Tank	R19	Power Distribution Panel 1, P91
Left Center Fuel Boost Pump	Center Tank	R54	Power Distribution Panel 1, P91
Right Center Fuel Boost Pump	Center Tank	R55	Power Distribution Panel 2, P92
Aft Fuel Boost Pump	No. 2 Main Tank	R20	Power Distribution Panel 1, P91
Forward Fuel Boost Pump	No. 2 Main Tank	R21	Power Distribution Panel 2, P92

SUBTASK 28-22-41-210-012

28-AWL-20: ALI

(5) Make sure that the RESET button on the applicable GFI relay has moved out, and shows a white band.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-20.

28-AWL-20: ALI

(a) For the No. 1 tank aft fuel boost pump, the relay is R18, found on the P92 panel.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-20.

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28-AWL-20: ALI

(b) For the No. 1 tank forward fuel boost pump, the relay is R19, found on the P91 panel.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-20.

28-AWL-20: ALI

(c) For the left center tank fuel boost pump, the relay is R54, found on the P91 panel.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-20.

28-AWL-20: ALI

(d) For the No. 2 aft fuel boost pump, the relay is R20, found on the P91 panel.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-20.

28-AWL-20: ALI

(e) For the No. 2 forward fuel boost pump, the relay is R21, found on the P92 panel.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-20.

28-AWL-20: ALI

(f) For the right center tank fuel boost pump, the relay is R55, found on the P92 panel.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-20.

SUBTASK 28-22-41-280-005

28-AWL-20: ALI

(6) Listen and make sure that the applicable fuel boost pump does not operate.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-20.

SUBTASK 28-22-41-210-008

(7) Make sure that the applicable LOW PRESSURE light comes on.

SUBTASK 28-22-41-860-025

(8) Set the applicable FUEL PUMPS switch to the OFF position.

SUBTASK 28-22-41-710-004

(9) To make sure that the applicable fuel boost pump does not operate when the GFI circuit disables the relay, do the subsequent steps:

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(a) Set the applicable FUEL PUMPS switch to the ON position.

1) Make sure that the applicable fuel boost pump does not operate.

(b) Forward or aft fuel boost pumps, make sure that the applicable LOW PRESSURE light is on.

(c) Left or right center fuel boost pumps, make sure that the applicable LOW PRESSURE light comes on.

(d) Set the applicable FUEL PUMPS switch to the OFF position.

SUBTASK 28-22-41-860-026

(10) Push the RESET button on the applicable GFI relay.

(a) Make sure that the RESET button does not move back out, and the white band does not show.

SUBTASK 28-22-41-860-027

(11) Set the applicable FUEL PUMPS switch to the ON position.

SUBTASK 28-22-41-280-003

(12) Make sure that the applicable fuel boost pump operates.

SUBTASK 28-22-41-210-009

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.

(13) Make sure that the applicable LOW PRESSURE light goes off.

SUBTASK 28-22-41-860-028

(14) Set the applicable FUEL PUMPS switch to the OFF position.

SUBTASK 28-22-41-280-004

(15) Make sure that the applicable fuel boost pump does not operate.

SUBTASK 28-22-41-210-010

(16) Forward or aft fuel boost pumps, make sure that the applicable LOW PRESSURE light comes on.

SUBTASK 28-22-41-710-005

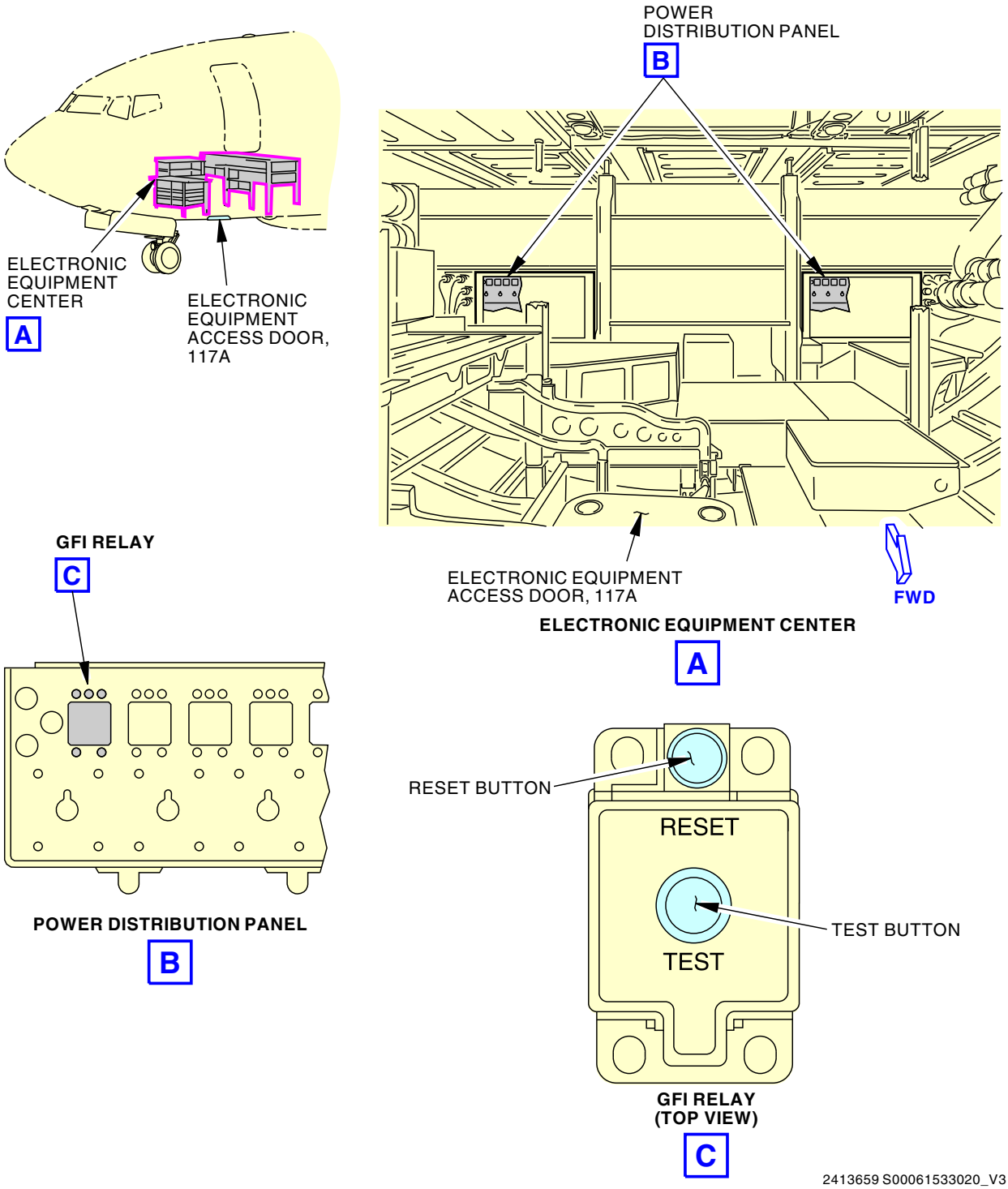
(17) Left or right center fuel boost pumps, make sure that the applicable LOW PRESSURE light stays off.

SUBTASK 28-22-41-860-029

(18) Repeat the GFI Test for the next fuel boost pump.

END OF TASK

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Ground Fault Interrupter (GFI) Relay Location
Figure 501/28-22-41-990-808

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FUEL SYSTEM MODULE, P5-2 - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) Fuel System Module, P5-2 Removal

(2) Fuel System Module, P5-2 Installation.

TASK 28-22-43-020-801

2. Fuel System Module, P5-2 Removal

(Figure 401)

A. General

(1) This task gives instructions to remove the fuel system module, P5-2.

B. References

Reference	Title
20-40-12 P/B 201	ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES - MAINTENANCE PRACTICES
28-43-21-020-801	Fuel Temperature Indicator Removal (P/B 401)

C. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
211	Flight Compartment - Left
212	Flight Compartment - Right

D. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door

E. Prepare for the Removal

SUBTASK 28-22-43-860-001

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
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 CONT
C	3	C01637	BOOST PMP CTR TNK L AUTO SHUT OFF-DC
C	4	C01471	FUEL SHUTOFF VALVES PWR PACK
C	6	C01472	FUEL SHUTOFF VALVES BUS
C	7	C01638	BOOST PMP CTR TNK R AUTO SHUT OFF-DC
C	11	C01275	MASTER CAUTION ANNUNCIATOR CONT 1
D	7	C01659	AT S-O/UCPO BST PMP CTR TNK L AC
E	3	C01321	ENGINE FUEL ENGINE 2 HPSOV CONT
E	4	C01396	ENGINE FUEL ENGINE 2 HPSOV IND

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(Continued)

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
E	5	C01320	ENGINE FUEL ENGINE 1 HPSOV CONT
E	6	C01395	ENGINE FUEL ENGINE 1 HPSOV IND
E	7	C01658	FUEL AT S-O/UCPO BST PMP CTR TNK R AC
E	11	C00313	INDICATOR MASTER DIM SECT 1
F	12	C00318	INDICATOR MASTER DIM SECT 6

SUBTASK 28-22-43-010-003

(2) Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-22-43-860-009

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-22-43-760-002

CAUTION

DO NOT TOUCH THE UNIT BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE UNIT.

(4) Before you touch the fuel system module, P5-2 [1], do the procedure for devices that are sensitive to electrostatic discharge (PAGEBLOCK 20-40-12/201).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-43-010-002

(5) Open the P5 Overhead Panel.

(a) Loosen the quarter-turn fasteners on the bottom corners of the P5 Overhead Panel.

WARNING HOLD THE PANEL TIGHTLY BEFORE YOU RELEASE THE LATCH. THE PANEL IS HEAVY. INJURIES CAN OCCUR IF IT HITS YOU.

(b) Release the P5 Overhead Panel safety latches.

F. Fuel System Module, P5-2 Removal

SUBTASK 28-22-43-020-001

(1) Loosen the six quarter-turn fasteners on the fuel system module, P5-2 [1].

SUBTASK 28-22-43-010-001

(2) Carefully move the fuel system module, P5-2 [1] from the P5 panel.

SUBTASK 28-22-43-020-002

(3) Disconnect the three connectors from the rear of the fuel system module, P5-2 [1].

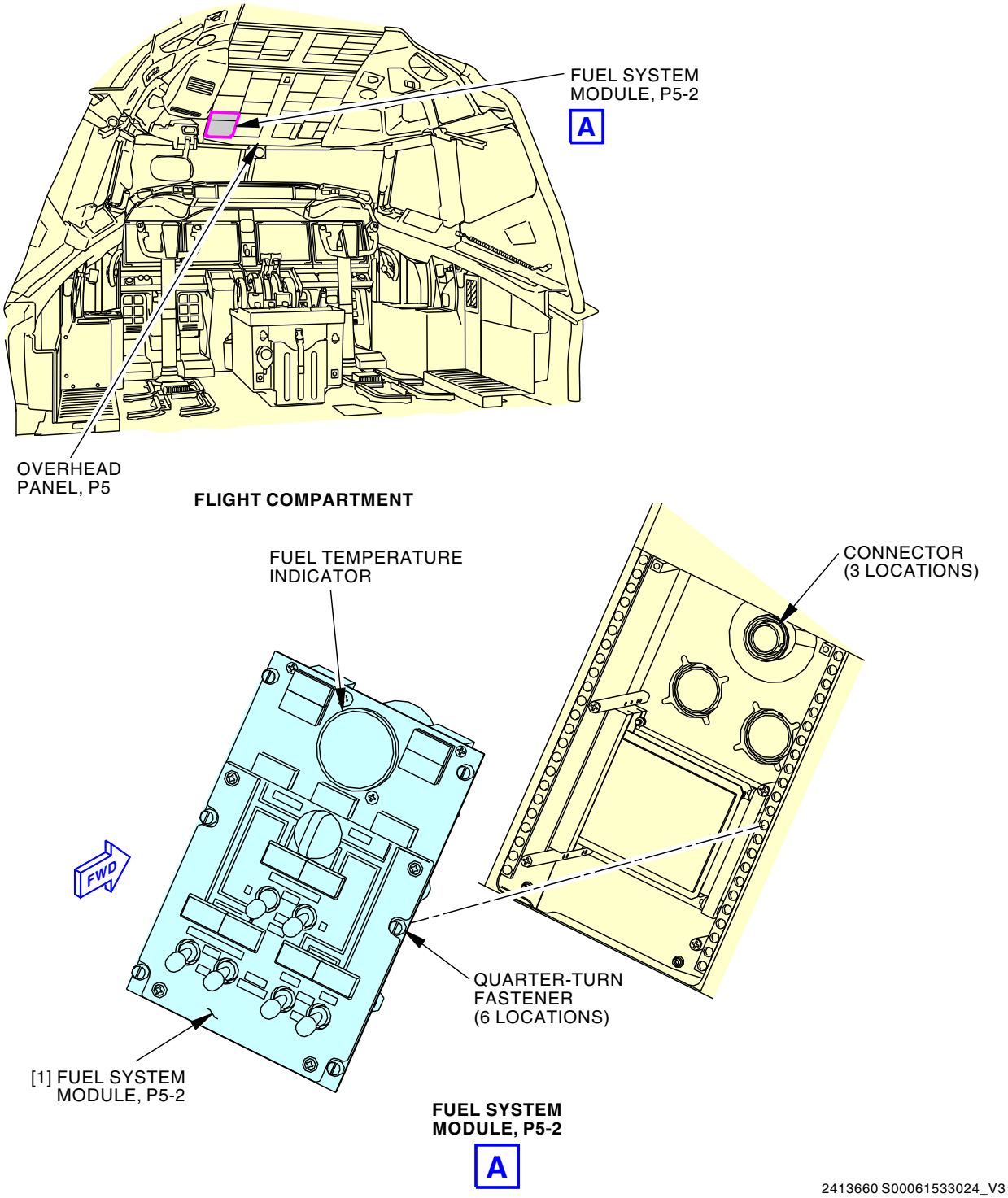
NOTE: The connectors are D626, D628, and D616.

SUBTASK 28-22-43-020-004

(4) Remove the fuel temperature indicator as necessary (TASK 28-43-21-020-801).

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fuel System Module, P5-2 Installation
Figure 401/28-22-43-990-801

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-43-420-801

3. Fuel System Module, P5-2 Installation

(Figure 401)

A. General

(1) This task gives instructions for the installation of the fuel system module, P5-2.

B. References

Reference	Title
20-40-12 P/B 201	ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES - MAINTENANCE PRACTICES
28-22-43-710-801	Fuel System Module, P5-2 - Operational Test (P/B 501)
28-43-21-020-802	Fuel Temperature Indicator Installation (P/B 401)

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Fuel system module, P5-2	28-22-43-01-050	SIA 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 Installation

SUBTASK 28-22-43-760-003

CAUTION

DO NOT TOUCH THE UNIT BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE UNIT.

(1) Before you touch the fuel system module, P5-2 [1], do the procedure for devices that are sensitive to electrostatic discharge (PAGEBLOCK 20-40-12/201).

SUBTASK 28-22-43-420-001

(2) Install the fuel temperature indicator as applicable (TASK 28-43-21-020-802).

G. Fuel System Module, P5-2 Installation

SUBTASK 28-22-43-420-003

(1) Align the fuel system module, P5-2 [1] in its position on the P5 Overhead Panel.

SUBTASK 28-22-43-420-005

(2) Tighten the six quarter-turn fasteners.

SUBTASK 28-22-43-420-004

(3) Connect the three connectors to the fuel system module, P5-2 [1].

NOTE: The connectors are D616, D626, and D628.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-43-410-002

(4) Close the P5 Overhead Panel, as follows:

(a) Raise the P5 Overhead Panel.

(b) Make sure that the safety latch is in the proper position.

(c) Tighten the quarter-turn fasteners on the bottom corners of the P5 Overhead Panel.

H. Fuel System Module, P5-2 Installation Test

SUBTASK 28-22-43-860-010

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-22-43-410-003

(2) Close this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-22-43-860-002

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
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

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(Continued)

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	7	C00361	FUEL CROSS FEED VALVE CONT
C	3	C01637	BOOST PMP CTR TNK L AUTO SHUT OFF-DC
C	4	C01471	FUEL SHUTOFF VALVES PWR PACK
C	6	C01472	FUEL SHUTOFF VALVES BUS
C	7	C01638	BOOST PMP CTR TNK R AUTO SHUT OFF-DC
C	11	C01275	MASTER CAUTION ANNUNCIATOR CONT 1
D	7	C01659	AT S-O/UCPO BST PMP CTR TNK L AC
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
E	7	C01658	FUEL AT S-O/UCPO BST PMP CTR TNK R AC
E	11	C00313	INDICATOR MASTER DIM SECT 1
F	12	C00318	INDICATOR MASTER DIM SECT 6

SUBTASK 28-22-43-710-001

(4) Do this task: Fuel System Module, P5-2 - Operational Test, TASK 28-22-43-710-801.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FUEL SYSTEM MODULE, P5-2 - ADJUSTMENT/TEST

1. General

A. This procedure has this task:

(1) Fuel System Module, P5-2 - Operational Test.

TASK 28-22-43-710-801

2. Fuel System Module, P5-2 - Operational Test

(Figure 501)

A. References

Reference	Title
28-22-41-710-801	Fuel Boost Pump - Operational Test (P/B 501)
71-00-00-700-809-G00	Test No. 33 - Lamp Check Out Special Functions Test (P/B 501)

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

C. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door

D. Prepare for the Test

SUBTASK 28-22-43-860-004

(1) Make sure that these circuit breakers are closed:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
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 CONT
C	3	C01637	BOOST PMP CTR TNK L AUTO SHUT OFF-DC
C	4	C01471	FUEL SHUTOFF VALVES PWR PACK
C	6	C01472	FUEL SHUTOFF VALVES BUS
C	7	C01638	BOOST PMP CTR TNK R AUTO SHUT OFF-DC
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
E	11	C00313	INDICATOR MASTER DIM SECT 1
F	12	C00318	INDICATOR MASTER DIM SECT 6

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-43-010-004

(2) Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-22-43-860-011

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(3) Make sure that these circuit breakers are closed:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

SUBTASK 28-22-43-860-005

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

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(WARNING PRECEDES)

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

E. Fuel System Module Test

SUBTASK 28-22-43-710-002

(1) On the P5-2 module, make sure that these engine No. 1 lights are on:

(a) SPAR VALVE CLOSED

(b) ENG VALVE CLOSED.

SUBTASK 28-22-43-710-003

(2) On the forward overhead panel, P5, make sure that the ENGINE START 1 and 2 switches are in the OFF position.

SUBTASK 28-22-43-710-004

(3) On the control stand, P10, set the Engine 1 Start Lever to the IDLE position.

(a) Make sure that engine No. 1 SPAR VALVE CLOSED light comes on brightly while the valve goes from the closed to the open position.

(b) Make sure that engine No. 1 SPAR VALVE CLOSED light goes off in 6 seconds.

(c) Make sure that engine No. 1 ENG VALVE CLOSED light comes on brightly.

SUBTASK 28-22-43-710-005

(4) Set the Engine 1 Start Lever to the CUTOFF position.

(a) Make sure that engine No. 1 SPAR VALVE CLOSED light comes on.

(b) Make sure that engine No. 1 ENG VALVE CLOSED light comes on.

SUBTASK 28-22-43-710-006

(5) On the P5-2 module, make sure that these engine No. 2 lights are on:

(a) SPAR VALVE CLOSED

(b) ENG VALVE CLOSED.

SUBTASK 28-22-43-710-007

(6) On the control stand, P10, set the Engine 2 Start Lever to the IDLE position.

(a) Make sure that engine No. 2 SPAR VALVE CLOSED light comes on brightly while the valve goes from the closed to the open position.

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(b) Make sure that engine No. 2 SPAR VALVE CLOSED light for engine No. 2 goes off in 6 seconds.

(c) Make sure that engine No. 2 ENG VALVE CLOSED light comes on brightly.

SUBTASK 28-22-43-710-008

(7) Set the Engine 2 Start Lever to the CUTOFF position.

(a) Make sure that the engine No. 2 SPAR VALVE CLOSED light comes on.

(b) Make sure that the engine No. 2 ENG VALVE CLOSED light comes on.

SUBTASK 28-22-43-710-009

(8) Make sure that the fuel gage needle is not supported by the needle indicator stops.

SUBTASK 28-22-43-860-006

(9) Make sure that the fuel crossfeed VALVE OPEN light is off.

SUBTASK 28-22-43-710-010

(10) Set the CROSS FEED switch to the open position.

(a) Make sure that the fuel crossfeed VALVE OPEN light is on bright while the valve goes from the closed position to the open position.

(b) Make sure that the fuel crossfeed VALVE OPEN light dims in 6 seconds.

SUBTASK 28-22-43-710-011

(11) Set the CROSS FEED switch to the closed position.

(a) Make sure that the fuel crossfeed VALVE OPEN light goes off.

SUBTASK 28-22-43-710-012

(12) Make sure that the LOW PRESSURE lights are on for these fuel boost pumps:

(a) Main tank No. 1 - forward fuel boost pump

(b) Main tank No. 1 - aft fuel boost pump

(c) Main tank No. 2 - forward fuel boost pump

(d) Main tank No. 2 - aft fuel boost pump.

SUBTASK 28-22-43-710-013

(13) Do a test of the system master caution annunciator:

(a) Set the FUEL PUMPS CTR L switch to the ON position.

1) Make sure that the LOW PRESSURE light comes on for the FUEL PUMPS CTR L switch.

(b) After approximately 15 seconds, set the FUEL PUMPS CTR L switch to the OFF position.

(c) On the glareshield panel, P7, make sure that the FUEL annunciator light is on for the left system annunciator light.

(d) On the glareshield panel, P7, push the MASTER CAUTION pushbutton.

1) Make sure that the FUEL annunciator light goes off.

(e) On the glareshield panel, P7, push the FLT CONT/IRS/FUEL annunciator light pushbutton on the left system annunciator light.

1) Make sure that the FUEL annunciator light comes on.

(f) Set the FUEL PUMPS CTR R switch to the ON position.

1) Make sure that the LOW PRESSURE light comes on for the FUEL PUMPS CTR R switch.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(g) After approximately 15 seconds, set the FUEL PUMPS CTR R switch to the OFF position.

(h) Make sure that the FUEL annunciator light is on.

(i) Push the MASTER CAUTION pushbutton.

1) Make sure that the FUEL annunciator light goes off.

(j) Push the FLT CONT/IRS/FUEL annunciator light pushbutton.

1) Make sure that the FUEL annunciator light comes on.

SUBTASK 28-22-43-710-014

(14) Do a test of the FILTER BYPASS (TASK 71-00-00-700-809-G00).

NOTE: This test will make sure that the FILTER BYPASS light operates correctly.

SUBTASK 28-22-43-860-007

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-22-43-410-004

(16) Close this access panel:

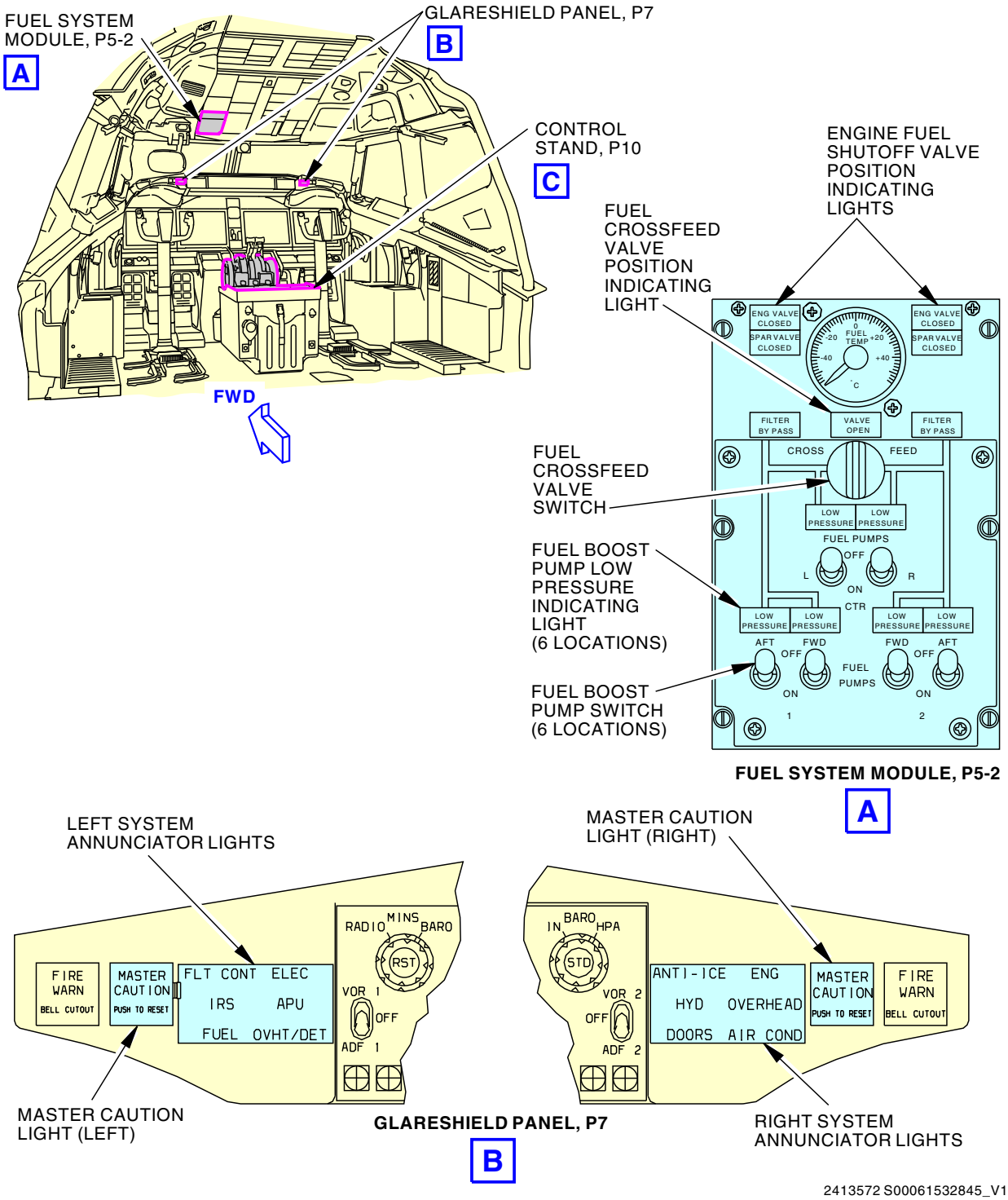
Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-22-43-760-001

(17) Do this task: Fuel Boost Pump - Operational Test, TASK 28-22-41-710-801.

END OF TASK

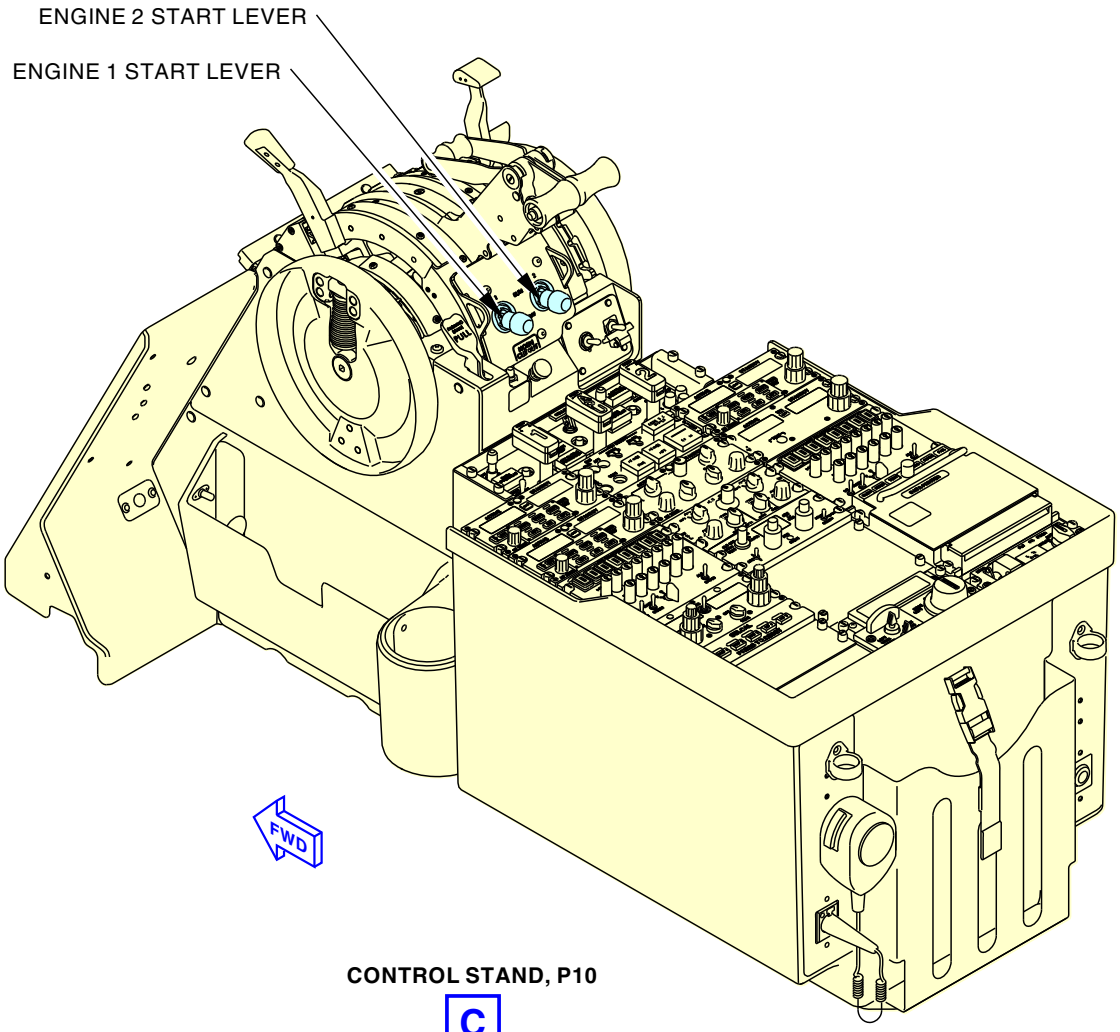
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413572 S00061532845_V1

Engine Fuel Feed System
Figure 501/28-22-43-990-802 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413573 S00061532846_V1

Engine Fuel Feed System
Figure 501/28-22-43-990-802 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FUEL BOOST PUMP REMOVAL CHECK VALVE - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) A removal of the removal check valve

(2) An installation of the removal check valve.

B. The fuel boost pump removal check valve is referred to as the removal check valve in this procedure.

C. A removal check valve attaches to each of the six fuel boost pumps. All fuel boost pumps are installed on the rear spars. The removal check valve is designed to allow the removal of the motor-impeller without defueling the center tank or main tanks.

TASK 28-22-51-000-801

2. Removal Check Valve Removal

(Figure 401)

A. General

(1) This task gives instructions to remove the removal check valve.

B. 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)
28-22-15-000-803	Couplings 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. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
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. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door
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. Prepare for the Removal

SUBTASK 28-22-51-480-001

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.

(1) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-22-51-650-001

(2) Defuel the center tank (TASK 28-26-00-650-801).

SUBTASK 28-22-51-650-002

(3) Defuel the No.1 main tank for the removal check valves [3] (TASK 28-26-00-650-801):

(a) Left center fuel boost pump

(b) Forward or aft fuel boost pumps, on the left wing.

SUBTASK 28-22-51-650-003

(4) Defuel the No. 2 main tank for the removal check valves [3] (TASK 28-26-00-650-801):

(a) Right center fuel boost pump

(b) Forward or aft fuel boost pumps, on the right wing.

SUBTASK 28-22-51-860-001

(5) Set the CROSSFEED valve switch, on the P5-2 fuel system module, to the closed position.

(a) Make sure that the indicator light for the crossfeed valve position goes off.

SUBTASK 28-22-51-010-002

(6) Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-22-51-860-002

WARNING WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(7) Open the applicable circuit breakers and install safety tags:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-22-51-410-001

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(8) Do this task for the applicable fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Access the removal check valves for the No. 1 main tank, remove this access door: (TASK 28-11-31-000-801)

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

(b) Access the removal check valves for the No. 2 main tank, remove this access door: (TASK 28-11-31-000-801)

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

(c) Access the removal check valves for the center tank, remove this access door: (TASK 28-11-31-000-801)

Number	Name/Location
131AB	Center Tank Access

SUBTASK 28-22-51-410-002

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.

(9) Go into the fuel tank (TASK 28-11-00-910-802).

F. Removal Check Valve Removal

SUBTASK 28-22-51-000-001

(1) Remove lockwire between the flexible half coupling assembly [5] and screw [9] on the bracket of the removal check valve [3] (View E, Figure 401).

SUBTASK 28-22-51-020-007

(2) Remove the washer [11], spacer [10], and screw [9] from the bracket of the removal check valve [3].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-51-020-001

(3) Disconnect the flexible half coupling assembly [5] between the removal check valve [3] and pump inlet line (TASK 28-22-15-000-803).

NOTE: The flexible half coupling assembly has two retaining rings.

(a) Remove and discard the O-ring [4].

SUBTASK 28-22-51-020-002

(4) Move the pump inlet line away from the removal check valve [3].

SUBTASK 28-22-51-020-003

(5) Remove the screws [6], washers [7], and nuts [8] from the flanges.

SUBTASK 28-22-51-020-004

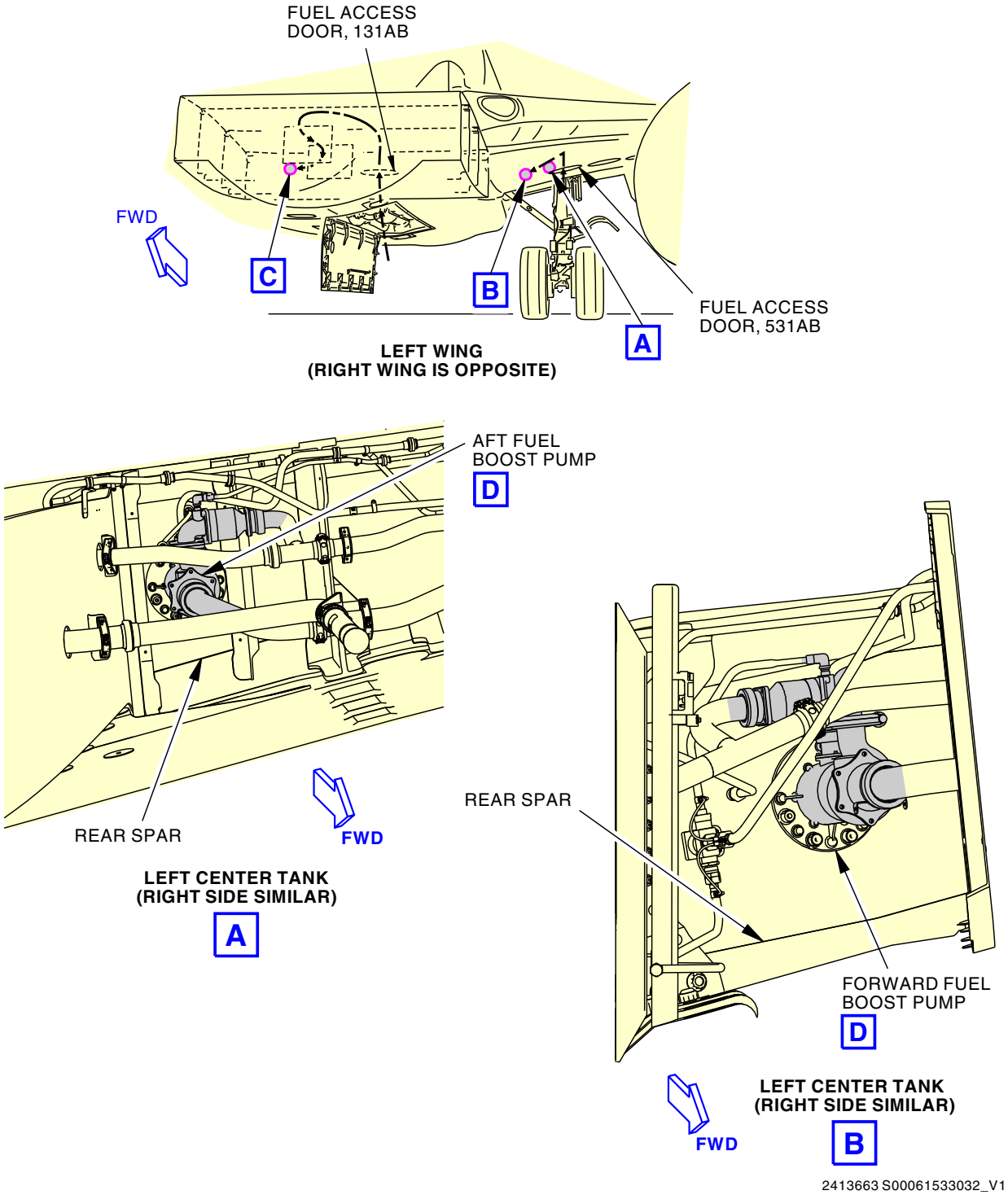
(6) Remove and discard the O-ring [2].

SUBTASK 28-22-51-020-005

(7) Remove the removal check valve [3].

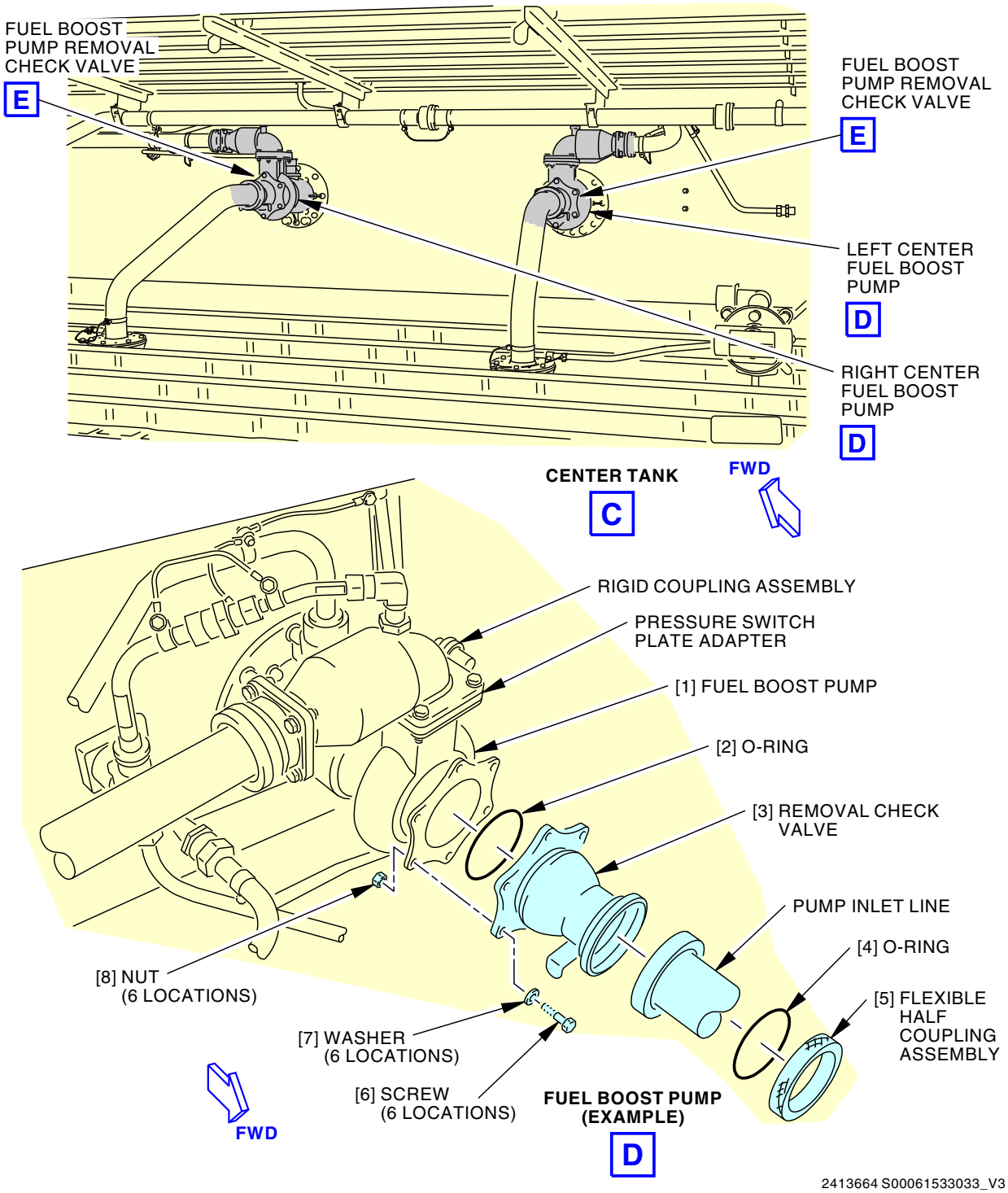
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



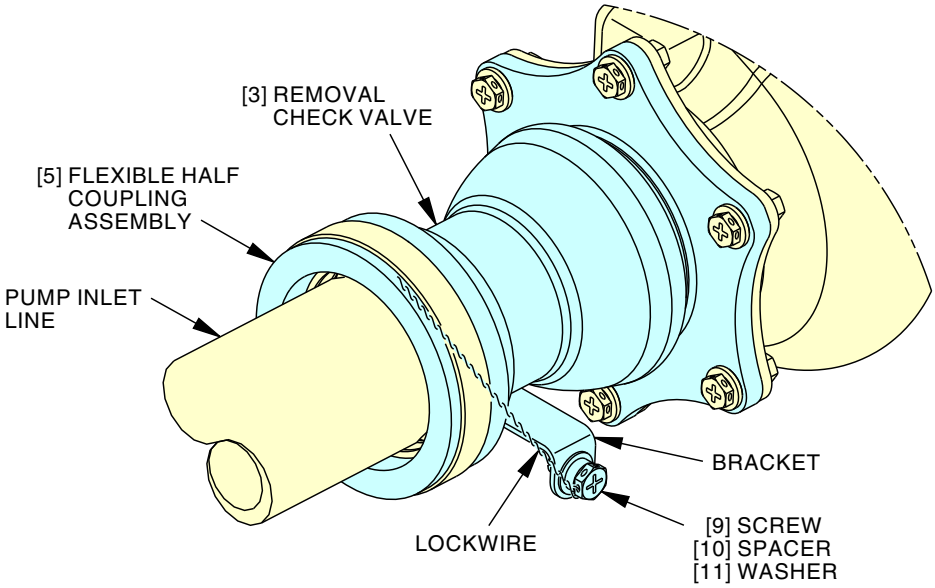
Boost Pump Removal Check Valve Installation
Figure 401/28-22-51-990-801 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Boost Pump Removal Check Valve Installation
Figure 401/28-22-51-990-801 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



FUEL BOOST PUMP REMOVAL CHECK VALVE (EXAMPLE)

E

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Boost Pump Removal Check Valve Installation
Figure 401/28-22-51-990-801 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-51-400-801

3. Removal Check Valve Installation

(Figure 401)

A. General

(1) This task gives instructions to install the removal check valve.

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-22-15-400-803	Couplings Installation (P/B 401)
28-22-41-000-801	Fuel Boost Pump Motor-Impeller Removal (P/B 401)
28-22-41-400-801	Fuel Boost Pump Motor-Impeller Installation (P/B 401)
51-21-41-370-802	Apply Bonderite M-CR 600, Bonderite M-CR 1200, Bonderite M-CR 600RTU, or Bonderite M-CR 1200S Solution (P/B 701)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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-1769	Puller - Fuel Pump Part #: B28003-1 Supplier: 81205

D. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
C50315	Coating - Chemical Conversion - Bonderite M-CR 600 Aero (Formerly Alodine 600)	BAC5719 Class A, C or D, MIL-DTL-81706 Type I Class 1A or 3
D00504	Grease - Petrolatum	VV-P-236
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G50347	Lockwire - MS20995NC32, Monel - 0.032 Inch (0.8128 mm) Diameter	NASM20995
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	Removal check valve	28-22-51-01-030	SIA ALL
		28-22-51-02-030	SIA ALL

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
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. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door
131AB	Center Tank Access
531AB	Center Tank Access Door - Wing Station 168
631AB	Center Tank Access Door - Wing Station 168

H. Removal Check Valve Installation

SUBTASK 28-22-51-100-001

(1) Do these steps to prepare the new removal check valve [3] and fuel boost pump [1] for the installation:

(a) Clean the fay surfaces of the fuel boost pump [1] and removal check valve [3] (SWPM 20-20-00).

1) Use Cleaning Procedure 1 to manually clean the inlet flange fay surface on the removal check valve [3].

a) Use an abrasive pad to clean the flange fay surface.

b) Move the pad in a circular movement while you press with your thumb.

NOTE: Do not clean the O-ring groove.

2) Use Cleaning Procedure 1 to manually clean the inlet flange fay surface on the fuel boost pump [1].

a) Use an abrasive pad to clean the flange fay surface.

b) Move the pad in a circular movement while you press with your thumb.

3) Final Clean the fay surfaces of the fuel boost pump [1] and removal check valve [3].

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

a) Use a new cotton wiper, G00034 (recommended), or knit cotton wiper, G51293 (alternate), soaked with solvent, B00062, or solvent, B00184.

b) Rub dry with a clean cotton wiper.

c) Continue to clean and dry the surface until the cotton wiper stays clean.

(b) Manually apply Bonderite M-CR 600 Aero coating, C50315, to the abraded surfaces (TASK 51-21-41-370-802).

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SUBTASK 28-22-51-420-001

(2) Connect the removal check valve [3] to the fuel boost pump [1]:

(a) Lubricate the new O-ring [2] with grease, D00504.

(b) Install the O-ring [2] in the groove on the flange of the removal check valve [3].

(c) Align the flange of the removal check valve [3] with the flange of the fuel boost pump [1].

(d) Install the screws [6], washers [7], and nuts [8].

SUBTASK 28-22-51-420-002

(3) Install the flexible half coupling assembly [5] to attach the pump inlet line to the removal check valve [3] (TASK 28-22-15-400-803).

(a) Install new O-ring [4].

SUBTASK 28-22-51-420-004

(4) Install the washer [11], spacer [10], and screw [9] on the bracket of the removal check valve [3].

SIA 001-013, 015-999

(a) Tighten the screw [9] to 33 in-lb (3.7 N·m) with the hand tool only.

1) Hold on the bracket with the adjustable wrench when torque the screw [9].

2) Make sure that the bracket does not twist after torque.

SIA 014

(b) Tighten the screw [9] to 35.0 in-lb (4.0 N·m) - 45.0 in-lb (5.1 N·m) with the hand tool only.

1) Hold the bracket with the adjustable wrench when you tighten the screw [9].

2) Do not under or over tighten the screw [9] to align the hole for lockwire.

3) Make sure that the bracket is not twisted or bent.

SIA ALL

SUBTASK 28-22-51-420-005

(5) Install MS20995NC32 lockwire, G50347, between the flexible half coupling assembly [5] and screw [9] on the bracket of the removal check valve [3] (View E, Figure 401).

I. Removal Check Valve Installation Test

SUBTASK 28-22-51-010-001

(1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

(a) Install the applicable access panels:

(TASK 28-11-31-400-801)

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-51-860-003

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-22-51-410-003

(3) Close this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-22-51-710-001

(4) To do an operational test of the applicable removal check valve [3] for the No. 1 main tank, do these steps:

(a) Refuel No.1 main tank to 300 lb (136 kg) minimum (TASK 12-11-00-650-803).

(b) Pull the motor-impeller out 0.6 in. (15.2 mm) (or to the MS35275-250 screws) from the fuel boost pump [1] (TASK 28-22-41-000-801).

NOTE: This allows the valve in the removal check valve to close.

1) Use the puller, SPL-1769, to pull out the motor-impeller.

WARNING

DO NOT LET FUEL SPILL. WHEN YOU REMOVE THE DRAIN PLUG, A SMALL QUANTITY OF FUEL WILL COME OUT OF THE MOTOR/IMPELLER UNIT. IF THERE IS A CONTINUOUS FLOW OF FUEL, THE VALVE IS NOT CLOSED. FUEL CAN CAUSE A FIRE OR AN EXPLOSION. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(c) Remove the drain plug.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Make sure that fuel does not continuously drain from the drain port.

(d) Install the drain plug.

(e) Install the motor-impeller (TASK 28-22-41-400-801).

SUBTASK 28-22-51-710-002

(5) To do an operational test of the applicable removal check valve [3] for the No. 2 main tank, do these steps:

(a) Refuel No. 2 main tank to 300 lb (136 kg) minimum (TASK 12-11-00-650-803).

(b) Pull the motor-impeller out 0.6 in. (15.2 mm) (or to the MS35275-250 screws) from the fuel boost pump [1] (TASK 28-22-41-000-801).

NOTE: This allows the valve in the removal check valve to close.

1) Use the puller, SPL-1769, to pull the motor-impeller out.

WARNING

DO NOT LET FUEL SPILL. WHEN YOU REMOVE THE DRAIN PLUG, A SMALL QUANTITY OF FUEL WILL COME OUT OF THE MOTOR/IMPELLER UNIT. IF THERE IS A CONTINUOUS FLOW OF FUEL, THE VALVE IS NOT CLOSED. FUEL CAN CAUSE A FIRE OR AN EXPLOSION. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(c) Remove the drain plug.

1) Make sure that fuel does not continuously drain from the drain port.

(d) Install the drain plug.

(e) Install the motor-impeller (TASK 28-22-41-400-801).

SUBTASK 28-22-51-710-003

(6) To do an operational test of the applicable removal check valve [3] for the center tank, do these steps:

(a) Refuel the center tank to 14,000 lb (6350 kg) minimum (TASK 12-11-00-650-803).

(b) Pull the motor-impeller out 0.6 in. (15.2 mm) (or to the MS35275-250 screws) from the fuel boost pump [1] (TASK 28-22-41-000-801).

NOTE: This allows the valve in the removal check valve to close.

WARNING

DO NOT LET FUEL SPILL. WHEN YOU REMOVE THE DRAIN PLUG, A SMALL QUANTITY OF FUEL WILL COME OUT OF THE MOTOR/IMPELLER UNIT. IF THERE IS A CONTINUOUS FLOW OF FUEL, THE VALVE IS NOT CLOSED. FUEL CAN CAUSE A FIRE OR AN EXPLOSION. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(c) Remove the drain plug.

1) Make sure that fuel does not continuously drain from the drain port.

(d) Install the drain plug.

(e) Install the motor-impeller (TASK 28-22-41-400-801).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

MAIN TANK FUEL BOOST PUMP BYPASS CHECK VALVE - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) Main Tank Fuel Boost Pump Bypass Check Valve Removal

(2) Main Tank Fuel Boost Pump Bypass Check Valve Installation.

B. There are two fuel boost pump bypass check valves installed, one in each main tank. The fuel boost pump bypass check valve are located between stringers 4 and 5 and ribs No. 5 and 6.

TASK 28-22-61-000-801

2. Main Tank Fuel Boost Pump Bypass Check Valve Removal

(Figure 401)

A. General

(1) The main tank fuel boost pump bypass check valve is referred to as bypass check valve in this task.

(2) This task gives instructions to remove the bypass check valve.

B. 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)
28-22-15-000-803	Couplings 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. 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. Prepare for the Removal

SUBTASK 28-22-61-480-001

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.

(1) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-22-61-650-001

(2) Defuel the No. 1 or No. 2 main tank (TASK 28-26-00-650-801).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-22-61-010-001

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.

(3) Do this task for the applicable fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove the applicable access door:

(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

SUBTASK 28-22-61-010-002

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.

(4) Go into the fuel tank (TASK 28-11-00-910-802).

F. Bypass Check Valve Removal

SUBTASK 28-22-61-020-001

(1) Remove the two screws [21], nuts [19], and four washers [20] that secures the suction feed line [1] to the mounting bracket and bracket.

SUBTASK 28-22-61-020-002

(2) Remove the screw [12], two washers [13], washer [15], and nut [18] from the loop clamp [14] and loop clamp [16].

NOTE: Keep the loop clamp [14] loop clamp [16] on the line and suction feed line [1].

SUBTASK 28-22-61-010-003

(3) Remove the four hex head bolts [11], washers [10], washers [9], and nuts [8] that secures the suction feed line [1] to the bypass check valve [4].

SUBTASK 28-22-61-020-003

(4) Remove the rigid coupling assembly [5] (TASK 28-22-15-000-803).

(a) Discard the O-ring [7] and cable assembly [6].

SUBTASK 28-22-61-020-004

(5) Remove the bypass check valve [4].

SUBTASK 28-22-61-020-005

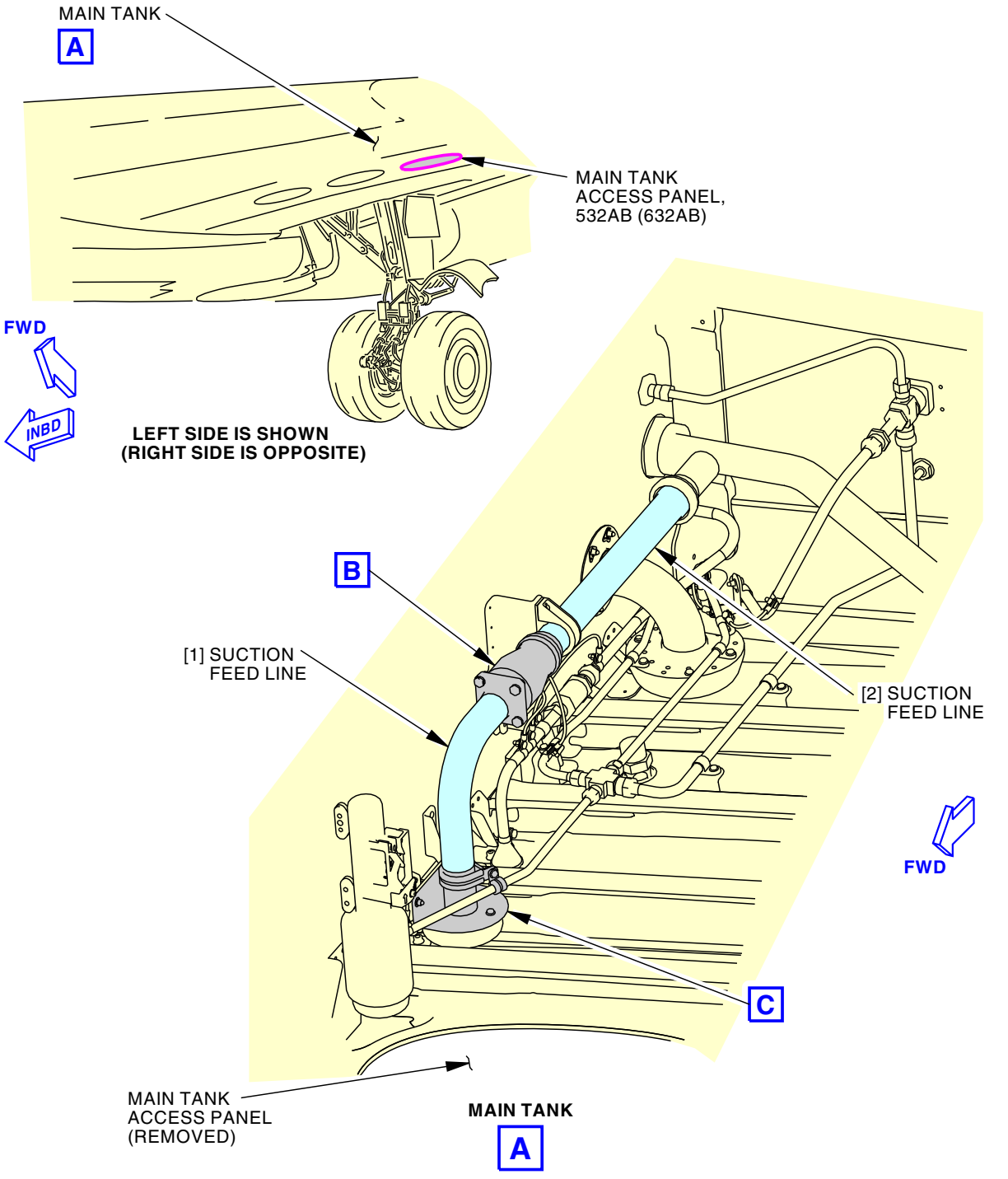
(6) Discard the O-ring [3].

SUBTASK 28-22-61-480-002

(7) Put covers on the open ends of the suction feed line [1] and suction feed line [2] to keep unwanted material out.

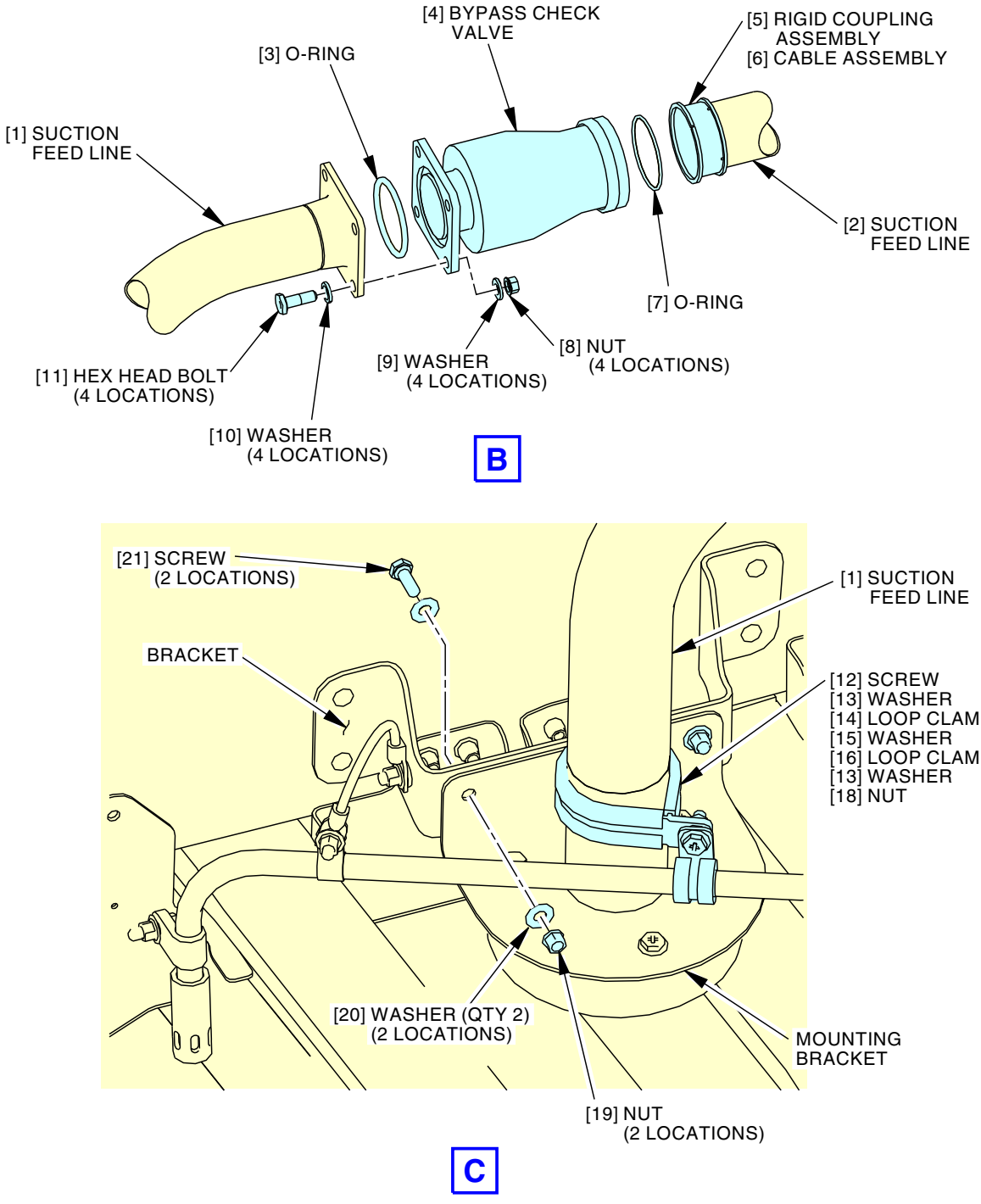
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Main Tank Fuel Boost Pump Bypass Check Valve Installation
Figure 401/28-22-61-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Main Tank Fuel Boost Pump Bypass Check Valve Installation
Figure 401/28-22-61-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-22-61-400-801

3. Main Tank Fuel Boost Pump Bypass Check Valve Installation

(Figure 401)

A. General

(1) The main tank fuel boost pump bypass check valve is referred to as bypass check valve in this task.

(2) This task gives instructions to install the bypass check valve.

B. References

Reference	Title
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-22-00-710-802	Engine Fuel Suction Feed - Operational Test (P/B 501)
28-22-15-400-803	Couplings Installation (P/B 401)
28-22-15-710-801	Engine Fuel Feed Manifold - Leak Test (P/B 601)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
D00504	Grease - Petrolatum	VV-P-236
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	O-ring	28-22-61-01-775	SIA ALL
		28-22-61-10-795	SIA ALL
4	Bypass check valve	28-22-61-01-770	SIA ALL

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(Continued)

AMM Item	Description	AIPC Reference	AIPC Effectivity
4 (cont.)		28-22-61-10-790	SIA ALL
7	O-ring	28-22-61-01-555	SIA ALL
		28-22-61-10-560	SIA ALL

F. 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

G. Access Panels

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216
632AB	Main Tank Access Door - Wing Station 216

H. Prepare for the Installation

SUBTASK 28-22-61-080-001

(1) Remove the cover from the open end of the suction feed line [1].

SUBTASK 28-22-61-100-001

(2) Do these steps to prepare the flange on the bypass check valve [4], flange and mounting bracket on the suction feed line [1], and bracket for installation:

(a) Clean the fay surfaces of the aluminum flanges, aluminum brackets, and aluminum bypass check valve [4] (SWPM 20-20-00):

1) Use Cleaning Procedure 5 to clean the flange fay surface on the suction feed line [1] and the fasteners.

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

a) Use a new cotton wiper, G00034, (alternate: knit cotton wiper, G51293) soaked with solvent, B00062 or solvent, B00184.

b) Use a new cotton wiper to dry the surfaces.

c) Continue to clean and dry the surface until the cotton wiper shows clean.

2) Use Cleaning Procedure 5 to clean the flange fay surface on the bypass check valve [4].

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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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

a) Use a new cotton wiper, G00034, (alternate: knit cotton wiper, G51293) soaked with solvent, B00062 or solvent, B00184.

b) Use a new cotton wiper to dry the surfaces.

c) Continue to clean and dry the surface until the cotton wiper shows clean.

3) Use Cleaning Procedure 5 to clean the mounting bracket fay surface on the suction feed line [1].

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

a) Use a new cotton wiper, G00034, (alternate: knit cotton wiper, G51293) soaked with solvent, B00062 or solvent, B00184.

b) Use a new cotton wiper to dry the surfaces.

c) Continue to clean and dry the surface until the cotton wiper shows clean.

4) Use Cleaning Procedure 5 to clean the bracket fay surface that is attached to the rib.

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

a) Use a new cotton wiper, G00034, (alternate: knit cotton wiper, G51293) soaked with solvent, B00062 or solvent, B00184.

b) Use a new cotton wiper to dry the surfaces.

c) Continue to clean and dry the surface until the cotton wiper shows clean.

SUBTASK 28-22-61-080-002

(3) Remove the cover from the open end of the suction feed line [2].

I. Bypass Check Valve Installation

SUBTASK 28-22-61-420-001

(1) Install the rigid coupling assembly [5] to secure the bypass check valve [4] to the suction feed line [2] (TASK 28-22-15-400-803).

(a) Install new O-ring [7].

SUBTASK 28-22-61-420-002

(2) Attach the bypass check valve [4] to the suction feed line [1] as follows:

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(a) Apply a thin layer of grease, D00504 to the new O-ring [3].

(b) Put the O-ring [3] in the groove of the bypass check valve [4].

(c) Align the bypass check valve [4] mounting holes with the suction feed line [1] mounting holes.

(d) Install the four hex head bolts [11], washers [10], and nuts [8] through the flanges to attach the bypass check valve [4] to the suction feed line [1].

(e) Tighten the four nuts [8] to 65 ±2 in-lb (7.3 ±0.3 N·m).

SUBTASK 28-22-61-420-003

(3) Install the two screws [21], four washers [20], and two nuts [19] to secure the mounting bracket on the suction feed line [1] to the bracket.

SUBTASK 28-22-61-420-004

(4) Tighten the two nuts [19] to 35 ±1 in-lb (4.0 ±0.2 N·m).

SUBTASK 28-22-61-860-001

(5) Measure the electrical bonding resistance between the flanges on the bypass check valve [4] and suction feed line [1] with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

(a) Make sure that the electrical bonding resistance is 0.00550 ohm (5.50 milliohms) or less.

SUBTASK 28-22-61-860-002

(6) Measure the electrical bonding resistance between the mounting bracket on the suction feed line [1] and bracket with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

(a) Make sure that the measured resistance is not more than the maximum bonding resistance value (SWPM 20-20-00).

SUBTASK 28-22-61-420-005

(7) Install the screw [12], washer [13], loop clamp [14], washer [15], loop clamp [16], washer [13], and nut [18] to secure the tube to the suction feed line [1].

J. Main Tank Fuel Boost Pump Bypass Check Valve Installation Test

SUBTASK 28-22-61-410-001

(1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

(a) Install these access doors:

(TASK 28-11-11-400-801)

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216
632AB	Main Tank Access Door - Wing Station 216

SUBTASK 28-22-61-710-001

(2) Do one of these tasks to test the bypass check valve [4] for leaks:

(a) Engine Fuel Feed Manifold - Leak Test, TASK 28-22-15-710-801.

(b) Engine Fuel Suction Feed - Operational Test, TASK 28-22-00-710-802.

——— END OF TASK ———

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FUEL BOOST PUMP DISCHARGE CHECK VALVE - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) Fuel Boost Pump Discharge Check Valve Removal

(2) Fuel Boost Pump Discharge Check Valve Installation.

TASK 28-22-71-000-801

2. Fuel Boost Pump Discharge Check Valve Removal

(Figure 401)

A. General

(1) The fuel boost pump discharge check valve is referred to as discharge check valve in this task.

(2) This task gives instructions to remove the discharge check valve.

B. References

Reference	Title
20-10-51-000-801	Flareless Tubing Assembly Removal (P/B 401)
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)
28-22-15-000-803	Couplings Removal (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)
28-42-11-000-801	Fuel Boost Pump Fuel Pressure Switch Removal (P/B 401)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

C. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
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. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door
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. Prepare for the Removal

SUBTASK 28-22-71-480-001

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.

(1) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-22-71-650-001

(2) Defuel the center tank (TASK 28-26-00-650-801).

SUBTASK 28-22-71-860-001

(3) Defuel the No. 1 main tank to get access to the discharge check valves [17] in these locations (TASK 28-26-00-650-801):

(a) Left center fuel boost pump

(b) Forward or aft fuel boost pumps, on the left wing.

SUBTASK 28-22-71-650-002

(4) Defuel the No. 2 main tank to get access to the discharge check valves [17] in these locations (TASK 28-26-00-650-801):

(a) Right center fuel boost pump

(b) Forward or aft fuel boost pumps, on the right wing.

SUBTASK 28-22-71-860-002

(5) Set the CROSSFEED valve switch to the closed position on the P5-2 fuel system module.

(a) Make sure that the indicator light for the crossfeed valve position goes off.

SUBTASK 28-22-71-010-001

(6) To get access to the P91 and P2 panels, open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-22-71-860-003

WARNING WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

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(WARNING PRECEDES)

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(7) Open the applicable circuit breakers and install safety tags:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-22-71-940-001

WARNING

OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(8) Do this task for the applicable fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove the applicable access panels:

(TASK 28-11-31-000-801)

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

SUBTASK 28-22-71-940-002

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.

(9) Go into the fuel tank (TASK 28-11-00-910-802).

F. Discharge Check Valve Removal

SUBTASK 28-22-71-020-001

(1) Remove the elbow [1]:

NOTE: The forward fuel boost pump on the right wing does not have an elbow [1] or scavenge pump pressure line [2].

(a) Disconnect the scavenge pump pressure line [2] from the elbow [1] on the discharge check valve [17] (TASK 20-10-51-000-801).

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(b) For the right aft or left forward fuel boost pumps, remove the lockwire between the bulkhead nut [19] and screw [4].

(c) For the right forward or left aft fuel boost pumps, remove the lockwire between the bulkhead nut [19] and rigid coupling assembly [13].

(d) Loosen the bulkhead nut [19].

(e) Remove the elbow [1].

(f) Remove the bulkhead nut [19] from the elbow [1].

(g) Remove and discard the O-ring [18].

SUBTASK 28-22-71-020-002

(2) Disconnect the pressure sensor line [9]:

(a) Disconnect the rigid coupling assembly [13] (TASK 28-22-15-000-803).

1) Remove and discard the O-ring [10].

(b) Make sure that fuel has drained from the pressure sensor line [9].

NOTE: This prevents the collection of water in the pressure sensor line [9]. Water can freeze and cause damage to the pressure sensor line [9]. To prevent this type of damage, the pressure sensor line [9] can be loosened at the pressure switch (TASK 28-42-11-000-801). A flush may be necessary to remove all water from the pressure sensor line [9].

SUBTASK 28-22-71-020-003

(3) Remove the screws [4], washers [6], and nuts [7] that attach the flange-adapter [3] to the discharge check valve [17] and pump discharge line.

SUBTASK 28-22-71-020-004

(4) Remove the screws [16], washers [15], and nuts [11] that attaches the pressure sensor plate adapter [14] and fuel boost pump housing [8] to the discharge check valve [17].

SUBTASK 28-22-71-020-005

(5) Remove the discharge check valve [17].

SUBTASK 28-22-71-020-006

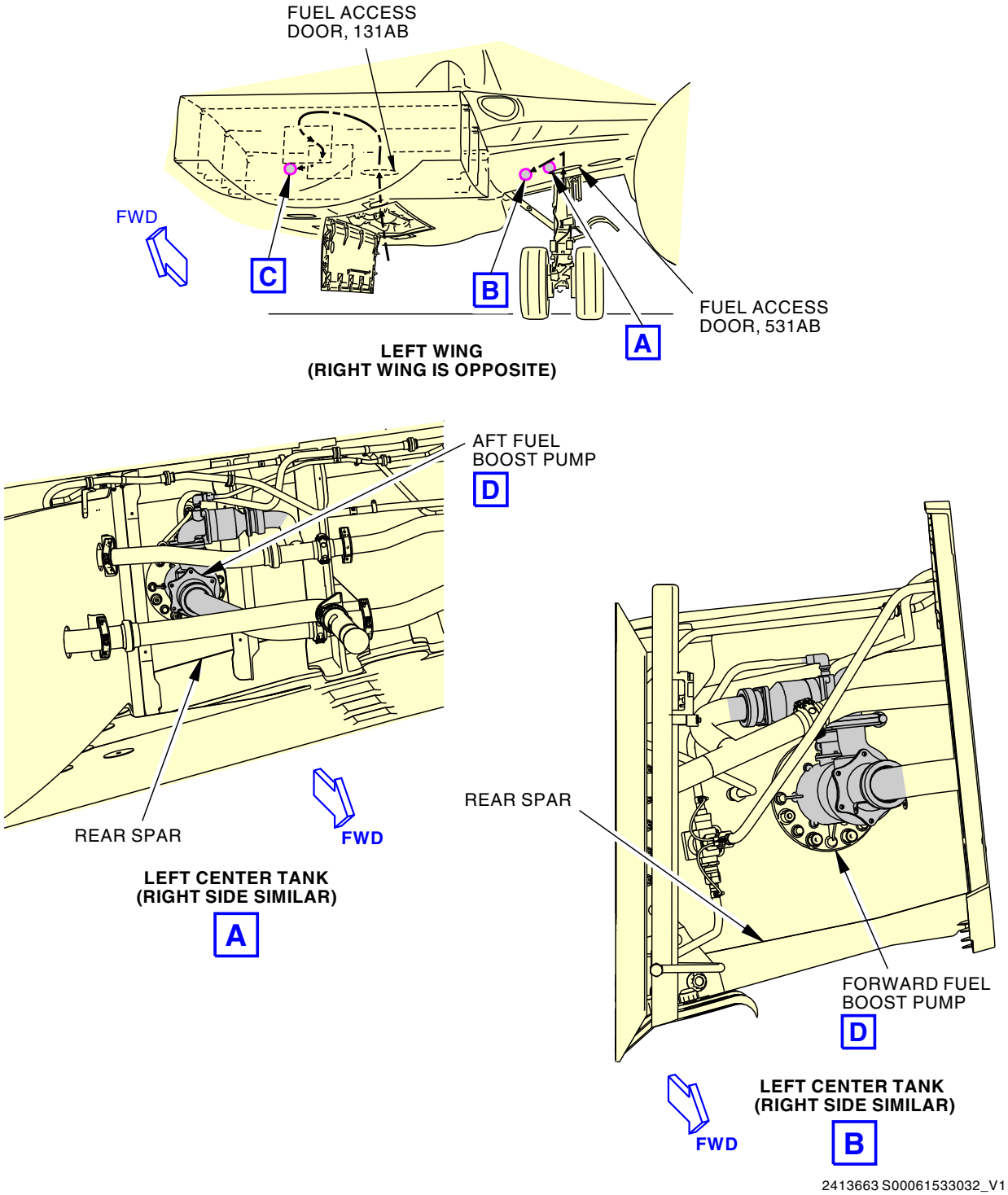
(6) Remove the pressure sensor plate adapter [14].

SUBTASK 28-22-71-020-007

(7) Remove and discard the O-rings [12] and O-ring [5].

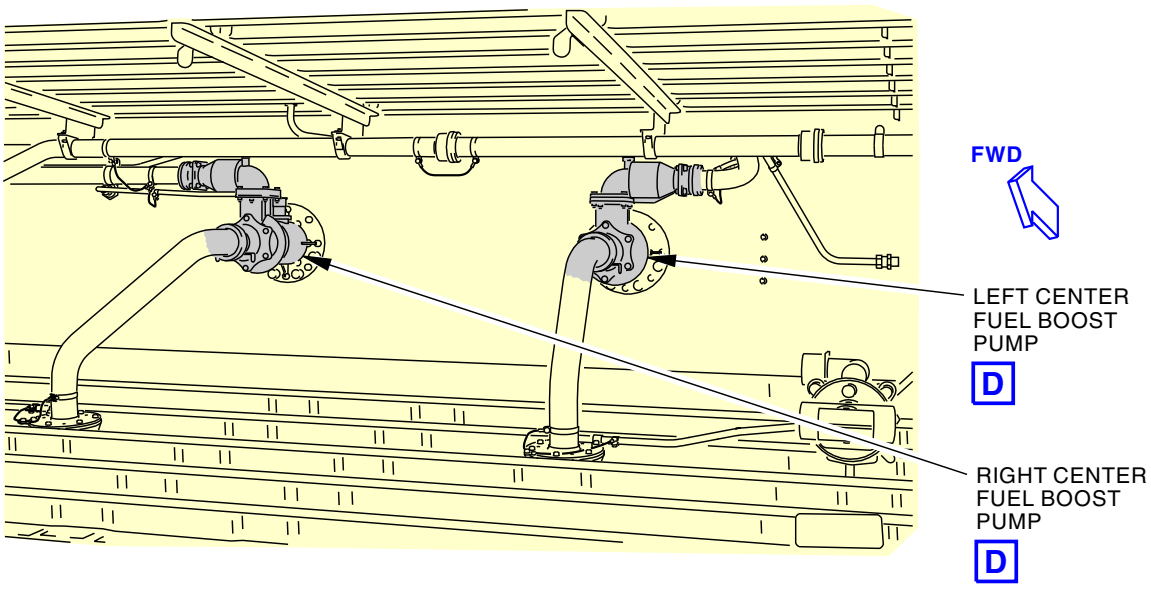
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Boost Pump Discharge Check Valve Installation
Figure 401/28-22-71-990-801 (Sheet 1 of 3)

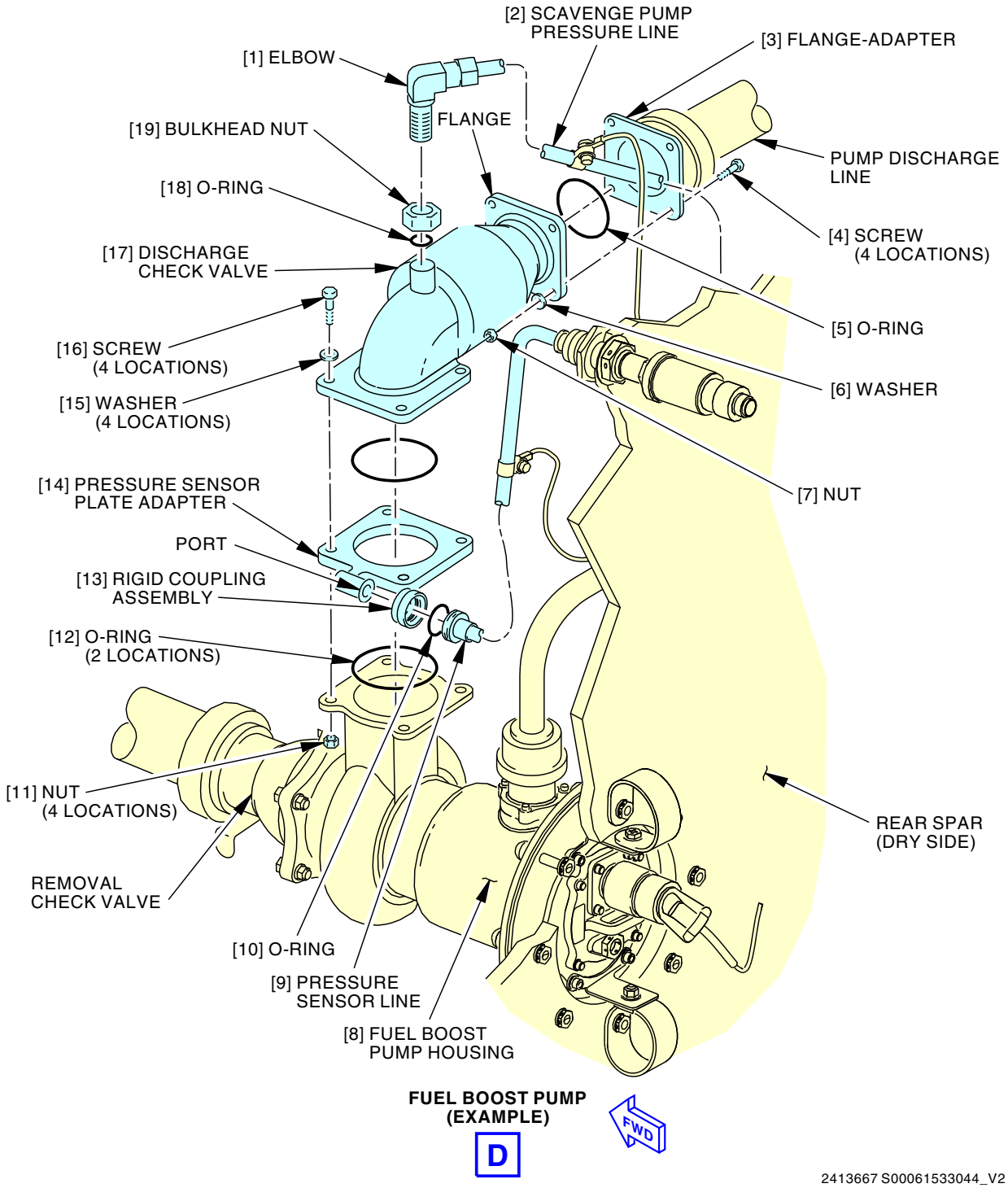
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Boost Pump Discharge Check Valve Installation
Figure 401/28-22-71-990-801 (Sheet 2 of 3)

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Boost Pump Discharge Check Valve Installation
Figure 401/28-22-71-990-801 (Sheet 3 of 3)

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TASK 28-22-71-400-801

3. Fuel Boost Pump Discharge Check Valve Installation

(Figure 401)

A. General

(1) This task gives instructions to install the discharge check valve.

(2) The fuel boost pump discharge check valve is referred to as discharge check valve in this task.

B. References

Reference	Title
20-10-44-400-801	Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401)
20-10-51-400-801	Flareless Tubing Assembly Installation (P/B 401)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-22-15-400-803	Couplings Installation (P/B 401)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

C. Consumable Materials

Reference	Description	Specification
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
C00064	Coating - Aluminum Chemical Conversion	BAC5719 Type II Class A (MIL-DTL-5541 Class 1A)
C50315	Coating - Chemical Conversion - Bonderite M-CR 600 Aero (Formerly Alodine 600)	BAC5719 Class A, C or D, MIL-DTL-81706 Type I Class 1A or 3
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
5	O-ring	28-22-71-01-035	SIA ALL
		28-22-71-02-040	SIA ALL
		28-22-71-02-240	SIA ALL
10	O-ring	28-22-41-01-020	SIA ALL
		28-22-41-02-070	SIA ALL
12	O-ring	28-22-71-01-065	SIA ALL
		28-22-71-02-070	SIA ALL
		28-22-71-02-270	SIA ALL
17	Discharge check valve	28-22-71-01-060	SIA ALL
		28-22-71-02-065	SIA ALL
		28-22-71-02-265	SIA ALL

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(Continued)

AMM Item	Description	AIPC Reference	AIPC Effectivity
18	O-ring	28-22-13-01-110	SIA ALL
		28-22-71-02-100	SIA ALL
		28-22-71-02-295	SIA ALL

E. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
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. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door
131AB	Center Tank Access
531AB	Center Tank Access Door - Wing Station 168
631AB	Center Tank Access Door - Wing Station 168

G. Discharge Check Valve Installation

SUBTASK 28-22-71-100-001

(1) Do these steps to prepare the fuel boost pump housing [8], pressure sensor plate adapter [14], flange-adapter [3], and the discharge check valve [17] for installation:

(a) Clean the fay surfaces of the aluminum fuel boost pump housing [8], aluminum pressure sensor plate adapter [14], aluminum flange-adapter [3], and the aluminum discharge check valve [17] (SWPM 20-20-00):

1) Use Cleaning Procedure 1 to manually clean the discharge flange fay surface on the fuel boost pump housing [8].

a) Use an abrasive pad to clean the flange fay surface.

b) Move the pad in a circular movement while you press with your thumb.

2) Use Cleaning Procedure 1 to manually clean the fay surface on each side of the pressure sensor plate adapter [14].

a) Use an abrasive pad to clean the flange fay surface.

b) Move the pad in a circular movement while you press with your thumb.

NOTE: Do not clean the O-ring groove.

3) Use Cleaning Procedure 1 to manually clean the fay surfaces on the inlet and outlet flanges of the discharge check valve [17].

a) Use an abrasive pad to clean the flange fay surface.

b) Move the pad in a circular movement while you press with your thumb.

NOTE: Do not clean the O-ring groove.

4) Use Cleaning Procedure 1 to manually clean the fay surface on the inlet flange of the flange-adapter [3].

a) Use an abrasive pad to clean the flange fay surface.

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b) Move the pad in a circular movement while you press with your thumb.

5) Final Clean the fay surfaces of the fuel boost pump housing [8], pressure sensor plate adapter [14], flange-adapter [3], and discharge check valve [17].

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

a) Use a new cotton wiper, G00034, (alternate: knit cotton wiper, G51293) soaked with solvent, B00062, or solvent, B00184.

b) Rub dry with a clean cotton wiper.

c) Continue to clean and dry the surface until the cotton wiper stays clean.

WARNING DO NOT GET ALODINE IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM ALODINE. PUT ON GOGGLES AND GLOVES WHEN YOU USE ALODINE. KEEP ALODINE AWAY FROM SPARKS, FLAME, AND HEAT. ALODINE IS POISONOUS AND FLAMMABLE, AND CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(b) Manually apply Bonderite M-CR 600 Aero coating, C50315, (alternate: coating, C00064) to the abraded surfaces on the pressure sensor plate adapter [14], discharge check valve [17], fuel boost pump housing [8], and the flange-adapter [3].

SUBTASK 28-22-71-420-001

(2) Install the discharge check valve [17]:

(a) Put the new O-ring [12] in the groove of the discharge check valve [17].

NOTE: Installed on the flange next to the pressure sensor plate adapter [14].

(b) Put the new O-ring [12] in the groove of the pressure sensor plate adapter [14].

(c) Put the new O-ring [5] in the groove of the discharge check valve [17].

NOTE: Installed on the flange next to the flange-adapter [3].

(d) Put the pressure sensor plate adapter [14] between the fuel boost pump housing [8] and the discharge check valve [17].

NOTE: The port faces the pressure sensor line [9].

(e) Align the discharge check valve [17] with the fuel boost pump housing [8] and the flange-adapter [3].

(f) Install the screws [16], washers [15], and nuts [11] to attach the pressure sensor plate adapter [14] and fuel boost pump housing [8] to the discharge check valve [17].

(g) Install the screws [4], washers [6], and nuts [7] to attach the flange-adapter [3] to the discharge check valve [17].

SUBTASK 28-22-71-420-002

(3) Connect the scavenge pump pressure line [2] to the discharge check valve [17]:

NOTE: The forward fuel boost pump on the right wing does not have an elbow [1] or scavenge pump pressure line [2].

(a) Install the bulkhead nut [19] on the elbow [1].

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(b) Install the new O-ring [18] on the elbow [1].

(c) Loosely install the bulkhead nut [19] on the boss of the discharge check valve [17].

(d) Connect the scavenge pump pressure line [2] (TASK 20-10-51-400-801).

(e) Tighten the bulkhead nut [19].

SUBTASK 28-22-71-420-003

(4) Install the rigid coupling assembly [13] to attach the pressure sensor line [9] to the pressure sensor plate adapter [14] (TASK 28-22-15-400-803).

NOTE: Do not install the lockwire on the rigid coupling.

(a) Install the new O-ring [10].

SUBTASK 28-22-71-420-004

(5) Install the lockwire between the rigid coupling assembly [13] and bulkhead nut [19] for these locations (TASK 20-10-44-400-801):

(a) Aft fuel boost pump, left wing

(b) Forward fuel boost pump, right wing

(c) Left center fuel boost pump, center tank

(d) Right center fuel boost pump, center tank.

SUBTASK 28-22-71-420-005

(6) Install the lockwire between the rigid coupling assembly [13] and the screw, on the removal check valve, for these locations (TASK 20-10-44-400-801):

(a) Aft fuel boost pump, right wing

(b) Forward fuel boost pump, left wing.

SUBTASK 28-22-71-420-006

(7) Install the lockwire between the bulkhead nut [19] and the screw [4] for these locations (TASK 20-10-44-400-801):

(a) Aft fuel boost pump, right wing

(b) Forward fuel boost pump, left wing.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 28-22-71-410-001

(1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

(a) Install the applicable access panels:

(TASK 28-11-31-400-801)

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

SUBTASK 28-22-71-860-004

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(WARNING PRECEDES)

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-22-71-410-002

(3) Close this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

APU FUEL FEED SYSTEM - ADJUSTMENT/TEST

1. General

A. This procedure has this task for the APU fuel feed system:

(1) APU Fuel Feed System - Operational Test

TASK 28-25-00-710-801

2. APU Fuel Feed System - Operational Test

(Figure 501, Figure 502)

A. References

Reference	Title
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

B. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left
211	Flight Compartment - Left
551	Left Wing - Rear Spar To Landing Gear Support Beam

C. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door

D. Prepare for the Test

SUBTASK 28-25-00-860-002

(1) On the P8-1 Engine and APU Fire Control Panel, make sure that the APU fire handle is in the NORMAL position.

SUBTASK 28-25-00-860-003

(2) On the P5 Overhead Panel, make sure that the APU master switch is in the OFF position.

SUBTASK 28-25-00-010-003

(3) To get access to EE bay, open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-25-00-860-013

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(WARNING PRECEDES)

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-25-00-480-001

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.

(5) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

E. APU Fuel Feed System - Test

SUBTASK 28-25-00-860-004

(1) Make sure that the manual override handle on the actuator of the APU fuel shutoff valve is in the CLSD position (Figure 502).

NOTE: The actuator is on the rear spar in the main landing gear wheel well.

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

Standby Power Control Unit, M01720

Row	Col	Number	Name
B	4	C00169	SW HOT BAT BUS

SUBTASK 28-25-00-860-006

(3) On the P5 Overhead Panel, set the APU master switch to the ON position.

NOTE: The APU will start if the APU master switch is set to the START position.

SUBTASK 28-25-00-210-001

(4) Make sure that the manual override handle on the actuator of the APU fuel shutoff valve moves to the OPEN position in less than 10 seconds.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-25-00-860-007

(5) On the P8-1 Engine and APU Fire Control Panel, do these steps:

(a) Under the APU fire handle, push the applicable manual override button.

CAUTION

DO NOT TURN THE FIRE HANDLE. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

(b) Pull the APU fire handle.

(c) Make sure that the manual override handle on the APU fuel shutoff valve moves to the CLSD position.

(d) On the P5-4 AC System, Generator and APU Module, make sure that the APU FAULT light comes on to show the fire shutdown.

CAUTION

DO NOT TURN THE FIRE HANDLE. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

(e) Push the APU fire handle to the normal position.

SUBTASK 28-25-00-860-009

(6) Set the APU master switch to the OFF position and then set the APU master switch to ON position.

NOTE: The APU will start if the APU master switch is set to the START position.

SUBTASK 28-25-00-210-003

(7) Make sure that the manual override handle on the actuator of the APU fuel shutoff valve moves to the OPEN position.

SUBTASK 28-25-00-210-002

(8) Make sure that the APU FAULT light goes off.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 28-25-00-860-008

(1) On the P5 Overhead Panel, set the APU master switch to the OFF position.

SUBTASK 28-25-00-860-017

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(WARNING PRECEDES)

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-25-00-410-003

(3) Close this access panel:

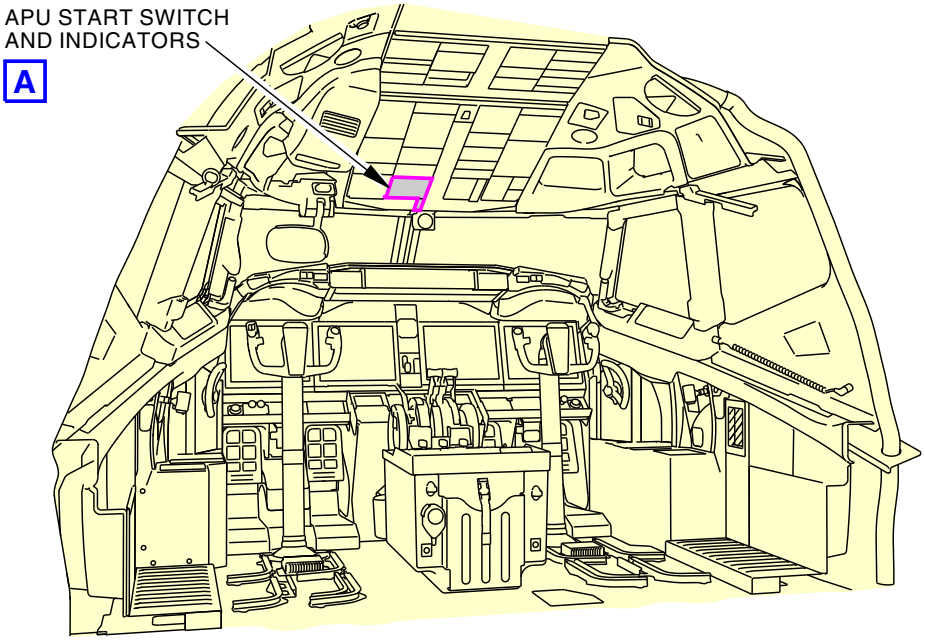
Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-25-00-210-004

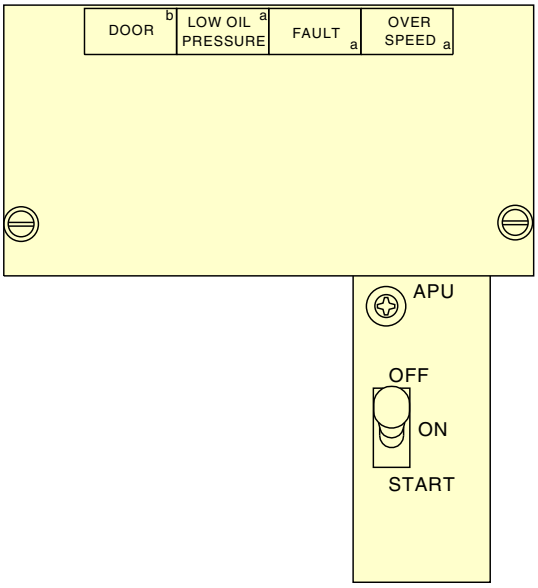
(4) Make sure that the manual override handle on the APU fuel shutoff valve moves to the CLSD position.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



FLIGHT COMPARTMENT



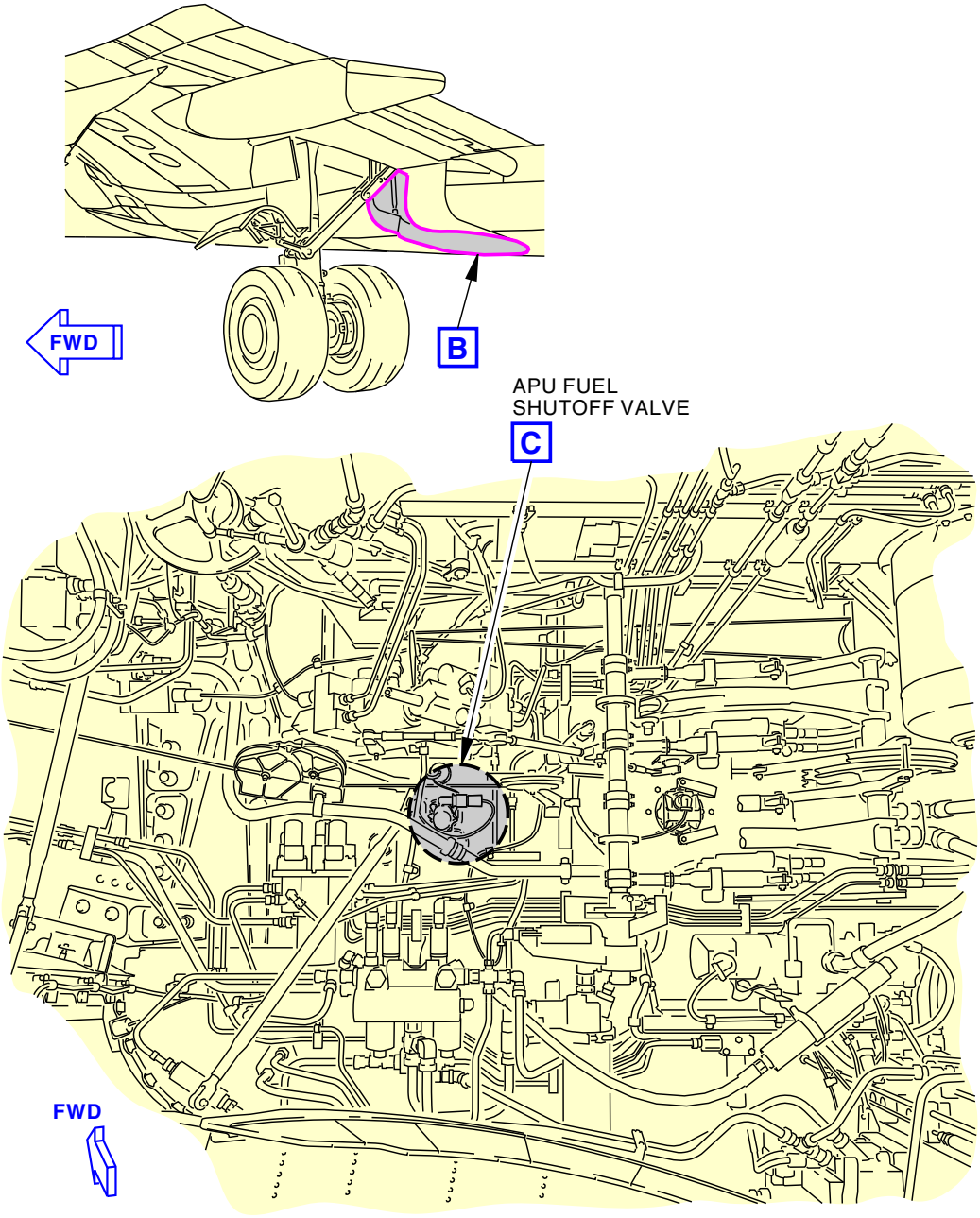
APU START SWITCH AND INDICATORS

A

2413668 S00061533050_V2

APU Fuel Feed System
Figure 501/28-25-00-990-802

ECCN 9E991 BOEING PROPRIETARY - See title page for details



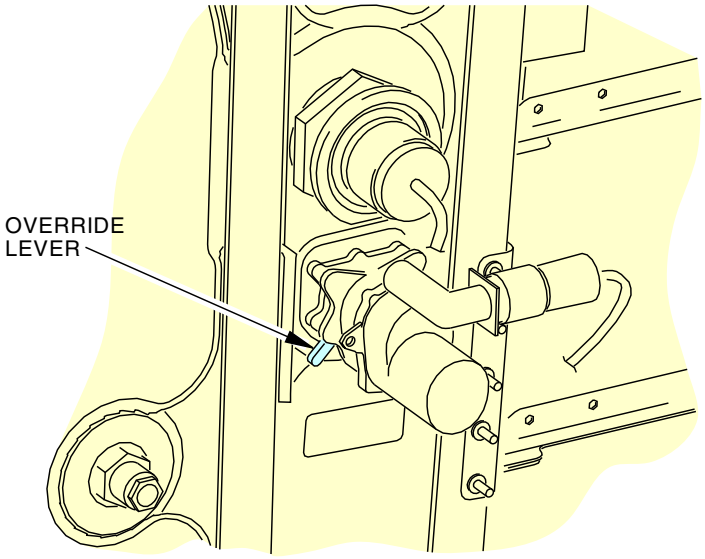
MAIN LANDING GEAR WHEEL WELL
(LEFT SIDE)

B

2413669 S00061533051_V1

APU Fuel Feed System Test
Figure 502/28-25-00-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



APU FUEL SHUTOFF VALVE

C

2413670 S00061533052_V1

APU Fuel Feed System Test
Figure 502/28-25-00-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

APU FUEL SHUTOFF VALVE - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) APU Fuel Shutoff Valve Actuator Assembly Removal

(2) APU Fuel Shutoff Valve Actuator Assembly Installation

(3) APU Shutoff Valve Operational Test

(4) APU Fuel Shutoff Valve Body Assembly Removal

(5) APU Fuel Shutoff Valve Body Assembly Installation.

B. The APU shutoff valve is installed on the rear spar in the main landing gear wheel well. It has these primary assemblies:

(1) APU shutoff valve actuator assembly

(2) APU shutoff valve body assembly

(3) Mounting adapter.

C. The APU shutoff valve actuator, V43, is also referred to as the APU fuel shutoff valve.

D. The APU fuel shutoff valve actuator assembly can be replaced without defueling the center tank. These procedures are necessary to replace the APU shutoff valve body:

(1) Removal of the APU shutoff valve actuator.

(2) Removal of the mounting adapter.

(3) Defueling the center tank.

TASK 28-25-02-000-801

2. APU Shutoff Valve Actuator Assembly Removal

(Figure 401, Figure 402)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task gives instructions to remove the APU fuel shutoff valve actuator assembly.

B. References

Reference	Title
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

D. Prepare for the Removal

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	14	C00033	AUX POWER UNIT CONT

SUBTASK 28-25-02-480-001

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.

(2) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

E. APU Shutoff Valve Actuator Assembly Removal

SUBTASK 28-25-02-020-008

(1) Remove the lockwire from the four actuator mounting screws [3].

SUBTASK 28-25-02-020-001

(2) Disconnect the electrical connector [1] from the APU fuel shutoff valve actuator [2] (Figure 401).

SUBTASK 28-25-02-020-002

(3) Remove the screw [6], three washers [7], bonding jumper [9], and nut [8] from the APU fuel shutoff valve actuator [2].

SUBTASK 28-25-02-020-003

CAUTION HOLD THE ACTUATOR ASSEMBLY UP TO KEEP ITS WEIGHT OFF THE SHAFT. ITS WEIGHT CAN CAUSE DAMAGE TO THE SHAFT.

(4) Hold the APU fuel shutoff valve actuator [2] and then remove the four actuator mounting screws [3].

SUBTASK 28-25-02-020-004

(5) Remove the APU fuel shutoff valve actuator [2].

(a) Carefully move the APU fuel shutoff valve actuator [2] away from the mounting adapter [5] until the output shaft is out of the mating part.

(b) Lift the APU fuel shutoff valve actuator [2] out of the airplane.

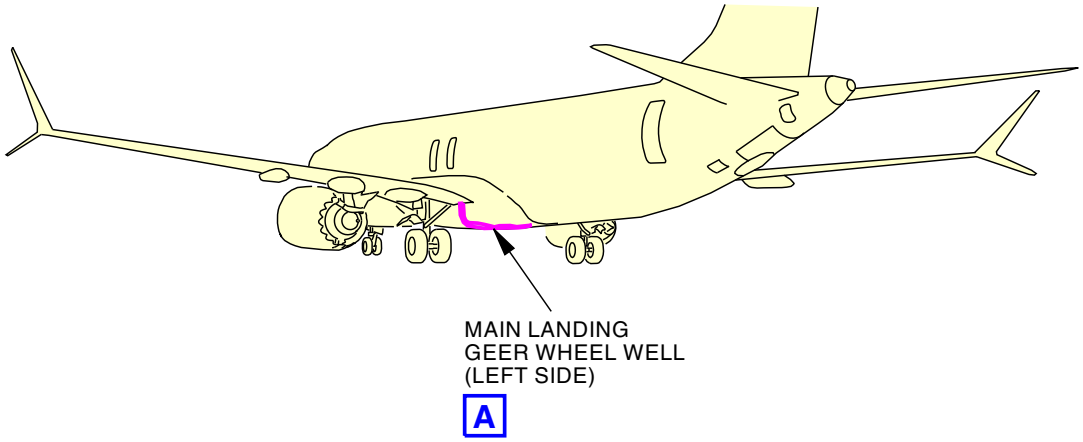
SUBTASK 28-25-02-020-009

(6) Remove and retain APU fuel shutoff valve data plate [12].

NOTE: Data plate is for fuel shutoff valve accountability/traceability and will be installed on new actuator.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

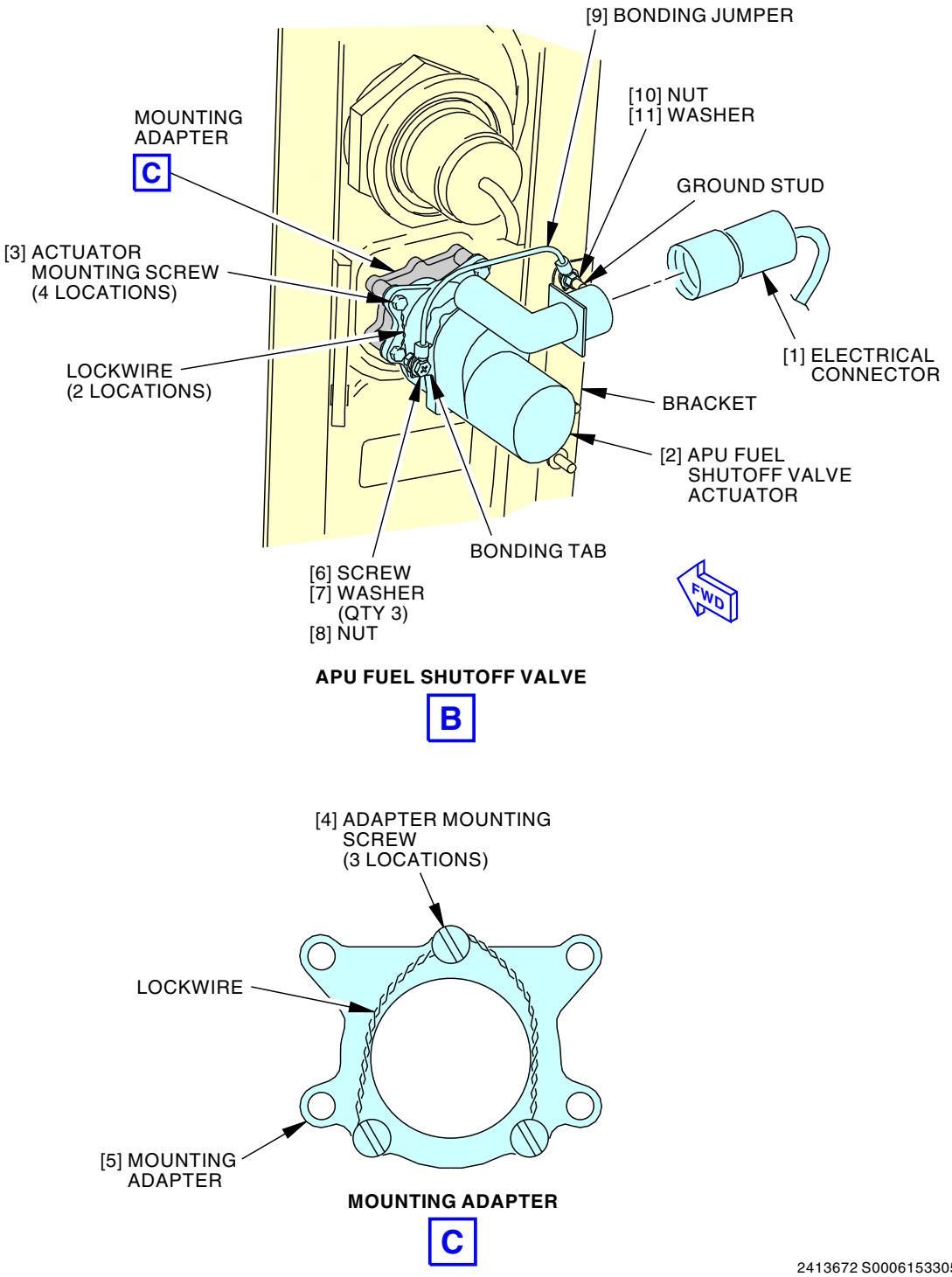


MAIN LANDING GEAR WHEEL WELL
(LEFT SIDE IS SHOWN)
(EXAMPLE)
A

2413671 S00061533056_V2

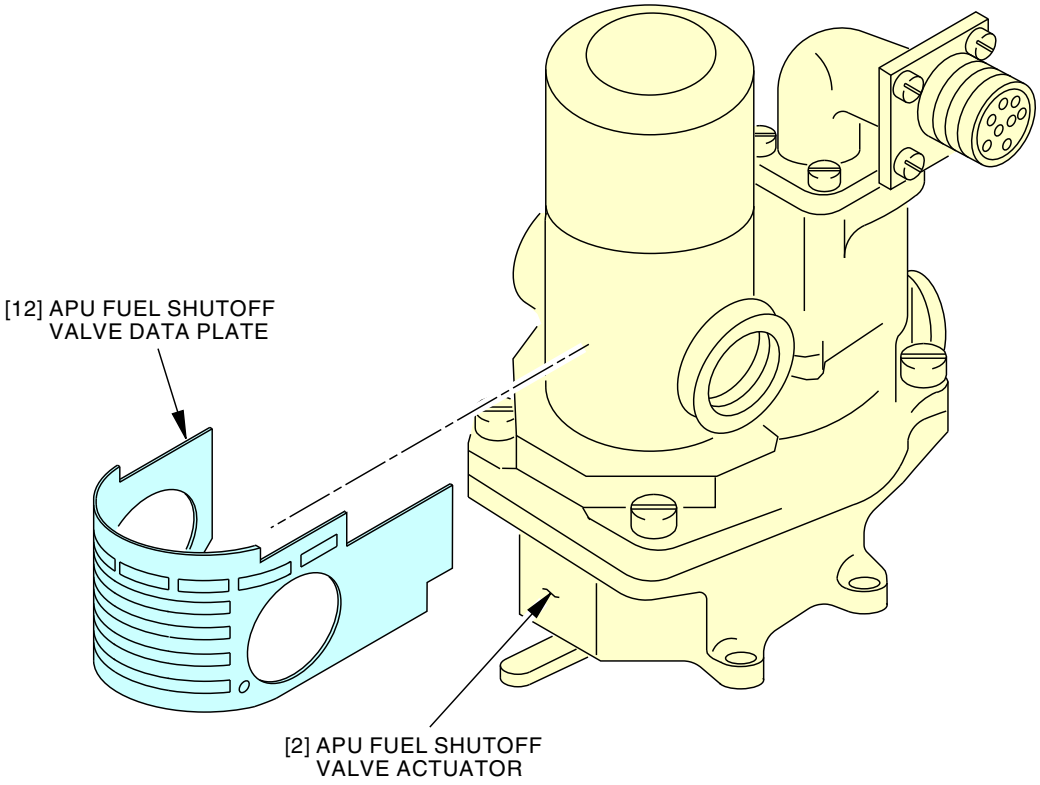
APU Fuel Shutoff Valve Actuator Installation
Figure 401/28-25-02-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



APU Fuel Shutoff Valve Actuator Installation
Figure 401/28-25-02-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2790358 S0000634717_V1

APU Fuel Shutoff Valve Actuator
Figure 402/28-25-02-990-805

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-25-02-400-801

3. APU Shutoff Valve Actuator Assembly Installation

(Figure 401, Figure 402)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task gives instructions to install the APU fuel shutoff valve actuator assembly.

(2) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-36.

B. References

Reference	Title
20-10-44-400-801	Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES
SWPM 20-20-10	REPLACEMENT OF GROUND STUDS AND BONDING JUMPER INSTALLATION

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
A50110	Sealant - Fuel Tank	BMS5-45 Class B-2
A50155	Sealant - Fuel Tank	BMS5-45 Class C
D00016	Grease - Aircraft, General Purpose, Wide Temperature Range	MIL-PRF-81322
G01505	Lockwire - Safety And Lock	NASM20995

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	APU fuel shutoff valve actuator	28-25-02-01-045	SIA ALL

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left

G. Prepare for the Installation

SUBTASK 28-25-02-100-003

(1) If the bonding jumper [9] is connected to the bracket on the stiffener, do these steps:

28-AWL-36: CDCCL

(a) Measure the electrical bonding resistance between the loose end of the bonding jumper [9] and the bracket on the stiffener (SWPM 20-20-10).

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-36.

1) Use an intrinsically safe approved bonding meter, COM-1550 to measure the electrical bonding resistance.

28-AWL-36: CDCCL

2) Make sure that the electrical bonding resistance is 0.0020 ohm (2.0 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-36.

SUBTASK 28-25-02-100-001

(2) If the bonding jumper [9] is disconnected from the bracket on the stiffener, do these steps:

28-AWL-36: CDCCL

(a) Clean the fay surfaces on the terminal of the bonding jumper [9], fasteners, and the aluminum bracket on the stiffener (SWPM 20-20-10).

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-36.

1) Do the solvent cleaning procedure for the surfaces of the bonding jumper [9], nut [10], washer [11], and the ground stud and bracket on the stiffener (SWPM 20-20-10).

28-AWL-36: CDCCL

(b) Apply sealant on the shank and threads on the ground stud.

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-36.

1) Use sealant, A50110 or sealant, A50155.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

28-AWL-36: CDCCL

(c) Apply sealant on the washer [11] and the terminal on the bonding jumper [9].

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-36.

1) Use sealant, A50110 or sealant, A50155.

(d) Install the bonding jumper [9], washer [11], and nut [10] to the ground stud on the bracket (Figure 401).

(e) Tighten the nut [10] to 31.5 ±3.5 in-lb (3.6 ±0.4 N·m).

28-AWL-36: CDCCL

(f) Measure the electrical bonding resistance between the loose end of the bonding jumper [9] and the bracket on the stiffener (SWPM 20-20-10).

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-36.

1) Use an intrinsically safe approved bonding meter, COM-1550 to measure the electrical bonding resistance.

28-AWL-36: CDCCL

2) Make sure that the electrical 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-36.

SUBTASK 28-25-02-940-001

(3) Apply a thin layer of the grease, D00016, to the keyway of the output shaft.

H. APU Shutoff Valve Actuator Assembly Installation

SUBTASK 28-25-02-420-012

(1) Install the APU fuel shutoff valve data plate [12] (Figure 402).

NOTE: Data plate is for fuel shutoff valve accountability/traceability.

SUBTASK 28-25-02-420-001

CAUTION

HOLD THE ACTUATOR ASSEMBLY UP TO KEEP ITS WEIGHT OFF THE SHAFT. ITS WEIGHT CAN CAUSE DAMAGE TO THE SHAFT.

(2) 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 [5].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-25-02-420-002

(3) If the mounting holes on the APU fuel shutoff valve actuator [2] are not aligned with the mating holes, carefully turn the assembly to align the holes.

SUBTASK 28-25-02-420-003

(4) Install actuator mounting screws [3] on the APU fuel shutoff valve actuator [2].

(a) Tighten the actuator mounting screws [3] to 17.5 ±2.5 in-lb (2.0 ±0.3 N·m).

(b) Install lockwire, G01505, on each of the actuator mounting screws [3] (TASK 20-10-44-400-801).

SUBTASK 28-25-02-100-002

28-AWL-36: CDCCL

(5) Clean the fay surfaces on the terminal of the bonding jumper [9], fasteners, and the aluminum bonding tab on the APU fuel shutoff valve actuator [2] (SWPM 20-20-10).

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-36.

(a) Do the abrasive cleaning procedure for the surfaces on the bonding tab or the APU fuel shutoff valve actuator [2] (SWPM 20-20-10).

(b) Do the solvent cleaning procedure for the surfaces of the bonding jumper [9], screw [6], three washers [7], and nut [8] (SWPM 20-20-10).

(c) Do the solvent cleaning procedure for the surfaces on the bonding tab of the APU fuel shutoff valve actuator [2] (SWPM 20-20-10).

SUBTASK 28-25-02-420-004

(6) Install the screw [6], three washers [7], and nut [8] to attach the bonding jumper [9] to the bonding tab on the APU fuel shutoff valve actuator [2].

SUBTASK 28-25-02-280-001

28-AWL-36: CDCCL

(7) Measure the electrical bonding resistance between the housing on the APU fuel shutoff valve actuator [2] and the terminal on the bonding jumper [9] (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-36.

(a) Use an intrinsically safe approved bonding meter, COM-1550 to measure the electrical bonding resistance.

28-AWL-36: CDCCL

(b) Make sure that the bonding resistance is 0.0010 ohm (1.0 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-36.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-25-02-390-004

28-AWL-36: CDCCL

(8) Apply a fillet seal to the screw [6], three washers [7], nut [8], and the bonding jumper [9] on the APU fuel shutoff valve actuator [2].

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-36.

(a) Use sealant, A50110 or sealant, A50155.

SUBTASK 28-25-02-420-005

(9) Connect the electrical connector [1] to the APU fuel shutoff valve actuator [2].

I. APU Shutoff Valve Actuator Assembly Installation Test

SUBTASK 28-25-02-860-002

(1) Remove the safety tags 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

SUBTASK 28-25-02-710-001

(2) Do this task: APU Shutoff Valve Operational Test, TASK 28-25-02-710-801.

——— END OF TASK ———

TASK 28-25-02-710-801

4. APU Shutoff Valve Operational Test

(Figure 401)

A. 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

B. APU Shutoff Valve Test

SUBTASK 28-25-02-860-003

(1) 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, P6-2

Row	Col	Number	Name
B	19	C01344	APU FIRE SW POWER

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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) On the P5-13 Electrical Meters, Battery, Cabin Utility and Inflight Entertainment Power Module, set the DC BAT switch to the ON position.

SUBTASK 28-25-02-710-002

(3) On the P5 Overhead Panel, set the APU master switch to the ON position.

(a) Make sure the manual override handle on the APU fuel shutoff valve 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 manual override handle on the APU fuel shutoff valve moves to the CLOSED position in less than of 10 seconds.

SUBTASK 28-25-02-860-005

(5) Set the DC BAT switch to the OFF position.

——— END OF TASK ———

TASK 28-25-02-000-802

5. APU Shutoff Valve Body Assembly Removal

(Figure 401, Figure 403)

A. General

(1) This task gives instructions to remove the APU shutoff valve body assembly.

B. 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)

C. Tools/Equipment

Reference	Description
STD-1054	Container - Fuel Resistant, 5-Gallon (19-Liter)

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

E. Access Panels

Number	Name/Location
131AB	Center Tank Access

F. Prepare for the Removal

SUBTASK 28-25-02-650-001

(1) Defuel the center fuel tank and the No.1 or transfer fuel out the tanks (Fuel Tank Defueling, TASK 28-26-00-650-801 or Tank to Tank Fuel Transfer, TASK 28-26-00-650-802).

SUBTASK 28-25-02-650-004

(2) If there is fuel in the No.2 tank, make sure that the crossfeed valve is closed and has no leakage (Crossfeed Valve - Functional Test, TASK 28-22-00-730-802).

(a) As an alternative, you can remove fuel from the No.2 tank (Fuel Tank Defueling, TASK 28-26-00-650-801).

SUBTASK 28-25-02-650-002

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

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

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:

(TASK 28-11-31-000-801)

Number	Name/Location
131AB	Center Tank Access

G. APU Shutoff Valve Body Assembly Removal

SUBTASK 28-25-02-020-005

(1) Do this task: APU Shutoff Valve Actuator Assembly Removal, TASK 28-25-02-000-801.

SUBTASK 28-25-02-020-006

(2) Put the 5-gallon (19-liter) fuel resistant container, STD-1054, below the APU shutoff valve body [23] and disconnect the APU fuel line from the unions [21].

SUBTASK 28-25-02-020-007

CAUTION DO NOT LET THE VALVE BODY ASSEMBLY FALL. YOU WILL CAUSE DAMAGE TO THE FUEL TANK SEAL.

(3) Do these steps to remove the APU shutoff valve body [23]:

(a) Remove sealant around the APU shutoff valve body [23] and the spar web.

(b) 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.

(c) The person in the tank must hold the APU shutoff valve body [23] assembly up.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(d) The person out of the tank must remove the adapter mounting adapter mounting screws [4] that attach the mounting adapter [5] to the APU shutoff valve body [23].

(e) Move the APU shutoff valve body [23] away from the rear spar.

(f) Remove the mounting adapter [5].

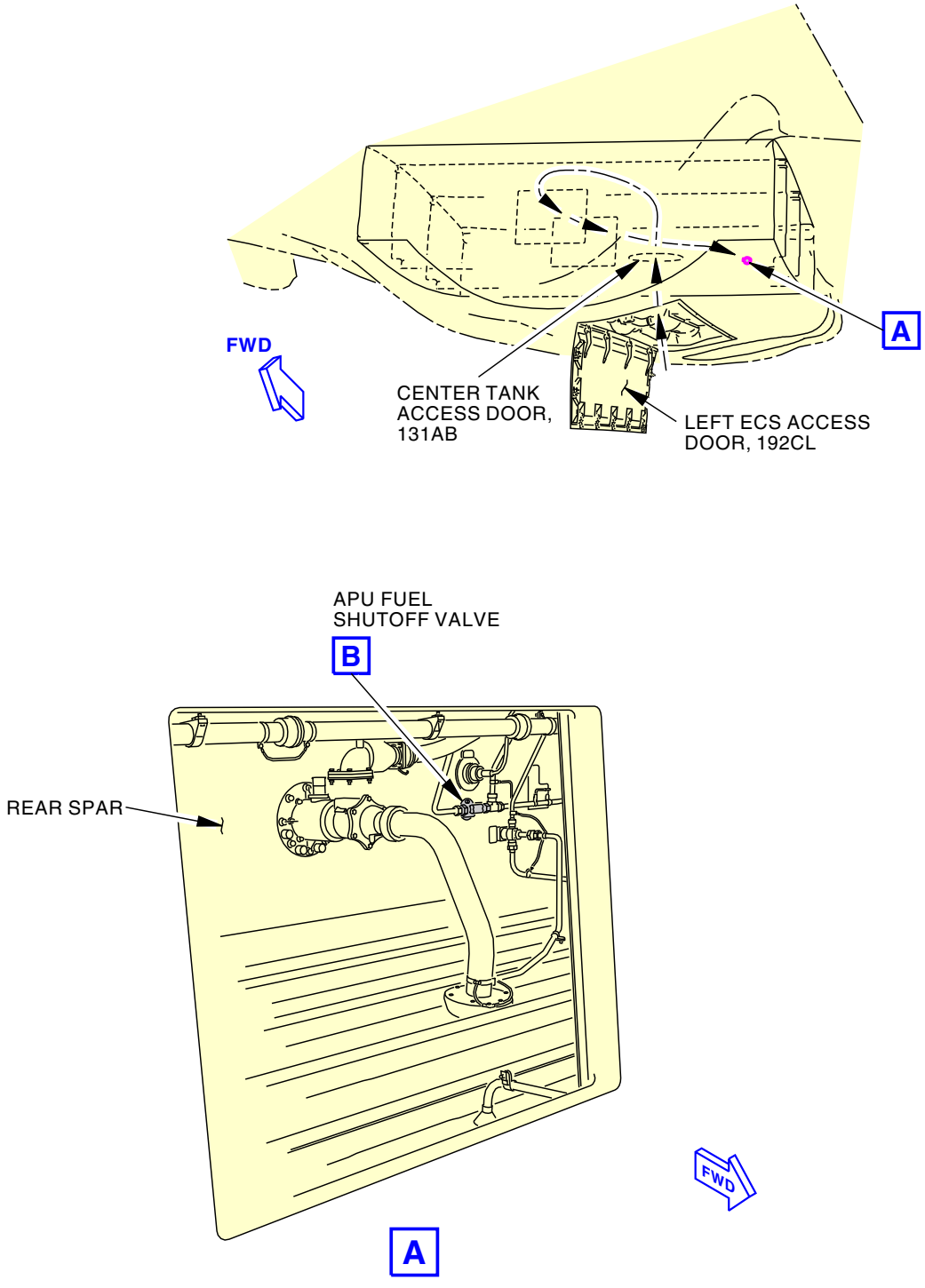
(g) Remove the unions [21] from the APU shutoff valve body [23].

(h) Remove and discard the O-rings [22].

(i) Remove and discard the O-ring [24] from the APU shutoff valve body [23].

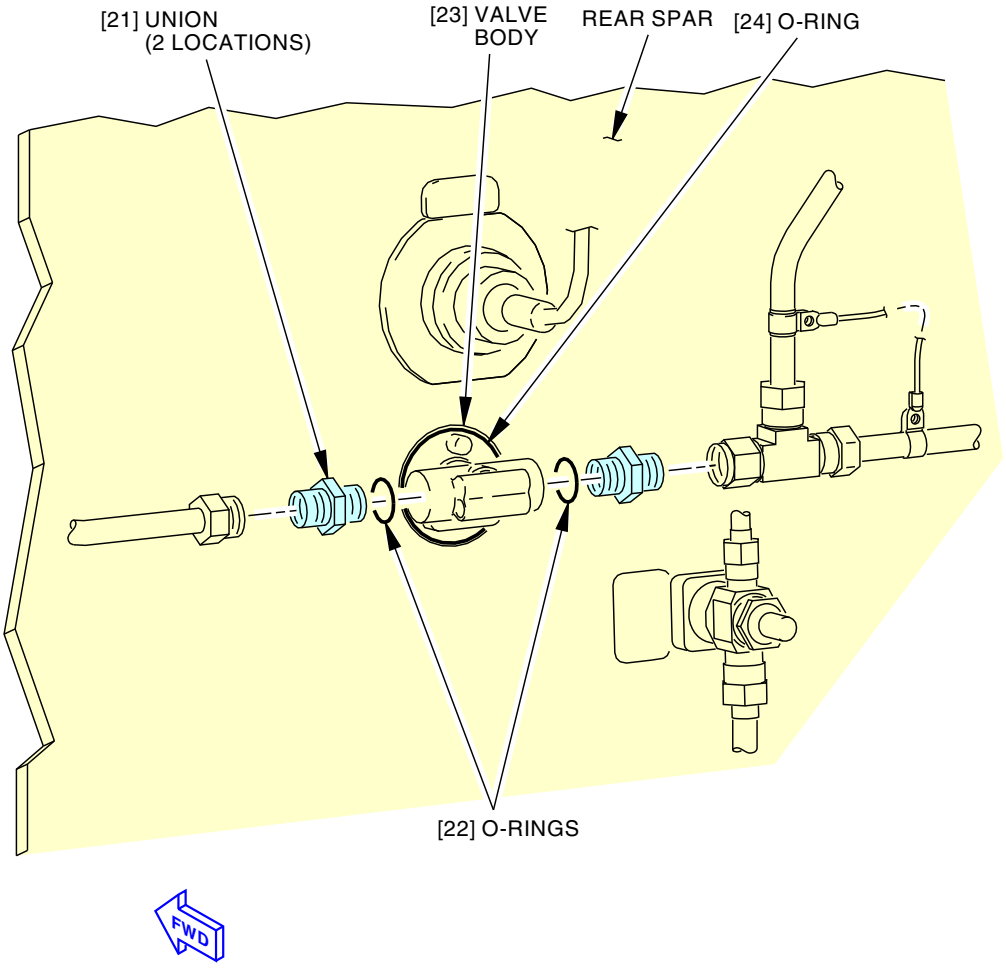
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



APU Fuel Shutoff Valve Body Installation
Figure 403/28-25-02-990-802 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



APU FUEL SHUTOFF VALVE

B

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APU Fuel Shutoff Valve Body Installation
Figure 403/28-25-02-990-802 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-25-02-400-802

6. APU Shutoff Valve Body Assembly Installation

(Figure 401, Figure 403)

A. General

(1) This task gives instructions to install the APU fuel shutoff valve actuator assembly.

(2) One person out of the tank and one person in the tank are necessary for this task.

(3) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-36.

B. References

Reference	Title
20-10-44-400-801	Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142 Type II
C00064	Coating - Aluminum Chemical Conversion	BAC5719 Type II Class A (MIL-DTL-5541 Class 1A)
C50315	Coating - Chemical Conversion - Bonderite M-CR 600 Aero (Formerly Alodine 600)	BAC5719 Class A, C or D, MIL-DTL-81706 Type I Class 1A or 3
D00504	Grease - Petrolatum	VV-P-236
G01505	Lockwire - Safety And Lock	NASM20995

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(Continued)

Reference	Description	Specification
G50237	Compound - Corrosion Inhibiting, Non-drying - Cor-Ban 27L	BMS3-38

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
22	O-rings	28-25-04-01-095	SIA ALL
23	APU shutoff valve body	28-25-02-01-130	SIA ALL
24	O-ring	28-25-02-01-135	SIA ALL

F. 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

G. Access Panels

Number	Name/Location
131AB	Center Tank Access

H. Prepare for the Installation

SUBTASK 28-25-02-160-001

28-AWL-36: CDCCL

(1) Prepare a fay surface bond between the APU shutoff valve body [23] and the rear spar inside the tank (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-36.

SUBTASK 28-25-02-370-001

(2) Manually apply coating, C00064 or Bonderite M-CR 600 Aero coating, C50315 to the abraded areas on the rear spar and APU shutoff valve body [23].

SUBTASK 28-25-02-390-002

(3) Install new O-rings [22], lightly lubricated with fuel, on the unions [21].

SUBTASK 28-25-02-420-013

(4) Install the unions [21] in the APU shutoff valve body [23].

SUBTASK 28-25-02-640-001

(5) Install the new O-ring [24], lightly lubricated with grease, D00504, in the groove on the APU shutoff valve body [23].

I. APU Shutoff Valve Body Assembly Installation

SUBTASK 28-25-02-420-008

CAUTION

DO NOT LOOSEN THE O-RING OR PUSH IT OUT OF ITS CORRECT SHAPE. IF YOU CAUSE DAMAGE TO THE O-RING, A FUEL LEAK CAN EASILY OCCUR.

(1) Install the APU shutoff valve body [23], as follows:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) The person in the tank must put the APU shutoff valve body [23] in the correct position between the fittings on the APU line.

(b) The person out of the tank must hold the APU shutoff valve body [23] up until it is installed.

(c) From outside the tank, install the mounting adapter [5].

WARNING

USE NITRILE GLOVES FOR SKIN PROTECTION WHEN YOU USE COR-BAN 27L, G50237. IF IT GETS ON YOUR SKIN, IMMEDIATELY REMOVE IT WITH WATER. IF THIS MATERIAL GETS IN YOUR EYES, IMMEDIATELY FLUSH YOUR EYES WITH WATER. GET MEDICAL AID. THIS MATERIAL CONTAINS FLAMMABLE AGENTS WHICH CAN CAUSE INJURIES TO PERSONNEL.

1) Install the three adapter mounting screws [4] wet with Cor-Ban 27L Compound, G50237 , that attach the mounting adapter [5] to the APU shutoff valve body [23].

2) Tighten the three adapter mounting screws [4] to 30 ±5 in-lb (3 ±1 N·m).

SUBTASK 28-25-02-860-006

28-AWL-36: CDCCL

(2) From inside the tank, measure the electrical bonding resistance between the APU shutoff valve body [23] and the rear spar (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-36.

(a) Use an intrinsically safe approved bonding meter, COM-1550 to measure the electrical bonding resistance.

28-AWL-36: CDCCL

(b) Make sure that 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-36.

SUBTASK 28-25-02-420-011

(3) From outside the tank, install the lockwire, G01505, on each of the adapter mounting screws [4] (TASK 20-10-44-400-801).

SUBTASK 28-25-02-420-009

(4) Connect the APU fuel line to the APU shutoff valve body [23].

SUBTASK 28-25-02-390-001

28-AWL-36: CDCCL

(5) Apply a fillet seal between the flange of the APU shutoff valve body [23] and the rear spar, in 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-36.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Make sure that you apply sufficient sealant to cover the unprimed areas on the rear spar.

SUBTASK 28-25-02-390-003

(6) Apply a fillet seal of sealant, A02315, between the flange of the mounting adapter [5] and rear spar.

SUBTASK 28-25-02-410-002

(7) Install this access panel:

(TASK 28-11-31-400-801)

Number	Name/Location
131AB	Center Tank Access

SUBTASK 28-25-02-420-010

(8) Do this task: APU Shutoff Valve Actuator Assembly Installation, TASK 28-25-02-400-801.

J. APU Shutoff Valve Body Assembly Installation Test

SUBTASK 28-25-02-710-004

(1) 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.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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. 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 BONDING PROCESSES
SWPM 20-20-10	Replacement of Ground Studs and Bonding Jumper Installation

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

C. Location Zones

Zone	Area
133	Main Landing Gear Wheel Well, Body Station 663.75 to Body Station 727.00 - Left

D. Prepare for the 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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-25-02-490-001

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.

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

E. Electrical Bonding Measurement

SUBTASK 28-25-02-765-001

(1) Measure the electrical bonding resistance between the APU fuel shutoff valve [1] (at the jumper bonding lug) and the spar (SWPM 20-20-00 and SWPM 20-20-10).

(a) Use an intrinsically safe approved bonding meter, COM-1550.

(b) Make sure that the resistance is 0.0010 ohm (1 milliohms) or less.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 28-25-02-865-002

(1) Remove the safety tags 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

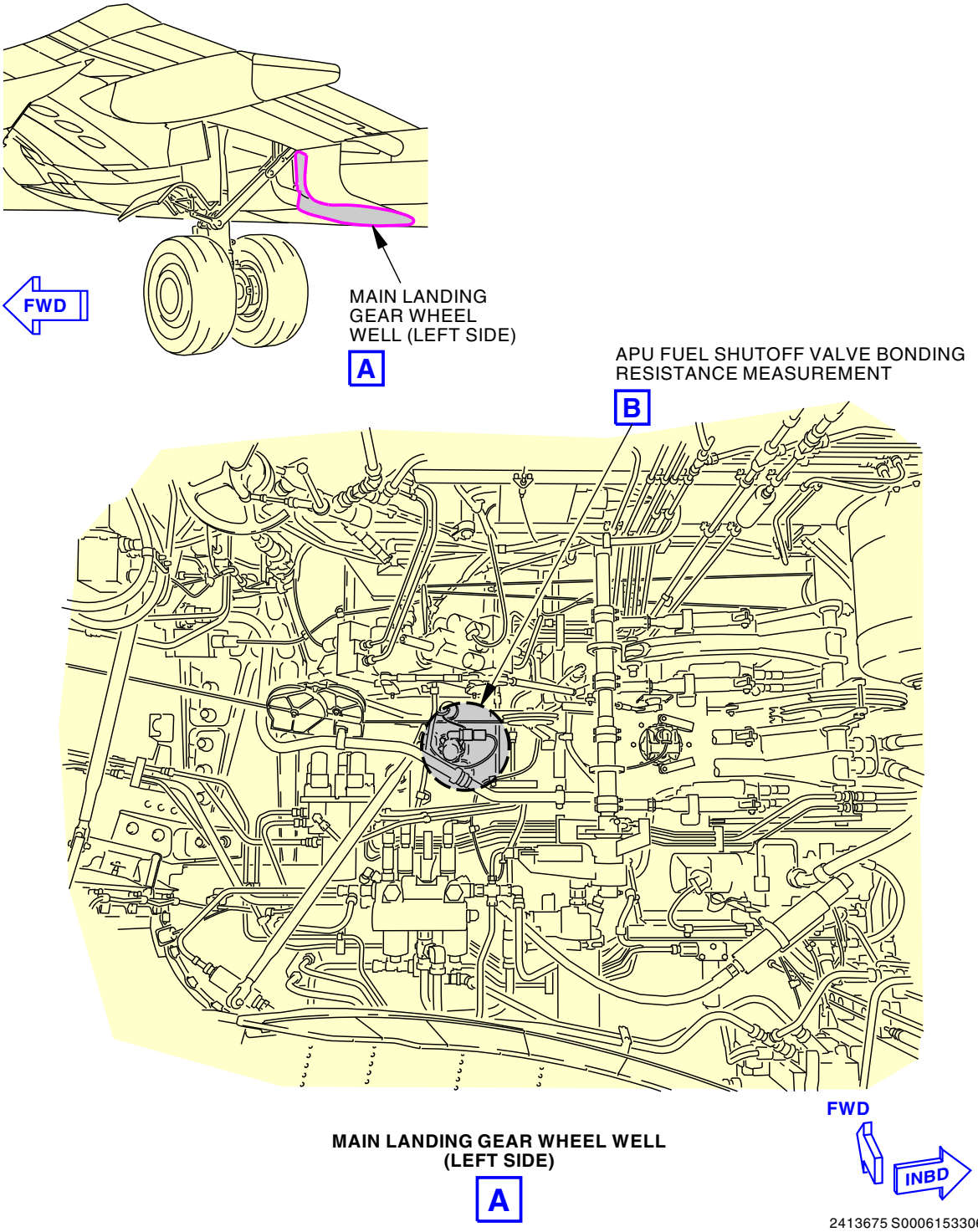
SUBTASK 28-25-02-090-001

WARNING DO THE APPLICABLE PROCEDURE TO REMOVE THE LANDING-GEAR-DOWNLOCK PINS INSTALLED ON THE LANDING GEAR. PERSONNEL INJURY AND DAMAGE TO EQUIPMENT CAN OCCUR IF YOU OPERATE THE LANDING GEAR BEFORE YOU REMOVE THE DOWNLOCK PINS.

(2) If the downlock pins are no longer necessary, do this task: Landing Gear Downlock Pins Removal, TASK 32-00-01-080-801.

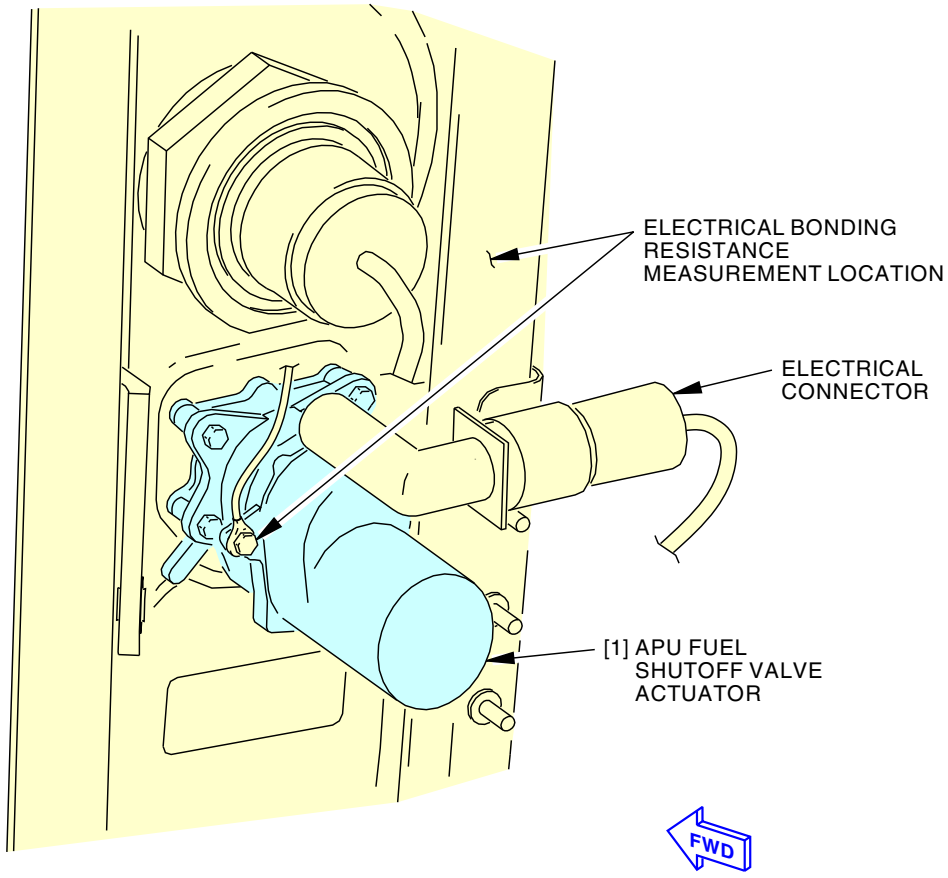
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



APU Fueling Shutoff Valve Actuator - Bonding Resistance Check
Figure 601/28-25-02-990-803 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



**APU FUEL SHUTOFF VALVE
BONDING RESISTANCE MEASUREMENT**

B

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**APU Fueling Shutoff Valve Actuator - Bonding Resistance Check
Figure 601/28-25-02-990-803 (Sheet 2 of 2)**

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 (No. 1 Tank and Center Tank) Removal

(Figure 401)

A. General

(1) This task gives instructions to remove the APU fuel feed line [1A], APU fuel feed line [1B], APU fuel feed line [1C], APU fuel feed line [1D], APU fuel feed line [1E], APU fuel feed line [1F], APU fuel feed line [1G], and APU fuel feed line [1H] for No. 1 tank and center tank.

B. References

Reference	Title
20-10-51-000-801	Flareless Tubing Assembly Removal (P/B 401)
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)
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

Reference	Description
STD-1054	Container - Fuel Resistant, 5-Gallon (19-Liter)

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

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E. Prepare for the Removal

SUBTASK 28-25-04-860-002

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 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 (TASK 28-26-00-650-802).

SUBTASK 28-25-04-010-001

(2) To get access to the APU fuel lines, do these tasks: Main Tank Access Door Removal, TASK 28-11-11-000-801 and Center Tank Access Door Removal, TASK 28-11-31-000-801.

SUBTASK 28-25-04-860-004

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.

(3) For the No. 1 tank and center tank, do this task: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

F. APU Fuel Line (No. 1 Tank and Center Tank) Removal

SUBTASK 28-25-04-020-018

(1) Remove the APU fuel feed line [1A] (View A):

(a) Remove the bolts [34], washers [35], and nuts [36] to disconnect the bonding jumper [30] between the APU fuel feed line [1A] and the support bracket (View O).

(b) Remove the screws [32] and washers [33], that hold the APU fuel feed line [1A] in the clamps [27] (TASK 28-22-15-000-801) (View N).

(c) Disconnect the bulkhead fitting (View M).

(d) Disconnect the APU fuel feed line [1A] from the APU shutoff valve [5] (View G).

1) Remove the union [8].

2) Remove and discard the packing [9].

(e) Drain the remaining fuel from the APU fuel feed lines into the 5-gallon (19-liter) fuel resistant container, STD-1054.

SUBTASK 28-25-04-020-013

(2) Remove the APU fuel feed line [1B] (View A):

(a) Remove the bolts [34], washers [35], and nuts [36] to disconnect the bonding jumper [30] between the APU fuel feed line [1B] and the support bracket (View O).

(b) Disconnect the APU fuel feed line [1B] from the tee [31] (View G).

(c) Disconnect the APU fuel feed line [1B] from the check valve [4] (View F).

(d) Drain the remaining fuel from the APU fuel feed lines into 5-gallon (19-liter) fuel resistant container, STD-1054.

SUBTASK 28-25-04-020-019

(3) Remove the APU fuel feed line [1C] (View A):

(a) Remove the bolts [34], washers [35], and nuts [36] to disconnect the bonding jumper [30] between the APU fuel feed line [1C] and the structure (View O).

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(b) Disconnect the APU fuel feed line [1C] from the tee [31] (View G).

(c) Disconnect the tee [31] from the APU shutoff valve [5]:

1) Disconnect the union [7].

2) Remove and discard the packing [6]

(d) Disconnect APU fuel feed line [1C] from the tube end union on APU fuel feed line [1D].

(e) Drain the remaining fuel from the APU fuel feed lines into the 5-gallon (19-liter) fuel resistant container, STD-1054.

SUBTASK 28-25-04-020-020

(4) Remove the APU fuel feed line [1D] (View B):

(a) Remove the bolts [34], washers [35], and nuts [36] to disconnect the bonding jumper [30] between the APU fuel feed line [1D] and the structure (View O).

(b) Remove the screws [32] and washers [33], that hold the APU fuel feed line [1D] in the clamp [27] (TASK 28-22-15-000-801) (View N).

(c) Remove and discard the safety cable from the rigid coupling [28].

(d) Disconnect the rigid coupling [28] between the APU fuel feed line [1D] and the APU fuel feed line [1E].

1) Remove and discard the packing [29].

(e) Drain the remaining fuel from the APU fuel feed lines into the 5-gallon (19-liter) fuel resistant container, STD-1054.

SUBTASK 28-25-04-020-021

(5) Remove the APU fuel feed line [1E] (View C):

(a) Remove the bolts [34], washers [35], and nuts [36] to disconnect the bonding jumper [30] between the APU fuel feed line [1E] and the structure (View O).

(b) Remove the screws [32] and washers [33], that hold the APU fuel feed line [1E] in the clamp [27] (TASK 28-22-15-000-801) (View N).

(c) Remove and discard the safety cable from the rigid coupling [28].

(d) Disconnect the rigid coupling [28] between the APU fuel feed line [1E] and the APU fuel feed line [1F].

1) Remove and discard the packing [29].

(e) Drain the remaining fuel from the APU fuel feed lines into the 5-gallon (19-liter) fuel resistant container, STD-1054.

SUBTASK 28-25-04-020-022

(6) Remove the APU fuel feed line [1F] (View D):

(a) Remove the bolts [34], washers [35], and nuts [36] to disconnect the bonding jumper [30] between the APU fuel feed line [1F] and the structure (View O).

(b) Remove the screws [32], and washers [33], that hold the APU fuel feed line [1F] in the clamps [27] (TASK 28-22-15-000-801) (View N).

(c) Disconnect the APU fuel feed line [1F] from the bulkhead fitting (TASK 20-10-51-000-801).

(d) Drain the remaining fuel from the APU fuel feed lines into the 5-gallon (19-liter) fuel resistant container, STD-1054.

SUBTASK 28-25-04-020-023

(7) Remove the APU fuel feed line [1G] (View E):

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(a) Remove the bolts [34], washers [35], and nuts [36] to disconnect the bonding jumper [30] between the APU fuel feed line [1F] and the APU fuel feed line [1H] (View O).

(b) Remove the screws [32] and washers [33], that hold the APU fuel feed line [1G] in the clamp [27] (TASK 28-22-15-000-801) (View N).

(c) Disconnect the APU fuel feed line [1G] from the check valve [4].

(d) Drain the remaining fuel from the APU fuel feed lines into the 5-gallon (19-liter) fuel resistant container, STD-1054.

SUBTASK 28-25-04-020-024

(8) Remove the APU fuel feed line [1H] (View E):

(a) Disconnect the bulkhead fitting (View M).

(b) Disconnect the APU fuel feed line [1H] from the check valve [4]:

1) Remove the union [2].

2) Remove and discard the packing [3].

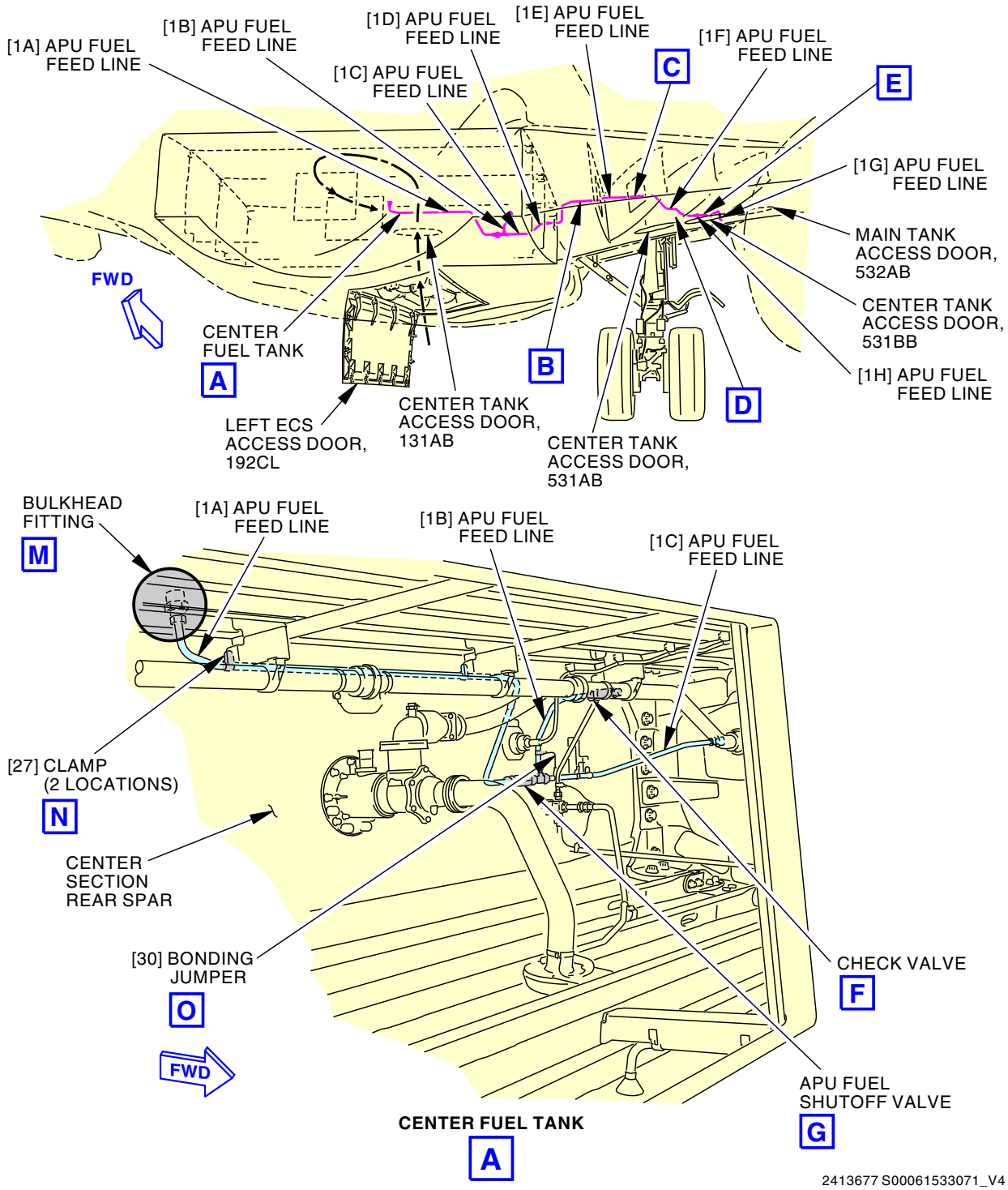
(c) Drain the remaining fuel from the APU fuel feed lines into the 5-gallon (19-liter) fuel resistant container, STD-1054.

SUBTASK 28-25-04-020-004

(9) Remove the APU fuel feed lines from the tank.

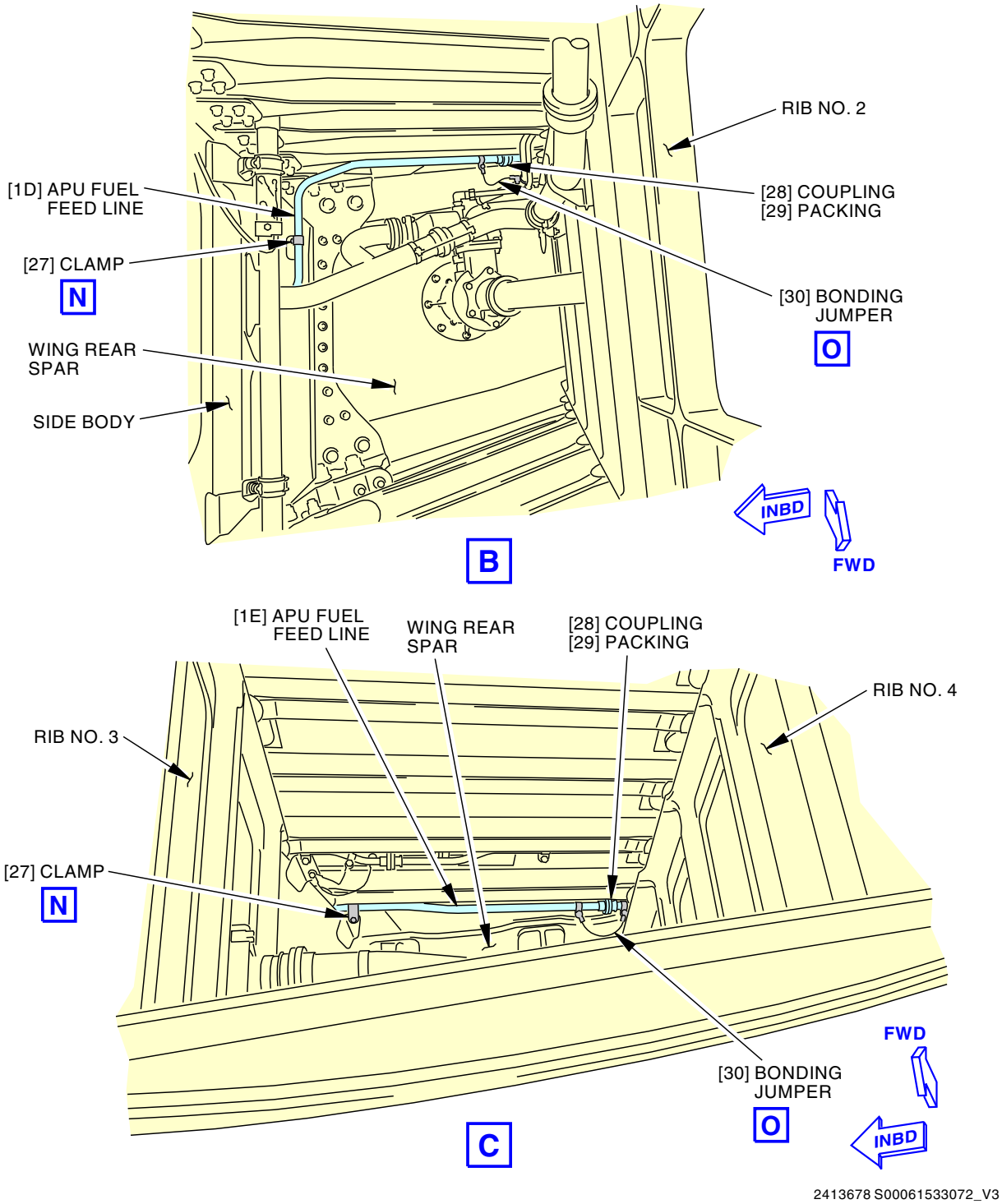
——— END OF TASK ———

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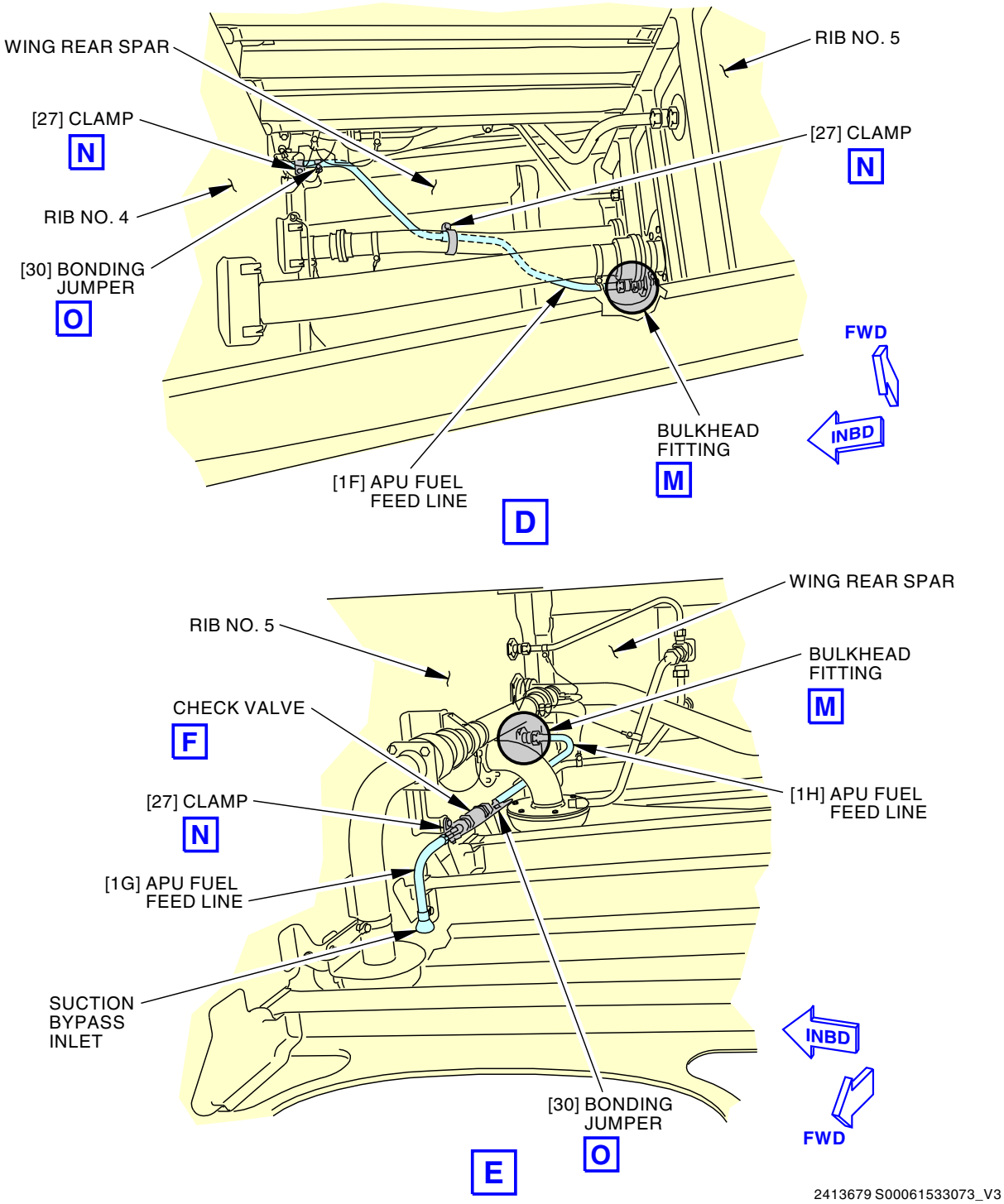
APU Fuel Feed Line Installation
Figure 401/28-25-04-990-801 (Sheet 1 of 8)

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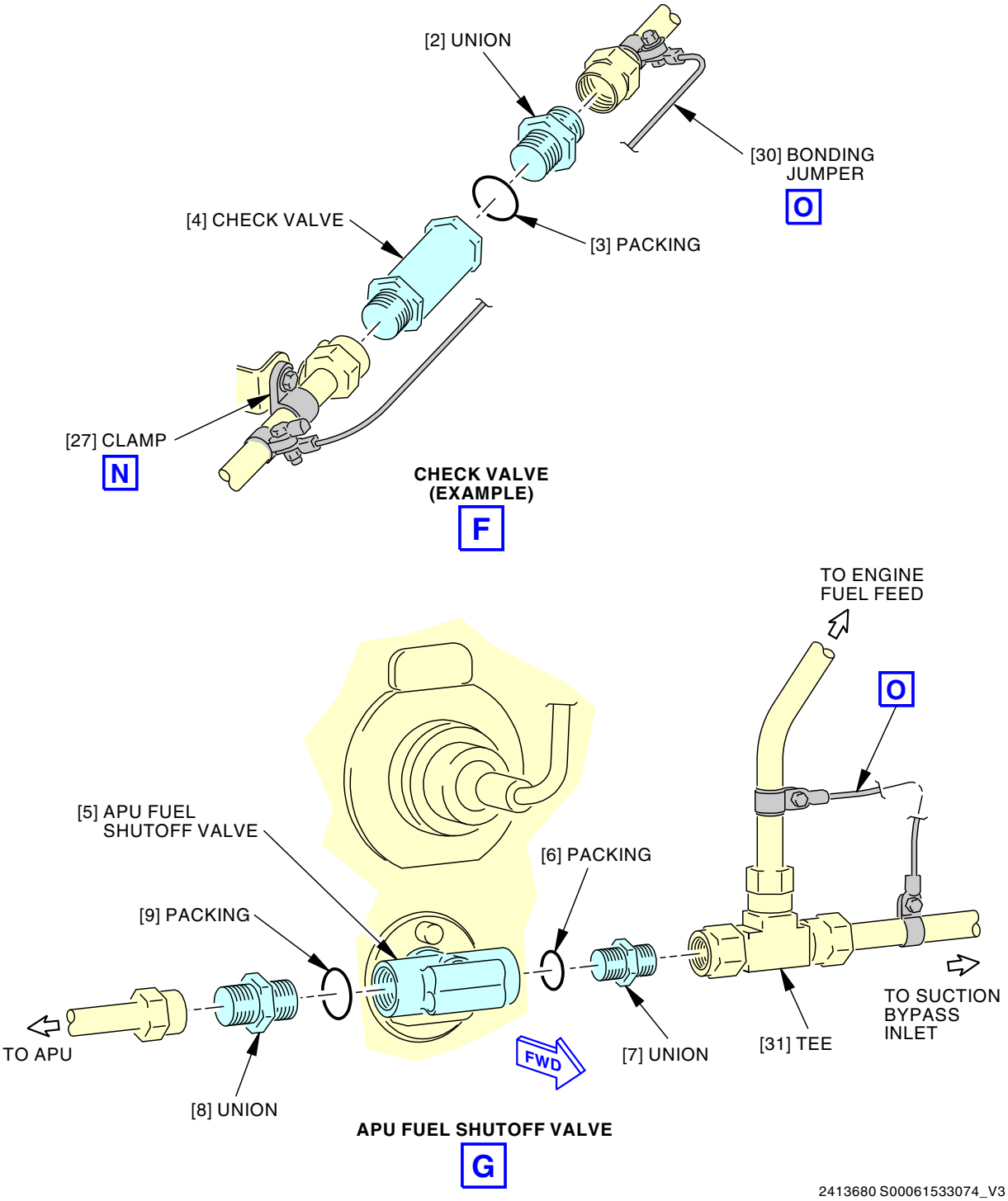
APU Fuel Feed Line Installation
Figure 401/28-25-04-990-801 (Sheet 2 of 8)

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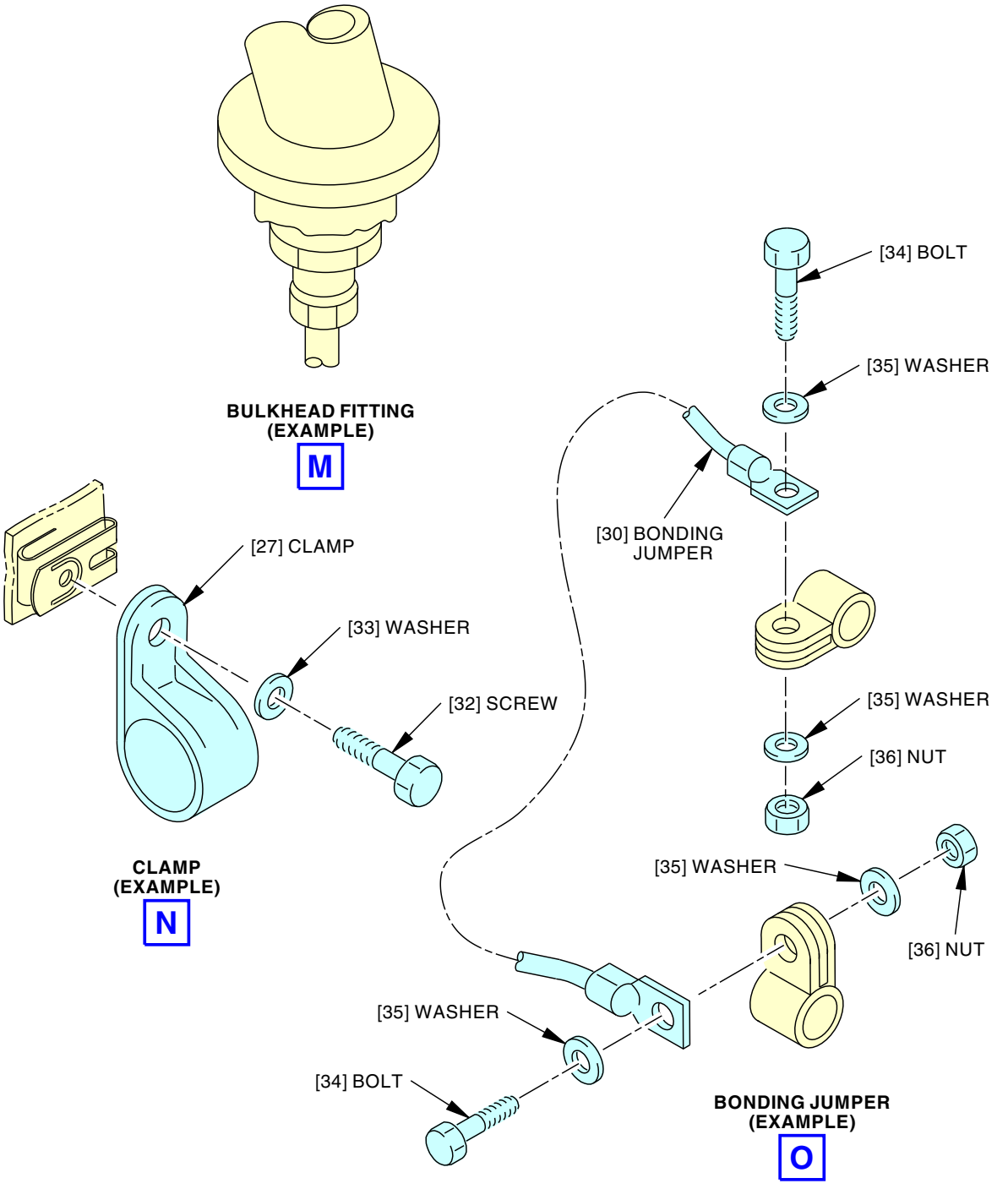
APU Fuel Feed Line Installation
Figure 401/28-25-04-990-801 (Sheet 3 of 8)

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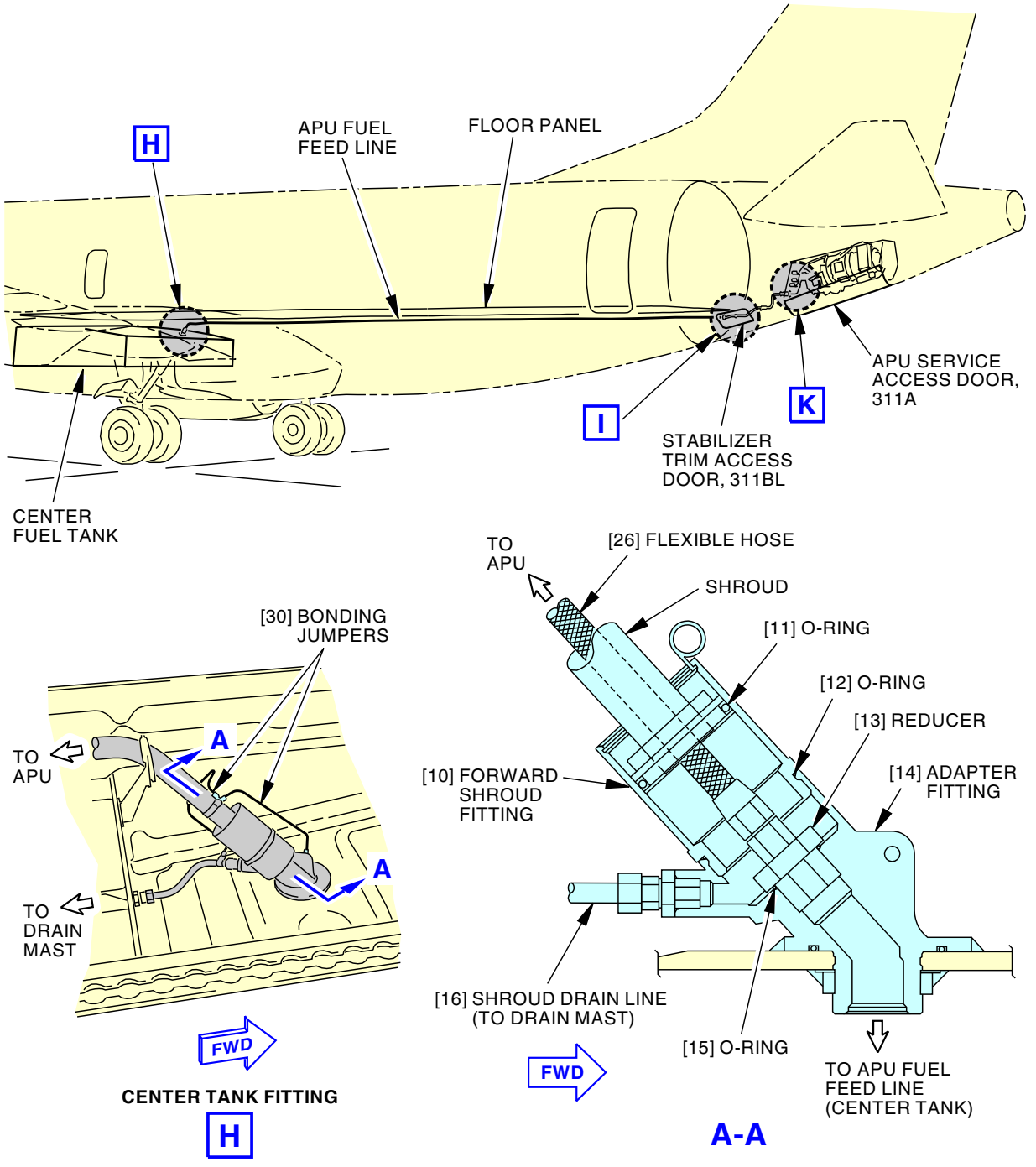
APU Fuel Feed Line Installation
Figure 401/28-25-04-990-801 (Sheet 4 of 8)

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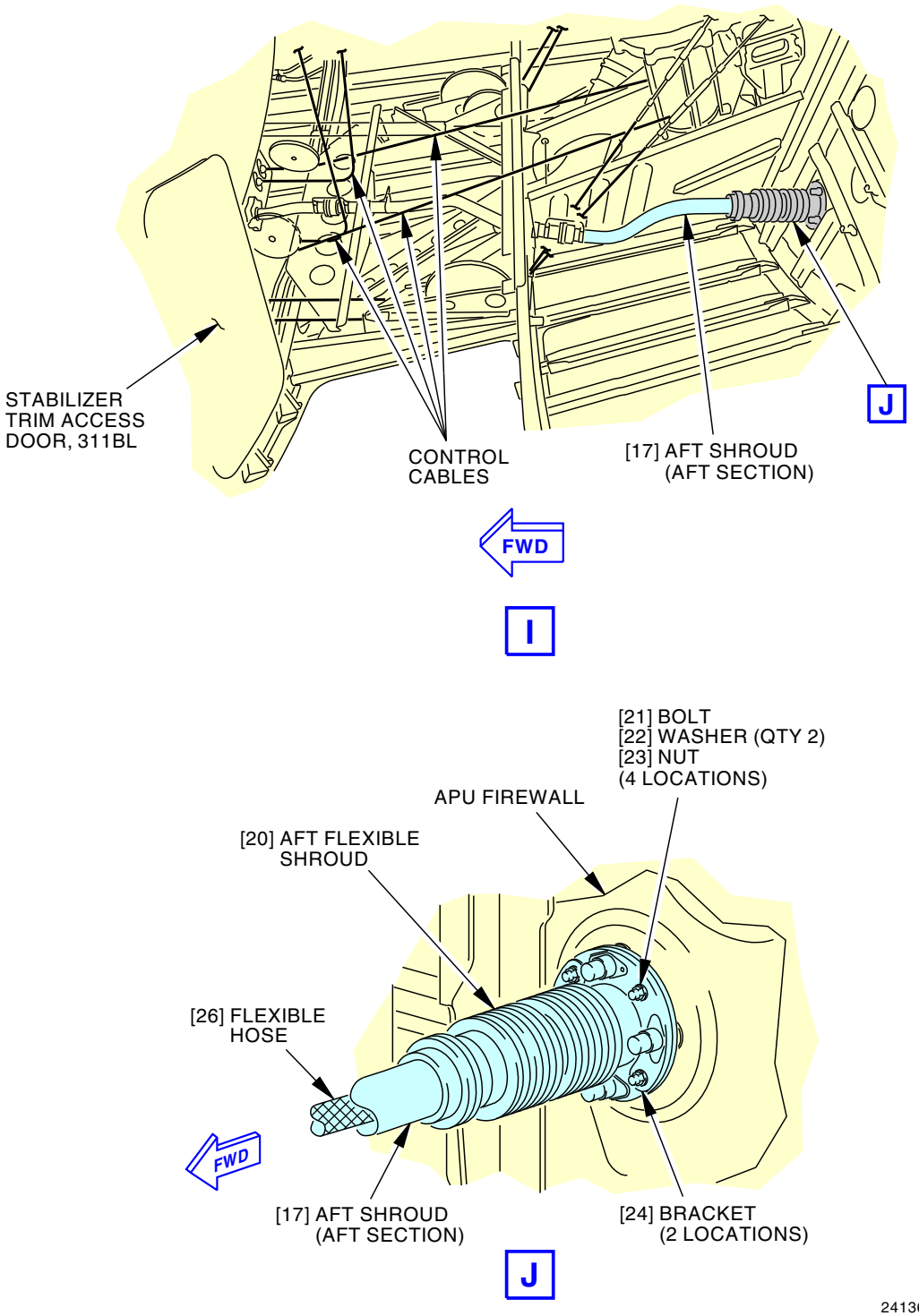
APU Fuel Feed Line Installation
Figure 401/28-25-04-990-801 (Sheet 5 of 8)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



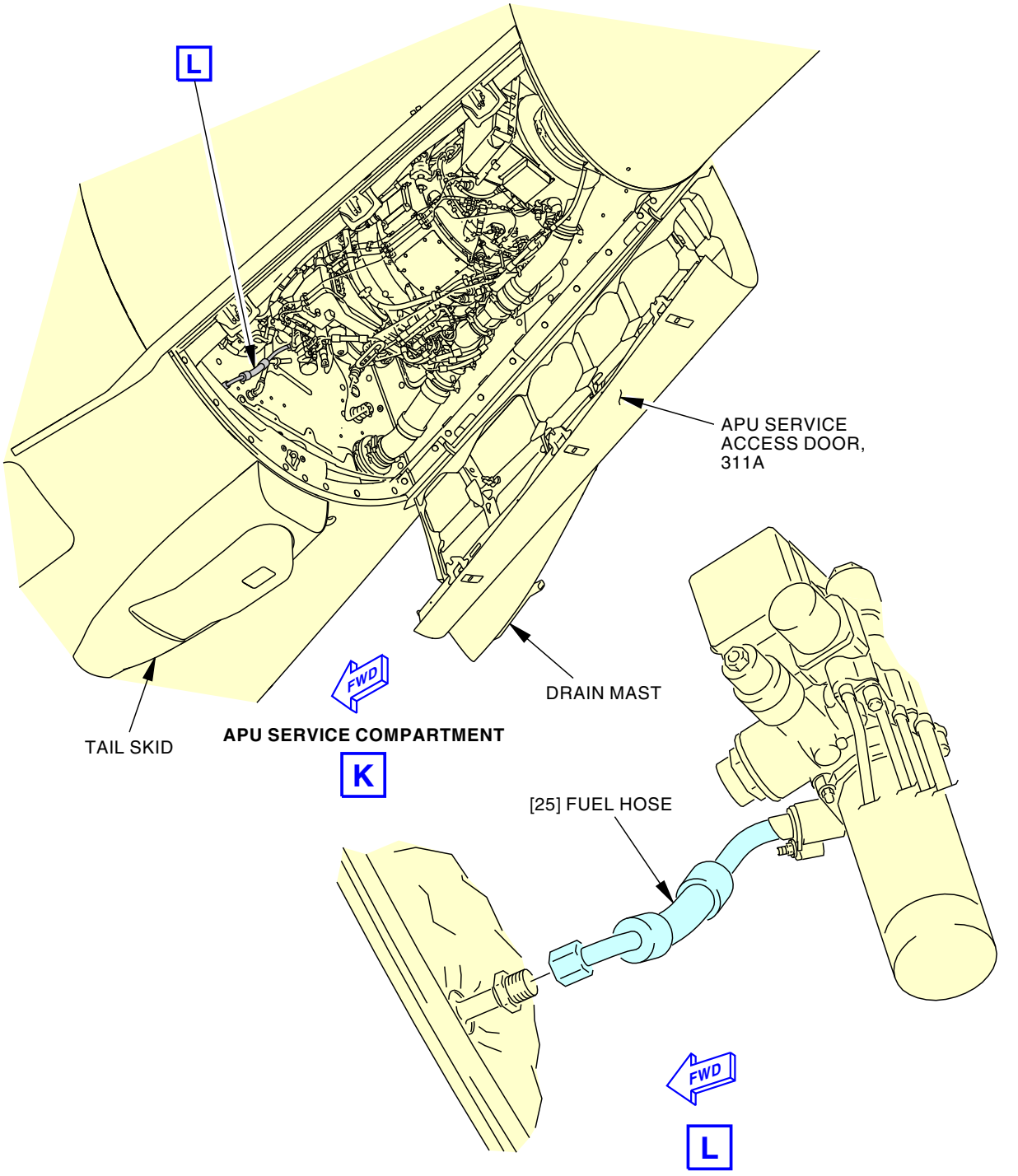
APU Fuel Feed Line Installation
Figure 401/28-25-04-990-801 (Sheet 6 of 8)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



APU Fuel Feed Line Installation
Figure 401/28-25-04-990-801 (Sheet 7 of 8)

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APU Fuel Feed Line Installation
Figure 401/28-25-04-990-801 (Sheet 8 of 8)

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TASK 28-25-04-400-801

3. APU Fuel Feed Line (No. 1 Tank and Center Tank) Installation

(Figure 401)

A. General

(1) This task gives the instruction to Install the APU fuel feed line [1A], APU fuel feed line [1B], APU fuel feed line [1C], APU fuel feed line [1D], APU fuel feed line [1E], APU fuel feed line [1F], APU fuel feed line [1G], and APU fuel feed line [1H] loosely in their positions in the tank.

B. References

Reference	Title
20-10-44-400-801	Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401)
20-10-51-400-801	Flareless Tubing Assembly Installation (P/B 401)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-22-15-400-801	Fuel Line, Fitting and Coupling Installation (P/B 401)
28-22-15-700-801	Engine and APU Fuel Feed, Shroud, Fuel Vent Line and Couplings, and NEADS Lines Dent Criteria - Inspection/Check (P/B 601)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES
SWPM 20-20-10	REPLACEMENT OF GROUND STUDS AND BONDING JUMPER INSTALLATION

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1A	APU fuel feed line	28-25-04-01-105	SIA ALL
1B	APU fuel feed line	28-25-04-01-115	SIA ALL
1C	APU fuel feed line	28-25-04-01-110	SIA ALL
1D	APU fuel feed line	28-25-04-05-185	SIA ALL
1E	APU fuel feed line	28-25-04-05-170	SIA ALL
1F	APU fuel feed line	28-25-04-05-150	SIA ALL
1G	APU fuel feed line	28-25-04-05-145	SIA ALL
1H	APU fuel feed line	28-25-04-05-405	SIA ALL

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(Continued)

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	Packing	28-25-04-05-090	SIA ALL
6	Packing	28-25-04-01-095	SIA ALL
9	Packing	28-25-04-01-095	SIA ALL
29	Packing	28-25-04-05-135	SIA ALL

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
532	Left Wing - Main Tank, Rib 5 to Rib 22, Wing Station 204.25 to Wing BL 643.50

F. 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

G. APU Fuel Line (No. 1 Tank and Center Tank) Installation

SUBTASK 28-25-04-420-014

(1) Install the APU fuel feed lines in the tank.

SUBTASK 28-25-04-420-015

(2) Install the APU fuel feed line [1H] (View E):

(a) Connect the APU fuel feed line [1H] to the check valve [4] (View F):

1) Install the union [2].

2) Install the new packing [3].

SUBTASK 28-25-04-420-016

(3) Install the APU fuel feed line [1G] (View E):

(a) Install the bolts [34], washers [35], and nuts [36] to connect the bonding jumper [30] between the APU fuel feed line [1F] and the APU fuel feed line [1H] (View O).

(b) Install the screws [32] and washers [33], that hold the APU fuel feed line [1G] in the clamp [27], but do not tighten (TASK 28-22-15-400-801) (View N).

(c) Connect the APU fuel feed line [1G] to the check valve [4] (View F).

SUBTASK 28-25-04-420-017

(4) Install the APU fuel feed line [1F] (View D):

(a) Install the bolts [34], washers [35], and nuts [36] to connect the bonding jumper [30] between the APU fuel feed line [1F] and the structure (View O).

(b) Install the screws [32] and washers [33], that hold the APU fuel feed line [1F] in the clamps [27], but do not tighten (TASK 28-22-15-400-801) (View N).

SUBTASK 28-25-04-420-018

(5) Install the APU fuel feed line [1E] (View C):

(a) Install the bolts [34], washers [35], and nuts [36] to connect the bonding jumper [30] between the APU fuel feed line [1E] and the structure (View O).

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(b) Install the screws [32] and washers [33], that hold the APU fuel feed line [1E] in the clamp [27], but do not tighten (TASK 28-22-15-400-801) (View N).

(c) Connect the rigid coupling [28] between the APU fuel feed line [1E] and the APU fuel feed line [1F].

1) Install the new packing [29].

2) Inspect the rigid coupling [28] for wear and replace if necessary (TASK 28-22-15-700-801).

(d) Install safety cable to the rigid coupling [28] (TASK 20-10-44-400-801).

SUBTASK 28-25-04-420-019

(6) Install the APU fuel feed line [1D] (View B):

(a) Install the bolts [34], washers [35], and nuts [36] to connect the bonding jumper [30] between the APU fuel feed line [1D] and the structure (View O).

(b) Install the screws [32] and washers [33], that hold the APU fuel feed line [1D] in the clamp [27], but do not tighten (TASK 28-22-15-400-801) (View N).

(c) Connect the rigid coupling [28] between the APU fuel feed line [1D] and the APU fuel feed line [1E].

1) Install the new packing [29].

2) Inspect the rigid coupling [28] for wear and replace if necessary (TASK 28-22-15-700-801).

(d) Install safety cable to the rigid coupling [28] (TASK 20-10-44-400-801).

SUBTASK 28-25-04-420-020

(7) Install the APU fuel feed line [1C] (View A):

(a) Install the bolts [34], washers [35], and nuts [36] to connect the bonding jumper [30] between the APU fuel feed line [1C] and the structure (View O).

(b) Connect the APU fuel feed line [1C] to the tee [31] (View G).

(c) Connect the tee [31] to the APU shutoff valve [5]:

1) Connect the union [7].

2) Install the new packing [6]

SUBTASK 28-25-04-420-021

(8) Install the APU fuel feed line [1B] (View A):

(a) Install the bolts [34], washers [35], and nuts [36] to connect the bonding jumpers [30] between the APU fuel feed line [1B] and the support bracket (View O).

(b) Connect the APU fuel feed line [1B] to the tee [31] (View G).

(c) Connect the APU fuel feed line [1B] to the check valve [4] (View F).

SUBTASK 28-25-04-420-022

(9) Install the APU fuel feed line [1A] (View A):

(a) Install the bolts [34], washers [35], and nuts [36] to connect the bonding jumpers [30] between the APU fuel feed line [1A] and the support bracket (View O).

(b) Install the screws [32] and washers [33], that hold the APU fuel feed line [1A] in the clamps [27], but do not tighten (TASK 28-22-15-400-801) (View N).

(c) Connect the APU fuel feed line [1A] to the APU shutoff valve [5] (View G).

1) Install the union [8].

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2) Install the new packing [9].

SUBTASK 28-25-04-420-024

CAUTION

DO NOT USE TOOLS TO TIGHTEN THE FITTINGS. DAMAGE TO THE FITTING COMPONENTS COULD OCCUR. THE ADJACENT FITTINGS COULD BECOME LOOSE AND CAUSE DAMAGE.

(10) Install the following flareless fittings to connect the APU fuel feed lines (TASK 20-10-51-400-801):

(a) Connect APU fuel feed line [1A] to the bulkhead fitting (View M)

(b) Connect APU fuel feed line [1C] to the tube end union on APU fuel feed line [1D]

(c) Connect APU fuel feed line [1F] to the bulkhead fitting (View M)

(d) Connect APU fuel feed line [1H] to the bulkhead fitting (View M).

SUBTASK 28-25-04-420-026

(11) Tighten the clamps [27] on the APU fuel feed lines (TASK 28-22-15-400-801).

SUBTASK 28-25-04-420-027

(12) Measure the bonding resistance across the bonding jumpers [30] (SWPM 20-20-00 and SWPM 20-20-10).

(a) Use an intrinsically safe approved bonding meter, COM-1550.

(b) Make sure that the bonding resistance is 0.010 ohm (10 milliohms) or less.

SUBTASK 28-25-04-420-028

(13) Remove all of the tools and equipment from the fuel tanks.

H. APU Fuel Feed Line (No. 1 Tank and Center Tank) Installation Test

SUBTASK 28-25-04-790-001

(1) Do this task: APU Fuel Line Leak Test (with air), TASK 28-25-04-790-801.

I. Put Airplane Back to its Usual Condition

SUBTASK 28-25-04-410-007

(1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

SUBTASK 28-25-04-410-002

(2) Install these access panels that you removed to get access to the APU fuel line:

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

(TASK 28-11-11-400-801, TASK 28-11-31-400-801).

——— END OF TASK ———

TASK 28-25-04-000-802

4. APU Fuel Line (Center Wing Section to APU Firewall) Removal

A. General

(1) This task gives instructions to remove the APU Fuel Line (Center Wing Section to APU Firewall).

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B. References

Reference	Title
24-22-00-860-804	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)

C. Tools/Equipment

Reference	Description
STD-1054	Container - Fuel Resistant, 5-Gallon (19-Liter)

D. 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

E. Access Panels

Number	Name/Location
311BL	Stabilizer Trim Access Door

F. Prepare for the Removal

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 28-25-04-860-014

(3) Do this task: Remove External Power, TASK 24-22-00-860-804.

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

G. APU Fuel Line (Center Wing Section to APU Firewall) Removal

SUBTASK 28-25-04-020-005

(1) Loosen the forward shroud fitting [10] from the adapter fitting [14] on the center tank (View H, Figure 401).

SUBTASK 28-25-04-020-006

WARNING MAKE SURE THAT YOU KEEP THE ELECTRICAL POWER OFF WHEN YOU DISCONNECT OR CONNECT THE FUEL, THE HYDRAULIC, AND THE ELECTRICAL LINES. IF YOU DO NOT, YOU CAN CAUSE INJURY TO PERSONNEL AND DAMAGE EQUIPMENT.

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(WARNING PRECEDES)

WARNING YOU MUST ELECTRICALLY GROUND AND BOND THE AIRPLANE BEFORE YOU DO MAINTENANCE ON THE FUEL SYSTEM. IF YOU DO NOT GROUND AND BOND THE AIRPLANE, STATIC ELECTRICITY CAN CAUSE A FIRE OR EXPLOSION.

(2) Do these steps to disconnect the flexible hose [26] from the adapter fitting [14] of the center tank:

(a) Loosen the forward shroud fitting [10] until it is against the reducing ferrule on the aft APU shroud.

(b) Put a 5-gallon (19-liter) fuel resistant container, STD-1054, below the drain mast for the aft APU shroud.

(c) Loosen the reducer [13] on the flexible hose [26] to disconnect the flexible hose [26] from adapter fitting [14] of the center tank.

(d) Move the flexible hose [26] from the adapter fitting [14].

(e) Remove the O-ring [11] and O-ring [12] from the shroud and discard them.

(f) Remove the O-ring [15] from the reducer [13] and discard it.

SUBTASK 28-25-04-010-004

(3) Open this access door to get access to the APU aft shroud:

Number	Name/Location
311BL	Stabilizer Trim Access Door

SUBTASK 28-25-04-020-007

(4) Disconnect the aft part of the aft APU shroud [17] from the aft flexible shroud [20] installed in the forward side of the APU firewall (View J, Figure 401)

SUBTASK 28-25-04-020-008

(5) Move the aft flexible shroud [20] back to get access to disconnect the flexible hose [26] from the fitting (for the fuel hose [25]) on the forward side of the APU firewall.

SUBTASK 28-25-04-020-009

(6) Remove the aft section of the aft APU shroud [17] (View I).

SUBTASK 28-25-04-020-010

(7) Do these steps to remove the flexible hose [26] from the aft APU shroud:

(a) Hold the exposed part of the flexible hose [26] firmly.

(b) Pull the flexible hose [26] in the aft direction until it is completely removed from the shroud.

NOTE: This step removes the complete length of the flexible hose [26] which you disconnected from the center tank fitting at the forward end. It may be necessary to twist and turn the flexible hose [26] in the shroud to get it to move freely.

(c) Move the flexible hose [26] through the opening for this access door:

Number	Name/Location
311BL	Stabilizer Trim Access Door

END OF TASK

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TASK 28-25-04-400-802

5. APU Fuel Line (Center Wing Section to APU Firewall) Installation

A. General

(1) This task gives instructions to install the APU Fuel Line (Center Wing Section to APU Firewall).

B. 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)
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 501)
53-21-00-400-801	Passenger Cabin Floor Panel Installation (P/B 401)

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
11	O-ring	28-25-05-01-135	SIA ALL
12	O-ring	28-25-05-01-155	SIA ALL
15	O-ring	28-25-05-01-185	SIA ALL
26	Flexible hose	28-25-04-10-005	SIA ALL
		28-25-05-01-090	SIA ALL

D. 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

E. Access Panels

Number	Name/Location
311BL	Stabilizer Trim Access Door

F. APU Fuel Line (Center Wing Section to APU Firewall) Installation

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 aft 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 28-25-04-020-011

(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 [26] (Figure 401, View H).

(a) Lubricate and install a new O-ring [11] and new O-ring [12] (TASK 20-10-17-400-801).

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(b) If the reducer [13] is not already installed in the flexible hose [26] 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].

(d) Connect the flexible hose [26] to the adapter fitting [14] with the reducer [13].

NOTE: Do not attach the forward shroud fitting [10] until you complete the leak check for the fuel line.

1) Tighten the reducer [13] in the adapter fitting [14] to a standard torque (TASK 20-50-11-910-801).

SUBTASK 28-25-04-020-012

(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 aft APU shroud [17] on the aft end of the flexible hose [26].

(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 [26].

(d) Connect the aft end of flexible hose [26] to the fitting at the APU firewall (Figure 401).

NOTE: Do not attach the aft APU shroud [17] to the aft flexible shroud [20] until you complete the leak check of the fuel line.

(e) Tighten the fitting at the APU firewall to 280 ±14 in-lb (32 ±2 N·m).

SUBTASK 28-25-04-790-002

(7) Do this task: APU Fuel Line Leak Test (with air), TASK 28-25-04-790-801.

SUBTASK 28-25-04-420-011

(8) Do these steps to connect the fuel hose [25] shroud to the center tank (Figure 401, View H).

(a) Engage and tighten the forward shroud fitting [10] on the center tank adapter fitting [14] to a torque of 700 ±70 in-lb (79 ±8 N·m).

SUBTASK 28-25-04-420-012

(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.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 28-25-04-410-003

(1) Install the floor panel at STA 660 (TASK 53-21-00-400-801).

SUBTASK 28-25-04-410-004

(2) Install the aisle carpets (TASK 25-27-15-400-801).

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SUBTASK 28-25-04-860-009

(3) 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

SUBTASK 28-25-04-410-005

(4) Close this access panel:

Number	Name/Location
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

Reference	Description
STD-1201	Gauge - Pressure, 0-75 PSIG (0-518 KPa)
STD-3940	Air Source - Regulated, Dry Filtered, 0-150 psig

C. Access Panels

Number	Name/Location
315A	APU Cowl Door

D. Pressurize the APU Fuel Line with Air and Do a Check for Leaks

SUBTASK 28-25-04-860-011

(1) Manually open the APU fuel shutoff valve with the override lever.

SUBTASK 28-25-04-010-005

(2) Open this access panel:

Number	Name/Location
315A	APU Cowl Door

SUBTASK 28-25-04-860-012

(3) Disconnect the APU flex line at the APU service compartment near the APU firewall (Figure 401), View L.

SUBTASK 28-25-04-860-013

(4) Install a 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 (3 kg/cm^2).

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SUBTASK 28-25-04-790-005

(6) Keep the pressure on the fuel line for a 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.

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 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 28-25-04-410-006

(10) Close this access panel:

Number	Name/Location
315A	APU Cowl Door

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

APU FUEL FEED LINE SHROUD - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) Main APU Fuel Feed Line Shroud Removal

(2) Main APU Feed Fuel Line Shroud Installation

(3) Aft APU Feed Fuel Line Shroud Removal

(4) Aft APU Feed Fuel Line Shroud Installation.

B. The APU fuel feed line shroud is referred to as the APU shroud.

C. The APU shroud is routed from the forward end of the APU shroud to the adapter fitting on the upper panel of the center fuel tank. The aft end of the APU shroud ends at the flexible shroud attached to the forward side of the APU firewall (View A, Figure 401).

D. The APU shroud is divided in 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. General

(1) This task gives the instructions for the removal of the main APU fuel feed line shroud.

(2) The APU fuel feed line shroud is referred to as the APU shroud.

B. References

Reference	Title
20-10-44-000-801	Lockwire, Cotter Pins, and Lockrings - Removal (P/B 401)
25-27-15-000-801	Carpet Removal (P/B 401)
28-22-15-000-803	Couplings Removal (P/B 401)
28-25-04-000-802	APU Fuel Line (Center Wing Section to APU Firewall) Removal (P/B 401)
53-21-00-000-801	Passenger Cabin Floor Panel Removal (P/B 401)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE
STD-6646	Container - Fuel Resistant

D. 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

E. Access Panels

Number	Name/Location
311BL	Stabilizer Trim Access Door

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F. Prepare for the Removal

SUBTASK 28-25-05-040-001

(1) On the P5 Overhead Panel, put the APU master switch to the OFF position.

SUBTASK 28-25-05-910-001

(2) Put a DO NOT OPERATE tag, STD-858 on the APU master switch.

SUBTASK 28-25-05-040-002

(3) 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 28-25-05-020-021

(4) Remove the aisle carpets between Station 616 and Station 1016 (TASK 25-27-15-000-801).

SUBTASK 28-25-05-020-022

(5) Remove the floor panels between Station 616 and Station 1016 (TASK 53-21-00-000-801).

SUBTASK 28-25-05-010-003

(6) To get access to the aft shroud, open this access panel:

(View B, Figure 401).

Number	Name/Location
311BL	Stabilizer Trim Access Door

G. Main APU Fuel Feed Line Shroud Removal

SUBTASK 28-25-05-020-037

(1) Loosen the forward shroud fitting [10] until it is against the ferrule [3] on the APU shroud tube assembly.

SUBTASK 28-25-05-020-001

WARNING MAKE SURE YOU KEEP THE ELECTRICAL POWER OFF WHEN YOU DISCONNECT OR CONNECT THE FUEL, THE HYDRAULIC, AND THE ELECTRICAL LINES. IF YOU DO NOT, YOU CAN CAUSE INJURY TO PERSONNEL WITH THE ACCIDENTAL APPLICATION OF PRESSURIZED FLUIDS, ENERGIZING OF ELECTRICAL CIRCUITS, OR FIRE.

WARNING YOU MUST ELECTRICALLY GROUND AND BOND THE AIRPLANE BEFORE YOU DO MAINTENANCE ON THE FUEL SYSTEM. IF YOU DO NOT GROUND AND BOND THE AIRPLANE, STATIC ELECTRICITY CAN CAUSE A FIRE OR EXPLOSION.

(2) Remove the flexible hose [11] from the main APU shroud [1].

NOTE: If you are scheduled to remove the flexible hose [11], refer to the applicable procedure (TASK 28-25-04-000-802).

(a) Disconnect the flexible hose [11] from the center tank adapter fitting [7] (View A-A, Figure 401).

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1) Put a fuel resistant container, STD-6646, below the APU shroud drain mast.

NOTE: A small quantity of fuel will spill from the flexible hose [11] and drain from the drain mast for the APU shroud.

SUBTASK 28-25-05-020-009

(3) Remove the O-ring [5] from the forward shroud fitting [10].

(a) Discard the O-ring [5].

SUBTASK 28-25-05-820-004

(4) Move the flexible hose [11] and the main APU shroud [1] from the adapter fitting [7].

SUBTASK 28-25-05-020-010

(5) Remove the O-ring [4] from the main APU shroud [1].

(a) Discard the O-ring [4].

SUBTASK 28-25-05-020-024

(6) Remove the safety cable or lockwire from the coupling nut assembly at the APU firewall (TASK 20-10-44-000-801) (View D, Figure 401).

SUBTASK 28-25-05-020-025

(7) Loosen the coupling nut assembly.

SUBTASK 28-25-05-020-026

(8) Disconnect the aft APU shroud [15] from the aft flexible shroud [20] at the APU firewall.

SUBTASK 28-25-05-020-012

(9) Remove the O-ring [26] from the aft APU shroud [15].

(a) Discard the O-ring [26].

SUBTASK 28-25-05-820-001

(10) Pull the aft flexible shroud [20] back toward the APU firewall.

SUBTASK 28-25-05-020-013

(11) Disconnect the flexible hose coupling [35] at the APU firewall.

SUBTASK 28-25-05-020-015

(12) Pull the flexible hose [11] through the main APU shroud [1].

SUBTASK 28-25-05-020-027

(13) Stow the flexible hose [11] in the aft compartment.

SUBTASK 28-25-05-020-014

(14) Remove the main APU shroud [1] from the slip joint fitting [16] on the pressure bulkhead as follows:

(a) Remove the six bolts [18] and six washers [19] that attach the two welded shroud tubes [37] to the pressure bulkhead (Figure 401).

(b) Discard the two gaskets [17].

(c) Remove the main APU shroud [1] from the slip joint fitting [16] on the pressure bulkhead.

(d) Remove the O-ring [25] from the aft end fitting of the main APU shroud [1].

(e) Discard the O-ring [25].

SUBTASK 28-25-05-020-002

(15) Remove the main APU shroud [1] from the floor beams.

(a) Remove the loop clamps and clamps that attach the main APU shroud [1] to the airplane structure.

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(b) Remove the bonding components.

1) Remove the clamp [30], screw [31], two washers [32], nut [33] and bonding jumper [34] from the main APU shroud [1].

(c) Remove the applicable couplings (TASK 28-22-15-000-803).

SUBTASK 28-25-05-020-016

(16) Pull the main APU shroud [1] forward through the floor beams.

SUBTASK 28-25-05-550-001

(17) Turn the main APU shroud [1] until it is clear of the control cables.

SUBTASK 28-25-05-550-002

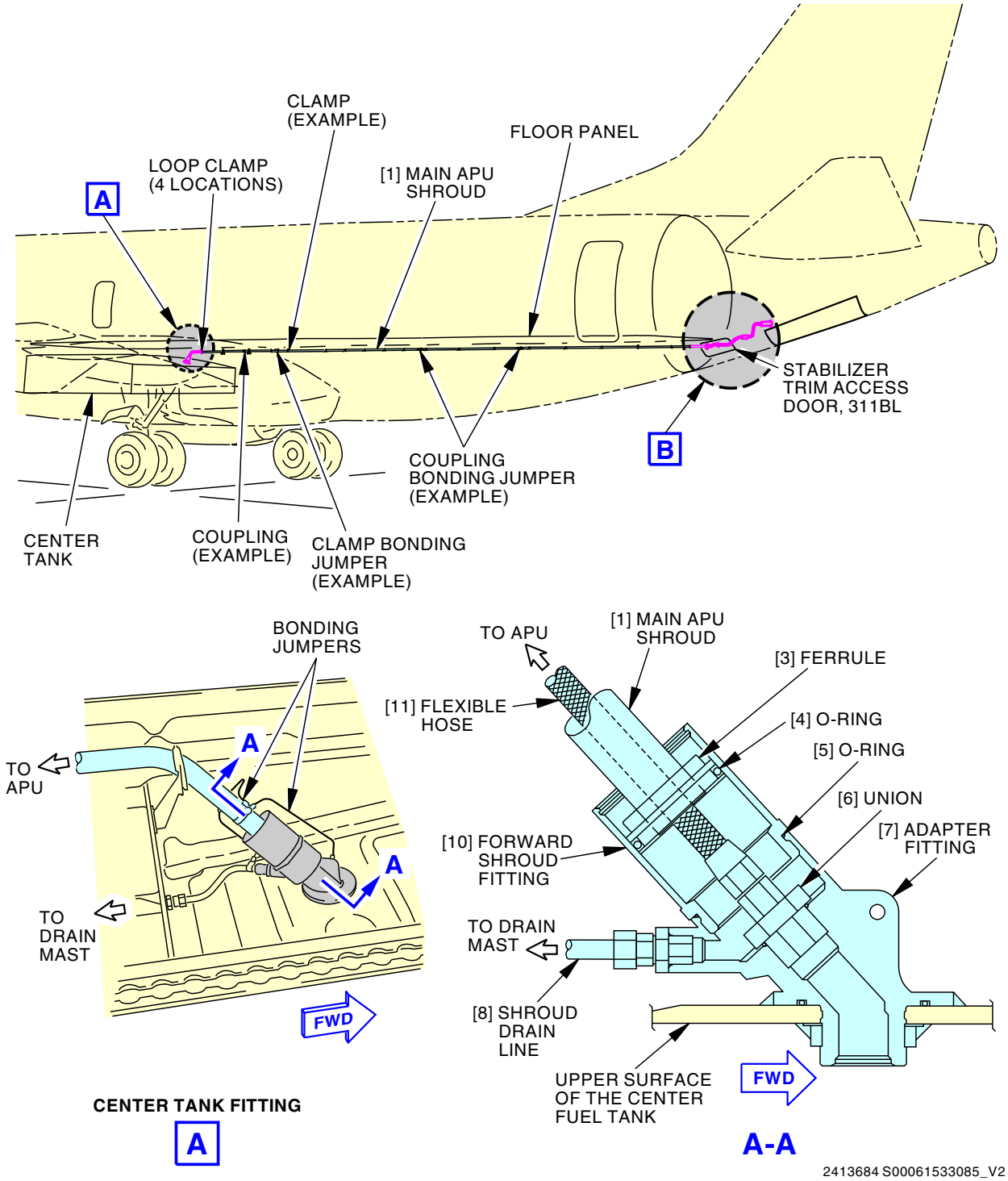
(18) Lift the main APU shroud [1] until it is clear of the floor panels.

SUBTASK 28-25-05-020-003

(19) Remove the main APU shroud [1] from the airplane through the aft entry door.

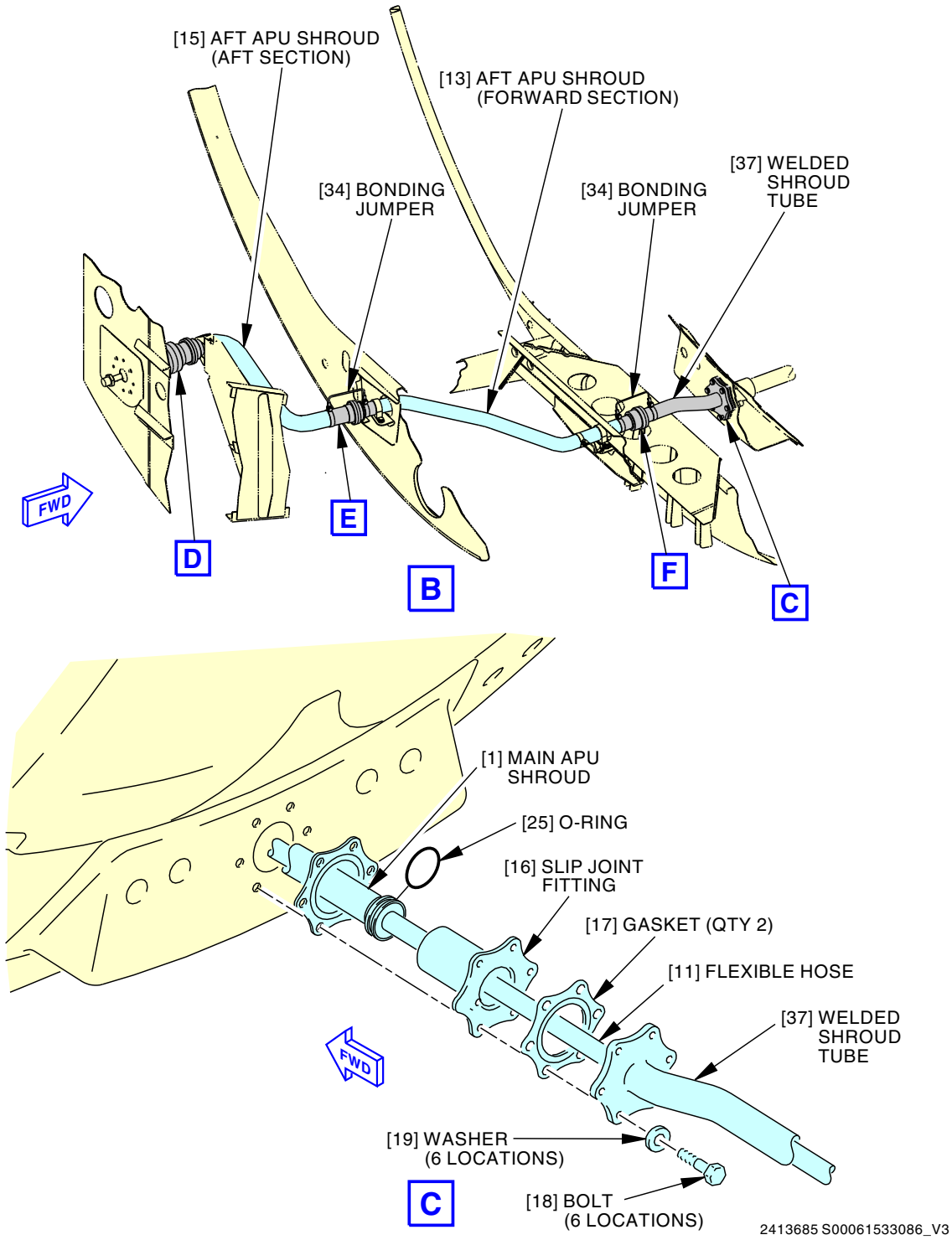
——— END OF TASK ———

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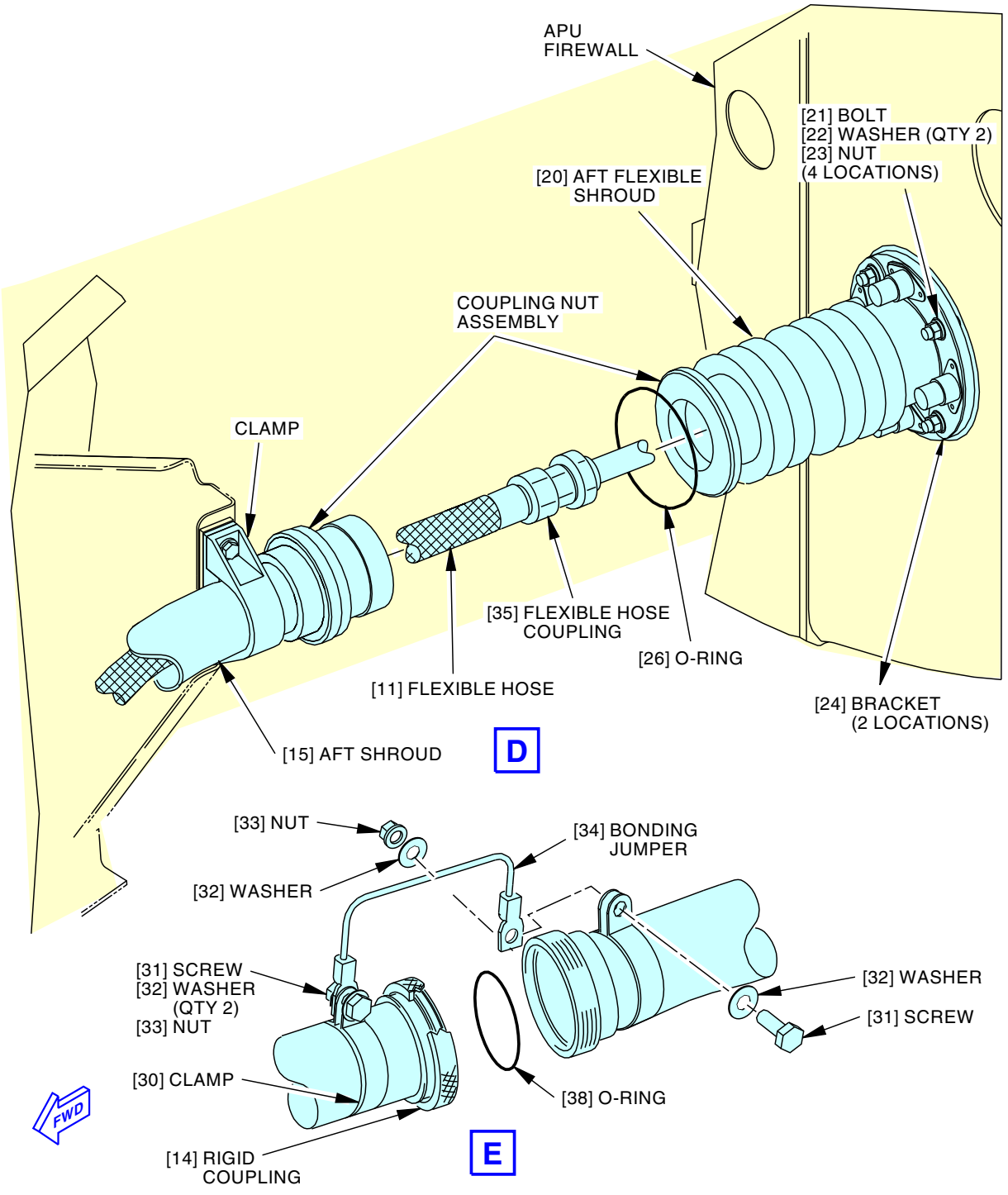
APU Fuel Feed Line Shroud Installation
Figure 401/28-25-05-990-801 (Sheet 1 of 4)

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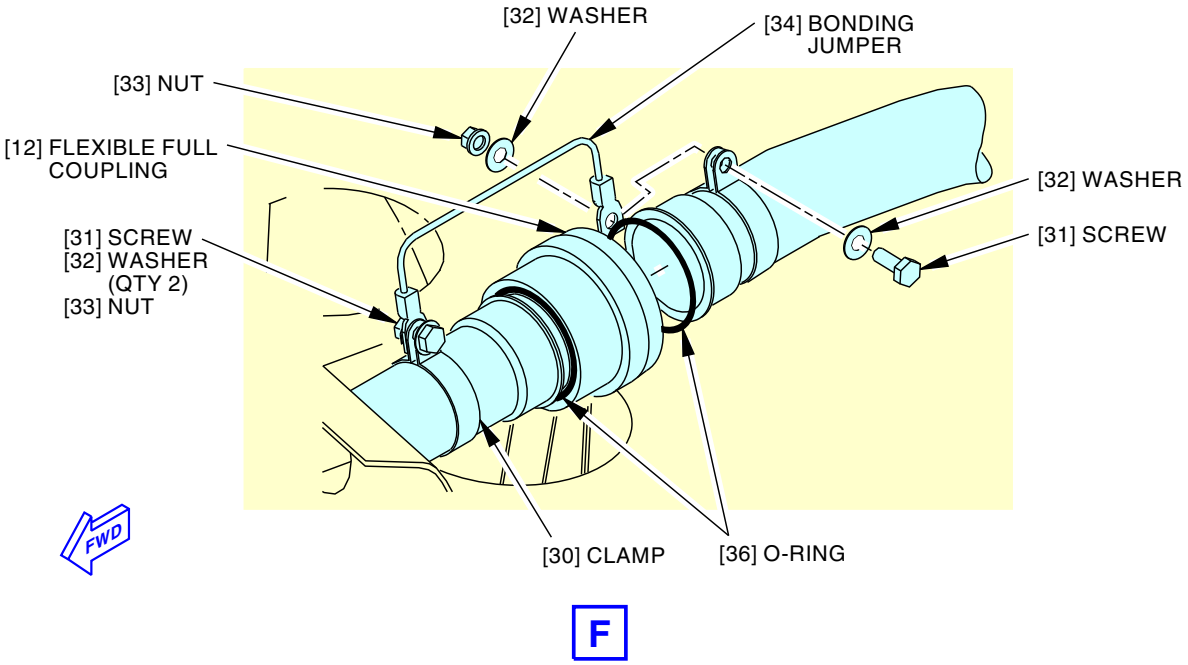
APU Fuel Feed Line Shroud Installation
Figure 401/28-25-05-990-801 (Sheet 2 of 4)

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APU Fuel Feed Line Shroud Installation
Figure 401/28-25-05-990-801 (Sheet 3 of 4)

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APU Fuel Feed Line Shroud Installation
Figure 401/28-25-05-990-801 (Sheet 4 of 4)

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TASK 28-25-05-400-801

3. Main APU Fuel Feed Line Shroud Installation

(Figure 401)

A. General

(1) This task gives instructions for the installation of the main APU fuel feed line shroud.

B. References

Reference	Title
20-10-44-400-801	Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401)
20-50-11-910-801	Standard Torque Values (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)
28-22-15-400-803	Couplings Installation (P/B 401)
28-25-04-790-801	APU Fuel Line Leak Test (with air) (P/B 401)
28-25-05-790-801	APU Fuel Line Shroud and Drain Line - Leak Test (P/B 501)
51-22-00-390-806	Fillet Seal Application (P/B 201)
53-21-00-400-801	Passenger Cabin Floor Panel Installation (P/B 401)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142 Type II
C00307	Coating - Corrosion Resistant Finish For Integral Fuel Tanks	BMS10-20 Type II
C50315	Coating - Chemical Conversion - Bonderite M-CR 600 Aero (Formerly Alodine 600)	BAC5719 Class A, C or D, MIL-DTL-81706 Type I Class 1A or 3
D00230	Oil - Lubricating, Aircraft Piston Engines (Non-Dispersant Mineral Oil)	SAE J1966
D00504	Grease - Petrolatum	VV-P-236
G01048	Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter	NASM20995

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(Continued)

Reference	Description	Specification
G50375	Kit - Safety Cable, 321 CRES - 0.032 Inch (0.81 mm) Diameter, (Contains both Cable and Ferrule)	BACC13AT3K, AMS 5689

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Main APU shroud	28-25-05-01-090	SIA ALL
		28-25-05-10-125	SIA ALL
		28-25-05-10-130	SIA ALL
		28-25-05-10-140	SIA ALL
4	O-ring	28-25-05-01-135	SIA ALL
5	O-ring	28-25-05-01-155	SIA ALL
13	Aft APU shroud	28-25-05-20-200	SIA ALL
15	Aft APU shroud	28-25-05-20-210	SIA ALL
17	Gasket	28-25-05-20-225	SIA ALL
25	O-ring	28-25-05-10-120	SIA ALL
26	O-ring	28-25-05-20-180	SIA ALL

F. 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

G. Access Panels

Number	Name/Location
311BL	Stabilizer Trim Access Door

H. Main APU Fuel Feed Line Shroud Installation

SUBTASK 28-25-05-420-001

(1) Load the main APU shroud [1] through the aft entry door.

(a) Feed the aft end of the main APU shroud [1] through the opening in the passenger cabin floor above the rear spar of the center wing section.

(b) Move the main APU shroud [1] aft through the floor beams.

(c) Align the main APU shroud [1] in the correct position.

SUBTASK 28-25-05-420-003

(2) Install the main APU shroud [1] in the slip joint fitting [16] on the pressure bulkhead fuel pan as follows (View C, Figure 401):

(a) Lightly coat a new O-ring [25] with grease, D00504.

(b) Install the new O-ring [25] on the aft end fitting of the main APU shroud [1].

(c) Align the slip joint fitting [16], the two new gaskets [17], welded shroud tube [37] and the main APU shroud [1] to the pressure bulkhead fuel pan (View C, Figure 401).

(d) Install the six bolts [18] and washers [19] for the slip joint fitting [16] and the new gaskets [17].

(e) Tighten the bolts [18] on the welded shroud tube [37] .

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SUBTASK 28-25-05-420-004

(3) Install the forward shroud fitting [10] as follows:

(a) Lightly coat a new O-ring [4] with grease, D00504.

(b) Install the new O-ring [4] on the ferrule [3].

(c) Install a new O-ring [5] on the forward shroud fitting [10].

(d) Install the forward shroud fitting [10] on the adapter fitting [7] next to the center tank.

(e) Tighten the forward shroud fitting [10] to 222 ±18 in-lb (25 ±2 N·m).

(f) Install the two bonding jumpers [34] as follows:

1) Connect the bonding jumper to the adapter fitting [7] with a screw [31], three washers [32], and a nut [33].

2) Connect the bonding jumper to the main APU shroud [1] clamp and the second bonding jumper with a screw [31], two washers [32], and a nut [33].

3) Tighten the screws [31] .

SUBTASK 28-25-05-420-005

(4) Install the loop clamps for the main APU shroud [1] (TASK 28-22-15-400-801).

(a) Loosely install the clamps [30].

SUBTASK 28-25-05-420-049

(5) Install the applicable couplings for the main APU shroud [1] (TASK 28-22-15-400-803).

SUBTASK 28-25-05-010-004

(6) Clean the fay surfaces of the main APU shroud [1], clamp [30] and the terminal of the bonding jumper [34] (3 locations) (SWPM 20-20-00, Paragraph 8).

SUBTASK 28-25-05-620-001

(7) Apply Bonderite M-CR 600 Aero coating, C50315, to the bare areas of the main APU shroud [1], clamp [30] and the terminal of the bonding jumper [34].

SUBTASK 28-25-05-420-024

(8) Install the clamp [30], screw [31], two washers [32], nut [33] and bonding jumper [34] to three locations on the main APU shroud [1].

(a) Install each clamp [30] aft of the forward shroud fitting [10] at a 90 +20 / -0°arc (1.6 +0.4 / -0.0 rad) from the main APU shroud [1] (2 locations).

(b) Tighten the nut [33] to 28 in-lb (3.2 N·m) - 35 in-lb (4.0 N·m).

SUBTASK 28-25-05-760-001

(9) Measure the bonding resistance between the main APU shroud [1] and the structure of the airplane with an intrinsically safe approved bonding meter, COM-1550 (3 locations) (SWPM 20-20-00).

(a) Make sure that the bonding resistance from the main APU shroud [1] to the structure is 0.0009 ohm (0.9 milliohm) or less.

SUBTASK 28-25-05-390-001

(10) Apply a fillet seal of sealant, A02315, around the clamp [30] and the main APU shroud [1] (TASK 51-22-00-390-806).

SUBTASK 28-25-05-390-004

(11) Apply one coat of coating, C00307 on the fillet seal.

SUBTASK 28-25-05-420-022

(12) Tighten the loop clamps and clamps.

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SUBTASK 28-25-05-420-006

(13) Connect the flexible hose [11].

(a) Feed the flexible hose [11] through the aft APU shroud [13].

(b) Move the flexible hose [11] in the forward direction until it touches the center tank adapter fitting [7].

SUBTASK 28-25-05-020-017

(14) Remove the forward shroud fitting [10] from the center tank adapter fitting [7].

SUBTASK 28-25-05-600-001

(15) Lightly coat a new O-ring [5] with grease, D00504.

SUBTASK 28-25-05-420-026

(16) Install the new O-ring [5] on the forward shroud fitting [10].

SUBTASK 28-25-05-600-002

(17) Lubricate the threads with oil, D00230, on the forward end of the flexible hose [11].

SUBTASK 28-25-05-420-025

(18) Connect the flexible hose coupling [35] to the aft flexible shroud [20] at the APU firewall (View D, Figure 401).

SUBTASK 28-25-05-420-036

(19) Tighten the flexible hose coupling [35] to 266 in-lb (30 N·m) - 294 in-lb (33.2 N·m).

NOTE: Do not attach the flange for the aft flexible shroud [20] until a fuel leak check is complete.

SUBTASK 28-25-05-790-001

(20) Do this task: APU Fuel Line Leak Test (with air), TASK 28-25-04-790-801.

SUBTASK 28-25-05-600-004

(21) Lightly coat a new O-ring [26] with grease, D00504.

SUBTASK 28-25-05-420-028

(22) Install the new O-ring [26] on the aft APU shroud [15].

SUBTASK 28-25-05-420-037

(23) Connect the coupling nut assembly on the aft APU shroud [15] to the aft flexible shroud [20] at the APU firewall (View D, Figure 401).

SUBTASK 28-25-05-420-038

(24) Tighten the coupling nut assembly (TASK 20-50-11-910-801).

SUBTASK 28-25-05-420-040

(25) Install safety cable kit, G50375 or MS20995C32 lockwire, G01048 on the coupling nut assembly (TASK 20-10-44-400-801).

SUBTASK 28-25-05-420-008

(26) Install the forward shroud fitting [10] (View A-A, Figure 401).

(a) Align the forward shroud fitting [10] in the center tank adapter fitting [7].

(b) Tighten the forward shroud fitting [10] to 660 in-lb (75 N·m) - 730 in-lb (82 N·m).

(c) Install the snap-ring [2] on the forward shroud fitting [10].

SUBTASK 28-25-05-790-002

(27) Do this task: APU Fuel Line Shroud and Drain Line - Leak Test, TASK 28-25-05-790-801.

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I. 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 28-25-05-410-003

(3) Close this access panel:

Number	Name/Location
311BL	Stabilizer Trim Access Door

SUBTASK 28-25-05-440-001

(4) Remove the safety tags 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

SUBTASK 28-25-05-440-002

(5) On the P5 Overhead Panel, put the APU master switch in the ON position.

——— END OF TASK ———

TASK 28-25-05-000-802

4. Aft APU Fuel Feed Line Shroud Removal

(Figure 401)

A. General

(1) This task gives instructions to remove the Aft APU Fuel Feed Line Shroud.

(2) The APU fuel feed line shroud is referred to as the APU shroud.

B. References

Reference	Title
20-10-44-000-801	Lockwire, Cotter Pins, and Lockrings - Removal (P/B 401)
28-22-15-000-801	Fuel Line, Fitting and Coupling Removal (P/B 401)
28-22-15-000-803	Couplings Removal (P/B 401)

C. Tools/Equipment

Reference	Description
STD-6646	Container - Fuel Resistant

D. 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

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E. Access Panels

Number	Name/Location
311BL	Stabilizer Trim Access Door

F. Prepare for the Removal

SUBTASK 28-25-05-040-003

(1) On the P5 Overhead Panel, put the APU master switch to the OFF position.

SUBTASK 28-25-05-040-004

(2) 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 28-25-05-010-002

(3) Open this access door:

Number	Name/Location
311BL	Stabilizer Trim Access Door

G. Aft APU Fuel-Feed Line Shroud Removal

SUBTASK 28-25-05-020-004

WARNING

MAKE SURE YOU KEEP THE ELECTRICAL POWER OFF WHEN YOU DISCONNECT OR CONNECT THE FUEL, THE HYDRAULIC, AND THE ELECTRICAL LINES. IF YOU DO NOT, YOU CAN CAUSE INJURY TO PERSONNEL WITH THE ACCIDENTAL APPLICATION OF PRESSURIZED FLUIDS, ENERGIZING OF ELECTRICAL CIRCUITS, OR FIRE.

WARNING

YOU MUST ELECTRICALLY GROUND AND BOND THE AIRPLANE BEFORE YOU DO MAINTENANCE ON THE FUEL SYSTEM. IF YOU DO NOT GROUND AND BOND THE AIRPLANE, STATIC ELECTRICITY CAN CAUSE A FIRE OR EXPLOSION.

(1) Disconnect the flexible hose [11].

(a) Remove the safety cable or the lockwire from the coupling nut assembly (TASK 20-10-44-000-801).

(b) Loosen the coupling nut assembly.

(c) Disconnect the aft APU shroud [15] from the aft flexible shroud [20] at the APU firewall.

(d) Discard the O-ring [26].

(e) Push the aft flexible shroud [20] aft to get access to the flexible hose coupling [35].

(f) Put a fuel resistant container, STD-6646, below the flexible hose coupling [35].

(g) Disconnect the flexible hose coupling [35] at the APU firewall.

SUBTASK 28-25-05-020-030

(2) Remove the clamp [30], screw [31], two washers [32], nut [33] and bonding jumper [34] from the aft APU shroud [13].

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SUBTASK 28-25-05-020-034

(3) Remove the flexible full coupling [12] that connects the aft APU shroud [13] to the welded shroud tube [37] (TASK 28-22-15-000-803).

(a) Discard the two O-rings [36].

SUBTASK 28-25-05-020-032

(4) Remove the clamp [30], screw [31], two washers [32], nut [33] and bonding jumper [34] from the aft APU shroud [15].

SUBTASK 28-25-05-020-035

(5) Remove the rigid coupling [14] that connects the aft end of the aft APU shroud [13] to the aft APU shroud [15] (TASK 28-22-15-000-803).

(a) Discard the O-ring [38].

SUBTASK 28-25-05-020-005

(6) Remove the aft APU shroud [13] and aft APU shroud [15].

(a) Remove the six bolts [18] and washers [19] that connect the slip joint fitting [16] to the aft pressure bulkhead (View C, Figure 401).

(b) Remove the APU shroud clamps that hold the aft APU shroud [13] and the aft APU shroud [15] (TASK 28-22-15-000-801), (View B, Figure 401).

SUBTASK 28-25-05-020-020

(7) Move the aft APU shroud [13], aft APU shroud [15], slip joint fitting [16], welded shroud tube [37], O-ring [25] and the gaskets [17] off of the flexible hose [11].

(a) Discard the two gaskets [17] and O-ring [25].

SUBTASK 28-25-05-010-005

(8) Remove the shroud and the gaskets from the airplane through this access door:

Number	Name/Location
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. General

(1) This task gives instructions to install the Aft APU Fuel Feed Line Shroud.

(2) The APU fuel feed line shroud is referred to as the APU shroud.

B. References

Reference	Title
20-10-44-400-801	Lockwire, Cotter Pins, and Lockrings - 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)
28-22-15-400-803	Couplings Installation (P/B 401)
28-25-04-790-801	APU Fuel Line Leak Test (with air) (P/B 401)
28-25-05-790-801	APU Fuel Line Shroud and Drain Line - Leak Test (P/B 501)
51-22-00-390-806	Fillet Seal Application (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142 Type II
C50315	Coating - Chemical Conversion - Bonderite M-CR 600 Aero (Formerly Alodine 600)	BAC5719 Class A, C or D, MIL-DTL-81706 Type I Class 1A or 3
D00230	Oil - Lubricating, Aircraft Piston Engines (Non-Dispersant Mineral Oil)	SAE J1966
D00504	Grease - Petrolatum	VV-P-236
G01048	Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter	NASM20995
G50375	Kit - Safety Cable, 321 CRES - 0.032 Inch (0.81 mm) Diameter, (Contains both Cable and Ferrule)	BACC13AT3K, AMS 5689

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
13	Aft APU shroud	28-25-05-20-200	SIA ALL
15	Aft APU shroud	28-25-05-20-210	SIA ALL
17	Gasket	28-25-05-20-225	SIA ALL
25	O-ring	28-25-05-10-120	SIA ALL
26	O-ring	28-25-05-20-180	SIA ALL
36	O-ring	28-25-05-01-085	SIA ALL
		28-25-05-10-115	SIA ALL
		28-25-05-20-160	SIA ALL
38	O-ring	28-25-05-20-170	SIA ALL

F. 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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Access Panels

Number	Name/Location
311BL	Stabilizer Trim Access Door

H. Aft APU Fuel Feed Line Shroud Installation

SUBTASK 28-25-05-420-009

(1) Install the aft APU shroud [13].

(a) Put the two new gaskets [17], slip joint fitting [16], and the welded shroud tube [37] on the flexible hose [11] (View C, Figure 401).

1) Align the new gaskets [17], slip joint fitting [16], and the welded shroud tube [37] in their position at the aft pressure bulkhead.

2) Put the aft APU shroud [13] over the flexible hose [11] in the forward direction until it touches the pressure bulkhead.

SUBTASK 28-25-05-420-043

(2) Put one retaining ring on the ferrule of the aft APU shroud [13] and welded shroud tube [37].

SUBTASK 28-25-05-820-007

(3) Align the aft APU shroud [13] and welded shroud tube [37].

SUBTASK 28-25-05-420-030

(4) Install the flexible full coupling [12] that connects the aft APU shroud [13] to the welded shroud tube [37] (TASK 28-22-15-400-803).

(a) Install the two new O-rings [36].

SUBTASK 28-25-05-100-002

(5) Clean the fay surfaces of the aft APU shroud [13], clamp [30] and the terminal of the bonding jumper [34] (SWPM 20-20-00, Paragraph 8).

SUBTASK 28-25-05-640-004

(6) Lightly coat a new O-ring [25] with grease, D00504.

SUBTASK 28-25-05-420-047

(7) Install the new O-ring [25]

SUBTASK 28-25-05-820-002

(8) Align the slip joint fitting [16], two new gaskets [17], new O-ring [25], welded shroud tube [37] and the aft APU shroud [13] (View C, Figure 401).

SUBTASK 28-25-05-420-031

(9) Install the six bolts [18] and washers [19] to the slip joint fitting [16] and the welded shroud tube [37] (Figure 401).

SUBTASK 28-25-05-420-044

(10) Tighten the six bolts [18] on the welded shroud tube [37].

SUBTASK 28-25-05-620-003

(11) Apply Bonderite M-CR 600 Aero coating, C50315, to the bare the areas of the aft APU shroud [13], clamp [30] and the terminal of the bonding jumper [34].

SUBTASK 28-25-05-420-032

(12) Install the clamp [30], screw [31], two washers [32], nut [33] and bonding jumper [34] to the aft APU shroud [13].

(a) Tighten the nut [33] to 28 in-lb (3.2 N·m) - 35 in-lb (4.0 N·m).

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SUBTASK 28-25-05-760-002

(13) Measure the bonding resistance between the aft APU shroud [13] and the structure of the airplane with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

(a) Make sure that the bonding resistance from the aft APU shroud [13] to the structure is 0.0009 ohm (0.9 milliohm) or less.

SUBTASK 28-25-05-390-002

(14) Apply a fillet seal of sealant, A02315, around the clamp [30] and the aft APU shroud [13] (TASK 51-22-00-390-806).

SUBTASK 28-25-05-820-005

(15) Put the aft APU shroud [15] over the flexible hose [11] until the flexible hose [11] and the aft APU shroud [15] can be reconnected at the aft flexible shroud [20].

SUBTASK 28-25-05-820-006

(16) Put a retaining ring on the ferrule to hold the nut on the APU shroud.

SUBTASK 28-25-05-820-003

(17) Align the aft APU shroud [13] and aft APU shroud [15].

SUBTASK 28-25-05-420-033

(18) Install the rigid coupling [14] that connects the aft end of the aft APU shroud [13] to the aft APU shroud [15] (TASK 28-22-15-400-803).

(a) Install the new O-ring [38].

SUBTASK 28-25-05-100-001

(19) Clean the fay surfaces of the aft APU shroud [15], clamp [30] and the terminal of the bonding jumper [34] (SWPM 20-20-00, Paragraph 8).

SUBTASK 28-25-05-620-002

(20) Apply Bonderite M-CR 600 Aero coating, C50315 to the bare areas of the aft APU shroud [15], clamp [30] and the terminal of the bonding jumper [34].

SUBTASK 28-25-05-420-034

(21) Install the clamp [30], screw [31], two washers [32], nut [33] and bonding jumper [34] to the aft APU shroud [15].

(a) Tighten the nut [33] to 28 in-lb (3.2 N·m) - 35 in-lb (4.0 N·m).

SUBTASK 28-25-05-760-003

(22) Measure the bonding resistance between the aft APU shroud [15] and the structure of the airplane with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

(a) Make sure that the bonding resistance from the aft APU shroud [15] to the structure is 0.0009 ohm (0.9 milliohm) or less.

SUBTASK 28-25-05-390-003

(23) Apply a fillet seal of sealant, A02315, around the clamp [30] and the aft APU shroud [15] (TASK 51-22-00-390-806).

SUBTASK 28-25-05-420-014

(24) Install the clamps for the aft APU shroud [13] and the aft APU shroud [15] (TASK 28-22-15-400-801).

(a) Loosely attach the clamps to the pressure bulkhead.

SUBTASK 28-25-05-420-010

(25) Lubricate the threads with oil, D00230, on the aft end of the flexible hose [11].

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SUBTASK 28-25-05-420-015

(26) Connect the flexible hose [11] at the APU firewall.

SUBTASK 28-25-05-420-016

(27) Tighten the flexible hose coupling [35] to 266 in-lb (30 N·m) - 294 in-lb (33.2 N·m).

NOTE: Do not attach the aft APU shroud [15] to the aft flexible shroud [20] until a leak fuel check is done.

SUBTASK 28-25-05-790-003

(28) Do this task: APU Fuel Line Leak Test (with air), TASK 28-25-04-790-801.

SUBTASK 28-25-05-420-011

(29) Lightly coat the new O-ring [26] with grease, D00504.

SUBTASK 28-25-05-420-017

(30) Install a new O-ring [26] on the aft APU shroud [15].

SUBTASK 28-25-05-420-018

(31) Connect the coupling nut assembly on the aft APU shroud [15] to the aft flexible shroud [20] at the APU firewall.

SUBTASK 28-25-05-420-019

(32) Tighten the coupling nut assembly (TASK 20-50-11-910-801).

SUBTASK 28-25-05-420-020

(33) Install safety cable kit, G50375 or MS20995C32 lockwire, G01048 on the coupling nut assembly (TASK 20-10-44-400-801).

SUBTASK 28-25-05-790-004

(34) Do this task: APU Fuel Line Shroud and Drain Line - Leak Test, TASK 28-25-05-790-801.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 28-25-05-410-004

(1) Close this access panel:

Number	Name/Location
311BL	Stabilizer Trim Access Door

SUBTASK 28-25-05-440-003

(2) Remove the safety tags 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

SUBTASK 28-25-05-440-004

(3) On the P5 Overhead Panel, put the APU master switch to the ON position.

——— END OF TASK ———

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APU FUEL FEED LINE SHROUD - ADJUSTMENT/TEST

1. General

A. This procedure has the following test:

(1) APU Fuel Line Shroud and Drain Line - Leak Test.

TASK 28-25-05-790-801

2. APU Fuel Line Shroud and Drain Line - Leak Test

(Figure 501)

NOTE: This procedure is a scheduled maintenance task.

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.

Reference	Description
SPL-1782	Hose - Test, Leak, APU Fuel Line Shroud Part #: A28005-82 Supplier: 81205 Opt Part #: A28005-42 Supplier: 81205 Opt Part #: A28005-50 Supplier: 81205
SPL-1783	Adapter - Leak Test, APU Fuel Line Shroud Part #: A28005-48 Supplier: 81205
STD-1234	Air Source - Regulated, Dry Filtered, Compressed 90-130 PSIG (6.0 CFM)

C. Location Zones

Zone	Area
194	Lower Wing-To-Body Fairing - Aft of Wheel Well

D. Pressurize the APU Shroud and Do a Check for Leaks

SUBTASK 28-25-05-400-001

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.

(1) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-25-05-420-042

(2) Connect the adapter, SPL-1783, and APU fuel line shroud leak test hose, SPL-1782, on the drain mast.

SUBTASK 28-25-05-420-012

(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.

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SUBTASK 28-25-05-780-001

WARNING BE CAREFUL WHEN YOU USE HIGH PRESSURE AIR AS A TEST MEDIUM. HIGH PRESSURE AIR CAN CAUSE AIRFRAME DAMAGE AND CAN CAUSE INJURY.

CAUTION DO NOT PRESSURIZE THE SHROUD MORE THAN 20 PSIG (34.75 PSIA). IF YOU PRESSURIZE TO MORE THAN 20 PSIG (34.75 PSIA), DAMAGE TO THE SHROUD CAN OCCUR.

(4) Apply pressure slowly and continuously to the APU shroud and drain line system until the pressure is 18.0 ±0.5 psig (124.1 ±3.5 kPa).

(a) Close the air pressure source.

(b) Make sure that the pressure is stable at 18.0 ±0.5 psig (124.1 ±3.5 kPa).

(c) Record the pressure.

(d) Monitor the pressure for 5 - 6 minutes.

(e) Record the pressure.

(f) Make sure that the pressure does not decrease more than 0.05 psig (0.34 kPa) after the 5 - 6 minutes.

SUBTASK 28-25-05-780-002

(5) Decrease the pressure slowly and continuously to 0 psig (0 kPa).

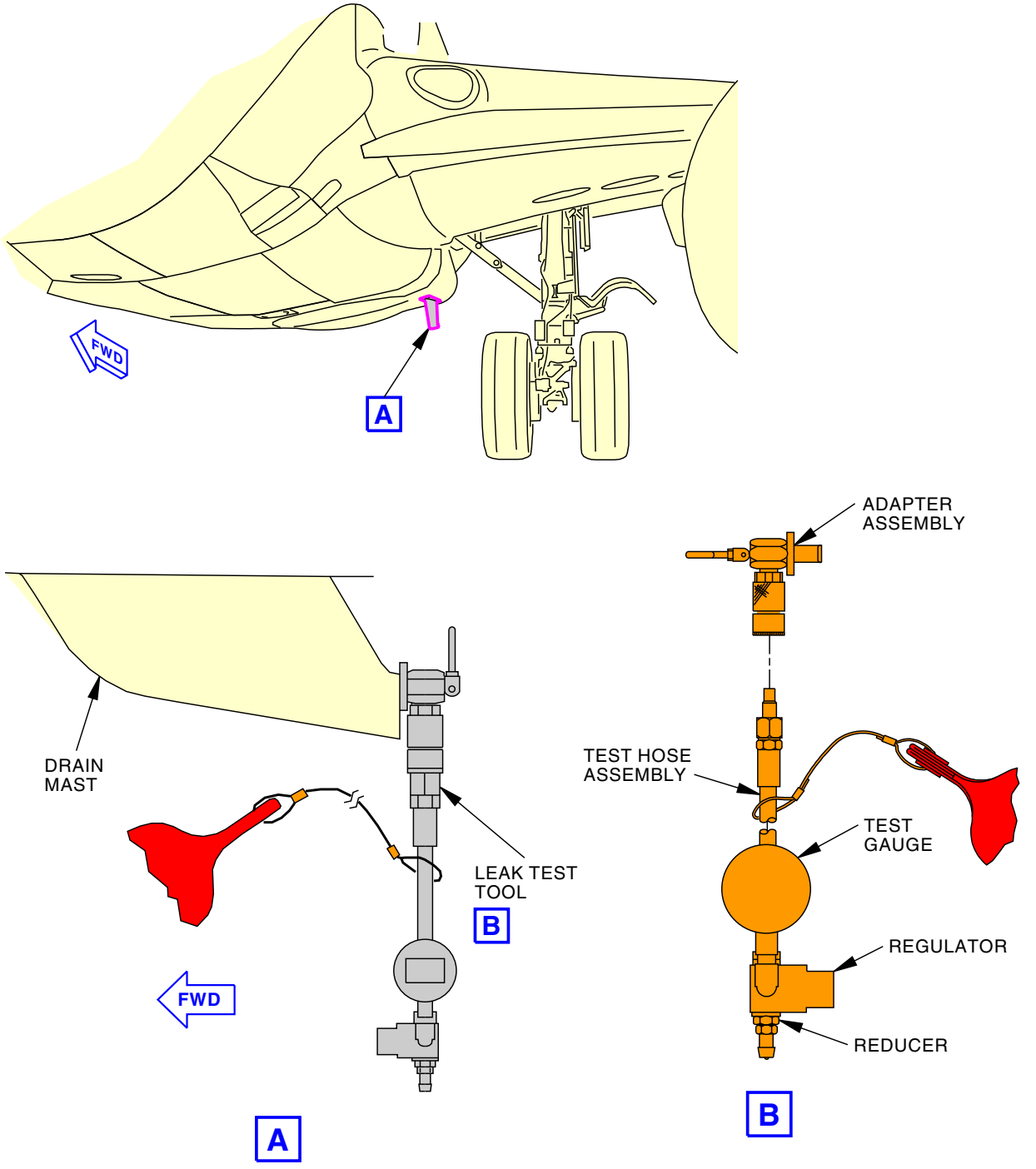
SUBTASK 28-25-05-080-001

(6) Remove the compressed (90-130 PSIG, 6.0 CFM) dry filtered regulated air source, STD-1234, from the APU fuel line shroud leak test hose, SPL-1782.

(7) Remove the adapter, SPL-1783, and APU fuel line shroud leak test hose, SPL-1782, from the drain mast.

END OF TASK

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APU Shroud Leak Test Equipment
Figure 501/28-25-05-990-802

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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. General

(1) This task gives instructions to remove the APU check valve [2].

B. 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)

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. Prepare for the Removal

SUBTASK 28-25-06-650-001

(1) Defuel the center fuel tank and the No. 1 tank or transfer fuel out of the tanks (TASK 28-26-00-650-801).

SUBTASK 28-25-06-860-001

(2) If there is fuel in the No. 2 tank, make sure that the crossfeed valve is closed and has no leakage (TASK 28-22-00-730-802).

(a) As an alternative, you can remove fuel from the No. 2 tank (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.

(a) Remove this access door for the center wing section:

Number	Name/Location
131AB	Center Tank Access

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. APU Check Valve Removal

SUBTASK 28-25-06-940-001

WARNING OBEY THE PRECAUTIONS FOR PURGING AND FUEL TANK ENTRY. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do the purging and fuel tank entry procedure for the center tank (Purging and Fuel Tank Entry, TASK 28-11-00-910-802).

SUBTASK 28-25-06-010-002

(2) In the center tank, carefully loosen the couplings that attach the APU check valve [2] to the APU fuel feed line [1].

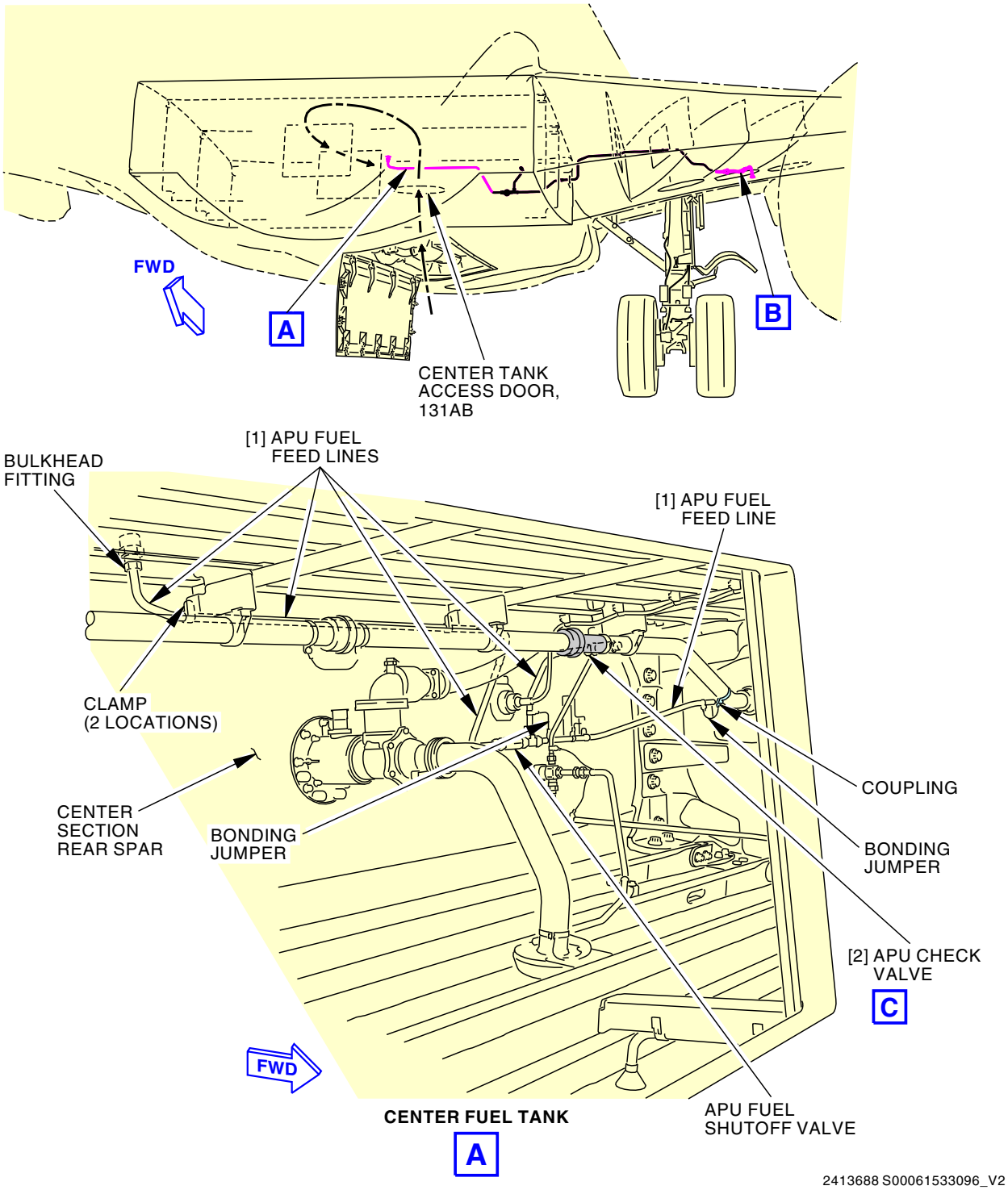
SUBTASK 28-25-06-020-001

(3) Remove the APU check valve [2], O-ring [4], and union [3] between the two ends of the APU fuel feed lines [1].

(a) Discard the O-ring [4].

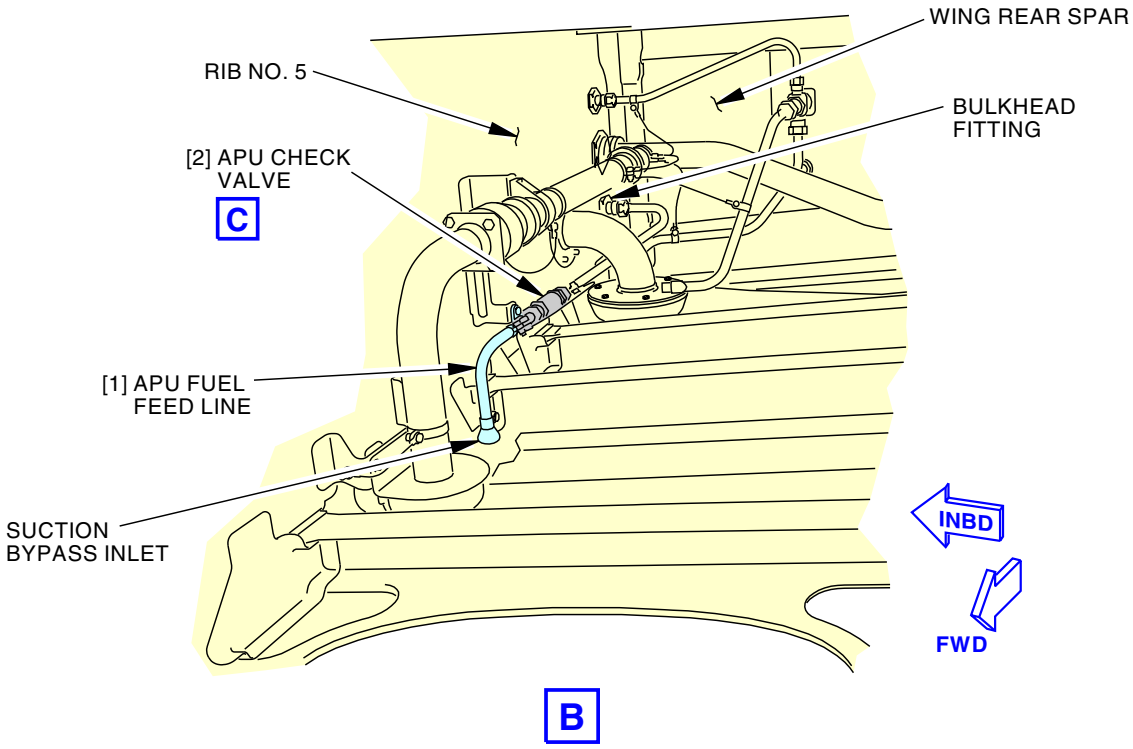
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



APU Check Valve Installation
Figure 401/28-25-06-990-801 (Sheet 1 of 3)

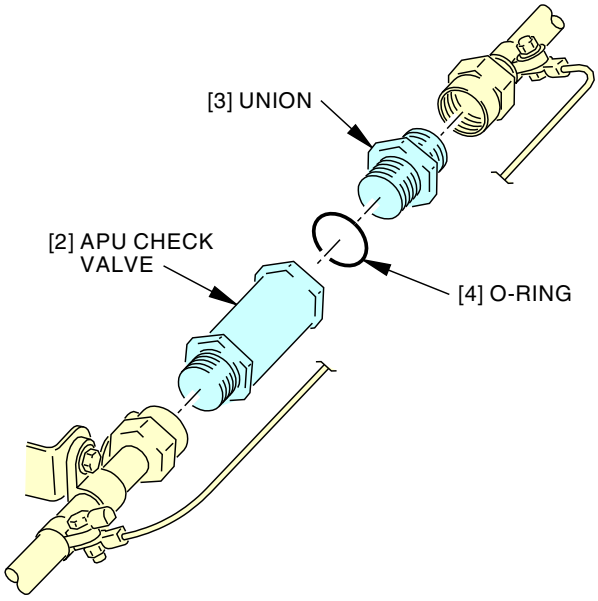
ECCN 9E991 BOEING PROPRIETARY - See title page for details



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APU Check Valve Installation
Figure 401/28-25-06-990-801 (Sheet 2 of 3)

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APU CHECK VALVE

C

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APU Check Valve Installation
Figure 401/28-25-06-990-801 (Sheet 3 of 3)

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TASK 28-25-06-400-801

3. APU Check Valve Installation

Figure 401

A. General

(1) This task gives instructions to install the APU check valve [2].

B. References

Reference	Title
28-11-00-410-801	Fuel Tank Closure (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)

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	APU check valve	28-25-04-05-100	SIA ALL
4	O-ring	28-25-04-05-090	SIA ALL

D. Location Zones

Zone	Area
131	Center Section Wing Box, Body Station 540.00 to Body Station 663.75 - Left

E. Access Panels

Number	Name/Location
131AB	Center Tank Access

F. APU Check Valve Installation

SUBTASK 28-25-06-420-001

(1) Put the APU check valve [2], new O-ring [4], and union [3] in their position between the two ends of the APU fuel feed lines [1].

(a) Use new O-ring [4].

SUBTASK 28-25-06-420-002

(2) Make sure that the arrow on the APU check valve [2] points in the aft direction (away from the engine fuel feed manifold).

SUBTASK 28-25-06-420-003

(3) Attach the APU check valve [2] to the ends of the APU fuel feed line [1] with the couplings on both ends.

(a) Tighten each of the couplings to a torque of 360 ±20 in-lb (41 ±3 N·m).

G. Put the Airplane Back to Its Usual Condition

SUBTASK 28-25-06-420-004

(1) Do the applicable steps to close the center tank (TASK 28-11-00-410-801).

SUBTASK 28-25-06-010-003

(2) Do this task: Center Tank Access Door - Installation, TASK 28-11-31-400-801.

(a) Install this access door for the center wing section:

Number	Name/Location
131AB	Center Tank Access

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-25-06-710-001

(3) Do this task: APU Fuel Supply Flow Check, TASK 49-31-00-700-802.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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. General

(1) This task gives instructions to remove the APU Fuel Feed Line Shroud Drain Mast.

B. References

Reference	Title
28-22-15-000-803	Couplings Removal (P/B 401)

C. Location Zones

Zone	Area
194	Lower Wing-To-Body Fairing - Aft of Wheel Well

D. Access Panels

Number	Name/Location
194DL	Aft Wing To Body Fairing Panel

E. Prepare for the Removal

SUBTASK 28-25-07-010-001

(1) Remove this access panel:

Number	Name/Location
194DL	Aft Wing To Body Fairing Panel

F. APU Fuel Feed Line Shroud Drain Mast Removal

SUBTASK 28-25-07-000-001

(1) Remove the clamp [12], screw [13], washers [14], nut [15], bonding jumper [16], and bonding jumper [19] from the mast hydraulic vent line.

SUBTASK 28-25-07-000-002

(2) Remove the clamp [7], screw [8], washers [9], nut [10], and bonding jumper [11] from the mast APU fuel drain line.

SUBTASK 28-25-07-020-001

(3) Disconnect the coupling [6] from the APU fuel shroud drain line [5] (TASK 28-22-15-000-803).

(a) Remove and discard the two O-rings [18] from the coupling [6].

SUBTASK 28-25-07-020-002

(4) Disconnect the hydraulic vent line [1] and the APU fuel shroud drain line [5] from the drain mast fittings.

(a) Remove the breather plug [17] from the coupling [6].

SUBTASK 28-25-07-020-005

(5) Loosen the four bolts [3] that attach the drain mast assembly [4] to the airplane structure.

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SUBTASK 28-25-07-020-006

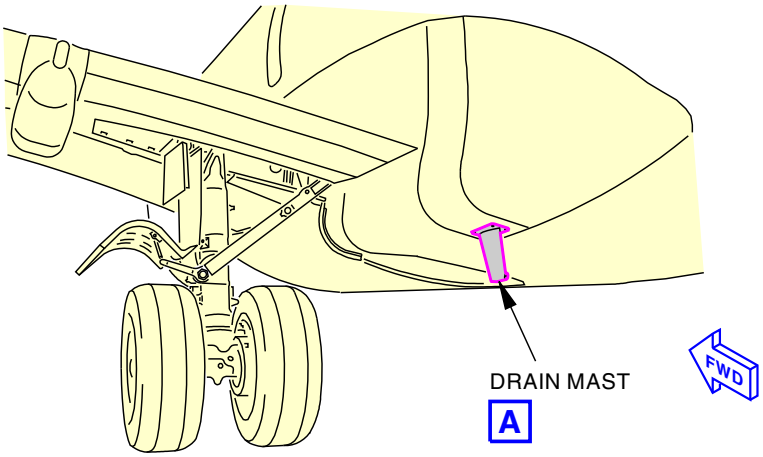
(6) Carefully separate the drain mast assembly [4] from the fairing with a sealant removal tool.

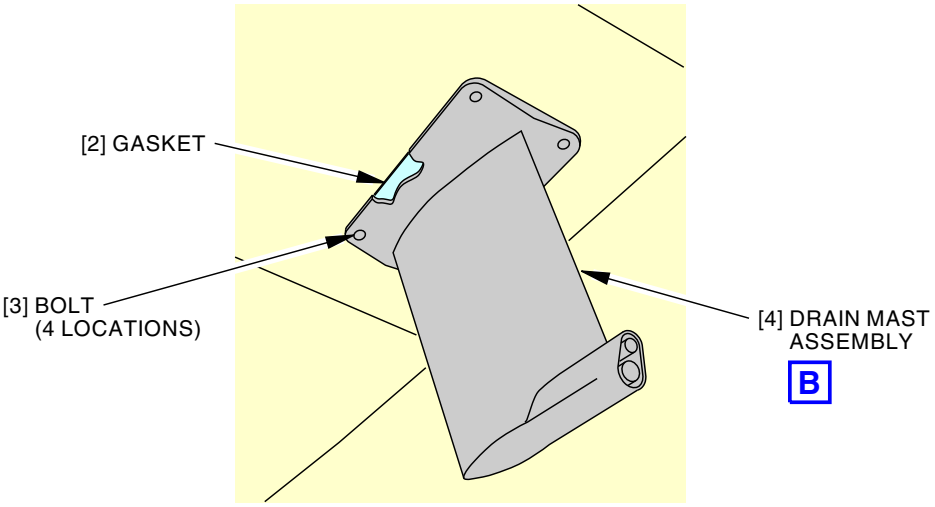
(a) Discard the gasket [2].

(b) Remove the sealant on the drain mast assembly [4].

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



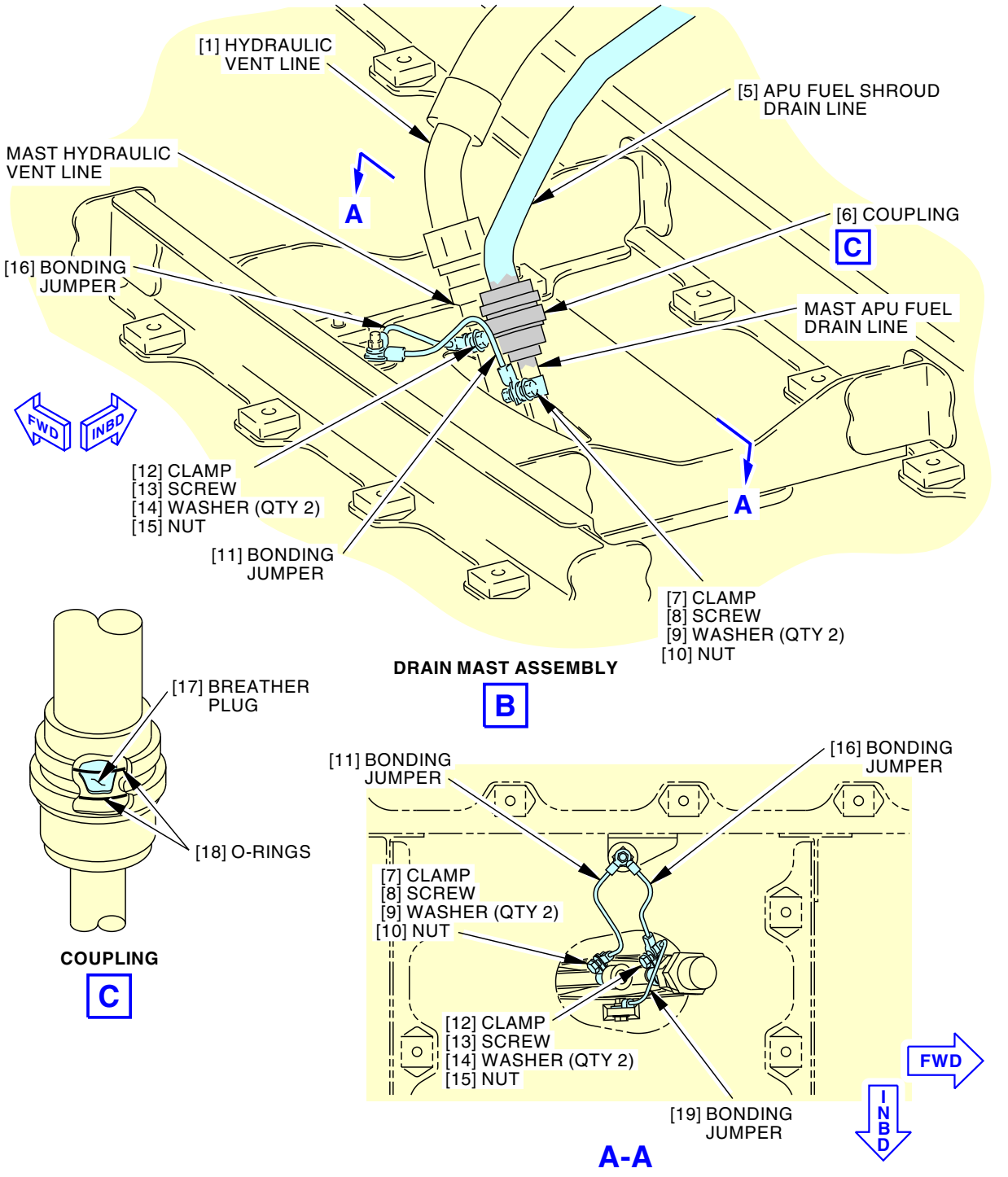


DRAIN MAST
A

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APU Shroud Drain Mast Installation
Figure 401/28-25-07-990-801 (Sheet 1 of 2)

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APU Shroud Drain Mast Installation
Figure 401/28-25-07-990-801 (Sheet 2 of 2)

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TASK 28-25-07-420-801

3. APU Fuel Feed Line Shroud Drain Mast Installation

(Figure 401)

A. General

(1) This task gives instructions to install the APU Fuel Feed Line Shroud Drain Mast.

B. References

Reference	Title
20-10-51-400-801	Flareless Tubing Assembly Installation (P/B 401)
20-50-11-910-801	Standard Torque Values (P/B 201)
28-22-15-400-803	Couplings Installation (P/B 401)
51-22-00-390-806	Fillet Seal Application (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
A02315	Sealant - Low Density, Synthetic Rubber. 2 Part	BMS5-142 Type II

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Gasket	28-25-07-01-050	SIA ALL
4	Drain mast assembly	28-25-07-01-055	SIA ALL
18	O-ring	29-21-52-07-470	SIA 001
		29-21-52-08-500	SIA 002-999

F. Location Zones

Zone	Area
194	Lower Wing-To-Body Fairing - Aft of Wheel Well

G. Access Panels

Number	Name/Location
194DL	Aft Wing To Body Fairing Panel

H. APU Fuel Feed Line Shroud Drain Mast Installation

SUBTASK 28-25-07-420-001

(1) Do these steps to install the drain mast assembly [4] in its position:

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(a) Install a new gasket [2] on the drain mast assembly [4].

(b) Put the drain mast assembly [4] with the gasket [2] in its position on the fairing.

(c) Install and then tighten the four bolts [3] (TASK 20-50-11-910-801).

SUBTASK 28-25-07-420-002

(2) Connect the hydraulic vent line [1] to the mast hydraulic vent line (TASK 20-10-51-400-801).

SUBTASK 28-25-07-420-003

(3) Do these steps to connect the APU fuel shroud drain line [5] to the drain mast assembly [4]:

(a) Install the breather plug [17] in the APU fuel shroud drain line [5].

(b) Connect the coupling [6] for the APU fuel shroud drain line [5] and the mast APU fuel drain line (TASK 28-22-15-400-803).

1) Install the two new O-rings [18].

SUBTASK 28-25-07-100-001

(4) Clean the fay surfaces of the mast APU fuel drain line, clamp [7] and the terminal of the bonding jumper [11] (SWPM 20-20-00, Paragraph 8).

SUBTASK 28-25-07-100-002

(5) Clean the fay surfaces of the mast hydraulic vent line, clamp [12], the terminal of the bonding jumper [16], and the terminal of the bonding jumper [19] (SWPM 20-20-00, Paragraph 8).

SUBTASK 28-25-07-420-004

(6) Install the clamp [7], screw [8], washers [9], nut [10], and bonding jumper [11] to the mast APU fuel drain line.

(a) Tighten the nut [10] to 28 in-lb (3 N·m) - 35 in-lb (4 N·m).

SUBTASK 28-25-07-420-005

(7) Install the clamp [12], screw [13], washers [14], nut [15], bonding jumper [16], and bonding jumper [19] to the mast hydraulic vent line.

(a) Tighten the nut [15] to 28 in-lb (3 N·m) - 35 in-lb (4 N·m).

SUBTASK 28-25-07-760-001

(8) Do an electrical bonding check from each drain mast tube to the primary structure of the airplane with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

(a) Make sure that the resistance from each tube to primary structure is 0.010 ohm (10 milliohms) or less.

SUBTASK 28-25-07-390-001

(9) Apply a fillet seal of sealant, A02315, around clamp [7] and clamp [12] (TASK 51-22-00-390-806).

SUBTASK 28-25-07-390-002

(10) Apply a fillet seal of sealant, A02315, around the flange of the drain mast assembly [4] (TASK 51-22-00-390-806).

I. Put the Airplane Back to Its Usual Condition

SUBTASK 28-25-07-010-002

(1) Install this access panel:

Number	Name/Location
194DL	Aft Wing To Body Fairing Panel

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

DEFUELING - MAINTENANCE PRACTICES

1. General

A. This procedure has three tasks:

(1) Precautions and Limits for the Defuel Operation

(2) Fuel Tank Defueling

(3) Tank to Tank Fuel Transfer

NOTE: For tank to tank fuel transfer, refer to steps to remove (purge) air from the engine fuel feed system (Fuel Tank Closure, TASK 28-11-00-410-801).

B. The heat exchanger for the hydraulic system can become too hot when it is above the surface of the fuel.

(1) Do not operate an engine driven or electric motor driven pump in the hydraulic system if the No. 1 main tank or the No. 2 main tank has less than 1675 lb (760 kg) of fuel (TASK 29-11-00-860-805).

C. All fuel tanks can be defueled at the same time or one at a time. If you defuel only one fuel tank, make sure the fuel and the fuel fumes in the other fuel tanks do not go into the fuel tank you defueled.

D. Stop the defueling procedure when thunderstorms or lightning are in a 10 mi (16 km) radius of the immediate area.

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. 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.

NOTE: Back-pressure is in relation to any configuration that can cause low fuel flow to the pumps. A low back-pressure condition can occur even if there is a significant amount of fuel in the tanks during defueling or transferring fuel from tank to tank.

(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 fuel 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.

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TASK 28-26-00-600-801

2. Precautions and Limits for the Defuel Operation

A. General

(1) If the center tank has more than 1000 lb (454 kg) of fuel, the No. 1 main tank and No. 2 main tank must be filled fully.

NOTE: This requirement is applicable to the fuel configuration for flight. A given quantity of fuel can be added to the center tank or transferred from the No. 1 or No. 2 main tank for ground maintenance (TASK 28-26-00-650-802).

B. References

Reference	Title
49-11-00-710-801	APU Operation Limits (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)
49-11-00-860-803	APU Emergency Shutdown (P/B 201)

C. Location Zones

Zone	Area
500	Left Wing
600	Right Wing

D. APU Operations During Defueling Limits and Precautions

SUBTASK 28-26-00-860-001

(1) If the Auxiliary Power Unit (APU) is operating during refueling, do these steps:

WARNING OBEY THE PRECAUTIONS FOR APU OPERATION WHEN YOU OPERATE THE APU DURING THE FUELING OPERATION OF THE AIRPLANE. IF YOU OPERATE THE APU INCORRECTLY, INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Obey the limits and operation for the operation of the APU (TASK 49-11-00-710-801, TASK 49-11-00-860-801).

(b) The APU can be started during defueling if the start is an initial start or a restart after a normal shutdown.

(c) The APU can be shutdown (manual or automatic) during the defueling operation.

WARNING IF THERE IS A PROTECTIVE AUTOMATIC SHUTDOWN OF THE APU OR A FAILURE TO START CONDITION, DO NOT TRY TO START THE APU DURING THE FUELING OPERATION OF THE AIRPLANE. IF YOU TRY TO START THE APU, INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT CAN OCCUR.

(d) If there is a protective automatic shutdown or failure to start condition on the APU, do one of these steps:

1) Complete the defuel operation before the APU is tried to start again.

2) Stop the defuel operation.

a) Disconnect the fuel hose(s) from the airplane fueling adapter(s) before the APU is started again.

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WARNING STOP THE FUELING OPERATION AND FOLLOW THE SAFETY PRECAUTIONS IF AN APU FIRE OCCURS DURING THE FUELING OPERATION OF THE AIRPLANE. IF YOU DO NOT OBEY, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(e) If an APU fire occurs, do these steps in this sequence:

1) Stop the defueling operation.

2) Make sure that the APU shuts down automatically.

a) If it does not shut down automatically, do this task: APU Emergency Shutdown, TASK 49-11-00-860-803.

3) Discharge the APU fire bottles (TASK 49-11-00-860-803).

4) Tell persons onboard the airplane and Airport Fire Services.

WARNING STOP THE FUELING OPERATION AND FOLLOW THE SAFETY PRECAUTIONS IF YOU SPILL FUEL DURING THE FUELING OPERATION OF THE AIRPLANE. IF YOU DO NOT OBEY, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(f) If fuel spillage occurs, do these steps:

1) Stop the defueling operation.

2) Tell a person onboard the airplane.

3) Unload the APU and shut it down (TASK 49-11-00-860-802).

a) Do not start the APU until the spilled fuel is removed and there is no further risk of spilled fuel or vapors.

WARNING MAKE SURE THAT FUELING VEHICLES ARE NOT PARKED IN THE EXHAUST FLOW OF THE ENGINES OF THIS AIRPLANE, OR ADJACENT AIRPLANES. THE HOT EXHAUST CAN CAUSE A FIRE OR EXPLOSION.

(g) Make sure that fueling vehicles are in a position that prevents risk of coming in the path of the APU exhaust stream.

NOTE: The APU exhaust stream can interfere with the fueling vehicles for other airplanes.

(h) Make sure that the exhaust stream from the APU does not go into a flammable vapor zone off airplane (for example, an adjacent aircraft during refueling).

SUBTASK 28-26-00-910-001

(2) If an adjacent aircraft is operating its APU, do this step:

(a) Make sure that the APU exhaust stream does not go into a flammable vapor zone (for example, the fuel vents or area around the fueling station and fueling vehicles).

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-26-00-650-801

3. 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 fuel boost pumps and the defueling (suction) pump on the refuel truck. This procedure defuels some or all of the fuel tanks at the same time. It is the fastest procedure to defuel the fuel tanks.

(b) Defuel through the pressure fueling receptacle with the airplane fuel boost pumps only.

(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 main 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 (fuel 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) When the defueling valve handle is hard to operate, you can lubricate or replace the mechanism.

(4) The preselect fuel quantity indicator is referred to as the refuel quantity indicator in this procedure.

B. References

Reference	Title
12-11-00-650-807	Drain the Fuel from the Sumps after Defueling (P/B 301)
20-40-11-760-801	Electrical Bonding (P/B 201)
20-40-11-910-801	Static Grounding (P/B 201)
24-22-00-860-801	Supply Electrical Power (P/B 201)
28-21-11-000-801	Fueling Receptacle Removal (P/B 401)
28-21-11-400-801	Fueling Receptacle Installation (P/B 401)
28-26-11 P/B 401	DEFUELING VALVE - REMOVAL/INSTALLATION
29-11-00-860-805	Hydraulic System A or B Power Removal (P/B 201)
33-18-00-710-801	Master Dim and Test - Operational Test (P/B 201)
49-11-00-860-801	APU Starting and Operation (P/B 201)

C. Consumable Materials

Reference	Description	Specification
D50248	Oil - Instrument, Aircraft, Low Volatility	MIL-PRF-6085 (Supersedes MIL-L-6085)

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

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(Continued)

Zone	Area
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	Lower Leading Edge Access Panel - Slat Station 91
621GB	Refuel Valve Door - Slat Station 125

F. Prepare for Procedure

SUBTASK 28-26-00-860-063

(1) The airplane usually must have the correct attitude (0-degree roll, +0.18 degree pitch, nose up) to defuel it correctly.

SUBTASK 28-26-00-650-009

(2) To completely defuel the center tank, do these steps:

(a) Adjust the airplane to 0-degree roll, +0.18 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 that the No. 1 main 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 main 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.

G. Defuel through the Pressure Fueling Receptacle With the Airplane Fuel Boost Pumps and the Defueling (Suction) Pump on the Fuel Truck

NOTE: It is necessary to operate the fuel boost pumps.

SUBTASK 28-26-00-860-002

WARNING OBEY THE SAFETY PRECAUTIONS. IF YOU DO NOT OBEY THE SAFETY PRECAUTIONS, YOU CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(1) Read and obey the precautions (TASK 28-26-00-600-801).

SUBTASK 28-26-00-860-003

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.

(2) Do not operate an engine-driven or electric motor-driven pump in the hydraulic system if the No.1 or the No. 2 main tank has less than 1675 lb (760 kg) of fuel (TASK 29-11-00-860-805).

SUBTASK 28-26-00-860-004

(3) Bond the fueling vehicle to the airplane (TASK 20-40-11-760-801).

SUBTASK 28-26-00-860-005

(4) Connect the electrical power to the airplane (TASK 24-22-00-860-801).

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(a) If you are not scheduled to defuel the No. 1 main tank fully, you can use the APU to supply electrical power (TASK 49-11-00-860-801)

1) You must have a minimum amount quantity of fuel in the No. 1 main tank to use the APU.

NOTE: The APU can be shutdown while defueling.

SUBTASK 28-26-00-860-006

(5) Make sure that all circuit breakers for the fuel system on the P6 panel are closed.

SUBTASK 28-26-00-710-001

(6) Do the master dim and test system operational test (TASK 33-18-00-710-801).

(a) Make sure that the fuel pump low pressure lights are operative.

SUBTASK 28-26-00-860-007

(7) If you are scheduled to defuel the No. 1 main tank or the center tank, do these steps:

(a) On the P5-2 Fuel System Module, set the CROSS FEED switch to the open position.

(b) On the P15 Refuel Panel, make sure that the TANK 1 or CENTER TANK VALVE POSITION LIGHTS is on dim (blue).

SUBTASK 28-26-00-010-001

(8) Open this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-26-00-020-001

(9) Remove the cap on the fueling receptacle.

SUBTASK 28-26-00-480-001

WARNING MAKE SURE THAT THERE IS NO TENSION ON THE HOSE. THE HOSE MUST HANG FREELY FROM THE REFUEL ADAPTER, WITH NO FORCE ON IT. TENSION ON THE HOSE CAN CAUSE DAMAGE TO THE FUEL RECEPTACLE AND CAUSE THE HOSE TO DISCONNECT. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(10) Do an inspection of the fueling receptacle before you connect the defueling hose nozzle:

(a) Make sure that the fueling receptacle is clean, not damaged and there are no fuel leaks.

1) Make sure that the screws, lugs, and slots are not loose or damaged.

(b) If there is a problem with the fueling receptacle, replace the fueling receptacle (TASK 28-21-11-000-801 and TASK 28-21-11-400-801).

CAUTION MAKE SURE THAT THE HOSE NOZZLE AND HOSE-END CONTROL VALVE ARE IN THE CORRECT CONFIGURATION. REFER TO THE SUPPLIER'S MAINTENANCE MANUAL FOR PROCEDURES. IF YOU DO NOT, IT COULD CAUSE DAMAGE TO THE AIRPLANE.

(c) Connect defueling hose nozzle to the fueling receptacle.

SUBTASK 28-26-00-860-008

(11) Open the shutoff handle on the defueling hose nozzle.

NOTE: The defueling nozzle must have a filter screen.

SUBTASK 28-26-00-860-009

(12) Make sure that the two spar valves are closed.

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SUBTASK 28-26-00-860-010

(13) On the P15 Refuel Panel, make sure that the switches for the fueling shutoff valves are in the CLOSED position.

SUBTASK 28-26-00-860-011

(14) On the P15 Refuel Panel, make sure that all of the VALVE POSITION LIGHTS are off.

SUBTASK 28-26-00-970-001

(15) Make sure that you know the correct quantity of fuel in the fuel tanks.

(a) Record the fuel quantity for the fuel tank or the tanks that you are scheduled to defuel.

(b) Hold the test switch on the P15 Refuel Panel in the TEST GAUGES 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 that 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)

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91

SUBTASK 28-26-00-860-012

(17) Set the defueling valve handle to the open position.

(a) If the defueling valve handle is hard to operate, lubricate the mechanism with aircraft instrument oil, D50248.

(b) If that does not decrease the force necessary to move the defueling valve handle, remove and replace the defueling valve handle (PAGEBLOCK 28-26-11/401).

SUBTASK 28-26-00-860-013

(18) On the P5-2 Fuel System Module, set the CROSS FEED switch to the open position.

NOTE: If you are scheduled to defuel the No. 2 main tank (right side), it is not necessary to open or to close the fuel crossfeed valve.

(a) On the P15 Refuel Panel, make sure that the TANK 2 VALVE POSITION LIGHTS is on dim (blue).

SUBTASK 28-26-00-860-014

(19) Obey these fuel pump limitations during the pump operation:

(a) To operate 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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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.

(b) Immediately set the applicable fuel pump switch(es) to the OFF position 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 back-pressure to the pumps, it is possible for the LOW PRESSURE light(s) to come on. In this case, monitor fuel tank quantity and set the pump switch to the OFF position if the fuel 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 the OFF position and continue defueling.

b) If the remaining LOW PRESSURE light for the fuel boost pump switch for the fuel tank comes on, monitor the fuel tank quantity.

c) If the fuel quantity for the fuel tank does not change, then immediately set the fuel boost pump switch to the OFF position.

d) For the No. 1 or No. 2 main tank, do not operate the main fuel boost pumps with fuel quantities less than 100 lb (45 kg).

e) If the automatic shutoff system for the center tank fuel boost pump is disabled, do not operate the center tank fuel 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 fuel tank come on at the same time, do these steps:

a) For the No. 1 or No. 2 main tanks, put the FUEL PUMP 1 AFT or the FUEL PUMP 2 AFT switch to the OFF position and continue to monitor the fuel tank quantity.

b) For the center tank, put one of the fuel boost pump switches to the OFF position and continue to monitor the fuel tank quantity.

c) If the fuel quantity in the fuel tank does not change, immediately put the remaining fuel boost pump switch to the OFF position.

d) For the No. 1 or No. 2 main tank, do not operate the main fuel boost pumps with fuel quantities less than 100 lb (45 kg).

e) If the automatic shutoff system for the center tank fuel boost pump is disabled, do not operate the center tank fuel boost pumps with fuel quantities less than 2000 lb (907 kg).

(c) If the automatic shutoff system for the center fuel boost pump turns the center fuel boost pump(s) off because of a reduced back-pressure condition, and there are no passengers on board or have at least 2000 lb (907 kg) in the center tank, do these steps:

1) On the P5-2 Fuel System Module, set the switches for all main tank fuel boost pumps to the OFF position.

a) FUEL PUMPS 1 FWD

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b) FUEL PUMPS 1 AFT

c) FUEL PUMPS 2 FWD

d) FUEL PUMPS 2 AFT

2) 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
D	7	C01659	AT S-O/UCPO BST PMP CTR TNK L AC
E	7	C01658	FUEL AT S-O/UCPO BST PMP CTR TNK R AC

3) Continue from where you were last in the fuel transfer procedure.

(d) Do these steps to defuel an airplane with passengers on board:

1) Do not let the fuel quantity in a main fuel tank become less than 2000 lb (907 kg).

2) If the automatic shutoff system for the center tank fuel boost pump is disabled, do not let the fuel quantity in the center tank become less than 2000 lb (907 kg).

SUBTASK 28-26-00-860-015

(20) On the P5-2 Fuel System Module, 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		
	MAIN TANK NO. 1	MAIN 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 refuel quantity indicator shows the specified quantity of fuel in the fuel tank.

(a) You can also defuel the fuel tank until the applicable fuel boost pump LOW PRESSURE light goes on.

(b) Set the applicable fuel boost pump switches to the OFF position.

SUBTASK 28-26-00-860-016

(23) On the P5-2 Fuel System Module, set the CROSS FEED switch to the closed position.

(a) On the P15 Refuel Panel, make sure that the VALVE POSITION LIGHTS is bright when the valve position changes.

(b) Make sure that the VALVE POSITION LIGHTS position light goes off when the valve is closed.

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SUBTASK 28-26-00-860-017

(24) Stop the defueling pump on the fuel truck.

SUBTASK 28-26-00-860-018

(25) Set the defueling valve handle to the closed position.

(a) If the defueling valve handle is hard to operate, lubricate the mechanism with aircraft instrument oil, D50248.

(b) If that does not decrease the force necessary to move the defueling valve handle, remove and replace the defueling valve handle (PAGEBLOCK 28-26-11/401).

SUBTASK 28-26-00-860-019

(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
D	7	C01659	AT S-O/UCPO BST PMP CTR TNK L AC
E	7	C01658	FUEL AT S-O/UCPO BST PMP CTR TNK R AC

SUBTASK 28-26-00-410-001

(27) Close this access panel:

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91

SUBTASK 28-26-00-860-020

(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 cable that you connected between the fueling source and the airplane (TASK 20-40-11-760-801).

SUBTASK 28-26-00-420-001

(31) Put the cap on the fueling receptacle.

SUBTASK 28-26-00-410-002

(32) Close this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-26-00-680-001

(33) Do this task: Drain the Fuel from the Sumps after Defueling, TASK 12-11-00-650-807.

H. Defuel through Pressure Fueling Receptacle With the Airplane Fuel Boost Pump Only

SUBTASK 28-26-00-860-022

WARNING OBEY THE SAFETY PRECAUTIONS. IF YOU DO NOT OBEY THE SAFETY PRECAUTIONS, YOU CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(1) Read and obey the precautions (TASK 28-26-00-600-801).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-26-00-860-023

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.

(2) Do not operate an engine-driven or electric motor-driven pump in the hydraulic system if the No.1 or the No. 2 main tank has less than 1675 lb (760 kg) of fuel (TASK 29-11-00-860-805).

SUBTASK 28-26-00-480-002

(3) Electrically ground the airplane and the fueling vehicle (TASK 20-40-11-910-801).

SUBTASK 28-26-00-860-024

(4) Bond the fueling source to the airplane (TASK 20-40-11-760-801).

SUBTASK 28-26-00-860-025

(5) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.

(a) If you are not scheduled to defuel the No. 1 main tank fully, you can use the APU to supply electrical power (TASK 49-11-00-860-801)

1) You must have a minimum amount quantity of fuel in the No. 1 main tank to use the APU.

NOTE: The APU can be shutdown while defueling.

SUBTASK 28-26-00-860-026

(6) Make sure that all circuit breakers for the fuel system on the P6 panel are closed.

SUBTASK 28-26-00-860-027

(7) If you are scheduled to defuel the No. 1 main tank or the center tank, do these steps:

(a) On the P5-2 Fuel System Module, set the CROSS FEED switch to the open position.

(b) On the P15 Refuel Panel, make sure that the TANK 1 or CENTER TANK VALVE POSITION LIGHTS is dim (blue).

SUBTASK 28-26-00-010-003

(8) Open this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-26-00-020-002

(9) Remove the cap on the fueling receptacle.

SUBTASK 28-26-00-480-003

WARNING MAKE SURE THAT THERE IS NO TENSION ON THE HOSE. THE HOSE MUST HANG FREELY FROM THE REFUEL ADAPTER, WITH NO FORCE ON IT. TENSION ON THE HOSE CAN CAUSE DAMAGE TO THE FUEL RECEPTACLE AND CAUSE THE HOSE TO DISCONNECT. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(10) Do an inspection of the fueling receptacle before you connect the defueling hose nozzle:

(a) Make sure that the fueling receptacle is clean, not damaged and there are no fuel leaks.

1) Make sure that the screws, lugs, and slots are not loose or damaged.

(b) If there is a problem with the fueling receptacle, replace the fueling receptacle (TASK 28-21-11-000-801 and TASK 28-21-11-400-801).

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CAUTION

MAKE SURE THAT THE HOSE NOZZLE AND HOSE-END CONTROL VALVE ARE IN THE CORRECT CONFIGURATION. REFER TO THE SUPPLIER'S MAINTENANCE MANUAL FOR PROCEDURES. IF YOU DO NOT, IT COULD CAUSE DAMAGE TO THE AIRPLANE.

(c) Connect defueling hose nozzle to the fueling receptacle.

SUBTASK 28-26-00-860-028

(11) Open the shutoff handle on the defueling hose nozzle.

NOTE: The defueling nozzle must have a filter screen.

SUBTASK 28-26-00-860-029

(12) Make sure that the spar valves are closed.

SUBTASK 28-26-00-860-030

(13) On the P15 Refuel Panel, make sure that the switches for the fueling shutoff valves are in the CLOSED position.

SUBTASK 28-26-00-860-031

(14) On the P15 Refuel Panel, make sure that the VALVE POSITION LIGHTS are off.

SUBTASK 28-26-00-970-002

(15) Make sure that you know the correct quantity of fuel in the fuel tanks.

(a) Write the fuel quantity for the fuel tank or the tanks that you are scheduled to defuel.

(b) Hold the test switch on the P15 Refuel Panel in the TEST GAUGES 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 that the indicator goes back to its initial value with a tolerance of ± 10 pounds (± 10 kilograms).

SUBTASK 28-26-00-010-004

(16) Open this access panel:

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91

(Figure 202).

SUBTASK 28-26-00-860-032

(17) Set the defueling valve handle to the open position.

(a) If the defueling valve handle is hard to operate, lubricate the mechanism with aircraft instrument oil, D50248.

(b) If that does not decrease the force necessary to move the defueling valve handle, remove and replace the defueling valve handle (PAGEBLOCK 28-26-11/401).

SUBTASK 28-26-00-860-033

(18) On the P5-2 Fuel System Module, set the CROSS FEED switch to the open position.

NOTE: If you are scheduled to defuel the No. 2 main tank (right side), it is not necessary to open or to close the fuel crossfeed valve.

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(a) Make sure that the TANK 2 VALVE POSITION LIGHTS is on dim (blue).

SUBTASK 28-26-00-860-034

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.

(19) To operate 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 the OFF position 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 back-pressure to the pumps, it is possible for the LOW PRESSURE light(s) to come on. In this case, monitor fuel tank quantity and set the pump switch to the OFF position if the fuel 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 the OFF position and continue defueling.

b) If the remaining LOW PRESSURE light for the fuel boost pump switch for the fuel tank comes on, monitor the fuel tank quantity.

c) If the fuel quantity for the fuel tank does not change, then immediately set the fuel boost pump switch to the OFF position.

d) For the No. 1 or No. 2 main tank, do not operate the main fuel boost pumps with fuel quantities less than 100 lb (45 kg).

e) If the automatic shutoff system for the center tank fuel boost pump is disabled, do not operate the center tank fuel 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 fuel tank come on at the same time, do these tasks:

a) For the No. 1 or No. 2 main tanks, put the Fuel Pump 1 AFT or the Fuel Pump 2 AFT switch to the OFF position and continue to monitor the fuel tank quantity.

b) For the center tank, put one of the fuel boost pump switches to the OFF position and continue to monitor the fuel tank quantity.

c) If the fuel quantity in the fuel tank does not change, immediately put the remaining fuel boost pump switch to the OFF position.

d) For the No. 1 or No. 2 main tank, do not operate the main fuel boost pumps with fuel quantities less than 100 lb (45 kg).

e) If the automatic shutoff system for the center tank fuel boost pump is disabled, do not operate the center tank fuel boost pumps with fuel quantities less than 2000 lb (907 kg).

(b) If the automatic shutoff system for the center fuel boost pump turns the center fuel boost pump(s) off because of a reduced back-pressure condition, and there are no passengers on board or have at least 2000 lb (907 kg) in the center tank, do these steps:

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1) On the P5-2 Fuel System Module, set the switches for all main tank fuel boost pumps to the OFF position.
   a) FUEL PUMPS 1 FWD
   b) FUEL PUMPS 1 AFT
   c) FUEL PUMPS 2 FWD
   d) FUEL PUMPS 2 AFT
2) 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
D	7	C01659	AT S-O/UCPO BST PMP CTR TNK L AC
E	7	C01658	FUEL AT S-O/UCPO BST PMP CTR TNK R AC

3) Continue from where you were last in the fuel transfer procedure.

(c) Do these steps to defuel an airplane with passengers on board:
1) Do not let the fuel quantity in a main fuel tank become less than 2000 lb (907 kg).
2) If the automatic shutoff system for the center tank fuel boost pump is disabled, do not let the fuel quantity in the center fuel tank become less than 2000 lb (907 kg).

SUBTASK 28-26-00-860-035

(20) On the P5-2 Fuel System Module, set the switches for the fuel boost pumps to the positions shown in this table:

Table 202/28-26-00-993-802

	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 28-26-00-650-003

(21) Defuel the applicable tank until the refuel quantity indicator shows the specified quantity of fuel in the fuel tank.

SUBTASK 28-26-00-860-036

(22) On the P5-2 Fuel System Module, set the CROSS FEED switch to the closed position.

SUBTASK 28-26-00-860-037

(23) Set the defueling valve handle to the closed position.
(a) If the defueling valve handle is hard to operate, lubricate the mechanism with aircraft instrument oil, D50248.
(b) If that does not decrease the force necessary to move the defueling valve handle, remove and replace the defueling valve handle (PAGEBLOCK 28-26-11/401).

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SUBTASK 28-26-00-860-038

(24) 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
D	7	C01659	AT S-O/UCPO BST PMP CTR TNK L AC
E	7	C01658	FUEL AT S-O/UCPO BST PMP CTR TNK R AC

SUBTASK 28-26-00-410-003

(25) Close this access panel:

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91

SUBTASK 28-26-00-860-039

(26) Close the fuel shutoff handle on the hose nozzle.

SUBTASK 28-26-00-080-003

(27) Disconnect the nozzle of the defueling hose from the fueling receptacle.

SUBTASK 28-26-00-420-002

(28) Put the cap on the fueling receptacle.

SUBTASK 28-26-00-080-004

(29) Disconnect the bonding cable that you connected between the fueling source and the airplane (TASK 20-40-11-760-801).

SUBTASK 28-26-00-680-002

(30) Do this task: Drain the Fuel from the Sumps after Defueling, TASK 12-11-00-650-807.

I. Defuel the No. 2 Main 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 main 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 Fuel Boost Pumps and the Defueling (Suction) Pump on the Fuel Truck (2) Defuel through Pressure Fueling Receptacle With the Airplane Fuel Boost Pump Only.

SUBTASK 28-26-00-860-041

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 or the No. 2 main tank has less than 1675 lb (760 kg) of fuel (TASK 29-11-00-860-805).

SUBTASK 28-26-00-860-042

(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)

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Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-26-00-020-003

(4) Remove the cap on the fueling receptacle.

SUBTASK 28-26-00-480-004

WARNING

MAKE SURE THAT THERE IS NO TENSION ON THE HOSE. THE HOSE MUST HANG FREELY FROM THE REFUEL ADAPTER, WITH NO FORCE ON IT. TENSION ON THE HOSE CAN CAUSE DAMAGE TO THE FUEL RECEPTACLE AND CAUSE THE HOSE TO DISCONNECT. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(5) Do an inspection of the fueling receptacle before you connect the defueling hose nozzle:

(a) Make sure that the fueling receptacle is clean, not damaged and there are no fuel leaks.

1) Make sure that the screws, lugs, and slots are not loose or damaged.

(b) If there is a problem with the fueling receptacle, replace the fueling receptacle (TASK 28-21-11-000-801 and TASK 28-21-11-400-801).

CAUTION

MAKE SURE THAT THE HOSE NOZZLE AND HOSE-END CONTROL VALVE ARE IN THE CORRECT CONFIGURATION. REFER TO THE SUPPLIER'S MAINTENANCE MANUAL FOR PROCEDURES. IF YOU DO NOT, IT COULD CAUSE DAMAGE TO THE AIRPLANE.

(c) Connect defueling hose nozzle to the fueling receptacle.

SUBTASK 28-26-00-860-043

(6) Open the shutoff handle on the hose nozzle.

SUBTASK 28-26-00-010-006

(7) Open this access panel:

(Figure 202)

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91

SUBTASK 28-26-00-860-044

(8) Set the defueling valve handle to the open position.

(a) If the defueling valve handle is hard to operate, lubricate the mechanism with aircraft instrument oil, D50248.

(b) If that does not decrease the force necessary to move the defueling valve handle, remove and replace the defueling valve handle (PAGEBLOCK 28-26-11/401).

SUBTASK 28-26-00-860-045

(9) On the P5-2 Fuel System Module, make sure that the CROSS FEED switch is in the closed position.

SUBTASK 28-26-00-650-004

(10) 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

(11) Continue to defuel the airplane until the fuel measuring sticks show the correct quantity of fuel in the No. 2 main 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

(12) Stop the defueling pump on the fuel truck.

SUBTASK 28-26-00-860-046

(13) Set the defueling valve handle to the closed position.

(a) If the defueling valve handle is hard to operate, lubricate the mechanism with aircraft instrument oil, D50248.

(b) If that does not decrease the force necessary to move the defueling valve handle, remove and replace the defueling valve handle (PAGEBLOCK 28-26-11/401).

SUBTASK 28-26-00-410-004

(14) Close this access panel:

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91

SUBTASK 28-26-00-860-047

(15) Close the shutoff handle on the nozzle of the fuel hose.

SUBTASK 28-26-00-080-005

(16) Disconnect the defueling hose nozzle.

SUBTASK 28-26-00-420-003

(17) Put the cap on the fueling receptacle.

SUBTASK 28-26-00-080-006

(18) Disconnect the bonding cable that you connected between the fueling source and the airplane (TASK 20-40-11-760-801).

SUBTASK 28-26-00-080-007

(19) Disconnect the ground cables from the fueling source and the airplane (TASK 20-40-11-910-801).

SUBTASK 28-26-00-410-005

(20) Close this access panel:

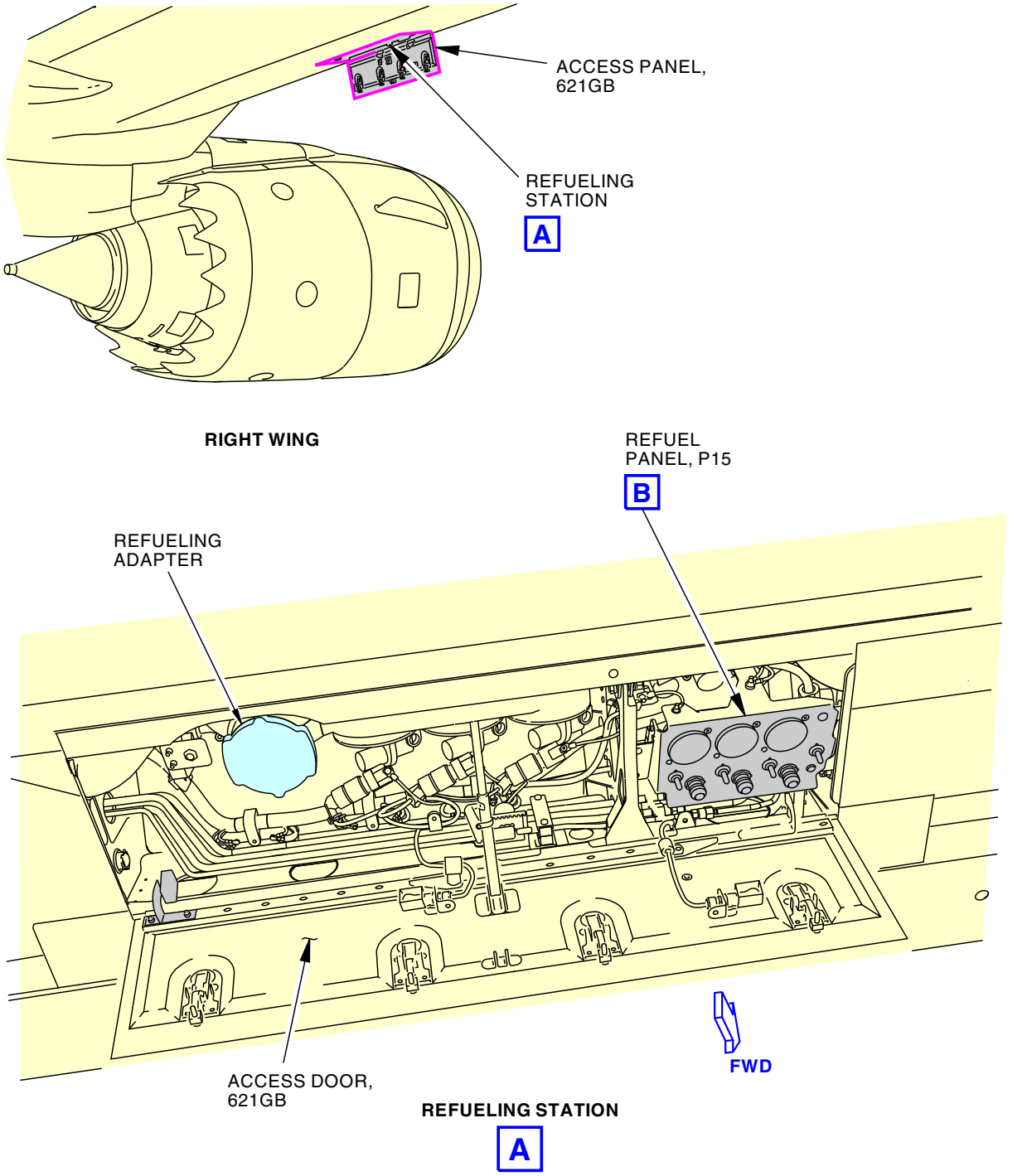
Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-26-00-650-007

(21) If you are scheduled to defuel the fuel tanks completely, do this task: TASK 12-11-00-650-807.

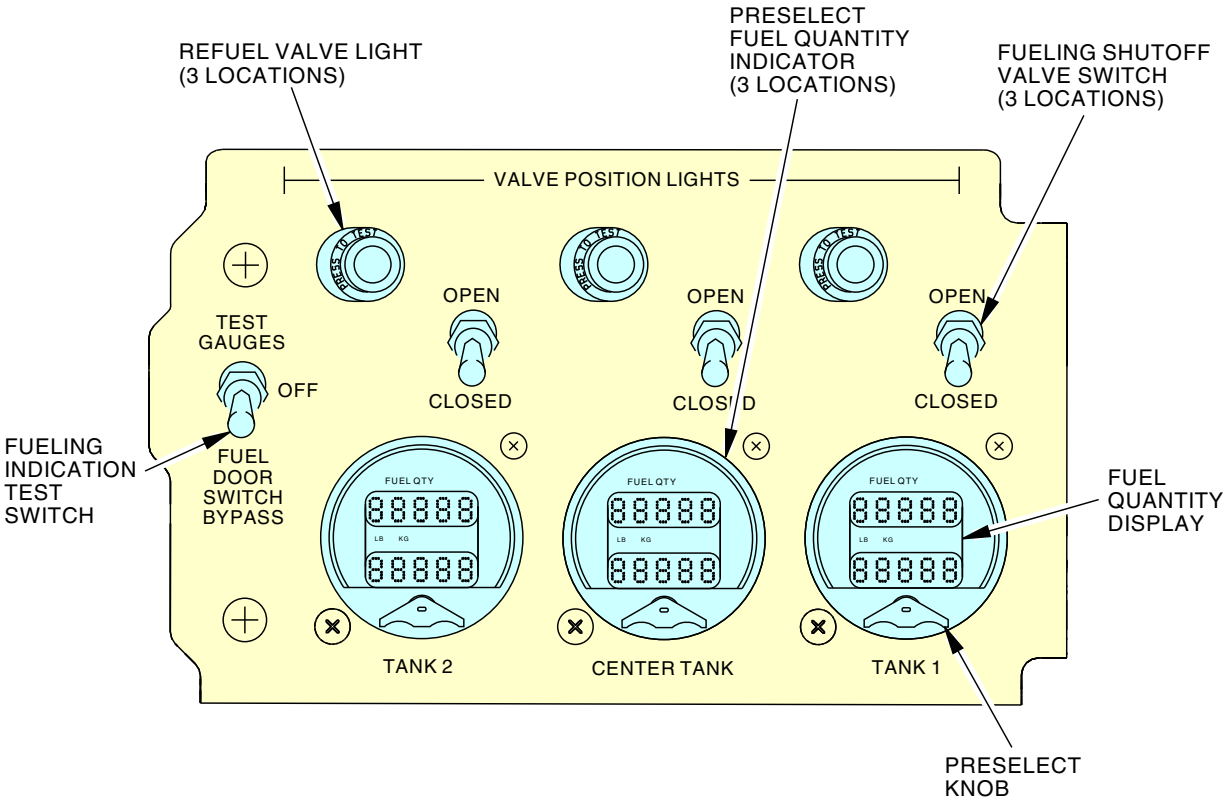
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Refueling Station Component Location
Figure 201/28-26-00-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



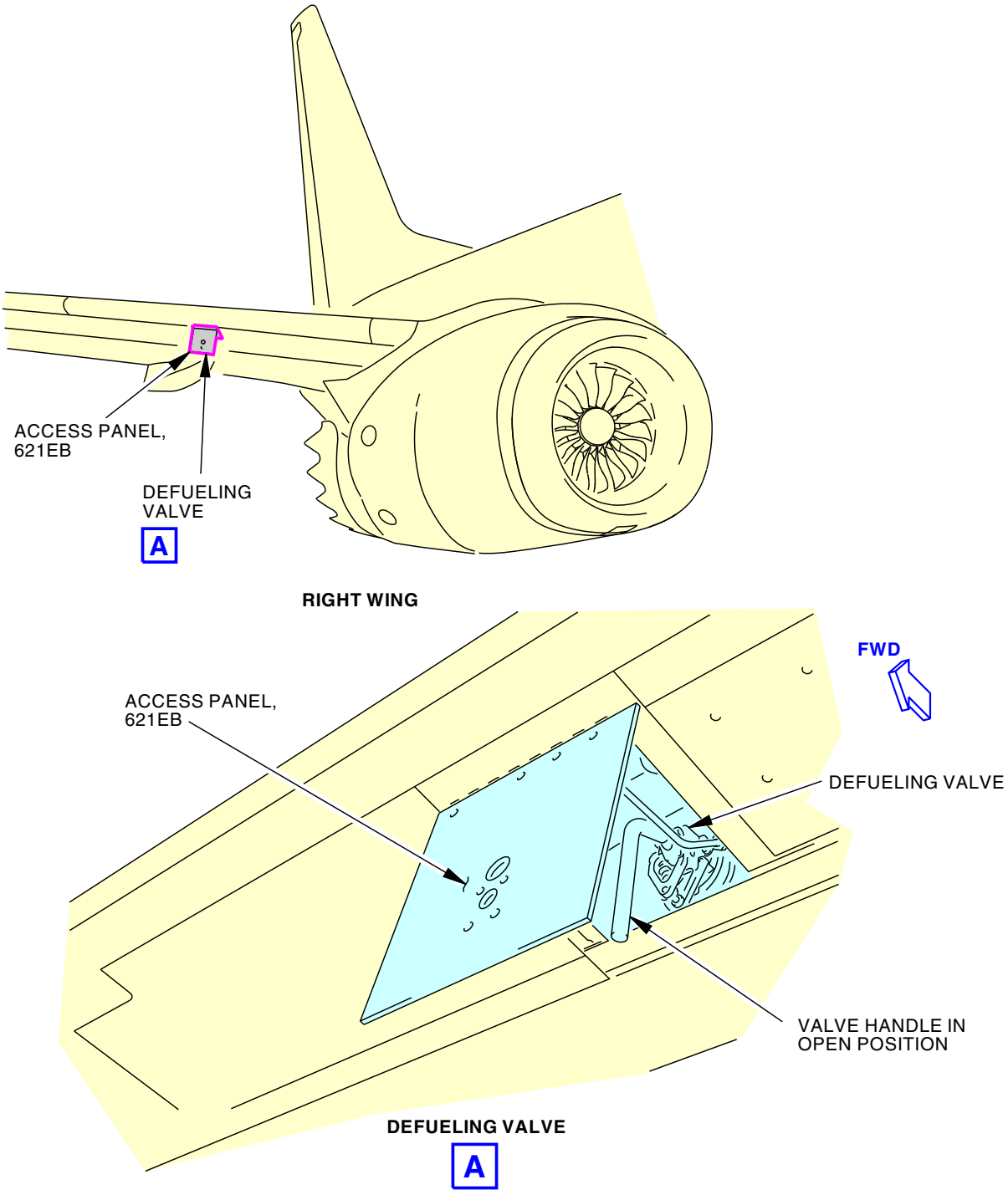
REFUEL PANEL, P15

B

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Refueling Station Component Location
Figure 201/28-26-00-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Defueling Valve Component Location
Figure 202/28-26-00-990-802

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-26-00-650-802

4. Tank to Tank Fuel Transfer

A. General

(1) If it is necessary to defuel only one of the fuel tanks, you can move the fuel from that fuel tank to a different fuel 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 fuel tank with the fuel boost pumps.

(2) Monitor the fuel quantity in each fuel tank when you move the fuel from one fuel tank to a different fuel tank.

(3) When the defueling valve handle is hard to operate, you can lubricate or replace the mechanism.

(4) An unexpected fuel transfer from the center tank to the No. 1 main tank can occur during maintenance.

(a) To prevent fuel transfer from the center tank to the No. 1 main tank through the fuel scavenge system, do not put more than 23,000 lb (10,433 kg) of fuel in the center tank when the No. 1 main tank is empty for maintenance.

NOTE: The fuel transfer will stop with less than 25,000 lb (11,340 kg) of fuel, however, it is recommended to use 23,000 lb (10,433 kg) for variations in airplane pitch and roll attitude while maintenance is done.

(5) The preselect fuel quantity indicator is referred to as the refuel quantity indicator in this procedure.

B. References

Reference	Title
12-11-00-650-807	Drain the Fuel from the Sumps after Defueling (P/B 301)
24-22-00-860-801	Supply Electrical Power (P/B 201)
28-26-11 P/B 401	DEFUELING VALVE - REMOVAL/INSTALLATION
29-11-00-860-805	Hydraulic System A or B Power Removal (P/B 201)
33-18-00-710-801	Master Dim and Test - Operational Test (P/B 201)
49-11-00-860-801	APU Starting and Operation (P/B 201)

C. Consumable Materials

Reference	Description	Specification
D50248	Oil - Instrument, Aircraft, Low Volatility	MIL-PRF-6085 (Supersedes MIL-L-6085)

D. Location Zones

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

E. Access Panels

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91
621GB	Refuel Valve Door - Slat Station 125

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Tank to Tank Fuel Transfer

SUBTASK 28-26-00-860-048

WARNING OBEY THE SAFETY PRECAUTIONS. IF YOU DO NOT OBEY THE SAFETY PRECAUTIONS, YOU CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(1) Read and obey the precautions (TASK 28-26-00-600-801).

SUBTASK 28-26-00-860-049

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.

(2) Do not operate an engine-driven or electric motor-driven pump in the hydraulic system if the No. 1 or the No. 2 main tank has less than 1675 lb (760 kg) of fuel (TASK 29-11-00-860-805).

SUBTASK 28-26-00-860-050

(3) Do this task: Supply Electrical Power, TASK 24-22-00-860-801.

(a) If you are not scheduled to defuel the No. 1 main tank fully, you can supply power with the APU (TASK 49-11-00-860-801).

1) Do a check for minimum fuel quantities and other data before you start the APU.

NOTE: The APU can be shutdown while defueling.

SUBTASK 28-26-00-860-051

(4) On the P6 panel, make sure that all of the circuit breakers for the fuel system are closed.

SUBTASK 28-26-00-710-002

(5) Do the master dim and test system operational test (TASK 33-18-00-710-801).

NOTE: Make sure that the fuel pump low pressure lights operate.

SUBTASK 28-26-00-860-052

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

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

F/O Electrical System Panel, P6-5

Row	Col	Number	Name
E	1	C04016	ENGINE 1 IGNITION PWR CONT
E	2	C04017	ENGINE 2 IGNITION PWR CONT

SUBTASK 28-26-00-860-053

(7) If you are scheduled to transfer fuel out of the No. 2 main tank, make sure that the CROSS FEED switch is in the closed position.

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SUBTASK 28-26-00-860-054

(8) If you are scheduled to transfer fuel out of the No. 1 main tank or the center tank, set the CROSS FEED switch to the open position.

SUBTASK 28-26-00-010-007

(9) Open this access panel for the refuel station:

(Figure 201)

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-26-00-710-003

(10) On the P15 Refuel Panel, set the fueling shutoff valve switches to the OPEN position to make sure that the VALVE POSITION LIGHTS operate correctly.

SUBTASK 28-26-00-860-055

(11) Find the fueling shutoff valve switch for the fuel tank that will get the fuel that you are scheduled to transfer.

(a) Set that fueling shutoff valve switch to the OPEN position.

(b) Make sure that all of the other fueling shutoff valve switches are in the CLOSED position.

SUBTASK 28-26-00-010-009

(12) Open this access panel:

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91

SUBTASK 28-26-00-010-008

(13) Set the defueling valve handle to the open position.

(a) If the defueling valve handle is hard to operate, lubricate the mechanism with aircraft instrument oil, D50248.

(b) If that does not decrease the force necessary to move the defueling valve handle, remove and replace the defueling valve handle (PAGEBLOCK 28-26-11/401).

SUBTASK 28-26-00-860-056

(14) Obey these fuel pump limitations during the pump operation:

(a) To operate the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable fuel tank.

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.

(b) Immediately set the applicable fuel pump switch(es) to the OFF position 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 back-pressure to the pumps, it is possible for the LOW PRESSURE light(s) to come on. In this case, monitor the fuel tank quantity and set the pump switch to the OFF position if the fuel tank quantity is not changing.

1) If one LOW PRESSURE light comes on because of a reduced back-pressure condition, do these steps:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

a) Put the applicable fuel boost pump switch to the OFF position and continue defueling.

b) If the remaining LOW PRESSURE light for the fuel boost pump switch for the fuel tank comes on, monitor the fuel tank quantity.

c) If the fuel quantity for the fuel tank does not change, then immediately set the fuel pump switch(es) to the OFF position.

d) For the No. 1 or No. 2 main tank, do not operate the main boost pumps with fuel quantities less than 100 lb (45 kg).

e) If the automatic shutoff system for the center tank fuel boost pump is disabled, do not operate the center tank fuel 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 fuel tank come on at the same time, do these steps:

a) For the No. 1 or No. 2 main tanks, put the Fuel Pump 1 AFT or the Fuel Pump 2 AFT switch to the OFF position and continue to monitor the fuel tank quantity.

b) For the center tank, put one of the fuel boost pump switches to the OFF position and continue to monitor the fuel tank quantity.

c) If the fuel quantity in the fuel tank does not change, immediately put the remaining fuel boost pump switch to the OFF position.

d) For the No. 1 or No. 2 main tank, do not operate the main boost pumps with fuel quantities less than 100 lb (45 kg).

e) If the automatic shutoff system for the center tank fuel boost pump is disabled, do not operate the center tank fuel boost pumps with fuel quantities less than 2000 lb (907 kg).

3) If the center tank fuel boost pump automatic shutoff system turns off the center tank fuel 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 203/28-26-00-993-803

	CONFIGURATION						
	A	**B**	**C**	**D**	**E**	**F**	**G**
FUEL PUMPS AFT 1	OFF	ON	OFF	OFF	ON	OFF	OFF
FUEL PUMPS FWD 1	OFF	ON	OFF	OFF	ON	OFF	OFF
FUEL PUMPS AFT 2	OFF	OFF	ON	OFF	OFF	ON	OFF
FUEL PUMPS FWD 2	OFF	OFF	ON	OFF	OFF	ON	OFF
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

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Table 203/28-26-00-993-803 (Continued)

	CONFIGURATION						
	A	B	C	D	E	F	G
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 fuel tank that will receive the fuel.

NOTE: Turning on the main tank fuel boost pumps will increase back-pressure to the center tank fuel boost pumps.

<1> If you must transfer fuel from the center tank into the No. 1 main tank, put the airplane in configuration B.

<2> If you must transfer fuel from the center tank into the No. 2 main tank, put the airplane in configuration C.

<3> Continue from where you were last in the fuel transfer procedure.

b) If the main tank fuel 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 fuel 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> On the P5 Overhead Panel, set the applicable fuel pump switches to the positions indicated in Table 203.

<a> If you must transfer fuel from the center tank into the No. 1 main tank, put the airplane in configuration E.

<b> If you must transfer fuel from the center tank into the No. 2 main 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 fuel boost pumps to the OFF position.

<2> Set the defueling valve handle to the open position.

<a> If the defueling valve handle is hard to operate, lubricate the mechanism with aircraft instrument oil, D50248.

<b> If that does not decrease the force necessary to move the defueling valve handle, remove and replace the defueling valve handle (PAGEBLOCK 28-26-11/401).

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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
D	7	C01659	AT S-O/UCPO BST PMP CTR TNK L AC
E	7	C01658	FUEL AT S-O/UCPO BST PMP CTR TNK R AC

<4> Continue from where you were last in the fuel transfer procedure.

(c) Do these steps to transfer fuel with passengers on board:

WARNING YOU MUST OBEY THE FUEL SAFETY PRECAUTIONS WHILE PASSENGERS ARE IN THE AIRCRAFT. MAKE SURE THAT THE FUEL LEVEL DOES NOT BECOME LESS THAN 2000 LB (907 KG). IF YOU DO NOT OBEY THE SAFETY PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

1) Do not let the fuel quantity in a main tank become less than 2000 lb (907 kg).

WARNING YOU MUST OBEY THE FUEL SAFETY PRECAUTIONS WHILE PASSENGERS ARE IN THE AIRCRAFT. MAKE SURE THAT THE FUEL LEVEL DOES NOT BECOME LESS THAN 2000 LB (907 KG). IF YOU DO NOT OBEY THE SAFETY PRECAUTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

2) If the automatic shutoff system for the center tank fuel boost pump is disabled, do not let the fuel quantity in the center tank become less than 2000 lb (907 kg).

SUBTASK 28-26-00-860-057

(15) To move fuel out of a fuel tank, use this table to set the fuel boost pump switch positions to remove the fuel from that fuel tank:

Table 204/28-26-00-993-804

FUEL BOOST PUMP SWITCH	SWITCH POSITION FOR DEFUELING		
	MAIN TANK NO. 1	MAIN 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

(16) Continue to move the fuel until the refuel quantity indicator shows the necessary quantity of remaining fuel in the fuel tank.

(a) You can also monitor the applicable low pressure light to show when the applicable fuel tank is empty.

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(b) When the applicable low pressure lights come on, the applicable fuel tank is empty.

(c) Set the applicable fuel boost pump switches to the OFF position.

SUBTASK 28-26-00-860-058

(17) 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
D	7	C01659	AT S-O/UCPO BST PMP CTR TNK L AC
E	7	C01658	FUEL AT S-O/UCPO BST PMP CTR TNK R AC

SUBTASK 28-26-00-860-059

(18) On the P15 Refuel Panel, set the fueling shutoff valve switches to the CLOSED position.

SUBTASK 28-26-00-410-007

(19) Close this access panel for the refuel station:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-26-00-860-060

(20) Set the defueling valve handle to the closed position.

(a) If the defueling valve handle is hard to operate, lubricate the mechanism with aircraft instrument oil, D50248.

(b) If that does not decrease the force necessary to move the defueling valve handle, remove and replace the defueling valve handle (PAGEBLOCK 28-26-11/401).

SUBTASK 28-26-00-410-008

(21) Close this access panel for the defueling valve:

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91

SUBTASK 28-26-00-860-061

(22) On the P5-2 Fuel System Module, set the CROSS FEED switch to the closed position if you opened it before this step.

SUBTASK 28-26-00-860-062

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

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F/O Electrical System Panel, P6-5

Row	Col	Number	Name
E	1	C04016	ENGINE 1 IGNITION PWR CONT
E	2	C04017	ENGINE 2 IGNITION PWR CONT

SUBTASK 28-26-00-680-003

(24) If you are scheduled to drain the sump fuel, do this task: TASK 12-11-00-650-807.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 these 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 main tank to remove the adapter shaft or the valve body.

TASK 28-26-11-010-801

2. Defueling Valve Handle Removal

(Figure 401)

A. General

(1) This task gives instructions to remove the defueling valve handle.

B. References

Reference	Title
20-10-44-000-801	Lockwire, Cotter Pins, and Lockrings - Removal (P/B 401)

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
621EB	Lower Leading Edge Access Panel - Slat Station 91

E. Prepare for the Removal

SUBTASK 28-26-11-010-001

(1) Open this access panel to get access to the defueling valve handle:

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91

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 that the defueling valve handle [6] is in the CLOSED position.

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F. Defueling Valve Handle Removal

SUBTASK 28-26-11-020-001

(1) Remove the lockwire from the four screws [1] (TASK 20-10-44-000-801).

SUBTASK 28-26-11-020-009

(2) Remove the sealant from the four screws [1] and washers [2].

SUBTASK 28-26-11-020-002

(3) Remove the four screws [1] and washers [2] that attach the defueling valve handle [6] to the valve index plate [4].

SUBTASK 28-26-11-020-003

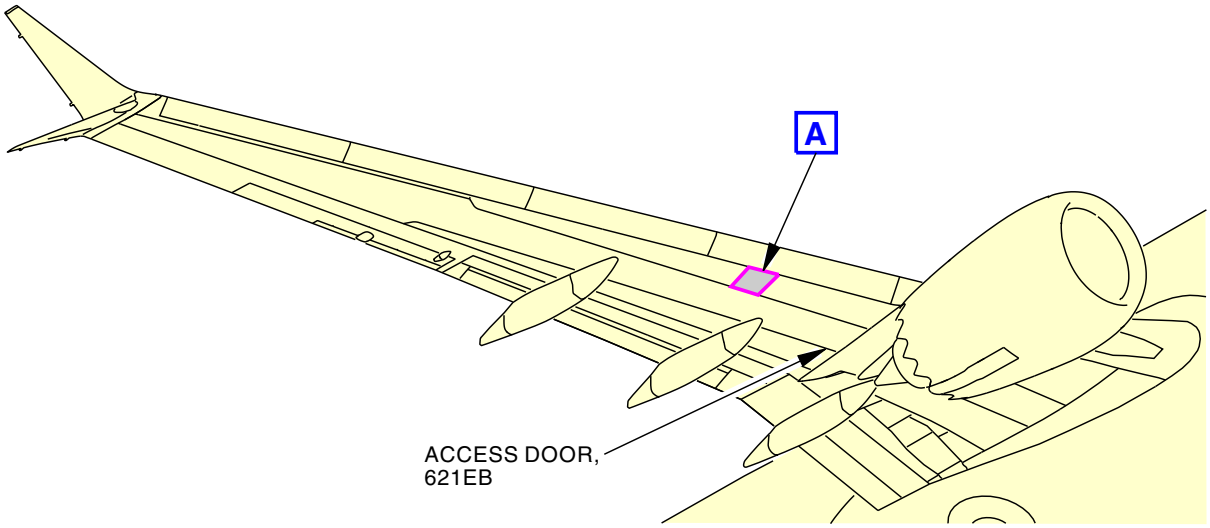
(4) Carefully remove the defueling valve handle [6] from the opening on the front spar.

SUBTASK 28-26-11-420-001

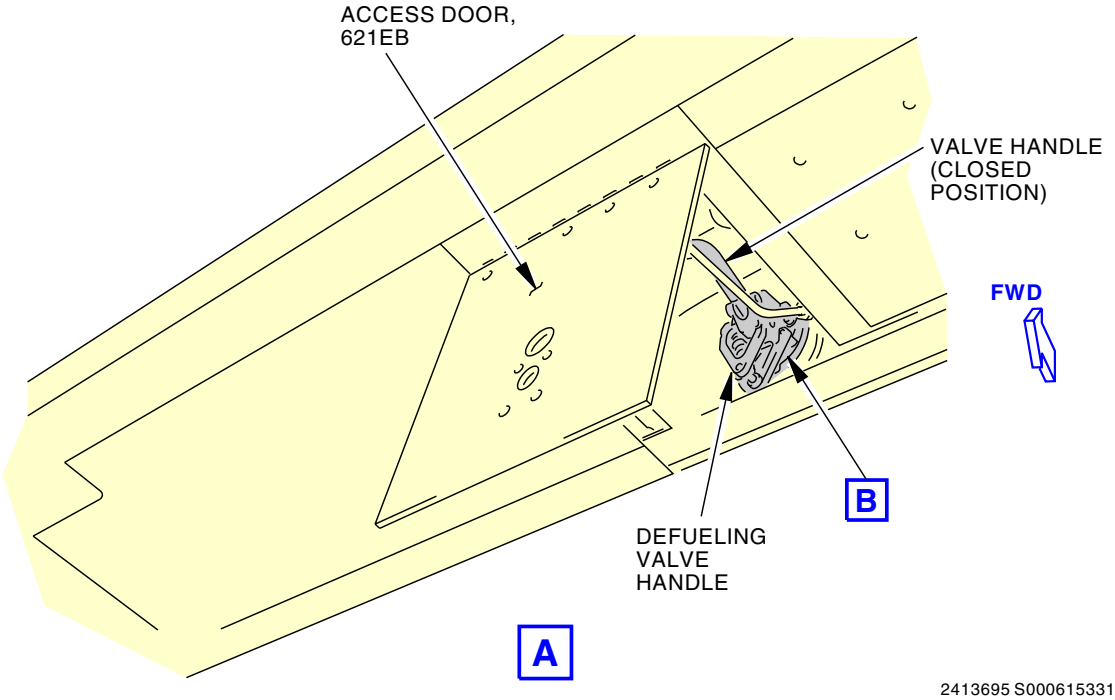
(5) Make sure that the adapter shaft did not move if you are not scheduled to remove the adapter shaft.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

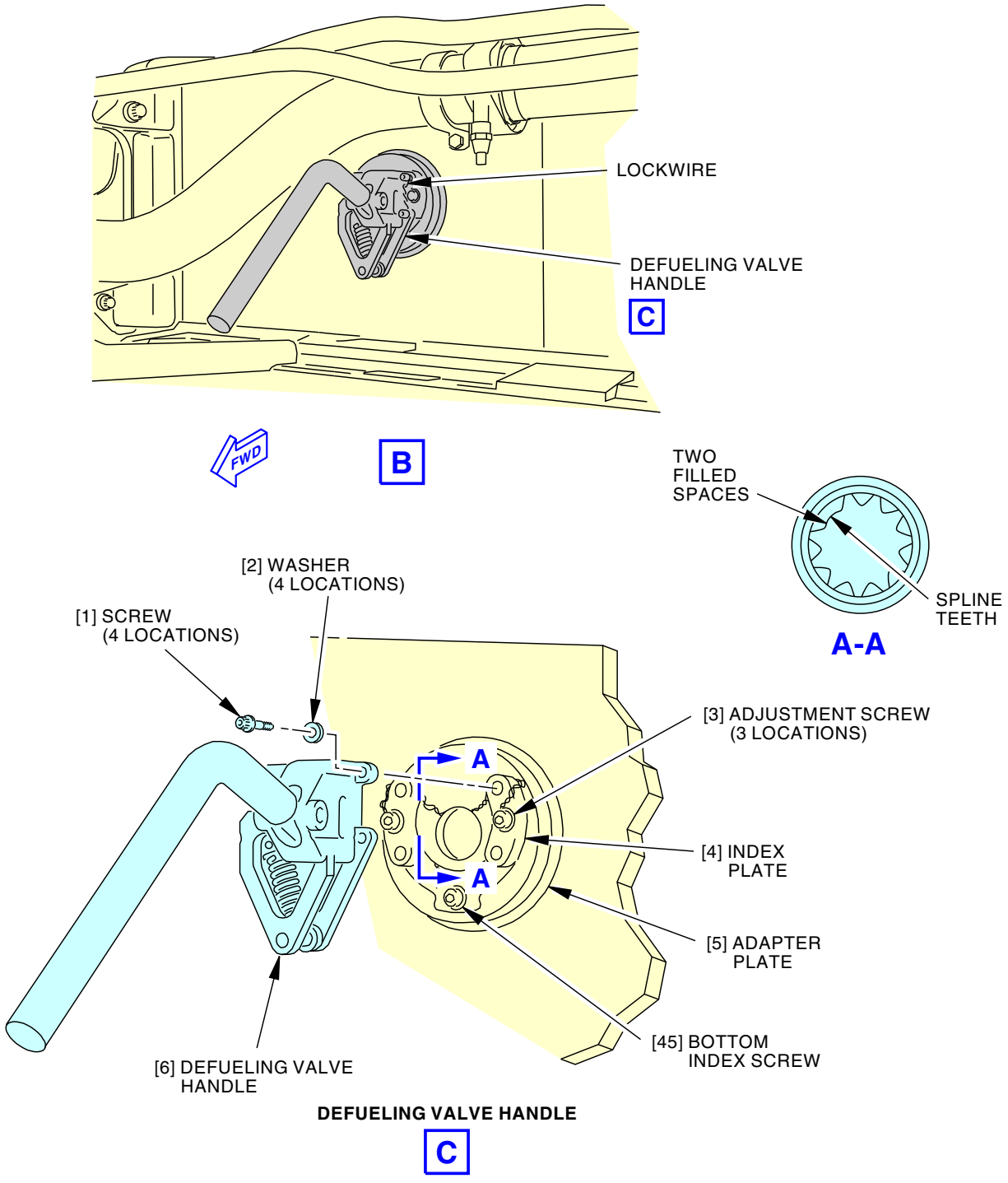


RIGHT WING



Defueling Valve Handle Installation
Figure 401/28-26-11-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Defueling Valve Handle Installation
Figure 401/28-26-11-990-801 (Sheet 2 of 2)

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TASK 28-26-11-400-801

3. Defueling Valve Handle Installation

(Figure 401)

A. General

(1) This task gives instructions to install the defueling valve handle.

B. References

Reference	Title
20-10-44-400-801	Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401)
51-22-00-390-808	Fastener Seal Application (P/B 201)

C. Consumable Materials

Reference	Description	Specification
A00247	Sealant - Pressure And Environmental - Chromate Type	BMS5-95
G01505	Lockwire - Safety And Lock	NASM20995

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
6	Defueling valve handle	28-26-11-01-010	SIA ALL

E. 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

F. Access Panels

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91

G. Defueling Valve Handle Installation

SUBTASK 28-26-11-860-002

(1) Move the handle on the defueling valve handle [6] to the CLOSED position.

SUBTASK 28-26-11-420-002

(2) Align the mating shaft on the defueling valve handle [6] with the two teeth spaces on the adapter shaft (View A-A, Figure 401).

NOTE: The mounting feet on the defueling valve handle [6] automatically align with the mounting points on the index plate [4].

SUBTASK 28-26-11-420-003

(3) Attach the defueling valve handle [6] to the valve index plate [4] with the screws [1].

(a) Install the four screws [1] and washers [2].

1) Tighten the four screws [1] to 20 in-lb (2 N·m).

(b) Install the lockwire, G01505, on the screws [1] (TASK 20-10-44-400-801).

SUBTASK 28-26-11-390-004

(4) Apply sealant, A00247 to the four screws [1] and washers [2] (TASK 51-22-00-390-808).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

H. Put Airplane Back to Its Usual Condition

SUBTASK 28-26-11-410-001

(1) Close this access panel:

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91

——— END OF TASK ———

TASK 28-26-11-010-802

4. Defueling Valve - Adapter Shaft Removal

(Figure 402)

A. General

(1) This task gives instructions to remove the defueling valve - adapter shaft.

(2) Two people minimum are required to do this procedure.

B. 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)

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.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Reference	Description
COM-2481	Sealant Removal Tool (meets BSS7384 requirements) Part #: 1-6390-A Supplier: 63318 Part #: 10810 Supplier: $0855 Part #: 10811 Supplier: $0855 Part #: 10812 Supplier: $0855 Part #: 234350 Supplier: 5HCF1 Part #: 235072 Supplier: 5HCF1 Part #: 235073 Supplier: 5HCF1 Part #: 235074 Supplier: 5HCF1 Part #: 235075 Supplier: 5HCF1 Part #: 235076 Supplier: 5HCF1 Part #: 311/03 Supplier: F6892 Part #: 311/14 Supplier: F6892 Part #: 311/25 Supplier: F6892 Part #: 311/37 Supplier: F6892 Part #: AS1 Supplier: $1351 Part #: AS2 Supplier: $1351 Part #: AS3 Supplier: $1351 Part #: DAD5013 Supplier: 7RKH2 Part #: DFD5019 Supplier: 7RKH2 Part #: JNT411B60 Supplier: 3DN12 Part #: JNT411B90 Supplier: 3DN12 Part #: SCD5019 Supplier: 7RKH2 Part #: ST982LF-9 Supplier: 81205 Part #: TS1275-4 Supplier: 22975
COM-4746	Handle - Sealant Removal Tool Part #: 310/1 (for SkyScraper) Supplier: F6892 Part #: SHR0272-T (for PnJ scraper) Supplier: 7RKH2 Part #: ST982LH-F-3 (for ST982LF-9) Supplier: 81205 Opt Part #: SHW0215 (for PnJ scraper) Supplier: 7RKH2

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	Lower Leading Edge Access Panel - Slat Station 91
632DB	Main Tank Access Door - Wing Station 313

F. Prepare for the Removal

SUBTASK 28-26-11-860-003

(1) On the P5-2 Fuel System Module, turn the CROSS FEED switch to the closed position.

(a) Make sure that the fuel crossfeed valve light is off.

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SUBTASK 28-26-11-860-004

WARNING MAKE SURE THAT YOU COMPLETE ALL OF THE DEFUEL SAFETY PROCEDURES BEFORE YOU GO INTO THE FUEL TANK. DAMAGE AND INJURIES TO PERSONS CAN OCCUR.

(2) Remove fuel from the No. 2 main tank and the center tank (TASK 28-26-00-650-801 or TASK 28-26-00-650-802).

SUBTASK 28-26-11-860-005

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

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

(a) Remove this access door:

(TASK 28-11-11-000-801).

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

SUBTASK 28-26-11-010-004

(4) Open this access panel to get access to the defueling valve adapter:

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91

NOTE: The access panel is on the forward side of the front spar and on the outboard side of the No. 2 engine.

G. Defueling Valve - Adapter Shaft Removal

SUBTASK 28-26-11-010-005

(1) Do these steps on the outside of the fuel tank:

(a) Remove the defueling valve handle [6] (TASK 28-26-11-010-801).

(b) Use a sealant removal tool to remove the sealant from the periphery of the valve adapter plate [5] (View A-A, Figure 402).

1) Use a sealant removal tool, COM-2481 and sealant removal tool handle, COM-4746 or equivalent.

SUBTASK 28-26-11-010-006

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.

(2) Have the second person go in the fuel tank to the defueling valve [25] location (TASK 28-11-00-910-802) (View A, Figure 402):

(a) Go to the valve adapter [11] location (View B, Figure 402).

(b) Remove the sealant from the bolts [22] and the valve adapter [11] front spar penetration (View A-A, Figure 402).

(c) Remove the bolts [22] and washers [21] that attach the valve adapter plate [5] to the front spar.

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(d) Disengage the adapter shaft from the defueling valve [25] (View C, Figure 402).

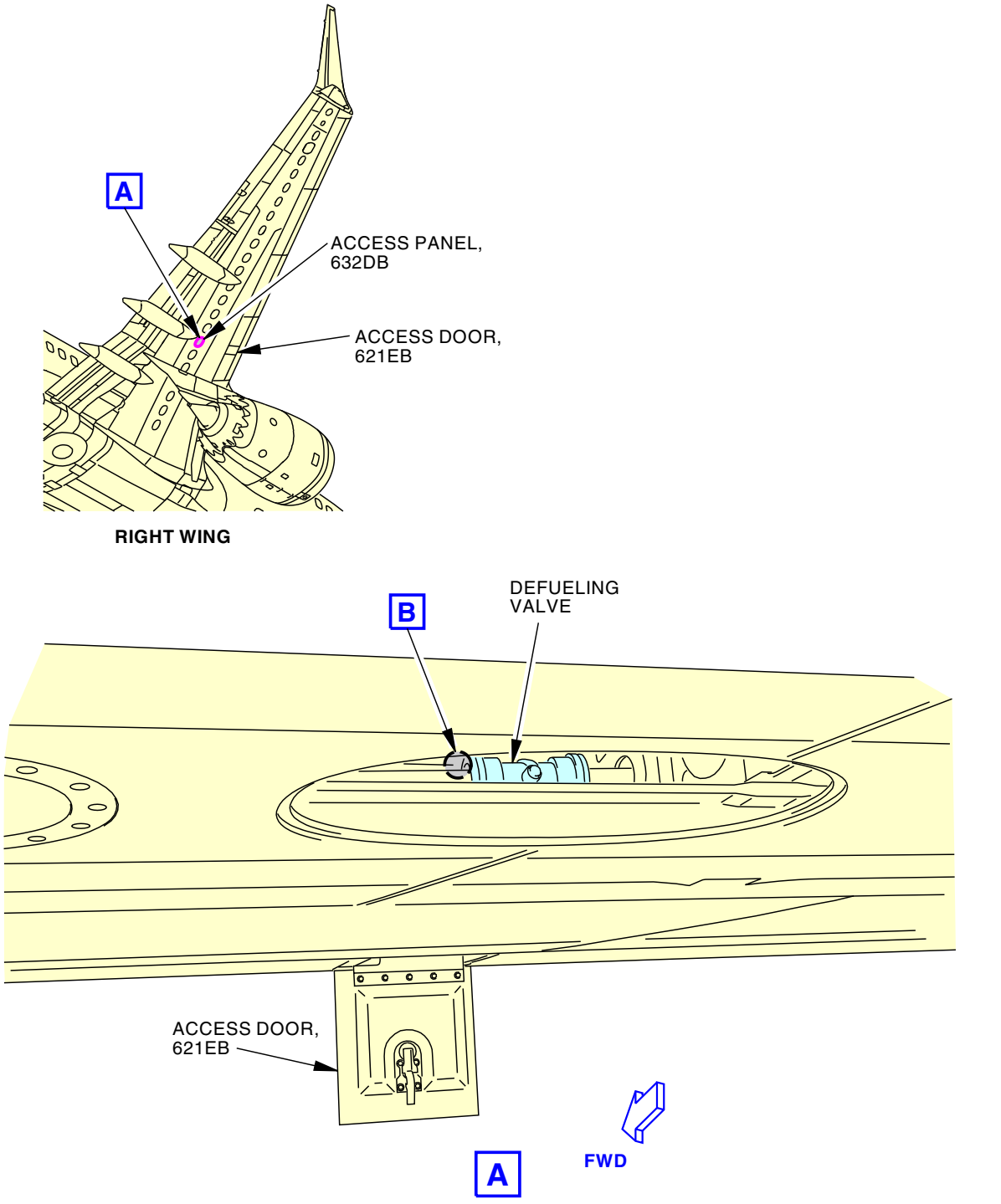
SUBTASK 28-26-11-010-007

(3) Have the person outside remove the adapter shaft through the hole in the front spar.

(a) Discard the O-ring [27].

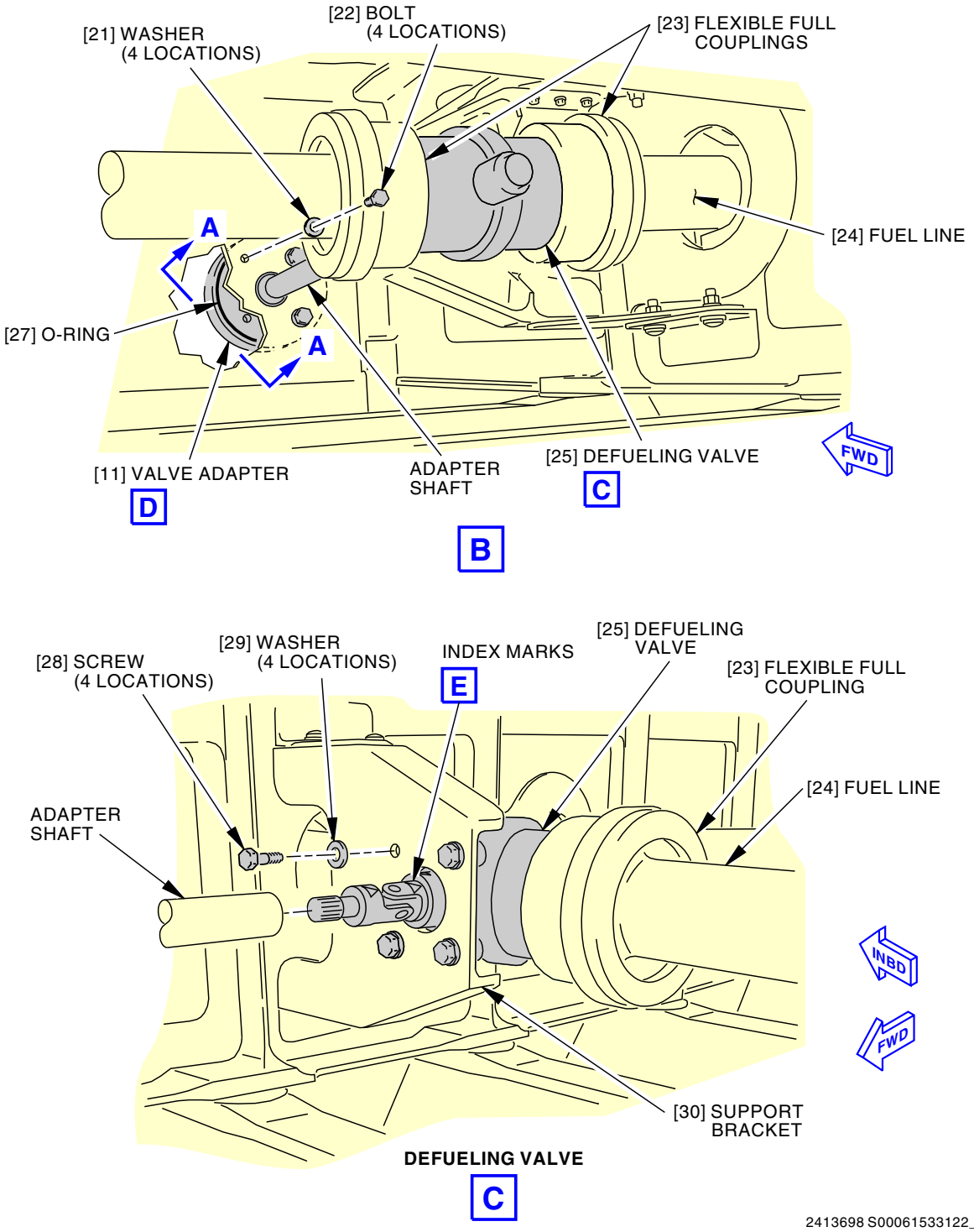
END OF TASK

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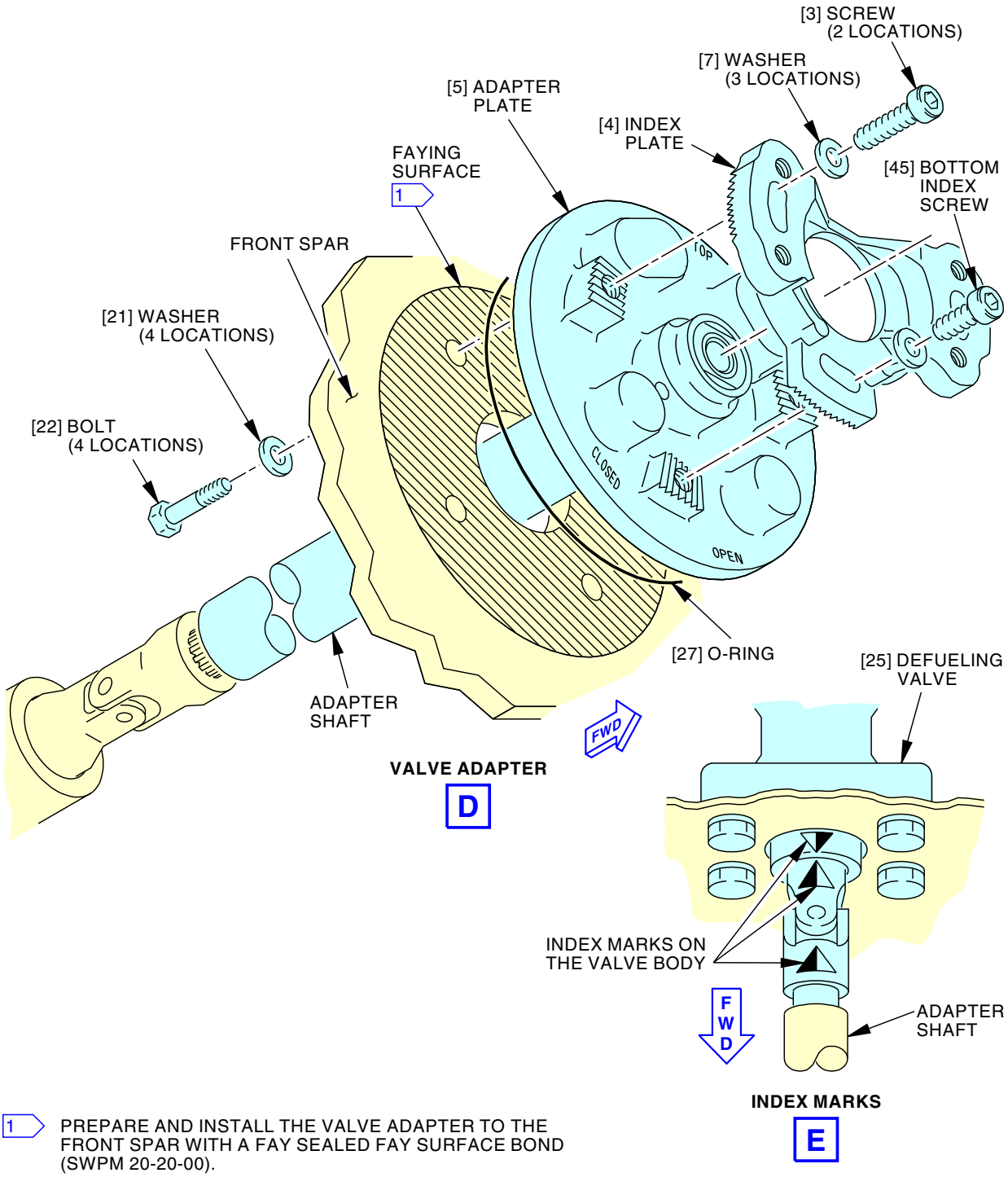
Defueling Valve Installation
Figure 402/28-26-11-990-802 (Sheet 1 of 4)

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Defueling Valve Installation
Figure 402/28-26-11-990-802 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

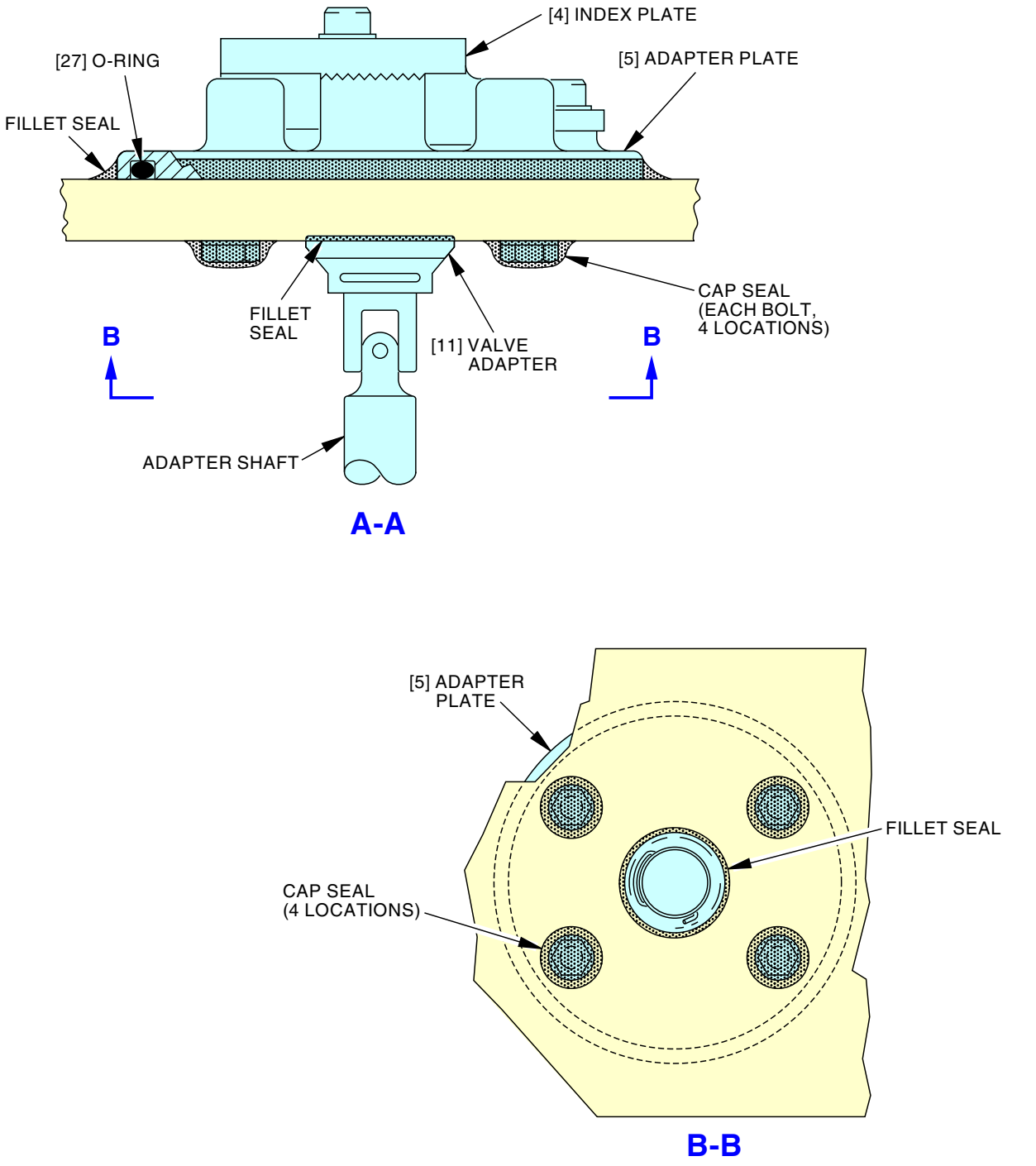


1 PREPARE AND INSTALL THE VALVE ADAPTER TO THE FRONT SPAR WITH A FAY SEALED FAY SURFACE BOND (SWPM 20-20-00).

2413699 S00061533123_V1

Defueling Valve Installation
Figure 402/28-26-11-990-802 (Sheet 3 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Defueling Valve Installation
Figure 402/28-26-11-990-802 (Sheet 4 of 4)

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TASK 28-26-11-410-801

5. Defueling Valve - Adapter Shaft Installation

(Figure 402)

A. General

(1) This task gives instructions to install the defueling valve - adapter shaft.

(2) The adapter shaft is used to connect the defueling valve handle to the defueling valve. The adapter shaft consists of these components:

(a) Adapter plate (with index plate installed)

(b) Adapter shaft (with U-joint connection).

(3) Two people minimum are required to do this procedure.

(4) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-31.

B. References

Reference	Title
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)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
51-21-41-370-802	Apply Bonderite M-CR 600, Bonderite M-CR 1200, Bonderite M-CR 600RTU, or Bonderite M-CR 1200S Solution (P/B 701)
51-22-00-390-806	Fillet Seal Application (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Reference	Description
COM-2481	Sealant Removal Tool (meets BSS7384 requirements) Part #: 1-6390-A Supplier: 63318 Part #: 10810 Supplier: $0855 Part #: 10811 Supplier: $0855 Part #: 10812 Supplier: $0855 Part #: 234350 Supplier: 5HCF1 Part #: 235072 Supplier: 5HCF1 Part #: 235073 Supplier: 5HCF1 Part #: 235074 Supplier: 5HCF1 Part #: 235075 Supplier: 5HCF1 Part #: 235076 Supplier: 5HCF1 Part #: 311/03 Supplier: F6892 Part #: 311/14 Supplier: F6892 Part #: 311/25 Supplier: F6892 Part #: 311/37 Supplier: F6892 Part #: AS1 Supplier: $1351 Part #: AS2 Supplier: $1351 Part #: AS3 Supplier: $1351 Part #: DAD5013 Supplier: 7RKH2 Part #: DFD5019 Supplier: 7RKH2 Part #: JNT411B60 Supplier: 3DN12 Part #: JNT411B90 Supplier: 3DN12 Part #: SCD5019 Supplier: 7RKH2 Part #: ST982LF-9 Supplier: 81205 Part #: TS1275-4 Supplier: 22975
COM-4746	Handle - Sealant Removal Tool Part #: 310/1 (for SkyScraper) Supplier: F6892 Part #: SHR0272-T (for PnJ scraper) Supplier: 7RKH2 Part #: ST982LH-F-3 (for ST982LF-9) Supplier: 81205 Opt Part #: SHW0215 (for PnJ scraper) Supplier: 7RKH2
STD-123	Brush - Soft Bristle

D. Consumable Materials

Reference	Description	Specification
A00247	Sealant - Pressure And Environmental - Chromate Type	BMS5-95
A00767	Sealant - Fuel Tank	BMS5-45
B00148	Solvent - Methyl Ethyl Ketone (MEK)	ASTM D740
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
C00064	Coating - Aluminum Chemical Conversion	BAC5719 Type II Class A (MIL-DTL-5541 Class 1A)
C00307	Coating - Corrosion Resistant Finish For Integral Fuel Tanks	BMS10-20 Type II
C50033	Coating - Chemical Conversion - Bonderite M-CR 1200S Aero (Formerly Alodine 1200)	BAC5719 Class A, C or D, MIL-DTL-81706 Type I Class 1A or 3
D00504	Grease - Petrolatum	VV-P-236

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(Continued)

Reference	Description	Specification
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
25	Defueling valve	28-26-11-05-065	SIA ALL
26	Adapter shaft	28-26-11-05-010	SIA ALL
27	O-ring	28-26-11-05-055	SIA ALL

F. 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

G. Access Panels

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91
632DB	Main Tank Access Door - Wing Station 313

H. Prepare for Installation

SUBTASK 28-26-11-100-001

(1) Remove the sealant and clean the front spar, valve adapter plate [5], and fasteners.

CAUTION USE APPROVED SEALANT REMOVAL TOOLS TO REMOVE THE SEALANT. IF YOU USE A TOOL THAT IS NOT APPROVED, YOU CAN CAUSE DAMAGE TO THE COMPONENT SURFACES AND FINISHES.

(a) To remove the sealant from the front spar use a sealant removal tool, COM-2481 and sealant removal tool 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 solvent, B00184 or solvent, B00148:

1) soft bristle brush, STD-123

2) cotton wiper, G00034

ECCN 9E991 BOEING PROPRIETARY - See title page for details

I. Defueling Valve - Adapter Shaft Installation

SUBTASK 28-26-11-100-002

28-AWL-31: CDCCL

(1) Apply a fay sealed fay surface bond of sealant, A00767 between the valve adapter plate [5] and the front spar outside of the fuel tank (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-31.

SUBTASK 28-26-11-420-004

(2) Prepare the adapter shaft and the valve adapter plate [5] for installation.

(a) Apply a thin layer of grease, D00504, on the new O-ring [27].

(b) Install the O-ring [27] in the O-ring groove of the valve adapter plate [5].

(c) Put the valve adapter shaft [26] through the hole in the front spar.

SUBTASK 28-26-11-420-005

(3) Have the second person hold the valve adapter shaft [26] (View A, Figure 402).

SUBTASK 28-26-11-420-006

(4) Install the valve adapter plate [5].

(a) Align the index marks on the defueling valve [25] and the valve adapter shaft [26] (View E, Figure 402).

NOTE: A small misalignment of the index marks is satisfactory.

(b) Put the valve adapter shaft [26] spline in the spline on the defueling valve [25] (View C, Figure 402).

(c) Make sure that the shoulder of the valve adapter plate [5] does not bind in the opening of the front spar.

(d) Install the four bolts [22] and washers [21] to attach the valve adapter plate [5] to the front spar.

SUBTASK 28-26-11-220-001

28-AWL-31: CDCCL

(5) Measure the electrical bonding resistance between the valve adapter plate [5] and spar outside the tank (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-31.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-31: CDCCL

(b) Make sure that 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-31.

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SUBTASK 28-26-11-390-001

(6) On the inside of the fuel tank, apply sealant, A00767, to the components below (View B-B, Figure 402):

28-AWL-31: CDCCL

(a) Apply a cap seal to each of the four bolts [22] (TASK 51-22-00-390-806).

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-31.

28-AWL-31: CDCCL

(b) Apply a fillet seal around the edge of the hole and on the stationary part of the valve adapter plate [5].

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-31.

1) Make sure that the sealant does not touch the adapter shaft or other parts of the valve adapter plate [5] that turn.

SUBTASK 28-26-11-390-002

(7) On the spar outside of the fuel tank, apply a fillet seal of sealant, A00247, around the periphery of the valve adapter plate [5] (TASK 51-22-00-390-806) (View A-A, Figure 402).

SUBTASK 28-26-11-800-001

(8) Apply protective finish coating, C00064 or coating, C00307 to the bare metal areas of the front spar (TASK 28-11-00-600-801).

(a) 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.

SUBTASK 28-26-11-800-002

(9) Apply Bonderite M-CR 1200S Aero coating, C50033, to all bare metal areas of the valve adapter plate [5] (TASK 51-21-41-370-802).

(a) Re-apply the protective coating to the valve adapter plate [5] where the electrical bonding probe removed the finish.

SUBTASK 28-26-11-410-002

(10) Do this task: Defueling Valve - Adapter Shaft Alignment, TASK 28-26-11-820-801.

J. Put Airplane Back to Its Usual Condition

SUBTASK 28-26-11-410-003

(1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

(a) Install this access door:

(TASK 28-11-11-400-801).

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

Close this access panel:

Number	Name/Location
621EB	Lower Leading Edge Access Panel - Slat Station 91

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——— END OF TASK ———

TASK 28-26-11-820-801

6. Defueling Valve - Adapter Shaft Alignment

(Figure 403)

A. References

Reference	Title
20-10-44-000-801	Lockwire, Cotter Pins, and Lockrings - Removal (P/B 401)
20-10-44-400-801	Lockwire, Cotter Pins, and Lockrings - 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-1587	Wrench - Torque, 30 in-lbs (4 N-m) Part #: TE3FUA Supplier: 55719
SPL-1771	Alignment Equipment, Fuel Shutoff Valve Part #: B28009-1 Supplier: 81205

C. Consumable Materials

Reference	Description	Specification
G01048	Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter	NASM20995

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. Prepare for the Procedure

SUBTASK 28-26-11-010-013

(1) Do this task: Defueling Valve Handle Removal, TASK 28-26-11-010-801

SUBTASK 28-26-11-010-014

(2) Remove the valve index plate [4] from the valve adapter plate [5].

(a) Remove the lockwires from the top two screws [3] and the bottom index screw [45] (TASK 20-10-44-000-801).

(b) Remove the top two screws [3] from the valve index plate [4].

(c) Remove the bottom index screw [45].

(d) Carefully disassemble the valve index plate [4] from the valve adapter plate [5].

NOTE: The two plates are bonded with faying surface sealant.

SUBTASK 28-26-11-480-001

(3) Install the alignment tool [44] (valve alignment equipment, SPL-1771) in the valve adapter plate [5] (View B, Figure 403):

(a) Position and align the serrated surfaces on the valve index plate [4] with the valve adapter plate [5].

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(b) Loosely install the bottom index screw [45] in the valve index plate [4].

(c) Install the alignment tool [44].

(d) Align the alignment tool [44] guide pins with the two screw holes and attach to the valve index plate [4].

(e) Make sure that the spline on the alignment tool [44] engages with the shaft spline.

F. Defueling Valve - Adapter Shaft Alignment (Alignment Tool with Handle)

SUBTASK 28-26-11-820-001

(1) To align the adapter shaft on the adapter plate [5], do these steps:

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) Align the tool handle in the counterclockwise position.

(b) Carefully turn the alignment tool handle clockwise until the torque necessary to turn the handle increases.

(c) If you cannot find where the torque increases, move the adapter shaft counterclockwise to its initial position.

(d) Turn the alignment tool [44] clockwise until the toque necessary to turn the handle increases, then immediately stop turning the handle.

(e) If you cannot find where the torque increases, go to the next procedure.

(f) Read the scale [42] on the alignment tool [44].

NOTE: This is the point where the valve butterfly starts to engage the edge of the seal.

(g) Turn the handle 13 degrees clockwise to center the valve seal.

NOTE: If the handle was turned more than 13 degrees, do not turn the handle back in the counterclockwise direction again. Start the procedure again with the handle in the counterclockwise position.

SUBTASK 28-26-11-480-003

(2) Tighten the lockscrew [43] to keep the alignment tool [44] in its position on the valve adapter plate [5].

NOTE: The lockscrew [43] keeps the adapter shaft calibrated while the valve index plate [4] is aligned.

SUBTASK 28-26-11-820-008

(3) Turn the valve index plate [4] until the actuator mounting holes in the valve index plate [4] align with the alignment screws [41].

SUBTASK 28-26-11-820-009

(4) Install the two alignment screws [41] to secure the valve index plate [4] to the valve adapter plate [5].

SUBTASK 28-26-11-480-004

(5) Tighten the bottom index screw [45] to a torque of 22 ±1 in-lb (2.5 ±0.1 N·m).

SUBTASK 28-26-11-080-003

(6) Disengage the two alignment screws [41].

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SUBTASK 28-26-11-080-004

(7) Loosen the lockscrew [43].

SUBTASK 28-26-11-080-005

(8) Carefully remove the alignment tool [44].

SUBTASK 28-26-11-930-001

(9) Use a fine point felt pen to apply a reference mark between the valve index plate [4] and the valve adapter plate [5] at one of the serrated attachment points.

SUBTASK 28-26-11-420-015

(10) Install the top two screws [3] in the valve index plate [4].

SUBTASK 28-26-11-480-005

(11) Tighten the top two screws [3] to 22 ±1 in-lb (2.5 ±0.1 N·m).

SUBTASK 28-26-11-420-016

(12) Install MS20995C32 lockwire, G01048 on the screws [3] and bottom index screw [45] (TASK 20-10-44-400-801).

SUBTASK 28-26-11-820-003

(13) Tighten the lockscrew [43] on the alignment tool [44] to keep the tool in its position on the adapter shaft (in its position).

G. Defueling Valve - Adapter Shaft Alignment (Alignment Tool with Wrench)

SUBTASK 28-26-11-820-002

(1) To align the adapter shaft on the valve adapter plate [5], do these steps:

NOTE: A torque wrench (30 in-lbs), COM-1587 is necessary to do this procedure.

(a) Put the torque wrench (30 in-lbs), COM-1587 in the base of the handle.

(b) Carefully turn the torque wrench (30 in-lbs), COM-1587, on the alignment tool handle, clockwise until the torque necessary to turn the handle increases.

(c) Write down the maximum torque that you applied, while you turned the torque wrench (30 in-lbs), COM-1587 in the clockwise position.

(d) Align the adapter shaft back to the initial counterclockwise position.

(e) Turn the torque wrench (30 in-lbs), COM-1587 clockwise at approximately the same rate.

(f) Stop at the position where the torque increases to approximately two-thirds of the maximum torque that you wrote.

(g) Read the scale [42] on the alignment tool [44] at this position.

NOTE: This is the position where valve butterfly starts to engage the edge of the seal.

(h) Turn the torque wrench (30 in-lbs), COM-1587 13 degrees clockwise to center the valve seal.

NOTE: If you turn the handle more than 13 degrees, do not turn the handle counterclockwise. Start the procedure again with the tool handle in the counterclockwise position.

SUBTASK 28-26-11-480-006

(2) Tighten the lockscrew [43] to keep the alignment tool [44] in its position on the valve adapter plate [5]

NOTE: The lockscrew [43] keeps the adapter shaft calibrated while the valve index plate [4] is aligned.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-26-11-820-004

(3) Turn the index plate [4] until the actuator mounting holes in the valve index plate [4] are aligned with the two alignment screws [41].

SUBTASK 28-26-11-820-005

(4) Install the two alignment screws [41] to secure the valve index plate [4] to the valve adapter plate [5].

SUBTASK 28-26-11-420-007

(5) Tighten the bottom index screw [45] to a torque of 22 ±1 in-lb (2.5 ±0.1 N·m).

SUBTASK 28-26-11-020-004

(6) Disengage the two alignment screws [41].

SUBTASK 28-26-11-080-001

(7) Loosen the lockscrew [43].

SUBTASK 28-26-11-080-006

(8) Carefully remove the alignment tool [44].

SUBTASK 28-26-11-930-002

(9) Use a fine point felt pen to apply a reference mark between the valve index plate [4] and the valve adapter plate [5] at one of the serrated attachment points.

SUBTASK 28-26-11-420-008

(10) Install the top two screws [3] in the valve index plate [4].

SUBTASK 28-26-11-480-007

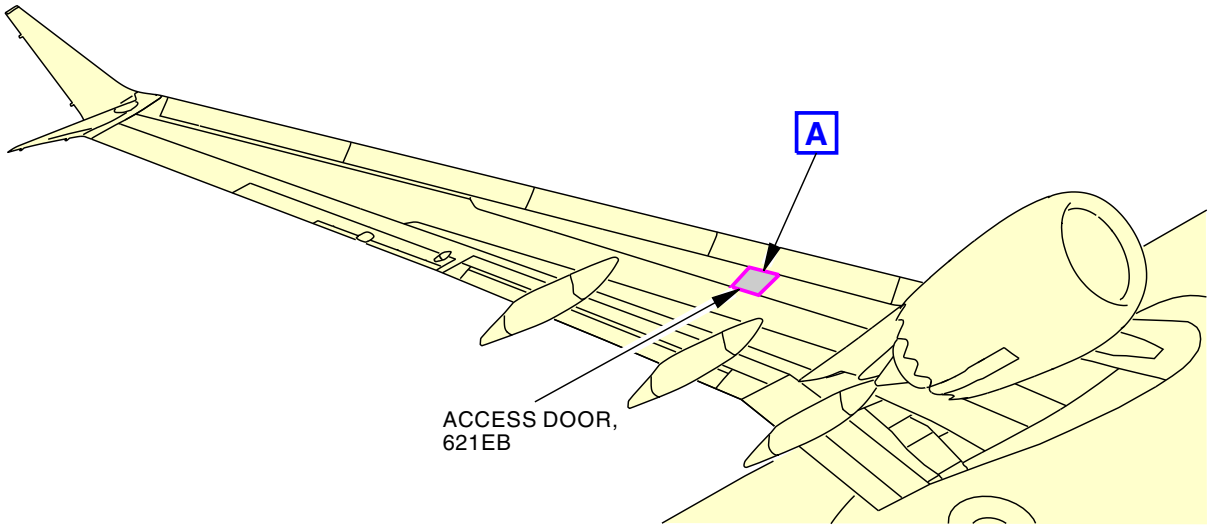
(11) Tighten the top two screws [3] to 22 ±1 in-lb (2.5 ±0.1 N·m).

SUBTASK 28-26-11-420-009

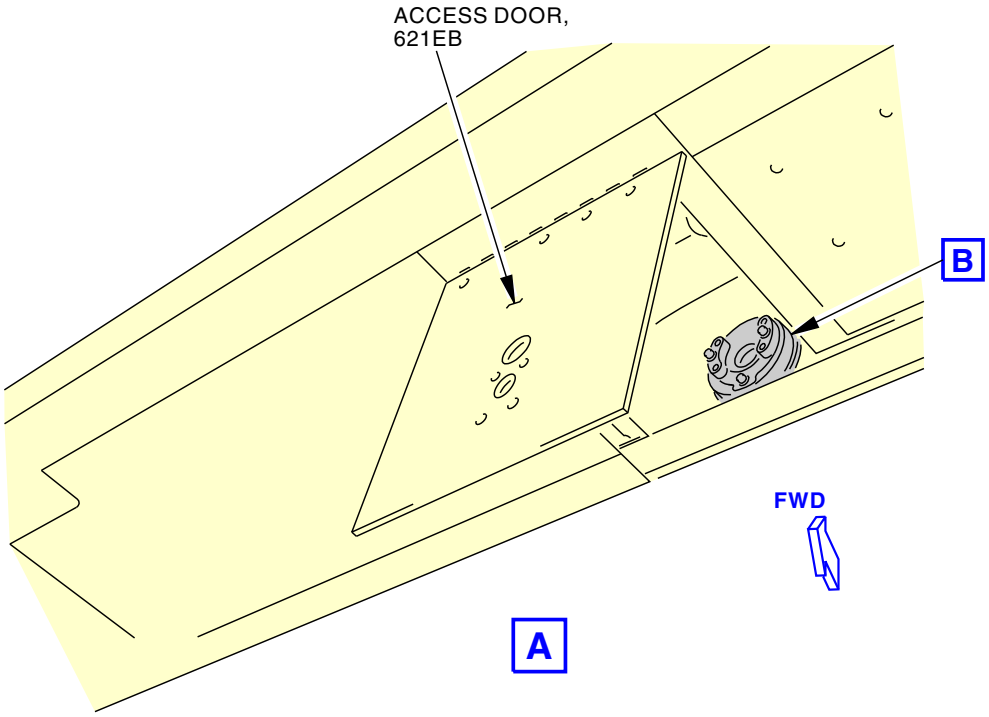
(12) Install MS20995C32 lockwire, G01048 on the screws [3] and bottom index screw [45] (TASK 20-10-44-400-801).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



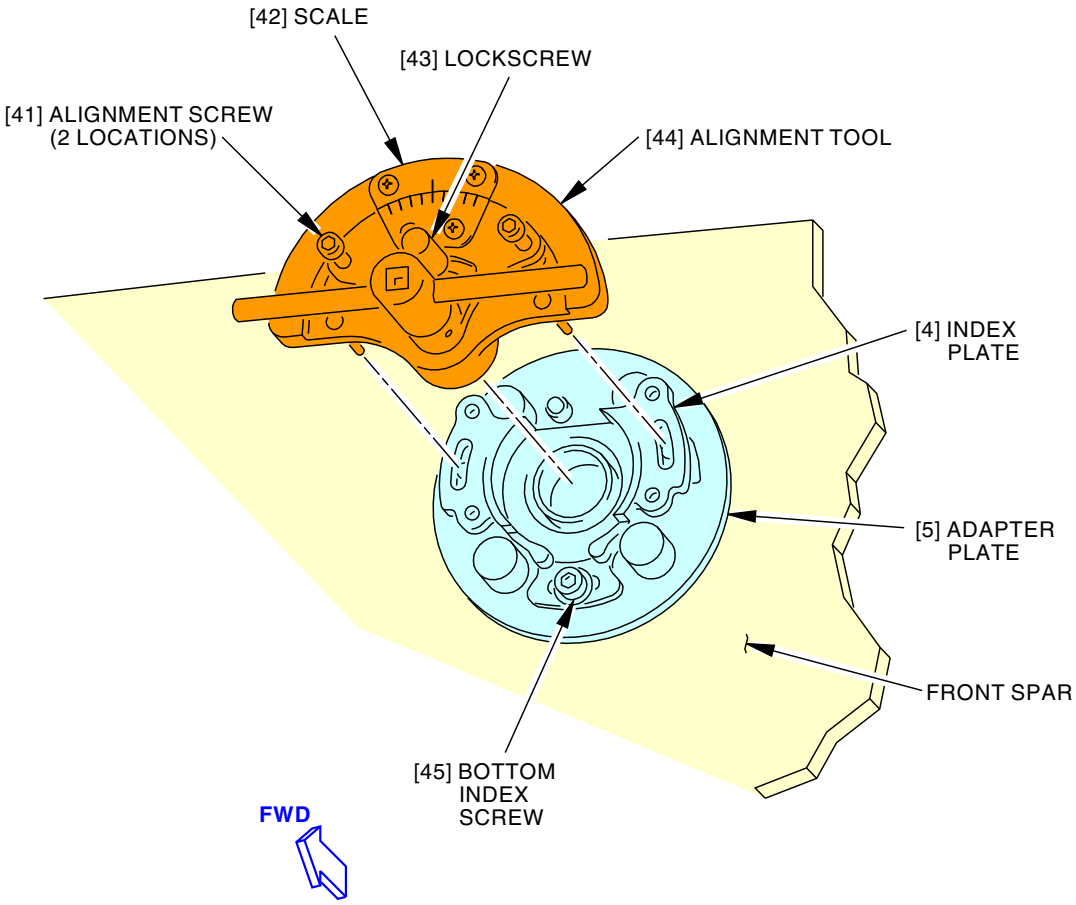
RIGHT WING



2413701 S00061533127_V1

Defueling Valve Alignment
Figure 403/28-26-11-990-803 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413702 S00061533128_V1

Defueling Valve Alignment
Figure 403/28-26-11-990-803 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-26-11-020-801

7. Defueling Valve - Valve Body Removal

(Figure 402)

A. General

(1) This task gives instructions to remove the defueling valve - valve body.

(2) The valve body is referred to as the defueling valve [25] in this task.

B. 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)
28-22-15-000-803	Couplings Removal (P/B 401)
28-26-00-650-801	Fuel Tank Defueling (P/B 201)

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. Prepare for the Removal

SUBTASK 28-26-11-860-006

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

SUBTASK 28-26-11-860-007

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

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

SUBTASK 28-26-11-010-015

(3) Remove this access door:

(TASK 28-11-11-000-801).

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

F. Defueling Valve - Valve Body Removal

SUBTASK 28-26-11-010-011

(1) Go into the No. 2 main tank and find the defueling valve [25].

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SUBTASK 28-26-11-020-005

(2) Disconnect the flexible full coupling [23] from each side of the defueling valve [25] (TASK 28-22-15-000-803).

SUBTASK 28-26-11-020-006

(3) Hold the defueling valve [25] and remove the screws [28] and washers [29] that attach the defueling valve [25] to the support bracket [30].

SUBTASK 28-26-11-020-007

(4) Disengage the defueling valve [25] from the valve adapter shaft [26].

SUBTASK 28-26-11-020-008

(5) Remove the defueling valve [25].

SUBTASK 28-26-11-480-002

(6) Put covers on the holes in the fuel line [24] to keep unwanted materials out.

——— END OF TASK ———

TASK 28-26-11-420-801

8. Defueling Valve - Valve Body Installation

(Figure 402)

A. General

(1) This task gives instructions to install the defueling valve - valve body.

(2) The valve body is referred to as the defueling valve in this task.

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
28-11-00-600-801	Apply the Corrosion Resistant Finish (Topcoat) (P/B 701)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-22-15-400-803	Couplings Installation (P/B 401)
28-26-00-650-802	Tank to Tank Fuel Transfer (P/B 201)
51-22-00-390-806	Fillet Seal Application (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

ECCN 9E991 BOEING PROPRIETARY - See title page for details

D. Consumable Materials

Reference	Description	Specification
A50110	Sealant - Fuel Tank	BMS5-45 Class B-2
C00307	Coating - Corrosion Resistant Finish For Integral Fuel Tanks	BMS10-20 Type II

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
25	Defueling valve	28-26-11-05-065	SIA ALL

F. 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

G. Access Panels

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

H. Defueling Valve - Valve Body Installation

SUBTASK 28-26-11-080-002

(1) Remove the covers from the fuel line.

SUBTASK 28-26-11-820-006

(2) Align the index marks on the defueling valve [25] and the valve adapter shaft [26].

NOTE: A small misalignment of the index marks is satisfactory.

SUBTASK 28-26-11-420-010

(3) Engage the defueling valve [25] in the valve adapter shaft [26].

(a) Make sure that the two teeth spaces on the spline of the valve adapter shaft [26] align with the teeth spaces in the rotor on the defueling valve [25].

(b) Make sure that the spline on the valve adapter shaft [26] is correctly engaged with the spline on the rotor of the defueling valve [25].

SUBTASK 28-26-11-420-014

(4) Apply a fillet sealed fay surface bond between the defueling valve [25] and the support bracket [30] (SWPM 20-20-00, Paragraph 2).

(a) Apply sealant, A50110 to the fay surface of the defueling valve [25].

SUBTASK 28-26-11-820-007

(5) Align the defueling valve [25] with the support bracket [30].

SUBTASK 28-26-11-420-011

(6) Install the washers [29] and screws [28] through the support bracket [30] to attach to the defueling valve [25].

(a) Tighten the screws [28] to 35 ±1 in-lb (4 ±0 N·m).

SUBTASK 28-26-11-420-013

(7) Measure the bonding resistance between the defueling valve [25] and the support bracket [30] with an intrinsically safe approved bonding meter, COM-1550 (SWPM 20-20-00).

(a) Make sure that the bonding resistance is 0.01 ohm (10 milliohms) or less.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-26-11-390-003

(8) Apply fillet seals of sealant, A50110 over the heads of the screws [28] on the support bracket [30] (TASK 51-22-00-390-806).

SUBTASK 28-26-11-800-003

(9) Apply protective finish coating, C00307 to the bare metal areas of the support bracket [30] not covered by the fillet seal, and where the electrical bonding probe removed the finishes (TASK 28-11-00-600-801).

SUBTASK 28-26-11-420-012

(10) Connect the flexible full couplings [23] that attach the defueling valve [25] to the fuel line [24] (TASK 28-22-15-400-803).

I. Defueling Valve - Valve Body Installation Test

SUBTASK 28-26-11-010-012

(1) Install this access door:

(TASK 28-11-11-400-801).

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

SUBTASK 28-26-11-710-001

(2) To do an operational test of the defueling valve [25], do these steps:

(a) Add a minimum of 300 lb (136 kg) to the No. 1 main tank (TASK 12-11-00-650-803).

(b) Make sure the defueling valve [25] is in the closed position.

1) Transfer a minimum of 100 lb (45 kg) from the No. 1 main tank to the No. 2 main tank (TASK 28-26-00-650-802).

(c) Monitor the fuel quantity indicators for the No. 1 and the No. 2 main tanks for five minutes.

(d) Make sure on the P5-2 Fuel System Module that all fuel boost pumps are OFF and the fuel crossfeed valve is closed.

(e) Make sure that there is no fuel transfer as shown by the fuel quantity indicating system.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FUEL QUANTITY INDICATING SYSTEM (FQIS) - ADJUSTMENT/TEST

1. General

A. This procedure has these tasks for the fuel quantity indicating system (FQIS):

(1) Fuel Quantity Indicating System - Operational Test

(2) Fuel Quantity Indicating System (FQIS) with the Fuel Measuring Sticks - Comparison Check

(3) Fuel Quantity Indicating System - Dry Capacitance Test

B. The operational test makes sure the FQIS operates correctly.

C. The comparison check makes sure the fuel quantity shown agrees with the correct quantity of fuel in the fuel tanks.

D. The dry capacitance test makes sure that 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. Fuel Quantity Indicating System - Operational Test

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This procedure contains:

(a) A check of the fuel quantity indicators on the P15 Refuel Panel.

(b) A fuel quantity BITE procedure to be done from the Control Display Unit (CDU) in the flight compartment.

(2) The preselect fuel quantity indicator is referred to as the refuel quantity indicator in this procedure.

B. References

Reference	Title
IFIM and do the applicable procedure(s)	Interactive Fault Isolation Manual

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 Valve Door - Slat Station 125

E. Check of the Fuel Quantity Indicators

(Figure 501)

SUBTASK 28-41-00-010-001

(1) Open this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-41-00-210-001

(2) Make sure that the display on each refuel quantity indicator shows the quantity of fuel in each fuel tank.

SUBTASK 28-41-00-710-001

(3) On the P15 Refuel Panel, select and hold the fueling indication test switch to the TEST GAUGES position.

(a) Make sure that 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 that the display on each refuel quantity indicator shows the quantity of fuel in each fuel tank.

SUBTASK 28-41-00-410-001

(5) Close this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

F. 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) 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 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) Go to the IFIM and do the applicable procedure(s) for each maintenance message.

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.

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3) If NO PRESENT FAULTS shows on the CURRENT STATUS display, then continue. No current faults are found in the system.

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 to the YES prompt to make sure 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.

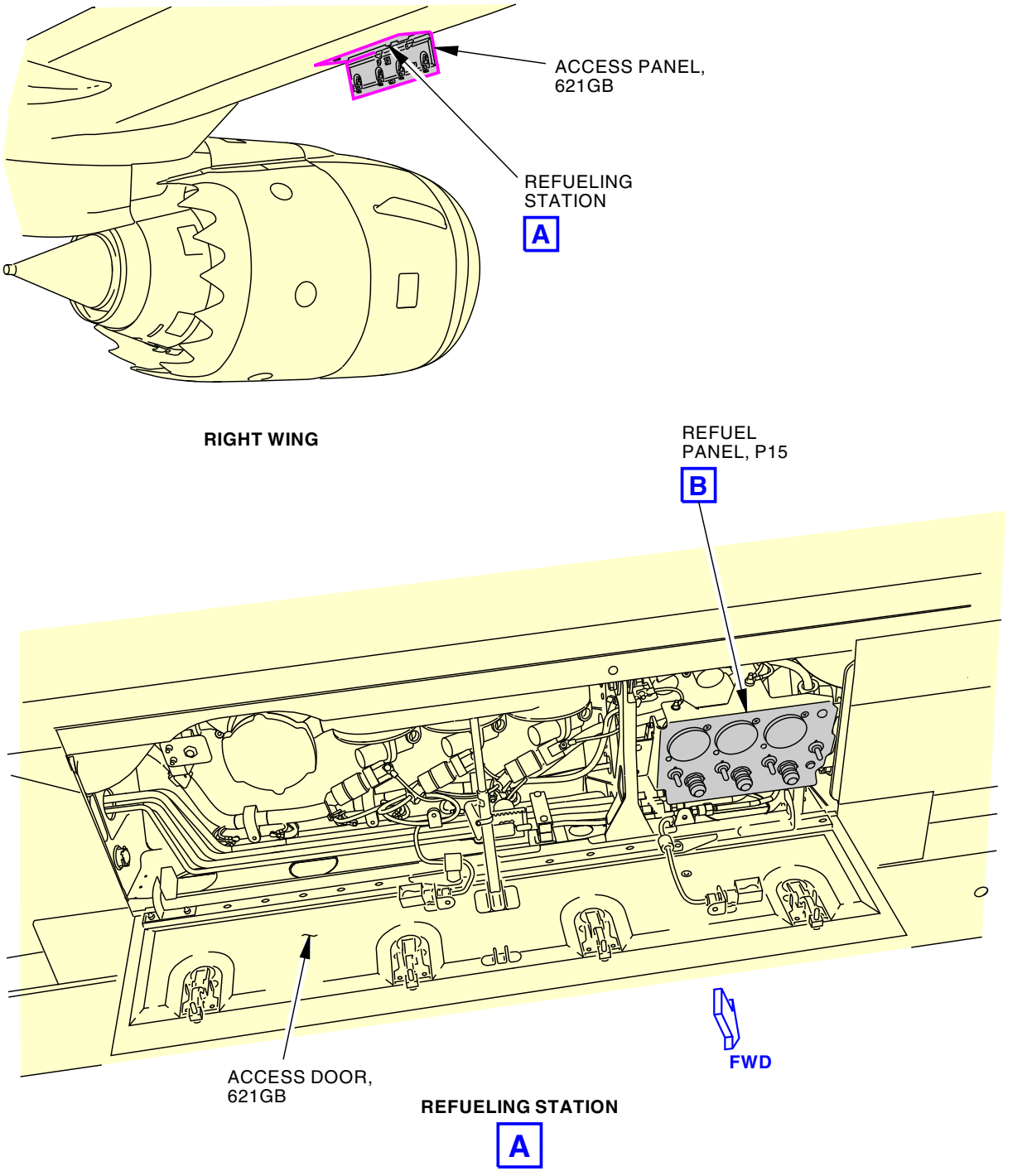
4) If the display shows GROUND TEST COMPLETE FAIL, go to the IFIM and do the applicable procedure(s) for each maintenance message.

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.

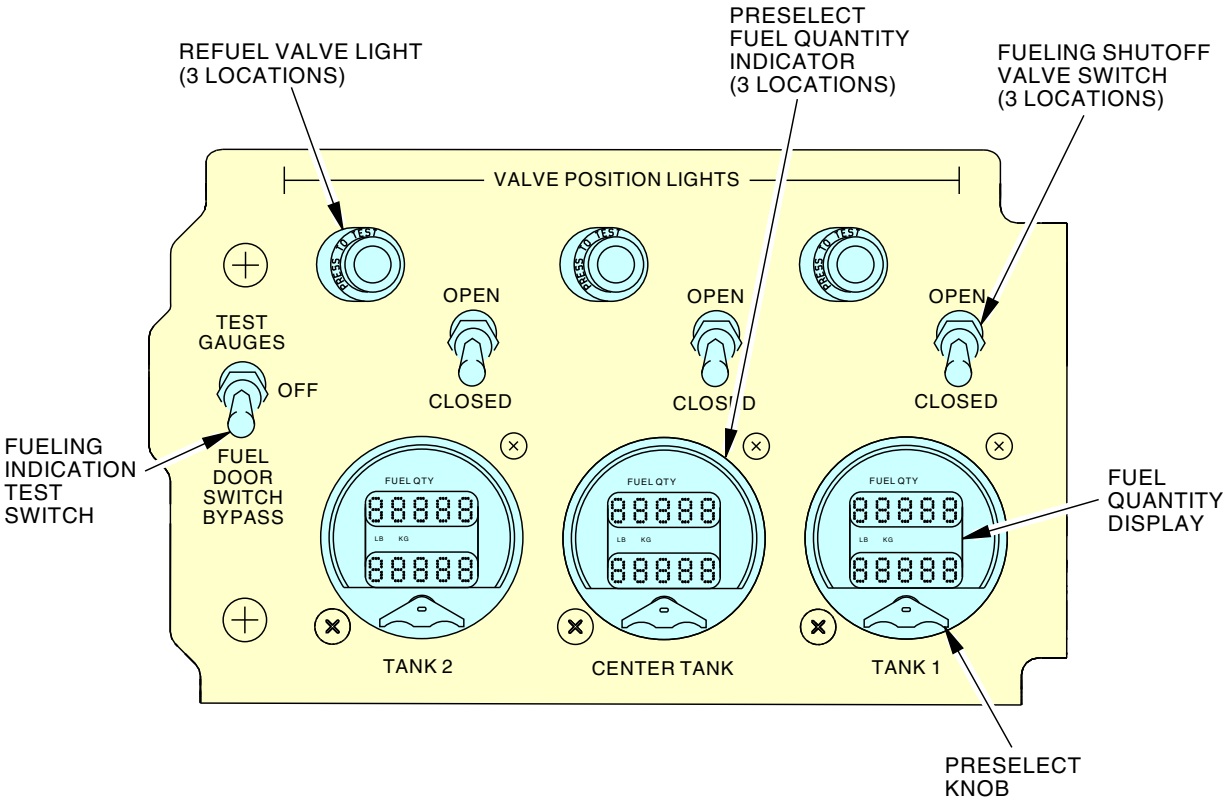
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Refuel Panel
Figure 501/28-41-00-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



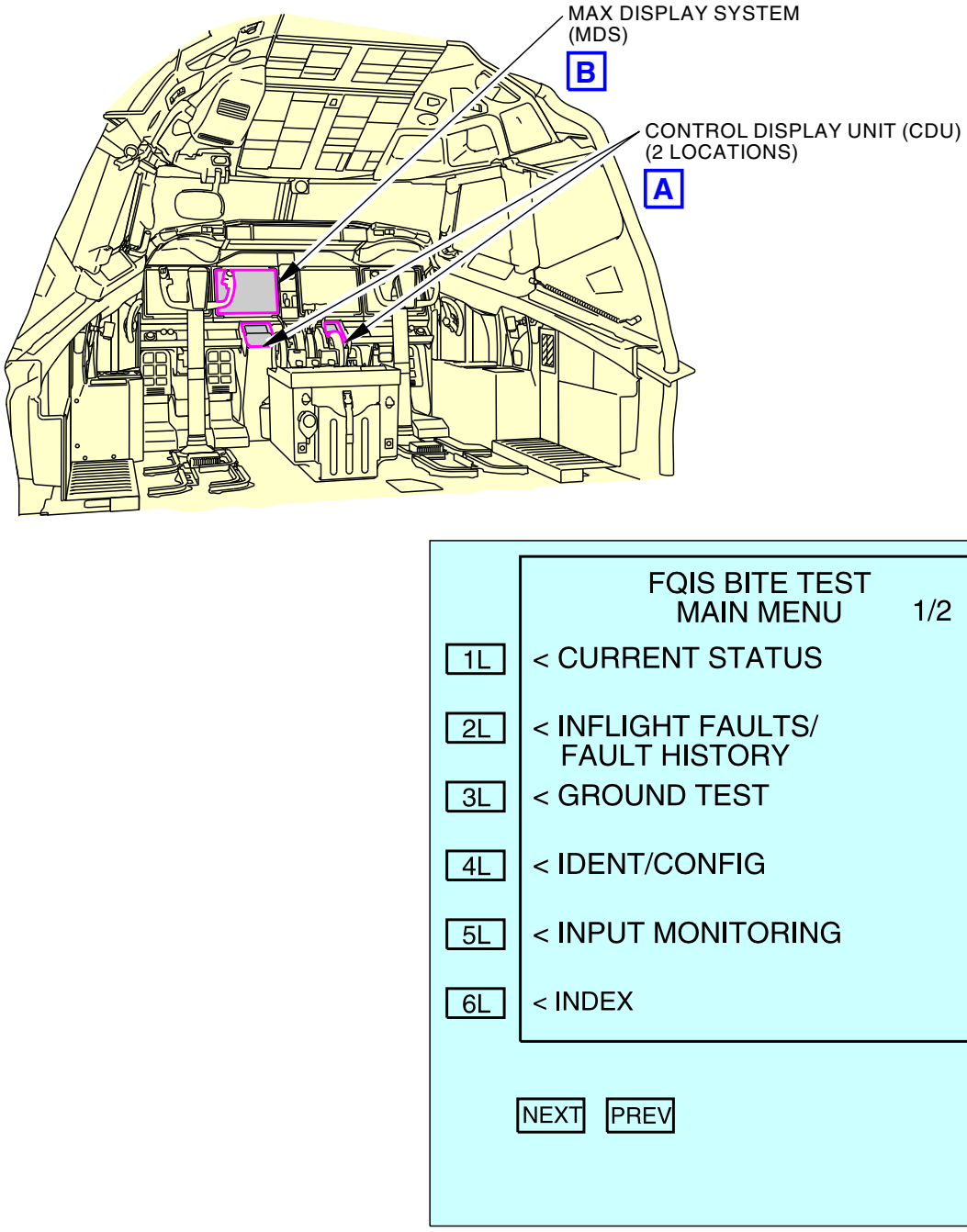
REFUEL PANEL, P15

B

2563930 S0000612581_V1

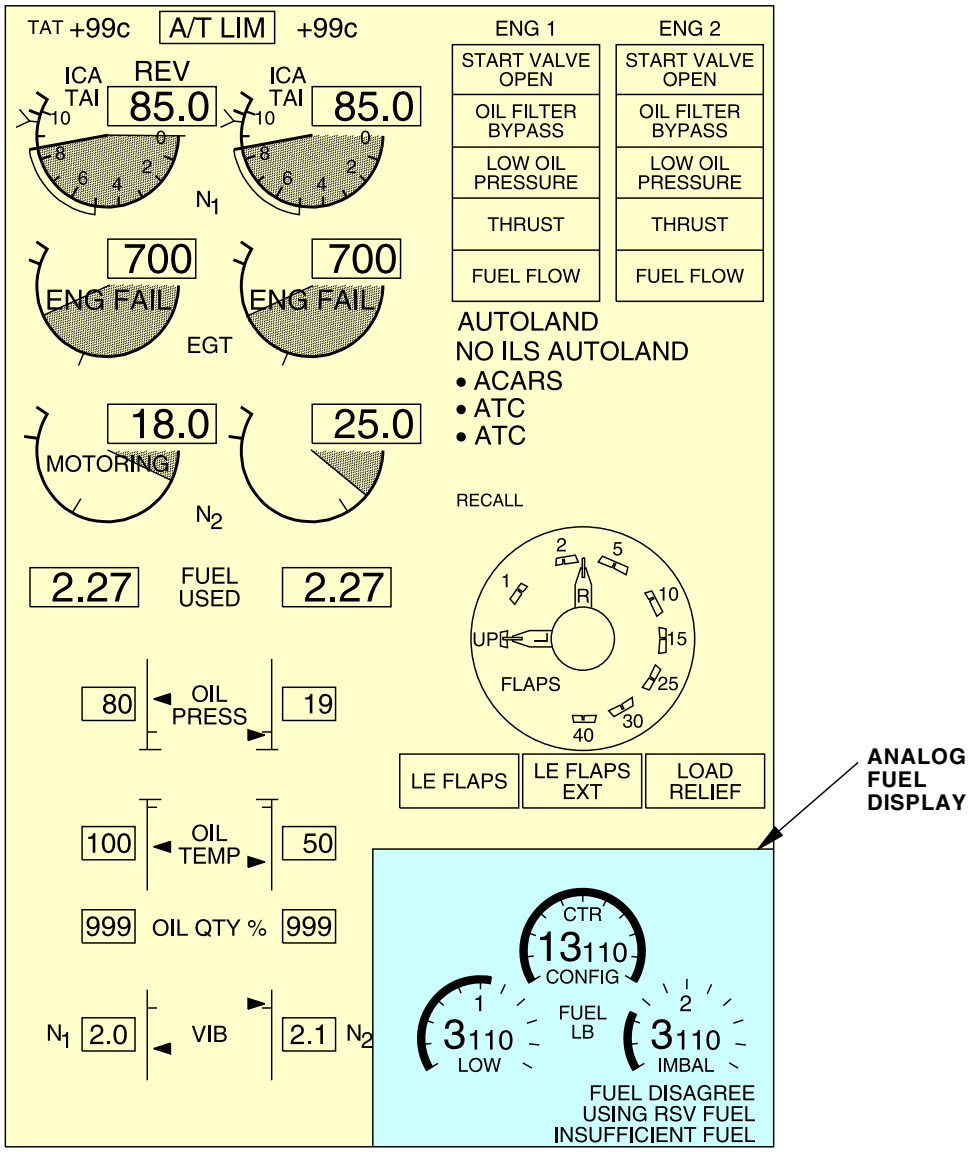
Refuel Panel
Figure 501/28-41-00-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fuel Quantity Indicating System Test
Figure 502/28-41-00-990-802 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



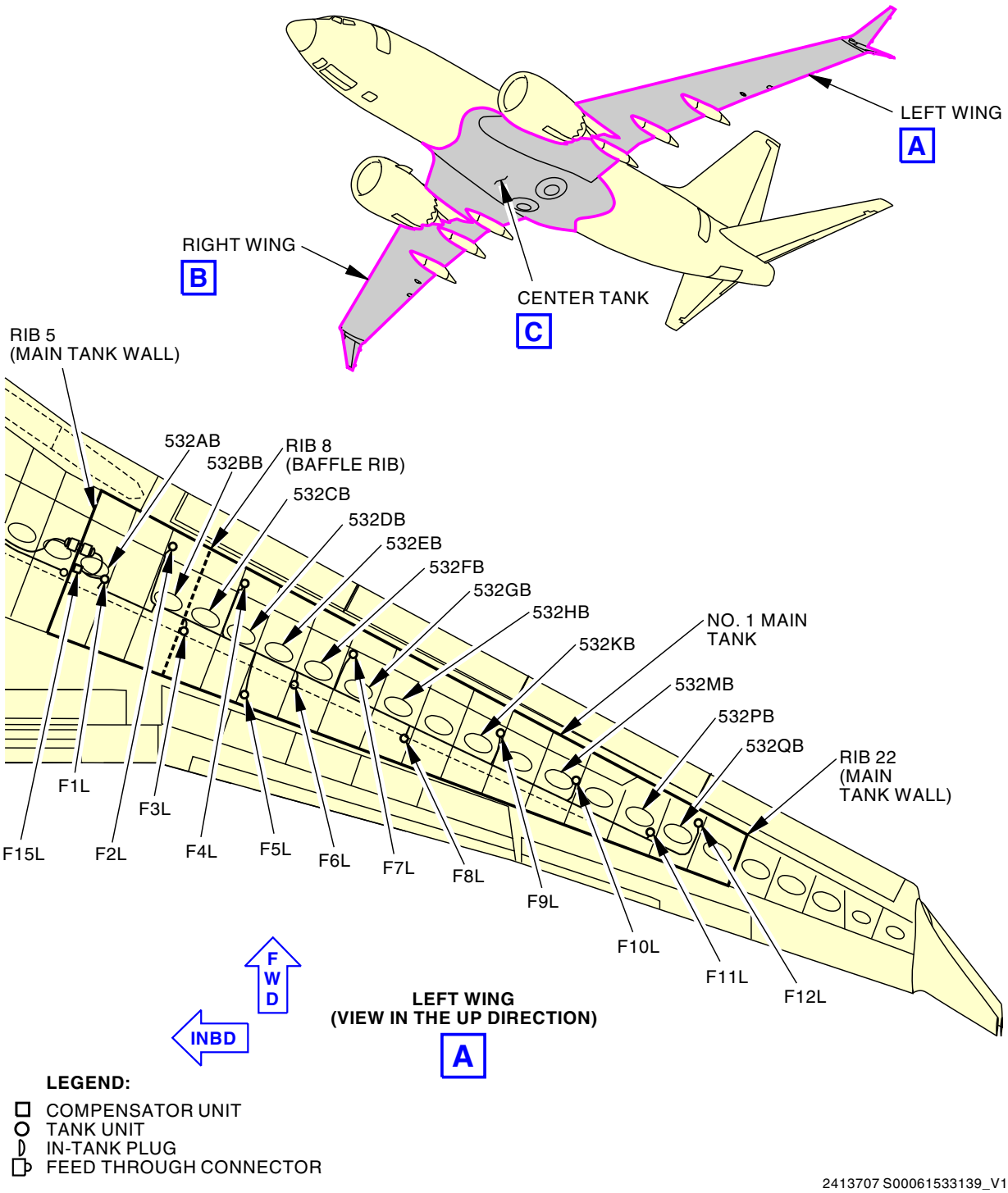
MAX DISPLAY SYSTEM (MDS)

B

2506931 S0000590326_V1

Fuel Quantity Indicating System Test
Figure 502/28-41-00-990-802 (Sheet 2 of 2)

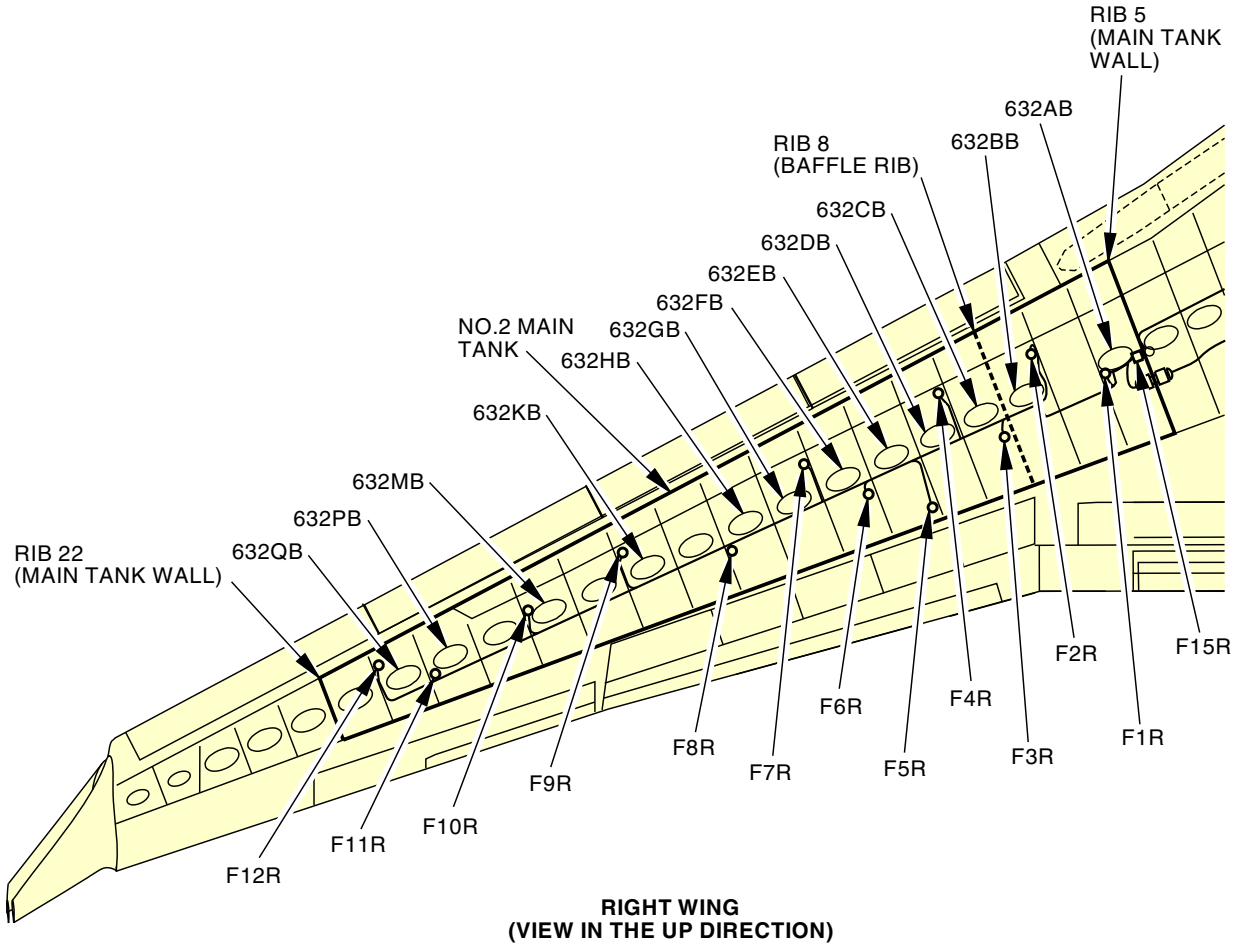
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413707 S00061533139_V1

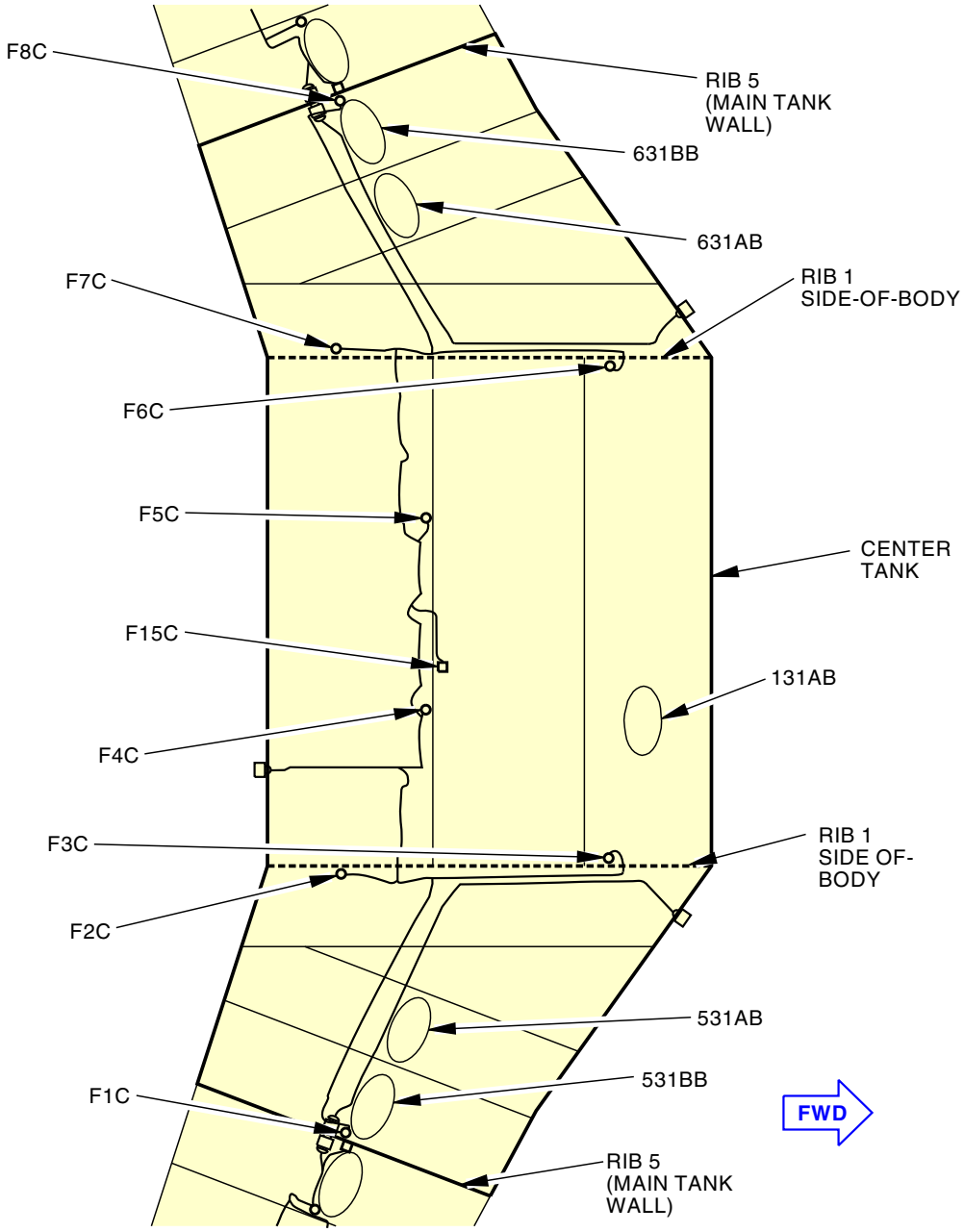
Fuel Quantity Indicating System
Figure 503/28-41-00-990-803 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fuel Quantity Indicating System
Figure 503/28-41-00-990-803 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



LEGEND:

- COMPENSATOR UNIT
- TANK UNIT
- IN-TANK PLUG
- FEED THROUGH CONNECTOR

CENTER TANK
(VIEW IN THE UP DIRECTION)

C

2545704 S0000604532_V1

Fuel Quantity Indicating System
Figure 503/28-41-00-990-803 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-41-00-720-801

3. Fuel Quantity Indicating System (FQIS) with the Fuel Measuring Sticks - Comparison Check

A. General

(1) This procedure contains:

(a) A comparison check of the FQIS with the fuel measuring sticks.

(2) The preselect fuel quantity indicator is referred to as the fuel quantity indicator in this procedure.

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (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. Access Panels

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

E. Fuel Quantity Indicating System (FQIS) with the Fuel Measuring Sticks - Comparison Check

SUBTASK 28-41-00-010-002

(1) Open this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-41-00-650-001

(2) Make sure that 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) Refuel the fuel tank (if it is necessary) (TASK 12-11-00-650-803).

SUBTASK 28-41-00-970-001

(3) Use the fuel measuring sticks to calculate the fuel quantity for each fuel tank.

SUBTASK 28-41-00-220-001

(4) Make sure that the difference between the calculated fuel quantity (with the fuel measuring sticks) for each tank and the fuel quantity shown on the fuel quantity indicators on the P15 Refuel Panel and the MAX display system 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

(5) Close this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

——— END OF TASK ———

TASK 28-41-00-730-801

4. Fuel Quantity Indicating System - Dry Capacitance Test

A. General

(1) The fuel quantity processor unit will do a capacitance test of the fuel tank units and compensators.

NOTE: This test is a dry capacitance test (no fuel in the tank).

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
12-11-00-650-807	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 - Insulation Resistance and Dry Capacitance Check (P/B 501)

C. Location Zones

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

D. Dry Capacitance Test in the Main Equipment Center (No Fuel in the Tank)

SUBTASK 28-41-00-740-002

(1) Do this task: Fuel Quantity Indicating System - Operational Test, TASK 28-41-00-710-801.

(a) If the BITE test shows faults, then do the corrective procedure for the fault shown.

(b) If the BITE test does not show faults, then continue.

SUBTASK 28-41-00-650-002

(2) Defuel the applicable fuel tank or transfer fuel out of the applicable tank (TASK 28-26-00-650-801 or TASK 28-26-00-650-802).

SUBTASK 28-41-00-650-003

(3) Drain the fuel from the applicable fuel tank (TASK 12-11-00-650-807).

SUBTASK 28-41-00-730-001

(4) On the Control Display Unit (CDU), push the line-select key adjacent 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 adjacent to the FQIS prompt.

(b) Push the line select key adjacent to the INPUT MONITORING prompt.

(c) Push the NEXT key to get to the second INPUT MONITORING page.

(d) Make sure that the quantities shown below TANK UNIT CAP are in this range for the applicable tank:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) No. 1 Main Tank and No. 2 Main Tank: 422.00 pf maximum/403.70 pf minimum

2) Center Tank: 756.40 pf maximum/737.40 pf minimum

(e) Make sure that the quantities shown below 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 main tank, No. 2 main tank, 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: Fuel Quantity Indicating System - Operational Test, 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 do the tank unit and compensator test from the wing spar to isolate the problem (TASK 28-41-21-710-801).

SUBTASK 28-41-00-650-004

(6) If no more tests are necessary, refuel the applicable tank (TASK 12-11-00-650-803).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TANK AND COMPENSATOR UNITS - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) Tank Unit or Compensator Unit Removal

(2) Tank Unit or Compensator Unit Installation.

B. The access to the tank units or compensator units is different for each unit.

TASK 28-41-21-000-801

2. Tank Unit or Compensator Unit - Removal

(Figure 401)

A. General

(1) This task gives instructions to remove the tank unit or the compensator unit.

B. 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)

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
131AB	Center Tank Access
532AB	Main Tank Access Door - Wing Station 216
632AB	Main Tank Access Door - Wing Station 216

E. Prepare for the Removal

SUBTASK 28-41-21-860-002

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the applicable fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) To access the applicable compensator, remove the applicable access doors:

(TASK 28-11-31-000-801 or TASK 28-11-11-000-801)

Number	Name/Location
131AB	Center Tank Access

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Number	Name/Location
532AB	Main Tank Access Door - Wing Station 216
632AB	Main Tank Access Door - Wing Station 216

(b) To access the tank units, remove the applicable access doors (TASK 28-11-31-000-801 or TASK 28-11-11-000-801).

SUBTASK 28-41-21-860-013

(2) 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

F. Tank Unit or Compensator Unit Removal

SUBTASK 28-41-21-020-001

(1) Remove the captive screw [18], plain washer [19], and relief clamp [20] from the terminal block.

SUBTASK 28-41-21-020-002

(2) Disconnect the electrical cable from the terminal block:

(a) Remove the self-locking insert [14], washer [15], and HI-Z wire [16].

(b) Remove the self-locking insert [24], washer [25], and HI-Z shield wire [23].

(c) Remove the self-locking insert [22], washer [21], and LO-Z wire [17].

(d) Remove the electrical cable from the terminal block.

SUBTASK 28-41-21-020-003

(3) Remove the two screws [10] and washers [11] that secures the fixed mounting bracket [12] to the structure.

SUBTASK 28-41-21-020-004

(4) Remove the two screws [10] and washers [11] that secures the rotating mounting bracket [13] to the structure.

SUBTASK 28-41-21-020-005

CAUTION

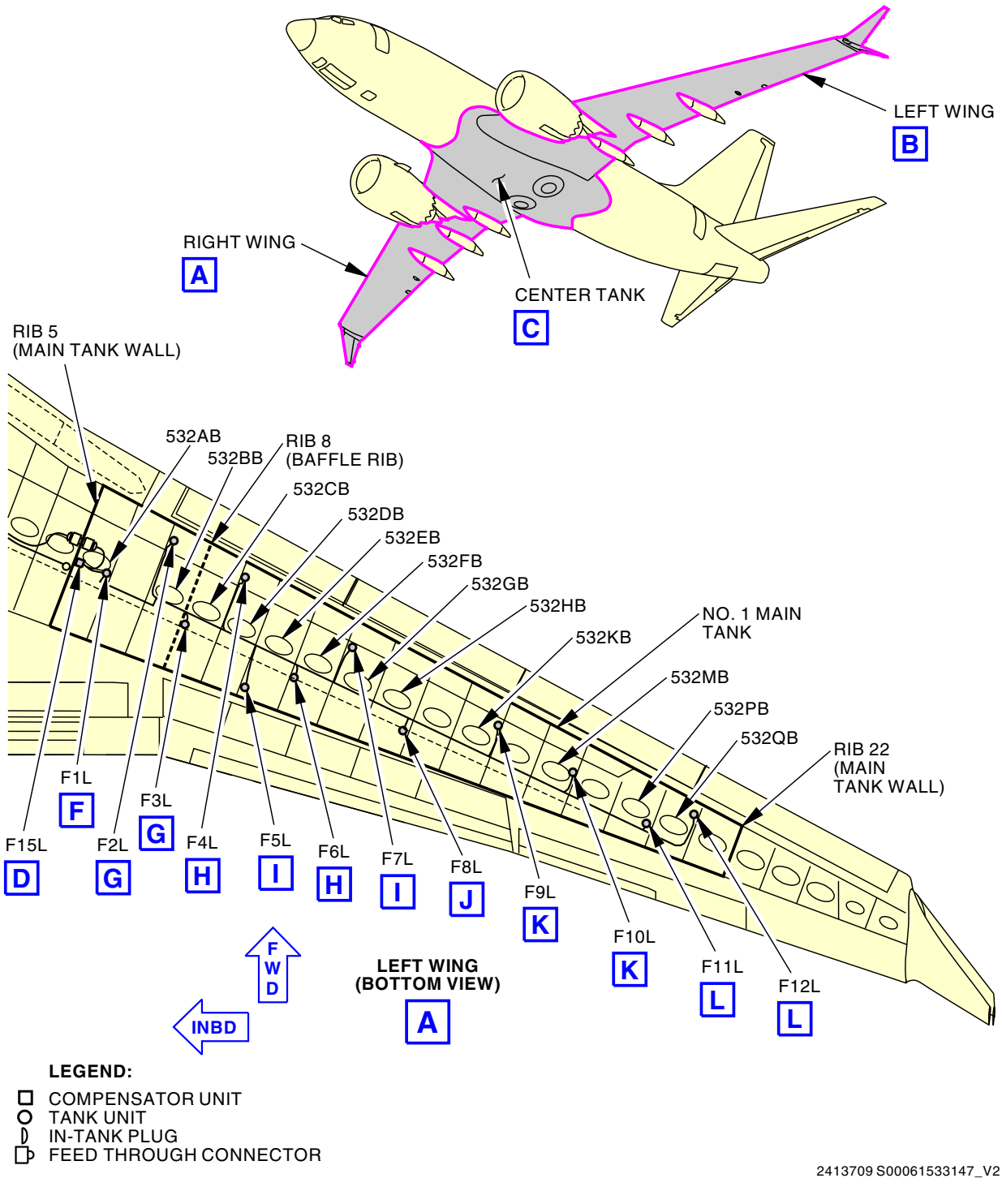
MOVE THE TANK UNITS AND THE COMPENSATOR UNITS CAREFULLY. YOU CAN CAUSE DAMAGE TO THE PROPERTIES OF THE TANK UNITS AND THE COMPENSATOR UNIT.

(5) Remove the compensator unit [1], tank unit [2], tank unit [3], tank unit [4], tank unit [5], tank unit [6], tank unit [7], tank unit [8] , or tank unit [9].

(a) If it is necessary, clean the tank unit [2], tank unit [3], tank unit [4], tank unit [5], tank unit [6], tank unit [7], tank unit [8], tank unit [9], or compensator unit [1], do this task: Reference Not Currently Available.

END OF TASK

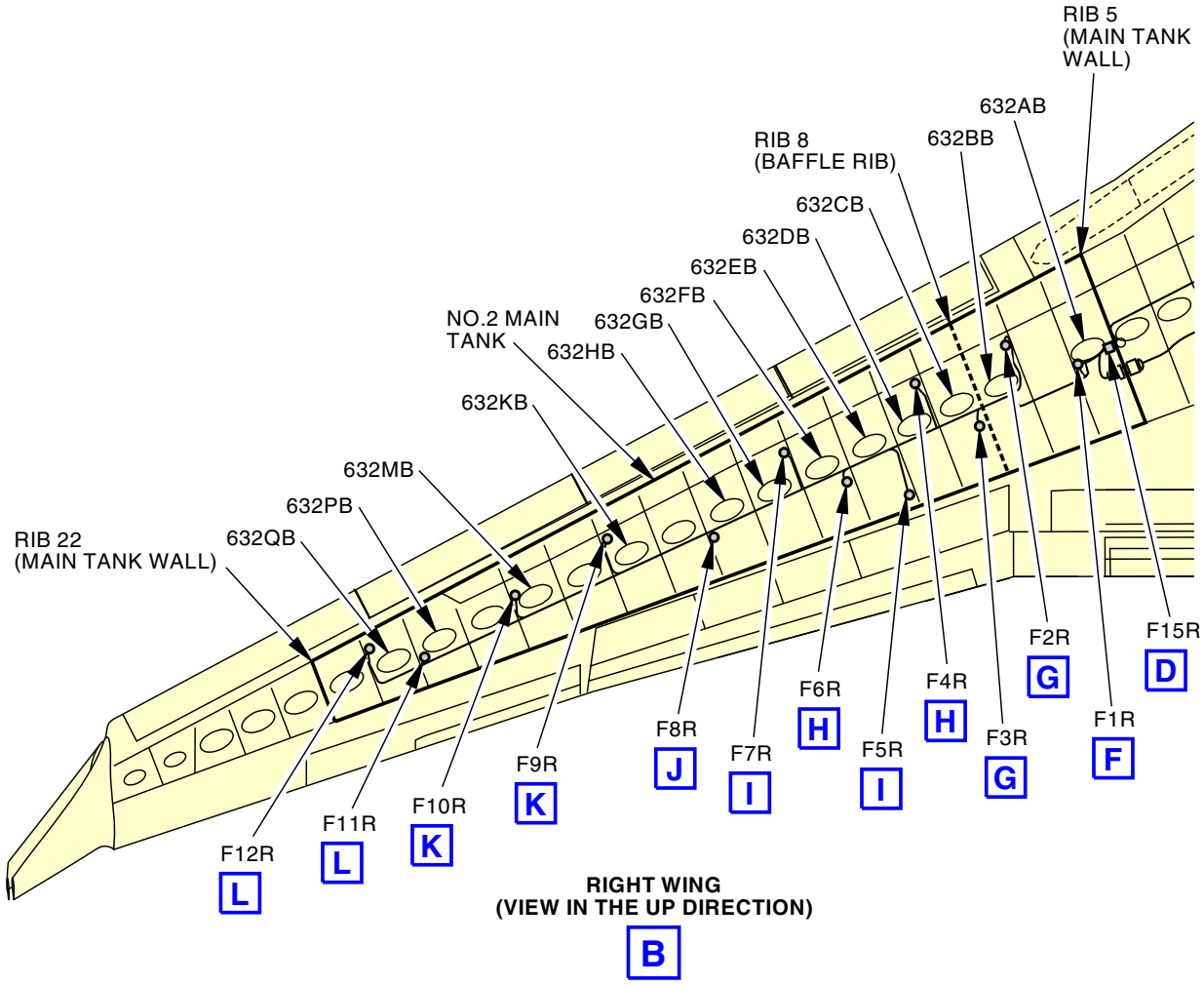
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413709 S00061533147_V2

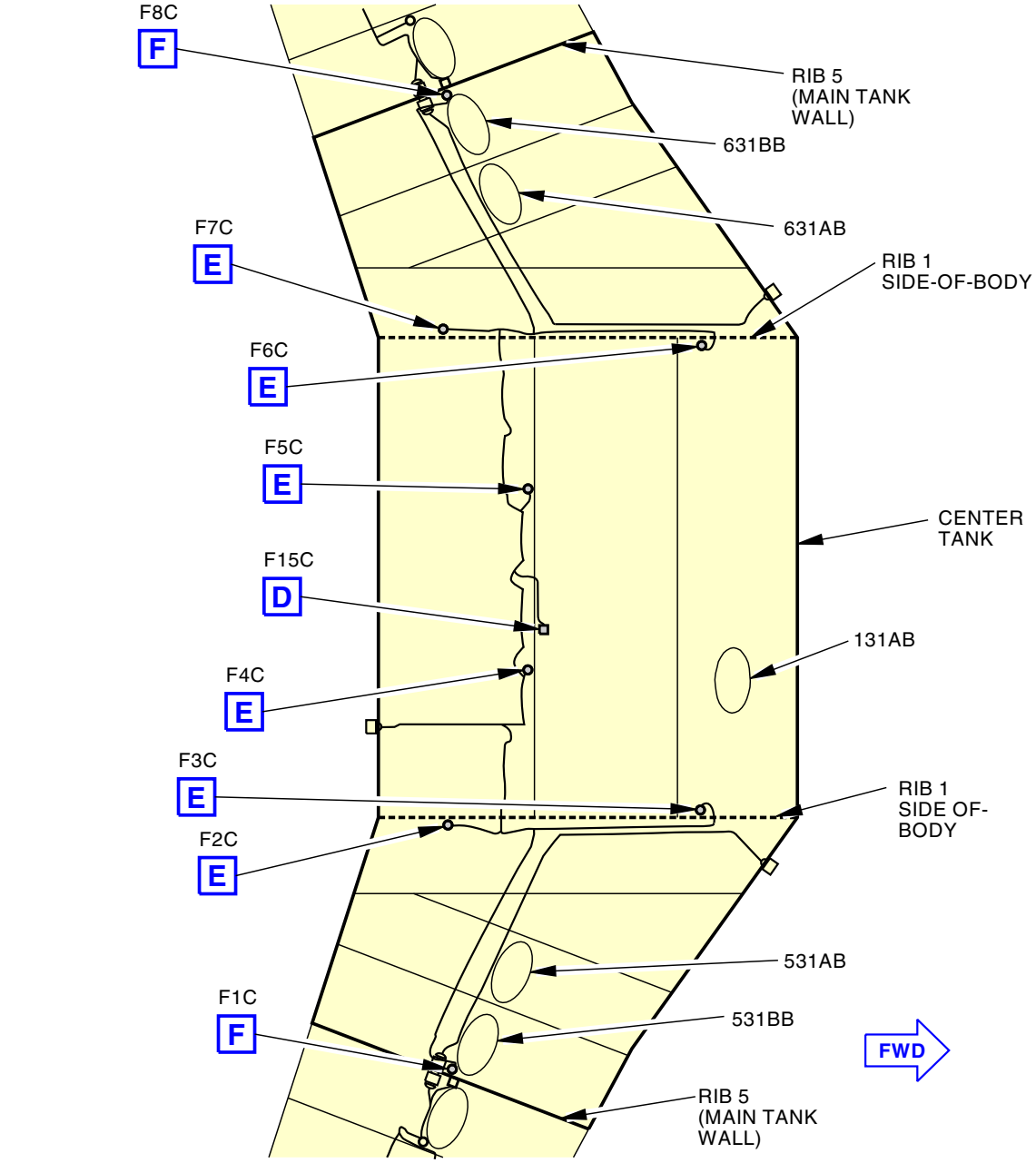
Tank and Compensator Unit Installation
Figure 401/28-41-21-990-801 (Sheet 1 of 8)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



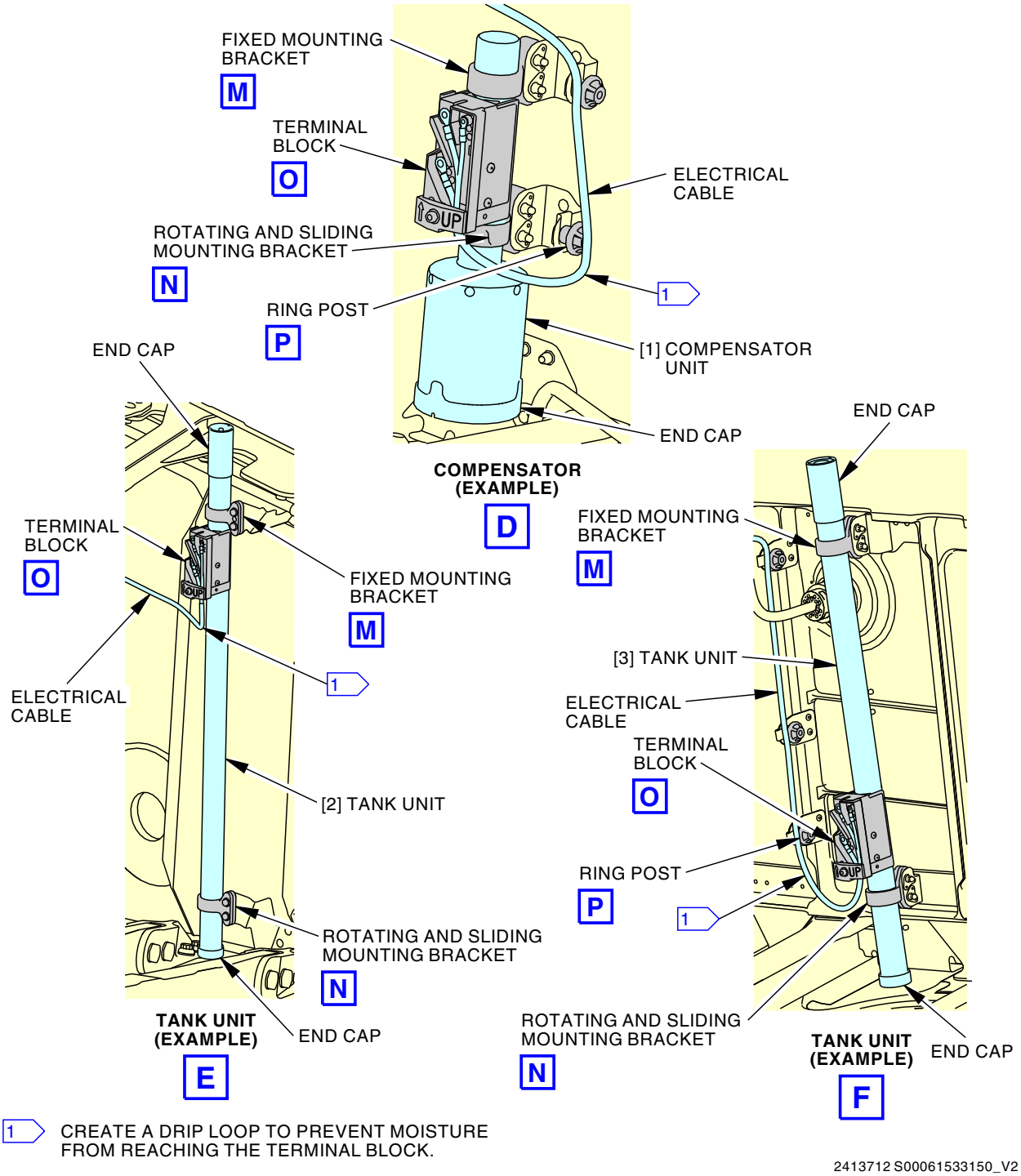
Tank and Compensator Unit Installation
Figure 401/28-41-21-990-801 (Sheet 2 of 8)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



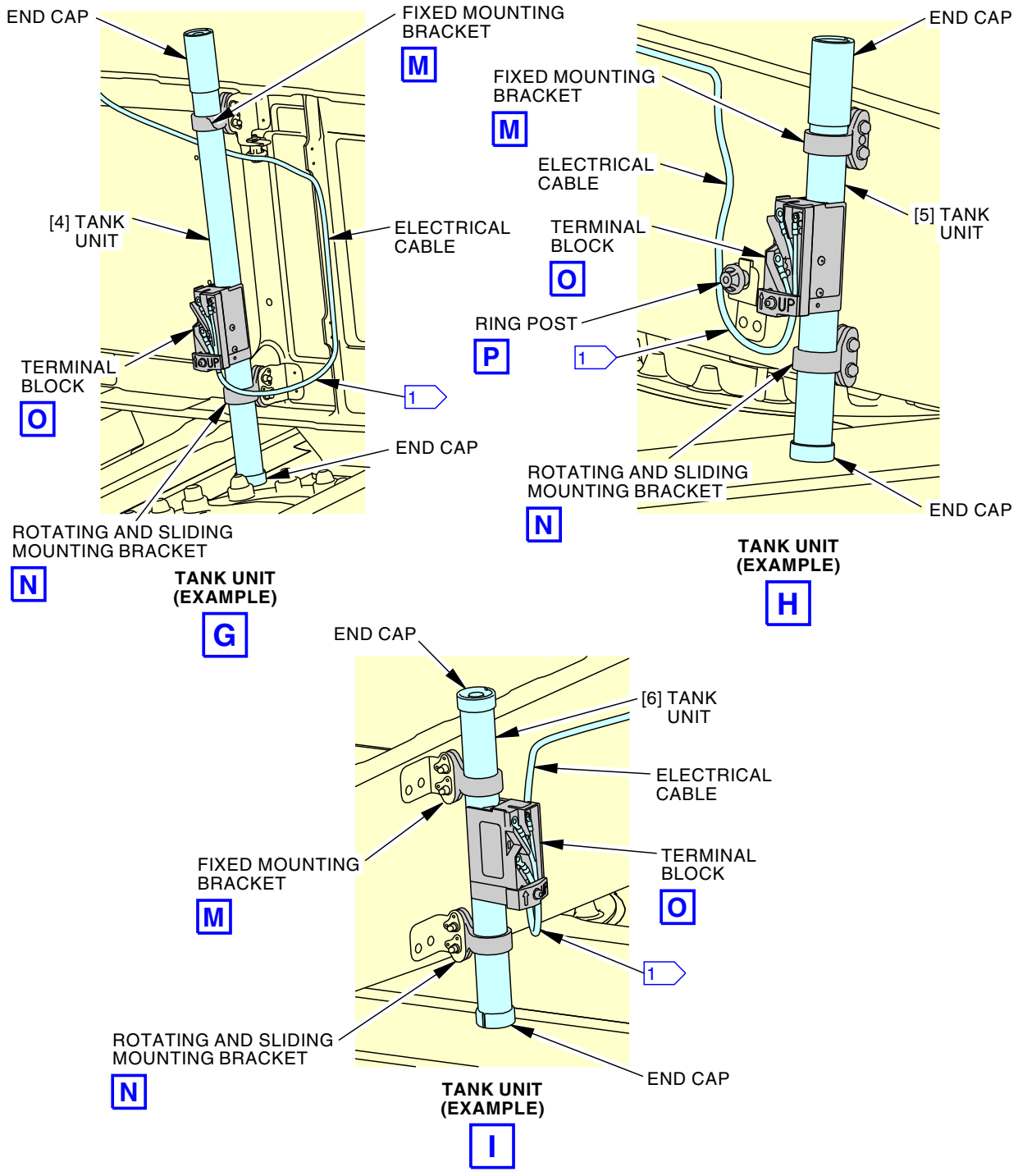
Tank and Compensator Unit Installation
Figure 401/28-41-21-990-801 (Sheet 3 of 8)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Tank and Compensator Unit Installation
Figure 401/28-41-21-990-801 (Sheet 4 of 8)

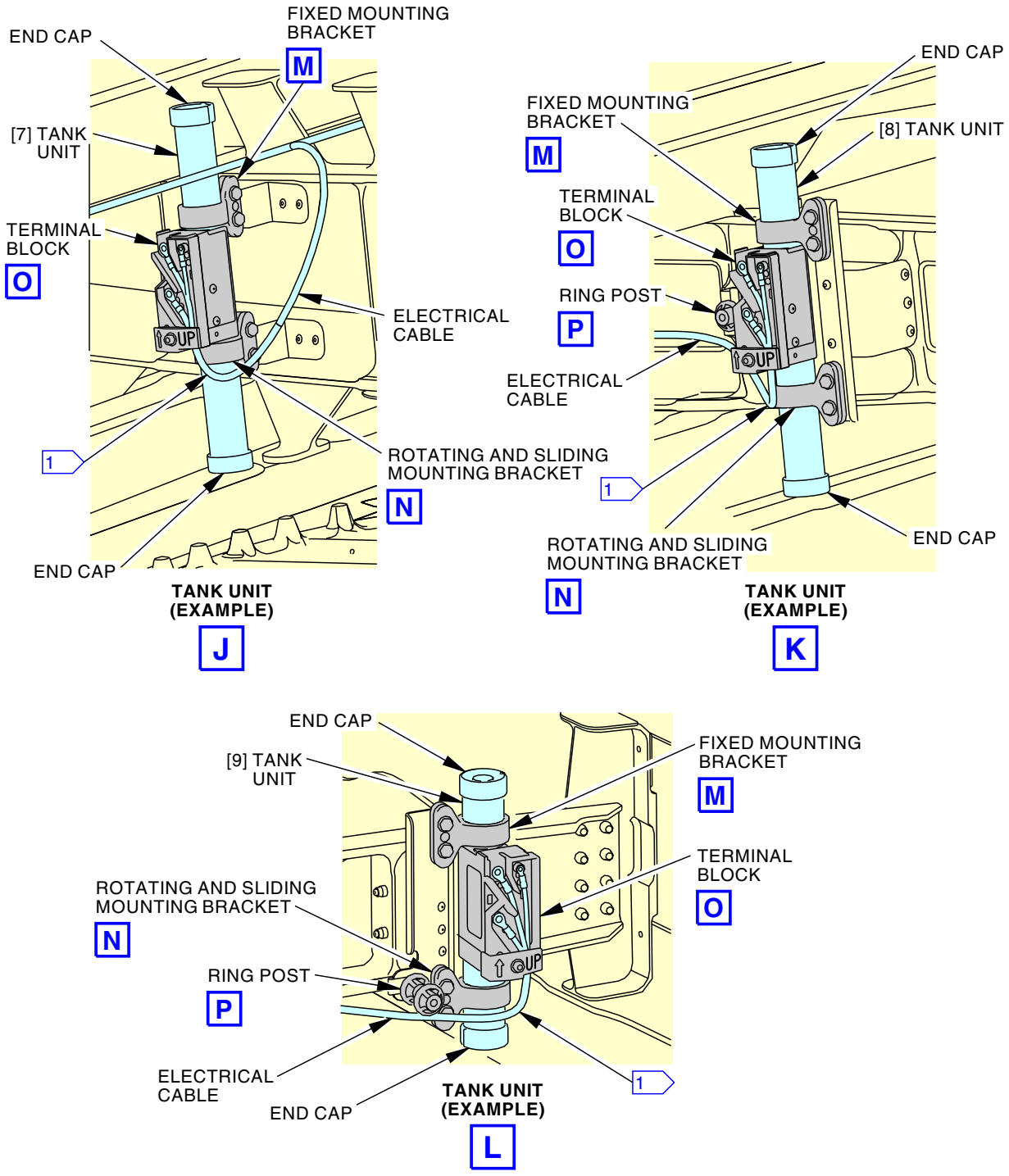
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2461982 S0000570990_V3

Tank and Compensator Unit Installation
Figure 401/28-41-21-990-801 (Sheet 5 of 8)

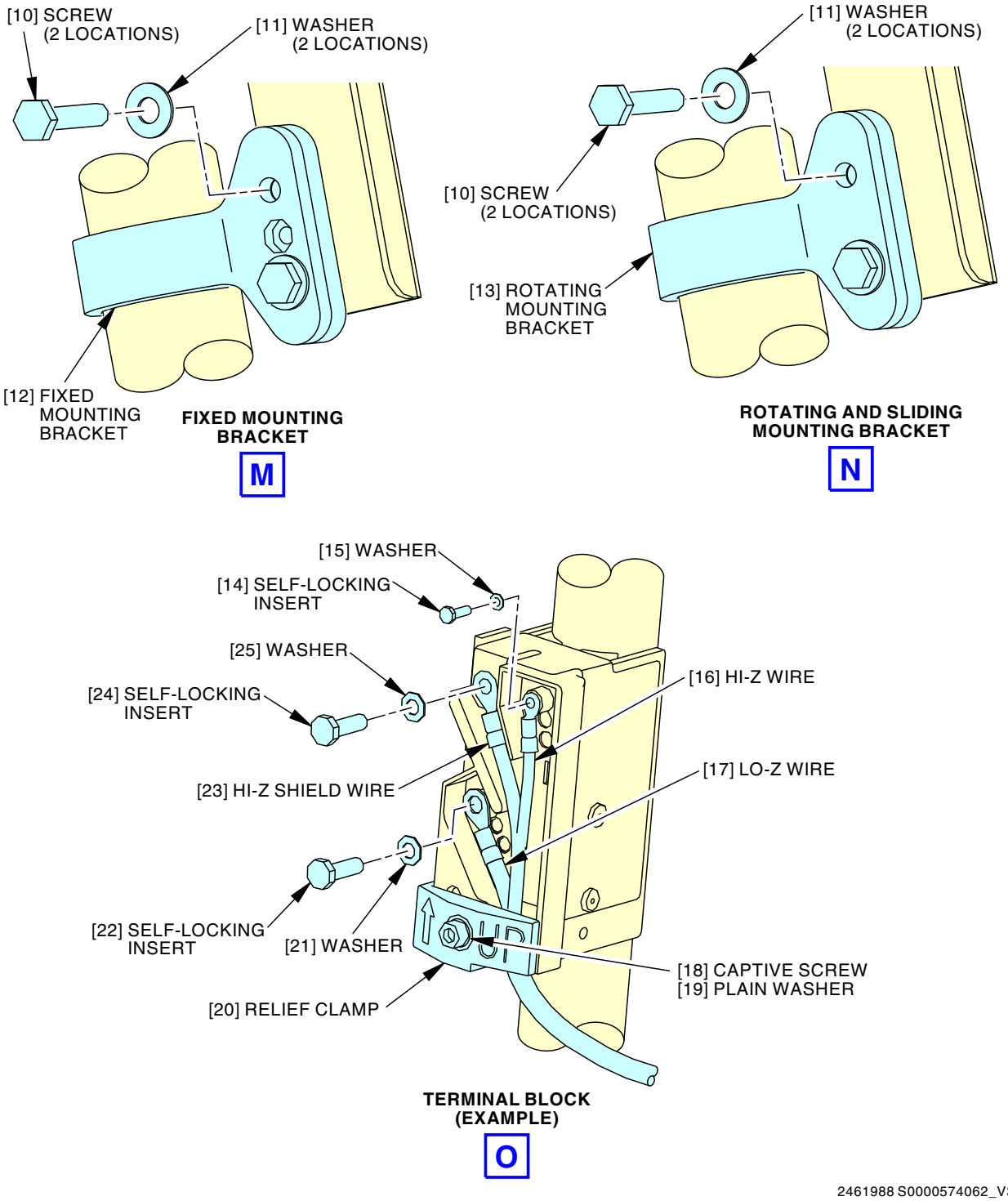
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2461983 S0000570991_V3

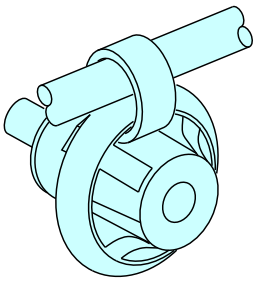
Tank and Compensator Unit Installation
Figure 401/28-41-21-990-801 (Sheet 6 of 8)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



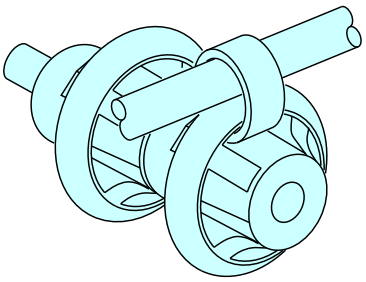
Tank and Compensator Unit Installation
Figure 401/28-41-21-990-801 (Sheet 7 of 8)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



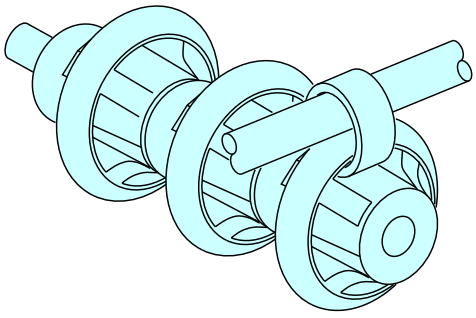
SINGLE RING POST
(EXAMPLE)

P



DOUBLE RING POST
(EXAMPLE)

P



TRIPLE RING POST
(EXAMPLE)

P

2504433 S0000587281_V1

Tank and Compensator Unit Installation
Figure 401/28-41-21-990-801 (Sheet 8 of 8)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-41-21-400-801

3. Tank Unit or Compensator Unit - Installation

(Figure 401)

A. General

(1) This task has one or more steps which are controlled by Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-09 and 28-AWL-30.

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-41-00-730-801	Fuel Quantity Indicating System - Dry Capacitance Test (P/B 501)
SWPM 20-10-12	WIRE HARNESS SUPPORTS
SWPM 20-10-19	WIRE SEPARATION

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Compensator unit	28-41-21-01-015	SIA ALL
		28-41-21-05-020	SIA ALL
		28-41-21-10-020	SIA ALL
2	Tank unit	28-41-21-01-020	SIA ALL
		28-41-21-01-025	SIA ALL
		28-41-21-05-025	SIA ALL
		28-41-21-10-025	SIA ALL
3	Tank unit	28-41-21-05-030	SIA ALL
		28-41-21-05-035	SIA ALL
		28-41-21-10-030	SIA ALL
		28-41-21-10-035	SIA ALL
4	Tank unit	28-41-21-05-040	SIA ALL
		28-41-21-05-045	SIA ALL
		28-41-21-10-040	SIA ALL
		28-41-21-10-045	SIA ALL
5	Tank unit	28-41-21-05-050	SIA ALL
		28-41-21-05-060	SIA ALL
		28-41-21-10-050	SIA ALL
		28-41-21-10-060	SIA ALL

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

AMM Item	Description	AIPC Reference	AIPC Effectivity
6	Tank unit	28-41-21-05-055	SIA ALL
		28-41-21-05-065	SIA ALL
		28-41-21-10-055	SIA ALL
		28-41-21-10-065	SIA ALL
7	Tank unit	28-41-21-05-070	SIA ALL
		28-41-21-10-070	SIA ALL
8	Tank unit	28-41-21-05-075	SIA ALL
		28-41-21-05-080	SIA ALL
		28-41-21-10-075	SIA ALL
		28-41-21-10-080	SIA ALL
9	Tank unit	28-41-21-05-085	SIA ALL
		28-41-21-10-085	SIA 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
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. Tank Unit Installation

SUBTASK 28-41-21-980-001

(1) Put the applicable tank unit in its position.

NOTE: The tank unit [2], tank unit [3], tank unit [4], tank unit [5], tank unit [6], tank unit [7], tank unit [8], and tank unit [9] is referred to as applicable tank unit in this task.

(a) Make sure that the arrow, on the terminal block, points to the upper wing skin.

28-AWL-30: CDCCL

(b) Make sure that the applicable tank unit has the end caps (upper and lower) installed.

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-30.

SUBTASK 28-41-21-420-001

(2) Close the fixed mounting bracket [12] with your hand, around the applicable tank unit.

NOTE: The fixed mounting bracket [12] needs to be replaced when the bracket cannot be closed with your hand.

(a) Make sure that the tab inside the fixed mounting bracket [12] is seated in the orientation hole on the applicable tank unit.

(b) Make sure that the terminal block face points away from the spanwise beams, ribs, or other structures.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(c) Install the screws [10] and washers [11] to secure the applicable tank unit to the bracket.

SUBTASK 28-41-21-420-002

(3) Close the rotating mounting bracket [13] with your hand around the applicable tank unit.

NOTE: The rotating mounting bracket [13] needs to be replaced when the bracket cannot be closed with your hand.

(a) Install the screws [10] and washers [11] to attach the applicable tank unit to the bracket.

SUBTASK 28-41-21-220-001

(4) Do a check for these gaps:

28-AWL-30: CDCCL

(a) Make sure that the gap between the tank unit end caps and the upper and lower fuel tank structure is 0.2 in. (5 mm) or more.

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-30.

28-AWL-30: CDCCL

(b) Make sure that the gap between the side of the tank unit and the fuel tank structure is 0.25 in. (6.4 mm) or more.

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-30.

SUBTASK 28-41-21-420-003

(5) Connect the electrical cable to the terminal block (SWPM 20-10-12, SWPM 20-10-19).

(a) Attach the relief clamp [20], electrical cable, captive screw [18], and plain washer [19] loosely to the terminal block.

(b) Adjust the electrical cable, accounting for slack in all directions, to maintain a clearance of 0.5 in. (12.7 mm) between the electrical cable and components or structure.

(c) When a clearance of 0.5 in. (12.7 mm) between the electrical cable and components or structure is not possible, do this step:

28-AWL-09: CDCCL

1) Make sure the clearance between the wires and structure, accounting for slack in all directions, is a minimum of 0.250 in. (6.4 mm).

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-09.

(d) Tighten the captive screw [18] to 18.5 ±1.5 in-lb (2.09 ±0.17 N·m).

SUBTASK 28-41-21-420-004

(6) Install the self-locking insert [14], washer [15], and HI-Z wire [16] to the terminal block.

(a) Tighten the self-locking insert [14] to 13.5 ±1.5 in-lb (1.53 ±0.17 N·m).

(b) Make sure that the self-locking insert [14] holds the terminal tightly and the HI-Z wire [16] does not turn.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-41-21-420-005

(7) Install the self-locking insert [24], washer [25], and HI-Z shield wire [23] to the terminal block.

(a) Tighten the self-locking insert [24] to 17.5 ±2.5 in-lb (1.98 ±0.29 N·m).

(b) Make sure that the self-locking insert [24] holds the terminal tightly and the HI-Z shield wire [23] does not turn.

SUBTASK 28-41-21-420-006

(8) Install the self-locking insert [22], washer [21], and LO-Z wire [17] to the terminal block.

(a) Tighten the LO-Z wire [17] to 30 ±5 in-lb (3.4 ±0.6 N·m).

(b) Make sure that the self-locking insert [22] holds the terminal tightly and the LO-Z wire [17] does not turn.

SUBTASK 28-41-21-210-001

(9) Make sure that the electrical cable has a drip loop.

NOTE: With no drip loop, water drops can collect on the electrical cable and fall on the electrical terminals. The drip loop prevents damage to the tank unit.

F. Compensator Unit Installation

SUBTASK 28-41-21-980-002

(1) Put the applicable compensator unit [1] in its position.

(a) Make sure that the arrow, on the terminal block, points to the upper wing skin.

28-AWL-30: CDCCL

(b) Make sure that the lower end-cap is installed on the compensator unit [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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-30.

SUBTASK 28-41-21-420-007

(2) Close the fixed mounting bracket [12] with your hand, around the compensator unit [1].

NOTE: The fixed mounting bracket [12] needs to be replaced when the bracket cannot be closed with your hand.

(a) Make sure that the tab on the fixed mounting bracket [12] is seated correctly in the orientation hole on the compensator unit [1].

(b) Make sure that the terminal block points away from the rib or spanwise beam.

(c) Install the screws [10] and washers [11] to attach the compensator unit [1] to the bracket.

SUBTASK 28-41-21-420-008

(3) Close the rotating mounting bracket [13] with your hand, around the compensator unit [1].

NOTE: The rotating mounting bracket [13] needs to be replaced when the bracket cannot be closed with your hand.

(a) Install the screws [10] and washers [11] to attach the compensator unit [1] to the bracket.

SUBTASK 28-41-21-220-002

(4) Do a check of these gaps:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

28-AWL-30: CDCCL

(a) Make sure that the gap between the side of the compensator unit [1] and the fuel tank structure is 0.2 in. (5 mm) or more.

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-30.

28-AWL-30: CDCCL

(b) Make sure that the gap between the lower end-cap of the compensator unit [1] and the fuel tank structure is 0.25 in. (6.4 mm) or more.

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-30.

SUBTASK 28-41-21-420-009

(5) Connect the electrical cable to the terminal block (SWPM 20-10-12, SWPM 20-10-19).

(a) Attach the relief clamp [20], electrical cable, captive screw [18], and plain washer [19] loosely to the terminal block.

(b) Adjust the electrical cable slack to maintain a clearance of 0.5 in. (12.7 mm) between the electrical cable and components or structure.

28-AWL-09: CDCCL

(c) If the clearance of 0.5 in. (12.7 mm) between the electrical cable and components or structure is not possible, do this step:

1) Make sure the clearance between the wires and structure or component, accounting for slack in all directions, is a minimum of 0.250 in. (6.4 mm).

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-09.

(d) Tighten the captive screw [18] to 18.5 ±1.5 in-lb (2.09 ±0.17 N·m).

SUBTASK 28-41-21-420-010

(6) Install the self-locking insert [14], washer [15], and HI-Z wire [16] to the terminal block.

(a) Tighten the self-locking insert [14] to 13.5 ±1.5 in-lb (1.53 ±0.17 N·m).

(b) Make sure that the self-locking insert [14] holds the terminal tightly and the HI-Z wire [16] does not turn.

SUBTASK 28-41-21-420-011

(7) Install the self-locking insert [24], washer [25], and HI-Z shield wire [23] to the terminal block.

(a) Tighten the self-locking insert [24] to 17.5 ±2.5 in-lb (1.98 ±0.29 N·m).

(b) Make sure that the self-locking insert [24] holds the terminal tightly and the HI-Z shield wire [23] does not turn.

SUBTASK 28-41-21-420-012

(8) Install the self-locking insert [22], washer [21], and LO-Z wire [17] to the terminal block.

(a) Tighten the LO-Z wire [17] to 30 ±5 in-lb (3.4 ±0.6 N·m).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) Make sure that the self-locking insert [22] holds the terminal tightly and the LO-Z wire [17] does not turn.

SUBTASK 28-41-21-210-002

(9) Make sure that the electrical cable has a drip loop.

NOTE: With no drip loop, water drops can collect on the electrical cable and fall on the electrical terminals. The drip loop prevents damage to the compensator unit [1].

G. Tank Unit or Compensator Unit Installation Test

SUBTASK 28-41-21-860-003

(1) 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 28-41-21-860-004

(2) Do this task: Fuel Quantity Indicating System - Dry Capacitance Test, TASK 28-41-00-730-801.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 28-41-21-410-001

(1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

(a) Install the applicable access doors (TASK 28-11-11-400-801 or TASK 28-11-31-400-801).

SUBTASK 28-41-21-650-001

(2) If it is necessary, do this task: Pressure Refuel Procedure, TASK 12-11-00-650-803.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TANK AND COMPENSATOR UNITS - ADJUSTMENT/TEST

1. General

A. This procedure measures the capacitance of each tank and compensator unit. It also measures the insulation resistance of the related wiring.

B. This procedure has these tasks:

(1) Tank and Compensator Units - Insulation Resistance and Dry Capacitance Check.

(2) Tank and Compensator Units - Wet Capacitance Check.

(3) Tank and Compensator Units - Fuel Quantity Indicating System Health Check.

TASK 28-41-21-710-801

2. Tank and Compensator Units - Insulation Resistance and Dry Capacitance Check

(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)
28-41-42-020-801	FQIS Spar Penetration Connector Removal (P/B 401)
28-41-42-420-801	FQIS Spar Penetration Connector 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 Part #: PSD60-2R Supplier: 51190 Opt Part #: PSD40-1 Supplier: 89305
COM-1780	Cables - Adapter, Fuel Quantity Indicating System (FQIS) Tester Part #: PSD737-1 Supplier: 41364
COM-15149	Adapter - Cable, FQIS Part #: 112-00007 Supplier: 21844 Part #: PSD40-524B Supplier: 41364
COM-15150	Adapter - Cable FQIS
COM-19223	Tester - Fuel Gauge System, Intrinsically Safe with Frequency Selector Part #: PSD60-2R Supplier: 51190

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 Test

SUBTASK 28-41-21-730-001

(1) Use system tester, COM-1770, and tester, COM-19223, with these cables, COM-1780.

NOTE: The cables, COM-1780, is referred to as test harness in this procedure.

SUBTASK 28-41-21-800-001

(2) The table below supplies more data about the approved FQIS test units and adapter equipment:

Table 501/28-41-21-993-801

Test Unit	Adapter Equipment
PSD60-2R, PSD60-2, PSD60-1, or PSD40	cables, COM-1780
Gull 361-012-001	cables, COM-1780 with FQIS cable adapter, COM-15149
Barfield 101-00540 MOD8000	FQIS adapter cable, COM-15150 or cables, COM-1780

SUBTASK 28-41-21-650-002

(3) Defuel the applicable fuel tanks (TASK 28-26-00-650-801).

SUBTASK 28-41-21-860-005

WARNING MAKE SURE THAT PERSONNEL AND EQUIPMENT STAY AWAY FROM THE LEADING EDGE 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.

(4) To test the tank or compensator units for the main tanks, 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 AND DAMAGE TO EQUIPMENT.

(a) Install safety locks on the leading edge flaps (TASK 27-81-00-480-801).

SUBTASK 28-41-21-860-006

(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

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(Continued)

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

E. Tank and Compensator Units Insulation Resistance and Dry Capacitance Test

SUBTASK 28-41-21-020-006

(1) Disconnect the bussing plug from the applicable fuel tank feed-through connector (TASK 28-41-41-000-801).

SUBTASK 28-41-21-480-001

(2) Connect the adapter plug on the test harness to the feed-through connector.

SUBTASK 28-41-21-480-002

(3) Connect the test harness to the system tester.

(a) Connect the alligator style clamp labeled AIRFRAME GROUND on the test harness to the aircraft ground/structure.

NOTE: The bonding bracket or stud used by the FQIS harness near the feed-through connector is a good location. A good ground is possible through the sealant, paint, or primer that might be present.

(b) Connect the banana jack connector, P5, on the test harness to the connector, J7, on the tester labeled CHASSIS.

(c) Connect the connector, P3, labeled Hi-Z on the test harness to the connector, J5, on the tester labeled TANK UNITS Hi-Z.

(d) To test the applicable tank units, do these steps:

1) Connect the connector, P2, labeled Lo-Z on the test harness to the connector, P4, labeled TANK UNITS LO-Z on the tester.

2) On the test harness, select the applicable tank unit to measure.

NOTE: To measure the total capacitance of the tank units, select TOTAL on the test harness.

(e) To test the applicable compensator units, do these steps:

NOTE: The following step to move cables is not necessary to test the COMP when using cables, COM-1780. It is only necessary to select COMP on the cables, COM-1780.

1) Connect the connector, P2, labeled Lo-Z on the test harness to the connector, P6, labeled TANK UNITS COMP on the tester.

2) On the test harness, select COMP.

(f) Connect the connector, P1, labeled P1 on the test harness to the feed-through connector on the rear or front spar.

SUBTASK 28-41-21-480-003

(4) Setup the system tester:

NOTE: No adjustment of the frequency is necessary.

(a) Set the POWER switch to ON.

NOTE: Three minutes is necessary for the system tester to stabilize.

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(b) Set the CAPACITANCE MEASUREMENT MODE switch to MODE A.

SUBTASK 28-41-21-710-006

(5) Measure the insulation resistance of each tank unit and compensator unit (Table 502, Table 503).

NOTE: The resistance for A to B and A to GRD must be greater than the quantity shown in Table 502, Table 503.

NOTE: The resistance for B to SHLD must be in the range shown in Table 502, Table 503.

Table 502/28-41-21-993-811 Insulation Resistance - Center Tank

COMPONENT (CENTER TANK)	PIN NUMBER*[1]	INSULATION RESISTANCE (MEGOHMS)		
		A to B	A to GRD	B to SHLD
F15C	3 AND 1	1000	10	4.9 to 6.0
F1C	6 AND 1	250	10	4.9 to 6.0
F2C	7 AND 1	250	10	4.9 to 6.0
F3C	8 AND 1	250	10	4.9 to 6.0
F4C	9 AND 1	250	10	4.9 to 6.0
F5C	10 AND 1	250	10	4.9 to 6.0
F6C	11 AND 1	250	10	4.9 to 6.0
F7C	12 AND 1	250	10	4.9 to 6.0
F8C	13 AND 1	250	10	4.9 to 6.0

*[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 SHLD correspond to the system tester switch positions inTable 504 .

Table 503/28-41-21-993-813 Insulation Resistance - Main Tank

COMPONENT NO. 1 (L) OR NO. 2 (R) FUEL TANK	PIN NUMBER*[1]	INSULATION RESISTANCE (MEGOHMS)		
		A to B	A to GRD	B to SHLD
F15 (L,R)	3 AND 1	1000	10	4.9 to 6.0
F1 (L,R)	6 AND 1	250	10	4.9 to 6.0
F2 (L,R)	7 AND 1	250	10	4.9 to 6.0
F3 (L,R)	8 AND 1	250	10	4.9 to 6.0
F4 (L,R)	9 AND 1	250	10	4.9 to 6.0
F5 (L,R)	10 AND 1	250	10	4.9 to 6.0
F6 (L,R)	11 AND 1	250	10	4.9 to 6.0
F7 (L,R)	12 AND 1	250	10	4.9 to 6.0
F8 (L,R)	13 AND 1	250	10	4.9 to 6.0
F9 (L,R)	14 AND 1	250	10	4.9 to 6.0
F10 (L,R)	15 AND 1	250	10	4.9 to 6.0
F11 (L,R)	16 AND 1	250	10	4.9 to 6.0

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Table 503/28-41-21-993-813 Insulation Resistance - Main Tank (Continued)

COMPONENT NO. 1 (L) OR NO. 2 (R) FUEL TANK	PIN NUMBER*[1]	INSULATION RESISTANCE (MEGOHMS)		
		A to B	A to GRD	B to SHLD
F12 (L,R)	17 AND 1	250	10	4.9 to 6.0

*[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 SHLD correspond to the system tester switch positions in Table 504.

Table 504/28-41-21-993-814 Tester Jack Location

GULL TESTER	SIMMONDS (PSD 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 SHLD = TANK OR COMP TO SHIELD	B TO SHLD = LO-Z TO SHIELD OR COMP TO SHIELD

SUBTASK 28-41-21-710-002

(6) Measure the capacitance of each tank unit and compensator unit (Table 505, Table 506).

Table 505/28-41-21-993-807 Empty Capacitance - Center Tank

COMPONENT	PIN NUMBER *[1]	EMPTY CAPACITANCE (PICOFARADS)
F15C	3 AND 1	57.60 – 58.70
F1C	6 AND 1	50.1 – 51.6
F2C	7 AND 1	78.1 – 80.2
F3C	8 AND 1	141.9 – 145.3
F4C	9 AND 1	98.6 – 101.1
F5C	10 AND 1	98.6 – 101.1
F6C	11 AND 1	141.9 – 145.3
F7C	12 AND 1	78.1 – 80.2
F8C	13 AND 1	50.1 – 51.6

*[1] Pin numbers correspond to numbers on the test harness and pin numbers on the airplane connector receptacle.

Table 506/28-41-21-993-804 Empty Capacitance - Main Tank

COMPONENT (NO. 1 (L) OR NO. 2 (R) MAIN TANK)	PIN NUMBER *[1]	EMPTY CAPACITANCE (PICOFARADS)
F15 (L,R)	3 AND 1	57.60 - 58.70
F1 (L,R)	6 AND 1	63.4 – 65.2
F2 (L,R)	7 AND 1	40.0 – 41.5
F3 (L,R)	8 AND 1	48.8 – 50.3
F4 (L,R)	9 AND 1	26.2 – 27.7
F5 (L,R)	10 AND 1	31.6 – 33.1
F6 (L,R)	11 AND 1	35.6 – 37.1

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Table 506/28-41-21-993-804 Empty Capacitance - Main Tank (Continued)

COMPONENT (NO. 1 (L) OR NO. 2 (R) MAIN TANK)	PIN NUMBER *[1]	EMPTY CAPACITANCE (PICOFARADS)
F7 (L,R)	12 AND 1	34.2 – 35.7
F8 (L,R)	13 AND 1	36.6 – 38.1
F9 (L,R)	14 AND 1	33.2 – 34.7
F10 (L,R)	15 AND 1	28.7 – 30.2
F11 (L,R)	16 AND 1	12.7 – 14.2
F12 (L,R)	17 AND 1	12.7 – 14.2

*[1] Pin numbers correspond to numbers on the test harness and pin numbers on the airplane connector receptacle.

SUBTASK 28-41-21-080-001

(7) Disconnect the adapter plug from the feed-through connector.

SUBTASK 28-41-21-080-002

(8) Disconnect the AIRFRAME GROUND alligator clamp.

SUBTASK 28-41-21-410-002

(9) Carefully connect the bussing plug to the feed-through connector (TASK 28-41-41-400-801).

(a) If the feed-through connector is damaged, replace the feed-through connector (TASK 28-41-42-020-801 or TASK 28-41-42-420-801).

NOTE: The connector pins and sockets are easily damaged.

SUBTASK 28-41-21-710-003

(10) Do the procedure again for the other fuel tanks.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 28-41-21-080-003

(1) Disconnect the system tester:

(a) Set the POWER switch to OFF.

(b) Disconnect the connector, P1.

(c) Disconnect the connector, P2 .

(d) Disconnect the connector, Hi-Z.

(e) Disconnect the banana jack connector, P5.

SUBTASK 28-41-21-860-007

(2) 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

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SUBTASK 28-41-21-080-004

WARNING YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO REMOVE THE LE FLAP SAFETY LOCK. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT DO THE STEPS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Remove the leading edge flap locks (TASK 27-81-00-080-801).

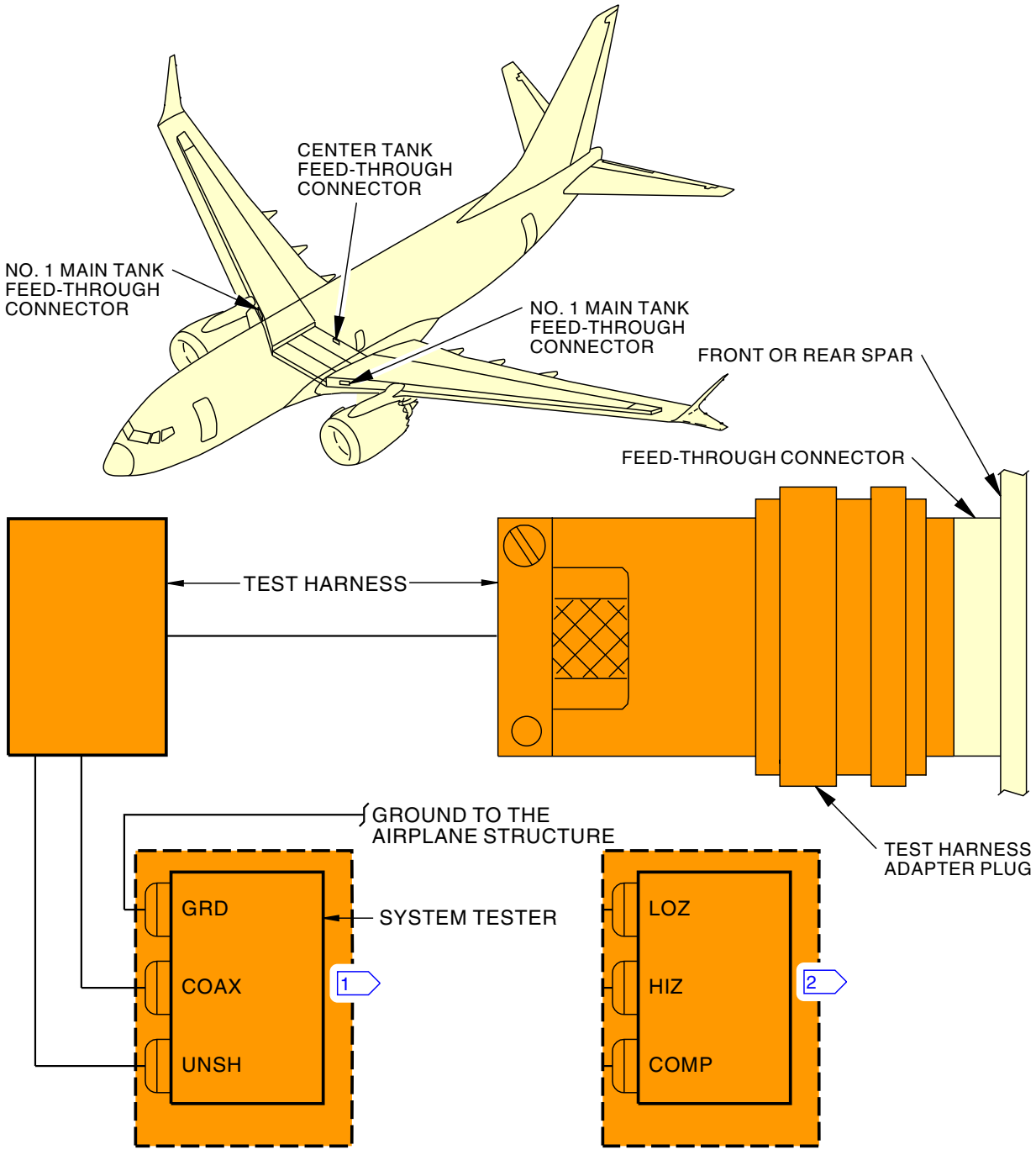
SUBTASK 28-41-21-860-008

WARNING MAKE SURE THAT PERSONNEL AND EQUIPMENT STAY AWAY FROM THE LEADING EDGE 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.

(4) Retract the leading edge flaps (TASK 27-81-00-860-804).

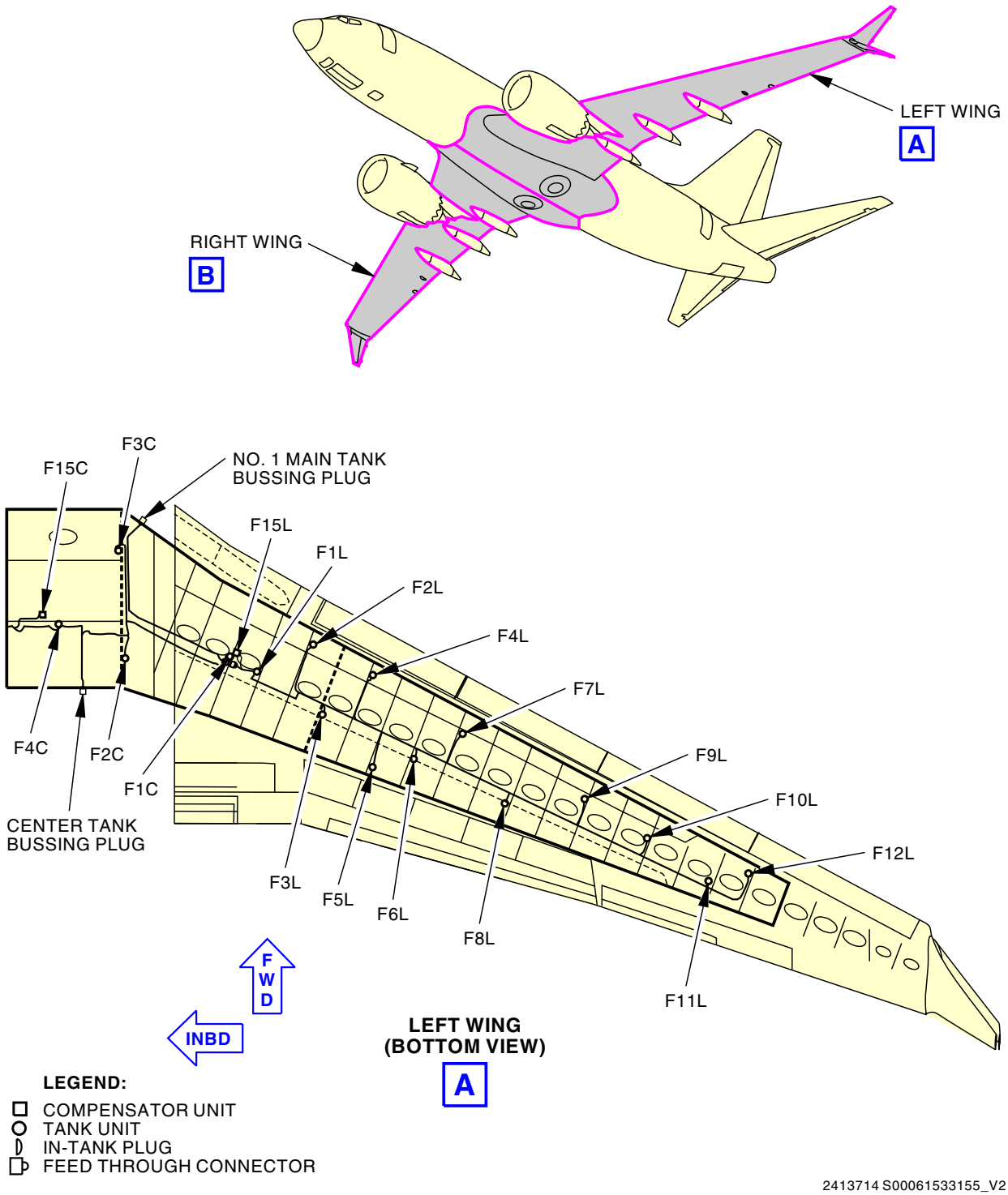
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Tank Unit and Compensator Unit Test Connections
Figure 501/28-41-21-990-802

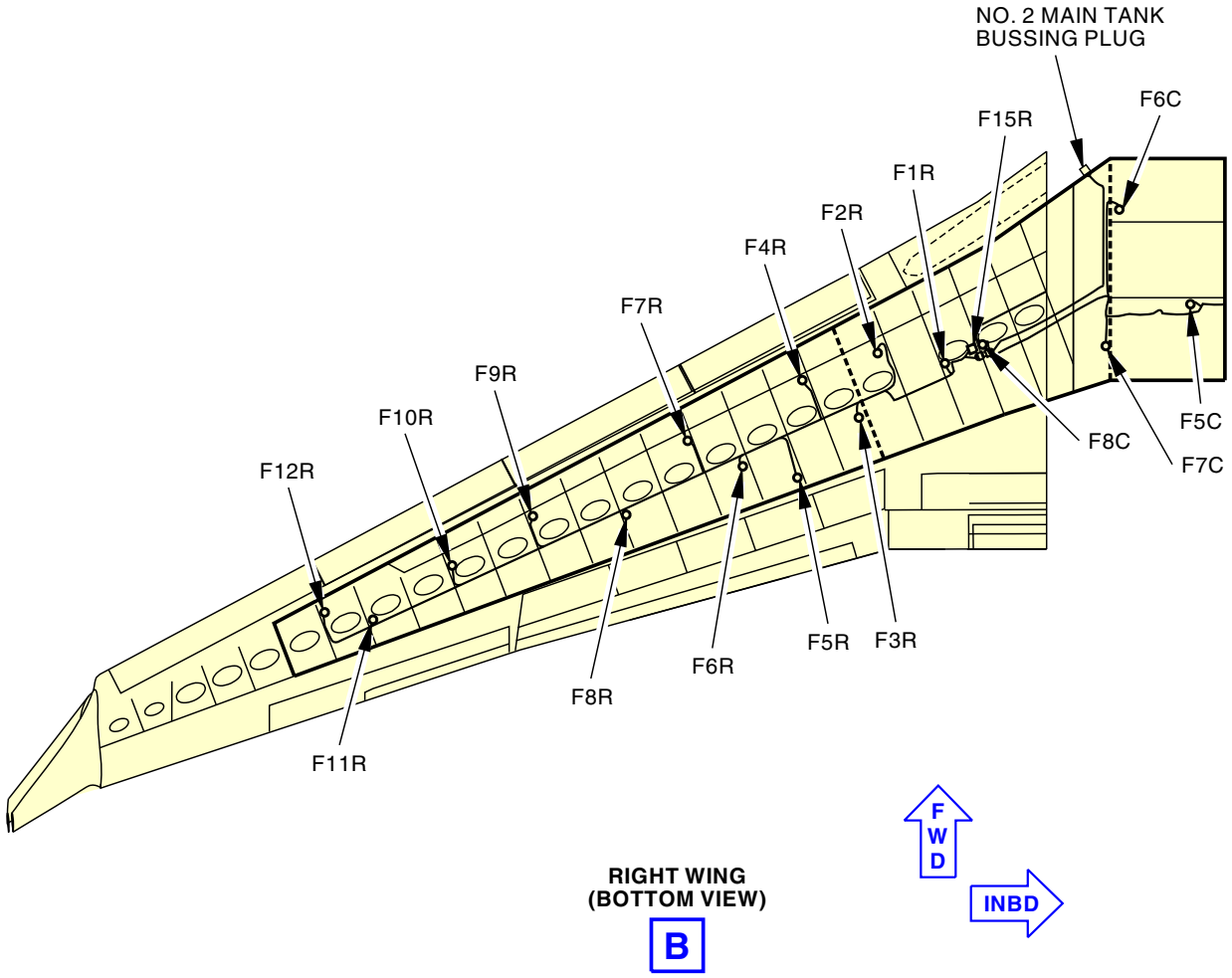
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413714 S00061533155_V2

Tank Unit and Compensator Unit Test
Figure 502/28-41-21-990-803 (Sheet 1 of 2)

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LEGEND:

- COMPENSATOR UNIT
- TANK UNIT
- IN-TANK PLUG
- FEED THROUGH CONNECTOR

2413715 S00061533156_V3

Tank Unit and Compensator Unit Test
Figure 502/28-41-21-990-803 (Sheet 2 of 2)

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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) The wet capacitance check is an alternative procedure to test the tank and compensator units with fuel. In isolated conditions, it is possible that problems can appear with a full fuel tank that does not appear with an empty fuel tank.

(2) The capacitance read by the tank or compensator unit changes with fuel properties and fuel temperature. The capacitance values supplied in this procedure are approximate and can help you identify possible faults.

B. References

Reference	Title
12-11-00-650-803	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)
28-41-42-020-801	FQIS Spar Penetration Connector Removal (P/B 401)
28-41-42-420-801	FQIS Spar Penetration Connector 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 Part #: PSD60-2R Supplier: 51190 Opt Part #: PSD40-1 Supplier: 89305
COM-1780	Cables - Adapter, Fuel Quantity Indicating System (FQIS) Tester Part #: PSD737-1 Supplier: 41364
COM-19223	Tester - Fuel Gauge System, Intrinsically Safe with Frequency Selector Part #: PSD60-2R Supplier: 51190

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

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E. Prepare for the Test

SUBTASK 28-41-21-730-002

(1) Use system tester, COM-1770, and tester, COM-19223, with these cables, COM-1780.

NOTE: The cables, COM-1780 is referred to as test harness in this procedure.

SUBTASK 28-41-21-650-003

(2) Add fuel to the applicable fuel tank (fill the fuel tank to its full capacity) (TASK 12-11-00-650-803).

SUBTASK 28-41-21-860-009

WARNING KEEP ALL PERSONNEL AND EQUIPMENT CLEAR OF THE LEADING EDGE FLAPS. THE LEADING EDGE FLAPS CAN MOVE QUICKLY. THE MOVEMENT OF THE LEADING EDGE FLAPS CAN CAUSE INJURIES TO PERSONNEL OR DAMAGE TO EQUIPMENT.

(3) To test the tank or compensator units for the main tanks, 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 AND DAMAGE TO EQUIPMENT.

(a) Install safety locks on the leading edge flaps (TASK 27-81-00-480-801).

SUBTASK 28-41-21-860-010

(4) 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

F. Tank and Compensator Units Wet Capacitance Check

SUBTASK 28-41-21-010-001

(1) Disconnect the applicable bussing plug from the applicable fuel tank feed-through connector (TASK 28-41-41-000-801).

SUBTASK 28-41-21-480-004

(2) Connect the adapter plug on the test harness to the feed-through connector (Figure 501).

SUBTASK 28-41-21-480-005

(3) Connect the system tester to the test harness (Figure 501).

SUBTASK 28-41-21-980-003

(4) Set the POWER switch to ON.

NOTE: Allow three minutes for the tester to stabilize.

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SUBTASK 28-41-21-710-004

(5) Measure the capacitance of each tank unit and compensator unit (Table 507 and Table 508).

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 507/28-41-21-993-805 Wet Capacitance - Main Tank

COMPONENT NO. 1 (L) OR NO. 2 (R) MAIN TANK	PIN NUMBER*[1]	WET CAPACITANCE (PICOFARADS)
F15 (L,R)	3 AND 1	122.5
F1 (L,R)	6 AND 1	136.9
F2 (L,R)	7 AND 1	86.9
F3 (L,R)	8 AND 1	105.1
F4 (L,R)	9 AND 1	57.6
F5 (L,R)	10 AND 1	69.1
F6 (L,R)	11 AND 1	77.6
F7 (L,R)	12 AND 1	74.7
F8 (L,R)	13 AND 1	79.8
F9 (L,R)	14 AND 1	72.5
F10 (L,R)	15 AND 1	62.9
F11 (L,R)	16 AND 1	25.0*[2]
F12 (L,R)	17 AND 1	18.8*[2]

*[1] Pin numbers correspond to numbers on the test harness and pin numbers on the airplane feed-through connector.

*[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.

Table 508/28-41-21-993-808 Wet Capacitance - Center Tank

COMPONENT	PIN NUMBER*[1]	WET CAPACITANCE (PICOFARADS)
F15C	3 AND 1	122.5
F1C	6 AND 1	107.8
F2C	7 AND 1	167.8
F3C	8 AND 1	304.4
F4C	9 AND 1	211.6
F5C	10 AND 1	211.6
F6C	11 AND 1	304.4
F7C	12 AND 1	167.8
F8C	13 AND 1	107.8

*[1] Pin numbers correspond to numbers on the test harness and pin numbers on the airplane feed-through connector.

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SUBTASK 28-41-21-080-005

(6) Disconnect the adapter plug from the feed-through connector.

SUBTASK 28-41-21-080-006

(7) Disconnect the AIRFRAME GROUND alligator clamp.

SUBTASK 28-41-21-480-006

(8) Carefully connect the bussing plug to the feed-through connector (TASK 28-41-41-400-801).

(a) If the feed-through connector is damaged, replace the feed-through connector (TASK 28-41-42-020-801, TASK 28-41-42-420-801).

NOTE: The connector pins and sockets are easily damaged.

SUBTASK 28-41-21-710-005

(9) Do the procedure again for the other fuel tanks.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 28-41-21-980-004

(1) Set the POWER switch to the OFF position.

SUBTASK 28-41-21-860-011

(2) 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 28-41-21-080-007

WARNING YOU MUST CAREFULLY DO THE STEPS IN THE TASK BELOW TO REMOVE THE LE FLAP SAFETY LOCK. THE LE FLAPS CAN MOVE QUICKLY IF YOU DO NOT DO THE STEPS CORRECTLY. THIS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

(3) Remove the leading edge flap locks (TASK 27-81-00-080-801).

SUBTASK 28-41-21-860-012

WARNING KEEP ALL PERSONNEL AND EQUIPMENT CLEAR OF THE LEADING EDGE FLAPS. THE LEADING EDGE FLAPS CAN MOVE QUICKLY. THE MOVEMENT OF THE LEADING EDGE FLAPS CAN CAUSE INJURIES TO PERSONNEL OR DAMAGE TO EQUIPMENT.

(4) Retract the leading edge flaps (TASK 27-81-00-860-804).

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-41-21-710-803

4. Tank and Compensator Units - Fuel Quantity Indicating System Health Check

(Figure 501, Figure 502)

A. General

(1) This task contains steps to inspect the tank fuel probes, compensator units, and Fuel Quantity Indicating System (FQIS) wiring harness and connectors for contamination and degradation that affects the capacitance measurement ability of the system.

(2) Water, Foreign Object Debris (FOD), and Microbiological Growth (MBG) in a fuel tank can lead to significant interruptions to the FQIS and corrosion of an aircraft structure. Hydrocarbon fuels are subject to bacterial and fungal growth during storage, transportation, and use. The organisms that feed on these hydrocarbons not only grow in small quantities of water present in the fuel systems, but also grow in the hydrocarbon fuel itself. Microbes can live for months, and any subsequent presence of free water may lead to rapid population increase. These micro organisms will feed on the boundary layers that exist between the water and fuel. Since water is heavier than fuel, it will eventually migrate to the lower inboard areas of the fuel tanks. If not addressed, secretions of the microbes will start to eat away the corrosion protection layers of FQIS components, wiring harnesses, structure, and lead to material corrosion damage.

(3) MBG or fungus contamination, will appear as a dirty slime that can stain the fuel tank primer and/or tank sealant. This FQIS Health Check will detect water, FOD, and MBG that typically occurs over time, but also after extended maintenance and storage.

(4) In order to mitigate future MBG reoccurrences and subsequent FQIS intermittent operation, sump the drains, use an approved fuel biocide protection additive, test the fuel regularly in accordance with maintenance manual recommendations and perform proactive FQIS health checks. While Boeing cannot guarantee prevention of MBG occurring due to the many outstanding variables, we do believe these recommendations will help mitigate any future MBG issues.

(5) This check is performed using intrinsically safe equipment to facilitate testing with any level of fuel in the tank. This enhances the ability to uncover issues that occur only in-flight and also eliminates the need to drain, sump, and purge the tanks prior to testing.

NOTE: A tank entry is necessary if the test fails and in-tank equipment or wire harness require replacement.

B. 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)
28-41-00-710-801	Fuel Quantity Indicating System - Operational Test (P/B 501)
28-41-21-000-801	Tank Unit or Compensator Unit - Removal (P/B 401)
28-41-21-400-801	Tank Unit or Compensator Unit - Installation (P/B 401)
28-41-41-000-801	Bussing Plug Removal (P/B 401)
28-41-41-400-801	Bussing Plug Installation (P/B 401)
28-41-42-020-801	FQIS Spar Penetration Connector Removal (P/B 401)
28-41-42-420-801	FQIS Spar Penetration Connector Installation (P/B 401)

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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-1780	Cables - Adapter, Fuel Quantity Indicating System (FQIS) Tester Part #: PSD737-1 Supplier: 41364
COM-19223	Tester - Fuel Gauge System, Intrinsically Safe with Frequency Selector Part #: PSD60-2R Supplier: 51190

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. Prepare for the Test

SUBTASK 28-41-21-730-003

WARNING

MAKE SURE THAT YOU USE AN INTRINSICALLY SAFE METER IN AN UNCONTROLLED TANK. AN ALTERNATIVE TOOL MUST BE INTRINSICALLY SAFE. IF YOU DO NOT OBEY, A FIRE OR EXPLOSION CAN CAUSE INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(1) Use system tester, COM-19223, with cables, COM-1780.

NOTE: The cables, COM-1780, are referred to as the test harness in this procedure.

SUBTASK 28-41-21-650-004

(2) This test may be performed at any fuel level.

(a) If the health check is performed to troubleshoot an issue, the ability to uncover issues may be increased by duplicating the conditions leading to the event by filling or transferring fuel to the tank at the level reported when the problem occurred.

SUBTASK 28-41-21-860-014

WARNING

KEEP ALL PERSONNEL AND EQUIPMENT CLEAR OF THE LEADING EDGE FLAPS. THE LEADING EDGE FLAPS CAN MOVE QUICKLY. THE MOVEMENT OF THE LEADING EDGE FLAPS CAN CAUSE INJURIES TO PERSONNEL OR DAMAGE TO EQUIPMENT.

(3) Extend the leading edge flaps to test the tank or compensator units for the main tanks (TASK 27-81-00-860-803).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 AND DAMAGE TO EQUIPMENT.

(a) Install safety locks on the leading edge flaps (TASK 27-81-00-480-801).

SUBTASK 28-41-21-860-015

(4) 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

F. Tank and Compensator Units - Fuel Quantity Indicating System Health Check

SUBTASK 28-41-21-010-002

(1) Disconnect the applicable bussing plug from the applicable fuel tank feed-through connector (TASK 28-41-41-000-801).

SUBTASK 28-41-21-480-007

(2) Connect the adapter plug on the test harness to the feed-through connector (Figure 501).

SUBTASK 28-41-21-480-008

(3) Connect the test harness to the system tester (Figure 501).

(a) Connect the alligator style clamp labeled AIRFRAME GROUND on the test harness to the aircraft ground/structure.

NOTE: The bonding bracket or stud used by the FQIS harness near the feed-through connector is a good location. A good ground is possible through the sealant, paint, or primer that might be present.

(b) Connect the banana jack connector, P5, on the test harness to the connector, J7, on the tester labeled CHASSIS.

(c) Connect the connector, P3, labeled HI-Z on the test harness to the connector, J5, on the tester labeled TANK UNIT HI-Z.

(d) Test the applicable tank units, do these steps:

1) Connect the connector, P2, labeled LO-Z on the test harness to the connector, P4, labeled TANK UNIT LO-Z on the tester.

2) On the test harness's selector box, select the applicable tank unit to measure.

a) If it is necessary, select TOTAL on the test harness to measure the total capacitance of the tank units.

(e) Connect the connector, P1, on the test harness to the feed-through connector on the rear or front spar.

SUBTASK 28-41-21-480-009

(4) Setup the system tester.

NOTE: Adjustment of the frequency will be necessary to conduct this health check.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Set the POWER switch to the ON position and wait for 3 minutes.

NOTE: Three minutes is necessary for the system tester to stabilize.

(b) Set the CAPACITANCE MEASUREMENT MODE switch to the MODE A position.

(c) Use the Frequency Select Switch to set the frequency to 5000Hz, push the knob down to enter.

(d) Place the Function Select Switch to MEASUREMENT EXT.

(e) Set the Megger Mode Switch to 3-WIRE.

(f) Place the Megger Select to TU.

NOTE: You may ignore the CAP SIMULATOR settings.

SUBTASK 28-41-21-710-007

(5) Measure the capacitance of each tank unit and compensator unit at 5000HZ and 500Hz and record the data (Table 509, Table 512).

NOTE: Each compensator or tank unit has a PROBE SELECT switch position. See Table 509 and Table 512 for the correct compensator or tank unit position on the switch. The switch positions will not be the same for all the fuel tanks. Some of the PROBE SELECT positions are not used.

(a) Push the frequency Select knob to change the frequency.

NOTE: You may need to push PWR INT or cycle power OFF/ON to enable the frequency change display.

SUBTASK 28-41-21-710-008

(6) Measure the insulation resistance of the tank units and compensator units by rotating the tester Megger Select knob to measure each of the circuits and record the data (Table 510, Table 513).

NOTE: During testing for each unit, the value may fluctuate and be slow to climb. Allow up to 30 seconds for the value to settle, if required.

NOTE: Tester reading as -0r- is Out of Range.

NOTE: The frequency setting does not affect the IR test.

SUBTASK 28-41-21-750-004

(7) Make sure that the measured capacitance values for the tank units and compensator are the following:

(a) Do not vary by more than 10% of the 500Hz reading when the frequency is lowered to 500Hz.

(b) Are within the limits given in Table 509 and Table 512 at 5000Hz.

SUBTASK 28-41-21-750-001

(8) If the capacitance value for a tank unit is out of tolerance for the steps above, further fault isolate by doing the following:

(a) De-fuel the fuel tank for entry (TASK 28-26-00-650-801).

(b) Disconnect the respective tank unit or compensator and retest.

1) If the test values are within limits, the respective tank unit or compensator is defective or contaminated.

a) Remove and replace component and retest (TASK 28-41-21-000-801, TASK 28-41-21-400-801).

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2) If the test still varies by more than 10% with the components disconnected, continue to fault isolate the defective harness segment by shaking the harness while monitoring the tester fluctuations.
   a) Verify faulty wiring harness bundle by disconnecting suspect segments and retesting.
   b) If isolated to the connector, clean or replace and retest.
3) If the capacitance values of the wire bundle segment continues to be out of tolerance, remove and replace or repair the in-tank FQIS wire bundle and retest after the corrective action to ensure the test values are within limits (Standard Wiring Practices Manual (SWPM)).

SUBTASK 28-41-21-750-003

(9) Make sure that the measured insulation resistance for each circuit is greater than the minimum insulation resistance as indicated in Table 510, Table 511, and Table 513.

SUBTASK 28-41-21-750-002

(10) If the insulation resistance value was out of tolerance, further fault isolate by doing the following:
   (a) De-fuel the fuel tank for entry (TASK 28-26-00-650-801).
   (b) Disconnect the respective tank unit or compensator and retest.
      1) If the insulation resistance values are in range, the respective tank unit or compensator is defective or contaminated.
         a) Remove and replace component and retest (TASK 28-41-21-000-801, TASK 28-41-21-400-801).
      2) If the insulation resistance test still fails with the components disconnected, continue to fault isolate the defective harness segment by shaking the harness while monitoring the tester fluctuations.
         a) Verify faulty wiring harness bundle by disconnecting suspect segments and retesting.
         b) If isolated to the connector, clean or replace and retest.
      3) If the insulation resistance values of the wire bundle segment continues to be out of tolerance, remove and replace or repair the in-tank FQIS wire bundle and retest after the corrective action to ensure the test values are within limits (SWPM).

Table 509/28-41-21-993-815 Health Range Capacitance - Main Tank

COMPONENT NO. 1 (L) OR NO. 2 (R) MAIN TANK	PIN NUMBER *[1]	CAPACITANCE (PICOFARADS)		MEASURED CAPACITANCE AT 5000 Hz (PICOFARADS)		MEASURED CAPACITANCE AT 500 Hz (PICOFARADS)	
		EMPTY	MAX WET	L TANK	R TANK	L TANK	R TANK
F15 (L,R)	3 AND 1	57.6 - 58.7	122.5				
F1 (L,R)	6 AND 1	63.4 - 65.2	136.9				
F2 (L,R)	7 AND 1	40.0 - 41.5	86.9				
F3 (L,R)	8 AND 1	48.8 - 50.3	105.1				
F4 (L,R)	9 AND 1	26.2 - 27.7	57.6				
F5 (L,R)	10 AND 1	31.6 - 33.1	69.1				

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Table 509/28-41-21-993-815 Health Range Capacitance - Main Tank (Continued)

COMPONENT NO. 1 (L) OR NO. 2 (R) MAIN TANK	PIN NUMBER *[1]	CAPACITANCE (PICOFARADS)		MEASURED CAPACITANCE AT 5000 Hz (PICOFARADS)		MEASURED CAPACITANCE AT 500 Hz (PICOFARADS)	
		EMPTY	MAX WET	L TANK	R TANK	L TANK	R TANK
F6 (L,R)	11 AND 1	35.6 - 37.1	77.6				
F7 (L,R)	12 AND 1	34.2 - 35.7	74.7				
F8 (L,R)	13 AND 1	36.6 - 38.1	79.8				
F9 (L,R)	14 AND 1	33.2 - 34.7	72.5				
F10 (L,R)	15 AND 1	28.7 - 30.2	62.9				
F11 (L,R)	16 AND 1	12.7 - 14.2	25.0 *[2]				
F12 (L,R)	17 AND 1	12.7 - 14.2	18.8 *[2]				

*[1] Pin numbers correspond to numbers on the test harness and pin numbers on the airplane feed-through connector.

*[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.

Table 510/28-41-21-993-817 Health Range Insulation Resistance - Left Tank

COMP	PIN NUMBER	LO-Z to HI-Z or Comp to HI-Z*[1] (1000 Min)	HI-Z to GND*[1] (10 Min)	LO-Z to SHLD or Comp to SHLD*[1] (4.9 to 6 Min)	LO-Z to SHLD*[1] (1000 Min)	HI-Z to SHLD*[1] (1000 Min)
F15 (L)	3 AND 1					
F1 (L)	6 AND 1					
F2 (L)	7 AND 1					
F3 (L)	8 AND 1					
F4 (L)	9 AND 1					
F5 (L)	10 AND 1					
F6 (L)	11 AND 1					
F7 (L)	12 AND 1					
F8 (L)	13 AND 1					
F9 (L)	14 AND 1					
F10 (L)	15 AND 1					
F11 (L)	16 AND 1					
F12 (L)	17 AND 1					

*[1] Units in Megaohms.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Table 511/28-41-21-993-819 Health Range Insulation Resistance - Right Tank

COMP	PIN NUMBER	LO-Z to HI-Z or Comp to HI-Z*[1] (1000 Min)	HI-Z to GND*[1] (10 Min)	LO-Z to SHLD or Comp to SHLD*[1] (4.9 to 6 Min)	LO-Z to SHLD*[1] (1000 Min)	HI-Z to SHLD*[1] (1000 min)
F15 (R)	3 AND 1					
F1 (R)	6 AND 1					
F2 (R)	7 AND 1					
F3 (R)	8 AND 1					
F4 (R)	9 AND 1					
F5 (R)	10 AND 1					
F6 (R)	11 AND 1					
F7 (R)	12 AND 1					
F8 (R)	13 AND 1					
F9 (R)	14 AND 1					
F10 (R)	15 AND 1					
F11 (R)	16 AND 1					
F12 (R)	17 AND 1					

*[1] Units in Megaohms.

Table 512/28-41-21-993-816 Health Range Capacitance - Center Tank

COMP	PIN NUMBER *[1]	CAPACITANCE (PICOFARADS)		MEASURED CAPACITANCE AT 5000Hz (PICOFARADS)		MEASURED CAPACITANCE AT 500 Hz (PICOFARADS)	
		EMPTY	MAX WET				
F15 (C)	3 AND 1	57.6 - 58.7	122.5				
F1 (C)	6 AND 1	50.1 - 51.6	107.8				
F2 (C)	7 AND 1	78.1 - 80.2	167.8				
F3 (C)	8 AND 1	141.9 - 145.3	304.4				
F4 (C)	9 AND 1	98.6 - 101.1	211.6				
F5 (C)	10 AND 1	98.6 - 101.1	211.6				
F6 (C)	11 AND 1	141.9 - 145.3	304.4				
F7 (C)	12 AND 1	78.1 - 80.2	167.8				
F8 (C)	13 AND 1	50.1 - 51.6	107.8				

*[1] Pin numbers correspond to numbers on the test harness and pin numbers on the airplane feed-through connector.

Table 513/28-41-21-993-818 Health Range Insulation Resistance - Center Tank

COMP	PIN NUMBER	LO-Z to HI-Z or Comp to HI-Z*[1] (1000 Min)	HI-Z to GND*[1] (10 Min)	LO-Z to SHLD or Comp to SHLD*[1] (4.9 to 6 Min)	LO-Z to SHLD*[1] (1000 Min)	HI-Z to SHLD*[1] (1000 Min)
F15 (C)	3 AND 1					

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Table 513/28-41-21-993-818 Health Range Insulation Resistance - Center Tank (Continued)

COMP	PIN NUMBER	LO-Z to HI-Z or Comp to HI-Z*[1] (1000 Min)	HI-Z to GND*[1] (10 Min)	LO-Z to SHLD or Comp to SHLD*[1] (4.9 to 6 Min)	LO-Z to SHLD*[1] (1000 Min)	HI-Z to SHLD*[1] (1000 Min)
F1 (C)	6 AND 1					
F2 (C)	7 AND 1					
F3 (C)	8 AND 1					
F4 (C)	9 AND 1					
F5 (C)	10 AND 1					
F6 (C)	11 AND 1					
F7 (C)	12 AND 1					
F8 (C)	13 AND 1					

*[1] Units in Megaohms.

SUBTASK 28-41-21-080-008

(11) Disconnect the adapter plug from the feed-through connector.

SUBTASK 28-41-21-080-009

(12) Disconnect the AIRFRAME GROUND alligator clamp.

SUBTASK 28-41-21-420-013

(13) Carefully connect the bussing plug to the feed-through connector (TASK 28-41-41-400-801).

(a) If the feed-through connector is damaged, replace the feed-through connector (TASK 28-41-42-020-801, TASK 28-41-42-420-801).

NOTE: The connector pins and sockets are easily damaged.

SUBTASK 28-41-21-700-001

(14) If it is necessary, do the procedure again for the other fuel tanks.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 28-41-21-980-006

(1) Set the POWER switch of the tester to the OFF position.

SUBTASK 28-41-21-860-016

(2) 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 28-41-21-280-001

(3) Do the FQIS Built-In-Test Equipment (BITE) Test procedure at the Control Display Unit (CDU) in the flight deck and make sure that the test passes (TASK 28-41-00-710-801).

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SUBTASK 28-41-21-080-010

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 AND DAMAGE TO EQUIPMENT.

(4) Remove the leading edge flap locks (TASK 27-81-00-080-801).

SUBTASK 28-41-21-860-017

WARNING KEEP ALL PERSONNEL AND EQUIPMENT CLEAR OF THE LEADING EDGE FLAPS. THE LEADING EDGE FLAPS CAN MOVE QUICKLY. THE MOVEMENT OF THE LEADING EDGE FLAPS CAN CAUSE INJURIES TO PERSONNEL OR DAMAGE TO EQUIPMENT.

(5) Retract the leading edge flaps (TASK 27-81-00-860-804).

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 behind the leading edge flaps 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. General

(1) This task gives instructions to remove the Bussing Plug.

B. 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)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)
SWPM 20-61-11	MIL-C-26500 FRONT RELEASE CONNECTORS

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. Prepare for the Removal

SUBTASK 28-41-41-710-002

(1) Do this step to get access to the bussing plug for No. 1 tank or No. 2 tank located on the front spar:

WARNING MAKE SURE THAT PERSONNEL AND EQUIPMENT STAY AWAY FROM THE LEADING EDGE 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) Operate the LE flaps to the Full Extend position (TASK 27-81-00-860-803).

WARNING MAKE SURE THAT YOU INSTALL THE LEADING EDGE FLAP AND SLAT ACTUATORS LOCKOUT SET TO PREVENT ACCIDENTAL OPERATION. THE LEADING EDGE FLAP AND SLAT CAN MOVE QUICKLY. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

1) Do this task: Leading Edge Flap and Slat Locks Installation, TASK 27-81-00-480-801.

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SUBTASK 28-41-41-480-002

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.

(2) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-41-41-860-002

(3) 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

E. Bussing Plug Removal

SUBTASK 28-41-41-020-001

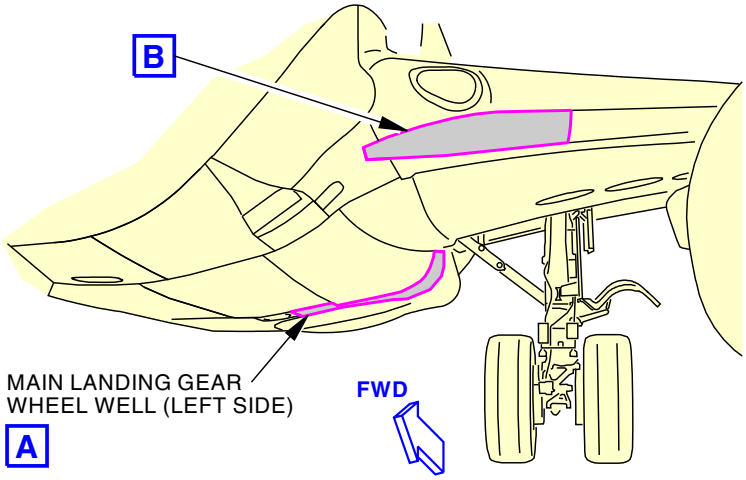
(1) Loosen the nut [4] to disconnect the ground wire [3].

SUBTASK 28-41-41-020-003

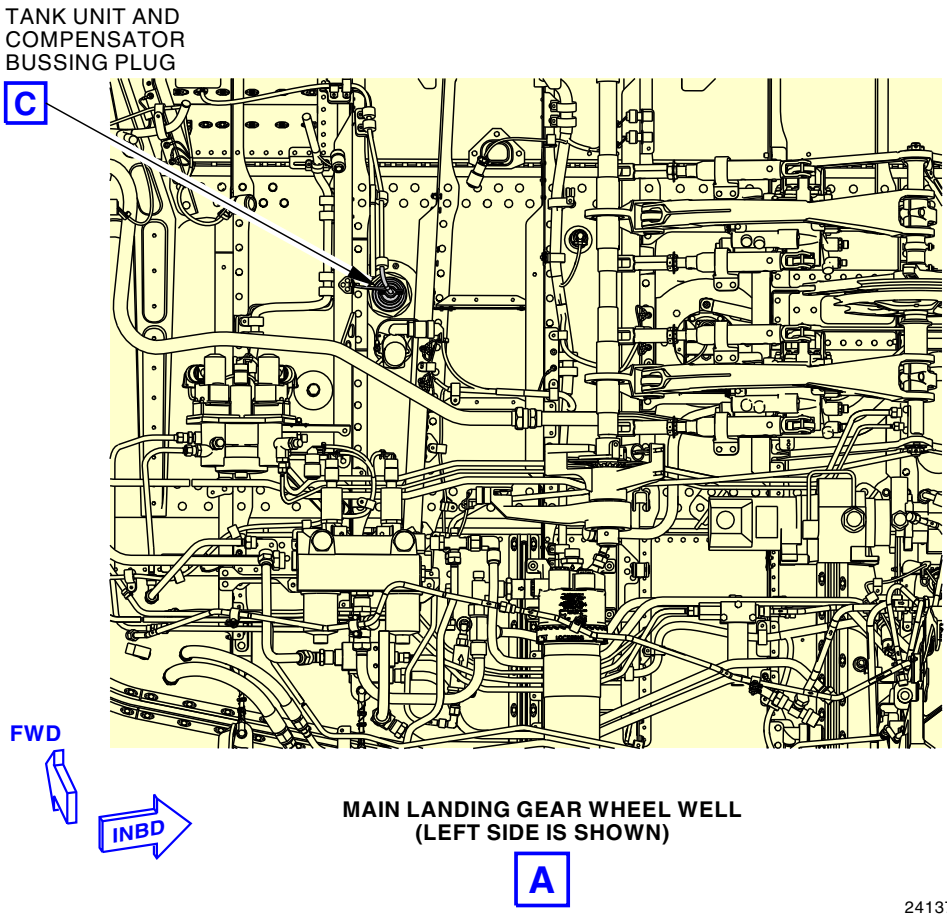
(2) Carefully remove the bussing plug [2] from the penetration connector [1] (SWPM 20-61-11).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



LEFT WING
(RIGHT WING IS EQUIVALENT)



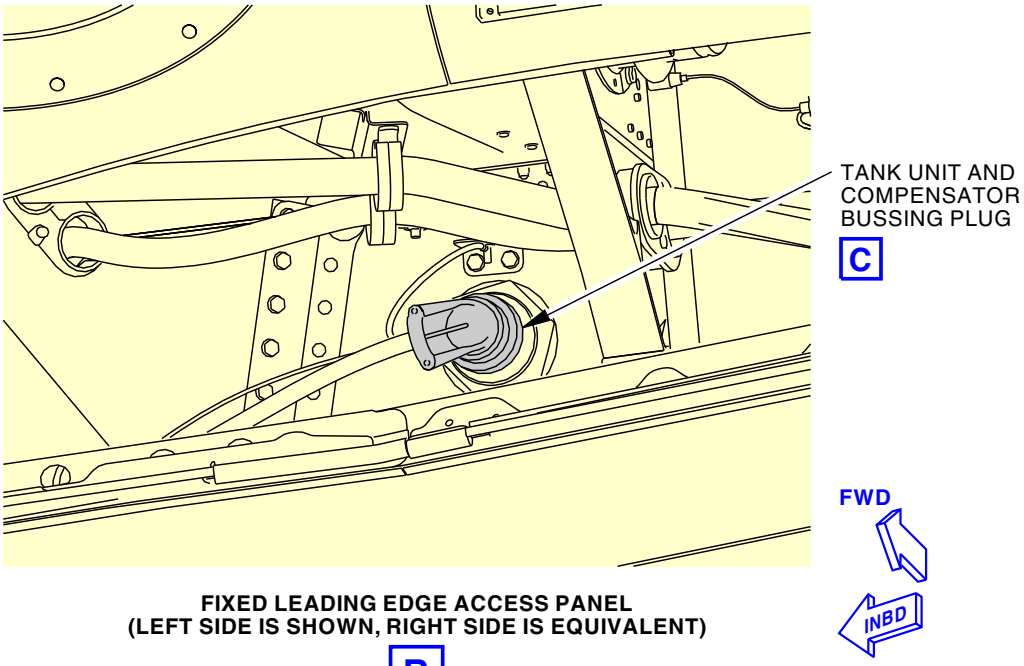
MAIN LANDING GEAR WHEEL WELL
(LEFT SIDE IS SHOWN)

A

2413716 S00061533161_V1

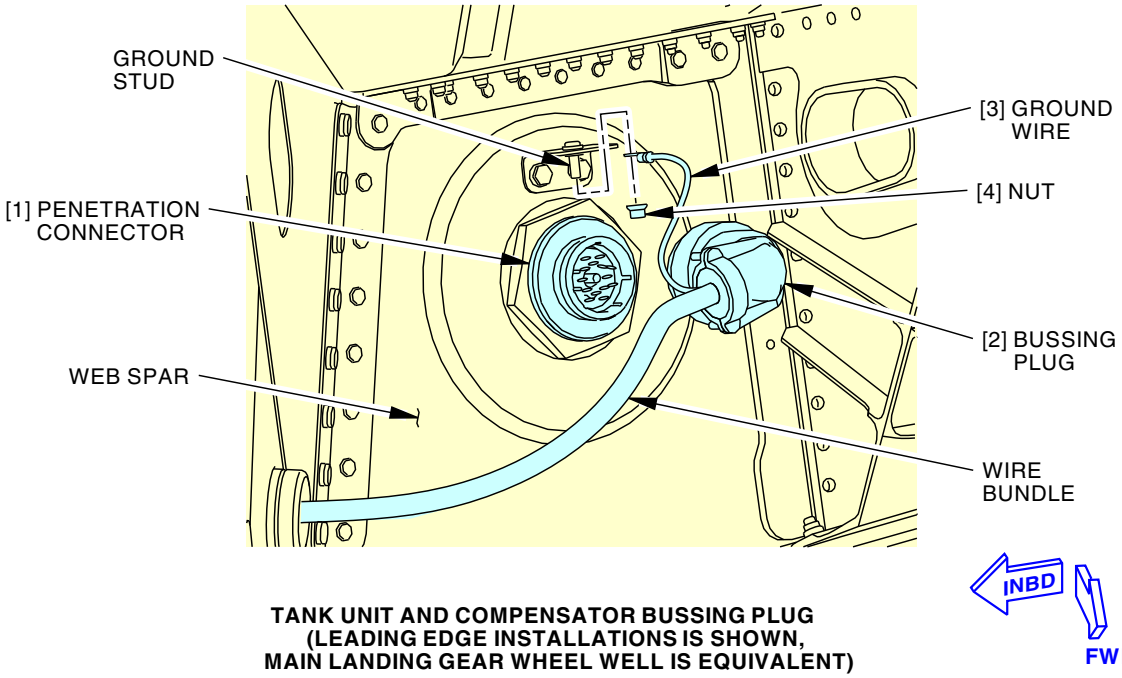
Tank Unit and Compensator Bussing Plug Installation
Figure 401/28-41-41-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



FIXED LEADING EDGE ACCESS PANEL
(LEFT SIDE IS SHOWN, RIGHT SIDE IS EQUIVALENT)

B



TANK UNIT AND COMPENSATOR BUSSING PLUG
(LEADING EDGE INSTALLATIONS IS SHOWN,
MAIN LANDING GEAR WHEEL WELL IS EQUIVALENT)

C

2413717 S00061533162_V1

Tank Unit and Compensator Bussing Plug Installation
Figure 401/28-41-41-990-801 (Sheet 2 of 2)

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TASK 28-41-41-400-801

3. Bussing Plug Installation

(Figure 401)

A. General

(1) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-04.

(2) This task gives instructions to install the Bussing Plug.

B. References

Reference	Title
20-60-07-910-802	Inspection, Cleaning and Sealing of Electrical Connectors (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)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-41-00-710-801	Fuel Quantity Indicating System - Operational Test (P/B 501)
SWPM 20-10-15	ASSEMBLY OF SHIELD GROUND WIRES
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES
SWPM 20-20-10	REPLACEMENT OF GROUND STUDS AND BONDING JUMPER INSTALLATION
SWPM 20-60-06	INSTALLATION OF ELECTRICAL CIRCULAR CONNECTORS
SWPM 20-61-11	MIL-C-26500 FRONT RELEASE CONNECTORS
SWPM 20-20-10	Replacement of Ground Studs and Bonding Jumper Installation

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
A50110	Sealant - Fuel Tank	BMS5-45 Class B-2
A50142	Sealant - Fuel Tank	BMS5-45 Class B-1/2
A50155	Sealant - Fuel Tank	BMS5-45 Class C

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Reference	Description	Specification
A50231	Sealant - Pressure And Environmental - Chromate Type	BMS5-95 Class B
A50296	Sealant - Pressure And Environmental - Chromate Type	BMS5-95 Class C
B00083	Solvent - VM&P Naphthas	TT-N-95 Type II, ASTM D-3735 Type III
B00130	Alcohol - Isopropyl	TT-I-735
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)

E. 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

F. 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 20-20-00, SWPM 20-60-06, SWPM 20-61-11).

(a) Tighten the bussing plug [2] to 95 in-lb (11 N·m) - 105 in-lb (12 N·m).

(b) For the center tank (connector D11316), inspect, clean and seal the bussing plug [2] (TASK 20-60-07-910-802).

(c) Make sure that the FQIS wire bundle is shielded and the shield ground is terminated (SWPM 20-10-15, SWPM 20-20-00).

SUBTASK 28-41-41-420-003

(4) For the main tanks and center tank do these steps to install the 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 alcohol, B00130, or solvent, B00184.

1) Rub dry with a clean, dry cotton wiper, G00034.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 ground wire [3] and the two washers.

1) Use BMS 5-45 Class B-2 sealant, A50110, BMS 5-45 Class C sealant, A50155, BMS 5-95 Class B sealant, A50231, or BMS 5-95 Class C sealant, A50296, for the faying surface seal that is outside the tank.

2) Make sure that the sealant layer is approximately 0.005 in. (0.127 mm) thick.

(c) Install the nut [4], washer, and ground wire [3] to the structure.

(d) Tighten the nut [4] to 31.5 ±3.5 in-lb (4 ±1 N·m).

SUBTASK 28-41-41-760-001

28-AWL-04: CDCCL

(5) Measure the electrical bonding resistance from terminal lug on the ground wire [3] (shield pigtail) to the ground stud bracket for the applicable tank side FQIS connector (D16352, D16354, or D11316) (SWPM 20-20-10).

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-04.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-04: CDCCL

(b) Make sure that the electrical bonding resistance is 0.0010 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-04.

SUBTASK 28-41-41-390-001

(6) Apply sealant, A50142, over the nut [4] and the bonding jumper terminal (SWPM 20-20-10).

NOTE: It is satisfactory to encapsulate the ground stud head.

SUBTASK 28-41-41-860-003

(7) 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 28-41-41-080-001

WARNING REMOVE THE LOCK FROM LEADING EDGE FLAP ACTUATOR CAREFULLY TO PREVENT ACCIDENTAL OPERATION OF THE LEADING EDGE FLAPS. THE LEADING EDGE FLAPS CAN MOVE QUICKLY. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(8) Do this task: Leading Edge Flap and Slat Locks Removal, TASK 27-81-00-080-801.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-41-41-710-003

WARNING MAKE SURE THAT PERSONNEL AND EQUIPMENT STAY AWAY FROM THE LEADING EDGE 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.

(9) Operate the LE flaps to the 0 detent and stowed (LE Flaps retracted) position (TASK 27-81-00-860-804).

SUBTASK 28-41-41-710-001

(10) Do this task: Fuel Quantity Indicating System - Operational Test, TASK 28-41-00-710-801.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FQIS SPAR PENETRATION CONNECTOR - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) FQIS Spar Penetration Connector Removal

(2) FQIS Spar Penetration Connector Installation.

TASK 28-41-42-020-801

2. FQIS Spar Penetration Connector Removal

(Figure 401)

A. General

(1) This task give instructions to remove the FQIS Spar Penetration Connector.

B. References

Reference	Title
20-10-44-000-801	Lockwire, Cotter Pins, and Lockrings - Removal (P/B 401)
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)
28-11-00-300-803	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)
28-11-31-000-801	Center Tank Access Door Removal (P/B 401)
28-41-41-000-801	Bussing Plug Removal (P/B 401)
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
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

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

E. Prepare for the Removal

SUBTASK 28-41-42-860-001

(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 28-41-42-860-002

(2) Extend the leading edge slats (TASK 27-81-00-860-803).

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SUBTASK 28-41-42-860-004

(3) Lock the leading edge slats (TASK 27-81-00-480-801).

SUBTASK 28-41-42-480-001

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.

(4) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-41-42-010-002

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.

(5) Do this task for the applicable fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Open the applicable access panels:

(TASK 28-11-31-000-801)

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

SUBTASK 28-41-42-020-001

(6) Disconnect the bussing plug [1] (TASK 28-41-41-000-801).

F. FQIS Spar Penetration Connector Removal

SUBTASK 28-41-42-020-002

(1) Remove the lockwire from the jamnut [3] and bolt [4] (TASK 20-10-44-000-801).

SUBTASK 28-41-42-020-006

(2) Loosen the jamnut [3] from the spar penetration connector [2].

SUBTASK 28-41-42-020-003

(3) Remove the jamnut [3].

SUBTASK 28-41-42-160-001

(4) Remove the sealant around the edge of the receptacle on the FQIS wire harness [7].

SUBTASK 28-41-42-020-004

(5) Remove the FQIS wire harness [7] from the spar penetration connector [2].

SUBTASK 28-41-42-140-001

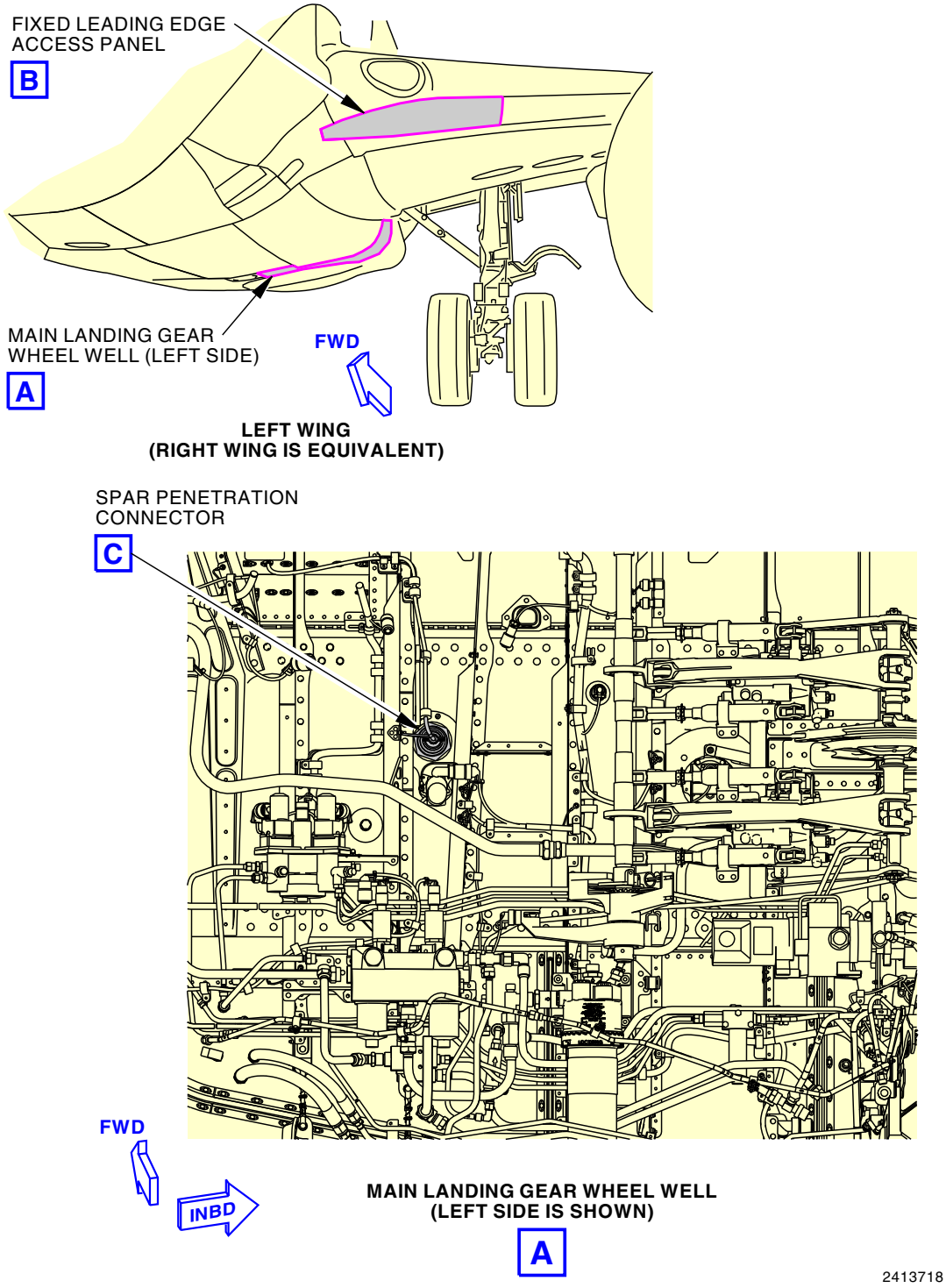
(6) Remove the sealant from the spar penetration connector [2] and the spar surface around the spar penetration connector (TASK 28-11-00-300-803).

SUBTASK 28-41-42-020-005

(7) Remove the spar penetration connector [2] from the spar.

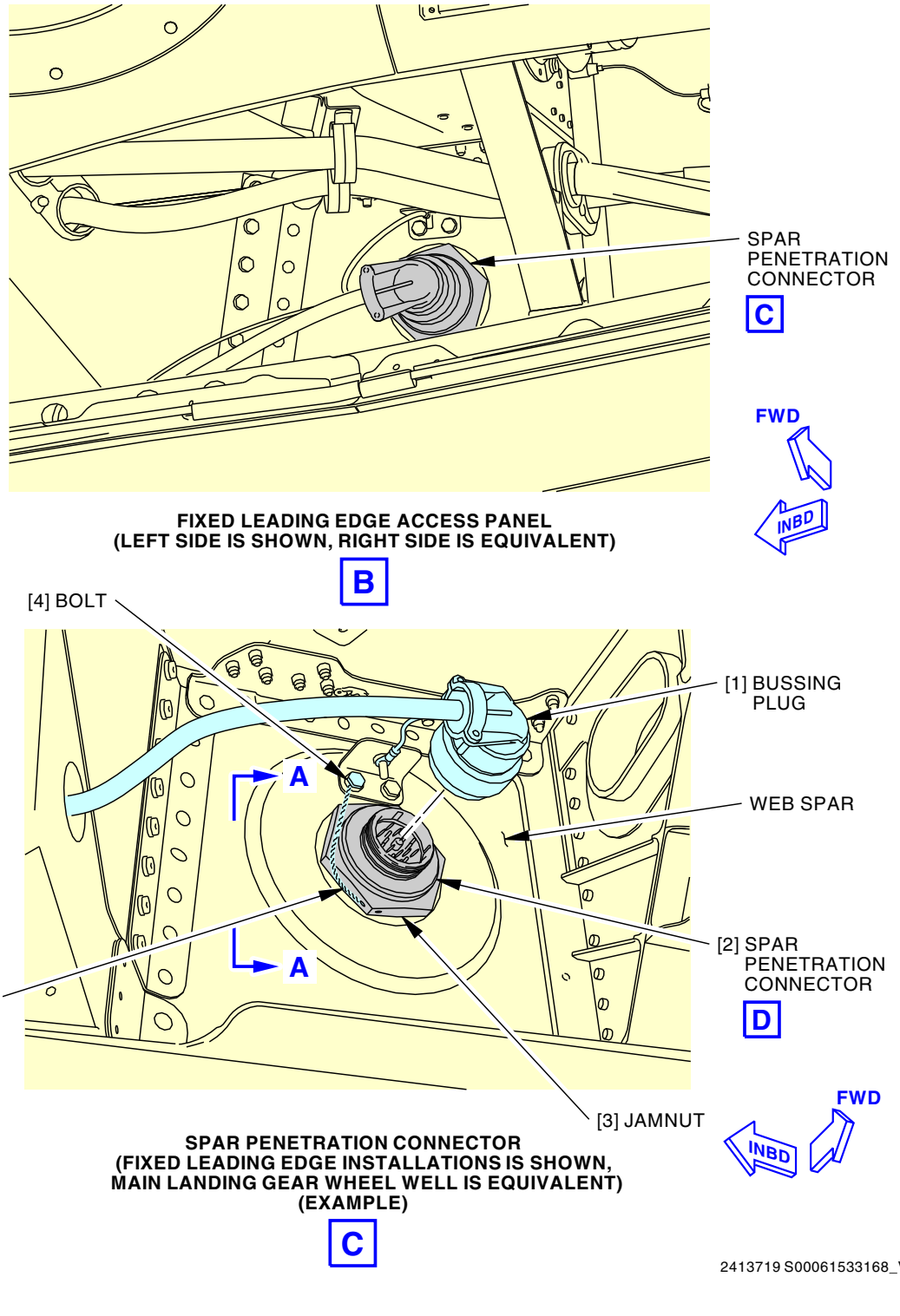
END OF TASK

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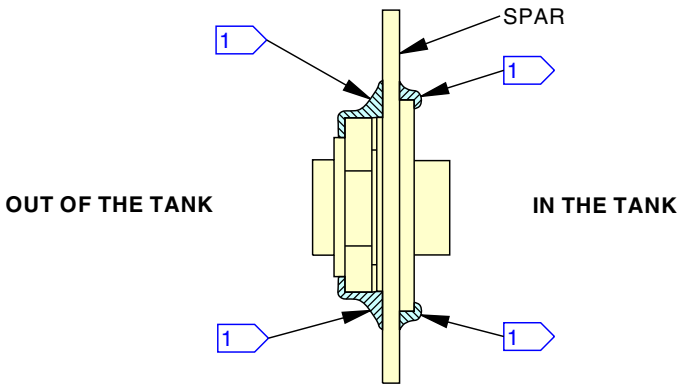
FQIS Penetration Connector Installation
Figure 401/28-41-42-990-801 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

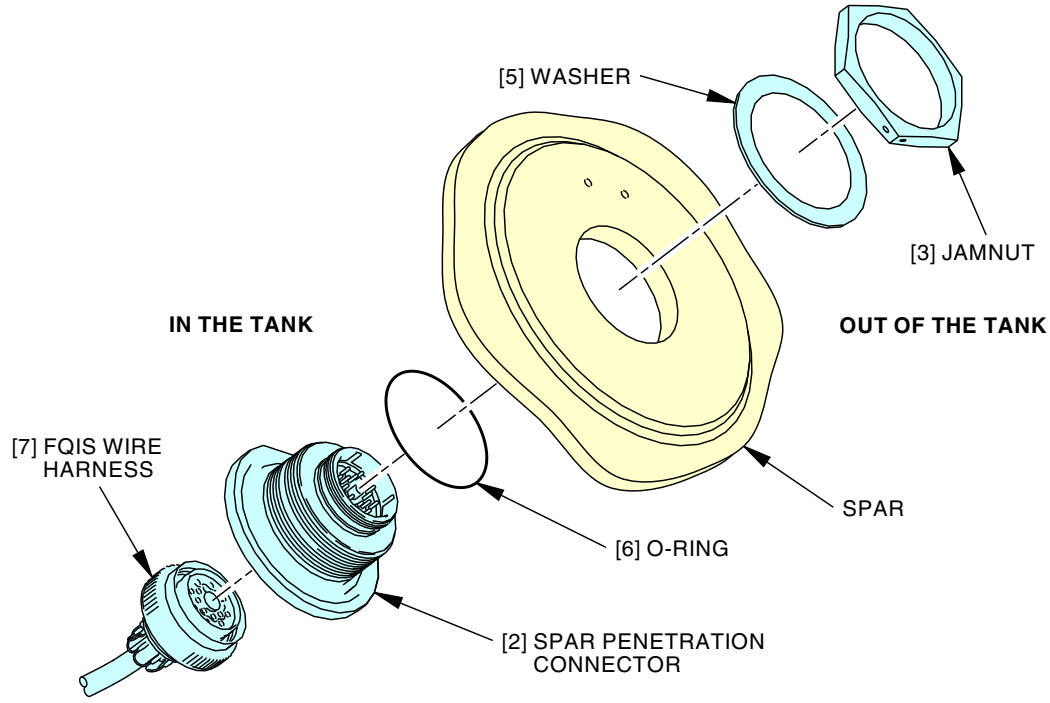


FQIS Penetration Connector Installation
Figure 401/28-41-42-990-801 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



FQIS SPAR PENETRATION CONNECTOR SEALING
A-A



SPAR PENETRATION CONNECTOR (EXAMPLE)
D

1 FILLET SEAL WITH BMS 5-45

2413720 S00061533169_V1

FQIS Penetration Connector Installation
Figure 401/28-41-42-990-801 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-41-42-420-801

3. FQIS Spar Penetration Connector Installation

(Figure 401)

A. General

(1) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-09.

B. References

Reference	Title
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
20-10-44-400-801	Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401)
20-60-07-910-802	Inspection, Cleaning and Sealing of Electrical Connectors (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)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-00-300-803	Repair of Sealant Leaks in the Fuel Tank Structure (P/B 801)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-00-790-804	Fuel Tank Closure Leak Check (P/B 601)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-41-00-730-801	Fuel Quantity Indicating System - Dry Capacitance Test (P/B 501)
28-41-41-400-801	Bussing Plug Installation (P/B 401)
51-22-00-390-806	Fillet Seal Application (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

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D. Consumable Materials

Reference	Description	Specification
A00247	Sealant - Pressure And Environmental - Chromate Type	BMS5-95
A00767	Sealant - Fuel Tank	BMS5-45
C00064	Coating - Aluminum Chemical Conversion	BAC5719 Type II Class A (MIL-DTL-5541 Class 1A)
C00259	Coating - Chemical And Solvent Resistant Finish, Corrosion Inhibiting Primer	BMS10-11 Type I

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	Spar penetration connector	28-11-51-20-030	SIA ALL
		28-11-51-21-080	SIA ALL
		28-11-51-22-080	SIA ALL
6	O-ring	28-11-51-20-015	SIA ALL
		28-11-51-21-060	SIA ALL
		28-11-51-22-060	SIA ALL

F. 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
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

G. 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

H. FQIS Spar Penetration Connector Installation

SUBTASK 28-41-42-100-001

(1) Clean the fay surfaces of the aluminum spar (abrasive), the flange (solvent) on the spar penetration connector [2], and the washer [5] (SWPM 20-20-00, Paragraphs 2 and 3).

SUBTASK 28-41-42-420-001

(2) Install a new O-ring [6] in the O-ring groove of the spar penetration connector [2].

SUBTASK 28-41-42-390-002

(3) Apply a thin layer of sealant, A00767, to one side of the washer [5].

SUBTASK 28-41-42-420-009

(4) Align the washer [5] to the spar with the sealant facing the spar (dry side).

(a) Carefully remove excess sealant in the spar hole.

SUBTASK 28-41-42-420-002

(5) Install the spar penetration connector [2] to the spar, as follows:

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28-AWL-09: CDCCL

(a) Apply a fay surface bond on the spar penetration connector [2] and the spar in the fuel tank (TASK 28-11-00-300-803, 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-09.

1) Use sealant, A00767.

(b) Install the spar penetration connector [2] in the spar.

(c) Install the jamnut [3] to the spar penetration connector [2].

SUBTASK 28-41-42-420-010

(6) Tighten the jamnut [3] to 325 in-lb (37 N·m) to 350 in-lb (40 N·m).

SUBTASK 28-41-42-765-001

28-AWL-09: CDCCL

(7) Measure the electrical bonding resistance between the spar penetration connector [2] and the structure (spar) in the fuel tank (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-09.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-09: CDCCL

(b) Make sure that the electrical bonding resistance is 0.0010 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-09.

SUBTASK 28-41-42-420-005

(8) Install the lockwire between the jamnut [3] and bolt [4] (TASK 20-10-44-400-801).

SUBTASK 28-41-42-390-001

28-AWL-09: CDCCL

(9) Apply a fillet seal around the spar penetration connector [2] in the fuel tank (TASK 51-22-00-390-806).

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-09.

(a) Use sealant, A00767.

SUBTASK 28-41-42-860-005

(10) Manually apply coating, C00064,on the bare metal surfaces on the spar in the fuel tank.

SUBTASK 28-41-42-860-006

(11) Apply primer, C00259, on the bare metal surfaces on the spar in the fuel tank.

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SUBTASK 28-41-42-420-006

(12) Connect the FQIS wire harness [7] to the spar penetration connector [2].

SUBTASK 28-41-42-420-007

28-AWL-09: CDCCL

(13) Apply a fillet seal around the spar penetration connector [2] out of the fuel tank (TASK 51-22-00-390-806).

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-09.

(a) Use sealant, A00247.

SUBTASK 28-41-42-860-007

(14) Manually apply coating, C00064, on the bare metal surfaces on the spar in the fuel tank.

SUBTASK 28-41-42-860-008

(15) Apply primer, C00259, on the bare metal surfaces on the spar in the fuel tank.

SUBTASK 28-41-42-211-001

(16) Inspect the bussing plug [1] (TASK 20-60-07-910-802).

SUBTASK 28-41-42-420-008

(17) Connect the bussing plug [1] to the spar penetration connector [2] (TASK 28-41-41-400-801).

I. FQIS Spar Penetration Connector Installation Test

SUBTASK 28-41-42-410-001

(1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

(a) Close the applicable access panels:

(TASK 28-11-31-400-801)

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

SUBTASK 28-41-42-860-003

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

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 28-41-42-820-001

(3) Do the fuel quantity indicating system test (TASK 28-41-00-730-801).

SUBTASK 28-41-42-650-003

(4) Refuel the applicable fuel tank (TASK 12-11-00-650-803).

SUBTASK 28-41-42-790-001

(5) Monitor the applicable spar penetration connector [2] for leakage for a minimum of one hour (TASK 28-11-00-790-804).

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J. Put the Airplane Back to Its Usual Condition

SUBTASK 28-41-42-080-001

(1) Remove and then retract the leading edge slats (TASK 27-81-00-080-801, TASK 27-81-00-860-804).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FQIS TANK-TO-TANK FEED-THROUGH CONNECTOR - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) FQIS Tank-to-Tank Feed-Through Connector Removal

(2) FQIS Tank-to-Tank Feed-Through Connector Installation.

TASK 28-41-43-000-801

2. FQIS Tank-to-Tank Feed-Through Connector Removal

A. References

Reference	Title
20-10-44-000-801	Lockwire, Cotter Pins, and Lockrings - Removal (P/B 401)
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)
32-00-01-480-801	Landing Gear Downlock Pins Installation (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
531BB	Center Tank Access Door - Wing Station 192
532AB	Main Tank Access Door - Wing Station 216
631BB	Center Tank Access Door - Wing Station 192
632AB	Main Tank Access Door - Wing Station 216

D. Prepare for the Removal

SUBTASK 28-41-43-860-001

(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 28-41-43-480-001

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.

(2) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-41-43-010-001

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.

(3) Do this task for the applicable fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Open the applicable access panels:

(TASK 28-11-31-000-801, TASK 28-11-11-000-801)

Number	Name/Location
531BB	Center Tank Access Door - Wing Station 192
532AB	Main Tank Access Door - Wing Station 216
631BB	Center Tank Access Door - Wing Station 192
632AB	Main Tank Access Door - Wing Station 216

E. FQIS Tank-to-Tank Feed-Through Connector Removal

SUBTASK 28-41-43-020-001

(1) Disconnect the FQIS connector [1] from the tank-to-tank feed-through connector [7].

SUBTASK 28-41-43-020-002

(2) Disconnect the FQIS connector [2] from the tank-to-tank feed-through connector [7].

SUBTASK 28-41-43-020-003

(3) Remove the lockwire between the jamnut [5] and bolt [6] (TASK 20-10-44-000-801).

SUBTASK 28-41-43-020-004

(4) Remove the jamnut [5] and washer [4] from the tank-to-tank feed-through connector [7].

SUBTASK 28-41-43-020-005

(5) Remove the tank-to-tank feed-through connector [7].

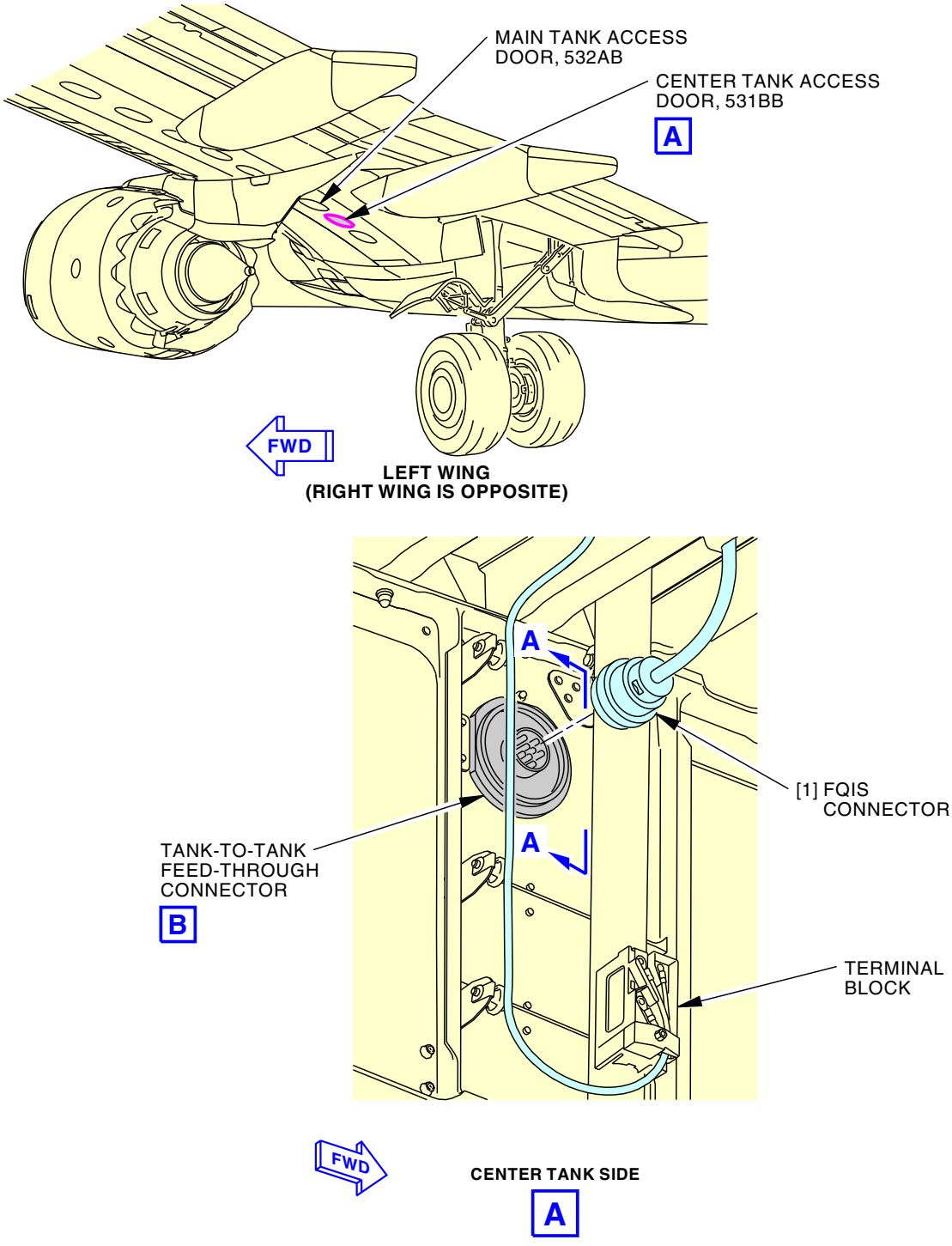
SUBTASK 28-41-43-020-006

(6) Remove the O-ring [3] from the tank-to-tank feed-through connector [7].

(a) Discard the O-ring [3]

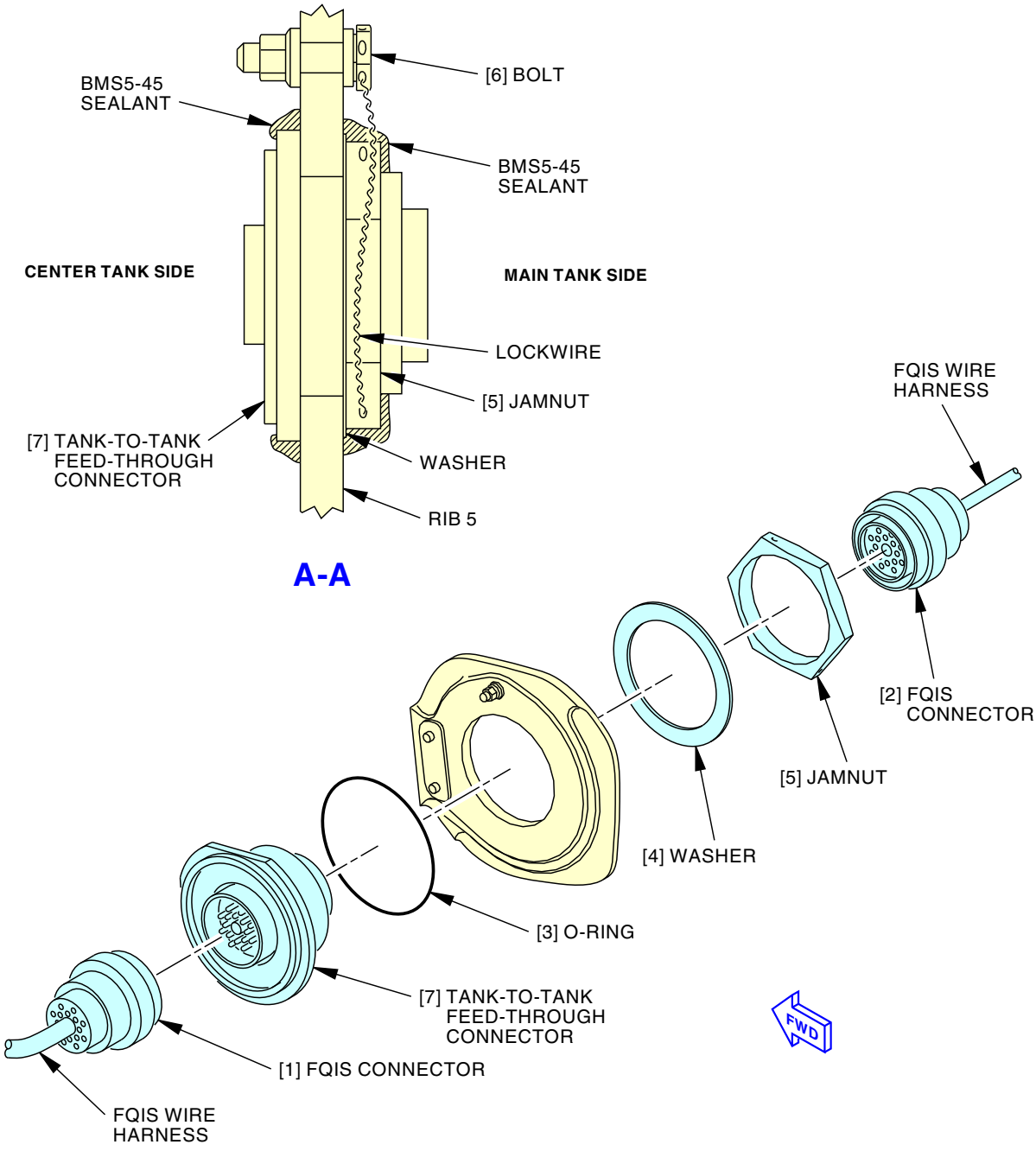
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



FQIS Rib Penetration Connector Installation
Figure 401/28-41-43-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



FQIS Rib Penetration Connector Installation
Figure 401/28-41-43-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-41-43-400-801

3. FQIS Tank-to-Tank Feed-Through Connector Installation

A. General

(1) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-09.

B. References

Reference	Title
20-10-44-400-801	Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401)
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-00-790-801	Fuel Leak Detection Procedures (P/B 601)
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)
28-41-00-710-801	Fuel Quantity Indicating System - Operational Test (P/B 501)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES
SWPM 20-60-06	INSTALLATION OF ELECTRICAL CIRCULAR CONNECTORS

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45
C00064	Coating - Aluminum Chemical Conversion	BAC5719 Type II Class A (MIL-DTL-5541 Class 1A)
C00259	Coating - Chemical And Solvent Resistant Finish, Corrosion Inhibiting Primer	BMS10-11 Type I

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	O-ring	28-11-51-21-060	SIA ALL

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

AMM Item	Description	AIPC Reference	AIPC Effectivity
3 (cont.)		28-11-51-22-060	SIA ALL
7	Tank-to-tank feed-through connector	28-11-51-21-070	SIA ALL
		28-11-51-22-070	SIA ALL

F. 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

G. Access Panels

Number	Name/Location
531BB	Center Tank Access Door - Wing Station 192
532AB	Main Tank Access Door - Wing Station 216
631BB	Center Tank Access Door - Wing Station 192
632AB	Main Tank Access Door - Wing Station 216

H. FQIS Rib Penetration Connector Installation

SUBTASK 28-41-43-120-001

(1) Clean the fay surfaces of the washer [4] and outboard side of Rib 5 (SWPM 20-20-00, Paragraphs 2 and 3).

SUBTASK 28-41-43-390-001

28-AWL-09: CDCCL

(2) Apply a fay surface bond between the flange on the tank-to-tank feed-through connector [7], and the inboard side of Rib 5 (SWPM 20-20-00, Paragraphs 2 and 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-09.

SUBTASK 28-41-43-420-001

(3) Install the new O-ring [3] in the O-ring groove on the tank-to-tank feed-through connector [7].

SUBTASK 28-41-43-390-002

(4) Apply a thin layer of sealant, A00767, to one side of the washer [4].

SUBTASK 28-41-43-820-001

(5) Align the washer [4] with the rib hole in the main tank.

(a) Make sure that the sealant side of the washer is inboard.

(b) Carefully remove sealant in the rib hole.

SUBTASK 28-41-43-420-002

(6) Install the tank-to-tank feed-through connector [7] in the rib.

SUBTASK 28-41-43-420-003

(7) Install the jamnut [5] to the tank-to-tank feed-through connector [7].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-41-43-420-004

(8) Tighten the jamnut [5] to 337.5 ±12.5 in-lb (38.1 ±1.4 N·m).

SUBTASK 28-41-43-860-002

28-AWL-09: CDCCL

(9) Measure the electrical bonding resistance between the tank-to-tank feed-through connector [7] and the structure (rib 5) (SWPM 20-20-00, Paragraph 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).

NOTE: This is applicable to Airworthiness Limitation 28-AWL-09.

NOTE: Measure the bonding resistance from the inboard side of Rib 5.

(a) Use an intrinsically safe approved bonding meter, COM-1550.

28-AWL-09: CDCCL

(b) Make sure that the electrical bonding resistance is 0.0010 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-09.

SUBTASK 28-41-43-420-005

(10) Install the lockwire between the jamnut [5] and bolt [6] (TASK 20-10-44-400-801).

SUBTASK 28-41-43-390-003

28-AWL-09: CDCCL

(11) Apply a fillet seal around the tank-to-tank feed-through connector [7] with sealant, A00767, inboard of Rib 5.

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-09.

SUBTASK 28-41-43-390-004

(12) Manually apply coating, C00064, on the bare metal surfaces on the rib in the center tank.

SUBTASK 28-41-43-390-005

(13) Apply primer, C00259, on the bare metal surfaces on the rib in the center tank.

SUBTASK 28-41-43-420-006

(14) Connect the FQIS connector [1] to the tank-to-tank feed-through connector [7].

NOTE: See SWPM 20-60-06 for more details.

(a) Tighten the FQIS connector [1] to 95 in-lb (11 N·m) - 105 in-lb (12 N·m).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-41-43-390-006

28-AWL-09: CDCCL

(15) Apply a fillet seal around the tank-to-tank feed-through connector [7] and the jamnut [5] with sealant, A00767, outboard of Rib 5.

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-09.

SUBTASK 28-41-43-390-007

(16) Manually apply coating, C00064, on the bare metal surfaces on the rib in the main tank.

SUBTASK 28-41-43-390-008

(17) Apply primer, C00259, on the bare metal surfaces on the rib in the main tank.

SUBTASK 28-41-43-420-007

(18) Connect the FQIS connector [2] to the tank-to-tank feed-through connector [7].

(a) Tighten the FQIS connector [2] to 95 in-lb (11 N·m) - 105 in-lb (12 N·m).

I. FQIS Tank-to-Tank Feed-Through Connector Installation Test

SUBTASK 28-41-43-710-001

(1) Do the air pressure and bubble solution (back-blowing) test (TASK 28-11-00-790-801).

NOTE: This test is done between the center tank and main tank.

SUBTASK 28-41-43-710-002

(2) Do this task: Fuel Quantity Indicating System - Operational Test, TASK 28-41-00-710-801.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 28-41-43-410-001

(1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

(a) Close the applicable access panels:

(TASK 28-11-31-000-801, TASK 28-11-11-400-801)

Number	Name/Location
531BB	Center Tank Access Door - Wing Station 192
532AB	Main Tank Access Door - Wing Station 216
631BB	Center Tank Access Door - Wing Station 192
632AB	Main Tank Access Door - Wing Station 216

SUBTASK 28-41-43-860-003

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

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

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FUEL TANK BULKHEAD (SPAR) RECEPTACLE WIRE HARNESS - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) FQIS Wire Harness Removal

(2) FQIS Wire Harness Installation.

B. This task replaces the FQIS wire harness in each fuel tank.

TASK 28-41-44-000-801

2. FQIS Wire Harness Removal

(Figure 401)

A. General

(1) The FQIS wire harness is referred to as the wire harness in this task.

B. 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)
SWPM 20-10-12	WIRE HARNESS SUPPORTS

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
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

E. Prepare for the Removal

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-41-44-860-002

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(2) Do this task for the applicable fuel tanks: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) For the No. 1 or No. 2 main tank, remove the access doors (TASK 28-11-11-000-801).

(b) For the center tank, remove the access doors (TASK 28-11-31-000-801).

SUBTASK 28-41-44-010-001

(3) Areas between rib No. 6 and No. 7, remove the applicable 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

NOTE: Only one access panel can be removed with the engine installed.

F. FQIS Wire Harness Removal

SUBTASK 28-41-44-020-001

(1) Disconnect the in-tank plug from the feed-through connector.

SUBTASK 28-41-44-020-002

(2) Disconnect the in-tank plug from the tank-to-tank feed through connector.

SUBTASK 28-41-44-020-003

(3) Disconnect the wire harness [1] from each terminal block on the tank units and compensator units:

(a) Remove the self-locking insert [4], washer [5], and HI-Z wire [6].

(b) Remove the self-locking insert [11], washer [10], and LO-Z wire [7].

(c) Remove the self-locking insert [13], washer [14], and HI-Z shield wire [12].

(d) Loosen the captive screw [8] on the relief clamp [9].

(e) Remove the wire harness [1] from the terminal block.

SUBTASK 28-41-44-020-004

(4) Cut all self-locking plastic straps from the stringer clips [2] and ring-post supports [3] (SWPM 20-10-12).

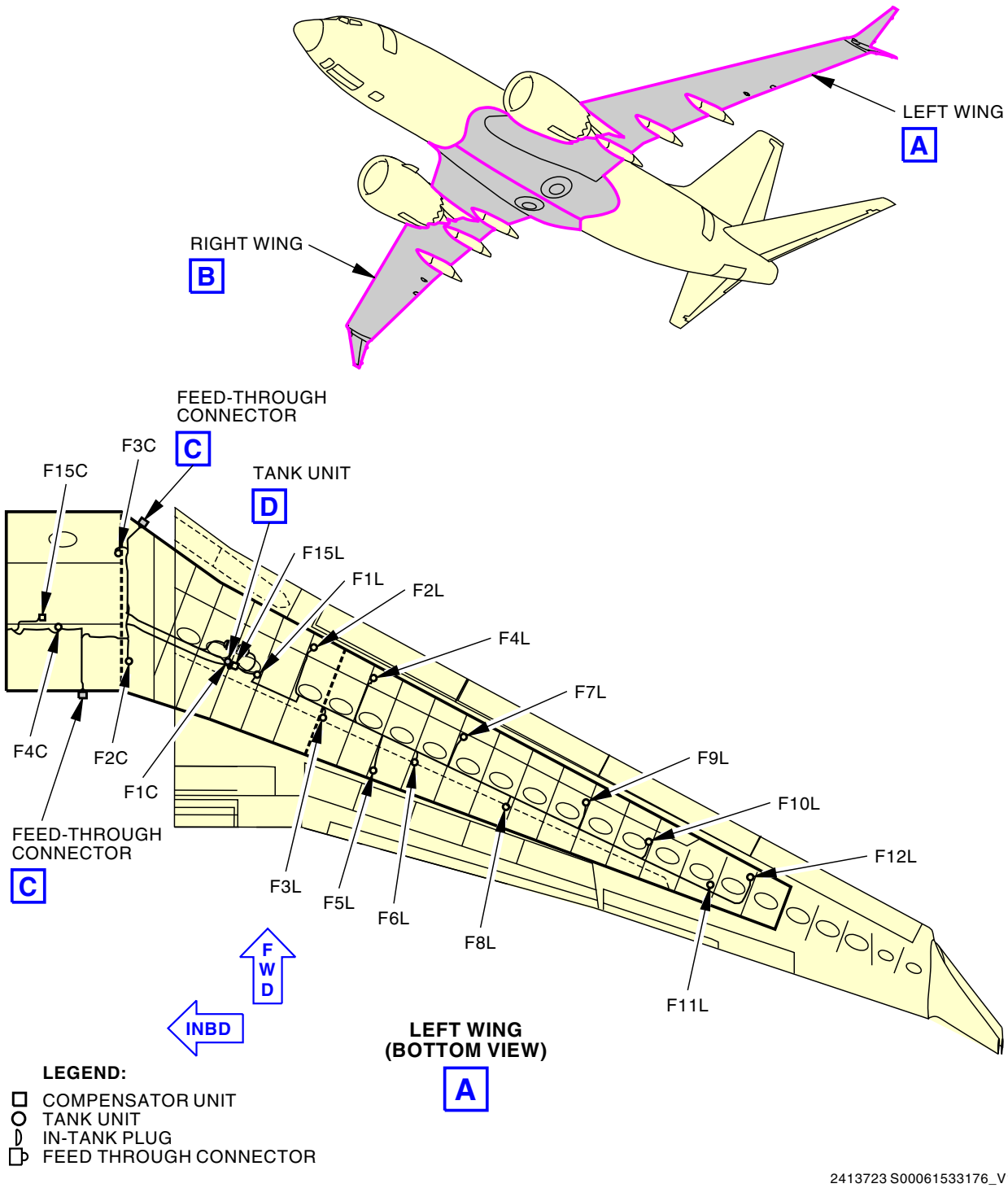
(a) Discard all self-locking plastic straps.

SUBTASK 28-41-44-020-005

(5) Remove the wire harness [1] from the fuel tank.

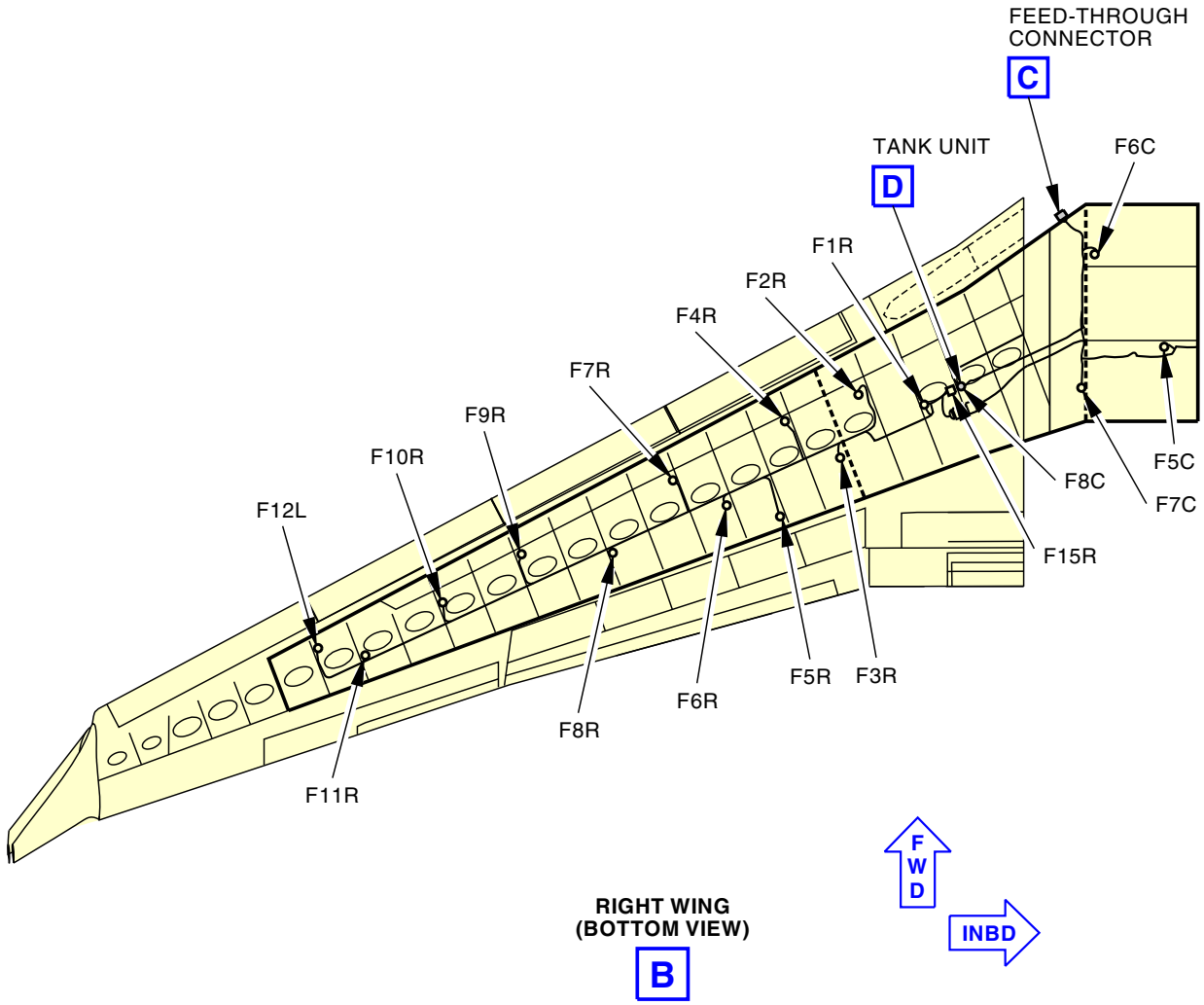
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



FQIS Wire Harness Installation
Figure 401/28-41-44-990-801 (Sheet 1 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



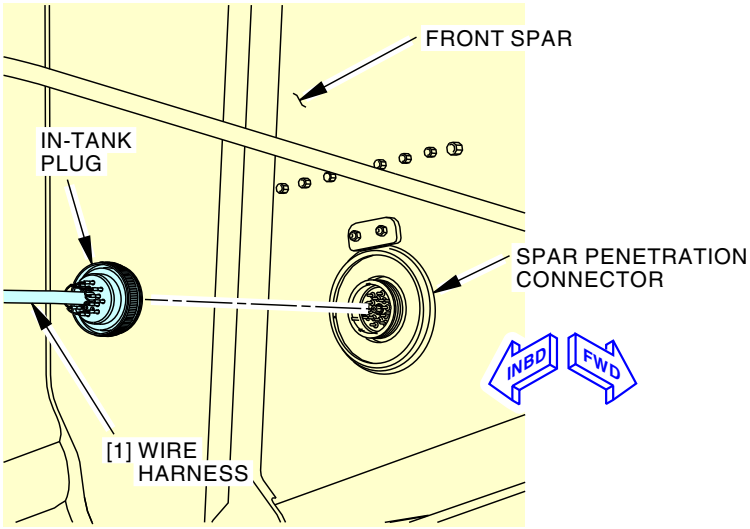
LEGEND:

- COMPENSATOR UNIT
- TANK UNIT
- IN-TANK PLUG
- FEED THROUGH CONNECTOR

2467491 S0000575619_V1

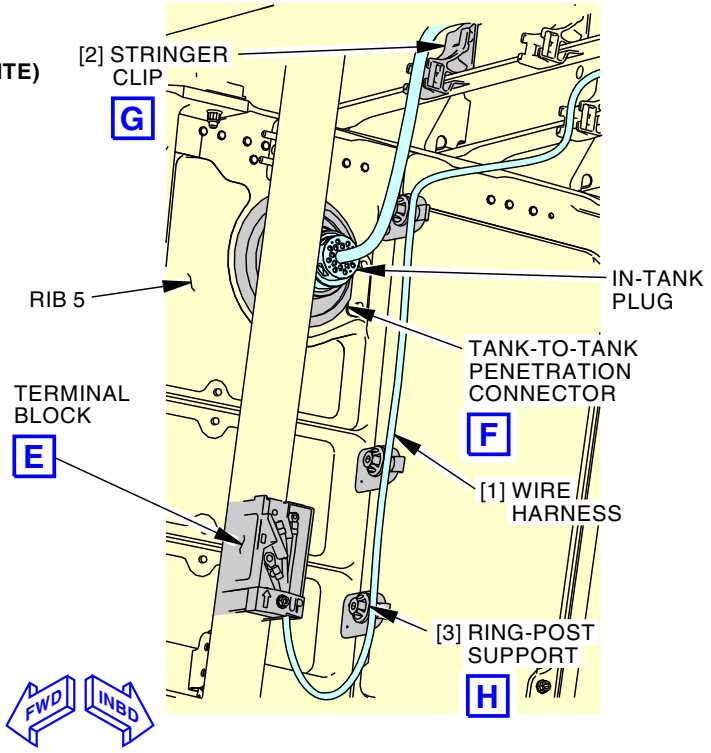
FQIS Wire Harness Installation
Figure 401/28-41-44-990-801 (Sheet 2 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



SPAR FEED THROUGH CONNECTOR
(RIGHT SIDE IS SHOWN, LEFT SIDE IS OPPOSITE)
(EXAMPLE)

C



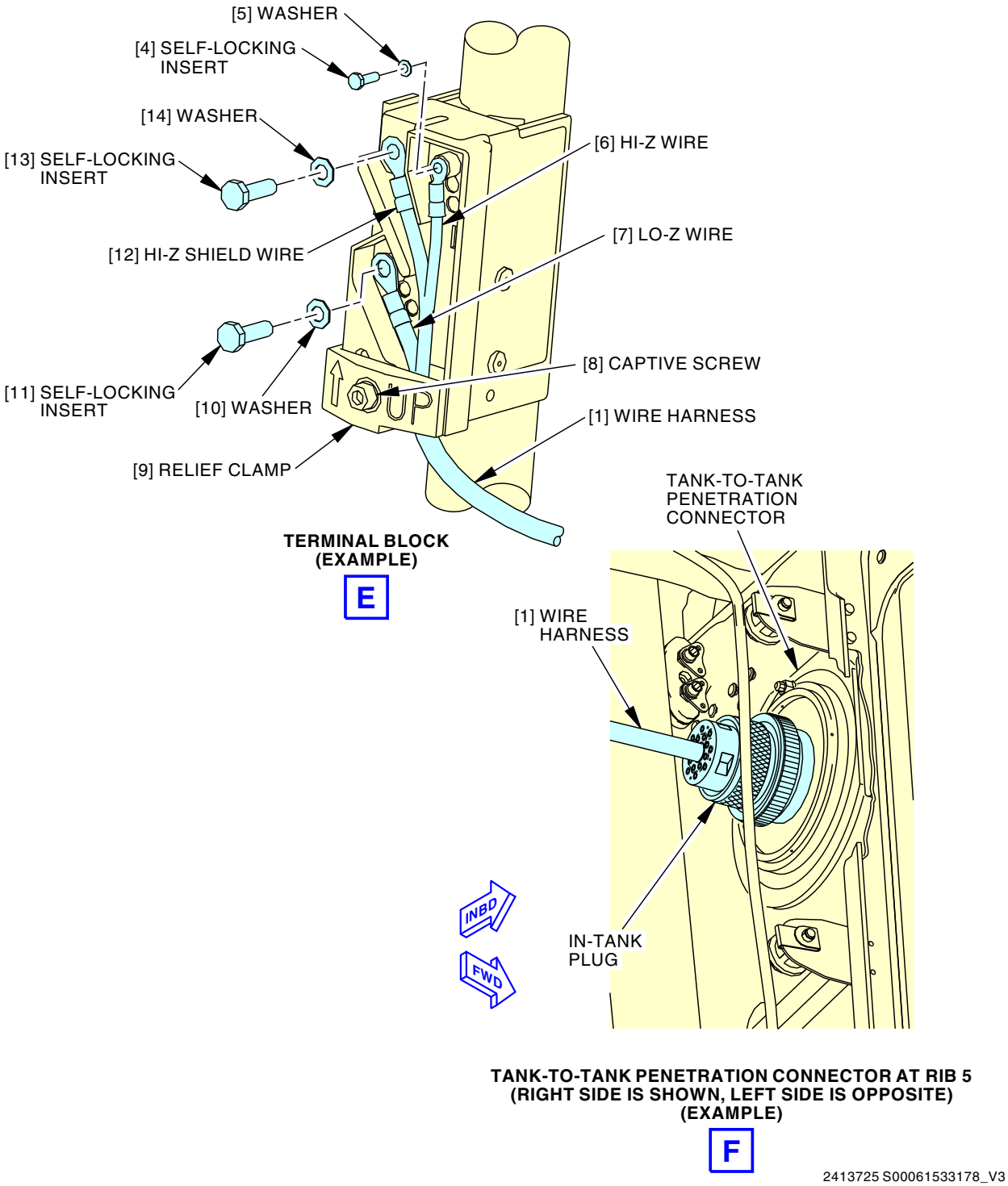
TANK-TO-TANK FEED THROUGH CONNECTOR AT RIB 5
(RIGHT SIDE IS SHOWN, LEFT SIDE IS OPPOSITE)
(EXAMPLE)

D

2413724 S00061533177_V3

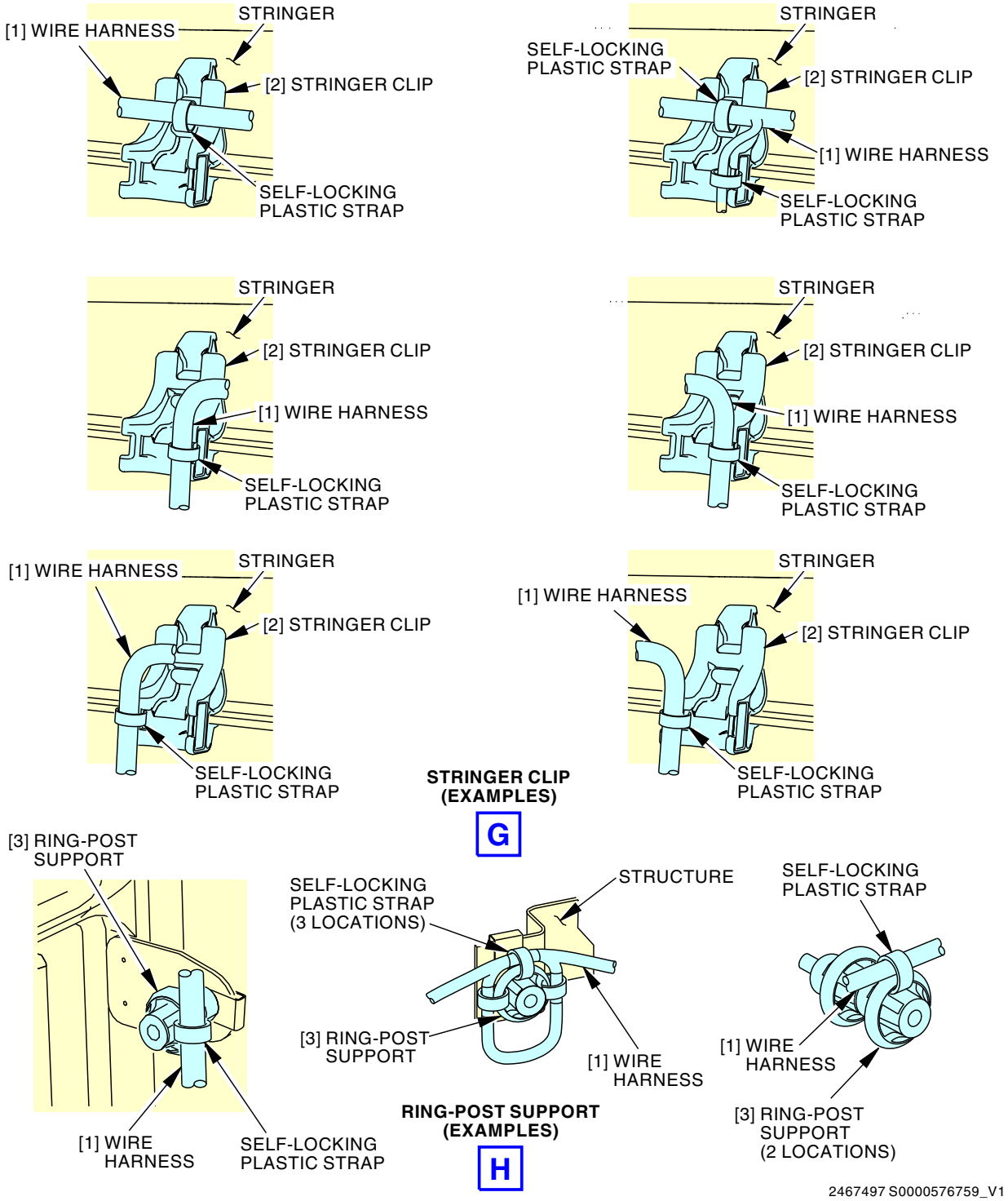
FQIS Wire Harness Installation
Figure 401/28-41-44-990-801 (Sheet 3 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



FQIS Wire Harness Installation
Figure 401/28-41-44-990-801 (Sheet 4 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



FQIS Wire Harness Installation
Figure 401/28-41-44-990-801 (Sheet 5 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-41-44-400-801

3. FQIS Wire Harness Installation

(Figure 401)

A. General

(1) This task has one or more steps which are a means to satisfy Critical Design Configuration Control Limitation (CDCCL) requirements. A CDCCL note will follow the step to which it applies. Any step or sub-step that precedes or follows a CDCCL identified step is not subject to the CDCCL requirement.

(a) For important information on CDCCL requirements, refer to this task: Airworthiness Limitation Precautions, TASK 28-00-00-910-801.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-09.

(b) This task includes the steps to install the FQIS wire harness.

B. References

Reference	Title
28-00-00-910-801	Airworthiness Limitation Precautions (P/B 201)
28-11-00-410-801	Fuel Tank Closure (P/B 201)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
28-11-31-400-801	Center Tank Access Door - Installation (P/B 401)
28-41-00-730-801	Fuel Quantity Indicating System - Dry Capacitance Test (P/B 501)
SWPM 20-10-11	WIRING ASSEMBLY AND INSTALLATION CONFIGURATION
SWPM 20-60-06	INSTALLATION OF ELECTRICAL CIRCULAR CONNECTORS

C. Consumable Materials

Reference	Description	Specification
G51043	Strap - Plastic, Wire Harness Tie, Self-locking, 8.25 Inches (209.55 mm) Long	BACS38W3
G51074	Strap - Plastic, Wire Harness Tie, Self-locking, 7.25 Inches (184.15 mm) Long	BACS38W1
G51075	Strap - Plastic, Wire Harness Tie, Self-locking, 7.50 Inches (190.50 mm) Long	BACS38W2
G51076	Strap - Plastic, Wire Harness Tie, Self-locking, 10.50 Inches (264.16 mm) Long	BACS38W4

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Wire harness	28-11-51-20-035	SIA ALL
		28-11-51-21-095	SIA ALL
		28-11-51-22-095	SIA ALL
		28-11-51-23-075	SIA ALL
		28-11-51-24-080	SIA ALL

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Zone	Area
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. 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

G. Prepare for the Installation

SUBTASK 28-41-44-210-001

28-AWL-09: CDCCL

(1) Make sure to maintain the existing (or newly approved) wire harness [1] routing, clamping, and nylon support rods.

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-09.

SUBTASK 28-41-44-210-002

28-AWL-09: CDCCL

(2) Make sure that the wire harness [1], clamps, and nylon support rods are not damaged.

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-09.

SUBTASK 28-41-44-210-003

28-AWL-09: CDCCL

(3) Make sure that the wires are not chafed.

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-09.

H. FQIS Wire Harness Installation

SUBTASK 28-41-44-420-001

(1) Connect the in-tank plug to the feed-through connector.

NOTE: See SWPM 20-60-06 for more details.

(a) Tighten the in-tank plug to 95 in-lb (11 N·m) - 105 in-lb (12 N·m).

SUBTASK 28-41-44-420-002

(2) Route the wire harness [1] in the fuel tank through these locations (SWPM 20-10-11):

- Compensator units

ECCN 9E991 BOEING PROPRIETARY - See title page for details

- Tank units
- Tank-to-tank feed-through connector.

SUBTASK 28-41-44-420-003

(3) Attach the wire harness [1] to the stringer clips [2].

(a) Hold the wire harness [1] against the stringer clip [2].

(b) Loosely tie the self-locking plastic strap to the stringer clip [2] and wire harness [1].

NOTE: The strap, G51074, strap, G51075, strap, G51043, and strap, G51076, are referred to as self-locking plastic strap in this task.

SUBTASK 28-41-44-420-004

(4) Attach the wire harness [1] to the ring-post supports [3].

(a) Hold the wire harness [1] against the ring-post support [3].

(b) Loosely tie the self-locking plastic strap to the ring-post support [3].

SUBTASK 28-41-44-420-005

(5) Adjust the wire harnesses [1] to make sure that the wires do not touch the structure.

(a) Move the wire harness [1] to make sure that it is equally spaced along the wire harness [1] routing.

(b) Keep the wire harness [1] 0.5 in. (12.7 mm) away from the structure.

28-AWL-09: CDCCL

(c) Make sure the clearance between the wire harness [1] and the structure, accounting for slack in all directions, is a minimum of 0.250 in. (6.4 mm).

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-09.

SUBTASK 28-41-44-420-006

(6) Connect the in-tank plug to the tank-to-tank feed-through connector.

NOTE: See SWPM 20-60-06 for more details.

(a) Tighten the in-tank plug to 95 in-lb (11 N·m) - 105 in-lb (12 N·m).

SUBTASK 28-41-44-420-007

(7) Connect the wire harnesses [1] to the terminal block.

(a) Install the self-locking insert [13], washer [14], and HI-Z shield wire [12] to the terminal block.

1) Tighten the self-locking insert [13] to 17.5 ±2.5 in-lb (1.98 ±0.29 N·m).

2) Make sure that the self-locking insert [13] holds the terminal tightly and HI-Z shield wire [12] does not turn.

(b) Install the self-locking insert [4], washer [5], and HI-Z wire [6] to the terminal block.

1) Tighten the self-locking insert [4] to 13.5 ±1.5 in-lb (1.53 ±0.17 N·m).

2) Make sure that the self-locking insert [4] holds the terminal tightly and HI-Z wire [6] does not turn.

(c) Install the self-locking insert [11], washer [10], and LO-Z wire [7] to the terminal block.

1) Tighten the self-locking insert [11] to 30 ±5 in-lb (3.4 ±0.6 N·m).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

2) Make sure that the self-locking insert [11] holds the terminal tightly and LO-Z wire [7] does not turn.

I. FQIS Wire Harness Installation Test

SUBTASK 28-41-44-410-001

(1) Install these 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

SUBTASK 28-41-44-410-002

(2) Close the fuel tanks (TASK 28-11-00-410-801).

(a) Install the access doors for the No. 1 or No. 2 main tanks (TASK 28-11-11-400-801).

(b) Install the access doors for the center tank (TASK 28-11-31-400-801).

SUBTASK 28-41-44-860-003

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

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 28-41-44-860-004

(4) Do this task: Fuel Quantity Indicating System - Dry Capacitance Test, TASK 28-41-00-730-801.

——— END OF TASK ———

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FUEL TANK BULKHEAD (SPAR) RECEPTACLE WIRE HARNESS - INSPECTION/CHECK

1. General

A. This procedure contains tasks to visually inspect the Fuel Quantity Indicating System (FQIS) wiring and components for each fuel tank.

B. This procedure has these tasks:

(1) FQIS Wiring and Component - Visual Inspection

(2) FQIS, No. 1 Main Tank - Inspection

(3) FQIS, No. 2 Main Tank - Inspection

(4) FQIS, Center Tank - Inspection

TASK 28-41-44-210-801

2. FQIS Wiring and Component Visual Inspection

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task has one or more steps which are a means to satisfy Airworthiness Limitation Instruction (ALI) requirements. An ALI note will follow the step to which it applies. Any step or sub-step that precedes or follows an ALI identified step is not subject to the ALI requirement.

NOTE: This is applicable to Airworthiness Limitation 28-AWL-33.

B. References

Reference	Title
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
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. Wiring Examination

SUBTASK 28-41-44-210-004

28-AWL-33: ALI

(1) Examine the wiring for the following conditions:

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-33.

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28-AWL-33: ALI

(a) Wire harness, clamps, and nylon support rod damage.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-33.

(b) Insulation is not abraded, cracked or over-stressed.

28-AWL-33: ALI

(c) Clearance between wires and structure, accounting for slack in all directions, is a minimum of 0.250 in. (6.4 mm).

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-33.

28-AWL-33: ALI

(d) Wires that are chafed.

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

NOTE: This is applicable to Airworthiness Limitation 28-AWL-33.

(e) Wires are not routed correctly.

(f) Conductors or shields that are broken or exposed.

E. Bussing Plug and Connector Examination

SUBTASK 28-41-44-210-043

(1) Examine the tank unit and compensator bussing plugs on the front spar between side-of-body rib and rib 2 for the following conditions:

(a) Tank unit and compensator bussing plugs that are lose or damaged.

(2) Examine the FQIS connectors at the inboard and outboard sides of rib 5 for the following conditions:

(a) Tank-to-tank FQIS connectors that are lose or damaged.

(3) Examine the tank unit and compensator bussing plug in the center tank located at the rear spar for the following conditions:

Tank unit and compensator bussing plug that is lose or damaged.

F. Compensator and Tank Unit Examination

SUBTASK 28-41-44-210-005

(1) Examine the compensators and tank units for damage and condition as follows:

(a) Wires attached to the terminals incorrectly.

(b) Wiring to the terminals that are damaged or incorrectly routed.

(c) An end cap is missing.

(d) Clearance from the structure that is not sufficient.

(e) Mounting brackets and hardware that are loose.

(f) Terminals that are bent.

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(g) Electrical connectors and seals that are damaged, worn, or show signs of fuel leakage.

——— END OF TASK ———

TASK 28-41-44-280-801

3. FQIS, No. 1 Main Tank - Inspection

A. 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)

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
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

D. No. 1 Main Tank Between Rib No. 5 and No. 7 - Inspection

NOTE: Rib No. 5, also known as the main tank wall.

SUBTASK 28-41-44-860-005

WARNING

OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

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(a) Remove this access panel:

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

SUBTASK 28-41-44-480-001

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-010-002

(3) To access areas between rib No. 6 and 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

SUBTASK 28-41-44-210-006

(4) For all FQIS wiring and components between Rib No. 5 and No. 7, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

E. No. 1 Main Tank Between Rib No. 7 and No. 8 - Inspection

SUBTASK 28-41-44-010-003

(1) Remove this access panel:

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

SUBTASK 28-41-44-860-006

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

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

(a) Remove this access panel:

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

SUBTASK 28-41-44-480-002

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.

(3) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-007

(4) For all FQIS wiring and components between Rib No. 7 and No. 8, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

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F. No. 1 Main Tank Between Rib No. 8 and No. 9 - Inspection

SUBTASK 28-41-44-860-007

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

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

SUBTASK 28-41-44-480-003

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-008

(3) For all FQIS wiring and components between Rib No. 8 and No. 9, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

G. No. 1 Main Tank Between Rib No. 9 and No. 10 - Inspection

SUBTASK 28-41-44-860-008

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

Number	Name/Location
532DB	Main Tank Access Door - Wing Station 313

SUBTASK 28-41-44-480-004

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-009

(3) For all FQIS wiring and components between Rib No. 9 and No. 10, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

ECCN 9E991 BOEING PROPRIETARY - See title page for details

H. No. 1 Main Tank Between Rib No. 10 and No. 11 - Inspection

SUBTASK 28-41-44-860-009

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

Number	Name/Location
532EB	Main Tank Access Door - Wing Station 337

SUBTASK 28-41-44-480-005

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-010

(3) For all FQIS wiring and components between Rib No. 10 an Rib No. 11, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

I. No. 1 Main Tank Between Rib No. 11 and No. 12 - Inspection

SUBTASK 28-41-44-860-010

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

Number	Name/Location
532FB	Main Tank Access Door - Wing Station 367

SUBTASK 28-41-44-480-006

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-011

(3) For all FQIS wiring and components between Rib No. 11 and No. 12, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

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J. No. 1 Main Tank Between Rib No. 12 and No. 13 - Inspection

SUBTASK 28-41-44-860-011

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

Number	Name/Location
532GB	Main Tank Access Door - Wing Station 390

SUBTASK 28-41-44-480-007

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-012

(3) For all FQIS wiring and components between Rib No. 12 and No. 13, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

K. No. 1 Main Tank Between Rib No. 13 and No. 14 - Inspection

SUBTASK 28-41-44-860-012

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

Number	Name/Location
532HB	Main Tank Access Door - Wing Station 417

SUBTASK 28-41-44-480-008

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-013

(3) For all FQIS wiring and components between Rib No. 13 and No. 14, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

ECCN 9E991 BOEING PROPRIETARY - See title page for details

L. No. 1 Main Tank Between Rib No. 14 and No. 15 - Inspection

SUBTASK 28-41-44-860-013

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

Number	Name/Location
532JB	Main Tank Access Door - Wing Station 443

SUBTASK 28-41-44-480-009

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-014

(3) For all FQIS wiring and components between Rib No. 14 and No. 15, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

M. No. 1 Main Tank Between Rib No. 15 and No. 16 - Inspection

SUBTASK 28-41-44-860-014

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

Number	Name/Location
532KB	Main Tank Access Door - Wing Station 470

SUBTASK 28-41-44-480-010

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-015

(3) For all FQIS wiring and components between Rib No. 15 and No. 16, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

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N. No. 1 Main Tank Between Rib No. 16 and No. 17 - Inspection

SUBTASK 28-41-44-860-015

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

Number	Name/Location
532LB	Main Tank Access Door - Wing Station 496

SUBTASK 28-41-44-480-011

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-016

(3) For all FQIS wiring and components between Rib No. 16 and No. 17, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

O. No. 1 Main Tank Between Rib No. 17 and No. 18 - Inspection

SUBTASK 28-41-44-860-016

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

Number	Name/Location
532MB	Main Tank Access Door - Wing Station 523

SUBTASK 28-41-44-480-012

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-017

(3) For all FQIS wiring and components between Rib No. 17 and No. 18, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

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P. No. 1 Main Tank Between Rib No. 18 and No. 19 - Inspection

SUBTASK 28-41-44-860-017

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

Number	Name/Location
532NB	Main Tank Access Door - Wing Station 549

SUBTASK 28-41-44-480-013

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-018

(3) For all FQIS wiring and components between Rib No. 18 and No. 19, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

Q. No. 1 Main Tank Between Rib No. 19 and No. 20 - Inspection

SUBTASK 28-41-44-860-018

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

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

SUBTASK 28-41-44-480-014

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-019

(3) For all FQIS wiring and components between Rib No. 19 and No. 20, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

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R. No. 1 Main Tank Between Rib No. 20 and No. 21 - Inspection

SUBTASK 28-41-44-860-019

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

Number	Name/Location
532QB	Main Tank Access Door - Wing Station 602

SUBTASK 28-41-44-480-015

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-020

(3) For all FQIS wiring and components between Rib No. 20 and No. 21, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

S. No. 1 Main Tank Between Rib No. 21 and No. 22 - Inspection

SUBTASK 28-41-44-860-020

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

Number	Name/Location
532RB	Main Tank Access Door - Wing Station 629

SUBTASK 28-41-44-480-016

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-021

(3) For all FQIS wiring and components between Rib No. 21 and No. 22, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

T. Put the Airplane Back to Its Usual Condition

SUBTASK 28-41-44-410-003

(1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

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(a) Close the applicable access panels if needed:

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

——— END OF TASK ———

TASK 28-41-44-280-802

4. FQIS, No. 2 Main Tank - Inspection

A. 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)

B. 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

C. 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

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(Continued)

Number	Name/Location
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

D. No. 2 Main Tank Between Rib No. 5 and No. 7 - Inspection

NOTE: Rib No. 5, also known as the main tank wall.

SUBTASK 28-41-44-860-021

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

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

SUBTASK 28-41-44-480-017

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-010-004

(3) To access areas between rib No. 6 and 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

SUBTASK 28-41-44-210-022

(4) For all FQIS wiring and components between Rib No. 5 and No. 7, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

E. No. 2 Main Tank Between Rib No. 7 and No. 8 - Inspection

SUBTASK 28-41-44-010-005

(1) Open this access panel:

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-41-44-860-022

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

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

(a) Remove this access panel:

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

SUBTASK 28-41-44-480-018

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.

(3) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-023

(4) For all FQIS wiring and components between Rib No. 7 and No. 8, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

F. No. 2 Main Tank Between Rib No. 8 and No. 9 - Inspection

SUBTASK 28-41-44-860-023

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

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

SUBTASK 28-41-44-480-019

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-024

(3) For all FQIS wiring and components between Rib No. 8 and No. 9, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. No. 2 Main Tank Between Rib No. 9 and No. 10 - Inspection

SUBTASK 28-41-44-860-024

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

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

SUBTASK 28-41-44-480-020

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.

(2) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-025

(3) For all FQIS wiring and components between Rib No. 9 and No. 10, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

H. No. 2 Main Tank Between Rib No. 10 and No. 11 - Inspection

SUBTASK 28-41-44-860-025

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

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

SUBTASK 28-41-44-480-021

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-026

(3) For all FQIS wiring and components between Rib No. 10 and No. 11, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

I. No. 2 Main Tank Between Rib No. 11 and No. 12 - Inspection

SUBTASK 28-41-44-860-026

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

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

SUBTASK 28-41-44-480-022

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-027

(3) For all FQIS wiring and components between Rib No. 11 and No. 12, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

J. No. 2 Main Tank Between Rib No. 12 and No. 13 - Inspection

SUBTASK 28-41-44-860-027

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

Number	Name/Location
632GB	Main Tank Access Door - Wing Station 390

SUBTASK 28-41-44-480-023

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-028

(3) For all FQIS wiring and components between Rib No. 12 and No. 13, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

K. No. 2 Main Tank Between Rib No. 13 and No. 14 - Inspection

SUBTASK 28-41-44-860-028

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

Number	Name/Location
632HB	Main Tank Access Door - Wing Station 417

SUBTASK 28-41-44-480-024

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-029

(3) For all FQIS wiring and components between Rib No. 13 and No. 14, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

L. No. 2 Main Tank Between Rib No. 14 and No. 15 - Inspection

SUBTASK 28-41-44-860-029

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

Number	Name/Location
632JB	Main Tank Access Door - Wing Station 443

SUBTASK 28-41-44-480-025

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-030

(3) For all FQIS wiring and components between Rib No. 14 and No. 15, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

M. No. 2 Main Tank Between Rib No. 15 and No. 16 - Inspection

SUBTASK 28-41-44-860-030

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

Number	Name/Location
632KB	Main Tank Access Door - Wing Station 470

SUBTASK 28-41-44-480-026

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-031

(3) For all FQIS wiring and components between Rib No. 15 and No. 16, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

N. No. 2 Main Tank Between Rib No. 16 and No. 17 - Inspection

SUBTASK 28-41-44-860-031

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

Number	Name/Location
632LB	Main Tank Access Door - Wing Station 496

SUBTASK 28-41-44-480-027

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-032

(3) For all FQIS wiring and components between Rib No. 16 and No. 17, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

O. No. 2 Main Tank Between Rib No. 17 and No. 18 - Inspection

SUBTASK 28-41-44-860-032

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

Number	Name/Location
632MB	Main Tank Access Door - Wing Station 523

SUBTASK 28-41-44-480-028

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-033

(3) For all FQIS wiring and components between Rib No. 17 and No. 18, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

P. No. 2 Main Tank Between Rib No. 18 and No. 19 - Inspection

SUBTASK 28-41-44-860-033

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

Number	Name/Location
632NB	Main Tank Access Door - Wing Station 549

SUBTASK 28-41-44-480-029

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-034

(3) For all FQIS wiring and components between Rib No. 18 and No. 19, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Q. No. 2 Main Tank Between Rib No. 19 and No. 20 - Inspection

SUBTASK 28-41-44-860-034

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

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

SUBTASK 28-41-44-480-030

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-035

(3) For all FQIS wiring and components between Rib No. 19 and No. 20, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

R. No. 2 Main Tank Between Rib No. 20 and No. 21 - Inspection

SUBTASK 28-41-44-860-035

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

Number	Name/Location
632QB	Main Tank Access Door - Wing Station 602

SUBTASK 28-41-44-480-031

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-036

(3) For all FQIS wiring and components between Rib No. 20 and No. 21, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

S. No. 2 Main Tank Between Rib No. 21 and No. 22 - Inspection

SUBTASK 28-41-44-860-036

> **WARNING** OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the fuel tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

Number	Name/Location
632RB	Main Tank Access Door - Wing Station 629

SUBTASK 28-41-44-480-032

> **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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-037

(3) For all FQIS wiring and components between Rib No. 21 and No. 22, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

T. Put the Airplane Back to Its Usual Condition

SUBTASK 28-41-44-410-004

(1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

(a) Close the applicable access panels if needed:

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

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-41-44-280-803

5. FQIS, Center Tank - Inspection

A. 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)

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
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. Left Wing Center Tank Between Rib No. 4 and No. 5 - Inspection

SUBTASK 28-41-44-860-037

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the center tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

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

SUBTASK 28-41-44-480-033

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-038

(3) For all FQIS wiring and components between Rib No. 4 and No. 5, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

E. Left Wing Center Tank Between Rib No. 1 and No. 4 - Inspection

NOTE: Rib No. 1, also known as side-of-body.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-41-44-860-038

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the center tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

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

SUBTASK 28-41-44-480-034

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-039

(3) For all FQIS wiring and components between Rib No. 1 and No. 4, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801.

F. Right Wing Center Tank Between Rib No. 4 and No. 5 - Inspection

SUBTASK 28-41-44-860-039

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the center tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

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

SUBTASK 28-41-44-480-035

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-040

(3) For all FQIS wiring and components between Rib No. 4 and No. 5, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

G. Right Wing Center Tank Between Rib No. 1 and No. 4 - Inspection

NOTE: Rib No. 1, also known as side-of-body.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-41-44-860-040

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the center tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

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

SUBTASK 28-41-44-480-036

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-041

(3) For all FQIS wiring and components between Rib No. 1 and No. 4, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

H. Fuselage Center Tank - Inspection

SUBTASK 28-41-44-860-041

WARNING OBEY THE PURGING AND FUEL TANK ENTRY PRECAUTIONS. IF YOU IGNORE THE PRECAUTIONS, THE CONDITIONS CAN KILL PERSONNEL, CAUSE INJURIES, AND CAUSE DAMAGE TO EQUIPMENT.

(1) Do this task for the center tank: Purging and Fuel Tank Entry, TASK 28-11-00-910-802.

(a) Remove this access panel:

Number	Name/Location
131AB	Center Tank Access

SUBTASK 28-41-44-480-037

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) Go into the fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-41-44-210-042

(3) For all FQIS wiring and components in the fuselage center tank, do this task: FQIS Wiring and Component Visual Inspection, TASK 28-41-44-210-801

I. Put the Airplane Back to Its Usual Condition

SUBTASK 28-41-44-410-005

(1) Do this task: Fuel Tank Closure, TASK 28-11-00-410-801.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Close the applicable access panels if needed:

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

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

REFUEL QUANTITY INDICATOR - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

SIA ALL; AIRPLANES WITHOUT ALOFT AUXILIARY TANK (STC TM-9000-AMMS AND TM-9001-AMMS)

(1) Refuel Quantity Indicator Removal

(2) Refuel Quantity Indicator Installation

SIA ALL

B. The preselect fuel quantity indicator is referred to as the fuel quantity indicator in these tasks.

C. When you remove a refuel quantity indicator, it is recommended that you inspect the wire bundles for wire chafing behind the P15 Refuel Panel. To check the wire bundles, you need to remove the P15 Refuel Panel.

SIA ALL; AIRPLANES WITHOUT ALOFT AUXILIARY TANK (STC TM-9000-AMMS AND TM-9001-AMMS)

TASK 28-41-61-000-801

2. Refuel Quantity Indicator Removal

(Figure 401)

A. General

(1) This task gives you instructions to remove the refuel quantity indicator.

B. References

Reference	Title
20-40-12 P/B 201	ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES - MAINTENANCE PRACTICES
28-21-82-000-801	Refuel Panel, P15 Removal (P/B 401)

C. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

D. Access Panels

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

E. Prepare for the Removal

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	4	C01441	FUEL FUELING IND
A	5	C00398	FUEL QTY 2
A	6	C00397	FUEL QTY 1

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA ALL; AIRPLANES WITHOUT ALOFT AUXILIARY TANK (STC TM-9000-AMMS AND TM-9001-AMMS) (Continued)

SUBTASK 28-41-61-010-001

(2) Open this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-41-61-010-002

(3) Remove the refuel panel [3] (TASK 28-21-82-000-801).

NOTE: The removal of the refuel panel is recommended, but not necessary. With the refuel panel [3] removed, you can do a visual check of the wire bundle behind the refuel panel [3].

F. Refuel Quantity Indicator Removal

SUBTASK 28-41-61-760-001

CAUTION

DO NOT TOUCH THE UNIT BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE UNIT.

(1) Before you touch the refuel quantity indicator [4], do the procedure for devices that are sensitive to electrostatic discharge (PAGEBLOCK 20-40-12/201).

SUBTASK 28-41-61-020-003

(2) Loosen the adjustment screw [2] of the applicable refuel quantity indicator [4].

SUBTASK 28-41-61-480-001

(3) Put a tag or mark on the applicable electrical connector [1] and the refuel quantity indicator [4].

SUBTASK 28-41-61-020-002

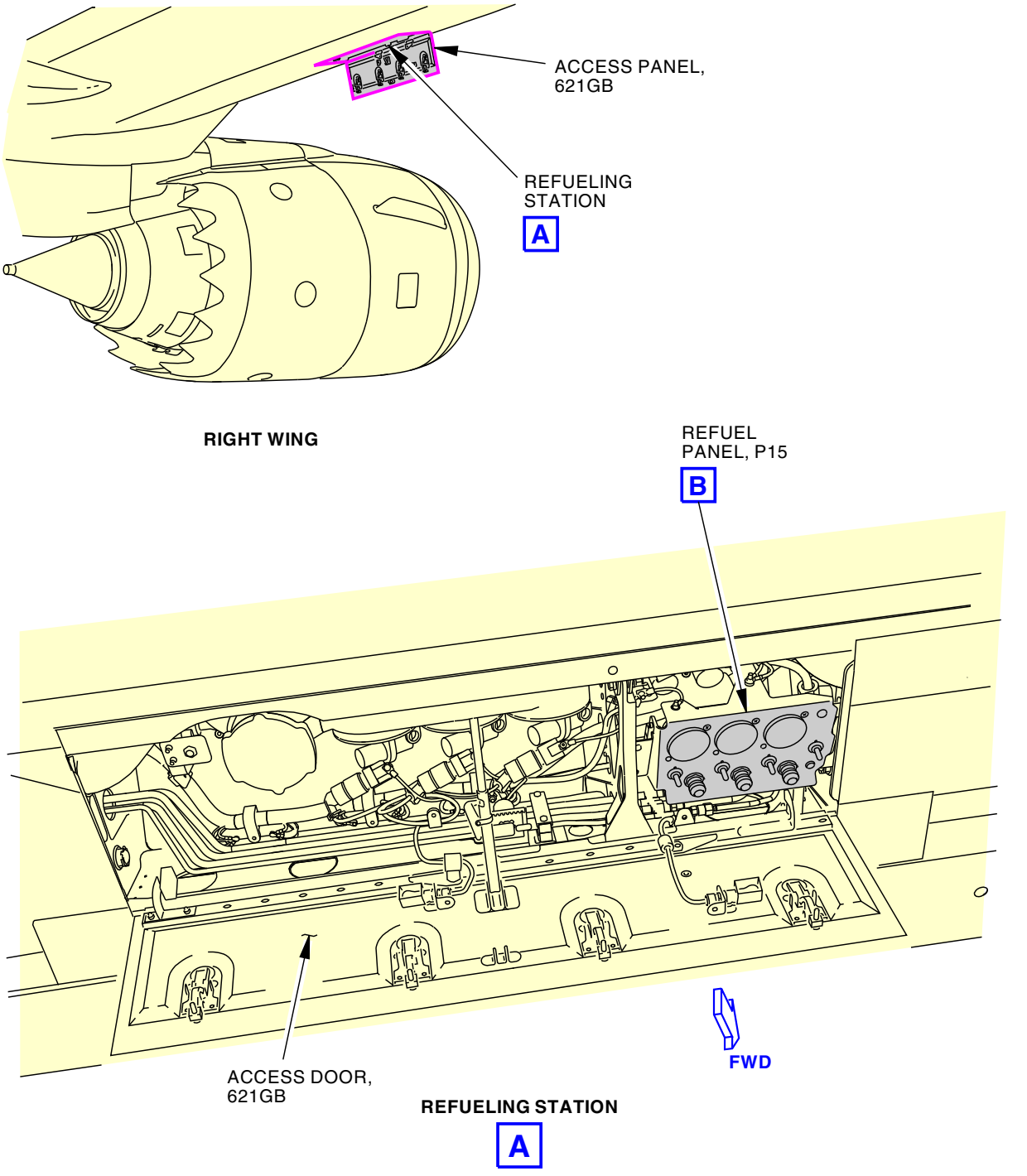
(4) Disconnect the applicable electrical connector [1] from the rear of the refuel quantity indicator [4].

SUBTASK 28-41-61-020-001

(5) Remove the refuel quantity indicator [4] through the forward side of the refuel panel [3].

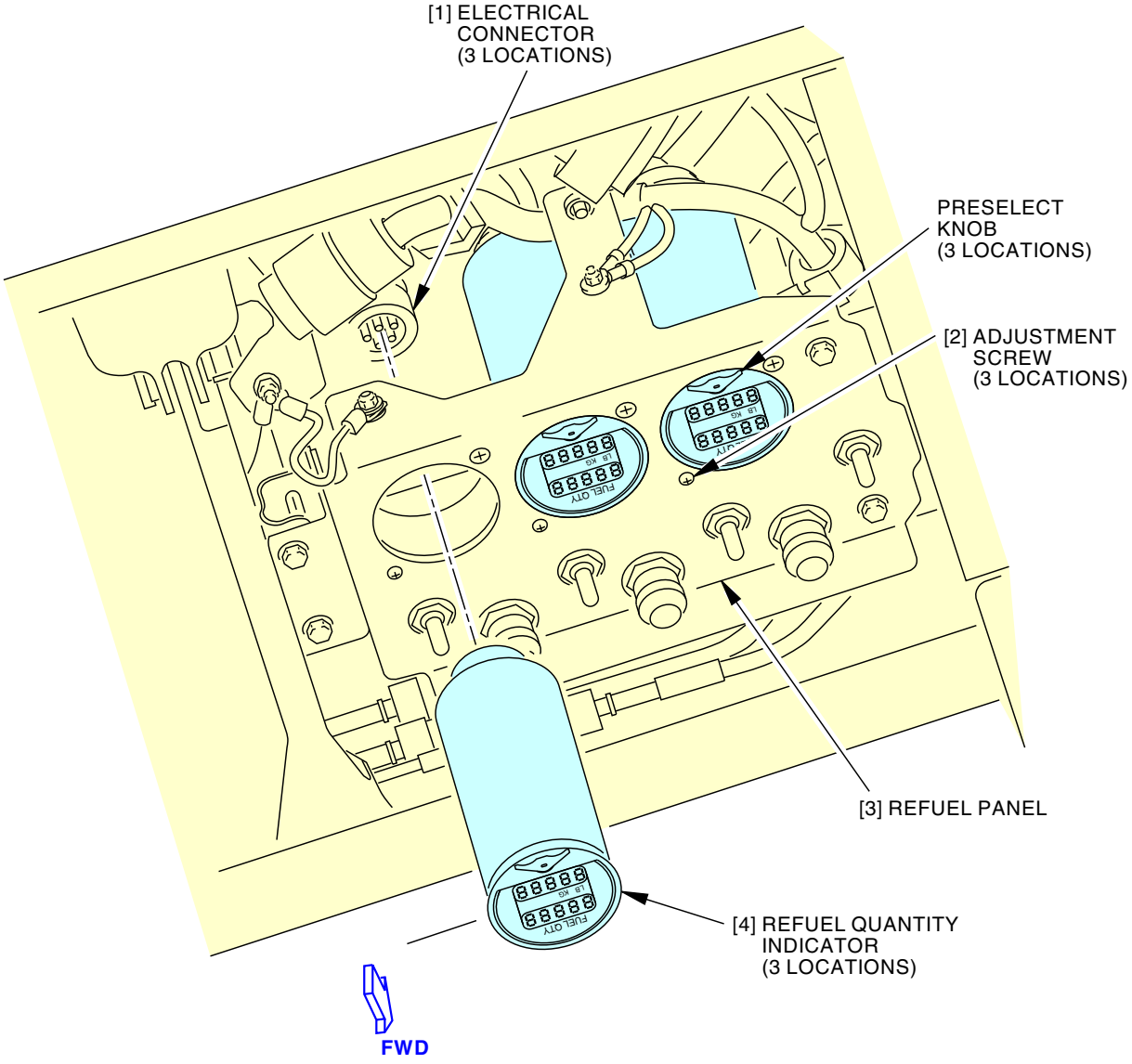
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Refuel Quantity Indicators Installation
Figure 401/28-41-61-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



REFUEL PANEL, P15

B

NOTE:

THE PRESELECT FUEL QUANTITY INDICATOR IS REFERRED TO AS THE REFUEL QUANTITY INDICATOR.

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Refuel Quantity Indicators Installation
Figure 401/28-41-61-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-41-61-400-801

3. Refuel Quantity Indicator Installation

(Figure 401)

A. References

Reference	Title
20-40-12 P/B 201	ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES - MAINTENANCE PRACTICES
28-21-82-400-801	Refuel Panel, P15 Installation (P/B 401)

B. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
4	Refuel quantity indicator	28-41-61-01-010	SIA ALL

C. Location Zones

Zone	Area
621	Right Wing - Leading Edge to Front Spar

D. Access Panels

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

E. Refuel Quantity Indicator Installation

SUBTASK 28-41-61-760-002

CAUTION

DO NOT TOUCH THE UNIT BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE UNIT.

(1) Before you touch the refuel quantity indicator [4], do the procedure for devices that are sensitive to electrostatic discharge (PAGEBLOCK 20-40-12/201).

SUBTASK 28-41-61-420-001

(2) Install the refuel quantity indicator [4] into the refuel panel [3].

SUBTASK 28-41-61-420-003

(3) Connect the electrical connector [1] to the refuel quantity indicator [4].

NOTE: Make sure that the temporary tags or marks match before you connect the electrical connector [1] to the refuel quantity indicator [4].

SUBTASK 28-41-61-080-001

(4) Remove the temporary tags or marks from the electrical connector [1] and refuel quantity indicator [4].

SUBTASK 28-41-61-820-001

(5) Align the face of the refuel quantity indicator [4] with the refuel panel [3].

SUBTASK 28-41-61-420-002

(6) Tighten the adjustment screw [2] to secure the refuel quantity indicator [4] to the refuel panel [3].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA ALL; AIRPLANES WITHOUT ALOFT AUXILIARY TANK (STC TM-9000-AMMS AND TM-9001-AMMS) (Continued)

SUBTASK 28-41-61-410-002

(7) Install the refuel panel [3] (TASK 28-21-82-400-801).

F. Refuel Quantity Indicator Test

SUBTASK 28-41-61-860-002

(1) 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 28-41-61-710-001

(2) On the P15 Refuel Panel, hold the fueling indication test switch to the TEST GAUGES position.

(a) Make sure that each refuel quantity indicator [4] operates correctly.

NOTE: The test blanks the displays on the three refuel quantity indicators [4] for two seconds, then all LED segments go on for two seconds. This sequence continues as long as you hold the fueling indication test switch to the TEST GAUGES position.

If you hold the fueling indication test switch for more than 20 seconds, the test mode times out and the refuel quantity indicators [4] goes back to its usual operating mode. If an internal fault is found during the test, the indicator will show Ind FAIL.

SUBTASK 28-41-61-860-003

(3) Release the fueling indication test switch.

SUBTASK 28-41-61-410-001

(4) Close this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FUEL QUANTITY PROCESSOR UNIT - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) A removal of the Fuel Quantity Processor Unit (FQPU)

(2) An installation of the FQPU.

B. The FQPU is installed in the forward cargo bay.

TASK 28-41-81-000-801

2. Fuel Quantity Processor Unit Removal

(Figure 401 or Figure 402)

A. General

(1) This task gives instructions to remove the fuel quantity processor unit.

B. References

Reference	Title
20-40-12-000-802	ESDS Handling for Metal Encased Unit Removal (P/B 201)
20-40-12-400-803	Conductive Dust Cap and Connector Cover 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-19264	Removal Aid - Fuel Quantity Processor Unit (FQPU) Part #: C28015-1 Supplier: 81205
STD-21103	Wedge, Parting - Phenolic/Nylon

D. Location Zones

Zone	Area
122	Forward Cargo Compartment - Right

E. Access Panels

Number	Name/Location
821	Forward Cargo Door

F. Prepare for the Removal

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-41-81-010-001

(2) Open this access panel:

Number	Name/Location
821	Forward Cargo Door

SUBTASK 28-41-81-020-001

(3) Remove the washer head screws [2] from the shroud [1].

SUBTASK 28-41-81-010-002

(4) Remove the shroud [1].

G. Fuel Quantity Processor Unit Removal

SUBTASK 28-41-81-910-001

CAUTION

BE CAREFUL WHEN YOU REMOVE OR INSTALL THE FQIS PROCESSOR. DAMAGE TO THE FQIS CONNECTOR PINS CAN EASILY OCCUR.

CAUTION

DO NOT TOUCH THE UNIT BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE UNIT.

(1) Do this task: ESDS Handling for Metal Encased Unit Removal, TASK 20-40-12-000-802.

SUBTASK 28-41-81-020-002

(2) Disconnect the electrical connectors from the fuel quantity processor unit [5].

SUBTASK 28-41-81-420-004

(3) Install protective caps on the electrical connectors and fuel quantity processor unit [5] (TASK 20-40-12-400-803).

SIA 006-999; SIA 001-005 POST SB 737-28-1363

SUBTASK 28-41-81-020-003

(4) Remove the fuel quantity processor unit [5], do these steps:

(a) Hold the fuel quantity processor unit [5], remove the bolts [3] and washers [4] from the FQPU mounting bracket legs [7].

(b) Remove the fuel quantity processor unit [5].

SIA 001-005 PRE SB 737-28-1363

SUBTASK 28-41-81-020-008

(5) Remove the fuel quantity processor unit [5], do these steps:

NOTE: Two persons and two Fuel Quantity Processor Unit (FQPU) removal aids (removal aid, SPL-19264, or parting wedge, STD-21103) are necessary to do this procedure.

(a) Hold the fuel quantity processor unit [5] and loosen the bolts [3].

1) Keep the bolts [3] in place finger tight to prevent the fuel quantity processor unit [5] from falling.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA 001-005 PRE SB 737-28-1363 (Continued)

2) Insert the two FQPU removal aids [8] (removal aid, SPL-19264, or parting wedge, STD-21103) in the AFT gap between the fuel quantity processor unit [5] and bracket [6] close to the FQPU mounting bracket legs [7].

NOTE: The gap between the fuel quantity processor unit and bracket is approximately 0.375 in. (0.952 cm).

a) Tighten each of the FQPU removal aids [8] (removal aid, SPL-19264, or parting wedge, STD-21103) in sequence, until the FQPU mounting bracket legs [7] and bracket [6] start de-bonding.

3) Insert the two FQPU removal aids [8] (removal aid, SPL-19264, or parting wedge, STD-21103) in the FWD gap between the fuel quantity processor unit [5] and bracket [6] close to the FQPU mounting bracket legs [7].

a) Tighten each of the FQPU removal aids [8] (removal aid, SPL-19264, or parting wedge, STD-21103) in sequence, until the FQPU mounting bracket legs [7] and bracket [6] start de-bonding.

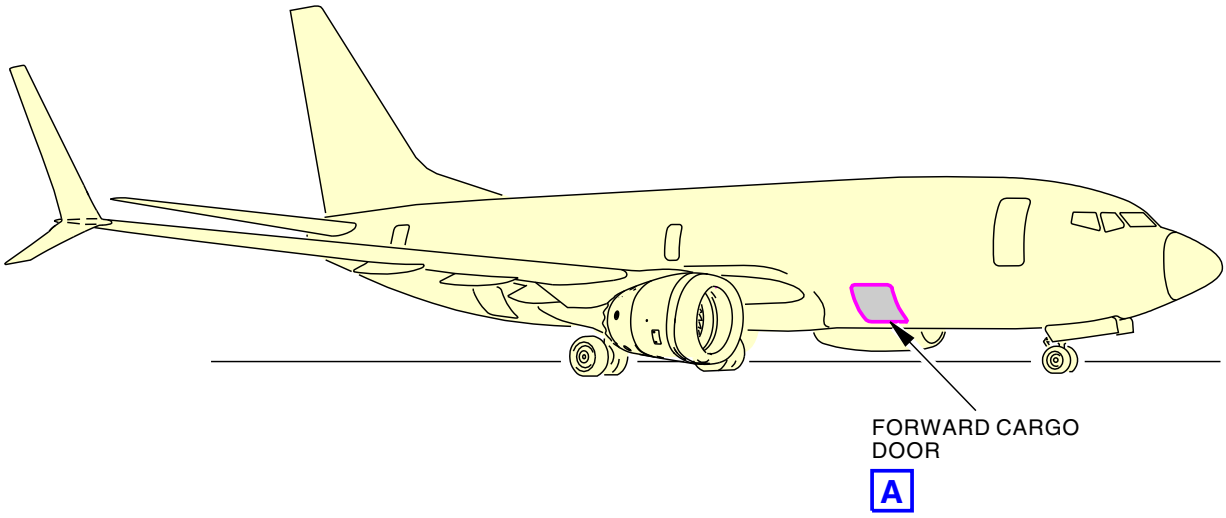
4) Hold the fuel quantity processor unit [5], remove the bolts [3] and washers [4] from the FQPU mounting bracket legs [7].

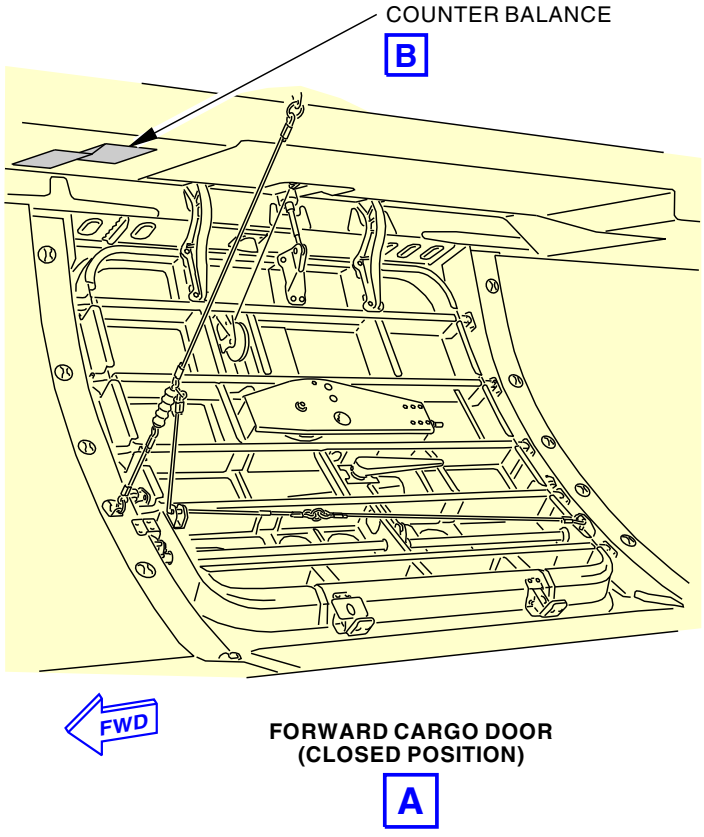
(b) Remove the fuel quantity processor unit [5].

SIA ALL

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

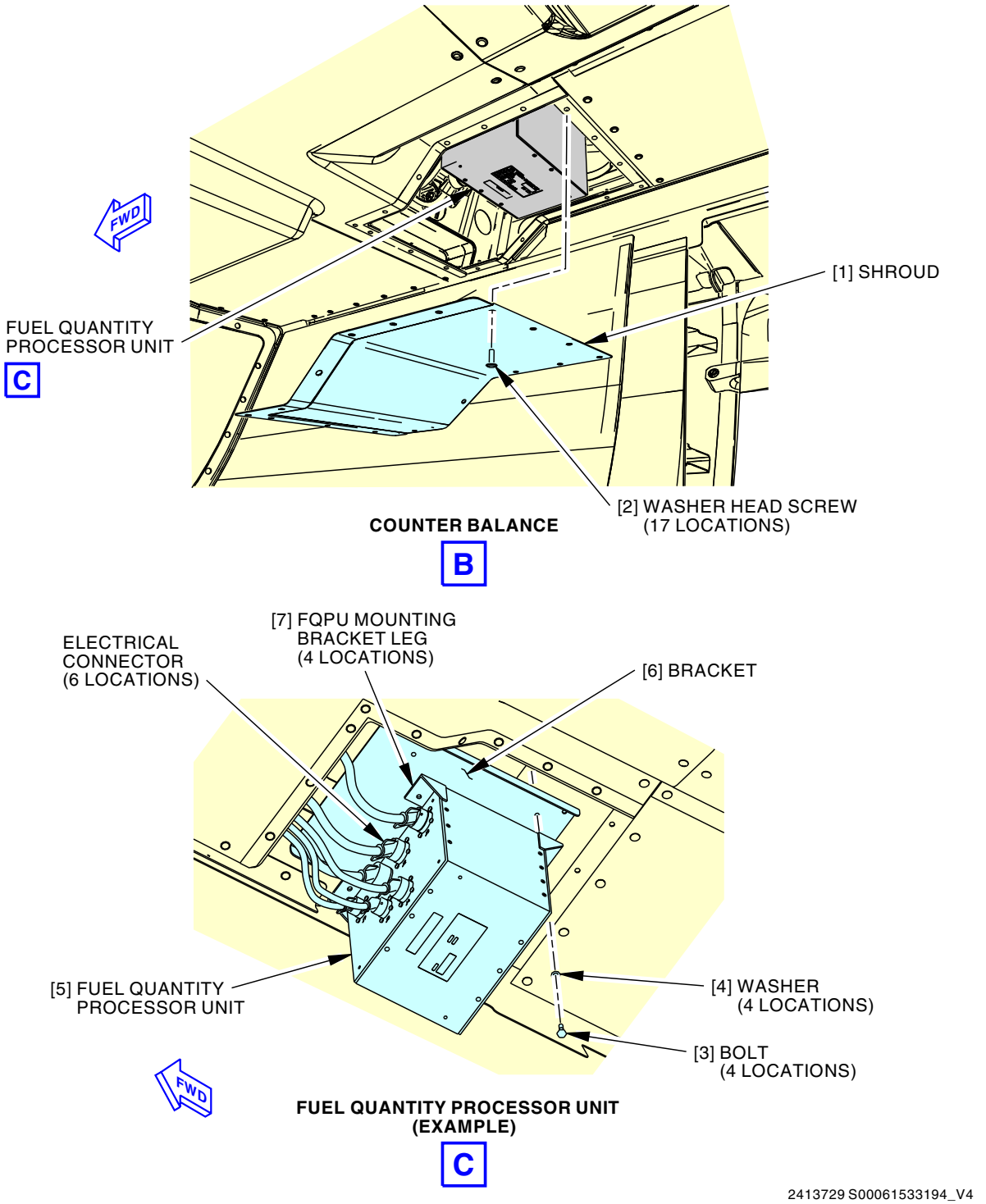




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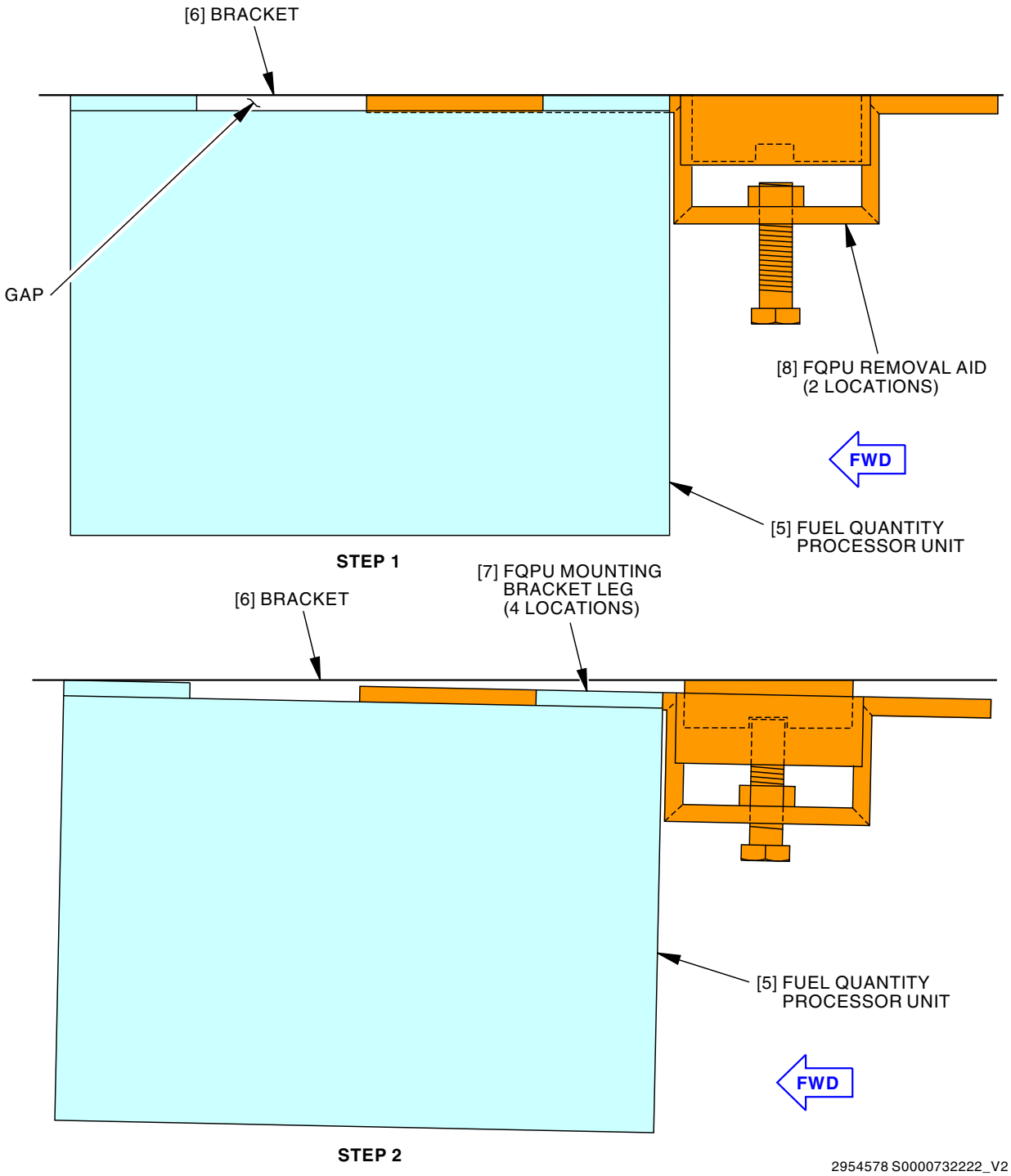
Fuel Quantity Processor Unit Installation
Figure 401/28-41-81-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fuel Quantity Processor Unit Installation
Figure 401/28-41-81-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fuel Quantity Processor Unit Removal Tool
Figure 402/28-41-81-990-802

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-41-81-400-801

3. Fuel Quantity Processor Unit Installation

(Figure 401 or Figure 402)

A. General

(1) This task gives instructions to install the fuel quantity processor unit.

B. References

Reference	Title
20-40-12-000-803	Conductive Dust Cap and Connector Cover Removal (P/B 201)
20-40-12-400-802	ESDS Handling for Metal Encased Unit Installation (P/B 201)
20-40-12-400-803	Conductive Dust Cap and Connector Cover Installation (P/B 201)
28-41-00-710-801	Fuel Quantity Indicating System - Operational Test (P/B 501)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

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	Bonding Meter - Approved, Intrinsically Safe (Approved for use in Class I, Divisions I & II hazardous (classified) locations. Outside these hazardous locations, COM-614 can be used in lieu of COM-1550). Part #: 620LK Supplier: 1CRL2 Part #: M1 Supplier: 3AD17 Part #: M1B Supplier: 3AD17 Part #: T477W (C15292) Supplier: 06659

D. Consumable Materials

Reference	Description	Specification
A50155	Sealant - Fuel Tank	BMS5-45 Class C
A50231	Sealant - Pressure And Environmental - Chromate Type	BMS5-95 Class B
A50296	Sealant - Pressure And Environmental - Chromate Type	BMS5-95 Class C
B00062	Solvent - Acetone (99.5% Grade)	ASTM D 329 (Supersedes O-A-51)
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
C00064	Coating - Aluminum Chemical Conversion	BAC5719 Type II Class A (MIL-DTL-5541 Class 1A)
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G00291	Tape - Aluminum Foil, 3M 425	AMS-T-23397 / L-T-80
G50136	Compound - Corrosion Inhibiting, Non-drying Paste	BMS3-38

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Reference	Description	Specification
G50398	Pad - Adbrasive, Scotch-Brite Type S, Abrasive Pad	
G50492	Pad - 3M Scotch Brite 7448 Ultra Fine Pad	MIL-A-9962A Type III Grade AAA
G51293	Cotton Wiper - Knit, Process Cleaning Absorbent Wiper	BMS15-5 Class B

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
5	Fuel quantity processor unit	28-41-81-01-055	SIA ALL
		28-41-81-01-100	SIA ALL

F. Location Zones

Zone	Area
122	Forward Cargo Compartment - Right

G. Access Panels

Number	Name/Location
821	Forward Cargo Door

H. Fuel Quantity Processor Unit Installation

SUBTASK 28-41-81-020-006

(1) Remove the protective caps from the electrical connectors and fuel quantity processor unit [5] (TASK 20-40-12-000-803).

(a) Make sure that the connector sockets on the electrical connectors are not damaged.

(b) Make sure that the pins on the fuel quantity processor unit [5] that go into the sockets on the electrical connectors are not damaged.

SUBTASK 28-41-81-910-004

CAUTION

BE CAREFUL WHEN YOU REMOVE OR INSTALL THE FQIS PROCESSOR. DAMAGE TO THE FQIS CONNECTOR PINS CAN EASILY OCCUR.

CAUTION

DO NOT TOUCH THE UNIT BEFORE YOU DO THE PROCEDURE FOR DEVICES THAT ARE SENSITIVE TO ELECTROSTATIC DISCHARGE. ELECTROSTATIC DISCHARGE CAN CAUSE DAMAGE TO THE UNIT.

(2) Do this task: ESDS Handling for Metal Encased Unit Installation, TASK 20-40-12-400-802.

SUBTASK 28-41-81-420-005

(3) Install protective caps on the electrical connectors and fuel quantity processor unit [5] (TASK 20-40-12-400-803).

SUBTASK 28-41-81-110-001

(4) Do these steps to prepare the FQPU mounting bracket legs [7] and bracket [6] for installation:

(a) Clean the fay surfaces of the FQPU mounting bracket legs [7] and bracket [6] (SWPM 20-20-00).

1) Use Cleaning Procedure 1 to manually clean the entire bracket [6] fay surface.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

a) Use a very fine Scotch-Brite Type S pad, G50398, or Scotch-Brite 7448 pad, G50492.

b) Move the pad in a linear movement while you press with your thumb.

2) Use Cleaning Procedure 1 to manually clean the fay surface on the FQPU mounting bracket legs [7].

a) Use a very fine Scotch-Brite Type S pad, G50398, or Scotch-Brite 7448 pad, G50492.

b) Move the pad in a linear movement while you press with your thumb.

SIA 006-999; SIA 001-005 POST SB 737-28-1363

<1> Clean the surface 1/16 in. (2 mm) - 3/16 in. (5 mm) more outside of the fay surface.

SIA 001-005 PRE SB 737-28-1363

3) Final clean the fay surfaces of the FQPU mounting bracket legs [7] and bracket [6].

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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

a) Use a new cotton wiper, G00034 (recommended), or knit cotton wiper, G51293 (alternate), soaked with solvent, B00062, or solvent, B00184.

b) Rub dry with a clean dry cotton wiper.

c) Continue to clean and dry the surface until the cotton wiper stays clean.

SUBTASK 28-41-81-110-002

(5) Apply sealant, A50155, sealant, A50296, or sealant, A50231, to the contact surfaces of the FQPU mounting bracket legs [7] and bracket [6].

SIA 006-999; SIA 001-005 POST SB 737-28-1363

SUBTASK 28-41-81-110-003

(6) If it is necessary, do these steps to refinish the abraded surfaces:

(a) Apply 3M 425 Aluminum Foil Tape, G00291, to the bracket [6] where the FQPU mounting bracket legs [7] and bracket [6] mate.

(b) Apply 3M 425 Aluminum Foil Tape, G00291, to the bracket [6] abraded surface 1/16 in. (2 mm) - 3/16 in. (5 mm) more outside of the fay surface.

(c) Manually apply coating, C00064, with a clean cotton wiper, G00034, to the abraded surfaces that are not masked.

1) Keep the surfaces wet, until a perceptible color develops.

NOTE: Color change takes about 2-3 minutes.

(d) Air dry at room temperature.

NOTE: The maximum drying air temperature is 130°F (54°C).

(e) Remove 3M 425 Aluminum Foil Tape, G00291, from the bracket [6].

(f) Final clean the fay surfaces of the FQPU mounting bracket legs [7] and bracket [6].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA 006-999; SIA 001-005 POST SB 737-28-1363 (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 OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

1) Use a new cotton wiper, G00034 (recommended), or knit cotton wiper, G51293 (alternate), soaked with solvent, B00062, or solvent, B00184.
2) Rub dry with a clean dry cotton wiper.
3) Continue to clean and dry the surface until the cotton wiper stays clean.

(g) Apply a thin coat of corrosion inhibiting material, G50136, to both mating faying surfaces of the FQPU mounting bracket legs [7] or bracket [6].

SIA ALL

SUBTASK 28-41-81-410-001

(7) Hold the fuel quantity processor unit [5], install the bolts [3] and washers [4].

SUBTASK 28-41-81-420-003

(8) Tighten the bolts [3] to 35 ±5 in-lb (4.0 ±0.6 N·m).

SIA 001-005 PRE SB 737-28-1363

(a) Make sure that the sealant has a continuous squeeze out between the FQPU mounting bracket legs [7] and bracket [6].

NOTE: Verification of sealant squeeze out is not required in areas where sealant cannot be seen.

SIA 006-999; SIA 001-005 POST SB 737-28-1363

(b) Make sure that the corrosion inhibiting material has a continuous squeeze out between the FQPU mounting bracket legs [7] and bracket [6].

NOTE: Verification of corrosion inhibiting material squeeze out is not required in areas where corrosion inhibiting material cannot be seen.

SIA 001-005 PRE SB 737-28-1363

SUBTASK 28-41-81-110-004

(9) Apply sealant, A50155, sealant, A50296, or sealant, A50231, to exposed abraded areas.

(a) If it is necessary, use excess squeeze out sealant to cover exposed abraded area.

SIA 006-999; SIA 001-005 POST SB 737-28-1363

SUBTASK 28-41-81-110-005

(10) Apply a thin coat of corrosion inhibiting material, G50136, to exposed abraded areas.

(a) If it is necessary, use excess squeeze out corrosion inhibiting material to cover exposed abraded area.

SIA ALL

SUBTASK 28-41-81-220-001

(11) Measure the electrical bonding resistance between the FQPU mounting bracket leg [7] and bracket [6] (SWPM 20-20-00).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Use an intrinsically safe approved bonding meter, COM-1550.

(b) Make sure that the electrical bonding resistance is 0.0005 ohm (0.5 milliohm) or less.

SUBTASK 28-41-81-020-007

(12) Remove the protective caps from the electrical connectors and fuel quantity processor unit [5] (TASK 20-40-12-000-803).

SUBTASK 28-41-81-420-001

(13) Connect the electrical connectors to the fuel quantity processor unit [5].

I. Fuel Quantity Processor Unit Installation Test

SUBTASK 28-41-81-860-002

(1) Close these circuit breakers:

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 28-41-81-740-001

(2) Do this task: Fuel Quantity Indicating System - Operational Test, TASK 28-41-00-710-801.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 28-41-81-420-002

(1) Install the shroud [1]:

(a) Hold and align the shroud [1].

(b) Loosely install the washer head screws [2] in a star pattern.

(c) Tighten the washer head screws [2] to 20 ±3 in-lb (2.3 ±0.4 N·m).

SUBTASK 28-41-81-410-002

(2) Close this access panel:

Number	Name/Location
821	Forward Cargo Door

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FUEL BOOST PUMP FUEL PRESSURE SWITCH - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) Fuel Boost Pump Fuel Pressure Switch Removal

(2) Fuel Boost Pump Fuel Pressure Switch Installation.

B. There is one fuel pressure switch installed on these fuel boost pumps:

(1) Left aft fuel boost pump

(2) Left forward fuel boost pump

(3) Left center fuel boost pump

(4) Right center fuel boost pump

(5) Right forward fuel boost pump

(6) Right aft fuel boost pump.

TASK 28-42-11-000-801

2. Fuel Boost Pump Fuel Pressure Switch Removal

(Figure 401 or Figure 402)

A. General

(1) The fuel boost pump fuel pressure switch is referred to as the fuel pressure switch in this task.

(2) This task gives instructions to remove the fuel pressure switch.

B. References

Reference	Title
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)

C. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
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
551	Left Wing - Rear Spar To Landing Gear Support Beam
651	Right Wing - Rear Spar to Landing Gear Support Beam

D. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door

E. Prepare for the Main Tank Fuel Pressure Switches Removal

SUBTASK 28-42-11-480-001

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.

(1) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-42-11-860-001

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

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

SUBTASK 28-42-11-010-005

(3) Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-42-11-860-018

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(4) Do these steps:

(a) For the aft fuel pressure switch, open these circuit breakers and install safety tags:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

(b) For the forward fuel pressure switch, open these circuit breakers and install safety tags:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

SUBTASK 28-42-11-010-001

(5) Get access to the applicable fuel pressure switch [1] inboard of the main landing gear.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Prepare for the Center Tank Fuel Pressure Switch Removal

SUBTASK 28-42-11-210-017

WARNING MAKE SURE THAT 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. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(1) Make sure that the fuel quantity in the center tank is less than 11,400 lb (5171 kg).

NOTE: The MDS Engine Display shows the fuel quantity on the center display unit (P2).

SUBTASK 28-42-11-480-004

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.

(2) Make sure that the downlock pins are installed on the nose and main landing gear (TASK 32-00-01-480-801).

SUBTASK 28-42-11-860-014

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

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

SUBTASK 28-42-11-010-004

(4) Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 28-42-11-860-015

WARNING WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

G. Main Tank Fuel Pressure Switches Removal

SUBTASK 28-42-11-020-001

(1) Disconnect the electrical connector [3] from the fuel pressure switch [1].

SUBTASK 28-42-11-020-002

(2) Remove the safety cable [4] from the fuel pressure switch [1].

SIA 004-999; SIA 001-003 POST SB 737-28-1370

SUBTASK 28-42-11-020-014

(3) Remove the sealing boot [5].

SIA ALL

SUBTASK 28-42-11-020-003

(4) Remove the fuel pressure switch [1] from the fuel adapter on the rear spar.

NOTE: When the forward fuel pressure switch is removed, fuel can leak from the fuel adapter. No more than 20 drops in one minute is permitted. When the fuel leaks more than 20 drops in one minute, replace the fuel adapter fitting.

SUBTASK 28-42-11-020-004

(5) Remove and discard the O-ring [2].

H. Center Tank Fuel Pressure Switch Removal

SUBTASK 28-42-11-020-009

(1) Disconnect the electrical connector [3] from the fuel pressure switch [1].

SUBTASK 28-42-11-020-010

(2) Remove the safety cable [4] from the fuel pressure switch [1].

SUBTASK 28-42-11-020-011

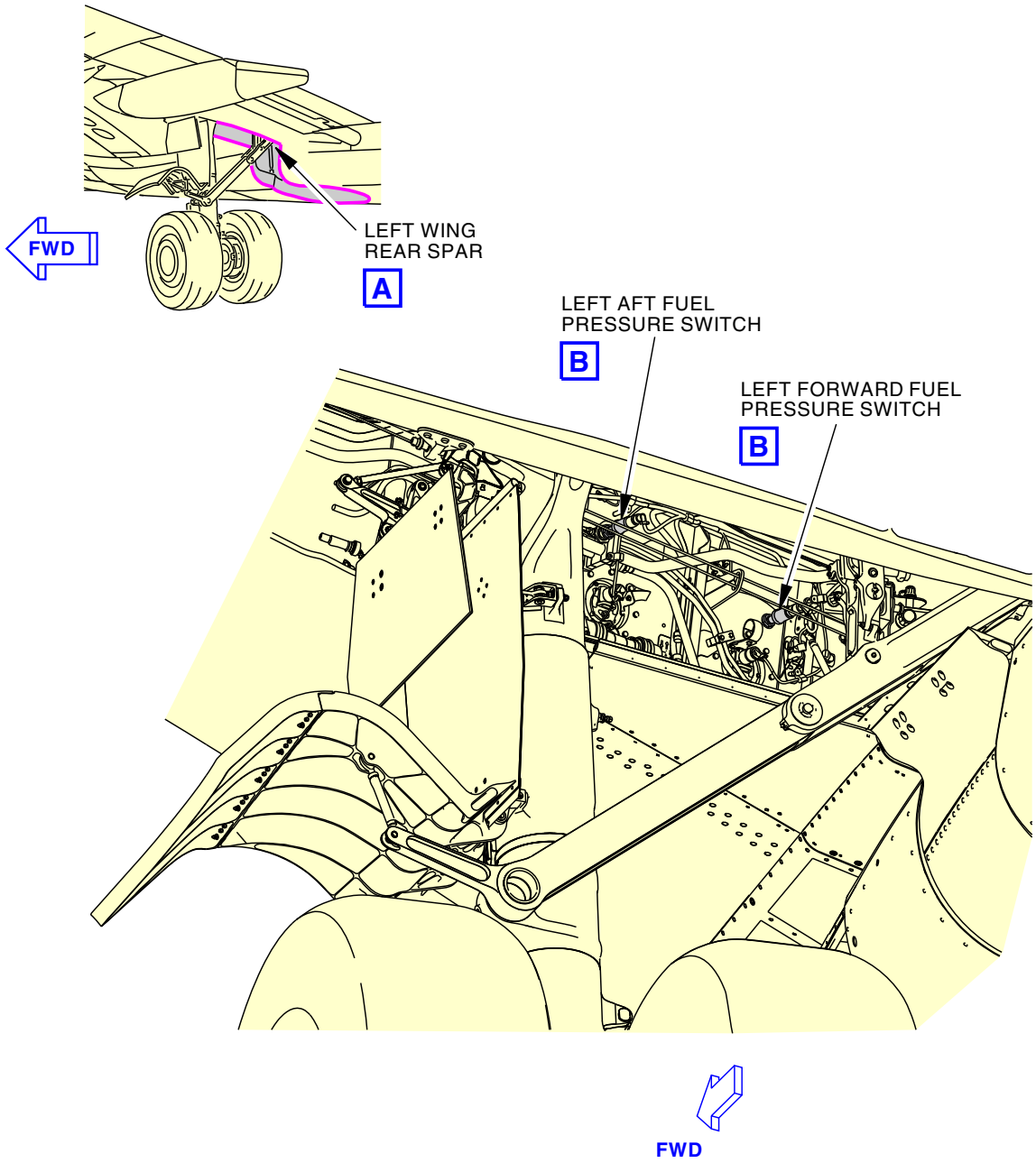
(3) Remove the fuel pressure switch [1] from the fuel adapter on the rear spar.

SUBTASK 28-42-11-020-012

(4) Remove and discard the O-ring [2].

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



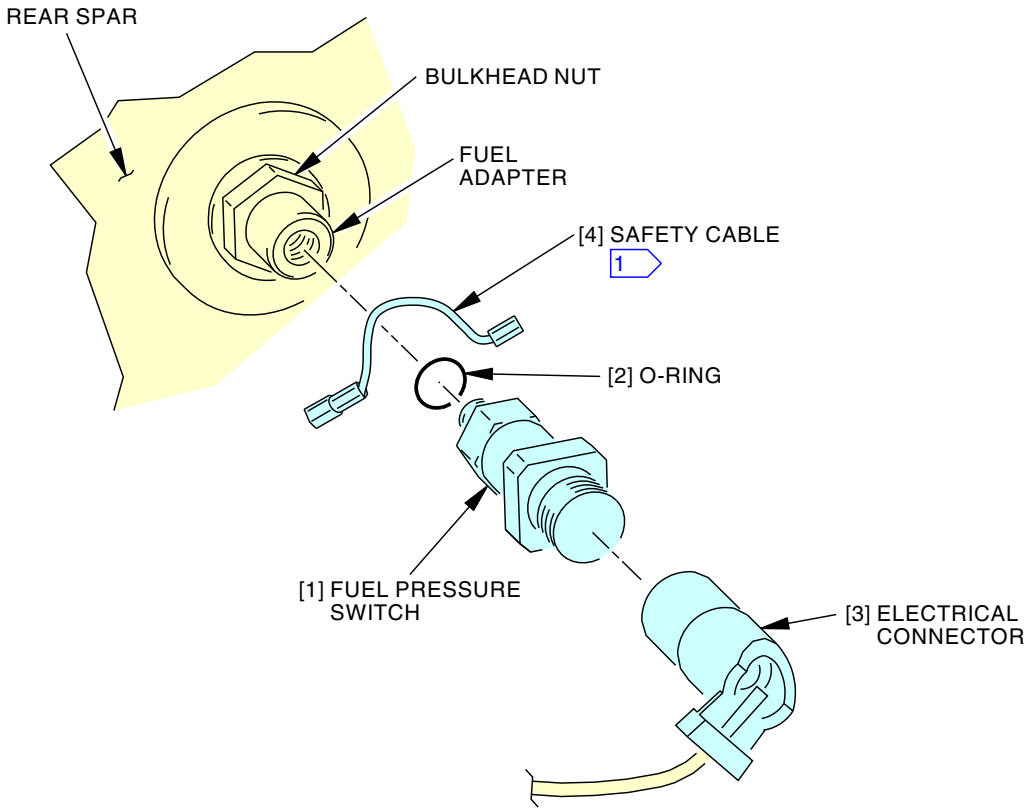
LEFT WING REAR SPAR
(RIGHT SIDE IS ALMOST THE SAME)

A

2413731 S00061533201_V1

Main Tanks Fuel Boost Pump Pressure Switch Installation
Figure 401/28-42-11-990-801 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



FUEL PRESSURE SWITCH (EXAMPLE)

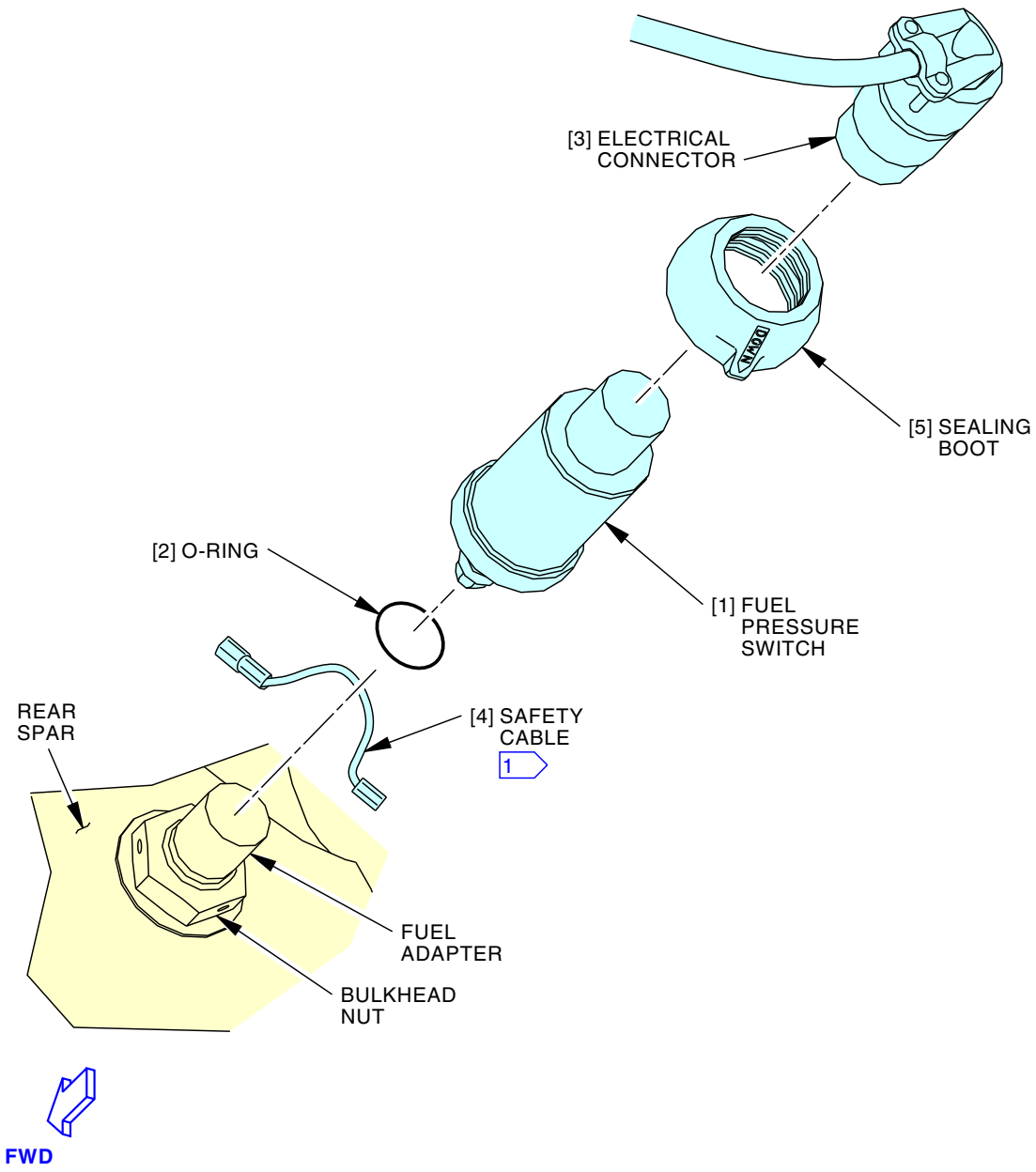
B

1 SAFETY CABLE PREFERRED, LOCKWIRE ALTERNATE.

2413732 S00061533202_V2

Main Tanks Fuel Boost Pump Pressure Switch Installation
Figure 401/28-42-11-990-801 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



FUEL PRESSURE SWITCH (EXAMPLE)

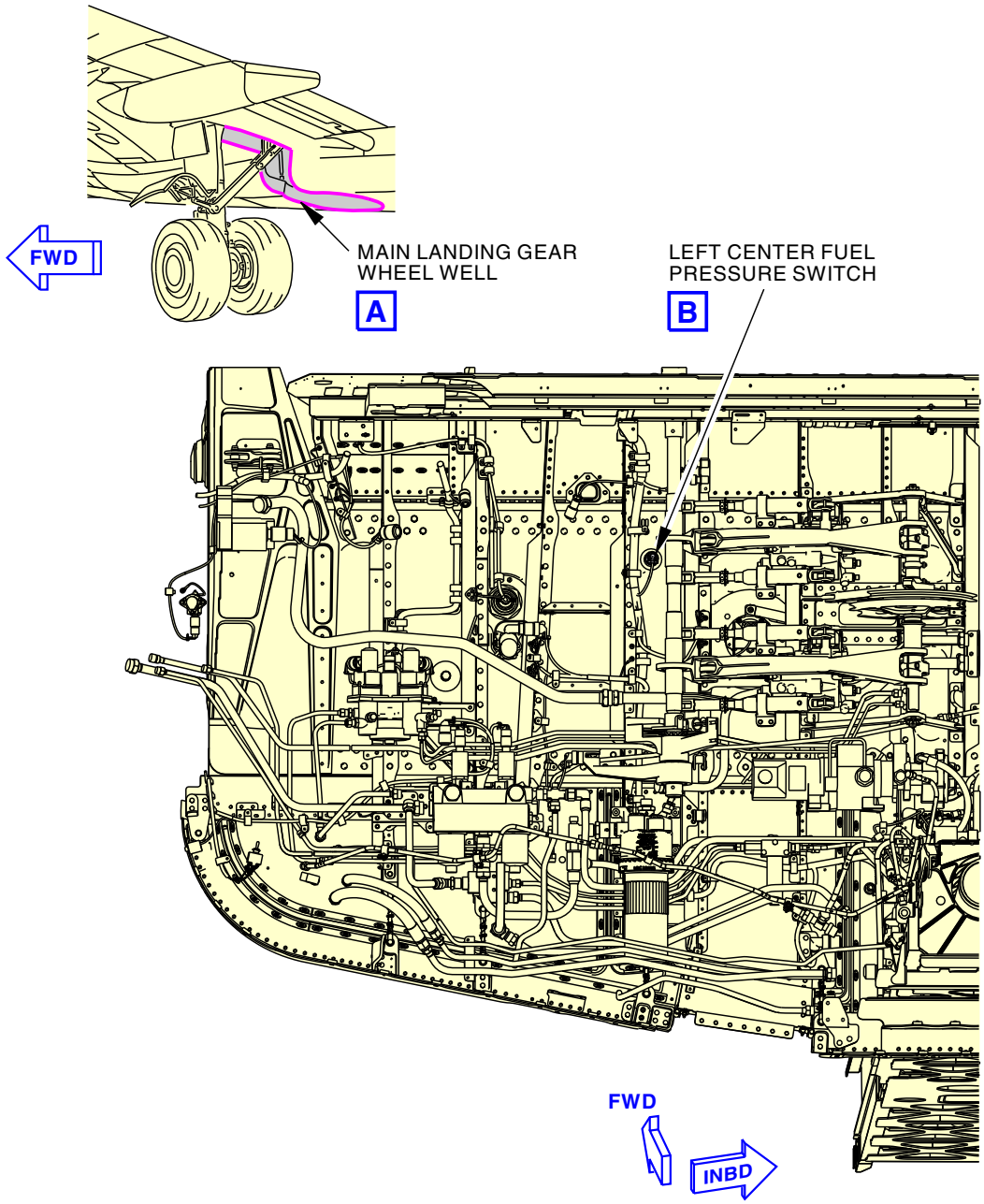
B

1 SAFETY CABLE PREFERRED, LOCKWIRE ALTERNATE.

2968218 S0000747620_V1

Main Tanks Fuel Boost Pump Pressure Switch Installation
Figure 401/28-42-11-990-801 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



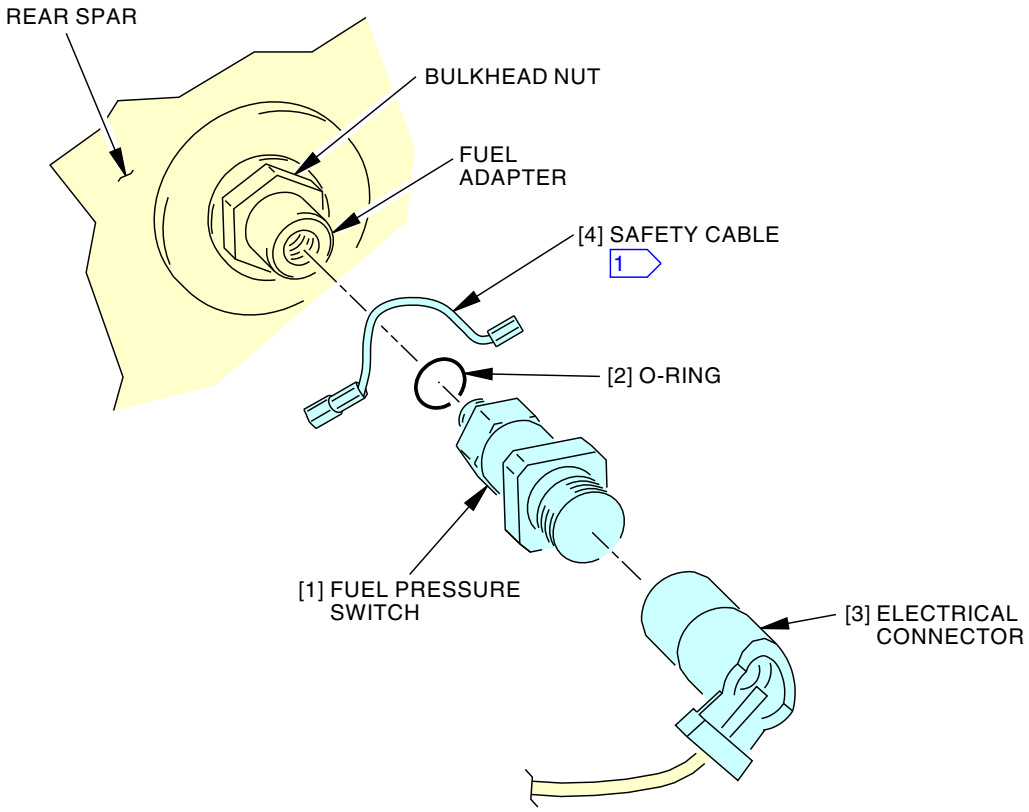
MAIN LANDING GEAR WHEEL WELL
(LEFT SIDE IS SHOWN, RIGHT SIDE IS ALMOST THE SAME)

A

2413730 S00061533200_V1

Center Tank Fuel Boost Pump Pressure Switch Installation
Figure 402/28-42-11-990-802 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



FUEL PRESSURE SWITCH (EXAMPLE)

B

1 SAFETY CABLE PREFERRED, LOCKWIRE ALTERNATE.

2413732 S00061533202_V2

Center Tank Fuel Boost Pump Pressure Switch Installation
Figure 402/28-42-11-990-802 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-42-11-420-801

3. Fuel Boost Pump Fuel Pressure Switch Installation

(Figure 401 or Figure 402)

A. General

(1) The fuel boost pump fuel pressure switch is referred to as the fuel pressure switch in this task.

(2) This task gives instructions to install the fuel pressure switch.

B. References

Reference	Title
20-10-17-400-801	O-Rings Installation (P/B 401)
20-10-44-400-801	Lockwire, Cotter Pins, and Lockrings - Installation (P/B 401)
SWPM 20-60-03	SPECIAL PROTECTION OF ELECTRICAL CONNECTORS

C. Consumable Materials

Reference	Description	Specification
D00504	Grease - Petrolatum	VV-P-236
G01912	Lockwire - MS20995NC32, Monel - 0.032 Inch (0.8128 mm) Diameter	NASM20995
G50170	Compound - Corrosion Inhibiting Compound, Soft Film, Exterior Use - Ardrox AV25	
G50171	Compound - Corrosion Inhibiting Compound, Interior Application - D5026NS or ZC-026	
G51372	Kit - Safety Cable, 321 CRES - 0.035 +/-0.003 Inch (1.0 mm) Diameter, (Contains both Cable and Ferrule), 12 Inches Long	BACC13AT3K

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Fuel pressure switch	28-42-11-01-005	SIA ALL
		28-42-11-02-010	SIA ALL
2	O-ring	28-42-11-01-020	SIA ALL
		28-42-11-02-015	SIA ALL

E. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
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
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
117A	Electronic Equipment Access Door
621GB	Refuel Valve Door - Slat Station 125

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Main Tank Pressure Switches Installation

SUBTASK 28-42-11-640-001

(1) Apply a thin layer of grease, D00504, to the new O-ring [2].

SUBTASK 28-42-11-420-001

(2) Install the O-ring [2] on the fuel pressure switch [1] (TASK 20-10-17-400-801).

SUBTASK 28-42-11-420-002

(3) Install the fuel pressure switch [1] to the fuel adapter on the rear spar.

(a) Tighten the fuel pressure switch [1] to 30 in-lb (3.4 N·m).

SIA 004-999; SIA 001-003 POST SB 737-28-1370

SUBTASK 28-42-11-210-015

(4) Make sure that surface of the fuel pressure switch [1] and nearest area are dry.

(a) If it is necessary, remove any moisture.

NOTE: It is necessary to keep pressure switch and area dry during installation.

SUBTASK 28-42-11-410-002

(5) Install the sealing boot [5] on the fuel pressure switch [1] with drain hole in downward position.

NOTE: Larger end of the sealing boot must be sealed and flush with the bottom of the pressure switch housing and smaller end of the sealing boot must be seated in the housing grooves.

NOTE: It is not necessary for the sealing boot drain hole to line up with the fuel pressure switch vent hole.

SIA ALL

SUBTASK 28-42-11-420-003

(6) Install the safety cable [4] (MS20995NC32 lockwire, G01912, or safety cable kit, G51372) from the fuel pressure switch [1] to the bulkhead nut (TASK 20-10-44-400-801).

SUBTASK 28-42-11-210-004

(7) Examine the electrical connector [3] for corrosion.

(a) If there is corrosion, correct the problem (SWPM 20-60-03).

SUBTASK 28-42-11-390-001

(8) Apply D5026NS or ZC-026 compound, G50171, to the electrical connector [3] (SWPM 20-60-03).

SUBTASK 28-42-11-420-004

(9) Connect the electrical connector [3] to the fuel pressure switch [1].

NOTE: Corrosion inhibiting compound is applied to the exterior of the mated electrical connectors after the operational test is completed.

H. Center Tank Fuel Pressure Switch Installation

SUBTASK 28-42-11-640-003

(1) Apply a thin layer of grease, D00504, to the new O-ring [2].

SUBTASK 28-42-11-420-009

(2) Install the O-ring [2] on the fuel pressure switch [1] (TASK 20-10-17-400-801).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-42-11-420-010

CAUTION DO NOT INSTALL THE SEALING BOOT ON THE PRESSURE SWITCH OF THE CENTER TANK. IF YOU DO NOT OBEY, DAMAGE TO THE PRESSURE SWITCH CAN OCCUR.

(3) Install the fuel pressure switch [1] to the fuel adapter on the rear spar.

(a) Tighten the fuel pressure switch [1] to 30 in-lb (3.4 N·m).

SUBTASK 28-42-11-420-011

(4) Install the safety cable [4] (MS20995NC32 lockwire, G01912, or safety cable kit, G51372) from the fuel pressure switch [1] to the bulkhead nut (TASK 20-10-44-400-801).

SUBTASK 28-42-11-210-010

(5) Examine the electrical connector [3] for corrosion.

(a) If there is corrosion, correct the problem (SWPM 20-60-03).

SUBTASK 28-42-11-390-003

(6) Apply D5026NS or ZC-026 compound, G50171, to the electrical connector [3] (SWPM 20-60-03).

SUBTASK 28-42-11-420-012

(7) Connect the electrical connector [3] to the fuel pressure switch [1].

NOTE: Corrosion inhibiting compound is applied to the exterior of the mated electrical connectors after the operational test is completed.

I. Main Tank Fuel Pressure Switches Installation Test

NOTE: Put a person in the flight compartment to operate the fuel boost pumps and to monitor the fuel quantity and LOW PRESSURE indicators.

SUBTASK 28-42-11-860-016

WARNING WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

(1) Do these steps:

(a) For the aft fuel pressure switch, remove the safety tags and close these circuit breakers:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	3	C00828	FUEL BOOST PUMP TANK 2 AFT

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	1	C00826	FUEL BOOST PUMP TANK 1 AFT

(b) For the forward fuel pressure switch, remove the safety tags and close these circuit breakers:

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	1	C00827	FUEL BOOST PUMP TANK 1 FWD

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	3	C00829	FUEL BOOST PUMP TANK 2 FWD

SUBTASK 28-42-11-860-008

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

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

SUBTASK 28-42-11-210-008

(3) On the P5-2 Fuel System Module, make sure that the LOW PRESSURE light for the No. 1 or No. 2 forward/aft fuel boost pump comes on.

SUBTASK 28-42-11-860-009

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) If the LOW PRESSURE light comes on and stays on, immediately set the applicable FUEL PUMPS switch to the OFF position.

SUBTASK 28-42-11-720-003

(5) On the P5-2 Fuel System Module, set the FUEL PUMPS FWD/FUEL PUMPS AFT 1 or 2 switch to the ON position.

(a) Make sure that the applicable LOW PRESSURE light goes off in 15 seconds or less.

SUBTASK 28-42-11-210-009

(6) Make sure that there is no fuel leakage at the fuel pressure switch [1].

SUBTASK 28-42-11-720-004

(7) Set the FUEL PUMPS FWD/FUEL PUMPS AFT 1 or 2 switch to the OFF position.

(a) Make sure that the applicable LOW PRESSURE light comes on.

J. Center Tank Fuel Pressure Switch Installation Test

NOTE: Put a person in the flight compartment to operate the fuel boost pumps and to monitor the fuel quantity and LOW PRESSURE indicators.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-42-11-860-017

WARNING

WHEN YOU OPEN THE P91 AND P92 PANELS, MAKE SURE THAT THE OUTER DOOR STAYS AS OPEN AS POSSIBLE. IF THE OUTER DOOR TURNS IN, THE ATTACHED DOOR COMPONENTS COULD TOUCH THE INNER DOOR COMPONENTS. THIS CAN CAUSE AN ARC CONDITION WHEN YOU SUPPLY POWER. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL CAN OCCUR.

WARNING

DO NOT TOUCH THE CONDUCTORS IN THE P91 AND P92 PANELS. BE CAREFUL WHEN YOU GET ACCESS TO THE CIRCUIT BREAKERS ON THE INNER SIDE OF THE P91 AND P92 PANELS (ROW F). IF IT IS POSSIBLE, REMOVE AIRPLANE ELECTRICAL POWER FIRST. THE P91 AND P92 PANELS HAVE HIGH VOLTAGES AND CURRENTS. ELECTRICAL VOLTAGE AND CURRENT CAN KILL YOU OR CAUSE INJURIES.

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

Power Distribution Panel Number 1, P91

Row	Col	Number	Name
D	5	C00845	FUEL BOOST PUMP CTR TANK LEFT

Power Distribution Panel Number 2, P92

Row	Col	Number	Name
D	5	C00846	FUEL BOOST PUMP CTR TANK RIGHT

SUBTASK 28-42-11-860-011

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

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

SUBTASK 28-42-11-010-003

(3) Open this access panel:

Number	Name/Location
621GB	Refuel Valve Door - Slat Station 125

SUBTASK 28-42-11-210-011

(4) Make sure that the center tank has a minimum of 3000 lb (1361 kg) of fuel.

SUBTASK 28-42-11-210-012

(5) On the P5-2 Fuel System Module, make sure that the LOW PRESSURE light for the left or right center tank fuel boost pump is off.

SUBTASK 28-42-11-860-012

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.

(6) Immediately set the applicable FUEL PUMPS switch to the OFF position if the LOW PRESSURE light comes on and stays on.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-42-11-720-005

(7) On the P5-2 Fuel System Module, set the FUEL PUMPS CTR L or R switch to the ON position.

(a) Make sure that the applicable LOW PRESSURE light goes off in 15 seconds or less.

SUBTASK 28-42-11-210-013

(8) Make sure that there is no fuel leakage at the fuel pressure switch [1].

SUBTASK 28-42-11-720-006

(9) Set the FUEL PUMPS CTR L or R switch to the OFF position.

(a) Make sure that the applicable LOW PRESSURE light is off.

K. Put the Airplane Back to Its Usual Condition

SUBTASK 28-42-11-390-004

(1) Apply Ardrox AV25 compound, G50170, to the mated electrical connector [3] completely, until the compound drips from the connector (SWPM 20-60-03).

(a) Do not remove the excess Ardrox AV25 compound, G50170.

SUBTASK 28-42-11-410-001

(2) Close these access panels:

Number	Name/Location
117A	Electronic Equipment Access Door
621GB	Refuel Valve Door - Slat Station 125

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FUEL TEMPERATURE INDICATING SYSTEM - ADJUSTMENT/TEST

1. General

A. This procedure has these tasks:

(1) Fuel Temperature Indicating System Test (Master Thermometer)

(2) Fuel Temperature Indicator Functional Test (Spare Temperature Indicator)

(3) Fuel Temperature Indicator Functional Test (Decade Resistor)

(4) Fuel Temperature Bulb Resistance Test.

B. The fuel temperature indicating system test (master thermometer) does a test of the fuel temperature bulb.

(1) To do the test for the fuel temperature 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.

C. The fuel temperature indicator functional test (spare temperature indicator) does a test of the fuel temperature indicator.

(1) To do the test for the fuel 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.

D. The functional test for the temperature indicator (decade resistor) can be used as an alternative to this task: Fuel Temperature Indicator Functional Test (Spare Temperature Indicator), TASK 28-43-00-720-801.

(1) To do the functional test for the temperature indicator, you stimulate the temperature bulb at three different temperatures with a decade resistor.

TASK 28-43-00-710-801

2. Fuel Temperature Indicating System Test (Master Thermometer)

(Figure 501, Figure 502)

A. Tools/Equipment

Reference	Description
STD-1336	Thermometer - Digital, 0-150 +/- 2 Degrees F, with a Probe, Thermocouple or Equivalent

B. Location Zones

Zone	Area
211	Flight Compartment - Left
551	Left Wing - Rear Spar To Landing Gear Support Beam

C. Access Panels

Number	Name/Location
551DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel

ECCN 9E991 BOEING PROPRIETARY - See title page for details

D. Prepare for the System Test

SUBTASK 28-43-00-860-002

(1) Make sure that this circuit breaker is closed:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
A	7	C00355	FUEL TEMP IND

SUBTASK 28-43-00-860-003

(2) Permit the temperature to become stable for 10 minutes.

SUBTASK 28-43-00-010-001

(3) Open this access panel:

Number	Name/Location
551DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel

E. Fuel Temperature Indicating System Test

SUBTASK 28-43-00-970-001

(1) Make a record of the values shown on the fuel temperature indicator on the P5 panel.

SUBTASK 28-43-00-020-001

(2) 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

(3) 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) Make a record of the temperature shown on the thermometer.

SUBTASK 28-43-00-970-003

(4) Compare the value on the 0-150 +/- 2 degrees F digital thermometer, STD-1336, and the value on the fuel temperature indicator.

(a) Make sure the two values are the same with a tolerance of ±7°F (±4°C).

SUBTASK 28-43-00-420-001

(5) Put the fuel temperature bulb back in the housing.

SUBTASK 28-43-00-860-004

(6) Open this circuit breaker:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
A	7	C00355	FUEL TEMP IND

SUBTASK 28-43-00-710-001

(7) Monitor the value shown on the fuel temperature indicator.

(a) Make sure the pointer on the indicator goes back to its usual position at the bottom of the scale.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-43-00-860-005

(8) Close this circuit breaker:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
A	7	C00355	FUEL TEMP IND

F. Put the Airplane Back to Its Usual Condition

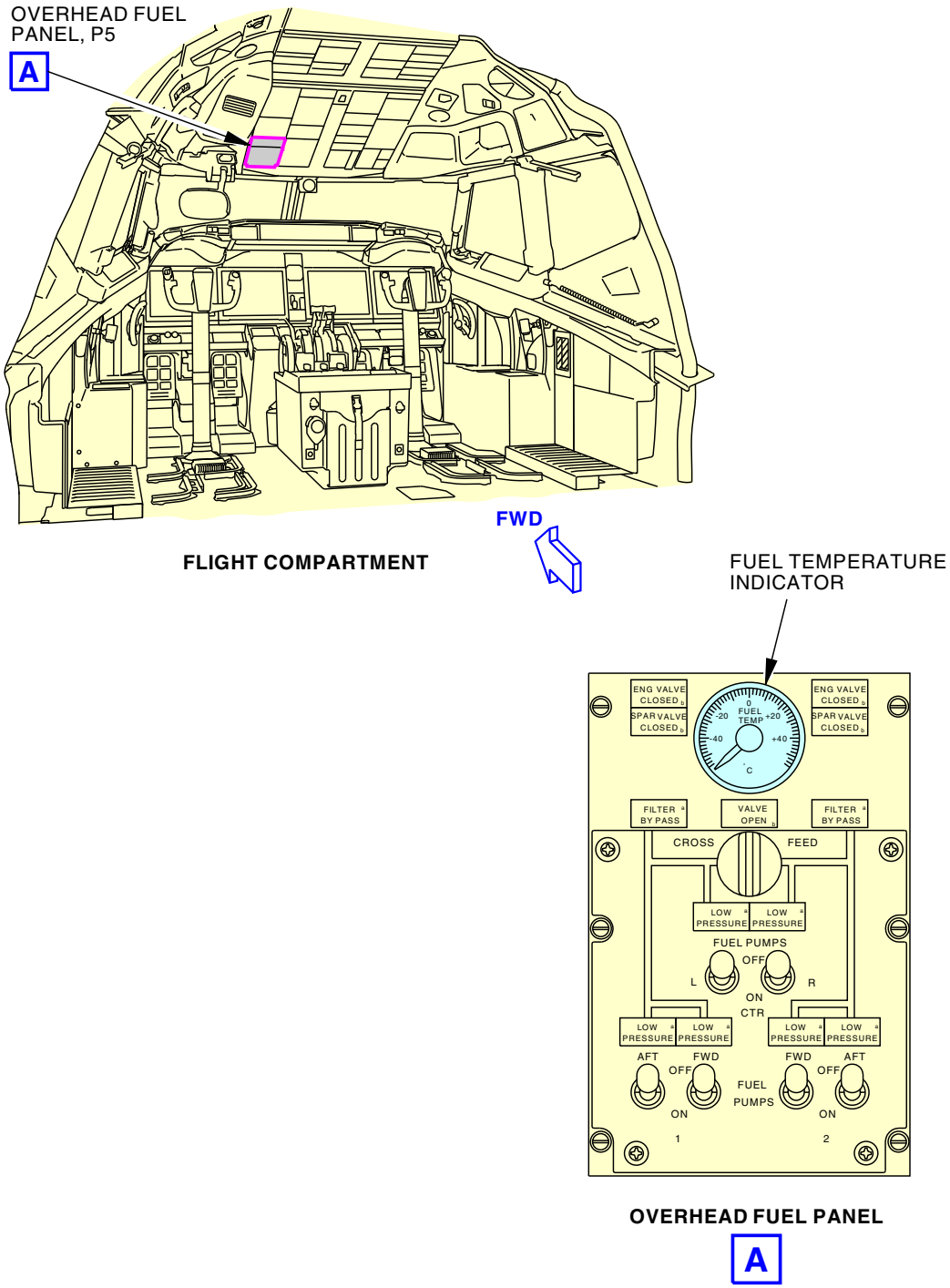
SUBTASK 28-43-00-410-001

(1) Close this access panel:

Number	Name/Location
551DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel

END OF TASK

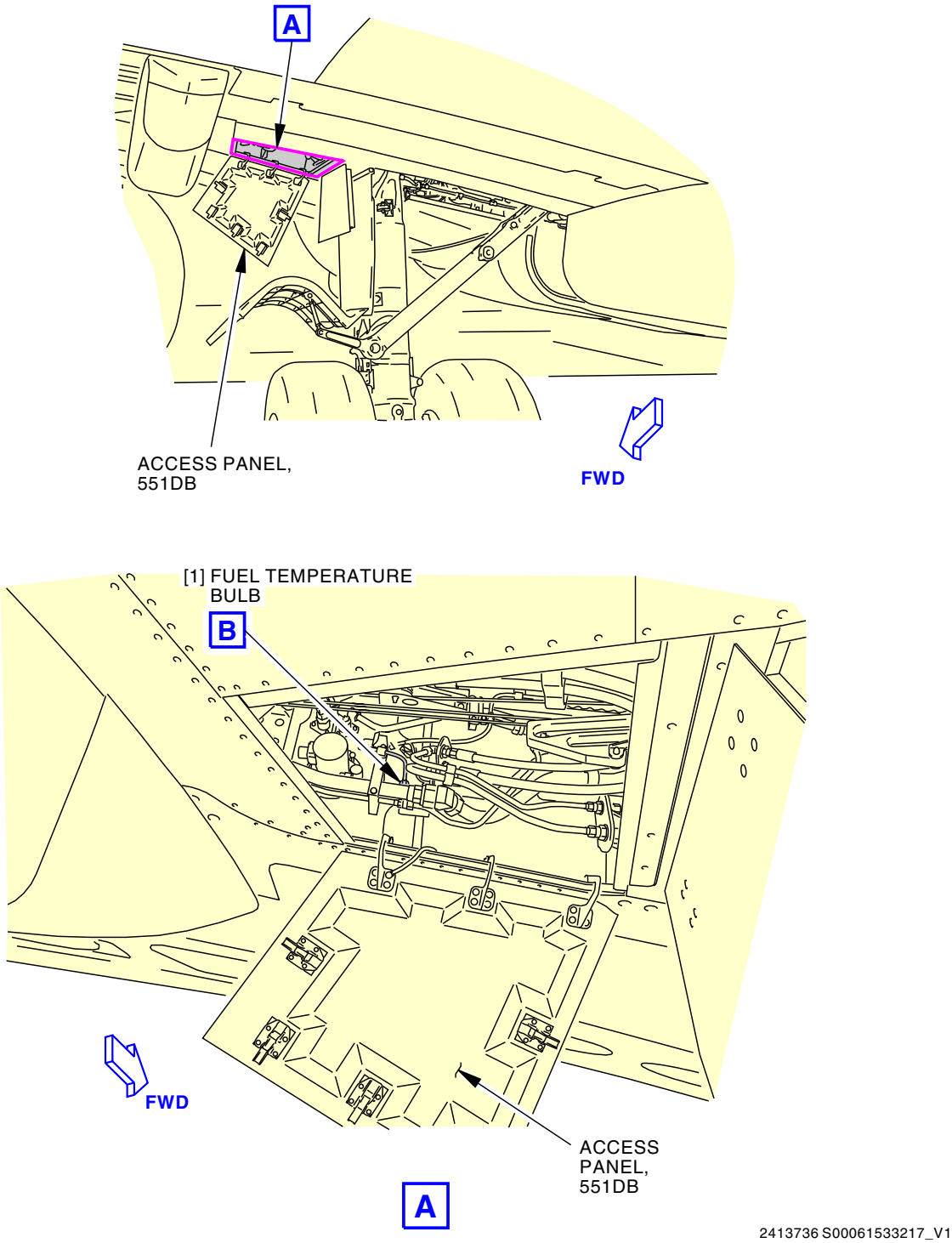
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413733 S00061533208_V1

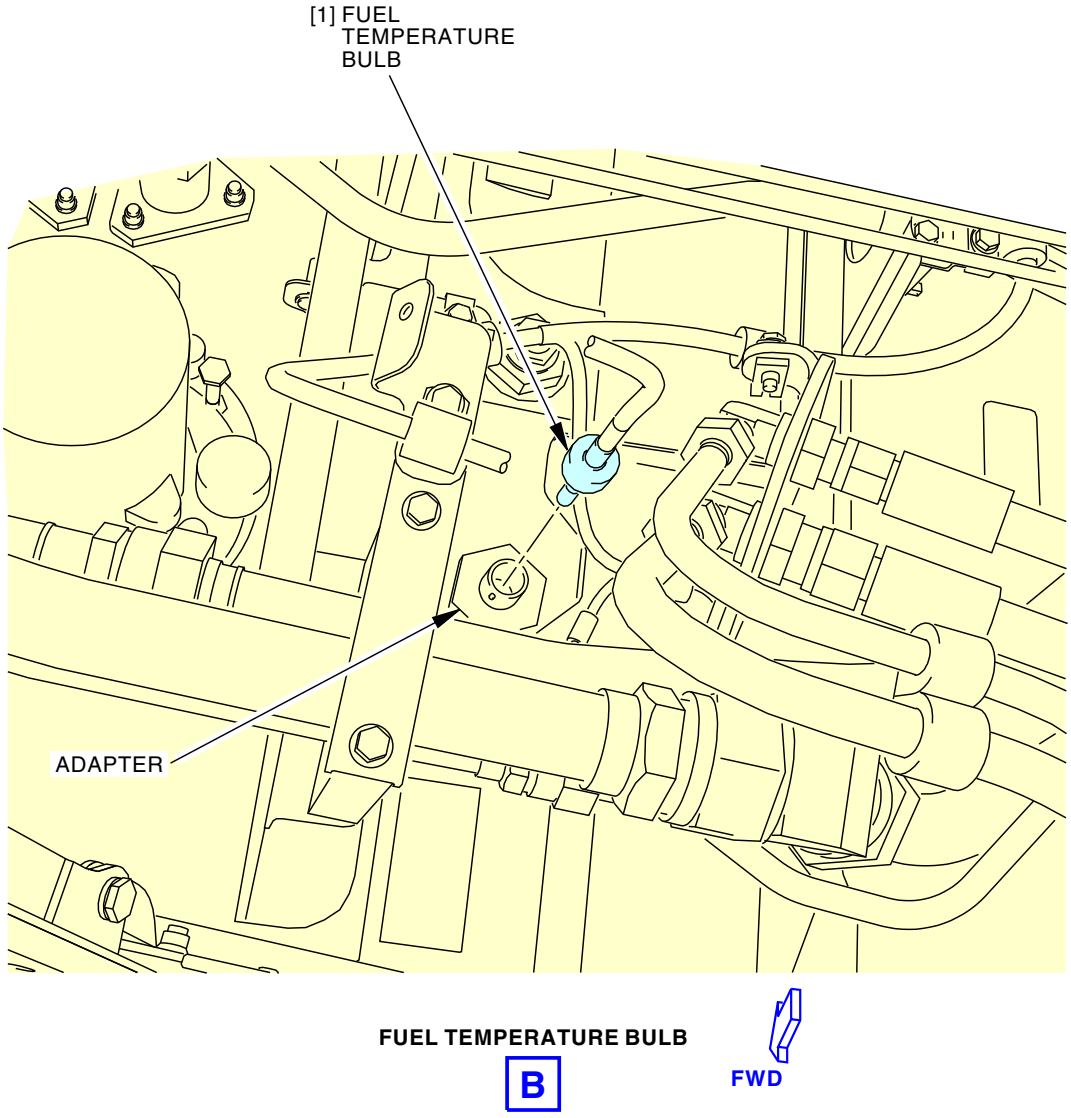
Fuel Temperature Indicator
Figure 501/28-43-00-990-801

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fuel Temperature Bulb Location
Figure 502/28-43-00-990-802 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2413737 S00061533218_V1

Fuel Temperature Bulb Location
Figure 502/28-43-00-990-802 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-43-00-720-801

3. Fuel Temperature Indicator Functional Test (Spare Temperature Indicator)

(Figure 501, Figure 502).

A. General

(1) As an alternative to this task, you can do a test for the fuel temperature indication with this task: Fuel Temperature Indicator Functional Test (Decade Resistor), TASK 28-43-00-710-802.

B. Location Zones

Zone	Area
211	Flight Compartment - Left
551	Left Wing - Rear Spar To Landing Gear Support Beam

C. Prepare for the Functional Test

SUBTASK 28-43-00-860-008

(1) Make sure that this circuit breaker is closed:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
A	7	C00355	FUEL TEMP IND

SUBTASK 28-43-00-860-009

(2) Permit the temperature to become stable for 10 minutes.

D. Fuel Temperature Indicator Functional Test

SUBTASK 28-43-00-970-004

(1) Make a record of the values shown on the fuel temperature indicator.

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 28-43-00-020-002

(3) Disconnect the electrical connector from the fuel temperature indicator on the airplane.

SUBTASK 28-43-00-420-002

(4) 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 that the fuel temperature indicator installed on the airplane operates correctly.

SUBTASK 28-43-00-860-011

(5) 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 28-43-00-970-005

(6) Compare the value shown on the spare indicator with the value from the fuel temperature indicator that you recorded before this step.

(a) These values must be the same within a tolerance of ±9°F (±5°C).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-43-00-860-012

(7) 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 28-43-00-020-003

(8) Disconnect the spare fuel temperature indicator.

SUBTASK 28-43-00-420-003

(9) Connect the fuel temperature indicator on the airplane to the electrical connector.

SUBTASK 28-43-00-860-013

(10) 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 28-43-00-970-006

(11) Make sure the value shown on the fuel temperature indicator is the same as it was before you did the test.

SUBTASK 28-43-00-860-014

(12) 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 28-43-00-720-001

(13) 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 28-43-00-860-015

(14) 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

——— END OF TASK ———

TASK 28-43-00-710-802

4. Fuel Temperature Indicator Functional Test (Decade Resistor)

A. General

(1) The functional test can be used as an alternative to the task: Fuel Temperature Indicator Functional Test (Spare Temperature Indicator), TASK 28-43-00-720-801.

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.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Reference	Description
COM-9597	Box - Decade, Resistance (11,111.1 Ohms total, 0.01 ohm/step) Part #: 1433-20 Supplier: 62015 Part #: RDS63-B Supplier: 0BHF9

C. Location Zones

Zone	Area
193	Lower Wing-To-Body Fairing - Wheel Well
212	Flight Compartment - Right

D. Prepare for the Procedure

SUBTASK 28-43-00-860-017

(1) 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 28-43-00-020-004

(2) At the left wheel well, disconnect the connector, D46028P, from the panel, AL0675B, position 4.

SUBTASK 28-43-00-860-018

(3) Set the decade resistance box, COM-9597, to 77.39 ohms.

SUBTASK 28-43-00-420-004

(4) Connect the high terminal of the decade resistance box, COM-9597, to connector, D46028J, pin 16.

SUBTASK 28-43-00-420-005

(5) Connect the low terminal of the decade resistance box, COM-9597, to connector, D46028J, pin 15 and connector, D46028P, pin 15.

SUBTASK 28-43-00-860-020

(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

E. Procedure

SUBTASK 28-43-00-210-001

(1) At the fuel temperature indicator, located on the P5 overhead panel, make sure that the fuel temperature indicator displays -40 ±13°F (-40 ±7°C).

SUBTASK 28-43-00-860-021

(2) Set the decade resistance box, COM-9597, to 90.38 ohms.

SUBTASK 28-43-00-210-002

(3) At the fuel temperature indicator, located on the P5 overhead panel, make sure the fuel temperature indicator displays 32 ±13°F (0 ±7°C).

SUBTASK 28-43-00-860-022

(4) Set the decade resistance box, COM-9597, to 104.6 ohms.

SUBTASK 28-43-00-210-003

(5) At the fuel temperature indicator, located on the P5 overhead panel, make sure the fuel temperature indicator displays 104 ±13°F (40 ±7°C).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Put the Airplane Back to Its Usual Condition

SUBTASK 28-43-00-860-023

(1) 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 28-43-00-020-005

(2) Disconnect the decade resistance box, COM-9597, from connector, D46028J, and connector, D46028P.

SUBTASK 28-43-00-420-006

(3) At the left wheel well, re-connect the connector, D46028P, to the panel, AL0675B, position 4.

SUBTASK 28-43-00-860-024

(4) 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

——— END OF TASK ———

TASK 28-43-00-760-801

5. Fuel Temperature Bulb Resistance Test

(Figure 501, Figure 502)

A. References

Reference	Title
WDM 28-42-11	D000534472

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. Access Panels

Number	Name/Location
551DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel

E. Procedure

SUBTASK 28-43-00-860-027

(1) 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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-43-00-010-002

(2) Open this access panel:

Number	Name/Location
551DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel

SUBTASK 28-43-00-020-006

(3) 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

(4) 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 28-43-00-420-009

(5) 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 28-43-00-020-007

(6) Disconnect the connector, D616, from the fuel temperature indicator in the flight compartment (WDM 28-42-11).

SUBTASK 28-43-00-020-008

(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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Table 501/28-43-00-993-801 (Continued)

TEMPERATURE (degrees Celsius)	RESISTANCE (ohms)
-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 28-43-00-420-007

(10) Connect the connector, D616, to the fuel temperature indicator in the flight compartment again (WDM 28-42-11).

SUBTASK 28-43-00-420-008

(11) Connect the ground GD476-DC on the A leg of the temperature sensor wiring to ground again (WDM 28-42-11).

SUBTASK 28-43-00-410-002

(12) Close this access panel:

Number	Name/Location
551DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel

SUBTASK 28-43-00-860-028

(13) 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

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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. General

(1) This task gives instructions to remove the fuel temperature bulb [1].

B. Location Zones

Zone	Area
561	Left Wing - Rear Spar to Trailing Edge, Outboard Of Inboard Flap, Inboard of Fixed Trailing Edge

C. Access Panels

Number	Name/Location
551DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel

D. Prepare for the Removal

SUBTASK 28-43-11-860-001

(1) 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

E. Fuel Temperature Bulb Removal

SUBTASK 28-43-11-010-001

(1) Open this access panel:

Number	Name/Location
551DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel

SUBTASK 28-43-11-020-001

(2) Cut the wires that go to the fuel temperature bulb [1].

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

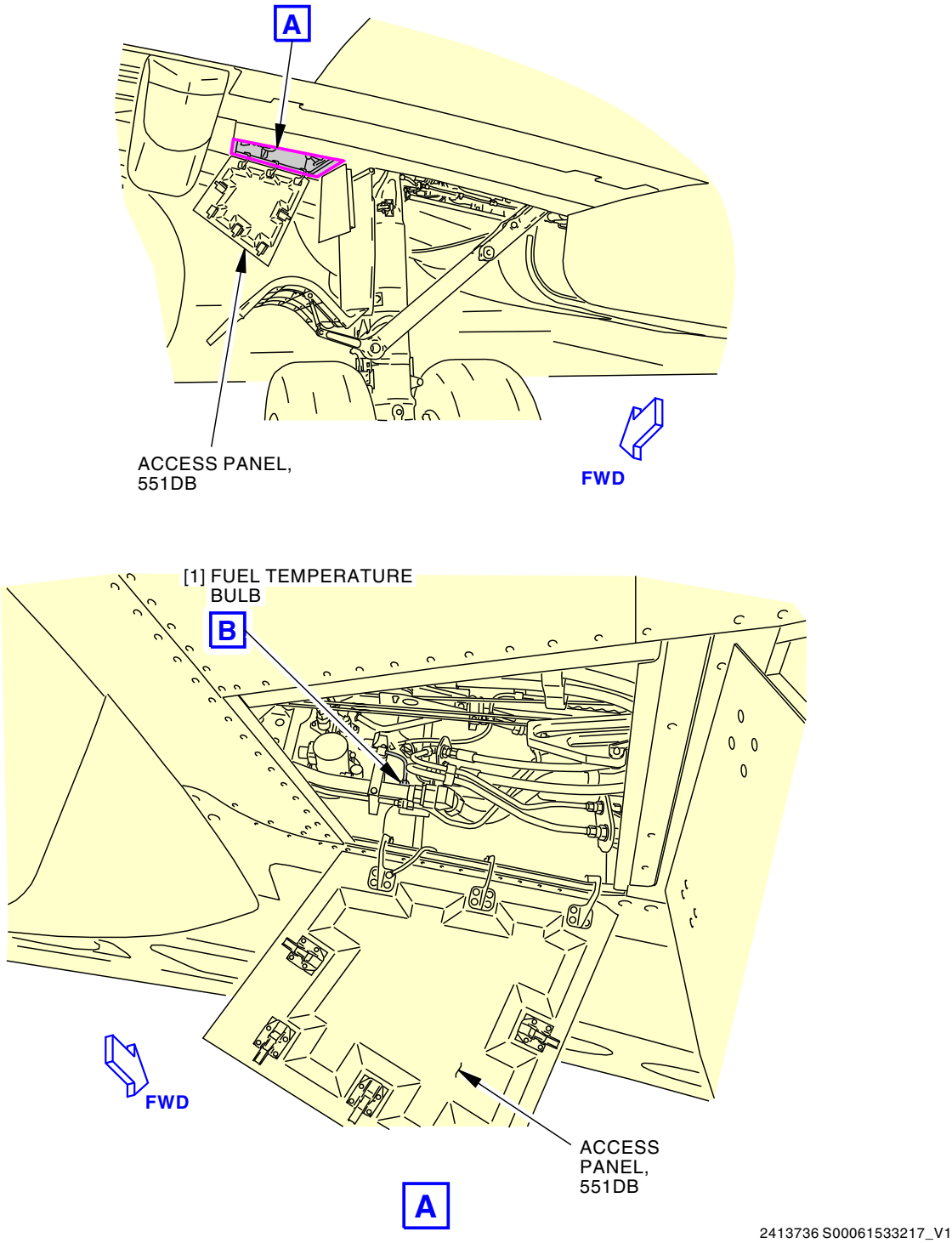
(3) Push the fuel temperature bulb [1] into the adapter with a maximum force of 4.0 lbf (17.8 N).

SUBTASK 28-43-11-020-003

(4) Turn the bulb until it is free and pull the fuel temperature bulb [1] out of the adapter.

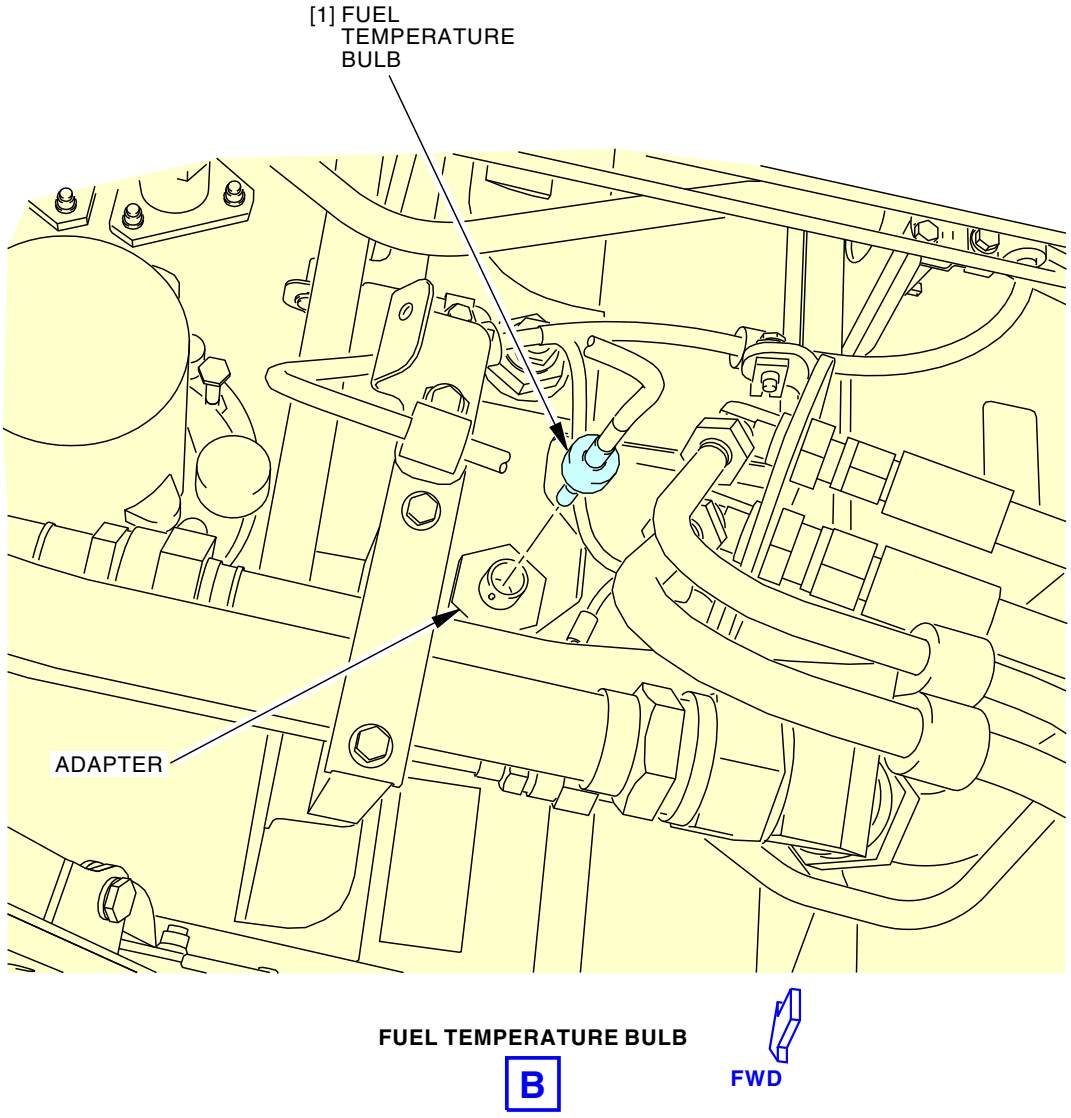
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fuel Temperature Bulb Installation
Figure 401/28-43-11-990-801 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Fuel Temperature Bulb Installation
Figure 401/28-43-11-990-801 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-43-11-400-801

3. Fuel Temperature Bulb Installation

(Figure 401)

A. General

(1) This task gives instructions to install the fuel temperature bulb [1].

B. References

Reference	Title
24-22-00-860-801	Supply Electrical Power (P/B 201)

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Fuel temperature bulb	28-43-11-01-035	SIA ALL

D. Access Panels

Number	Name/Location
551DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel

E. Fuel Temperature Bulb Installation

SUBTASK 28-43-11-420-001

(1) Hold the fuel temperature bulb [1] 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 [1] 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 [1] to the airplane wire bundle.

F. Put the Airplane Back to its Usual Condition

SUBTASK 28-43-11-860-002

(1) 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

(2) Do this task if necessary: Supply Electrical Power, TASK 24-22-00-860-801.

SUBTASK 28-43-11-710-001

(3) Monitor the fuel temperature on the indicator.

(a) Make sure the indicator shows the correct temperature.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-43-11-410-001

(4) Close this access panel:

Number	Name/Location
551DB	Lower Inboard Fixed Trailing Edge, Lube Actuator & MLG Beam Outboard Attach Pin Access Panel

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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. General

(1) This task gives instructions to remove the Fuel Temperature Indicator.

B. Location Zones

Zone	Area
211	Flight Compartment - Left

C. Prepare for the Removal

SUBTASK 28-43-21-860-001

(1) Do these steps to remove the fuel temperature indicator [1] from the P5-2 overhead panel:

(a) 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

D. Fuel Temperature Indicator Removal

SUBTASK 28-43-21-020-001

(1) Loosen the 6 quarter-turn fasteners that hold the P5-2 overhead panel.

(2) Carefully pull the P5-2 overhead panel away from the rest of the P5 panel until there is sufficient access to the fuel temperature indicator [1] behind the face of the P5-2 panel.

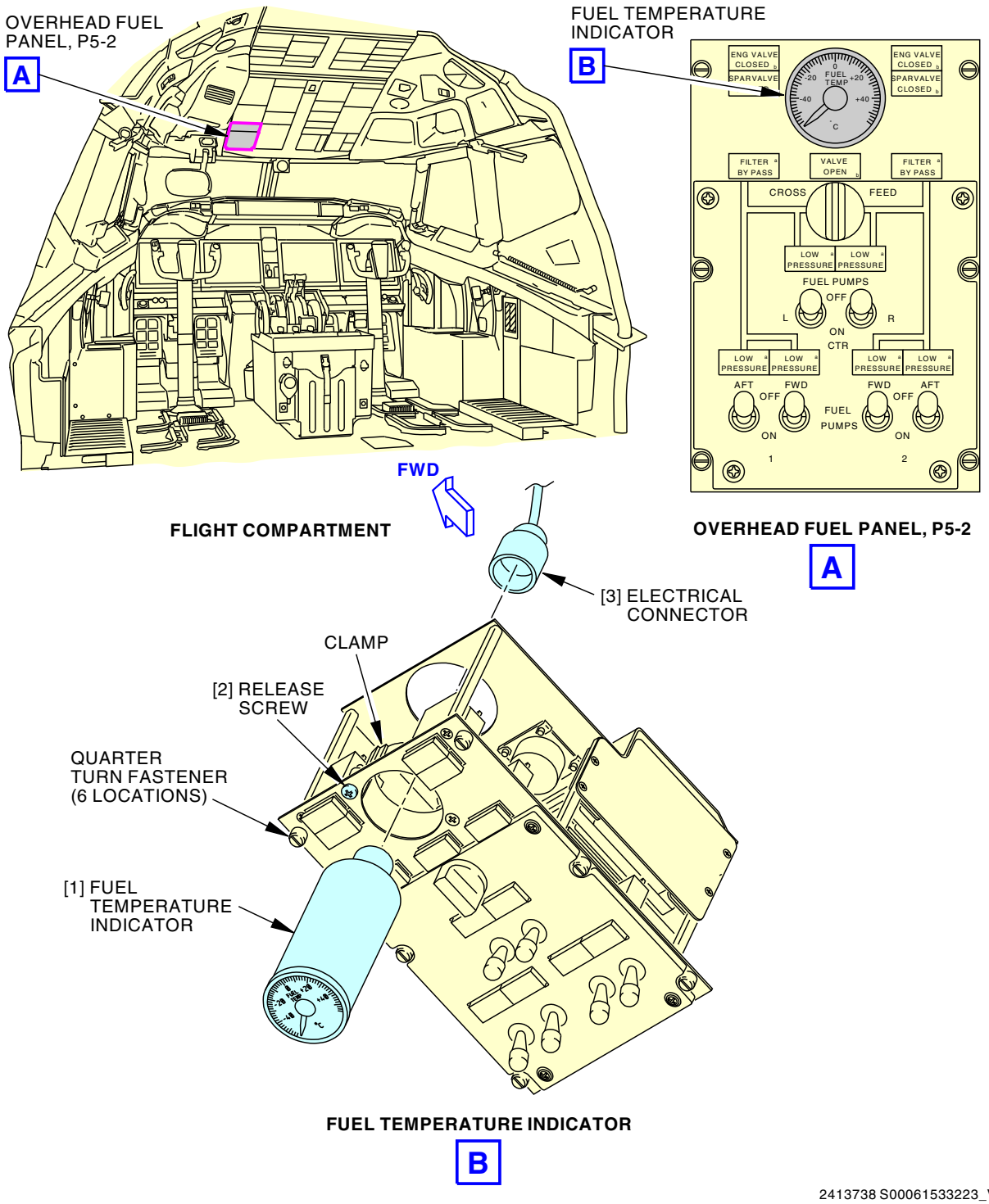
(3) Disconnect the electrical connector [3] from the fuel temperature indicator [1].

(4) Loosen the release screw [2] to loosen the clamp that holds the fuel temperature indicator [1] in its position.

(5) Remove the fuel temperature indicator from the P5-2 panel.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Fuel Temperature Indicator Installation
Figure 401/28-43-21-990-801

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-43-21-020-802

3. Fuel Temperature Indicator Installation

(Figure 401)

A. General

(1) This task gives instructions to install the Fuel Temperature Indicator.

B. References

Reference	Title
28-43-00-710-801	Fuel Temperature Indicating System Test (Master Thermometer) (P/B 501)

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Fuel temperature indicator	28-43-21-01-050	SIA ALL

D. Location Zones

Zone	Area
211	Flight Compartment - Left

E. Fuel Temperature Indicator Installation

SUBTASK 28-43-21-020-002

(1) Do these steps to install the fuel temperature indicator on the P5-2 overhead panel:

(a) Put the fuel temperature indicator [1] in its position in the P5-2 overhead panel.

(b) Tighten the release screw [2] to tighten the clamp that holds the fuel temperature indicator [1] in its position.

(c) Connect the electrical connector [3] 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 fuel temperature indicator [1] behind the face of the P5-2 panel.

(e) Tighten the 6 quarter-turn fasteners that hold the P5-2 overhead panel.

F. Fuel Temperature Indicator Installation Test

SUBTASK 28-43-21-860-002

(1) 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 test of the Fuel Temperature Indicating System: Fuel Temperature Indicating System Test (Master Thermometer), TASK 28-43-00-710-801.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

MEASURING STICK - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) A removal of the fuel measuring stick

(2) An installation of the fuel measuring stick

(3) A removal of the fuel measuring stick mounting base

(4) An installation of the fuel measuring stick mounting base.

B. To remove the fuel measuring stick, it is not necessary to defuel the fuel tanks.

C. To remove the fuel measuring stick mounting base:

(1) Defuel the applicable fuel tank.

(2) Remove the applicable access panel when necessary.

TASK 28-44-11-000-801

2. Fuel Measuring Stick Removal

(Figure 401)

A. General

(1) This task gives instruction to remove the fuel measuring stick.

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-5738	Spanner Wrench - Fuel Stick Retainer Part #: A28016-1 Supplier: 81205 Part #: T5-0497K Supplier: 86831

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 Removal

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, SPL-5738, to remove the bayonet socket [10] or retainer [8] from the stick fitting or mounting base [36] (Figure 401).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-44-11-020-002

(3) Pull the stick subassembly [35] from the housing [26] with the retainer [8], spring [30], and the 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 that the applicable tank contains sufficient fuel to cover the base of the fuel measuring stick housing.

Table 401/28-44-11-993-801 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

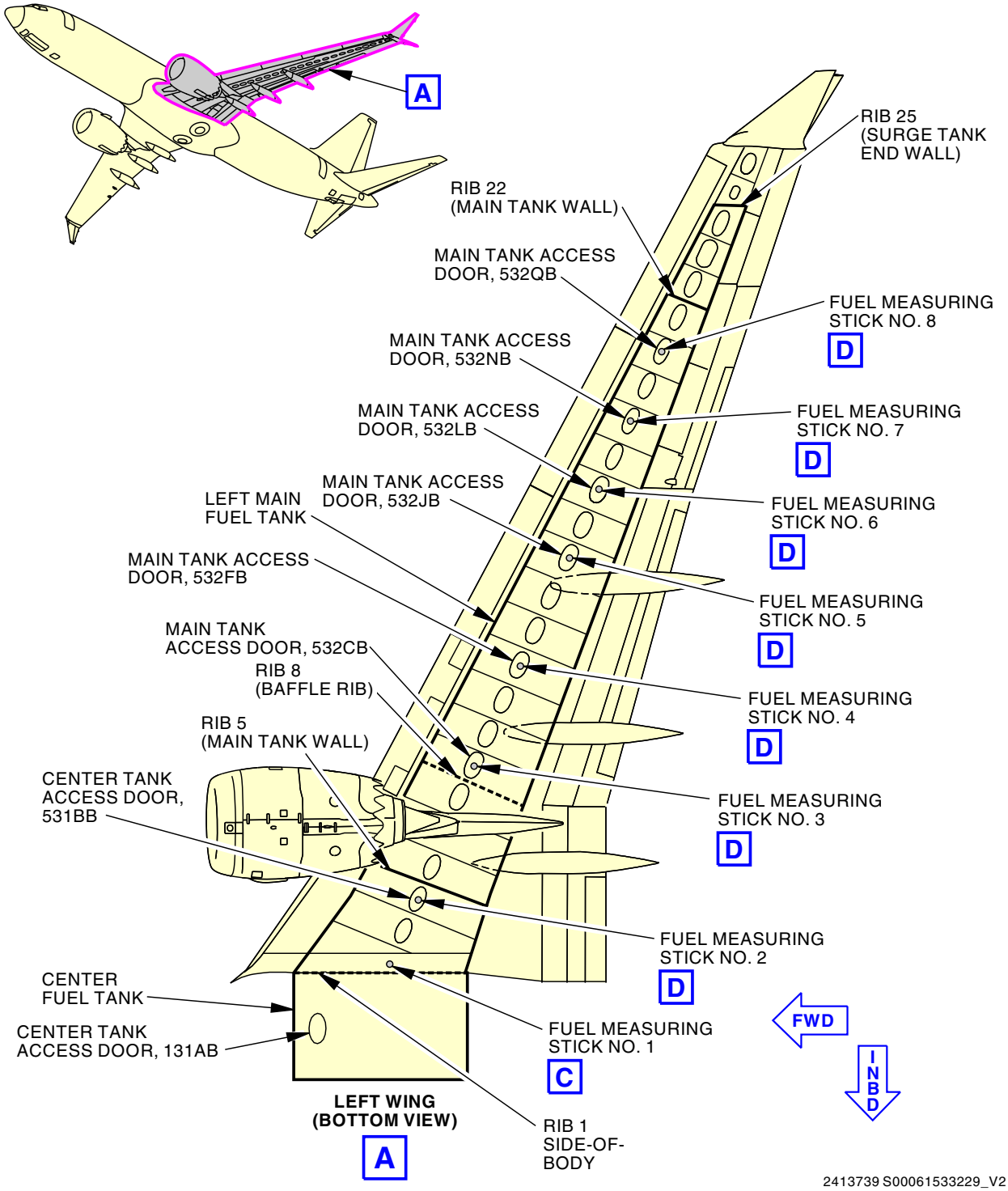
Table 402/28-44-11-993-802 FUEL NECESSARY TO COVER THE NO. 1 OR NO. 2 TANK MEASURING STICKS

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 that there is no fuel leakage.

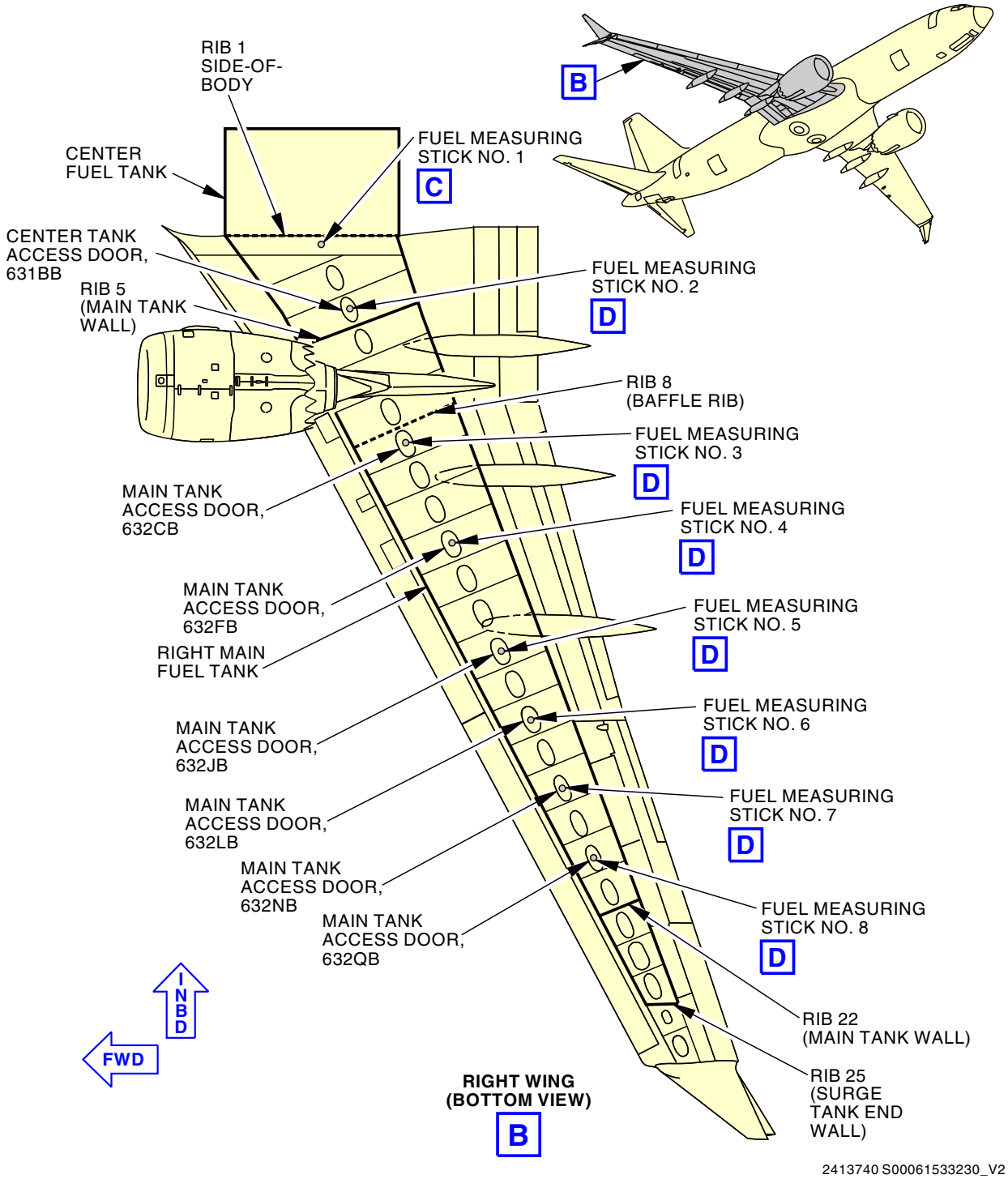
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



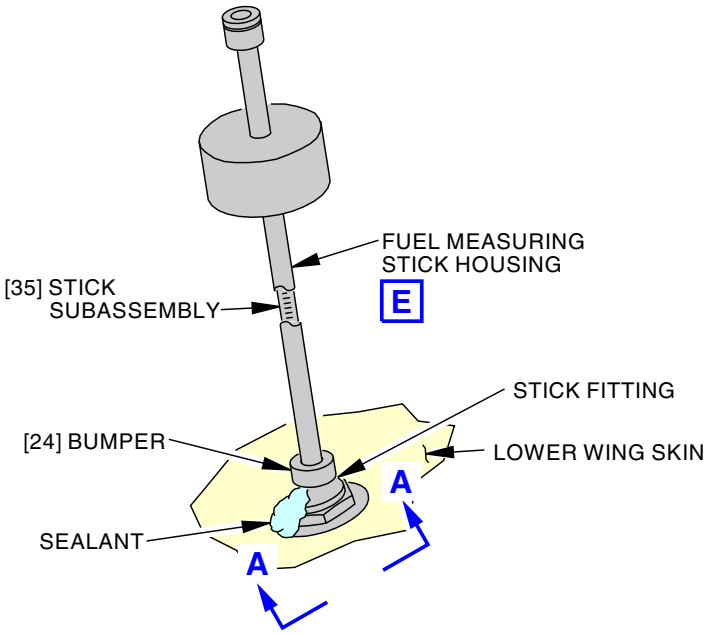
Fuel Measuring Stick Installation
Figure 401/28-44-11-990-801 (Sheet 1 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



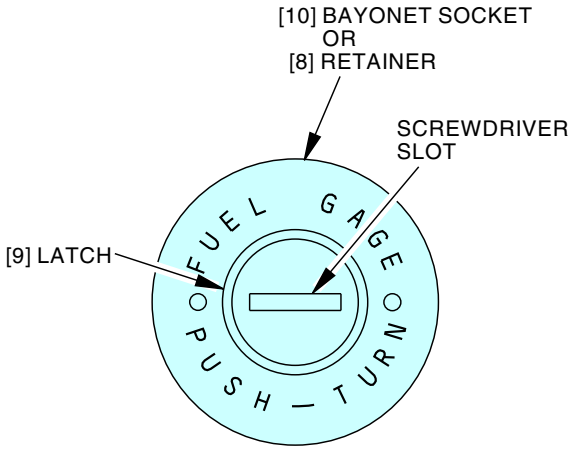
Fuel Measuring Stick Installation
Figure 401/28-44-11-990-801 (Sheet 2 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



**FUEL MEASURING STICK INSTALLATION
(STICK NO. 1)**

C



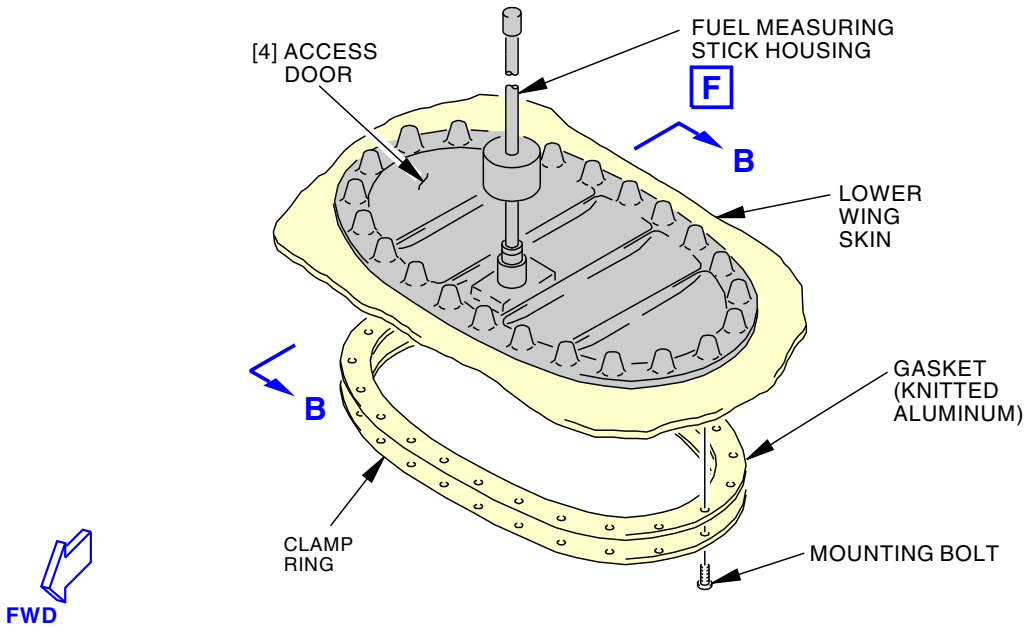
**BAYONET SOCKET OR RETAINER
(VIEW FROM BELOW THE WING,
STICKS NO. 1 THROUGH 8)**

A-A

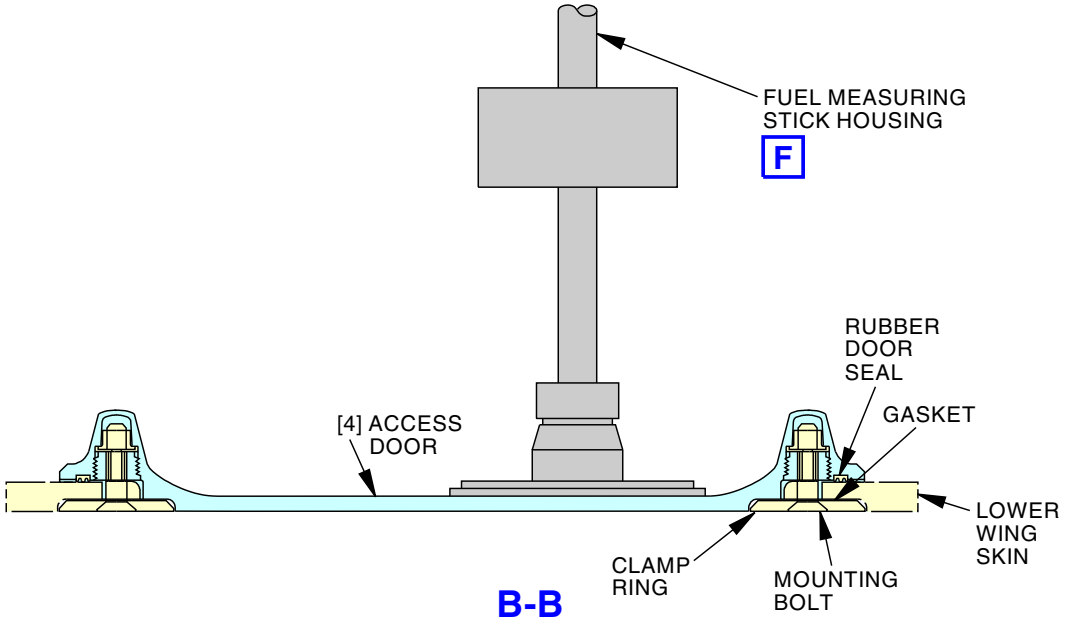
2413741 S00061533231_V2

**Fuel Measuring Stick Installation
Figure 401/28-44-11-990-801 (Sheet 3 of 5)**

ECCN 9E991 BOEING PROPRIETARY - See title page for details



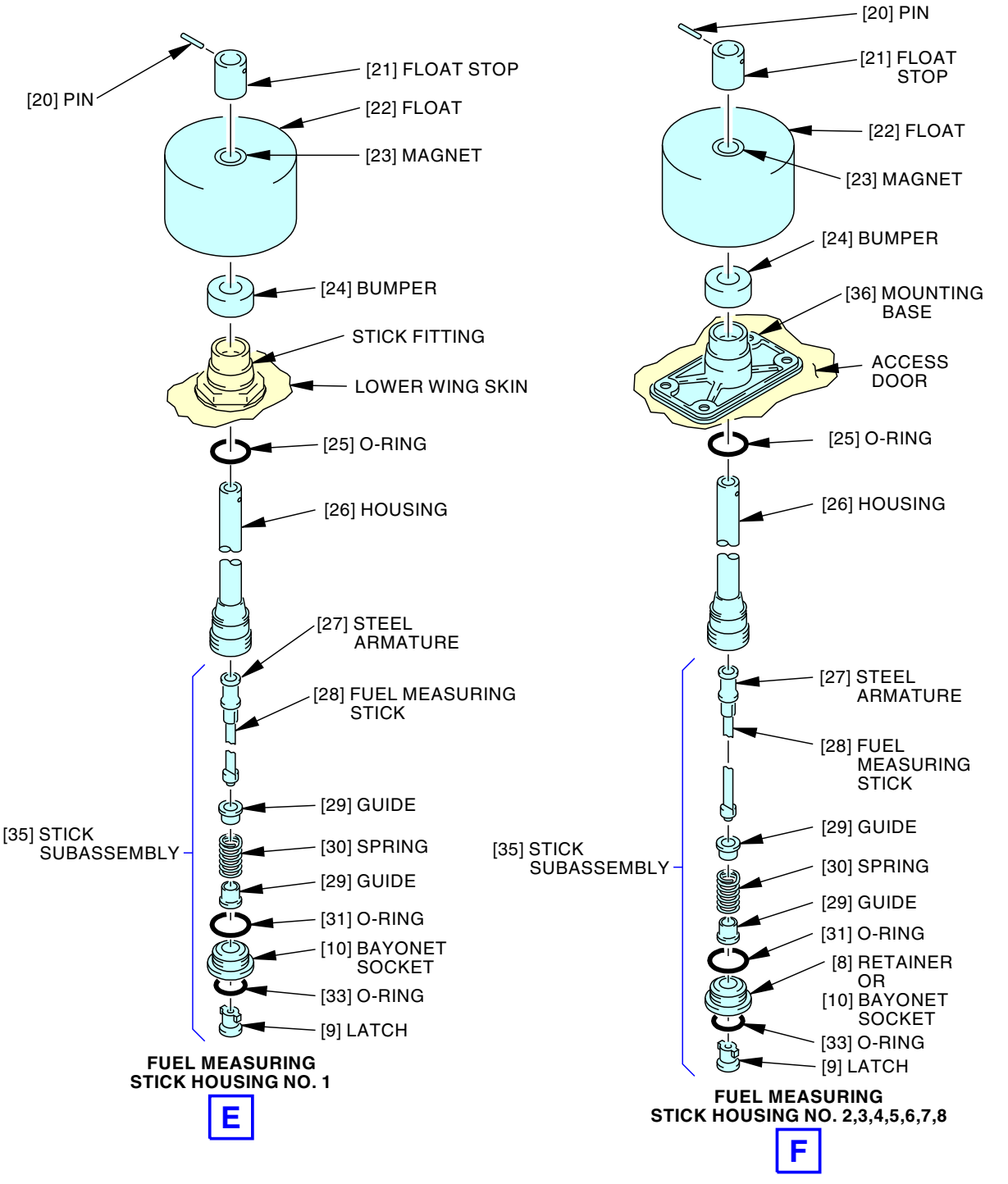
FUEL MEASURING STICK INSTALLATION (STICK NO. 2,3,4,5,6,7 AND 8)



2413742 S00061533232_V2

Fuel Measuring Stick Installation
Figure 401/28-44-11-990-801 (Sheet 4 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fuel Measuring Stick Installation
Figure 401/28-44-11-990-801 (Sheet 5 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-44-11-400-801

3. Fuel Measuring Stick Installation

(Figure 401)

A. General

(1) This task gives instructions to install the fuel measuring stick.

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-5738	Spanner Wrench - Fuel Stick Retainer Part #: A28016-1 Supplier: 81205 Part #: T5-0497K Supplier: 86831

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
31	O-ring	28-44-11-01A-025	SIA ALL
		28-44-11-12-060	SIA ALL
		28-44-11-13-060	SIA ALL
		28-44-11-16-060	SIA ALL
		28-44-11-19-060	SIA ALL
33	O-ring	28-44-11-01A-020	SIA ALL
		28-44-11-12-055	SIA ALL
		28-44-11-13-055	SIA ALL
		28-44-11-16-055	SIA ALL
		28-44-11-19-055	SIA ALL
35	Stick subassembly	28-44-11-01A-010	SIA ALL
		28-44-11-01A-015	SIA ALL
		28-44-11-12-045	SIA ALL
		28-44-11-12-050	SIA ALL
		28-44-11-13-045	SIA ALL
		28-44-11-13-050	SIA ALL
		28-44-11-16-045	SIA ALL
		28-44-11-16-050	SIA ALL
		28-44-11-19-045	SIA ALL

D. 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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

E. Fuel Measuring Stick Installation

SUBTASK 28-44-11-420-001

(1) Install the new O-ring [31] and new O-ring [33] on the bayonet socket [10] or retainer [8].

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 that the applicable tank contains sufficient fuel to cover the base of the fuel measuring stick housing.

Table 403/28-44-11-993-803

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 404/28-44-11-993-804

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 that there are no indications of fuel leakage from the housing before installation of 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].

SUBTASK 28-44-11-420-003

(4) Install the guide [29], spring [30], second guide [29], and the retainer [8] in the housing [26].

SUBTASK 28-44-11-420-004

(5) Use a spanner wrench, SPL-5738, to tighten the retainer [8] in the housing to a torque of 80 ±5 in-lb (9 ±1 N·m).

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 28-44-11-000-802

4. Fuel Measuring Stick Mounting Base Removal

(Figure 401)

A. General

(1) This task gives instructions to remove the Fuel Measuring Stick Mounting Base.

B. 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)
28-11-11-000-801	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

Reference	Description
STD-625	Pen

D. 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

E. Access Panels

Number	Name/Location
531BB	Center Tank Access Door - Wing Station 192
532CB	Main Tank Access Door - Wing Station 290
532FB	Main Tank Access Door - Wing Station 367
532JB	Main Tank Access Door - Wing Station 443
532LB	Main Tank Access Door - Wing Station 496
532NB	Main Tank Access Door - Wing Station 549
532QB	Main Tank Access Door - Wing Station 602
631BB	Center Tank Access Door - Wing Station 192
632CB	Main Tank Access Door - Wing Station 290
632FB	Main Tank Access Door - Wing Station 367
632JB	Main Tank Access Door - Wing Station 443
632LB	Main Tank Access Door - Wing Station 496
632NB	Main Tank Access Door - Wing Station 549
632QB	Main Tank Access Door - Wing Station 602

F. Prepare for the Removal

SUBTASK 28-44-11-650-001

(1) Defuel the applicable main tank (TASK 28-26-00-650-801) or transfer fuel out of the applicable tank (TASK 28-26-00-650-802).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-44-11-860-005

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 28-11-00-910-801).

SUBTASK 28-44-11-650-002

(3) Drain and purge the applicable main fuel tank (TASK 28-11-00-910-802).

SUBTASK 28-44-11-020-004

(4) Do this task: Main Tank Access Door Removal, TASK 28-11-11-000-801.

(a) Remove the applicable fuel tank access door(s):

Number	Name/Location
531BB	Center Tank Access Door - Wing Station 192
532CB	Main Tank Access Door - Wing Station 290
532FB	Main Tank Access Door - Wing Station 367
532JB	Main Tank Access Door - Wing Station 443
532LB	Main Tank Access Door - Wing Station 496
532NB	Main Tank Access Door - Wing Station 549
532QB	Main Tank Access Door - Wing Station 602
631BB	Center Tank Access Door - Wing Station 192
632CB	Main Tank Access Door - Wing Station 290
632FB	Main Tank Access Door - Wing Station 367
632JB	Main Tank Access Door - Wing Station 443
632LB	Main Tank Access Door - Wing Station 496
632NB	Main Tank Access Door - Wing Station 549
632QB	Main Tank Access Door - Wing Station 602

G. Fuel Measuring Stick Mounting Base Removal

SUBTASK 28-44-11-020-005

(1) Remove the fuel measuring stick (TASK 28-44-11-000-801).

SUBTASK 28-44-11-020-006

(2) Remove the old sealant from the mounting base [36] and fasteners.

SUBTASK 28-44-11-860-006

(3) Make a mark on the mounting base with a pen, STD-625, of an arrow that points in the forward direction.

NOTE: This arrow will make sure the mounting base and fuel measuring stick are installed with the correct orientation.

SUBTASK 28-44-11-020-007

(4) Remove the bolts, collars, and washers from the mounting base (four locations).

(a) Keep the fasteners for the installation.

SUBTASK 28-44-11-020-008

(5) Carefully remove the mounting base and fuel measuring stick housing from the fuel tank access door.

NOTE: The mounting base and fuel tank access door are bonded with faying surface sealant.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Keep the mounting base and fuel measuring stick housing for the installation.

——— END OF TASK ———

TASK 28-44-11-400-802

5. Fuel Measuring Stick Mounting Base Installation

(Figure 401)

A. General

(1) This task gives instructions to install the Fuel Measuring Stick Mounting Base.

(2) For faying surface seal applications:

(a) Inside the fuel tank, use BMS 5-45 Class B-2 sealant, A50110, or BMS 5-45 Class C sealant, A50155.

(b) Outside the fuel tank, use BMS 5-45 Class B-2 sealant, A50110, BMS 5-45 Class C sealant, A50155, BMS 5-95 Class B sealant, A50231, or BMS 5-95 Class C sealant, A50296.

(c) Do not apply a faying surface seal with a temperature higher than 100°F (38°C).

(d) Do not use alternatives for faying surface sealants.

B. References

Reference	Title
28-11-00-300-803	Repair of Sealant Leaks in the Fuel Tank Structure (P/B 801)
28-11-11-400-801	Main Tank Access Door Installation (P/B 401)
51-22-00-390-806	Fillet Seal Application (P/B 201)
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES

C. Tools/Equipment

Reference	Description
STD-123	Brush - Soft Bristle

D. Consumable Materials

Reference	Description	Specification
A50110	Sealant - Fuel Tank	BMS5-45 Class B-2
A50155	Sealant - Fuel Tank	BMS5-45 Class C
A50231	Sealant - Pressure And Environmental - Chromate Type	BMS5-95 Class B
A50296	Sealant - Pressure And Environmental - Chromate Type	BMS5-95 Class C
B00130	Alcohol - Isopropyl	TT-I-735
B00184	Solvent - Presealing, Cleaning Solvent	BMS11-7
B00666	Solvent - Methyl Propyl Ketone	BMS11-9
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G50021	Pad - General Purpose Scrubbing - Scotch-Brite 96W	

ECCN 9E991 BOEING PROPRIETARY - See title page for details

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
36	Mounting base	28-44-11-12-130	SIA ALL
		28-44-11-13-130	SIA ALL
		28-44-11-16-130	SIA ALL
		28-44-11-16-135	SIA ALL
		28-44-11-19-120	SIA ALL

F. 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

G. Access Panels

Number	Name/Location
531BB	Center Tank Access Door - Wing Station 192
532CB	Main Tank Access Door - Wing Station 290
532FB	Main Tank Access Door - Wing Station 367
532JB	Main Tank Access Door - Wing Station 443
532LB	Main Tank Access Door - Wing Station 496
532NB	Main Tank Access Door - Wing Station 549
532QB	Main Tank Access Door - Wing Station 602
631BB	Center Tank Access Door - Wing Station 192
632CB	Main Tank Access Door - Wing Station 290
632FB	Main Tank Access Door - Wing Station 367
632JB	Main Tank Access Door - Wing Station 443
632LB	Main Tank Access Door - Wing Station 496
632NB	Main Tank Access Door - Wing Station 549
632QB	Main Tank Access Door - Wing Station 602

H. Fuel Measuring Stick Mounting Base Installation

SUBTASK 28-44-11-110-001

(1) Remove the old sealant from these components:

(a) mounting base [36] (if re-used)

(b) bolts, collars, and washers.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-44-11-110-002

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.

(2) To remove the remaining sealant, grease, oil, dirt, and other contamination from the components, use one of these brushed/pads soaked with solvent, B00184, or solvent, B00666:

(a) soft bristle brush, STD-123

(b) cotton wiper, G00034

(c) Scotch-Brite 96W pad, G50021.

SUBTASK 28-44-11-760-001

(3) Do these steps to prepare the mounting base and the fuel tank access door for an electrical faying surface bond (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.

(a) Final clean the contact surfaces of the mounting base and the fuel tank access door with a cotton wiper, G00034, soaked with alcohol, B00130, or solvent, B00184.

(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 BMS 5-45 Class B-2 sealant, A50110, or BMS 5-45 Class C sealant, A50155, to the contact area of the mounting base.

1) For the use of faster cure time sealants, refer to the figure "Sealant Usable Time" in TASK 28-11-00-300-803 for BMS 5-45 Class B or Class C sealants.

SUBTASK 28-44-11-420-006

(4) Do these steps to install the mounting base to the fuel tank access door:

(a) Put the mounting base onto the fuel tank access door.

1) Make sure that the arrow on the mounting base is pointing in the forward direction.

(b) Install the bolts, washers, and collars (four locations).

SUBTASK 28-44-11-390-001

(5) On the in-tank side of the fuel tank access door, apply sealant, A50110, to these components:

(a) A cap seal on the four bolts

(b) A fillet seal around the periphery of the mounting base and the fuel tank access door (TASK 51-22-00-390-806).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-44-11-760-002

(6) Do these steps to do a check of the electrical bonding resistance for all fuel tank access doors except 531BB and 631BB (SWPM 20-20-00):

(a) Measure the electrical bonding resistance between the mounting base and the fuel tank access door.

1) Make sure that the resistance is less than 0.001 ohm (1 milliohm).

SUBTASK 28-44-11-760-003

(7) Do these steps to do a check of the electrical bonding resistance for fuel tank access doors 531BB and 631BB only (SWPM 20-20-00):

(a) Measure the electrical bonding resistance between the mounting base and the unpainted periphery of the aluminum face sheet.

1) Make sure that the resistance is less than 0.0025 ohm (2.5 milliohms).

I. Put the Airplane Back to Its Usual Condition

SUBTASK 28-44-11-420-007

(1) Do this task: Main Tank Access Door Installation, TASK 28-11-11-400-801.

(a) Install the applicable fuel tank access door(s):

Number	Name/Location
531BB	Center Tank Access Door - Wing Station 192
532CB	Main Tank Access Door - Wing Station 290
532FB	Main Tank Access Door - Wing Station 367
532JB	Main Tank Access Door - Wing Station 443
532LB	Main Tank Access Door - Wing Station 496
532NB	Main Tank Access Door - Wing Station 549
532QB	Main Tank Access Door - Wing Station 602
631BB	Center Tank Access Door - Wing Station 192
632CB	Main Tank Access Door - Wing Station 290
632FB	Main Tank Access Door - Wing Station 367
632JB	Main Tank Access Door - Wing Station 443
632LB	Main Tank Access Door - Wing Station 496
632NB	Main Tank Access Door - Wing Station 549
632QB	Main Tank Access Door - Wing Station 602

SUBTASK 28-44-11-420-011

(2) Install the fuel measuring stick (TASK 28-44-11-400-801).

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 28-44-11-360-801

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)
28-44-11-400-801	Fuel Measuring Stick Installation (P/B 401)

B. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
2	O-Ring	28-44-11-12-115	SIA ALL
		28-44-11-13-115	SIA ALL
		28-44-11-16-115	SIA ALL
		28-44-11-19-110	SIA ALL

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. Replacement of the O-Ring Seal Between the Housing and the Base Assembly

SUBTASK 28-44-11-860-007

(1) Make sure that the airplane has a roll between -1 degree and +1 degree (less than one degree left or right roll).

SUBTASK 28-44-11-860-008

(2) Make sure that the airplane has a pitch between -1 and +1 degrees (less than one degree pitch up or down).

SUBTASK 28-44-11-860-009

WARNING OBEY THESE PRECAUTIONS. IF YOU SPILL FUEL, IT CAN CAUSE FIRES AND EXPLOSIONS. THESE CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(3) Make sure that 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).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Table 801/28-44-11-993-805 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 802/28-44-11-993-806 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
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 28-44-11-010-001

(4) Remove the fuel measuring stick subassembly [1] from its housing (TASK 28-44-11-000-801).

SUBTASK 28-44-11-020-009

(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 28-44-11-020-010

(6) Loosen the housing [3] from the base with the wrench.

SUBTASK 28-44-11-020-011

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 28-44-11-020-012

(8) Use a plastic pick to remove the O-Ring [2] from the housing.

SUBTASK 28-44-11-360-001

(9) Install new O-Ring [2] on the housing.

SUBTASK 28-44-11-420-008

(10) Lift the housing into the base assembly.

SUBTASK 28-44-11-420-009

(11) Tighten the housing into the base assembly with the hexagonal wrench to 40 in-lb (4.5 N·m) - 50 in-lb (5.6 N·m).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 28-44-11-650-003

(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 803/28-44-11-993-807 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

*[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 804/28-44-11-993-808 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 28-44-11-210-001

(13) Do a check for fuel leakage in the area of the fuel measuring stick.

SUBTASK 28-44-11-410-001

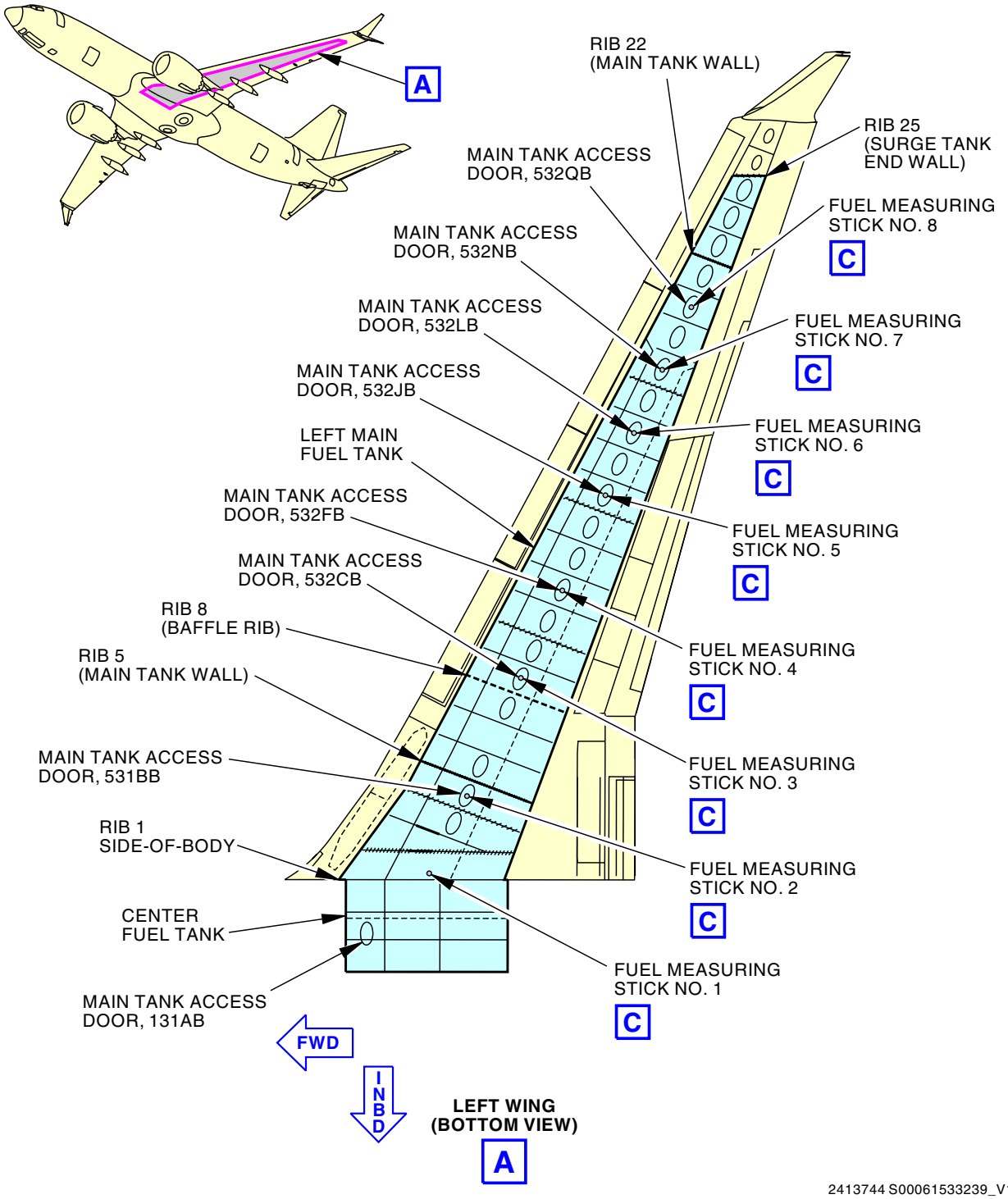
(14) If there is no fuel leakage, install the fuel measuring stick again (TASK 28-44-11-400-801).

SUBTASK 28-44-11-420-010

(15) If the fuel leakage continues, replace the housing for the fuel measuring stick.

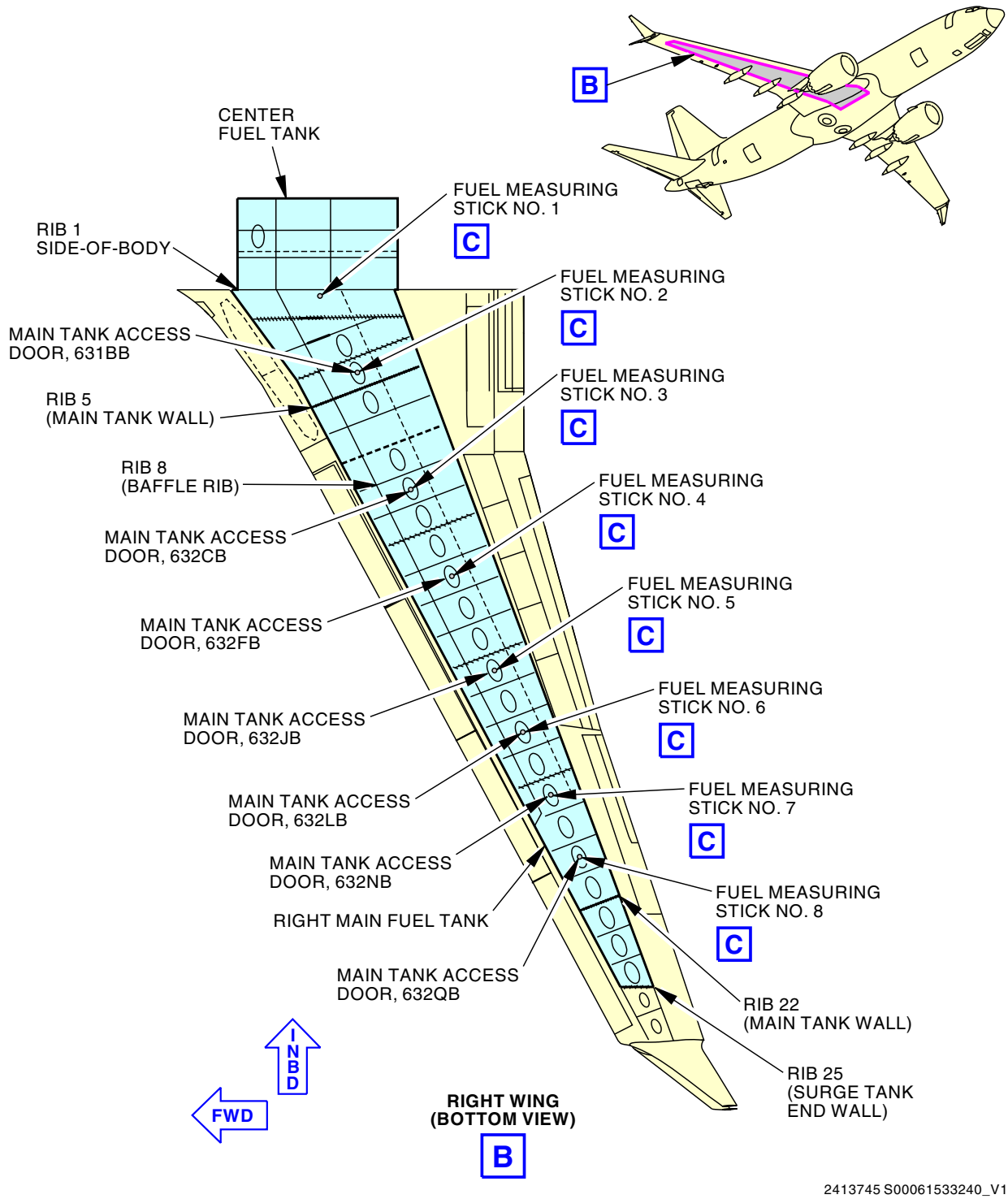
——— END OF TASK ———

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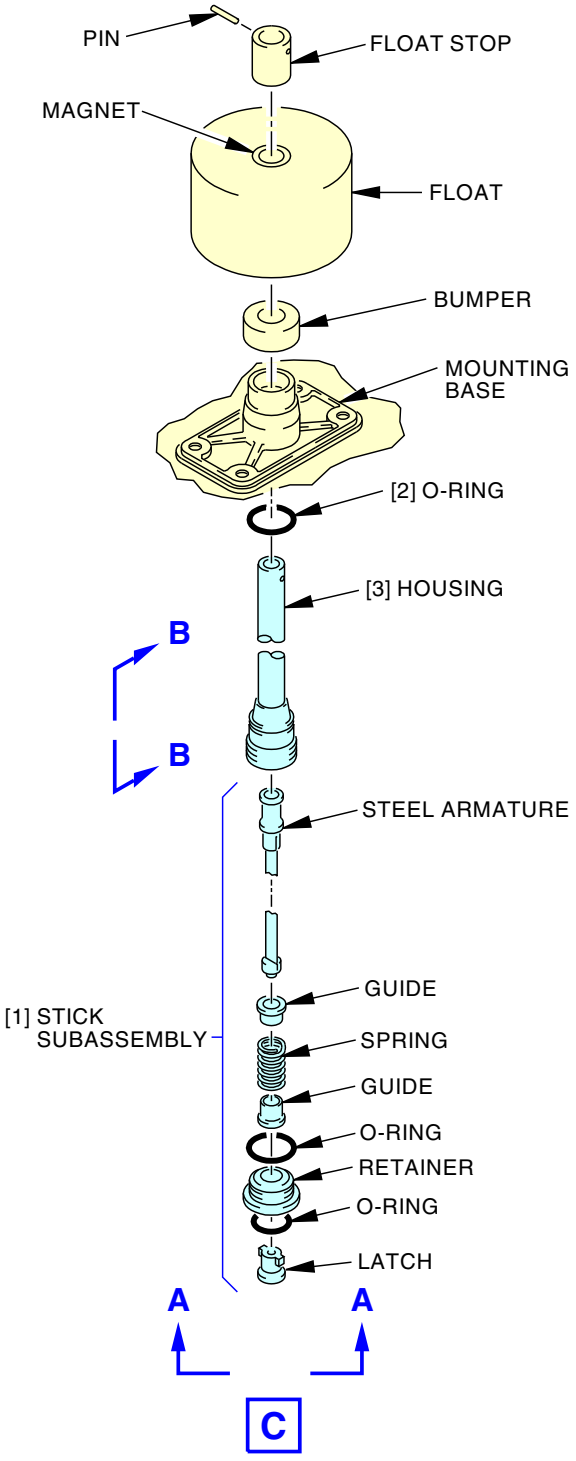
Fuel Measuring Stick Installation
Figure 801/28-44-11-990-802 (Sheet 1 of 3)

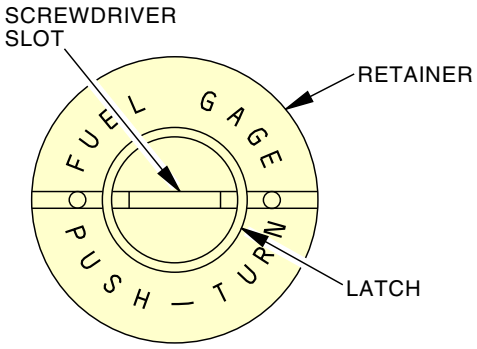
ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fuel Measuring Stick Installation
Figure 801/28-44-11-990-802 (Sheet 2 of 3)

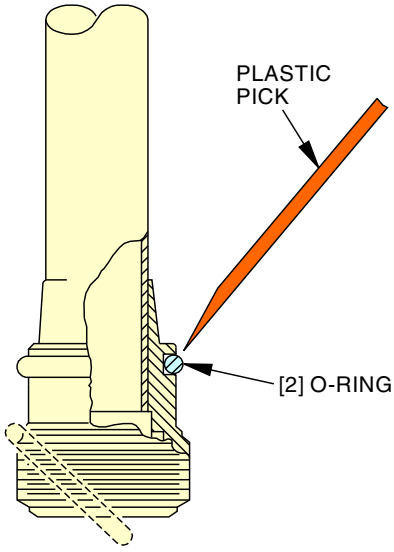
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RETAINER
(VIEWED FROM BELOW THE WING)

A-A



REMOVAL OF O-RING

B-B

2413746 S00061533241_V1

Fuel Measuring Stick Installation
Figure 801/28-44-11-990-802 (Sheet 3 of 3)

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