CHAPTER

71

POWER PLANT

(LEAP-1B ENGINES)

BOEING

737-7/8/8200/9/10
AIRCRAFT MAINTENANCE MANUAL

CHAPTER 71
POWER PLANT

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R 6	Sep 15/2023	
O 7	Sep 15/2023	
O 8	Sep 15/2023	
O 9	Sep 15/2023	
O 10	Sep 15/2023	
O 11	Sep 15/2023	
12	BLANK	
71-00-00		
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204	Sep 15/2021	
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208	Jan 15/2022	
209	May 15/2022	
210	Jan 15/2022	
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212	Sep 15/2021	
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214	Sep 15/2021	
215	Jan 15/2022	
216	Sep 15/2021	
217	Sep 15/2021	
218	May 15/2022	
219	May 15/2022	
220	May 15/2022	
221	May 15/2022	
71-00-00 (cont)		
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223	May 15/2022	
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R 253	Sep 15/2023	
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255	May 15/2022	
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71-00-00 (cont)		
R 258	Sep 15/2023	
R 259	Sep 15/2023	
R 260	Sep 15/2023	
R 261	Sep 15/2023	
262	May 15/2022	
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R 272	Sep 15/2023	
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292	May 15/2022	
293	May 15/2022	

A = Added, R = Revised, D = Deleted, O = Overflow, C = Customer Originated Change

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295	May 15/2022	
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298.6	May 15/2022	
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298.8	May 15/2022	
298.9	May 15/2022	
298.10	May 15/2022	
298.11	May 15/2022	
298.12	May 15/2022	
298.13	May 15/2022	
298.14	Jan 15/2023	
298.15	May 15/2022	
298.16	Jan 15/2023	
298.17	Jan 15/2023	
298.18	May 15/2022	
298.19	May 15/2022	
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298.21	May 15/2022	
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298.23	May 15/2022	
298.24	May 15/2022	
71-00-00		
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502	Jan 15/2023	
503	Jan 15/2022	
504	Sep 15/2021	
505	Jan 15/2023	
506	Jan 15/2023	
71-00-00 (cont)		
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509	May 15/2023	
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R 534	Sep 15/2023	
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571	Jan 15/2022	
572	Jan 15/2022	
573	Jan 15/2022	
574	Jan 15/2022	
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577	Jan 15/2022	
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581	Sep 15/2022	
582	Sep 15/2022	
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R 590	Sep 15/2023	
R 591	Sep 15/2023	
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598.7	Jan 15/2023	
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R 598.9	Sep 15/2023	
R 598.10	Sep 15/2023	
R 598.11	Sep 15/2023	
R 598.12	Sep 15/2023	
R 598.13	Sep 15/2023	
R 598.14	Sep 15/2023	
R 598.15	Sep 15/2023	
R 598.16	Sep 15/2023	
R 598.17	Sep 15/2023	
R 598.18	Sep 15/2023	
598.19	Sep 15/2022	
598.20	Jan 15/2023	
598.21	Sep 15/2022	
598.22	Sep 15/2022	
598.23	Sep 15/2022	
598.24	Sep 15/2022	
598.25	Sep 15/2022	
R 598.26	Sep 15/2023	
598.27	Jan 15/2023	
R 598.28	Sep 15/2023	
R 598.29	Sep 15/2023	
R 598.30	Sep 15/2023	
O 598.31	Sep 15/2023	
598.32	Sep 15/2022	
598.33	Jan 15/2023	
598.34	Sep 15/2022	
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598.36	Jan 15/2023	
598.37	Sep 15/2022	
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598.44	Sep 15/2022	
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598.47	Jan 15/2023	
598.48	Sep 15/2022	
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598.50	Jan 15/2023	
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598.58	Jan 15/2023	
598.59	Sep 15/2022	
598.60	Sep 15/2022	
598.61	Sep 15/2022	
598.62	Sep 15/2022	
598.63	Jan 15/2023	
598.64	Sep 15/2022	
71-00-00		
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618	Jan 15/2023	
619	May 15/2022	
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621	Jan 15/2023	
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626	Sep 15/2021	
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655	Sep 15/2021	
656	Sep 15/2021	
657	Sep 15/2021	
658	May 15/2022	
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662	May 15/2022	
71-00-00		
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902	Sep 15/2021	
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R 904	Sep 15/2023	
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R 402	Sep 15/2023	
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O 411	Sep 15/2023	
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R 414	Sep 15/2023	
R 415	Sep 15/2023	
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O 426	Sep 15/2023	
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O 460	Sep 15/2023	
O 461	Sep 15/2023	
O 462	Sep 15/2023	
R 463	Sep 15/2023	
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R 467	Sep 15/2023	
R 468	Sep 15/2023	
R 469	Sep 15/2023	
R 470	Sep 15/2023	
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R 472	Sep 15/2023	
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R 474	Sep 15/2023	
R 475	Sep 15/2023	
O 476	Sep 15/2023	
R 477	Sep 15/2023	
R 478	Sep 15/2023	
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R 480	Sep 15/2023	
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R 482	Sep 15/2023	
R 483	Sep 15/2023	
R 484	Sep 15/2023	
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R 486	Sep 15/2023	
A 487	Sep 15/2023	
A 488	Sep 15/2023	
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R 228	Sep 15/2023	
O 229	Sep 15/2023	
R 230	Sep 15/2023	
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O 232	Sep 15/2023	
R 233	Sep 15/2023	
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R 235	Sep 15/2023	
O 236	Sep 15/2023	
O 237	Sep 15/2023	
O 238	Sep 15/2023	
R 239	Sep 15/2023	
R 240	Sep 15/2023	
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R 242	Sep 15/2023	
O 243	Sep 15/2023	
O 244	Sep 15/2023	
O 245	Sep 15/2023	
O 246	Sep 15/2023	
O 247	Sep 15/2023	
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A 207	Sep 15/2023	
A 208	Sep 15/2023	
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71-11-00		
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R 602	Sep 15/2023	
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71-11-00		
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809	May 15/2022	
810	May 15/2022	
811	May 15/2022	
812	May 15/2022	
813	May 15/2022	
814	May 15/2022	
815	May 15/2022	
816	May 15/2022	

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POWER PLANT

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204	Sep 15/2021	
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206	May 15/2023	
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R 403	Sep 15/2023	
R 404	Sep 15/2023	
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R 414	Sep 15/2023	
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R 416	Sep 15/2023	
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R 418	Sep 15/2023	
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71-11-02		
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402	Sep 15/2021	
403	Sep 15/2021	
404	May 15/2023	
405	May 15/2023	
406	May 15/2023	
71-11-03		
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O 402	Sep 15/2023	
R 403	Sep 15/2023	
R 404	Sep 15/2023	
R 405	Sep 15/2023	
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71-11-04		
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O 207	Sep 15/2023	
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410	Jan 15/2023	
411	Sep 15/2021	
R 412	Sep 15/2023	
R 413	Sep 15/2023	
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71-11-04		
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406	May 15/2023	
407	May 15/2023	
R 408	Sep 15/2023	
R 409	Sep 15/2023	
R 410	Sep 15/2023	
R 411	Sep 15/2023	
R 412	Sep 15/2023	

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A 416	Sep 15/2023	
71-11-05		
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R 503	Sep 15/2023	
O 504	Sep 15/2023	
O 505	Sep 15/2023	
O 506	Sep 15/2023	
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O 508	Sep 15/2023	
71-11-06		
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R 405	Sep 15/2023	
R 406	Sep 15/2023	
R 407	Sep 15/2023	
R 408	Sep 15/2023	
71-11-11		
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R 204	Sep 15/2023	
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207	Sep 15/2022	
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212	BLANK	
71-11-12		
401	Jan 15/2023	
402	Sep 15/2021	
403	Sep 15/2021	
404	Jan 15/2023	
405	Sep 15/2021	
406	BLANK	
71-12-01		
401	May 15/2022	
402	Jan 15/2023	
403	May 15/2022	
404	May 15/2022	
405	Sep 15/2021	
406	May 15/2022	
407	May 15/2022	
408	May 15/2022	
71-12-01 (cont)		
409	May 15/2022	
410	May 15/2023	
R 411	Sep 15/2023	
412	BLANK	
71-12-01		
601	Jan 15/2023	
602	Sep 15/2021	
603	Sep 15/2021	
604	Sep 15/2021	
71-21-00		
601	Sep 15/2021	
602	Sep 15/2021	
603	Sep 15/2021	
604	Sep 15/2021	
605	Sep 15/2021	
606	Sep 15/2021	
607	Sep 15/2021	
608	Sep 15/2021	
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610	Sep 15/2021	
611	Sep 15/2021	
612	Sep 15/2021	
613	Sep 15/2021	
614	Sep 15/2021	
615	Sep 15/2021	
616	Sep 15/2021	
617	Sep 15/2021	
618	BLANK	
71-21-01		
401	Sep 15/2021	
402	Sep 15/2021	
403	Sep 15/2021	
404	Sep 15/2021	
71-21-02		
401	Sep 15/2021	
402	Sep 15/2021	
403	Sep 15/2021	

A = Added, R = Revised, D = Deleted, O = Overflow, C = Customer Originated Change

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POWER PLANT

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71-21-02 (cont)		
404	Sep 15/2021	
405	Sep 15/2021	
406	Sep 15/2021	
407	Sep 15/2021	
R 408	Sep 15/2023	
R 409	Sep 15/2023	
R 410	Sep 15/2023	
71-21-03		
601	May 15/2023	
602	May 15/2023	
603	Sep 15/2021	
604	Sep 15/2021	
605	Sep 15/2021	
606	BLANK	
71-21-04		
R 401	Sep 15/2023	
O 402	Sep 15/2023	
O 403	Sep 15/2023	
O 404	Sep 15/2023	
405	Sep 15/2021	
406	Sep 15/2021	
407	Sep 15/2021	
408	Sep 15/2021	
R 409	Sep 15/2023	
O 410	Sep 15/2023	
O 411	Sep 15/2023	
O 412	Sep 15/2023	
71-21-04		
601	Jan 15/2023	
602	Jan 15/2023	
603	Sep 15/2021	
604	Sep 15/2021	
605	Sep 15/2021	
606	Sep 15/2021	
71-71-00		
601	Sep 15/2021	
602	Jan 15/2022	

Subject/Page	Date	COC
71-71-00 (cont)		
603	Jan 15/2023	
604	Sep 15/2021	
R 605	Sep 15/2023	
R 606	Sep 15/2023	
R 607	Sep 15/2023	
R 608	Sep 15/2023	
O 609	Sep 15/2023	
R 610	Sep 15/2023	
R 611	Sep 15/2023	
O 612	Sep 15/2023	
O 613	Sep 15/2023	
O 614	Sep 15/2023	
R 615	Sep 15/2023	
R 616	Sep 15/2023	
O 617	Sep 15/2023	
O 618	Sep 15/2023	
O 619	Sep 15/2023	
O 620	Sep 15/2023	
O 621	Sep 15/2023	
R 622	Sep 15/2023	
O 623	Sep 15/2023	
O 624	Sep 15/2023	
O 625	Sep 15/2023	
O 626	Sep 15/2023	
O 627	Sep 15/2023	
O 628	Sep 15/2023	
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O 630	Sep 15/2023	
O 631	Sep 15/2023	
O 632	Sep 15/2023	
71-71-01		
401	Jan 15/2023	
402	Sep 15/2021	
R 403	Sep 15/2023	
404	Sep 15/2021	
405	Sep 15/2021	

Subject/Page	Date	COC
71-71-01 (cont)		
406	May 15/2023	
R 407	Sep 15/2023	
O 408	Sep 15/2023	

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CHAPTER 71
POWER PLANT

SUBJECT	CHAPTER SECTION SUBJECT	CONF	PAGE	EFFECT
POWER PLANT - MAINTENANCE PRACTICES	71-00-00		201	SIA ALL
Engine Ground Safety Precautions TASK 71-00-00-800-801-G00			201	SIA ALL
Engine Operation Limits TASK 71-00-00-800-802-G00			228	SIA ALL
Maintenance Data Pages from the Engine Propulsion Control System (EPCS) TASK 71-00-00-970-801-G00			237	SIA ALL
Engine Performance Page TASK 71-00-00-970-802-G00			250	SIA ALL
Prepare the Engine for Operation TASK 71-00-00-910-801-G00			252	SIA ALL
Prepare the Engine Before a Start in Cold Weather TASK 71-00-00-910-815-G00			264	SIA ALL
Start the Engine (Selection) TASK 71-00-00-910-802-G00			269	SIA ALL
Start the Engine (Normal Start) TASK 71-00-00-910-803-G00			270	SIA ALL
Pre-Start Motoring TASK 71-00-00-910-814-G00			277	SIA ALL
Start the Engine - Manual Override of Starter Air Valve Using APU Bleed Air TASK 71-00-00-910-804-G00			282	SIA ALL
Start the Engine (Manual Override Start Using Ground Air Source or Engine Cross Bleed) TASK 71-00-00-800-805-G00			290	SIA ALL
Start the Engine (Engine Cross Bleed Start) TASK 71-00-00-910-805-G00			297	SIA ALL
Start the Engine (Start Cart) TASK 71-00-00-910-811-G00			298	SIA ALL
Start the Engine (Battery Start) TASK 71-00-00-910-813-G00			298.2	SIA ALL
Stop the Engine (Usual Engine Stop) TASK 71-00-00-910-806-G00			298.8	SIA ALL

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SUBJECT	CHAPTER SECTION SUBJECT	CONF	PAGE	EFFECT
Stop the Engine Procedure (Emergency Engine Stop) TASK 71-00-00-910-807-G00			298.11	SIA ALL
Dry Motor Procedure TASK 71-00-00-910-808-G00			298.14	SIA ALL
Wet Motor Procedure TASK 71-00-00-910-809-G00			298.18	SIA ALL
POWER PLANT - ADJUSTMENT/TEST	71-00-00		501	SIA ALL
Power Plant Test Reference Table TASK 71-00-00-800-804-G00			502	SIA ALL
Test No. 1 - Pneumatic Leak Test TASK 71-00-00-790-801-G00			507	SIA ALL
Test No. 2 - Dry Motor Leak Test TASK 71-00-00-790-802-G00			514	SIA ALL
Test No. 3 - Wet Motor Leak Test TASK 71-00-00-790-803-G00			517	SIA ALL
Test No. 4 - Idle Leak Test TASK 71-00-00-790-804-G00			522	SIA ALL
Test No. 5 - Part Power Leak Check TASK 71-00-00-710-801-G00			527	SIA ALL
Test No. 6 - Power Assurance Test TASK 71-00-00-720-802-G00			533	SIA ALL
Test No. 7 - Replacement Engine (Pretested Engine) Test TASK 71-00-00-710-802-G00			559	SIA ALL
Test No. 8 - Replacement Engine (Untested Engine) Test TASK 71-00-00-710-803-G00			562	SIA ALL
Test No. 9 - Low Pressure System (Fan/LPT) Vibration Survey TASK 71-00-00-720-803-G00			567	SIA ALL
Test No. 10 - High Pressure System (HPC/HPT) Vibration Survey TASK 71-00-00-720-804-G00			573	SIA ALL

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SUBJECT	CHAPTER SECTION SUBJECT	CONF	PAGE	EFFECT
Test No. 11 - Low Pressure System (Fan) Trim Balance (With ONS) TASK 71-00-00-720-805-G00			578	SIA ALL
Test No. 12 - Thrust Reverser Interlock Operational Test TASK 71-00-00-710-804-G00			589	SIA ALL
Test No. 15 - Actuator Operational Test TASK 71-00-00-730-802-G00			591	SIA ALL
Test No. 16 - Harness System Test TASK 71-00-00-730-803-G00			598.1	SIA ALL
Test No. 17 - Electronic Engine Control (EEC) System Test TASK 71-00-00-710-806-G00			598.5	SIA ALL
Test No. 18 - EEC Channel A Ignition System Test TASK 71-00-00-730-804-G00			598.8	SIA ALL
Test No. 19 - EEC Channel B Ignition System Test TASK 71-00-00-730-805-G00			598.13	SIA ALL
Test No. 24 - EEC Blower Test TASK 71-00-00-710-807-G00			598.19	SIA ALL
Test No. 25 - Fuel System Preservation Special Functions Test TASK 71-00-00-700-801-G00			598.21	SIA ALL
Test No. 26 - Debris Monitoring System Channel B Special Functions Test TASK 71-00-00-700-802-G00			598.26	SIA ALL
Test No. 27 - Clear Engine SMT Message TASK 71-00-00-700-803-G00			598.30	SIA ALL
Test No. 29 - Water Wash Special Functions Test TASK 71-00-00-700-805-G00			598.32	SIA ALL
Test No. 30 - Engine Running Simulation Special Functions Test TASK 71-00-00-700-806-G00			598.35	SIA ALL
Test No. 31 - Wet Motor Ground Test TASK 71-00-00-700-807-G00			598.37	SIA ALL
Test No. 32 - Engine Idle System Test TASK 71-00-00-700-808-G00			598.40	SIA ALL

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SUBJECT	CHAPTER SECTION SUBJECT	CONF	PAGE	EFFECT
Test No. 33 - Lamp Check Out Special Functions Test TASK 71-00-00-700-809-G00			598.46	SIA ALL
Test No. 34 - Menu Mode Hardware Code Entry Special Functions Test TASK 71-00-00-700-810-G00			598.49	SIA ALL
Test No. 35 - Erase All Channel A Faults Special Functions Test TASK 71-00-00-700-811-G00			598.53	SIA ALL
Test No. 36 - Erase All Channel B Faults Special Functions Test TASK 71-00-00-700-812-G00			598.55	SIA ALL
Test No. 37 - Engine Serial Number Entry Special Functions Test TASK 71-00-00-700-813-G00			598.57	SIA ALL
Test No. 38 - Thrust Reverser Cycle Special Functions TASK 71-00-00-700-816-G00			598.62	SIA ALL
POWER PLANT - INSPECTION/CHECK	71-00-00		601	SIA ALL
Engine Exposure to Fire and Extinguishing Agents Inspection TASK 71-00-00-200-801-G00			601	SIA ALL
Engine Foreign Object Damage and Birdstrike Inspection TASK 71-00-00-200-802-G00			608	SIA ALL
Engine Ice Crystal Operation Foreign Object Damage Inspection TASK 71-00-00-200-804-G00			616	SIA ALL
Engine Stall Inspection TASK 71-00-00-200-805-G00			620	SIA ALL
Heavy Sand/Dust Ingestion and Volcanic Ash Ingestion Inspection TASK 71-00-00-200-806-G00			624	SIA ALL
In-Flight Windmilling Inspection TASK 71-00-00-200-807-G00			627	SIA ALL
No or Low Oil Pressure Inspection TASK 71-00-00-200-808-G00			628	SIA ALL

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SUBJECT	CHAPTER SECTION SUBJECT	CONF	PAGE	EFFECT
Overspeed Inspection TASK 71-00-00-200-809-G00			631	SIA ALL
Overtemperature Inspection TASK 71-00-00-200-810-G00			635	SIA ALL
Engine High Vibration Inspection TASK 71-00-00-200-811-G00			642	SIA ALL
Engine After a Hard Landing Inspection TASK 71-00-00-200-813-G00			658	SIA ALL
POWER PLANT - DDG MAINTENANCE PROCEDURES	71-00-00		901	SIA 008-999; SIA 001-007 POST SB 737-71-1894
DDG 71-11-01 Fan Cowl Latch Indication System Inoperative - Preparation TASK 71-00-00-040-801-G00			901	SIA 008-999; SIA 001-007 POST SB 737-71-1894
DDG 71-11-01 Fan Cowl Latch Indication System Inoperative - Restoration TASK 71-00-00-440-801-G00			904	SIA 008-999; SIA 001-007 POST SB 737-71-1894
POWER PLANT - REMOVAL/INSTALLATION	71-00-02		401	SIA ALL
Power Plant - Removal TASK 71-00-02-000-801-G00			401	SIA ALL
Power Plant - Installation TASK 71-00-02-400-801-G00			463	SIA ALL
POWER PLANT (ENGINE PRESERVATION AND DEPRESERVATION) - MAINTENANCE PRACTICES	71-00-03		201	SIA ALL
Inlet Cowl Lipskin Protective Coating Procedure TASK 71-00-03-390-801-G00			201	SIA ALL
Preservation of an Engine (Task Selection) TASK 71-00-03-620-801-G00			210	SIA ALL
Preservation of an Engine on Wing for not more than 10 Days TASK 71-00-03-600-801-G00			212	SIA ALL
Preservation of an Engine on Wing for not more than 30 Days TASK 71-00-03-620-802-G00			215	SIA ALL

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SUBJECT	CHAPTER SECTION SUBJECT	CONF	PAGE	EFFECT
Preservation of an Engine on Wing for not more than 3 Months TASK 71-00-03-620-806-G00			219	SIA ALL
Preservation of an Engine on Wing for 30 Days to 1 Year TASK 71-00-03-630-801-G00			228	SIA ALL
Preservation of an Engine on Wing That Has Expired TASK 71-00-03-620-808-G00			235	SIA ALL
Preservation Renewal Requirements TASK 71-00-03-620-809-G00			236	SIA ALL
Dry-Out Of An Engine On-Wing After An In-Flight Shutdown TASK 71-00-03-800-801-G00			238	SIA ALL
Depreservation of an Engine on Wing TASK 71-00-03-630-802-G00			243	SIA ALL
POWER PLANT - MAINTENANCE PRACTICES (ENGINE TRANSPORTATION)	71-00-04	1	201	SIA ALL
Engine Transportation TASK 71-00-04-500-801-G01		1	201	SIA ALL
ENGINE COWLING - INSPECTION/CHECK	71-11-00		601	SIA ALL
Inlet Cowl Inspection TASK 71-11-00-200-801-G00			601	SIA ALL
ENGINE COWLING - REPAIR	71-11-00		801	SIA ALL
Engine Cowling - TV-Chord Assembly Repair TASK 71-11-00-300-801-G00			801	SIA ALL
INLET COWL - MAINTENANCE PRACTICES	71-11-01		201	SIA ALL; AIRPLANES WITH INLET COWL WITH GROUND COOLING DUCT
Inlet Ground Cooling Duct Cap and Cover Removal TASK 71-11-01-000-802-G00			201	SIA ALL; AIRPLANES WITH INLET COWL WITH GROUND COOLING DUCT
Inlet Ground Cooling Duct Cap and Cover Installation TASK 71-11-01-400-802-G00			205	SIA ALL; AIRPLANES WITH INLET COWL WITH GROUND COOLING DUCT

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INLET COWL - REMOVAL/INSTALLATION	71-11-01		401	SIA ALL
Inlet Cowl Removal TASK 71-11-01-000-801-G00			401	SIA ALL
Inlet Cowl Installation TASK 71-11-01-400-801-G00			413	SIA ALL
INLET COWL - INSPECTION/CHECK	71-11-01		601	SIA ALL
Inlet Cowl Inspection TASK 71-11-01-200-801-G00			601	SIA ALL
Inlet Cowl Attachment Ring Detailed Inspection TASK 71-11-01-211-801-G00			607	SIA ALL
FAN COWL CHINE - REMOVAL/INSTALLATION	71-11-02		401	SIA ALL
Fan Cowl Chine Removal TASK 71-11-02-000-801-G00			401	SIA ALL
Fan Cowl Chine Installation TASK 71-11-02-400-801-G00			404	SIA ALL
FAN COWL CROSS ENGINE DEBRIS SHIELD - REMOVAL/INSTALLATION	71-11-03		401	SIA ALL
Fan Cowl Cross Engine Debris Shield Removal TASK 71-11-03-000-801-G00			401	SIA ALL
Fan Cowl Cross Engine Debris Shield Installation TASK 71-11-03-400-801-G00			404	SIA ALL
FAN COWL PANELS - MAINTENANCE PRACTICES	71-11-04		201	SIA ALL
Open the Fan Cowl Panels (Selection) TASK 71-11-04-010-801-G00			201	SIA ALL
Open the Fan Cowl Panels (Manual Method) TASK 71-11-04-010-803-G00			201	SIA ALL
Open the Fan Cowl Panels (Sling Method) TASK 71-11-04-010-804-G00			208	SIA ALL
Close the Fan Cowl Panels (Selection) TASK 71-11-04-410-801-G00			212	SIA ALL
Close the Fan Cowl Panels (Manual Method) TASK 71-11-04-410-803-G00			212	SIA ALL
Close the Fan Cowl Panels (Sling Method) TASK 71-11-04-410-804-G00			214	SIA ALL

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FAN COWL PANELS - REMOVAL/INSTALLATION	71-11-04		401	SIA ALL
Fan Cowl Panels Removal TASK 71-11-04-000-801-G00			401	SIA ALL
Fan Cowl Panels Installation TASK 71-11-04-400-801-G00			409	SIA ALL
FAN COWL PANELS - ADJUSTMENT/TEST	71-11-04		501	SIA ALL
Engine Side Radial Restraint Bracket Adjustment TASK 71-11-04-820-801-G00			501	SIA ALL
FAN COWL PANELS - INSPECTION/CHECK	71-11-04		601	SIA ALL
Fan Cowl Panels Inspection TASK 71-11-04-200-801-G00			601	SIA ALL
FAN COWL LATCHES AND KEEPERS - REMOVAL/INSTALLATION	71-11-05		401	SIA ALL
Fan Cowl Latches Removal TASK 71-11-05-000-801-G00			401	SIA ALL
Fan Cowl Latches Installation TASK 71-11-05-400-801-G00			406	SIA ALL
Fan Cowl Latch Keeper Pin Removal TASK 71-11-05-000-802-G00			408	SIA ALL
Fan Cowl Latch Keeper Pin Installation TASK 71-11-05-400-802-G00			414	SIA ALL
FAN COWL LATCHES - ADJUSTMENT/TEST	71-11-05		501	SIA ALL
Fan Cowl Latch Adjustment TASK 71-11-05-821-801-G00			501	SIA ALL
FAN COWL LATCH INDICATION SYSTEM - MAINTENANCE PRACTICES	71-11-06		201	SIA 008-999; SIA 001-007 POST SB 737-71-1894
Fan Cowl Latch Indication System Removal TASK 71-11-06-000-801-G00			201	SIA 008-999; SIA 001-007 POST SB 737-71-1894
Fan Cowl Latch Indication System Installation TASK 71-11-06-400-801-G00			207	SIA 008-999; SIA 001-007 POST SB 737-71-1894
FAN COWL LATCH INDICATION SYSTEM - ADJUSTMENT/TEST	71-11-06		501	SIA 008-999; SIA 001-007 POST SB 737-71-1894
Fan Cowl Latch Indication System Rigging Check TASK 71-11-06-720-801-G00			501	SIA 008-999; SIA 001-007 POST SB 737-71-1894

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IDG ACCESS DOOR - MAINTENANCE PRACTICES	71-11-08		201	SIA ALL
IDG Access Door Removal TASK 71-11-08-000-801-G00			201	SIA ALL
IDG Access Door Installation TASK 71-11-08-400-801-G00			205	SIA ALL
ENGINE OIL TANK ACCESS DOOR - REMOVAL/INSTALLATION	71-11-10		401	SIA ALL
Engine Oil Tank Access Door Removal TASK 71-11-10-000-801-G00			401	SIA ALL
Engine Oil Tank Access Door Installation TASK 71-11-10-400-801-G00			406	SIA ALL
HOLD-OPEN RODS - MAINTENANCE PRACTICES	71-11-11		201	SIA ALL
Fan Cowl Hold Open Rod Removal TASK 71-11-11-000-801-G00			201	SIA ALL
Fan Cowl Hold Open Rod Installation TASK 71-11-11-400-801-G00			204	SIA ALL
Fan Cowl Hold-Open Rod Inspection TASK 71-11-11-200-801-G00			205	SIA ALL
Fan Cowl Hold-Open Rod Cleaning TASK 71-11-11-100-801-G00			209	SIA ALL
FAN COWL ALIGNMENT BUMPER - REMOVAL/INSTALLATION	71-11-12		401	SIA ALL
Fan Cowl Alignment Bumper Removal TASK 71-11-12-000-801-G00			401	SIA ALL
Fan Cowl Alignment Bumper Installation TASK 71-11-12-400-801-G00			404	SIA ALL
FAN COWL SDOS ACTUATORS - REMOVAL/INSTALLATION	71-12-01		401	SIA ALL
Fan Cowl SDOS Actuators Removal TASK 71-12-01-000-801-G00			401	SIA ALL
Fan Cowl SDOS Actuators Installation TASK 71-12-01-400-801-G00			410	SIA ALL

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FAN COWL SDOS ACTUATORS - INSPECTION/CHECK	71-12-01		601	SIA ALL
Fan Cowl SDOS Actuators Inspection TASK 71-12-01-200-801-G00			601	SIA ALL
ENGINE MOUNTS - INSPECTION/CHECK	71-21-00		601	SIA ALL
Forward Engine Mount Visual Inspection TASK 71-21-00-200-801-G00			601	SIA ALL
Forward Engine Mounts Detailed Inspection TASK 71-21-00-211-801-G00			604	SIA ALL
Aft Engine Mount Visual Inspection TASK 71-21-00-200-802-G00			607	SIA ALL
Aft Engine Mount Detailed Inspection TASK 71-21-00-211-802-G00			610	SIA ALL
FORWARD ENGINE MOUNT - REMOVAL/INSTALLATION	71-21-01		401	SIA ALL
Forward Engine Mount Removal TASK 71-21-01-000-801-G00			401	SIA ALL
Forward Engine Mount Installation TASK 71-21-01-400-801-G00			403	SIA ALL
AFT ENGINE MOUNT - REMOVAL/INSTALLATION	71-21-02		401	SIA ALL
Aft Engine Mount Removal TASK 71-21-02-000-801-G00			401	SIA ALL
Aft Engine Mount Installation TASK 71-21-02-400-801-G00			408	SIA ALL
ENGINE MOUNT BOLTS AND NUTS - INSPECTION/CHECK	71-21-03		601	SIA ALL
Engine Mount Bolts and Nuts Inspection TASK 71-21-03-200-801-G00			601	SIA ALL
THRUST LINKS - REMOVAL/INSTALLATION	71-21-04		401	SIA ALL
Thrust Links Removal TASK 71-21-04-000-801-G00			401	SIA ALL
Thrust Links Installation TASK 71-21-04-400-801-G00			409	SIA ALL

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THRUST LINKS - INSPECTION/CHECK	71-21-04		601	SIA ALL
Thrust Links Visual Inspection TASK 71-21-04-210-801-G00			601	SIA ALL
Thrust Links Detailed Inspection TASK 71-21-04-211-801-G00			604	SIA ALL
ENGINE VENTS AND DRAINS - INSPECTION/CHECK	71-71-00		601	SIA ALL
Engine Vents and Drains Inspection TASK 71-71-00-200-801-G00			601	SIA ALL
DRAIN MAST - REMOVAL/INSTALLATION	71-71-01		401	SIA ALL
Drain Mast Removal TASK 71-71-01-000-801-G00			401	SIA ALL
Drain Mast Installation TASK 71-71-01-400-801-G00			406	SIA ALL

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POWER PLANT - MAINTENANCE PRACTICES

1. General

A. This procedure has these tasks:

(1) Engine Ground Safety Precautions
(2) Engine Operation Limits
(3) Maintenance Data Pages from the Engine Propulsion Control System (EPCS)
(4) Engine Performance Page
(5) Prepare the Engine for Operation
(6) Prepare the Engine Before a Start in Cold Weather
(7) Start the Engine (Selection)
(8) Start the Engine (Normal Start)
(9) Pre-Start Motoring
(10) Start the Engine (Manual Override Start Using APU Bleed Air)
(11) Start the Engine (Manual Override Start Using Ground Air Source or Engine Cross Bleed)
(12) Start the Engine (Engine Cross Bleed Start)
(13) Start the Engine (Start Cart)
(14) Start the Engine (Battery Start)
(15) Stop the Engine Procedure (Usual Engine Stop)
(16) Stop the Engine Procedure (Emergency Engine Stop)
(17) Dry Motor Procedure
(18) Wet Motor Procedure.

TASK 71-00-00-800-801-G00

2. Engine Ground Safety Precautions

(Figure 201, Figure 202, Figure 203, Figure 204, Figure 205, Figure 206, Figure 207, Figure 208, and Figure 209)

A. General

(1) This task gives the safety instructions when you go near an engine in operation.
(2) This task also includes the precautions for airplane handling to make sure that the airplane does not move during engine operation.

B. References

Reference	Title
71-00-00-200-801-G00	Engine Exposure to Fire and Extinguishing Agents Inspection (P/B 601)

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-1616	Meter - Sound Level Part #: CEL-240/K1 Supplier: 01RN5 Part #: SE-402-AC3 Supplier: 1QDV5 Opt Part #: 2100-10 Supplier: 90435 Opt Part #: 2400-10 Supplier: 90435 Opt Part #: CEL-254/K1 Supplier: 01RN5
SPL-1531	Guard - Engine Inlet, Engine Run-Up Part #: C71034-1 Supplier: 81205
SPL-2109	Screen - Safety, Engine Inlet Part #: C71032-1 Supplier: 81205
SPL-14547	Lanyard - Personnel Safety, Engine Maintenance, LEAP-1B Part #: C71035-1 Supplier: 81205
SPL-14726	Engine Stand - LEAP-1B Part #: 956A8600G04 Supplier: 58828 Opt Part #: 956A8600G03 Supplier: 58828
SPL-17099	Handling Brackets - Engine Fan Case Part #: 956A8018G02 Supplier: 58828

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. The Air Inlet

SUBTASK 71-00-00-800-001-G00

WARNING

KEEP ALL PERSONNEL AND EQUIPMENT AWAY FROM THE FRONT, SIDES AND REAR OF THE ENGINE WHILE IT OPERATES. THESE AREAS ARE DANGEROUS. IF YOU ARE TO THE FRONT OR THE SIDES, THERE IS SUFFICIENT SUCTION TO PULL PERSONNEL OR EQUIPMENT INTO THE ENGINE. IF YOU ARE BEHIND THE ENGINE, THE EXHAUST AND FAN AIR HAVE HIGH VELOCITY AND HEAT. THESE CONDITIONS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

WARNING

MAKE SURE THAT ALL ENGINE OPERATING AREAS ARE AS CLEAN AS POSSIBLE. ALL RAMPS, TAXIWAYS, RUNWAYS, AND OTHER OPERATING AREAS MUST BE VERY CLEAN TO PREVENT SERIOUS DAMAGE TO THE ENGINE, AIRCRAFT AND INJURY TO THE PERSONS IN THE AREA.

CAUTION

THE SUCTION NEAR THE INLET COWL CAN PULL HATS, GLASSES, LOOSE CLOTHING AND OTHER UNWANTED MATERIALS FROM YOUR POCKETS. ALL LOOSE OBJECTS MUST BE REMOVED BEFORE YOU WORK AROUND THE POWER PLANT. DAMAGE TO EQUIPMENT COULD OCCUR.

(1) When the engine operates, it makes a low air pressure area in the inlet.

NOTE: TAT, AOA sensors, and the CAPT, FO, AUX, and pitot probes heat will operate automatically when you operate one or both engines.

(a) This low pressure area causes a large quantity of air from the area forward of the inlet cowl to go in the engine.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) The air that is near to the inlet cowl moves at a much higher velocity than air that is farther from the inlet.

(c) The quantity of the engine suction does not increase slowly and continuously when you go near the inlet cowl.

(d) The suction is low until you go near the inlet, where the suction increases suddenly.

SUBTASK 71-00-00-800-002-G00

(2) Before you operate the engine, do the steps that follow:

(a) Make sure that there are no tools, unwanted materials, or objects in the air inlet.

(b) Make sure that the area 40 ft (12 m) to each side and forward of the engine is clean.

(c) Make sure that the ground surface forward of the engine is not cracked or loose.

(d) Make sure that suction of the engine will not pull unwanted material from the ground into the engine.

(e) Make sure that persons with loose objects (such as hats, eyeglasses, loose clothing, or rags) do not go in the inlet hazard areas.

(f) When an engine is in operation, use an engine inlet guard.

NOTE: This will prevent the suction of persons and large objects into the inlet by the engine.

SUBTASK 71-00-00-800-003-G00

WARNING

KEEP ALL PERSONNEL AND EQUIPMENT AWAY FROM THE FRONT, SIDES AND REAR OF THE ENGINE WHILE IT OPERATES. THESE AREAS ARE DANGEROUS. IF YOU ARE TO THE FRONT OR THE SIDES, THERE IS SUFFICIENT SUCTION TO PULL PERSONNEL OR EQUIPMENT INTO THE ENGINE. IF YOU ARE BEHIND THE ENGINE, THE EXHAUST AND FAN AIR HAVE HIGH VELOCITY AND HEAT. THESE CONDITIONS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(3) Obey these warnings for the areas near the air inlet that are marked for dangerous air conditions:

(a) Inlet hazard areas are shown on the left and right fan cowl panels with stripes and placards.

1) There are red warning stripes, NO ENTRY placards, ABOVE IDLE HAZARD area placards and warning placards.

(b) Persons near the engine during operation must know of the hazard areas that are aft of the inlet cowl lip.

1) This hazard area extends completely around the outer diameter and to the forward end of the engine.

2) After the engine is stopped, make sure that the fan is stopped before you go near the air inlet.

(c) Make sure that all persons that do not know of the hazard areas around the air inlet do not go in these areas.

SUBTASK 71-00-00-800-004-G00

(4) It is recommended that ground persons stay outside of the inlet hazard areas for a minimum of 30 seconds after the start lever is put in the CUTOFF position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Engine Exhaust and Fan Discharge Air

SUBTASK 71-00-00-800-005-G00

WARNING

KEEP ALL PERSONNEL AND EQUIPMENT AWAY FROM THE FRONT, SIDES AND REAR OF THE ENGINE WHILE IT OPERATES. THESE AREAS ARE DANGEROUS. IF YOU ARE TO THE FRONT OR THE SIDES, THERE IS SUFFICIENT SUCTION TO PULL PERSONNEL OR EQUIPMENT INTO THE ENGINE. IF YOU ARE BEHIND THE ENGINE, THE EXHAUST AND FAN AIR HAVE HIGH VELOCITY AND HEAT. THESE CONDITIONS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

WARNING

KEEP ALL PERSONNEL AND EQUIPMENT OUT OF THE FAN AIR PATH WHEN THE THRUST REVERSER OPERATES. FAN AIR COMES OUT TO THE SIDES OF THE ENGINE AND GOES TO THE FRONT. THE FAN AIR IS SUFFICIENT TO MOVE A PERSON OR EQUIPMENT. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) The velocity of the engine exhaust and the fan air is high when you operate the engine.

(a) The engine exhaust and fan discharge air moves very fast at idle and much more at takeoff power.

(b) The air blown behind the engine can move loose stones and other material a long distance.

1) The airplane must be parked in an area that prevents injury to persons or damage to equipment and other airplanes.

2) Use a blast fence to deflect the thrust if the engine or engines are operated without sufficient space to decrease the fan discharge and engine exhaust velocity to zero.

SUBTASK 71-00-00-800-006-G00

WARNING

KEEP ALL PERSONNEL AND EQUIPMENT AWAY FROM THE FRONT, SIDES AND REAR OF THE ENGINE WHILE IT OPERATES. THESE AREAS ARE DANGEROUS. IF YOU ARE TO THE FRONT OR THE SIDES, THERE IS SUFFICIENT SUCTION TO PULL PERSONNEL OR EQUIPMENT INTO THE ENGINE. IF YOU ARE BEHIND THE ENGINE, THE EXHAUST AND FAN AIR HAVE HIGH VELOCITY AND HEAT. THESE CONDITIONS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

WARNING

KEEP ALL PERSONNEL, EQUIPMENT, AND FLAMMABLE MATERIALS AWAY FROM BEHIND THE ENGINE WHEN YOU START THE ENGINE. THERE CAN BE FUEL IN THE COMBUSTION CHAMBER. THIS FUEL CAN BURN IN THE EXHAUST NOZZLE. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT CAN OCCUR.

(2) The engine exhaust temperature is very hot at all thrust levels and have these conditions:

(a) The high-temperature zone extends a long distance behind the engine.

(b) The exhaust temperature is sufficient to cause damage to asphalt.

(c) Concrete is the recommended material for the area behind the engines.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-800-007-G00

WARNING

KEEP ALL PERSONNEL AND EQUIPMENT AWAY FROM THE FRONT, SIDES AND REAR OF THE ENGINE WHILE IT OPERATES. THESE AREAS ARE DANGEROUS. IF YOU ARE TO THE FRONT OR THE SIDES, THERE IS SUFFICIENT SUCTION TO PULL PERSONNEL OR EQUIPMENT INTO THE ENGINE. IF YOU ARE BEHIND THE ENGINE, THE EXHAUST AND FAN AIR HAVE HIGH VELOCITY AND HEAT. THESE CONDITIONS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(3) There is carbon monoxide in the jet exhaust gas, know these conditions:

(a) The exhaust gas is poisonous to breathe and can also cause injury to your eyes.

1) These gases will usually cause your eyes to water or burn.

2) The gases can cause irritation to your lungs.

(b) Stay away from all areas that do not have sufficient ventilation.

SUBTASK 71-00-00-800-008-G00

(4) When you start the engine, fuel that collect in the turbine exhaust sleeve can ignite, know these conditions:

(a) Long flames will blow out of the engine exhaust.

(b) All flammable materials must be kept away from the exhaust nozzle and sleeve.

SUBTASK 71-00-00-800-009-G00

WARNING

KEEP ALL PERSONNEL AND EQUIPMENT AWAY FROM THE FRONT, SIDES AND REAR OF THE ENGINE WHILE IT OPERATES. THESE AREAS ARE DANGEROUS. IF YOU ARE TO THE FRONT OR THE SIDES, THERE IS SUFFICIENT SUCTION TO PULL PERSONNEL OR EQUIPMENT INTO THE ENGINE. IF YOU ARE BEHIND THE ENGINE, THE EXHAUST AND FAN AIR HAVE HIGH VELOCITY AND HEAT. THESE CONDITIONS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

WARNING

KEEP ALL PERSONNEL AND EQUIPMENT OUT OF THE FAN AIR PATH WHEN THE THRUST REVERSER OPERATES. FAN AIR COMES OUT TO THE SIDES OF THE ENGINE AND GOES TO THE FRONT. THE FAN AIR IS SUFFICIENT TO MOVE A PERSON OR EQUIPMENT. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(5) When the airplane is parked and the engine is at idle, the thrust reversers can be used for maintenance checks.

(a) When the thrust reverser operates, the fan discharge air blows out of the sides of the engine and goes forward.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Entry Corridor

SUBTASK 71-00-00-800-010-G00

WARNING

DO NOT GO NEAR THE ENGINE WHEN THE ENGINE OPERATES ABOVE MINIMUM IDLE. THERE ARE NO SAFE AREAS AROUND AN ENGINE WHEN THE ENGINE SPEED IS ABOVE MINIMUM IDLE. SERIOUS INJURY OR DEATH AND DAMAGE TO EQUIPMENT COULD OCCUR.

(1) If it is necessary for you to be near the engine during an engine idle operation area, do these steps:

NOTE: This includes when you will do an idle leak check or when you disconnect the ground air cart.

(a) Use a safety lanyard, SPL-14547, screen, SPL-2109, or a guard, SPL-1531, for your safety.

NOTE: The safety lanyard, screen, and guard are not necessary to disconnect the ground air cart with the engines in operation.

1) Choose the correct lanyard attach point on the fan case.

NOTE: Right and left side attach points are on the fan case.

SIA ALL; PRE LEAP-1B SERVICE BULLETIN 72-0181

a) Attach the safety lanyard, SPL-14547, to the forward engine handling mount (View D, Figure 206).

SIA ALL; POST LEAP-1B SERVICE BULLETIN 72-0181

b) Install the handling brackets, SPL-17099, onto the engine (View D, Figure 206).

NOTE: Follow the manufacturer's instructions to install the engine fan case handling brackets, SPL-17099.

c) Attach the safety lanyard, SPL-14547, to the handling brackets, SPL-17099 (View D, Figure 206).

SIA ALL

(b) Make sure that the engine(s) are at minimum idle and that you stay in the entry/exit corridor.

SIA ALL; POST LEAP-1B SERVICE BULLETIN 72-0181

SUBTASK 71-00-00-080-004-G00

(2) If they are no longer necessary, remove the handling brackets, SPL-17099, from the engine.

(a) Follow the manufacturer's instructions to remove the engine fan case handling brackets, SPL-17099, and store them in the engine stand, SPL-14726.

SIA ALL

H. Engine Noise

SUBTASK 71-00-00-800-011-G00

WARNING

USE APPROVED SAFETY EQUIPMENT FOR EARS FOR ALL PERSONNEL WHEN THEY ARE NEAR NOISE THAT IS MORE THAN 84 DBA. THIS WILL PREVENT INJURIES TO THEIR EARS.

(1) Noise from the jet engines can cause damage to your ears, as follows:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Refer to these graphs for the safe levels of engine noise (Figure 207 and Figure 208).

(b) Noise can have an unwanted effect on your ears that will affect your ability to balance when you move or when you stay in one position.

(c) If you listen to high quantities of noise for a short time, you can cause temporary damage to your hearing.

(d) If you listen to high quantities of noise for a long time, you can cause permanent damage to your hearing.

(e) If you listen to very high quantities of noise for a short time, you can cause permanent damage to your hearing.

(f) When you are near an engine in operation, always use hearing protection.

NOTE: A cup-type, earmuff, hearing protection are recommended.

SUBTASK 71-00-00-800-012-G00

(2) These two graphs show the time limits for engine noise and engine operation noise contours.

(a) The noise contour graphs are guidelines for the amount of noise that the engine makes at two defined power settings for the standard conditions shown on the graph.

(b) When the data from the noise contour graphs are used with the noise time limit chart, this shows the need for hearing protection for certain conditions.

(c) The noise time limits are from the standards of the Occupational Safety and Health Administration (OSHA), the International Organization for Standardization (ISO), and the European Union (EU).

1) Refer to Figure 208 for the noise time limits.

(d) For one engine operation, the noise contours are for the ground idle and takeoff thrust levels.

1) Refer to Figure 207 for the noise contours.

2) This figure also give the values for the noise from the operation of more than one engine.

(e) To find the quantity of noise energy, use a sound level meter, COM-1616.

(f) For the distance and the circumferential position from the engine, find the maximum noise from the applicable noise contour graph.

1) Compare this value with the noise time limits graph.

(g) Use a noise safety person to help you make decisions about the risk of noise damage to your ears.

NOTE: These noise contour graphs should not be used as a reliable basis for the prediction of noise in the surrounding community. These graphs are given to show the noise environment and to give guidance for hearing safety practices. Decisions about the risks of noise exposure should be made by a qualified, noise safety expert with the aid of a sound exposure dosimeter.

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I. Engine Ignition Voltage

SUBTASK 71-00-00-800-013-G00

WARNING DO NOT TOUCH THE ENGINE IGNITION SYSTEM WHILE THE SYSTEM OPERATES. IGNITION VOLTAGE IS HIGH WHICH MAKES IT DANGEROUS. ELECTRICAL SHOCK CAN KILL, OR CAUSE INJURIES TO PERSONNEL.

(1) The engine ignition system supplies high energy and high voltage to start the engine, know these:

(a) An electrical shock from this system can kill or cause injury to persons.

(b) You must wait a minimum of five minutes after the ignition system is off before you can touch an ignition component.

(c) The ignition system operates when the engine starts, but the system can also be operated when the engine is not operational.

J. Hot Engine Parts

SUBTASK 71-00-00-800-014-G00

WARNING DO NOT TOUCH ENGINE PARTS UNTIL THEY BECOME COOL. AFTER THE ENGINE OPERATES, SOME ENGINE PARTS CAN STAY HOT FOR ALMOST ONE HOUR. HOT PARTS CAN CAUSE INJURIES TO PERSONNEL.

(1) Be aware that the engine will be very hot after you operate it.

NOTE: The combustion module, turbines and exhaust areas will be hotter than other areas.

K. Fuel and Oil

SUBTASK 71-00-00-800-015-G00

WARNING DO NOT GET FUEL OR OIL ON YOUR SKIN. REMOVE THE FUEL OR OIL FROM YOUR SKIN IMMEDIATELY. IF YOU LET FUEL OR OIL STAY ON YOUR SKIN, IT CAN CAUSE INJURIES TO YOUR SKIN.

(1) Engine fuel and oil can cause damage to your skin.

(a) If fuel or oil touches your skin, make sure that you remove them as soon as possible.

L. Oil System Pressure

SUBTASK 71-00-00-800-016-G00

WARNING DO NOT OPEN THE OIL SYSTEM UNTIL THE PRESSURE GOES TO ZERO. THE PRESSURE GOES TO ZERO APPROXIMATELY 5 MINUTES AFTER AN ENGINE STOPS. A PRESSURIZED OIL SYSTEM CAN RELEASE A SPRAY OF HOT OIL THAT CAN BURN YOU.

(1) There is pressurized oil in the engine oil tank when the engine operates.

(a) The oil pressure will slowly decrease after you stop the engine.

(b) Make sure that you wait a minimum of 5 minutes after you stop the engine before you remove oil tank cap.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

M. Deicing Fluid

SUBTASK 71-00-00-800-017-G00

CAUTION

DO NOT APPLY DEICING FLUID IN THE ENGINE INLET WHILE THE ENGINE OPERATES. CONTAMINATION OF THE AIRFOILS AND OTHER COMPONENTS WITH DEICING FLUID DECREASES ENGINE PERFORMANCE.

(1) The deicing fluid is applied to the airplane to remove and prevent ice on the wings, fuselage and engine cowls, do these steps:

(a) Make sure that you do not apply the deicing fluid into the engine inlet or exhaust.

1) If there are traces of deicing fluid you must wipe the fan blades with a clean cloth.

(b) To deice the engine, do the task for Prepare the Engine Before a Start in Cold Weather, do this task: (TASK 71-00-00-910-801-G00).

N. Thrust Lever Movement

SUBTASK 71-00-00-800-018-G00

CAUTION

YOU MUST MOVE THE THRUST LEVERS SLOWLY AND SMOOTHLY. IF YOU DO NOT OBEY THESE INSTRUCTIONS, DETERIORATION OF THE ENGINE PERFORMANCE CAN OCCUR.

(1) When you operate the engine, move the thrust levers slowly and smoothly.

O. Wind Direction

SUBTASK 71-00-00-800-019-G00

(1) Wind direction and speed can cause stability problems for the engine, do these steps:

(a) Put the airplane in a position to limit the amount of crosswind into the engine inlet.

(b) Refer to this figure for the preferred relative wind direction and wind velocity limits during low power engine runs (Figure 209).

(c) The wind direction chart can be interpreted, as follows:

1) The nose of the aircraft is at 0 degrees, right wing at 90 degrees, tail at 180 degrees, and left wing at 270 degrees.

2) The wind direction relative to the nose of the aircraft is separated into 10 degree increments.

NOTE: The wind speed increases radially outward from 0 knot (0 km/h) - 55 knots (102 km/h).

3) There are wind direction and velocity zones segmented by the thicker black lines on the polar diagram. Refer to the legend in Figure 209 for the limitations related to operations in those zones.

a) Example 1 - Windspeed of 40 knots (74 km/h), at a direction 140 degrees from the nose of the aircraft, would be in Zone 3 and fan speed must be limited to taxi speed.

NOTE: There is no specific N1 associated with taxi. The intent is to advise flight crews operating the aircraft in wind conditions defined by zone 3 to keep engine power settings at or below thrust required for taxi.

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b) Example 2 - Windspeed of 10 knots (19 km/h), at a direction 180 degrees from the nose of the aircraft, would be in Zone 2 and fan speed must be limited to 86.4% N1 for static engine runs.

P. Dry Chemical Fire Extinguishing Agents

SUBTASK 71-00-00-800-020-G00

CAUTION DO NOT USE THE DRY CHEMICAL FIRE EXTINGUISHING AGENTS ON THE ENGINE. THE DRY CHEMICAL FIRE EXTINGUISHING AGENTS CAN CAUSE CORROSION TO THE ENGINE PARTS.

(1) Make sure that you use approved fire extinguishing agents on the engine.

NOTE: Use of dry chemical fire extinguishing agents is not recommended.

SUBTASK 71-00-00-800-021-G00

(2) If you use fire extinguishing agents, do this task: Engine Exposure to Fire and Extinguishing Agents Inspection, TASK 71-00-00-200-801-G00.

SUBTASK 71-00-00-800-022-G00

CAUTION DO NOT USE WATER TO REMOVE THE DRY CHEMICAL FIRE EXTINGUISHING AGENTS FROM THE ENGINE. IF YOU USE WATER TO REMOVE THE DRY CHEMICAL FIRE EXTINGUISHING AGENTS, IT CAN CAUSE DAMAGE TO ENGINE PARTS.

(3) The use of water to remove dry chemical fire extinguishing agents is not recommended as follows:

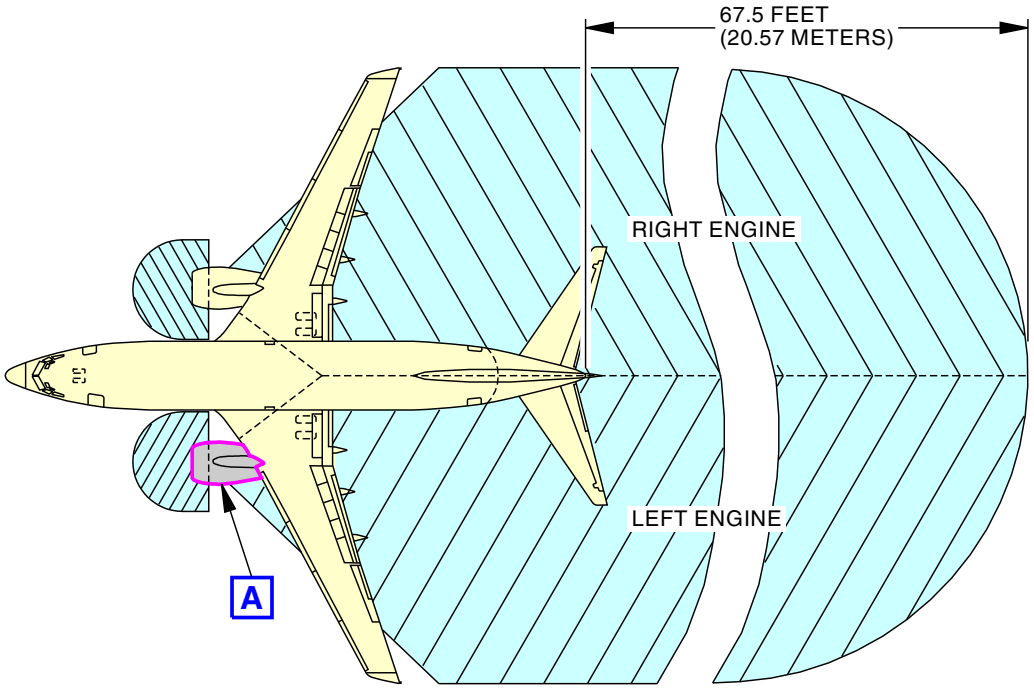
(a) These fire extinguishing agents are not water soluble.

(b) Water can cause the fire extinguishing agents to collect and bond to the engine parts.

(c) This will cause corrosion to engine parts and cause engine performance to decrease.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



EXHAUST HAZARD AREA

WARNING:

KEEP ALL PERSONS OUT OF THE DANGEROUS AREA DURING ENGINE OPERATION. IF THE SURFACE WIND IS MORE THAN 25 KNOTS, INCREASE THE DANGEROUS AREA AT THE ENGINE INLET BY 20%.

CLEAN THE RAMP IF THERE IS SNOW, ICE, WATER, OIL OR OTHER CONTAMINATION, OR MOVE THE AIRPLANE TO A LOCATION THAT IS CLEAN.

MAKE SURE THAT ALL PERSONS ARE SAFE BEFORE YOU START THE ENGINE.

MAKE SURE THE PERSONS IN THE FLIGHT COMPARTMENT CAN SPEAK TO ALL PERSONS NEAR THE DANGEROUS AREA DURING ENGINE OPERATION.

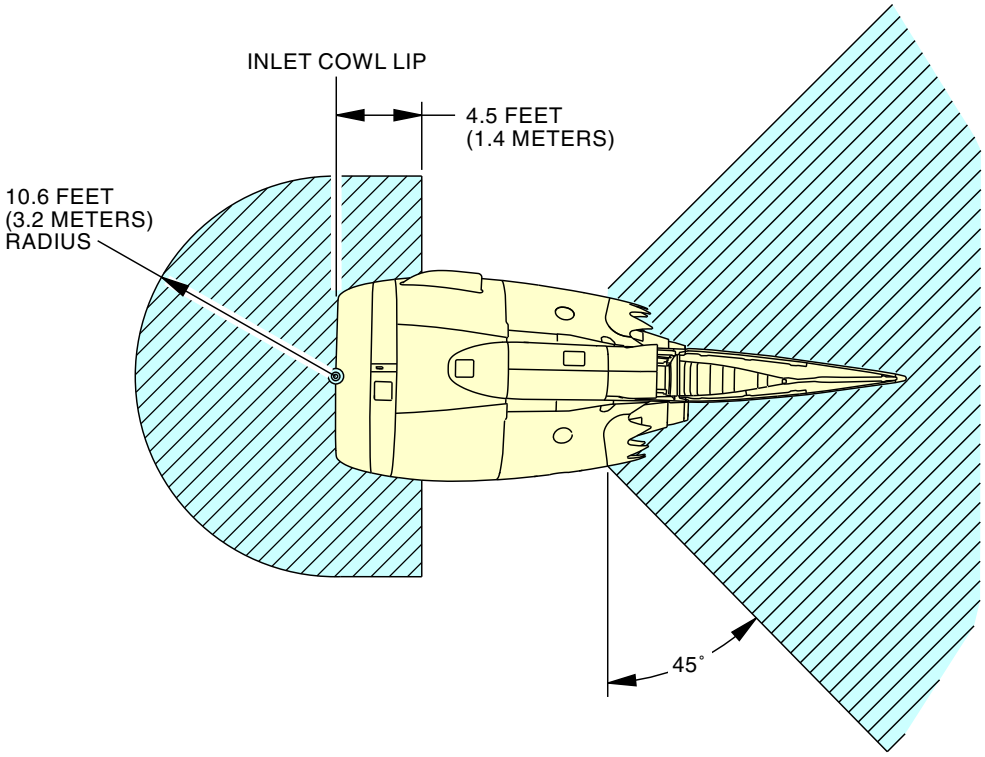
OBEY ALL OF THE GROUND SAFETY PRECAUTIONS FOR THE ENGINES.

THE ENGINES CAN PULL PERSONS OR UNWANTED MATERIALS INTO THEM AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

2354151 S00061514879_V2

Minimum Idle - Power Hazard Area
Figure 201/71-00-00-990-801-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



INLET HAZARD AREA

A

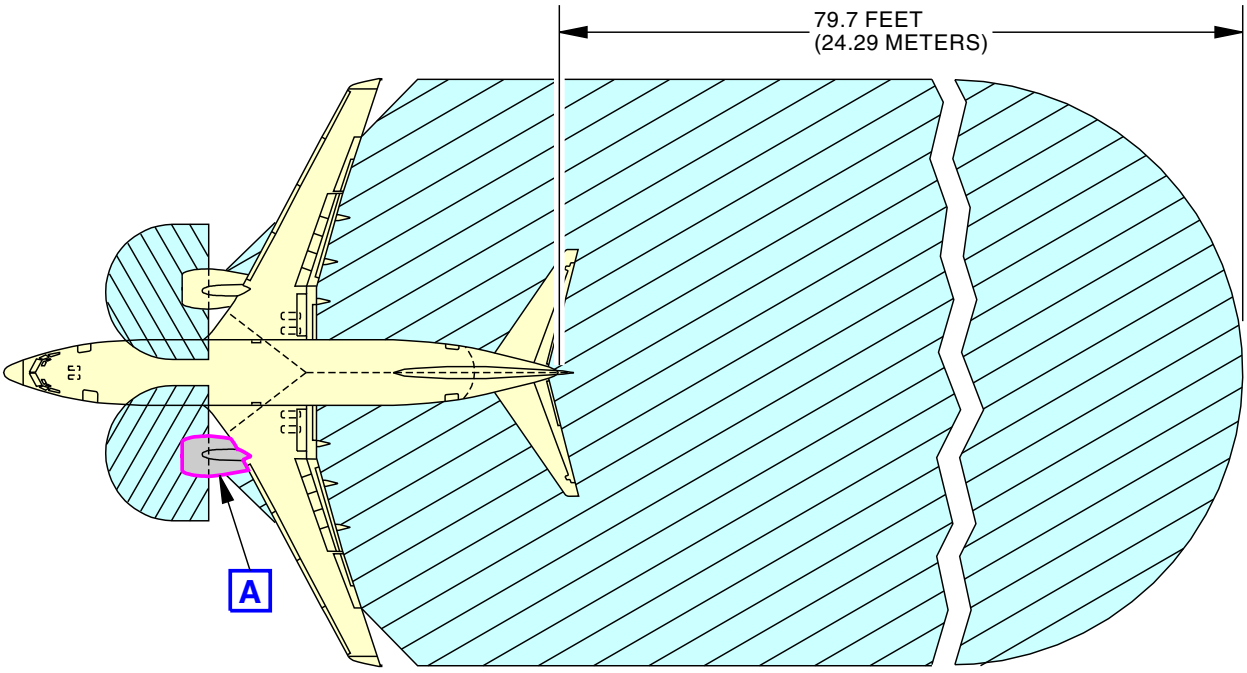
NOTE:

THE DANGEROUS AREA IS SHOWN FOR THE LEFT ENGINE ONLY. THE DANGEROUS AREA AROUND THE RIGHT ENGINE HAS THE SAME DIMENSIONS. WHEN YOU OPERATE TWO ENGINES, THE DANGEROUS AREA IS THE SUM OF THE LEFT AND RIGHT DANGEROUS AREAS.

2354152 S00061514880_V2

Minimum Idle - Power Hazard Area
Figure 201/71-00-00-990-801-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



EXHAUST HAZARD AREA

WARNING:

KEEP ALL PERSONS OUT OF THE DANGEROUS AREA DURING ENGINE OPERATION. IF THE SURFACE WIND IS MORE THAN 25 KNOTS, INCREASE THE DANGEROUS AREA AT THE ENGINE INLET BY 20%.

CLEAN THE RAMP IF THERE IS SNOW, ICE, WATER, OIL OR OTHER CONTAMINATION, OR MOVE THE AIRPLANE TO A LOCATION THAT IS CLEAN.

MAKE SURE THAT ALL PERSONS ARE SAFE BEFORE YOU START THE ENGINE.

MAKE SURE THE PERSONS IN THE FLIGHT COMPARTMENT CAN SPEAK TO ALL PERSONS NEAR THE DANGEROUS AREA DURING ENGINE OPERATION.

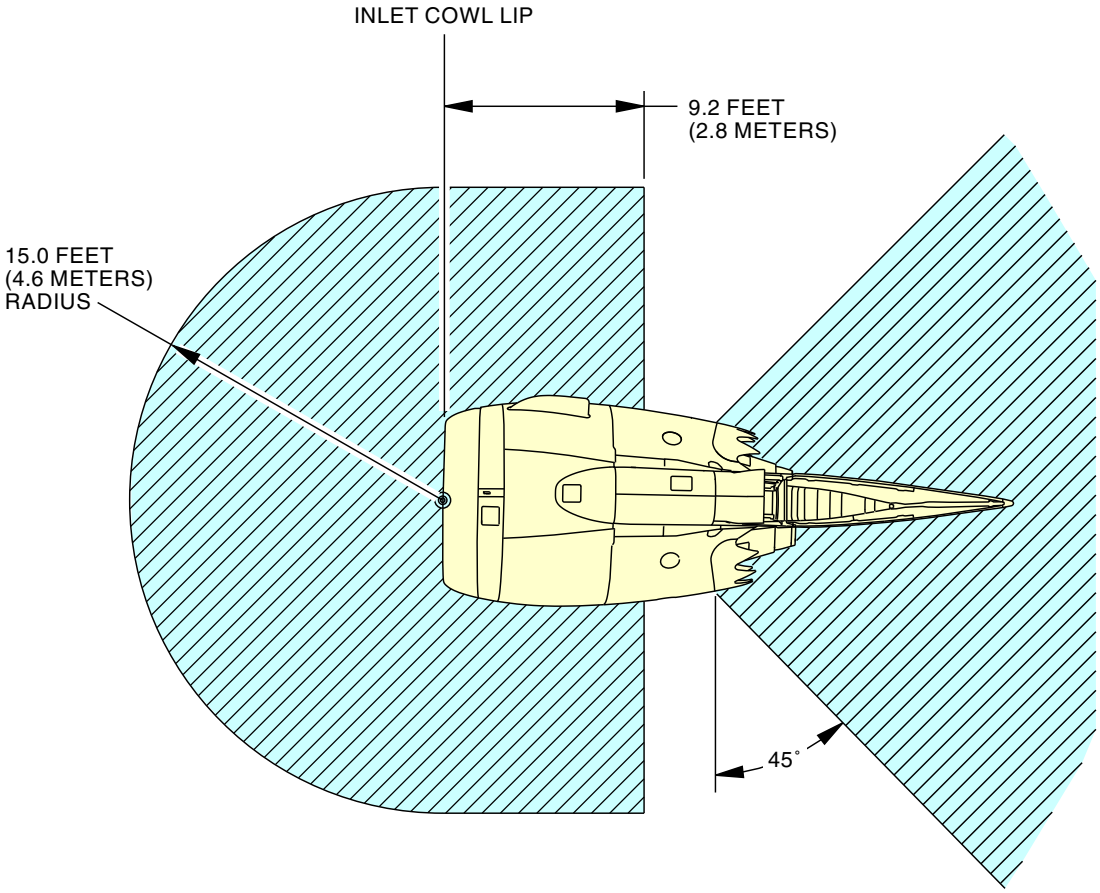
OBEY ALL OF THE GROUND SAFETY PRECAUTIONS FOR THE ENGINES.

THE ENGINES CAN PULL PERSONS OR UNWANTED MATERIALS INTO THEM AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

2444008 S0000566245_V2

Breakaway Thrust - Power Hazard Area
Figure 202/71-00-00-990-878-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



INLET HAZARD AREA

A

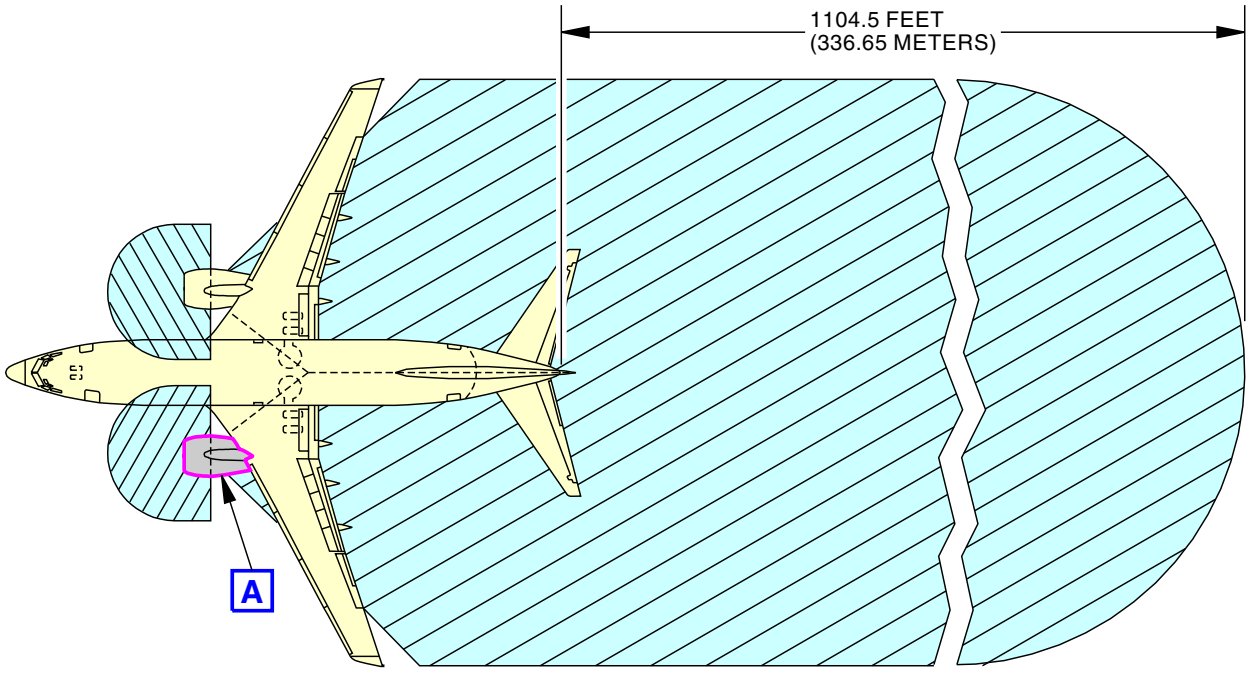
NOTE:

THE DANGEROUS AREA IS SHOWN FOR THE LEFT ENGINE ONLY. THE DANGEROUS AREA AROUND THE RIGHT ENGINE HAS THE SAME DIMENSIONS. WHEN YOU OPERATE TWO ENGINES, THE DANGEROUS AREA IS THE SUM OF THE LEFT AND RIGHT DANGEROUS AREAS.

2444009 S0000566246_V3

Breakaway Thrust - Power Hazard Area
Figure 202/71-00-00-990-878-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



EXHAUST HAZARD AREA

WARNING:

KEEP ALL PERSONS OUT OF THE DANGEROUS AREA DURING ENGINE OPERATION. IF THE SURFACE WIND IS MORE THAN 25 KNOTS, INCREASE THE DANGEROUS AREA AT THE ENGINE INLET BY 20%.

CLEAN THE RAMP IF THERE IS SNOW, ICE, WATER, OIL OR OTHER CONTAMINATION, OR MOVE THE AIRPLANE TO A LOCATION THAT IS CLEAN.

MAKE SURE THAT ALL PERSONS ARE SAFE BEFORE YOU START THE ENGINE.

MAKE SURE THE PERSONS IN THE FLIGHT COMPARTMENT CAN SPEAK TO ALL PERSONS NEAR THE DANGEROUS AREA DURING ENGINE OPERATION.

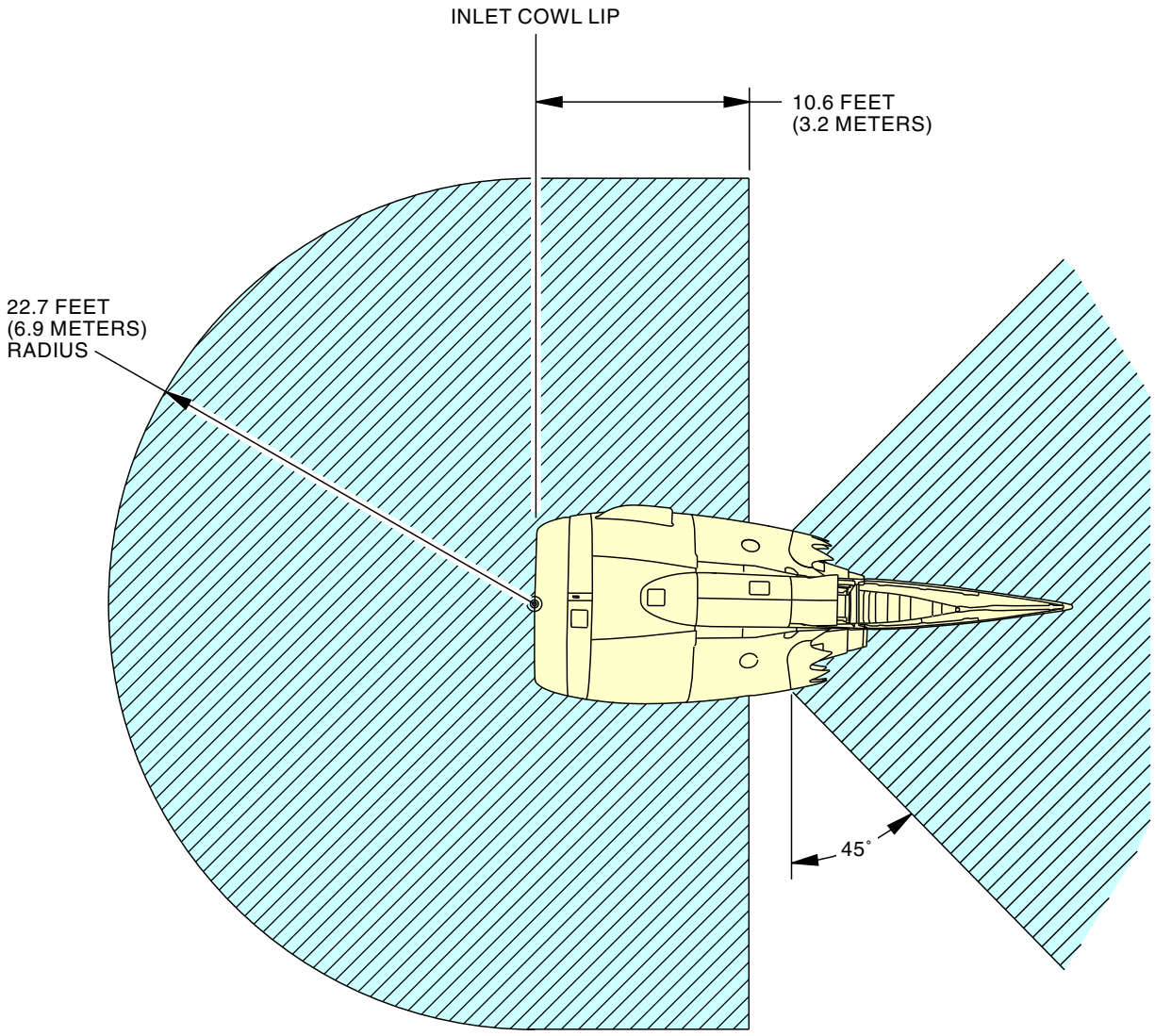
OBEY ALL OF THE GROUND SAFETY PRECAUTIONS FOR THE ENGINES.

THE ENGINES CAN PULL PERSONS OR UNWANTED MATERIALS INTO THEM AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

2354153 S00061514881_V2

Takeoff Thrust - Power Hazard Area
Figure 203/71-00-00-990-802-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



INLET HAZARD AREA

A

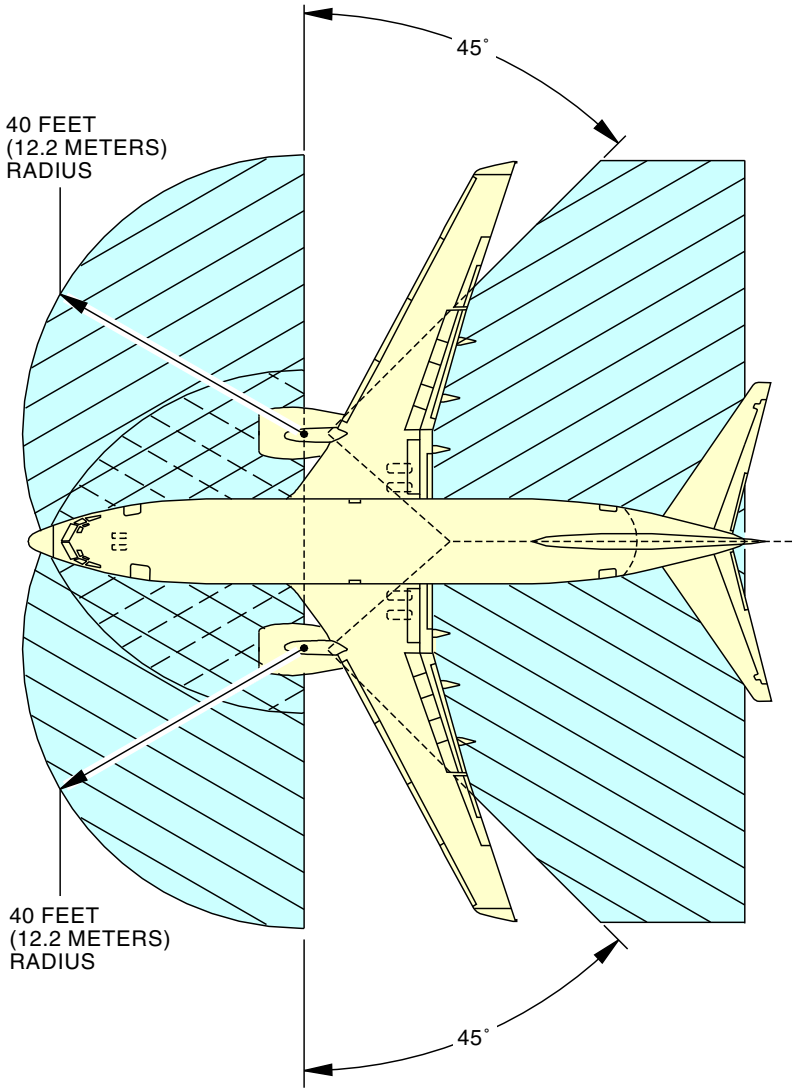
NOTE:

THE DANGEROUS AREA IS SHOWN FOR THE LEFT ENGINE ONLY. THE DANGEROUS AREA AROUND THE RIGHT ENGINE HAS THE SAME DIMENSIONS. WHEN YOU OPERATE TWO ENGINES, THE DANGEROUS AREA IS THE SUM OF THE LEFT AND RIGHT DANGEROUS AREAS.

2354154 S00061514882_V2

Takeoff Thrust - Power Hazard Area
Figure 203/71-00-00-990-802-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



WARNING:

MAKE SURE THAT ALL PERSONS ARE SAFE BEFORE YOU START THE ENGINE.

MAKE SURE THE PERSONS IN THE FLIGHT COMPARTMENT CAN SPEAK TO ALL PERSONS NEAR THE DANGEROUS AREA DURING ENGINE OPERATION.

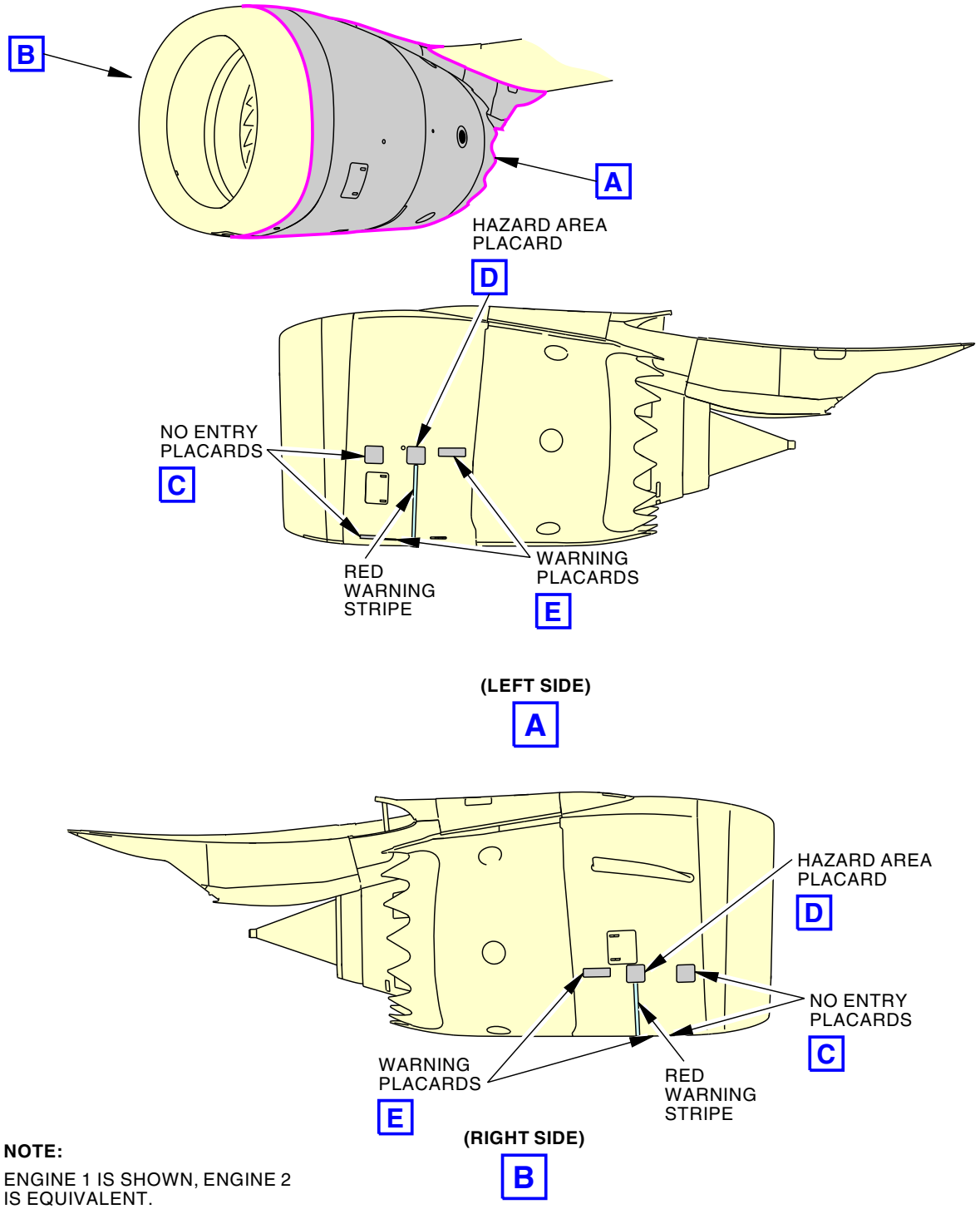
OBEY ALL OF THE GROUND SAFETY PRECAUTIONS FOR THE ENGINES.

THE ENGINES CAN PULL PERSONS OR UNWANTED MATERIALS INTO THEM AND CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

2444010 S0000566247_V1

Reverse Minimum Idle - Power Hazard Area
Figure 204/71-00-00-990-879-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details



NOTE:

ENGINE 1 IS SHOWN, ENGINE 2 IS EQUIVALENT.

2444012 S0000566249_V2

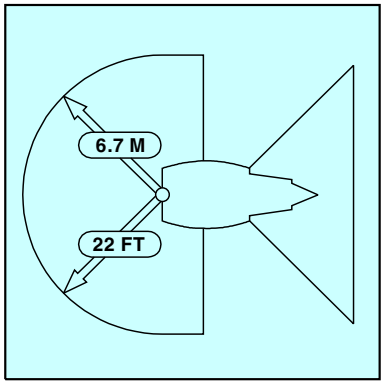
Engine Inlet Hazard Area Placards
Figure 205/71-00-00-990-881-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



NO ENTRY PLACARD

C



HAZARD AREA PLACARD

D



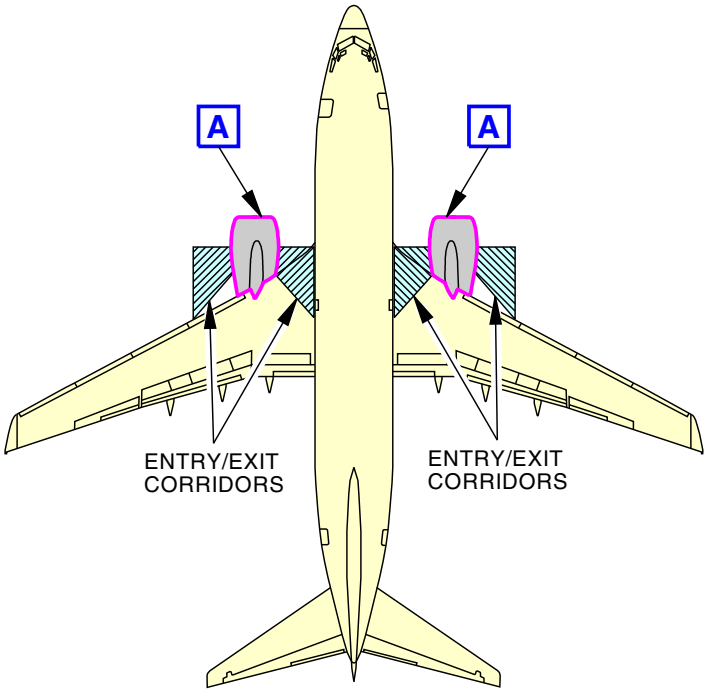
WARNING PLACARD

E

2444013 S0000566250_V3

Engine Inlet Hazard Area Placards
Figure 205/71-00-00-990-881-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

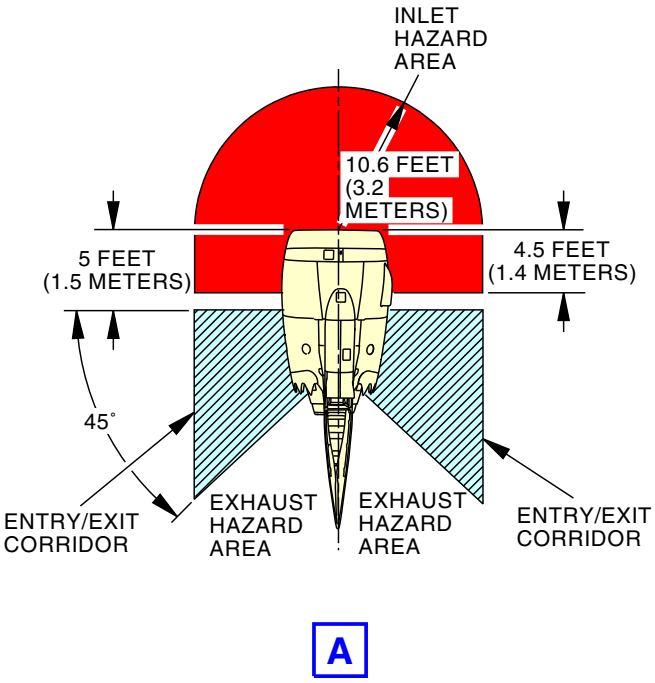


WARNING:

ENTRY/EXIT CORRIDOR MUST BE USED ONLY UNDER THESE CONDITIONS:

1. DO NOT OPERATE THE ENGINE AT MORE THAN LOW IDLE RPM WHEN PERSONNEL ARE IN THE ENTRY/EXIT CORRIDOR.
2. POSITIVE COMMUNICATION BETWEEN PERSONNEL IN THE FLIGHT COMPARTMENT AND PERSONNEL USING THE ENTRY/EXIT CORRIDOR IS MANDATORY.
3. YOU MUST OBEY THE INLET AND EXHAUST HAZARD AREAS WHEN PERSONS ARE IN THE ENTRY/EXIT CORRIDOR.

IF SURFACE WIND IS MORE THAN 25 KNOTS, INCREASE THE DISTANCE OF THE INLET BOUNDARY BY 20%. IF THE RAMP SURFACES ARE SLIPPERY, ADDITIONAL PRECAUTIONS SUCH AS CLEANING THE RAMP WILL BE NECESSARY TO GIVE PERSONNEL SAFETY.



ENTRY/EXIT CORRIDOR (LOW IDLE)

2444014 S0000566252_V4

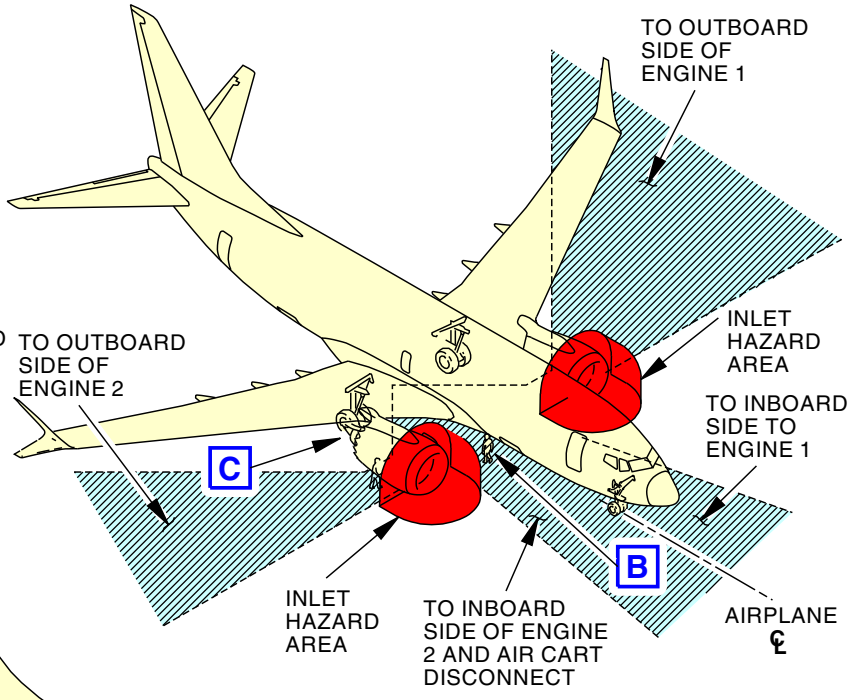
Engine Maintenance Entry/Exit Corridors
Figure 206/71-00-00-990-882-G00 (Sheet 1 of 5)

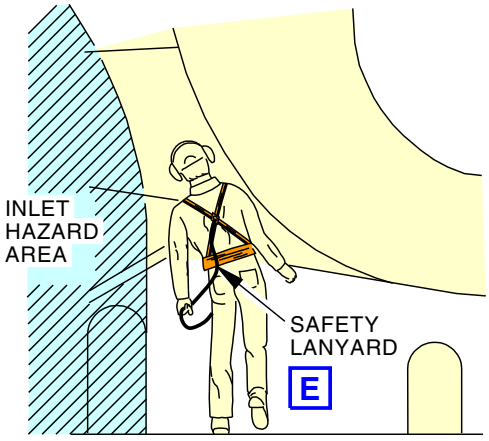
ECCN 9E991 BOEING PROPRIETARY - See title page for details

NOTE:

BEFORE THE ENGINE OPERATES, YOU CAN PUT A PLUG-IN PERSONNEL INLET BARRIER OR AN ENGINE RUN-UP INLET GUARD AT THE ENGINE INLET AS AN ADDED PRECAUTION

1. TO APPROACH THE OUTBOARD SIDE OF ENGINE, ENTER THE FAN CASE AREA FROM THE AFT END OF THE FAN COWL PANEL.

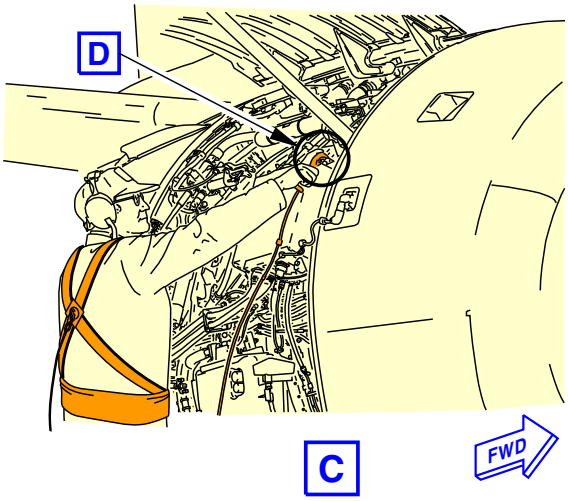




B

2. TO GO NEAR THE INBOARD SIDE OF THE ENGINE, START FORWARD OF THE INLET HAZARD ZONE. WALK AFT WITH YOUR SHOULDER NEXT TO THE FUSELAGE, GO ACROSS TOWARD THE ENGINE AT A POINT JUST FORWARD OF THE LANDING GEAR, AND ENTER THE FAN CASE AREA FROM THE AFT END OF THE FAN COWL PANEL.

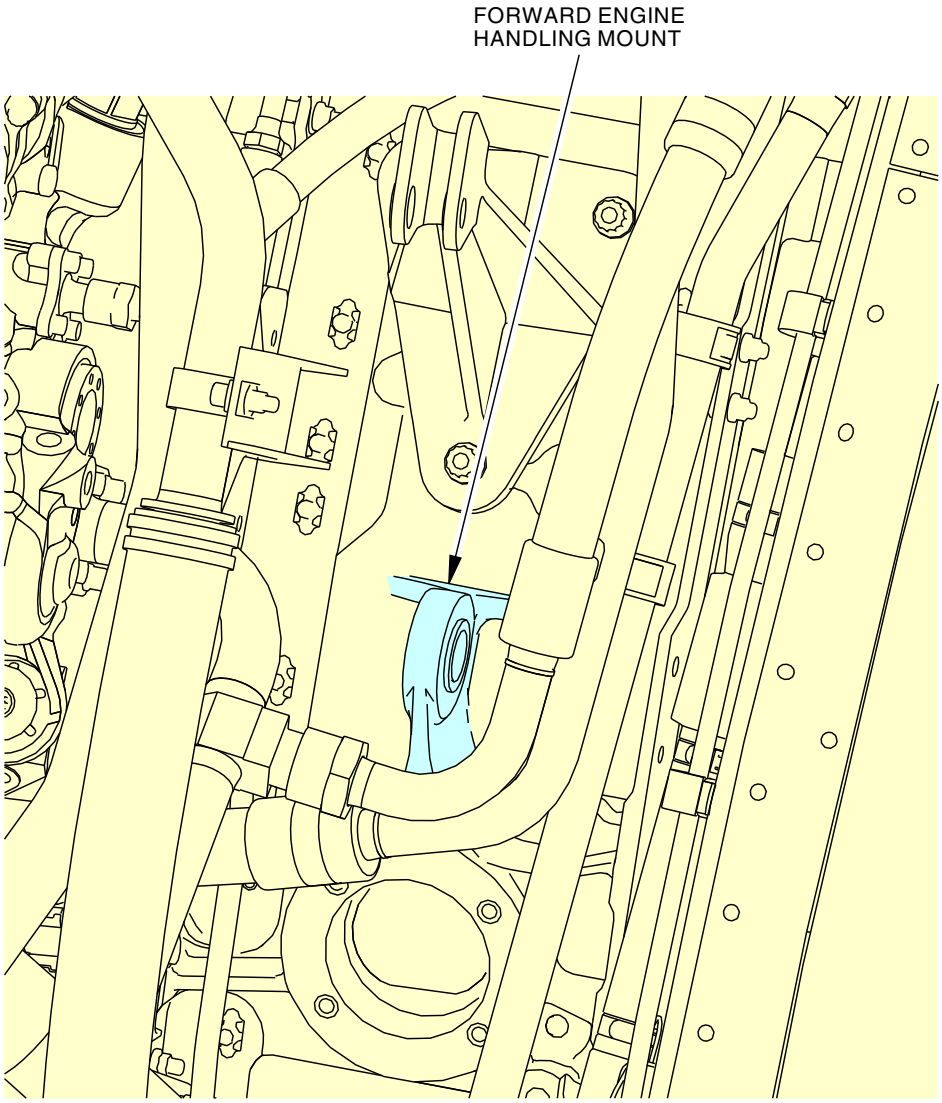
3. ATTACH A SAFETY LANYARD HOOK TO THE CORRECT ATTACH POINT. (SEE "D" FOR THE ATTACH POINTS LOCATIONS) RIGHT AND LEFT SIDE ATTACH POINTS ARE ON THE FAN CASE.



2444015 S0000566253_V5

Engine Maintenance Entry/Exit Corridors
Figure 206/71-00-00-990-882-G00 (Sheet 2 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



FORWARD ENGINE HANDLING MOUNT LOCATION (LEFT SIDE - EXAMPLE)

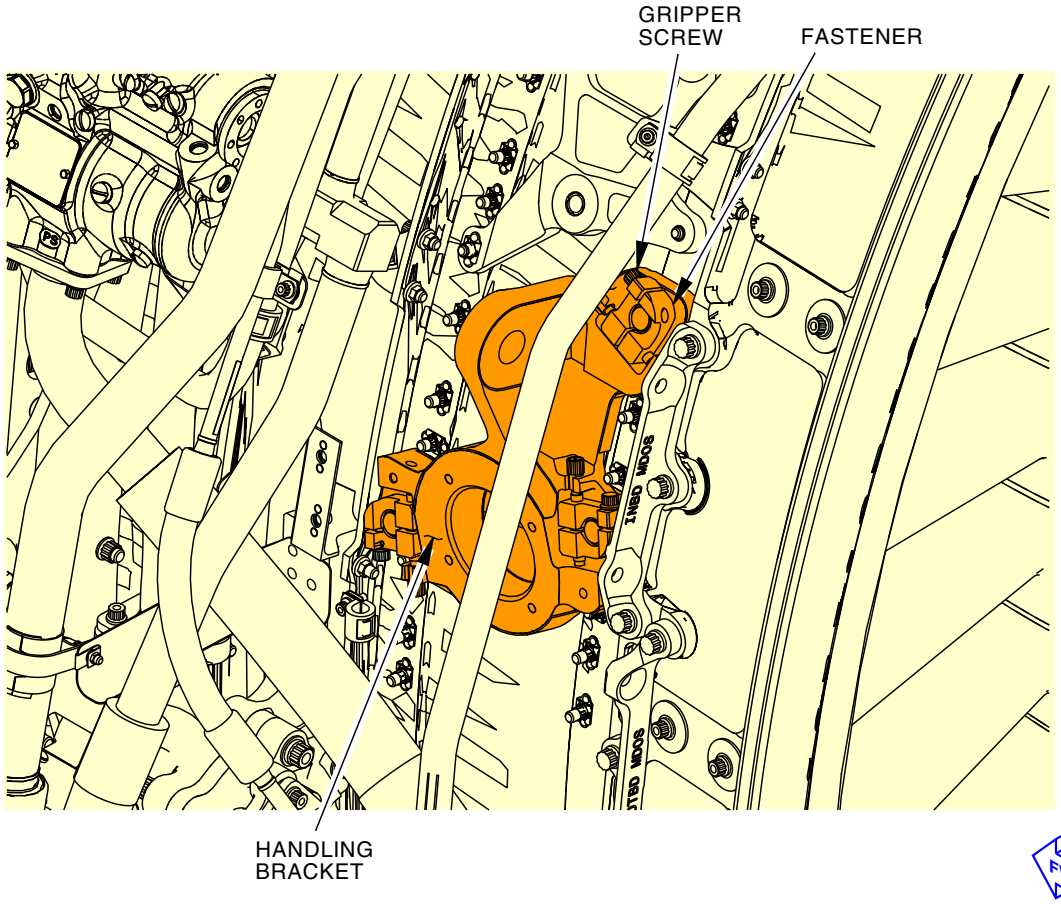
D

HOW TO APPROACH/EXIT THE FAN CASE AREA DURING AN ENGINE MAINTENANCE RUN

2444016 S0000566254_V3

Engine Maintenance Entry/Exit Corridors
Figure 206/71-00-00-990-882-G00 (Sheet 3 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



HANDLING BRACKET LOCATION (LEFT SIDE-EXAMPLE)

D

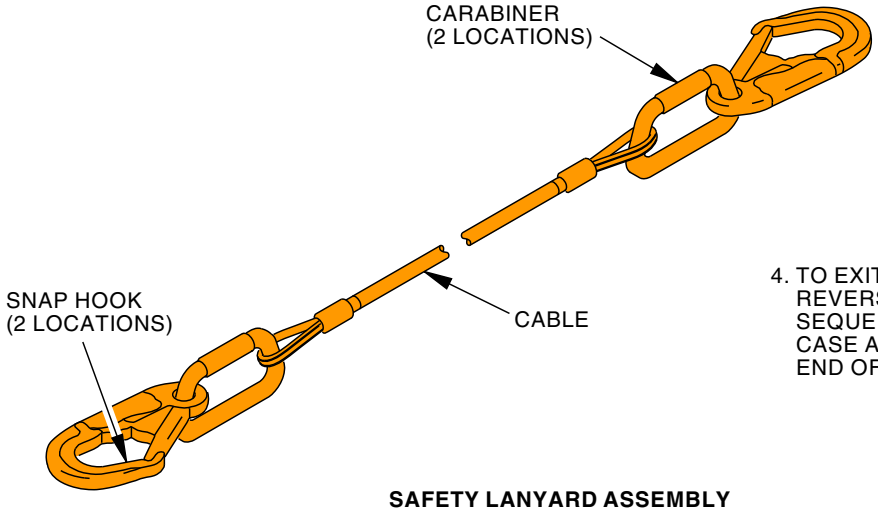
HOW TO APPROACH/EXIT THE FAN CASE AREA DURING AN ENGINE MAINTENANCE RUN

ICN-LEAP-1B-XXXXXX-B-F0301-XXXXX-A-001-02

2886895 S0000686171_V1

Engine Maintenance Entry/Exit Corridors
Figure 206/71-00-00-990-882-G00 (Sheet 4 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



4. TO EXIT FROM THE ENGINE, REVERSE THE APPROACH SEQUENCE. ALWAYS EXIT THE FAN CASE AREA THROUGH THE AFT END OF THE FAN COWL PANEL.

SAFETY LANYARD ASSEMBLY

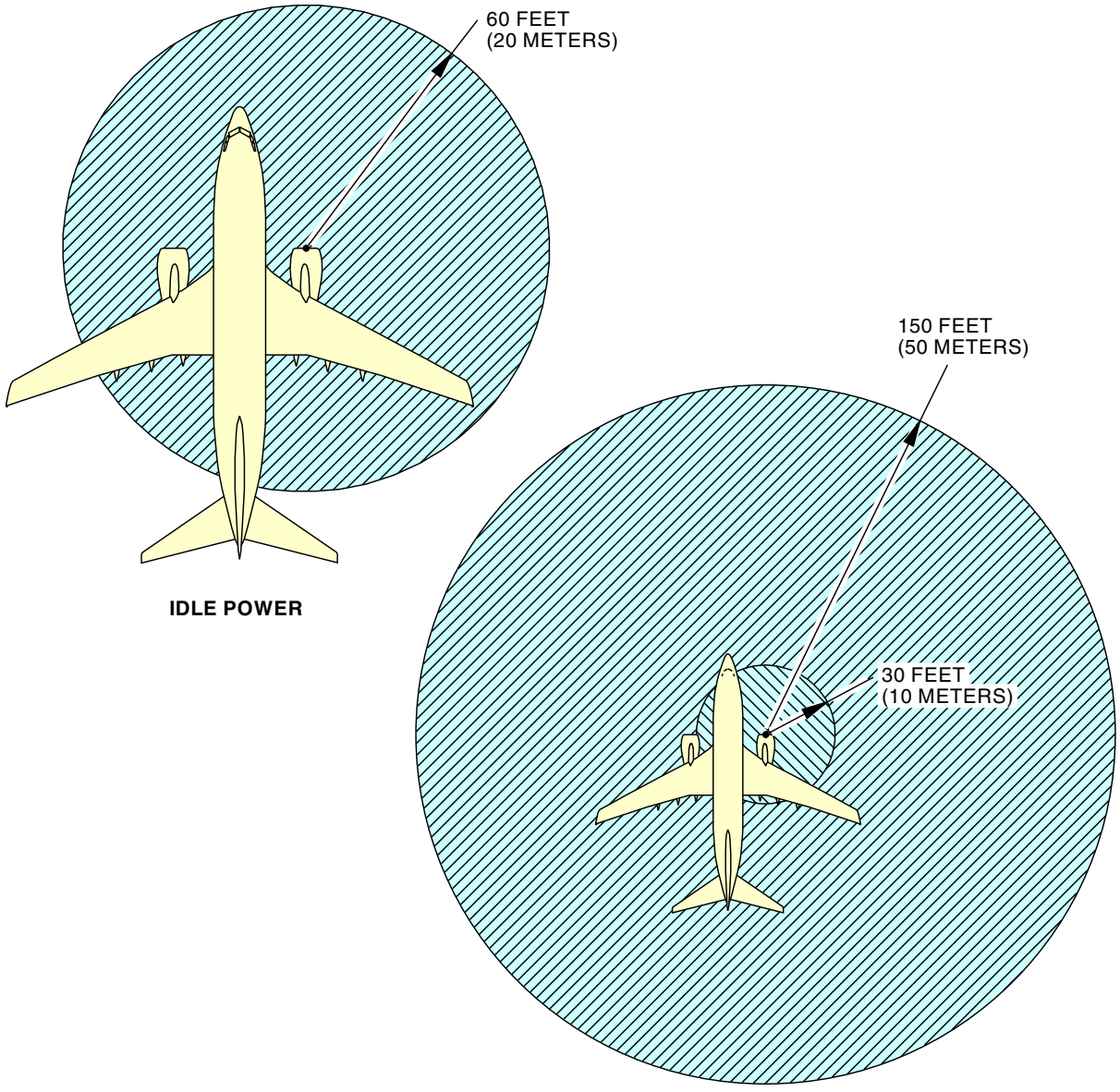
E

HOW TO APPROACH/EXIT THE FAN CASE AREA DURING AN ENGINE MAINTENANCE RUN

2886897 S0000686190_V1

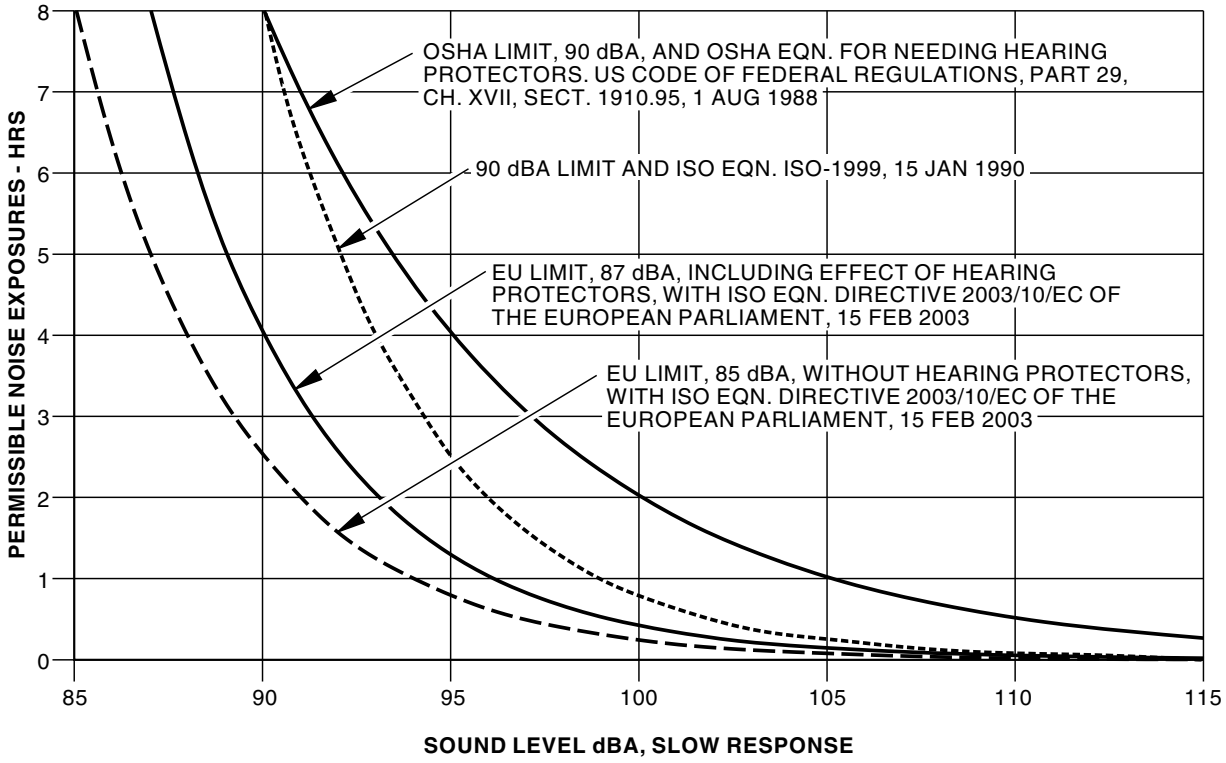
Engine Maintenance Entry/Exit Corridors
Figure 206/71-00-00-990-882-G00 (Sheet 5 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Engine Noise Hazard Areas
Figure 207/71-00-00-990-883-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

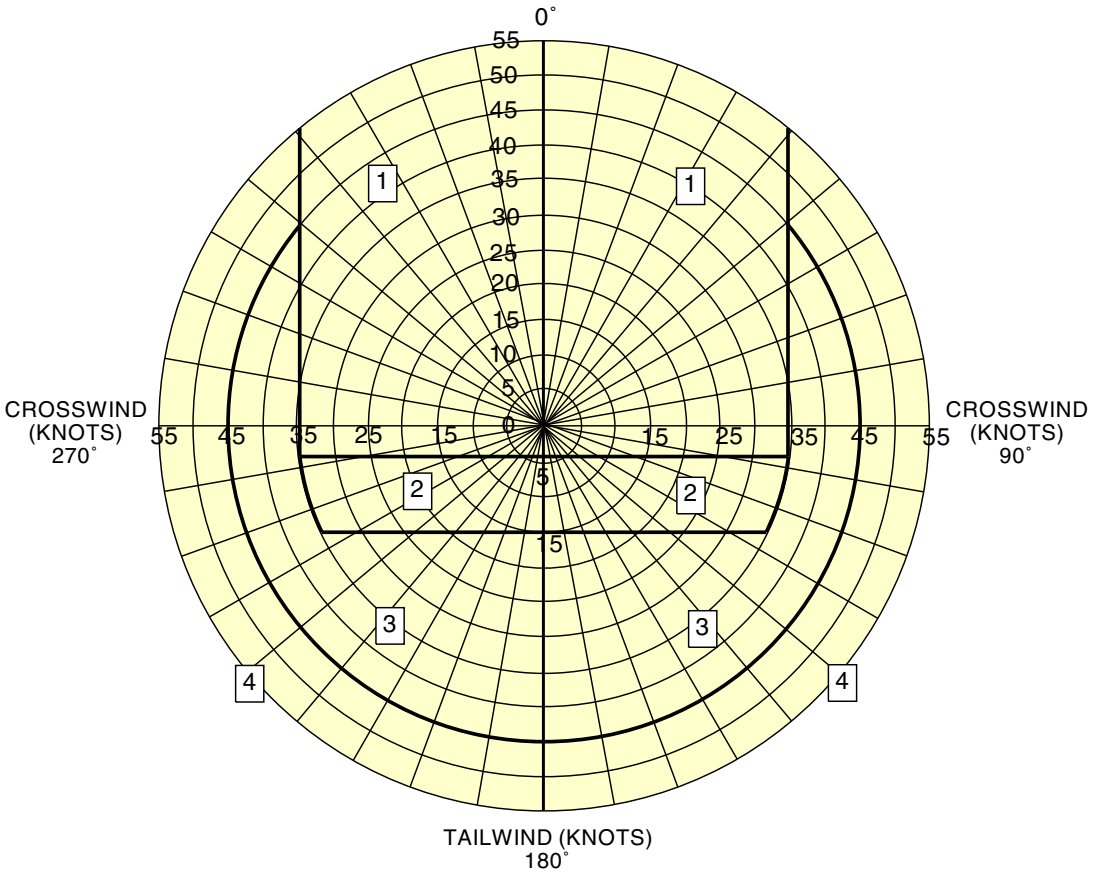


**PERMISSIBLE NOISE EXPOSURE
VS
TIME-AVERAGED SOUND LEVEL**

2354156 S00061514884_V1

**Noise Time Limits
Figure 208/71-00-00-990-804-G00**

ECCN 9E991 BOEING PROPRIETARY - See title page for details



LEGEND:
ZONE1:
UNRESTRICTED OPERATIONS

ZONE 2:
- ROLLING TAKEOFF RECOMMENDED: LIMIT FAN SPEED TO 50%N1 WITH BRAKES APPLIED
- STATIC GROUND OPERATION: LIMIT FAN SPEED TO N1=3800 rpm (86.4%N1) RECOMMENDED

ZONE 3: LIMIT FAN SPEED TO TAXI

ZONE 4: LIMIT FAN SPEED TO IDLE

CAUTION:
IF ENGINE RUNS ARE DONE OUT OF THE PREFERRED LIMITS, MONITOR ENGINE PARAMETERS N1, N2 AND EGT. ENGINE OVERHEAT OR STALL CAN OCCUR AND CAUSE ENGINE DAMAGE.

5036611-00
2354155 S00061514883_V2

Preferred Relative Wind Direction and Wind Velocity Limitations During Low Power Engine Operation
Figure 209/71-00-00-990-803-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-00-00-800-802-G00

3. Engine Operation Limits

(Figure 210)

A. General

(1) This task gives the normal operational limits of the engine.

(a) If an engine parameter is not in the operation limits, it is necessary to do maintenance on the engine.

1) These tasks give the maintenance that is necessary when an engine parameter is not in the operation limits.

a) No or Low Oil Pressure Inspection, TASK 71-00-00-200-808-G00

b) Overspeed Inspection, TASK 71-00-00-200-809-G00

c) Overtemperature Inspection, TASK 71-00-00-200-810-G00.

(b) If you do not know the cause of the exceedance, do this step:

1) Refer to IFIM and do the applicable procedure(s).

B. References

Reference	Title
71-00-00-200-808-G00	No or Low Oil Pressure Inspection (P/B 601)
71-00-00-200-809-G00	Overspeed Inspection (P/B 601)
71-00-00-200-810-G00	Overtemperature Inspection (P/B 601)
71-71-00-200-801-G00	Engine Vents and Drains Inspection (P/B 601)
IFIM and do the applicable procedure(s)	Interactive Fault Isolation Manual

C. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Exhaust Gas Temperature (EGT) Limits

SUBTASK 71-00-00-212-001-G00

(1) When the engine is at or above idle, the engine Exhaust Gas Temperature (EGT) limit is 1900°F (1038°C) and as follows:

(a) EGT is permitted to up to 1918°F (1048°C) for a maximum of 30 seconds without maintenance action required. In order to prevent maintenance burden that is not necessary, the EEC automatically prevents indication to the aircraft of transient exceedances below 1918°F (1048°C) for a maximum of 30 seconds.

(b) There is no time limit for EGT below 1855°F (1013°C).

NOTE: The condition and configuration of an engine can cause a difference in EGT between engines. At idle and low power operation, a difference between engines in EGT values is, by itself, not an indication of a problem unless there is an EGT limit exceedance.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-210-001-G00

(2) The EGT limit for ground starts is 1387°F (753°C).

NOTE: The adaptive start feature of the EEC system adjusts the fuel schedule to decrease conditions for engine overtemperature. The EEC system will interrupt the start if the engine approaches an overtemperature condition. Engine starts in excess of the 1387°F (753°C) limit must be reported for corrective action.

SUBTASK 71-00-00-210-049-G00

(3) The EGT limit for in-flight starts is 1621°F (883°C).

SUBTASK 71-00-00-210-002-G00

(4) If the EGT increases more than the limit, do this task: Overtemperature Inspection, TASK 71-00-00-200-810-G00.

E. Oil Pressure Limit

SUBTASK 71-00-00-212-002-G00

(1) The minimum oil pressure at minimum ground idle speed is 17.4 psi (120.0 kPa).

NOTE: The oil pressure must increase when engine N2 speed increases.

SUBTASK 71-00-00-210-003-G00

(2) The oil pressure during the engine operation must be in the usual oil pressure envelope (Figure 210).

(a) If the engine operated with oil pressure lower than the limit, do this task: No or Low Oil Pressure Inspection, TASK 71-00-00-200-808-G00.

F. Oil Temperature Limits

SUBTASK 71-00-00-212-003-G00

(1) The maximum supply oil temperature limit for continuous operation is 284°F (140°C).

(a) The time limit for engine operation with a supply oil temperature between 284°F (140°C) and 311°F (155°C) is 15 minutes.

(b) Engine operation with a supply oil temperature above 311°F (155°C) is not permitted.

(c) If the oil temperature is above the limit, do these steps:

1) Stop the engine (TASK 71-00-00-910-806-G00).

2) Refer to IFIM and do the applicable procedure(s).

SUBTASK 71-00-00-212-004-G00

(2) The minimum supply oil temperature for the engine start is -40°F (-40°C).

(a) If the supply oil temperatures is less than -40°F (-40°C), do the special cold weather engine start procedures (TASK 71-00-00-910-801-G00).

SUBTASK 71-00-00-910-004-G00

(3) After engine start, let it run at or near idle speed until the oil temperature is at or above 88°F (31°C) before you increase the engine thrust.

SIA ALL; AIRPLANES WITH POST CFM SB 73-0025

The oil temperature low amber exceedance is displayed on the forward flight display until the oil temperature is at or above 88°F (31°C). Let the engine run at or near idle speed until the oil temperature low amber exceedance is no longer shown.

SIA ALL

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Oil Specifications

SUBTASK 71-00-00-212-005-G00

CAUTION

ONLY USE TYPES AND BRANDS OF ENGINE OIL THAT ARE APPROVED BY THE CFM SB 79-0001. DAMAGE TO THE ENGINE CAN OCCUR IF YOU USE OIL THAT IS NOT APPROVED.

(1) See the CFM service bulletin 79-0001 for the engine oil specifications.

H. Fuel Specifications

SUBTASK 71-00-00-212-006-G00

(1) CFM Service Bulletin 73-0001 gives the specifications for the fuel that is approved for use in the LEAP 1B engine.

I. Rotor Speed Limits (Redline Limits)

SUBTASK 71-00-00-212-007-G00

(1) The maximum N1 rotor speed is 4586 RPM (104.3%).

SUBTASK 71-00-00-212-008-G00

(2) The maximum N2 rotor speed is 20171 RPM (117.5%).

J. Oil Consumption Guidelines

SUBTASK 71-00-00-970-024-G00

(1) Calculate the oil consumption of the engine as a rolling average as follows:

(a) Find the total quantity of oil that the engine used during a period of 100 to 200 flight hours.

(b) Divide this total quantity by the number of flight hours.

NOTE: If you calculate the oil consumption based on a smaller number of flight hours, the calculation will be less accurate.

SUBTASK 71-00-00-790-012-G00

SYSTEM AWL 2

(2) Use Table 201 to find the maximum permitted oil consumption.

Table 201/71-00-00-993-863-G00 MAXIMUM ENGINE OIL CONSUMPTION

737-7/8/8200/9/10 MODEL	Maximum Oil Consumption US Quarts/Hour (Liters/ Hour)
737-7	0.70 qt (0.66 l)
737-8	0.74 qt (0.70 l)
737-8200	0.74 qt (0.70 l)
737-9	0.76 qt (0.72 l)

SUBTASK 71-00-00-212-010-G00

(3) If the engine oil consumption changes unexpectedly, do these steps:

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(a) If the engine oil consumption increases slowly, suddenly, or is higher than 0.36 qt (0.34 l) per flight hour, refer to IFIM and do the applicable procedure(s).

NOTE: The oil quantity indicator in the flight compartment shows the amount of engine oil in the engine oil tank. The instrument does not show the quantity of engine oil in the engine. When you operate the engine, oil will go from the engine oil tank to the engine. This will cause the oil quantity indication in the flight compartment to decrease by the same quantity. After you stop the engine, the engine oil goes back into the engine oil tank. The oil quantity indication in the flight compartment will show an increase in the quantity of oil.

(b) If the oil consumption suddenly decreases, goes to zero, or negative values, and the oil tank level is unusually high, this can be an indication of abnormal system scavenge or fuel leaks into the oil system.

1) Refer to IFIM and do the applicable procedure(s).

SUBTASK 71-00-00-211-005-G00

(4) The oil quantity required for engine start is 14.7 qt (13.9 l) plus additional quantity for the anticipated oil consumption based on the duration of operation and typical oil consumption rate.

(a) The oil quantity low exceedance alert is set when the indicated oil quantity is less than 6.6 qt (6.25 l).

K. Engine Starter Operation

SUBTASK 71-00-00-212-011-G00

(1) The EEC interfaces with the command signals from the aircraft to control starting and engine motoring.

(a) The engine starting system operates in “enhanced-manual” control mode.

1) The “enhanced-manual” mode is the control mode used for all engine starts, and includes automatic abnormal start protection features.

(b) For ground starts, the EEC can automatically abort an abnormal start when the fuel flow to the engine is stopped.

NOTE: The EEC cannot automatically attempt an engine restart.

(c) Starting can be aborted if you move the fuel start lever to the CUTOFF position to command the fuel and ignition off and then closing the START switch to close the Starter Air Valve (SAV).

SUBTASK 71-00-00-210-085-G00

(2) The EEC will detect abnormal starts and adjust control settings to protect the engine or it will either abort or recover start sequences depending upon the abnormal event.

(a) The operator does not need to interrupt the auto-start sequence.

SUBTASK 71-00-00-210-086-G00

(3) The normal operation inlet air pressure range for the starter air valve is 13 psia (90 kPa) - 43 psia (296 kPa).

(a) Starter air valve inlet pressure lower than 13 psia will result in an aborted start and an MDS status message.

SUBTASK 71-00-00-210-087-G00

(4) Air turbine starter duty cycle is permitted for 3 minutes of continuous operation for ground operation and as follows:

(a) Multiple consecutive start attempts are permitted.

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(b) Each start attempt is limited to 3 minutes of starter operation.

(c) The starter must be off a minimum of 10 seconds between start attempts for cooling.

SUBTASK 71-00-00-910-005-G00

(5) The extended starter operation limits are given as follows:

NOTE: As an example, the extended starter operation is used during maintenance related activities such as water wash and the wet and dry motoring procedures.

(a) Starter usage is limited to 5 minutes for all extended engine motorings.

(b) For the first and second engine motorings, the starter limit is as follows:

1) The starter must be off a minimum of 5 minutes between each motoring to cool the starter.

(c) For the third and subsequent extended engine motorings, the starter limit is as follows:

1) The starter must be off for a minimum of 10 minutes between each motoring to cool the starter.

SUBTASK 71-00-00-910-006-G00

(6) The starter engagement speeds are given as follows:

CAUTION

DO NOT ENGAGE THE STARTER AGAIN WHEN THE ENGINE IS AT OR MORE THAN IDLE. DAMAGE TO THE STARTER CAN OCCUR.

(a) For usual operation, do not try to engage the starter when the engine is at or more than idle.

1) It is recommended that the starter be removed for inspection at the subsequent convenient opportunity if it was engaged at or more than idle for more than 30 seconds.

(b) Starter re-engagement up to 60% N2 is permitted to clear a fire or after an EGT exceedance condition.

L. Engine Thrust Levels

SUBTASK 71-00-00-910-007-G00

(1) Each thrust position is found at a specific low pressure rotor speed (N1). These thrust positions are given as follows:

(a) Takeoff

1) This is the maximum thrust that can be used and not overboost the engine.

a) This thrust can be used in takeoff for a maximum of 5 minutes.

b) This limit applies to all operations above the maximum continuous thrust.

c) This thrust can be used in engine-out conditions for a maximum of 10 minutes.

2) If the takeoff power is used for more than 5 minutes, do these steps:

a) Record the total time the engine was operated at the takeoff power.

b) Make sure that the EGT is within limits.

<1> If the EGT was more than the limits, do this task: Overtemperature Inspection, TASK 71-00-00-200-810-G00.

(b) Maximum Continuous

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1) This is the maximum thrust for continuous operation during an engine-out condition.

NOTE: This thrust is used only for emergency conditions at the Captain's discretion.

(c) Maximum Climb

1) This is the maximum thrust permitted for normal climb operation.

(d) Maximum Cruise

1) This is the maximum thrust permitted for normal cruise operation.

(e) Idle

1) The engine has two idle modes; approach idle and minimum idle.

2) Full Authority Digital Engine Control (FADEC) system automatically selects between the two modes based on inputs from the aircraft.

3) The idle speed changes with altitude.

(f) Approach Idle

1) This is used in-flight to permit a fast engine acceleration to takeoff/go-around thrust.

2) The thrust levers must be in the idle position with the engine in the approach idle mode.

(g) Minimum Idle

1) This is used for stable, minimum engine thrust level.

2) The thrust levers must be in the idle position with the engine in the minimum idle mode.

3) In-flight, the minimum idle can change as a function of these parameters; minimum compressor static discharge pressure, minimum N2, total bleed air, environmental control system, Mach number, altitude, temperature, and anti-ice selection.

M. Engine Vibration Guidelines

SUBTASK 71-00-00-212-012-G00

(1) N1 Rotor - the advisory level for maximum N1 vibration is 4.0 units (6 MILS DA).

SUBTASK 71-00-00-212-013-G00

(2) N2 Rotor - the advisory level for maximum N2 vibration is 4.0 units (1.8 IPS).

N. Inlet Cowl Anti-Icing System Limits

SUBTASK 71-00-00-910-009-G00

(1) Do not use the inlet cowl anti-icing system for more than 30 seconds when the temperature is more than 65°F (18°C).

SUBTASK 71-00-00-910-010-G00

(2) There is no time limit for operation of the cowl anti-icing system when the temperature is at or less than 65°F (18°C).

O. Leakage Limits

SUBTASK 71-00-00-910-011-G00

(1) Static leaks that are less than a continuous stream from the engine drains are permitted as follows:

(a) The leaks stops completely within 5 minutes after the engine start.

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SUBTASK 71-00-00-810-004-G00

(2) If the leak is a continuous stream or persists after 5 minutes at engine idle, do this task: Engine Vents and Drains Inspection, TASK 71-71-00-200-801-G00.

P. Ignition Ground Use Limits

SUBTASK 71-00-00-910-012-G00

(1) After the engine is started, keep the ENGINE START switch in the OFF/AUTO position.

NOTE: The ignition must stay off when the engine is running to prevent an overtemperature condition, if there is a compressor stall.

SUBTASK 71-00-00-860-783-G00

(2) The EEC will automatically introduce ignition if an engine flameout or rollback is detected, after the engine has been operating at or above idle power.

Q. Thrust Reverser Limits

SUBTASK 71-00-00-910-013-G00

CAUTION

OBEY THE PRECAUTIONS FOR ENGINE OPERATION WHEN THE THRUST REVERSERS ARE IN OPERATION WITH THE AIRPLANE IN A STATIC CONDITION. IF YOU DO NOT, THE THRUST REVERSER COMPONENTS CAN BECOME TOO HOT. DAMAGE TO THE THRUST REVERSER CAN OCCUR.

(1) Obey these engine limits when the thrust reverser is extended:

(a) Maximum N1 is 40%.

(b) There is no time limit if you do not go above 40% N1.

R. Cowling Limitations

SUBTASK 71-00-00-910-014-G00

(1) Engine operation is usually done with the fan cowl panels and thrust reversers closed and latched.

SUBTASK 71-00-00-910-015-G00

(2) Engine motoring with the engine cowling open is permitted with these conditions:

(a) Motoring the engine:

1) The thrust reverser halves can be open to a maximum motoring speed of 24-32% N2 rpm.

2) The fan cowl panels can be open up to a maximum motoring speed of 24-32% N2 rpm.

SUBTASK 71-00-00-910-022-G00

(3) Engine operation with the engine cowling open is permitted with these conditions:

(a) The fan cowl panels can be open during an idle leak check.

(b) Forward thrust only.

(c) The engine is not operated at more than minimum idle RPM.

S. Start After Emergency Shutdown

SUBTASK 71-00-00-910-016-G00

(1) An emergency engine shutdown is an engine shutdown from the power levels that are more than the minimum idle because of an emergency condition (i.e. compressor stall).

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(a) This procedure is only for an engine, which is started after an emergency engine shutdown, for a ground test of the engine during maintenance.

NOTE: This procedure is not for flight operations.

(b) The function of this procedure is to keep the damage to the tip seals at a minimum.

SUBTASK 71-00-00-860-456-G00

CAUTION YOU MUST OBEY THE INSTRUCTIONS FOR THE START PROCEDURE AFTER AN EMERGENCY ENGINE SHUTDOWN. IF YOU DO NOT OBEY THESE INSTRUCTIONS, YOU CAN CAUSE DAMAGE TO THE TIP SEALS OF THE TURBINE BLADES.

(2) If the EGT was not more than the limits and the two rotors move freely, you can start the engine again with the applicable step that follows:

(a) If you can, start the engine within 15 minutes from the time of the engine shutdown:

1) Start the engine again.
2) Put the start lever to IDLE at the maximum speed you can motor the engine (20-25% N2).
3) Stay at minimum idle for a minimum of 15 minutes before you increase the speed to a higher power.

(b) If you cannot start the engine within 15 minutes from the time of the engine shutdown:

1) Stop for a minimum of 50 minutes from the time of the engine shutdown before you try to start the engine again.
2) After the 50 minutes, make sure that the two rotors turn freely.
3) If the two rotors turn freely, motor the engine for approximately two minutes to permit the engine to become cool.
4) After you motor the engine, permit the engine to become cool for 5 minutes before you motor again.
5) After the engine becomes cool, motor the engine again for two minutes.
6) Start the engine again.
7) Put the start lever to IDLE at the maximum speed you can motor the engine (20-25% N2).
8) Stay at minimum idle for a minimum of 15 minutes before you increase the speed to a higher power.

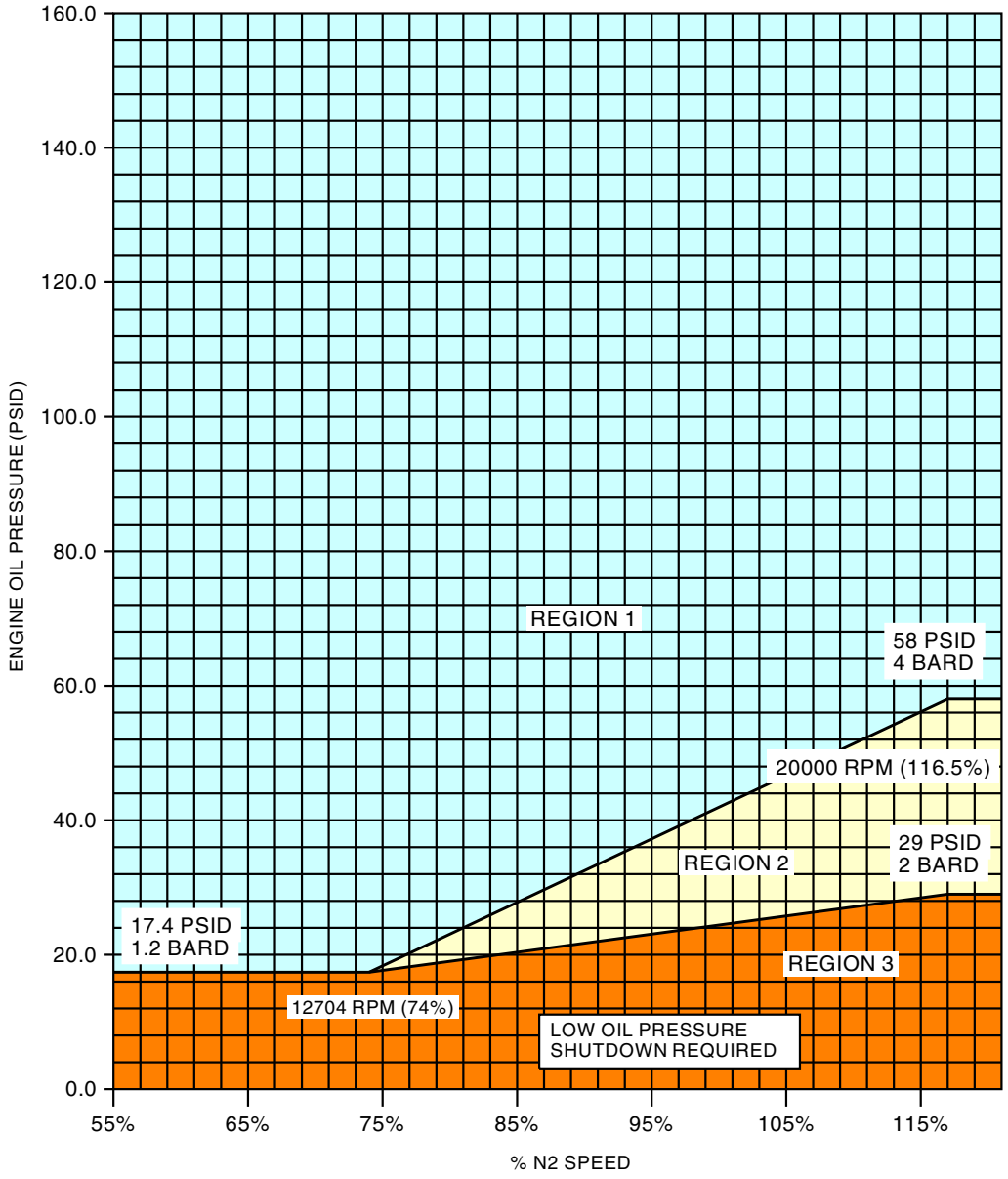
T. Engine Test Data Nomenclature

SUBTASK 71-00-00-970-023-G00

(1) The engine system parameters available on the Electronic Propulsion Control System (EPCS) display pages are given in Maintenance Data Pages from the Engine Propulsion Control System (EPCS), TASK 71-00-00-970-801-G00.

END OF TASK

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REGION 1 - NORMAL OPERATING PRESSURE

REGION 2 - APPROACHING LOW OIL PRESSURE EXCEEDANCE

REGION 3 - LOW OIL PRESSURE REDLINE EXCEEDANCE

2354160 S00061514889_V5

Oil Pressure During Operation
Figure 210/71-00-00-990-806-G00

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TASK 71-00-00-970-801-G00

4. Maintenance Data Pages from the Engine Propulsion Control System (EPCS)

A. General

(1) This task gives the instructions to get the engine parameters from the Engine Propulsion Control System (EPCS) maintenance data pages that are displayed on the MAX Display System (MDS).

(2) The EPCS maintenance pages display all channels of digital engine data, selected engine data, and engine status to provide maintenance data to the mechanics and engineers for troubleshooting on the aircraft.

(3) The EPCS maintenance pages replace the Input Monitoring maintenance function.

(4) The EPCS maintenance pages 1, 2, 3, and 4 show REAL TIME engine parameters.

(5) Data displayed on the EPCS and Performance maintenance pages can be recorded by taking a snapshot, which captures the current display data. Snapshots can be triggered either manually or automatically.

(6) The Maintenance Page application will store up to 5 (the last 5) manual snapshots and up to 5 (the first 5) automatic snapshots for each aircraft system. Real time and snapshot data can be printed or transmitted by data link. The snapshots are recorded in the Display Processor Computer (DPC) Non Volatile Memory (NVM) and until erased by the maintenance personnel.

(7) Automatic snapshots occur on events such as detected exceedances or Alert or System Status messages.

(a) Engine exceedances include N1 red line, N2 red line, EGT normal amber limit, EGT normal red line, EGT start red line, oil pressure amber limit, oil pressure red line, oil temperature amber limit, oil temperature red line, oil quantity low, engine vibration limit, engine hot start/stall detected.

(b) Alert messages ENG FAIL, OIL FILTER BYPASS, LOW OIL PRESS, THRUST, REVERSER LIMITED result in an automatic snap shot.

(c) Status messages ENG X CONTROL, ENG X EEC OVERHEAT, ENG X PSS OVERHEAT, ENG X FUEL FILTER, ENG X FUEL FILTER STRAINER, ENG X FUEL MAIN HX, ENG X OIL DEBRIS, ENG X BAI/SBV VALVE, ENG X TBV result in an automatic snap shot.

(8) Blank values on the EPCS display shows either the EEC finds the signal is out of range or the component does not supply input to the EEC. If the values are blank on EPCS display, do these steps:

(a) Do a check for existing out of range faults for the applicable component (TASK 73-00-00-700-803-G00).

(b) Examine the engine system configuration to find out if the component supplies input to the EEC (TASK 73-21-00-470-801-G00).

1) Engines with the single MTC system configuration show a blank value for EEC channel A MTC parameters on EPCS page 2.

2) Engines with the fan compartment temperature sensing system removed (LEAP-1B Service Bulletin 72-0178) show a blank value for parameters on EPCS page 2.

3) Engines with the EEC channel B accelerometer input disabled per Test No. 34 - Menu Mode Hardware Code Entry Special Functions Test, TASK 71-00-00-700-810-G00 show blank values for parameters dependent on the number one bearing (NOB) accelerometer signal on EPCS page 3.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(c) The N1 LPT VIBE and TCF N1 AMP signals are blanked when the engine is operating at low power (N1 less than 34% and N2 less than 85%) to prevent displaying erroneous signal noise. There is no issue with the associated LRUs when these signal displays are blanked at low power settings.

B. References

Reference	Title
31-65-00-970-801	System Maintenance Data Pages Function (P/B 201)
71-00-00-700-810-G00	Test No. 34 - Menu Mode Hardware Code Entry Special Functions Test (P/B 501)
73-00-00-700-803-G00	Maintenance Messages Check for EEC Faults (P/B 501)
73-21-00-470-801-G00	EEC System Configuration Data Functions Check (P/B 201)

C. Procedure

SUBTASK 71-00-00-860-641-G00

(1) Use the MDS to show the EPCS maintenance data pages on the left center display panel. This is the task:

System Maintenance Data Pages Function, TASK 31-65-00-970-801.

SUBTASK 71-00-00-970-017-G00

(2) To take a snapshot of the real time engine parameters on the EPCS pages 1, 2, 3, and 4, do these steps:

(a) Use the applicable selector rotary knob to move the cursor to highlight the manual event RECORD screen button on the bottom page menu.

NOTE: There are three (3) Selector Knobs, CAPT SELECTOR L/C knob or the F/O SELECTOR C/R knob on the Multi-Functional Display Panel (MFP), P9-82 or the MAINT SELECTOR knob on the Maintenance BITE panel, P61-4, which are used to make the necessary selections on the forward displays. The selector rotary knobs are also known as the Tabber.

NOTE: Each SELECTOR has a different shaped cursor shown on the maintenance pages. The cursor for the P61-4 MAINT SELECTOR is in the shape of crossed wrenches. The cursor for the P9-82 F/O SELECTOR is in the shape of a hollow plus sign (+). The cursor for the P9-82 CAPT SELECTOR is in the shape of an open sight cross hairs.

(b) Push the SEL button in the center of the applicable selector knob to select the RECORD screen button on the MDS.

SUBTASK 71-00-00-970-016-G00

(3) The AUTO EVENT MESSAGE at the bottom of each snapshot page indicates which EEC output triggered the snapshot.

SUBTASK 71-00-00-970-018-G00

(4) The EPCS maintenance pages show the engine parameters from the EEC channels A and B for each engine.

(a) The letter of the EEC channel in control has a frame around it.

(b) The standby EEC channel does not have a frame around the letter.

(c) The parameters can be different between the EEC channels A and B.

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SUBTASK 71-00-00-700-069-G00

(5) Blank values on the EPCS display shows either the EEC finds the signal is out of range or the component does not supply input to the EEC. If the values are blank on EPCS display, do these steps:

(a) Do a check for existing out of range faults for the applicable component (TASK 73-00-00-700-803-G00).

(b) Examine the engine system configuration to find out if the component supplies input to the EEC (TASK 73-21-00-470-801-G00).

1) Engines with the single MTC system configuration show a blank value for EEC channel A MTC parameters on EPCS page 2.

2) Engines with the EEC channel B accelerometer input disabled per Test No. 34 - Menu Mode Hardware Code Entry Special Functions Test, TASK 71-00-00-700-810-G00 show blank values for parameters dependent on the number one bearing (NOB) accelerometer signal on EPCS page 3.

(c) The N1 LPT VIBE and TCF N1 AMP signals are blanked when the engine is operating at low power (N1 less than 34% and N2 less than 85%) to prevent the display of erroneous signal noise. There is no issue with the associated LRUs when these signal displays are blanked at low power settings.

SUBTASK 71-00-00-910-019-G00

(6) The engine parameters and units shown on the EPCS maintenance pages 1, 2, and 3 are given in the Table 202.

NOTE: Units for Fuel Flow are displayed next to the FF parameter, and can be configured to either LBS/HR or KGS/HR.

Table 202/71-00-00-993-854-G00 Parameters Available on EPCS Pages

EPCS Page	EPCS Parameter	Description	Units
1	N1	Fan Speed	% rpm
1	N2	Core Speed	% rpm
1	TRA	Thrust Lever Resolver Angle	deg
1	T/R SLEEVE LEFT	Thrust Reverser Left Sleeve Position	%
1	T/R SLEEVE RIGHT	Thrust Reverser Right Sleeve Position	%
1	P0	Ambient Pressure	psia
1	PS3	Compress or Discharge Pressure	psia
1	P3B	Engine Bleed Port Pressure	psia
1	BLEED FLOW	Engine Bleed Flow	pps
1	T12	Inlet Total Temperature	deg C
1	T25	Compressor Inlet Temperature	deg C
1	T3	Compressor Discharge Temperature	deg C
1	VBV	Variable Bleed Valve Position	%
1	VBV CMD	Variable Bleed Valve Position Demand	%
1	N1K12	Corrected Fan Speed	%
1	VSV	Variable Stator Vane Position	%

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Table 202/71-00-00-993-854-G00 Parameters Available on EPCS Pages (Continued)

EPCS Page	EPCS Parameter	Description	Units
1	VSV CMD	Variable Stator Vane Position Demand	%
1	N2K25	Corrected Core Speed	% rpm
1	FUEL STR DP	Fuel Strainer Delta Pressure	psid
1	FCOC DP	Fuel-Cooled Oil Cooler Delta Pressure	psid
1	FUEL FLT DP	Fuel Filter Delta Pressure	psid
1	FMV	Fuel Metering Valve Position	%
1	FMV CMD	Fuel Metering Valve Position Demand	%
1	FF (units)	Fuel Mass Flow Rate	NOTE
1	PMV	Pilot Metering Valve Position	%
1	PMV CMD	Pilot Metering Valve Position Demand	%
1	PFMN	Fuel Manifold Pressure	psia
2	N1	Fan Speed	% rpm
2	N2	Core Speed	% rpm
2	TBV	Transient Bleed Valve Position	%
2	TBV CMD	Transient Bleed Valve Position Demand	%
2	HPTACC	High-Pressure Turbine Active Clearance Control Valve Position	%
2	HPTACC CMD	High-Pressure Turbine Active Clearance Control Valve Position Demand	%
2	LPTACC	Low-Pressure Turbine Active Clearance Control Valve Position	%
2	LPTACC CMD	Low-Pressure Turbine Active Clearance Control Valve Position Demand	%
2	MTC	Modulated Turbine Cooling Valve Position	%
2	MTC CMD	Modulated Turbine Cooling Valve Position Demand	%
2	BAI/SBV	Booster Anti-Ice / Start Bleed Valve Position	%
2	BAI/SBV CMD	Booster Anti-Ice / Start Bleed Valve Position Demand	%
2	SAV	Starter Air Valve Feedback Pressure	psid
2	SAV CMD	Starter Air Valve Solenoid Demand	m A
2	EEC INT TEMP	EEC Internal Temperature	deg C
2	OIL T	Oil Temperature	deg C
2	OIL P	Oil Pressure	psid
2	OIL FLT DP	Oil Filter Delta Pressure	psid
2	DMS	Oil Debris Monitoring System Chip Count	cnts
2	EGT (un)	Exhaust Gas Temperature (unshunted)	deg C
2	EGT 1	EGT Probe 1 (A), Probe 2 (B)	deg C

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Table 202/71-00-00-993-854-G00 Parameters Available on EPCS Pages (Continued)

EPCS Page	EPCS Parameter	Description	Units
2	EGT 2	EGT Probe 8 (A), Probe 3 (B)	deg C
2	EGT 3	EGT Probe 7 (A), Probe 4 (B)	deg C
2	EGT 4	EGT Probe 6 (A), Probe 5 (B)	deg C
2	REGULATOR	FMV Control Loop Regulator	None
2	IDLE IN CTL	Idle in Control Indicator	None
2	FAN COMP T1	Fan Compartment Temperature Sensor 1 (Upper) Temperature	deg C
2	FAN COMP T2	Fan Compartment Temperature Sensor 2 (Lower) Temperature	deg C
2	PSS T	Pressure Sub System (PSS) Internal Temperature	deg C
3	N1	Fan Speed	% rpm
3	N2	Core Speed	% rpm
3	N1 TACH	Fan Speed in RPM	Rpm
3	N2 TACH	Core Speed in RPM	Rpm
3	NOB N1 AMP	#1 Bearing N1 Amplitude	Mils p-p
3	NOB N2 AMP	#1 Bearing N2 Amplitude	IPS pk
3	NOB BB AMP	#1 Bearing BB Amplitude	IPS pk
3	TCF N1 AMP	Turbine Center Frame N1 Amplitude	Mils p-p
3	TCF N2 AMP	Turbine Center Frame N2 Amplitude	IPS pk
3	TCF BB AMP	Turbine Center Frame BB Amplitude	IPS pk
3	N1 FAN VIBE	Fan Vibration Amplitude	CU
3	N1 LPT VIBE	Low Pressure Turbine Vibration Amplitude	CU
3	N2 HPT VIBE	Core HP Turbine Vibration Amplitude	CU
3	N2 HPC VIBE	Core HP Compressor Vibration Amplitude	CU
3	FAN PH	Fan Vibration Phase Angle	Deg
3	LPT PH	Low Pressure Turbine Vibration Phase Angle	Deg

SUBTASK 71-00-00-970-020-G00

(7) The EPCS maintenance page 4 status words shows the parameters and conditions of the engine during an engine operation.

SUBTASK 71-00-00-970-019-G00

(8) The status discrete definitions shown on maintenance page 4 are given in these tables:

EPCS Page 4, Status 1 Discrete Map/Table 203,

EPCS Page 4, Status 2 Discrete Map/Table 204 and,

EPCS Page 4, Status 3 Discrete Map/Table 205.

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Table 203/71-00-00-993-855-G00

EPCS Bit	Output Parameter	ARINC Label	ARINC Bit
0	No-Dispatch	270	24
1	Short-Time Dispatch	270	25
2	Long-Time Dispatch	270	26
3	Economic Dispatch	270	27
4	EEC Channel-in-Control	270	13
5	Channel Fault	275	24
6	Cross-Channel Fault	275	25
7	Alternator Fault	275	26
8	Channel in Menu Mode (Active)	270	28
9	EEC Primary Air/Ground Indication (EECONGND)	270	15
10	Start Switch to GRD	272	11
11	Start Switch to CONT	272	12
12	Start Switch to FLT	272	13
13	Starter Air Valve Open	053	14
14	Engine Starter Cutout	270	22
15	Fuel Control Switch (analog discrete) to RUN	270	12
16	Fuel Control Switch RUN Selected	270	14
17	Left Ignition (#1) Commanded ON	272	16
18	Right Ignition (#2) Commanded ON	272	17
19	115 VAC Unavailable to Left Ignition (#1)	272	18
20	115 VAC Unavailable to Right Ignition (#2)	272	19
21	Continuous Ignition Active	272	15
22	No Light-Off Detected	272	26
23	Engine Running	270	18
24	Engine at or Above Idle	270	23
25	Generator Control Unit (GCU) Ready to Load	270	17
26	Bowed Rotor Speed Exceedance	050	27
27	Bowed Rotor Vibration Exceedance	050	28
28	Flameout Protection Active	272	27
29	Engine Operating at Min Allowable Power	274	27
30	PT Taxi Inhibit	277	28
31	TAT Inhibit Flag	277	29

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Table 204/71-00-00-993-856-G00

EPCS Bit	Output Parameter	ARINC Label	ARINC Bit
0	EEC Reverser/RTO Aircraft-on-Ground Selected (TRONGND)	051	15
1	Reverse Thrust Limited by Reverser Position	275	18
2	Forward Thrust Limited by Reverser Position	275	19
3	T/R ARM (HIV) Solenoid Energized	051	16
4	T/R Hydraulic Isolation Valve Open	051	22
5	T/R DCV (Stow) Solenoid Energized	051	17
6	Thrust Lever Interlock Solenoid Energized	275	14
7	Thrust Reverser In-Transit	275	16
8	Thrust Reverser Fully Deployed	275	15
9	Left Sleeve Unstowed	275	20
10	Left Sleeve Fully Deployed	275	21
11	Right Sleeve Unstowed	275	22
12	Right Sleeve Fully Deployed	275	23
13	Left Sleeve Center Actuator Locked	051	18
14	Left Sleeve Upper Actuator Locked	051	19
15	Right Sleeve Center Actuator Locked	051	20
16	Right Sleeve Upper Actuator Locked	051	21
17	T/R Left Sleeve Sync Lock = LOCKED	051	24
18	T/R Right Sleeve Sync Lock = LOCKED	051	25
19	RTO Mode Enabled	051	14
20	TCMA Event Detected	051	11
21	TCMA N1K Boundary Breached	051	12
22	Thrust Instability Event (TIE) Event Detected	274	14
23	[Spare]	275	11
24	[Spare]	275	12
25	Acceleration Limit Mode Selected	274	28
26	Deceleration Limit Mode Selected	274	29
27	[Spare]	274	23
28	EEC Temperature Over Limit	275	29
SIA 001-005 PRE SB 737-CFM-LEAP-1B-75-0010 AND PRE SB 737-CFM-LEAP-1B-75-0011; EEC HARDWARE BLOWER SYSTEM INSTALLED			
29	EEC Blowers Command	274	24
30	Blower 1 Running	274	25
31	Blower 2 Running	274	26

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SIA 001-005 PRE SB 737-CFM-LEAP-1B-75-0010 AND PRE SB 737-CFM-LEAP-1B-75-0011; EEC HARDWARE BLOWER SYSTEM INSTALLED (Continued)

Table 204/71-00-00-993-856-G00 (Continued)

EPCS Bit	Output Parameter	ARINC Label	ARINC Bit
SIA ALL			

Table 205/71-00-00-993-857-G00

EPCS Bit	Output Parameter	ARINC Label	ARINC Bit
0	Alternate Mode Switch (analog discrete) to ALTN	270	19
1	“Soft” Alternate Mode Selected	270	20
2	“Hard” Alternate Mode Selected	270	21
3	Left Wing Flaps Not Up	272	24
4	Right Wing Flaps Not Up	272	25
5	Approach Idle Selected	270	16
6	Icing Idle Selected	276	17
7	Ice Crystal Icing Detected and Accommodation Active	276	18
8	Ice Crystal Icing Detection/Accommodation Unavailable	276	19
9	ECS Configuration Code (BCD Bit 1)	276	11
10	ECS Configuration Code (BCD Bit 2)	276	12
11	WAI Configuration Code (BCD Bit 1)	276	13
12	WAI Configuration Code (BCD Bit 2)	276	14
13	EAI Configuration Code (BCD Bit 1)	276	15
14	EAI Configuration Code (BCD Bit 2)	276	16
15	Engine Configuration LSB (BCD Bit 1)	273	21
16	Engine Configuration (BCD Bit 2)	273	22
17	Engine Configuration LSB (BCD Bit 3)	273	23
18	Aircraft Type Code LSB (BCD Bit 1)	273	24
19	Aircraft Type Code (BCD Bit 2)	273	25
20	Aircraft Type Code MSB (BCD Bit 3)	273	26
21	[Spare]	272	14
22	[Spare]	272	20
23	[Spare]	272	22
24	[Spare]	274	12
25	[Spare]	274	13
26	[Spare]	275	13
27	[Spare]	275	17
28	[Spare]	276	20

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Table 205/71-00-00-993-857-G00 (Continued)

EPCS Bit	Output Parameter	ARINC Label	ARINC Bit
29	[Spare]	276	21
30	[Spare]	051	13
31	[Spare]	051	23

(a) Each status word shows EPCS bit numbers 0 to 31 for the left and right engines and channel A and channel B for each engine.

(b) The EPCS bit is set to either zero or one (0 or 1) and defines FALSE or TRUE (off or on, no or yes).

(c) The EEC ARINC label and bit that sets the EPCS bit is shown.

SUBTASK 71-00-00-970-021-G00

(9) The N1 ANALOG, N2 ANALOG, and OIL QTY parameters at the bottom of the EPCS Maintenance Page 4 are not from the EEC. These parameters are wired directly to the Display Processor Computer (DPC).

——— END OF TASK ———

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SYS MENU	STATUS	MAINT DATA PGS	MAINT CTRL PGS	DNBD MAINT

EPCS PG 1 OF 4

ENGINE 1 A	ENGINE 1 B		ENGINE 2 A	ENGINE 2 B
0.0	0.0	N1	0.0	0.0
0.0	0.0	N2	0.0	0.0
36.1	36.1	TRA	36.0	35.9
0.0	0.0	T/R SLEEVE L	0.0	0.1
0.0	0.0	T/R SLEEVE R	-0.1	0.0
14.7	14.7	P0	14.7	14.7
0.0	0.0	PS3	14.8	14.8
15.0	15.0	P3B	15.0	15.0
2.2	2.2	BLEED FLOW	0.0	0.0
+15.0	+15.0	T12	+15.4	+15.2
+14	+14	T25	+15	+15
+15	+15	T3	+15	+16
0.0	0.0	VBV	0.2	0.2
0.0	0.0	VBV CMD	0.0	0.0
0.0	0.0	N1K12	0.0	0.0
-3.3	-3.3	VSV	0.1	0.1
-3.3	-3.3	VSV CMD	0.0	0.0
0.0	0.0	N2K25	0.0	0.0
0.0	0.0	FUEL STR DP	0.0	0.0
0.0	0.0	FCOC DP	0.0	-0.1
4.8	4.8	FUEL FLT DP	0.0	0.0
0.0	0.0	FMV	-29.3	-29.2
-28.8	-28.8	FMV CMD	-42.4	-29.2
0	0	FF (LBS/HR)	2	2
0	0	PMV	0	0
0	0	PMV CMD	0	0
0	0	PFMN	0	0

DATE 21 JAN 16 UTC 20:37:00

PREV MENU	PRINT	SEND	RECORD	PREV PAGE	NEXT PAGE

2482057 S0000583411_V1

Engine Propulsion Control System Maintenance Data Pages
Figure 211/71-00-00-990-889-G00 (Sheet 1 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SYS MENU	STATUS	MAINT DATA PGS	MAINT CTRL PGS	DNBD MAINT

EPCS PG 2 OF 4

ENGINE 1			ENGINE 2	
A	B		A	B
0.0	0.0	N1	0.0	0.0
0.0	0.0	N2	0.0	0.0
0.0	0.0	TBV	91.6	91.6
100.0	100.0	TBV CMD	91.9	91.9
0.0	0.0	HPTACC	-2.9	-2.9
0.0	0.0	HPTACC CMD	0.0	0.0
0.0	0.0	LPTACC	-2.8	-2.8
0.0	0.0	LPTACC CMD	1.9	1.9
0.0	0.0	MTC	100.0	100.1
0.0	0.0	MTC CMD	100.0	100.0
100.0	100.0	BAI/SBV	25.1	25.1
100.0	100.0	BAI/SBV CMD	25.6	25.6
0.0	0.0	SAV DP	14.7	14.5
0.0	0.0	SAV CMD	0.0	0.0
0	0	EEC INT TEMP	+31	+30
0	0	OIL T	+10	+10
0.0	0.0	OIL P	0.0	0.0
7.4	7.4	OIL FLT DP	0.0	-0.2
0	0	DMS	0	0
15	15	EGT (un)	16	16
14	13	EGT 1	16	17
19	12	EGT 2	16	17
18	11	EGT 3	16	17
17	16	EGT 4	15	16
+27	+27	REGULATOR	+27	+27
0	0	IDLE IN CTRL	0	0
11.9	21.1	FAN COMP T1	11.9	21.1
11.6	11.1	FAN COMP T2	11.6	11.1
10	10	PSS T	10	10

DATE 21 JAN 16 UTC 20:37:09

PREV MENU	PRINT	SEND	RECORD	PREV PAGE	NEXT PAGE

2482280 S0000583412_V2

Engine Propulsion Control System Maintenance Data Pages
Figure 211/71-00-00-990-889-G00 (Sheet 2 of 4)

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SYS MENU	STATUS	MAINT DATA PGS	MAINT CTRL PGS	DNBD MAINT

EPCS PG 3 OF 4

ENGINE 1		ENGINE 2
0.0	N1	0.0
0.0	N2	0.0
0	N1 TACH	0
0	N2 TACH	0
0.0	NOB N1 AMP	0.0
0.00	NOB N2 AMP	0.00
0.04	NOB BB AMP	
0.0	TCF N1 AMP	0.0
0.00	TCF N2 AMP	0.00
0.00	TCF BB AMP	
0.0	N1 FAN VIBE	0.0
0.0	N1 LPT VIBE	0.0
0.0	N2 HPC VIBE	0.0
0.0	N2 HPT VIBE	0.0
0	FAN PH	
0	LPT PH	

GROUND RUN SPEED BIN STATUS

BIN	1	2	3	4	5	6	7	8	9	10
ENG 1 N1	38	45	50	54	59	63	76	87	90	94
ENG 2 N1	38	45	50	54	59	63	76	87	90	94

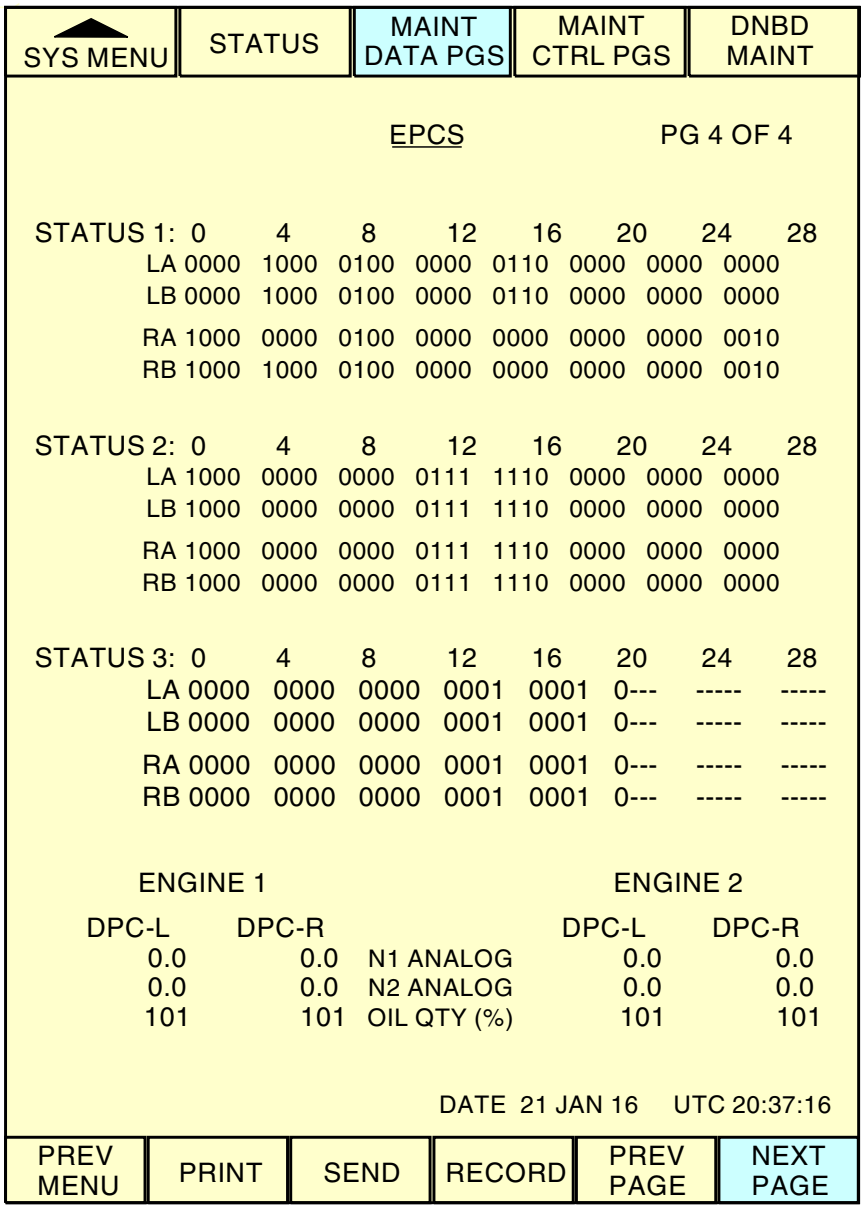
DATE 21 JAN 16 UTC 20:37:16

PREV MENU	PRINT	SEND	RECORD	PREV PAGE	NEXT PAGE

2482283 S0000583413_V1

Engine Propulsion Control System Maintenance Data Pages
Figure 211/71-00-00-990-889-G00 (Sheet 3 of 4)

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2482286 S0000583414_V1

Engine Propulsion Control System Maintenance Data Pages
Figure 211/71-00-00-990-889-G00 (Sheet 4 of 4)

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TASK 71-00-00-970-802-G00

5. Engine Performance Page

A. General

(1) This task gives the instructions to get the engine performance page that is displayed on the Max Display System.

(2) The engine performance page displays selected engine data to provide maintenance data to the mechanics and engineers during an engine operational test for troubleshooting on the aircraft.

(3) The engine performance page shows REAL TIME engine parameters. You should use the performance page manual snap shot to limit the engine run time during ground engine runs.

(4) Data displayed on the Performance page can be recorded by taking a manual snapshot, which captures the current display data. Snapshots can be triggered either manually or automatically.

(5) The Maintenance Page application will store up to 5 (the last 5) manual snapshots and up to 5 (the first 5) automatic snapshots for each aircraft system. Real time and snapshot data can be printed or transmitted by data link. The snapshots are recorded in the display processor computer (DPC) non-volitile memory (NVM) and until erased by the maintenance personnel.

(6) Automatic snapshots occur on events such as detected engine exceedances or Alert messages or System Status messages.

(a) Engine exceedances include these conditions:

- N1 red line
- N2 red line
- EGT normal amber limit
- EGT normal red line
- EGT start red line
- oil pressure amber limit
- oil pressure red line
- oil temperature amber limit
- oil temperature red line
- oil quantity low
- engine vibration limit
- engine hot start/stall detected

(b) An automatic snap shot is made for these Alert messages on the center display screen.

- ENG FAIL (EGT dial)
- OIL FILTER BYPASS (screen box)
- LOW OIL PRESS (screen box)
- THRUST (screen box)
- REVERSER LIMITED

(c) An automatic snap shot is made for these Status messages:

- ENG X CONTROL
- ENG X EEC OVERHEAT
- ENG X PSS OVERHEAT

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- ENG X FUEL FILTER
- ENG X FUEL FILTER STRAINER
- ENG X FUEL MAIN HX
- ENG X OIL DEBRIS
- ENG X BAI/SBV VALVE
- ENG X BAI/SBV VALVE
- ENG X TBV

B. References

Reference	Title
31-65-00-970-801	System Maintenance Data Pages Function (P/B 201)

C. Procedure

SUBTASK 71-00-00-860-647-G00

(1) Use the Max Display System (MDS) to show the Performance page on the left center display panel. This is the task:

System Maintenance Data Pages Function, TASK 31-65-00-970-801..

SUBTASK 71-00-00-970-022-G00

(2) To take a snapshot of the real time engine parameters on the Performance page, do these steps:

(a) Use the applicable selector rotary knob to move the cursor to highlight the manual event RECORD screen button on the bottom page menu.

NOTE: There are three (3) Selector Knobs, CAPT SELECTOR L/C knob or the F/O SELECTOR C/R knob on the Multi-Functional Display Panel (MFP), P9-82 or the MAINT SELECTOR knob on the Maintenance BITE panel, P61-4, which are used to make the necessary selections on the forward displays. The selector rotary knobs are also known as the Tabber.

NOTE: Each SELECTOR has a different shaped cursor shown on the maintenance pages. The cursor for the P61-4 MAINT SELECTOR is in the shape of crossed wrenches. The cursor for the P9-82 F/O SELECTOR is in the shape of a hollow plus sign (+). The cursor for the P9-82 CAPT SELECTOR is in the shape of an open sight cross hairs.

(b) Push the SEL button in the center of the applicable selector knob to select the RECORD screen button on the MDS.

SUBTASK 71-00-00-910-020-G00

(3) The engine parameters and units shown on the Performance page are given in the table

Table 206/71-00-00-993-858-G00

Parameters	Description	ARINC Label	Units
N1 MAX	Maximum Fan Speed	342	% rpm
N1 CMD IND	Commanded Fan Speed Indicated	341	% rpm
N1 CMD	Commanded Fan Speed (Unmodified)	360	% rpm
N1 SEL IND	Fan Speed Indicated	346	% rpm
N1 SEL	Fan Speed (Unmodified)	045	% rpm

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Table 206/71-00-00-993-858-G00 (Continued)

Parameters	Description	ARINC Label	Units
EGT IND	Exhaust Gas Temperature Indicated	345	deg C
EGT	Exhaust Gas Temperature	321	deg C
N2	Core Speed	344	% rpm
FF (Units)	Fuel Flow	244	*[1]
PS3	Compressor Discharge Pressure	264	psia
TRA	Thrust Lever Resolver Angle	133	deg
T/R SLEEVE L	Thrust Reverser Left Sleeve Position	201	%
T/R SLEEVE R	Thrust Reverser Right Sleeve Position	202	%
OIL PRESS IND	Oil Pressure Indicated	317	psid
OIL PRESS	Oil Pressure	325	psid
OIL TEMP IND	Oil Temperature Indicated	316	deg C
OIL TEMP	Oil Temperature	323	deg C
OIL QTY (Units)	Oil Quantity	*[2]	*[3]

*[1] Units for Fuel Flow are displayed next to the FF parameter, and can be configured to either LBS/HR or KGS/HR.

*[2] Oil Quantity is not processed by the EEC, but is rather wired directly to the DPC.

*[3] Units for Oil Quantity are displayed next to the OIL QTY parameter, and can be configured to either percent of full tank (%), quarts (QT), or liters (L). If the display is configured to units of quarts or liters, the display readout will be 2 digits. If the display is configured to units of percent of full tank, the readout can be up to 3 digits.

——— END OF TASK ———

TASK 71-00-00-910-801-G00

6. Prepare the Engine for Operation

(Figure 212)

A. General

(1) This task gives the instructions to prepare the engine for operation.

(2) For maintenance, engine operation at high power can be necessary.

(a) One engine can be operated at high power to a limited power setting, and the other engine can be operated at TAKEOFF power, or;

NOTE: If it is operator policy, you can operate the first and second engines at TAKEOFF power. This is not recommended for normal operation, however.

(b) One engine can be operated with the second engine stopped.

(3) With the parking brakes on and the wheel chocks installed at the nose and main landing gear wheels, engine operation at high thrust can move the airplane.

(a) The airplane could go over (jump) the wheel chocks.

(b) The airplane could move in a skid until the thrust is decreased.

NOTE: A skid is a sideways or a forward movement on the ground with the wheels locked. This movement can not be controlled.

(4) During cold weather, special procedures are necessary before you start the engine and after the engine is stopped.

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(5) It is very important that you remove all loose objects from the air inlet and the area around the air inlet before you start the engine.

B. References

Reference	Title
10-11-05-480-801	Chock Installation During Engine Operation (P/B 201)
12-11-00-650-803	Pressure Refuel Procedure (P/B 301)
12-13-11-600-801	Engine Servicing (Oil Replenishing) (P/B 301)
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)
36-00-00-860-801	Supply Pressure to the Pneumatic System (Selection) (P/B 201)

C. Tools/Equipment

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

Reference	Description
COM-1505	Chocks - Wheel Part #: 19CAL455 - Type 1 Supplier: $1329 Part #: 99-9028-6000 Supplier: 59603 Part #: AC6820-LR Supplier: 032T9 Part #: ALPHACHOCKS MID Supplier: 6X2T Part #: W86 Supplier: 3XZM7 Part #: W88 Supplier: 3XZM7 Opt Part #: W92 Supplier: 9L752
SPL-1499	Pin - Lock, NLG Towing Lever Part #: A09003-2 Supplier: 81205 Opt Part #: A09003-1 Supplier: 81205
STD-1122	Thermometer - Alcohol/Mercury (or equivalent meter meets task requirements)

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Prepare for the Engine Operation

SUBTASK 71-00-00-860-001-G00

(1) Find the airplane gross weight for the operation of an engine at high power as follows:

NOTE: The airplane gross weight is the sum of the total empty weight of the airplane with the fuel load necessary to do the engine run, the weight of the crew, and if more weight is necessary, a load in the cargo compartment.

(a) The fuel burnoff during the test must be subtracted from the airplane fuel load and credited as ballast.

(b) You must subtract the weight of all equipment that is removed from the airplane (seats, interior panels, galleys, etc).

(c) The airplane must have a minimum fuel load and all other loads must be in the usual Center of Gravity (CG) range of the airplane.

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(d) It is not always possible to use the fuel load to increase the gross weight because of operational considerations.

(e) Record the airplane gross weight.

SUBTASK 71-00-00-860-002-G00

(2) If the first engine is to be set at or near Takeoff (T/O) power, do these steps (Table 207):

(a) Get the CG location of the airplane.

NOTE: The calculations of the Center of Gravity (CG) location depends on the location of the loads on the airplane. To get the CG, you must start with the empty weight and CG of the airplane, add the weight and CG of each load, and change the total weights and CG's into %MAC.

1) The method for the calculation of the CG location in %MAC is given in the Weight and Balance Manual.

2) Your airline weights engineer has the Weight and Balance Manual.

(b) Use the applicable airplane model and engine thrust to find the minimum gross weight, the opposite engine thrust limit, and the CG limit.

1) If there is no CG limit, the data applies to CG's in the usual operating range of the airplane.

2) Record the minimum gross weight, N1 limit for the opposite engine (if used) and CG limit (if given).

a) The opposite engine can be operated at idle power for the 0% N1 values.

3) Make sure that the airplane gross weight is more than the minimum gross weight.

4) Make sure that the CG of the airplane is in the CG limits.

(c) The data assumes friction coefficient for a damp ramp surface.

NOTE: A damp ramp surface is permitted. Water (standing), frost, ice, oil, grease, sand, or other contaminants are not permitted.

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Table 207/71-00-00-993-837-G00

Minimum Gross Weight For Engine Operation (High Power)				
Airplane Model	Thrust		Minimum Gross Weight	CG (%MAC)
	Test Engine Takeoff Power	Opposite Engine Percent N1		
737-8 737-8200	LEAP-1B25	0	109,000 lb (49,442 kg)	<10
		0	124,000 lb (56,245 kg)	<15
		0	143,000 lb (64,864 kg)	<20
		50 %N1	111,000 lb (50,349 kg)	<25
		50 %N1	140,000 lb (63,503 kg)	<31
		60 %N1	119,000 lb (53,977 kg)	<34
		70 %N1	130,000 lb (58,967 kg)	-
		Takeoff Power	139,000 lb (63,049 kg)	-
	LEAP-1B27	0	116,000 lb (52,617 kg)	<10
		0	132,000 lb (59,874 kg)	<15
		0	152,000 lb (68,946 kg)	<20
		50 %N1	115,000 lb (52,163 kg)	<23
		50 %N1	140,000 lb (63,503 kg)	<28
		60 %N1	124,000 lb (56,245 kg)	<32
		70 %N1	136,000 lb (61,689 kg)	-
		Takeoff Power	148,000 lb (67,132 kg)	-
	LEAP-1B28 LEAP-1B28B1 LEAP-1B28B2	0	119,000 lb (53,977 kg)	<10
		0	136,000 lb (61,689 kg)	<15
		0	157,000 lb (71,214 kg)	<20
		50 %N1	118,000 lb (53,524 kg)	<22
		50 %N1	141,000 lb (63,957 kg)	<27
		60 %N1	127,000 lb (57,606 kg)	<31
		70 %N1	139,000 lb (63,049 kg)	-
		Takeoff Power	152,000 lb (68,946 kg)	-

(d) If the engine(s) are to be operated at part power (not more than 75% N1), then use the Minimum Gross Weight (MGW) and CG data in Table 208.

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Table 208/71-00-00-993-838-G00

Minimum Gross Weight For Engine Operation (Part Power) One Or Two Engines Set To Not More Than 75% N1				
Airplane Model	**Thrust (%N1) #1 Engine**	**Thrust (%N1) #2 Engine**	**Minimum Gross Weight**	**CG (%MAC)**
737-8 737-8200 737-8BBJ	75%	75%	138,000 lb (62,596 kg)	<20
	70%	70%	116,000 lb (52,617 kg)	<20
	60%	60%	94,000 lb (42,638 kg)	<25

SUBTASK 71-00-00-860-003-G00

WARNING

ALL PERSONNEL MUST AVOID DANGER AREAS IN FRONT AND REAR OF POWER PLANT DURING GROUND RUNNING OPERATIONS. THE ENGINE IS CAPABLE OF DEVELOPING ENOUGH SUCTION AT THE INLET DUCT TO PULL PERSONNEL UP TO OR PARTIALLY INTO THE DUCT WITH POSSIBLE FATAL RESULTS. THEREFORE, WHEN APPROACHING ANY TYPE OF JET ENGINE, PRECAUTIONS MUST BE TAKEN TO KEEP CLEAR OF THE INTAKE AIR STREAM. THE SUCTION NEAR THE INTAKE CAN ALSO PULL IN HATS, GLASSES, LOOSE CLOTHING AND WIPE-RAGS FROM POCKETS. ANY LOOSE ARTICLES MUST BE MADE SECURE OR REMOVED BEFORE WORKING AROUND THE ENGINE.

WARNING

KEEP ALL AREAS WHERE AIRPLANE ENGINES WILL OPERATE AS CLEAN AS POSSIBLE. KEEP ALL RAMPS, TAXIWAYS, AND RUNWAYS VERY CLEAN TO PREVENT DAMAGE TO THE ENGINE, AIRPLANE, AND INJURIES TO PERSONNEL.

(3) Make sure that the airplane is parked in a clean area with the wheels on areas that do not have oil, grease, or other materials.

SUBTASK 71-00-00-860-004-G00

(4) Remove the air inlet and exhaust covers, if they are installed.

SUBTASK 71-00-00-860-005-G00

CAUTION

DO NOT OPERATE THE HYDRAULIC SYSTEMS UNLESS THE FUEL LEVEL IS HIGHER THAN THE HEAT EXCHANGERS. WITHOUT SUFFICIENT FUEL, THE HEAT EXCHANGER WILL BECOME TOO HOT. DAMAGE TO THE HYDRAULIC SYSTEM WILL OCCUR.

(5) Make sure that there is sufficient fuel in the Main Tank 1 and the Main Tank 2 to cover the heat exchangers for the hydraulic system as follows:

(a) A minimum of 1675 lb (760 kg) in each of the Main Tank 1 and Main Tank 2 is necessary to cool the hydraulic system heat exchangers.

(b) Supply additional fuel above these limits in the applicable fuel tanks to operate the engine (TASK 12-11-00-650-803).

SUBTASK 71-00-00-860-007-G00

(6) Put the airplane in a position to limit the amount of crosswind into the engine inlet.

NOTE: The preferred relative wind direction and wind velocity limits during low power engine runs are shown in this task Engine Ground Safety Precautions, TASK 71-00-00-800-801-G00.

(a) Wind Limitations During Static Engine Ground Operations:

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1) Limit fan speed to no more than 85 percent N1 for either of these conditions:
   a) Crosswinds are between 25 and 35 knots
   b) Tailwinds are between 5 and 15 knots.
2) Limit fan speed to no more than taxi or idle power for either of these conditions:
   a) Crosswinds are more than 35 knots
   b) Tailwinds are more than 15 knots.

SUBTASK 71-00-00-860-008-G00

(7) Make sure that the nose landing gear is in the forward direction.

SUBTASK 71-00-00-860-009-G00

(8) Install the lock pins in the landing gear (TASK 32-00-01-480-801).

SUBTASK 71-00-00-410-024-G00

WARNING

USE THE CORRECT PIN FOR THE AIRPLANE MODEL. IF YOU USE AN INCORRECT PIN, THE HYDRAULIC STEERING CAN OPERATE. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(9) Make sure that the NLG towing lever pin, SPL-1499, is installed.

SUBTASK 71-00-00-860-010-G00

WARNING

MAKE SURE THAT THE PARKING BRAKE IS ENGAGED, AND THE WHEEL CHOCKS ARE INSTALLED. ENGINE EXHAUST (JET BLAST) CAN MOVE THE AIRPLANE AND CAUSE INJURIES TO PERSONNEL.

(10) Install the wheel chocks, COM-1505 in front and to the rear of the nose gear and all the main gear tires (TASK 10-11-05-480-801).

SUBTASK 71-00-00-010-016-G00

(11) Remove the NLG towing lever pin, SPL-1499, after you install the chocks.

SUBTASK 71-00-00-860-011-G00

(12) Make sure that there are no covers on the pitot probe, Angle of Attack (AOA) sensor and Total Air Temperature (TAT) probe.

NOTE: Probe heat is automatically on during the engine start for probe heat switches with the AUTO position.

NOTE: TAT, ALPHA VANE, AND CAPT, FO, and AUX will operate automatically when either or both engines are operated.

SUBTASK 71-00-00-800-024-G00

(13) Make sure that all loose objects are removed from the air inlet and from the ground area around the air inlet.

(a) Examples of loose objects are:
   1) Parts, lockwire and safety cable
   2) Tools and equipment
   3) Rags
   4) Interphone equipment and cables.

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SUBTASK 71-00-00-860-012-G00

(14) Do a visual check for damage or ice on the inlet cowl, the fan blades, the fan spinner, the T12 sensor, and the external cowl surfaces.

(a) Make sure that the thrust reverser is stowed.

(b) Make sure that the latch engagement for the fan cowl and thrust reverser latches is correct.

NOTE: The fan cowl panels can be open for engine operation with given conditions (TASK 71-00-00-800-802-G00).

(c) If you find ice on these parts, you must remove the ice from the engine with hot air.

1) Do the steps to prepare the engine before a start in cold weather (TASK 71-00-00-910-815-G00).

SUBTASK 71-00-00-800-025-G00

(15) Do a visual check of the core exhaust (LPT), the exhaust plug, and the primary nozzle for damage and unwanted material.

SUBTASK 71-00-00-860-013-G00

(16) Examine the engine oil level indication in the flight compartment.

NOTE: The minimum indicated oil level necessary for airplane dispatch must be adequate considering oil level and expected oil consumption.

(a) If the oil level is low, do this task: Engine Servicing (Oil Replenishing), TASK 12-13-11-600-801.

SUBTASK 71-00-00-860-015-G00

(17) Make sure that the thrust levers are in the correct position (Figure 212).

(a) Make sure that the forward thrust levers are in the idle thrust position.

(b) Make sure that the reverse thrust levers are in the stow position.

(c) Make sure that the start levers are in the CUTOFF position.

(d) On the overhead panel, P5, make sure that the engine start switches are in the AUTO position.

SUBTASK 71-00-00-860-016-G00

(18) If you do not want the flight recorder to record the data for this engine operation, open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
C	9	C00109	FLIGHT RECORDER AC
C	10	C00468	FLIGHT RECORDER DC

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SUBTASK 71-00-00-860-017-G00

WARNING

MAKE SURE THAT YOU OPEN THE CIRCUIT BREAKERS FOR THE WEATHER RADAR SYSTEM. THE FORWARD MOVEMENT OF A THRUST LEVER CAN CAUSE THE AUTOMATIC OPERATION OF THE SYSTEM. THE OPERATION OF THIS SYSTEM CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

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

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
C	7	C01678	WEATHER RADAR RT RIGHT

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	13	C00120	WEATHER RADAR RT

SUBTASK 71-00-00-860-018-G00

(20) Make sure that all circuit breakers on these panels are closed:

NOTE: Do not close the circuit breakers which have a DO-NOT-CLOSE tag or a INOP collar.

(a) Circuit Breaker Panel, P6

(b) Circuit Breaker Panel, P18.

SUBTASK 71-00-00-800-026-G00

(21) Make sure that the applicable engine fire switch handle (DISCH 1 or DISCH 2) is in its usual (pushed in and locked) position.

NOTE: The engine fire switch handle (DISCH 1 or DISCH 2) is on the P8 panel of the control stand.

SUBTASK 71-00-00-860-019-G00

(22) Make sure that the parking brake lever on the control stand is pulled up in the ON position.

(a) Make sure that the red light for the parking brake light is ON.

SUBTASK 71-00-00-860-020-G00

WARNING

WARNING: MAKE SURE THAT ALL PERSONNEL AND EQUIPMENT ARE CLEAR OF THE ENGINE WHILE IT OPERATES. IF YOU DO NOT OBEY THESE INSTRUCTIONS INJURY TO PERSONS AND DAMAGE TO THE AIRPLANE CAN OCCUR.

(23) Make sure that the airplane is clear and that there all persons are clear of the dangerous areas.

SUBTASK 71-00-00-800-027-G00

(24) Do this check of the Outside Air Temperature (OAT) in the Flight Management Computer System (FMCS).

(a) If you operate the engine at high power and the OAT is not set in the FMCS, you can get maintenance messages in the Engine Electronic Controller (EEC) BITE.

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CAUTION

KEEP MERCURY THERMOMETERS AWAY FROM THE AIRPLANE. IF THE THERMOMETER BREAKS, MERCURY CAN CAUSE DAMAGE TO THE AIRPLANE COMPONENTS.

(b) Use a thermometer, STD-1122 to get the ambient air temperature in the shade of the nose wheel well.

NOTE: Do not use the TAT indication from the airplane for the ambient air temperature. The TAT from the airplane can be different from the OAT and can cause an incorrect N1 target selection.

(c) Do these steps to get access to the TAKEOFF REF page to show the OAT in the FMCS Control Display Unit (CDU).

1) Push the INIT/REF key on the CDU.

2) Push these Line Select Keys (LSK) on the CDU:

a) INDEX

b) TAKEOFF REF

c) If the OAT is not correct, push the applicable LSK and adjust the OAT.

d) Push the INDEX LSK to exit the TAKEOFF REF page.

SUBTASK 71-00-00-860-021-G00

WARNING

KEEP PERSONNEL, AND EQUIPMENT AWAY FROM THE PITOT PROBES, TOTAL AIR TEMPERATURE PROBE, AND ANGLE-OF-ATTACK VANE. THESE COMPONENTS WILL BECOME VERY HOT. THEY CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(25) If you will operate the engine at high power, make sure that you put the probe heat switches A and B to the ON position.

NOTE: For engine operation at high power, the EEC can go into Alternate Mode operation if either pitot probe is not heated.

SUBTASK 71-00-00-860-022-G00

WARNING

BEFORE THE FLAPS ARE MOVED, MAKE SURE THE AREA AROUND THE FLAPS IS CLEAR OF EQUIPMENT AND PERSONS. THIS WILL PREVENT INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

CAUTION

IF THE FLAPS ARE EXTENDED FOR A LONG PERIOD OF TIME DURING HIGH POWERED OPERATION, THE ENGINE AIR FLOW CAN CAUSE DAMAGE TO THE FLAPS.

CAUTION

BEFORE YOU RETRACT THE FLAPS, MAKE SURE THE SPOILER ACTUATOR SAFETY LOCKS ARE NOT INSTALLED. IF THE SPOILER ACTUATOR SAFETY LOCKS ARE INSTALLED, DAMAGE TO THE FLAP FIXED VANE WILL OCCUR.

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(CAUTION PRECEDES)

CAUTION

DO NOT ELECTRICALLY EXTEND OR RETRACT THE FLAPS MORE THAN ONE TIME IN 5 MINUTES. DAMAGE TO THE MOTOR CAN OCCUR IF THE MOTOR BECOMES TOO HOT.

(26) If you operate the engine at high power, do these steps:

(a) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

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

SUBTASK 71-00-00-860-023-G00

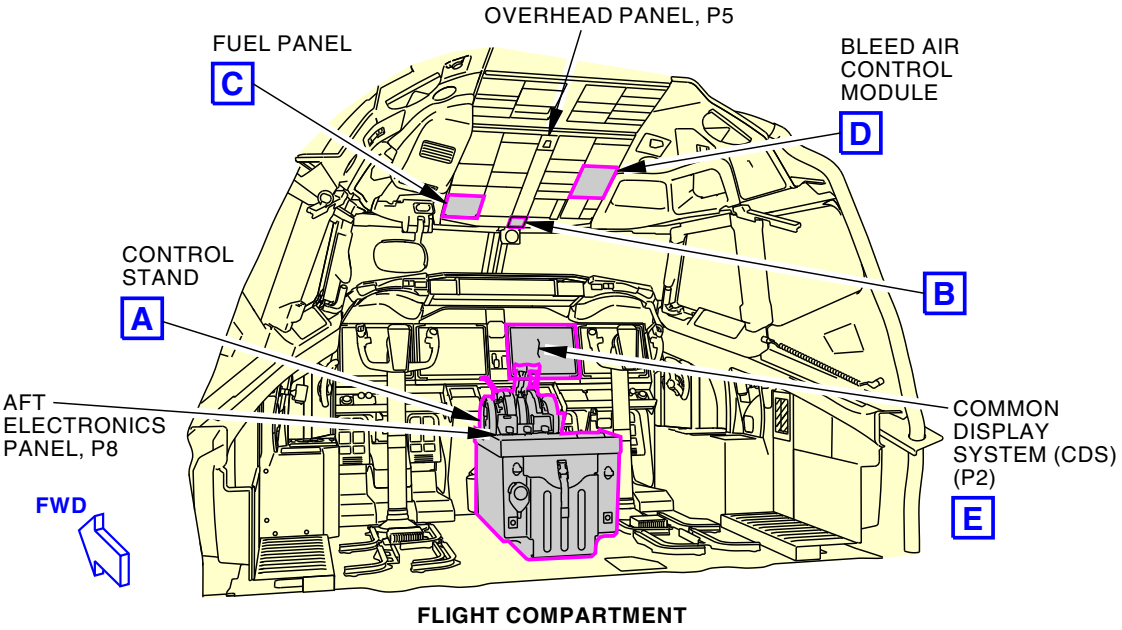
CAUTION

MAKE SURE THE ELECTRICAL POWER IS ON BEFORE YOU SUPPLY THE PNEUMATIC POWER AND REMOVE THE PNEUMATIC POWER BEFORE YOU REMOVE THE ELECTRICAL POWER. DAMAGE TO THE AIR CONDITIONING SYSTEM COULD OCCUR.

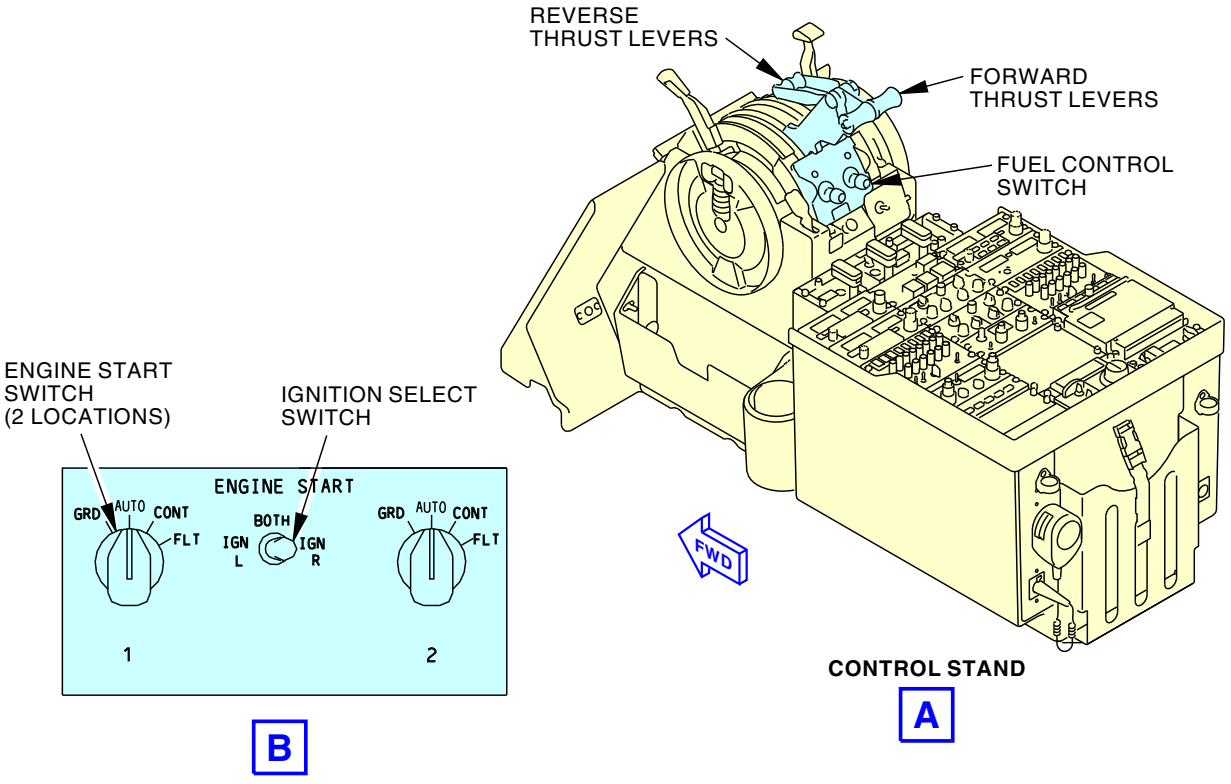
(27) Do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.

——— END OF TASK ———

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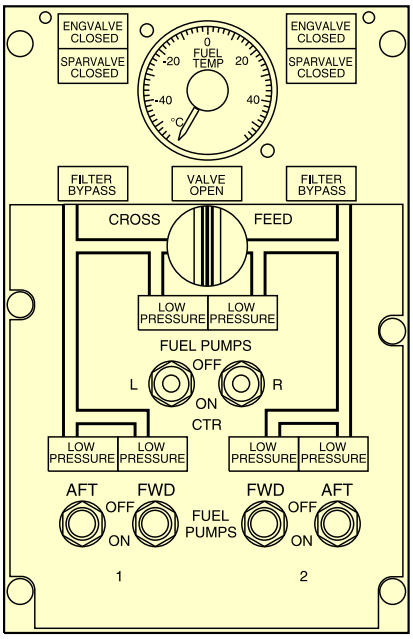
FLIGHT COMPARTMENT



2558752 S0000610475_V1

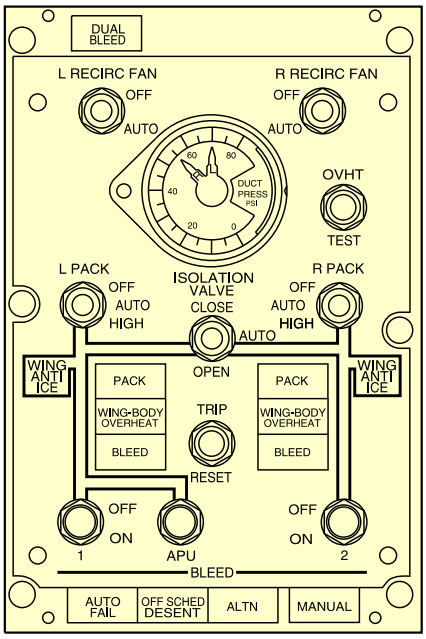
Engine Start Controls/Displays in the Flight Compartment
Figure 212/71-00-00-990-875-G00 (Sheet 1 of 2)

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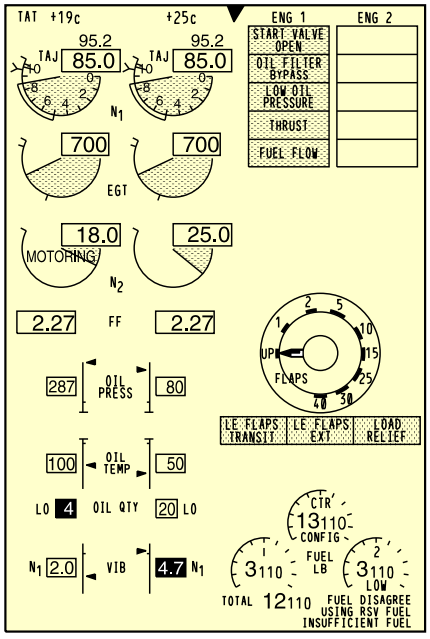
FUEL PANEL (P5-2)

C



BLEED AIR CONTROL MODULE (P5-10) (TYPICAL)

D



CDS - ENGINE DISPLAYS (TYPICAL)

E

2409858 S0000555934_V2

Engine Start Controls/Displays in the Flight Compartment
Figure 212/71-00-00-990-875-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-00-00-910-815-G00

7. Prepare the Engine Before a Start in Cold Weather

(Figure 212)

A. General

(1) This task gives the instructions to prepare for engine start in cold weather.

(2) During cold weather, special procedures are necessary before you start the engine and after the engine is stopped.

B. References

Reference	Title
71-00-00-800-804-G00	Power Plant Test Reference Table (P/B 501)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)
IFIM and do the applicable procedure(s)	Interactive Fault Isolation Manual

C. Tools/Equipment

Reference	Description
STD-12345	Heater - Portable; maximum 400,000 BTU/hr output, output temperature range of 150 - 280 deg. F (66 - 138 deg. C)

D. Consumable Materials

Reference	Description	Specification
G50169 [CP2499]	Fluid - Deicer - KilFrost ABC3	
G51462 [CP2930]	Fluid - Deicer - PolarGuard II	

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. Access Panels

Number	Name/Location
414AR	Oil Tank Access / Pressure Relief Door, Engine 1
424AR	Oil Tank Access / Pressure Relief Door, Engine 2

G. Prepare the Engine Before a Start in Cold Weather

SUBTASK 71-00-00-860-765-G00

(1) Make sure that the oil temperature for the engine and the starter are at minimum limits as follows:

(a) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the TEST position (TASK 73-21-00-800-801-G00).

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER switch to the TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

(b) Make sure that the oil temperature is at or above the minimum limit (TASK 71-00-00-800-802-G00).

(c) If the oil temperature is below the minimum limit, do the steps to preheat a cold-soaked engine.

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SUBTASK 71-00-00-210-075-G00

(2) Do the steps for preheating a cold-soaked engine if there is ice or snow in these areas:

(a) Acoustic liners of the inlet cowl

(b) Booster inlet including the splitter and IGV

(c) Fan outlet guide vanes

(d) Primary nozzle.

SUBTASK 71-00-00-800-033-G00

(3) If the airplane has cold-soaked at -40°F (-40°C) or less for more than one hour, preheat the engine(s) as follows:

NOTE: It is necessary to preheat the engine to increase the oil temperature to 70°F (21°C). This will also improve fluorocarbon seal capability and reduce potential for fuel leak during engine start before the engine fuel system reaches operating temperature. Do these steps also if there is ice or snow in the areas identified.

(a) Open these access panels:

Number	Name/Location
414AR	Oil Tank Access / Pressure Relief Door, Engine 1
424AR	Oil Tank Access / Pressure Relief Door, Engine 2

(b) Use a portable heater, STD-12345 or equivalent system to heat the engine.

NOTE: All commercially available heater that have equivalent output is permitted.

(c) If it is necessary, preheat the heater per the manufacturer's operation manual.

(d) Insert and secure the heater flexible duct into the oil tank access opening.



CAUTION

DO NOT APPLY HEATER OUTLET AIR THAT IS MORE THAN 175°F (79°C) TO THE ENGINE. IF YOU APPLY MORE THAN THIS TEMPERATURE, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(e) Adjust the temperature setting of the heater outlet air to not more than 175°F (79°C).

NOTE: Make sure that you follow the instructions in the manufacturer's operation manual.

(f) Monitor the oil temperature on the engine indication display in the flight compartment.

(g) When the oil temperature is 70°F (21°C) or more, stop and remove the heater.

NOTE: This should take approximately 5 to 10 minutes depending on outside temperature.

(h) Remove the flexible duct from the oil tank access / pressure relief door opening.

(i) Do the heating procedure again for the other engine.

NOTE: Start the engines as soon as possible after heating to make sure that the engine temperature does not go below -40°F (-40°C).

(j) After engine start, let it run at or near idle speed until the oil temperature is at or above 88°F (31°C) before you increase the engine thrust.

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SIA ALL; AIRPLANES WITH POST CFM SB 73-0025

NOTE: The oil temperature low amber exceedance is displayed on the forward flight display until the oil temperature is at or above 88°F (31°C). Let the engine run at or near idle speed until the oil temperature low amber exceedance is no longer shown.

SIA ALL

NOTE: The table below gives the approximate time needed for a cold-soaked engine to reach an oil temperature of 88°F (31°C) with the engine operating at idle thrust:

Ambient Temperature	Approx. Idle Time
32°F (0°C)	3 minutes
19°F (-7°C)	4 minutes
0°F (-18°C)	6 minutes
-26°F (-32°C)	8 minutes
-40°F (-40°C)	9 minutes
-65°F (-54°C)	10 minutes

(k) Close these access panels:

Number	Name/Location
414AR	Oil Tank Access / Pressure Relief Door, Engine 1
424AR	Oil Tank Access / Pressure Relief Door, Engine 2

(l) Make sure that the latches are fully closed as follows:

1) Press the aft “PUSH CLOSE” button to fully close the latch.

NOTE: The latch may not close if the aft “PUSH CLOSE” button is released before the latch is fully closed.

2) If the latch jams in the fully opened position or does not close, do these steps:

NOTE: Do not use a prying tool to force the latch closed.

a) Press the forward “PUSH OPEN” button to reset the latch

b) Press the aft “PUSH CLOSE” button again to fully close the latch.

SUBTASK 71-00-00-860-766-G00

(4) If snow or ice holds the fan cowl panels or the thrust reverser closed, do these steps:

(a) Remove all snow and ice before you open the fan cowl panels or the thrust reversers.

NOTE: If it is necessary, apply heat to remove the snow and ice.

SUBTASK 71-00-00-860-767-G00

(5) Remove all covers from the engine.

SUBTASK 71-00-00-860-768-G00

(6) Before you start the engine, do these steps:

(a) Make sure that the N1 rotor turns freely.

(b) Make sure that there is no ice on the fan blades.

(c) Make sure that there is no ice or snow on the booster inlet, splitter or inlet guide vanes (IGV).

SUBTASK 71-00-00-860-769-G00

(7) If the N1 rotor will not turn freely, do these steps:

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(a) Install a cover on the engine primary nozzle.

(b) Attach an applicable hot air duct from a heater to the engine.

CAUTION DO NOT APPLY HEATER OUTLET AIR THAT IS MORE THAN 175°F (79°C) TO THE ENGINE. IF YOU APPLY MORE THAN THIS TEMPERATURE, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(c) Apply heat to the engine gas path until the N1 rotor turns freely.

(d) Apply heat to the fan blades to remove the ice.

SUBTASK 71-00-00-860-770-G00

(8) If it is necessary, deice or anti-ice the fan blades and fan blade platforms with KilFrost ABC3 fluid, G50169 [CP2499] or PolarGuard II fluid, G51462 [CP2930].

WARNING DO NOT GET DEICING/ANTI-ICING FLUID IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. PUT ON GOGGLES, GLOVES, AND CLOTHING FOR PROTECTION WHEN YOU USE DEICING/ANTI-ICING FLUID. DEICING/ANTI-ICING FLUID IS POISONOUS. IT CAN CAUSE INJURIES TO PERSONNEL.

CAUTION USE ONLY GLYCOL ALCOHOL AS A DEICING/ANTI-ICING MIXTURE. METHANOL CAN CAUSE CORROSION TO ENGINE PARTS MADE OF TITANIUM.

(a) Prepare the KilFrost ABC3 fluid, G50169 [CP2499] or PolarGuard II fluid, G51462 [CP2930], and water (Table 209):

NOTE: Hot water above 140°F (60°C) is more efficient. The temperature must not be more than 194°F (90°C).

(b) Apply the deicing/anti-icing mixture using a soaked clean cloth on the frozen fan blades.

Table 209/71-00-00-993-859-G00

CONCENTRATION OF HEATED WATER/DEICER FLUID (VOL %)		
OAT	**DEICING**	**ANTI-ICING**
27°F (-3°C) and above	WATER HEATED TO 140°F (60°C) MINIMUM (194°F (90°C) MAXIMUM) OR HEATED MIX OF DEICER WITH WATER	50/50 WATER/DEICER
25°F (-4°C) to 19°F (-7°C)	50/50 HEATED WATER/DEICER	50/50 WATER/DEICER
18°F (-8°C) to 7°F (-14°C)	50/50 HEATED WATER/DEICER	25/75 WATER/DEICER
-5°F (-15°C) to 1°F (-17°C)	50/50 HEATED WATER/DEICER	100% DEICER
0°F (-18°C) to -13°F (-25°C)	25/75 HEATED WATER/DEICER	100% DEICER

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Table 209/71-00-00-993-859-G00 (Continued)

CONCENTRATION OF HEATED WATER/DEICER FLUID (VOL %)		
OAT	**DEICING**	**ANTI-ICING**
-15°F (-26°C) and below	SAE TYPE II FLUIDS can be used as de-icing/anti- icing agents, provided a 7 degrees Centigrade or 13 degrees Fahrenheit buffer is maintained between the freezing point of the concentrated fluid and OAT. In no case shall this temperature be lower than the lowest operational use temperature as defined by the aerodynamic acceptance test of the manufacturer.	

SUBTASK 71-00-00-860-771-G00

(9) If the N2 rotor does not turn freely or the START VALVE OPEN message does not come on after the start switch is put to the GRD position, do this step:

(a) Apply external heat to the start valve or the engine to remove all snow and ice.

SUBTASK 71-00-00-860-772-G00

(10) Let the engines run at or near idle speed for a minimum of 3 minutes and until the oil temperature is at or above 88°F (31°C) before you increase the engine thrust.

SUBTASK 71-00-00-860-773-G00

(11) If the oil pressure indication is slow to decrease, or the OIL FILTER BYPASS light does not go off, do these steps:

(a) Continue to operate the engine at the idle speed position until the oil pressure becomes normal and the OIL FILTER BYPASS light goes off.

NOTE: It can take some minutes for the oil pressure to become normal.

(b) If the oil pressure remains above the normal range after the oil temperature has stabilized within limits, shut down the engine.

1) Go to IFIM and do the applicable procedure(s).

(c) Let more warm-up time for the display units and the engine indications to correctly show new values.

NOTE: The display units can show less bright than normal.

SUBTASK 71-00-00-860-774-G00

(12) If icing conditions occur or are about to occur, do these steps:

NOTE: Icing conditions occur when the Outside Air Temperature (OAT) is 37°F (2.78°C) or less and there is visible moisture.

(a) Put the applicable ENG 1 ANTI-ICE or ENG 2 ANTI-ICE switch to the ON position after the engine starts.

NOTE: Some of the test in the power plant test reference table (TASK 71-00-00-800-804-G00) have steps to turn off the engine anti-ice during the test. Monitor the engine for ice buildup during the test.

(b) If the engine is to be run in icing conditions or if increased fan vibration due to fan ice accumulation is present, do these steps:

1) Increase the thrust to a minimum of 50 percent N1 and decrease to idle at intervals no greater than 60 minutes.

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2) Decrease thrust to idle and repeat as necessary or at intervals no greater than 60 minutes.

NOTE: This will limit the size of ice accumulations by shedding ice that has accumulated.

NOTE: Engine vibration can indicate above the normal operating range up to the maximum display value prior to shedding ice, however, this will have no adverse effect on the engine.

(c) If the engine is to be operated at high power, do these steps 5 minutes before or when you apply takeoff power:

1) Increase thrust to a minimum of 50% N1.

2) Confirm stable engine operation prior to the final advance to takeoff thrust.

NOTE: Engine vibration may indicate above the normal operating range up to the maximum display value during ice shedding. This will have no adverse effect on the engine.

——— END OF TASK ———

TASK 71-00-00-910-802-G00

8. Start the Engine (Selection)

A. General

(1) The purpose of this task is to permit mechanics to select the applicable method to start the engine.

(2) There are four options for starting the engine:

(a) Normal Start (Enhanced Manual Start) - Typical start where the starting air pressure is supplied by the APU and Starter Air Valve (SAV) position is controlled by the Start Switch.

(b) Manual Override of Starter Air Valve - This start requires maintenance access under the engine cowl to manually override the SAV position. This start method can be used to start the engine in the case of a SAV unresponsive to Start Switch command.

(c) Engine Cross Bleed Start - This start method uses starting air pressure supplied by bleed air pressure from the cross engine, which was started previously.

(d) Ground Start Cart - This start method uses starting air pressure supplied by the ground start cart and Starter Air Valve (SAV) position is controlled by the Start Switch.

B. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

C. Start the Engine (Selection)

SUBTASK 71-00-00-860-035-G00

(1) Do one of these tasks to start the applicable engine:

(a) Do this task: (Start the Engine (Normal Start), TASK 71-00-00-910-803-G00).

(b) Do this task: (Start the Engine - Manual Override of Starter Air Valve Using APU Bleed Air, TASK 71-00-00-910-804-G00).

(c) Do this task: (Start the Engine (Engine Cross Bleed Start), TASK 71-00-00-910-805-G00).

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(d) Do this task: (Start the Engine (Start Cart), TASK 71-00-00-910-811-G00).

——— END OF TASK ———

TASK 71-00-00-910-803-G00

9. Start the Engine (Normal Start)

A. General

(1) This task gives the instructions to start the engine under normal weather conditions.

(a) During cold weather, heating the engine and other procedures can be necessary before the start.

(b) If it is necessary to start in cold weather, there are steps to prepare the engine for the start (TASK 71-00-00-910-801-G00).

(2) The EEC controls the engine start operation as follows:

(a) Control of the starter, ignition selection, and fuel-on after the start is initiated with the ENGINE START switch, on the P5 overhead panel, and START LEVER switch, on the control stand.

(b) During a normal start (enhanced manual mode), the EEC automatically performs the necessary corrections if one of these conditions occur:

1) Hot start
2) Overtemperature start
3) Rollback from idle
4) Hung start
5) No light-off
6) Start stall
7) Bowed rotor motoring speed exceedance
8) Locked fan rotor
9) Dual N2 sensor failure.

(3) You must monitor the other engine data during the start to make sure that they are in the limits.

(a) Monitor the oil pressure, N1 and N2 rotor speeds, and vibration during the start.

(4) You must stop the start procedure when the engine data is not satisfactory.

(5) During the start, keep the service air bleed inputs and accessory loads to a minimum.

(6) Do each step of the procedure in a sequence.

(7) If you stop the engine start, you must do each of the steps in a sequence again.

B. References

Reference	Title
31-65-00-750-801	Fault Interrogation for a Maintenance Message (P/B 201)
36-00-00-860-802	Supply Pressure to the Pneumatic System with an External Ground Air Source (P/B 201)
36-00-00-860-803	Supply Pressure to the Pneumatic System with the APU (P/B 201)
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
49-11-00-860-801	APU Starting and Operation (P/B 201)

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C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Start the Engine (Normal Start)

SUBTASK 71-00-00-860-036-G00

(1) Do this task: Prepare the Engine for Operation, TASK 71-00-00-910-801-G00.

SUBTASK 71-00-00-860-524-G00

(2) Start the APU and supply air pressure to the pneumatic system (TASK 36-00-00-860-803).

SUBTASK 71-00-00-860-037-G00

(3) Do these steps to make sure that the fire detection system for the engine is serviceable:

(a) On the P8 panel, make sure that the OVHT DET switches for Engine 1 and Engine 2 are in the NORMAL position.

(b) On the P8 panel, move and hold the TEST switch to the OVHT/FIRE position.

(c) Make sure that these lights, on the P8 panel, come on:

1) The amber ENG 1 OVERHEAT light
2) The amber ENG 2 OVERHEAT light
3) The red Engine 1 fire handle
4) The red Engine 2 fire handle
5) The red Engine 1 CUTOFF light
6) The red Engine 2 CUTOFF light
7) The red WHEEL WELL light
8) The red APU fire handle.

(d) Make sure that these lights, on the P7 glareshield panel, come on:

1) The two amber MASTER CAUTION lights
2) The two red FIRE WARN lights
3) The amber OVHT/DET annunciator light.

(e) Release the TEST switch.

1) Make sure that all the above lights go off.

(f) Move and hold the TEST switch to the FAULT/INOP position.

NOTE: The FAULT/INOP test is not necessary if it is completed per TASK 49-11-00-860-801. The FAULT/INOP test is necessary if the TASK 36-00-00-860-802 is used.

1) Make sure that these lights, on the P8 panel, come on:

a) The amber FAULT light
b) The amber APU DET INOP light.

2) Make sure that these lights, on the P7 glareshield panel, come on:

a) The amber MASTER CAUTION lights
b) The amber OVHT/DET annunciator light.

(g) Release the TEST switch.

1) Make sure that all the above lights go off.

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(h) On the P8 panel, move and hold the EXT TEST switch to the 1 position.

1) Make sure that the APU, L, and R lights come on.

(i) Move and hold the EXT TEST switch to the 2 position.

1) Make sure that the APU, L, and R lights come on.

(j) Release the EXT/TEST switch.

1) Make sure that the APU, L, and R lights go off.

SUBTASK 71-00-00-860-038-G00

(4) On the P5 overhead panel, do these steps:

NOTE: Keep the pressure on the "A" and "B" hydraulic systems. This will make sure that you have full control of the nose gear steering and the main wheel brakes.

(a) Move the HYD PUMPS A ENG 1 switch to ON position.

1) Make sure that the low pressure light stays on.

(b) Move the HYD PUMPS A ELEC 2 switch to ON position.

1) Make sure that the low pressure light goes off.

(c) Move the HYD PUMPS B ENG 2 switch to ON position.

1) Make sure that the low pressure light stays on.

(d) Move the HYD PUMPS B ELEC 1 to ON position.

1) Make sure that the low pressure light goes off.

SUBTASK 71-00-00-860-039-G00

(5) Make sure that these switches, on the P5-10 air conditioning panel, are in the OFF position.

(a) L PACK

(b) R PACK.

SUBTASK 71-00-00-860-040-G00

(6) Make sure that these switches, on the P5-11 wing anti-ice panel, are in the OFF position.

(a) WING ANTI - ICE

(b) ENG 1 ANTI - ICE

(c) ENG 2 ANTI - ICE.

SUBTASK 71-00-00-860-041-G00

(7) Make sure that the BLEED AIR ISOLATION VALVE switch, on the P5-10 air conditioning panel, is in the AUTO position.

SUBTASK 71-00-00-860-042-G00

(8) Make sure that these switches, on the P5-10 air conditioning panel, are in the ON position.

(a) BLEED 1

(b) BLEED 2.

SUBTASK 71-00-00-860-043-G00

(9) Make sure that the ENG 1 and ENG 2 EEC switches, on the P5 aft overhead panel, show ON.

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SUBTASK 71-00-00-860-046-G00

WARNING PUT THE FUEL PUMP SWITCHES TO OFF IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. IF YOU DO NOT, FUMES IN THE TANK CAN INCREASE. A FIRE AND AN EXPLOSION CAN OCCUR.

(10) To operate a fuel pump(s), you must be in the flight compartment to continuously monitor the fuel quantity and low pressure indication in the applicable tank.

(a) Immediately set the applicable fuel pump switch to OFF if the LOW PRESSURE light comes on and stays on.

SUBTASK 71-00-00-860-047-G00

(11) For the left engine, put these switches, on the P5 fuel control panel, to the ON position:

(a) FUEL PUMP 1 FWD

(b) FUEL PUMP 1 AFT.

SUBTASK 71-00-00-860-049-G00

(12) For the right engine, put these switches, on the P5 fuel control panel, to the ON position:

(a) FUEL PUMP 2 FWD

(b) FUEL PUMP 2 AFT.

SUBTASK 71-00-00-860-528-G00

(13) Put these switches, on the P5 overhead panel, to the ON position:

NOTE: This step makes sure that the generator control relays and the generator fields are closed before the generators are applied to the buses.

(a) GEN 1

(b) GEN 2.

SUBTASK 71-00-00-860-050-G00

(14) Move the ignition select switch to set the ignition source as follows:

NOTE: You can use one or two igniters to start the engine. If one igniter is used, the subsequent start must be made with the other igniter.

NOTE: To start the engine with battery power only, put the ignition select switch in the R IGN position.

(a) Put the ignition select switch to the L IGN or R IGN position to start the engine with one igniter.

(b) Put the ignition select switch to the BOTH position to start the engine with the two igniters.

SUBTASK 71-00-00-860-457-G00

(15) Put the ENGINE START switch for the applicable engine to the GRD position and release.

SUBTASK 71-00-00-860-051-G00

(16) Make sure that these conditions occur:

(a) On the MDS engine display, the START VALVE OPEN message comes on and you see the indications for N2 and then N1.

(b) If the ground cart or the other engine supplies the pneumatic power, you see a decrease in the pneumatic manifold duct pressure.

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(c) If the APU supplies the pneumatic power, you see an increase in the pneumatic manifold duct pressure.

NOTE: The APU goes into the Main Engine Start (MES) mode which provides increased air flow and pressure. The MES mode operates when the start valve is selected open with the ENGINE START switch.

(d) The person on the ground sees the N1 rotor starts to turn in the counterclockwise direction.

SUBTASK 71-00-00-860-052-G00

(17) When the engine is at 25% N2 or the maximum motoring speed and 'MOTORING' is no longer displayed on the N2 dial, move the START LEVER switch to the IDLE position.

CAUTION DO NOT SET THE START LEVER SWITCH TO IDLE IF THE MAXIMUM MOTORING SPEED IS LESS THAN 20% N2. IF YOU DO, THE ENGINE CAN HAVE A HUNG OR HOT START. DAMAGE TO THE ENGINE CAN OCCUR.

(a) If the engine speed is less than 25% N2, you can move the START LEVER switch to the IDLE position when the engine is at its maximum motoring speed.

NOTE: The motoring flag is displayed when the engine requires bowed rotor motoring sequence.

NOTE: The maximum motoring speed is defined as the speed when the rate of increase in N2 is less than 1% during a 5 seconds time period. The maximum motoring speed should be no less than 20% N2.

CAUTION DO NOT OPERATE THE ENGINE STARTER BEYOND ITS LIMITS. DAMAGE TO THE STARTER CAN OCCUR.

(b) Make sure that you obey the starter operation limits (TASK 71-00-00-800-802-G00).

SUBTASK 71-00-00-860-053-G00

(18) Monitor the EGT and N2 carefully when you start the engine for unusual conditions.

NOTE: Under normal conditions, the engine will start (EGT increases) in 15 seconds after the START LEVER switch is moved to the IDLE position. The time from engine start to a stable idle must not be more than 120 seconds.

SUBTASK 71-00-00-860-054-G00

(19) Do these steps if the engine does not start (no EGT increase) in 15 seconds:

NOTE: If the engine does not start after 15 seconds, the EEC will automatically turn the fuel and ignition off.

(a) Move the START LEVER switch to the CUTOFF position.

(b) Continue to motor the engine for 60 seconds to remove all fuel from the engine.

(c) Move the ENGINE START switch to AUTO position.

SUBTASK 71-00-00-860-055-G00

(20) Monitor the EGT, fuel flow, N1, N2, and engine oil indications as the engine accelerates to the idle speed.

(a) Make sure that the engine acceleration does not slow or stop before idle speed.

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SUBTASK 71-00-00-210-040-G00

(21) Make sure that the starter disengages at or before 63% N2 and these conditions occur:

NOTE: When the starter disengages, the start switch will move from the GRD to the AUTO position automatically. If the start switch does not transition within 30 seconds, the EEC will command the SAV to close to minimize the possibility of damage to starter.

(a) The STARTER VALVE OPEN message on the MDS engine display goes off.

(b) The manifold duct pressure increases.

SUBTASK 71-00-00-210-041-G00

(22) If the starter disengages at more than 63% N2 or does not disengage, do these steps:

(a) Manually move the ENGINE START switch to the AUTO position.

(b) Make sure that the START VALVE OPEN message on the MDS engine display goes off.

(c) If the START VALVE OPEN message stays on, do these steps:

1) Move the BLEED ISOLATION VALVE switch to the CLOSE position.

2) Do the applicable step that follows to remove the pneumatic source:

a) Move the applicable BLEED 1 switch or BLEED 2 switch to the OFF position.

b) Move the APU BLEED switch to the OFF position.

3) Move the START LEVER switch to the CUTOFF position to stop the engine.

4) Disconnect the ground air source.

5) Refer to the FIM to isolate the cause of the starter fault.

SUBTASK 71-00-00-200-013-G00

(23) Make sure that the engine is stable at idle.

(a) The engine is at stable idle when the EGT Start Limit Redline (tick mark) is no longer shown on the EGT indication.

NOTE: Do not change the airplane BLEED valve configuration or select the PACKS, ENG 1/2 ANTI-ICE, or WING ANTI-ICE on until the EGT start Limit Redline is no longer shown. Change the engine bleed configuration before the engine is stable at idle can lead to an engine no start or start stall.

SUBTASK 71-00-00-860-056-G00

(24) The usual engine parameters for a standard day engine start are as follows:

(a) N1: approximately 21%

(b) N2: approximately 71%

(c) EGT: Stable and in serviceable limits, approximately 905°F (485°C)

NOTE: At idle, the EGT can vary due to the engine condition, ambient temperature, altitude, and other factors. Engine condition and bleed configuration can cause EGT differences between engines. If N1, N2 and fuel flow are satisfactory and stable at minimum idle, it is not unusual to see EGT differences between the engines.

(d) Fuel flow: approximately 630 lb/hr (286 kg/hr).

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SUBTASK 71-00-00-210-042-G00

CAUTION

STOP THE ENGINE IF THE OIL PRESSURE IS BELOW MINIMUM LIMITS. FIND THE CAUSE OF THE CONDITION BEFORE YOU START THE ENGINE AGAIN. DAMAGE TO THE ENGINE CAN OCCUR.

(25) Make sure that the oil pressure is stable and greater than 17 psig (117 kPa) when the engine is at idle speed (TASK 71-00-00-800-802-G00).

NOTE: During cold weather conditions, the oil pressure can go above the normal operation limits for a short time due to high oil viscosity. While the engine temperature increases, the oil pressure will decrease.

SUBTASK 71-00-00-860-057-G00

(26) On the MDS engine display, make sure that the applicable LOW OIL PRESSURE message goes off.

SUBTASK 71-00-00-860-058-G00

(27) Make sure that the master caution light did not come on during the engine start.

SUBTASK 71-00-00-860-061-G00

(28) On the P5 overhead panel, make sure the applicable generator 1 DRIVE or 2 DRIVE light goes out.

SUBTASK 71-00-00-860-063-G00

(29) On the P5 overhead panel, move the APU BLEED switch to the OFF position.

SUBTASK 71-00-00-860-064-G00

(30) Let the engine run at the idle for a minimum of 5 minutes before you accelerate the engine.

SUBTASK 71-00-00-970-015-G00

(31) If you started the engine with battery power only (no AC power), check the STATUS MESSAGES page to make sure that there are no new status messages (TASK 31-65-00-750-801).

NOTE: Before you start an engine with the battery power only (no AC power), the MAINT light will come on. After the engine starts, you need to make sure there are no new status messages.

SUBTASK 71-00-00-860-065-G00

WARNING

DO NOT GO NEAR THE ENGINE WHEN THE ENGINE OPERATES ABOVE MINIMUM IDLE. THERE ARE NO SAFE AREAS AROUND AN ENGINE WHEN THE ENGINE SPEED IS ABOVE MINIMUM IDLE. SERIOUS INJURY OR DEATH AND DAMAGE TO EQUIPMENT COULD OCCUR.

(32) If it is not necessary, remove the pneumatic power (TASK 36-00-00-860-806).

(a) Make sure that the engine is at minimum idle before you disconnect the ground air cart from the airplane.

NOTE: The connection for the pneumatic power is in the dangerous zone of the inlet area for the right engine.

END OF TASK

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TASK 71-00-00-910-814-G00

10. Pre-Start Motoring

A. General

(1) This task gives the instructions to dry motor the engine before engine start when using manual override of the engine start valve with bleed air supplied by a ground air source or using the engine cross bleed start procedure. This task is required with EEC s/w v4.5 to prevent damage to the engine due to a possible bowed rotor condition. When EEC s/w v5.2 or later is installed, this task can be used as an option to the pre-start motoring in Start the Engine (Manual Override Start Using Ground Air Source or Engine Cross Bleed), TASK 71-00-00-800-805-G00.

(2) If the engine starter air valve and APU are both inoperative, and bleed air for engine start is supplied by a ground air source or using the engine cross bleed start procedure, additional pre-start motoring procedures are required. The engine must be dry motored for four minutes with one ECS PACK in the AUTO position to prevent damage to the engine. Manual control of the starter air valve is used to dry motor the engine with one ECS PACK in the AUTO position before performing an engine start.

(3) This task must not be performed with Engine Electronic Controller (EEC) data load and trim balance functions tasks.

NOTE: EEC data load tasks and trim balance functions tasks will inhibit the use of any EEC ground tests and special functions through the Onboard Maintenance Function (OMF).

B. References

Reference	Title
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)

C. Pre-Start Motoring when APU Inoperative (Starting Air Pressure from Engine Cross Bleed or Ground Start Cart)

NOTE: These steps are only required with EEC s/w v4.5 installed when performing an engine start using bleed air supplied by a ground air source or using the engine cross bleed start procedure. When EEC s/w v5.2 or later is installed, these steps can be used as an option to the pre-start motoring in Start the Engine (Manual Override Start Using Ground Air Source or Engine Cross Bleed), TASK 71-00-00-800-805-G00.

SUBTASK 71-00-00-860-737-G00

(1) Select the left or right Multi Function Display (MFD).

(a) Push the SYS button, on the P9 MFD control panel.

(b) Push the SEL button on SELECTOR knob, on the P9 MFD control panel.

SUBTASK 71-00-00-860-738-G00

(2) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the TEST position (TASK 73-21-00-800-801-G00).

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER switch to the TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 71-00-00-860-739-G00

(3) Set the GND TESTS switch, on the P61-4 maintenance BITE panel, to the ENABLE position.

SUBTASK 71-00-00-860-740-G00

(4) Make sure that the applicable START LEVER switch is in the CUTOFF position.

SUBTASK 71-00-00-860-761-G00

(5) Set the applicable thrust lever to idle.

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SUBTASK 71-00-00-860-742-G00

(6) Make sure that these switches, on the P5 overhead panel, are in the OFF position:

(a) L PACK

(b) R PACK

(c) WING ANTI-ICE

(d) ENG 1 ANTI-ICE

(e) ENG 2 ANTI-ICE

(f) BLEED 1

(g) BLEED 2.

SUBTASK 71-00-00-860-743-G00

(7) For the applicable engine, 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 71-00-00-860-744-G00

CAUTION

ENGINE FUEL SYSTEM COMPONENTS ARE FUEL LUBRICATED. DO NOT MOTOR THE ENGINE UNLESS THE BOOST PUMP PRESSURE IS APPLIED TO THE FUEL PUMP INLET. IF YOU DO NOT OBEY THIS CAUTION, YOU CAN CAUSE DAMAGE TO THE ENGINE.

(8) On the engine to be dry motored, apply the boost pump pressure to the fuel pump inlet:

(a) For engine 1, make sure that this circuit breaker is closed:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1

(b) For engine 2, make sure that this circuit breaker is closed:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2

(c) Move the applicable START LEVER switch to the IDLE position.

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(d) Make sure that the applicable SPAR VALVE CLOSED light, on the P5 overhead panel, comes on bright (valve in transition or when the valve does not agree with the commanded position) and then goes off (valve open).

NOTE: The applicable ENG VALVE CLOSED light will change to bright and not go off because engine fuel pump pressure (N2 turns) is necessary to open the valve.

(e) For engine 1, open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1

(f) For engine 2, open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2

(g) Move the applicable START LEVER switch to the CUTOFF position.

WARNING DO NOT OPERATE A FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. THIS CONDITION CAN CAUSE THE IGNITION OF THE FUEL FUMES IN THE FUEL TANK. A FIRE OR AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(h) Operate the applicable fuel pumps:

1) You must be in the flight compartment to continuously monitor the fuel quantity and low pressure indication in the applicable tank.
2) If you will start engine 1, put the FUEL PUMP 1 FWD and FUEL PUMP 1 AFT to ON position.
3) If you will start engine 2, put the FUEL PUMP 2 FWD and FUEL PUMP 2 AFT to ON position.
4) Make sure that the fuel pump LOW PRESSURE lights do not come on.
5) If the LOW PRESSURE light comes on and stays on, immediately set the applicable fuel pump switch to OFF position.

SUBTASK 71-00-00-860-745-G00

(9) Make these selections on the MFD main function menu:

NOTE: This function takes approximately 5-10 minutes to complete.

(a) ONBOARD MAINTENANCE
(b) OTHER FUNCTIONS
(c) SPECIAL FUNCTIONS
(d) 71-80 Engine 1 or 71-80 Engine 2
(e) Starter Air Valve Manual Start
(f) CONTINUE.

SUBTASK 71-00-00-860-746-G00

(10) Do the instructions that show on the MFD PRECONDITIONS.

(a) Make sure that you check and follow the inhibited conditions instructions closely.

NOTE: If one of the inhibited conditions is not met, the test will fail.

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SUBTASK 71-00-00-860-747-G00

(11) Make these selections on the MFD:

(a) CONTINUE

(b) START FUNCTION.

SUBTASK 71-00-00-860-748-G00

(12) Set the applicable PACK switch, on the P5 overhead panel, to the AUTO position.

NOTE: The steps that follow will cool the engine and reduce the bowed rotor effect.

(a) If you will start engine 1, set the L PACK switch to the AUTO position.

(b) If you will start engine 2, set the R PACK switch to the AUTO position.

SUBTASK 71-00-00-860-749-G00

WARNING POSITIVE COMMUNICATION BETWEEN THE PERSONS IN THE FLIGHT COMPARTMENT AND THE GROUND MAINTENANCE PERSONS IS MANDATORY. IF POSITIVE COMMUNICATION IS NOT AVAILABLE, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT COULD OCCUR.

(13) Make sure that you have interphone communication between the persons on the ground and persons in the flight compartment.

SUBTASK 71-00-00-860-750-G00

WARNING OBEY THE HAZARD AREAS, ESPECIALLY THE ENTRY/EXIT CORRIDOR. MAKE SURE THAT YOUR BODY STAYS AFT OF THE FAN-COWL WARNING STRIPE. IT IS PERMITTED TO REACH FORWARD OF THE WARNING STRIPE WITH YOUR HAND, BUT ONLY TO MANUALLY OPEN THE STARTER AIR VALVE (SAV). ENTRY INTO THE HAZARD AREA COULD CAUSE SERIOUS INJURY TO PERSONS OR POSSIBLE LOSS OF LIFE.

WARNING MAKE SURE THAT YOU WEAR GLOVES WHEN YOU OPEN THE START VALVE. BLEED AIR CAN BE HOT AND CAUSE INJURIES TO PERSONNEL.

CAUTION MAKE SURE THAT THERE IS AIR PRESSURE IN THE STARTER AIR DUCT. IF THERE IS NO AIR PRESSURE, DAMAGE TO THE STARTER AIR VALVE CAN OCCUR.

(14) When instructed, put the ENGINE START switch for the applicable engine to the GRD position.

SUBTASK 71-00-00-860-751-G00

CAUTION DO NOT OVERTORQUE THE SAV MANUAL OVERRIDE. DAMAGE TO SAV OVERRIDE CABLE AND SAV COULD OCCUR.

CAUTION IF THE N2 RPM INCREASES MORE THAN 26%, STOP THE ENGINE. ENGINE DAMAGE CAN OCCUR.

(15) Tell the person on the ground to manually open the Starter Air Valve (SAV):

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(a) Push a 3/8-inch square drive extension through the guide port of the start valve manual override.

(b) Turn the valve approximately 75 degrees counterclockwise to the OPEN position and hold it open with approximately 80.0 in-lb (9.04 N·m) to 120.0 in-lb (13.56 N·m) of torque.

NOTE: Do not to use more than 200.0 in-lb (22.60 N·m) of torque to hold the valve open.

NOTE: Keep the valve open until the person in the flight compartment gives the command to release and close the valve.

SUBTASK 71-00-00-860-752-G00

(16) When instructed by the MFD, do these steps:

(a) Turn the ENGINE START switch to OFF position.

(b) Tell the person on the ground to manually turn the start valve approximately 75 degrees clockwise to the CLOSED position.

(c) Make sure that the START VALVE OPEN alert on the center panel display goes off.

NOTE: The engine start must occur within 15 minutes of completing the Special Function or damage to the engine can occur. You must allow the starter to cool for 5 minutes, then start the engine eithin the next 10 minutes or the Pre-Start Motoring procedure must be repeated.

(d) Select CONFIRM.

(e) Select CONTINUE.

SUBTASK 71-00-00-860-753-G00

(17) When the motoring is complete, make sure that COMPLETED shows adjacent to SPECIAL FUNCTION CONDITION on the MFD.

SUBTASK 71-00-00-860-754-G00

(18) Wait 5 minutes before the next start attempt to allow the starter to cool.

NOTE: Starter usage is limited to 5 minutes for the first two extended engine motorings. A minimum of 5 minutes between starter operation is necessary for starter cooling.

SUBTASK 71-00-00-860-755-G00

(19) Make sure that you follow the limits for engine starter operation (TASK 71-00-00-800-802-G00).

SUBTASK 71-00-00-860-756-G00

(20) Make sure that you start the engine a minimum of 5 minutes and a maximum of 15 minutes after completing the Special Function.

NOTE: If you do not start the engine within 15 minutes after completing the Special Function, do the pre-start motoring again in this task before the next start attempt.

NOTE: Do not turn off power to the EECs or the pre-start motoring will have to be repeated. If EEC power is interrupted before the subsequent engine start attempt, the EEC may inhibit the start attempt.

SUBTASK 71-00-00-860-760-G00

(21) For the applicable engine, remove the safety tags and close these applicable 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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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

——— END OF TASK ———

TASK 71-00-00-910-804-G00

11. Start the Engine - Manual Override of Starter Air Valve Using APU Bleed Air

(Figure 213)

A. General

(1) This task gives the instructions to manually override the engine start valve and start the engine using the APU bleed air.

(2) This procedure is used when the Starter Air Valve (SAV) does not respond to start switch input. The manual override start is done with the fan cowl panels and the thrust reversers in the closed position.

(3) Pre-start motoring is not required when the APU provides the air pressure for the manual start.

(4) If the APU is inoperative and bleed air is supplied from a ground air source or using the engine cross bleed start procedure, you must perform Start the Engine (Manual Override Start Using Ground Air Source or Engine Cross Bleed), TASK 71-00-00-800-805-G00 to accomplish additional pre-start motoring procedures. The engine must be dry motored for four minutes with one ECS PACK in the AUTO position to prevent damage to the engine. Manual control of the starter air valve is used to dry motor the engine with one ECS PACK in the AUTO position prior to performing an engine start.

(5) Critical engine parameters like Exhaust Gas Temperature (EGT), oil pressure, N1 and N2 rotor speeds and vibration must be monitored during the start to make sure that they are in the limits. Stop the start during the manual override start procedure when the engine data is not satisfactory or an emergency condition exists.

(6) Do each step of the procedure in sequence. If you stop the start, you must do each step of the sequence again.

(7) During the start, keep the service air bleed inputs and accessory loads to a minimum.

B. References

Reference	Title
36-00-00-860-803	Supply Pressure to the Pneumatic System with the APU (P/B 201)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

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D. Prepare to Start the Engine

SUBTASK 71-00-00-840-001-G00

(1) Do this task: Prepare the Engine for Operation, TASK 71-00-00-910-801-G00.

SUBTASK 71-00-00-780-003-G00

(2) Do this task: Supply Pressure to the Pneumatic System with the APU, TASK 36-00-00-860-803.

NOTE: The APU must be used to supply pneumatic system pressure for the manual SAV override start. It is recommended to perform the start using starting air pressure from the APU.

SUBTASK 71-00-00-860-067-G00

(3) Make sure that the engine fire detection system is operational:

(a) On the P8 panel, move the OVHT DET switches for engine 1 and engine 2 to the NORMAL position.

(b) On the P8 panel, move and hold the TEST switch to the OVHT/FIRE position.

(c) Make sure that these lights on the P8 panel come on:

1) The amber ENG 1 OVERHEAT light

2) The amber ENG 2 OVERHEAT light

3) The red engine 1 fire handle

4) The red engine 2 fire handle.

(d) Make sure that these lights on the P7 lightshield panel come on:

1) The two amber MASTER CAUTION lights

2) The two red FIRE WARN lights

3) The amber OVHT DET annunciator light.

(e) Release the TEST switch.

1) Make sure that all the above lights go off.

(f) On the P8 panel, move and hold the EXT TEST switch to the 1 position.

1) Make sure that the L and R lights come on.

(g) Move and hold the EXT TEST switch to the 2 position.

1) Make sure that the L and R lights come on.

(h) Release the EXT/TEST switch.

1) Make sure that the L and R lights go off.

SUBTASK 71-00-00-860-068-G00

(4) On the overhead panel, P5, put these switches to the ON position:

NOTE: Keep the pressure on the "A" and "B" hydraulic systems. This will make sure that you have full control of the nose gear steering and the main wheel brakes.

(a) HYD PUMPS A ENG 1

1) Make sure that the low pressure light stays on.

(b) HYD PUMPS A ELEC 2

1) Make sure that the low pressure light goes off.

(c) HYD PUMPS B ENG 2

1) Make sure that the low pressure light stays on.

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(d) HYD PUMPS B ELEC 1.

1) Make sure that the low pressure light goes off.

SUBTASK 71-00-00-860-069-G00

(5) Make sure that these switches on the overhead panel, P5, are in the OFF position.

(a) L PACK

(b) R PACK.

(c) WING ANTI - ICE

(d) ENG 1 ANTI - ICE

(e) ENG 2 ANTI - ICE.

SUBTASK 71-00-00-860-071-G00

(6) Make sure that the BLEED AIR ISOLATION VALVE switch on the overhead panel, P5, is in the AUTO position.

SUBTASK 71-00-00-860-072-G00

(7) Make sure that these switches on the overhead panel, P5, are in the OFF position.

(a) BLEED 1

(b) BLEED 2.

SUBTASK 71-00-00-860-073-G00

(8) Make sure that the ENG 1 and ENG 2 EEC switches on the overhead panel, P5, shows ON.

NOTE: The EEC is not powered at this time. The VIB indications on the MDS will be blank.

SUBTASK 71-00-00-860-075-G00

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.

(9) Make sure that you are in the flight compartment to continuously monitor the fuel quantity and the low pressure indication when you operate the fuel pump.

(a) Immediately set the applicable fuel pump switch to OFF if the LOW PRESSURE light comes on and stays on.

SUBTASK 71-00-00-860-076-G00

(10) For the left hand engine, put these switches on the overhead panel P5 to the ON position:

NOTE: Make sure that the LOW PRESSURE lights do not come on.

(a) FUEL PUMP 1 FWD

(b) FUEL PUMP 1 AFT.

SUBTASK 71-00-00-860-077-G00

(11) For the right hand engine, put these switches on the overhead panel P5 to the ON position:

NOTE: Make sure that the LOW PRESSURE lights do not come on.

(a) FUEL PUMP 2 FWD

(b) FUEL PUMP 2 AFT.

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SUBTASK 71-00-00-860-078-G00

(12) Put these switches on the overhead panel, P5, to the ON position:

NOTE: This step makes sure that the generator control relays and the generator fields are closed before the generators are applied to the buses.

(a) GEN 1

(b) GEN 2.

SUBTASK 71-00-00-860-079-G00

(13) Move the ignition select switch to set the ignition source:

NOTE: You can use one or two igniters to start the engine. If one igniter is used, the subsequent start must be made with the other igniter.

NOTE: To start the engine with battery power only, put the ignition select switch in the R IGN position.

(a) Put the ignition select switch to the L IGN or R IGN position to start the engine with one igniter.

(b) Put the ignition select switch to the BOTH position to start the engine with the two igniters.

SUBTASK 71-00-00-860-080-G00

WARNING

POSITIVE COMMUNICATION BETWEEN THE PERSONS IN THE FLIGHT COMPARTMENT AND THE GROUND MAINTENANCE PERSONS IS MANDATORY. IF POSITIVE COMMUNICATION IS NOT AVAILABLE, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT COULD OCCUR.

(14) Make sure that you have interphone communication between the persons on the ground and the persons in the flight compartment.

SUBTASK 71-00-00-800-034-G00

(15) Confirm the bleed air source being used for engine start.

(a) If the bleed air is supplied by the APU, continue to use this task.

(b) If the bleed air is supplied by a ground air source or using the engine cross bleed start procedure, do this task: Start the Engine (Manual Override Start Using Ground Air Source or Engine Cross Bleed), TASK 71-00-00-800-805-G00.

E. Start the Engine (Manual Override of Starter Air Valve Using APU Bleed Air)

SUBTASK 71-00-00-860-081-G00

(1) Put the ENGINE START switch for the applicable engine to the GRD position and release.

SUBTASK 71-00-00-860-082-G00

WARNING

OBEY THE HAZARD AREAS, ESPECIALLY THE ENTRY/EXIT CORRIDOR. MAKE SURE THAT YOUR BODY STAYS AFT OF THE FAN-COWL WARNING STRIPE. IT IS PERMITTED TO REACH FORWARD OF THE WARNING STRIPE WITH YOUR HAND, BUT ONLY TO MANUALLY OPEN THE STARTER AIR VALVE (SAV). ENTRY INTO THE HAZARD AREA COULD CAUSE SERIOUS INJURY TO PERSONS OR POSSIBLE LOSS OF LIFE.

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(WARNING PRECEDES)

WARNING MAKE SURE THAT YOU WEAR GLOVES WHEN YOU OPEN THE START VALVE. BLEED AIR CAN BE HOT AND CAUSE INJURIES TO PERSONNEL.

(2) Tell the person on the ground to manually open the start valve:

(a) Push a 3/8-inch square drive extension through the guide port of the start valve manual override.

(b) Turn the valve approximately 75 degrees counterclockwise to the OPEN position.

CAUTION DO NOT OVERTORQUE THE SAV MANUAL OVERRIDE. DAMAGE TO SAV OVERRIDE CABLE AND SAV COULD OCCUR.

(c) Hold the SAV open with approximately 80.0 in-lb (9.04 N·m) to 120.0 in-lb (13.56 N·m) of torque.

NOTE: The torque you will use to hold the valve open must not be more than 200.0 in-lb (22.6 N·m).

(d) Hold the SAV open until given the command to close it.

SUBTASK 71-00-00-860-083-G00

(3) Make sure that these conditions occur:

(a) On the MDS engine display, you see the indications for N1 and N2.

NOTE: If you will start the engine with battery power, only N1 and N2 indications will be available. All other indications will be available after 12 - 15% N2.

(b) The person on the ground sees that the N1 rotor start to turn in the counterclockwise direction.

SUBTASK 71-00-00-860-084-G00

CAUTION DO NOT SET THE START LEVER SWITCH TO IDLE IF THE MAXIMUM MOTORING SPEED IS LESS THAN 20% N2. IF YOU DO, THE ENGINE CAN HAVE A HUNG OR HOT START. DAMAGE TO THE ENGINE CAN OCCUR.

(4) When the engine is at 25% N2 or the maximum motoring speed, and 'MOTORING' is no longer displayed on the N2 dial, move the start lever to the IDLE position.

NOTE: The maximum motoring speed is defined as the speed when the rate of increase in N2 is less than 1% during a 5 seconds time period. The minimum N2 for maximum motoring speed is 20%.

CAUTION DO NOT OPERATE THE ENGINE STARTER BEYOND ITS LIMITS. DAMAGE TO THE STARTER CAN OCCUR.

(a) Make sure that you obey the starter operation limits (TASK 71-00-00-800-802-G00).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-860-085-G00

(5) Monitor the EGT and N2 carefully as the engine starts for unusual conditions.

NOTE: Under normal conditions, the engine will start in 15 seconds (20 seconds for a cold day) after you move the start lever to the IDLE position. The time from engine start to a stable idle must not take more than 120 seconds.

SUBTASK 71-00-00-860-086-G00

(6) Do these steps if the engine does not start in 20 seconds:

NOTE: If the engine does not start after 20 seconds, the EEC will automatically turn the fuel off and stop the ignition.

(a) Move the start lever to the CUTOFF position.

(b) Continue to motor the engine for 60 seconds to remove all fuel from the engine.

NOTE: Make sure that you obey the starter operation limits. The air turbine starter duty cycle is permitted for 3 minutes of continuous operation for ground operation.

(c) Put the ENGINE START switch to the AUTO position.

(d) Tell the person on the ground to close the SAV and start the task again.

SUBTASK 71-00-00-860-087-G00

(7) Monitor the EGT, fuel flow, N1, N2 and engine oil indications as the engine accelerates to the idle speed.

NOTE: Make sure that the engine acceleration does not slow or stop before the idle speed.

SUBTASK 71-00-00-860-090-G00

(8) When the N2 value is greater than 63%, tell the person on the ground to turn the start valve approximately 75 degrees clockwise to the CLOSED position.

SUBTASK 71-00-00-020-009-G00

(9) Remove the 3/8-inch square drive extension.

SUBTASK 71-00-00-210-052-G00

(10) Make sure that the START VALVE OPEN alert on the center display panel goes off.

SUBTASK 71-00-00-200-014-G00

(11) Make sure that the engine is stable at idle.

(a) The engine is at stable idle when the EGT start limit redline (tick mark) is no longer shown on the EGT indication.

NOTE: Do not change the airplane BLEED valve configuration or select the PACKS, ENG 1/2 ANTI-ICE, or WING ANTI-ICE on until the EGT start limit redline is no longer shown. Changing the engine bleed configuration before the engine is stable at idle can lead to an engine no start or start stall.

SUBTASK 71-00-00-860-459-G00

(12) The usual engine parameters for a standard day engine start are as follows:

(a) N1: Approximately 21%.

(b) N2: Approximately 71%.

(c) EGT: Stable and within operating limits, approximately 905°F (485°C).

NOTE: Idle EGT may vary due to engine condition, ambient temperature, altitude, and other factors. Engine condition and bleed configuration can cause EGT differences between engines. If N1, N2, and fuel flow are satisfactory and stable at minimum idle, it is not unusual to see EGT differences between engines.

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(d) Fuel flow: Approximately 630 lb/hr (286 kg/hr).

SUBTASK 71-00-00-860-460-G00

CAUTION STOP THE ENGINE IF THE OIL PRESSURE IS BELOW MINIMUM LIMITS. FIND THE CAUSE OF THE CONDITION BEFORE YOU START THE ENGINE AGAIN. DAMAGE TO THE ENGINE CAN OCCUR.

(13) Make sure that the oil pressure is stable and greater than 17 psig (117 kPa) at the idle speed (TASK 71-00-00-800-802-G00).

NOTE: Under cold weather conditions, the oil pressure can go above the normal operation limits for a short time due to high oil viscosity. As the engine temperature increase, the oil pressure will decrease.

SUBTASK 71-00-00-860-088-G00

(14) On the center display panel, make sure that the applicable LOW OIL PRESSURE alert goes out.

SUBTASK 71-00-00-860-089-G00

(15) Make sure that the engine master caution light does not come on during the engine start.

SUBTASK 71-00-00-860-091-G00

(16) On the overhead panel, P5, make sure that the applicable GENERATOR 1 DRIVE or GENERATOR 2 DRIVE light goes out.

SUBTASK 71-00-00-860-656-G00

(17) On the overhead panel, P5, move the APU BLEED switch to the OFF position.

SUBTASK 71-00-00-860-702-G00

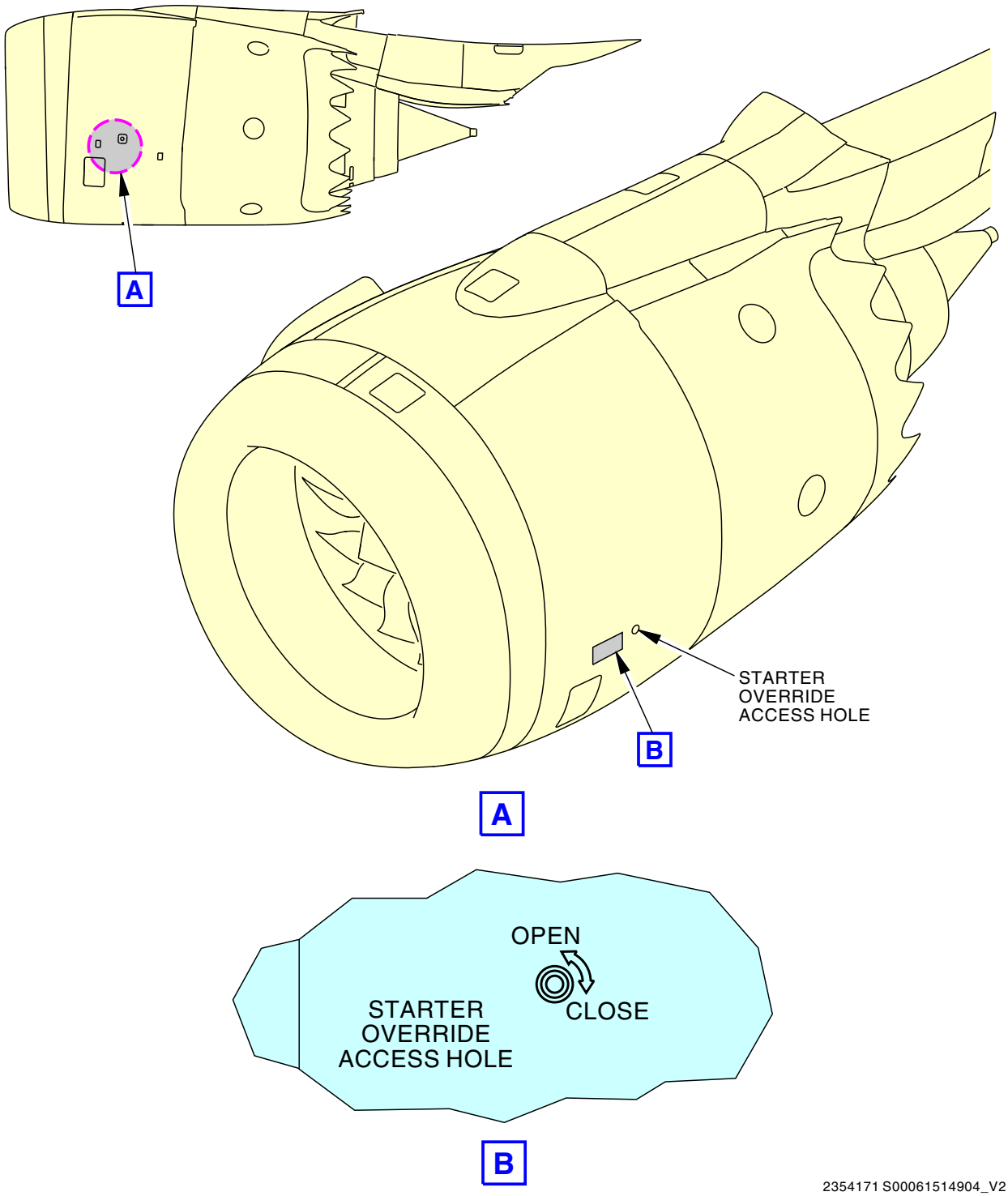
(18) Put the bleed air ISOLATION VALVE switch on the overhead panel, P5, to the AUTO position.

SUBTASK 71-00-00-860-095-G00

(19) Let the engine run at the idle position for a minimum of 5 minutes before you accelerate the engine.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Start the Engine (Manual Override of Starter Air Valve)
Figure 213/71-00-00-990-811-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-00-00-800-805-G00

12. Start the Engine (Manual Override Start Using Ground Air Source or Engine Cross Bleed)

(Figure 213)

A. General

(1) This task gives the instructions to manually override the engine start valve and start the engine using a ground air source or engine cross bleed air.

(2) Do this procedure when the Starter Air Valve (SAV) does not respond to start switch input. Do the manual override start with the fan cowl panels and the thrust reversers in the closed position.

(3) If the APU is operative, use the APU bleed air to start the engine. Use of APU bleed air for the manual override start will not require pre-start motoring.

(4) Use of a ground air source or engine cross bleed requires pre-start motoring. The engine must be dry motored using the Onboard Maintenance Function (OMF) special function for four minutes with one ECS PACK open in order to prevent damage to the engine. Manual control of the start valve is used to dry motor the engine with one Environmental Control System (ECS) Pneumatic Air Condition Kit (PACK) open before performing a start.

(5) Critical engine parameters like Exhaust Gas Temperature (EGT), oil pressure, N1 and N2 rotor speeds and vibration must be monitored during the start to make sure that they are in the limits. Stop the start during the manual override start procedure when the engine data is not satisfactory or an emergency condition exists.

(6) Do each step of the procedure in sequence. If you stop the start, you must do each step of the sequence again.

(7) During the start, keep the service air bleed inputs and accessory loads to a minimum.

B. References

Reference	Title
36-00-00-860-802	Supply Pressure to the Pneumatic System with an External Ground Air Source (P/B 201)
36-00-00-860-804	Supply Pressure to the Pneumatic System with One or Both Engines (P/B 201)
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Prepare to Start the Engine

SUBTASK 71-00-00-910-023-G00

(1) Do this task: Prepare the Engine for Operation, TASK 71-00-00-910-801-G00.

SUBTASK 71-00-00-910-024-G00

(2) Supply pressure to the pneumatic system (TASK 36-00-00-860-802 or TASK 36-00-00-860-804).

NOTE: Use a ground air cart or bleed air from the opposite engine to start the engine with the unresponsive SAV.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-710-018-G00

(3) Make sure that the engine fire detection system is operational:

(a) On the P8 panel, move the OVHT DET switches for engine 1 and engine 2 to the NORMAL position.

(b) On the P8 panel, move and hold the TEST switch to the OVHT/FIRE position.

(c) Make sure that these lights on the P8 panel come on:

1) The amber ENG 1 OVERHEAT light

2) The amber ENG 2 OVERHEAT light

3) The red engine 1 fire handle

4) The red engine 2 fire handle.

(d) Make sure that these lights on the P7 lightshield panel come on:

1) The two amber MASTER CAUTION lights

2) The two red FIRE WARN lights

3) The amber OVHT DET annunciator light.

(e) Release the TEST switch.

1) Make sure that all the above lights go off.

(f) On the P8 panel, move and hold the EXT TEST switch to the 1 position.

1) Make sure that the L and R lights come on.

(g) Move and hold the EXT TEST switch to the 2 position.

1) Make sure that the L and R lights come on.

(h) Release the EXT/TEST switch.

1) Make sure that the L and R lights go off.

SUBTASK 71-00-00-860-788-G00

(4) On the overhead panel, P5, put these switches to the ON position:

NOTE: Keep the pressure on the "A" and "B" hydraulic systems. this will make sure that you have full control of the nose gear steering and the main wheel brakes.

(a) HYD PUMPS A ENG 1

1) Make sure that the low pressure light stays on.

(b) HYD PUMPS A ELEC 2

1) Make sure that the low pressure light goes off.

(c) HYD PUMPS B ENG 2

1) Make sure that the low pressure light stays on.

(d) HYD PUMPS B ELEC 1.

1) Make sure that the low pressure light goes off.

SUBTASK 71-00-00-860-789-G00

(5) Make sure that these switches on the overhead panel, P5, are in the OFF position.

(a) L PACK

(b) R PACK.

(c) WING ANTI - ICE

(d) ENG 1 ANTI - ICE

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(e) ENG 2 ANTI - ICE.

SUBTASK 71-00-00-860-791-G00

(6) Make sure that the BLEED AIR ISOLATION VALVE switch on the overhead panel, P5, is in the AUTO position.

SUBTASK 71-00-00-860-792-G00

(7) Make sure that these switches on the overhead panel, P5, are in the OFF position.

(a) BLEED 1

(b) BLEED 2.

SUBTASK 71-00-00-860-793-G00

(8) Make sure that the ENG 1 and ENG 2 EEC switches on the overhead panel, P5, shows ON.

NOTE: The EEC is not powered at this time. The VIB indications on the MDS will be blank.

SUBTASK 71-00-00-580-001-G00

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.

(9) Make sure that you are in the flight compartment to continuously monitor the fuel quantity and the low pressure indication when you operate the fuel pump.

(a) Immediately set the applicable fuel pump switch to OFF if the LOW PRESSURE light comes on and stays on.

SUBTASK 71-00-00-860-794-G00

(10) For the left hand engine, put these switches on the overhead panel P5 to the ON position:

NOTE: Make sure that the LOW PRESSURE lights do not come on.

(a) FUEL PUMP 1 FWD

(b) FUEL PUMP 1 AFT.

SUBTASK 71-00-00-860-795-G00

(11) For the right hand engine, put these switches on the overhead panel P5 to the ON position:

NOTE: Make sure that the LOW PRESSURE lights do not come on.

(a) FUEL PUMP 2 FWD

(b) FUEL PUMP 2 AFT.

SUBTASK 71-00-00-860-796-G00

(12) Put these switches on the overhead panel, P5, to the ON position:

NOTE: This step makes sure that the generator control relays and the generator fields are closed before the generators are applied to the buses.

(a) GEN 1

(b) GEN 2.

SUBTASK 71-00-00-860-797-G00

(13) Move the ignition select switch to set the ignition source:

NOTE: You can use one or two igniters to start the engine. If one igniter is used, the subsequent start must be made with the other igniter.

NOTE: To start the engine with battery power only, put the ignition select switch in the R IGN position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Put the ignition select switch to the L IGN or R IGN position to start the engine with one igniter.

(b) Put the ignition select switch to the BOTH position to start the engine with the two igniters.

SUBTASK 71-00-00-910-025-G00

WARNING POSITIVE COMMUNICATION BETWEEN THE PERSONS IN THE FLIGHT COMPARTMENT AND THE GROUND MAINTENANCE PERSONS IS MANDATORY. IF POSITIVE COMMUNICATION IS NOT AVAILABLE, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT COULD OCCUR.

(14) Make sure that you have interphone communication between the persons on the ground and the persons in the flight compartment.

SUBTASK 71-00-00-910-026-G00

(15) Confirm the bleed air source that you will use for the engine start.

SUBTASK 71-00-00-910-027-G00

WARNING OBEY THE HAZARD AREAS, ESPECIALLY THE ENTRY/EXIT CORRIDOR. MAKE SURE THAT YOUR BODY STAYS AFT OF THE FAN-COWL WARNING STRIPE. IT IS PERMITTED TO REACH FORWARD OF THE WARNING STRIPE WITH YOUR HAND, BUT ONLY TO MANUALLY OPEN THE STARTER AIR VALVE (SAV). ENTRY INTO THE HAZARD AREA COULD CAUSE SERIOUS INJURY TO PERSONS OR POSSIBLE LOSS OF LIFE.

WARNING MAKE SURE THAT YOU WEAR GLOVES WHEN YOU OPEN THE START VALVE. BLEED AIR CAN BE HOT AND CAUSE INJURIES TO PERSONNEL.

(16) Do the pre-start motoring on the applicable engine as follows:

NOTE: As an option to these steps for pre-start motoring with EEC s/w v5.2 or later installed, you can accomplish the Pre-Start Motoring procedure using the Onboard Maintenance Function (OMF) EEC special function (TASK 71-00-00-910-814-G00)

(a) Put the applicable PACK switch on the overhead panel, P5, to the AUTO position.

(b) Put the ENGINE START switch for the applicable engine to the GRD position and tell the person on the ground to manually open the start valve as follows:

1) With a torque wrench (dial torque wrench preferred), push a 3/8-inch square drive extension through the guide port of the SAV manual override.

2) Turn the start valve approximately 75 degrees counterclockwise to the OPEN position.

3) Hold the SAV open with approximately 80.0 in-lb (9.04 N·m) to 120.0 in-lb (13.56 N·m).

NOTE: The torque you will use to hold the valve open must not be more than 200.0 in-lb (22.6 N·m).

(c) Tell the person on the ground when there is N2 indication.

(d) Monitor the N2 speed carefully during motoring to make sure that N2 does not increase over 25%.

NOTE: Be prepared to tell the person on the ground to immediately close the valve if the N2 indication increases over 25%.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(e) After 4 minutes of motoring, tell the person on the ground to turn the start valve approximately 75 degrees clockwise to the CLOSED position.

(f) Put both PACK switches on the overhead panel, P5, in the OFF positions.

(g) Wait 5 minutes to allow the engine starter to cool, then continue to start the engine.

NOTE: If you will not start the engine within 15 minutes after the pre-motoring, repeat the steps to do the engine pre-start motoring again.

E. Start the Engine (Manual Override Start Using Ground Air Source or Engine Cross Bleed)

SUBTASK 71-00-00-910-028-G00

CAUTION

MAKE SURE THAT YOU DO THE START LESS THAN 15 MINUTES AFTER THE MOTORING. IF YOU START AFTER 15 MINUTES, DAMAGE TO THE ENGINE CAN OCCUR.

(1) Put the ENGINE START switch for the applicable engine to the GRD position.

SUBTASK 71-00-00-980-001-G00

CAUTION

DO NOT OPERATE THE ENGINE STARTER BEYOND ITS LIMITS. DAMAGE TO THE STARTER CAN OCCUR.

(2) Make sure that you obey the starter operation limits (TASK 71-00-00-800-802-G00).

SUBTASK 71-00-00-980-002-G00

(3) Tell the person on the ground to manually open the SAV as follows:

(a) With a torque wrench (dial torque wrench preferred), push a 3/8-inch square drive extension through the guide port of the SAV manual override.

(b) Turn the start valve approximately 75 degrees counterclockwise to the OPEN position.

(c) Hold the SAV open with approximately 80.0 in-lb (9.04 N·m) to 120.0 in-lb (13.56 N·m) of torque.

NOTE: The torque you will use to hold the valve open must not be more than 200.0 in-lb (22.6 N·m).

(d) Hold the SAV open until given the command to close it.

SUBTASK 71-00-00-210-076-G00

(4) Make sure that these conditions occur:

(a) On the MDS engine display, you see the indications for N1 and N2.

NOTE: If you will start the engine with battery power, only N1 and N2 indications will be available. All other indications will be available after 12–15% N2.

(b) The person on the ground sees that the N1 rotor starts to turn in the counterclockwise direction.

(c) The 'MOTORING' indication does not display on the N2 dial when N2 increases above 18%.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-860-798-G00

CAUTION

DO NOT MOVE THE START LEVER FORWARD UNTIL THE ENGINE IS AT 25% N2 OR THE MAXIMUM MOTORING SPEED, BUT NOT LESS THAN 20%. IF YOU DO, THE ENGINE CAN HAVE A HOT OR HUNG START. THIS CAN CAUSE DAMAGE TO THE ENGINE.

(5) When the engine is at 25% N2 or the maximum motoring speed, move the start lever to the IDLE position.

NOTE: Maximum motoring speed is when the rate of N2 increase is less than 1% during a 5 seconds time period. The minimum N2 for maximum motoring speed is 20%.

SUBTASK 71-00-00-210-077-G00

(6) Monitor the EGT and N2 carefully as the engine starts for unusual conditions.

NOTE: Under normal conditions, the engine will start in 15 seconds (20 seconds for a cold day) after you move the start lever to the IDLE position. The time from engine start to a stable idle must not take more than 120 seconds.

SUBTASK 71-00-00-860-799-G00

(7) If the engine does not start in 20 seconds, do these steps:

NOTE: If the engine does not start after 20 seconds, the EEC will automatically turn the fuel off and stop the ignition.

(a) Move the start lever to the CUTOFF position.

(b) Continue to motor the engine for 60 seconds to remove all fuel from the engine.

NOTE: Make sure that you obey the starter operation limits. The air turbine starter duty cycle is permitted for 3 minutes of continuous operation for ground operation.

(c) Put the ENGINE START switch to the AUTO position.

(d) Tell the person on the ground to close the SAV and start the task again.

NOTE: The starter must be off a minimum of 10 seconds between start attempts for cooling.

SUBTASK 71-00-00-210-078-G00

(8) Monitor the EGT, fuel flow, N1, N2 and engine oil indications as the engine accelerates to idle.

NOTE: Make sure that the engine acceleration does not slow or stop before the idle speed.

SUBTASK 71-00-00-980-003-G00

(9) When the N2 value is greater than 63%, tell the person on the ground to turn the start valve approximately 75 degrees clockwise to the CLOSED position.

SUBTASK 71-00-00-080-005-G00

(10) Remove the 3/8-inch square drive extension.

SUBTASK 71-00-00-210-079-G00

(11) Make sure that the START VALVE OPEN alert on the center display panel goes off.

SUBTASK 71-00-00-210-080-G00

(12) Make sure that the engine is stable at idle.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) The engine is at stable idle when the EGT Start Limit Redline (tick mark) is no longer shown on the EGT indication.

NOTE: Do not change the airplane BLEED valve configuration or select the PACKS, ENG 1/2 ANTI-ICE, or WING ANTI-ICE on until the EGT start limit redline is no longer shown. Changing the engine bleed configuration before the engine is stable at idle can lead to an engine no start or start stall.

SUBTASK 71-00-00-210-081-G00

(13) The usual engine parameters for a standard day engine start are as follows:

(a) N1: Approximately 21%.

(b) N2: Approximately 71%.

(c) EGT: Stable and within operating limits, approximately 905°F (485°C).

NOTE: Idle EGT may vary due to engine condition, ambient temperature, altitude, and other factors. Engine condition and bleed configuration can cause EGT differences between engines. If N1, N2, and fuel flow are satisfactory and stable at minimum idle, it is not unusual to see EGT differences between engines.

(d) Fuel flow: Approximately 630 lb/hr (286 kg/hr).

SUBTASK 71-00-00-210-082-G00

CAUTION

STOP THE ENGINE IF THE OIL PRESSURE IS BELOW MINIMUM LIMITS. FIND THE CAUSE OF THE CONDITION BEFORE YOU START THE ENGINE AGAIN. DAMAGE TO THE ENGINE CAN OCCUR.

(14) Make sure that the oil pressure is stable and greater than 17 psig (117 kPa) at the idle speed (TASK 71-00-00-800-802-G00).

NOTE: Under cold weather conditions, the oil pressure can go above the normal operation limits for a short time due to high oil viscosity. As the engine temperature increase, the oil pressure will decrease.

SUBTASK 71-00-00-210-083-G00

(15) On the center display panel, make sure that the applicable LOW OIL PRESSURE alert goes out.

SUBTASK 71-00-00-210-084-G00

(16) Make sure that the engine master caution light does not come on during the engine start.

SUBTASK 71-00-00-860-J01-G00

(17) On the overhead panel, P5, make sure that the applicable GENERATOR 1 DRIVE or GENERATOR 2 DRIVE light goes out.

SUBTASK 71-00-00-860-J02-G00

(18) Put the bleed air ISOLATION VALVE switch on the overhead panel, P5, to the AUTO position.

SUBTASK 71-00-00-860-J03-G00

(19) If the pre-start motoring with the OMF special function was done, do these steps:

(a) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the NORM position (TASK 73-21-00-800-801-G00).

(b) Put the GND TESTS switch on the maintenance BITE panel, P61-4, to the NORM position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-080-006-G00

WARNING DO NOT GO NEAR THE ENGINE WHEN THE ENGINE OPERATES ABOVE MINIMUM IDLE. THERE ARE NO SAFE AREAS AROUND AN ENGINE WHEN THE ENGINE SPEED IS ABOVE MINIMUM IDLE. SERIOUS INJURY OR DEATH AND DAMAGE TO EQUIPMENT COULD OCCUR.

(20) If the ground start cart is connected and no longer necessary, disconnect it (TASK 36-00-00-860-806).

NOTE: Make sure that the engine is at minimum idle before you disconnect the ground air cart from the airplane. The connection for the pneumatic power is in the dangerous zone of the inlet area for engine No. 2.

SUBTASK 71-00-00-910-029-G00

(21) Let the engine run at the idle position for a minimum of 5 minutes before you accelerate the engine.

——— END OF TASK ———

TASK 71-00-00-910-805-G00

13. Start the Engine (Engine Cross Bleed Start)

A. General

(1) This task gives the instructions to start the second engine with bleed air from the first engine.

(2) Do each step of the procedure in sequence.

NOTE: If you stop the cross bleed start, you must do each step of the sequence again.

(3) During the cross bleed start, keep the service air bleed inputs and accessory loads to a minimum.

B. References

Reference	Title
49-11-00-860-802	APU Usual Shutdown (P/B 201)

C. Start the Engine (Engine Cross Bleed Start)

SUBTASK 71-00-00-860-096-G00

(1) Do this task: Prepare the Engine for Operation, TASK 71-00-00-910-801-G00.

SUBTASK 71-00-00-910-017-G00

(2) Start the engine that will supply pneumatic pressure to start the second engine (TASK 71-00-00-910-803-G00)

SUBTASK 71-00-00-860-098-G00

(3) If the APU supplies pneumatic pressure, put the APU BLEED switch on the overhead panel, P5, to the OFF position.

SUBTASK 71-00-00-860-099-G00

(4) If the operation of the APU is no longer necessary, do this task: APU Usual Shutdown, TASK 49-11-00-860-802.

(a) Make sure that the DUAL BLEED light on the overhead panel, P5, goes out.

SUBTASK 71-00-00-860-100-G00

(5) Move the thrust lever on the engine in operation forward until the manifold duct pressure on the overhead panel shows a minimum of 30 PSI.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-860-101-G00

CAUTION IF THE STARTER AIR VALVE IS NOT OPERATIONAL, MAKE SURE THAT YOU DO THE PRESTART MOTORING BEFORE YOU START THE ENGINE. IF YOU DO NOT DO THIS, HIGH ENGINE VIBRATION AND DAMAGE TO ENGINE HARDWARE CAN OCCUR.

(6) Start the second engine (TASK 71-00-00-910-803-G00).

SUBTASK 71-00-00-860-590-G00

(7) Monitor the engine parameters that follow during each start to make sure that they are within operational limits:

(a) EGT

(b) Engine oil pressure

(c) N1 and N2 rotor speeds

(d) N1 and N2 vibration.

SUBTASK 71-00-00-860-102-G00

(8) After the engine reaches idle speed or when the START VALVE OPEN message goes off, decrease the power of the engine for the cross-start to the idle position.

SUBTASK 71-00-00-200-017-G00

(9) Make sure that the engine is stable at idle.

(a) The engine is at stable idle when the EGT Start Limit Redline (tick mark) is no longer shown on the EGT indication.

NOTE: Do not change the airplane BLEED valve configuration or select the PACKS, ENG 1/2 ANTI-ICE, or WING ANTI-ICE on until the EGT start Limit Redline is no longer shown. Change the engine bleed configuration before the engine is stable at idle can lead to an engine no start or start stall.

SUBTASK 71-00-00-860-103-G00

(10) On the overhead panel, put the bleed air ISOLATION VALVE switch to the AUTO position.

SUBTASK 71-00-00-860-104-G00

(11) Put the L PACK and R PACK switches on the overhead panel, P5, to the AUTO position.

——— END OF TASK ———

TASK 71-00-00-910-811-G00

14. Start the Engine (Start Cart)

A. General

(1) This task gives the instructions to start the engine with bleed air from an external ground cart.

(2) Do each step of the procedure in sequence. If you stop the start, you must do each step of the sequence again.

(3) During the start, keep the service air bleed inputs and accessory loads to a minimum.

B. References

Reference	Title
36-00-00-860-802	Supply Pressure to the Pneumatic System with an External Ground Air Source (P/B 201)
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Start the Engine (Start Cart)

SUBTASK 71-00-00-860-105-G00

(1) Do this task: Prepare the Engine for Operation, TASK 71-00-00-910-801-G00.

SUBTASK 71-00-00-780-001-G00

(2) Supply pressure to the pneumatic system with an external ground start cart (TASK 36-00-00-860-802).

SUBTASK 71-00-00-780-002-G00

(3) Make sure that the manifold duct pressure on the overhead panel shows a minimum of 30 PSI.

SUBTASK 71-00-00-860-106-G00

CAUTION

IF THE STARTER AIR VALVE IS NOT OPERATIONAL, MAKE SURE THAT YOU DO THE PRESTART MOTORING BEFORE YOU START THE ENGINE. IF YOU DO NOT DO THIS, HIGH ENGINE VIBRATION AND DAMAGE TO ENGINE HARDWARE CAN OCCUR.

(4) Start the applicable engine (TASK 71-00-00-910-803-G00).

SUBTASK 71-00-00-700-001-G00

(5) Monitor the engine parameters that follow during each start to make sure that they are within operational limits:

(a) EGT

(b) Engine oil pressure

(c) N1 and N2 rotor speeds

(d) N1 and N2 vibration.

SUBTASK 71-00-00-200-015-G00

(6) Make sure that the engine is stable at idle.

(a) The engine is at stable idle when the EGT Start Limit Redline (tick mark) is no longer shown on the EGT indication.

NOTE: Do not change the airplane BLEED valve configuration or select the PACKS, ENG 1/2 ANTI-ICE, or WING ANTI-ICE on until the EGT start Limit Redline is no longer shown. Change the engine bleed configuration before the engine is stable at idle can lead to an engine no start or start stall.

SUBTASK 71-00-00-860-107-G00

(7) After the engine reaches idle speed or when the START VALVE OPEN message goes off, put the bleed air ISOLATION VALVE switch on the overhead panel to the AUTO position.

SUBTASK 71-00-00-860-108-G00

(8) Put these switches on the overhead panel, P5, to the AUTO position:

(a) L PACK

(b) R PACK.

SUBTASK 71-00-00-860-109-G00

(9) Let the engine run at the idle for a minimum of 5 minutes before you accelerate the engine.

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SUBTASK 71-00-00-860-110-G00

WARNING DO NOT GO NEAR THE ENGINE WHEN THE ENGINE OPERATES ABOVE MINIMUM IDLE. THERE ARE NO SAFE AREAS AROUND AN ENGINE WHEN THE ENGINE SPEED IS ABOVE MINIMUM IDLE. SERIOUS INJURY OR DEATH AND DAMAGE TO EQUIPMENT COULD OCCUR.

(10) Remove the pneumatic ground cart power if it is not necessary (TASK 36-00-00-860-806).

NOTE: Make sure that the engine is at minimum idle before you disconnect the ground air cart from the airplane. The connection for the pneumatic power is in the dangerous zone of the inlet area for the right engine.

——— END OF TASK ———

TASK 71-00-00-910-813-G00

15. Start the Engine (Battery Start)

A. General

(1) This task gives the instructions to start the engine under normal weather conditions.

(a) During cold weather, heating the engine and other procedures can be necessary before the start.

(b) If it is necessary to start in cold weather, there are steps to prepare the engine for the start (TASK 71-00-00-910-801-G00).

(2) The EEC controls the engine start operation as follows:

(a) Control of the starter, ignition selection, and fuel-on after the start is initiated with the ENGINE START switch on the overhead panel and START LEVER switch on the control stand.

(b) During a normal start (enhanced manual mode), the EEC automatically performs the necessary corrections if one of these conditions occur:

1) Hot start
2) Overtemperature start
3) Rollback from idle
4) Hung start
5) No light-off
6) Start stall
7) Bowed rotor motoring speed exceedance
8) Locked fan rotor
9) Dual N2 sensor failure.

(3) You must monitor the other engine data during the start to make sure that they are in the limits.

(a) Monitor the oil pressure, N1 and N2 rotor speeds and vibration during the start.

(4) You must stop the start procedure when the engine data is not satisfactory.

(5) During the start, keep the service air bleed inputs and accessory loads to a minimum.

(6) Do each step of the procedure in a sequence.

(7) If you stop the engine start, you must do each of the steps in a sequence again.

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B. References

Reference	Title
31-65-00-750-801	Fault Interrogation for a Maintenance Message (P/B 201)
36-00-00-860-802	Supply Pressure to the Pneumatic System with an External Ground Air Source (P/B 201)
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Start the Engine (Battery Start)

SUBTASK 71-00-00-860-705-G00

(1) Do this task: Prepare the Engine for Operation, TASK 71-00-00-910-801-G00.

SUBTASK 71-00-00-860-706-G00

(2) Supply air pressure to the pneumatic system (TASK 36-00-00-860-802).

SUBTASK 71-00-00-860-707-G00

(3) Do these steps to make sure that the fire detection system for the engine is serviceable:

(a) On the P8 panel, make sure that the OVHT DET switches for Engine 1 and Engine 2 are in the NORMAL position.

(b) On the P8 panel, move and hold the TEST switch to the OVHT/FIRE position.

(c) Make sure that these lights on the P8 panel come on:

1) The amber ENG 1 OVERHEAT light
2) The amber ENG 2 OVERHEAT light
3) The red Engine 1 fire handle
4) The red Engine 2 fire handle
5) The red Engine 1 CUTOFF light.
6) The red Engine 2 CUTOFF light.
7) The red WHEEL WELL light.
8) The red APU fire handle.

(d) Make sure that these lights on the P7 lightshield panel come on:

1) The two amber MASTER CAUTION lights
2) The two red FIRE WARN lights
3) The amber OVHT/DET annunciator light.

(e) Release the TEST switch.

1) Make sure that all the above lights go off.

(f) On the P8 panel, move and hold the EXT TEST switch to the 1 position.

1) Make sure that the APU, L, and R lights come on.

(g) Move and hold the EXT TEST switch to the 2 position.

1) Make sure that the APU, L, and R lights come on.

(h) Release the EXT/TEST switch.

1) Make sure that the APU, L, and R lights go off.

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SUBTASK 71-00-00-860-708-G00

(4) On the overhead panel, P5, do these steps:

NOTE: Keep the pressure on the "A" and "B" hydraulic systems. This will make sure that you have full control of the nose gear steering and the main wheel brakes.

(a) Move the HYD PUMPS A ENG 1 switch to ON.

1) Make sure that the low pressure light stays on.

(b) Move the HYD PUMPS A ELEC 2 switch to OFF.

1) Make sure that the low pressure light goes off.

(c) Move the HYD PUMPS B ENG 2 switch to ON.

1) Make sure that the low pressure light stays on.

(d) Move the HYD PUMPS B ELEC 1 to OFF.

1) Make sure the low pressure light goes off.

SUBTASK 71-00-00-860-709-G00

(5) Make sure that these switches on the overhead panel, P5, are in the OFF position.

(a) L PACK

(b) R PACK

SUBTASK 71-00-00-860-710-G00

(6) Make sure that these switches on the overhead panel, P5, are in the OFF position.

(a) WING ANTI - ICE

(b) ENG 1 ANTI - ICE

(c) ENG 2 ANTI - ICE

SUBTASK 71-00-00-860-711-G00

(7) Make sure that the BLEED AIR ISOLATION VALVE switch on the aft overhead panel, P5, is in the AUTO position.

SUBTASK 71-00-00-860-712-G00

(8) Make sure that these switches on the overhead panel, P5, are in the ON position.

(a) BLEED 1

(b) BLEED 2

SUBTASK 71-00-00-860-713-G00

(9) Make sure that the ENG 1 and ENG 2 EEC switches on the aft overhead panel, P5, show ON.

SUBTASK 71-00-00-860-714-G00

WARNING

PUT THE FUEL PUMP SWITCHES TO OFF IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. IF YOU DO NOT, FUMES IN THE TANK CAN INCREASE. A FIRE AND AN EXPLOSION CAN OCCUR.

(10) To operate a fuel pump(s), 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 to OFF if the LOW PRESSURE light comes on and stays on.

SUBTASK 71-00-00-860-715-G00

(11) For the left engine, put these switches on the overhead panel, P5, to the ON position:

(a) FUEL PUMP 1 FWD

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(b) FUEL PUMP 1 AFT

SUBTASK 71-00-00-860-716-G00

(12) For the right engine, put these switches on the overhead panel, P5, to the ON position:

(a) FUEL PUMP 2 FWD

(b) FUEL PUMP 2 AFT

SUBTASK 71-00-00-860-717-G00

(13) Put these switches on the overhead panel, P5, to the ON position:

NOTE: This step makes sure that the generator control relays and the generator fields are closed before the generators are applied to the buses.

(a) GEN 1

(b) GEN 2

SUBTASK 71-00-00-860-718-G00

(14) Move the ignition select switch to the R IGN position.

SUBTASK 71-00-00-860-719-G00

(15) Put the ENGINE START switch for the applicable engine to the GRD position and release.

SUBTASK 71-00-00-860-720-G00

(16) Make sure that these conditions occur:

(a) On the MDS engine display, the START VALVE OPEN message comes on and you see the indications for N2 and then N1.

(b) If the ground cart supplies the pneumatic power, you see a decrease in the pneumatic manifold duct pressure.

(c) If the APU supplies the pneumatic power, you see an increase in the pneumatic manifold duct pressure.

NOTE: The APU goes into the Main Engine Start (MES) mode which provides increased air flow and pressure. The MES mode operates when the start valve is selected open with the ENGINE START switch.

(d) The person on the ground sees the N1 rotor starts to turn in the counterclockwise direction.

SUBTASK 71-00-00-860-721-G00

(17) When the engine is at 25% N2 or the maximum motoring speed and 'MOTORING' is no longer displayed on the N2 dial, move the START LEVER switch to the IDLE position.

CAUTION DO NOT SET THE START LEVER SWITCH TO IDLE IF THE MAXIMUM MOTORING SPEED IS LESS THAN 20% N2. IF YOU DO, THE ENGINE CAN HAVE A HUNG OR HOT START. DAMAGE TO THE ENGINE CAN OCCUR.

(a) If the engine speed is less than 25% N2, you can move the START LEVER switch to the IDLE position when the engine is at its maximum motoring speed.

NOTE: The motoring flag is displayed when the engine requires bowed rotor motoring sequence.

NOTE: The maximum motoring speed is defined as the speed when the rate of increase in N2 is less than 1% during a 5 seconds time period. The maximum motoring speed should be no less than 20% N2.

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CAUTION

DO NOT OPERATE THE ENGINE STARTER BEYOND ITS LIMITS. DAMAGE TO THE STARTER CAN OCCUR.

(b) Make sure that you obey the starter operation limits (TASK 71-00-00-800-802-G00).

SUBTASK 71-00-00-860-722-G00

(18) Monitor the EGT and N2 carefully when you start the engine for unusual conditions.

NOTE: Under normal conditions, the engine will start (EGT increases) in 15 seconds after the START LEVER switch is moved to the IDLE position. The time from engine start to a stable idle must not be more than 120 seconds.

SUBTASK 71-00-00-860-723-G00

(19) Do these steps if the engine does not start (no EGT increase) in 15 seconds:

NOTE: If the engine does not start after 15 seconds, the EEC will automatically turn the fuel and ignition off.

(a) Move the START LEVER switch to the CUTOFF position.

(b) Continue to motor the engine for 60 seconds to remove all fuel from the engine.

(c) Move the ENGINE START switch to AUTO.

SUBTASK 71-00-00-860-724-G00

(20) Monitor the EGT, fuel flow, N1, N2 and engine oil indications as the engine accelerates to the idle speed.

NOTE: Make sure that the engine acceleration does not slow or stop before idle speed.

SUBTASK 71-00-00-860-725-G00

(21) Make sure that the starter disengages at or before 63% N2 and these conditions occur:

NOTE: When the starter disengages, the start switch will move from the GRD to the AUTO position automatically. If the start switch does not transition within 30 seconds, the EEC will command the SAV to close to minimize the possibility of damage to starter.

(a) The STARTER VALVE OPEN message on the MDS engine display goes off.

(b) The manifold duct pressure increases.

SUBTASK 71-00-00-860-726-G00

(22) If the starter disengages at more than 63% N2 or does not disengage, do these steps:

(a) Manually move the ENGINE START switch to the AUTO position.

(b) Make sure that the START VALVE OPEN message on the MDS engine display goes off.

(c) If the START VALVE OPEN message stays on, do these steps:

1) Move the BLEED ISOLATION VALVE switch to the CLOSE position.

2) Do the applicable step that follows to remove the pneumatic source:

a) Move the applicable BLEED 1 switch or BLEED 2 switch to the OFF position.

b) Move the APU BLEED switch to the OFF position.

3) Move the START LEVER switch to the CUTOFF position to stop the engine.

4) Disconnect the ground air source.

5) Refer to the FIM to isolate the cause of the starter fault.

SUBTASK 71-00-00-200-016-G00

(23) Make sure that the engine is stable at idle.

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(a) The engine is at stable idle when the EGT Start Limit Redline (tick mark) is no longer shown on the EGT indication.

NOTE: Do not change the airplane BLEED valve configuration or select the PACKS, ENG 1/2 ANTI-ICE, or WING ANTI-ICE on until the EGT start Limit Redline is no longer shown. Change the engine bleed configuration before the engine is stable at idle can lead to an engine no start or start stall.

SUBTASK 71-00-00-860-727-G00

(24) The usual engine parameters for a standard day engine start are as follows:

(a) N1: approximately 21%

(b) N2: approximately 71%

(c) EGT: Stable and in serviceable limits, approximately 485 degrees C (905 degrees F).

NOTE: At idle, the EGT can vary due to the engine condition, ambient temperature, altitude, and other factors. Engine condition and bleed configuration can cause EGT differences between engines. If N1, N2 and fuel flow are satisfactory and stable at minimum idle, it is not unusual to see EGT differences between the engines.

(d) Fuel flow: approximately 630 lb/hr (286 kg/hr).

SUBTASK 71-00-00-860-728-G00

CAUTION

STOP THE ENGINE IF THE OIL PRESSURE IS BELOW MINIMUM LIMITS. FIND THE CAUSE OF THE CONDITION BEFORE YOU START THE ENGINE AGAIN. DAMAGE TO THE ENGINE CAN OCCUR.

(25) Make sure that the oil pressure is stable and greater than 17 PSIG when the engine is at idle speed (TASK 71-00-00-800-802-G00).

NOTE: During cold weather conditions, the oil pressure can go above the normal operation limits for a short time due to high oil viscosity. While the engine temperature increases, the oil pressure will decrease.

SUBTASK 71-00-00-860-729-G00

(26) On the MDS engine display, make sure that the applicable LOW OIL PRESSURE message goes off.

SUBTASK 71-00-00-860-730-G00

(27) Make sure that the master caution light did not come on during the engine start.

SUBTASK 71-00-00-860-731-G00

(28) On the overhead panel, P5, make sure the applicable generator 1 DRIVE or 2 DRIVE light goes out.

SUBTASK 71-00-00-860-732-G00

(29) On the overhead panel, P5, move the APU BLEED switch to the OFF position.

SUBTASK 71-00-00-860-733-G00

(30) On the overhead panel, P5, push the EEC MODE switch to ALTN and then to ON.

SUBTASK 71-00-00-860-734-G00

(31) Let the engine run at the idle for a minimum of 5 minutes before you accelerate the engine.

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SUBTASK 71-00-00-860-735-G00

(32) Check the STATUS MESSAGES page to make sure that there are no new status messages (TASK 31-65-00-750-801).

NOTE: Before you start an engine with the battery power only (no AC power), the MAINT light will come on. After the engine starts, you need to make sure there are no new status messages.

SUBTASK 71-00-00-860-736-G00

WARNING

DO NOT GO NEAR THE ENGINE WHEN THE ENGINE OPERATES ABOVE MINIMUM IDLE. THERE ARE NO SAFE AREAS AROUND AN ENGINE WHEN THE ENGINE SPEED IS ABOVE MINIMUM IDLE. SERIOUS INJURY OR DEATH AND DAMAGE TO EQUIPMENT COULD OCCUR.

(33) Remove the pneumatic power if it is not necessary (TASK 36-00-00-860-806).

NOTE: Make sure that the engine is at minimum idle before you disconnect the ground air cart from the airplane. The connection for the pneumatic power is in the dangerous zone of the inlet area for the right engine.

——— END OF TASK ———

TASK 71-00-00-910-806-G00

16. Stop the Engine (Usual Engine Stop)

A. General

(1) This task provides the instructions on how to stop the engine.

(2) This task also provides the instruction after you stop the engine in cold weather.

B. References

Reference	Title
36-00-00-860-801	Supply Pressure to the Pneumatic System (Selection) (P/B 201)
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Usual Engine Stop

SUBTASK 71-00-00-910-018-G00

(1) If during this usual engine stop procedure you see signs that an internal engine fire, external engine fire, engine failure or stall is occurring or will occur, do this task: Stop the Engine Procedure (Emergency Engine Stop), TASK 71-00-00-910-807-G00.

SUBTASK 71-00-00-860-111-G00

(2) Move the thrust lever for the applicable engine to the minimum idle position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-868-001-G00

CAUTION

DO NOT STOP THE ENGINE UNTIL THE ROTORS AND CASE TEMPERATURE IS COOL AND STABLE. IF YOU STOP THE ENGINE WITH A HIGH TEMPERATURE, THE ROTORS CAN LOCK. DAMAGE TO THE ENGINE CAN OCCUR.

(3) If you operate the engine at more than minimum idle, decrease the engine speed to idle and operate at idle as follows:

NOTE: This will also permit temperatures below the cowling to decrease and not overheat the core-mounted components.

(a) If the engine was operated at more than idle, operate the engine at idle for a minimum of 3 minutes before you stop the engine.

NOTE: Taxi time at or near the idle speed can be part of the three minute time limit to cool the engine.

(b) If the engine was operated at high static thrust, operate the engine at idle for a minimum of 10 minutes before you stop it.

NOTE: Maximum power assurance check and high thrust settings used to do the vibration survey are examples of high static thrust.

NOTE: The 10 minute idle period is necessary to stabilize the engine temperature and reduce the undercowl soak-back temperatures before shutdown.

SUBTASK 71-00-00-861-001-G00

CAUTION

DO NOT STOP THE ENGINE WITHOUT A SOURCE OF PNEUMATIC POWER FOR ENGINE MOTORING. IF AN INTERNAL ENGINE FIRE OCCURS, YOU MUST DRY-MOTOR THE ENGINE. DAMAGE CAN OCCUR IF YOU CANNOT DRY-MOTOR THE ENGINE.

(4) Do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.

SUBTASK 71-00-00-860-112-G00

(5) Make sure that these switches, on the P5 aft overhead panel, are set as follows:

NOTE: This will make sure that a pneumatic source is available if an internal engine fire occurs.

(a) The APU switch, BLEED 1 and BLEED 2 switches are in the ON position.

(b) The ISOLATION VALVE switch is in the OPEN position.

SUBTASK 71-00-00-860-113-G00

CAUTION

MONITOR EGT AND FUEL FLOW FOR SIGNS THAT THE EGT OR FUEL FLOW DECREASES TOO SLOWLY. THIS IS AN INDICATION OF AN INTERNAL ENGINE FIRE OR A TAILPIPE FIRE OR THE ENGINE FUEL VALVE IS STILL OPEN.

(6) Set the applicable start lever on the control stand to the CUTOFF position.

SUBTASK 71-00-00-860-114-G00

(7) Monitor the EGT, N1, N2, and the fuel flow indication while the engine stops.

NOTE: Decrease in engine temperature and rotor speed is an indication fuel flow has been cut off from the engine.

NOTE: After the engine shutdown is completed, oil pressure indication can show a residual pressure. The residual oil pressure limit is +/- 7 psi (48 kPa).

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SUBTASK 71-00-00-212-014-G00

(8) Look for indications of fire after the engine is stopped.

NOTE: EGT may increase after the engine is shutdown and the rotors have stopped turning. EGT increase due to temperature soak back is normal and not a sign of a fire.

SUBTASK 71-00-00-212-015-G00

(9) If you see signs of a fire, immediately, do this task: Stop the Engine Procedure (Emergency Engine Stop), TASK 71-00-00-910-807-G00.

SUBTASK 71-00-00-212-016-G00

(10) Put the L PACK and R PACK switches, on the P5 overhead panel, to the OFF position.

SUBTASK 71-00-00-860-115-G00

(11) For the left engine, put these switches, on the P5 overhead panel, to the OFF position:

(a) FUEL PUMP 1 FWD

(b) FUEL PUMP 1 AFT.

SUBTASK 71-00-00-860-116-G00

(12) For the right engine, put these switches, on the P5 overhead panel, to the OFF position:

(a) FUEL PUMP 2 FWD

(b) FUEL PUMP 2 AFT.

SUBTASK 71-00-00-860-117-G00

(13) Make sure that the fuel LOW PRESSURE message for the applicable engine comes on.

E. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-118-G00

(1) Put the PROBE HEAT A and B switches, on the P5 overhead panel, to the AUTO position.

SUBTASK 71-00-00-860-119-G00

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

CAPT Electrical System Panel, P18-3

Row	Col	Number	Name
C	7	C01678	WEATHER RADAR RT RIGHT

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	13	C00120	WEATHER RADAR RT

SUBTASK 71-00-00-860-J14-G00

(3) If opened, remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
C	9	C00109	FLIGHT RECORDER AC
C	10	C00468	FLIGHT RECORDER DC

SUBTASK 71-00-00-860-J09-G00

(4) If the pneumatic power is not necessary, remove the pressure from the pneumatic system (TASK 36-00-00-860-806).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-860-122-G00

(5) When it is practical or operator policy, it is recommended that you install the engine inlet and exhaust covers on the engine.

NOTE: In cold weather, snow and rain can enter the engine and form ice when the engine is not in operation. Ice can lock the rotors to the stators. Ice can also cause the rotor system to be unbalanced. After shutdown in cold weather, install the inlet and exhaust covers on the engine when the temperature of the engine has decreased sufficiently (usually two to four hours).

——— END OF TASK ———

TASK 71-00-00-910-807-G00

17. Stop the Engine Procedure (Emergency Engine Stop)

A. General

(1) This task provides the steps that are necessary to stop the engine in an emergency.

(2) An emergency can be an internal or external engine fire, or an engine failure or an engine stall.

(3) In an emergency, the engine must be immediately isolated from the airplane fuel supply.

(4) If an internal fire cannot be extinguished by motoring the engine or if motoring is not possible, the fire must be extinguish with a portable fire extinguisher.

(5) The use of fire extinguishing agents to put out a fire must be reported for maintenance actions.

B. References

Reference	Title
71-00-00-200-801-G00	Engine Exposure to Fire and Extinguishing Agents Inspection (P/B 601)

C. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
411	Engine 1 - Engine
421	Engine 2 - Engine

ECCN 9E991 BOEING PROPRIETARY - See title page for details

D. Emergency Engine Stop Procedure

SUBTASK 71-00-00-910-001-G00

CAUTION

DO NOT USE A FIRE EXTINGUISHING AGENT UNLESS THE ENGINE DRY-MOTOR PROCEDURE DOES NOT STOP THE FIRE. IF YOU USE FIRE EXTINGUISHING AGENTS, ENGINE REMOVAL IS MANDATORY.

(1) If an engine has an internal engine fire, do these steps:

NOTE: An internal engine fire during a start or shutdown can be heard and seen by ground personnel as smoke or fire from the primary nozzle.

NOTE: The EGT may or may not be above the redline limit. An EGT indication is not available if the N2 speed is below 4%. N2 speed above 4% is necessary to keep electrical power to the EEC.

NOTE: The hot section of the engine can be resistant to very high temperatures. Usually, if the fire is permitted to burn until the engine can be dry motored, there will be less damage to the engine. There will be more damage to the engine if a fire extinguisher is used. The chemicals from the fire extinguisher can cause corrosion to the engine components. The engine can also be damaged if the engine components do not cool equally.

(a) Move the thrust lever for the applicable engine to the idle position.

(b) Put the applicable start lever to the CUTOFF position.

(c) Monitor the EGT, N1, N2, and fuel flow on the MDS engine display for indication of an engine shutdown.

CAUTION

DO NOT ENGAGE THE STARTER AGAIN WHEN THE ENGINE IS AT OR MORE THAN IDLE. DAMAGE TO THE STARTER CAN OCCUR.

(d) When the N2 speed decreases below 60%, do these steps:

1) Set the applicable engine start switch on the overhead panel, P5, to the GRD position.

NOTE: Make sure that pneumatic air pressure is available to motor the engine.

2) Motor the engine for 30 seconds, or until the fire goes out.

NOTE: Do not obey the starter duty limits if you have an internal engine fire.

(e) If the internal fire continues, use a fire extinguishing agent to put out the fire.

1) After the fire is extinguished, do this task: Engine Exposure to Fire and Extinguishing Agents Inspection, TASK 71-00-00-200-801-G00.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-800-029-G00

(2) If the engine has an external engine fire (cowls open or closed), do these steps:

NOTE: In the event of a failure of the engine starting system, N2 speed will be low during motoring. Failure of the air turbine starter can trigger the engine overheat and fire indications.

NOTE: With the engine cowls closed, the engine fire extinguishing system is discharged in an enclosed volume under the cowl. This will have a good effect on a fire on the external surface of the engine.

NOTE: With the engine cowls opened, the engine fire extinguishing system is discharge in the open and is not enclosed. This will not have a good effect on a fire on the external surface of the engine.

(a) Move the forward thrust lever to the idle position.

(b) Set the start lever on the control stand to the CUTOFF position.

(c) Pull the applicable engine fire handle (DISCH 1 or 2) on the P8 panel of the control stand.

NOTE: This will put the engine fire switch handle (DISCH 1 or 2) in the ready position.

(d) For the left engine, put these switches on the overhead panel, P5, to the OFF position:

1) FUEL PUMP 1 FWD

2) FUEL PUMP 1 AFT.

(e) For the right engine, put these switches on the P5 panel to the OFF position:

1) FUEL PUMP 2 FWD

2) FUEL PUMP 2 AFT.

(f) Turn the applicable engine fire handle (DISCH 1 or 2) to the left or right and hold for 1 second.

NOTE: This will discharge the left or right fire extinguishing bottle.

(g) If the fire warning continues, do this step:

1) Turn the engine fire handle in the opposite position and hold for 1 second.

NOTE: This will discharge the second fire extinguishing bottle.

(h) Report the use of fire extinguishing agents to identify the necessary correct maintenance actions.

1) After the fire is extinguished, do this task: Engine Exposure to Fire and Extinguishing Agents Inspection, TASK 71-00-00-200-801-G00.

SUBTASK 71-00-00-800-030-G00

(3) If the engine has a failure or stall, do these steps:

(a) Move the thrust lever to the minimum idle position.

NOTE: An increase in vibration levels with sudden changes in engine parameters, could indicate an engine failure. The engine is to be stopped and the cause of the vibration or parameters change corrected. Do not try to re-start an engine until the cause of the vibration and parameter changes is identified and corrected.

(b) Set the applicable start lever switch on the control stand to the CUTOFF position.

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(c) Find the type of failure.

NOTE: If loud noises, such as bangs, bumps are heard, or if there was significant vibrations, do not attempt another engine start.

NOTE: An engine flameout will show an immediate decrease in EGT and N2 followed closely by a decrease in N1. Low oil pressure and abnormal electrical indications will also occur.

(d) If the flameout was not caused by an engine failure, do these steps:

NOTE: During a rapid engine shutdown, cooling air through the engine decreases quickly and stops as soon as the engine rotors stop. The sudden loss of cooling air can cause a turbine blade-to-shroud rub and the seizure of the Low Pressure Turbine (LPT).

1) Dry motor the engine for 30 seconds or more to make sure that the N1 and N2 rotors operate satisfactorily (TASK 71-00-00-910-808-G00).

NOTE: The air turbine starter has a duty cycle of 5 minutes of continuous operation for ground operation.

2) Start the engine to make sure that the N1, N2, and main oil pressure are satisfactory (TASK 71-00-00-910-802-G00).

(e) If the flameout was caused by an engine failure, do this step:

1) Correct the cause of the failure before you dry motor or do another engine start.

——— END OF TASK ———

TASK 71-00-00-910-808-G00

18. Dry Motor Procedure

A. General

(1) This task gives the instructions to dry motor the engine.

(2) This task motors the engine with the starter without ignition or fuel to the combustion chamber.

(3) Use this task to remove the fuel that remains in the engine after wet motoring or to accelerate the EGT cooling after engine shutdown.

NOTE: It is normal to see oil wetting or coking in the exhaust plug center vent tube extension (CVTE) after engine dry or wet motoring.

(4) Use this task for all maintenance operation where it is necessary to motor the engine unless the wet motor procedure is specified.

(5) The fan cowl panels and the thrust reversers can be open when you do this task.

B. References

Reference	Title
36-00-00-860-803	Supply Pressure to the Pneumatic System with the APU (P/B 201)
71-00-03-630-801-G00	Preservation of an Engine on Wing for 30 Days to 1 Year (P/B 201)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

ECCN 9E991 BOEING PROPRIETARY - See title page for details

D. Prepare for the Dry Motor Procedure

SUBTASK 71-00-00-860-124-G00

(1) Do this task: Prepare the Engine for Operation, TASK 71-00-00-910-801-G00.

SUBTASK 71-00-00-860-531-G00

(2) Start the Auxiliary Power Unit (APU) and supply air pressure to the pneumatic system (TASK 36-00-00-860-803).

SUBTASK 71-00-00-860-125-G00

(3) Make sure that these switches, on the P5 overhead panel, are in the OFF position.

(a) L PACK

(b) R PACK.

SUBTASK 71-00-00-860-126-G00

(4) Make sure that these switches, on the P5 overhead panel, are in the OFF position.

(a) WING ANTI - ICE

(b) ENG 1 ANTI - ICE

(c) ENG 2 ANTI - ICE.

SUBTASK 71-00-00-860-127-G00

(5) On the P5 overhead panel, make sure that the BLEED AIR ISOLATION VALVE switch is in the OPEN position.

SUBTASK 71-00-00-860-128-G00

(6) Make sure that these switches, on the P5 overhead panel, are in the OFF position.

(a) BLEED 1

(b) BLEED 2.

SUBTASK 71-00-00-860-129-G00

(7) If hydraulic pressure is not necessary, do this step for the applicable engine:

(a) Make sure that these switches, on the P5 overhead panel, are in the OFF position.

1) HYD PUMPS A ENG 1

2) HYD PUMPS B ENG 2.

SUBTASK 71-00-00-860-132-G00

(8) For the applicable engine, 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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-860-133-G00

CAUTION ENGINE FUEL SYSTEM COMPONENTS ARE FUEL LUBRICATED. DO NOT MOTOR THE ENGINE UNLESS THE BOOST PUMP PRESSURE IS APPLIED TO THE FUEL PUMP INLET. IF YOU DO NOT OBEY THIS CAUTION, YOU CAN CAUSE DAMAGE TO THE ENGINE.

CAUTION DO NOT APPLY BOOST PUMP PRESSURE TO THE FUEL PUMP INLET WHEN YOU DRY-MOTOR THE ENGINE WITH THE DISCONNECTED FUEL LINE. FUEL WILL SPILL ON THE ENGINE AND CAUSE DAMAGE TO THE EQUIPMENT.

(9) On the engine to be dry motored, apply the boost pump pressure to the fuel pump inlet as follows:

NOTE: This step is not required if you are dry motoring and the fuel line is disconnected and capped as part of engine preservation procedure. Fuel boost pump pressure can cause the cap on the supply line to come off and fuel to spill on the engine.

(a) For engine 1, make sure that this circuit breaker is closed:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1

(b) For engine 2, make sure that this circuit breaker is closed:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2

(c) Move the applicable start lever to the IDLE position.

(d) Make sure that the applicable SPAR VALVE CLOSED light, on the P5 overhead panel, comes on bright and then goes off.

NOTE: The momentary SPAR VALVE CLOSED light occurs when the valve is in transition from close to open.

NOTE: The applicable ENG VALVE CLOSED light will change to bright and not go off because engine fuel pump pressure (N2 turns) is necessary to open the valve.

(e) For engine 1, open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1

(f) For engine 2, open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2

(g) Move the applicable start lever to the CUTOFF position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-860-134-G00

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.

(10) Make sure that you are in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.

NOTE: This step is not required if you dry motor the engine for this procedure: Preservation of an Engine on Wing for 30 Days to 1 Year, TASK 71-00-03-630-801-G00.

NOTE: Immediately set the applicable fuel pump switch to OFF if the LOW PRESSURE light comes on and stays on.

(a) For the left engine, put these switches, on the P5 overhead panel, to the ON position:

1) FUEL PUMP 1 FWD

2) FUEL PUMP 1 AFT.

(b) For the right engine, put these switches, on the P5 overhead panel, to the ON position:

1) FUEL PUMP 2 FWD

2) FUEL PUMP 2 AFT.

E. Dry Motor Procedure

SUBTASK 71-00-00-860-137-G00

(1) Turn the applicable engine start switch to the GRD position and make sure that these conditions occur:

(a) The START VALVE OPEN message comes on.

(b) Pneumatic manifold duct pressure increases.

(c) N1 and N2 indications are displayed and increasing.

(d) The person on the ground sees the N1 rotor starts to turn in the counterclockwise direction.

SUBTASK 71-00-00-860-138-G00

(2) Make sure that you see a positive oil pressure indication.

SUBTASK 71-00-00-860-139-G00

(3) Make sure that the N2 speed becomes stable at 24 - 32%.

NOTE: N2 will not increase above 24% until the bowed rotor motoring sequence is complete. The 'MOTORING' flag is displayed over the N2 gauge while the engine does the bowed rotor motoring procedure.

SUBTASK 71-00-00-860-140-G00

CAUTION DO NOT OPERATE THE ENGINE STARTER BEYOND ITS LIMITS. DAMAGE TO THE STARTER CAN OCCUR.

(4) Make sure that you obey the starter operation limits (TASK 71-00-00-800-802-G00).

NOTE: It is normal to see oil wetting or coking in the exhaust plug center vent tube extension (CVTE) after engine dry or wet motoring.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-860-141-G00

(5) Put the applicable engine start switch to the OFF position to stop the dry motor procedure.

(a) Make sure that the START VALVE OPEN message goes out.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-144-G00

(1) Remove the safety tags and close the applicable 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

SUBTASK 71-00-00-860-J12-G00

(2) Make sure that applicable SPAR VALVE CLOSED and ENG VALVE CLOSED lights illuminate dim, when the valve is closed.

SUBTASK 71-00-00-860-145-G00

(3) For the applicable engine, remove the safety tags and close these applicable 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

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 71-00-00-070-002-G00

(4) Erase all status messages related to the engine ignition system not receiving aircraft power that may have set during the dry motor.

——— END OF TASK ———

TASK 71-00-00-910-809-G00

19. Wet Motor Procedure

A. General

(1) This task gives the instructions to wet motor the engine.

(2) This task motors the engine with the starter and fuel to the combustion chamber but without ignition.

(3) Only use this task for all maintenance operations that tell you to motor the engine with fuel to the combustion chamber. Use the Dry Motor Procedure for all other motor tasks. It is normal to see oil wetting or coking in the exhaust plug center vent tube extension (CVTE) after engine dry or wet motoring.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(4) This task can be used with the wet motor leak check.

(5) The task can be done with the fan cowl panels and the thrust reversers open.

B. References

Reference	Title
36-00-00-860-803	Supply Pressure to the Pneumatic System with the APU (P/B 201)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Prepare for the Wet Motor

SUBTASK 71-00-00-860-146-G00

(1) Do this task: Prepare the Engine for Operation, TASK 71-00-00-910-801-G00.

SUBTASK 71-00-00-860-537-G00

(2) Start the Auxiliary Power Unit (APU) and supply air pressure to the pneumatic system (TASK 36-00-00-860-803).

SUBTASK 71-00-00-700-002-G00

(3) Make sure that these switches, on the P5 overhead panel, are in the OFF position.

(a) L PACK

(b) R PACK.

SUBTASK 71-00-00-860-147-G00

(4) Make sure that these switches, on the P5 overhead panel, are in the OFF position.

(a) WING ANTI - ICE

(b) ENG 1 ANTI - ICE

(c) ENG 2 ANTI - ICE.

SUBTASK 71-00-00-860-148-G00

(5) Make sure that the BLEED AIR ISOLATION VALVE switch, on the P5 overhead panel, is in the OPEN position.

SUBTASK 71-00-00-860-149-G00

(6) If hydraulic pressure is not necessary, do this step for the applicable engine:

(a) Make sure that these switches, on the P5 overhead panel, are in the OFF position.

1) HYD PUMPS A ENG 1

2) HYD PUMPS B ENG 2.

SUBTASK 71-00-00-860-538-G00

(7) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button on the P9 MFD control panel.

(b) Push the SEL button on SELECTOR knob on the P9 MFD control panel.

SUBTASK 71-00-00-860-539-G00

(8) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the TEST position (TASK 73-21-00-800-801-G00).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-860-540-G00

(9) Set the GND TESTS switch, on the P61-4 maintenance BITE panel, to the ENABLE position.

SUBTASK 71-00-00-860-151-G00

(10) Make sure that the two VIBRATION indications on the MDS engine display are zero.

NOTE: A blank vibration indication is a sign of a system malfunction.

SUBTASK 71-00-00-860-152-G00

(11) For the applicable engine, 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 71-00-00-860-683-G00

CAUTION

ENGINE FUEL SYSTEM COMPONENTS ARE FUEL LUBRICATED. DO NOT MOTOR THE ENGINE UNLESS THE BOOST PUMP PRESSURE IS APPLIED TO THE FUEL PUMP INLET. IF YOU DO NOT OBEY THIS CAUTION, YOU CAN CAUSE DAMAGE TO THE ENGINE.

CAUTION

DO NOT APPLY BOOST PUMP PRESSURE TO THE FUEL PUMP INLET IF YOU DRY MOTOR THE ENGINE FOR THE TASK OF THE PRESERVATION OF AN ON-WING ENGINE. FUEL WILL SPILL ON THE ENGINE AND CAUSE DAMAGE TO THE EQUIPMENT.

(12) On the engine to be wet motored, apply the boost pump pressure to the fuel pump inlet as follows:

(a) For engine 1, make sure that this circuit breaker is closed:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1

(b) For engine 2, make sure that this circuit breaker is closed:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2

(c) Move the applicable start lever to the IDLE position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(d) Make sure that the applicable SPAR VALVE CLOSED light, on the P5 overhead panel, comes on bright and then goes off.

NOTE: The momentary SPAR VALVE CLOSED light occurs when the valve is in transition from close to open.

NOTE: The applicable ENG VALVE CLOSED light will change to bright and not go off because engine fuel pump pressure (N2 turns) is necessary to open the valve.

(e) For engine 1, open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1

(f) For engine 2, open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2

(g) Move the applicable start lever to the CUTOFF position.

SUBTASK 71-00-00-860-153-G00

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 you are in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.

NOTE: Immediately set the applicable fuel pump switch to OFF if the LOW PRESSURE light comes on and stays on.

SUBTASK 71-00-00-860-154-G00

(14) For engine 1, put these switches, on the P5 overhead panel, to the ON position:

(a) FUEL PUMP 1 FWD

(b) FUEL PUMP 1 AFT.

SUBTASK 71-00-00-860-462-G00

(15) For engine 2, put these switches, on the P5 overhead panel, to the ON position:

(a) FUEL PUMP 2 FWD

(b) FUEL PUMP 2 AFT.

E. Wet Motor Procedure

SUBTASK 71-00-00-860-155-G00

WARNING

MAKE SURE THAT ALL PERSONNEL AND EQUIPMENT ARE CLEAR OF THE ENGINE BEFORE YOU START THIS GROUND TEST. THE ENGINE COMPONENTS WILL MOVE AND THE ENGINE ROTORS WILL TURN DURING THIS GROUND TEST. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(WARNING PRECEDES)

CAUTION MAKE SURE THAT EGT IS LESS THAN 100°C (212°F) BEFORE YOU DO THE WET MOTOR PROCEDURE. IF YOU DO NOT OBEY, ENGINE DAMAGE AND FIRE CAN OCCUR.

(1) Turn the applicable engine start switch to the GRD position and make sure these conditions occur:

(a) The START VALVE OPEN message comes on.

(b) Pneumatic manifold duct pressure increases.

(c) N1 and N2 indications are displayed and increasing.

(d) The person on the ground sees the N1 rotor starts to turn in the counterclockwise direction.

SUBTASK 71-00-00-860-541-G00

(2) Make sure that you see a positive oil pressure indication.

SUBTASK 71-00-00-860-542-G00

(3) Make sure that the N2 speed becomes stable at 24 - 32%.

NOTE: N2 will not increase above 24% until the bowed rotor motoring sequence is complete. The 'MOTORING' flag is displayed over the N2 gauge while the engine does the bowed rotor motoring procedure.

SUBTASK 71-00-00-860-156-G00

(4) At a minimum 20% N2, move the applicable start lever to the IDLE position and do these steps:

(a) Make sure that you do not see an EGT rise.

NOTE: If you see an EGT rise, this is an indication of an engine internal or tailpipe fire. If this occurs, move the start lever to the cutoff position and continue to motor the engine to extinguish the fire.

(b) Make sure that the ENG VALVE CLOSED light, on the P5 overhead panel, goes off.

(c) Make sure that you see positive oil pressure and positive fuel flow indications.

SUBTASK 71-00-00-860-157-G00

(5) Motor the engine for a maximum of 15 seconds per MFD screen or until you can see fuel vapors from the primary nozzle.

NOTE: As the ignition system circuit breakers are pulled, the EEC may set the ENG X IGNITER R and/or ENG X IGNITER L Status message during the wet motor. No fault isolation is required for these faults.

SUBTASK 71-00-00-860-158-G00

(6) Put the applicable engine start lever to the CUTOFF position to stop the wet motor procedure.

SUBTASK 71-00-00-210-053-G00

(7) Make sure that the fuel flow indication decreases to zero.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-860-159-G00

CAUTION

DO NOT OPERATE THE ENGINE STARTER BEYOND ITS LIMITS. DAMAGE TO THE STARTER CAN OCCUR.

(8) Continue to motor the engine for 60 - 90 seconds per MFD screen to remove the fuel that remains.

NOTE: Oil wetting or coking in exhaust plug center vent tube extension (CVTE) is usual.

SUBTASK 71-00-00-860-160-G00

(9) Put the applicable engine start switch to the AUTO position.

(a) Make sure that the START VALVE OPEN message goes out.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-161-G00

(1) For engine 1, put these switches, on the P5 overhead panel, to the OFF position:

(a) FUEL PUMP 1 FWD

(b) FUEL PUMP 1 AFT.

SUBTASK 71-00-00-860-463-G00

(2) For engine 2, put these switches, on the P5 overhead panel, to the OFF position:

(a) FUEL PUMP 2 FWD

(b) FUEL PUMP 2 AFT.

SUBTASK 71-00-00-860-682-G00

(3) Close the spar valve circuit breaker on the applicable engine.

(a) For engine 1, close this circuit breaker:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1

(b) For engine 2, close this circuit breaker:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2

SUBTASK 71-00-00-860-J13-G00

(4) Make sure that applicable SPAR VALVE CLOSED and ENG VALVE CLOSED lights illuminate dim, when the valve is closed.

SUBTASK 71-00-00-860-162-G00

(5) For the applicable engine, remove the safety tags and close these applicable 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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 71-00-00-070-001-G00

(6) Erase all status messages related to the engine ignition system not receiving aircraft power that may have set during the wet motor.

SUBTASK 71-00-00-860-543-G00

(7) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the NORM position (TASK 73-21-00-800-801-G00).

SUBTASK 71-00-00-860-544-G00

(8) Set the GND TESTS switch, on the P61-4 maintenance BITE panel, to the NORM position.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

POWER PLANT - ADJUSTMENT/TEST

1. General

A. This procedure contains the necessary tests to make sure that the engine operates correctly after components are repaired or replaced as follows:

(1) Test No. 1 - Pneumatic Leak Test
(2) Test No. 2 - Dry Motor Leak Test
(3) Test No. 3 - Wet Motor Leak Test
(4) Test No. 4 - Idle Leak Test
(5) Test No. 5 - Part Power Leak Test
(6) Test No. 6 - Power Assurance Test
(7) Test No. 7- Replacement Engine (Pretested Engine) Test
(8) Test No. 8 - Replacement Engine (Untested Engine) Test
(9) Test No. 9 - Low Pressure System (Fan/LPT) Vibration Survey
(10) Test No. 10 - High Pressure System (HPC/HPT) Vibration Survey
(11) Test No. 11 - Low Pressure System (Fan) Trim Balance (with ONS)
(12) Test No. 12 - Thrust Lever Interlock Operational Test
(13) Test No. 15 - Actuators Operational Test
(14) Test No. 16 - Harness System Test
(15) Test No. 17 - Electronic Engine Control (EEC) System Test
(16) Test No. 18 - EEC Channel A Ignition System Test
(17) Test No. 19 - EEC Channel B Ignition System Test

SIA 001-005 PRE SB 737-CFM-LEAP-1B-75-0010 AND PRE SB 737-CFM-LEAP-1B-75-0011; EEC HARDWARE BLOWER SYSTEM INSTALLED

(18) Test No. 24 - EEC Blower Test

SIA ALL

(19) Test No. 25 - Fuel System Preservation Special Functions Test
(20) Test No. 26 - Debris Monitoring System Channel B Special Functions Test
(21) Test No. 27 - Clear Engine SMT Message
(22) Test No. 29 - Water Wash Special Functions Test
(23) Test No. 30 - Engine Running Simulation Special Functions Test
(24) Test No. 31 - Wet Motor Ground Test
(25) Test No. 32 - Engine Idle System Test
(26) Test No. 33 - Lamp Check Out Special Functions Test
(27) Test No. 34 - Menu Mode Hardware Code Entry Special Functions Test
(28) Test No. 35 - Erase All Channel A Faults Special Functions Test
(29) Test No. 36 - Erase All Channel B Faults Special Functions Test
(30) Test No. 37 - Engine Serial Number Entry Special Functions Test
(31) Test No. 38 - Thrust Reverser Cycle Special Functions Test.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-00-00-800-804-G00

2. Power Plant Test Reference Table

A. General

(1) This task identifies the necessary tests that are required after the repair or replacement a component on the engine.

B. References

Reference	Title
12-13-11-600-801	Engine Servicing (Oil Replenishing) (P/B 301)
24-11-00-700-803	Number 1 IDG Operational Test (P/B 501)
24-11-00-700-804	Number 2 IDG Operational Test (P/B 501)
36-11-00-700-802	Engine Bleed Air System - Leak Check (P/B 501)
71-00-00-970-801-G00	Maintenance Data Pages from the Engine Propulsion Control System (EPCS) (P/B 201)
73-21-09-700-801-G00	Data Entry Plug Configuration Check (P/B 601)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Power Plant Test Reference

SUBTASK 71-00-00-720-001-G00

(1) The power plant test reference table shows the necessary tests that are required after the repair or replacement of an applicable component.

Table 501/71-00-00-993-849-G00

Component Repaired or Replaced	Test *[1]
AGB	4, 5
AGB Manual Control Cover	4
AGB Rotating Seals	5
Air Ducts (Non LRU Items)	4 *[2]
Air Duct Seals (Fan Compartment and Environmental Control System)	1
Air Tubes (Non LRU Items)	4 *[2]
Data Entry Plug (DEP)	17*[3]
Engine (Pretested)	7
Engine (Untested)	8
Engine Control Electrical Harnesses	17
Electronic Engine Control (EEC) (Channel A)	37, 17*[4]
Electronic Engine Control (EEC) (Channel B)	37, 17, 26 *[4]*[5]
SIA 001-005 PRE SB 737-CFM-LEAP-1B-75-0010 AND PRE SB 737-CFM-LEAP-1B-75-0011; EEC HARDWARE BLOWER SYSTEM INSTALLED	
Electronic Engine Control (EEC) Cooling Blower	24

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SIA 001-005 PRE SB 737-CFM-LEAP-1B-75-0010 AND PRE SB 737-CFM-LEAP-1B-75-0011; EEC HARDWARE BLOWER SYSTEM INSTALLED (Continued)

Table 501/71-00-00-993-849-G00 (Continued)

Component Repaired or Replaced	Test *[1]
SIA ALL	
Engine Surface Air Cooling Oil Coolers (SACOC)	4
Fan Blade Individual Replacement	9 *[6]
Fan Blades Pair Replacement (more than 3 pairs)	9 *[6]
Fan Blades Set Replacement	9 *[6]
Fuel Filter Cartridge	2*[7]
Fuel Filter Differential Pressure (DP) Transducer	32
Fuel Flow Transmitter (FFT)	32 *[8]
Fuel Lines / Tubes	4*[7]
Fuel Manifold Pressure Transducer	32 *[8]
Fuel Nozzles	4*[7]
FMU Fuel Strainer Differential Pressure (DP) Transducer	32
Fuel Metering Unit (FMU)	15, 32*[7]
Fuel Metering Unit (FMU) Strainer	2
HPT ACC Valve	32
Hydraulic Engine Driven Pump	2
IDG	4, *[9]
IDG Fuel/Oil Heat Exchanger	4
IDG Oil Level Sight glass	2
IDG Oil (IN) Temperature Sensor	4
IDG Oil (OUT) Temperature Sensor	4
Igniter	18, 19
Ignition Exciter	18, 19
Ignition Lead	18, 19
Inlet Cowl	*[10]
LPTACC Valve	32
Lubrication Unit	4
Magnetic Bar	4
Main Fuel Filter Housing	2, 17*[7]
Main Fuel/Oil Heat Exchanger (MHX)	32*[7]
Main Fuel/Oil Heat Exchanger (MHX) Differential Pressure (DP) Transducer	32
Main Fuel Pump (MFP)	2 or 4*[7]
Main Fuel Supply Hose	2*[7]

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Table 501/71-00-00-993-849-G00 (Continued)

Component Repaired or Replaced	Test *[1]
Modulated Turbine Cooling (MTC) Actuators	32
Modulated Turbine Cooling (MTC)	32
N1 Speed Sensor	32 *[8]
N2 Speed Sensor	32 *[8]
ODMS Unit	17
ODMS Sensor	17, 26 *[5]*[11]
ODMS Separator	4
Oil Eductor Air Valve	2
Oil Filter Cartridge Element	4
Oil Filter Differential Pressure (DP) Sensor	32
Oil Level (EOL) Sensor	4 *[8]
Oil Pressure and Temperature (OPT) Sensor	32
Oil System Flushing	4
Oil Supply Tube	4
Oil Supply Tube (Squeeze Film)	4
Oil Tank	4
Oil Tank Cap Assembly	4
Oil Tank Cap Packing Assembly	4
Oil Tank Filler Cap	4
Oil Tank Lower Strainer	4
Pressure Sub-System (PSS)	32
Permanent Magnet Alternator (PMA) Stator and Rotor	32
Scavenge Screen Plug	4
Servo Fuel Heater (SFH)	4
Split Control Unit (SCU) and Servo Valve Assembly (SVA)	15, 32
Starter	1, 32
Starter Air Valve (SAV)	1, 15
Start Bleed/Booster Anti-Ice (SB/BAI) Valve	15
T3 Sensor	17
T12 Sensor	17
T25	17
T48 EGT Harnesses	17
T48 EGT Sensors	17
Transfer Gearbox (TGB) Assembly	4, 5, and *[12]

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Table 501/71-00-00-993-849-G00 (Continued)

Component Repaired or Replaced	Test *[1]
Transfer Gearbox (TGB) Radial Shaft	4, 5, and *[12]
Transfer Gearbox (TGB) Shaft	4
Transient Bleed Valve (TBV)	15
Turbine Center Frame (TCF) Accelerometer	17
Variable Bleed Valve (VBV) Actuators	15
Variable Bleed Valve (VBV) Doors	15
Variable Stator Vane (VSV) Actuators	15

*[1] Do the test in the sequence that are listed for each component.

*[2] Do a visual check on all non LRU air tubes or ducts that were disconnected or removed for engine maintenance.

*[3] Make sure the data entry plug configuration matches the engine data plate's related thrust and hardware configuration (TASK 73-21-09-700-801-G00).

*[4] If only one EEC channel was replaced, you do not need to manually enter the engine trim balance weight configuration. The EEC channel that was not replaced will automatically transfer the engine trim balance weight configuration to the newly installed EEC channel.

(a) If both EEC channels were replaced, after you complete the Engine Serial Number Entry Special Function (Test No. 37), input the engine trim balance weight configuration into the EECs (TASK 71-00-00-720-805-G00).

1) This can be done on the next maintenance schedule, but the balance weight configuration will not be correct when you attempt to perform an engine fan trim balance or when you view the Engine Health Monitoring (EHM) vibration reports.

*[5] If only one EEC channel was replaced, you do not need to do Test No.26 (DMS Special Function). The EEC channel that was not replaced will automatically transfer the engine oil debris cumulative chip count to the newly installed EEC channel.

(a) If both EEC channels were replaced, and the DMS chip count was recorded before removal of the EECs, you do not need to do an inspection and wipe clean the ODMS sensor. The known DMS chip count can be manually entered into EEC NVM with the Test No. 26 (DMS Special Function).

*[6] Test No. 9 is not necessary if you replace less than 3 pairs of fan blades or reinstall fan blades and fan blades platforms in the same position.

*[7] EEC may detect fuel system faults after fuel system maintenance due to residual air in fuel lines. Do the steps that follow:

(a) Do an Engine Idle Run (TASK 71-00-00-790-804-G00).

(b) Check the Onboard Maintenance Function (OMF) for any new fuel system faults, and, if present, clear the faults (TASK 71-00-00-700-811-G00 and TASK 71-00-00-700-812-G00).

(c) Do the test listed in Table 501.

*[8] Do a check for the presence of channel A and B parameters on the EPCS while the engine is at idle. Refer to the engine test data nomenclature parameter names on the EPCS pages (Maintenance Data Pages from the Engine Propulsion Control System (EPCS), TASK 71-00-00-970-801-G00).

*[9] Do the IDG system operational test procedure (TASK 24-11-00-700-803 or TASK 24-11-00-700-804).

*[10] Do the Engine Bleed Air System – Leak Check (TASK 36-11-00-700-802).

NOTE: Leak check is only required at the Engine Anti-Ice (EAI) duct coupling.

*[11] A visual check of the installation of the gaskets and/or preformed packings by two separate mechanics on these components is an alternative to the Test No. 4.

*[12] Do the oil level check (TASK 12-13-11-600-801).

SUBTASK 71-00-00-720-002-G00

(2) If you have digital access to this data, use these referenced task links to go to the applicable test:

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(a) Do this task: Test No. 1 - Pneumatic Leak Test, TASK 71-00-00-790-801-G00.

(b) Do this task: Test No. 2 - Dry Motor Leak Test, TASK 71-00-00-790-802-G00.

(c) Do this task: Test No. 3 - Wet Motor Leak Test, TASK 71-00-00-790-803-G00.

(d) Do this task: Test No. 4 - Idle Leak Test, TASK 71-00-00-790-804-G00.

(e) Do this task: Test No. 5 - Part Power Leak Check, TASK 71-00-00-710-801-G00.

(f) Do this task: Test No. 6 - Power Assurance Test, TASK 71-00-00-720-802-G00.

(g) Do this task: Test No. 7 - Replacement Engine (Pretested Engine) Test, TASK 71-00-00-710-802-G00.

(h) Do this task: Test No. 8 - Replacement Engine (Untested Engine) Test, TASK 71-00-00-710-803-G00.

(i) Do this task: Test No. 9 - Low Pressure System (Fan/LPT) Vibration Survey, TASK 71-00-00-720-803-G00.

(j) Do this task: Test No. 10 - High Pressure System (HPC/HPT) Vibration Survey, TASK 71-00-00-720-804-G00.

(k) Do this task: Test No. 11 - Low Pressure System (Fan) Trim Balance (With ONS), TASK 71-00-00-720-805-G00.

(l) Do this task: Test No. 12 - Thrust Reverser Interlock Operational Test, TASK 71-00-00-710-804-G00.

(m) Do this task: Test No. 15 - Actuator Operational Test, TASK 71-00-00-730-802-G00.

(n) Do this task: Test No. 16 - Harness System Test, TASK 71-00-00-730-803-G00.

(o) Do this task: Test No. 17 - Electronic Engine Control (EEC) System Test, TASK 71-00-00-710-806-G00.

(p) Do this task: Test No. 18 - EEC Channel A Ignition System Test, TASK 71-00-00-730-804-G00.

(q) Do this task: Test No. 19 - EEC Channel B Ignition System Test, TASK 71-00-00-730-805-G00.

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(r) Do this task: Test No. 24 - EEC Blower Test, TASK 71-00-00-710-807-G00.

SIA ALL

(s) Do this task: Test No. 25 - Fuel System Preservation Special Functions Test, TASK 71-00-00-700-801-G00.

(t) Do this task: Test No. 26 - Debris Monitoring System Channel B Special Functions Test, TASK 71-00-00-700-802-G00.

(u) Do this task: Test No. 27 - Clear Engine SMT Message, TASK 71-00-00-700-803-G00.

(v) Do this task: Test No. 29 - Water Wash Special Functions Test, TASK 71-00-00-700-805-G00.

(w) Do this task: Test No. 30 - Engine Running Simulation Special Functions Test, TASK 71-00-00-700-806-G00.

(x) Do this task: Test No. 31 - Wet Motor Ground Test, TASK 71-00-00-700-807-G00.

(y) Do this task: Test No. 32 - Engine Idle System Test, TASK 71-00-00-700-808-G00.

(z) Do this task: Test No. 33 - Lamp Check Out Special Functions Test, TASK 71-00-00-700-809-G00.

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(aa) Do this task: Test No. 34 - Menu Mode Hardware Code Entry Special Functions Test, TASK 71-00-00-700-810-G00.

(ab) Do this task: Test No. 35 - Erase All Channel A Faults Special Functions Test, TASK 71-00-00-700-811-G00.

(ac) Do this task: Test No. 36 - Erase All Channel B Faults Special Functions Test, TASK 71-00-00-700-812-G00.

(ad) Do this task: Test No. 37 - Engine Serial Number Entry Special Functions Test, TASK 71-00-00-700-813-G00.

(ae) Do this task: Test No. 38 - Thrust Reverser Cycle Special Functions, TASK 71-00-00-700-816-G00.

——— END OF TASK ———

TASK 71-00-00-790-801-G00

3. Test No. 1 - Pneumatic Leak Test

(Figure 501)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task provides the instructions on how to do a check for air leaks in the pneumatic system ducts and joints.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (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)
71-00-00-910-808-G00	Dry Motor Procedure (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)
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. Consumable Materials

Reference	Description	Specification
G02380	Developer - Inspection - Met-L-Chek D-70	
G50513	Foil - Aluminum	QQ-A-1876

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

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E. 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

F. Prepare for the Check

SUBTASK 71-00-00-860-680-G00

(1) Do this task: APU Starting and Operation, TASK 49-11-00-860-801.

SUBTASK 71-00-00-860-177-G00

(2) Put the applicable BLEED 1 or BLEED 2 switch on the overhead panel, P5, to the OFF position.

NOTE: This will close the applicable PRSOV.

SUBTASK 71-00-00-860-178-G00

(3) Select the appropriate Engine Anti-Ice valve (EAI) position:

(a) If the pneumatic leak test is being performed to inspect for fan compartment duct leaks, put the applicable ENG ANTI-ICE 1 or ENG ANTI-ICE 2 switch on the overhead panel, P5, to the ON position.

NOTE: This will open the applicable engine thermal anti-ice (EAI) valve.

(b) Otherwise, put the applicable ENG ANTI-ICE 1 or ENG ANTI-ICE 2 switch on the overhead panel, P5, to the OFF position.

NOTE: This will close the applicable engine thermal anti-ice (EAI) valve.

SUBTASK 71-00-00-860-545-G00

(4) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 71-00-00-860-546-G00

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

SUBTASK 71-00-00-010-002-G00

(6) 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

G. Pneumatic Leak Check

SUBTASK 71-00-00-790-009-G00

(1) Wrap the ducts and joints in aluminum foil, G50513 or apply Met-L-Chek D-70 developer, G02380 to the locations in order to detect leak.

(a) The starter duct (the interface between the starter air valve and the air turbine starter, the ducting between the starter air valve and the pylon strut interface).

(b) The stages 4 and 10 pneumatic ducts (the engine/duct interfaces to the PRSOV and the PRSOV to the pre-cooler manifold located at 12:00 o'clock on the engine in the upper core area).

(c) The engine anti-ice duct (the offtake duct connection on the core at 1:00 o'clock aft-looking forward to the EAI valve in the 12:00 o'clock fan frame strut, the EAI valve through the strut to the inlet).

(d) The Transient Bleed Valve (TBV) duct (the interface between the TBV valve and the TBV duct located at 2:30 aft-looking fwd on the High Pressure Turbine (HPT) area).

SUBTASK 71-00-00-790-001-G00

(2) Do this task: Dry Motor Procedure, TASK 71-00-00-910-808-G00.

(a) As you do the dry motor procedure, carefully look at the ducts and joints for leaks.

(b) It is permitted to have a small leakage around the couplings. A jet of air is not permitted.

1) If you find leakage that is not permitted, repair the ducts and couplings.

a) For the leak test with aluminum foil, a damaged coupling will cause the foil to balloon or burst.

b) For the leak test with dry developer, a damaged coupling will displace the developer powder.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-681-G00

(1) Do this task: APU Usual Shutdown, TASK 49-11-00-860-802.

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SUBTASK 71-00-00-080-008-G00

(2) Remove any aluminum foil, G50513 or Met-L-Chek D-70 developer, G02380 used during the leak test.

SUBTASK 71-00-00-410-004-G00

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.

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

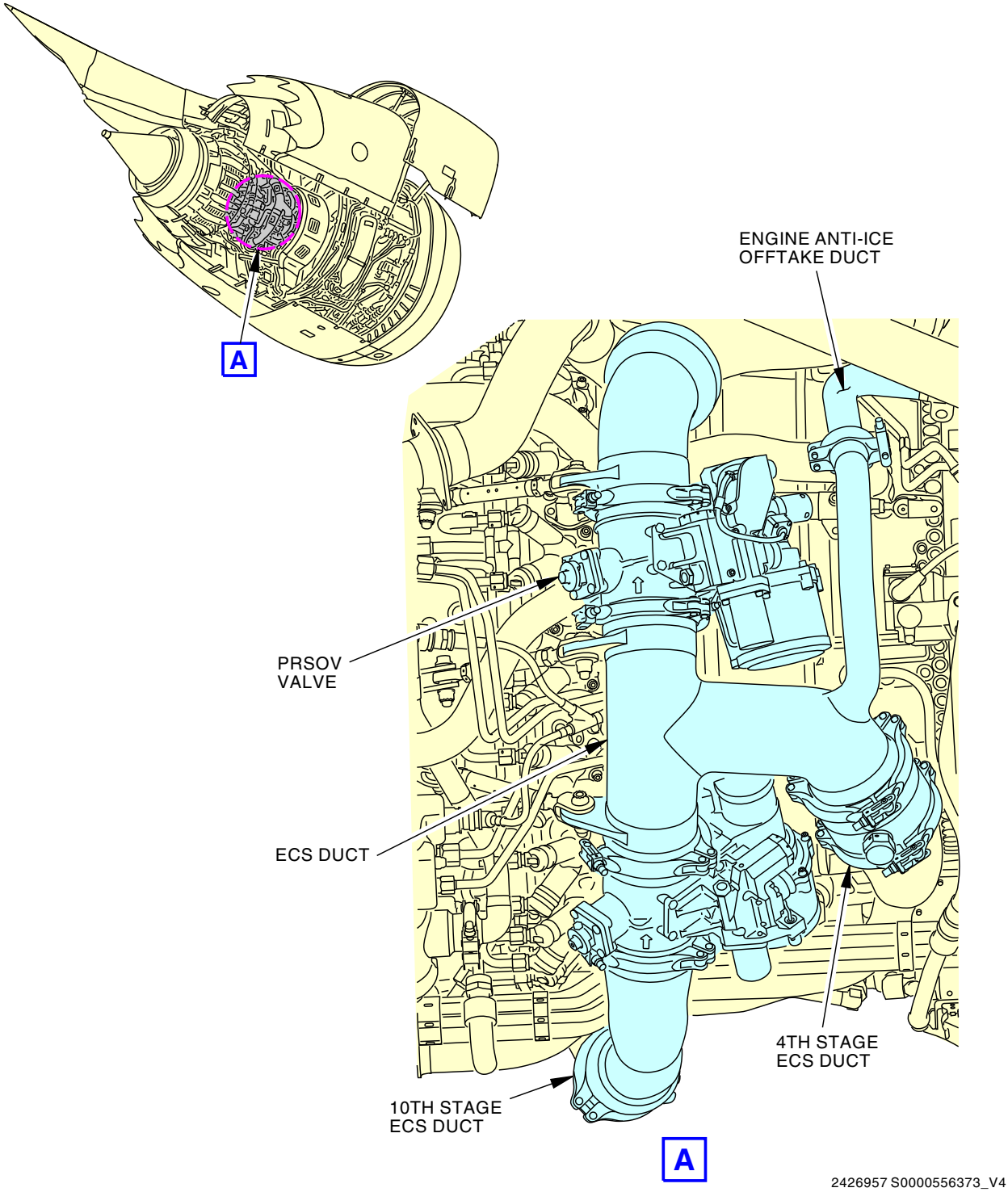
(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 71-00-00-860-547-G00

(4) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

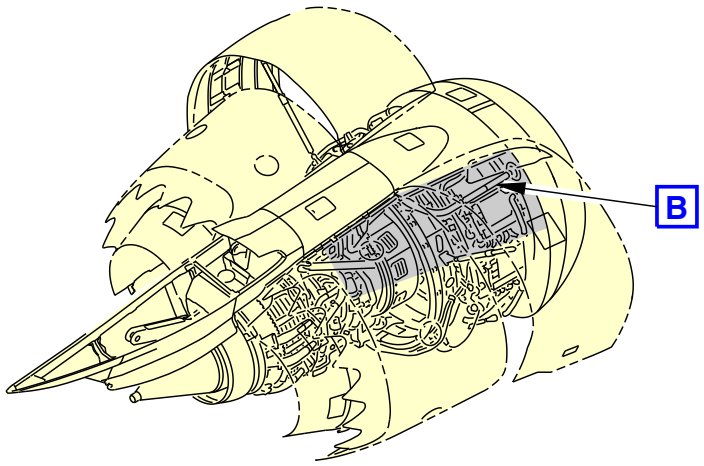
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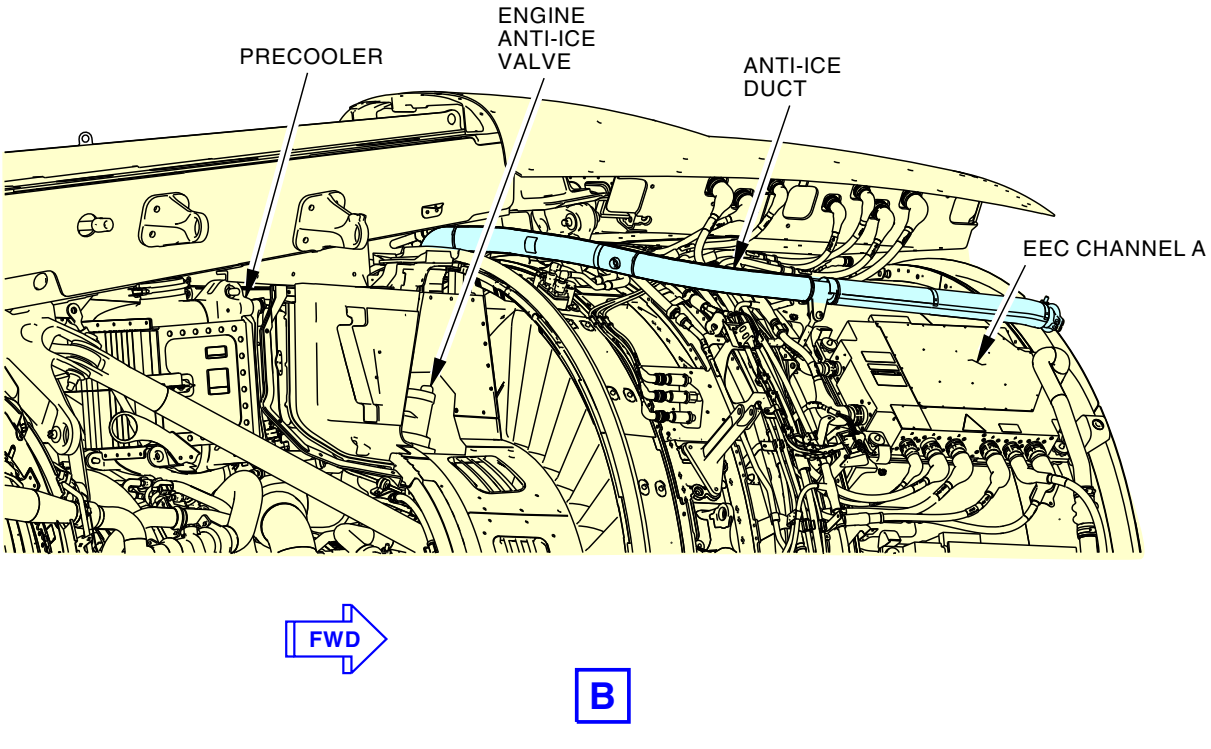
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Engine Pneumatic Duct Locations
Figure 501/71-00-00-990-876-G00 (Sheet 1 of 3)

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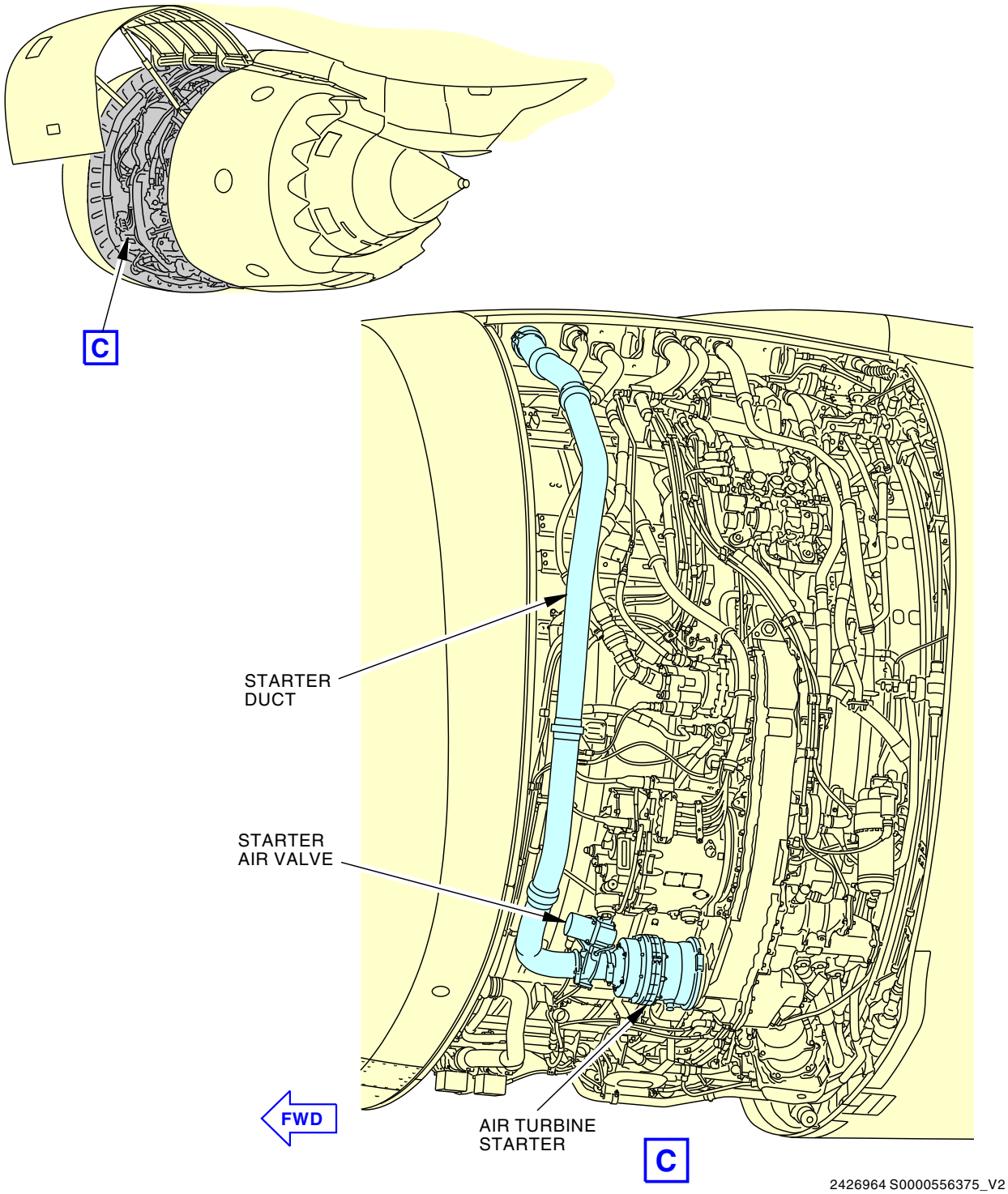




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Engine Pneumatic Duct Locations
Figure 501/71-00-00-990-876-G00 (Sheet 2 of 3)

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Engine Pneumatic Duct Locations
Figure 501/71-00-00-990-876-G00 (Sheet 3 of 3)

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TASK 71-00-00-790-802-G00

4. Test No. 2 - Dry Motor Leak Test

A. General

(1) This task provides the instructions on how to find leaks in oil and fuel system components.

(2) This procedures motors the engine with the fuel and ignition disabled to prevent engine start.

(3) This task must not be used as an alternate for the idle leak test. The dry motor leak test cannot be used to find all possible engine oil or fuel leaks due to low pressure of engine dry motoring.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
71-00-00-910-808-G00	Dry Motor Procedure (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)
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

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-20664	Fixture - Leak Check Part #: 956A3624G01 Supplier: 58828

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
411	Engine 1 - Engine
421	Engine 2 - Engine

F. 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

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(Continued)

Number	Name/Location
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

G. Prepare for the Test

SUBTASK 71-00-00-860-591-G00

(1) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 71-00-00-860-592-G00

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

SUBTASK 71-00-00-010-003-G00

(3) 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
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 71-00-00-860-179-G00

(4) Make sure that the areas under the thrust reversers are clean.

(a) If it is necessary, clean the areas with a cotton wiper, G00034.

SUBTASK 71-00-00-790-011-G00

(5) Install a leak check fixture, SPL-20664, as an option to collect oil in case of leaks.

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(a) Put the test tube holder on a work table and put all seven test tubes in each of the grommets of the rack.

(b) Install the tube holder in the rack on the top of the test tubes and tightly attach it with knobs.

(c) Identify the drain master and each of the collecting tubes with the diameter in Table 502.

Table 502/71-00-00-993-870-G00 Collecting Tubes Diameters

Drain Mast Tube	Diameter	Collecting Tube
A-SUMP 1R	0.3125 in. (7.9 mm)	4
A-SUMP 3R	0.3125 in. (7.9 mm)	4
LRU CORE LEFT	0.3125 in. (7.9 mm)	4
LRU CORE RIGHT	0.3125 in. (7.9 mm)	4
AUX.	0.41 in. (10.4 mm)	4
B-SUMP	0.41 in. (10.4 mm)	5
C-SUMP	0.44 in. (11.2 mm)	5

CAUTION

MAKE SURE THAT THE O-RINGS DO NOT HAVE DAMAGES AND INSTALLATION IS CORRECT. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT CAN OCCUR.

(d) Put each collecting tube into the related drain master tube until they touch the drain mast.

(e) Place the rack below the drain mast and make sure it points in the FWD direction.

(f) Put the hoses into the holder in the related test tube.

1) Make sure that the marks on the drain mast match with the marks on the holder.

H. Dry Motor Leak Test

SUBTASK 71-00-00-868-002-G00

CAUTION

DO NOT OPERATE THE ENGINE STARTER BEYOND ITS LIMITS. DAMAGE TO THE STARTER CAN OCCUR.

(1) Do this task: Dry Motor Procedure, TASK 71-00-00-910-808-G00.

SUBTASK 71-00-00-790-002-G00

(2) Examine the applicable component(s) or system for signs of fluid leakage as follows:

NOTE: An engine exhaust system consists of the exhaust plug and the exhaust sleeve.

NOTE: When engine operates, some oil leak can occur at the aft sump rotating seal. After operation, oil wetting or coking in the exhaust plug center vent tube extension (CVTE) is usual.

(a) If you find leakage, repair or replace the damaged components or seals.

NOTE: The damaged components include tubes, tube flanges, fitting and seals. Refer to the applicable inspection, removal and installation tasks to do the necessary repair or replacement of the component(s).

(b) Do the leak check again after you replace or repair the components or seals.

NOTE: This makes sure that the repair was successful.

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I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-410-019-G00

(1) Remove a leak check fixture, SPL-20664.

(a) Remove hoses from the holder in the test tubes.

(b) Remove collecting tubes from the drain master tubes.

(c) Remove tubes holder from the rack.

SUBTASK 71-00-00-410-005-G00

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.

(2) 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 71-00-00-860-593-G00

(3) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

END OF TASK

TASK 71-00-00-790-803-G00

5. Test No. 3 - Wet Motor Leak Test

A. General

(1) This task provides the instructions on how to do the wet-motor leak test of the oil and fuel systems.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
70-43-42-300-802-G00	Blending Procedures - Hand Blending (P/B 201)

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(Continued)

Reference	Title
71-00-00-910-808-G00	Dry Motor Procedure (P/B 201)
71-00-00-910-809-G00	Wet Motor Procedure (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)
73-11-05-400-801-G00	Fuel Nozzle Installation (P/B 401)
73-11-05-400-802-G00	Fuel Nozzle Set Installation (P/B 401)
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

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-20664	Fixture - Leak Check Part #: 956A3624G01 Supplier: 58828

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
411	Engine 1 - Engine
421	Engine 2 - Engine

F. 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

G. Prepare for the Test

SUBTASK 71-00-00-860-464-G00

(1) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-860-465-G00

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

SUBTASK 71-00-00-010-004-G00

(3) 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
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 71-00-00-160-001-G00

(4) Clean the areas to be examined with cotton wiper, G00034.

SUBTASK 71-00-00-790-008-G00

CAUTION MAKE SURE THAT THE O-RINGS DO NOT HAVE DAMAGES AND INSTALLATION IS CORRECT. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT CAN OCCUR.

(5) Install a leak check fixture, SPL-20664, as an option to collect oil in case of leaks:

(a) Put the test tube holder on a work table and put all seven test tubes in each of the grommets of the rack.

(b) Install the tube holder in the rack on the top of the test tubes and tightly attach it with knobs.

(c) Identify the drain master and each of the collecting tubes with the diameter in table below:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

Table 503/71-00-00-993-869-G00 Collecting Tubes Diameters

Drain Mast Tube	Diameter	Collecting Tube
A-SUMP 1R	0.3125 in. (7.9 mm)	4
A-SUMP 3R	0.3125 in. (7.9 mm)	4
LRU CORE LEFT	0.3125 in. (7.9 mm)	4
LRU CORE RIGHT	0.3125 in. (7.9 mm)	4
AUX.	0.41 in. (10.4 mm)	4
B-SUMP	0.41 in. (10.4 mm)	5
C-SUMP	0.44 in. (11.2 mm)	5

(d) Put each collecting tube into the related drain master tube until they touch the drain mast.

(e) Place the rack below the drain mast.

1) Make sure that rack points in the FWD direction.

(f) Put the hoses into the holder in the related test tube.

1) Make sure that the marks on the drain mast match with the marks on the holder.

H. Wet Motor Leak Test

SUBTASK 71-00-00-860-180-G00

WARNING

AFTER THE WET-MOTOR, DRY-MOTOR THE ENGINE FOR 60 SECONDS TO REMOVE THE FUEL FROM THE COMBUSTION CHAMBER. IF YOU DO NOT, AN INTERNAL ENGINE FIRE OR TAILPIPE FIRE CAN OCCUR ON THE SUBSEQUENT START. THE FIRE CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO THE ENGINE.

CAUTION

DO NOT OPERATE THE ENGINE STARTER BEYOND ITS LIMITS. DAMAGE TO THE STARTER CAN OCCUR.

(1) Do this task: Wet Motor Procedure, TASK 71-00-00-910-809-G00.

(a) Wet motor the engine for a maximum of 15 seconds or until you can see fuel vapors from the primary nozzle.

SUBTASK 71-00-00-790-003-G00

(2) Examine the applicable component or system while you motor the engine and after you stop the engine as follows:

NOTE: When engine operates, some oil leak can occur at the aft sump rotating seal. After operation, oil wetting or coking in the exhaust plug center vent tube extension (CVTE) is usual.

(a) If you find leakage, repair or replace the damaged tubes, tube flanges, fittings, seals, or components.

NOTE: The fuel nozzle seal is a secondary seal surface and does not prevent fuel leakage.

1) Replace the fuel nozzle seal only if there are nicks or cuts.

(b) If you have a fuel leak at the fuel manifold B-nut, do these steps:

1) Examine the B-nut surfaces for high metal.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

a) If it is necessary, polish the surface to remove the high metal (TASK 70-43-42-300-802-G00).

2) Tighten the fuel manifold B-nut (TASK 73-11-05-400-801-G00 or TASK 73-11-05-400-802-G00).

(c) Look at the cases for oil and fuel stains.

NOTE: During the wet motor, fuel will pool in the lower cases and can leak between the mating flanges of the cases. Do a dry motor of the engine before subsequent start (TASK 71-00-00-910-808-G00).

(d) Do the leak check again after you replace or repair the tubes, tube flanges, fittings, seals, or components.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-410-020-G00

(1) Remove the leak check fixture, SPL-20664.

(a) Remove hoses from the holder in the test tubes.

(b) Remove collecting tubes from the drain master tubes.

(c) Remove tubes holder from the rack.

SUBTASK 71-00-00-410-006-G00

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.

(2) 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 71-00-00-860-466-G00

(3) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-00-00-790-804-G00

6. Test No. 4 - Idle Leak Test

A. General

(1) This task provides the instructions on how to operate the engine at idle in order to examine the engine fuel and oil systems and their particular components for leakage.

(2) If the ground conditions prevent a wet motor test from being performed, this test may be substituted for Test No. 3 - Wet Motor Leak Test, TASK 71-00-00-790-803-G00.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
70-43-42-300-802-G00	Blending Procedures - Hand Blending (P/B 201)
71-00-00-800-802-G00	Engine Operation Limits (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)
71-00-00-910-808-G00	Dry Motor Procedure (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)
73-11-05-400-801-G00	Fuel Nozzle Installation (P/B 401)
73-11-05-400-802-G00	Fuel Nozzle Set Installation (P/B 401)
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

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-20664	Fixture - Leak Check Part #: 956A3624G01 Supplier: 58828

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
411	Engine 1 - Engine
421	Engine 2 - Engine

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. 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

G. Prepare for the Test

SUBTASK 71-00-00-860-181-G00

(1) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 71-00-00-860-182-G00

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

SUBTASK 71-00-00-860-183-G00

(3) 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
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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

H. Idle Leak Test

SUBTASK 71-00-00-160-002-G00

(1) Clean the areas to be examined with cotton wiper, G00034.

SUBTASK 71-00-00-790-010-G00

(2) Install the leak check fixture, SPL-20664, as an option to collect oil in case of leaks.

(a) Put the test tube holder on a work table and put all seven test tubes in each of the grommets of the rack.

(b) Install the tube holder in the rack on the top of the test tubes and tightly attach it with knobs.

(c) Identify the drain master and each of the collecting tubes with the diameter in table below:

Table 504/71-00-00-993-871-G00 Collecting Tubes Diameters

Drain Mast Tube	Diameter	Collecting Tube
A-SUMP 1R	0.3125 in. (7.9 mm)	4
A-SUMP 3R	0.3125 in. (7.9 mm)	4
LRU CORE LEFT	0.3125 in. (7.9 mm)	4
LRU CORE RIGHT	0.3125 in. (7.9 mm)	4
AUX.	0.41 in. (10.4 mm)	4
B-SUMP	0.41 in. (10.4 mm)	5
C-SUMP	0.44 in. (11.2 mm)	5

CAUTION MAKE SURE THAT THE O-RINGS DO NOT HAVE DAMAGES AND INSTALLATION IS CORRECT. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT CAN OCCUR.

(d) Put each collecting tube into the related drain master tube until they touch the drain mast.

(e) Put the rack below the drain mast.

1) Make sure that the rack points in the FWD direction.

(f) Put the hoses into the holder in the related test tube.

1) Make sure that the marks on the drain mast match with the marks on the holder.

SUBTASK 71-00-00-860-184-G00

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Number	Name/Location
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 71-00-00-860-185-G00

(4) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

SUBTASK 71-00-00-860-186-G00

(5) Do this task: Start the Engine (Selection), TASK 71-00-00-910-802-G00.

(a) Let the engine become stable at the minimum idle for five minutes.

(b) Make sure that the engine is within the engine operation limits (TASK 71-00-00-800-802-G00).

SUBTASK 71-00-00-860-187-G00

(6) Do this task: Stop the Engine (Usual Engine Stop), TASK 71-00-00-910-806-G00.

SUBTASK 71-00-00-720-006-G00

(7) Dry motor the engine for 2 minutes (TASK 71-00-00-910-808-G00).

SUBTASK 71-00-00-860-188-G00

(8) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 71-00-00-860-189-G00

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

SUBTASK 71-00-00-860-190-G00

(10) 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
414	Right Fan Cowl, Engine 1

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Number	Name/Location
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 71-00-00-790-004-G00

(11) Examine the applicable component or system for signs of fluid leakage as follows:

(a) If you find leakage, repair or replace the damaged tubes, tube flanges, fittings, seals or components as necessary.

NOTE: The fuel nozzle seal is a secondary seal surface and does not prevent fuel leakage.

1) If there are nicks or cuts on the fuel nozzle seal, replace it.

(b) If you have a fuel leak at the fuel manifold B-nut, do the steps that follows:

1) Examine the B-nut surfaces for high metal.

a) If it is necessary, polish the surface to remove the high metal (TASK 70-43-42-300-802-G00).

2) Tighten the fuel manifold B-nut (TASK 73-11-05-400-801-G00 or TASK 73-11-05-400-802-G00).

(c) Look at the cases and the areas for oil and fuel stains.

(d) Do the leak check again after you replace or repair the tubes, tube flanges, fittings, seals or components to verify the repair.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-410-021-G00

(1) Remove the leak check fixture, SPL-20664.

(a) Remove the hoses from the holder in the test tubes.

(b) Remove collecting tubes from the drain master tubes.

(c) Remove tubes holder from the rack.

SUBTASK 71-00-00-860-191-G00

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.

(2) Do these tasks in sequence to safely close the applicable left or right thrust reversers:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(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 71-00-00-860-192-G00

(3) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

——— END OF TASK ———

TASK 71-00-00-710-801-G00

7. Test No. 5 - Part Power Leak Check

A. General

(1) This task provides the instructions on how to do the part power leak check.

(2) The part-power leak check operates the engines at approximately 70% N1 in order to supply fuel pressures higher than idle speed as well as actuate fuel system components that are only active at above idle conditions.

(3) This check is necessary as some engine components do not have sufficient pressure at idle to do a leak check.

(4) You must close all cowlings to do this task.

(5) As this test involves operating the engine at elevated power settings, it is recommended that the airplane is pointed with the nose into the wind during engine ground runs.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
70-43-42-300-802-G00	Blending Procedures - Hand Blending (P/B 201)
71-00-00-800-802-G00	Engine Operation Limits (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)
71-00-00-910-808-G00	Dry Motor Procedure (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)

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(Continued)

Reference	Title
73-11-05-400-801-G00	Fuel Nozzle Installation (P/B 401)
73-11-05-400-802-G00	Fuel Nozzle Set Installation (P/B 401)
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

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-20664	Fixture - Leak Check Part #: 956A3624G01 Supplier: 58828

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
411	Engine 1 - Engine
421	Engine 2 - Engine

F. 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

G. Prepare for the Check

SUBTASK 71-00-00-860-193-G00

(1) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 71-00-00-860-467-G00

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

SUBTASK 71-00-00-860-548-G00

(3) 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 71-00-00-860-468-G00

(4) Clean the areas to be examined with cotton wiper, G00034.

SUBTASK 71-00-00-860-469-G00

CAUTION MAKE SURE THAT THE O-RINGS DO NOT HAVE DAMAGES AND INSTALLATION IS CORRECT. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT CAN OCCUR.

(5) Install a leak check fixture, SPL-20664, as an option to collect oil in case of leaks:

(a) Put the test tube holder on a work table and put all seven test tubes in each of the grommets of the rack.

(b) Install the tube holder in the rack on the top of the test tubes and tightly attach it with knobs.

(c) Identify the drain master and each of the collecting tubes with the diameter in table below:

Table 505/71-00-00-993-868-G00 Collecting Tubes Diameters

Drain Mast Tube	Diameter	Collecting Tube
A-SUMP 1R	0.3125 in. (7.9 mm)	4
A-SUMP 3R	0.3125 in. (7.9 mm)	4

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Table 505/71-00-00-993-868-G00 Collecting Tubes Diameters (Continued)

Drain Mast Tube	Diameter	Collecting Tube
LRU CORE LEFT	0.3125 in. (7.9 mm)	4
LRU CORE RIGHT	0.3125 in. (7.9 mm)	4
AUX.	0.41 in. (10.4 mm)	4
B-SUMP	0.41 in. (10.4 mm)	5
C-SUMP	0.44 in. (11.2 mm)	5

(d) Put each collecting tube into the related drain master tube until they touch the drain mast.

(e) Place the rack below the drain mast.

1) Make sure that rack points in the FWD direction.

(f) Put the hoses into the holder in the related test tube.

1) Make sure that the marks on the drain mast match with the marks on the holder.

SUBTASK 71-00-00-860-470-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS WHEN YOU CLOSE THE THRUST REVERSERS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(6) If you opened the thrust reversers, do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

SUBTASK 71-00-00-860-471-G00

(7) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

H. Part-Power Leak Check

SUBTASK 71-00-00-860-594-G00

WARNING MAKE SURE THAT THE ENGINE COWLS ARE CLOSED, OR THAT THE LEADING EDGE SLATS AND FLAPS ARE LOCKED. IF YOU DO NOT OBEY THESE INSTRUCTIONS, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

WARNING MAKE SURE THAT YOU OBEY ALL THE INSTRUCTIONS AND PRECAUTIONS WHEN YOU OPERATE AN ENGINE AT HIGH POWER. IF YOU DO NOT OBEY THE INSTRUCTIONS AND PRECAUTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

WARNING MAKE SURE THAT ALL PERSONS AND EQUIPMENT ARE CLEAR OF THE AREA AFT OF THE APPLICABLE THRUST REVERSER. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do this task: Start the Engine (Selection), TASK 71-00-00-910-802-G00.

(a) Let the engine become stable at the minimum idle thrust for 5 minutes.

(b) Make sure that the engine operates in the operation limits (TASK 71-00-00-800-802-G00).

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(c) Put the PROBE HEAT "A" or "B" switch, on the P5 overhead panel, to the ON position.

NOTE: For engine operation at high power, the EEC can go into Alternate Mode operation if neither pitot probe is heated.

SUBTASK 71-00-00-860-595-G00

WARNING

MAKE SURE THAT YOU CAN APPLY FULL BRAKE FORCE TO THE AIRPLANE. IF THE BRAKE IS NOT ON, ENGINE THRUST CAN MOVE THE AIRPLANE. THIS CAN CAUSE INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(2) Do these steps to operate the engine at the 70% N1 power position:

(a) Slowly move the applicable forward thrust lever to the position where N1 is at 70% power.

1) Let the engine become stable at this speed for a minimum of 3 minutes.

(b) Slowly move the thrust lever to the idle-power position.

1) Let the engine become stable at this speed for a minimum of 5 minutes.

SUBTASK 71-00-00-210-048-G00

(3) Put the PROBE HEAT "A" or "B" switch, on the P5 overhead panel, to the AUTO position.

SUBTASK 71-00-00-860-596-G00

CAUTION

MAKE SURE YOU OBEY THE INSTRUCTIONS IN THE PROCEDURE WHEN YOU STOP AN ENGINE THAT OPERATES AT HIGH POWER. IF YOU DO NOT, DAMAGE TO THE ENGINE CAN OCCUR.

(4) Do these tasks in sequence:

(a) Do this task: Stop the Engine (Usual Engine Stop), TASK 71-00-00-910-806-G00.

(b) Dry motor the engine for 2 minutes, do this task: Dry Motor Procedure, TASK 71-00-00-910-808-G00.

SUBTASK 71-00-00-860-475-G00

(5) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

SUBTASK 71-00-00-860-476-G00

WARNING

DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSERS: RETRACT THE LEADING EDGE, DO THE DEACTIVATION PROCEDURES FOR THE LEADING EDGE AND THE THRUST REVERSER (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(6) If it is necessary, do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

SUBTASK 71-00-00-210-007-G00

(7) Examine the applicable component or system for signs of fluid leakage.

(a) Look at the inside surfaces of the fan cowl panels and thrust reverser as applicable for new fuel, oil, or hydraulic stains.

NOTE: When the engine operates, some oil leak can occur at the aft sump rotating seal. After operation, oil wetting or coking in the exhaust plug center vent tube extension (CVTE) is usual.

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(b) If you find leakage, repair or replace the damaged tubes, tube flanges, fittings, seals, or components.

NOTE: The fuel nozzle seal is a secondary seal surface and does not prevent fuel leakage.

1) Replace the fuel nozzle seal only if there are nicks or cuts.

(c) If you have a fuel leak at the fuel manifold B-nut, do these steps:

1) Examine the B-nut surfaces for high metal.

a) If it is necessary, polish the surface to remove the high metal (TASK 70-43-42-300-802-G00).

2) Tighten the fuel manifold B-nut (TASK 73-11-05-400-801-G00 or TASK 73-11-05-400-802-G00).

(d) Look at the cases for oil and fuel stains.

(e) Do the leak check again after you replace or repair the tubes, tube flanges, fittings, seals.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-478-G00

(1) Remove the leak check fixture, SPL-20664.

(a) Remove hoses from the holder in the test tubes.

(b) Remove collecting tubes from the drain master tubes.

(c) Remove tubes holder from the rack.

(d) If any of the collection tubes collect fluid, dispose of them correctly.

SUBTASK 71-00-00-860-477-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS WHEN YOU CLOSE THE THRUST REVERSERS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(2) If the thrust reversers were opened, do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

SUBTASK 71-00-00-410-018-G00

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.

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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 71-00-00-860-552-G00

(4) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

——— END OF TASK ———

TASK 71-00-00-720-802-G00

8. Test No. 6 - Power Assurance Test

(Figure 502 and Figure 503)

A. General

(1) This task gives the instructions to do the engine power assurance test.

(2) This test can run the engine at elevated power settings. The airplane nose should be pointed into the wind during engine ground runs. Obey the ground engine operations limitations for crosswind conditions.

(3) You do this test to make sure that the engine will be able to make takeoff power without going over the EGT or N2 redline limits.

(a) To complete this test, you will do these steps:

1) Measure the outside temperature.

2) Use the value of the outside temperature to find the target N1 speed, maximum N2, and maximum EGT.

3) For a specific %N1, this check will calculate the maximum EGT and the %N2 target values.

4) Run the engine at the target N1 speed and record engine N2 and EGT.

5) Calculate the necessary adjustments to the recorded N2 and recorded EGT for any differences between the target N1 speed and actual N1 speed.

6) Make an N1 modifier correction of the maximum EGT to adjust the limit. This is needed if the engine is operating with an N1 modifier level.

7) Adjust the as tested parameters to sea level condition to compare to test limits.

8) Compare the recorded and adjusted N2 and EGT with the maximum N2 and EGT to make sure that there is positive margin.

(b) This task includes an example of the calculations that you will do.

(4) The Power assurance test is not for performance analysis of the engine. Do not use only the power assurance test to accept or reject an engine. The power assurance run is usually not sufficiently stable to accurately calculate the engine's health. You can get better performance analysis from the test cell operation or on-wing performance trend monitoring.

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B. References

Reference	Title
31-65-00-970-801	System Maintenance Data Pages Function (P/B 201)
71-00-00-910-801-G00	Prepare the Engine for Operation (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)
71-00-00-910-808-G00	Dry Motor Procedure (P/B 201)
71-00-00-970-802-G00	Engine Performance Page (P/B 201)
73-21-00-470-801-G00	EEC System Configuration Data Functions Check (P/B 201)
73-21-09-700-801-G00	Data Entry Plug Configuration Check (P/B 601)

C. Tools/Equipment

Reference	Description
STD-1116	Thermometer - Alcohol (Mercury),-40 to +125 Degrees F (-40 to +52 Degrees C)
STD-1122	Thermometer - Alcohol/Mercury (or equivalent meter meets task requirements)

D. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Power Assurance Test

SUBTASK 71-00-00-860-J16-G00

(1) If necessary, do this task: Prepare the Engine for Operation, TASK 71-00-00-910-801-G00.

SUBTASK 71-00-00-720-003-G00

CAUTION KEEP MERCURY THERMOMETERS AWAY FROM THE AIRPLANE. IF THE THERMOMETER BREAKS, MERCURY CAN CAUSE DAMAGE TO THE AIRPLANE COMPONENTS.

(2) Use a thermometer, STD-1122, or equivalent, and read the ambient Outside Air Temperature (OAT) in the shade of the nose wheel well.

NOTE: Do not use the total temperature indication from the airplane for the ambient air temperature. This will prevent an incorrect trim balance target selection.

(a) Get the OAT with a thermometer, STD-1116 as follows:

1) Read the temperature in the shaded area of the airplane.

2) Record the OAT on the data sheet.

SUBTASK 71-00-00-970-001-G00

(3) Use the OAT to get the %N1 Target speed, the Max EGT and the Max %N2 for the applicable engine model and thrust rating.

NOTE: Fuel flow parameters are included for fault isolation and not as a specified limit.

(a) Record the %N1 Target, Max EGT and Max %N2 on the data sheet.

(b) To do a check of the thrust rating, refer to the engine dataplate or system configuration check (TASK 73-21-00-470-801-G00).

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1) Record the trim level for the N1 modifier adjustment used in the test results.

SUBTASK 71-00-00-868-003-G00

WARNING MAKE SURE THAT YOU OBEY ALL THE INSTRUCTIONS AND PRECAUTIONS WHEN YOU OPERATE AN ENGINE AT HIGH POWER. IF YOU DO NOT OBEY THE INSTRUCTIONS AND PRECAUTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(4) Start the engine (TASK 71-00-00-910-802-G00).

(a) Put the applicable ENGINE BLEED switch, on the overhead panel, P5, to the OFF position.

(b) Set the applicable GEN switch, on the overhead panel, P5, to the OFF position and release.

NOTE: This will remove the load from the IDG, if it is not already removed.

1) Make sure that the applicable GEN switch GEN OFF BUS light comes on.

(c) Let the engine become stable at the idle-power position for 5 minutes.

SUBTASK 71-00-00-860-199-G00

(5) Put these switches on the overhead panel, P5, to the OFF position:

(a) WING ANTI-ICE

(b) ENG ANTI-ICE.

SUBTASK 71-00-00-860-479-G00

(6) Put the PROBE HEAT "A" or “B” switch on the overhead panel, P5, to the ON position.

NOTE: For engine operation at high power, the EEC can go into Alternate Mode operation if neither pitot probe is heated.

SUBTASK 71-00-00-860-648-G00

(7) Get the performance maintenance data page to record the engine parameters (TASK 71-00-00-970-802-G00 and TASK 31-65-00-970-801).

NOTE: You can use the RECORD screen button on the menu at the bottom of the performance page to record the parameters.

SUBTASK 71-00-00-860-200-G00

(8) Monitor all the engine parameters.

NOTE: Carefully monitor EGT and N2.

(a) Record the values when the engine is operating at the target N1.

(b) Use the RECORD screen button on the menu at the bottom of the performance page to record the parameters.

SUBTASK 71-00-00-860-202-G00

(9) Slowly move the applicable forward thrust lever to the N1 target speed that you got for the applicable MPA power level: 70% or 75%.

(a) It is recommended that the initial check be done at 70% N1.

1) If that test fails, or if it is operator policy, then do a subsequent test at the higher N1 speeds.

(b) If this is a subsequent check at a higher speed, make sure that the engine runs at the idle-power position for a minimum of 10 minutes before you increase the engine speed again.

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SUBTASK 71-00-00-970-002-G00

(10) Let the engine become stable at this power assurance target for a minimum of 5 minutes.

SUBTASK 71-00-00-970-003-G00

(11) Record these indicated parameters from the power assurance target.

NOTE: Use the RECORD screen button on the menu at the bottom of the performance page to record the parameters.

NOTE: You can print or download the performance page. This will let you transfer the engine parameter values to the data work sheet at a later time when you will calculate the test results.

(a) %N1

(b) %N2

(c) EGT

(d) Fuel flow.

NOTE: Fuel flow is used only for fault isolation purposes.

SUBTASK 71-00-00-860-203-G00

(12) Slowly move the applicable forward thrust lever to the idle power position.

SUBTASK 71-00-00-970-004-G00

(13) When the test is complete, do the steps in the Test Results paragraph to find if an additional check is necessary:

(a) If the test was satisfactory, stop the engine (TASK 71-00-00-910-806-G00).

1) Dry motor the engine for 2 minutes (TASK 71-00-00-910-808-G00).

(b) If the test was not satisfactory, do the test again at a higher N1 speed.

F. Test Results

SUBTASK 71-00-00-970-026-G00

(1) Refer to the Hardware Configuration Data Entry Plug Pin Configuration table to determine whether the engine is pre or post LEAP-1B Service Bulletin 72-0169 (TASK 73-21-09-700-801-G00).

SUBTASK 71-00-00-860-480-G00

(2) Use the applicable power assurance test table to find the maximum N2 and EGT for the correct engine rating and ambient temperature.

SUBTASK 71-00-00-860-204-G00

(3) If there is a positive or negative difference between the N1 target and the N1 record, do these steps to adjust the N2 and EGT indications (Table 506):

NOTE: If the N1 target is more than the N1 record, there is a positive difference. If the N1 target is less than the N1 record, there is a negative difference.

Table 506/71-00-00-993-841-G00 Adjustment for Difference between N1 Target and N1 Recorded

Target N1	Parameter Correction value/0.1 %N1		
	EGT	N2	Fuel Flow *[1]
70%	0.8°C	0.03%	14.00 lbs/hr (6.35 kg/hr)
75%	0.8°C	0.04%	16.00 lbs/hr (7.26 kg/hr)

*[1] Fuel flow parameters are included for fault isolation and not as a specified limit.

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(a) For each 0.1% of positive difference in N1, add the values in Table 506 to each recorded parameter of the test target N1 speed.

(b) For each 0.1% of negative difference in N1, subtract the values in Table 506 to each recorded parameter of the test target N1 speed.

SUBTASK 71-00-00-970-025-G00

(4) To adjust the EGT margin for N1 modifiers, do these steps:

(a) Find the applicable trim level (TASK 73-21-00-470-801-G00).

(b) Find the N1 Modifier Adjustment in the table below for the applicable trim level.

(c) Add the adjustment to the calculated EGT margin.

SIA ALL; POST LEAP-1B SERVICE BULLETIN 72-0169 AND POST LEAP-1B SERVICE BULLETIN 73-0015

Table 507/71-00-00-993-865-G00 N1 Modifier Adjustments

N1 Modifier Level	Delta EGT (°C)	Delta N2 (%)	Delta Fuel Flow *[1]	
			(lbs/hr)	(kg/hr)
0	0.0	0	0	0
1	-0.8	-0.04	-18	-8
2	-1.7	-0.09	-35	-16
3	-2.5	-0.13	-53	-24
4	-3.4	-0.17	-71	-32
5	-4.3	-0.21	-89	-40
6	-5.2	-0.26	-107	-48
7	-6.1	-0.30	-125	-57

*[1] Fuel flow parameters are for fault isolation and not a specified limit.

SIA ALL

SUBTASK 71-00-00-970-005-G00

(5) Adjust the EGT margin for the airport elevation as follows:

NOTE: If available, it is preferred to use airport pressure altitude as an alternative to airport elevation. Airport pressure altitude gives a more accurate adjustment factor.

(a) Use the airport elevation where the test is being performed to find the adjustment factors from the Table 508 or Table 509.

NOTE: The EGT corrections shown are for takeoff worst case flight condition and includes ambient temperature and pressure altitude effects.

NOTE: The airport elevation adjustment tables show corrections to the parameters above sea level.

(b) Do linear interpolation to find the delta values for airport elevations not shown in the tables.

(c) Add the airport elevation adjustment value from the calculated EGT margin.

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SIA ALL; POST LEAP-1B SERVICE BULLETIN 72-0169 AND POST LEAP-1B SERVICE BULLETIN 73-0015

Table 508/71-00-00-993-866-G00 Airport Elevation Adjustment Factors from Target 70% N1

Airport Elevation (ft) *[1]	Delta N2 (%)	Delta EGT (°C)	Delta Fuel Flow *[2]	
			(lbs/hr)	(kg/hr)
-2000	-0.72	-14.1	-380.4	-172.5
0	0.00	0.0	0	0
2000	0.64	11.6	343.0	155.6
5000	1.68	28.9	816.7	370.4
10000	3.50	56.5	1499.4	680.1
15000	5.38	85.4	2088.6	947.4
19000	6.83	117.3	2492.3	1130.5

*[1] Linear interpolation is necessary for elevation delta values that are not in the table.

*[2] Fuel flow parameters are for fault isolation and not as a specified limit.

Table 509/71-00-00-993-867-G00 Airport Elevation Adjustment Factors from Target 75% N1

Airport Elevation (ft) *[1]	Delta N2 (%)	Delta EGT (°C)	Delta Fuel Flow *[2]	
			(lbs/hr)	(kg/hr)
-2000	-0.72	-14.1	-447.0	-172.5
0	0.00	0.0	0.0	0.0
2000	0.64	11.6	401.0	181.9
5000	1.68	28.9	958.3	434.7
10000	3.50	53.5	1787.7	810.9
15000	5.38	85.4	2458.7	1115.3
19000	6.83	117.3	2935.3	1331.4

*[1] Linear interpolation is necessary for elevation delta values that are not in the table.

*[2] Fuel flow parameters are included for fault isolation and not as a specified limit.

SIA ALL

SUBTASK 71-00-00-970-012-G00

(6) If the 70% N1 power assurance test is not satisfactory, do the test again at 75% N1.

(a) A positive result for margin (margin greater than zero) shows the engine is not fully deteriorated and has sufficient margin to conduct operations without experiencing an exceedance.

SUBTASK 71-00-00-970-014-G00

(7) If the 75% N1 power assurance test is not satisfactory, do a check on the engine related maintenance messages, and do the applicable fault isolation tasks.

(a) If you find and correct the cause, do the test again at the power level that failed.

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(b) If you do not find the cause, use your airline policy to make the decision if engine replacement is necessary.

G. Test Result Calculations Example

SUBTASK 71-00-00-720-004-G00

(1) The steps that follow are an example of the calculations you must do for the power assurance test.

NOTE: The values provided in this example are for use in this example only. For the actual test, you will use the data in the tables and the engine parameter values that you record during the engine run.

(a) Assume that you record an OAT of 50°F (10°C), the example engine is B28B2 (post-LEAP-1B Service Bulletin 72-0169 and post-LEAP-1B Service Bulletin 73-0015) rating with an N1 modifier level of 1, and tested to Target N1% of 75%.

1) Use Figure 503 (post LEAP-1B Service Bulletin 72-0169 and post LEAP-1B Service Bulletin 73-0015) to find the values that follows for the B28B2 engine rating with a Target N1 of 75%:

a) Target N1 = 74.3

b) N2 maximum = 106.6

c) EGT maximum = 786.3 °C

(b) Assume that you run the power assurance test and record the values that follow:

1) N1 recorded = 74.5

2) N2 recorded = 105.7

3) EGT recorded = 757 °C

(c) N1 target is less than the N1 recorded, so there is a negative difference.

(d) N1 difference = N1 recorded - N1 target = 74.5 - 74.3 = 0.2.

(e) Use the N1 difference value of 0.2 and the adjustment constants in Table 506, to calculate N2 and the EGT adjusted.

1) N2 adjusted = N2% recorded - 0.04 * (N1% difference/0.1) = 105.70 - 0.04 * (0.2/0.1) = 105.62%.

2) EGT adjusted = EGT recorded - 0.8 * (N1 difference/0.1) = 757 - 0.8 * (0.2/0.1) = 755.4 °C.

(f) Use the N2 and the EGT adjusted with the maximum N2 and EGT to find the N2 and EGT margins:

1) N2 margin = N2 maximum - N2 adjusted = 106.6 - 105.62 = 0.98%.

2) EGT margin = EGT maximum - EGT adjusted = 786.3 °C - 755.4 °C = 30.9 °C

(g) Adjust the calculated N2 and EGT margin for the N1 modifier level as follows:

1) The N1 modifier level on the OMF System Configuration Page is 1.

2) For the N1 modifier level of 1, use the Table 507 to find an N1 modifier adjustment factor for N2 and EGT.

3) N2 margin (N1 modifier adjusted) = calculated N2 margin + N1 modifier adjustment factor = 0.98 + (-0.04) = 0.94%.

4) EGT margin (N1 modifier adjusted) = calculated EGT margin + N1 modifier adjustment factor = 30.9 + (-0.8) = 30.1°C.

(h) Adjust the calculated N2 and EGT margin for the airport elevation as follows:

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1) Assume that engine test is performed at an airport elevation of 5000 feet.
2) For the 5000 foot elevation, use the Table 509 to find an altitude adjustment factor for N2 and EGT.
3) N2 margin (altitude adjusted) = calculated N2 margin + altitude adjustment factor = 0.94 + (1.68) = 2.62%.
4) EGT margin (altitude adjusted) = calculated EGT margin + altitude adjustment factor = 30.1 + (28.9) = 59°C.

NOTE: As the example results are both positive (greater than zero), this shows the engine is not fully deteriorated and has sufficient N2 and EGT margin to conduct operations without experiencing an exceedance.

NOTE: The results of the power assurance test are to be taken on a pass/fail criteria. The results are not to be used to compare to trended takeoff EGT hot day margin (EGTHDM).

H. Power Assurance Test Tables

SUBTASK 71-00-00-720-005-G00

(1) Use the tables in Figure 502 and Figure 503 for the power assurance test.

NOTE: The following tables provide fuel flow as a reference parameter in units of lbs/hr.

The conversion from lbs/hr to kg/hr is 1 lbs/hr = 0.4535 kg/hr.

The conversion from kg/hr to lbs/hr is 1 kg/hr = 2.205 lbs/hr.

——— END OF TASK ———

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70% N1K											
AMBIENT TEMPERATURE		N1 (%)	ENGINE RATING								
			B28B3			B28B2			B28B1 / B28BBJ1		
˚F	˚C		MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)
-65.2	-54	61.0	92.7	550.5	3878	93.0	552.4	3884	93.0	558.0	3905
-63.4	-53	61.2	92.9	553.3	3879	93.2	555.2	3886	93.2	560.7	3907
-61.6	-52	61.3	93.1	556.1	3881	93.4	558.0	3888	93.4	563.5	3911
-59.8	-51	61.5	93.4	558.9	3886	93.7	560.7	3893	93.7	566.3	3916
-58	-50	61.6	93.6	561.7	3892	93.9	563.5	3899	93.9	569.1	3923
-56.2	-49	61.7	93.8	564.5	3898	94.1	566.3	3906	94.1	571.9	3929
-54.4	-48	61.9	94.0	567.3	3904	94.3	569.2	3912	94.3	574.8	3936
-52.6	-47	62.0	94.2	570.2	3911	94.5	572.1	3919	94.5	577.7	3942
-50.8	-46	62.2	94.4	573.0	3917	94.7	575.0	3926	94.7	580.6	3949
-49	-45	62.3	94.6	575.8	3924	94.9	577.8	3932	94.9	583.5	3956
-47.2	-44	62.4	94.8	578.5	3930	95.1	580.5	3938	95.1	586.2	3962
-45.4	-43	62.6	95.0	581.1	3935	95.3	583.1	3944	95.3	588.9	3968
-43.6	-42	62.7	95.2	583.9	3942	95.5	585.9	3950	95.5	591.8	3975
-41.8	-41	62.8	95.4	586.8	3949	95.7	588.8	3957	95.7	594.7	3982
-40	-40	63.0	95.6	589.7	3956	95.9	591.7	3965	95.9	597.7	3990
-38.2	-39	63.1	95.8	593.0	3965	96.1	595.0	3974	96.1	601.0	3999
-36.4	-38	63.2	96.0	596.0	3972	96.3	598.0	3981	96.3	603.9	4006
-34.6	-37	63.4	96.2	599.0	3980	96.5	601.0	3988	96.5	606.9	4014
-32.8	-36	63.5	96.4	602.0	3987	96.7	603.9	3996	96.7	609.9	4021
-31	-35	63.6	96.6	604.8	3994	96.9	606.8	4003	96.9	612.8	4028
-29.2	-34	63.8	96.8	607.8	4002	97.1	609.8	4010	97.1	615.7	4036
-27.4	-33	63.9	97.0	610.7	4009	97.3	612.7	4017	97.3	618.7	4043
-25.6	-32	64.0	97.1	613.7	4016	97.4	615.7	4025	97.4	621.6	4051
-23.8	-31	64.2	97.3	616.7	4023	97.6	618.6	4032	97.6	624.6	4058
-22	-30	64.3	97.5	619.6	4031	97.8	621.6	4039	97.8	627.6	4065
-20.2	-29	64.4	97.7	622.7	4039	98.0	624.7	4047	98.0	630.6	4073
-18.4	-28	64.6	97.9	625.8	4047	98.2	627.8	4055	98.2	633.7	4081
-16.6	-27	64.7	98.1	628.9	4055	98.4	630.9	4063	98.4	636.8	4089
-14.8	-26	64.8	98.3	632.0	4063	98.6	633.9	4071	98.6	639.9	4098
-13	-25	65.0	98.5	635.0	4071	98.8	637.0	4079	98.8	643.0	4106
-11.2	-24	65.1	98.7	638.2	4079	99.0	640.2	4088	99.0	646.2	4114
-9.4	-23	65.2	98.8	641.5	4088	99.1	643.5	4097	99.1	649.5	4123
-7.6	-22	65.4	99.0	644.7	4096	99.3	646.7	4105	99.3	652.7	4131
-5.8	-21	65.5	99.2	647.9	4105	99.5	649.9	4114	99.5	655.9	4140
-4	-20	65.6	99.4	651.1	4113	99.7	653.1	4122	99.7	659.1	4148
-2.2	-19	65.7	99.6	654.4	4122	99.9	656.4	4131	99.9	662.4	4157

5054470-00

2827726 S0000655752_V2

Power Assurance Test 70% N1 Corrected Fan Speed
Figure 502/71-00-00-990-877-G00 (Sheet 1 of 9)

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70% N1K											
AMBIENT TEMPERATURE		N1 (%)	ENGINE RATING								
			B28B3			B28B2			B28B1 / B28BBJ1		
˚F	˚C		MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)
-0.4	-18	65.9	99.8	657.7	4131	100.1	659.7	4140	100.1	665.7	4166
1.4	-17	66.0	99.9	660.9	4140	100.2	663.0	4149	100.2	669.0	4175
3.2	-16	66.1	100.1	664.2	4149	100.4	666.2	4158	100.4	672.2	4184
5	-15	66.3	100.3	667.4	4158	100.6	669.4	4167	100.6	675.4	4193
6.8	-14	66.4	100.5	670.7	4167	100.8	672.7	4175	100.8	678.6	4201
8.6	-13	66.5	100.7	674.0	4176	101.0	676.0	4185	101.0	681.8	4210
10.4	-12	66.6	100.8	677.3	4185	101.1	679.2	4193	101.1	685.0	4218
12.2	-11	66.8	101.0	680.5	4193	101.3	682.4	4202	101.3	688.2	4227
14	-10	66.9	101.2	683.7	4202	101.5	685.6	4211	101.5	691.4	4236
15.8	-9	67.0	101.4	686.9	4211	101.7	688.9	4219	101.7	694.6	4244
17.6	-8	67.1	101.5	690.0	4219	101.8	692.0	4227	101.8	697.7	4252
19.4	-7	67.3	101.7	693.1	4227	102.0	695.0	4235	102.0	700.8	4260
21.2	-6	67.4	101.9	696.2	4235	102.2	698.1	4244	102.2	703.9	4269
23	-5	67.5	102.1	699.2	4243	102.4	701.2	4252	102.4	706.9	4277
24.8	-4	67.7	102.3	702.3	4252	102.6	704.2	4260	102.6	710.0	4285
26.6	-3	67.8	102.4	705.3	4260	102.7	707.3	4268	102.7	713.1	4293
28.4	-2	67.9	102.6	708.3	4268	102.9	710.3	4276	102.9	716.1	4301
30.2	-1	68.0	102.8	711.4	4276	103.1	713.3	4284	103.1	719.1	4309
32	0	68.2	103.0	714.4	4284	103.3	716.3	4292	103.3	722.1	4317
33.8	1	68.3	103.1	717.4	4291	103.4	719.3	4300	103.4	725.1	4325
35.6	2	68.4	103.3	720.3	4299	103.6	722.3	4307	103.6	728.0	4332
37.4	3	68.5	103.5	723.3	4307	103.8	725.2	4315	103.8	731.0	4340
39.2	4	68.7	103.7	726.3	4315	104.0	728.2	4323	104.0	734.0	4348
41	5	68.8	103.8	729.3	4323	104.1	731.2	4331	104.1	737.0	4356
42.8	6	68.9	104.0	732.5	4331	104.3	734.4	4339	104.3	740.2	4364
44.6	7	69.0	104.2	735.7	4340	104.5	737.6	4348	104.5	743.4	4373
46.4	8	69.1	104.3	738.9	4348	104.6	740.8	4357	104.6	746.6	4381
48.2	9	69.3	104.5	742.0	4357	104.8	744.0	4365	104.8	749.7	4390
50	10	69.4	104.7	745.2	4365	105.0	747.1	4373	105.0	752.8	4398
51.8	11	69.5	104.9	748.3	4373	105.2	750.2	4381	105.2	755.9	4406
53.6	12	69.6	105.0	751.3	4381	105.3	753.3	4389	105.3	759.0	4413
55.4	13	69.8	105.2	754.4	4389	105.5	756.3	4397	105.5	762.1	4421
57.2	14	69.9	105.4	757.4	4397	105.7	759.4	4405	105.7	765.1	4429
59	15	70.0	105.5	760.5	4405	105.8	762.4	4413	105.8	768.2	4438
60.8	16	70.1	105.7	763.8	4414	106.0	765.7	4422	106.0	771.5	4447
62.6	17	70.2	105.9	767.1	4423	106.2	769.0	4431	106.2	774.8	4456

5054471-00

2828297 S0000655753_V2

Power Assurance Test 70% N1 Corrected Fan Speed
Figure 502/71-00-00-990-877-G00 (Sheet 2 of 9)

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70% N1K											
AMBIENT TEMPERATURE		N1 (%)	ENGINE RATING								
			B28B3			B28B2			B28B1 / B28BBJ1		
˚F	˚C		MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)
64.4	18	70.4	106.0	770.4	4432	106.3	772.3	4440	106.3	778.1	4465
66.2	19	70.5	106.2	773.7	4441	106.5	775.6	4450	106.5	781.4	4474
68	20	70.6	106.4	777.0	4450	106.7	778.9	4459	106.7	784.7	4483
69.8	21	70.7	106.5	780.0	4459	106.8	781.9	4467	106.8	787.7	4491
71.6	22	70.8	106.7	783.0	4467	107.0	785.0	4475	107.0	790.7	4499
73.4	23	71.0	106.9	786.1	4475	107.2	788.1	4483	107.2	793.8	4507
75.2	24	71.1	107.0	789.3	4484	107.3	791.2	4492	107.3	797.0	4516
77	25	71.2	107.2	792.5	4492	107.5	794.4	4500	107.5	800.2	4525
78.8	26	71.3	107.4	795.7	4501	107.7	797.6	4509	107.7	803.4	4533
80.6	27	71.4	107.5	798.8	4510	107.8	800.7	4518	107.8	806.5	4542
82.4	28	71.6	107.7	801.8	4518	108.0	803.8	4526	108.0	809.5	4550
84.2	29	71.7	107.9	804.8	4525	108.2	806.7	4533	108.2	812.4	4558
86	30	71.8	108.0	807.7	4533	108.3	809.6	4541	108.3	815.4	4565
87.8	31	71.9	108.2	810.4	4540	108.5	812.3	4548	108.5	818.1	4572
89.6	32	72.0	108.4	813.1	4547	108.7	815.0	4555	108.7	820.8	4579
91.4	33	72.2	108.5	815.8	4554	108.8	817.8	4562	108.8	823.5	4586
93.2	34	72.3	108.7	818.6	4561	109.0	820.5	4569	109.0	826.3	4593
95	35	72.4	108.9	821.3	4568	109.2	823.2	4576	109.2	829.0	4600
96.8	36	72.5	109.0	824.0	4575	109.3	825.9	4583	109.3	831.7	4607
98.6	37	72.6	109.2	826.7	4582	109.5	828.6	4590	109.5	834.4	4614
100.4	38	72.7	109.4	829.5	4589	109.7	831.4	4597	109.7	837.1	4621
102.2	39	72.9	109.6	832.3	4597	109.9	834.2	4605	109.9	840.0	4628
104	40	73.0	109.7	835.1	4604	110.0	837.0	4612	110.0	842.8	4636
105.8	41	73.1	109.9	838.0	4612	110.2	839.9	4620	110.2	845.7	4644
107.6	42	73.2	110.1	840.9	4620	110.4	842.8	4628	110.4	848.5	4652
109.4	43	73.3	110.2	843.7	4627	110.5	845.6	4635	110.5	851.4	4659
111.2	44	73.4	110.4	846.3	4634	110.7	848.2	4642	110.7	854.0	4666
113	45	73.6	110.5	848.9	4640	110.8	850.8	4648	110.8	856.6	4672
114.8	46	73.7	110.7	851.4	4647	111.0	853.3	4655	111.0	859.1	4679
116.6	47	73.8	110.9	854.0	4653	111.2	855.9	4661	111.2	861.6	4685
118.4	48	73.9	111.0	856.5	4659	111.3	858.3	4667	111.3	864.1	4691
120.2	49	74.0	111.2	858.8	4665	111.5	860.7	4673	111.5	866.5	4697
122	50	74.1	111.3	861.2	4670	111.6	863.0	4678	111.6	868.8	4702
123.8	51	74.2	111.5	863.4	4676	111.8	865.3	4684	111.8	871.0	4707
125.6	52	74.4	111.7	865.8	4682	112.0	867.7	4690	112.0	873.4	4713
127.4	53	74.5	111.8	868.0	4687	112.1	869.9	4695	112.1	875.6	4718
129.2	54	74.6	112.0	870.7	4694	112.3	872.6	4702	112.3	878.3	4726

5054472-00

2828301 S0000655754_V2

Power Assurance Test 70% N1 Corrected Fan Speed
Figure 502/71-00-00-990-877-G00 (Sheet 3 of 9)

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70% N1K											
AMBIENT TEMPERATURE		N1 (%)	ENGINE RATING								
			B28			B27			B25		
˚F	˚C		MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)
-65.2	-54	61.0	93.6	569.2	3946	93.8	593.4	4018	94.6	612.4	4018
-63.4	-53	61.2	93.8	571.9	3950	94.0	596.2	4025	94.8	615.2	4025
-61.6	-52	61.3	94.0	574.7	3956	94.2	598.9	4031	95.0	617.9	4031
-59.8	-51	61.5	94.3	577.5	3962	94.5	601.7	4038	95.3	620.7	4038
-58	-50	61.6	94.5	580.3	3969	94.7	604.5	4044	95.5	623.5	4044
-56.2	-49	61.7	94.7	583.1	3975	94.9	607.2	4051	95.7	626.2	4051
-54.4	-48	61.9	94.9	586.0	3982	95.1	610.1	4058	95.9	629.1	4058
-52.6	-47	62.0	95.1	588.9	3989	95.3	613.0	4065	96.1	632.0	4065
-50.8	-46	62.2	95.3	591.8	3996	95.5	615.9	4072	96.3	634.9	4072
-49	-45	62.3	95.5	594.7	4003	95.7	618.7	4080	96.5	637.7	4080
-47.2	-44	62.4	95.7	597.4	4009	95.9	621.4	4086	96.7	640.4	4086
-45.4	-43	62.6	95.9	600.1	4015	96.1	624.1	4092	96.9	643.1	4092
-43.6	-42	62.7	96.1	603.0	4022	96.3	626.9	4099	97.1	645.9	4099
-41.8	-41	62.8	96.3	605.9	4030	96.5	629.8	4106	97.3	648.8	4106
-40	-40	63.0	96.5	608.9	4037	96.7	632.7	4114	97.5	651.7	4114
-38.2	-39	63.1	96.7	612.2	4046	96.9	636.0	4123	97.7	655.0	4123
-36.4	-38	63.2	96.9	615.2	4054	97.1	639.0	4130	97.9	658.0	4130
-34.6	-37	63.4	97.1	618.2	4062	97.3	642.0	4138	98.1	661.0	4138
-32.8	-36	63.5	97.3	621.2	4070	97.5	645.1	4146	98.3	664.1	4146
-31	-35	63.6	97.5	624.1	4077	97.7	648.0	4154	98.5	667.0	4154
-29.2	-34	63.8	97.7	627.2	4085	97.9	651.0	4162	98.7	670.0	4162
-27.4	-33	63.9	97.9	630.2	4093	98.1	654.0	4169	98.9	673.0	4169
-25.6	-32	64.0	98.0	633.2	4101	98.2	657.0	4177	99.0	676.0	4177
-23.8	-31	64.2	98.2	636.2	4108	98.4	660.0	4185	99.2	679.0	4185
-22	-30	64.3	98.4	639.2	4116	98.6	663.0	4193	99.4	682.0	4193
-20.2	-29	64.4	98.6	642.3	4124	98.8	666.2	4201	99.6	685.2	4201
-18.4	-28	64.6	98.8	645.5	4132	99.0	669.3	4209	99.8	688.3	4209
-16.6	-27	64.7	99.0	648.6	4141	99.2	672.5	4217	100.0	691.5	4217
-14.8	-26	64.8	99.2	651.8	4149	99.4	675.6	4226	100.2	694.6	4226
-13	-25	65.0	99.4	654.9	4157	99.6	678.7	4234	100.4	697.7	4234
-11.2	-24	65.1	99.6	658.2	4166	99.8	681.9	4242	100.6	700.9	4242
-9.4	-23	65.2	99.7	661.4	4175	99.9	685.1	4250	100.7	704.1	4250
-7.6	-22	65.4	99.9	664.7	4183	100.1	688.2	4259	100.9	707.2	4259
-5.8	-21	65.5	100.1	667.9	4192	100.3	691.4	4267	101.1	710.4	4267
-4	-20	65.6	100.3	671.2	4200	100.5	694.5	4275	101.3	713.5	4275
-2.2	-19	65.7	100.5	674.4	4209	100.7	697.7	4284	101.5	716.7	4284

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Power Assurance Test 70% N1 Corrected Fan Speed
Figure 502/71-00-00-990-877-G00 (Sheet 4 of 9)

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70% N1K											
AMBIENT TEMPERATURE		N1 (%)	ENGINE RATING								
			B28			B27			B25		
˚F	˚C		MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)
-0.4	-18	65.9	100.7	677.6	4218	100.9	700.9	4293	101.7	719.9	4293
1.4	-17	66.0	100.8	680.8	4226	101.0	704.0	4301	101.8	723.0	4301
3.2	-16	66.1	101.0	683.9	4235	101.2	707.2	4309	102.0	726.2	4309
5	-15	66.3	101.2	687.0	4243	101.4	710.4	4318	102.2	729.4	4318
6.8	-14	66.4	101.4	690.1	4251	101.6	713.5	4326	102.4	732.5	4326
8.6	-13	66.5	101.6	693.3	4260	101.8	716.8	4335	102.6	735.8	4335
10.4	-12	66.6	101.7	696.6	4269	101.9	720.0	4344	102.7	739.0	4344
12.2	-11	66.8	101.9	699.8	4277	102.1	723.3	4352	102.9	742.3	4352
14	-10	66.9	102.1	703.0	4286	102.3	726.5	4361	103.1	745.5	4361
15.8	-9	67.0	102.3	706.2	4294	102.5	729.8	4370	103.3	748.8	4370
17.6	-8	67.1	102.4	709.3	4302	102.6	732.9	4378	103.4	751.9	4378
19.4	-7	67.3	102.6	712.4	4310	102.8	736.0	4386	103.6	755.0	4386
21.2	-6	67.4	102.8	715.4	4319	103.0	739.1	4394	103.8	758.1	4394
23	-5	67.5	103.0	718.5	4327	103.2	742.2	4403	104.0	761.2	4403
24.8	-4	67.7	103.2	721.6	4335	103.4	745.3	4411	104.2	764.3	4411
26.6	-3	67.8	103.3	724.6	4343	103.5	748.4	4419	104.3	767.4	4419
28.4	-2	67.9	103.5	727.6	4351	103.7	751.5	4427	104.5	770.5	4427
30.2	-1	68.0	103.7	730.6	4358	103.9	754.5	4435	104.7	773.5	4435
32	0	68.2	103.9	733.6	4366	104.1	757.6	4443	104.9	776.6	4443
33.8	1	68.3	104.0	736.6	4374	104.2	760.6	4451	105.0	779.6	4451
35.6	2	68.4	104.2	739.6	4382	104.4	763.6	4459	105.2	782.6	4459
37.4	3	68.5	104.4	742.5	4390	104.6	766.6	4467	105.4	785.6	4467
39.2	4	68.7	104.6	745.6	4397	104.8	769.7	4475	105.6	788.7	4475
41	5	68.8	104.7	748.6	4405	104.9	772.7	4483	105.7	791.7	4483
42.8	6	68.9	104.9	751.7	4414	105.1	775.9	4491	105.9	794.9	4491
44.6	7	69.0	105.1	754.9	4422	105.3	779.1	4499	106.1	798.1	4499
46.4	8	69.1	105.2	758.1	4431	105.4	782.4	4508	106.2	801.4	4508
48.2	9	69.3	105.4	761.3	4439	105.6	785.6	4516	106.4	804.6	4516
50	10	69.4	105.6	764.4	4447	105.8	788.7	4524	106.6	807.7	4524
51.8	11	69.5	105.8	767.5	4455	106.0	791.8	4532	106.8	810.8	4532
53.6	12	69.6	105.9	770.6	4463	106.1	794.9	4541	106.9	813.9	4541
55.4	13	69.8	106.1	773.6	4471	106.3	798.0	4549	107.1	817.0	4549
57.2	14	69.9	106.3	776.7	4479	106.5	801.0	4557	107.3	820.0	4557
59	15	70.0	106.4	779.7	4487	106.6	804.1	4565	107.4	823.1	4565
60.8	16	70.1	106.6	783.1	4496	106.8	807.4	4574	107.6	826.4	4574
62.6	17	70.2	106.8	786.4	4505	107.0	810.7	4583	107.8	829.7	4583

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Power Assurance Test 70% N1 Corrected Fan Speed
Figure 502/71-00-00-990-877-G00 (Sheet 5 of 9)

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70% N1K											
AMBIENT TEMPERATURE		N1 (%)	ENGINE RATING								
			B28			B27			B25		
˚F	˚C		MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)
64.4	18	70.4	106.9	789.6	4514	107.1	814.0	4592	107.9	833.0	4592
66.2	19	70.5	107.1	792.9	4523	107.3	817.3	4601	108.1	836.3	4601
68	20	70.6	107.3	796.2	4532	107.5	820.5	4610	108.3	839.5	4610
69.8	21	70.7	107.4	799.2	4540	107.6	823.6	4618	108.4	842.6	4618
71.6	22	70.8	107.6	802.3	4548	107.8	826.6	4626	108.6	845.6	4626
73.4	23	71.0	107.8	805.4	4557	108.0	829.7	4635	108.8	848.7	4635
75.2	24	71.1	107.9	808.5	4565	108.1	832.9	4643	108.9	851.9	4643
77	25	71.2	108.1	811.7	4574	108.3	836.0	4652	109.1	855.0	4652
78.8	26	71.3	108.3	814.9	4582	108.5	839.2	4660	109.3	858.2	4660
80.6	27	71.4	108.4	818.1	4591	108.6	842.4	4669	109.4	861.4	4669
82.4	28	71.6	108.6	821.1	4599	108.8	845.4	4677	109.6	864.4	4677
84.2	29	71.7	108.8	824.0	4606	109.0	848.3	4684	109.8	867.3	4684
86	30	71.8	108.9	826.9	4614	109.1	851.3	4692	109.9	870.3	4692
87.8	31	71.9	109.1	829.6	4621	109.3	853.4	4699	110.1	872.8	4699
89.6	32	72.0	109.3	832.4	4628	109.5	855.5	4706	110.3	875.3	4706
91.4	33	72.2	109.4	835.1	4635	109.6	857.6	4712	110.4	877.8	4712
93.2	34	72.3	109.6	837.8	4642	109.8	859.7	4719	110.6	880.3	4719
95	35	72.4	109.8	840.5	4649	110.0	861.8	4726	110.8	882.8	4726
96.8	36	72.5	109.9	843.2	4655	110.1	864.5	4733	110.9	884.7	4733
98.6	37	72.6	110.1	845.9	4662	110.3	867.2	4740	111.1	886.6	4740
100.4	38	72.7	110.3	848.7	4669	110.5	870.0	4746	111.3	888.6	4746
102.2	39	72.9	110.5	851.5	4677	110.7	872.8	4754	111.5	890.6	4754
104	40	73.0	110.6	854.3	4684	110.8	875.6	4761	111.6	892.6	4761
105.8	41	73.1	110.8	857.2	4691	111.0	878.5	4768	111.8	895.5	4768
107.6	42	73.2	111.0	860.1	4699	111.2	881.4	4776	112.0	898.4	4776
109.4	43	73.3	111.1	862.9	4707	111.3	884.2	4783	112.1	901.2	4783
111.2	44	73.4	111.3	865.5	4714	111.5	886.8	4789	112.3	903.8	4789
113	45	73.6	111.4	868.1	4720	111.6	889.4	4796	112.4	906.4	4796
114.8	46	73.7	111.6	870.6	4727	111.8	891.9	4802	112.6	908.9	4802
116.6	47	73.8	111.8	873.2	4733	112.0	894.4	4808	112.8	911.4	4808
118.4	48	73.9	111.9	875.6	4739	112.1	896.9	4814	112.9	913.9	4814
120.2	49	74.0	112.1	878.0	4745	112.3	899.3	4820	113.1	916.3	4820
122	50	74.1	112.2	880.3	4750	112.4	901.6	4825	113.2	918.6	4825
123.8	51	74.2	112.4	882.6	4755	112.6	903.9	4830	113.4	920.9	4830
125.6	52	74.4	112.6	884.9	4761	112.8	906.2	4836	113.6	923.2	4836
127.4	53	74.5	112.7	887.1	4766	112.9	908.4	4841	113.7	925.4	4841
129.2	54	74.6	112.9	889.8	4773	113.1	911.2	4848	113.9	928.2	4848

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Power Assurance Test 70% N1 Corrected Fan Speed
Figure 502/71-00-00-990-877-G00 (Sheet 6 of 9)

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70% N1K											
AMBIENT TEMPERATURE		N1 (%)	ENGINE RATING								
			B23			B21			B28B2C / B28BBJ2		
˚F	˚C		MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)
-65.2	-54	61.0	94.9	624.4	4018.5	95.4	637.4	4018.5	93.0	564.0	3904.5
-63.4	-53	61.2	95.1	627.2	4024.8	95.6	640.2	4024.8	93.2	566.7	3906.9
-61.6	-52	61.3	95.3	629.9	4031.4	95.8	642.9	4031.4	93.4	569.5	3910.6
-59.8	-51	61.5	95.6	632.7	4037.8	96.1	645.7	4037.8	93.7	572.3	3916.5
-58	-50	61.6	95.8	635.5	4044.5	96.3	648.5	4044.5	93.9	575.1	3922.5
-56.2	-49	61.7	96.0	638.2	4051.1	96.5	651.2	4051.1	94.1	577.9	3928.9
-54.4	-48	61.9	96.2	641.1	4058.1	96.7	654.1	4058.1	94.3	580.8	3935.6
-52.6	-47	62.0	96.4	644.0	4065.2	96.9	657.0	4065.2	94.5	583.7	3942.4
-50.8	-46	62.2	96.6	646.9	4072.4	97.1	659.9	4072.4	94.7	586.6	3949.4
-49	-45	62.3	96.8	649.7	4079.5	97.3	662.7	4079.5	94.9	589.5	3956.1
-47.2	-44	62.4	97.0	652.4	4085.8	97.5	665.4	4085.8	95.1	592.2	3962.1
-45.4	-43	62.6	97.2	655.1	4092.1	97.7	668.1	4092.1	95.3	594.9	3968.2
-43.6	-42	62.7	97.4	657.9	4099.0	97.9	670.9	4099.0	95.5	597.8	3975.1
-41.8	-41	62.8	97.6	660.8	4106.3	98.1	673.8	4106.3	95.7	600.7	3982.2
-40	-40	63.0	97.8	663.7	4113.9	98.3	676.7	4113.9	95.9	603.7	3989.8
-38.2	-39	63.1	98.0	667.0	4122.7	98.5	680.0	4122.7	96.1	607.0	3998.8
-36.4	-38	63.2	98.2	670.0	4130.0	98.7	683.0	4130.0	96.3	609.9	4005.8
-34.6	-37	63.4	98.4	673.0	4137.9	98.9	686.0	4137.9	96.5	612.9	4013.5
-32.8	-36	63.5	98.6	676.1	4145.9	99.1	689.1	4145.9	96.7	615.9	4021.1
-31	-35	63.6	98.8	679.0	4153.6	99.3	692.0	4153.6	96.9	618.8	4028.3
-29.2	-34	63.8	99.0	682.0	4161.6	99.5	695.0	4161.6	97.1	621.7	4035.9
-27.4	-33	63.9	99.2	685.0	4169.2	99.7	698.0	4169.2	97.3	624.7	4043.4
-25.6	-32	64.0	99.3	688.0	4177.1	99.8	701.0	4177.1	97.4	627.6	4050.8
-23.8	-31	64.2	99.5	691.0	4184.9	100.0	704.0	4184.9	97.6	630.6	4058.1
-22	-30	64.3	99.7	694.0	4192.8	100.2	707.0	4192.8	97.8	633.6	4065.5
-20.2	-29	64.4	99.9	697.2	4201.0	100.4	710.2	4201.0	98.0	636.6	4073.3
-18.4	-28	64.6	100.1	700.3	4209.2	100.6	713.3	4209.2	98.2	639.7	4081.4
-16.6	-27	64.7	100.3	703.5	4217.5	100.8	716.5	4217.5	98.4	642.8	4089.5
-14.8	-26	64.8	100.5	706.6	4225.7	101.0	719.6	4225.7	98.6	645.9	4097.6
-13	-25	65.0	100.7	709.7	4233.8	101.2	722.7	4233.8	98.8	649.0	4105.7
-11.2	-24	65.1	100.9	712.9	4242.1	101.4	725.9	4242.1	99.0	652.2	4114.2
-9.4	-23	65.2	101.0	716.1	4250.5	101.5	729.1	4250.5	99.1	655.5	4122.8
-7.6	-22	65.4	101.2	719.2	4258.8	101.7	732.2	4258.8	99.3	658.7	4131.3
-5.8	-21	65.5	101.4	722.4	4267.1	101.9	735.4	4267.1	99.5	661.9	4139.8
-4	-20	65.6	101.6	725.5	4275.5	102.1	738.5	4275.5	99.7	665.1	4148.2
-2.2	-19	65 7	101.8	728.7	4284.0	102.3	741.7	4284.0	99.9	668.4	4157.0

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Power Assurance Test 70% N1 Corrected Fan Speed
Figure 502/71-00-00-990-877-G00 (Sheet 7 of 9)

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70% N1K											
AMBIENT TEMPERATURE		N1 (%)	ENGINE RATING								
			B23			B21			B28B2C / B28BBJ2		
˚F	˚C		MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)
-0.4	-18	65.9	102.0	731.9	4292.6	102.5	744.9	4292.6	100.1	671.7	4166.0
1.4	-17	66.0	102.1	735.0	4301.0	102.6	748.0	4301.0	100.2	675.0	4175.0
3.2	-16	66.1	102.3	738.2	4309.4	102.8	751.2	4309.4	100.4	678.2	4183.9
5	-15	66.3	102.5	741.4	4317.8	103.0	754.4	4317.8	100.6	681.4	4192.7
6.8	-14	66.4	102.7	744.5	4326.2	103.2	757.5	4326.2	100.8	684.6	4201.1
8.6	-13	66.5	102.9	747.8	4334.9	103.4	760.8	4334.9	101.0	687.8	4209.8
10.4	-12	66.6	103.0	751.0	4343.6	103.5	764.0	4343.6	101.1	691.0	4218.4
12.2	-11	66.8	103.2	754.3	4352.2	103.7	767.3	4352.2	101.3	694.2	4227.0
14	-10	66.9	103.4	757.5	4361.0	103.9	770.5	4361.0	101.5	697.4	4235.7
15.8	-9	67.0	103.6	760.8	4369.7	104.1	773.8	4369.7	101.7	700.6	4244.4
17.6	-8	67.1	103.7	763.9	4377.9	104.2	776.9	4377.9	101.8	703.7	4252.5
19.4	-7	67.3	103.9	767.0	4386.1	104.4	780.0	4386.1	102.0	706.8	4260.5
21.2	-6	67.4	104.1	770.1	4394.3	104.6	783.1	4394.3	102.2	709.9	4268.7
23	-5	67.5	104.3	773.2	4402.6	104.8	786.2	4402.6	102.4	712.9	4276.8
24.8	-4	67.7	104.5	776.3	4410.8	105.0	789.3	4410.8	102.6	716.0	4284.9
26.6	-3	67.8	104.6	779.4	4419.0	105.1	792.4	4419.0	102.7	719.1	4293.0
28.4	-2	67.9	104.8	782.5	4426.9	105.3	795.5	4426.9	102.9	722.1	4300.9
30.2	-1	68.0	105.0	785.5	4434.9	105.5	798.5	4434.9	103.1	725.1	4308.8
32	0	68.2	105.2	788.6	4442.9	105.7	801.6	4442.9	103.3	728.1	4316.7
33.8	1	68.3	105.3	791.6	4450.9	105.8	804.6	4450.9	103.4	731.1	4324.5
35.6	2	68.4	105.5	794.6	4458.7	106.0	807.6	4458.7	103.6	734.0	4332.3
37.4	3	68.5	105.7	797.6	4466.6	106.2	810.6	4466.6	103.8	737.0	4339.9
39.2	4	68.7	105.9	800.7	4474.6	106.4	813.7	4474.6	104.0	740.0	4347.9
41	5	68.8	106.0	803.7	4482.6	106.5	816.7	4482.6	104.1	743.0	4355.8
42.8	6	68.9	106.2	806.9	4490.8	106.7	819.9	4490.8	104.3	746.2	4364.1
44.6	7	69.0	106.4	810.1	4499.1	106.9	823.1	4499.1	104.5	749.4	4372.6
46.4	8	69.1	106.5	813.4	4507.5	107.0	826.4	4507.5	104.6	752.6	4381.2
48.2	9	69.3	106.7	816.6	4516.0	107.2	829.6	4516.0	104.8	755.7	4389.6
50	10	69.4	106.9	819.7	4524.2	107.4	832.7	4524.2	105.0	758.8	4397.6
51.8	11	69.5	107.1	822.8	4532.4	107.6	835.8	4532.4	105.2	761.9	4405.5
53.6	12	69.6	107.2	825.9	4540.6	107.7	838.9	4540.6	105.3	765.0	4413.5
55.4	13	69.8	107.4	829.0	4548.7	107.9	842.0	4548.7	105.5	768.1	4421.4
57.2	14	69.9	107.6	832.0	4556.7	108.1	845.0	4556.7	105.7	771.1	4429.4
59	15	70.0	107.7	835.1	4564.8	108.2	848.1	4564.8	105.8	774.2	4437.5
60.8	16	70.1	107.9	838.4	4574.0	108.4	851.4	4574.0	106.0	777.5	4446.6
62.6	17	70.2	108.1	841.7	4583.1	108.6	854.7	4583.1	106.2	780.8	4455.6

5055190-00

2831801 S0000658000_V1

Power Assurance Test 70% N1 Corrected Fan Speed
Figure 502/71-00-00-990-877-G00 (Sheet 8 of 9)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

70% N1K											
AMBIENT TEMPERATURE		N1 (%)	ENGINE RATING								
			B23			B21			B28B2C / B28BBJ2		
˚F	˚C		MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)
64.4	18	70.4	108.2	845.0	4592.2	108.7	858.0	4592.2	106.3	784.1	4464.7
66.2	19	70.5	108.4	848.3	4601.2	108.9	861.3	4601.2	106.5	787.4	4473.8
68	20	70.6	108.6	851.5	4610.2	109.1	864.5	4610.2	106.7	790.7	4482.9
69.8	21	70.7	108.7	854.6	4618.2	109.2	867.6	4618.2	106.8	793.7	4490.9
71.6	22	70.8	108.9	857.6	4626.3	109.4	870.6	4626.3	107.0	796.7	4499.1
73.4	23	71.0	109.1	860.7	4634.5	109.6	873.7	4634.5	107.2	799.8	4507.4
75.2	24	71.1	109.2	863.9	4643.1	109.7	876.9	4643.1	107.3	803.0	4516.0
77	25	71.2	109.4	867.0	4651.7	109.9	880.0	4651.7	107.5	806.2	4524.7
78.8	26	71.3	109.6	870.2	4660.4	110.1	883.2	4660.4	107.7	809.4	4533.4
80.6	27	71.4	109.7	873.4	4668.9	110.2	886.4	4668.9	107.8	812.5	4541.9
82.4	28	71.6	109.9	876.4	4676.7	110.4	889.4	4676.7	108.0	815.5	4549.9
84.2	29	71.7	110.1	879.3	4684.3	110.6	892.3	4684.3	108.2	818.4	4557.6
86	30	71.8	110.2	882.3	4692.1	110.7	895.3	4692.1	108.3	821.4	4565.4
87.8	31	71.9	110.4	884.2	4698.9	110.9	897.2	4698.9	108.5	818.1	4572.2
89.6	32	72.0	110.6	886.1	4705.7	111.1	899.1	4705.7	108.7	820.8	4579.1
91.4	33	72.2	110.7	888.0	4712.5	111.2	901.0	4712.5	108.8	823.5	4586.0
93.2	34	72.3	110.9	889.9	4719.3	111.4	902.9	4719.3	109.0	826.3	4593.0
95	35	72.4	111.1	891.8	4726.2	111.6	904.8	4726.2	109.2	829.0	4599.9
96.8	36	72.5	111.2	894.5	4732.9	111.7	907.5	4732.9	109.3	831.7	4607.0
98.6	37	72.6	111.4	897.2	4739.6	111.9	910.2	4739.6	109.5	834.4	4613.9
100.4	38	72.7	111.6	900.0	4746.4	112.1	913.0	4746.4	109.7	837.1	4621.0
102.2	39	72.9	111.8	902.8	4753.6	112.3	915.8	4753.6	109.9	840.0	4628.4
104	40	73.0	111.9	905.6	4760.9	112.4	918.6	4760.9	110.0	842.8	4636.1
105.8	41	73.1	112.1	908.5	4768.3	112.6	921.5	4768.3	110.2	845.7	4643.8
107.6	42	73.2	112.3	911.4	4775.6	112.8	924.4	4775.6	110.4	848.5	4651.5
109.4	43	73.3	112.4	914.2	4782.8	112.9	927.2	4782.8	110.5	851.4	4659.1
111.2	44	73.4	112.6	916.8	4789.5	113.1	929.8	4789.5	110.7	854.0	4665.9
113	45	73.6	112.7	919.4	4795.9	113.2	932.4	4795.9	110.8	856.6	4672.5
114.8	46	73.7	112.9	921.9	4802.1	113.4	934.9	4802.1	111.0	859.1	4678.7
116.6	47	73.8	113.1	924.4	4808.1	113.6	937.4	4808.1	111.2	861.6	4684.8
118.4	48	73.9	113.2	926.9	4814.0	113.7	939.9	4814.0	111.3	864.1	4690.9
120.2	49	74.0	113.4	929.3	4819.6	113.9	942.3	4819.6	111.5	866.5	4696.6
122	50	74.1	113.5	931.6	4824.9	114.0	944.6	4824.9	111.6	868.8	4701.9
123.8	51	74.2	113.7	933.9	4830.3	114.2	946.9	4830.3	111.8	871.0	4707.4
125.6	52	74.4	113.9	936.2	4836.1	114.4	949.2	4836.1	112.0	873.4	4713.2
127.4	53	74.5	114.0	938.4	4840.9	114.5	951.4	4840.9	112.1	875.6	4718.2
129.2	54	74.6	114.2	941.2	4848.0	114.7	954.2	4848.0	112.3	878.3	4725.6

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2831803 S0000658003_V1

Power Assurance Test 70% N1 Corrected Fan Speed
Figure 502/71-00-00-990-877-G00 (Sheet 9 of 9)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

75% N1K											
AMBIENT TEMPERATURE		N1 (%)	ENGINE RATING								
			B28B3			B28B2			B28B1 / B28BBJ1		
˚F	˚C		MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)
-65.2	-54	65.4	94.3	578.2	4506	94.6	580.1	4515	94.6	585.8	4541
-63.4	-53	65.6	94.5	581.1	4514	94.8	583.1	4523	94.8	588.8	4550
-61.6	-52	65.7	94.7	584	4522	95	585.9	4531	95	591.7	4558
-59.8	-51	65.9	94.9	586.8	4529	95.2	588.8	4538	95.2	594.5	4565
-58	-50	66	95.1	589.6	4537	95.4	591.5	4546	95.4	597.3	4573
-56.2	-49	66.1	95.3	592.4	4544	95.6	594.3	4553	95.6	600.1	4580
-54.4	-48	66.3	95.5	595.4	4553	95.8	597.3	4562	95.8	603.1	4589
-52.6	-47	66.4	95.7	598.8	4564	96	600.7	4573	96	606.5	4600
-50.8	-46	66.6	95.9	601.9	4573	96.2	603.8	4582	96.2	609.6	4609
-49	-45	66.7	96.1	605	4582	96.4	607	4591	96.4	612.7	4619
-47.2	-44	66.9	96.3	608.2	4592	96.6	610.1	4601	96.6	615.9	4629
-45.4	-43	67	96.5	611.3	4602	96.8	613.3	4611	96.8	619	4639
-43.6	-42	67.2	96.7	614.7	4612	97	616.6	4621	97	622.3	4649
-41.8	-41	67.3	96.9	618	4623	97.2	619.9	4632	97.2	625.7	4659
-40	-40	67.5	97.1	621.2	4632	97.4	623.1	4641	97.4	628.9	4669
-38.2	-39	67.6	97.3	624.4	4641	97.6	626.2	4650	97.6	632	4678
-36.4	-38	67.8	97.5	627.5	4650	97.8	629.4	4660	97.8	635.1	4687
-34.6	-37	67.9	97.7	630.7	4660	98	632.6	4669	98	638.3	4697
-32.8	-36	68	97.9	634	4670	98.2	635.8	4679	98.2	641.6	4707
-31	-35	68.2	98.1	637.3	4680	98.4	639.1	4689	98.4	644.9	4717
-29.2	-34	68.3	98.3	640.5	4690	98.6	642.4	4699	98.6	648.1	4727
-27.4	-33	68.5	98.5	643.8	4700	98.8	645.7	4709	98.8	651.4	4737
-25.6	-32	68.6	98.7	647.1	4710	99	649	4720	99	654.7	4747
-23.8	-31	68.8	98.9	650.5	4721	99.2	652.4	4730	99.2	658.1	4758
-22	-30	68.9	99.1	653.9	4732	99.4	655.8	4741	99.4	661.4	4768
-20.2	-29	69	99.3	657.3	4742	99.6	659.1	4752	99.6	664.8	4779
-18.4	-28	69.2	99.5	660.7	4753	99.8	662.5	4762	99.8	668.2	4789
-16.6	-27	69.3	99.6	664.1	4764	99.9	665.9	4773	99.9	671.6	4800
-14.8	-26	69.5	99.8	667.5	4775	100.1	669.4	4784	100.1	675	4811
-13	-25	69.6	100	670.9	4786	100.3	672.7	4795	100.3	678.2	4821
-11.2	-24	69.7	100.2	674.2	4796	100.5	676	4805	100.5	681.4	4831
-9.4	-23	69.9	100.4	677.5	4806	100.7	679.2	4815	100.7	684.6	4841
-7.6	-22	70	100.6	680.7	4816	100.9	682.5	4825	100.9	687.9	4851
-5.8	-21	70.2	100.8	684	4826	101.1	685.8	4835	101.1	691.1	4861
-4	-20	70.3	101	687.2	4836	101.3	689	4845	101.3	694.4	4871
-2.2	-19	70.4	101.1	690.5	4846	101.4	692.3	4855	101.4	697.7	4881

6035940-00
2828359 S0000655758_V3

Power Assurance Test 75% N1 Corrected Fan Speed
Figure 503/71-00-00-990-885-G00 (Sheet 1 of 9)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

75% N1K											
AMBIENT TEMPERATURE		N1 (%)	ENGINE RATING								
			B28B3			B28B2			B28B1 / B28BBJ1		
˚F	˚C		MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)
-0.4	-18	70.6	101.3	693.8	4856	101.6	695.6	4865	101.6	701	4891
1.4	-17	70.7	101.5	697.1	4866	101.8	698.9	4875	101.8	704.2	4901
3.2	-16	70.9	101.7	700.3	4876	102	702.1	4885	102	707.5	4910
5	-15	71	101.9	703.5	4886	102.2	705.3	4895	102.2	710.7	4920
6.8	-14	71.1	102.1	706.7	4896	102.4	708.5	4904	102.4	713.9	4930
8.6	-13	71.3	102.2	710	4906	102.5	711.8	4914	102.5	717.1	4940
10.4	-12	71.4	102.4	713.2	4916	102.7	715	4924	102.7	720.3	4950
12.2	-11	71.5	102.6	716.3	4925	102.9	718.1	4934	102.9	723.5	4959
14	-10	71.7	102.8	719.5	4935	103.1	721.3	4944	103.1	726.7	4969
15.8	-9	71.8	103	722.6	4945	103.3	724.4	4953	103.3	729.8	4979
17.6	-8	71.9	103.2	725.8	4954	103.5	727.5	4963	103.5	732.9	4988
19.4	-7	72.1	103.3	728.9	4964	103.6	730.7	4972	103.6	736.1	4998
21.2	-6	72.2	103.5	732.1	4974	103.8	733.9	4982	103.8	739.3	5008
23	-5	72.4	103.7	735.5	4984	104	737.2	4993	104	742.6	5018
24.8	-4	72.5	103.9	738.8	4995	104.2	740.6	5003	104.2	746	5029
26.6	-3	72.6	104.1	742.1	5005	104.4	743.9	5014	104.4	749.3	5039
28.4	-2	72.8	104.2	745.5	5016	104.5	747.3	5024	104.5	752.7	5049
30.2	-1	72.9	104.4	748.8	5026	104.7	750.6	5035	104.7	756	5060
32	0	73	104.6	752.1	5036	104.9	753.9	5045	104.9	759.3	5070
33.8	1	73.2	104.8	755.4	5047	105.1	757.2	5055	105.1	762.6	5080
35.6	2	73.3	104.9	758.6	5057	105.2	760.5	5065	105.2	765.9	5090
37.4	3	73.4	105.1	761.9	5067	105.4	763.7	5075	105.4	769.1	5100
39.2	4	73.6	105.3	765.1	5077	105.6	766.9	5085	105.6	772.4	5110
41	5	73.7	105.5	768.3	5087	105.8	770.1	5095	105.8	775.6	5120
42.8	6	73.8	105.6	771.6	5097	105.9	773.4	5105	105.9	778.8	5130
44.6	7	74	105.8	774.8	5107	106.1	776.6	5115	106.1	782.1	5140
46.4	8	74.1	106	778.1	5117	106.3	779.9	5125	106.3	785.3	5150
48.2	9	74.2	106.2	781.3	5127	106.5	783.1	5135	106.5	788.5	5160
50	10	74.3	106.3	784.5	5137	106.6	786.3	5145	106.6	791.7	5170
51.8	11	74.5	106.5	787.7	5147	106.8	789.5	5155	106.8	795	5180
53.6	12	74.6	106.7	791	5157	107	792.8	5165	107	798.2	5190
55.4	13	74.7	106.9	794.2	5167	107.2	796.1	5175	107.2	801.5	5200
57.2	14	74.9	107	797.5	5177	107.3	799.3	5185	107.3	804.7	5210
59	15	75	107.2	800.7	5187	107.5	802.5	5195	107.5	807.9	5220
60.8	16	75.1	107.4	804.1	5198	107.7	805.9	5206	107.7	811.3	5231
62.6	17	75.3	107.5	807.5	5208	107.8	809.4	5217	107.8	814.8	5242

6035941-00
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Power Assurance Test 75% N1 Corrected Fan Speed
Figure 503/71-00-00-990-885-G00 (Sheet 2 of 9)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

75% N1K											
AMBIENT TEMPERATURE		N1 (%)	ENGINE RATING								
			B28B3			B28B2			B28B1 / B28BBJ1		
˚F	˚C		MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)
64.4	18	75.4	107.7	810.7	5218	108	812.6	5227	108	818	5252
66.2	19	75.5	107.9	813.9	5228	108.2	815.8	5237	108.2	821.2	5262
68	20	75.6	108	817.1	5238	108.3	819	5247	108.3	824.4	5272
69.8	21	75.8	108.2	820	5247	108.5	821.9	5256	108.5	827.4	5281
71.6	22	75.9	108.4	822.9	5256	108.7	824.8	5264	108.7	830.4	5290
73.4	23	76	108.6	825.8	5264	108.9	827.7	5273	108.9	833.3	5299
75.2	24	76.2	108.7	828.8	5274	109	830.7	5283	109	836.4	5309
77	25	76.3	108.9	831.8	5283	109.2	833.7	5292	109.2	839.4	5318
78.8	26	76.4	109.1	834.8	5292	109.4	836.7	5301	109.4	842.5	5327
80.6	27	76.5	109.3	837.8	5301	109.6	839.7	5310	109.6	845.5	5337
82.4	28	76.7	109.4	840.8	5310	109.7	842.7	5319	109.7	848.5	5345
84.2	29	76.8	109.6	843.7	5319	109.9	845.7	5328	109.9	851.4	5354
86	30	76.9	109.8	846.7	5328	110.1	848.6	5337	110.1	854.4	5363
87.8	31	77.1	109.9	849.4	5336	110.2	851.3	5345	110.2	857.1	5371
89.6	32	77.2	110.1	852.2	5345	110.4	854.2	5353	110.4	859.9	5380
91.4	33	77.3	110.3	855.1	5354	110.6	857	5362	110.6	862.8	5389
93.2	34	77.4	110.5	858	5363	110.8	859.9	5371	110.8	865.7	5398
95	35	77.6	110.6	860.9	5372	110.9	862.8	5380	110.9	868.6	5407
96.8	36	77.7	110.8	863.8	5381	111.1	865.7	5389	111.1	871.5	5416
98.6	37	77.8	111	866.7	5389	111.3	868.6	5398	111.3	874.4	5425
100.4	38	77.9	111.1	869.6	5398	111.4	871.5	5407	111.4	877.3	5434
102.2	39	78.1	111.3	872.5	5407	111.6	874.4	5416	111.6	880.2	5443
104	40	78.2	111.5	875.4	5416	111.8	877.4	5425	111.8	883.1	5451
105.8	41	78.3	111.7	878.4	5425	112	880.4	5434	112	886.1	5461
107.6	42	78.4	111.8	881.4	5434	112.1	883.3	5443	112.1	889.1	5469
109.4	43	78.6	112	884.5	5444	112.3	886.4	5453	112.3	892.2	5478
111.2	44	78.7	112.1	887.4	5452	112.4	889.4	5461	112.4	895.2	5487
113	45	78.8	112.3	890.3	5460	112.6	892.2	5469	112.6	898	5494
114.8	46	78.9	112.5	893.1	5467	112.8	895	5476	112.8	900.8	5502
116.6	47	79.1	112.6	896	5475	112.9	897.9	5484	112.9	903.7	5510
118.4	48	79.2	112.8	898.8	5483	113.1	900.8	5492	113.1	906.6	5517
120.2	49	79.3	113	901.7	5491	113.3	903.6	5499	113.3	909.4	5525
122	50	79.4	113.1	904.5	5498	113.4	906.5	5507	113.4	912.3	5532
123.8	51	79.5	113.3	907.6	5507	113.6	909.5	5515	113.6	915.4	5541
125.6	52	79.7	113.4	910.7	5515	113.7	912.6	5523	113.7	918.4	5549
127.4	53	79.8	113.6	913.8	5524	113.9	915.8	5533	113.9	921.6	5558
129.2	54	79.9	113.7	917.1	5533	114	919	5542	114	924.8	5568

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Power Assurance Test 75% N1 Corrected Fan Speed
Figure 503/71-00-00-990-885-G00 (Sheet 3 of 9)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

75% N1K											
AMBIENT TEMPERATURE		N1 (%)	ENGINE RATING								
			B28			B27			B25		
˚F	˚C		MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)
-65.2	-54	65.4	95.2	597.7	4597	95.4	622.8	4686	96.2	641.8	4686
-63.4	-53	65.6	95.4	600.7	4605	95.6	625.7	4695	96.4	644.7	4695
-61.6	-52	65.7	95.6	603.5	4613	95.8	628.6	4703	96.6	647.6	4703
-59.8	-51	65.9	95.8	606.3	4621	96	631.4	4711	96.8	650.4	4711
-58	-50	66	96	609	4628	96.2	634.1	4718	97	653.1	4718
-56.2	-49	66.1	96.2	611.7	4636	96.4	636.9	4726	97.2	655.9	4726
-54.4	-48	66.3	96.4	614.7	4644	96.6	639.8	4734	97.4	658.8	4734
-52.6	-47	66.4	96.6	618	4655	96.8	643.1	4745	97.6	662.1	4745
-50.8	-46	66.6	96.8	621.1	4664	97	646.2	4754	97.8	665.2	4754
-49	-45	66.7	97	624.2	4673	97.2	649.3	4763	98	668.3	4763
-47.2	-44	66.9	97.2	627.4	4683	97.4	652.4	4772	98.2	671.4	4772
-45.4	-43	67	97.4	630.5	4693	97.6	655.6	4782	98.4	674.6	4782
-43.6	-42	67.2	97.6	633.9	4704	97.8	658.9	4793	98.6	677.9	4793
-41.8	-41	67.3	97.8	637.2	4714	98	662.2	4803	98.8	681.2	4803
-40	-40	67.5	98	640.4	4724	98.2	665.3	4813	99	684.3	4813
-38.2	-39	67.6	98.2	643.5	4733	98.4	668.4	4822	99.2	687.4	4822
-36.4	-38	67.8	98.4	646.6	4743	98.6	671.5	4832	99.4	690.5	4832
-34.6	-37	67.9	98.6	649.9	4752	98.8	674.7	4842	99.6	693.7	4842
-32.8	-36	68	98.8	653.1	4762	99	677.9	4851	99.8	696.9	4851
-31	-35	68.2	99	656.4	4772	99.2	681.1	4861	100	700.1	4861
-29.2	-34	68.3	99.2	659.6	4782	99.4	684.2	4871	100.2	703.2	4871
-27.4	-33	68.5	99.4	662.9	4792	99.6	687.3	4880	100.4	706.3	4880
-25.6	-32	68.6	99.6	666.2	4803	99.8	690.5	4890	100.6	709.5	4890
-23.8	-31	68.8	99.8	669.6	4813	100	693.7	4899	100.8	712.7	4899
-22	-30	68.9	100	672.9	4824	100.2	696.9	4909	101	715.9	4909
-20.2	-29	69	100.2	676.2	4834	100.4	700.1	4919	101.2	719.1	4919
-18.4	-28	69.2	100.4	679.5	4844	100.6	703.3	4929	101.4	722.3	4929
-16.6	-27	69.3	100.5	682.8	4854	100.7	706.6	4939	101.5	725.6	4939
-14.8	-26	69.5	100.7	686	4864	100.9	709.9	4949	101.7	728.9	4949
-13	-25	69.6	100.9	689.3	4874	101.1	713.1	4958	101.9	732.1	4958
-11.2	-24	69.7	101.1	692.5	4884	101.3	716.2	4968	102.1	735.2	4968
-9.4	-23	69.9	101.3	695.7	4894	101.5	719.4	4977	102.3	738.4	4977
-7.6	-22	70	101.5	698.9	4903	101.7	722.6	4987	102.5	741.6	4987
-5.8	-21	70.2	101.7	702.2	4913	101.9	725.8	4997	102.7	744.8	4997
-4	-20	70.3	101.9	705.4	4923	102.1	729	5006	102.9	748	5006
-2.2	-19	70.4	102	708.7	4933	102.2	732.3	5016	103	751.3	5016

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Power Assurance Test 75% N1 Corrected Fan Speed
Figure 503/71-00-00-990-885-G00 (Sheet 4 of 9)

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75% N1K											
AMBIENT TEMPERATURE		N1 (%)	ENGINE RATING								
			B28			B27			B25		
˚F	˚C		MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)
-0.4	-18	70.6	102.2	712	4943	102.4	735.5	5026	103.2	754.5	5026
1.4	-17	70.7	102.4	715.2	4953	102.6	738.8	5035	103.4	757.8	5035
3.2	-16	70.9	102.6	718.4	4962	102.8	742	5045	103.6	761	5045
5	-15	71	102.8	721.6	4972	103	745.2	5055	103.8	764.2	5055
6.8	-14	71.1	103	724.8	4982	103.2	748.4	5064	104	767.4	5064
8.6	-13	71.3	103.1	728	4992	103.3	751.6	5074	104.1	770.6	5074
10.4	-12	71.4	103.3	731.2	5002	103.5	754.8	5084	104.3	773.8	5084
12.2	-11	71.5	103.5	734.4	5011	103.7	757.9	5093	104.5	776.9	5093
14	-10	71.7	103.7	737.5	5021	103.9	761.1	5103	104.7	780.1	5103
15.8	-9	71.8	103.9	740.6	5030	104.1	764.2	5112	104.9	783.2	5112
17.6	-8	71.9	104.1	743.7	5039	104.3	767.4	5122	105.1	786.4	5122
19.4	-7	72.1	104.2	746.8	5049	104.4	770.5	5131	105.2	789.5	5131
21.2	-6	72.2	104.4	750	5059	104.6	773.7	5141	105.4	792.7	5141
23	-5	72.4	104.6	753.4	5069	104.8	777.1	5151	105.6	796.1	5151
24.8	-4	72.5	104.8	756.8	5080	105	780.4	5162	105.8	799.4	5162
26.6	-3	72.6	105	760.1	5090	105.2	783.8	5172	106	802.8	5172
28.4	-2	72.8	105.1	763.5	5100	105.3	787.1	5183	106.1	806.1	5183
30.2	-1	72.9	105.3	766.8	5111	105.5	790.5	5193	106.3	809.5	5193
32	0	73	105.5	770.1	5121	105.7	793.7	5203	106.5	812.7	5203
33.8	1	73.2	105.7	773.4	5131	105.9	797	5213	106.7	816	5213
35.6	2	73.3	105.8	776.7	5141	106	800.3	5223	106.8	819.3	5223
37.4	3	73.4	106	780	5151	106.2	803.5	5233	107	822.5	5233
39.2	4	73.6	106.2	783.2	5161	106.4	806.7	5243	107.2	825.7	5243
41	5	73.7	106.4	786.4	5171	106.6	809.9	5253	107.4	828.9	5253
42.8	6	73.8	106.5	789.7	5181	106.7	813.1	5263	107.5	832.1	5263
44.6	7	74	106.7	792.9	5191	106.9	816.4	5273	107.7	835.4	5273
46.4	8	74.1	106.9	796.1	5201	107.1	819.6	5283	107.9	838.6	5283
48.2	9	74.2	107.1	799.4	5211	107.3	822.8	5292	108.1	841.8	5292
50	10	74.3	107.2	802.6	5221	107.4	826	5302	108.2	845	5302
51.8	11	74.5	107.4	805.8	5231	107.6	829.2	5312	108.4	848.2	5312
53.6	12	74.6	107.6	809.1	5241	107.8	832.5	5322	108.6	851.5	5322
55.4	13	74.7	107.8	812.3	5251	108	835.7	5332	108.8	854.7	5332
57.2	14	74.9	107.9	815.5	5261	108.1	838.9	5342	108.9	857.9	5342
59	15	75	108.1	818.8	5271	108.3	842.1	5352	109.1	861.1	5352
60.8	16	75.1	108.3	822.2	5282	108.5	845.5	5363	109.3	864.5	5363
62.6	17	75.3	108.4	825.6	5293	108.6	848.9	5374	109.4	867.9	5374

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Power Assurance Test 75% N1 Corrected Fan Speed
Figure 503/71-00-00-990-885-G00 (Sheet 5 of 9)

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75% N1K											
AMBIENT TEMPERATURE		N1 (%)	ENGINE RATING								
			B28			B27			B25		
˚F	˚C		MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)
64.4	18	75.4	108.6	828.9	5303	108.8	852.2	5384	109.6	871.2	5384
66.2	19	75.5	108.8	832.1	5312	109	855.3	5394	109.8	874.3	5394
68	20	75.6	108.9	835.3	5323	109.1	858.6	5404	109.9	877.6	5404
69.8	21	75.8	109.1	838.3	5332	109.3	861.5	5413	110.1	880.5	5413
71.6	22	75.9	109.3	841.2	5341	109.5	864.4	5421	110.3	883.4	5421
73.4	23	76	109.5	844.2	5350	109.7	867.4	5430	110.5	886.4	5430
75.2	24	76.2	109.6	847.2	5359	109.8	870.4	5439	110.6	889.4	5439
77	25	76.3	109.8	850.3	5368	110	873.4	5449	110.8	892.4	5449
78.8	26	76.4	110	853.3	5378	110.2	876.5	5458	111	895.5	5458
80.6	27	76.5	110.2	856.4	5387	110.4	879.5	5467	111.2	898.5	5467
82.4	28	76.7	110.3	859.4	5396	110.5	882.5	5476	111.3	901.5	5476
84.2	29	76.8	110.5	862.4	5405	110.7	885.5	5485	111.5	904.5	5485
86	30	76.9	110.7	865.4	5414	110.9	888.5	5494	111.7	907.5	5494
87.8	31	77.1	110.8	868.1	5422	111	890.7	5502	111.8	910.1	5502
89.6	32	77.2	111	871	5431	111.2	893	5511	112	912.8	5511
91.4	33	77.3	111.2	873.9	5440	111.4	895.3	5519	112.2	915.5	5519
93.2	34	77.4	111.4	876.9	5449	111.6	897.7	5528	112.4	918.3	5528
95	35	77.6	111.5	879.8	5458	111.7	900	5536	112.5	921	5536
96.8	36	77.7	111.7	882.8	5467	111.9	903	5545	112.7	923.2	5545
98.6	37	77.8	111.9	885.7	5476	112.1	905.9	5554	112.9	925.3	5554
100.4	38	77.9	112	888.7	5485	112.2	908.9	5562	113	927.5	5562
102.2	39	78.1	112.2	891.7	5494	112.4	911.9	5571	113.2	929.7	5571
104	40	78.2	112.4	894.6	5503	112.6	914.9	5580	113.4	931.9	5580
105.8	41	78.3	112.6	897.7	5512	112.8	917.9	5589	113.6	934.9	5589
107.6	42	78.4	112.7	900.7	5521	112.9	920.9	5598	113.7	937.9	5598
109.4	43	78.6	112.9	903.8	5530	113.1	924.1	5607	113.9	941.1	5607
111.2	44	78.7	113	906.8	5539	113.2	927.1	5616	114	944.1	5616
113	45	78.8	113.2	909.6	5546	113.4	930.1	5624	114.2	947.1	5624
114.8	46	78.9	113.4	912.5	5553	113.6	932.9	5631	114.4	949.9	5631
116.6	47	79.1	113.5	915.3	5561	113.7	935.9	5639	114.5	952.9	5639
118.4	48	79.2	113.7	918.2	5568	113.9	938.8	5647	114.7	955.8	5647
120.2	49	79.3	113.9	921.1	5576	114.1	941.7	5655	114.9	958.7	5655
122	50	79.4	114	923.9	5583	114.2	944.6	5663	115	961.6	5663
123.8	51	79.5	114.2	927	5592	114.4	947.7	5673	115.2	964.7	5673
125.6	52	79.7	114.3	930.1	5601	114.5	950.8	5682	115.3	967.8	5682
127.4	53	79.8	114.5	933.2	5610	114.7	954	5691	115.5	971	5691
129.2	54	79.9	114.6	936.4	5620	114.8	957.3	5701	115.5	974.3	5701

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Power Assurance Test 75% N1 Corrected Fan Speed
Figure 503/71-00-00-990-885-G00 (Sheet 6 of 9)

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75% N1K											
AMBIENT TEMPERATURE		N1 (%)	ENGINE RATING								
			B23			B21			B28B2C / B28BBJ2		
˚F	˚C		MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)
-65.2	-54	65.4	96.5	653.8	4685.9	97	666.8	4685.9	94.6	585.8	4541.2
-63.4	-53	65.6	96.7	656.7	4694.6	97.2	669.7	4694.6	94.8	588.8	4549.7
-61.6	-52	65.7	96.9	659.6	4702.9	97.4	672.6	4702.9	95	591.7	4557.6
-59.8	-51	65.9	97.1	662.4	4710.6	97.6	675.4	4710.6	95.2	594.5	4565.3
-58	-50	66	97.3	665.1	4718.2	97.8	678.1	4718.2	95.4	597.3	4572.8
-56.2	-49	66.1	97.5	667.9	4725.9	98	680.9	4725.9	95.6	600.1	4580.5
-54.4	-48	66.3	97.7	670.8	4734.5	98.2	683.8	4734.5	95.8	603.1	4589.3
-52.6	-47	66.4	97.9	674.1	4744.8	98.4	687.1	4744.8	96	606.5	4600
-50.8	-46	66.6	98.1	677.2	4753.7	98.6	690.2	4753.7	96.2	609.6	4609.1
-49	-45	66.7	98.3	680.3	4763	98.8	693.3	4763	96.4	612.7	4618.8
-47.2	-44	66.9	98.5	683.4	4772.4	99	696.4	4772.4	96.6	615.9	4628.7
-45.4	-43	67	98.7	686.6	4782.2	99.2	699.6	4782.2	96.8	619	4638.5
-43.6	-42	67.2	98.9	689.9	4792.7	99.4	702.9	4792.7	97	622.3	4649
-41.8	-41	67.3	99.1	693.2	4803.5	99.6	706.2	4803.5	97.2	625.7	4659.5
-40	-40	67.5	99.3	696.3	4813.1	99.8	709.3	4813.1	97.4	628.9	4669.2
-38.2	-39	67.6	99.5	699.4	4822.2	100	712.4	4822.2	97.6	632	4678.4
-36.4	-38	67.8	99.7	702.5	4831.6	100.2	715.5	4831.6	97.8	635.1	4687.4
-34.6	-37	67.9	99.9	705.7	4841.5	100.4	718.7	4841.5	98	638.3	4697
-32.8	-36	68	100.1	708.9	4851.5	100.6	721.9	4851.5	98.2	641.6	4706.9
-31	-35	68.2	100.3	712.1	4861.3	100.8	725.1	4861.3	98.4	644.9	4716.8
-29.2	-34	68.3	100.5	715.2	4870.6	101	728.2	4870.6	98.6	648.1	4726.6
-27.4	-33	68.5	100.7	718.3	4879.9	101.2	731.3	4879.9	98.8	651.4	4736.6
-25.6	-32	68.6	100.9	721.5	4889.7	101.4	734.5	4889.7	99	654.7	4747.1
-23.8	-31	68.8	101.1	724.7	4899.5	101.6	737.7	4899.5	99.2	658.1	4757.7
-22	-30	68.9	101.3	727.9	4909.3	101.8	740.9	4909.3	99.4	661.4	4768.3
-20.2	-29	69	101.5	731.1	4919	102	744.1	4919	99.6	664.8	4778.9
-18.4	-28	69.2	101.7	734.3	4928.8	102.2	747.3	4928.8	99.8	668.2	4789.5
-16.6	-27	69.3	101.8	737.6	4938.7	102.3	750.6	4938.7	99.9	671.6	4800.3
-14.8	-26	69.5	102	740.9	4948.7	102.5	753.9	4948.7	100.1	675	4811.2
-13	-25	69.6	102.2	744.1	4958.3	102.7	757.1	4958.3	100.3	678.2	4821.2
-11.2	-24	69.7	102.4	747.2	4967.7	102.9	760.2	4967.7	100.5	681.4	4831
-9.4	-23	69.9	102.6	750.4	4977.2	103.1	763.4	4977.2	100.7	684.6	4840.8
-7.6	-22	70	102.8	753.6	4986.8	103.3	766.6	4986.8	100.9	687.9	4850.7
-5.8	-21	70.2	103	756.8	4996.5	103.5	769.8	4996.5	101.1	691.1	4860.8
-4	-20	70.3	103.2	760	5006.3	103.7	773	5006.3	101.3	694.4	4870.8
-2.2	-19	70.4	103.3	763.3	5015.9	103.8	776.3	5015.9	101.4	697.7	4880.7

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Power Assurance Test 75% N1 Corrected Fan Speed
Figure 503/71-00-00-990-885-G00 (Sheet 7 of 9)

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75% N1K											
AMBIENT TEMPERATURE		N1 (%)	ENGINE RATING								
			B23			B21			B28B2C / B28BBJ2		
˚F	˚C		MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)
-0.4	-18	70.6	103.5	766.5	5025.6	104	779.5	5025.6	101.6	701	4890.6
1.4	-17	70.7	103.7	769.8	5035.3	104.2	782.8	5035.3	101.8	704.2	4900.5
3.2	-16	70.9	103.9	773	5044.9	104.4	786	5044.9	102	707.5	4910.3
5	-15	71	104.1	776.2	5054.6	104.6	789.2	5054.6	102.2	710.7	4920.2
6.8	-14	71.1	104.3	779.4	5064.4	104.8	792.4	5064.4	102.4	713.9	4930.1
8.6	-13	71.3	104.4	782.6	5074.1	104.9	795.6	5074.1	102.5	717.1	4940
10.4	-12	71.4	104.6	785.8	5083.7	105.1	798.8	5083.7	102.7	720.3	4949.8
12.2	-11	71.5	104.8	788.9	5093.3	105.3	801.9	5093.3	102.9	723.5	4959.5
14	-10	71.7	105	792.1	5102.8	105.5	805.1	5102.8	103.1	726.7	4969.1
15.8	-9	71.8	105.2	795.2	5112.3	105.7	808.2	5112.3	103.3	729.8	4978.7
17.6	-8	71.9	105.4	798.4	5121.7	105.9	811.4	5121.7	103.5	732.9	4988.2
19.4	-7	72.1	105.5	801.5	5131.2	106	814.5	5131.2	103.6	736.1	4997.7
21.2	-6	72.2	105.7	804.7	5141	106.2	817.7	5141	103.8	739.3	5007.6
23	-5	72.4	105.9	808.1	5151.5	106.4	821.1	5151.5	104	742.6	5018.2
24.8	-4	72.5	106.1	811.4	5161.8	106.6	824.4	5161.8	104.2	746	5028.6
26.6	-3	72.6	106.3	814.8	5172.2	106.8	827.8	5172.2	104.4	749.3	5039.1
28.4	-2	72.8	106.4	818.1	5182.5	106.9	831.1	5182.5	104.5	752.7	5049.4
30.2	-1	72.9	106.6	821.5	5192.9	107.1	834.5	5192.9	104.7	756	5059.7
32	0	73	106.8	824.7	5203.1	107.3	837.7	5203.1	104.9	759.3	5069.9
33.8	1	73.2	107	828	5213.1	107.5	841	5213.1	105.1	762.6	5080
35.6	2	73.3	107.1	831.3	5223.1	107.6	844.3	5223.1	105.2	765.9	5090.1
37.4	3	73.4	107.3	834.5	5233.1	107.8	847.5	5233.1	105.4	769.1	5100.2
39.2	4	73.6	107.5	837.7	5242.9	108	850.7	5242.9	105.6	772.4	5110.1
41	5	73.7	107.7	840.9	5252.8	108.2	853.9	5252.8	105.8	775.6	5120.2
42.8	6	73.8	107.8	844.1	5262.7	108.3	857.1	5262.7	105.9	778.8	5130.3
44.6	7	74	108	847.4	5272.6	108.5	860.4	5272.6	106.1	782.1	5140.2
46.4	8	74.1	108.2	850.6	5282.5	108.7	863.6	5282.5	106.3	785.3	5150.2
48.2	9	74.2	108.4	853.8	5292.4	108.9	866.8	5292.4	106.5	788.5	5160.1
50	10	74.3	108.5	857	5302.2	109	870	5302.2	106.6	791.7	5170.1
51.8	11	74.5	108.7	860.2	5312.1	109.2	873.2	5312.1	106.8	795	5180
53.6	12	74.6	108.9	863.5	5322.2	109.4	876.5	5322.2	107	798.2	5190.1
55.4	13	74.7	109.1	866.7	5332.3	109.6	879.7	5332.3	107.2	801.5	5200.2
57.2	14	74.9	109.2	869.9	5342.3	109.7	882.9	5342.3	107.3	804.7	5210.3
59	15	75	109.4	873.1	5352.3	109.9	886.1	5352.3	107.5	807.9	5220.4
60.8	16	75.1	109.6	876.5	5363	110.1	889.5	5363	107.7	811.3	5231.1
62.6	17	75.3	109.7	879.9	5373.9	110.2	892.9	5373.9	107.8	814.8	5242

6035947-00
2831807 S0000658006_V2

Power Assurance Test 75% N1 Corrected Fan Speed
Figure 503/71-00-00-990-885-G00 (Sheet 8 of 9)

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75% N1K											
AMBIENT TEMPERATURE		N1 (%)	ENGINE RATING								
			B23			B21			B28B2C / B28BBJ2		
˚F	˚C		MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)	MAX N2 (%)	MAX EGT (˚C)	FUEL FLOW (lbs/hr)
64.4	18	75.4	109.9	883.2	5383.9	110.4	896.2	5383.9	108	818	5252
66.2	19	75.5	110.1	886.3	5393.7	110.6	899.3	5393.7	108.2	821.2	5261.8
68	20	75.6	110.2	889.6	5403.7	110.7	902.6	5403.7	108.3	824.4	5271.9
69.8	21	75.8	110.4	892.5	5412.6	110.9	905.5	5412.6	108.5	827.4	5281
71.6	22	75.9	110.6	895.4	5421.4	111.1	908.4	5421.4	108.7	830.4	5290.1
73.4	23	76	110.8	898.4	5430.3	111.3	911.4	5430.3	108.9	833.3	5299.1
75.2	24	76.2	110.9	901.4	5439.5	111.4	914.4	5439.5	109	836.4	5308.6
77	25	76.3	111.1	904.4	5448.6	111.6	917.4	5448.6	109.2	839.4	5317.9
78.8	26	76.4	111.3	907.5	5457.8	111.8	920.5	5457.8	109.4	842.5	5327.3
80.6	27	76.5	111.5	910.5	5467	112	923.5	5467	109.6	845.5	5336.5
82.4	28	76.7	111.6	913.5	5476	112.1	926.5	5476	109.7	848.5	5345.5
84.2	29	76.8	111.8	916.5	5484.9	112.3	929.5	5484.9	109.9	851.4	5354.3
86	30	76.9	112	919.5	5494	112.5	932.5	5494	110.1	854.4	5363.2
87.8	31	77.1	112.1	921.5	5502	112.6	934.5	5502	110.2	857.1	5371.2
89.6	32	77.2	112.3	923.6	5510.6	112.8	936.6	5510.6	110.4	859.9	5379.7
91.4	33	77.3	112.5	925.7	5519.3	113	938.7	5519.3	110.6	862.8	5388.6
93.2	34	77.4	112.7	927.9	5527.8	113.2	940.9	5527.8	110.8	865.7	5397.6
95	35	77.6	112.8	930	5536.3	113.3	943	5536.3	110.9	868.6	5406.6
96.8	36	77.7	113	933	5544.8	113.5	946	5544.8	111.1	871.5	5415.5
98.6	37	77.8	113.2	935.9	5553.5	113.7	948.9	5553.5	111.3	874.4	5424.5
100.4	38	77.9	113.3	938.9	5562.2	113.8	951.9	5562.2	111.4	877.3	5433.5
102.2	39	78.1	113.5	941.9	5570.9	114	954.9	5570.9	111.6	880.2	5442.6
104	40	78.2	113.7	944.9	5579.6	114.2	957.9	5579.6	111.8	883.1	5451.5
105.8	41	78.3	113.9	947.9	5588.8	114.4	960.9	5588.8	112	886.1	5460.7
107.6	42	78.4	114	950.9	5597.6	114.5	963.9	5597.6	112.1	889.1	5469.1
109.4	43	78.6	114.2	954.1	5607.1	114.7	967.1	5607.1	112.3	892.2	5478.3
111.2	44	78.7	114.3	957.1	5615.9	114.8	970.1	5615.9	112.4	895.2	5486.6
113	45	78.8	114.5	960.1	5623.6	115	973.1	5623.6	112.6	898	5494.4
114.8	46	78.9	114.7	962.9	5631.1	115.2	975.9	5631.1	112.8	900.8	5501.8
116.6	47	79.1	114.8	965.9	5639.1	115.3	978.9	5639.1	112.9	903.7	5509.5
118.4	48	79.2	115	968.8	5647.1	115.5	981.8	5647.1	113.1	906.6	5517.2
120.2	49	79.3	115.2	971.7	5655.2	115.5	984.7	5655.2	113.3	909.4	5524.8
122	50	79.4	115.3	974.6	5663.4	115.5	987.6	5663.4	113.4	912.3	5532.2
123.8	51	79.5	115.5	977.7	5672.6	115.5	990	5672.6	113.6	915.4	5540.6
125.6	52	79.7	115.5	980.8	5681.8	115.5	990	5681.8	113.7	918.4	5549.3
127.4	53	79.8	115.5	984	5691.3	115.5	990	5691.3	113.9	921.6	5558.4
129.2	54	79.9	115.5	987.3	5701	115.5	990	5701	114	924.8	5567.8

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2831815 S0000658007_V3

Power Assurance Test 75% N1 Corrected Fan Speed
Figure 503/71-00-00-990-885-G00 (Sheet 9 of 9)

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TASK 71-00-00-710-802-G00

9. Test No. 7 - Replacement Engine (Pretested Engine) Test

A. General

(1) This task gives the instructions to do the checks that are necessary when a new pretested engine is installed on an airplane.

(2) A pretested engine is a complete engine, with or without the Quick Engine Change (QEC) parts, that was operated satisfactorily in an approved test cell or an operational engine that has been run on another airplane before it was installed on the airplane.

(3) There is a separate task for a replacement engine that has not been pretested (TASK 71-00-00-710-803-G00).

(4) This task will do all the necessary checks for the QEC components on the engine.

B. References

Reference	Title
24-11-00-700-803	Number 1 IDG Operational Test (P/B 501)
24-11-00-700-804	Number 2 IDG Operational Test (P/B 501)
26-11-00-710-801	Engine Fire Detection - Operational Test (P/B 501)
30-21-00-710-801	Engine Anti-Ice System Operational Test (P/B 501)
36-00-00-860-805	Supply Pressure Upstream of the PRSOV with Engines Off (P/B 201)
71-00-00-200-810-G00	Overtemperature Inspection (P/B 601)
71-00-00-910-802-G00	Start the Engine (Selection) (P/B 201)
71-00-03-630-802-G00	Depreservation of an Engine on Wing (P/B 201)
71-71-00-200-801-G00	Engine Vents and Drains Inspection (P/B 601)
73-00-00-700-801-G00	Scheduled Maintenance Task for Short-Time Fault Interrogation (P/B 501)
73-00-00-700-802-G00	Scheduled Maintenance Task for Long-Time Fault Interrogation (P/B 501)
73-00-00-700-803-G00	Maintenance Messages Check for EEC Faults (P/B 501)
73-21-00-470-801-G00	EEC System Configuration Data Functions Check (P/B 201)
IFIM and do the applicable procedure(s)	Interactive Fault Isolation Manual

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Replacement Engine Test (Pretested)

SUBTASK 71-00-00-620-003-G00

(1) If the replacement engine was preserved, do this task: Depreservation of an Engine on Wing, TASK 71-00-03-630-802-G00.

SUBTASK 71-00-00-860-597-G00

(2) Do this task: Test No. 35 - Erase All Channel A Faults Special Functions Test, TASK 71-00-00-700-811-G00.

NOTE: If the engine that is being tested was preserved on wing do not erase faults.

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SUBTASK 71-00-00-860-598-G00

(3) Do this task: Test No. 36 - Erase All Channel B Faults Special Functions Test, TASK 71-00-00-700-812-G00.

NOTE: If the engine that is being tested was preserved on wing do not erase faults.

SUBTASK 71-00-00-860-599-G00

(4) Do this task: Test No. 17 - Electronic Engine Control (EEC) System Test, TASK 71-00-00-710-806-G00.

SUBTASK 71-00-00-860-600-G00

(5) Do this task: EEC System Configuration Data Functions Check, TASK 73-21-00-470-801-G00.

(a) Make sure that the Engine Serial Number (ESN) on display agrees with the one on the engine data plate.

1) If the ESN on the display does not match the ESN on the engine data plate, input the correct ESN (TASK 71-00-00-700-813-G00).

NOTE: The next engine start after one of the tasks that follow can have a longer pre-start motoring time than typical of cold engines. This is because the engine off time has been erased from EEC NVM.

- Install new EEC software
- Enter new Engine Serial Number (ESN)
- Install the engine on a new aircraft tail number
- Install the engine on the opposite engine position on the same aircraft tail number
- Install a data entry plug with new thrust rating, N1 trim, or engine configuration.

(b) Make sure that the engine thrust rating agrees with the one on the engine data plate.

(c) Make sure that the engine thrust rating matches the opposite engine's thrust rating.

(d) Make sure that the engine thrust rating is applicable to the airplane model.

(e) Make sure that the EEC software version matches between the EEC channels for each engine.

(f) Make sure that the EEC software version in the EECs match between the engines.

SUBTASK 71-00-00-710-010-G00

(6) Do this task: Engine Fire Detection - Operational Test, TASK 26-11-00-710-801.

SUBTASK 71-00-00-730-008-G00

(7) Do the pneumatic leak test (TASK 71-00-00-790-801-G00).

NOTE: If the airplane was in active storage and the duct connections were not disturbed, it is not necessary to check all the ducts and valves for leaks.

NOTE: This leak check can be done after Test No. 4 - Idle Leak Test, TASK 71-00-00-790-804-G00.

(a) Do this task: Supply Pressure Upstream of the PRSOV with Engines Off, TASK 36-00-00-860-805.

(b) Make sure that there is no leakage at the ducts and valves.

SUBTASK 71-00-00-710-011-G00

(8) Do this task: Test No. 15 - Actuator Operational Test, TASK 71-00-00-730-802-G00.

NOTE: This test can be done after Test No. 4 - Idle Leak Test, TASK 71-00-00-790-804-G00.

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SUBTASK 71-00-00-790-005-G00

(9) Do this task: Test No. 4 - Idle Leak Test, TASK 71-00-00-790-804-G00.

NOTE: It may be necessary to use a special start procedures for the first start because of residual air trapped within the FMU EOS fuel circuit.

(a) If the engine fails to start and the maintenance message 73-4235X - FUEL METERING UNIT SHUTOFF VALVE IS FAILED CLOSED is set, do these steps:

1) Do the engine start procedure up to when the START LEVER is moved to IDLE position (TASK 71-00-00-910-802-G00).

2) When the engine is at 25% N2 or the maximum motoring speed and 'MOTORING' is no longer displayed on the N2 dial, toggle the START LEVER switch between IDLE position and CUTOFF position for five seconds (approximately 8 cycles) then put the START LEVER to IDLE position.

3) If the engine did not start, do the procedure again.

NOTE: Multiple start attempts may be necessary if the engine fuel system was not fully depreserved.

(b) During engine operation, make sure that the pressure of the high stage valve is more than 10 psig (69 kPa).

(c) Make sure that there is no fuel leakage from the fuel inlet hose.

(d) Make sure that there are no hydraulic leaks from the hydraulic supply, hydraulic pressure, or case drain lines.

(e) For engine 1, do this task: Number 1 IDG Operational Test, TASK 24-11-00-700-803.

(f) For engine 2, do this task: Number 2 IDG Operational Test, TASK 24-11-00-700-804.

(g) Do this task: Engine Anti-Ice System Operational Test, TASK 30-21-00-710-801.

1) Make sure that the engine has stopped and complete the remaining steps.

(h) After the engine is stopped, examine the engine drains for signs of leakage.

1) If you find signs of leakage, do this task: Engine Vents and Drains Inspection, TASK 71-71-00-200-801-G00.

SUBTASK 71-00-00-860-209-G00

(10) Look for the EEC Maintenance messages faults (TASK 73-00-00-700-803-G00).

(a) If the fault message is a Scheduled Maintenance Task (SMT), do one of the scheduled maintenance tasks below:

1) Do this task: Scheduled Maintenance Task for Short-Time Fault Interrogation, TASK 73-00-00-700-801-G00.

2) Do this task: Scheduled Maintenance Task for Long-Time Fault Interrogation, TASK 73-00-00-700-802-G00.

(b) Refer to IFIM and do the applicable procedure(s) for the maintenance messages.

SUBTASK 71-00-00-860-210-G00

(11) If you find and correct maintenance messages or other problems, do the applicable sections in this task again.

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SUBTASK 71-00-00-710-012-G00

SYSTEM AWL 1

(12) For a new spare engine or a refurbished spare engine which had replacement of the low pressure turbine (LPT) gas path seals, conduct a functional check flight that includes a windmill in-flight start within the Flight Crew Operating Manual (FCOM) in-flight starting envelop.

NOTE: This limitation is only applicable to LEAP-1B engines that have not incorporated CFM Service Bulletin LEAP-1B-73-00-0013-01A-930A-D.

NOTE: This functional check flight is required to comply with Systems Airworthiness Limitation 1, LEAP-1B Spare Engine Low Pressure Spool Rotorlock (refer to 737-7/8/9 Airworthiness Limitations (AWL) document D626A011-9-01).

(a) Engine relight checks must be completed prior to flight above FL270.

(b) A drift down may be required to maintain airspeed for a windmill relight.

(c) APU must be running prior to engine shutdown.

(d) Set an airspeed and altitude to remain within the Windmill In-Flight Start Envelope defined in the QRH

(e) Stabilize the newly installed engine at idle for a minimum of 3 minutes.

(f) Do the Quick Reference Handbook (QRH) Engine Failure or Shutdown checklist.

(g) Within 2-5 minutes after engine shutdown, perform a “windmill start” Engine In-Flight Start per the QRH checklist.

NOTE: Initial N1 drop (up to 5%) during the relight is normal; the N1 will recover as the start progresses.

(h) After completion of the Engine In-Flight Start QRH checklist, operate the engine at idle for a minimum of 3 minutes before setting a higher thrust.

SUBTASK 71-00-00-710-014-G00

(13) If a successful In-flight Start is achieved, gain access to applicable Maintenance Page, engine exceedance display on MDS.

(a) Make sure that there were no EGT Start, EGT Amber, or EGT Redline exceedances recorded.

SUBTASK 71-00-00-710-020-G00

(14) If any EGT exceedances are present, contact Boeing and CFM prior to dispatch (TASK 71-00-00-200-810-G00).

SUBTASK 71-00-00-710-017-G00

(15) If the inflight start is not successful, contact Boeing and CFM prior to dispatch.

——— END OF TASK ———

TASK 71-00-00-710-803-G00

10. Test No. 8 - Replacement Engine (Untested Engine) Test

A. General

(1) This task gives the instructions on how to do the tests that are necessary when an untested engine is installed on an airplane.

(2) A untested engine is a complete engine, with or without the Boeing Quick Engine Change (QEC) parts, that was not tested in an approved test cell after these maintenance actions:

(a) Separation of a major module-to-major module flange (Fan Module, Core Module, LPT Module)

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(b) Separation of a minor module flange.

NOTE: Test No. 8 Replacement Engine (Untested Engine) Test is not necessary on removed engines that were previously tested in an approved test cell or on-wing after an LRU removal and replacement.

(3) After installation of a pretested replacement engine, do this task: Test No. 7 - Replacement Engine (Pretested Engine) Test, TASK 71-00-00-710-802-G00.

NOTE: This procedure will do all the necessary checks for the Boeing QEC components on the engine.

B. References

Reference	Title
24-11-00-700-803	Number 1 IDG Operational Test (P/B 501)
24-11-00-700-804	Number 2 IDG Operational Test (P/B 501)
26-11-00-710-801	Engine Fire Detection - Operational Test (P/B 501)
30-21-00-710-801	Engine Anti-Ice System Operational Test (P/B 501)
36-00-00-860-805	Supply Pressure Upstream of the PRSOV with Engines Off (P/B 201)
71-00-00-200-810-G00	Overtemperature Inspection (P/B 601)
71-00-00-910-802-G00	Start the Engine (Selection) (P/B 201)
71-71-00-200-801-G00	Engine Vents and Drains Inspection (P/B 601)
73-00-00-700-801-G00	Scheduled Maintenance Task for Short-Time Fault Interrogation (P/B 501)
73-00-00-700-802-G00	Scheduled Maintenance Task for Long-Time Fault Interrogation (P/B 501)
73-00-00-700-803-G00	Maintenance Messages Check for EEC Faults (P/B 501)
73-11-00-211-801-G00	Fuel Filter Contamination Detailed Visual Inspection (P/B 601)
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)
73-21-00-470-801-G00	EEC System Configuration Data Functions Check (P/B 201)
79-00-00-210-804-G00	Oil Debris Monitoring System Sensor Inspection (P/B 601)
79-21-04-211-801-G00	Scavenge Screen Plug Inspection (P/B 201)
79-21-07-000-801-G00	Oil Filter Cartridge Element Removal (P/B 401)
79-21-07-400-801-G00	Oil Filter Cartridge Element Installation (P/B 401)
80-11-01-211-801-G00	Engine Starter Oil Leaks Inspection (P/B 601)
80-11-09-200-801-G00	Engine Starter Magnetic Plug Inspection (P/B 201)
IFIM and do the applicable procedure(s)	Interactive Fault Isolation Manual

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Replacement Engine Test (Untested)

SUBTASK 71-00-00-860-211-G00

(1) Do this task:Test No. 35 - Erase All Channel A Faults Special Functions Test, TASK 71-00-00-700-811-G00.

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SUBTASK 71-00-00-860-553-G00

(2) Do this task: Test No. 36 - Erase All Channel B Faults Special Functions Test, TASK 71-00-00-700-812-G00.

SUBTASK 71-00-00-860-212-G00

(3) Do this task: Test No. 17 - Electronic Engine Control (EEC) System Test, TASK 71-00-00-710-806-G00.

SUBTASK 71-00-00-860-213-G00

(4) Do this task: EEC System Configuration Data Functions Check, TASK 73-21-00-470-801-G00.

(a) Make sure that the correct Engine Serial Number (ESN), Electronic Engine Control (EEC) software versions, airplane model and thrust rating for the applicable engine.

1) If the EEC software versions for both EEC channels and engines do not match, install the latest EEC software version.

2) If the engine thrust rating for both engines do not match the airplane thrust rating, change the thrust rating.

3) If the ESN on the display does not match the ESN on the engine data plate, input the correct ESN (TASK 71-00-00-700-813-G00).

NOTE: The next engine start after one of the tasks that follow can have a longer pre-start motoring time than typical of cold engines. This is because the engine off time has been erased from EEC NVM.

- Install new EEC software

- Enter new Engine Serial Number (ESN)

- Install the engine on a new aircraft tail number

- Install the engine on the opposite engine position on the same aircraft tail number

- Install a data entry plug with new thrust rating, N1 trim, or engine configuration.

SUBTASK 71-00-00-710-004-G00

(5) Do this task: Engine Fire Detection - Operational Test, TASK 26-11-00-710-801.

SUBTASK 71-00-00-790-006-G00

(6) Do the pneumatic leak test (TASK 71-00-00-790-801-G00).

(a) Do this task: Supply Pressure Upstream of the PRSOV with Engines Off, TASK 36-00-00-860-805.

(b) Make sure that there is no leakage at the ducts and valves.

SUBTASK 71-00-00-710-005-G00

(7) Do this task: Test No. 15 - Actuator Operational Test, TASK 71-00-00-730-802-G00.

NOTE: This test can be done after Test No. 4 - Idle Leak Test, TASK 71-00-00-790-804-G00.

SUBTASK 71-00-00-860-215-G00

(8) Do this task: Test No. 3 - Wet Motor Leak Test, TASK 71-00-00-790-803-G00.

NOTE: This procedure will make sure that there are no leaks from the fuel filter, the fuel inlet line, and all other fuel tubes and hoses.

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SUBTASK 71-00-00-860-216-G00

(9) During each of the tests that follow, look for these messages: ENG X FUEL FILTER SENSOR and ENG X OIL FILTER SENSOR.

NOTE: ENG X is referred to engine 1 (left) or 2 (right).

(a) In addition, look for other indications, messages, or lights (temperature, pressure, and etc.) that might indicate a possible engine problem.

SUBTASK 71-00-00-860-217-G00

(10) Look for the EEC Maintenance messages faults (TASK 73-00-00-700-803-G00).

(a) If the fault message is a Scheduled Maintenance Task (SMT), do one of the scheduled maintenance tasks below:

1) Do this task: Scheduled Maintenance Task for Short-Time Fault Interrogation, TASK 73-00-00-700-801-G00.

2) Do this task: Scheduled Maintenance Task for Long-Time Fault Interrogation, TASK 73-00-00-700-802-G00.

(b) Refer to IFIM and do the applicable procedure(s) for the maintenance messages.

SUBTASK 71-00-00-790-007-G00

(11) Do the idle leak test (TASK 71-00-00-790-804-G00).

NOTE: It may be necessary to use a special start procedures for the first start because of residual air trapped within the FMU EOS fuel circuit.

(a) If the engine fails to start and the maintenance message 73-4235X - FUEL METERING UNIT SHUTOFF VALVE IS FAILED CLOSED is set, do these steps:

1) Do the engine start procedure up to when the START LEVER is moved to IDLE (TASK 71-00-00-910-802-G00).

2) When the engine is at 25% N2 or the maximum motoring speed and 'MOTORING' is no longer displayed on the N2 dial, toggle the START LEVER switch between IDLE and CUTOFF for five seconds (approximately 8 cycles) then put the START LEVER to IDLE.

3) If the engine did not start, do the procedure again.

NOTE: Multiple start attempts may be necessary if the engine fuel system was not fully depreserved.

(b) During engine operation, make sure that the pressure of the high stage valve is more than 10 psig (69 kPa).

(c) Make sure that there is no fuel leakage from the fuel inlet hose.

(d) Make sure that there are no hydraulic leaks from the hydraulic supply, hydraulic pressure, or the case drain lines.

(e) For engine 1, do this task: Number 1 IDG Operational Test, TASK 24-11-00-700-803.

1) Do the steps to re-connect the IDG after the engine has stopped and complete the remaining steps.

(f) For engine 2, do this task: Number 2 IDG Operational Test, TASK 24-11-00-700-804.

1) Do the steps to re-connect the IDG after the engine has stopped and complete the remaining steps.

(g) Do this task: Engine Anti-Ice System Operational Test, TASK 30-21-00-710-801.

1) Make sure that the engine has stopped and complete the remaining steps.

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(h) After the engine is stopped, examine the engine drains for signs of leakage.

1) If you find signs of leakage, do this task: Engine Vents and Drains Inspection, TASK 71-71-00-200-801-G00.

(i) Re-connect the IDG.

SUBTASK 71-00-00-860-218-G00

(12) Do this task: Test No. 6 - Power Assurance Test, TASK 71-00-00-720-802-G00.

(a) During the test monitor that the N1 and N2 vibrations are within limits and nothing unusual is seen.

SUBTASK 71-00-00-860-220-G00

(13) Do this task: Oil Debris Monitoring System Sensor Inspection, TASK 79-00-00-210-804-G00.

SUBTASK 71-00-00-220-007-G00

(14) Do this task: Scavenge Screen Plug Inspection, TASK 79-21-04-211-801-G00.

SUBTASK 71-00-00-220-001-G00

(15) Replace the scavenge oil filter element.

(a) Remove the scavenge oil filter element (TASK 79-21-07-000-801-G00).

(b) Install a new scavenge oil filter element (TASK 79-21-07-400-801-G00).

SUBTASK 71-00-00-210-009-G00

(16) Examine the fuel filter element.

(a) Remove the fuel filter element (TASK 73-11-02-000-801-G00).

(b) Examine the fuel filter element for debris or contamination (TASK 73-11-00-211-801-G00).

(c) Install a new fuel filter element (TASK 73-11-02-400-801-G00).

SUBTASK 71-00-00-220-002-G00

(17) Do this task: Engine Starter Oil Leaks Inspection, TASK 80-11-01-211-801-G00.

SUBTASK 71-00-00-220-003-G00

(18) Do this task: Engine Starter Magnetic Plug Inspection, TASK 80-11-09-200-801-G00.

SUBTASK 71-00-00-710-013-G00

SYSTEM AWL 1

(19) For a new spare engine or a refurbished spare engine which had replacement of the low pressure turbine (LPT) gas path seals, conduct a functional check flight that includes a windmill in-flight start within the Flight Crew Operating Manual (FCOM) in-flight starting envelop.

NOTE: This limitation is only applicable to LEAP-1B engines that have not incorporated CFM Service Bulletin LEAP-1B-73-00-0013-01A-930A-D.

NOTE: This functional check flight is required to comply with Systems Airworthiness Limitation 1, LEAP-1B Spare Engine Low Pressure Spool Rotorlock (refer to 737-7/8/9 Airworthiness Limitations (AWL) document D626A011-9-01).

(a) Engine relight checks must be completed prior to flight above FL270.

(b) A drift down may be required to maintain airspeed for a windmill relight.

(c) APU must be running prior to engine shutdown.

(d) Set an airspeed and altitude to remain within the Windmill In-Flight Start Envelope defined in the QRH.

(e) Stabilize the newly installed engine at idle for a minimum of 3 minutes.

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(f) Do the Quick Reference Handbook (QRH) Engine Failure or Shutdown checklist.

(g) Within 2-5 minutes after engine shutdown, perform a “windmill start” Engine In-Flight Start per the QRH checklist.

NOTE: Initial N1 drop (up to 5%) during the relight is normal; the N1 will recover as the start progresses.

(h) After completion of the Engine In-Flight Start QRH checklist, operate the engine at idle for a minimum of 3 minutes before setting a higher thrust.

SUBTASK 71-00-00-710-015-G00

(20) If a successful In-flight Start is achieved, gain access to applicable Maintenance Page, engine exceedance display on MDS and make sure there were no EGT Start, EGT Amber, or EGT Redline exceedances recorded. If any EGT exceedances are present, contact Boeing and CFM prior to dispatch. (Overtemperature Inspection, TASK 71-00-00-200-810-G00)

SUBTASK 71-00-00-710-016-G00

(21) If the inflight start is not successful, contact Boeing and CFM prior to dispatch.

——— END OF TASK ———

TASK 71-00-00-720-803-G00

11. Test No. 9 - Low Pressure System (Fan/LPT) Vibration Survey

(Figure 504)

A. General

(1) This task gives the instructions to do the vibration survey of the engine low pressure system (FAN and LPT).

NOTE: This test can involve operating the engine at elevated power settings. It is recommended that the airplane is pointed with the nose into the wind during engine ground runs. Obey the ground static engine crosswind and tailwind operation limitations.

(2) This test is not necessary if maintenance was not done to the fan blades, fan blade spacers or spinner, or if the engine has been pretested and pre-trimmed at an approved test facility before installation, with the current the fan blades, fan blade spacers and spinner installed.

(3) After you replace some engine components that affect engine balance, you must do the low pressure system vibration survey to make sure that the engine balance is satisfactory.

(4) An inspection of the low pressure system vibration data can help isolate the cause of high engine vibration to the low pressure or high pressure system.

(5) Engine operation to gather vibration data for the EEC per paragraph E is optional, but recommended if vibration levels are above 0.8 units in order for trim balance solution per TASK 71-00-00-720-805-G00.

(a) You do this task to supply low pressure system vibration data to the Electronic Engine Control (EEC).

(b) The EEC uses the low pressure system vibration data in the calculation of the engine balancing.

(c) The EEC can keep vibration data for the low pressure system at a maximum of 10 specified engine speeds.

1) These specified engine speeds are referred to as 'speed bins’:

a) The speed bins have numbers 1 through 10.

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<1> Speed bin 1 is the lowest speed for which the EEC can keep vibration data for the low pressure system.

<2> Speed bin 10 is the highest engine speed for which the EEC can keep vibration data for the low pressure system.

2) For most engine imbalance conditions, the EEC can calculate a satisfactory balance solution with vibration data in a minimum of 3 speed bins.

NOTE: To keep the engine operation time and intensity to a minimum during the vibration survey, it is recommended to operate at the engine speeds specified for speed bins 1, 2 and 3.

(d) For ONS version 1.0, the EEC will not save balance weight information, it will always show no weights, EEC MAINT test switches must stay powered (TEST position) on until all balance procedures are complete.

NOTE: The ONS version is 1.0.

NOTE: There may be some weight saved in the EEC. For correct balance weight, enter the current weight so that it will over write the existing weight in the EEC.

(e) It is optional to operate the engine to higher speeds during the vibration survey. The EEC can calculate a more accurate balance solution with the additional vibration data in the higher speed bins.

NOTE: The EEC will also store vibration data in the higher speed bins during flight. You can use the vibration data generated during flight to calculate a more accurate balance solution.

(f) You can use a Portable Maintenance Device (PMD) to do the Low Pressure System (Fan/LPT) vibration survey ground test.

B. References

Reference	Title
31-65-00-970-801	System Maintenance Data Pages Function (P/B 201)
46-13-00-480-801	Maintenance Laptop Connection (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)
71-00-00-910-808-G00	Dry Motor Procedure (P/B 201)
71-00-00-970-801-G00	Maintenance Data Pages from the Engine Propulsion Control System (EPCS) (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Prepare for the Vibration Survey

SUBTASK 71-00-00-860-483-G00

(1) Set the GND TESTS switch on the maintenance BITE panel, P61-4, to the ENABLE position.

SUBTASK 71-00-00-860-484-G00

(2) Set the applicable thrust lever to idle.

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E. Low Pressure System (Fan/LPT) Vibration Survey

SUBTASK 71-00-00-860-221-G00

(1) Make sure that the bleed air control module, engine BLEED 1 and BLEED 2 switches, on the overhead panel, P5, are in the OFF position.

SUBTASK 71-00-00-700-005-G00

(2) Start the engine (TASK 71-00-00-910-802-G00).

SUBTASK 71-00-00-700-006-G00

(3) Let the engine become stable at idle for five minutes.

(a) Make sure that the engine is sufficiently warm to prevent unusual vibration characteristics.

SUBTASK 71-00-00-700-007-G00

(4) Get the EPCS maintenance data page for the vibration survey (TASK 71-00-00-970-801-G00 and TASK 31-65-00-970-801).

(a) Go to the EPCS maintenance page 3 for the engine vibration to see the GROUND RUN SPEED BIN STATUS.

(b) Make sure that the GROUND RUN SPEED BIN STATUS is on the display.

NOTE: There are 10 speed targets. At the start of a ground run to support a vibration survey, all speed bin indications will be blank below the speed target. As enough vibration data is collected at a given speed, the speed bin indication will change to FULL and will be enclosed with a white box. This change in status will indicate to the mechanic to set the next N1 speed target.

SUBTASK 71-00-00-480-007-G00

(5) Connect the PMD to the ONS ports (TASK 46-13-00-480-801).

SUBTASK 71-00-00-700-008-G00

(6) On the PMD from the Onboard Maintenance Function (OMF) main menu, make these selections:

(a) OTHER FUNCTIONS

(b) ENGINE HEALTH MANAGEMENT (EHM).

SUBTASK 71-00-00-700-009-G00

(7) From the ENGINE HEALTH MANAGEMENT main menu, do the steps that follow:

(a) Select the engine to perform the vibration survey.

1) Select the appropriate engine (ENGINE 1 or ENGINE 2) from the ENGINE dropdown tab.

2) Make sure that the weights configuration on display is correct..

a) If the Weights Configuration is not correct, do this task: Test No. 11 - Low Pressure System (Fan) Trim Balance (With ONS), TASK 71-00-00-720-805-G00.

(b) Make sure that the stability criteria is set to the correct level and the configuration is correct as follows:

NOTE: The default stability criteria is medium. Changing the stability criteria to high will result in a longer time to collect data.

1) Select DATA CRITERIA from the FUNCTION dropdown tab.

2) Make sure that the stability criteria is set to the correct level.

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WARNING MAKE SURE THAT THE PARKING BRAKE IS ENGAGED, AND THE WHEEL CHOCKS ARE INSTALLED. ENGINE EXHAUST (JET BLAST) CAN MOVE THE AIRPLANE AND CAUSE INJURIES TO PERSONNEL.

(c) Do the engine ground run.

1) Select GROUND RUN from the FUNCTION drop down tab.

SUBTASK 71-00-00-700-010-G00

WARNING MAKE SURE THAT THE PARKING BRAKE IS ENGAGED, AND THE WHEEL CHOCKS ARE INSTALLED. ENGINE EXHAUST (JET BLAST) CAN MOVE THE AIRPLANE AND CAUSE INJURIES TO PERSONNEL.

(8) Select RECORD on the PMD to begin storing engine ground run data.

SUBTASK 71-00-00-700-011-G00

(9) Slowly move the thrust lever forward until the N1 speed is approximately equal to the first target speed bin (“ENG X N1”) shown on the EPCS page 3.

(a) Hold the thrust lever at the target speed until “FULL” is displayed above the target speed.

NOTE: “FULL” is displayed when the EEC has collected sufficient data in that speed bin.

NOTE: The speed bin data acquisition is related to the Stability Criteria selection. Higher Stability Criteria offers improved balance solutions, but may take additional time to achieve stability required to collect data.

SUBTASK 71-00-00-700-012-G00

(10) Continue to move the thrust lever forward until the N1 speed is approximately equal to the next higher target speed bin (“ENG X N1”) shown on the EPCS page 3.

(a) Hold the thrust lever at the target speed until “FULL” is displayed above the target speed.

SUBTASK 71-00-00-700-013-G00

(11) Capture the vibration data in three or more speed bins.

(a) It is an option to continue to capture vibration data at the higher speed bins.

SUBTASK 71-00-00-700-014-G00

(12) When the vibration survey is complete, slowly return the thrust lever to idle.

SUBTASK 71-00-00-700-073-G00

(13) Select STOP on the PMD to end the engine ground run.

SUBTASK 71-00-00-700-015-G00

(14) Select SAVE on the PMD to store the engine ground run data.

SUBTASK 71-00-00-700-016-G00

(15) Do this task: Stop the Engine (Usual Engine Stop), TASK 71-00-00-910-806-G00.

SUBTASK 71-00-00-720-007-G00

(16) Dry motor the engine for 2 minutes (TASK 71-00-00-910-808-G00).

SUBTASK 71-00-00-700-017-G00

(17) If it is necessary, do the Trim Balance Test No. 11 to calculate and implement an engine balance solution (TASK 71-00-00-720-805-G00).

F. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-485-G00

(1) Disconnect the Portable Maintenance Device (PMD).

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SUBTASK 71-00-00-860-487-G00

(2) Set the GND TESTS switch on the maintenance BITE panel, P61-4, to the NORM position.

——— END OF TASK ———

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SYS MENU | STATUS | MAINT DATA PGS | MAINT CTRL PGS | DNBD MAINT

EPCS PG 3 OF 4

ENGINE 1		ENGINE 2
18.2	N1	59.2
66.6	N2	95.2
801	N1 TACH	2602
0	N2 TACH	16348
0.0	N08 N1 AMP	3.5
0.11	N08 N2 AMP	0.00
0.17	N08 88 AMP	0.50
0.0	TCF N1 AMP	2.9
0.00	TCF N2 AMP	0.00
0.00	TCF 88 AMP	0.39
0.0	N1 FAN VIBE	2.4
0.3	N1 LPT VIBE	1.5
0.0	N2 HPC VIBE	0.0
0.1	N2 HPT VIBE	0.0
0	FAN PH	13
0	LPT PH	14

GROUND RUN BIN SPEED STATUS

BIN	1	2	3	4	5	6	7	8	8	10
ENG 1 N1	38	45	50	54	59	63	76	87	90	94
	FULL	FULL	FULL	FULL	FULL					
ENG 2 N1	38	45	50	54	59	63	76	87	90	94

DATE 16 OCT 14 UTC 22:10:35

PREV MENU | PRINT | SEND | RECORD | PREV PAGE | NEXT PAGE

5025969-00

2354206 S00061514970_V5

EPCS Vibration Data Display
Figure 504/71-00-00-990-827-G00

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TASK 71-00-00-720-804-G00

12. Test No. 10 - High Pressure System (HPC/HPT) Vibration Survey

(Figure 505)

A. General

(1) This task gives the instructions to do the vibration survey of the engine high pressure system (HPC and HPT).

(2) This test requires that you run the engine at high power settings. It is recommended that the airplane be pointed with the nose into the wind during ground run. Make sure that you obey ground static engine crosswind and tailwind operation limitations.

(3) You do this task to supply high pressure system vibration data to the EEC.

(4) The high pressure system vibration data is for information only.

(a) You cannot balance the high pressure system when the engine is installed.

(b) It is necessary to remove and disassemble the engine to balance the high pressure system.

(5) An inspection of the high pressure system vibration data can help isolate the cause of high engine vibration to the low pressure or high pressure system.

(6) The EEC can keep vibration data for the high pressure system at a maximum of 10 specified engine speeds. These specified engine speeds are referred to as 'speed bins'.

(a) The speed bins have numbers 1 through 10.

1) Speed bin 1 is the lowest speed for which the EEC can keep vibration data for the high pressure system.

2) Speed bin 10 is the highest speed for which the EEC can keep vibration data for the high pressure system.

(7) You can use a Portable Maintenance Device (PMD) to do the high pressure system ground test.

B. References

Reference	Title
31-65-00-970-801	System Maintenance Data Pages Function (P/B 201)
46-13-00-480-801	Maintenance Laptop Connection (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)
71-00-00-910-808-G00	Dry Motor Procedure (P/B 201)
71-00-00-970-801-G00	Maintenance Data Pages from the Engine Propulsion Control System (EPCS) (P/B 201)
73-21-00-800-801-G00	EEC Maintenance Power Selection (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
411	Engine 1 - Engine
421	Engine 2 - Engine

ECCN 9E991 BOEING PROPRIETARY - See title page for details

D. Prepare for the Test

SUBTASK 71-00-00-860-489-G00

(1) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button on the MFD control panel, P9.

(b) Push the SEL button on SELECTOR knob on the MFD control panel, P9.

SUBTASK 71-00-00-860-488-G00

(2) Set the applicable EEC MAINT POWER on the MISC SYSTEM CTRLS page on the MFD to TEST (TASK 73-21-00-800-801-G00).

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER switch to the TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 71-00-00-860-490-G00

(3) Set the GND TEST switch on the P61-4 maintenance bite panel to the ENABLE position.

SUBTASK 71-00-00-860-687-G00

(4) Set the applicable thrust lever to idle.

E. Test No. 10 - High Pressure System (HPC/HPT) Vibration Survey

SUBTASK 71-00-00-210-044-G00

(1) Make sure that the engine BLEED 1 and BLEED 2 switches, on the overhead panel, P5, are in the OFF position.

SUBTASK 71-00-00-860-492-G00

(2) Start the engine (TASK 71-00-00-910-802-G00).

SUBTASK 71-00-00-210-045-G00

(3) Let the engine become stable at idle for 5 minutes.

(a) Make sure that the engine is sufficiently warm to prevent unusual vibration characteristics.

SUBTASK 71-00-00-860-493-G00

(4) Get the EPCS maintenance data page for the vibration survey (TASK 71-00-00-970-801-G00 and TASK 31-65-00-970-801).

(a) Go to the EPCS maintenance data page 3 for the engine vibration.

NOTE: You cannot monitor the bin status for the N2 speed on the EPCS status page. The flight history screens for the post ground run will display the bin status for the N2 speed.

(b) Make sure that the GROUND RUN SPEED BIN STATUS is on the display.

NOTE: There are 10 speed targets. At the start of a ground run to support a vibration survey, all speed bin indications will be blank below the speed target. As enough vibration data is collected at a given speed, the speed bin indication will change to FULL and will be enclosed with a white box. This change in status will indicate to the mechanic to set the next N1 speed target.

SUBTASK 71-00-00-480-006-G00

(5) Connect the Portable Maintenance Device (PMD) to the ONS ports (TASK 46-13-00-480-801).

SUBTASK 71-00-00-860-494-G00

(6) On the PMD from the Onboard Maintenance Function (OMF) main menu, make these selections:

(a) OTHER FUNCTIONS

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(b) ENGINE HEALTH MANAGEMENT (EHM).

SUBTASK 71-00-00-860-495-G00

(7) From the ENGINE HEALTH MANAGEMENT main menu, do these steps:

(a) Select the engine to do the vibration survey.

1) Select the applicable engine (ENGINE 1 or ENGINE 2) from the ENGINE drop down tab.

(b) Make sure that the weights configuration on display is correct.

1) If the weights configuration is not correct, do this task: Test No. 11 - Low Pressure System (Fan) Trim Balance (With ONS), TASK 71-00-00-720-805-G00.

(c) Make sure that the stability criteria is set to the correct level and configuration.

1) Select DATA CRITERIA from the FUNCTION drop down tab.

WARNING MAKE SURE THAT THE PARKING BRAKE IS ENGAGED, AND THE WHEEL CHOCKS ARE INSTALLED. ENGINE EXHAUST (JET BLAST) CAN MOVE THE AIRPLANE AND CAUSE INJURIES TO PERSONNEL.

(d) Do the engine ground run.

1) Select GROUND RUN from the FUNCTION drop down tab.

(e) Select RECORD on the PMD to begin storing engine ground run data.

SUBTASK 71-00-00-210-046-G00

(8) If the engine operates above the limits, stop the engine, refer to the IFIM and do the applicable procedure(s).

SUBTASK 71-00-00-860-496-G00

(9) Make sure that you use the correct speed from the table below when you do the speed run.

BIN	MINIMUM N2%	CENTER N2%	MAXIMUM N2
SPEED BIN 1	64.6	65.2	65.8
SPEED BIN 2	70.1	70.7	71.3
SPEED BIN 3	75.7	76.3	76.9
SPEED BIN 4	81.2	81.8	82.4
SPEED BIN 5	86.8	87.4	88.0
SPEED BIN 6	92.3	92.9	93.5
SPEED BIN 7	97.9	98.5	99.1
SPEED BIN 8	103.4	104.0	104.6
SPEED BIN 9	109.0	109.6	110.2
SPEED BIN 10	114.5	115.1	115.7

SUBTASK 71-00-00-970-007-G00

(10) Slowly move the thrust lever forward until the N2 speed is approximately 65.2%.

NOTE: 65.2% N2 is in the center of the range for speed bin 1.

NOTE: You cannot monitor the bin status for the N2 speed on the EPCS status page. The flight history screens for the post ground run will display the bin status for the N2 speed.

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(a) Continue to operate the engine for 40 seconds at 65.2% N2.

(b) Slowly move the thrust lever forward until the N2 speed is approximately 70.7%.

NOTE: 70.7% N2 is in the center of the range for speed bin 2.

(c) Continue to operate the engine for 40 seconds at 70.7% N2.

(d) Slowly move the thrust lever forward until the N2 speed is approximately 76.3%.

NOTE: 76.3% N2 is in the center of the range for speed bin 3.

(e) Continue to operate the engine for 40 seconds at 76.3% N2.

(f) If it is necessary, continue to increase the engine speed to the center of the range for the remaining speed bins.

1) Operate the engine for 40 seconds at the center of the range before you increase the engine speed to the next speed bin.

(g) When you complete the vibration survey, slowly return the thrust lever to idle.

SUBTASK 71-00-00-860-497-G00

(11) Select SAVE on the PMD to store the engine ground run data.

SUBTASK 71-00-00-860-498-G00

(12) Do this task: Stop the Engine (Usual Engine Stop), TASK 71-00-00-910-806-G00.

SUBTASK 71-00-00-720-008-G00

(13) Dry motor the engine for 2 minutes (TASK 71-00-00-910-808-G00).

SUBTASK 71-00-00-080-003-G00

(14) Disconnect the Portable Maintenance Device (PMD).

F. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-499-G00

(1) Set the applicable EEC MAINT POWER function on the MISC SYSTEM CTRLS page on the MFD to NORM (TASK 73-21-00-800-801-G00).

SUBTASK 71-00-00-860-500-G00

(2) Set the GND TEST switch on the P61-4 maintenance bite panel to the to the NORM position.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SYS MENU | STATUS | MAINT DATA PGS | MAINT CTRL PGS | ONBD MAINT

EPCS PG 1 OF 4

ENGINE 1 A	ENGINE 1 B		ENGINE 2 A	ENGINE 2 B
XXX.X	XXX.X	N1	XXX.X	XXX.X
XXX.X	XXX.X	N2	XXX.X	XXX.X
XX.X	XX.X	TRA	XX.X	XX.X
XXX.X	XXX.X	T/R SLEEVE L	XXX.X	XXX.X
XXX.X	XXX.X	T/R SLEEVE R	XXX.X	XXX.X
XX.X	XX.X	P0	XX.X	XX.X
XXX.X	XXX.X	P53	XXX.X	XXX.X
XXX.X	XXX.X	P38	XXX.X	XXX.X
XXX.X	XXX.X	BLEED FLOW	XXX.X	XXX.X
XXX.X	XXX.X	T12	XXX.X	XXX.X
XXXX	XXXX	T25	XXXX	XXXX
XXXX	XXXX	T3	XXXX	XXXX
XXX.X	XXX.X	VBV	XXX.X	XXX.X
XXX.X	XXX.X	VBV CHD	XXX.X	XXX.X
XXX.X	XXX.X	N1K12	XXX.X	XXX.X
XXX.X	XXX.X	VSV	XXX.X	XXX.X
XXX.X	XXX.X	VSV CHD	XXX.X	XXX.X
XXX.X	XXX.X	N2K25	XXX.X	XXX.X
XXX.X	XXX.X	FUEL SRT DP	XXX.X	XXX.X
XXX.X	XXX.X	FCOC DP	XXX.X	XXX.X
XXX.X	XXX.X	FUEL FLT DP	XXX.X	XXX.X
XXX.X	XXX.X	FMV	XXX.X	XXX.X
XXX.X	XXX.X	FMV CHD	XXX.X	XXX.X
XXXXX	XXXXX	FF (LBS/ HR)	XXXXX	XXXXX
XXX.X	XXX.X	PMV	XXX.X	XXX.X
XXX.X	XXX.X	PMV CHD	XXX.X	XXX.X
XXXX	XXXX	PF MN	XXXX	XXXX

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PREV MENU | PRINT | SEND | RECORD | PREV PAGE | NEXT PAGE

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Test No. 10 - High Pressure System (HPC/HPT) Vibration Survey
Figure 505/71-00-00-990-828-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-00-00-720-805-G00

13. Test No. 11 - Low Pressure System (Fan) Trim Balance (With ONS)

A. General

(1) This task gives the instructions to do a trim balance for the low pressure system.

(2) You can do the trim balance with the Onboard Network System (ONS).

(3) You use the Portable Maintenance Device (PMD) to control the engine trim balance function.

SIA 015-999; SIA 001-014 POST SB 737-46-1029

(4) You can use the Multi Function Display (MFD) to control the engine trim balance function.

SIA ALL

(5) The ONS engine trim balance program stores vibration data and uses the data to calculate a balance solution. It also stores generic balance coefficients, an engine weight table for display on the MD, and peak vibration history.

(6) The engine trim balance application uses the engine weight configuration and flight history or ground run data to review and calculate engine balance solution.

(7) The new balance solutions are calculated based on the data from selected flight legs, ground runs or for an average of all valid data.

(8) When a new balance solution is accepted, the trim balance data will turn blue.

NOTE: Data that is blue cannot be selected.

B. References

Reference	Title
46-13-00-480-801	Maintenance Laptop Connection (P/B 201)
71-00-00-910-803-G00	Start the Engine (Normal Start) (P/B 201)
71-00-00-910-806-G00	Stop the Engine (Usual Engine Stop) (P/B 201)
71-00-00-910-808-G00	Dry Motor Procedure (P/B 201)
72-22-01-000-801-G00	Front Spinner Cone Removal (P/B 401)
72-22-01-400-801-G00	Front Spinner Cone Installation (P/B 401)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)

C. Tools/Equipment

Reference	Description
STD-585	Mat - Protective, Closed Cell Neoprene, 30-50 duro, Weather and Oil Resistant, 3/8 Inch Min Thickness, Minimum 42x60 Inches with Warning Streamers
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
D00599 [CP2442]	Oil - Engine	

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

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F. Prepare for the Test

SUBTASK 71-00-00-480-003-G00

(1) If using the PMD, connect the PMD to the ONS (TASK 46-13-00-480-801).

SUBTASK 71-00-00-860-226-G00

(2) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button, on the P9 MFD control panel.

(b) Push the SEL button on SELECTOR knob, on the P9 MFD control panel.

SUBTASK 71-00-00-860-225-G00

(3) Set the applicable EEC MAINT POWER on the MISC SYSTEM CTRLS page to TEST (TASK 73-21-00-800-801-G00).

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER switch to the TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 71-00-00-860-227-G00

(4) Set the GND TESTS switch, on the P61 maintenance BITE panel, to the ENABLE position.

SUBTASK 71-00-00-860-228-G00

(5) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-00-00-860-229-G00

(6) Set the applicable thrust lever to idle.

SUBTASK 71-00-00-210-010-G00

(7) Do a vibration data check as follows:

(a) Get information on the type of high vibration (N1, N2 or broadband) and flight conditions.

1) Do a check on FAULT HISTORY for maintenance messages of the high vibration.

a) If there is no engine high vibration data in the system, do this task: Test No. 9 - Low Pressure System (Fan/LPT) Vibration Survey, TASK 71-00-00-720-803-G00.

NOTE: This step is to do a vibration check of an engine and to see if the vibration of the engine is more than vibration guidelines.

b) If there is no vibration history data in the system, do an engine ground run to collect the vibration data.

NOTE: You can use the ground run data to do the trim balance (See the Ground Run Data Collection Paragraph below).

2) Do a check of the vibration data saved in the ONS system as follows:

a) Make these selections on the MFD or PMD main function menu:

<1> ONBOARD MAINTENANCE (If you will use the MFD)

<2> OTHER FUNCTIONS

<3> ENGINE HEALTH MANAGEMENT (EHM)

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<4> 71–80 ENGINE 1 or 71-80 ENGINE 2 (If you will use the MFD)

<5> ENGINE X

<6> FUNCTIONS

<7> TRIM BALANCE

<8> FLIGHT HISTORY.

<a> Look for conditions with high N1 or N2 vibration data.

NOTE: Look at the flight leg or ground run data to find the high vibration.

NOTE: Vibration data will be highlighted if N1 vibration is equal or above 4.0 scalar units (6 mils D.A.)(front or rear).

NOTE: Vibration data will be highlighted if N2 vibration is equal or above 4.0 scalar units.

<b> If the flight crew made a report of high vibration as broadband with N1 and N2 vibration low during the event, and there is no highlighted N1 or N2 vibration data from the flight history page, troubleshoot and find the cause (See FIM).

<c> If the N1 or N2 vibration data are not satisfactory, continue with the engine trim balance procedure.

<d> If the N1 and N2 vibration data are satisfactory, exit the engine TRIM BALANCE.

NOTE: If using the MFD, do not exit engine TRIM BALANCE and proceed to the next step.

SUBTASK 71-00-00-210-011-G00

(8) Do a balance weights list check for the fan as follows:

NOTE: After saving a Weights Configuration change, wait 75 seconds before making additional Weights Configuration changes. If you do not wait 75 seconds, the EEC will not save the Weight Configuration to memory.

(a) If using the PMD, make these selections to go back to the Weights Configuration display page:

1) ENGINE + TRIM BALANCE

a) CONFIGURATION (Bottom of screen)

<1> Confirm of the engine balance weights configuration.

(b) If using the MFD, make these selections:

1) ENGINE WEIGHTS

a) Confirm the engine balance weights configuration.

(c) Print a report (or make a record by hand) of the existing weights configuration display.

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(d) Compare the balance weights currently on the engine fan the fan balance weights shown on the Weights Configuration display.

NOTE: You need to identify the fan balance weights on the engine and compare the weights currently on the Weights Configuration display on the PMD or MFD. If the fan balance weights are not the same, you can get incorrect instructions for the removal and installation of fan balance weights when you do an engine balancing. The fan balance weight holes are numbered on every four holes counterclockwise (viewed in the aft direction), which start at the hole 1 mark (dimple mark) on the the front platform shroud. Refer to Figure 506 for fan balancing weight positions and Table 510 for fan weight references.

Table 510/71-00-00-993-862-G00 Fan Weight References

Mass Reference	Bolt (51-350) (SIN: 80141)	Nut (51-360) (SIN: 80128)	Weight (51-370) (SIN: 80191)	Unbalance (g-cm)
P01	No	No	No	0.0
P02	Yes	Yes	No	168.7
P03	Yes	Yes	Yes	251.8

1) If the fan balance weights on the engine are different than those listed on the existing Weights Configuration display and a past leg on the Flight History page is needed to determine the trim balance solution, do the steps that follow:

a) Edit the list of current weights to match the newly discovered configuration.

b) Select FLIGHT HISTORY.

<1> If using the MFD, select TRIM BALANCE on the ENGINE HEALTH MANAGEMENT page.

c) Select the LEG that has the preferred vibration data.

d) Select WEIGHTS from the bottom of the screen menu and edit the engine weight configuration.

e) Go back to the FLIGHT HISTORY page and select the vibration data associated with the weight configuration that was just changed.

NOTE: The vibration data on the preferred LEG is now white and may be selected to produce a balance solution.

2) If the fan balance weights on the engine are different than those listed on the existing Weights Configuration display, change the fan balance weights shown on the existing Weights Configuration display so they are the same as the fan balance weights on the engine.

NOTE: This method will require Ground Run Data Collection prior to producing a balance solution. Prior existing vibration data will not be selectable.

a) If it is necessary to modify the configuration, add or delete with the use of the bottom functions below:

<1> Select ENGINE HEALTH MANAGEMENT + ENGINE X.

<a> If using the MFD, select ENGINE WEIGHTS on the ENGINE HEALTH MANAGEMENT page.

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<2> If using the PMD, select UNLOCK at the bottom function.

NOTE: You must select UNLOCK at the bottom function to unlock the screen prior to add or delete the part number or hole/blade configuration.

<3> Select ADD.

NOTE: For the fan weight selection, the part number (P0x) includes P02 and P03 references. The P01 reference is equivalent to an empty hole (without installed bolt/nut and weight).

NOTE: With the MAX Display System (MDS), keep bolt entries to 7 or fewer bolts. To add 8 or more bolts, select SAVE after the 7th bolt, then continue to add bolts. If the “ONBD MAINT NOT AVAILABLE” screen shows, power cycle the Display Processing Computers (DPCs). The bolt addition operates correctly on the ONS browser through the Universal Maintenance Device (UMD).

<a> Select the part number (P0x) column or configuration hole/blade (yy) column.

NOTE: You also can add or change the fan balance weight bolts on the front platform shroud, if it is necessary.

SIA 015-999; SIA 001-014 POST SB 737-46-1029

NOTE: When using the forward display select SAVE, when adding or changing more than 5 balance weights. If more than 8 balance weights are changed the Display Processing Computer (DPC) may need to be reset and changes to balance weights will be deleted.

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<4> DELETE or SAVE.

G. Ground Run Data Collection

SUBTASK 71-00-00-860-230-G00

(1) Use the PMD to collect the ground run vibration data for these conditions:

(a) The ONS does not have enough flight leg data.

(b) You prefer to use ground run data for trim balance.

(c) You do a test run check for the vibration level after you repair low pressure components or the replacement engine indicated a high N1 vibration during a vibration survey.

(d) You need to calculate the specific coefficients when the system default generic coefficient did not provide the acceptable solution result for the trim balance.

SUBTASK 71-00-00-750-008-G00

(2) Make these selections on the PMD:

(a) OTHER FUNCTIONS

(b) ENGINE HEALTH MANAGEMENT (EHM)

(c) ENGINE 1 or ENGINE 2.

(d) Start the engine (TASK 71-00-00-910-803-G00).

1) Select RECORD.

NOTE: RECORD button will change from white to green.

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2) Advance the thrust lever to the first desired N1 Speed Target BIN displayed on the PMD or EPCS page 3 on the MFD.

NOTE: The Ground Run Speed Targets BIN will show FULL from 1 through 10 speed points.

NOTE: Speed Target BINs take approximately 20 seconds to fill depending on the Data Criteria selected.

3) After the Speed Target BIN displays FULL, advance the thrust lever to the next desired Speed Target BIN.

(e) Select STOP (Record)

(f) Select SAVE.

(g) Shut down the engine after all Speed Target BINs are displayed as FULL (TASK 71-00-00-910-806-G00).

(h) Dry motor the engine for 2 minutes (TASK 71-00-00-910-808-G00).

H. Low Pressure System (Fan) Trim Balance (ONS)

SUBTASK 71-00-00-860-231-G00

(1) Do the preparation and balance weights check as necessary before you do the trim balance (Paragraph above).

SUBTASK 71-00-00-860-232-G00

(2) Use the PMD to do the trim balance on the applicable engine as follows:

(a) Make these selections on the main function menu:

1) Select OTHER FUNCTIONS.

2) Select ENGINE HEALTH MANAGEMENT (EHM).

3) Select 71-80 ENGINE 1 or 71-80 ENGINE 2.

4) Select ENGINE X.

5) Select FUNCTION.

a) Make sure that these functions show:

<1> TRIM BALANCE

<2> BALANCE COEFFICIENTS

<3> DATA CRITERIA

<4> GROUND RUN

<5> ADVANCED GROUND RUN

<6> EEC DATA DOWNLOAD.

b) Select TRIM BALANCE.

SUBTASK 71-00-00-860-233-G00

(3) Do the trim balance procedure as follows:

(a) Make sure that the TRIM BALANCE display shows and do this step:

1) Select the N1 FRONT (N1 REAR, or N2) + WEIGHTS + PEAK DATA at the bottom function to show the flight legs and its high vibrations of the N1 or the LPT blades.

NOTE: This will provide the vibration data of the flight legs or ground run data of the N1 FRONT, N1 REAR, or N2 bottom function and its high vibrations of the N1 or LPT blades.

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(b) Do the instructions that show on the TRIM BALANCE + FLIGHT HISTORY + BALANCE SOLUTION display and then make these selections:

1) Select the AVERAGE (preferred) or the flight leg that has the highest vibration data or the last ground run data (if you decide to use the ground run data. If it is necessary to collect the ground run data, go to the Ground Run Data Collection section).

NOTE: The AVERAGE is the default for the ENGINE BALANCING. The AVERAGE is recommended unless you will use the ground run data. If none of the flight legs or the AVERAGE have data for at least two speeds, there is not enough data to balance the engine. You will need to do a ground run to collect data or wait until the high vibration data saves more flight legs for this engine.

NOTE: If you decide to go to a different display and then decide to get back to the N1 FRONT (or N2) SENSOR FLIGHT HISTORY display, Make sure that you select the AVERAGE or the flight leg that has the most data or the last ground run data (that you selected before) again.

2) Select the TRIM BALANCE COEFFICIENTS.

NOTE: You can select the Generic Coefficients or the stored Specific Coefficients.

a) Select OK.

3) Calculate the balance solution from TRIM BALANCE + FLIGHT LEG 0X + BALANCE SOLUTION display:

a) Select the N1 FRONT (N1 REAR, or N2) + WEIGHTS + PEAK DATA.

b) Select AVERAGE or the desired Flight Leg or Ground Run, then select SOLUTION at the bottom function.

NOTE: The selected flight leg must have data in two speed bins, in order to calculate a balance solution.

c) Select One Plane solution or Two Plane solution:

NOTE: Balance solution display will show after you select the One Plane solution or Two Plane solution.

d) Take a look of the Prediction Reduction percentile.

<1> If you would like to see the new weight prediction of the new locations, do the steps that follow:

<a> PREDICTION

NOTE: Look at the SPEED BIN to see the new predicted of the front and rear vibrations.

<2> If rejected the solution, do this step.

<a> REJECT.

<b> Select a new flight leg with the most high vibration data and see the prediction again.

<3> If accepted the solution, do this step.

<a> Select REPORT to record the new balance weights and locations for the solution to the ONS Download Manager "ehm:report" directory.

NOTE: You can also make a manual record of the new balance weights and locations.

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<b> ACCEPT.

SUBTASK 71-00-00-410-008-G00

(4) Replace the engine balance weight with the new weights on the specific locations.

(a) If you replace the fan balance weight bolts, do the steps that follow:

CAUTION PUT THE PROTECTIVE MAT IN THE INLET COWL. THIS WILL PREVENT DAMAGE TO THE INLET COWL OR ENGINE BY TOOLS, PARTS, OR UNWANTED MATERIALS THAT FALL ON THE INLET COWL SURFACE.

1) Put the protective mat, STD-585, on the lower half of the inlet cowl.
2) Remove the front spinner cone to get access to the front platform shroud (TASK 72-22-01-000-801-G00).
3) Remove the applicable balance weight bolts from the fan rotor front platform shroud.
4) Apply a thin coat of oil, D00599 [CP2442], to the threads of the balance weight bolt.
5) Install the new balance weight bolts into the applicable holes on the fan rotor front platform shroud.
6) Tighten the new balance weight bolts to 109.31 in-lb (12.35 N·m) to 120.81 in-lb (13.65 N·m).
7) Do this task: Front Spinner Cone Installation, TASK 72-22-01-400-801-G00.
8) Remove the protective mat, STD-585, from the lower half of the inlet cowl.

I. Trim Balance Specific Coefficients Calculation

SUBTASK 71-00-00-700-024-G00

(1) Access the ENGINE HEALTH MANAGEMENT + ONBOARD MAINTENANCE + OTHER FUNCTIONS menu on the maintenance device.

NOTE: It is only necessary to calculate Specific Coefficients if you are unable to balance the engine to an acceptable level using the Generic Coefficients.

(a) ENGINE + BALANCE COEFFICIENTS

NOTE: The N1 VIBRATION FRONT (or REAR) SENSOR FLIGHT HISTORY screen will show. N1 FRONT is for the fan balance configuration. N1 REAR is for the LPT balance configuration.

(b) Do these steps on the N1 VIBRATION FRONT (or REAR) SENSOR FLIGHT HISTORY screen to start the specific balance coefficients calculation.

NOTE: Calculation of the coefficients with the same weight configurations is inhibited.

1) Select two flight legs with a different fan balance weight configuration and the same LPT balance configuration.

NOTE: The two flight legs must have data in at least three of the same speed bins, or data in at least one same speed bin, if it is either the lowest or second lowest speed bin. The data in the same speed bin must be different.

2) Select CALCULATE at the bottom of the screen.
   a) Select COEFF
   b) When the popup CALCULATE COEFFICIENTS screen shows, do this step:

NOTE: New Specific Coefficients have been calculated.

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<1> Select OK.

3) When the popup TRIM BALANCE COEFFICIENTS screen shows, do the steps that follow:

NOTE: The EEC uses the Generic Coefficients for Trim Balance. You can select the Generic Coefficients or the stored Specific Coefficients.

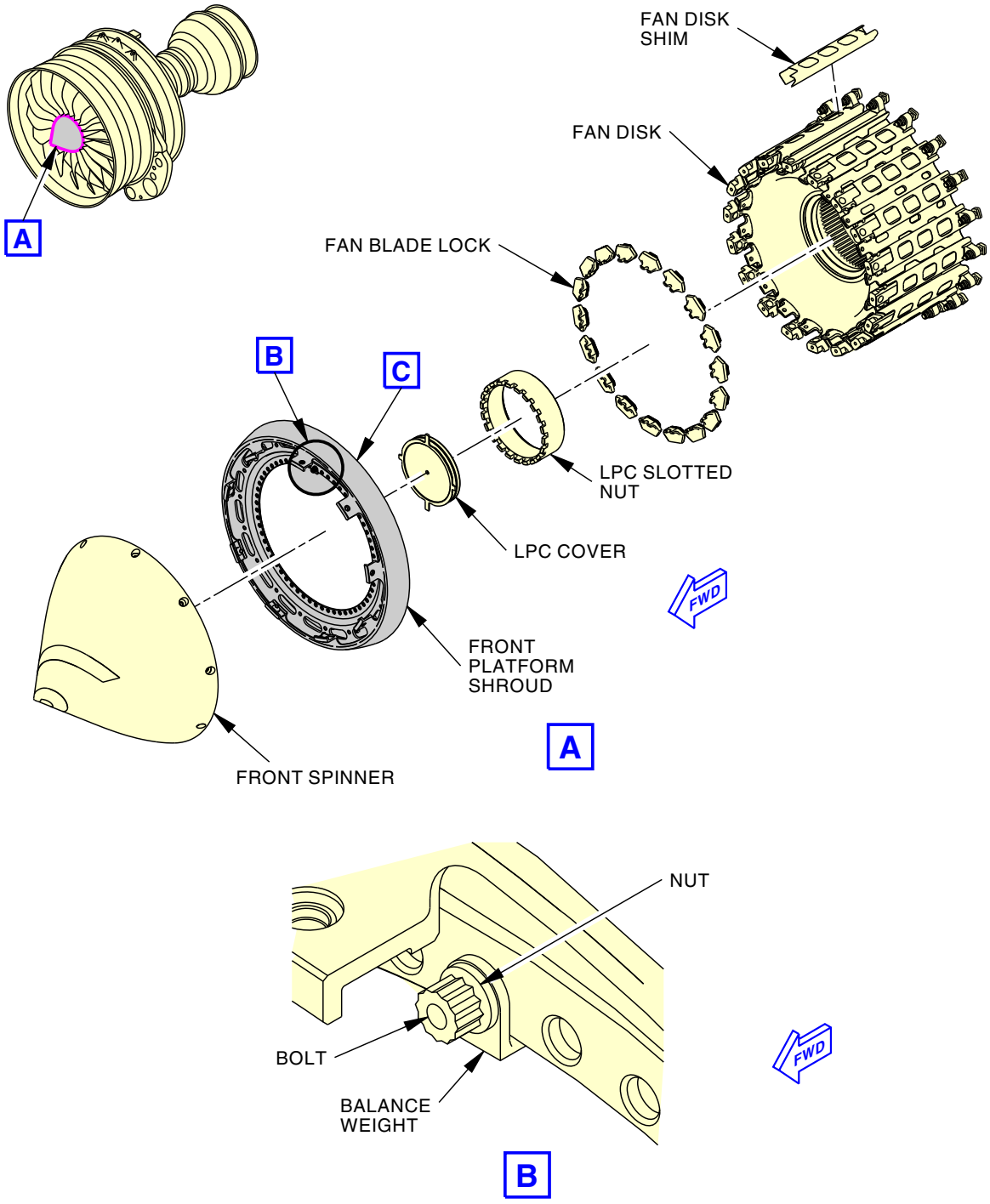
a) Select the Use Specific Coefficients.

NOTE: If the two flight legs with the same weight configurations were selected, it can not calculate the new Specific Coefficients. A popup screen will tell you that the Specific Coefficient are not available.

<1> Select OK.

——— END OF TASK ———

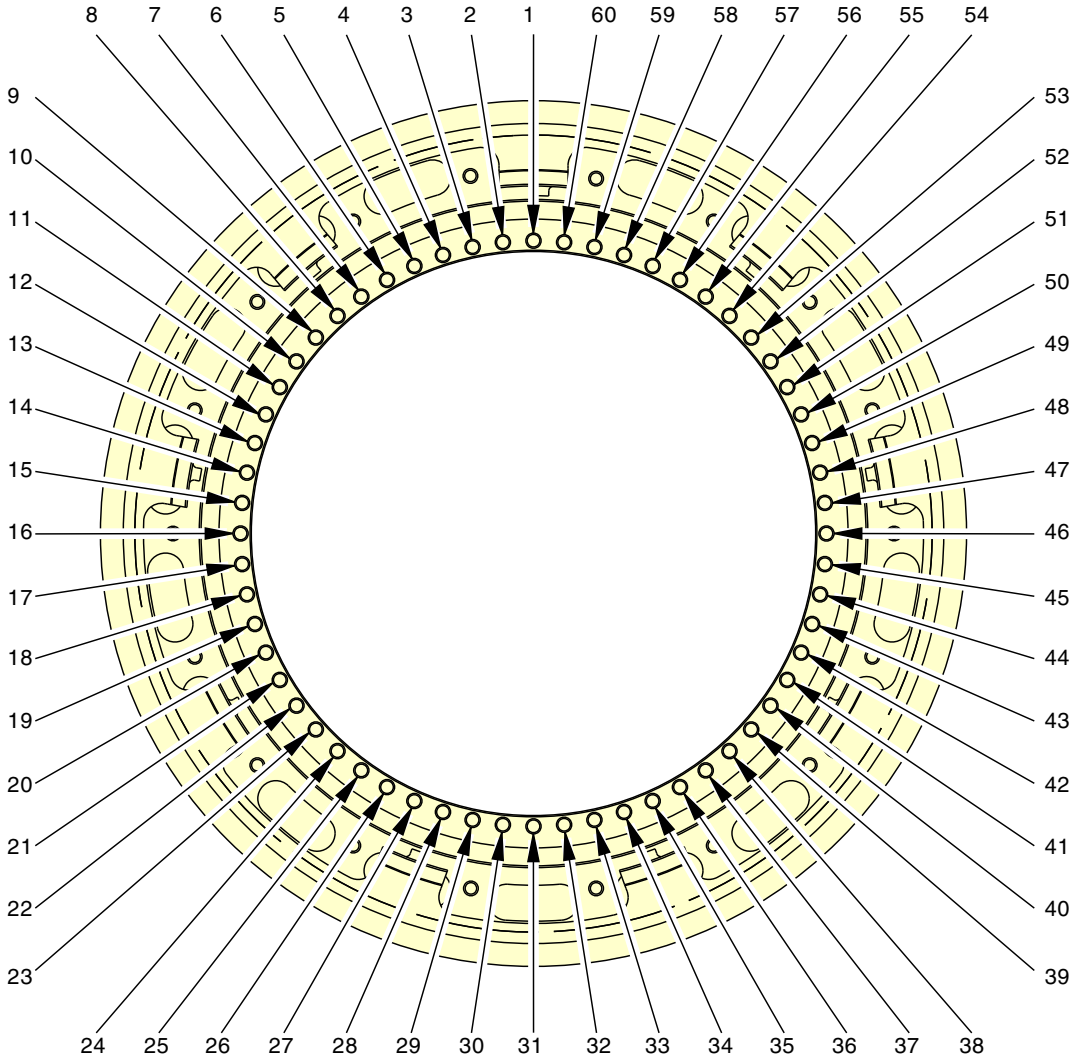
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2802700 S0000642687_V2

Fan Balancing Weight Positions
Figure 506/71-00-00-990-891-G00 (Sheet 1 of 2)

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2816494 S0000649648_V1

Fan Balancing Weight Positions
Figure 506/71-00-00-990-891-G00 (Sheet 2 of 2)

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TASK 71-00-00-710-804-G00

14. Test No. 12 - Thrust Reverser Interlock Operational Test

A. General

(1) This task gives the instructions to do the operational test for the thrust reverser interlock.

(2) This test verifies the ability of the Engine Electronic Controller (EEC) to enable and disable the thrust lever interlock. During this test the interlock solenoid will be energized and the operator will move the reverse thrust lever to make sure that interlock is disengaged.

(3) During this test, the thrust reverser will not deploy.

(4) This task must not be performed with EEC data load and trim balance functions tasks.

NOTE: The EEC data load tasks and trim balance functions tasks will inhibit the use of any EEC ground tests and special functions through the Onboard Maintenance Function (OMF).

B. References

Reference	Title
46-13-02-710-801	Onboard Maintenance Function Ground Test (P/B 201)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Prepare for the Test

SUBTASK 71-00-00-860-236-G00

(1) Select the left or right Multi Function Display (MFD).

(a) Push the SYS button, on the MFD P9 control panel.

(b) Push the SEL button on SELECTOR knob, on the MFD P9 control panel.

SUBTASK 71-00-00-860-235-G00

(2) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the TEST position.

(a) Do this task: EEC Maintenance Power Selection, TASK 73-21-00-800-801-G00.

SUBTASK 71-00-00-860-237-G00

(3) Set the GND TESTS switch, on the P61 auxiliary panel, to the ENABLE position.

SUBTASK 71-00-00-860-238-G00

(4) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

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1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-00-00-860-239-G00

(5) Set the applicable thrust lever to idle.

F. Thrust Reverser Interlock Operational Test

SUBTASK 71-00-00-860-241-G00

(1) Use the MFD screen to use the OMF Ground Test to do the thrust reverser interlock test for the applicable engine.

(a) Do this task: Onboard Maintenance Function Ground Test, TASK 46-13-02-710-801.

(b) Make these selections on the MFD main function menu using the applicable selector knob and center SEL button:

1) ONBOARD MAINTENANCE
2) LINE MAINTENANCE
3) GROUND TESTS
4) 71-80 Engine 1 or 71-80 Engine 2
5) OPERATIONAL TEST
6) Left Engine Thrust Reverser Interlock Test or Right Engine Thrust Reverser Interlock Test
7) CONTINUE.

(c) Do the instructions that show on the MFD PRECONDITIONS.

1) Make sure that you verify and follow the inhibited conditions instructions closely.

NOTE: If one of the inhibited conditions is not met, the test will fail.

(d) Make these selections using the applicable selector knob and center SEL button to continue the test:

1) START TEST.

NOTE: "STARTING TEST" will momentarily show on the display screen.

NOTE: After the test has started, the test can be stopped from any subsequent screen by selecting "STOP TEST".

(e) Do the instructions that show on the screen.

NOTE: The forward thrust levers must be forward and down before the reverse thrust levers can be moved up and aft.

(f) Make these selection using the applicable selector knob and center SEL button to complete the test:

1) CONFIRM.
2) CONTINUE.

NOTE: The display will show a "TEST CONDITIONS: OPERATING" screen.

(g) WAIT until GROUND TEST Thrust Reverser Interlock Test Calculating Test Results shows 0%========100%.

(h) Make sure that the TEST CONDITION: PASS.

(i) Make these selection using the applicable selector knob and center SEL button to complete the test:

1) POST CONDITIONS.

a) Read and follow the instructions on the screen.

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2) GO BACK.

3) SYS MENU.

(j) When the test is completed, make sure that PASS or COMPLETED show adjacent to TEST CONDITION on the MFD.

(k) If FAILED shows, refer to the applicable Maintenance Message Reference in the FAULT GUIDANCE or select the maintenance message to see the recommended maintenance actions.

1) If the screen shows that test is failed and the data was unsuccessfully stored to the Non Volatile Memory (NVM), do these steps:

a) Stop and exit the test and power cycling EEC's.

b) Power the EEC's on.

c) Check EEC NVM faults.

d) If faults are present, correct EEC NVM or power faults prior to attempting the special function again.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-242-G00

(1) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the NORM position.

(a) Do this task: EEC Maintenance Power Selection, TASK 73-21-00-800-801-G00.

SUBTASK 71-00-00-860-243-G00

(2) Set the GND TESTS switch, on the P61 auxiliary panel, to the NORM position.

SUBTASK 71-00-00-860-244-G00

(3) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

TASK 71-00-00-730-802-G00

15. Test No. 15 - Actuator Operational Test

A. General

(1) This task gives the instructions to do the operational test for the engine fuel-driven actuators.

(2) This test is to make sure that the EECs can control the fuel-driven actuators correctly and make sure that the actuators can move through their full range of operation. Engine N2 speed must be below 10% to begin the test.

(3) This task is used to move the ENGINE START switch to the GRD position that opens the starter air valve during the dry motor. A minimum pressure of 30 psig (207 kPa) must be available in the pneumatic manifold before the test is done.

(4) This test begins once the engine has achieved motoring speed after the bowed rotor motoring sequence is completed.

(5) This test is to make sure that the components that follow can be actuated by the EEC channel in control (EEC channel Menu Mode is active on):

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(a) Fuel Metering Valve (FMV)

(b) Pilot Metering Valve (PMV)

(c) Variable Stator Vane (VSV)

(d) Variable Bleed Valve (VBV)

(e) Transient Bleed Valve (TBV)

(f) Start Bleed Valve (SBV)/Booster Anti-Ice (BAI).

SIA 007-999; SIA 001-006 POST SB 737-73-1021; ENGINES WITH EEC SOFTWARE VERSION 6.7 (BOEING SB 73-1021, CFM SB 73-0025 EEC OPS SOFTWARE P/N 2628M86P12) AND SUBSEQUENT

(g) Electronic overspeed function within Fuel Metering Unit (FMU).

SIA ALL

(6) The Low Pressure Turbine Active Clearance Control (LPTACC), High Pressure Turbine Active Clearance Control (HPTACC), and Modulated Turbine Cooling (MTC) valves are not tested during this test as they are hydraulically disabled at sub-idle motoring speeds.

(7) This task must not be performed with Engine Electronic Controller (EEC) data load and trim balance functions tasks.

NOTE: EEC data load tasks and trim balance functions tasks will inhibit the use of any EEC ground tests and special functions through the Onboard Maintenance Function (OMF).

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
46-13-02-710-801	Onboard Maintenance Function Ground Test (P/B 201)
70-43-42-300-802-G00	Blending Procedures - Hand Blending (P/B 201)
71-00-00-910-806-G00	Stop the Engine (Usual Engine Stop) (P/B 201)
71-00-00-910-808-G00	Dry Motor Procedure (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)
73-11-05-400-801-G00	Fuel Nozzle Installation (P/B 401)
73-11-05-400-802-G00	Fuel Nozzle Set Installation (P/B 401)
73-21-00-800-801-G00	EEC Maintenance Power 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-203	Container - Oil Resistant, 1 U.S.-Gal (3.8 l)
STD-858	Tag - DO NOT OPERATE

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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
411	Engine 1 - Engine
421	Engine 2 - Engine

F. 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

G. Prepare for the Test

SUBTASK 71-00-00-410-029-G00

(1) If this test is done as part of a leak check or after a component replacement, do the following steps to get access to the components to do the leak check:

(a) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

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

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.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(d) Open the applicable left or right fan cowl panels:

(Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00)

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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.

(e) If it is necessary, open the applicable left or right thrust reversers:

(Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00)

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

(f) Clean the areas that are examined with cotton wiper, G00034.

(g) Put the 1 U.S.-gal (3.81 l) oil resistant container, STD-203, for each line of the drain mast below the power plant.

SUBTASK 71-00-00-860-502-G00

(2) Select the left or right Multi Function Display (MFD).

(a) Push the SYS button, on the P9 MFD control panel.

(b) Push the SEL button on SELECTOR knob, on the P9 MFD control panel.

SUBTASK 71-00-00-860-501-G00

(3) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the TEST position.

(a) Do this task: EEC Maintenance Power Selection, TASK 73-21-00-800-801-G00.

SUBTASK 71-00-00-860-245-G00

(4) Set the GND TESTS switch, on the P61-4 maintenance bite panel, to the ENABLE position.

SUBTASK 71-00-00-860-246-G00

(5) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-00-00-860-247-G00

(6) Set the applicable thrust lever to idle.

SUBTASK 71-00-00-860-617-G00

(7) Do the dry motor procedure and stop at the step where the ENGINE START switch is moved to the GRD position (TASK 71-00-00-910-808-G00).

(a) A minimum pressure of 30 psig (207 kPa) must be available in the pneumatic manifold before the dry motor procedure is started.

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SUBTASK 71-00-00-860-618-G00

(8) Make sure that the boost pump pressure is at the fuel pump inlet.

NOTE: If the boost pump pressure is not provided at the fuel pump inlet before the start of the test sequence, the actuators operational test can fail and show maintenance messages (TASK 71-00-00-910-808-G00).

SUBTASK 71-00-00-860-781-G00

(9) Open the applicable circuit breakers and install safety tags:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2
B	4	C00359	FUEL SPAR VALVE ENG 1

SUBTASK 71-00-00-860-619-G00

(10) For engine 1, make sure that these circuit breakers are closed:

CAPT Electrical System Panel, P18-1

Row	Col	Number	Name
E	5	C01009	ADIRU LEFT DC
E	7	C01007	ADIRU LEFT AC

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	6	C01017	FMCS CMPTR 1
E	8	C00425	ADIRU LEFT EXC

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
C	14	C01008	ADIRU RIGHT AC
C	15	C00426	ADIRU RIGHT EXC
C	17	C01010	ADIRU RIGHT DC

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
F	13	C01179	INDICATOR MASTER DIM SECT 7

SUBTASK 71-00-00-860-620-G00

(11) For engine 2, make sure that these circuit breakers are closed:

CAPT Electrical System Panel, P18-1

Row	Col	Number	Name
E	5	C01009	ADIRU LEFT DC
E	7	C01007	ADIRU LEFT AC

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	6	C01017	FMCS CMPTR 1
E	8	C00425	ADIRU LEFT EXC

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F/O Electrical System Panel, P6-1

Row	Col	Number	Name
C	14	C01008	ADIRU RIGHT AC
C	15	C00426	ADIRU RIGHT EXC
C	17	C01010	ADIRU RIGHT DC

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
F	13	C01179	INDICATOR MASTER DIM SECT 7

H. Test No. 15 Actuator Operational Test

SUBTASK 71-00-00-710-006-G00

WARNING MAKE SURE THAT ALL PERSONNEL AND EQUIPMENT ARE CLEAR OF THE ENGINE BEFORE YOU START THIS TEST. THE ENGINE COMPONENTS WILL MOVE AND THE ENGINE ROTORS WILL TURN DURING THIS TEST. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Use the MFD screen to use the OMF Ground Test to do the operational test of the applicable engine actuators.

(a) Do this task: Onboard Maintenance Function Ground Test, TASK 46-13-02-710-801.

NOTE: The actuator test takes approximately 4 minutes to complete.

(b) Make these selections on the MFD main function menu:

1) ONBOARD MAINTENANCE
2) LINE MAINTENANCE
3) GROUND TESTS
4) 71 -80 Engine 1 or 71 -80 Engine 2
5) OPERATIONAL TEST
6) Actuator Test
7) CONTINUE.

(c) Do the instructions that show on the MFD PRECONDITIONS screen.

1) Make sure that the inhibited conditions instructions are checked and followed closely.

NOTE: If one of the inhibited conditions is not met, the test will be failed.

(d) Make these selections on the MFD:

1) CONTINUE
2) START TEST.

(e) When the actuator test instructs, move the applicable ENGINE START switch to the GRD position.

NOTE: This will open the applicable start air valve to begin the dry motor of the engine.

1) Do this task: Dry Motor Procedure, TASK 71-00-00-910-808-G00.

(f) Make sure that N2 increases during the dry motoring of the engine.

1) Make sure that the MFD screen instructions are followed closely.

NOTE: If one of the inhibited conditions is not met, the test will be failed.

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2) If the test is failed, check and correct the inhibited conditions on the PRECONDITIONS screen again.

NOTE: Test will be failed if there is an interference from other initiated testing during the same time.

a) Follow the instructions on the GROUND TEST screen and do the test run again.

(g) Monitor the drain masts for leakage while the engine is running.

1) If leakage is found, inspect the applicable components or system to determine the source (TASK 71-00-00-790-802-G00).

(h) When the instruction is to stop the engine, do this task: Stop the Engine (Usual Engine Stop), TASK 71-00-00-910-806-G00.

(i) Make the selection that follows on the MFD to continue the test:

1) CONTINUE.

(j) When the test is completed, make sure that PASS or COMPLETED show adjacent to TEST CONDITION on the MFD.

(k) If FAILED shows, refer to the applicable Maintenance Message Reference in the FAULT GUIDANCE or select the maintenance message to see the recommended maintenance actions.

SUBTASK 71-00-00-200-024-G00

(2) If this test is done as part of a leak check, do the following steps:

(a) Examine the applicable component or system for signs of fluid leakage as follows:

1) If leakage is found, repair or replace the damaged tubes, tube flanges, fittings, seals, or components as necessary.

NOTE: The fuel nozzle seal is a secondary seal surface and does not prevent fuel leakage.

a) If there are nicks or cuts on the fuel nozzle seal, replace it.

2) If a fuel leak is at the fuel manifold B-nut, do the following steps:

a) Examine the B-nut surfaces for high metal.

<1> If it is necessary, polish the surface to remove the high metal (TASK 70-43-42-300-802-G00).

b) Tighten the fuel manifold B-nut (TASK 73-11-05-400-801-G00 or TASK 73-11-05-400-802-G00).

3) Look at the cases and areas for oil and fuel stains.

4) Do the leak check again after replacing or repairing the tubes, tube flanges, fittings, seals, or components to make sure that the repair is correct.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-410-030-G00

(1) If this test was done after component replacement or as part of a leak check , do the following steps:

(a) Remove the 1 U.S.-gal (3.81 l) oil resistant container, STD-203, from each drain mast line and correctly dispose of accumulated fluid (if any).

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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.

(b) If the thrust reversers are opened, close the applicable left or right thrust reversers:

(Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00)

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

(c) Close applicable left or right fan cowl panels:

(Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00)

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

(d) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

(e) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

SUBTASK 71-00-00-860-782-G00

(2) Remove the safety tags and close the applicable 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

SUBTASK 71-00-00-860-249-G00

(3) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the NORM position.

(a) Do this task: EEC Maintenance Power Selection, TASK 73-21-00-800-801-G00.

SUBTASK 71-00-00-860-504-G00

(4) Set the GND TESTS switch, on the P61-4 maintenance bite panel, to the NORM position.

SUBTASK 71-00-00-860-250-G00

(5) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-00-00-730-803-G00

16. Test No. 16 - Harness System Test

A. General

(1) This task gives the instructions to do the wire harness test.

(a) This test will check for intermittent connections in cables. The cables will be moved manually during the test.

(b) The harness system test completes when either the technician ends the test or the test automatically times out after 30 minutes.

(c) It is recommended that two technicians are available to perform this test:

1) One technician in the cockpit starting and stopping the test, and monitoring the OMF screen for faults

2) One technician at the engine manually manipulating the suspected harness(es).

(d) The technician in the cockpit should notify the technician at the engine immediately once a fault is detected so the proper harness and damage location can be identified.

(e) Only one harness should be moved at a time. It is recommended to begin from one end of the harness (EEC or component) and work towards the other end (whichever is easier).

(2) If you think there is an intermittent fault related to a specific line replaceable unit (LRU), use the wiring diagram manual and system schematic manual to identify the wiring harness numbers related with the LRU. Then use the wiring harness illustrations to identify the location of the wiring harness on the engine (TASK 73-22-01-000-801-G00).

(3) The harness system test can only be performed on one EEC channel at a time. Do the test on the EEC channel that is reporting the fault condition:

(a) Select "Harness Channel A Test" to run the test on EEC channel A.

(b) Select "Harness Channel B Test" to run the test on EEC channel B.

NOTE: When the harness system test is run on only one EEC channel at a time, the EEC that does the test enables torque motor output current in order to find out of range faults related to EEC-controlled torque motors.

(4) This task must not be performed with Engine Electronic Controller (EEC) data load and trim balance functions tasks.

NOTE: EEC data load tasks and trim balance functions tasks will inhibit the use of any EEC ground tests and special functions through the Onboard Maintenance Function (OMF).

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
46-13-02-710-801	Onboard Maintenance Function Ground Test (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)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)
73-22-01-000-801-G00	Electronic Engine Control (EEC) Electrical Harness (HJ3A) Removal (P/B 401)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)

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(Continued)

Reference	Title
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-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. 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

F. Prepare for the Test

SUBTASK 71-00-00-860-506-G00

(1) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button on the MFD control panel, P9.

(b) Push the SEL button on SELECTOR knob on the MFD control panel, P9.

SUBTASK 71-00-00-860-505-G00

(2) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the TEST position (TASK 73-21-00-800-801-G00).

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER to TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 71-00-00-860-507-G00

(3) Set the GND TESTS switch on the P61-4 maintenance bite panel to the ENABLE position.

SUBTASK 71-00-00-860-508-G00

(4) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

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1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-00-00-860-775-G00

(5) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 71-00-00-860-776-G00

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

SUBTASK 71-00-00-860-777-G00

(7) 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
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 71-00-00-860-509-G00

(8) Set the applicable thrust lever to idle.

G. Test No. 16 - Harness System Test

SUBTASK 71-00-00-730-003-G00

(1) Use the Multi-Function Display (MFD) screen to use the OMF Ground Test to do the engine wire harness test for the applicable engine (TASK 46-13-02-710-801).

NOTE: The EEC system test takes up to 30 minutes to complete.

(a) Make these selections on the MFD main function menu:

1) ONBOARD MAINTENANCE

2) LINE MAINTENANCE

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3) GROUND TESTS

4) 71 -80 Engine 1 or 71 -80 Engine 2

5) SYSTEM TEST

NOTE: Do the test on the EEC channel that is reporting the fault condition:

Select "Harness Channel A Test" to run the test on EEC channel A.

Select "Harness Channel B Test" to run the test on EEC channel B.

6) Harness Test or Harness Channel A Test or Harness Channel B Test

7) CONTINUE.

(b) Do the instructions that show on the MFD PRECONDITIONS and then make these selections:

NOTE: Make sure that you verify and follow the inhibited conditions instructions closely. If one of the inhibited conditions is not met, the test will be failed.

1) CONTINUE

2) START TEST.

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.

a) The technician at the engine should begin to move the suspected harness in several directions to try and create the fault.

<1> Do these steps to shake the wiring harness:

<a> Keep the wiring harness in the spring clips, when you move the wiring harness with your hand.

<b> Move the harness in all the directions that it has freedom to move.

<c> Move the harness at different rates.

b) Once the technician at the engine has completed a section of harness or the complete harness, the technician in cockpit should stop the test.

<1> Review any faults detected by the test.

<2> If no faults are detected, do the test again and continue on harness route until the complete harness has been evaluated.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-511-G00

(1) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the NORM position (TASK 73-21-00-800-801-G00).

SUBTASK 71-00-00-860-512-G00

(2) Set the GND TESTS switch on the P61-4 maintenance bite panel to the NORM position.

SUBTASK 71-00-00-860-513-G00

(3) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

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(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

SUBTASK 71-00-00-860-778-G00

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.

(4) 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 71-00-00-860-779-G00

(5) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

——— END OF TASK ———

TASK 71-00-00-710-806-G00

17. Test No. 17 - Electronic Engine Control (EEC) System Test

A. General

(1) This task gives the instructions to do the Electronic Engine Control (EEC) system test.

(2) The purpose of this test is to do a check of the electrical connections to the EEC and the EEC output drivers.

(3) During this test the actuator circuits are energized, but as there is no fuel pressure, the engine does not operate and the actuator systems do not move. Both channel A EEC and channel B EEC circuits are tested.

(4) Normal fault detection of the input circuitry will occur during this test.

(5) Both EEC channels exercise the output drivers that follow to verify correct operation of the driver and electrical continuity to the component:

(a) Fuel metering valve (FMV)

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(b) Pilot metering valve (PMV)

(c) Variable stator vanes (VSV)

(d) Variable bleed valves (VBV)

(e) Transient bleed valve (TBV)

(f) Start bleed valve/booster anti-ice valve (SBV/BAI)

(g) Low pressure turbine active clearance control (LPTACC)

(h) High pressure turbine active clearance control (HPTACC)

(i) Modulated turbine cooling (MTC).

(6) This task must not be performed with Engine Electronic Controller (EEC) data load and trim balance functions tasks.

NOTE: EEC data load tasks and trim balance functions tasks will inhibit the use of any EEC ground tests and special functions through the Onboard Maintenance Function (OMF).

B. References

Reference	Title
46-13-02-710-801	Onboard Maintenance Function Ground Test (P/B 201)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Prepare for the Test

SUBTASK 71-00-00-860-555-G00

(1) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button on the MFD control panel, P9.

(b) Push the SEL button on SELECTOR knob on the MFD control panel, P9.

SUBTASK 71-00-00-860-554-G00

(2) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the TEST position. Do this task: EEC Maintenance Power Selection, TASK 73-21-00-800-801-G00.

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER switch to the TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 71-00-00-860-556-G00

(3) Set the GND TESTS switch on the auxiliary panel, P61, to the ENABLE position.

SUBTASK 71-00-00-860-263-G00

(4) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

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(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-00-00-860-264-G00

(5) Set the applicable thrust lever to idle.

F. Test No. 17 - Electronic Engine Control (EEC) System Test

SUBTASK 71-00-00-730-005-G00

(1) Use the Multi-Function Display (MFD) screen to use the OMF Ground Test to do the EEC system test for the applicable engine. Do this task: Onboard Maintenance Function Ground Test, TASK 46-13-02-710-801.

NOTE: The EEC system test takes approximately five minutes to complete.

NOTE: Loss of valid N1 data during the EEC System Test will cause the FCC to activate the SPEED TRIM warning light. The SPEED TRIM warning light should extinguish after the test is completed.

(a) Make these selections on the MFD main function menu:

1) ONBOARD MAINTENANCE
2) LINE MAINTENANCE
3) GROUND TESTS
4) 71-80 Engine 1 or 71-80 Engine 2
5) SYSTEM TEST
6) Electronic Engine Controller Test
7) CONTINUE.

(b) Do the instructions that show on the MFD PRECONDITIONS and then make these selections:

NOTE: Make sure that you verify and follow the inhibited conditions instructions closely. If one of the inhibited conditions is not met, the test will be failed.

1) CONTINUE
2) START TEST.

(c) When the test is completed, make sure that PASS or COMPLETED show adjacent to TEST CONDITION on the MFD.

(d) If FAILED shows, refer to the applicable Maintenance Message Reference in the FAULT GUIDANCE or select the maintenance message to see the recommended maintenance actions.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-268-G00

(1) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the NORM position. Do this task: EEC Maintenance Power Selection, TASK 73-21-00-800-801-G00.

SUBTASK 71-00-00-860-269-G00

(2) Set the GND TESTS switch on the auxiliary panel, P61, to the NORM position.

SUBTASK 71-00-00-860-270-G00

(3) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

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(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

TASK 71-00-00-730-804-G00

18. Test No. 18 - EEC Channel A Ignition System Test

A. General

(1) This task gives the instructions to do the tests for the ability of the Channel A Electronic Engine Control (EEC) to activate the engine ignition system (both igniter 1 and igniter 2).

(2) This task also gives an overview of the ignition ground test screens that show on the Multi Function Display (MFD).

(a) You use the MFD screens to start and stop the ignition system ground test.

NOTE: You can use the maintenance computer or the MFD to do the ignition system ground test. The maintenance computer or the MFD gives access to the OMF screens to do the ignition system test.

(b) During the ignition system ground test:

1) The EEC supplies the power to enable the ignition system.

2) The EEC will do the electrical check of the ignition system circuits and reports any faults that it detects.

3) Channel A energizes igniter 1 circuit for 10 seconds, followed by a confirmation input (audible igniter sparking), then Channel A energizes the igniter 2 circuit for 10 seconds, again followed by a confirmation input.

4) The operator listens for the sound of the ignition spark for each igniter to make sure that the igniter is operational.

NOTE: It is necessary to have a person near the engine to listen for the sound of the spark.

NOTE: It is not necessary to open the fan cowls and thrust reverser cowls to hear the igniter test. It is optional to open the fan cowls and thrust reverser cowls to make the sounds of the ignition spark easier to hear.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
46-13-02-710-801	Onboard Maintenance Function Ground Test (P/B 201)
71-00-00-910-808-G00	Dry Motor Procedure (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)
73-21-00-800-801-G00	EEC Maintenance Power 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)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. 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

F. Prepare for the Test

SUBTASK 71-00-00-860-557-G00

CAUTION

MAKE SURE THAT YOU DRY MOTOR THE ENGINE BEFORE YOU DO THE OPERATIONAL TEST OF THE IGNITION SYSTEM. THIS WILL MAKE SURE THAT THERE IS NO FUEL IN THE ENGINE. IF YOU DO NOT DRY MOTOR THE ENGINE, THE IGNITION OF THE FUEL COULD CAUSE AN ENGINE FIRE OR TAILPIPE FIRE.

CAUTION

MAKE SURE THAT THE START LEVERS ARE IN THE CUTOFF POSITION TO HELP PREVENT ACCIDENTAL LIGHTOFF.

(1) Do this task: Dry Motor Procedure, TASK 71-00-00-910-808-G00.

SUBTASK 71-00-00-860-601-G00

(2) Do these steps to make sure that the ENGINE START switch is not operated:

(a) On the P5 forward overhead panel, make sure that the applicable ENGINE START switch is in the AUTO position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

SUBTASK 71-00-00-010-014-G00

(3) If it is necessary, do the steps that follow 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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) Open the left and 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 left and 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 71-00-00-860-559-G00

(4) Select the left or right MFD.

(a) Push the SYS button on the P9 MFD control panel.

(b) Push the SEL button on SELECTOR knob on the P9 MFD control panel.

SUBTASK 71-00-00-860-558-G00

(5) Set the applicable EEC MAINT POWER switch, on the MISC SYSTEM CTRLS page on the MFD, to the TEST position (TASK 73-21-00-800-801-G00).

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER switch to the TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 71-00-00-860-560-G00

(6) Set the GND TESTS switch, on the P61 auxiliary panel, to the ENABLE position.

SUBTASK 71-00-00-860-561-G00

(7) Set the applicable thrust lever to the IDLE position.

SUBTASK 71-00-00-860-562-G00

(8) Make sure that the EEC Data Load and Trim Balance Functions are inactive.

SUBTASK 71-00-00-860-621-G00

(9) Open the applicable circuit breakers and install safety tags:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2
B	4	C00359	FUEL SPAR VALVE ENG 1

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-860-622-G00

(10) If you do the ignition system test on standby power, open the applicable circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
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

G. Test No. 18 - EEC Channel A Ignition System Test

SUBTASK 71-00-00-730-006-G00

WARNING DO NOT TOUCH THE ENGINE IGNITION SYSTEM WHILE THE SYSTEM OPERATES. IGNITION VOLTAGE IS HIGH WHICH MAKES IT DANGEROUS. ELECTRICAL SHOCK CAN KILL, OR CAUSE INJURIES TO PERSONNEL.

(1) Use the MFD screen to use the OMF Ground Test to do the test of the Channel A ignition system for the applicable engine (TASK 46-13-02-710-801).

NOTE: The EEC Channel A ignition system test takes approximately four (4) minutes to complete.

NOTE: The test operator must have active voice communications with a person stationed near the engine that can listen and alert the test operator of igniter firing.

(a) Make these selections on the MFD main function menu:

1) ONBOARD MAINTENANCE
2) LINE MAINTENANCE
3) GROUND TESTS
4) 71 -80 Engine 1 or 71 -80 Engine 2
5) SYSTEM TEST
6) Ignition Channel A Test
7) CONTINUE.

(b) Do the instructions that show on the MFD PRECONDITIONS screen.

1) Make sure that you verify and follow the inhibited conditions instructions closely.

NOTE: If one of the inhibited conditions is not met, the test will be failed.

(c) Make these selections on the MFD:

1) CONTINUE
2) START TEST.

(d) Follow the instructions on the MFD screen.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(e) If you do the ignition system test on standby power, after you have entered a response for IGNITER 1 (LEFT), remove the safety tags and close the applicable circuit breakers before select CONTINUE:

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

(f) When the test is completed, make sure that PASS or COMPLETED show adjacent to TEST CONDITION on the MFD.

(g) If FAILED shows, refer to the applicable Maintenance Message Reference in the FAULT GUIDANCE or select the maintenance message to see the recommended maintenance actions.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-410-022-G00

(1) If it is necessary, do the steps that follow to safely close the left and right thrust reversers:

WARNING

OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS, BUT DO NOT DO THE THRUST REVERSER OR LEADING EDGE ACTIVATION. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(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

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 71-00-00-860-279-G00

(2) Set the applicable EEC MAINT POWER switch, on the MISC SYSTEM CTRLS page on the MFD, to the NORM position (TASK 73-21-00-800-801-G00).

SUBTASK 71-00-00-860-563-G00

(3) Set the GND TESTS switch, on the P61 auxiliary panel, to the NORM position.

SUBTASK 71-00-00-860-602-G00

(4) On the P5 forward overhead panel, remove the DO-NOT-OPERATE tag from the applicable ENGINE START switch.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-860-623-G00

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

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	6	C00151	ENGINE 2 IGNITION LEFT

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

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 71-00-00-860-651-G00

(6) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

——— END OF TASK ———

TASK 71-00-00-730-805-G00

19. Test No. 19 - EEC Channel B Ignition System Test

A. General

(1) This task gives the instructions to do the tests for the ability of the Channel B Electronic Engine Control (EEC) to activate the engine ignition system (both igniter 1 and igniter 2).

(2) This task also gives an overview of the ignition ground test screens that show on the Multi Function Display (MFD).

(a) You use the MFD screens to start and stop the ignition system ground test.

NOTE: You can use the maintenance computer or the MFD to do the ignition system ground test. The maintenance computer or the MFD gives access to the OMF screens to do the ignition system test.

(b) During the ignition system ground test:

1) The EEC supplies the power to enable the ignition system.

2) The EEC performs an electrical check of the ignition system circuits and reports any faults that it detects.

3) Channel B energizes igniter 1 circuit for 10 seconds, followed by a confirmation input (audible igniter sparking), then Channel B energizes the igniter 2 circuit for 10 seconds, again followed by a confirmation input.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

4) The operator listens for the sound of the ignition spark for each igniter to make sure the igniter is operational.

NOTE: It is necessary to have a person near the engine to listen for the sound of the spark.

NOTE: It is not necessary to open the fan cowls and thrust reverser cowls to hear the igniter test. It is optional to open the fan cowls and thrust reverser cowls to make the sounds of the ignition spark easier to hear.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
46-13-02-710-801	Onboard Maintenance Function Ground Test (P/B 201)
71-00-00-910-808-G00	Dry Motor Procedure (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)
73-21-00-800-801-G00	EEC Maintenance Power 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-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. 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

F. Prepare for the Test

SUBTASK 71-00-00-860-564-G00

CAUTION

MAKE SURE THAT YOU DRY MOTOR THE ENGINE BEFORE YOU DO THE OPERATIONAL TEST OF THE IGNITION SYSTEM. THIS WILL MAKE SURE THAT THERE IS NO FUEL IN THE ENGINE. IF YOU DO NOT DRY MOTOR THE ENGINE, THE IGNITION OF THE FUEL COULD CAUSE AN ENGINE FIRE OR TAILPIPE FIRE.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(CAUTION PRECEDES)

CAUTION

MAKE SURE THAT THE START LEVERS ARE IN THE CUTOFF POSITION TO HELP PREVENT ACCIDENTAL LIGHTOFF.

(1) Do this task: Dry Motor Procedure, TASK 71-00-00-910-808-G00.

SUBTASK 71-00-00-860-603-G00

(2) Do these steps to make sure that the ENGINE START switch is not operated:

(a) On the P5 forward overhead panel, make sure that the applicable ENGINE START switch is in the AUTO position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

SUBTASK 71-00-00-010-015-G00

(3) If it is necessary, do the steps that follow 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 left and 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 left and 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 71-00-00-860-566-G00

(4) Select the left or right MFD.

(a) Push the SYS button on the P9 MFD control panel.

(b) Push the SEL button on SELECTOR knob on the P9 MFD control panel.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-860-565-G00

(5) Set the applicable EEC MAINT POWER switch, on the MISC SYSTEM CTRLS page on the MFD, to the TEST position (TASK 73-21-00-800-801-G00).

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER switch to the TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 71-00-00-860-567-G00

(6) Set the GND TESTS switch, on the P61-4 maintenance bite panel, to the ENABLE position.

SUBTASK 71-00-00-860-568-G00

(7) Set the applicable thrust lever to the IDLE position.

SUBTASK 71-00-00-860-569-G00

(8) Make sure that the EEC Data Load and Trim Balance Functions are inactive.

SUBTASK 71-00-00-860-624-G00

(9) Open the applicable circuit breakers and install safety tags:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2
B	4	C00359	FUEL SPAR VALVE ENG 1

SUBTASK 71-00-00-860-625-G00

(10) If you do the ignition system test on standby power, open the applicable circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
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

G. Test No. 19 - EEC Channel B Ignition System Test

SUBTASK 71-00-00-730-007-G00

WARNING DO NOT TOUCH THE ENGINE IGNITION SYSTEM WHILE THE SYSTEM OPERATES. IGNITION VOLTAGE IS HIGH WHICH MAKES IT DANGEROUS. ELECTRICAL SHOCK CAN KILL, OR CAUSE INJURIES TO PERSONNEL.

(1) Use the MFD screen to use the OMF Ground Test Function to do the test of the Channel B ignition system of the applicable engine (TASK 46-13-02-710-801).

NOTE: The EEC Channel B ignition system test takes approximately four (4) minutes to complete.

NOTE: The test operator must have active voice communications with a person stationed near the engine that can listen and alert the test operator of igniter firing.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Make these selections on the MFD main function menu:

1) ONBOARD MAINTENANCE
2) LINE MAINTENANCE
3) GROUND TESTS
4) 71-80 Engine 1 or 71-80 Engine 2
5) SYSTEM TEST
6) Ignition Channel B Test
7) CONTINUE.

(b) Do the instructions that shown on the MFD PRECONDITIONS screen.

1) Make sure that you verify and follow the inhibited conditions instructions closely.

NOTE: If one of the inhibited conditions is not met, the test will be failed.

(c) Make these selections on the MFD:

1) CONTINUE
2) START TEST.

(d) Follow the instructions on the MFD screen.

(e) If you do the ignition system test on standby power, after you have entered a response for IGNITER 1 (LEFT), remove the safety tags and close the applicable circuit breakers before select CONTINUE:

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

(f) When the test is completed, make sure that PASS or COMPLETED show adjacent to TEST CONDITION on the MFD.

(g) If FAILED shows, refer to the applicable Maintenance Message Reference in the FAULT GUIDANCE or select the maintenance message to see the recommended maintenance actions.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-410-023-G00

(1) If it is necessary, do the steps that follow to safely close the left and right thrust reversers:

WARNING

OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS, BUT DO NOT DO THE THRUST REVERSER OR LEADING EDGE ACTIVATION. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Number	Name/Location
426	Right Thrust Reverser, Engine 2

(b) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00

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 71-00-00-860-284-G00

(2) Set the applicable EEC MAINT POWER switch, on the MISC SYSTEM CTRLS page on the MFD, to the NORM position (TASK 73-21-00-800-801-G00).

SUBTASK 71-00-00-860-570-G00

(3) Set the GND TESTS switch, on the P61-4 maintenance bite panel, to the NORM position.

SUBTASK 71-00-00-860-604-G00

(4) On the P5 forward overhead panel, remove the DO-NOT-OPERATE tag from the applicable ENGINE START switch.

SUBTASK 71-00-00-860-626-G00

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

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	6	C00151	ENGINE 2 IGNITION LEFT

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

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 71-00-00-860-640-G00

(6) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-00-00-710-807-G00

20. Test No. 24 - EEC Blower Test

A. General

(1) The EEC blower installed configuration has been disabled by EEC software. Test No. 24 - EEC Blower Test is obsolete. If you try to do this test, the OMF screen will display the "EEC Blower Not Installed" message. This does not indicate a fault condition. No maintenance action is necessary for this message.

(2) This task gives the instructions to test the operation of the EEC blowers.

(3) This test verifies the operation of the EEC blowers and resets the EEC blowers auto test flight cycle counter stored in the Non Volatile Memory (NVM).

(4) The test turns on the EEC blower for channels A and B for 15 seconds to verify the blower is operational. The test takes approximately 60 seconds to complete.

(5) If the outside air temperature is at or below 2 deg C, apply warm air to the blower inlet located at the bottom of the fan cowl before you do this test. Operating the EEC blower during icing conditions without added heating may cause damage to blower hardware.

(6) This task must not be performed with EEC data load and trim balance functions tasks.

NOTE: EEC data load tasks and trim balance functions tasks will inhibit the use of any EEC ground tests and special functions through the Onboard Maintenance Function (OMF).

B. References

Reference	Title
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Prepare for the Test

SUBTASK 71-00-00-860-515-G00

(1) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button on the MFD control panel, P9.

(b) Push the SEL button on SELECTOR knob on the MFD control panel, P9.

SUBTASK 71-00-00-860-514-G00

(2) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the TEST position.

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER switch to the TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

(a) Do this task: EEC Maintenance Power Selection, TASK 73-21-00-800-801-G00.

SUBTASK 71-00-00-860-516-G00

(3) Set the GND TESTS switch on the P61 auxiliary panel to the ENABLE position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-860-517-G00

(4) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-00-00-860-518-G00

(5) Set the applicable thrust lever to idle.

F. Test No. 24 - EEC Blower Test

SUBTASK 71-00-00-730-004-G00

(1) Use the Multi-Function Display (MFD) screen to do the system test of the applicable engine EECs as follow:

NOTE: The EEC blower test takes approximately one minute to complete.

(a) Make these selections on the MFD main function menu:

1) ONBOARD MAINTENANCE
2) LINE MAINTENANCE
3) GROUND TESTS
4) 71-80 Engine 1 or 71-80 Engine 2
5) SYSTEM TEST
6) Electronic Engine Controller Blower Test
7) CONTINUE.

(b) Do the instructions that show on the MFD PRECONDITIONS and then make these selections:

1) Make sure that you verify and follow the inhibited conditions instructions closely.

NOTE: If one of the inhibited conditions is not met, the test will be failed.

2) CONTINUE
3) START TEST.

NOTE: The EEC blower installed configuration has been disabled by EEC software. Test No. 24 - EEC Blower Test is obsolete. If you try to do this test, the OMF screen will display the "EEC Blower Not Installed" message. This does not indicate a fault condition. No maintenance action is necessary for this message.

(c) When the test is completed, make sure that PASS or COMPLETED show adjacent to TEST CONDITION on the MFD.

(d) If FAILED shows, refer to the applicable maintenance message reference in the FAULT GUIDANCE or select the maintenance message to see the recommended maintenance actions.

1) If the screen shows that test is failed and the data was unsuccesfully stored to the Non-volatile Memory, do these steps:

a) Stop and exit the test and power cycling EEC's.

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b) Power the EEC's on.

c) Check for EEC NVM faults.

d) If faults are present, correct EEC NVM or power faults prior to attempting the special function again.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-520-G00

(1) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the NORM position.

(a) Do this task: EEC Maintenance Power Selection, TASK 73-21-00-800-801-G00.

SUBTASK 71-00-00-860-521-G00

(2) Set the GND TESTS switch on the P61 auxiliary panel to the NORM position.

SUBTASK 71-00-00-860-522-G00

(3) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

TASK 71-00-00-700-801-G00

21. Test No. 25 - Fuel System Preservation Special Functions Test

A. General

(1) This task gives the instructions to do the engine preservation special function.

(2) This is a wet motor test that cycles the fuel valves to aid in fuel system preservation.

(3) The wet motor ends when the fuel valve cycle is complete and the fuel system is filled with preservation fluid.

(4) This task must not be performed with Engine Electronic Controller (EEC) data load and trim balance functions tasks.

NOTE: EEC data load tasks and trim balance functions tasks will inhibit the use of any EEC ground tests and special functions through the Onboard Maintenance Function (OMF).

B. References

Reference	Title
36-00-00-860-803	Supply Pressure to the Pneumatic System with the APU (P/B 201)
71-00-00-910-801-G00	Prepare the Engine for Operation (P/B 201)
71-00-00-910-806-G00	Stop the Engine (Usual Engine Stop) (P/B 201)
71-00-00-910-808-G00	Dry Motor Procedure (P/B 201)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

ECCN 9E991 BOEING PROPRIETARY - See title page for details

D. Prepare for the Test

SUBTASK 71-00-00-840-005-G00

(1) Do this task: Prepare the Engine for Operation, TASK 71-00-00-910-801-G00.

SUBTASK 71-00-00-860-J04-G00

(2) Start the APU and Supply Pressure to the Pneumatic System with the APU, TASK 36-00-00-860-803.

SUBTASK 71-00-00-700-071-G00

(3) Make sure that these switches on the overhead panel, P5, are in the OFF position.

(a) L PACK

(b) R PACK

SUBTASK 71-00-00-860-J05-G00

(4) Make sure that these switches on the overhead panel, P5, are in the OFF position.

(a) WING ANTI - ICE

(b) ENG 1 ANTI - ICE

(c) ENG 2 ANTI - ICE.

SUBTASK 71-00-00-860-J06-G00

(5) Make sure that the BLEED AIR ISOLATION VALVE switch on the overhead panel, P5, is in the OPEN position

SUBTASK 71-00-00-860-J07-G00

(6) If hydraulic pressure is not necessary, do this step for the applicable engine:

(a) Make sure that these switches on the overhead panel, P5, are in the OFF position.

1) HYD PUMPS A ENG 1

2) HYD PUMPS B ENG 2.

SUBTASK 71-00-00-860-291-G00

(7) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button on the MFD control panel, P9.

(b) Push the SEL button on SELECTOR knob on the MFD control panel, P9.

SUBTASK 71-00-00-860-290-G00

(8) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the TEST position.

(a) Do this task: EEC Maintenance Power Selection, TASK 73-21-00-800-801-G00.

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER switch to the TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 71-00-00-860-292-G00

(9) Set the GND TEST switch on the P61-4 maintenance bite panel to the ENABLE position.

SUBTASK 71-00-00-860-572-G00

(10) Set the applicable thrust lever to idle.

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SUBTASK 71-00-00-620-004-G00

CAUTION

DO NOT APPLY BOOST PUMP PRESSURE TO THE FUEL PUMP INLET IF YOU DRY MOTOR THE ENGINE FOR THE TASK OF THE PRESERVATION OF AN ON-WING ENGINE. FUEL WILL SPILL ON THE ENGINE AND CAUSE DAMAGE TO THE EQUIPMENT.

(11) Do these steps to let the preservation fluid flow in the engine:

(a) Make sure to do this check of the circuit breakers before you do the wet motor procedure to prevent fuel leakage from the spar valve.

1) For engine 1, open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1

For engine 2, open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2

(b) Do not change the position of the circuit breaker until the fuel system preservation is complete or fuel leakage from spar valve could occur.

SUBTASK 71-00-00-860-J08-G00

(12) Make sure that the two VIBRATION indications on the MDS engine display are zero.

NOTE: A blank vibration indication is a sign of a system malfunction.

SUBTASK 71-00-00-860-574-G00

(13) Make sure that these circuit breakers are open and have 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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

E. Test No. 25 - Fuel System Preservation Special Functions

WARNING

MAKE SURE THAT ALL PERSONNEL AND EQUIPMENT ARE CLEAR OF THE ENGINE BEFORE YOU START THIS GROUND TEST. THE ENGINE COMPONENTS WILL MOVE AND THE ENGINE ROTORS WILL TURN DURING THIS GROUND TEST. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

SUBTASK 71-00-00-700-040-G00

(1) Use the Multi-Function Display (MFD) screen to do the engine fuel system preservation special function.

NOTE: The engine fuel system preservation special function takes approximately 10 minutes to complete.

(a) Make these selections on the MFD main function menu:

1) ONBOARD MAINTENANCE
2) OTHER FUNCTIONS
3) SPECIAL FUNCTIONS
4) 71-80 Engine 1 or 71-80 Engine 2
5) Fuel System Preservation
6) CONTINUE.

(b) Do the instructions that shown on the MFD PRECONDITIONS screen.

1) Make sure that you verify and follow the inhibited conditions instructions closely.

NOTE: If one of the inhibited conditions is not met, the test will be failed.

(c) Make these selections on the MFD:

1) CONTINUE.
2) START FUNCTION.

(d) Follow the instructions on the MFD screen.

CAUTION

DO NOT OPERATE THE ENGINE STARTER BEYOND ITS LIMITS. DAMAGE TO THE STARTER CAN OCCUR.

1) When the MFD instructs you to turn the applicable engine start switch to the GRD position, make sure these conditions occur:

a) The START VALVE OPEN message comes on.
b) Pneumatic manifold duct pressure increases.
c) N1 and N2 indications are displayed and increasing.
d) The person on the ground sees the N1 rotor starts to turn in the counterclockwise direction.

2) Make sure that you see a positive oil pressure indication.
3) Make sure that the N2 speed becomes stable at 24 - 32%

NOTE: N2 will not increase above 24% until the bowed rotor motoring sequence is complete. The 'MOTORING' flag is displayed over the N2 gauge while the engine does the bowed rotor motoring procedure.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

4) At a minimum 20% N2, move the applicable start lever to the IDLE position and do these steps:

a) Make sure that you do not see an EGT rise.

NOTE: If you see an EGT rise, this is an indication of an engine internal or tailpipe fire. If this occurs, move the start lever to the cutoff position and continue to motor the engine to extinguish the fire.

b) Make sure that the ENG VALVE CLOSED light on the overhead panel, P5, go off.

c) Make sure that you see positive oil pressure and positive fuel flow indications.

NOTE: The fuel metering valve (FMV) and the pilot metering valve (PMV) are cycled to move preservation fluid throughout the fuel system.

(e) When the MFD instructs you to stop the engine, do these tasks in sequence:

1) Do this task: Stop the Engine (Usual Engine Stop), TASK 71-00-00-910-806-G00.

2) Dry motor the engine for 2 minutes. Do this task: Dry Motor Procedure, TASK 71-00-00-910-808-G00.

(f) Put the applicable ENGINE START switch to the OFF position to stop the dry motor.

1) Make sure that the START VALVE OPEN message goes out.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-293-G00

(1) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the NORM position (TASK 73-21-00-800-801-G00).

SUBTASK 71-00-00-860-294-G00

(2) Set the GND TEST switch on the P61-4 maintenance bite panel to the NORM position.

SUBTASK 71-00-00-860-576-G00

(3) For the applicable engine, remove the safety tags and close these applicable 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

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-860-J11-G00

(4) For the applicable engine, remove the safety tags and close these applicable 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

SUBTASK 71-00-00-700-072-G00

(5) Erase all status messages related to the engine ignition system not receiving aircraft power that may have set during the wet motor.

——— END OF TASK ———

TASK 71-00-00-700-802-G00

22. Test No. 26 - Debris Monitoring System Channel B Special Functions Test

A. General

CAUTION

DO NOT DO TEST NO. 26 DEBRIS MONITORING SYSTEM RESET CHANNEL B SPECIAL FUNCTIONS TEST BEFORE THE ENGINE OIL SYSTEM (OIL DEBRIS MONITORING SYSTEM SENSOR (ODMS) DETAILED DIMENSIONAL CHECK IF THE PARTICLE COUNT VALUE IS MORE THAN 0 WITH PARTICLES THAT ARE LARGER THAN 0.004 IN (0.010MM) (ABNORMAL FUZZ) IN ANY DIMENSION ON THE MAGNETIC TIP OF THE ODMS SENSOR. IF YOU DO NOT OBEY, DAMAGE TO THE ENGINE CAN OCCUR.

CAUTION

DO THE TEST NO. 26 - DEBRIS MONITORING SYSTEM RESET CHANNEL B SPECIAL FUNCTIONS TEST ONLY IF IT IS NECESSARY DURING THE ENGINE OIL SYSTEM ODMS DETAILED DIMENSIONAL CHECK. IF YOU DO NOT OBEY, DAMAGE TO THE ENGINE CAN OCCUR.

(1) This task gives the instructions to run the debris monitoring system Channel B functions test.

(2) This task modifies the Debris Monitoring System (DMS) counter stored in Engine Electronic Controller (EEC) channel B memory.

(a) You can use this task to input the known DMS chip count into EEC memory, after installing new EEC software or replacing both EECs on the same engine. Two digits can be entered for the DMS chip count.

1) For engines with EEC software version 6.72 (Service Bulletin 73-1023) or later, it is not necessary to input the DMS chip count for future EEC software loading. The EEC will store the DMS chip count in protected memory.

I (b) The test title on the Onboard Maintenance Function (OMF) is “DMS Chip Count Entry Channel B Special Functions Test”.

(3) This task cannot be performed when EEC software is being installed (data load function) or the trim balance function is active.

NOTE: EEC data load tasks and trim balance functions tasks will inhibit the use of any EEC ground tests and special functions through the OMF.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(4) The OMF must receive an input with the EEC software version in order to display this special function as selectable option. The OMF receives the EEC software version inputs from the Digital Flight Data Acquisition Unit (DFDAU). If the DFDAU is not powered, or if it has invalid credentials, then the OMF will not receive the EEC software version information and will not display the special function.

B. References

Reference	Title
46-13-00-480-801	Maintenance Laptop Connection (P/B 201)
46-13-00-860-803	Client Credentials Check (P/B 201)
46-13-02-860-802	Special Functions (P/B 201)
71-00-00-970-801-G00	Maintenance Data Pages from the Engine Propulsion Control System (EPCS) (P/B 201)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)
IFIM and do the applicable procedure(s)	Interactive Fault Isolation Manual

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Prepare for the Test

SUBTASK 71-00-00-860-628-G00

(1) Select the left or right Multi Function Display (MFD).

(a) Push the SYS button on the MFD P9 control panel.

(b) Push the SEL button on SELECTOR knob on the MFD P9 control panel.

SUBTASK 71-00-00-860-627-G00

(2) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the TEST position.

(a) Do this task: EEC Maintenance Power Selection, TASK 73-21-00-800-801-G00.

SUBTASK 71-00-00-860-629-G00

(3) Set the GND TESTS switch, on the P61 auxiliary panel, to the ENABLE position.

SUBTASK 71-00-00-860-630-G00

(4) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-00-00-860-631-G00

(5) Set the applicable thrust lever to idle.

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SUBTASK 71-00-00-860-787-G00

(6) Make sure that there is power on the DFDAU as follows:

(a) Put the TEST-NORMAL switch, on the P5 FLIGHT RECORDER/MACH AIRSPEED WARNING TEST panel, to the TEST position.

(b) Make sure that the FLIGHT RECORDER OFF light, on the P5 panel, is off.

F. Test No. 26 - Debris Monitoring System Channel B Special Functions Test

SUBTASK 71-00-00-730-009-G00

(1) Use the MFD screen to use the OMF Special Functions to reset the DMS (TASK 46-13-02-860-802).

NOTE: The DMS counter reset function takes approximately 3 minutes to complete.

(a) Make these selections on the Special Function:

1) Access the Onboard Network System (ONS):

SIA 001-014 PRE SB 737-46-1029

a) For OS7.1: On the MFD main function menu, select ONBOARD MAINTENANCE or access the ONS with a laptop, do this task: Maintenance Laptop Connection, TASK 46-13-00-480-801.

SIA 015-999; SIA 001-014 POST SB 737-46-1029

b) For OS9.1: Connect the Portable Maintenance Device (PMD), do this task: Maintenance Laptop Connection, TASK 46-13-00-480-801.

NOTE: For OS9.1, the special function is only available on the PMD.

SIA ALL

2) OTHER FUNCTIONS

SIA 001-014 PRE SB 737-46-1029

3) SPECIAL FUNCTIONS

SIA 015-999; SIA 001-014 POST SB 737-46-1029

4) Special Functions

SIA ALL

5) 71-80 Engine 1 or 71-80 Engine 2

6) Debris Monitoring System (DMS) Chip Count Entry Channel B

NOTE: The “X” digit of the cumulative chip counter is set at “1” by default in the Special Function page.

7) CONTINUE.

(b) If a special function is not displayed, do these steps:

1) Make sure that there is power on the DFDAU.

2) Make sure that there are no open circuit breakers that can stop the signal to the OMF.

3) If it is necessary, generate new credentials for the EECs, DFDAU and Network File Server (NFS) (TASK 46-13-00-860-803).

NOTE: If the DFDAU is powered on while looking for the EEC special functions, new credentials can be necessary.

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SIA 001-014 PRE SB 737-46-1029

(c) Do the instructions that show on the MFD PRECONDITIONS:

SIA 015-999; SIA 001-014 POST SB 737-46-1029

(d) Do the instructions that show on the PRECONDITIONS:

SIA ALL

(e) Make these selections:

1) CONTINUE

2) START FUNCTION.

3) Make sure that you check and follow the inhibited conditions instructions closely.

NOTE: If one of the inhibited conditions is not met, the test will be failed.

(f) Follow the instructions on the screen.

SIA 001-014 PRE SB 737-46-1029

1) OS7.1 will have instructions on the MFD screen.

SIA 015-999; SIA 001-014 POST SB 737-46-1029

2) OS9.1 will have instructions on the ONS screen.

SIA ALL

NOTE: Engine Propulsion Control System (EPCS) page 2 shows the engine DMS chip count for both EEC channel A and EEC channel B. Enter only the DMS chip count for EEC channel B into the special function. EEC channel A automatically copies the DMS chip count from EEC channel B.

NOTE: In the special function, you must enter each DMS count digit separately. This means to enter a value of "7" DMS chips as indicated by EEC channel B, you select "0" for the first digit, and then select "CONTINUE." Next you select "7" for the second digit and then select "CONTINUE." The maximum cumulative DMS chip count that can be entered is "19." The MAINT light and "ENG X OIL DEBRIS" status message are set when the cumulative DMS chip count reaches "20."

NOTE: As an example, if you input a known DMS chip count after a dual channel EEC replacement and the recorded engine EEC channel B DMS chip count was "3", enter "03" into the special function.

NOTE: As an example, if you did an inspection and wiped the DMS tip clean, and you reset the DMS chip count to zero, enter "00" into the special function.

(g) If FAILED shows, refer to the applicable Maintenance Message Reference in the FAULT GUIDANCE or select the maintenance message to see the recommended maintenance actions.

NOTE: If the DMS chip counter was unable to be reset due to an EEC Non Volatile Memory (NVM) failure, verify no EEC NVM or power faults are present. If faults are present, correct EEC NVM or power faults prior to re-attempting the special function.

1) If the screen shows that test is failed and the data was unsuccessfully stored to the NVM, do these steps:

a) Stop and exit the test and power cycling EEC's.

b) Power the EEC's on.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

c) Check for EEC NVM faults.

d) If faults are present, correct EEC NVM or power faults prior to attempting the special function again.

SUBTASK 71-00-00-860-784-G00

(2) Make sure that the indicated DMS chip count is correct.

NOTE: The EPCS page 2 DMS chip count must show what was entered into the special function. The EPCS page 2 DMS chip count for EEC channel A should match the EEC channel B DMS chip count.

(a) If the DMS chip count does not match, do these steps:

1) Check for faults related to EEC power and cross-channel data link.

a) If faults are present, refer to IFIM and do the applicable procedure(s).

2) Do the steps above again to input the correct chip count.

(b) Do a review of the applicable engine EEC channel B 'DMS' count on EPCS page 2 (TASK 71-00-00-970-801-G00).

1) If the DMS chip count is not correct, do the steps above again to input the correct chip count.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-633-G00

(1) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the NORM position.

(a) Do this task: EEC Maintenance Power Selection, TASK 73-21-00-800-801-G00.

SUBTASK 71-00-00-860-634-G00

(2) Set the GND TESTS switch, on the P61 auxiliary panel, to the NORM position.

SUBTASK 71-00-00-860-636-G01

(3) Set the TEST-NORMAL switch, on the P5 FLIGHT RECORDER/MACH AIRSPEED WARNING TEST panel, to the NORMAL position.

SUBTASK 71-00-00-860-635-G00

(4) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

TASK 71-00-00-700-803-G00

23. Test No. 27 - Clear Engine SMT Message

A. General

(1) This task gives the instructions to clear the engine Scheduled Maintenance Task (SMT) message.

(2) This task will clear the latch on the SMT messages in the Max Display System. Engine SMT messages include the Short Term Dispatch (STD) and Long Time Dispatch (LTD) output from the Electronic Engine Control (EEC).

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(a) This will allow confirmation of repair of a failure that causes an ENG C1 or ENG C2 message without starting the engine.

(b) The latch is cleared just before the engine reaches idle.

(c) This function will run on both channels, regardless of the channel-in-control status.

(3) You can use the Multi-Function Display (MFD) to clear an ENG C1 or ENG C2 message.

(4) This task must not be performed with Engine Electronic Controller (EEC) data load and trim balance functions tasks.

NOTE: EEC data load tasks and trim balance functions tasks will inhibit the use of any EEC ground tests and special functions through the Onboard Maintenance Function (OMF).

B. References

Reference	Title
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Prepare for the Test

SUBTASK 71-00-00-860-301-G00

(1) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button on the MFD control panel, P9.

(b) Push the SEL button on SELECTOR knob on the MFD control panel, P9.

SUBTASK 71-00-00-860-300-G00

(2) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the TEST position. Do this task: EEC Maintenance Power Selection, TASK 73-21-00-800-801-G00.

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER switch to the TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 71-00-00-860-577-G00

(3) Set the GND TESTS switch on the auxiliary panel, P61, to the ENABLE position.

SUBTASK 71-00-00-860-578-G00

(4) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-00-00-860-579-G00

(5) Set the applicable thrust lever to idle.

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F. Test No. 27 – Clear Engine SMT Message Special Functions Test

SUBTASK 71-00-00-700-047-G00

(1) Use the Multi-Function Display (MFD) screen to use the Maintenance Control Pages to clear the scheduled maintenance task (SMT) for the applicable engine system.

(a) Make these selections on the MFD SYS menu:

1) MAINTENANCE CONTROL PAGES

2) LATCHED MESSAGE ERASE

SUBTASK 71-00-00-700-064-G00

(2) Look for any existing fault STATUS message under ERASABLE STATUS MESSAGE screen or SCHEDULED MAINTENANCE TASK MESSAGES screen.

SUBTASK 71-00-00-700-065-G00

(3) Make a record of the STATUS Message or Scheduled Maintenance Task Message on the screens before you erase the message.

SUBTASK 71-00-00-700-066-G00

(4) Select the applicable status message from the SCHEDULED MAINTENANCE TASK MESSAGE section at the bottom of the page.

SUBTASK 71-00-00-700-067-G00

(5) Select and push the ERASE button under ERASABLE STATUS MESSAGE screen and SCHEDULED MAINTENANCE TASK MESSAGES screen.

NOTE: This will clear all the STATUS messages and Scheduled Maintenance Task (SMT) messages.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-302-G00

(1) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the NORM position. Do this task: EEC Maintenance Power Selection, TASK 73-21-00-800-801-G00.

SUBTASK 71-00-00-860-653-G00

(2) Set the GND TESTS switch on the auxiliary panel, P61, to the NORM position.

SUBTASK 71-00-00-860-303-G00

(3) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

TASK 71-00-00-700-805-G00

24. Test No. 29 - Water Wash Special Functions Test

A. General

(1) This task gives the instructions to do the water wash special function.

(2) This special function moves the VSV actuators to open the VSVs and the VBV actuators to close the VBVs. This gives an improved spray path for the compressor turbo-machinery water wash.

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(3) You use the Onboard Maintenance Function (OMF) features accessible through the Multi-Function Display (MFD) to do the water wash special function.

(4) This task must not be performed with Engine Electronic Controller (EEC) data load and trim balance functions tasks.

NOTE: EEC data load tasks and trim balance functions tasks will inhibit the use of any EEC ground tests and special functions through the OMF.

B. References

Reference	Title
46-13-02-860-802	Special Functions (P/B 201)
71-00-00-910-806-G00	Stop the Engine (Usual Engine Stop) (P/B 201)
71-00-00-910-808-G00	Dry Motor Procedure (P/B 201)
72-00-00-100-802-G00	Engine Gas-Path Cleaning With Pure Water (P/B 701)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Prepare for the Test

SUBTASK 71-00-00-860-305-G00

(1) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button on the MFD control panel, P9.

(b) Push the SEL button on SELECTOR knob on the MFD control panel, P9.

SUBTASK 71-00-00-860-304-G00

(2) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the TEST position (TASK 73-21-00-800-801-G00).

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER switch to the TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 71-00-00-860-306-G00

(3) Set the GND TEST switch on the P61-4 maintenance bite panel to the ENABLE position.

SUBTASK 71-00-00-860-582-G00

(4) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-00-00-860-583-G00

(5) Set the applicable thrust lever to idle.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-860-585-G00

(6) Do the dry motor procedure and stop at the step before the applicable START switch is set to GRD (TASK 71-00-00-910-808-G00).

F. Test No. 29 - Water Wash Special Functions

SUBTASK 71-00-00-700-048-G00

(1) Use the Multi-Function Display (MFD) screen to use the OMF Special Function to do the applicable engine water wash (TASK 46-13-02-860-802).

NOTE: This function takes approximately 5-10 minutes to complete.

(a) Make these selections on the MFD main function menu:

1) ONBOARD MAINTENANCE
2) OTHER FUNCTIONS
3) SPECIAL FUNCTIONS
4) 71 -80 Engine 1 or 71 -80 Engine 2
5) Water Wash
6) CONTINUE.

(b) Do the instructions that show on the MFD PRECONDITIONS and then make these selections:

NOTE: Make sure that you verify and follow the inhibited conditions instructions closely. If one of the inhibited conditions is not met, the test will be failed.

1) CONTINUE
2) START FUNCTION.

NOTE: If multiple wash and dry motoring cycles are necessary, obey starter duty cycle limitations to prevent damage to engine hardware.

(c) When you are instructed to dry-motor the engine, do this task: Dry Motor Procedure, TASK 71-00-00-910-808-G00

(d) Begin the water wash of the compressor turbomachinery (TASK 72-00-00-100-802-G00).

(e) In 5 minutes or less from the time you start the dry motoring, do this task: Stop the Engine (Usual Engine Stop), TASK 71-00-00-910-806-G00.

(f) When the engine has stopped, select "STOP TEST".

G. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-307-G00

(1) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the NORM position (TASK 73-21-00-800-801-G00).

SUBTASK 71-00-00-860-308-G00

(2) Set the GND TEST switch on the P61-4 maintenance bite panel to the NORM position.

SUBTASK 71-00-00-860-309-G00

(3) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

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(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

TASK 71-00-00-700-806-G00

25. Test No. 30 - Engine Running Simulation Special Functions Test

A. General

(1) This task gives the instructions to do the engine running simulation special function.

(2) This special function enables the Engine Electronic Controller (EEC) to output signals simulating engine operation at or above engine idle speed.

(3) Once this special function is activated, the user may leave the special function to run other tests or functions. The function remains active until either terminated by the user or a function aborting condition occur.

(4) The EEC controls the outputs during this test including the "start switch release" analog output and the ARINC output bits that indicate the engine is running at or above idle speed.

(5) This test may be done with the Onboard Maintenance Function (OMF) displayed on the MFD.

(6) This task must not be performed with EEC data load and trim balance functions tasks.

NOTE: EEC data load tasks and trim balance functions tasks will inhibit the use of any EEC ground tests and special functions through the OMF.

B. References

Reference	Title
46-13-02-860-802	Special Functions (P/B 201)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Prepare for the Test

SUBTASK 71-00-00-860-606-G00

(1) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button on the MFD control panel, P9.

(b) Push the SEL button on SELECTOR knob on the MFD control panel, P9.

SUBTASK 71-00-00-860-605-G00

(2) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the TEST position (TASK 73-21-00-800-801-G00).

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER switch to the TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 71-00-00-860-607-G00

(3) Set the GND TEST switch on the P61-4 maintenance bite panel to the ENABLE position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-860-608-G00

(4) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-00-00-860-609-G00

(5) Set the applicable thrust lever to idle.

F. Test No. 30 - Engine Running Simulation Special Functions

SUBTASK 71-00-00-750-007-G00

(1) Use the Multi-Function Display (MFD) screen to do the OMF Special Function for the applicable engine running simulation (TASK 46-13-02-860-802).

(a) Make these selections on the MFD main function menu:

1) ONBOARD MAINTENANCE
2) OTHER FUNCTIONS
3) SPECIAL FUNCTIONS
4) 71-80 Engine 1 or 71-80 Engine 2
5) Engine Running Simulation
6) CONTINUE.

(b) Do the instructions that show on the MFD PRECONDITIONS and then make these selections:

NOTE: Make sure that you verify and follow the inhibited conditions instructions closely. If one of the inhibited conditions is not met, the test will be failed.

1) CONTINUE
2) START FUNCTION.

(c) Do the instructions that show on the MFD to ENABLE, DISABLE, or LEAVE AS IS the Engine Running Simulation Special Function.

(d) When the test is completed, make sure that COMPLETED shows adjacent to SPECIAL FUNCTION CONDITION on the MFD.

NOTE: The Engine Running Simulation Special Function runs in the selected mode until the user changes the selection status or exits the function via EEC MAINT POWER switch or GND TESTS switch.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-611-G00

(1) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the NORM position (TASK 73-21-00-800-801-G00).

SUBTASK 71-00-00-860-612-G00

(2) Set the GND TEST switch on the P61-4 maintenance bite panel to the NORM position.

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SUBTASK 71-00-00-860-613-G00

(3) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

TASK 71-00-00-700-807-G00

26. Test No. 31 - Wet Motor Ground Test

A. General

(1) This task gives the instructions to do the wet motor engine run.

(2) This procedure motors the engine with the starter and fuel to the combustion chamber but without ignition.

NOTE: Oil wetting or coking in the exhaust plug center vent tube extension (CVTE) is usual.

(3) Only use this procedure for maintenance operations that tell you to motor the engine with fuel to the combustion chamber.

(4) This task can be used with the wet motor leak check.

(5) This procedure can be done with the fan cowl panels and the thrust reversers open.

B. References

Reference	Title
46-13-02-710-801	Onboard Maintenance Function Ground Test (P/B 201)
71-00-00-910-806-G00	Stop the Engine (Usual Engine Stop) (P/B 201)
71-00-00-910-809-G00	Wet Motor Procedure (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
71-71-00-200-801-G00	Engine Vents and Drains Inspection (P/B 601)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Prepare for the Wet Motor Ground Test

SUBTASK 71-00-00-860-336-G00

(1) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button on the MFD control panel, P9.

(b) Push the SEL button on SELECTOR knob on the MFD control panel, P9.

SUBTASK 71-00-00-860-335-G00

(2) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the TEST position (TASK 73-21-00-800-801-G00).

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER switch to the TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

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SUBTASK 71-00-00-860-337-G00

(3) Set the GND TEST switch on the P61-4 maintenance bite panel to the ENABLE position.

SUBTASK 71-00-00-860-338-G00

(4) Set the applicable thrust lever to idle.

SUBTASK 71-00-00-860-586-G00

(5) Prepare to wet motor the engine and stop at the step in the procedure before the applicable START switch is set to GRD (TASK 71-00-00-910-809-G00).

(a) Make sure that the ignition system CBs are open and the fuel pump switches are ON.

SUBTASK 71-00-00-860-614-G00

(6) Make sure that the applicable 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

E. Test No. 31 - Wet Motor Ground Test

SUBTASK 71-00-00-730-002-G00

(1) Use the Multi-Function Display (MFD) screen to use the OMF Ground Test to do the applicable engine wet motor (TASK 46-13-02-710-801).

NOTE: This function takes approximately 5-10 minutes to complete.

(a) Make these selections on the MFD main function menu:

1) ONBOARD MAINTENANCE
2) LINE MAINTENANCE
3) GROUND TESTS
4) 71-80 Engine 1 or 71-80 Engine 2
5) SYSTEM TEST
6) Wet Motor Test
7) CONTINUE.

(b) Do the instructions that show on the MFD PRECONDITIONS and then make these selections:

NOTE: Make sure that you verify and follow the inhibited conditions instructions closely. If one of the inhibited conditions is not met, the test will be failed.

1) CONTINUE
2) START TEST.

(c) When you are instructed to wet-motor the engine, do these steps:

1) Do this task: Wet Motor Procedure, TASK 71-00-00-910-809-G00.

NOTE: To prevent fuel accumulation in the LPT or fuel spillage on the ground, stop the wet motor when fuel vapors are visible.

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CAUTION

MAKE SURE THAT YOU DO NOT SEE AN EGT RISE. THIS IS AN INDICATION OF AN ENGINE INTERNAL OR TAILPIPE FIRE. IF THIS OCCURS, MOVE THE START LEVER TO THE CUTOFF POSITION AND DRY MOTOR THE ENGINE TO EXTINGUISH THE FIRE. DAMAGE TO EQUIPMENT CAN OCCUR.

2) Once the engine has reached maximum motoring speed and the 'MOTORING' flag has cleared from the N2 gage, move the applicable START LEVER to the IDLE position and make sure these conditions occur:

a) The ENG VALVE CLOSED and SPAR VALVE CLOSED lights on the P5 overhead panel come on bright (valves in transition or when the valves do not agree with the commanded position) and then go off (valves are open).

b) You see positive oil pressure and positive fuel flow indications.

3) Follow the instructions that show on the MFD.

(d) Monitor the drain masts for leakage while the engine is motoring.

1) If you find leakage, examine the applicable components or system to find the source of the leak (TASK 71-71-00-200-801-G00).

(e) When you are instructed to stop the engine, do this task: Stop the Engine (Usual Engine Stop), TASK 71-00-00-910-806-G00.

(f) When you are instructed, set the applicable ENGINE START switch to AUTO.

(g) When the test is completed, make sure that PASS show adjacent to TEST CONDITION on the MFD.

(h) If FAILED shows, refer to the applicable Maintenance Message Reference in the FAULT GUIDANCE or select the maintenance message to see the recommended maintenance actions.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-340-G00

(1) For the applicable engine, put the applicable switches on the P5 overhead panel to the OFF position:

(a) FUEL PUMP 1 FWD

(b) FUEL PUMP 2 FWD

(c) FUEL PUMP 1 AFT

(d) FUEL PUMP 2 AFT.

SUBTASK 71-00-00-860-341-G00

(2) For the applicable engine, remove the safety tags and close these applicable 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

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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 71-00-00-860-342-G00

WARNING OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS WHEN YOU CLOSE THE THRUST REVERSERS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(3) If the thrust reversers were opened, do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00.

SUBTASK 71-00-00-860-343-G00

(4) If the fan cowl panels were opened, do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

SUBTASK 71-00-00-860-344-G00

(5) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the NORM position. Do this task: EEC Maintenance Power Selection, TASK 73-21-00-800-801-G00.

SUBTASK 71-00-00-860-345-G00

(6) Set the GND TEST switch on the P61-4 maintenance bite panel to the NORM position.

——— END OF TASK ———

TASK 71-00-00-700-808-G00

27. Test No. 32 - Engine Idle System Test

A. General

(1) This task gives the instructions on how to do the engine idle system test.

(2) This interactive test slews the cooling system actuators open and closed at engine idle to verify command and sensor feedback. Both EEC channels are tested by this special function.

(3) This test verifies the operation of the following actuators that require idle pressures to move: HPTACC, LPTACC, and MTC valves.

NOTE: Operation of the FMV, PMV, VSV, VBV, TBV, and SBV/BAI valves is tested by Test No. 15 - Actuator Operational Test, TASK 71-00-00-730-802-G00.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
46-13-02-710-801	Onboard Maintenance Function Ground Test (P/B 201)
70-43-42-300-802-G00	Blending Procedures - Hand Blending (P/B 201)
71-00-00-910-801-G00	Prepare the Engine for Operation (P/B 201)
71-00-00-910-803-G00	Start the Engine (Normal Start) (P/B 201)
71-00-00-910-806-G00	Stop the Engine (Usual Engine Stop) (P/B 201)
71-00-00-910-808-G00	Dry Motor Procedure (P/B 201)

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(Continued)

Reference	Title
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)
73-11-05-400-801-G00	Fuel Nozzle Installation (P/B 401)
73-11-05-400-802-G00	Fuel Nozzle Set Installation (P/B 401)
73-21-00-800-801-G00	EEC Maintenance Power 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-203	Container - Oil Resistant, 1 U.S.-Gal (3.8 l)

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
411	Engine 1 - Engine
421	Engine 2 - Engine

F. 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

G. Prepare for the Test

SUBTASK 71-00-00-410-028-G00

(1) If this test is done as part of a leak check or after a component replacement, do the following steps to get access to the components to do the leak check:

(a) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

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

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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.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

(d) Open the applicable left or right fan cowl panels:

(Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00)

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.

(e) If it is necessary, open the applicable left or right thrust reversers:

(Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00)

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

(f) Clean the areas that you examine with cotton wiper, G00034.

(g) Put the 1 U.S.-gal (3.81 l) oil resistant container, STD-203, for each line of the drain mast below the power plant.

SUBTASK 71-00-00-860-351-G00

(2) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button, on the P9 MFD control panel.

(b) Push the SEL button on SELECTOR knob, on the P9 MFD control panel.

SUBTASK 71-00-00-860-350-G00

(3) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the TEST position (TASK 73-21-00-800-801-G00).

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER switch to the TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 71-00-00-860-352-G00

(4) Set the GND TESTS switch on the P61-4 maintenance bite panel to the ENABLE position.

SUBTASK 71-00-00-860-354-G00

(5) Set the applicable thrust lever to idle.

SUBTASK 71-00-00-410-027-G00

(6) Before you run the engine, do the following steps:

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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.

(a) If you opened the thrust reversers, close the applicable left or right thrust reversers:

(Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00)

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) Close applicable left or right fan cowl panels:

(Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00)

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.

(d) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

SUBTASK 71-00-00-860-355-G00

(7) Make sure that the EEC Data Load and Trim Balance Functions are inactive.

SUBTASK 71-00-00-860-587-G00

(8) Prepare to do the normal engine start procedure and stop at the step in the procedure before the ENGINE START switch is moved to the GRD position, do these tasks:

NOTE: Before you start the engine, you must start the engine idle system test.

- Prepare the Engine for Operation, TASK 71-00-00-910-801-G00
- Start the Engine (Normal Start), TASK 71-00-00-910-803-G00.

H. Test No. 32 - Engine Idle System Test

SUBTASK 71-00-00-800-031-G00

(1) Use the MFD screen to use the OMF Ground Test to do the engine idle system test for the applicable engine, do this task: Onboard Maintenance Function Ground Test, TASK 46-13-02-710-801.

(a) Make these selections on the MFD main function menu as follow:

1) ONBOARD MAINTENANCE
2) LINE MAINTENANCE
3) GROUND TESTS
4) 71-80 Engine 1 or 71-80 Engine 2
5) SYSTEM TEST
6) Engine Idle Test
7) CONTINUE.

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(b) Do the instructions that shown on the MFD PRECONDITIONS screen.

1) Make sure that you verify and follow the inhibited conditions instructions closely.

NOTE: If one of the inhibited conditions is not met, the test will be failed.

(c) Make these selections on the MFD:

1) CONTINUE

2) START TEST.

(d) When you are instructed to start the engine, do this task: Start the Engine (Normal Start), TASK 71-00-00-910-803-G00.

(e) Make sure that N2 increases during the start and become stable at idle.

1) Make sure that you follow the MFD screen instructions closely.

NOTE: If one of the inhibited conditions is not met, the test will be failed.

2) If the test is failed, verify and correct the inhibited conditions on the PRECONDITIONS screen again.

NOTE: Test will be failed if there is an interference from other initiated testing during the same time.

a) Follow the instructions on the GROUND TEST screen and do the test run again.

(f) Monitor the drain masts for leakage while the engine is operated.

1) If you find leakage, examine the applicable components or system to find the source of the leak (TASK 71-00-00-790-804-G00).

(g) When the test is completed, make sure that PASS show adjacent to TEST CONDITION on the MFD.

(h) If FAILED shows, refer to the applicable Maintenance Message Reference in the FAULT GUIDANCE or select the maintenance message to see the recommended maintenance actions.

(i) Do this task: Stop the Engine (Usual Engine Stop), TASK 71-00-00-910-806-G00.

(j) Dry motor the engine for two minutes, do this task: Dry Motor Procedure, TASK 71-00-00-910-808-G00.

(k) If this test was performed following the replacement of a fuel or oil system component, gain access to the component and verify no leaks are present (TASK 71-00-00-790-804-G00).

SUBTASK 71-00-00-200-025-G00

(2) If this test is done as part of a leak check, do the following steps:

(a) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

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

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.

(c) Do this task: Thrust Reverser Deactivation For Ground Maintenance, TASK 78-31-00-040-801-G00.

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(d) Open the applicable left or right fan cowl panels:

(Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00)

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.

(e) If it is necessary, open the applicable left or right thrust reversers:

(Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00)

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

(f) Examine the applicable component or system for signs of fluid leakage as follows:

1) If you find leakage, repair or replace the damaged tubes, tube flanges, fittings, seals or components as necessary.

NOTE: The fuel nozzle seal is a secondary seal surface and does not prevent fuel leakage.

a) If there are nicks or cuts on the fuel nozzle, replace it.

2) If you have a fuel leak at the fuel manifold B-nut, do the following steps:

a) Examine the B-nut surfaces for high metal.

<1> If it is necessary, polish the surface to remove the high metal (TASK 70-43-42-300-802-G00).

b) Tighten the fuel manifold B-nut (TASK 73-11-05-400-801-G00 or TASK 73-11-05-400-802-G00).

3) Look at the cases and areas for oil and fuel stains.

4) Do the leak check again after you replace or repair the tubes, tube flanges, fittings, seals or components to make sure that the repair is correct.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-410-026-G00

(1) If this test was done after component replacement or as part of a leak check , do the following steps:

(a) Remove the 1 U.S.-gal (3.81 l) oil resistant container, STD-203, from each drain mast line and correctly dispose of accumulated fluid (if any).

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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.

(b) If you opened the thrust reversers, close the applicable left or right thrust reversers:

(Close the Thrust Reverser (Selection), TASK 78-31-00-010-802-G00)

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

(c) Close applicable left or right fan cowl panels:

(Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00)

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

(d) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

(e) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

SUBTASK 71-00-00-860-356-G00

(2) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the NORM position (TASK 73-21-00-800-801-G00).

SUBTASK 71-00-00-860-357-G00

(3) Set the GND TESTS switch, on the P61-4 maintenance bite panel, to the NORM position.

END OF TASK

TASK 71-00-00-700-809-G00

28. Test No. 33 - Lamp Check Out Special Functions Test

A. General

(1) This task gives the instructions to do the lamp check out special function to test the EEC lights.

(2) This special function will illuminate all of the EEC lights for channel A and then channel B. The lights will stay on until the user has made sure that the lamps have successfully illuminated.

(3) During this test, the ALTN light, the ENGINE CONTROL light, the REVERSER AIR/GND light, the REVERSER COMMAND LIGHT, the REVERSER LIMITED light, the FILTER BYPASS light, the OIL FILTER BYPASS ALERT light, the THRUST light and the ENG ANTI-ICE light, will all be illuminated.

B. References

Reference	Title
46-13-02-860-802	Special Functions (P/B 201)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Prepare for the Test

SUBTASK 71-00-00-860-364-G00

(1) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button on the MFD control panel, P9.

(b) Push the SEL button on SELECTOR knob on the MFD control panel, P9.

SUBTASK 71-00-00-860-363-G00

(2) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the TEST position (TASK 73-21-00-800-801-G00).

SUBTASK 71-00-00-860-365-G00

(3) Set the GND TEST switch on the P61-4 maintenance bite panel to the ENABLE position.

SUBTASK 71-00-00-860-366-G00

(4) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-00-00-860-367-G00

(5) Set the applicable thrust lever to idle.

F. Test No. 33 - Lamp Check Out Special Function

SUBTASK 71-00-00-860-368-G00

(1) Use the Multi-Function Display (MFD) screen to use the OMF Special Function to do the lamp check out (TASK 46-13-02-860-802).

(a) Make these selections on the MFD main function menu using the applicable selector knob and the center SEL button:

1) ONBOARD MAINTENANCE

2) OTHER FUNCTIONS

3) SPECIAL FUNCTIONS

4) 71-80 Engine 1 or 71-80 Engine 2

5) Lamp Check Out

6) CONTINUE.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) Do the instructions that show on the MFD PRECONDITIONS.

NOTE: Make sure that you verify and follow the inhibited conditions instructions closely. If one of the inhibited conditions is not met, the function will fail.

(c) Make these selections using the applicable selector knob and the center SEL button to continue the test:

1) CONTINUE

NOTE: The display will show a "SPECIAL FUNCTION CONDITION: READY" screen.

2) START FUNCTION.

NOTE: "Starting Special Function" will momentarily show on the display screen.

(d) Make sure that these lights are on for channel A:

- REVERSER COMMAND light on the Aft Overhead Panel, Engine Control Module
- REVERSER AIR/GRD light on the Aft Overhead Panel, Engine Control Module
- REVERSER LIMITED light on the Aft Overhead Panel, Engine Control Module
- ENGINE CONTROL light on the Aft Overhead Panel, Engine Control Module
- ALTN light (EEC control switch) on the Aft Overhead Panel, Engine Control Module
- ENG ANTI-ICE light on the Forward Overhead Panel, Anti-Ice Control Module
- FILTER BYPASS (FUEL) light on the Forward Overhead Panel, Fuel Control Module
- OIL FILTER BYPASS alert message box on the Center Display Panel
- THRUST alert message box on the Center Display Panel

(e) Make these selection using the applicable selector knob and the center SEL button to continue the test:

1) CONFIRM

2) CONTINUE

NOTE: The display will show a "SPECIAL FUNCTION CONDITION: OPERATING" screen.

(f) Make sure that these lights are on for channel B:

- REVERSER COMMAND light on the Aft Overhead Panel, Engine Control Module
- REVERSER AIR/GRD light on the Aft Overhead Panel, Engine Control Module
- REVERSER LIMITED light on the Aft Overhead Panel, Engine Control Module
- ENGINE CONTROL light on the Aft Overhead Panel, Engine Control Module
- ALTN light (EEC control switch) on the Aft Overhead Panel, Engine Control Module
- ENG ANTI-ICE light on the Forward Overhead Panel, Anti-Ice Control Module
- FILTER BYPASS (FUEL) light on the Forward Overhead Panel, Fuel Control Module
- OIL FILTER BYPASS alert message box on the Center Display Panel
- THRUST alert message box on the Center Display Panel

(g) Make these selection using the applicable selector knob and the center SEL button to complete the test:

1) CONFIRM

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2) CONTINUE

NOTE: The display will show a "SPECIAL FUNCTION CONDITION: COMPLETE" screen.

3) POST CONDITIONS

NOTE: Read and follow the instructions on the screen.

4) GO BACK

5) SYS MENU

(h) When the test is completed, make sure that PASS or COMPLETED show adjacent to TEST CONDITION on the MFD.

(i) If FAILED shows, refer to the applicable Maintenance Message Reference in the FAULT GUIDANCE or select the maintenance message to see the recommended maintenance actions.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-369-G00

(1) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the NORM position (TASK 73-21-00-800-801-G00).

SUBTASK 71-00-00-860-370-G00

(2) Set the GND TEST switch on the P61-4 maintenance bite panel to the NORM position.

SUBTASK 71-00-00-860-371-G00

(3) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

TASK 71-00-00-700-810-G00

29. Test No. 34 - Menu Mode Hardware Code Entry Special Functions Test

A. General

(1) This task gives the instructions to enter an engine hardware configuration code to the Engine Electronic Controller (EEC) units using the Onboard Maintenance Function (OMF).

(2) The menu mode hardware code provides the EECs with the applicable engine configuration to enable or disable monitoring of various systems installed on the engine.

(3) You can find the current menu mode hardware code by viewing the engine System Configuration page on the OMF (TASK 73-21-00-470-801-G00).

(4) The menu mode hardware code is input to EEC memory after installing an EEC on an engine or reprogramming the EEC software on an installed EEC. Any changes to the existing menu mode hardware code for a particular engine are defined in the applicable Service Bulletin.

(5) The OMF must receive an input with the EEC software version in order to display this special function as selectable option. The OMF receives the EEC software version inputs from the DFDAU. If the DFDAU is not powered, or if it has invalid credentials, then the OMF will not receive the EEC software version information and will not display the special function.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(6) If the EEC channel B accelerometer input disabled per Test No. 34, the EPCS page 3 parameters dependent on the number one bearing (NOB) accelerometer will show blank values and corresponding maintenance message 77-41002 (left engine) or 77-41004 (right engine) will be set.

B. References

Reference	Title
46-13-00-860-803	Client Credentials Check (P/B 201)
46-13-02-860-802	Special Functions (P/B 201)
73-21-00-470-801-G00	EEC System Configuration Data Functions Check (P/B 201)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Prepare for the Test

SUBTASK 71-00-00-860-373-G00

(1) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button on the MFD control panel, P9.

(b) Push the SEL button on SELECTOR knob on the MFD control panel, P9.

SUBTASK 71-00-00-860-372-G00

(2) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the TEST position (TASK 73-21-00-800-801-G00).

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER switch to the TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 71-00-00-860-374-G00

(3) Set the GND TESTS switch on the P61-4 maintenance bite panel to the ENABLE position.

SUBTASK 71-00-00-860-375-G00

(4) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-00-00-860-376-G00

(5) Set the applicable thrust lever to idle.

SUBTASK 71-00-00-860-780-G00

(6) Select the hardware code applicable to the engine configuration from this task: EEC System Configuration Data Functions Check, TASK 73-21-00-470-801-G00.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(7) If the EEC channel B accelerometer input disabled per Test No. 34, the EPCS page 3 parameters dependent on the number one bearing (NOB) accelerometer will show blank values and corresponding maintenance message 77-41002 (left engine) or 77-41004 (right engine) will be set.

SUBTASK 71-00-00-860-786-G00

(8) Make sure that there is power on the DFDAU as follows:

(a) Put the TEST-NORMAL switch on the FLIGHT RECORDER/MACH AIRSPEED WARNING TEST Panel, P5, to the TEST position.

(b) Make sure that the FLIGHT RECORDER OFF light on the P5 panel is OFF.

F. Test No. 34 - Menu Mode Hardware Code Entry Special Functions Test

SUBTASK 71-00-00-860-379-G00

(1) Use the Multi-Function Display (MFD) screen to use the OMF Special Function select the applicable engine menu mode hardware configuration code (TASK 46-13-02-860-802).

NOTE: The menu mode hardware code entry function takes approximately 2 minutes to complete.

(a) Make these selections on the MFD main function menu:

1) ONBOARD MAINTENANCE
2) OTHER FUNCTIONS
3) SPECIAL FUNCTIONS
4) 71 -80 Engine 1 or 71 -80 Engine 2
5) Menu Mode Hardware Code Entry
6) CONTINUE.

(b) If a special function is not displayed, do these steps:

1) Make sure that there is power on the DFDU.
2) Make sure that there are no open circuit breakers that can stop the signal to the OMF.
3) If it is necessary, generate new credentials for the EECs, DFDAU and NFS (TASK 46-13-00-860-803).

NOTE: If the DFDAU is powered on while looking for the EEC special functions, new credentials can be necessary.

(c) Do the instructions that show on the MFD PRECONDITIONS and then make these selections:

NOTE: Make sure that you verify and follow the inhibited conditions instructions closely. If one of the inhibited conditions is not met, the test will be failed.

1) CONTINUE
2) START FUNCTION.

a) Follow the instructions on the MFD screen.

NOTE: The first digit entered is the left most code character and the second digit is the right most code character.

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(d) If the test is failed, verify and correct the inhibited conditions on the PRECONDITIONS screen again.

NOTE: If the code was unable to be stored due to an EEC Non Volatile Memory (NVM) failure, verify no EEC NVM or power faults are present. If faults are present, correct EEC NVM or power faults prior to re-attempting the special function.

NOTE: Test will be failed if there is an interference from other initiated testing during the same time.

NOTE: Make sure that you follow the MFD screen instructions closely. If one of the inhibited conditions is not met, the test will be failed.

1) If the screen shows that test is failed and the data was unsuccessfully stored to the Non-volatile Memory, do these steps:

a) Stop and exit the test and power cycling EEC's.

b) Power the EEC's on.

c) Check for EEC NVM faults.

d) If faults are present, correct EEC NVM or power faults prior to attempting the special function again.

2) Follow the instructions on the MFD TEST screen and do the test run again.

(e) When the test is completed, make sure that PASS or COMPLETED show adjacent to TEST CONDITION on the MFD.

(f) If FAILED shows, refer to the applicable Maintenance Message Reference in the FAULT GUIDANCE or select the maintenance message to see the recommended maintenance actions.

(2) Confirm the correct code was entered by checking the menu mode hardware code on the EEC system configuration page (TASK 73-21-00-470-801-G00).

G. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-380-G00

(1) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the NORM position (TASK 73-21-00-800-801-G00).

SUBTASK 71-00-00-860-381-G00

(2) Set the GND TESTS switch on the P61-4 maintenance bite panel to the NORM position.

SUBTASK 71-00-00-860-382-G00

(3) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-00-00-700-811-G00

30. Test No. 35 - Erase All Channel A Faults Special Functions Test

A. General

(1) This task gives the instructions to erase all previous fault data stored on the channel A EEC.

(2) This special function is performed when an Engine Electronic Controller (EEC) is installed on a different engine as the stored fault data (if any) is not relevant to the new engine. Erasing the data removes the possibility of confusing fault data between engines and EECs.

(3) This task must not be performed with EEC data load and trim balance functions tasks.

NOTE: EEC data load tasks and trim balance functions tasks will inhibit the use of any EEC ground tests and special functions through the Onboard Maintenance Function (OMF).

B. References

Reference	Title
46-13-02-860-802	Special Functions (P/B 201)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Prepare for the Test

SUBTASK 71-00-00-860-383-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-00-00-860-385-G00

(2) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button on the MFD control panel, P9.

(b) Push the SEL button on SELECTOR knob on the MFD control panel, P9.

SUBTASK 71-00-00-860-384-G00

(3) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the TEST position (TASK 73-21-00-800-801-G00).

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER switch to the TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 71-00-00-860-386-G00

(4) Set the GND TEST switch on the P61-4 maintenance bite panel to the ENABLE position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-00-860-387-G00

(5) Set the applicable thrust lever to idle.

F. Test No. 35 – Erase All Channel A Faults Special Functions

SUBTASK 71-00-00-750-001-G00

(1) Use the MFD screen to use the OMF Special Function to erase the fault data on channel A EEC for the applicable engine (TASK 46-13-02-860-802).

NOTE: The erase all faults function takes approximately 5 minutes to complete.

(a) Make these selections on the MFD main function menu:

1) ONBOARD MAINTENANCE
2) OTHER FUNCTIONS
3) SPECIAL FUNCTIONS
4) 71-80 Engine 1 or 71-80 Engine 2
5) Erase All Channel A Faults
6) CONTINUE.

(b) Do the instructions that show on the MFD PRECONDITIONS and then make these selections:

NOTE: Make sure that you verify and follow the inhibited conditions instructions closely. If one of the inhibited conditions is not met, the test will be failed.

1) CONTINUE
2) START FUNCTION.

(c) If the test is failed, verify and correct the inhibited conditions on the PRECONDITIONS screen again.

NOTE: If the fault data was unable to be erased due to an EEC Non Volatile Memory (NVM) failure, verify no EEC NVM or power faults are present. If faults are present, correct EEC NVM or power faults prior to re-attempting the special function test.

NOTE: Test will be failed if there is an interference from other initiated testing during the same time.

NOTE: Make sure that you follow the MFD screen instructions closely. If one of the inhibited conditions is not met, the test will be failed.

1) If the screen shows that test is failed and the data was unsuccessfully stored to the Non-volatile Memory, do these steps:

a) Stop and exit the test and power cycling EEC's.
b) Power the EEC's on.
c) Check for EEC NVM faults.
d) If faults are present, correct EEC NVM or power faults prior to attempting the special function again.

2) Follow the instructions on the MFD TEST screen and do the test run again.

(d) When the test is completed, make sure that PASS or COMPLETED show adjacent to TEST CONDITION on the MFD.

(e) If FAILED shows, refer to the applicable Maintenance Message Reference in the FAULT GUIDANCE or select the maintenance message to see the recommended maintenance actions.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-389-G00

(1) Set the applicable EEC MAINT POWER switch on the MISC SYSTEM CTRLS page on the MFD to the NORM position (TASK 73-21-00-800-801-G00).

SUBTASK 71-00-00-860-390-G00

(2) Set the GND TEST switch on the P61-4 maintenance bite panel, to the NORM position.

SUBTASK 71-00-00-860-391-G00

(3) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

TASK 71-00-00-700-812-G00

31. Test No. 36 - Erase All Channel B Faults Special Functions Test

A. General

(1) This task gives the instructions on how to erase all previous fault data stored on the channel B EEC.

(2) This special function is performed when an EEC is installed on a different engine. Erasing the data removes the possibility of confusing fault data between engines and the EECs.

B. References

Reference	Title
46-13-02-860-802	Special Functions (P/B 201)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Prepare for the Test

SUBTASK 71-00-00-860-392-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

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SUBTASK 71-00-00-860-394-G00

(2) Select MAINT CTRL PGS on the Multi-Function Display (MFD).

SUBTASK 71-00-00-860-652-G00

(3) Select the MISC SYSTEM CTRLS (MSC) page from the MAINT CTRL PGS.

SUBTASK 71-00-00-860-393-G00

(4) Set the applicable EEC MAINT POWER on the MISC SYSTEM CTRLS (MSC) page to TEST (TASK 73-21-00-800-801-G00).

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER to TEST. Wait a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 71-00-00-860-395-G00

(5) Set the GND TESTS switch on the auxiliary panel, P61, to the ENABLE position.

SUBTASK 71-00-00-860-396-G00

(6) Set the applicable thrust lever to idle.

SUBTASK 71-00-00-860-397-G00

(7) Make sure that the EEC Data Load and Trim Balance Functions are inactive.

F. Test No. 36 – Erase All Channel B Faults Special Functions

SUBTASK 71-00-00-750-002-G00

(1) Use the Multi-Function Display (MFD) screen to use the OMF Special Function to erase the fault data on channel B EEC for the applicable engine (TASK 46-13-02-860-802).

NOTE: The erase all faults function takes approximately 5 minutes to complete.

(a) Make these selections on the MFD main function menu:

1) ONBOARD MAINTENANCE
2) OTHER FUNCTIONS
3) SPECIAL FUNCTIONS
4) 71 -80 Engine 1 or 71 -80 Engine 2
5) Erase All Channel B Faults
6) CONTINUE.

(b) Do the instructions that show on the MFD PRECONDITIONS and then make these selections:

NOTE: Make sure that you verify and follow the inhibited conditions instructions closely. If one of the inhibited conditions is not met, the test will fail.

1) CONTINUE
2) START FUNCTION.

(c) If the test fails, verify and correct the inhibited conditions on the PRECONDITIONS screen again.

NOTE: If the fault data was unable to be erased due to an EEC Non-Volatile Memory (NVM) failure, verify no EEC NVM or power faults are present. If faults are present, correct EEC NVM or power faults prior to attempting again the special function.

NOTE: Test will fail if there is interference from other initiated testing during the same time.

NOTE: Make sure that you follow the MFD screen instructions closely. If one of the inhibited conditions is not met, the test will fail.

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1) If the screen shows that test is failed and the data was unsuccessfully stored to the Non-volatile Memory, do these steps:
   a) Stop and exit the test and power cycling EEC's.
   b) Power the EEC's on.
   c) Check for EEC NVM faults.
   d) If faults are present, correct EEC NVM or power faults prior to attempting the special function again.
2) Follow the instructions on the MFD TEST screen and do the test run again.

(d) When the test is completed, make sure that PASS or COMPLETED shows adjacent to TEST CONDITION on the MFD.

(e) If FAILED shows, refer to the applicable Maintenance Message Reference in the FAULT GUIDANCE or select the maintenance message to see the recommended maintenance actions.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-398-G00

(1) Set the applicable EEC MAINT POWER on the MISC SYSTEM CTRLS page to NORM (TASK 73-21-00-800-801-G00).

SUBTASK 71-00-00-860-399-G00

(2) Set the GND TESTS switch on the auxiliary panel, P61, to the NORM position.

SUBTASK 71-00-00-860-400-G00

(3) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:
   (a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.
   (b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

TASK 71-00-00-700-813-G00

32. Test No. 37 - Engine Serial Number Entry Special Functions Test

(Figure 507)

A. General

(1) This task gives the instructions to manually change the Engine Serial Number (ESN) stored in the EEC.

(2) This task is necessary when you replace an EEC on the engine. The first digit entered is the left most character and the sixth digit is the right most character of the ESN.

(3) The ESN entry function stores the ESN on both EEC channels simultaneously.

(4) ESN characters 1 through 9 are on one ESN entry screen; characters 0 and A through F are on the second ESN entry screen (Figure 507).

(5) This task must not be performed with Engine Electronic Controller (EEC) data load and trim balance functions tasks.

NOTE: EEC data load tasks and trim balance functions tasks will inhibit the use of any EEC ground tests and special functions through the Onboard Maintenance Function (OMF).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

B. References

Reference	Title
46-13-02-860-802	Special Functions (P/B 201)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Prepare for the Special Function

SUBTASK 71-00-00-860-401-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-00-00-860-403-G00

(2) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button on the MFD control panel, P9.

(b) Push the SEL button on SELECTOR knob on the MFD control panel, P9.

SUBTASK 71-00-00-860-402-G00

(3) Set the applicable EEC MAINT POWER on the MISC SYSTEM CTRLS (MSC) page to TEST (TASK 73-21-00-800-801-G00).

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER switch to the TEST position. Wait for a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 71-00-00-860-404-G00

(4) Set the GND TESTS switch on the auxiliary panel, P61, to the ENABLE position.

SUBTASK 71-00-00-860-405-G00

(5) Set the applicable thrust lever to idle.

F. Test No. 37 - Engine Serial Number Entry Special Function

SUBTASK 71-00-00-750-003-G00

(1) Use the Multi-Function Display (MFD) screen to use the OMF Special Functions to enter the applicable engine serial number (TASK 46-13-02-860-802).

NOTE: The engine serial number entry function takes approximately 5 minutes to complete.

(a) Make these selections on the MFD main function menu:

1) ONBOARD MAINTENANCE

2) OTHER FUNCTIONS

ECCN 9E991 BOEING PROPRIETARY - See title page for details

3) SPECIAL FUNCTIONS

4) 71 -80 Engine 1 or 71 -80 Engine 2

5) Engine Serial Number Entry

6) CONTINUE.

(b) Do the instructions that show on the MFD PRECONDITIONS and then make these selections:

NOTE: Make sure that you verify and follow the inhibited conditions instructions closely. If one of the inhibited conditions is not met, the special function will fail.

1) CONTINUE

2) START FUNCTION.

(c) Follow the instructions on the MFD screen.

NOTE: The first digit entered is the left most ESN character and the sixth digit is the right most ESN character.

(d) If the test is failed, verify and correct the inhibited conditions on the PRECONDITIONS screen again.

NOTE: If the ESN entry was unable to be stored due to an EEC Non-Volatile Memory (NVM) failure, verify no EEC NVM or power faults are present. If faults are present, correct EEC NVM or power faults prior to attempting again the special function test.

NOTE: Test will fail if there is interference from other initiated testing during the same time.

NOTE: Make sure that you follow the MFD screen instructions closely. If one of the inhibited conditions is not met, the test will fail.

1) Follow the instructions on the MFD TEST screen and do the function again.

(e) When the test is completed, make sure that PASS or COMPLETED show adjacent to TEST CONDITION on the MFD.

(f) If FAILED shows, refer to the applicable maintenance message reference in the FAULT GUIDANCE or select the maintenance message to see the recommended maintenance actions.

NOTE: The next engine start after one of the tasks that follow can have a longer pre-start motoring time than typical of cold engines. This is because the engine off time has been erased from EEC NVM.

- Install new EEC software
- Enter new Engine Serial Number (ESN)
- Install the engine on a new aircraft tail number
- Install the engine on the opposite engine position on the same aircraft tail number
- Install a data entry plug with new thrust rating, N1 trim, or engine configuration.

1) If the screen shows that test is failed and the data was unsuccessfully stored to the Non-volatile Memory, do these steps:

a) Stop and exit the test and power cycling EEC's.

b) Power the EEC's on.

c) Check for EEC NVM faults.

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d) If faults are present, correct EEC NVM or power faults prior to attempting the special function again.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-407-G00

(1) Set the applicable EEC MAINT POWER on the MISC SYSTEM CTRLS page to NORM (TASK 73-21-00-800-801-G00)

SUBTASK 71-00-00-860-408-G00

(2) Set the GND TESTS switch on the auxiliary panel, P61, to the NORM position.

SUBTASK 71-00-00-860-409-G00

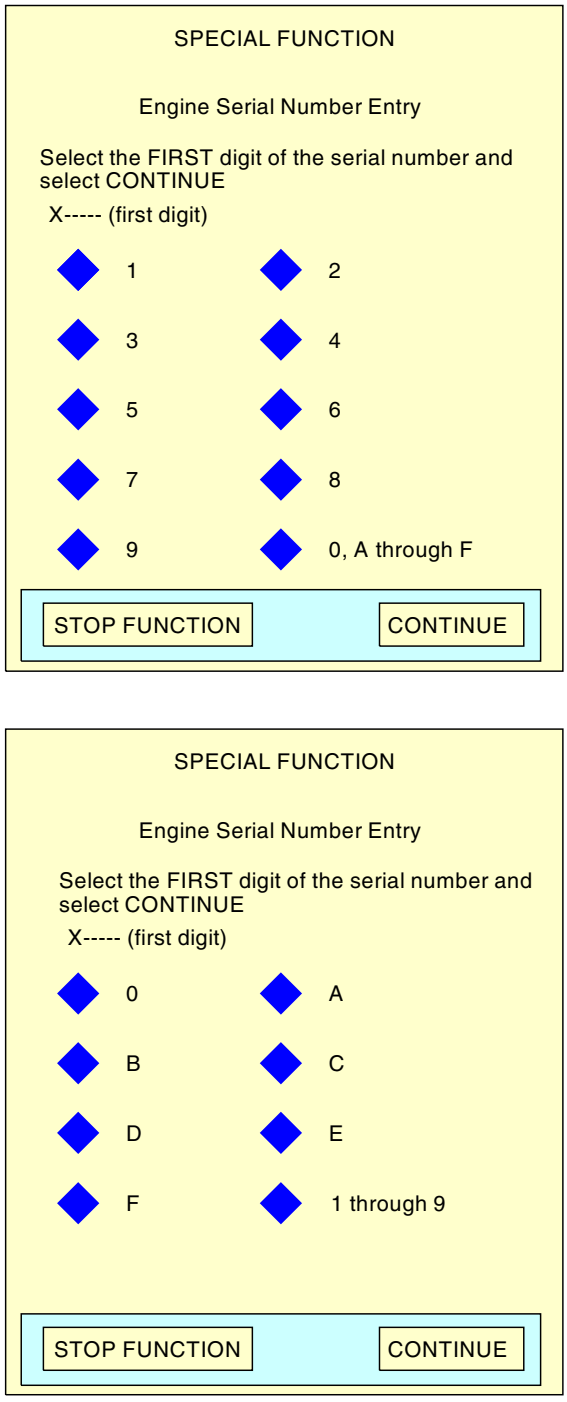
(3) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

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Engine Serial Number Entry Special Function
Figure 507/71-00-00-990-884-G00

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TASK 71-00-00-700-816-G00

33. Test No. 38 - Thrust Reverser Cycle Special Functions

A. General

(1) This task gives the instructions to extend and retract the thrust reverser for ground maintlenance.

(2) This task must not be performed with Engine Electronic Controller (EEC) data load and trim balance functions tasks.

NOTE: EEC data load tasks and trim balance functions tasks will inhibit the use of any EEC ground tests and special functions through the Onboard Maintenance Function (OMF).

(3) This special function is a safety feature to prevent thrust reverser movement when the engine is off.

(4) The thrust reverser can extend in 2.5 seconds when reverse thrust levers are pulled up and aft to the deploy position.

(5) You must use a portable maintenance device (PMD) or universal maintenance device (UMD) in order to access maintenance messages that can be set during this special function. Thrust reverser faults can be inhibited or show “NOT ACTIVE” when the Thrust Reverser Cycle SPECIAL FUNCTION is stopped. Make sure that you verify and follow the operational test instructions closely.

(6) This task is referenced by other thrust reverser system tests in AMM Chapter 78. Refer to those tasks for specific procedures on operating the thrust reverser system and monitoring system condition.

B. References

Reference	Title
29-11-00-860-805	Hydraulic System A or B Power Removal (P/B 201)
46-13-02-860-802	Special Functions (P/B 201)
71-00-00-970-801-G00	Maintenance Data Pages from the Engine Propulsion Control System (EPCS) (P/B 201)
73-21-00-800-801-G00	EEC Maintenance Power Selection (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Prepare for the Special Function

SUBTASK 71-00-00-860-415-G00

(1) Select the left or right Multi-Function Display (MFD).

(a) Push the SYS button on the MFD control panel, P9.

(b) Push the SEL button on SELECTOR knob on the MFD control panel, P9.

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SUBTASK 71-00-00-860-414-G00

(2) Set the applicable EEC MAINT POWER function on the MISC SYSTEM CTRLS page on the MFD to TEST (TASK 73-21-00-800-801-G00).

NOTE: The EEC will do a self-test when you set the EEC MAINT POWER to TEST. Wait for a minimum of 30 seconds to let the EEC complete the test.

SUBTASK 71-00-00-860-416-G00

(3) Set the GND TESTS switch on the auxiliary panel, P61, to the ENABLE position.

SUBTASK 71-00-00-860-417-G00

(4) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-00-00-860-418-G00

(5) Make sure that the forward thrust levers are in the idle position and the reverse thrust levers are down at the thrust reverser stowed position.

SUBTASK 71-00-00-860-615-G00

WARNING

KEEP PERSONS AND EQUIPMENT AWAY FROM THE FLIGHT CONTROL SURFACES. THE AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, STABILIZER, AND NOSE GEAR CAN MOVE SUDDENLY WHEN YOU SUPPLY HYDRAULIC POWER. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

CAUTION

DO NOT OPERATE THE EMDP FOR MORE THAN 2 MINUTES UNLESS THE APPLICABLE FUEL TANK HAS A MINIMUM OF 1675 LBS (760 KG) OF FUEL IN IT. IF YOU OPERATE THE EMDP FOR 2 MINUTES WITHOUT FUEL IN THE TANK, LET THE RESERVOIR GO BACK TO AMBIENT TEMPERATURE BEFORE YOU CONTINUE WITH THE TEST. IF YOU CONTINUE TO OPERATE THE EMDP, THE HYDRAULIC FLUID CAN BECOME TOO HOT.

CAUTION

DO NOT START THE PUMP MORE THAN FIVE TIMES IN A FIVE MINUTE PERIOD. THE PUMP CAN BECOME TOO HOT. THIS CAN CAUSE DAMAGE TO THE PUMP.

(6) Pressurize the applicable hydraulic system A or B as follows:

(a) If you will do the TR cycle special function test on the number 1 engine, put the ELEC 2 switch for system A to ON.

(b) If you will do the TR cycle special function test on the number 2 engine, put the ELEC 1 switch for system B to ON.

SUBTASK 71-00-00-860-646-G00

(7) Get the EPCS maintenance data pages to see the T/R SLEEVE L and T/R SLEEVE R position (TASK 71-00-00-970-801-G00).

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F. Test No. 38 - Thrust Reverser Cycle Special Functions

SUBTASK 71-00-00-860-421-G00

(1) Use the Multi-Function Display (MFD) screen to use the OMF Special Function to cycle applicable thrust reverser (TASK 46-13-02-860-802).

(a) Make these selections on the MFD main function menu:

1) ONBOARD MAINTENANCE
2) OTHER FUNCTIONS
3) SPECIAL FUNCTIONS
4) 71-80 Engine 1 or 71-80 Engine 2
5) Thrust Reverser Cycle
6) CONTINUE.

(b) Do the instructions that show on the MFD PRECONDITIONS and then make these selections:

NOTE: Make sure that you verify and follow the inhibited conditions instructions closely. If one of the inhibited conditions is not met, the special function will fail.

1) CONTINUE
2) START TEST.

(c) Make sure that the reverse thrust lever matches the thrust reverser sleeve position from the EPCS screen page.

NOTE: If the thrust reverser sleeve is stowed the reverse thrust lever must be forward and down. If the thrust reverser sleeve is deployed then the reverse thrust lever must be up and aft.

(d) After you deploy and stow the thrust reversers, select the STOP FUNCTION to complete the special function.

NOTE: There is no PASS or FAILED for this function.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-616-G00

(1) Do this task: Hydraulic System A or B Power Removal, TASK 29-11-00-860-805.

SUBTASK 71-00-00-860-422-G00

(2) Set the applicable EEC MAINT POWER function on the MISC SYSTEM CTRLS page on the MFD to NORM (TASK 73-21-00-800-801-G00).

SUBTASK 71-00-00-860-423-G00

(3) Set the GND TESTS switch on the auxiliary panel, P61, to the NORM position.

SUBTASK 71-00-00-860-424-G00

(4) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

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POWER PLANT - INSPECTION/CHECK

1. General

A. This procedure has these tasks:

(1) Engine Exposure to Fire and Extinguishing Agents Inspection

(2) Engine Foreign Object Damage and Birdstrike Inspection

(3) Engine Ice Crystal Operation Foreign Object Damage Inspection

(4) Engine Stall Inspection

(5) Heavy Sand/Dust Ingestion and Volcanic Ash Ingestion Inspection

(6) In-Flight Windmilling Inspection

(7) No or Low Oil Pressure Inspection

(8) Overspeed Inspection

(9) Overtemperature Inspection

(10) Engine High Vibration Inspection.

(11) Engine After a Hard Landing Inspection

TASK 71-00-00-200-801-G00

2. Engine Exposure to Fire and Extinguishing Agents Inspection

A. General

(1) This task provides the instructions for these inspections:

(a) Inspection after an engine fire.

(b) Inspection that follows the use of fire extinguishing agents on the engine.

(c) Inspection after the nacelle temperature was above the limits.

B. References

Reference	Title
12-13-11-600-803	Engine Oil Change Servicing (P/B 301)
29-11-11-000-801	Hydraulic Systems A and B Engine-Driven Pump (EDP) Removal (P/B 401)
29-11-11-400-801	Hydraulic Systems A and B Engine-Driven Pump (EDP) Installation (P/B 401)
29-11-51-000-801	EDP Case Drain Filter Element Removal (P/B 401)
29-11-51-400-801	EDP Case Drain Filter Element Installation (P/B 401)
71-00-00-790-801-G00	Test No. 1 - Pneumatic Leak Test (P/B 501)
71-00-00-910-802-G00	Start the Engine (Selection) (P/B 201)
71-00-00-910-808-G00	Dry Motor Procedure (P/B 201)
71-00-02-000-801-G00	Power Plant - Removal (P/B 401)
71-00-02-400-801-G00	Power Plant - Installation (P/B 401)
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)
72-00-00-100-802-G00	Engine Gas-Path Cleaning With Pure Water (P/B 701)
72-00-00-290-805-G00	Combustion Section and High Pressure Turbine Section Stage One Nozzle Leading Edge Detailed Inspection (P/B 601)
72-00-00-290-806-G00	High Pressure Turbine Section Detailed Inspection (P/B 601)

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(Continued)

Reference	Title
72-00-00-290-811-G00	Low Pressure Turbine (LPT) Section Borescope Inspection (P/B 601)
73-11-05-200-801-G00	Fuel Nozzle and Fuel Manifold Leak Check (P/B 601)
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)
79-00-00-211-801-G00	Engine Oil System (Fluids (Fuel or Skydrol) and Solids Contamination) Detailed Inspection (P/B 601)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE
STD-1068	Vacuum - High Capacity
STD-1280	Source - Air, Regulated, Dry Filtered, 0-30 PSIG

D. Consumable Materials

Reference	Description	Specification
B01023	Cleaner - Primary - Ardrox 6025	

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. 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

G. Prepare for the Inspection

SUBTASK 71-00-00-860-588-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

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SUBTASK 71-00-00-010-009-G00

(2) 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
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

H. Engine Exposure to Fire Inspection

SUBTASK 71-00-00-210-054-G00

CAUTION MAKE SURE YOU EXAMINE THE ENGINE-DRIVEN HYDRAULIC PUMP WHEN YOU THINK THE ENGINE HAS DRY-MOTORED FOR MORE THAN 5 MINUTES AFTER THE APPLICABLE FIRE HANDLE HAS BEEN PULLED. IF YOU DO NOT, DAMAGE TO THE PUMP CAN OCCUR.

(1) If the engine motors for more than 5 minutes after the fire switches have been closed, do these steps to make an inspection of the engine driven hydraulic pump (EDP) for damage:

(a) Do this task: EDP Case Drain Filter Element Removal, TASK 29-11-51-000-801.

(b) Look for metallic particles in the filter element.

(c) If you find metallic particles, replace the engine-driven pump (Hydraulic Systems A and B Engine-Driven Pump (EDP) Removal, TASK 29-11-11-000-801 and Hydraulic Systems A and B Engine-Driven Pump (EDP) Installation, TASK 29-11-11-400-801).

(d) If you do not find metallic particles, do this task: EDP Case Drain Filter Element Installation, TASK 29-11-51-400-801.

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SUBTASK 71-00-00-210-055-G00

(2) Examine the engine for the cause of the engine fire or an engine that become too hot.

(a) If you find that there was a fire in turbine exhaust area, do the inspection that follows:

NOTE: If a wet motoring operation had been performed just prior to the fire incident, the fire may have resulted from residual fuel in the LPT module. Engine dry motoring is required before you can do a new engine start sequence.

1) Do a borescope inspection of the engine modules that follows:

a) Combustion Section and High Pressure Turbine Section Stage One Nozzle Leading Edge Detailed Inspection, TASK 72-00-00-290-805-G00

b) High Pressure Turbine Section Detailed Inspection, TASK 72-00-00-290-806-G00

c) Low Pressure Turbine (LPT) Section Borescope Inspection, TASK 72-00-00-290-811-G00

2) Fuel Nozzle and Fuel Manifold Leak Check, TASK 73-11-05-200-801-G00.

3) Do a check for the presence of fuel in the oil:

a) Do this task: Engine Oil System (Fluids (Fuel or Skydrol) and Solids Contamination) Detailed Inspection, TASK 79-00-00-211-801-G00

(b) If you find external damage to the engine, replace the engine (Power Plant - Removal, TASK 71-00-02-000-801-G00 and Power Plant - Installation, TASK 71-00-02-400-801-G00).

(c) If you do not find external damage to the engine, refer to the Fault Isolation Manual for the fire detection system to find the cause of the high temperature indication

1) If the fire detection system operates correctly, do this task: Test No. 1 - Pneumatic Leak Test, TASK 71-00-00-790-801-G00.

SUBTASK 71-00-00-210-056-G00

(3) Use the applicable procedure given below after a fire extinguishing agent was used on the external areas of the engine (engine cowls open or closed):

(a) If carbon dioxide (CO_2) gas was used:

1) On areas of the engine that were cold when the extinguishing agent was applied, no maintenance action is necessary.

2) On areas of the engine that were at elevated operating temperatures (hot) when the extinguishing agent was applied, you must replace the engine components

NOTE: Use the CFM Engine Shop Manual to examine the removed components for damage.

(b) If foam was used:



CAUTION

DO NOT ALLOW FOAM TO ENTER ANY ENGINE CAVITIES. FOAM RESIDUE MAY CAUSE CORROSION DAMAGE.

1) Clean the areas of the engine where the foam was used with clean water.

2) Use a brush to remove all the foam.

(c) If dry chemical powders were used:

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CAUTION

DO NOT USE WATER TO REMOVE THE DRY CHEMICAL POWDER FROM THE ENGINE. THE DRY AGENTS IN THE CHEMICAL POWDER AND WATER WILL MAKE A COMPOUND THAT CAN CAUSE CORROSION. DO NOT LET THE DRY CHEMICAL POWDER GO IN THE HOLES ON THE ENGINE. DRY CHEMICAL POWDER THAT STAYS IN THE ENGINE CAN CAUSE CORROSION OF THE ENGINE INTERNAL COMPONENTS.

1) If it is necessary, use a high capacity vacuum, STD-1068 and 0-30 psig dry filtered regulated air source, STD-1280 to remove all the powder from the engine.

2) If the powder turned to a glaze due to the high temperatures, clean the areas with Ardrox 6025 cleaner, B01023.

(d) If halogen or equivalent materials were used in flight:

1) In-flight use of the fire extinguishing system in the nacelle is permitted without special cleaning.

(e) If halogen or equivalent materials were used on the ground:

WARNING

DO NOT BREATHE THE FUMES FROM THE FIRE EXTINGUISHING AGENT IN THE APU COMPARTMENT AFTER THE SYSTEM RELEASES ITS CONTENTS. DO NOT LET THE FIRE EXTINGUISHING AGENT TOUCH YOUR SKIN. MAKE SURE THAT THERE IS GOOD AIRFLOW IN THE AREA. FIRE EXTINGUISHING AGENT CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

CAUTION

DO NOT LET TITANIUM COMPONENTS TOUCH MATERIALS THAT CONTAIN HALOGEN OR EQUIVALENT CHEMICALS. DAMAGE TO THE TITANIUM PARTS CAN OCCUR.

1) If the agent was used with the engine cowls closed, you must do this task immediately to open the thrust reversers and the fan cowl panels to remove all halogen or equivalent gases:

a) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

2) If the engine was operated at or above the maximum continuous power at the time the agent was used, do these steps:

a) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

b) Clean the external areas of the engine with clean water from the combustion case to the aft end.

SUBTASK 71-00-00-210-057-G00

(4) Do these steps to examine the engine for damage and to find the cause of the internal engine fire:

(a) If you see fire damage in the engine inlet, replace the engine.

These are the tasks:

Power Plant - Removal, TASK 71-00-02-000-801-G00,

Power Plant - Installation, TASK 71-00-02-400-801-G00.

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(b) If the fire was contained in the exhaust area, use the EGT overtemperature limits to determine the inspection requirements.

1) Do this task: Overtemperature Inspection, TASK 71-00-00-200-810-G00

a) Use the Fault Isolation Manual to find the cause of the internal engine fire.

SUBTASK 71-00-00-210-058-G00

(5) Do one of the procedures given below after the fire extinguishing agents have been used on the internal area of the engine:

(a) If carbon dioxide (CO2) gas was used:

1) Replace the engine.

These are the tasks:

Power Plant - Removal, TASK 71-00-02-000-801-G00,

Power Plant - Installation, TASK 71-00-02-400-801-G00.

NOTE: Use the CFM Engine Shop Manual to do an inspection of the areas where the carbon dioxide gas was used on the removed engine.

(b) If foam was used:

1) Clean the engine gas path with warm water. To clean it, do this task: Engine Gas-Path Cleaning With Pure Water, TASK 72-00-00-100-802-G00.

2) Dry motor the engine until all the unwanted material is removed and the engine is dry. To dry motor the engine, do this task: Dry Motor Procedure, TASK 71-00-00-910-808-G00.

3) Replace the engine.

These are the tasks:

Power Plant - Removal, TASK 71-00-02-000-801-G00,

Power Plant - Installation, TASK 71-00-02-400-801-G00.

NOTE: Use the CFM Engine Shop Manual to do an inspection of the removed engine.

(c) If dry powders were used:

1) Where it is possible, remove the loose powder with a high capacity vacuum, STD-1068 and 0-30 psig dry filtered regulated air source, STD-1280.

2) If the powder turned to a glaze due to the high temperatures, clean the areas with Ardrox 6025 cleaner, B01023.

3) Dry motor the engine until all the unwanted material is removed and the engine is dry. To dry motor the engine, do this task: Dry Motor Procedure, TASK 71-00-00-910-808-G00.

4) Replace the engine.

These are the tasks:

Power Plant - Removal, TASK 71-00-02-000-801-G00,

Power Plant - Installation, TASK 71-00-02-400-801-G00.

NOTE: Use the CFM Engine Shop Manual to do an inspection of the removed engine.

(d) If halogen or equivalent materials were used:

1) If you can operate the engine within 3 hours, do these steps:

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a) Dry motor the engine for 5 minutes. To dry motor the engine, do this task: Dry Motor Procedure, TASK 71-00-00-910-808-G00.

b) Stop the engine for 5-10 minutes.

c) Dry motor the engine again for 5 minutes. To dry motor the engine, do this task: Dry Motor Procedure, TASK 71-00-00-910-808-G00.

d) Clean the engine. To clean it, do this task: Engine Gas-Path Cleaning With Pure Water, TASK 72-00-00-100-802-G00.

e) Do this task: Engine Oil Change Servicing, TASK 12-13-11-600-803

f) Before the subsequent three hours, operate the engine at idle-power for a minimum of 10 minutes. To start the engine, do this task: Start the Engine (Selection), TASK 71-00-00-910-802-G00

2) If you can not operate the engine before the subsequent 3 hours, replace the engine.

These are the tasks:

Power Plant - Removal, TASK 71-00-02-000-801-G00,

Power Plant - Installation, TASK 71-00-02-400-801-G00.

NOTE: Use the CFM Engine Shop Manual to clean and do an inspection of the removed engine.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-410-012-G00

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.

(1) 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.

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SUBTASK 71-00-00-860-589-G00

(2) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

TASK 71-00-00-200-802-G00

3. Engine Foreign Object Damage and Birdstrike Inspection

A. General

(1) This task gives the instructions to do an inspection of the engine for damage after a birdstrike or Foreign Object Damage (FOD).

(2) You must do, at minimum, a visual inspection when foreign objects go into the engine.

(3) A borescope inspection can be necessary for these conditions:

(a) The engine has unusual parameters.

(b) The engine has normal parameters, but unwanted material is found in the booster inlet or surrounding parts are more than the serviceable limits.

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(4) The engine do not have the rotating spacer ring installed.

SIA ALL

B. References

Reference	Title
24-11-13-210-801	IDG Air/Oil Heat Exchanger - Inspection (P/B 601)
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
71-00-00-720-802-G00	Test No. 6 - Power Assurance Test (P/B 501)
71-00-00-720-803-G00	Test No. 9 - Low Pressure System (Fan/LPT) Vibration Survey (P/B 501)
71-00-00-720-804-G00	Test No. 10 - High Pressure System (HPC/HPT) Vibration Survey (P/B 501)
71-00-00-720-805-G00	Test No. 11 - Low Pressure System (Fan) Trim Balance (With ONS) (P/B 501)
71-00-02-000-801-G00	Power Plant - Removal (P/B 401)
71-00-02-400-801-G00	Power Plant - Installation (P/B 401)
71-11-01-200-801-G00	Inlet Cowl Inspection (P/B 601)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-200-801-G00	Fan Cowl Panels Inspection (P/B 601)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
72-00-00-290-803-G00	Booster Blades and Vanes Borescope Inspection (P/B 601)
72-00-00-290-804-G00	High Pressure Compressor Section Borescope Detailed Inspection (P/B 601)

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(Continued)

Reference	Title
72-21-00-200-802-G00	Fan Case Module Inspection (P/B 601)
72-21-00-220-801-G00	Low Pressure Compressor Stage 1 Inlet Guide Vane and Rotating Ring Spacer Inspection (P/B 601)
72-22-00-200-807-G00	Shroud Segment Inspection (P/B 601)
72-22-00-200-808-G00	Fan and Booster Module Inspection (P/B 601)
72-22-01-200-801-G00	Front Spinner Cone Inspection (P/B 601)
72-22-02-200-801-G00	Fan Blade Inspection (P/B 601)
72-22-03-200-801-G00	Fan Blade Platforms Inspection (P/B 601)
72-22-05-200-801-G00	Flowpath Fairing Inspection (P/B 601)
72-22-06-200-801-G00	Splitter Fairing Inspection (P/B 601)
72-23-00-211-804-G00	Fan Frame Module Inspection (P/B 601)
72-23-04-200-801-G00	Fan Frame Module Segment Shrouds Inspection (P/B 601)
72-23-06-200-801-G00	Fan Frame Strut Panels Inspection (P/B 601)
73-21-00-200-801-G00	Fuel Control System Inspection (P/B 601)
73-21-63-000-801-G00	T25 Sensor Removal (P/B 401)
73-21-63-400-801-G00	T25 Sensor Installation (P/B 401)
75-31-00-910-801-G00	Variable Stator Vane Actuator Manual Operation (P/B 201)
78-11-00-210-802-G00	Primary Nozzle Assembly and Primary Plug Assembly Inspection (P/B 601)
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)
79-21-02-211-801-G00	Engine Surface Air Cooling Oil Cooler Inspection (P/B 601)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE
STD-1136	Facepiece (Mask) - Particulate Filtering, Disposable (NIOSH N95 approved)
STD-1425	Gloves
STD-3904	Goggles - Safety

D. Consumable Materials

Reference	Description	Specification
B00679 [C04-035]	Alcohol - Isopropyl	
G00624	Bag - Plastic, General Purpose	
G01043	Cloth - Lint-free	
G50140	Gloves - Protective, Latex or Nitrile	
G50230	Glove - Vinyl	
G51352	Respirator - Particulate/Face Mask FSP2, 3M 8810	

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E. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
411	Engine 1 - Engine
421	Engine 2 - Engine

F. 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

G. Prepare for the Inspection

SUBTASK 71-00-00-860-441-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

H. Engine Foreign Object Damage and Birdstrike Inspection

SUBTASK 71-00-00-860-442-G00

WARNING PUT ON EQUIPMENT FOR PROTECTION BEFORE YOU TOUCH THE BIRD CARCASS, BLOOD, GUTS, AND RESIDUE. THIS CAN CONTAIN BACTERIA AND VIRUSES THAT CAN CAUSE ILLNESSES, AND INJURIES TO PERSONNEL.

(1) If you find signs of a birdstrike, follow these steps before you continue:

(a) Before you touch all materials from the birdstrike, do these steps:

1) Put on the vinyl glove, G50230 or protective gloves, G50140.

2) Put on the usual cut-resistant gloves, STD-1425.

3) Put on a disposable face mask, G51352 (FSP2 type) or filtering facepiece, STD-1136.

4) Put on the safety goggles, STD-3904.

5) Wear a disposable coverall if there is the possibility of contact with the bird carcass.

(b) Remove the bird pieces and put them in a plastic bag, G00624 or a hermetically sealed plastic bag.

NOTE: Do not touch your face, eyes, and nose with your gloves.

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WARNING DO NOT USE AIR OR WATER PRESSURE TO CLEAN THE BIRD PIECES FROM THE ENGINE. THE BIRD PIECES CAN CONTAIN INFECTIOUS MATERIAL (BACTERIA AND VIRUSES). THEY CAN CAUSE ILLNESSES, AND INJURIES TO PERSONNEL.

1) Clean the area with a lint-free cloth, G01043 moist with alcohol, B00679 [C04-035].
2) If you used tools to remove the unwanted materials, clean the tools with alcohol, B00679 [C04-035].
3) Remove the gloves and disposable coveralls and put them in the plastic bag.
4) Carefully wash your hands with soap and water.

(c) Contact the local medical authorities to get more data and direction on how to discard the unwanted material.

NOTE: The operators and maintenance personnel must obey the directions of the local medical authorities. The requirements of the medical authority are above the engine manufacturer guidelines.

SUBTASK 71-00-00-210-013-G00

(2) Do a visual inspection of the engine inlet and the engine exhaust areas as follows:

(a) Look for visual signs of dangerous engine damage or failure.

NOTE: These signs can include missing or broken blades in the inlet area and metal splatter, missing or broken blades, and loose metal pieces in the exhaust area.

(b) If you find indications of severe engine damage or failure, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

SUBTASK 71-00-00-210-014-G00

(3) Examine the external areas of the front spinner cone for damage.

(a) If you find damage, use the limits from the front spinner cone inspection (TASK 72-22-01-200-801-G00).

SUBTASK 71-00-00-210-063-G00

(4) Examine the external areas of the platform front shroud for damage.

(a) If you find damage, use the applicable limits from this task: Fan and Booster Module Inspection, TASK 72-22-00-200-808-G00.

SUBTASK 71-00-00-220-004-G00

(5) Examine the external areas of the installed fan blades for damage:

(a) If you find damage, use the limits from this task: Fan Blade Inspection, TASK 72-22-02-200-801-G00.

SUBTASK 71-00-00-200-001-G00

(6) Examine the external areas of the installed fan blade platforms for damage.

(a) If you find damage, use the limits from this task: Fan Blade Platforms Inspection, TASK 72-22-03-200-801-G00.

SUBTASK 71-00-00-210-064-G00

(7) Examine the external areas of the installed fan case abradable for damage.

(a) If you find any damage, use the applicable limits from this task: Fan Case Module Inspection, TASK 72-21-00-200-802-G00.

SUBTASK 71-00-00-210-065-G00

(8) Examine the external areas of the installed acoustic shroud for damage.

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(a) If you find any damage, use the applicable limits from this task: Fan Case Module Inspection, TASK 72-21-00-200-802-G00.

SUBTASK 71-00-00-220-005-G00

(9) Examine the external areas of the installed splitter fairing, inlet guide vanes of the booster, and rotating spacer ring for damage.

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NOTE: The engine do not have the rotating spacer ring installed.

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(a) If you find damage to the splitter fairing, use the limits from this task: Splitter Fairing Inspection, TASK 72-22-06-200-801-G00.

(b) If you find damage to the inlet guide vanes or rotating spacer ring, use the applicable limits from this task: Low Pressure Compressor Stage 1 Inlet Guide Vane and Rotating Ring Spacer Inspection, TASK 72-21-00-220-801-G00.

SUBTASK 71-00-00-210-066-G00

(10) Examine the external areas of the flowpath fairings and flowpath fairing half rings for damage.

(a) If you find any damage, use the limits from these tasks: Flowpath Fairing Inspection, TASK 72-22-05-200-801-G00 and Shroud Segment Inspection, TASK 72-22-00-200-807-G00.

SUBTASK 71-00-00-860-523-G00

(11) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 71-00-00-040-001-G00

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

SUBTASK 71-00-00-010-010-G00

(13) 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
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).

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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 71-00-00-210-073-G00

(14) Examine the external areas of the fan frame module segment shroud and fan frame module strut panels for damage.

(a) If you find any damage, use the limits from these tasks: Fan Frame Module Segment Shrouds Inspection, TASK 72-23-04-200-801-G00 and Fan Frame Strut Panels Inspection, TASK 72-23-06-200-801-G00.

SUBTASK 71-00-00-210-016-G00

(15) Examine the external areas of the Outlet Guide Vanes (OGV) and struts for damage

(a) If you find any damage, use the applicable limits from this task: Fan Frame Module Inspection, TASK 72-23-00-211-804-G00.

SUBTASK 71-00-00-210-067-G00

(16) Examine the external areas of the OGV platforms for damage.

(a) If you find any damage, use the applicable limits from this task: Fan Frame Module Inspection, TASK 72-23-00-211-804-G00.

SUBTASK 71-00-00-210-068-G00

(17) Examine the external areas of the aft acoustical panels for damage.

(a) If you find any damage, use the applicable limits from this task: Fan Case Module Inspection, TASK 72-21-00-200-802-G00.

SUBTASK 71-00-00-210-061-G00

(18) Examine the external areas of the engine Surface Air Cooling Oil Cooler (SACOC) for damage.

(a) If you find any damage, use the limits from this task: Engine Surface Air Cooling Oil Cooler Inspection, TASK 79-21-02-211-801-G00.

SUBTASK 71-00-00-210-062-G00

(19) Examine the external areas of the Integrated Drive Generator (IDG) air/oil heat exchangers for damage.

(a) If you find any damage, use the limits from this task: IDG Air/Oil Heat Exchanger - Inspection, TASK 24-11-13-210-801.

SUBTASK 71-00-00-210-071-G00

(20) Examine the accessories & hardware attachments for distortion and fracture.

SUBTASK 71-00-00-210-072-G00

(21) Examine the piping connections for leaks.

SUBTASK 71-00-00-210-069-G00

(22) Examine lines, tubes, harnesses for possible interfaces.

SUBTASK 71-00-00-210-070-G00

(23) Examine the external condition of the T12 sensor (TASK 73-21-00-200-801-G00).

SUBTASK 71-00-00-200-003-G00

(24) Examine the engine gas path for damage:

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(a) FOD with normal engine parameters.

NOTE: It is normal to have fluctuations on engine parameters such as N1, N2, and EGT because of the impact of the bird in the engine flow path. These fluctuations are permitted if there were no engine exceedance and the fluctuations only show for a short time.

1) Do the steps that follow if one of more of these conditions exist:

NOTE: For a single engine condition, if the FOD did not cause damage beyond serviceable limits on the fan blade, fan blade platforms, low pressure compressor stage 1 inlet guide vane, or rotating spacer ring, but unwanted material can be found in the booster inlet, the borescope inspection can be deferred for 25 flight hours or 10 flight cycles (use the first limit to occur). The service extension is only permitted on one engine if the airplane had a dual-engine FOD.

a) FOD has caused damage to the fan blades, fan blade platforms, low pressure compressor stage 1 Inlet Guide Vane (IGV), or rotating spacer ring beyond serviceable limits.

b) You see signs of unwanted material went into the booster inlet.

NOTE: To find if unwanted material went into the booster inlet, look for damage or unwanted material in the front spinner, platform front shroud, fan blade platform, rotating spacer ring, the booster inlet guide vanes, or the splitter fairing.

2) Do this task: Booster Blades and Vanes Borescope Inspection, TASK 72-00-00-290-803-G00.

3) Do a borescope inspection of the Stages 1, 3, and 8 HPC blades (TASK 72-00-00-290-804-G00).

NOTE: If necessary, the VSV system can be manually shifted to permit inspection of stages 1 through 4 blisks. Refer to TASK 75-31-00-910-801-G00.

a) If you find damage, do the borescope inspection on the remaining HPC blades (TASK 72-00-00-290-804-G00).

(b) FOD with abnormal engine parameters.

1) Do this task: Booster Blades and Vanes Borescope Inspection, TASK 72-00-00-290-803-G00.

2) If there was a surge, a stall or a flameout with the FOD, do these steps:

a) Do this task: T25 Sensor Removal, TASK 73-21-63-000-801-G00.

NOTE: It is acceptable to examine the T25 sensor with a borescope through the LPC booster or the HPC (Port D). If you find damage or debris, remove, clean, and examine for further damage.

b) Examine the T25 sensor for damage.

<1> Make sure that the T25 sensor flange is not loose.

<2> Make sure that there are no cracks in the sensor.

<3> Wear and indentations less than 0.08 in. (2.03 mm) deep from the leading edge of the ice wedge are permitted.

<4> Discoloration is permitted.

<5> Missing material is not allowed.

<6> If damage to the sensor is beyond limits, replace the T25 sensor.

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c) Do this task: T25 Sensor Installation, TASK 73-21-63-400-801-G00.

3) Do a borescope inspection of the Stages 1, 3, and 8 HPC blades (TASK 72-00-00-290-804-G00).

NOTE: If necessary, the VSV system can be manually shifted to permit inspection of stages 1 through 4 blisks. Refer to TASK 75-31-00-910-801-G00.

a) If you find damage, do the borescope inspection on the remaining HPC blades (TASK 72-00-00-290-804-G00).

SUBTASK 71-00-00-410-017-G00

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.

(25) 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 71-00-00-440-001-G00

(26) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

SUBTASK 71-00-00-200-004-G00

(27) Examine the engine after the birdstrike for damage:

(a) Examine the inlet cowl at the location where the bird hit (TASK 71-11-01-200-801-G00).

(b) Examine the fan cowl panels for damage (TASK 71-11-04-200-801-G00).

(c) If there are indications that the engine is not balanced, do these steps:

1) Do this task: Test No. 9 - Low Pressure System (Fan/LPT) Vibration Survey, TASK 71-00-00-720-803-G00.

a) If it is necessary, do an engine trim balance to reduce N1 rotor vibration (TASK 71-00-00-720-805-G00).

2) Do this task: Test No. 10 - High Pressure System (HPC/HPT) Vibration Survey, TASK 71-00-00-720-804-G00.

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(d) If there is indication of a subsequent engine imbalance, examine the exhaust nozzle and plug for signs of damage (TASK 78-11-00-210-802-G00).

(e) If the FOD resulted in abnormal engine parameters, do this task: Test No. 6 - Power Assurance Test, TASK 71-00-00-720-802-G00.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-443-G00

(1) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

TASK 71-00-00-200-804-G00

4. Engine Ice Crystal Operation Foreign Object Damage Inspection

A. General

(1) This task is the inspection of the engine for damage caused by ice ingestion.

(2) If there are signs of damage caused by the ice ingestion, the Engine Foreign Object Damage and Birdstrike Inspection (Task G71-00-00-200-802-G00) must be accomplished.

(3) Indications of engine ice ingestion include engine flameout, uncommanded N1 or N2 reduction, thrust loss, engine stall, or engine surge, when associated with operations in suspected ice crystal icing conditions.

(4) These Crew Alert messages show on the center display panel when associated with operations in suspected ice crystal icing conditions:

(a) ENG FAIL

NOTE: ENG FAIL alert appears over the EGT round dial indicators for Engine 1 or 2 on the flight deck display.

(b) THRUST

NOTE: THRUST alert light comes on in the two row of boxes for Engine 1 or 2 on the flight deck display upper left corner.

(5) These Flight Deck Effects (FDE) messages are indications of operations in suspected ice crystal icing conditions:

(a) 730 301 51, Flight Deck Effect ENG 1 FAIL

(b) 730 301 52, Flight Deck Effect ENG 2 FAIL

(c) 730 302 51, Flight Deck Effect ENG 1 THRUST INDICATION

(d) 730 302 52, Flight Deck Effect ENG 2 THRUST INDICATION

(6) These OMF maintenance messages are indications of engine ice ingestion when associated with operations in suspected ice crystal icing conditions:

(a) 73-43700 N2 SPEED IS BELOW IDLE WITH FUEL SWITCH ON, DETECTED BY: ENGINE-1 EEC CHANNEL-A AND CHANNEL-B.

(b) 73-43701 N2 SPEED IS BELOW IDLE WITH FUEL SWITCH ON, DETECTED BY: ENGINE-1 EEC CHANNEL-A.

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(c) 73-43702 N2 SPEED IS BELOW IDLE WITH FUEL SWITCH ON, DETECTED BY: ENGINE-1 EEC CHANNEL-B.

(d) 73-43703 N2 SPEED IS BELOW IDLE WITH FUEL SWITCH ON, DETECTED BY: ENGINE-1 EEC CHANNEL-A.

(e) 73-43704 N2 SPEED IS BELOW IDLE WITH FUEL SWITCH ON, DETECTED BY: ENGINE-1 EEC CHANNEL-B.

(f) 73-43705 N2 SPEED IS BELOW IDLE WITH FUEL SWITCH ON, DETECTED BY: ENGINE-1 EEC CHANNEL-A AND CHANNEL-B.

(7) This inspection must be completed before the next revenue service flight on all engines that have indications of engine ice ingestion.

(8) If one engine has indications of ice ingestion, you must also perform this inspection on the other engine on the airplane. These inspections must be performed before the next revenue service flight.

B. References

Reference	Title
31-31-00-970-802	Make a Copy of the FDR Data with the HHMPI or PI (P/B 201)
31-31-22-470-803	Maintenance Data Download with the Use of the CFast Card (P/B 201)
46-13-02-970-802	Download Manager (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)
72-00-00-290-804-G00	High Pressure Compressor Section Borescope Detailed Inspection (P/B 601)
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-858	Tag - DO NOT OPERATE
STD-10719	Borescope - Rigid (Meets General Electric or CFM Standard Practices Manual Specification such as: model R857ELSV60)

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. 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

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(Continued)

Number	Name/Location
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

F. Prepare for the Inspection

SUBTASK 71-00-00-860-643-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-00-00-860-644-G00

(2) 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
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

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G. Engine Ice Crystal Operation Foreign Object Damage Inspection

SUBTASK 71-00-00-290-001-G00

(1) Examine the high pressure compressor (HPC) stage one airfoils with a rigid borescope, STD-10719, (TASK 72-00-00-290-804-G00).

NOTE: All the high pressure compressor stage one airfoils shall be inspected for damage.

NOTE: The inspection limits in the HPC stage one borescope inspection task must be applied.

SUBTASK 71-00-00-280-006-G00

(2) If there are signs of Foreign Object Damage (FOD) with the ice ingestion, do this task: Engine Foreign Object Damage and Birdstrike Inspection, TASK 71-00-00-200-802-G00.

SUBTASK 71-00-00-970-008-G00

(3) Do the steps to down load the flight data from the quick access recorder (DFDAU) (TASK 31-31-22-470-803).

SUBTASK 71-00-00-970-009-G00

(4) Do the steps in one of these tasks to download the flight data from the flight data recorder:

- Make a Copy of the FDR Data with the HHMPI or PI, TASK 31-31-00-970-802.

SUBTASK 71-00-00-970-010-G00

(5) Down load the engine Full Flight Data from the EEC through the ONS server (TASK 46-13-02-970-802).

NOTE: GE/CFM and Boeing use stored engine and aircraft data for engine health assessment and event investigation. It is requested that the operator send the flight data for the affected flight leg and the previous flight leg to GE/CFM for analysis. This request is not a requirement to correct the fault condition.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-645-G00

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.

(1) 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

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(c) Do this task: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

——— END OF TASK ———

TASK 71-00-00-200-805-G00

5. Engine Stall Inspection

A. General

(1) This task gives the instructions on how to examine the engine after a compressor stall.

B. References

Reference	Title
46-13-02-710-801	Onboard Maintenance Function Ground Test (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)
72-00-00-290-803-G00	Booster Blades and Vanes Borescope Inspection (P/B 601)
72-00-00-290-804-G00	High Pressure Compressor Section Borescope Detailed Inspection (P/B 601)
72-00-00-290-806-G00	High Pressure Turbine Section Detailed Inspection (P/B 601)
72-00-00-290-811-G00	Low Pressure Turbine (LPT) Section Borescope Inspection (P/B 601)
72-22-00-200-808-G00	Fan and Booster Module Inspection (P/B 601)
75-30-00-211-801-G00	Compressor Control Detailed Inspection (P/B 601)
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)
79-00-00-210-804-G00	Oil Debris Monitoring System Sensor Inspection (P/B 601)
79-21-04-211-801-G00	Scavenge Screen Plug Inspection (P/B 201)
80-11-09-200-801-G00	Engine Starter Magnetic Plug Inspection (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
411	Engine 1 - Engine
421	Engine 2 - Engine

E. 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

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(Continued)

Number	Name/Location
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2
425	Left Thrust Reverser, Engine 2
426	Right Thrust Reverser, Engine 2

F. Prepare for the Inspection

SUBTASK 71-00-00-860-444-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-00-00-010-011-G00

(2) 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
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

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SUBTASK 71-00-00-865-001-G00

(3) For the applicable engine, 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

G. Engine Stall Inspection

SUBTASK 71-00-00-210-033-G00

(1) Look in the display unit for engine faults (TASK 46-13-02-710-801).

(a) Do the applicable IFIM procedure for the engine faults that you find.

(b) Do the applicable IFIM procedure for the Debris Monitoring System (DMS) faults that you find.

SUBTASK 71-00-00-210-035-G00

(2) Examine the fan and booster module (TASK 72-22-00-200-808-G00).

SUBTASK 71-00-00-290-004-G00

(3) Examine the stage 3 booster blades with a borescope (TASK 72-00-00-290-803-G00).

SUBTASK 71-00-00-200-006-G00

(4) Examine the booster blades (TASK 72-00-00-290-803-G00).

SUBTASK 71-00-00-200-007-G00

(5) Examine the compressor control system for damage (TASK 75-30-00-211-801-G00).

SUBTASK 71-00-00-200-008-G00

(6) Examine the stage 1, 5, and 8 of the High Pressure Compressor (HPC) blades with a borescope (TASK 72-00-00-290-804-G00).

(a) If you find damage, do an inspection of all HPC blades.

SUBTASK 71-00-00-290-002-G00

(7) Examine the High Pressure Turbine (HPT) stage 1 blades with a borescope (TASK 72-00-00-290-806-G00).

SUBTASK 71-00-00-290-003-G00

(8) Examine the Low Pressure Turbine (LPT) stage 1 blades with a borescope (TASK 72-00-00-290-811-G00).

SUBTASK 71-00-00-211-013-G00

(9) Examine the ODMS sensor (TASK 79-00-00-210-804-G00).

SUBTASK 71-00-00-211-014-G00

(10) Examine all scavenge screen plugs (TASK 79-21-04-211-801-G00).

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SUBTASK 71-00-00-211-015-G00

(11) Examine the engine starter magnetic plug (TASK 80-11-09-200-801-G00).

SUBTASK 71-00-00-810-001-G00

(12) Do the applicable IFIM procedure to find the cause of the engine stall.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-865-002-G00

(1) For the applicable engine, remove the safety tags and close these applicable 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

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 71-00-00-860-445-G00

(2) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

SUBTASK 71-00-00-410-014-G00

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.

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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.

END OF TASK

TASK 71-00-00-200-806-G00

6. Heavy Sand/Dust Ingestion and Volcanic Ash Ingestion Inspection

A. General

(1) This task provides the instructions on how to do the inspection of the engine after heavy sand/dust ingestion or volcanic ash ingestion.

B. References

Reference	Title
12-13-11-600-803	Engine Oil Change Servicing (P/B 301)
71-00-00-910-808-G00	Dry Motor Procedure (P/B 201)
71-11-01-000-801-G00	Inlet Cowl Removal (P/B 401)
71-11-01-400-801-G00	Inlet Cowl Installation (P/B 401)
72-00-00-290-804-G00	High Pressure Compressor Section Borescope Detailed Inspection (P/B 601)
72-00-00-290-805-G00	Combustion Section and High Pressure Turbine Section Stage One Nozzle Leading Edge Detailed Inspection (P/B 601)
72-00-00-290-806-G00	High Pressure Turbine Section Detailed Inspection (P/B 601)
72-22-01-200-801-G00	Front Spinner Cone Inspection (P/B 601)
72-22-06-200-801-G00	Splitter Fairing Inspection (P/B 601)
78-11-01-000-801-G00	Primary Nozzle Assembly Removal (P/B 401)
78-11-01-400-801-G00	Primary Nozzle Assembly Installation (P/B 401)
79-21-04-000-801-G00	Scavenge Screen Plugs Removal (P/B 201)
79-21-04-400-801-G00	Scavenge Screen Plugs Installation (P/B 201)
79-21-07-000-801-G00	Oil Filter Cartridge Element Removal (P/B 401)
79-21-07-400-801-G00	Oil Filter Cartridge Element Installation (P/B 401)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

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D. Heavy Sand/Dust Ingestion and Volcanic Ash Ingestion Inspection

SUBTASK 71-00-00-210-036-G00

(1) If the engines have flown though or operated in volcanic ash, severe dust or sand conditions, do these steps:

NOTE: Some airplanes have operated in normally sandy or dusty conditions (deserts, unimproved runways) without adverse affects on the engines. This inspection is for severe dust or sand where conditions are more than normal such as in sand storms or from nearby heavy construction.

(a) Do a visual inspection of the engine inlet and the engine exhaust areas for signs of damage or erosion.

1) If it is necessary, repair or replace the inlet cowl (TASK 71-11-01-000-801-G00 and TASK 71-11-01-400-801-G00).

2) If it is necessary, repair or replace the engine primary exhaust nozzle (TASK 78-11-01-000-801-G00 and TASK 78-11-01-400-801-G00).

3) Examine the fan and booster inlet as follows:

a) Do an inspection of the fan spinner cone (TASK 72-22-01-200-801-G00).

b) Do an inspection of the fan booster splitter (TASK 72-22-06-200-801-G00).

c) Do a visual inspection of the fan outlet guide vane.

(b) Do a borescope inspection of the HPC combustor and HPT components (TASK 72-00-00-290-804-G00, TASK 72-00-00-290-805-G00 and TASK 72-00-00-290-806-G00):

NOTE: Examine all stages of the HPC. The aft stages of the HPC will have the most erosion.

NOTE: Examine the HPT nozzle vanes and HPT blades for erosion and quantity of solidified material. Sufficient quantity of collected material on the HPT nozzle vanes can cause a decreased engine stall margin.

NOTE: Examine the HPT nozzle vanes and HPT blades for cooling hole blockage by loose or solidified material. Sufficient quantity of collected material can cause localized heat damage and decreased EGT margin.

(c) Look for these damages:

1) Erosion that is more than the limits.

2) Foreign object damage

3) Ash, dust or sand particles that have solidified on the HPT nozzle vanes and HPT blades.

a) If material has solidified on the HPT nozzle vanes and HPT blades, contact the local CFM representative.

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SUBTASK 71-00-00-210-037-G00

CAUTION	DO NOT WATER WASH AN ENGINE WHICH HAS HAD VOLCANIC ASH INGESTION, SEVERE DUST OR SAND CONDITIONS UNTIL THIS MATERIAL HAS BEEN REMOVED FROM THE ENGINE AND WAIT A MINIMUM OF 5 FLIGHTS BEFORE WATER WASH. WATER WASH CAN CAUSE VOLCANIC ASH TO COLLECT IN THE HPT NOZZLE AND BLADE COOLING PATHS. THIS CAN RESULT IN REDUCED COOLING FLOW AND CAN ALSO CAUSE ROTOR IMBALANCE FROM COLLECTION OF MATERIAL SETTLING AND DRYING IN THE ROTOR SPOOLS.

(2) If the engines have been exposed to volcanic ash, severe dust or sand conditions on the ground but have not flown through these conditions, do these steps:

(a) Examine the engine inlet and exhaust for ash, dust or sand particles that could have collected in the engine.

(b) Vacuum the particles from all accessible areas in the engine inlet and exhaust.

(c) Do the dry-motor procedure (TASK 71-00-00-910-808-G00).

(d) Do a borescope inspection of the HPC combustor and HPT at the 6:00 o'clock positions and look for ash, dust and sand (TASK 72-00-00-290-804-G00, TASK 72-00-00-290-805-G00, and TASK 72-00-00-290-806-G00).

1) If loose material is still present in the engine flowpath, dry motor the engine for an additional 2 minutes.

2) Do a borescope inspection of the HPC combustor and HPT again for loose material.

3) Continue to do two minute motorings and borescope inspections until all loose material is removed.

SUBTASK 71-00-00-200-009-G00

(3) Do these steps to remove and install the scavenge oil inlet screens:

(a) Remove the scavenge oil inlet screen (TASK 79-21-04-000-801-G00).

(b) Install the scavenge oil inlet screens (TASK 79-21-04-400-801-G00).

SUBTASK 71-00-00-960-001-G00

(4) Replace the oil filter element (TASK 79-21-07-000-801-G00 and TASK 79-21-07-400-801-G00).

SUBTASK 71-00-00-616-001-G00

(5) Drain and replace the engine oil (TASK 12-13-11-600-803).

SUBTASK 71-00-00-700-062-G00

(6) Monitor the engine performance parameters for usual operation.

(a) If the engine parameters are unusual, do the fault isolation for the applicable engine parameter.

SUBTASK 71-00-00-210-038-G00

(7) After 400 but not more than 800 cycles do a one time borescope inspection of the HPT components (TASK 72-00-00-290-805-G00 and TASK 72-00-00-290-806-G00).

NOTE: The borescope inspection of the HPT components is recommended after 400 but not more than 800 cycles to make sure that the HPT nozzles and HP blades are serviceable.

END OF TASK

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TASK 71-00-00-200-807-G00

7. In-Flight Windmilling Inspection

A. General

(1) This task gives the instructions to do the inspection for possible damage when the rotors have windmilled in-flight because of an engine shutdown.

B. References

Reference	Title
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)
71-00-00-910-808-G00	Dry Motor Procedure (P/B 201)
71-00-02-000-801-G00	Power Plant - Removal (P/B 401)
71-00-03-800-801-G00	Dry-Out Of An Engine On-Wing After An In-Flight Shutdown (P/B 201)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. In-Flight Windmilling Inspection

SUBTASK 71-00-00-020-008-G00

(1) If the engine was windmilling for more than 180 minutes, remove the engine (TASK 71-00-02-000-801-G00).

SUBTASK 71-00-00-280-001-G00

(2) Make sure that there was oil pressure at the time the engine was shutdown.

SUBTASK 71-00-00-200-010-G00

(3) If there was no oil pressure when the engine was shutdown, do this task: No or Low Oil Pressure Inspection, TASK 71-00-00-200-808-G00.

SUBTASK 71-00-00-810-002-G00

(4) Correct the cause for the engine shutdown.

SUBTASK 71-00-00-868-006-G00

(5) Operate the engine for five minutes at ground idle, not more than 24 hours after the landing as follows:

(a) Do this task: Start the Engine (Selection), TASK 71-00-00-910-802-G00.

(b) Do this task: Stop the Engine (Usual Engine Stop), TASK 71-00-00-910-806-G00.

(c) Dry motor the engine for 2 minutes (TASK 71-00-00-910-808-G00).

SUBTASK 71-00-00-860-446-G00

(6) Do the engine dry-out procedure if the engine is not operated.

(a) Do this task: Dry-Out Of An Engine On-Wing After An In-Flight Shutdown, TASK 71-00-03-800-801-G00.

——— END OF TASK ———

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TASK 71-00-00-200-808-G00

8. No or Low Oil Pressure Inspection

A. General

(1) This task provides the instructions on the steps to do when an engine operated at or below the low oil pressure limit.

B. References

Reference	Title
12-13-11-600-801	Engine Servicing (Oil Replenishing) (P/B 301)
46-13-02-700-802	Inbound Flight Deck Effects Check (P/B 201)
46-13-02-700-803	Existing Flight Deck Effects Check (P/B 201)
46-13-02-700-804	Present Leg Faults Check (P/B 201)
46-13-02-700-805	Existing Faults Check (P/B 201)
46-13-02-700-806	Fault History Check (P/B 201)
71-00-00-800-804-G00	Power Plant Test Reference Table (P/B 501)
71-00-00-970-801-G00	Maintenance Data Pages from the Engine Propulsion Control System (EPCS) (P/B 201)
71-00-02-000-801-G00	Power Plant - Removal (P/B 401)
71-00-02-400-801-G00	Power Plant - Installation (P/B 401)
79-00-00-210-801-G00	Engine Oil System (External Surfaces Walk Around) Inspection (P/B 601)
79-00-00-210-802-G00	Engine Oil System (Fan Cowl Panels and Thrust Reversers Open) Inspection (P/B 601)
79-00-00-210-804-G00	Oil Debris Monitoring System Sensor Inspection (P/B 601)
79-00-00-211-801-G00	Engine Oil System (Fluids (Fuel or Skydrol) and Solids Contamination) Detailed Inspection (P/B 601)
79-00-00-220-801-G00	Engine Oil System (Oil Debris Monitoring System Sensor (ODMS), Scavenge Screen Plugs, Starter Magnetic Plug, and Oil Filter) Detailed Dimensional Check (P/B 601)
79-21-04-211-801-G00	Scavenge Screen Plug Inspection (P/B 201)
80-11-09-200-801-G00	Engine Starter Magnetic Plug Inspection (P/B 201)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. No or Low Oil Pressure Inspection

SUBTASK 71-00-00-860-642-G00

(1) Get access to the Maintenance Pages of the Electronic Propulsion Control System (EPCS) and read the level and the duration of the exceedance (TASK 71-00-00-970-801-G00).

SUBTASK 71-00-00-900-003-G00

(2) If the engine operated with no oil pressure for more than 18 seconds, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

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SUBTASK 71-00-00-810-003-G00

WARNING DO NOT TOUCH THE COMPONENTS OF THE OIL SYSTEM IF THE APU IS HOT. THESE COMPONENTS STAY HOTTER THAN OTHER COMPONENTS. HOT COMPONENTS CAN BURN YOU.

WARNING DO NOT LET HOT OIL GET ON YOU. PUT ON GOGGLE AND PROTECTIVE EQUIPMENT OR LET THE APU BECOME COOL. LET 5 MINUTES GO BY AFTER AN APU SHUTDOWN TO LET THE OIL SYSTEM PRESSURE GO TO ZERO. IF YOU OPEN THE OIL SYSTEM WHEN IT HAS PRESSURE, A SPRAY OF HOT OIL CAN BURN YOU.

WARNING DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

CAUTION DO NOT LET HOT OIL GET ON THE ENGINE OR OTHER COMPONENTS. IMMEDIATELY CLEAN THE COMPONENT IF OIL FALLS ON IT. OIL CAN CAUSE DAMAGE TO PAINT AND RUBBER.

(3) If the engine operated with oil pressure lower than the limit for less than 18 seconds, do these steps:

(a) Get the applicable flight deck effect from the Onboard Maintenance Function (OMF) inbound flight deck effects or existing flight deck effects (TASK 46-13-02-700-802 or TASK 46-13-02-700-803).

1) Look for these flight deck effects related to no oil pressure or low oil pressure:

- 793 301 51, Flight Deck Effect ENG 1 LOW OIL PRESS INDICATION
- 793 301 52, Flight Deck Effect ENG 2 LOW OIL PRESS INDICATION
- 793 304 51, Flight Deck Effect ENG 1 OIL P LO AMB
- 793 304 52, Flight Deck Effect ENG 2 OIL P LO AMB
- 793 305 51, Flight Deck Effect ENG 1 OIL P LO RED
- 793 305 52, Flight Deck Effect ENG 2 OIL P LO RED
- 793 331 51, Flight Deck Effect ENG 1 LOW OIL Q ALERT
- 793 331 52, Flight Deck Effect ENG 2 LOW OIL Q ALERT.

2) If maintenance message(s) are found, do the Interactive Fault Isolation Manual (IFIM) task(s) for the associated maintenance message(s).

(b) Get the maintenance messages in the OMF present leg faults, existing faults or fault history (TASK 46-13-02-700-804 or TASK 46-13-02-700-805 or TASK 46-13-02-700-806).

1) Look for these maintenance messages:

- 79-41800, Engine Oil Pressure (PEO) is Below the Amber Limit: detected by Eng-1 EEC Channel A and Channel B
- 79-41801, Engine Oil Pressure (PEO) is Below the Amber Limit: detected by Eng-1 EEC Channel A
- 79-41802, Engine Oil Pressure (PEO) is Below the Amber Limit: detected by Eng-1 EEC Channel B

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- 79-41803, Engine Oil Pressure (PEO) is Below the Amber Limit: detected by Eng-2 EEC Channel A
- 79-41804, Engine Oil Pressure (PEO) is Below the Amber Limit: detected by Eng-2 EEC Channel B
- 79-41805, Engine Oil Pressure (PEO) is Below the Amber Limit: detected by Eng-2 EEC Channel A and Channel B
- 79-41810, Engine Oil Pressure (PEO) is Below the Redline Limit: detected by Eng-1 EEC Channel A and Channel B
- 79-41811, Engine Oil Pressure (PEO) is Below the Redline Limit: detected by Eng-1 EEC Channel A
- 79-41812, Engine Oil Pressure (PEO) is Below the Redline Limit: detected by Eng-1 EEC Channel B
- 79-41813, Engine Oil Pressure (PEO) is Below the Redline Limit: detected by Eng-2 EEC Channel A
- 79-41814, Engine Oil Pressure (PEO) is Below the Redline Limit: detected by Eng 2 EEC Channel B
- 79-41815, Engine Oil Pressure (PEO) is Below the Redline Limit: detected by Eng-2 EEC Channel A and Channel B
- 79-41192, Oil Debris Monitoring System has Detected Debris: detected by Eng 1 EEC Channel B
- 79-41194, Oil Debris Monitoring System has Detected Debris: detected by Eng 2 EEC Channel B
- 79-42862, Oil Debris Monitoring System has Detected Debris in a Single Flight: detected by Eng 1 EEC Channel B
- 79-42864, Oil Debris Monitoring System has Detected Debris in a Single Flight: detected by Eng 2 EEC Channel B.

2) If maintenance message(s) are found, do the IFIM task(s) for the associated maintenance message(s).

(c) Inspect the ODMS sensor, all the scavenge screen plugs and the starter magnetic plug to check any presence of particles (TASK 79-00-00-210-804-G00, TASK 79-21-04-211-801-G00 and TASK 80-11-09-200-801-G00).

1) If no particles are found, no further inspections are needed.

2) If particles are found, do this task: Engine Oil System (Oil Debris Monitoring System Sensor (ODMS), Scavenge Screen Plugs, Starter Magnetic Plug, and Oil Filter) Detailed Dimensional Check, TASK 79-00-00-220-801-G00.

(d) Repeat the inspections above in 25FH, 50FH, and 100 FH.

SUBTASK 71-00-00-211-007-G00

(4) If there is low oil quantity, examine the engine for oil leakage as follows:

(a) Do these tasks: Engine Oil System (External Surfaces Walk Around) Inspection, TASK 79-00-00-210-801-G00 and Engine Oil System (Fan Cowl Panels and Thrust Reversers Open) Inspection, TASK 79-00-00-210-802-G00.

(b) Examine the oil distribution system components for leakage or damage.

SUBTASK 71-00-00-211-008-G00

(5) Do this task: Engine Oil System (Fluids (Fuel or Skydrol) and Solids Contamination) Detailed Inspection, TASK 79-00-00-211-801-G00.

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SUBTASK 71-00-00-610-001-G00

(6) Service the oil tank when the troubleshooting task is completed (TASK 12-13-11-600-801).

E. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-700-063-G00

(1) Do the test(s) that are given in the Power Plant Test Reference Table (TASK 71-00-00-800-804-G00).

——— END OF TASK ———

TASK 71-00-00-200-809-G00

9. Overspeed Inspection

(Figure 601)

A. General

(1) This task gives the instructions to do the overspeed inspection.

(2) This task is used to examine for possible engine damage because of an N1 low pressure system overspeed or an N2 high pressure system overspeed.

(3) The decision to do an on-wing inspection or a disassembly inspection depends on the proportion of the overspeed.

B. References

Reference	Title
31-65-00-970-801	System Maintenance Data Pages Function (P/B 201)
71-00-02-000-801-G00	Power Plant - Removal (P/B 401)
71-00-02-400-801-G00	Power Plant - Installation (P/B 401)
72-00-00-290-803-G00	Booster Blades and Vanes Borescope Inspection (P/B 601)
72-00-00-290-804-G00	High Pressure Compressor Section Borescope Detailed Inspection (P/B 601)
72-00-00-290-806-G00	High Pressure Turbine Section Detailed Inspection (P/B 601)
72-00-00-290-811-G00	Low Pressure Turbine (LPT) Section Borescope Inspection (P/B 601)
72-21-00-200-802-G00	Fan Case Module Inspection (P/B 601)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Overspeed Inspection

SUBTASK 71-00-00-280-002-G00

(1) Examine the N1 for the overspeed as follows:

(a) Find the maximum N1 overspeed.

1) Make these selections on the Multi Function Display (MFD) to gain access to the applicable engine exceedance page (TASK 31-65-00-970-801):

a) MAINT DATA PGS

b) ENGINE 1 EXCEEDANCE or ENGINE 2 EXCEEDANCE.

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2) The maximum overspeed value is displayed above the exceedance threshold along with the exceedance duration (Figure 601).

NOTE: The N1 exceedance value is also displayed in a red box on the N1 dial after both engines have been shutdown.

(b) If the N1 overspeed was more than 104.3%, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

(c) If the N1 overspeed was not more than 104.3%, do these tasks:

1) Examine the inlet and exhaust for damage and loose material.

2) Examine the fan rotor to make sure that it turns freely and there are no abnormal noises when you turn it.

a) If the fan rotor will not turn or you hear abnormal noise when you turn it, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

NOTE: Suspect internal damage to the engine if you hear abnormal noise when you turn the fan rotor.

3) Examine the first stage fan abradable shroud for excessive rub or damage (TASK 72-21-00-200-802-G00).

4) Examine the stage 5 LPT blades through the primary exhaust nozzle for damage (TASK 72-00-00-290-811-G00).

5) Use the OMF to find the DMS maintenance messages.

6) Make these selections on the OMF:

a) ONBOARD MAINTENANCE

b) EXTENDED MAINTENANCE

c) PRESENT LEG FAULTS

d) 71-80 Left Engine or 71-80 Right Engine.

7) Look for the applicable DMS debris maintenance message 79-4119X, in the uncorrelated message category.

NOTE: Where X is the engine location.

a) If you find the fault messages, do the corrective action in the FIM.

8) Do a BSI inspection of the LPT stage 1 blades (TASK 72-00-00-290-811-G00).

9) Do a BSI inspection of the booster stage 3 blades (TASK 72-00-00-290-803-G00).

SUBTASK 71-00-00-280-003-G00

(2) Examine the N2 for the overspeed as follows:

(a) Find the maximum N2 overspeed.

1) Make these selections on the MFD to gain access to the applicable engine exceedance page (TASK 31-65-00-970-801):

a) MAINT DATA PGS

b) ENGINE 1 EXCEEDANCE or ENGINE 2 EXCEEDANCE.

2) The maximum overspeed value is displayed above the exceedance threshold along with the exceedance duration (Figure 601).

NOTE: The N2 exceedance value is also displayed in a red box on the N2 dial after both engines have been shutdown.

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(b) If the N2 overspeed was more than 117.5%, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

(c) If the N2 overspeed was not more than 117.5%, do these tasks.

1) Examine the inlet and exhaust for damage.

2) Use the OMF to find the DMS maintenance messages.

a) Make these selections on the OMF:

<1> ONBOARD MAINTENANCE

<2> EXTENDED MAINTENANCE

<3> PRESENT LEG FAULTS

<4> 71-80 Left Engine or 71-80 Right Engine.

3) Look for the applicable DMS debris maintenance message 79-4119X, in the uncorrelated message category.

NOTE: Where X is the engine location.

a) If you find the fault messages, do the corrective action in the FIM.

4) Do the borescope inspection on the HPC stages one, five, and nine blades (TASK 72-00-00-290-804-G00).

5) If the engine will not turn during the borescope inspection, then replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

6) Do the borescope inspection on the HPT stage one blades and stage two blades (TASK 72-00-00-290-806-G00).

SUBTASK 71-00-00-942-001-G00

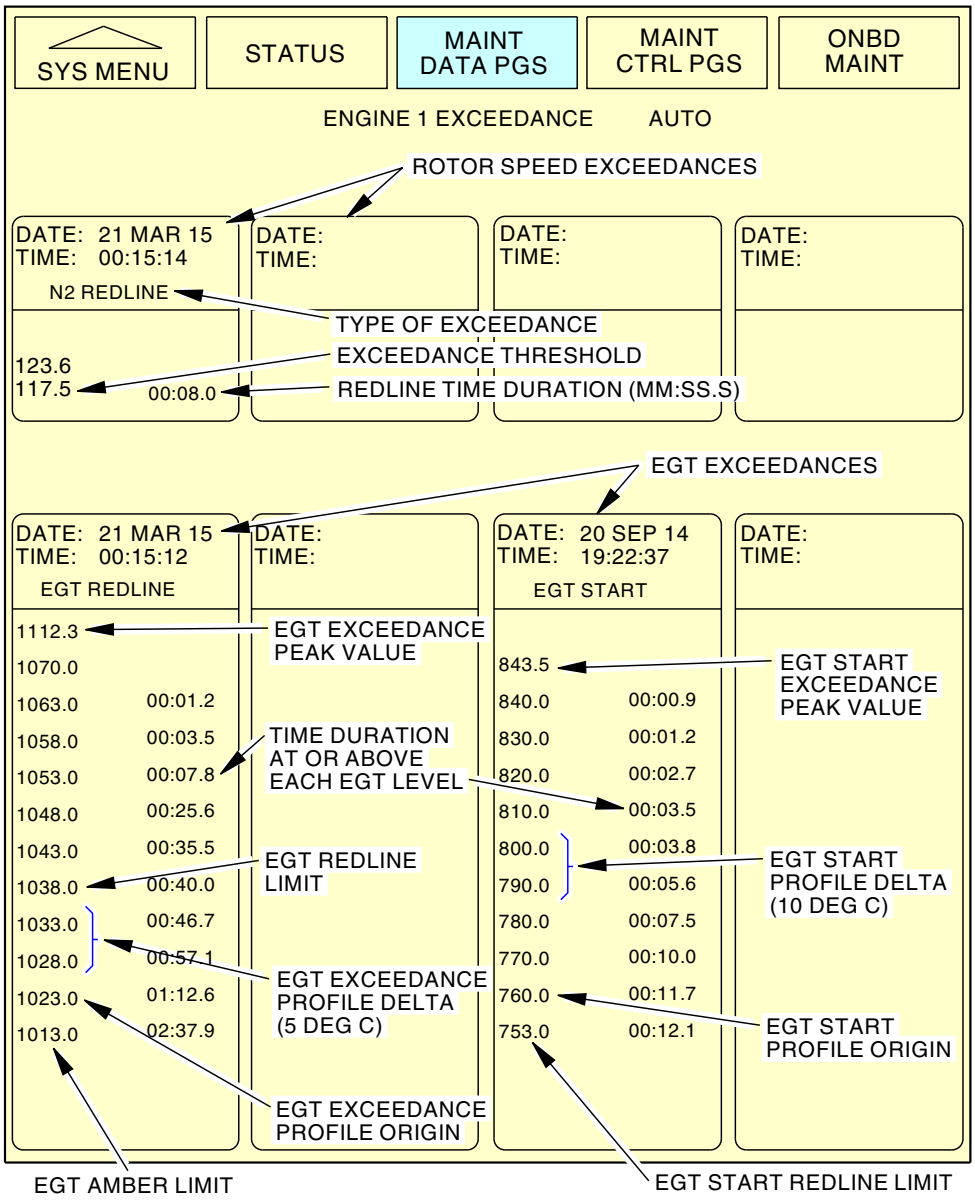
(3) After you complete all of the troubleshooting and problem resolution, do these steps:

(a) Erase any applicable fault messages.

(b) Reset the exceedance indication.

——— END OF TASK ———

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MDS ENGINE EXCEEDANCE DISPLAY

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MDS Engine Exceedance Display
Figure 601/71-00-00-990-888-G00

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TASK 71-00-00-200-810-G00

10. Overtemperature Inspection

(Figure 602, Figure 603, and Figure 604)

A. General

(1) This task gives the instructions to do the inspection for possible engine damage because of engine operation that exceeded start, takeoff, or maximum continuous EGT limits.

(2) The Table 601 gives the explanation between Airplane Condition And Monitoring System (ACMS) flight phase number and Aircraft Maintenance Manual (AMM) phase.

Table 601/71-00-00-993-872-G00

ACMS flight phase number	Description	AMM phase
1	Power On	N/A
2	Engine Start	Starting
3	Taxi Out	Takeoff
4	Takeoff Roll	Takeoff
5	Initial Climb	Climb
6	Climb	Climb
7	Enroute Cruise	Cruise
8	Descent	Cruise
9	Approach	N/A
10	Go Around	N/A
11	Flare	N/A
12	Rollout	N/A
13	Taxi In	N/A
14	Engine Shutdown	N/A

(3) The decision to do an on-wing inspection or a disassembly inspection is dependent on these conditions:

(a) The maximum given (recorded) EGT

(b) The length of time that the EGT was above the maximum limit.

(4) The CFM LEAP-1B engine is certified to permit continued operation with transient EGT exceedances between 1038°C and 1048°C for a maximum of 30 seconds. In order to prevent maintenance burden that is not necessary, the EEC automatically prevents indication to the aircraft of transient exceedances below 1048°C for a maximum of 30 seconds. As the EEC accommodates the transient EGT exceedance allowance, Figure 603 does not include a zone for transient exceedances.

B. References

Reference	Title
31-65-00-970-801	System Maintenance Data Pages Function (P/B 201)
71-00-02-000-801-G00	Power Plant - Removal (P/B 401)
71-00-02-400-801-G00	Power Plant - Installation (P/B 401)

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(Continued)

Reference	Title
72-00-00-100-802-G00	Engine Gas-Path Cleaning With Pure Water (P/B 701)
72-00-00-290-806-G00	High Pressure Turbine Section Detailed Inspection (P/B 601)
72-00-00-290-811-G00	Low Pressure Turbine (LPT) Section Borescope Inspection (P/B 601)
72-50-03-200-801-G00	Turbine Rear Vane Module Inspection (P/B 601)
73-00-00-700-803-G00	Maintenance Messages Check for EEC Faults (P/B 501)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Overtemperature Inspection

SUBTASK 71-00-00-280-004-G00

(1) Examine the Start EGT for the over limits (Exceedance) condition as follows (Figure 602 and Figure 604):

NOTE: After the cause of the EGT exceedance has been identified and the applicable repairs are completed, you can clear the exceedance indication when you erase the maintenance page snapshot generated by the EGT exceedance event.

(a) Make these selections on the Multi Function Display (MFD) to gain access to the applicable engine exceedance page (TASK 31-65-00-970-801):

1) MAINT DATA PGS

2) ENGINE 1 EXCEEDANCE or ENGINE 2 EXCEEDANCE.

(b) Find the maximum EGT and the length of time of the start over limits.

NOTE: Time length digital readout is in the form “MM:SS.S”, where MM is the minutes, and SS.S is the seconds showing tenths of seconds.

(c) If the start EGT was in the Area A, do the steps that follow:

1) Use the Fault Isolation Manual (FIM) to find and correct the cause of the hot start before the next start attempt.

2) If the N1 rotor stopped during the hot start, do the steps that follow:

a) Do a borescope inspection for the Stage 1 and 5 LPT blades (TASK 72-00-00-290-811-G00)

b) Do a visual inspection of the TRV (TASK 72-50-03-200-801-G00)

3) A maximum service extension of one start is permitted. If that start is satisfactory, one cycle is permitted before you must find and correct the cause of the hot start.

(d) If the start EGT was in the Area B, do the steps that follow:

1) Use the Fault Isolation Manual (FIM) to find and correct the cause of the hot start before the next start attempt.

2) Do a borescope inspection for the Stage 1 HPT blades (TASK 72-00-00-290-806-G00)

3) Do a borescope inspection for the Stage 1 and 5 LPT blades (TASK 72-00-00-290-811-G00)

4) Do a visual inspection of the TRV (TASK 72-50-03-200-801-G00)

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5) A maximum service extension of one start is permitted. If that start is satisfactory, one cycle is permitted before you must find and correct the cause of the hot start.

(e) If the start EGT was in the Area C, do the steps that follow before the next start attempt:

1) Use the Fault Isolation Manual (FIM) to find and correct the cause of the hot start before the next start attempt.

2) Do a borescope inspection for the Stage 1 HPT blades (TASK 72-00-00-290-806-G00)

3) Do a borescope inspection for the Stage 1 and 5 LPT blades (TASK 72-00-00-290-811-G00)

4) Do a visual inspection of the TRV (TASK 72-50-03-200-801-G00)

SUBTASK 71-00-00-280-005-G00

(2) Examine the takeoff and maximum continuous EGT for the over limits (Exceedance) condition as follows (Figure 603 and Figure 604):

(a) Make these selections on the MFD to gain access to the applicable engine exceedance page (TASK 31-65-00-970-801):

1) MAINT DATA PGS

2) ENGINE 1 EXCEEDANCE or ENGINE 2 EXCEEDANCE.

(b) Find the maximum EGT and the length of time of the takeoff or maximum continuous limit (exceedance).

NOTE: Time length digital readout is in the form “MM:SS.S”, where MM is the minutes, and SS.S is the seconds showing tenths of seconds.

(c) There are many causes for an EGT overtemperature. Some examples are:

NOTE: There are engine malfunctions that can lead to an EGT overtemperature condition. These malfunctions require trouble shooting prior to engine operation.

NOTE: If the EGT overtemperature condition is identified to be caused by expected engine deterioration (low remaining EGT hot day margin, (EGTHDM), some positive EGT margin can result by doing an engine gas path water wash Engine Gas-Path Cleaning With Pure Water, TASK 72-00-00-100-802-G00). This may temporarily improve EGT margin, but is not a long term repair for engine deterioration. EGT margin may be trend monitored, see CFM Leap-1B Service Bulletin 71–0006 for additional information.

- N1 overspeed
- Too much bleed air
- Deterioration of the engine (low EGT hot day margin)
- Temperature inversion during takeoff
- Insufficient engine warm-up time before takeoff

(d) If you do not have the exceedence data, refer to the FIM task for EGT Overtemperature.

(e) Determine the maximum EGT and the length of time of the takeoff or maximum continuous limit exceedence.

1) Locate the data points on Figure 603.

NOTE: A maximum of ten EGT overtemperatures in Area A and B together are permitted before the engine must be removed for EGT overtemperature inspection.

(f) If the EGT was in the Area A, and you do not know the cause, do these inspections:

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1) Do a check for engine-related faults that may have occurred in the same flight leg as the overtemperature (Maintenance Messages Check for EEC Faults, TASK 73-00-00-700-803-G00).
2) Do a visual inspection of the engine inlet for damage before the next flight.
3) Do a visual inspection of the engine exhaust for damage before the next flight.
4) Do the borescope inspection on the HPT stage one blades within ten cycles (TASK 72-00-00-290-806-G00).
5) If the inspections are satisfactory, continue the engine in-service.

(g) If the EGT was in the Area A, and you know the cause, do these steps:

1) Correct the cause of the overtemperature.

NOTE: If the EGT overtemperature condition is identified to be caused by engine deterioration (low remaining EGT margin, EGTHDM) no troubleshooting is necessary.

2) Monitor the engine EGT performance trend and make sure that the engine stays in the serviceable EGT margins.

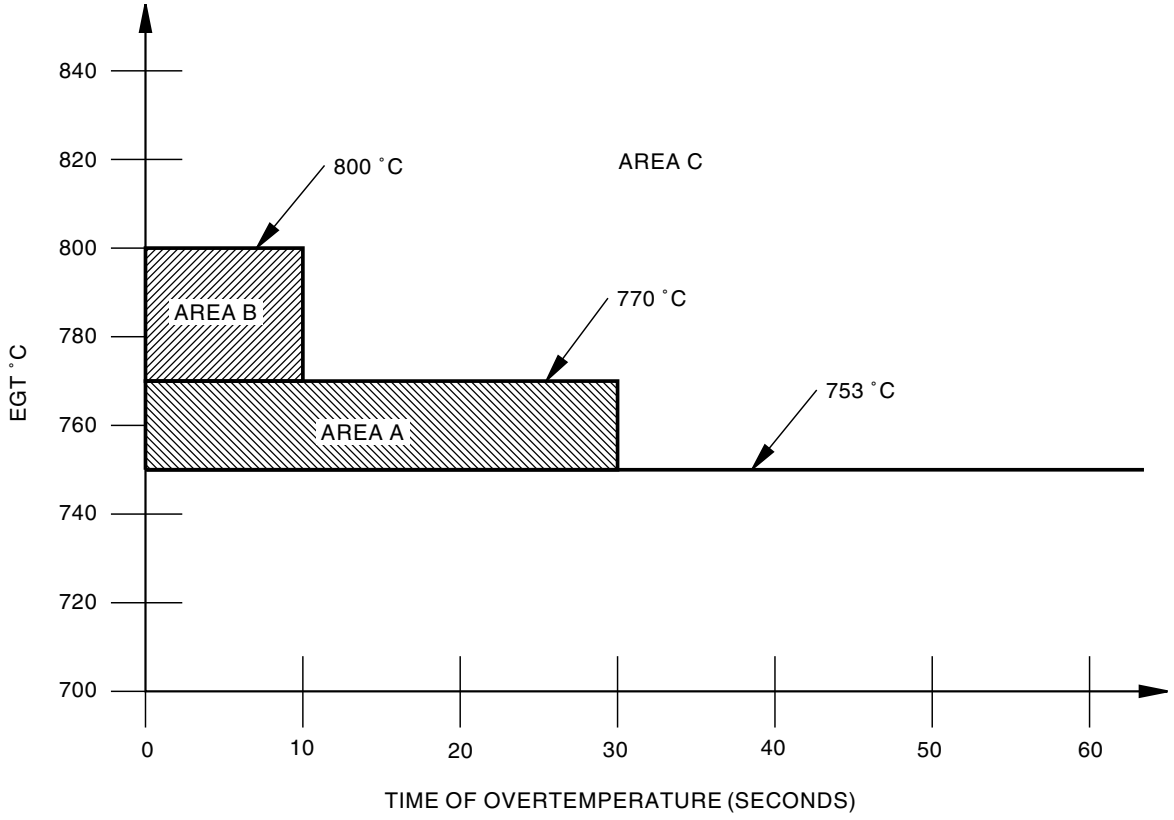
(h) If the EGT was in the Area B, do these tasks:

1) Do a visual inspection of the engine inlet for damage before the next flight.
2) Do a visual inspection of the engine exhaust for damage before the next flight.
3) Do the borescope inspection on the HPT stage one blades within ten cycles (TASK 72-00-00-290-806-G00).
4) Do a borescope inspection for the Stage 1 and 5 LPT blades (TASK 72-00-00-290-811-G00)
5) Do a visual inspection of the TRV (TASK 72-50-03-200-801-G00)
6) Monitor the engine EGT performance trend and make sure that the engine stays in the serviceable EGT margins.

(i) If the EGT was in the Area C, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

——— END OF TASK ———

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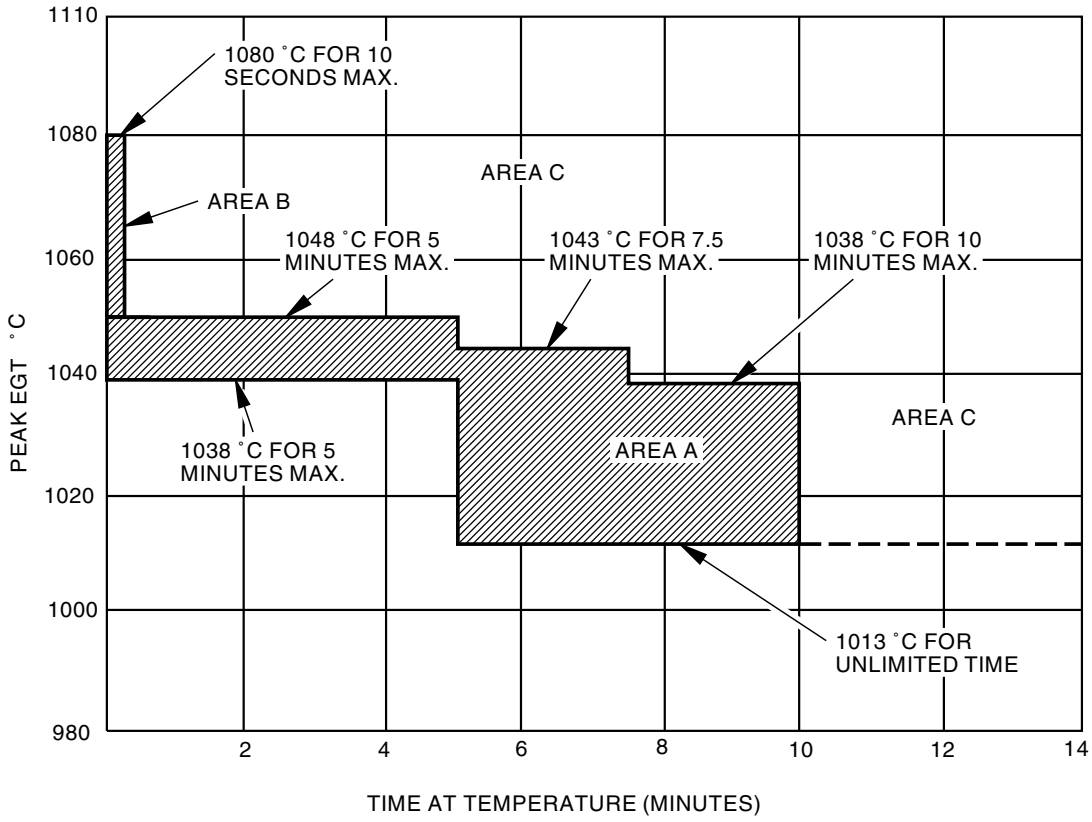
LEGEND:

AREAS: A: UNUSUAL START
B: ABNORMAL START
C: ABORT START

5030995-00
2354256 S00061515045_V4

Start EGT Exceedance Limits
Figure 602/71-00-00-990-873-G00

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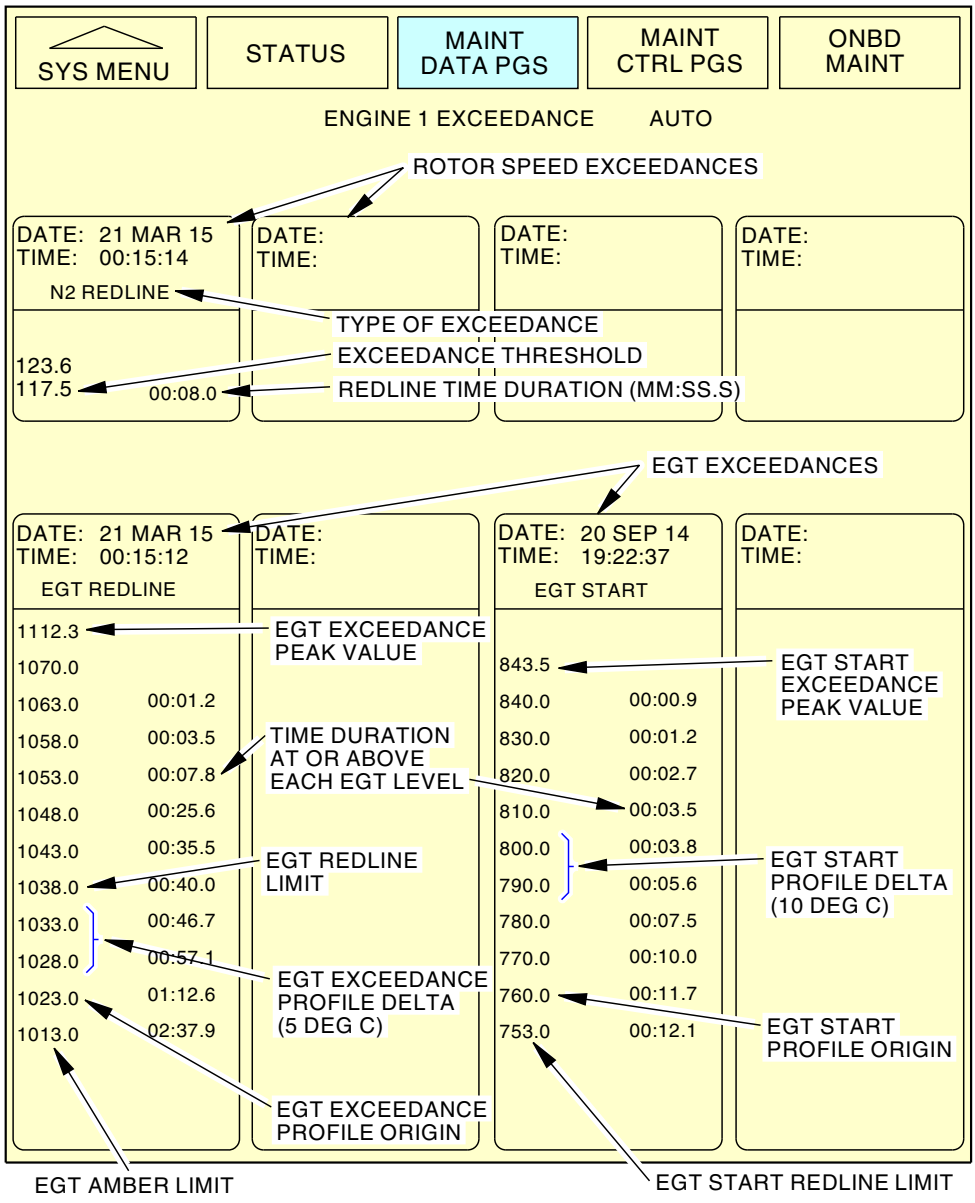


5038692-00

2354257 S00061515046_V5

Takeoff and Maximum Continuous EGT Exceedance Limits
Figure 603/71-00-00-990-874-G00

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MDS ENGINE EXCEEDANCE DISPLAY

2488712 S0000585786_V1

MDS Engine Exceedance Display
Figure 604/71-00-00-990-892-G00

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TASK 71-00-00-200-811-G00

11. Engine High Vibration Inspection

A. General

(1) This task gives the instructions to do the inspection for high engine vibration.

(2) The high vibration in the airplane is displayed and recorded in the flight crew report.

(3) This task has three procedures:

(a) Engine High Vibration Inspection (At or Above Idle)

(b) Engine Core High Vibration Inspection (During Engine Start)

(c) Engine Fan/LPT High Transient Vibration During Ice Crystal Icing (ICI) Conditions Inspection.

(4) Vibration that occurs during an engine start can be caused by uneven heating of the engine core (bowed rotor effect). The Engine Electronic Control (EEC) logic mitigates the bowed rotor effect by increasing motoring time before supplying fuel and ignition during the start attempt. If vibration exceeds limits during the start (even if the vibration is below limits when the engine reaches idle), you must look for damage on the compressor and external hardware. Go to the IFIM and do the applicable procedure(s).

(5) Engine low pressure (fan/LPT) vibration may increase during operation in ice crystal icing conditions due to accumulation of ice crystals on the spinner and fan blade platforms. Vibrations typically reduce after leaving the ice crystal icing conditions, as the accumulated ice sublimates and/or melts. Water draining from the spinner or fan blade platforms after engine shutdown is a typical indication of ice crystal accumulation during the previous flight.

If the vibration during ICI conditions occurred in conjunction with engine surge, stall, flameout, or uncommanded thrust loss; do this task: Engine Ice Crystal Operation Foreign Object Damage Inspection, TASK 71-00-00-200-804-G00.

B. References

Reference	Title
71-00-00-720-803-G00	Test No. 9 - Low Pressure System (Fan/LPT) Vibration Survey (P/B 501)
71-00-00-720-804-G00	Test No. 10 - High Pressure System (HPC/HPT) Vibration Survey (P/B 501)
71-00-00-720-805-G00	Test No. 11 - Low Pressure System (Fan) Trim Balance (With ONS) (P/B 501)
71-00-00-790-804-G00	Test No. 4 - Idle Leak Test (P/B 501)
71-00-02-000-801-G00	Power Plant - Removal (P/B 401)
71-00-02-400-801-G00	Power Plant - Installation (P/B 401)
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)
72-00-00-290-803-G00	Booster Blades and Vanes Borescope Inspection (P/B 601)
72-00-00-290-804-G00	High Pressure Compressor Section Borescope Detailed Inspection (P/B 601)
72-00-00-290-806-G00	High Pressure Turbine Section Detailed Inspection (P/B 601)
72-00-00-290-811-G00	Low Pressure Turbine (LPT) Section Borescope Inspection (P/B 601)
72-21-00-200-802-G00	Fan Case Module Inspection (P/B 601)
72-22-01-000-801-G00	Front Spinner Cone Removal (P/B 401)

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(Continued)

Reference	Title
72-22-01-200-801-G00	Front Spinner Cone Inspection (P/B 601)
72-22-01-400-801-G00	Front Spinner Cone Installation (P/B 401)
72-22-02-000-802-G00	Fan Blades (Pair) Removal (P/B 401)
72-22-02-000-803-G00	Fan Blades (Set) Removal (P/B 401)
72-22-02-200-801-G00	Fan Blade Inspection (P/B 601)
72-22-02-400-802-G00	Fan Blades (Pair) Installation (P/B 401)
72-22-02-400-803-G00	Fan Blades (Set) Installation (P/B 401)
72-22-03-000-801-G00	Fan Blade Platforms - Removal (P/B 401)
72-22-03-200-801-G00	Fan Blade Platforms Inspection (P/B 601)
72-22-03-400-801-G00	Fan Blade Platforms - Installation (P/B 401)
72-23-00-211-804-G00	Fan Frame Module Inspection (P/B 601)
72-50-02-200-801-G00	Low Pressure Turbine (LPT) Rotor and Stator Module Inspection (P/B 601)
72-50-03-200-801-G00	Turbine Rear Vane Module Inspection (P/B 601)
73-11-06-210-801-G00	Split Control Unit Inspection (P/B 601)
73-21-05-000-801-G00	Electronic Engine Control (EEC) Channel A Removal (P/B 401)
73-21-05-000-802-G00	Electronic Engine Control (EEC) Channel B Removal (P/B 401)
73-21-05-210-801-G00	Electronic Engine Control Inspection (P/B 601)
73-21-05-400-801-G00	Electronic Engine Control (EEC) Channel A Installation (P/B 401)
73-21-05-400-802-G00	Electronic Engine Control (EEC) Channel B Installation (P/B 401)
73-22-01-210-802-G00	Engine Control Electrical Harness Connectors Inspection (P/B 601)
77-12-00-210-801-G00	Engine Tachometer Inspection (P/B 601)
77-12-01-000-801-G00	N1 Speed Sensor Removal (P/B 401)
77-12-01-400-801-G00	N1 Speed Sensor Installation (P/B 401)
77-12-02-000-801-G00	N2 Speed Sensor Removal (P/B 401)
77-12-02-400-801-G00	N2 Speed Sensor Installation (P/B 401)
77-31-06-000-801-G00	Turbine Center Frame Accelerometer Removal (P/B 401)
77-31-06-400-801-G00	Turbine Center Frame Accelerometer Installation (P/B 401)
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)
78-31-01-820-801-G00	Thrust Reverser Adjustment (P/B 501)
79-00-00-210-804-G00	Oil Debris Monitoring System Sensor Inspection (P/B 601)
79-21-04-211-801-G00	Scavenge Screen Plug Inspection (P/B 201)
IFIM and do the applicable procedure(s)	Interactive Fault Isolation Manual

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C. Tools/Equipment

Reference	Description
STD-664	Pliers - Teflon-jawed (or Equivalent Soft-Jawed)

D. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
411	Engine 1 - Engine
421	Engine 2 - Engine

E. 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

F. Prepare for the Inspection

SUBTASK 71-00-00-010-013-G00

(1) 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
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).

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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

G. Engine High Vibration Inspection (At or Above Idle)

SUBTASK 71-00-00-210-039-G00

(1) Find the engine rotor in which the vibration is more than the limit.

NOTE: Engine rotor vibrations are displayed on the EPCS page 3 on the Multi Function Display (MFD) under the System (SYS) Maintenance Data Pages. The engine rotor vibration reading on the EPCS page 3 allows to check if high levels are due to fluctuations or spikes (spurious signals). It is recommended to make this vibration reading on the EPCS page 3 when performing vibration survey tasks.

(a) If the N1 vibration is high, do this step for the low pressure (FAN and LPT) system high vibration:

1) Make a record of the vibration source, FAN or Low Pressure Turbine (LPT).

(b) If the N2 vibration is high, do this step for the high pressure (HPC and HPT) system high vibration:

1) Make a record of the vibration source, High Pressure Compressor (HPC) or High Pressure Turbine (HPT).

(c) If the broadband (BB) vibration was shown, do the steps of the broadband vibration below.

SUBTASK 71-00-00-211-001-G00

(2) If the engine has a low pressure (FAN and LPT) system high vibration, do these steps:

(a) Examine the internal surfaces of the inlet cowl and engine fan for obvious signs of damage, unwanted material, metal or broken blades, hit (impact) marks or damage from a bird strike.

1) If there are signs of impact damage, do an inspection for foreign object damage or a bird strike (TASK 71-00-00-200-802-G00).

2) If you find damage that is in the limits, identify the cause or the source and make a record to do the applicable repairs as necessary.

3) If you find engine damage that is more than the limits, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

(b) Examine the internal surfaces of the turbine exhaust areas for clear signs of heat damage, unwanted material, metal particles or broken blades.

1) If there are signs of damage, examine the turbine exhaust system.

2) If you find damage in the turbine exhaust that is in the limits, identify the cause or the source and make a record to do the applicable repairs as necessary.

3) If you find damage that is more than the limits, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

(c) Examine the Oil Debris Monitoring System (ODMS) sensor and all the scavenge screen plugs on the engine oil system for possible bearing damage or oil contamination (TASK 79-00-00-210-804-G00 and TASK 79-21-04-211-801-G00).

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1) If you find damage that is within limits, you must identify the cause or the source and make a record to do the applicable repairs as necessary.

2) If you find engine damage that is more than the limits, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

(d) Examine the applicable Electronic Engine Control (EEC), its attachment fasteners, wire harnesses, and electrical connectors (TASK 73-21-05-210-801-G00).

1) If there is damage to the EEC, replace the EEC (TASK 73-21-05-000-801-G00 or TASK 73-21-05-000-802-G00 and TASK 73-21-05-400-801-G00 or TASK 73-21-05-400-802-G00).

(e) Examine the No. 1 bearing accelerometer, the wire harnesses and electrical connectors.

1) Look for loose or damaged engine components, pneumatic ducts and brackets installed around the accelerometer and under the wire harnesses that can cause vibration.

a) Repair the damage that you find.

2) Examine the accelerometer electrical connector for damage, open circuits, shorts to ground, and wire-to-wire short circuits or signs of electrical arcing, and corrosion or oxidation on the connector pins.

CAUTION

MAKE SURE THAT THE ELECTRICAL CONNECTORS AND RECEPTACLES ARE CLEAN AND CLEAR OF UNWANTED MATERIALS BEFORE YOU DISCONNECT, OR CONNECT THEM. CONTAMINATION OF THE ELECTRICAL CONNECTORS AND RECEPTACLES CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION

USE PLIERS THAT HAVE TEFLON JAWS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE PLIERS THAT HAVE METAL JAWS. METAL JAWS CAN CAUSE DAMAGE TO THE ELECTRICAL CONNECTORS.

a) If an electrical connector is loose, use a teflon-jawed pliers, STD-664 to tighten the connector.

3) Look for damage (chaffing) to the wire harness insulation for the length of the harness route.

a) If it is necessary, repair the wire harness.

4) Tighten all loose wire harness clamps and fasteners for the length of the harness route.

(f) Examine the Turbine Center Frame (TCF) accelerometer, the wire harness and electrical connectors.

1) Look for loose or damaged engine components, pneumatic ducts and brackets installed around the accelerometer and under the wire harness that can cause vibration.

a) Repair the damage that you find.

2) Examine the accelerometer electrical connector for damage, open circuits, shorts to ground, and wire-to-wire short circuits or signs of electrical arcing, and corrosion or oxidation on the connector pins.

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CAUTION MAKE SURE THAT THE ELECTRICAL CONNECTORS AND RECEPTACLES ARE CLEAN AND CLEAR OF UNWANTED MATERIALS BEFORE YOU DISCONNECT, OR CONNECT THEM. CONTAMINATION OF THE ELECTRICAL CONNECTORS AND RECEPTACLES CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION USE PLIERS THAT HAVE TEFLON JAWS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE PLIERS THAT HAVE METAL JAWS. METAL JAWS CAN CAUSE DAMAGE TO THE ELECTRICAL CONNECTORS.

a) If an electrical connector is loose, use a teflon-jawed pliers, STD-664 to tighten the connector.

3) Look for damage (chaffing) to the wire harness insulation for the length of the harness route from the accelerometer to the Channel A EEC.

a) If it is necessary, repair the wire harness.

4) Tighten all loose wire harness clamps and fasteners for the length of the harness route.

5) If there is damage or cracks, replace the TCF accelerometer (TASK 77-31-06-000-801-G00 and TASK 77-31-06-400-801-G00).

(g) If the MFD showed a high N1 (Fan or LPT) vibration and there were fluctuations or spikes in the vibration reading, replace the TCF bearing accelerometer (TASK 77-31-06-000-801-G00 and TASK 77-31-06-400-801-G00).

(h) Do the inspection of the split control unit (TASK 73-11-06-210-801-G00).

(i) Do the inspection of the LPT upper and lower cooling manifold and turbine rear vane.

1) Examine the LPT upper and lower cooling manifold (TASK 72-50-02-200-801-G00).

2) Examine the turbine rear vane (TASK 72-50-03-200-801-G00).

(j) Do the borescope inspection of the LPT (TASK 72-00-00-290-811-G00).

1) If you find damage that is within the limits, do the applicable repairs as necessary.

a) Monitor the engine for high vibration on the subsequent flight.

2) If you find damage that is out of limits, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

(k) Do the inspection of the fan blades, front spinner cone, fan blade platforms, outer OGV platforms, and fan case abradable.

1) Examine the front spinner cone (TASK 72-22-01-200-801-G00).

a) If the front spinner cone is damaged, replace the front spinner cone (TASK 72-22-01-000-801-G00 and TASK 72-22-01-400-801-G00).

2) Examine the fan blade platforms (TASK 72-22-03-200-801-G00).

a) If you find damage, replace the fan blade platform (TASK 72-22-03-000-801-G00 and TASK 72-22-03-400-801-G00).

3) Examine the installed fan blades using the criteria from this task: Fan Blade Inspection, TASK 72-22-02-200-801-G00.

a) If you find damage, replace the fan blade(s) (TASK 72-22-02-000-802-G00 and TASK 72-22-02-400-802-G00 or TASK 72-22-02-000-803-G00 and TASK 72-22-02-400-803-G00).

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4) Examine the outer OGV platforms (TASK 72-23-00-211-804-G00).

5) Examine the fan case abradable (TASK 72-21-00-200-802-G00).

6) If you find engine damage that you cannot repair, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

(l) Do the borescope inspection of the booster section (TASK 72-00-00-290-803-G00).

1) If you find damage that is within the limits, do the applicable repairs as necessary.

a) Monitor the engine for high vibration on the subsequent flight.

2) If you find damage that is out of limits, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

(m) Do this task: Test No. 9 - Low Pressure System (Fan/LPT) Vibration Survey, TASK 71-00-00-720-803-G00.

NOTE: This step validates any corrective action done in the steps above.

1) If the vibration is in limits, return the engine to service and monitor for high vibration on the subsequent flight.

(n) If you did not find damage and the N1 vibration was more than 4.0 units at all conditions, do the fan trim balance procedure (TASK 71-00-00-720-805-G00).

1) Do the applicable repairs as necessary.

2) Make sure that the fan trim balance procedure decreases the vibration to a limit that is satisfactory in the IFIM. Do this task: Test No. 9 - Low Pressure System (Fan/LPT) Vibration Survey, TASK 71-00-00-720-803-G00.

3) Monitor the engine for high vibration on the subsequent flight.

(o) If the vibration remains high, do a check for the possibility of vibration caused by the engine installation, engine mounts and thrust links or the engine cowling.

(p) If the vibration remains high after you do all fault isolation procedures to find the problem, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00)

SUBTASK 71-00-00-211-002-G00

(3) If the engine has a high pressure (HPC and HPT) system high vibration, do the steps as follow:

(a) Examine the internal surfaces of the inlet cowl and engine fan for obvious signs of damage, unwanted material, metal or broken blades, hit (impact) marks or damage from a bird strike.

1) If there are signs of impact damage, do an inspection for foreign object damage or a bird strike (TASK 71-00-00-200-802-G00).

2) If you find damage that is in the limits, identify the cause or the source and make a record to do the applicable repairs as necessary.

3) If you find engine damage that is more than the limits, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

(b) Examine the internal surfaces of the turbine exhaust areas for clear signs of heat damage, unwanted material, metal particles or broken blades.

1) If there are signs of damage, examine the turbine exhaust system for damage.

2) If you find damage that is within limits, identify the cause or the source and make a record to do the applicable repairs as necessary.

3) If you find engine damage that is more than the limits, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

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(c) Examine the Oil Debris Monitoring System (ODMS) sensor and all the scavenge screen plugs on the engine oil system for possible bearing damage or oil contamination (TASK 79-00-00-210-804-G00 and TASK 79-21-04-211-801-G00).

1) If you find damage that is within limits, you must identify the cause or the source and make a record to do the applicable repairs as necessary.

2) If you find engine damage that is more than the limits, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

(d) Examine the applicable Electronic Engine Control (EEC), its attachment fasteners, wire harnesses, and electrical connectors (TASK 73-21-05-210-801-G00).

1) If there is damage to the EEC, replace the EEC (TASK 73-21-05-000-801-G00 or TASK 73-21-05-000-802-G00 and TASK 73-21-05-400-801-G00 or TASK 73-21-05-400-802-G00).

(e) Examine the No. 1 bearing accelerometer, the wire harnesses and electrical connectors.

1) Look for loose or damaged engine components, pneumatic ducts and brackets installed around the accelerometer and under the wire harnesses that can cause vibration.

a) Repair the damage that you find.

2) Examine the accelerometer electrical connector for damage, open circuits, shorts to ground, and wire-to-wire short circuits or signs of electrical arcing, and corrosion or oxidation on the connector pins.

CAUTION MAKE SURE THAT THE ELECTRICAL CONNECTORS AND RECEPTACLES ARE CLEAN AND CLEAR OF UNWANTED MATERIALS BEFORE YOU DISCONNECT, OR CONNECT THEM. CONTAMINATION OF THE ELECTRICAL CONNECTORS AND RECEPTACLES CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION USE PLIERS THAT HAVE TEFLON JAWS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE PLIERS THAT HAVE METAL JAWS. METAL JAWS CAN CAUSE DAMAGE TO THE ELECTRICAL CONNECTORS.

a) If an electrical connector is loose, use a teflon-jawed pliers, STD-664 to tighten the connector.

3) Look for damage (chaffing) to the wire harness insulation for the length of the harness route.

a) If it is necessary, repair the wire harness.

4) Tighten all loose wire harness clamps and fasteners for the length of the harness route.

(f) Examine the Turbine Center Frame (TCF) accelerometer, the wire harness and electrical connectors.

1) Look for loose or damaged engine components, pneumatic ducts and brackets installed around the accelerometer and under the wire harness that can cause vibration.

a) Repair the damage that you find.

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2) Examine the accelerometer electrical connector for damage, open circuits, shorts to ground, and wire-to-wire short circuits or signs of electrical arcing, and corrosion or oxidation on the connector pins.

CAUTION MAKE SURE THAT THE ELECTRICAL CONNECTORS AND RECEPTACLES ARE CLEAN AND CLEAR OF UNWANTED MATERIALS BEFORE YOU DISCONNECT, OR CONNECT THEM. CONTAMINATION OF THE ELECTRICAL CONNECTORS AND RECEPTACLES CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION USE PLIERS THAT HAVE TEFLON JAWS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE PLIERS THAT HAVE METAL JAWS. METAL JAWS CAN CAUSE DAMAGE TO THE ELECTRICAL CONNECTORS.

a) If an electrical connector is loose, use a teflon-jawed pliers, STD-664 to tighten the connector.

3) Look for damage (chaffing) to the wire harness insulation for the length of the harness route from the accelerometer to the Channel A EEC.

a) If it is necessary, repair the wire harness.

4) Tighten all loose wire harness clamps and fasteners for the length of the harness route.

5) If there is damage or cracks, replace the TCF accelerometer (TASK 77-31-06-000-801-G00 and TASK 77-31-06-400-801-G00).

(g) If the Multi Function Display (MFD) showed a high N2 vibration and there were fluctuations or spikes in the vibration reading, replace the TCF accelerometer (TASK 77-31-06-000-801-G00 and TASK 77-31-06-400-801-G00).

(h) Do the inspection of the LPT upper and lower cooling manifold and turbine rear vane.

1) Examine the LPT upper and lower cooling manifold (TASK 72-50-02-200-801-G00).

2) Examine the turbine rear vane (TASK 72-50-03-200-801-G00).

(i) Do the borescope inspection of the High Pressure Compressor (HPC) (TASK 72-00-00-290-804-G00).

1) If you find damage that is within the limits, continue to monitor the engine for high vibration on the subsequent flight.

2) If you find damage that is out of limits, do the applicable repairs as necessary.

a) If no repairs are available, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

(j) Do the borescope inspection of the High Pressure Turbine (HPT) (TASK 72-00-00-290-806-G00).

1) If you find damage that is within the limits, continue to monitor the engine for high vibration on the subsequent flight.

2) If you find damage that is out of limits, do the applicable repairs as necessary.

a) If no repairs are available, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

(k) Do the high pressure system vibration survey (TASK 71-00-00-720-804-G00).

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1) If the vibration is in limits, return to service and monitor the engine for high vibration on the subsequent flight.

(l) If the vibration remains high, do a check for the possibility of vibration caused by the engine installation, engine mounts and thrust links or the engine cowling.

(m) If the vibration remains high after you have done all fault isolation procedures to find the problem, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00)

SUBTASK 71-00-00-211-003-G00

(4) If the engine has broadband vibration, do the steps as follow:

(a) Examine the N1 speed sensor, the electrical connectors and the wire harness and clamps (TASK 77-12-00-210-801-G00).

1) Examine the sensor electrical connectors for damage, open circuits, shorts to ground, and wire-to-wire short circuits or signs of electrical arcing, and corrosion or oxidation on the connector pins (TASK 73-22-01-210-802-G00).

CAUTION MAKE SURE THAT THE ELECTRICAL CONNECTORS AND RECEPTACLES ARE CLEAN AND CLEAR OF UNWANTED MATERIALS BEFORE YOU DISCONNECT, OR CONNECT THEM. CONTAMINATION OF THE ELECTRICAL CONNECTORS AND RECEPTACLES CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION USE PLIERS THAT HAVE TEFLON JAWS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE PLIERS THAT HAVE METAL JAWS. METAL JAWS CAN CAUSE DAMAGE TO THE ELECTRICAL CONNECTORS.

a) If an electrical connector is loose, use a teflon-jawed pliers, STD-664 to tighten the connector.

2) Look for damage (chaffing) to the wire harness insulation for the length of the harness route from the accelerometer to the EEC.

a) If it is necessary, repair the wire harness.

3) Tighten all loose wire harness clamps and fasteners for the length of the harness route.

4) If there is damage to the N1 speed sensor, replace the speed sensor (TASK 77-12-01-000-801-G00 and TASK 77-12-01-400-801-G00)

(b) Examine the N2 speed sensor, the electrical connectors and the wire harness and clamps (TASK 77-12-00-210-801-G00).

1) Examine the sensor electrical connectors for damage, open circuits, shorts to ground, and wire-to-wire short circuits or signs of electrical arcing, and corrosion or oxidation on the connector pins (TASK 73-22-01-210-802-G00).

a) If an electrical connector is loose, use a teflon-jawed pliers, STD-664 to tighten the connector.

2) Look for damage (chaffing) to the wire harness insulation for the length of the harness route from the accelerometer to the EEC.

a) If it is necessary, repair the wire harness.

3) Tighten all loose wire harness clamps and fasteners for the length of the harness route.

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4) If there is damage to the N2 speed sensor, replace the speed sensor (TASK 77-12-02-000-801-G00 and TASK 77-12-02-400-801-G00)

(c) Examine the applicable Electronic Engine Control (EEC), its attachment fasteners, wire harnesses, and electrical connectors (TASK 73-21-05-210-801-G00).

1) If there is damage to the EEC, replace the EEC (TASK 73-21-05-000-801-G00 or TASK 73-21-05-000-802-G00 and TASK 73-21-05-400-801-G00 or TASK 73-21-05-400-802-G00).

(d) Examine the No. 1 bearing accelerometer, the wire harnesses and electrical connectors.

1) Look for loose or damage on engine components, pneumatic ducts and brackets installed around the accelerometer and under the wire harnesses that can cause vibration.

a) Repair the damage that you find.

2) Examine the accelerometer electrical connector for damage, open circuits, shorts to ground, and wire-to-wire short circuits or signs of electrical arcing, and corrosion or oxidation on the connector pins.

CAUTION MAKE SURE THAT THE ELECTRICAL CONNECTORS AND RECEPTACLES ARE CLEAN AND CLEAR OF UNWANTED MATERIALS BEFORE YOU DISCONNECT, OR CONNECT THEM. CONTAMINATION OF THE ELECTRICAL CONNECTORS AND RECEPTACLES CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION USE PLIERS THAT HAVE TEFLON JAWS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE PLIERS THAT HAVE METAL JAWS. METAL JAWS CAN CAUSE DAMAGE TO THE ELECTRICAL CONNECTORS.

a) If an electrical connector is loose, use a teflon-jawed pliers, STD-664 to tighten the connector.

3) Look for damage (chaffing) to the wire harness insulation for the length of the harness route.

a) If it is necessary, repair the wire harness.

4) Tighten all loose wire harness clamps and fasteners for the length of the harness route.

5) If there is damage or cracks, replace the damaged components.

(e) Examine the Turbine Center Frame (TCF) accelerometer, the wire harness and electrical connectors.

1) Look for loose or damage on engine components, pneumatic ducts and brackets installed around the accelerometer and under the wire harness that can cause vibration.

a) Repair the damage that you find.

2) Examine the accelerometer electrical connector for damage, open circuits, shorts to ground, and wire-to-wire short circuits or signs of electrical arcing, and corrosion or oxidation on the connector pins.

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CAUTION MAKE SURE THAT THE ELECTRICAL CONNECTORS AND RECEPTACLES ARE CLEAN AND CLEAR OF UNWANTED MATERIALS BEFORE YOU DISCONNECT, OR CONNECT THEM. CONTAMINATION OF THE ELECTRICAL CONNECTORS AND RECEPTACLES CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION USE PLIERS THAT HAVE TEFLON JAWS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE PLIERS THAT HAVE METAL JAWS. METAL JAWS CAN CAUSE DAMAGE TO THE ELECTRICAL CONNECTORS.

a) If an electrical connector is loose, use a teflon-jawed pliers, STD-664 to tighten the connector.

3) Look for damage (chaffing) to the wire harness insulation for the length of the harness route from the accelerometer to the EEC.

a) If it is necessary, repair the wire harness.

4) Tighten all loose wire harness clamps and fasteners for the length of the harness route.

5) If there is damage or cracks, replace the TCF accelerometer (TASK 77-31-06-000-801-G00 and TASK 77-31-06-400-801-G00).

(f) If the N1 speed sensor or the N2 speed sensor, the electrical connectors and the wire harness and clamps were repaired or replaced, do this task: Test No. 4 - Idle Leak Test, TASK 71-00-00-790-804-G00.

1) Monitor the engine for high vibration on the subsequent flight.

(g) If the No. 1 bearing accelerometer, the electrical connectors and the wire harnesses and clamps were repaired or replaced, do this task: Test No. 9 - Low Pressure System (Fan/LPT) Vibration Survey, TASK 71-00-00-720-803-G00.

1) Monitor the engine for high vibration on the subsequent flight.

(h) If the TCF accelerometer, the electrical connectors and the wire harness and clamps were repaired or replaced, do this task: Test No. 10 - High Pressure System (HPC/HPT) Vibration Survey, TASK 71-00-00-720-804-G00.

1) Monitor the engine for high vibration on the subsequent flight.

SUBTASK 71-00-00-211-004-G00

(5) If the engine has high vibration caused by external components, do the steps as follow:

(a) Examine the thrust reverser halves are adjusted to touch together when completely closed and latched.

1) If the thrust reverser halves do not touch, adjust the thrust reverser (TASK 78-31-01-820-801-G00).

2) Monitor the engine for high vibration on the subsequent flight.

(b) Examine the engine installation to the strut.

1) No gap or light can be seen between the strut bottom and the top of the engine mounts.

2) If a gap can be seen, tighten the engine attachment bolts (TASK 71-00-02-400-801-G00).

3) Monitor the engine for high vibration on the subsequent flight.

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(c) Examine the applicable forward and aft engine mounts and thrust links for damage or loose bolts.

(d) If you find damage or loose bolts on the engine mounts or thrust links, do these steps:

1) Do this task: Power Plant - Removal, TASK 71-00-02-000-801-G00.

2) If the thrust link bolts are loose or there is damage to the link, replace the thrust link or tighten the thrust link bolts.

3) If the forward or aft engine mount bolts are loose or there is damage to the mounts, tighten the bolts or replace the engine mount.

4) Do this task: Power Plant - Installation, TASK 71-00-02-400-801-G00.

5) Monitor the engine for high vibration on the subsequent flight.

(e) Do these steps if you find loose engine or cowling parts and parts that are not stowed correctly:

1) Repair or replace the loose part.

2) If it is necessary, correctly stow the part.

3) Monitor the engine for high vibration on the subsequent flight.

(f) Examine the accessory gearbox and mounting hardware for damage.

1) Repair the damage that you find.

SUBTASK 71-00-00-160-004-G00

(6) Clean the work area and clear the tools and items that you used to do the task.

H. Engine Core High Vibration Inspection (During Engine Start)

SUBTASK 71-00-00-211-009-G00

(1) Do the inspection of the engine for obvious signs of damage.

NOTE: The ENGINE CONTROL light is set when engine core rotor (N2) vibration exceeds limits during engine start.

(a) Examine the internal surfaces of the booster inlet obvious signs of damage, unwanted material, metal or broken blades, hit (impact) marks or damage from a bird strike (TASK 71-00-00-200-802-G00).

1) If you find damage that is within limits, continue the procedure.

2) If you find engine damage that is more than the limits, do the applicable repairs as necessary and continue the procedure.

a) If no on-wing repairs are available, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

(b) Examine the internal surfaces of the turbine exhaust areas for clear signs of heat damage, unwanted material, metal particles or broken blades.

1) If there are signs of damage, examine the turbine exhaust system for damage.

2) If you find damage that is within limits, continue the procedure.

3) If you find engine damage that is more than the limits, do the applicable repairs as necessary and continue the procedure.

a) If no on-wing repairs are available, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

(c) Examine the Oil Debris Monitoring System (ODMS) sensor and all the scavenge screen plugs on the engine oil system for possible bearing damage or oil contamination (TASK 79-00-00-210-804-G00 and TASK 79-21-04-211-801-G00).

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1) If you find damage that is within limits, you must identify the cause or the source and make a record to do the applicable repairs as necessary.

2) If you find engine damage that is more than the limits, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

3) If you do not find debris or damage with the ODMS, continue the procedure.

(d) Examine the LPT upper and lower cooling manifold (TASK 72-50-02-200-801-G00).

(e) Examine the turbine rear vane (TASK 72-50-03-200-801-G00).

SUBTASK 71-00-00-290-005-G00

(2) Do the borescope inspection of stages 6 through 9 of the HPC (TASK 72-00-00-290-804-G00).

(a) If you find damage that is within the limits, continue to monitor the engine for high vibration on the subsequent engine starts.

(b) If you find damage that is out of limits, do the applicable repairs as necessary.

1) If no repairs are available, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

SUBTASK 71-00-00-210-059-G00

(3) Do the inspection of the core engine externals for signs of damage.

(a) Look for loose or damaged engine components, fuel/oil tubes, pneumatic ducts, and brackets installed around the engine core.

1) Repair the damage that you find.

2) If there are signs of fuel or oil system leaks, do this task: Test No. 4 - Idle Leak Test, TASK 71-00-00-790-804-G00.

SUBTASK 71-00-00-211-010-G00

(4) Examine the Turbine Center Frame (TCF) accelerometer, the wire harness and electrical connectors (TASK 73-22-01-210-802-G00 and TASK 77-12-00-210-801-G00).

(a) Look for loose or damaged engine components, pneumatic ducts and brackets installed around the accelerometer and under the wire harness that can cause vibration.

1) Repair the damage that you find.

(b) Examine the accelerometer electrical connector for damage, open circuits, shorts to ground, and wire-to-wire short circuits or signs of electrical arcing, and corrosion or oxidation on the connector pins.

CAUTION

MAKE SURE THAT THE ELECTRICAL CONNECTORS AND RECEPTACLES ARE CLEAN AND CLEAR OF UNWANTED MATERIALS BEFORE YOU DISCONNECT, OR CONNECT THEM. CONTAMINATION OF THE ELECTRICAL CONNECTORS AND RECEPTACLES CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION

USE PLIERS THAT HAVE TEFLON JAWS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE PLIERS THAT HAVE METAL JAWS. METAL JAWS CAN CAUSE DAMAGE TO THE ELECTRICAL CONNECTORS.

1) If an electrical connector is loose, use a teflon-jawed pliers, STD-664 to tighten the connector.

(c) Look for damage (chaffing) to the wire harness insulation for the length of the harness route from the accelerometer to the Channel A EEC.

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1) If it is necessary, repair the wire harness.

(d) Tighten all loose wire harness clamps and fasteners for the length of the harness route.

(e) If there is damage or cracks, replace the TCF accelerometer (TASK 77-31-06-000-801-G00 and TASK 77-31-06-400-801-G00).

SUBTASK 71-00-00-211-011-G00

(5) Examine the No. 1 bearing accelerometer, the wire harnesses and electrical connectors (TASK 73-22-01-210-802-G00).

(a) Look for loose or damaged engine components, pneumatic ducts and brackets installed around the accelerometer and under the wire harnesses that can cause vibration.

1) Repair the damage that you find.

(b) Examine the accelerometer electrical connector for damage, open circuits, shorts to ground, and wire-to-wire short circuits or signs of electrical arcing, and corrosion or oxidation on the connector pins.

CAUTION

MAKE SURE THAT THE ELECTRICAL CONNECTORS AND RECEPTACLES ARE CLEAN AND CLEAR OF UNWANTED MATERIALS BEFORE YOU DISCONNECT, OR CONNECT THEM. CONTAMINATION OF THE ELECTRICAL CONNECTORS AND RECEPTACLES CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION

USE PLIERS THAT HAVE TEFLON JAWS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE PLIERS THAT HAVE METAL JAWS. METAL JAWS CAN CAUSE DAMAGE TO THE ELECTRICAL CONNECTORS.

1) If an electrical connector is loose, use a teflon-jawed pliers, STD-664 to tighten the connector.

(c) Look for damage (chaffing) to the wire harness insulation for the length of the harness route.

1) If it is necessary, repair the wire harness.

(d) Tighten all loose wire harness clamps and fasteners for the length of the harness route.

(e) If there is damage or cracks, replace the damaged components.

SUBTASK 71-00-00-700-068-G00

(6) Do this task: Test No. 10 - High Pressure System (HPC/HPT) Vibration Survey, TASK 71-00-00-720-804-G00.

(a) If the vibration is in limits during the engine start, return to service and continue to monitor the engine for high vibration on subsequent starts.

SUBTASK 71-00-00-210-060-G00

(7) If the vibration remains high, do a check for the possibility of vibration caused by the engine installation, engine mounts and thrust links or the engine cowling.

SUBTASK 71-00-00-960-002-G00

(8) If the vibration remains high after you have done all fault isolation procedures to find the problem, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

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I. Engine Fan/LPT High Transient Vibration During Ice Crystal Icing (ICI) Conditions Inspection

SUBTASK 71-00-00-211-012-G00

(1) If the engine low pressure (fan/LPT) vibration reduces to normal level before the end of the flight, do these steps:

NOTE: If the vibration during ICI conditions occurred in conjunction with engine surge, stall, flameout, or uncommanded thrust loss, do this task: Engine Ice Crystal Operation Foreign Object Damage Inspection, TASK 71-00-00-200-804-G00.

(a) Examine the internal surfaces of the inlet cowl and engine fan for obvious signs of crack, unwanted material, metal, or broken blades.

1) If there are signs of impact, do an inspection for foreign object damage (TASK 71-00-00-200-802-G00).

2) If there is an engine finding that is in the limits, identify the cause or the source and make a record to do the applicable repairs as necessary.

3) If there is an engine finding that is more than the limits, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

(b) Do the inspection of the front spinner cone, fan blade platforms, and installed fan blades.

NOTE: Water draining from the spinner or fan blade platforms after engine shutdown is a typical indication of ice crystal accumulation during the previous flight.

1) Examine the external areas of the front spinner cone for findings.

a) If there is a finding, use the limits from this task: Front Spinner Cone Inspection, TASK 72-22-01-200-801-G00.

2) Examine the external areas of the installed fan blade platforms for findings.

a) If there is a finding, use the limits from this task: Fan Blade Platforms Inspection, TASK 72-22-03-200-801-G00.

3) Examine the external areas of the installed fan blades for findings.

a) If there is a finding, use the limits from this task: Fan Blade Inspection, TASK 72-22-02-200-801-G00.

4) If there is an engine finding that you cannot repair, replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

SUBTASK 71-00-00-700-070-G00

(2) If the engine low pressure (fan/LPT) vibration did not reduce to normal level before the end of the flight or there is no finding during previous inspections, do these steps:

(a) Do this task: Test No. 9 - Low Pressure System (Fan/LPT) Vibration Survey, TASK 71-00-00-720-803-G00.

(b) If the vibration is in limits, return to service and monitor the engine for high vibration on the subsequent flight.

1) If vibration is in the usual limits, return to service and continue to monitor the engine for high vibration on the subsequent flight.

2) If vibration is not in the usual limits, then do all the remaining inspections called out in the topic “Engine High Vibration Inspection (At or Above Idle)”.

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J. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-410-016-G00

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.

(1) 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.

——— END OF TASK ———

TASK 71-00-00-200-813-G00

12. Engine After a Hard Landing Inspection

A. General

(1) This task gives the instructions to do the inspection for possible damage of an engine after a hard landing.

(2) Do this task for a Phase II Hard Landing.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (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)
72-00-00-290-803-G00	Booster Blades and Vanes Borescope Inspection (P/B 601)
72-00-00-290-804-G00	High Pressure Compressor Section Borescope Detailed Inspection (P/B 601)
72-00-00-290-806-G00	High Pressure Turbine Section Detailed Inspection (P/B 601)
72-00-00-290-811-G00	Low Pressure Turbine (LPT) Section Borescope Inspection (P/B 601)

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(Continued)

Reference	Title
72-21-00-200-802-G00	Fan Case Module Inspection (P/B 601)
72-23-00-211-804-G00	Fan Frame Module Inspection (P/B 601)
72-50-00-200-802-G00	Turbine Center Frame (TCF) Aft Engine Mount Lugs (Scheduled Maintenance Requirement) Inspection (P/B 601)
72-50-00-200-804-G00	Turbine Center Frame (TCF) Section Inspection (P/B 601)
72-50-02-200-801-G00	Low Pressure Turbine (LPT) Rotor and Stator Module Inspection (P/B 601)
72-50-03-200-801-G00	Turbine Rear Vane Module Inspection (P/B 601)
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)
79-00-00-210-804-G00	Oil Debris Monitoring System Sensor Inspection (P/B 601)
79-21-04-211-801-G00	Scavenge Screen Plug Inspection (P/B 201)
79-21-07-200-801-G00	Oil Filter Cartridge Element Inspection (P/B 601)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. 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

F. Prepare for the Inspection

SUBTASK 71-00-00-860-J10-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

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1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-00-00-760-001-G00

(2) 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

SUBTASK 71-00-00-800-035-G00

(3) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 71-00-00-040-002-G00

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

SUBTASK 71-00-00-010-017-G00

(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
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

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G. Engine After a Hard Landing Inspection

SUBTASK 71-00-00-200-018-G00

WARNING BE CAREFUL WHEN YOU TURN THE FAN ROTOR. MAKE SURE THAT YOU ARE IN A STABLE POSITION. ALSO, YOU MUST WEAR HEAVY PROTECTIVE GLOVES TO PREVENT PERSONAL INJURY.

(1) Do these steps to examine the engine for damage as follows:

(a) Turn the fan rotor with your hand counter clockwise (forward looking aft).

1) Make sure that there are no bearing roughness, unusual noises and bindings.

(b) Do a visual inspection of the engine Inlet cowl, exhaust sleeve and exhaust nozzle and all the fasteners.

(c) Examine the forward engine mount (TASK 72-23-00-211-804-G00).

(d) Examine the aft engine mount (TASK 72-50-00-200-802-G00).

(e) Examine the fan frame module (TASK 72-23-00-211-804-G00).

(f) Examine the turbine center frame (TASK 72-50-00-200-804-G00).

(g) Examine the abradable material on the fan inlet case (TASK 72-21-00-200-802-G00).

(h) Do an inspection of the LPT upper and lower cooling manifold and turbine rear vane.

1) Examine the LPT upper and lower cooling manifold (TASK 72-50-02-200-801-G00).

2) Examine the turbine rear vane (TASK 72-50-03-200-801-G00).

(i) Do a visual inspection of the accessory and hardware attachments for metal fractures or excessive distortion.

(j) Do a visual inspection of all ducts, tubes, hoses, and fittings.

1) Make sure that there are no leaks, cracks, distortion or possible interferences.

SUBTASK 71-00-00-200-026-G00

(2) Do a borescope inspection of the booster section (TASK 72-00-00-290-803-G00).

SUBTASK 71-00-00-200-019-G00

(3) Do a borescope inspection of the Stages 1, 3, 4, 8, and 9 High Pressure Compressor (HPC) blades (TASK 72-00-00-290-804-G00).

SUBTASK 71-00-00-200-027-G00

(4) Do a borescope inspection of the LPT (TASK 72-00-00-290-811-G00).

SUBTASK 71-00-00-200-028-G00

(5) Do a borescope inspection of the High Pressure Turbine (HPT) (TASK 72-00-00-290-806-G00).

SUBTASK 71-00-00-200-021-G00

(6) Do an inspection of the oil debris monitoring system sensor, the lubrication unit oil filter cartridge element, and all of the scavenge screen plugs (TASK 79-00-00-210-804-G00, TASK 79-21-07-200-801-G00, TASK 79-21-04-211-801-G00).

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H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-410-025-G00

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.

(1) 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 71-00-00-440-002-G00

(2) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

SUBTASK 71-00-00-760-002-G00

(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

SUBTASK 71-00-00-800-036-G00

(4) Do these steps to remove the DO NOT OPERATE tag, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, from the applicable START LEVER switch.

END OF TASK

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POWER PLANT - DDG MAINTENANCE PROCEDURES

1. General

A. This procedure has maintenance tasks for the Master Minimum Equipment List (MMEL) maintenance requirements as shown in the Dispatch Deviations Guide (DDG). These tasks are used to prepare the airplane for flight with certain systems/components inoperative.

B. This procedure also has the tasks that put the airplane back to its usual condition.

C. This procedure has these tasks:

(1) DDG 71-11-01 Fan Cowl Latch Indication System Inoperative - Preparation

(2) DDG 71-11-01 Fan Cowl Latch Indication System Inoperative - Restoration.

TASK 71-00-00-040-801-G00

2. DDG 71-11-01 Fan Cowl Latch Indication System Inoperative - Preparation

(Figure 901)

A. General

(1) This task gives the maintenance steps which prepare the airplane for flight with the fan cowl latch indication system inoperative.

(2) The fan cowl latch indication system may be inoperative provided that the associated fan cowl latch indication system blade is removed.

B. References

Reference	Title
71-11-06-000-801-G00	Fan Cowl Latch Indication System Removal (P/B 201)
71-11-06-400-801-G00	Fan Cowl Latch Indication System Installation (P/B 201)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
414	Engine 1 - Fan Cowl, Right
421	Engine 2 - Engine
424	Engine 2 - Fan Cowl, Right

D. Fan Cowl Latch Indication System Deactivation

SUBTASK 71-00-00-020-010-G00

(1) Remove the latch indication system forward fairing (TASK 71-11-06-000-801-G00).

SUBTASK 71-00-00-020-011-G00

(2) Remove the blade assembly and re-install the bolt for the blade assembly (TASK 71-11-06-000-801-G00).

SUBTASK 71-00-00-420-001-G00

(3) If the forward fairing is available and not damaged, re-install the forward fairing (TASK 71-11-06-400-801-G00).

NOTE: It is acceptable to operate with the forward fairing missing.

(a) If you will not install the forward fairing, apply speed tape to the fan cowl surface to cover the area where the forward fairing was.

(b) Make sure that the speed tape does not cover the latch or the two drain holes near the location of the forward fairing.

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SUBTASK 71-00-00-020-014-G00

(4) If there is damage to the aft fairing, remove the outer aft fairing (TASK 71-11-06-400-801-G00).

NOTE: It is acceptable to operate with the aft fairing missing.

NOTE: Do not remove the inner aft fairing which is attached to the fan cowl skin with adhesive.

(a) Apply speed tape over the inner portion of the aft fairing.

NOTE: Make sure that the speed tape extends from the lower edge of the fan cowl and approximately 2.0 in. (50.8 mm) aft and above the aft fairing.

(b) Make sure that the speed tape does not cover the latch and the drain holes.

SUBTASK 71-00-00-020-012-G00

(5) If the latch indication system jammed with the handle in the deployed position, remove the handle (TASK 71-11-06-000-801-G00).

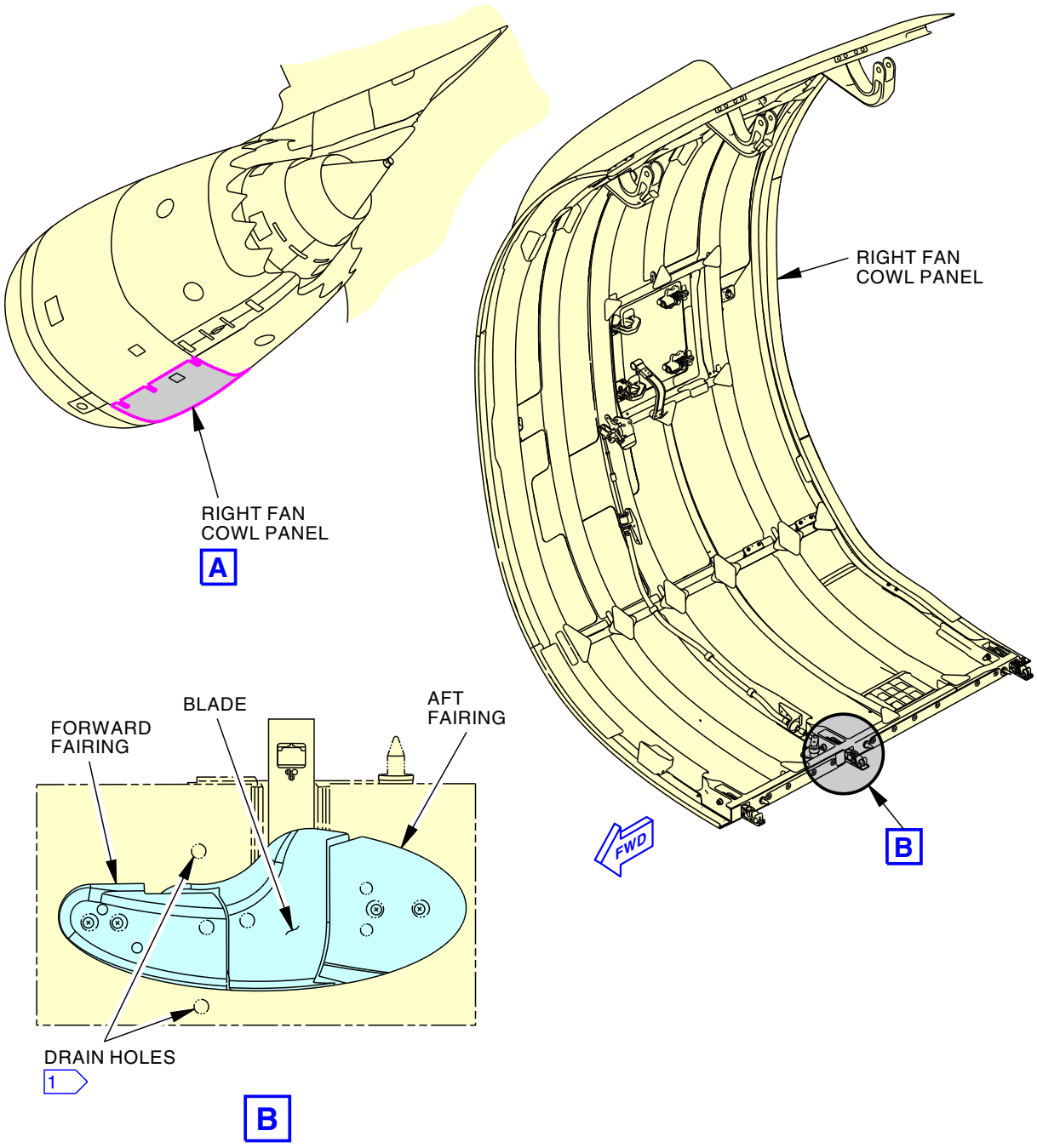
SUBTASK 71-00-00-910-030-G00

(6) Keep all the parts that you removed and are not damaged.

NOTE: These parts will be used for re-installation during the latch indication system restoration.

——— END OF TASK ———

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1 DO NOT COVER WITH SPEED TAPE.

2872103 S0000677998_V1

Fan Cowl Latch Indication System Inoperative - Preparation
Figure 901/71-00-00-990-893-G00

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TASK 71-00-00-440-801-G00

3. DDG 71-11-01 Fan Cowl Latch Indication System Inoperative - Restoration

(Figure 901)

A. General

(1) This task puts the airplane back to its usual condition after operation with the fan cowl latch indication system inoperative.

B. References

Reference	Title
71-11-06-000-801-G00	Fan Cowl Latch Indication System Removal (P/B 201)
71-11-06-400-801-G00	Fan Cowl Latch Indication System Installation (P/B 201)
71-11-06-720-801-G00	Fan Cowl Latch Indication System Rigging Check (P/B 501)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
414	Engine 1 - Fan Cowl, Right
421	Engine 2 - Engine
424	Engine 2 - Fan Cowl, Right

D. Fan Cowl Latch Indication System Restoration

SUBTASK 71-00-00-080-007-G00

(1) Carefully remove all speed tapes installed in the preparation task.

SUBTASK 71-00-00-020-013-G00

(2) If installed, remove the latch indication system forward fairing (TASK 71-11-06-000-801-G00).

SUBTASK 71-00-00-400-001-G00

(3) Remove the bolt for the blade assembly, and use the bolt to install the blade assembly (TASK 71-11-06-000-801-G00 and TASK 71-11-06-400-801-G00).

SUBTASK 71-00-00-420-002-G00

(4) Re-install the forward fairing (TASK 71-11-06-400-801-G00).

SUBTASK 71-00-00-420-004-G00

(5) If removed, install the aft fairing (TASK 71-11-06-000-801-G00).

SUBTASK 71-00-00-420-003-G00

(6) If removed, install the handle (TASK 71-11-06-400-801-G00).

E. Fan Cowl Latch Indication Rigging Check

SUBTASK 71-00-00-710-019-G00

(1) Do this task: Fan Cowl Latch Indication System Rigging Check, TASK 71-11-06-720-801-G00.

——— END OF TASK ———

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POWER PLANT - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) A removal of the power plant

(2) An installation of the power plant.

B. After disconnecting the fuel lines, the hydraulic lines, and the electrical connectors, electrical power can be supplied to the airplane to do other maintenance.

(1) Circuit breakers required for engine removal should be opened and tagged, electrical connectors and exposed wire terminals should be protected with covers, all tube ends, ducts, fueling fittings, and hydraulic fittings are protected.

(2) Make sure that electrical power is removed to connect the fuel lines, the hydraulic lines, and electrical connectors after engine installation.

TASK 71-00-02-000-801-G00

2. Power Plant - Removal

(Figure 401, Figure 402, Figure 403, Figure 404, Figure 405, Figure 406, Figure 407, Figure 408, Figure 409, Figure 410, Figure 411, Figure 412, and Figure 413)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task gives the instructions to remove the power plant.

(2) You can use the bootstrap equipment to remove and install the engine. The bootstrap equipment includes the forward and the aft support assemblies, cradles, chains, and engine stands.

(3) Platforms and stands are necessary to get access to the disconnect points on the power plant.

(4) The bootstrap equipment uses lever hoists to lift and lower the power plant. You can adjust the lever hoists to change the pitch and roll of the power plant while it hangs from the strut.

(5) You can change the pitch when you lift or lower the two front hoists or the rear hoist. You can change the roll when you adjust the aft hoist.

(6) With the bootstrap equipment, dynamometers (load cells) are installed at the hoist locations to show the loads that the bootstrap equipment has on it. You must monitor the loads. And keep them less than the given maximum load limits.

(7) The power plant weighs approximately 7300 lb (3311 kg). You must include the weight of the ground support equipment when you calculate the load.

(8) You can remove an engine with the inlet cowl or without the inlet cowl installed. Without the inlet cowl installed, the aft loads will be slightly higher than the engine with the inlet cowl installed.

B. References

Reference	Title
08-20-02-580-801	Level the Airplane With a Plumb Bob and Inclinometers (P/B 201)
08-20-03-580-801	Level the Airplane With a Attitude Gage (P/B 201)
20-40-11-910-801	Static Grounding (P/B 201)
24-22-00-860-802	Remove Electrical Power (P/B 201)

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Reference	Title
29-11-00-860-805	Hydraulic System A or B Power Removal (P/B 201)
36-00-00-860-806	Remove Pressure from the Pneumatic System (P/B 201)
54-52-01-010-801	Forward Fairing Removal (P/B 401)
71-00-00-720-805-G00	Test No. 11 - Low Pressure System (Fan) Trim Balance (With ONS) (P/B 501)
71-00-03-620-801-G00	Preservation of an Engine (Task Selection) (P/B 201)
71-11-01-000-801-G00	Inlet Cowl Removal (P/B 401)
71-11-04-000-801-G00	Fan Cowl Panels Removal (P/B 401)
71-11-11-000-801-G00	Fan Cowl Hold Open Rod Removal (P/B 201)
71-12-01-000-801-G00	Fan Cowl SDOS Actuators Removal (P/B 401)
71-21-01-000-801-G00	Forward Engine Mount Removal (P/B 401)
71-21-02-000-801-G00	Aft Engine Mount Removal (P/B 401)
71-71-01-000-801-G00	Drain Mast Removal (P/B 401)
73-00-00-700-803-G00	Maintenance Messages Check for EEC Faults (P/B 501)
73-21-00-470-801-G00	EEC System Configuration Data Functions Check (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)
78-31-01-000-801-G00	Thrust Reverser Removal (P/B 401)
78-31-08-000-801-G00	Thrust Reverser Opening Actuator Removal (P/B 401)
78-31-13-000-801-G00	Insulation Blankets - Removal (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-14542	Kit - Bootstrap, LEAP-1B Engine Part #: C71029-1 Supplier: 81205
SPL-14548	Engine Anti-Ice Duct Cover/Support, LEAP-1B Part #: C71037-1 Supplier: 81205
SPL-14550	Equipment - Hold Open, Thrust Reverser Cowl, LEAP-1B Engine Part #: C78033-40 Supplier: 81205 Opt Part #: C78033-1 Supplier: 81205
SPL-14557	Stabilizer - Engine Mount, CFM LEAP-1B Part #: C71036-1 Supplier: 81205
SPL-14637	Torque Equipment - Engine Mount Bolt Part #: C71040-34 Supplier: 81205 Opt Part #: C71040-1 Supplier: 81205 Opt Part #: C71040-30 Supplier: 81205
SPL-14726	Engine Stand - LEAP-1B Part #: 956A8600G04 Supplier: 58828 Opt Part #: 956A8600G03 Supplier: 58828
SPL-15012	Bracket, Lifting - Frame, Turbine Center (TCF) Part #: 956A8667G04 Supplier: 58828

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(Continued)

Reference	Description
SPL-17099	Handling Brackets - Engine Fan Case Part #: 956A8018G02 Supplier: 58828
SPL-18258	Blanking Plate - PRSOV Part #: C36007-11 Supplier: 81205 Opt Part #: C36007-1 Supplier: 81205
SPL-18640	Blanking Plates - Starter Air Duct & Precooler, CFM Engine Series Part #: C36007-12 Supplier: 81205
STD-201	Container - Fuel Resistant, 5 U.S.-Gal (19 l)
STD-664	Pliers - Teflon-jawed (or Equivalent Soft-Jawed)
STD-858	Tag - DO NOT OPERATE
STD-3906	Mallet - Rubber

D. Consumable Materials

Reference	Description	Specification
D00599 [CP2442]	Oil - Engine	
D00601 [CP2101]	Vaseline - Graphite Mineral	
G02495 [CP8002]	Wire - Safety, 0.032 Inch (0.8 mm) Diameter	AMS5689

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
252	Preformed packing	73-11-01-01-050	SIA ALL
257	Preformed packing	73-11-01-01-070	SIA ALL
259	Preformed packing	73-11-01-01-070	SIA ALL
262	Preformed packing	73-21-04-01-023	SIA ALL

F. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

G. 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

H. Prepare for the Removal

SUBTASK 71-00-02-970-001-G00

(1) If you will replace the engine with a different engine, it is recommended that you do these steps:

(a) Print or record all active and inactive faults from the existing faults of the extended maintenance function from the Multi Function Display (MFD) (TASK 73-00-00-700-803-G00).

(b) Print or record the existing flight history vibration stored in the engine health management (TASK 71-00-00-720-805-G00).

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(c) Print or record the fan and Low Pressure Turbine (LPT) weight configurations from the engine health management balance solution page (TASK 71-00-00-720-805-G00).

NOTE: This requires a Portable Maintenance Device (PMD).

(d) Print or record the system configuration page for the two EECs on the engine to be removed (TASK 73-21-00-470-801-G00).

NOTE: The EEC System Configuration page includes the EEC software version, engine configuration, menu mode hardware code, and auto-detected hardware configuration code. It is recommended to record this information as it is not easy to get after the engine is removed from the aircraft.

SUBTASK 71-00-02-900-001-G00

(2) If it is necessary, preserve the engine for storage (TASK 71-00-03-620-801-G00).

NOTE: This recommended step for the preservation of the engine will change relative to the interval of time that depends on whether the engine is operable or non-operable.

SUBTASK 71-00-02-620-001-G00

(3) Do this task: Static Grounding, TASK 20-40-11-910-801.

NOTE: Use the approved ground lugs to ground the airplane.

SUBTASK 71-00-02-940-002-G00

(4) Make sure that the weight and balance Center of Gravity (CG) is in the forward section or install a tail jack.

SUBTASK 71-00-02-860-004-G00

(5) Make sure that the forward thrust levers are in the idle position.

(a) Attach a DO NOT OPERATE tag, STD-858, on the thrust levers.

SUBTASK 71-00-02-860-006-G00

(6) Do these steps to make sure that the fuel control valve and spar valve stay in the closed position:

(a) Make sure that the L (R) START LEVER switch is in the CUTOFF position.

1) Install a DO NOT OPERATE tag, STD-858, on the L (R) START LEVER switch.

(b) Make sure that the applicable SPAR VALVE CLOSED and ENG VALVE CLOSED lights, on the P5 forward overhead panel, are on dimly.

SUBTASK 71-00-02-860-007-G00

(7) Make sure that the applicable engine and spar fuel valves stay closed.

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2
B	4	C00359	FUEL SPAR VALVE ENG 1

SUBTASK 71-00-02-860-060-G00

(8) Do these steps to make sure that the ENGINE START switch is not operated:

(a) On the P5 overhead panel, make sure that the applicable ENGINE START switch is in the OFF position.

(b) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

SUBTASK 71-00-02-010-001-G00

(9) Do this task: Hydraulic System A or B Power Removal, TASK 29-11-00-860-805.

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SUBTASK 71-00-02-860-009-G00

(10) Make sure that the supply shutoff valve for the Engine Driven Pump (EDP) is closed.

(a) For the left engine, make sure that this circuit breaker is closed:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	19	C00347	HYDRAULIC SYSTEM SHUTOFF VALVE ENG 1

(b) For the right engine, make sure that this circuit breaker is closed:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	18	C00348	HYDRAULIC SYSTEM SHUTOFF VALVE ENG 2

(c) For the left engine, open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	22	C00296	FIRE PROTECTION EXTINGUISHERS LEFT
B	24	C01021	FIRE PROTECTION EXTINGUISHERS ALTN L

(d) For the right engine, open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	20	C00297	FIRE PROTECTION EXTINGUISHERS RIGHT
B	23	C01022	FIRE PROTECTION EXTINGUISHERS ALTN R

(e) Make sure that the engine (1 or 2) fire switch handle for the applicable engine is in its usual position.

NOTE: The engine (1 and 2) fire switch handles are on the P8 control stand panel.

(f) Push the manual override switch that is below the engine fire switch handle.

CAUTION

DO NOT TURN THE FIRE HANDLE AFTER YOU PULLED IT UP. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

(g) Pull the applicable engine (1 or 2) fire switch handle up, but do not turn it.

1) Attach a DO NOT OPERATE tag, STD-858, to the engine fire switch handle.

(h) Make sure that the position indicator on the supply shutoff valve is in the CLOSE position.

(i) For the left engine, open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	19	C00347	HYDRAULIC SYSTEM SHUTOFF VALVE ENG 1

(j) For the right engine, open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	18	C00348	HYDRAULIC SYSTEM SHUTOFF VALVE ENG 2

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SUBTASK 71-00-02-860-058-G00

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

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	6	C04035	AIR COND BLEED AIR CONTROL PRIMARY LEFT
B	6	C04036	AIR COND BLEED AIR CONTROL PRIMARY RIGHT
D	5	C04037	AIR COND BLEED AIR CONTROL BACKUP LEFT
D	6	C04038	AIR COND BLEED AIR CONTROL BACKUP RIGHT

SUBTASK 71-00-02-860-011-G00

(12) For the left engine, open these applicable circuit breakers and install safety tags:

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

SUBTASK 71-00-02-860-012-G00

(13) For the right engine, open these applicable circuit breakers and install safety tags:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
E	3	C01321	ENGINE FUEL ENGINE 2 HPSOV CONT
E	4	C01396	ENGINE FUEL ENGINE 2 HPSOV IND

SUBTASK 71-00-02-860-013-G00

(14) For the left engine, open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C04008	ENGINE 1 ALTN PWR CHAN B
A	5	C04007	ENGINE 1 ALTN PWR CHAN A

SUBTASK 71-00-02-860-014-G00

(15) For the right engine, open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	7	C04010	ENGINE 2 ALTN PWR CHAN B
D	8	C04009	ENGINE 2 ALTN PWR CHAN A

SUBTASK 71-00-02-860-015-G00

(16) For the applicable engine, 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

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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 71-00-02-860-016-G00

(17) Open these 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

SUBTASK 71-00-02-010-023-G00

WARNING MAKE SURE THAT THE SDOS ACTUATOR IS FULLY EXTENDED AND LOCKED. THE ACTUATOR CONTAINS STORED ENERGY. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURY CAN OCCUR.

(18) Remove the left and right fan cowl panels (TASK 71-11-04-000-801-G00).

SUBTASK 71-00-02-020-018-G00

(19) Remove the left and right fan cowl hold open rods. Do this task: Fan Cowl Hold Open Rod Removal, TASK 71-11-11-000-801-G00.

(20) Remove the EBU bracket [604] and bracket [601] used to attach the fan cowl hold open rods to the left and right side of the engine fan case as follows (Figure 403):

(a) Remove the three bolts [602] and the three washers [603] that attach the bracket [601] and bracket [604] to each side of the fan case.

SUBTASK 71-00-02-020-019-G00

(21) Remove the left and right Spring Door Opening System (SDOS). Do this task: Fan Cowl SDOS Actuators Removal, TASK 71-12-01-000-801-G00.

(22) Remove the EBU bracket [609] and bracket [610] used to attach the SDOS to the left and right side of the engine fan case as follows (Figure 403):

(a) Remove the three bolts [605], three washers [606], three washers [607], and three nuts [608] that attach the bracket [609] and bracket [610] to each side of the fan case.

SUBTASK 71-00-02-010-025-G00

(23) Remove the applicable thumbnail fairing (TASK 54-52-01-010-801).

SUBTASK 71-00-02-860-069-G00

(24) Do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

SUBTASK 71-00-02-010-003-G00

(25) If you will install the same inlet cowl on the replacement engine, do this task: Inlet Cowl Removal, TASK 71-11-01-000-801-G00.

(a) If the engine will be transported or put into storage, install the duct support, SPL-14548.

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SUBTASK 71-00-02-010-024-G00

(26) 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.

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.

(b) Open the left and 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 71-00-02-860-057-G00

(27) Do this task: Remove Electrical Power, TASK 24-22-00-860-802.

SUBTASK 71-00-02-010-030-G00

(28) If necessary, remove the thrust reversers. Do this task: Thrust Reverser Removal, TASK 78-31-01-000-801-G00.

SUBTASK 71-00-02-860-017-G00

(29) If the thrust reversers remain installed, install the hold open equipment, SPL-14550, between the two thrust reversers as follows (Figure 401):

(a) Remove the thrust reverser insulation blankets that cover the hold-open equipment attached points (TASK 78-31-13-000-801-G00).

(b) If the hold open equipment, SPL-14550 (P/N C78033-1), is used, remove the No. 1 compression rod and bracket as follows:

NOTE: It is not necessary to remove the No. 1 compression rod and bracket if you use the hold open equipment, SPL-14550 (P/N C78033-40).

1) Remove the rubber grommet from the inboard side of the No. 1 compression rod.

2) Move the No. 1 compression rod in the outboard direction to remove the compression rod.

3) Keep the compression rod and grommet for installation.

4) Remove the two bolts [4] that attach the No. 1 compression rod support bracket [5].

5) Keep the No. 1 compression rod support bracket [5] and two bolts [4] for installation.

(c) Back out the drive screw to move the pin hole to the lowest position on the left fitting assembly [7].

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(d) Back out the drive screw to move the pin hole to the lowest position on the right fitting assembly [9].

(e) Attach the left fitting assembly [7] and right fitting assembly [9] to the thrust reverser precooler fittings.

1) Install the pin assemblies [15] and lynch pins [16] on the fitting brackets.

(f) Attach the inboard arm assembly [8] from the outboard side to the right fitting assembly [9] as follows:

1) Install the lower arm pin [11] that attaches the inboard arm assembly [8] to the lower hole of the right fitting assembly [9].

2) Secure with the lynch pin [12].

3) Install the upper arm pin [13] that attaches the inboard arm assembly [8] to the upper hole of the right fitting assembly [9].

4) Secure with the lynch pin [14].

(g) Attach the outboard arm assembly [6] to the left fitting assembly [7] and to the stop pin [19] and retaining ring [20] of the inboard arm assembly [8] as follows:

1) Install the lower arm pin [11] that attaches the outboard arm assembly [6] to the lower hole of the left fitting assembly [7].

2) Secure with the lynch pin [12].

3) Install the upper arm pin [13] that attaches the outboard arm assembly [6] to the upper hole of the left fitting assembly [7].

4) Secure with the lynch pin [14].

(h) Adjust the drive screws until the inboard arm assembly [8] pin hole aligns to the outboard arm assembly [6] pin hole.

(i) Install pivot pin [17] and secure with the lynch pin [18].

(j) Adjust the drive screws so it can support the weight of the thrust reversers.

(k) Lower the thrust reversers on the thrust reverser hold-open equipment [10].

(l) Disconnect the thrust reverser opening actuators (MDOS actuators) from the fan case bracket on the inboard and outboard sides of the engine (TASK 78-31-08-000-801-G00).

SIA ALL; PRE LEAP-1B SERVICE BULLETIN 72-0181

NOTE: The MDOS actuator brackets are installed on the aft side of flange B13 inboard and outboard sides of the engine.

SIA ALL; POST LEAP-1B SERVICE BULLETIN 72-0181

NOTE: The MDOS actuator brackets are installed on the fan frame shroud bridge brackets. The inboard actuator bracket is installed on the upper bridge bracket. The outboard actuator bracket is installed on the lower bridge bracket.

SIA ALL

(m) Stow the thrust reverser opening actuators (MDOS actuators) on the thrust reversers.

(n) Remove the thrust reverser opening actuators (MDOS) brackets from both the inboard and outboard sides of the engine.

NOTE: Keep the brackets for the installation.

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I. Engine Core Disconnects

SUBTASK 71-00-02-020-004-G00

(1) Remove the No. 2 compression rod and No.3 compression rod.

SUBTASK 71-00-02-020-008-G00

(2) Disconnect the crossover duct [60] from the precooler inlet [51] as follows (Figure 405):

(a) Remove the V-clamp [52] and E-seal [53] from the crossover duct [60].

(b) Pull the crossover duct [60] forward away from the precooler inlet [51].

(c) Install the protective caps on the crossover duct [60] and precooler inlet [51].

SUBTASK 71-00-02-020-009-G00

(3) If the APU or external air will be used to operate the ECS while the engine is removed, install the precooler blanking plate as follows (View D, Figure 405):

(a) Use an E-seal and coupling with a blanking plate, SPL-18258, and install on the precooler inlet [51].

(b) When the coupling is in its position, tighten the coupling.

1) Tighten the coupling nut to 115.0 in-lb (13.0 N·m) - 125 in-lb (14.1 N·m).

2) Lightly tap the outer surface of the coupling with a rubber mallet, STD-3906.

3) Tighten the coupling nut again to 115.0 in-lb (13.0 N·m) - 125 in-lb (14.1 N·m).

SUBTASK 71-00-02-020-010-G00

(4) Disconnect the FAMV line [62] under the precooler on the right side of the fan cowl support beam as follows (Figure 405):

(a) Disconnect the B-nut [63] from the FAMV line [62].

(b) Install the protective caps on the FAMV line [62] and hose fitting.

SUBTASK 71-00-02-020-002-G00

(5) Do this task: Drain Mast Removal, TASK 71-71-01-000-801-G00.

J. Fan Case Disconnects on Left Side

SUBTASK 71-00-02-680-001-G00

WARNING

DO NOT GET FUEL IN YOUR MOUTH, OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE FUEL. KEEP THE FUEL AWAY FROM SPARKS, FLAME, AND HEAT. FUEL IS POISONOUS AND FLAMMABLE, WHICH CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

CAUTION

A LARGE VOLUME OF FUEL WILL DRAIN FROM THE FUEL SUPPLY SYSTEM. TO PREVENT A FUEL SPILL, YOU MUST USE A MINIMUM OF TWO CONTAINERS TO DRAIN THE FUEL SYSTEM.

(1) Drain the main fuel pump [251] (Figure 407).

(a) Put a 5 U.S.-gal (19 l) fuel resistant container, STD-201, below the main fuel pump [251].

(b) Remove the drain plug [256] from the main fuel pump [251] as follows:

1) Remove the drain plug [256] from the main fuel pump [251].

2) Let the fuel drain into the 5 U.S.-gal (19 l) fuel resistant container, STD-201.

3) Remove and discard the preformed packing [257] from drain plug [256].

(c) Install the drain plug [256] on the main fuel pump [251] as follows:

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1) Make sure that the mating faces are clean and clear of unwanted materials.
2) Lubricate the threads of the drain plug [256] and new preformed packing [257] with clean oil, D00599 [CP2442].
3) Install the preformed packing [257] on the drain plug [256].
4) Install the drain plug [256] in a correct position on the main fuel pump [251].
5) Tighten the drain plug [256] to 190.3 in-lb (21.5 N·m) - 208.0 in-lb (23.5 N·m).
6) Install safety wire, G02495 [CP8002], on the drain plug [256].

(d) Remove the drain plug [258] from the main fuel pump [251] as follows:
1) Remove the drain plug [258] from the main fuel pump [251].
2) Let the fuel drain into the 5 U.S.-gal (19 l) fuel resistant container, STD-201.
3) Remove and discard the preformed packing [259] from the drain plug [258].

(e) Install the drain plug [258] on the main fuel pump [251] as follows:
1) Make sure that the mating faces are clean and clear of unwanted materials.
2) Lubricate the threads of the drain plug [258] and new preformed packing [259] with clean oil, D00599 [CP2442].
3) Install the preformed packing [259] on the drain plug [258].
4) Install the drain plug [258] in a correct position on the main fuel pump [251].
5) Tighten the drain plug [258] to 190.3 in-lb (21.5 N·m) - 208.0 in-lb (23.5 N·m).
6) Install safety wire, G02495 [CP8002], on the drain plug [258].

(f) Remove the drain plug [254] from the main fuel pump [251] as follows:
1) Remove the drain plug [254] from the main fuel pump [251]:
2) Let the fuel drain into the 5 U.S.-gal (19 l) fuel resistant container, STD-201.
3) Remove and discard the preformed packing [252] from the drain plug [254].

(g) Install the drain plug [254] on the main fuel pump [251] as follows:
1) Make sure that the mating faces are clean and clear of unwanted materials.
2) Lubricate the threads of the drain plug [254] and new preformed packing [252] with engine oil, D00599 [CP2442].
3) Install the preformed packing [252] on the drain plug [254].
4) Install the drain plug [254] in a correct position on the main fuel pump [251].
5) Tighten the drain plug [254] to 13.3 in-lb (1.5 N·m) - 15.0 in-lb (1.7 N·m).
6) Install safety wire, G02495 [CP8002], on the drain plug [254].

(h) Remove the drain plug [261] from the FMU [260] as follows:
1) Put a 5 U.S.-gal (19 l) fuel resistant container, STD-201, below the FMU [260].
2) Remove the drain plug [261] from the FMU [260].
3) Let the fuel drain from the FMU [260] into the 5 U.S.-gal (19 l) fuel resistant container, STD-201.
4) Remove and discard the preformed packing [262] from the drain plug [261].

(i) Install the drain plug [261] on the FMU [260] as follows:
1) Lubricate the new preformed packing [262] with engine oil, D00599 [CP2442].

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2) Put graphite mineral vaseline, D00601 [CP2101], on the threads and under the heads of the drain plug [261].

3) Install the preformed packing [262] on the drain plug [261].

4) Make sure that the mating faces are clean and clear of unwanted materials.

5) Install the drain plug [261] on the FMU [260].

6) Tighten the drain plug [261] to 31.9 in-lb (3.6 N·m) - 35.4 in-lb (4.0 N·m).

SUBTASK 71-00-02-010-007-G00

(2) Disconnect the starter duct [36] from the starter duct inlet as follows (Figure 404):

(a) Remove the coupling [37] and preformed packing [38] that attach the starter duct [36] to the starter duct inlet.

(b) Install the protective caps on the starter duct [36] and starter duct inlet.

SUBTASK 71-00-02-480-009-G00

(3) If the APU or external air will be used to operate the ECS while the engine is removed, install the starter air valve blanking plate as follows (View E, Figure 404):

(a) Use an E-seal and a coupling with a blanking plate, SPL-18640, and install on the starter duct inlet.

1) When the coupling is in its position, tighten the coupling.

a) Tighten the coupling nut to 90 in-lb (10.2 N·m) - 94.0 in-lb (10.6 N·m).

b) Lightly tap the outer surface of the coupling with a rubber mallet, STD-3906.

c) Tighten the coupling nut again to 90.0 in-lb (10.2 N·m) - 94.0 in-lb (10.6 N·m).

SUBTASK 71-00-02-010-008-G00

CAUTION

MAKE SURE THAT THE ELECTRICAL CONNECTORS AND RECEPTACLES ARE CLEAN AND CLEAR OF UNWANTED MATERIALS BEFORE YOU DISCONNECT, OR CONNECT THEM. CONTAMINATION OF THE ELECTRICAL CONNECTORS AND RECEPTACLES CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION

USE TEFLON-JAWED PLIERS TO LOOSEN ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(4) Disconnect the IDG power feeder harness [39] from the left side of the fan cowl support beam as follows (Figure 404):

SIA 011-999; SIA 001-010 POST SB 737-24-1233

(a) Remove the screw [47], nut [48], and washers [49] that attach the bonding jumper [46] to the IDG power feeder harness [39] clip.

SIA ALL

(b) Disconnect the IDG power feeder harness [39] from the fan cowl support beam receptacle.

(c) Install the protective caps on the IDG power feeder harness [39] electrical connector and fan cowl support beam receptacle.

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SUBTASK 71-00-02-010-009-G00

CAUTION

BE CAREFUL WITH THE HYDRAULIC HOSE. DO NOT BEND OR PUT THE HOSE INTO A COIL TOO TIGHTLY. YOU CAN CAUSE A BLOCKAGE OF THE HOSE. IF YOU DO NOT OBEY THESE INSTRUCTIONS, YOU CAN CAUSE A FAILURE OF THE ENGINE-DRIVEN PUMP (EDP).

CAUTION

DO NOT LET HYDRAULIC FLUID LEAKAGE COLLECT. IF YOU DO NOT MAKE THE AREA CLEAN, DAMAGE CAN OCCUR FROM THE HYDRAULIC FLUID.

(5) Disconnect the hydraulic pressure hose [40], hydraulic supply hose [41], and hydraulic case drain hose [42] from the left side of the fan cowl support beam as follows (Figure 404):

(a) Disconnect the hydraulic pressure hose [40] from the fan cowl support beam.

1) Rotate the quick-release outer sleeve in the clockwise direction and pull the outer sleeve axially away from the male quick-release fitting to disengage the lock tab.

2) Rotate the quick-release outer sleeve in the counterclockwise direction to unthread the hose quick-release fitting from the male quick-release fitting.

SIA 001-005 PRE SB 737-71-1883

(b) Loosen the clamp blocks [44] on the hydraulic pressure hose [40].

NOTE: This is to properly align pressure line to the quick disconnect on the support beam during power plant installation.

SIA 006-999; SIA 001-005 POST SB 737-71-1883

(c) Loosen the clamp blocks [44] and clamp blocks [56] on the hydraulic pressure hose [40].

NOTE: This is to properly align pressure line to the quick disconnect on the support beam during power plant installation.

SIA ALL

(d) Install the protective caps on the hydraulic pressure hose [40] and fan cowl support beam connector.

(e) Disconnect the hydraulic supply hose [41] from the fan cowl support beam.

1) Rotate the quick-release outer sleeve in the clockwise direction and pull the outer sleeve axially away from the male quick-release fitting to disengage the lock tab.

2) Rotate the quick-release outer sleeve in the counterclockwise direction to unthread the hose quick-release fitting from the male quick-release fitting.

(f) Install the protective caps on the hydraulic supply hose [41] and fan cowl support beam connector.

(g) Disconnect the hydraulic case drain hose [42] from the fan cowl support beam.

1) Rotate the quick-release outer sleeve in the clockwise direction and pull the outer sleeve axially away from the male quick-release fitting to disengage the lock tab.

2) Rotate the quick-release outer sleeve in the counterclockwise direction to unthread the hose quick-release fitting from the male quick-release fitting.

(h) Install the protective caps on the hydraulic case drain hose [42] and fan cowl support beam connector.

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SUBTASK 71-00-02-010-013-G00

(6) Disconnect the main fuel supply hose [43] from the left side of the fan cowl support beam (Figure 404).

SUBTASK 71-00-02-480-005-G00

(7) Install protective caps on the main fuel supply hose [43] and on the fitting in the fan cowl support beam.

K. Fan Case Disconnects on Right Side

SUBTASK 71-00-02-020-012-G00

(1) Disconnect the strut drain line from the right side of the strut fitting (Figure 406).

SUBTASK 71-00-02-020-013-G00

CAUTION

MAKE SURE THAT THE ELECTRICAL CONNECTORS AND RECEPTACLES ARE CLEAN AND CLEAR OF UNWANTED MATERIALS BEFORE YOU DISCONNECT, OR CONNECT THEM. CONTAMINATION OF THE ELECTRICAL CONNECTORS AND RECEPTACLES CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION

USE TEFLON-JAWED PLIERS TO LOOSEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(2) Use the teflon-jawed pliers, STD-664, to disconnect the electrical connectors from the right side of the fan cowl support beam as follows (Figure 405):

(a) Disconnect the electrical connector [70], electrical connector [69], electrical connector [68], and electrical connector [67].

(b) Disconnect the electrical connector [66], electrical connector [65], and electrical connector [64].

(c) Install the protective covers on the electrical connectors and fan cowl support beam electrical receptacles.

L. Power Plant Removal

SUBTASK 71-00-02-860-018-G00

(1) Use protective rugs or mats on the engine core to protect the engine components from falling objects.

SUBTASK 71-00-02-940-001-G00

(2) Make sure that there is sufficient clearance to put the engine transportation stand below the engine as follows:

NOTE: If you use the engine stand, SPL-14726 (956A8600G04), it is not necessary to inflate the Main Landing Gear (MLG) strut. It is recommended to inflate the MLG strut as an alternative to lowering the engine stand, SPL-14726 (956A8600G04), wheel casters and cradle. This will decrease the engine change time.

(a) Make sure that the airplane is in a level position (TASK 08-20-02-580-801 or TASK 08-20-03-580-801).

NOTE: Inflate the MLG and Nose Landing Gear (NLG) struts when necessary. The airplane must be level (no more than ±0.5° in the pitch axis and ±1.0° about the roll axis).

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(b) If you use engine stand, SPL-14726 (956A8600G04), and MLG struts are not inflated, do these steps to prepare the engine stand:

1) Use the engine stand hydraulic device to lift the wheel casters off the ground.
2) Lower the wheel casters on the engine transportation stand to 2 in. (51 mm).
3) Remove the four pins in the cradle to deactivate the cradle damping.
4) Adjust and lower the engine stand base with the stand hydraulic device.

NOTE: Ground clearance to the engine stand base is approximately 1.17 in. (29.72 mm).

5) Make sure that the engine stand hydraulic actuators are fully retracted.
6) Make sure that other parts of the engine transportation stand are in the stow positions.

SUBTASK 71-00-02-480-001-G00

(3) Install the forward bootstrap equipment from the bootstrap kit, SPL-14542, as follows (Figure 409):

(a) Install the forward center beam [401] on top of the forward mount brackets.

1) Install the two pins [403] and two retainers [402] that attach the forward center beam [401] to the forward mount brackets.

a) If it is necessary, remove the one of the pin and retainer from the forward center beam [401] to facilitate the installation.

(b) Attach the forward support arm assembly [406] to the top of the forward center beam [401].

(c) Install the pin [408] and retainer [407] that attach the forward support arm assembly [406] to the forward center beam [401].

(d) Install the pin [418] and retainer [419] that attach the other end of the forward support arm assembly [406] to the strut fan cowl support beam.

1) If it is necessary, move the forward center beam back to install the forward support arm assembly.

(e) Install the forward outboard arm assembly [409] and forward inboard arm assembly [416] on the forward center beam [401] as follows:

1) Install the pin [420] and retainer [421] that join the forward outboard arm assembly [409] and forward inboard arm assembly [416] to the top of the forward support arm assembly [406].
2) Install the two pins [423] and two retainers [422] that attach the forward outboard arm assembly [409] and forward inboard arm assembly [416] to the forward center beam [401].

(f) Install the dynamometer assembly [415] on both ends of the forward outboard arm assembly [409] and forward inboard arm assembly [416] as follows:

1) Install the two pins [411] and two retainers [412] that attach the dynamometer assembly [415] on both ends of the forward outboard arm assembly [409] andforward inboard arm assembly [416].

SIA ALL; PRE LEAP-1B SERVICE BULLETIN 72-0181

2) Attach the two shackles [414] to the forward engine adapter mounts.

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SIA ALL; POST LEAP-1B SERVICE BULLETIN 72-0181

3) Attach the two shackles [414] to the handling brackets, SPL-17099.

SIA ALL

4) Attach the lever hoists [413] and two shackles [414] to the dynamometer assembly [415].

(g) Install the lever hoists [413] on the engine fan case brackets with the two shackles [414].

NOTE: If it is necessary, use an extra shackle to attach the lever hoists to the engine fan case brackets.

SIA ALL; PRE LEAP-1B SERVICE BULLETIN 72-0181

NOTE: The handling brackets are included on the fan frame shroud of the engine.

SIA ALL; POST LEAP-1B SERVICE BULLETIN 72-0181

NOTE: The handling brackets, SPL-17099, are tools, not installed on the fan frame shroud.

1) Install the handling bracket, SPL-17099, as follows:

a) On the two handling brackets, loosen the three gripper screws to open the three fasteners.

b) Loosen the three axis on each handling bracket with the screw heads.

c) Install the brackets on the fan frame shroud.

d) Make sure that the handling brackets are correctly installed.

e) Tighten the five gripper screws and seven screw heads as follows:

<1> All six axis are tightened with the screw heads.

<2> All five gripper screws and gripper screw are tightened with the screw heads.

<3> Tighten the five gripper screws and seven screw heads to 88.5 in-lb (10.0 N·m).

<4> Make sure that grippers stayed parallel during tightening.

SIA ALL

(h) Take up the slack in the hoist chains.

SUBTASK 71-00-02-480-002-G00

(4) Install the aft bootstrap equipment from the bootstrap kit, SPL-14542, as follows (Figure 408):

(a) Remove the No. 3 compression rod support bracket [425].

1) Remove the two bolts [426] and two nuts [427].

NOTE: Prior to the installation of the bootstrap equipment, it is acceptable to apply breakaway torque ONLY to the aft, outboard bolt [514] location of the aft engine mount.

NOTE: The tool sweep should not exceed 15 degrees when applying torque.

(b) Install the outboard aft support beam assembly [442] on the outboard forward strut bracket with the pin [441] and retainer [443].

(c) Install the outboard aft cross beam assembly [444] on the outboard forward strut two brackets with the two pins [441] and two retainers [443].

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(d) Attach the aft torque beam assembly [446] to the outboard aft cross beam assembly [444] and outboard aft support beam assembly [442] with the two pins [447] and two pins [445].

(e) Secure the two pins [447] and two pins [445] with the four retainers [443].

(f) Attach the aft outboard arm assembly [448] to the aft torque beam assembly [446] with the two pins [447] and two retainers [443].

(g) Install the lever hoist [453] and dynamometer assembly [454] on the end of the aft outboard arm assembly [448] with the shackle [451], bolt [452], nut [450], and pin [449].

NOTE: If it is necessary, use the extra shackle to attach the dynamometers and lever hoist to the aft outboard arm assembly.

1) Make sure that the hooks are oriented towards the engine (View C, Figure 408).

(h) Install the dynamometer assembly [454] on the Turbine Rear Frame (TRF) case bracket with the two pins [455] and two retainers [456].

(i) Take up the slack in the hoist chain.

SIA ALL; PRE LEAP-1B SERVICE BULLETIN 72-0181

SUBTASK 71-00-02-860-020-G00

(5) Install the engine stand forward adapters [472] on the engine as follows (Figure 410):

(a) Attach the engine stand forward adapters [472] to the forward engine adapter mounts as follows:

1) Install the eight adapter mounting bolts [473] that attach the engine stand forward adapters [472] to the forward engine adapter mounts.

2) Tighten the eight adapter mounting bolts [473] to 151.05 in-lb (17.1 N·m) - 166.95 in-lb (18.9 N·m).

SIA ALL; POST LEAP-1B SERVICE BULLETIN 72-0181

SUBTASK 71-00-02-860-080-G00

(6) Install the engine stand forward adapters [472] on the engine as follows (Figure 410):

(a) Attach the engine stand forward adapters [472] to the handling bracket, SPL-17099 as follows:

1) Install the eight adapter mounting bolts [473] that attach the engine stand forward adapters [472] to the handling bracket, SPL-17099.

2) Tighten the eight adapter mounting bolts [473] to 151.05 in-lb (17.1 N·m) - 166.95 in-lb (18.9 N·m).

SIA ALL

SUBTASK 71-00-02-480-004-G00

(7) Install the TCF lifting bracket adapters, SPL-15012 on the engine as follows:

(a) Attach the TCF lifting bracket adapters, SPL-15012, to the turbine center frame.

(b) Tighten the mounting bolts to 84.1 in-lb (9.5 N·m) - 92.9 in-lb (10.5 N·m).

SUBTASK 71-00-02-860-021-G00

WARNING LET ONLY APPROVED PERSONS OPERATE THE LEVER HOISTS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(WARNING PRECEDES)

WARNING MONITOR THE DYNAMOMETERS ON THE FORWARD AND THE AFT HOIST. MAKE SURE THAT THE LOADS ARE WITHIN THE LIMITS. IF THE LOADS ARE MORE THAN THE LIMITS, THE ENGINE CAN FALL. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(8) Operate the forward lever hoists [413] and aft lever hoist [453] equally until the dynamometers show approximately to these preloads (Figure 409):

(a) Make sure that you continuously monitor all three dynamometers when you operate the lever hoists.

NOTE: Operation of one hoist can affect the loads at the other two hoist locations.

(b) Make sure that the dynamometers do not have more the given limits below.

(c) If the inlet cowl is installed on the engine, operate the hoists to apply the maximum load limit as follows:

NOTE: Upward preloads are included in the limits.

1) The forward outboard dynamometer assembly [415] shows no more than 3180 lb (1442 kg).

2) The forward inboard dynamometer assembly [415] shows no more than 4100 lb (1860 kg).

3) The aft dynamometer assembly [454] shows no more than 2500 lb (1134 kg).

(d) If the inlet cowl is not installed on the engine, operate the hoists to apply the maximum load limit as follows:

NOTE: Upward preloads are included in the limits.

1) The forward outboard dynamometer assembly [415] shows no more than 3000 lb (1361 kg).

2) The forward inboard dynamometer assembly [415] shows no more than 3500 lb (1588 kg).

3) The aft dynamometer assembly [454] shows no more than 2500 lb (1134 kg).

SUBTASK 71-00-02-010-015-G00

(9) Disconnect the forward engine mount [492] and aft engine mount [513] as follows (Figure 411 and Figure 412):

(a) Apply Teflon tape or another appropriate material to the wrench/ratchet head and aft engine mount fitting in the vicinity near the tool on both sides of each pocket.

CAUTION DO NOT LOOSEN THE BOLTS MORE THAN ONE-HALF OF A TURN. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO THE ENGINE MOUNTS OR THE STRUT CAN OCCUR.

(b) Use the forward mount torque equipment [491] (torque equipment, SPL-14637) to loosen the bolts [493] and bolts [514] for the forward mount and aft mount one half turn.

1) Look at the forward and aft engine mounts for the clearance between the upper and lower mounts.

a) If there is a clearance between the mounts, operate and increase the forward lever hoists [413] and aft lever hoist [453] to remove the clearance.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

b) Make sure that you do not have more than the maximum permitted loads shown on the dynamometers.

CAUTION DO NOT LOOSEN THE BOLTS MORE THAN ONE-HALF OF A TURN. IF YOU DO NOT OBEY THIS INSTRUCTION, DAMAGE TO THE ENGINE MOUNTS OR THE STRUT CAN OCCUR.

CAUTION BE CAREFUL WHEN YOU LOOSEN OR TIGHTEN THE BOLTS WITH TORQUE EQUIPMENT ON THE AFT SIDE OF THE AFT ENGINE MOUNT. IF YOU DO NOT OBEY, DAMAGE TO THE HANGER FITTING OF THE AFT ENGINE MOUNT CAN OCCUR.

(c) Loosen the bolts [493] and bolts [514] for the forward mount and aft mount one half turn as follows:

1) Make sure that the forward dynamometer assembly [415] and aft dynamometer assembly [454] do not have more than the load limits.

2) Make sure that there is no clearance between the engine mounts again.

NOTE: The entire weight of the engine is now supported by the bootstrap hoists.

(d) Remove the forward mount bolts [493] that attach the forward engine strut mount to the forward engine mount [492] as follows (Figure 411):

1) Remove the forward mount bolts [493] and washers [494] from the barrel nuts [495] and barrel nut retainers [496].

(e) Remove the aft mount bolts [514] that attach the aft engine strut mount to the aft engine mount [513] as follows (Figure 412):

1) Remove the aft mount bolts [514] and washers [515] from the barrel nuts [511] and barrel nut retainers [512].

SUBTASK 71-00-02-860-019-G00

(10) Move the engine stand, SPL-14726, into its position from the front of the power plant as follows:

(a) Use the engine stand center red mark line to center the engine stand under the engine.

(b) Move the two forward stand arms outwards.

(c) If it is necessary, adjust the height of the stand cradle by the stand hydraulic jack that is located on the left side of the engine stand.

(d) If it is necessary, adjust the wheel positions.

SUBTASK 71-00-02-860-022-G00

WARNING LET ONLY APPROVED PERSONS OPERATE THE LEVER HOISTS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

WARNING MAKE SURE THAT WORKSTANDS AND PERSONNEL ARE AWAY FROM THE ENGINE BEFORE YOU LOWER IT. THE ENGINE CAN MOVE RELATIVE TO THE STRUT WHEN THE SHEAR PINS ARE NOT IN THE UPPER ENGINE MOUNTS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(11) Lower the engine to the engine stand as follows:

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(a) Slowly lower the forward lever hoists [413] and aft lever hoist [453] equally until the shear pins are clear of the upper engine mounts.

NOTE: Binding of the aft engine mount can occur if the forward hoists are lowered too far ahead of the aft hoist.

CAUTION

MONITOR THE THRUST LINKS WHEN YOU LOWER AND TURN THE ENGINE. MAKE SURE IT DOES NOT INTERFERE WITH THE PRECOOLER OR DAMAGE TO THE PRECOOLER CAN OCCUR.

(b) Lower the forward lever hoists [413] and aft lever hoist [453] equally until the engine is approximately 4 in. (10 cm) - 6 in. (15 cm) above the engine stand.

(c) Adjust the lever hoists [413] and aft lever hoist [453] to align the engine with the engine stand as follows:

1) If it is necessary, adjust the height of the cradle, wheels, and engine stand positions.

2) Align the engine stand forward adapters [472] to the forward engine stand support arms.

3) Secure with the adapter pins [474] and retainers [475].

NOTE: Insert the pins from the rear.

4) Raise the aft engine stand support columns from the stowed position.

5) Attach the engine stand aft adapters [476] to the TCF lifting bracket adapter, SPL-15012 as follows:

a) Align the engine stand aft adapters [476] to the aft engine stand support columns.

b) Secure with the adapter pins [477] and retainers [478].

(d) Remove the forward lever hoists [413] with the forward dynamometer assembly [415], the aft lever hoist [453] with the aft dynamometer assembly [454], shackles [414], and shackle [451] from the engine attached brackets and from the bootstrap equipment (View C, Figure 409).

SUBTASK 71-00-02-860-024-G00

(12) Carefully pull the engine stand with the engine attached, forward until it is clear of the strut.

(a) Make sure that you monitor the clearance between the engine and other components while you pull the engine stand forward.

SUBTASK 71-00-02-860-065-G00

(13) If you lower the engine stand cradle and casters, do these steps to put the engine stand in a position to taxi the removed engine:

(a) Use the stand hydraulic device to lift the cradle until engine stand casters off the ground.

(b) Install the four pins in the cradle to activate the cradle damping.

(c) If it is necessary, put the wheel casters on the engine transportation stand to 3.15 in. (80.01 mm).

(d) Lower the engine stand with the stand hydraulic device.

(e) Make sure that the engine stand hydraulic actuators are fully retracted.

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SUBTASK 71-00-02-480-003-G00

(14) If it is necessary, install the transportation brace, SPL-14557, on the forward and aft engine mount for shipping.

NOTE: Boeing recommends using the transportation brace, SPL-14557, for engine transportation with the forward and aft engine mounts installed. The tool is designed to prevent the movement and damage of the engine mounts and the engine core case when installed on the engine. If the engine mount stabilization equipment is not used, the engine mounts can be removed to prevent the mounts from moving during transportation. Alternatively, commercially available packaging materials can be used in lieu of transportation brace, SPL-14557, as long as they serve the same purpose.

SUBTASK 71-00-02-020-001-G00

(15) If it is necessary, remove the forward and aft engine mount (TASK 71-21-01-000-801-G00 and TASK 71-21-02-000-801-G00).

SUBTASK 71-00-02-860-025-G00

(16) Put the covers on the open ends of the ducts on the engine and strut.

SUBTASK 71-00-02-080-001-G00

(17) If it is necessary, remove the bootstrap equipment as follows:

(a) Remove the two pins [447] and two retainers [443] that attach the aft outboard arm assembly [448] (View C, Figure 408).

(b) Remove the aft outboard arm assembly [448] from the aft torque beam assembly [446].

(c) Remove the retainer [443] and pin [441] from the outboard aft support beam assembly [442] (View A, Figure 408).

(d) Remove the outboard aft support beam assembly [442] from the outboard forward strut bracket.

(e) Remove the two retainers [443] from the two pins [441] that attach the outboard aft cross beam assembly [444] (View A, Figure 408).

(f) Remove the outboard aft cross beam assembly [444] from the outboard forward strut two brackets.

(g) Remove the four retainers [443] from the two pins [447] and two pins [445] (View B, Figure 408).

(h) Remove the two pins [447] and two pins [445] that attach the aft torque beam assembly [446] to the outboard aft support beam assembly [442] and outboard aft cross beam assembly [444].

(i) Remove the pin [420] and retainer [421] that join the forward outboard arm assembly [409] and forward inboard arm assembly [416] to the top of the forward support arm assembly [406] (View C, Figure 409 and View E, Figure 409).

(j) Remove the two pins [423] and two retainers [422] that attach the forward outboard arm assembly [409] and forward inboard arm assembly [416] to the forward center beam [401] (View C, Figure 409 and View E, Figure 409).

(k) Remove the forward outboard arm assembly [409] and forward inboard arm assembly [416] from the forward center beam [401].

(l) Remove the pin [408] and retainer [407] that attach the forward support arm assembly [406] to the forward center beam [401] (View B, Figure 409).

(m) Remove the pin [418] and retainer [419] that attach the other end of the forward support arm assembly [406] to the strut fan cowl support beam (View D, Figure 409).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

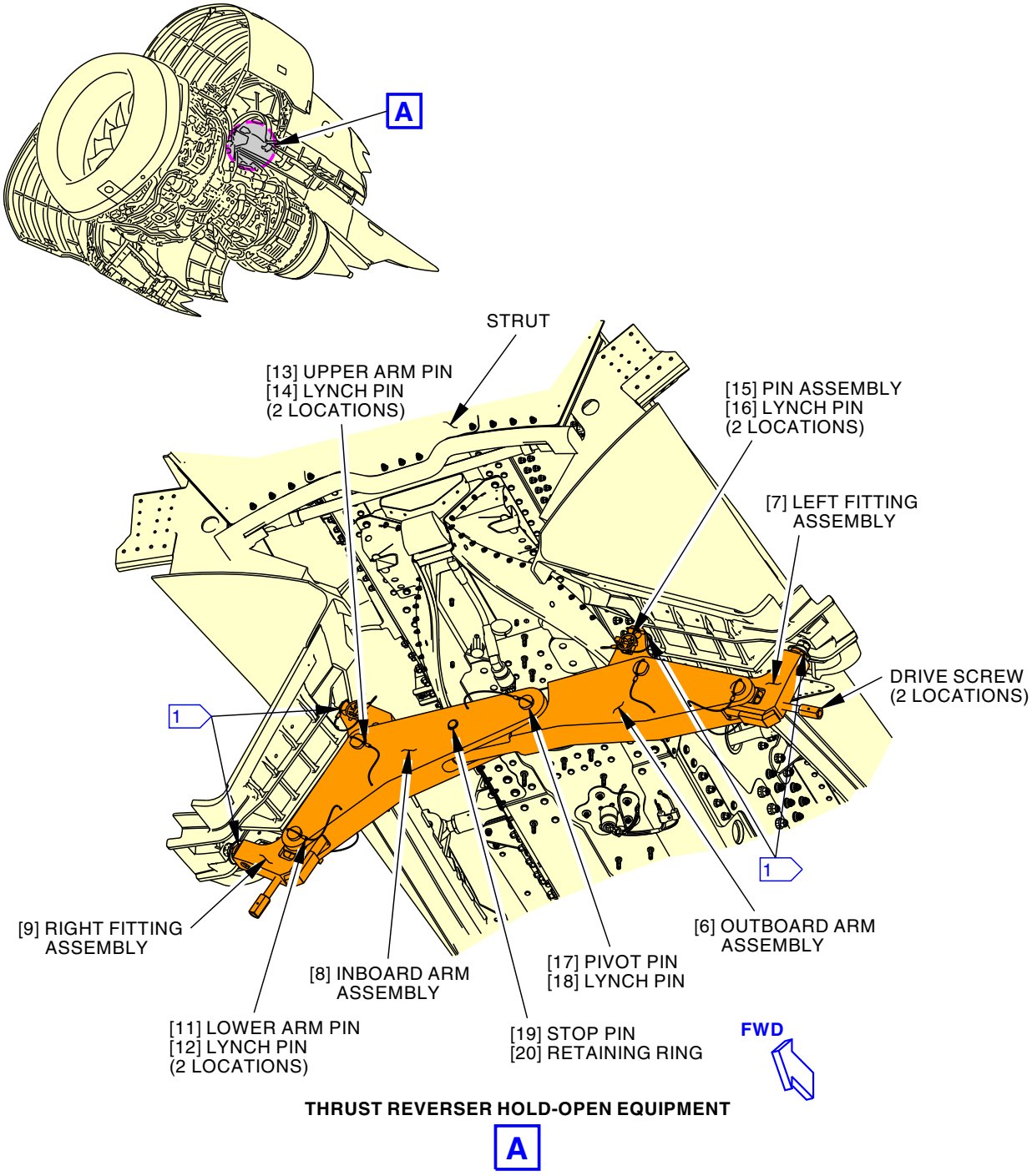
(n) Remove the forward support arm assembly [406] from top of the forward center beam [401].

(o) Remove the two pins [403] and two retainers [402] that attach the forward center beam [401] to the forward mount brackets (View A, Figure 409).

(p) Remove the forward center beam [401] from top of the forward mount brackets.

——— END OF TASK ———

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THRUST REVERSER HOLD-OPEN EQUIPMENT

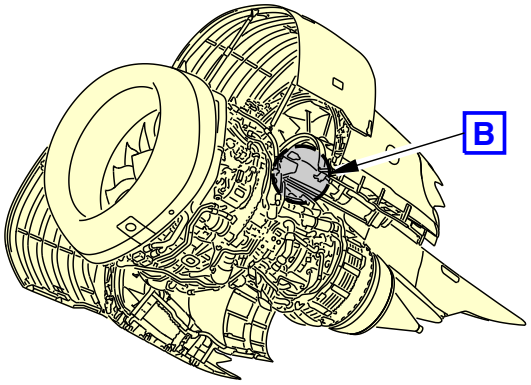
A

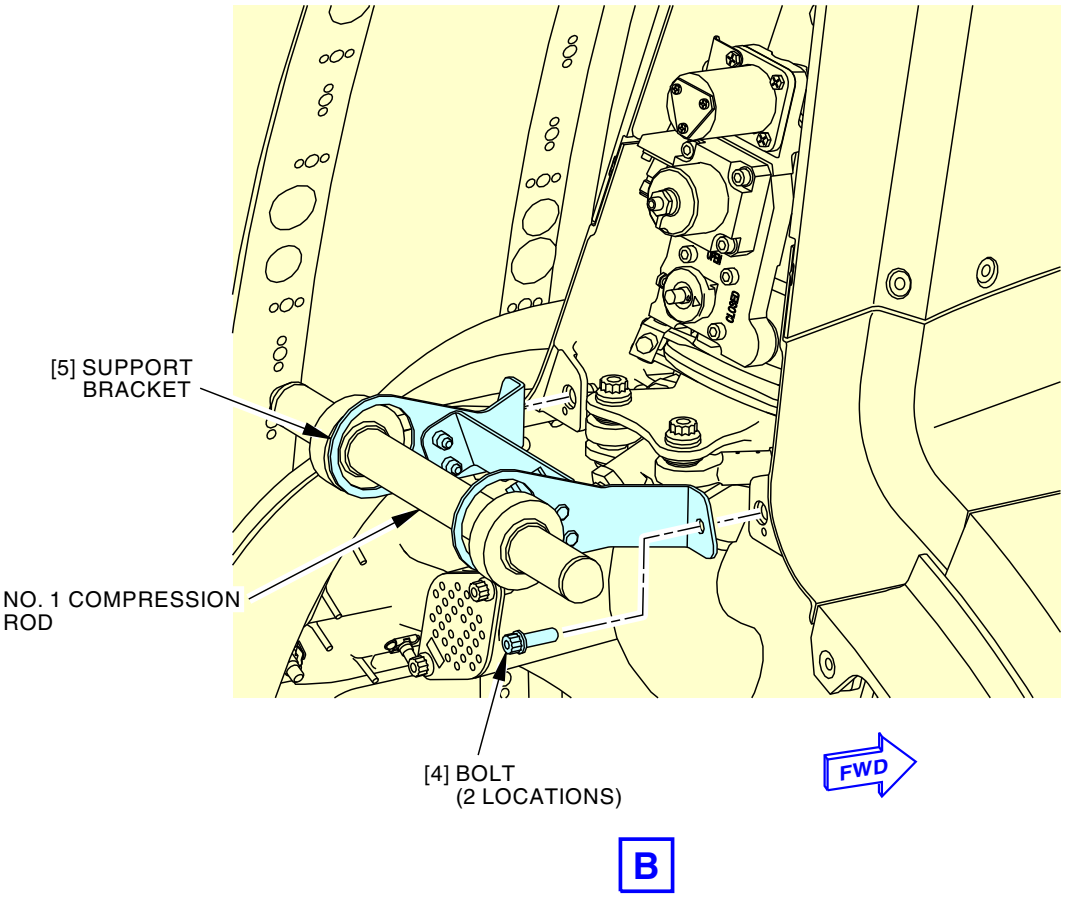
1 INSULATION BLANKET REMOVAL REQUIRED

2433567 S0000562680_V2

Thrust Reverser Hold-Open Equipment Installation
Figure 401/71-00-02-990-815-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

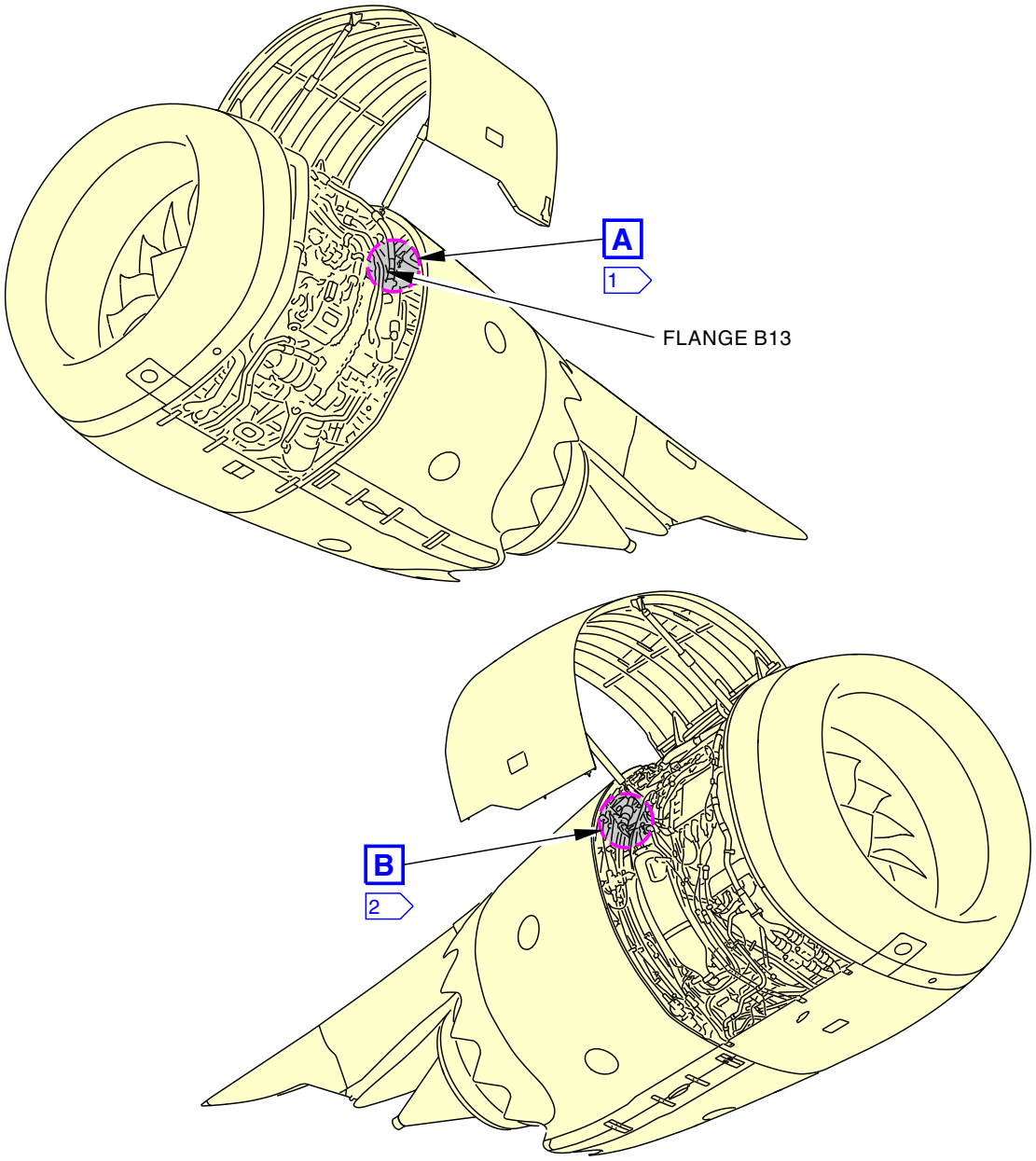




2935851 S0000711688_V1

Thrust Reverser Hold-Open Equipment Installation
Figure 401/71-00-02-990-815-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



NOTE:

THE MDOS ACTUATORS ARE SPECIFIC FOR THE INBOARD AND OUTBOARD SIDE OF THE ENGINE.

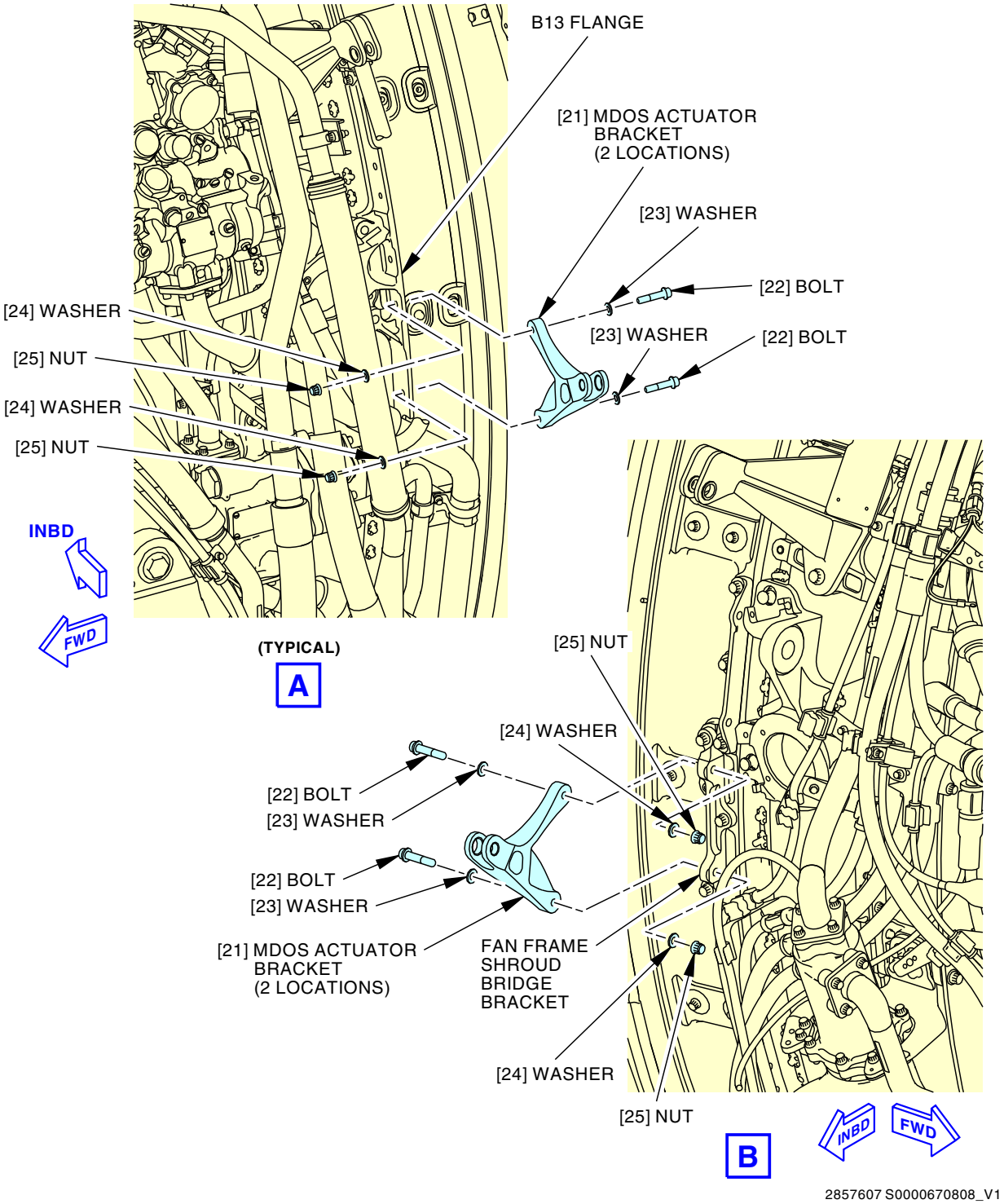
1 MDOS ACTUATOR BRACKETS INSTALL ON THE AFT SIDE OF THE FLANGE B13 INBOARD AND OUTBOARD SIDE OF THE ENGINE.

2 MDOS ACTUATOR BRACKETS INSTALL ON THE FAN FRAME SHROUD BRIDGE BRACKETS. UPPER BRACKET FOR THE INBOARD ACTUATOR AND LOWER BRACKET FOR THE OUTBOARD ACTUATOR.

2857378 S0000670950_V1

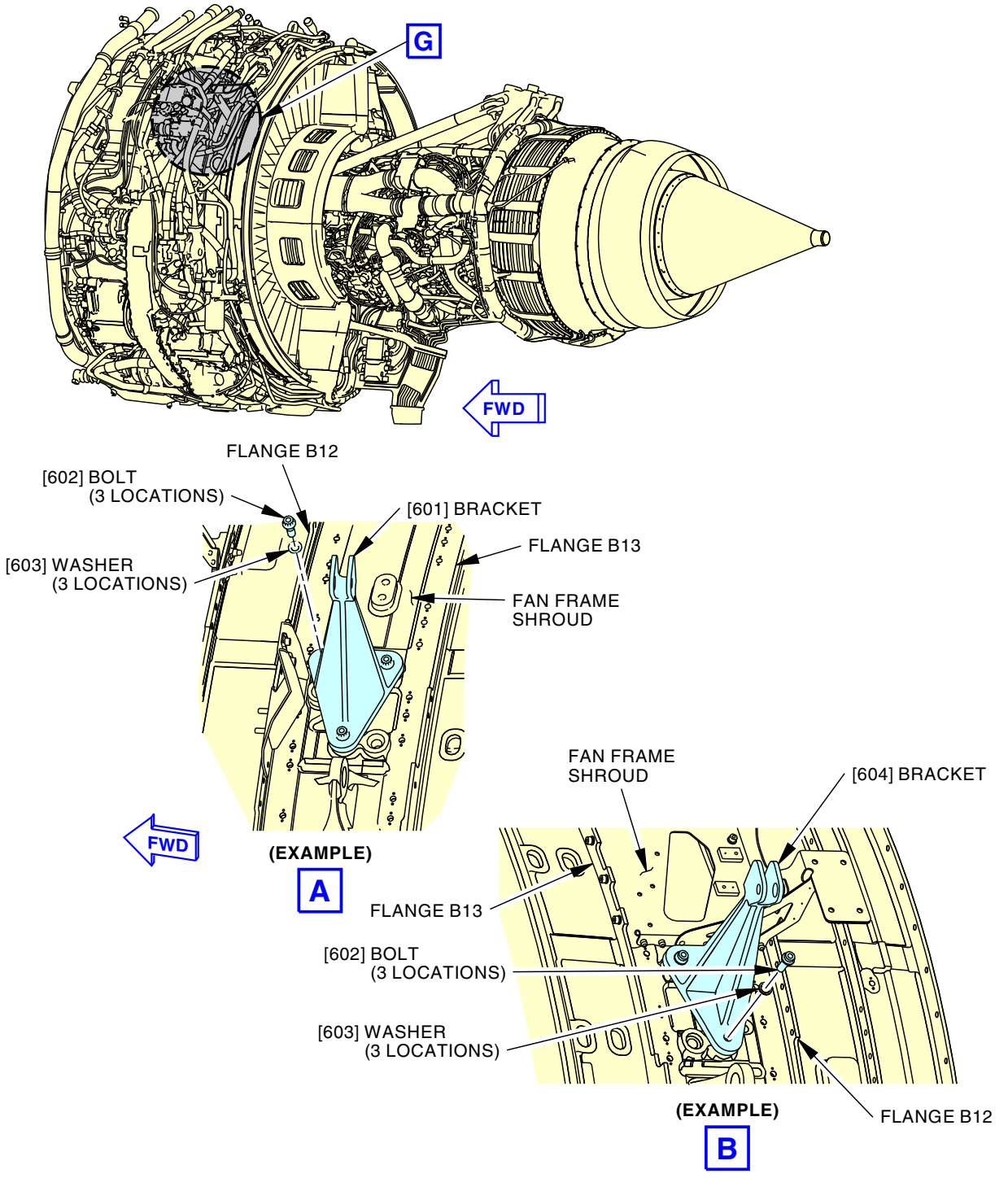
MDOS Engine Bracket Installation
Figure 402/71-00-02-990-819-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



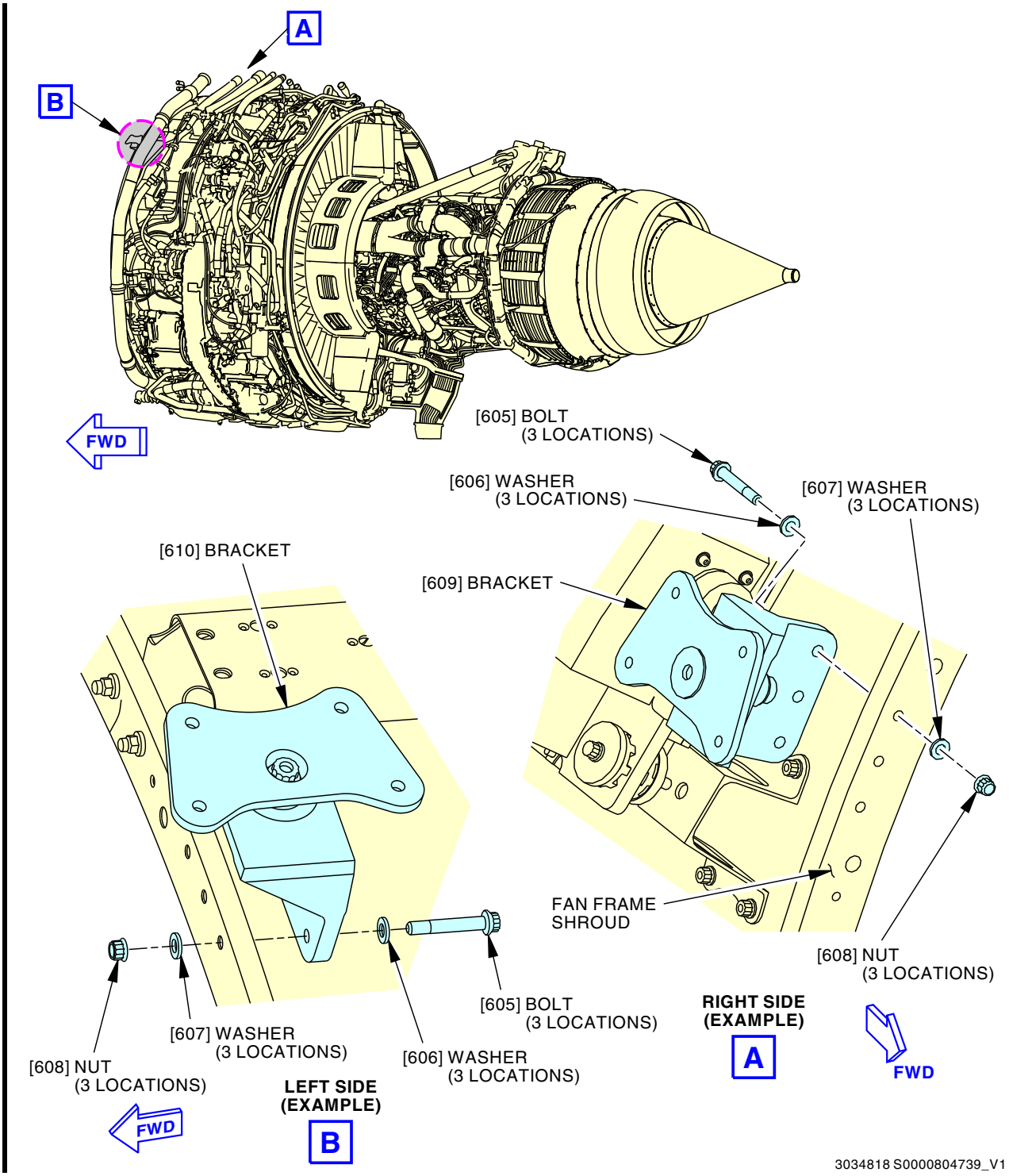
MDOS Engine Bracket Installation
Figure 402/71-00-02-990-819-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



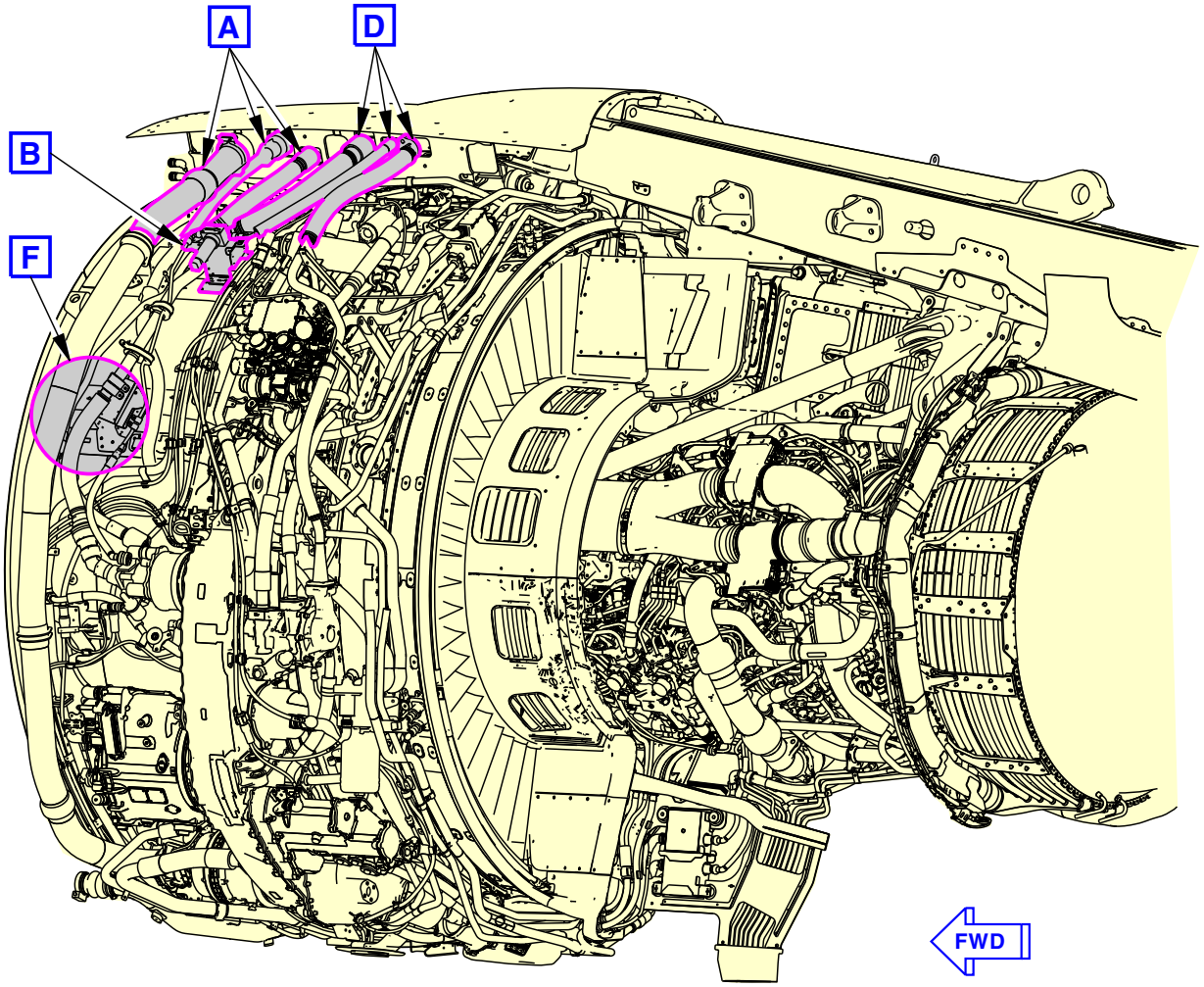
EBU Brackets Installation
Figure 403/71-00-02-990-818-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



EBU Brackets Installation
Figure 403/71-00-02-990-818-G00 (Sheet 2 of 2)

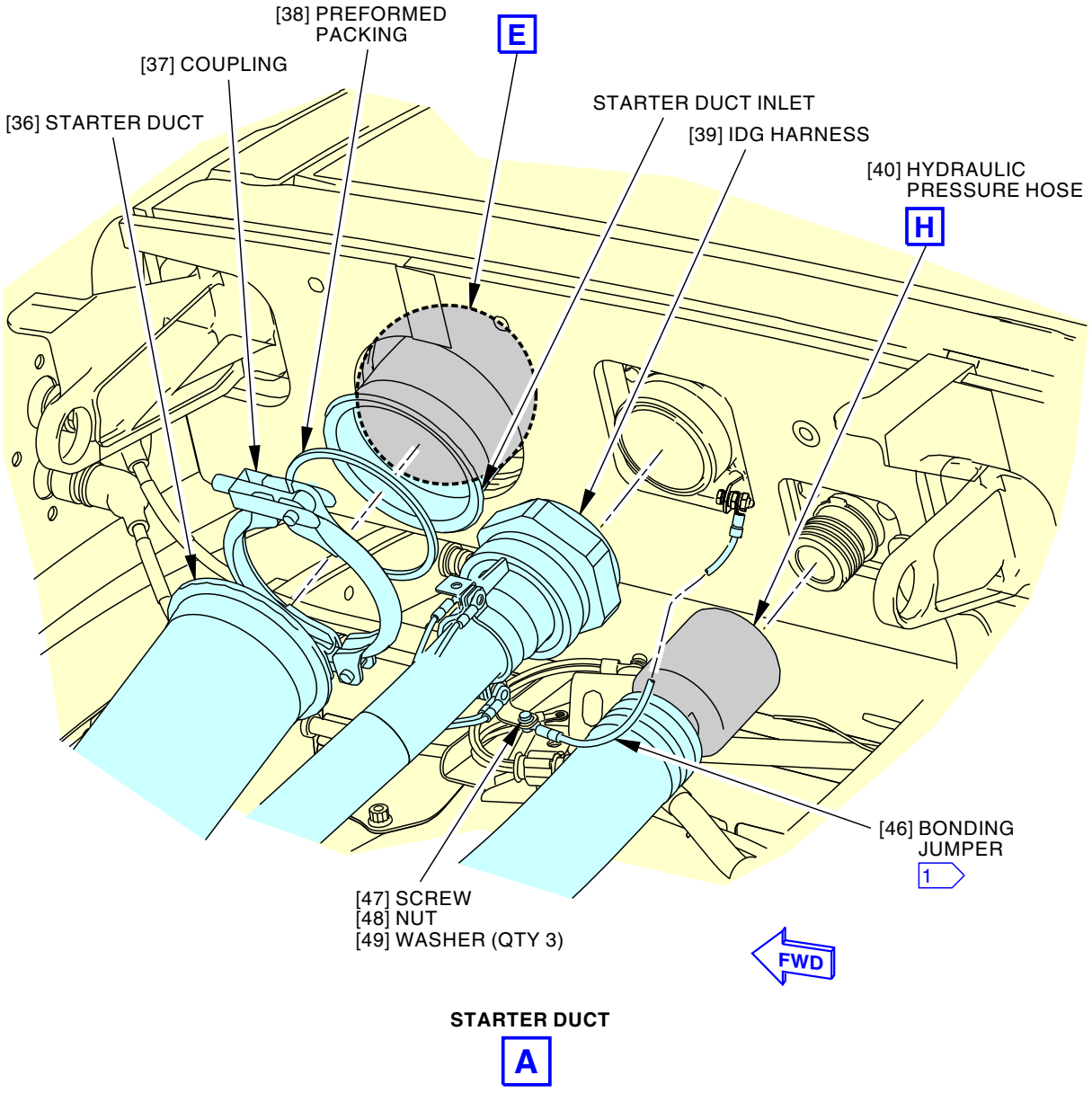
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2354177 S00061514929_V4

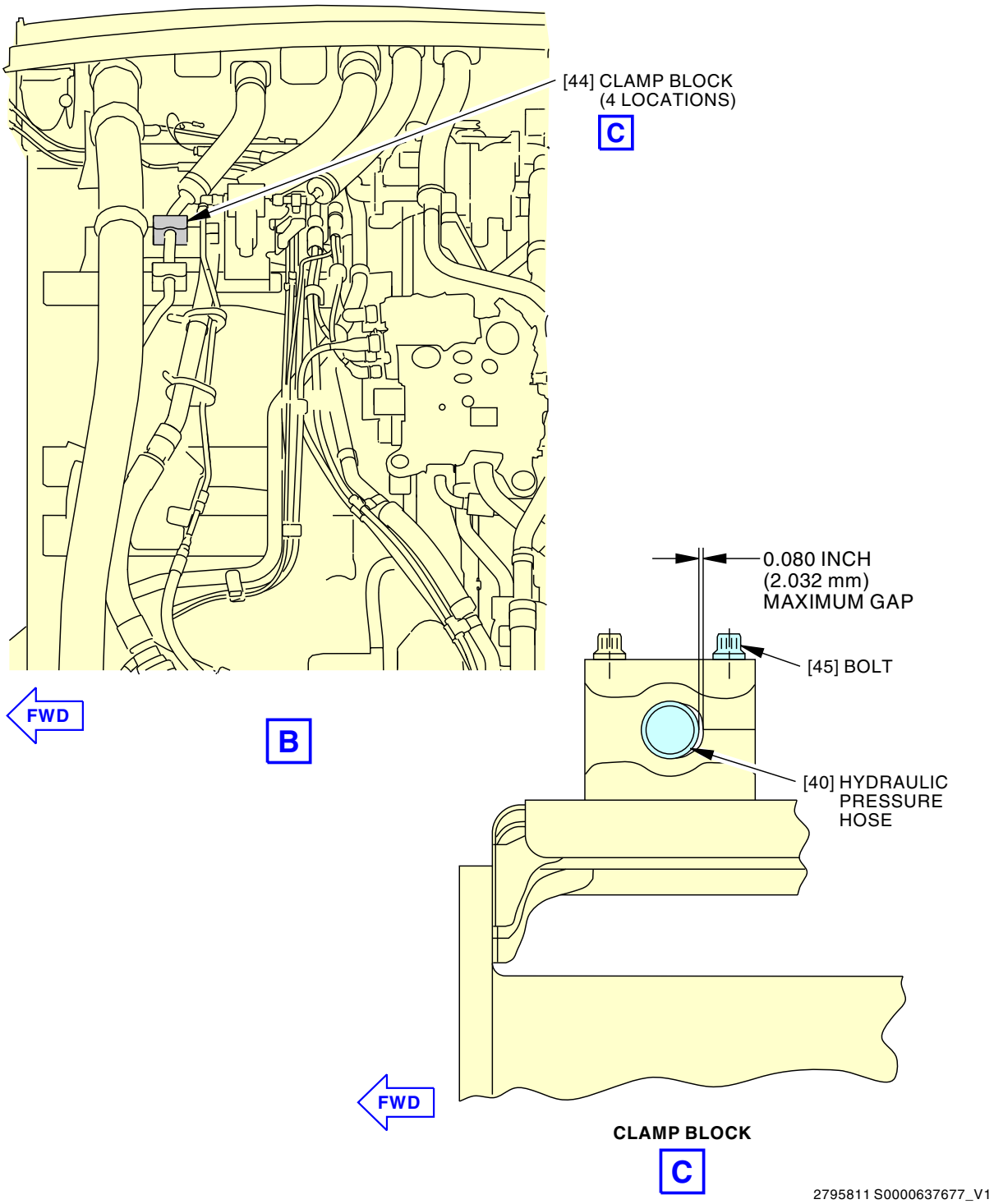
Left Side of Engine Installation
Figure 404/71-00-02-990-802-G00 (Sheet 1 of 6)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



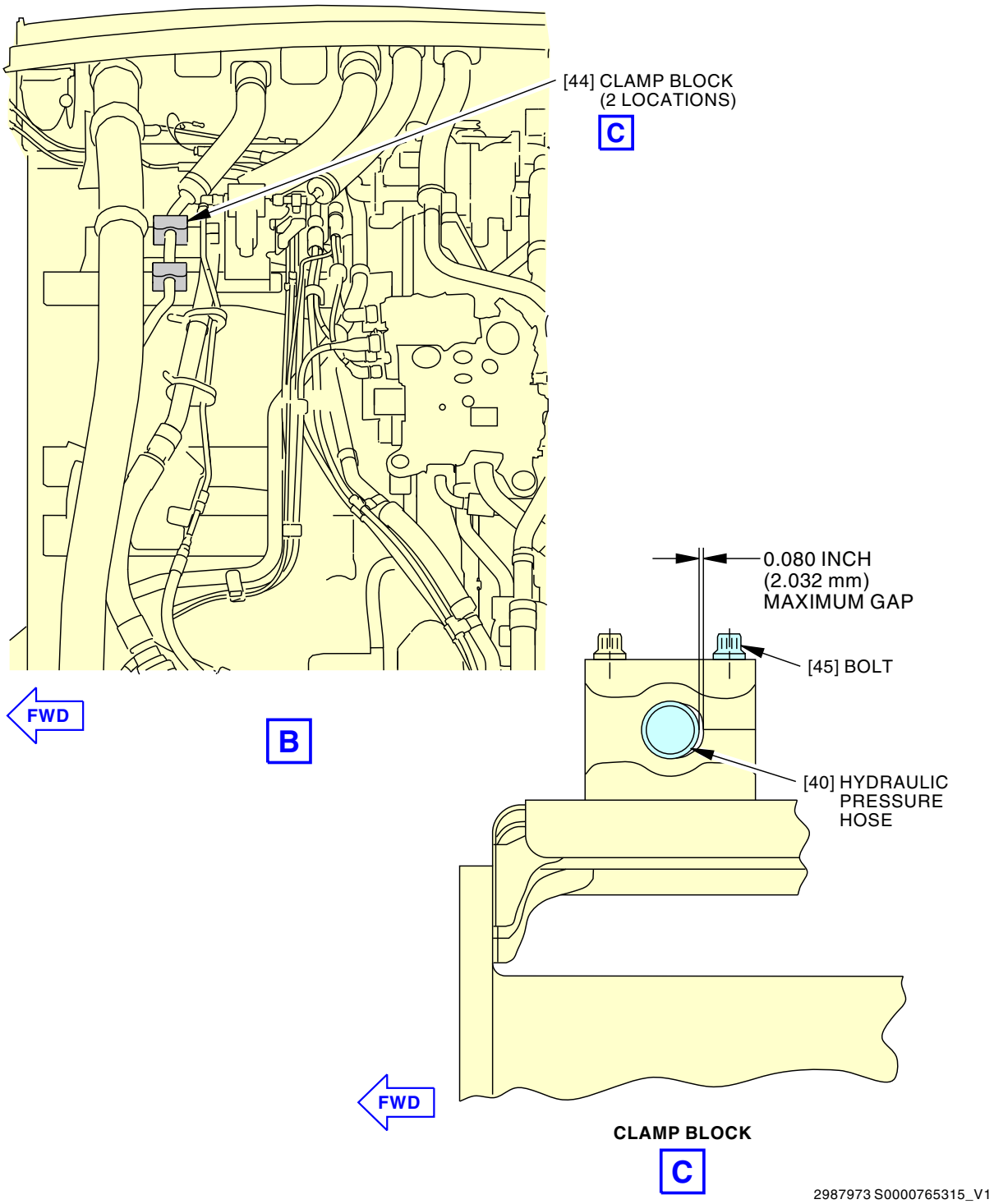
Left Side of Engine Installation
Figure 404/71-00-02-990-802-G00 (Sheet 2 of 6)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



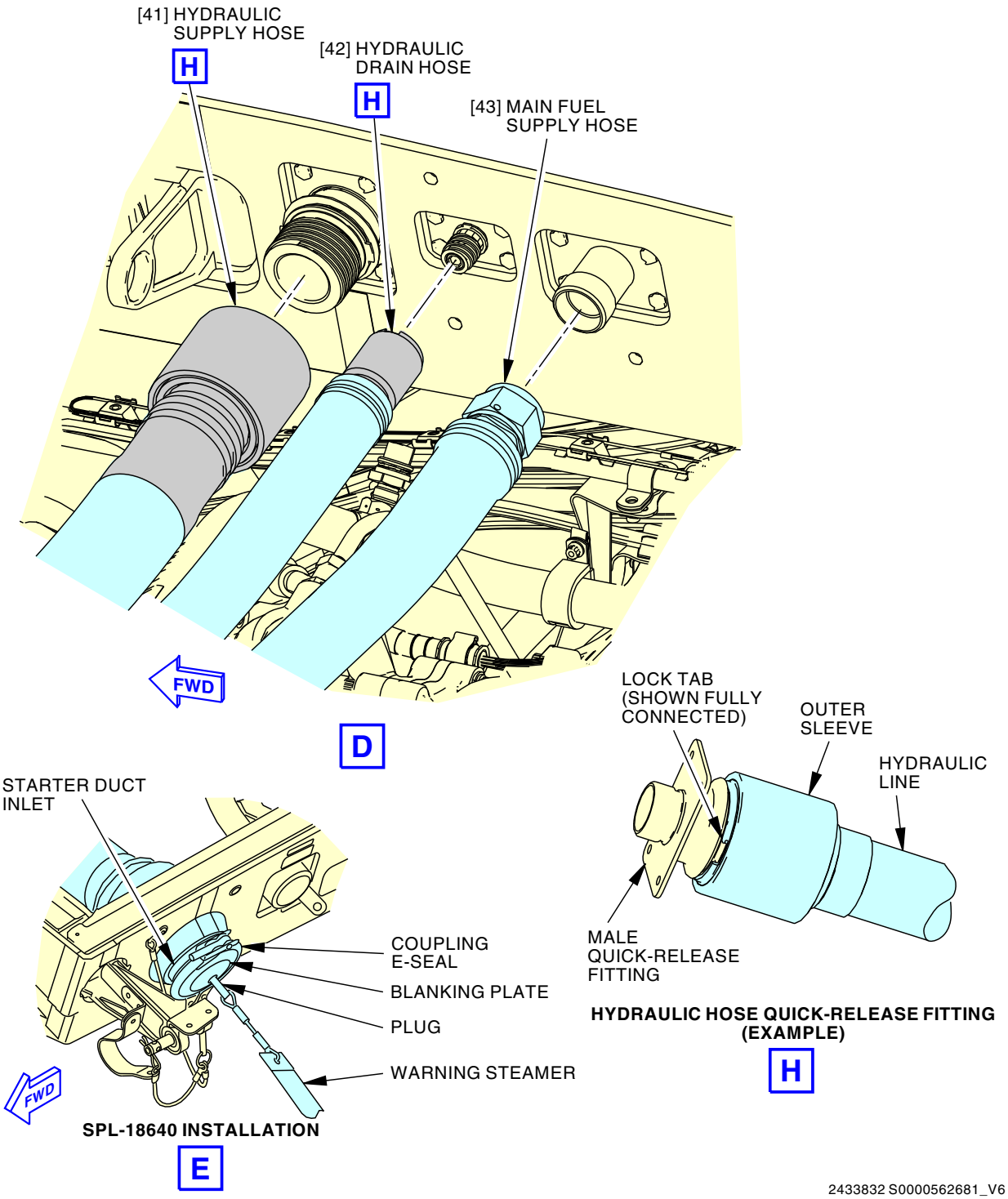
Left Side of Engine Installation
Figure 404/71-00-02-990-802-G00 (Sheet 3 of 6)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



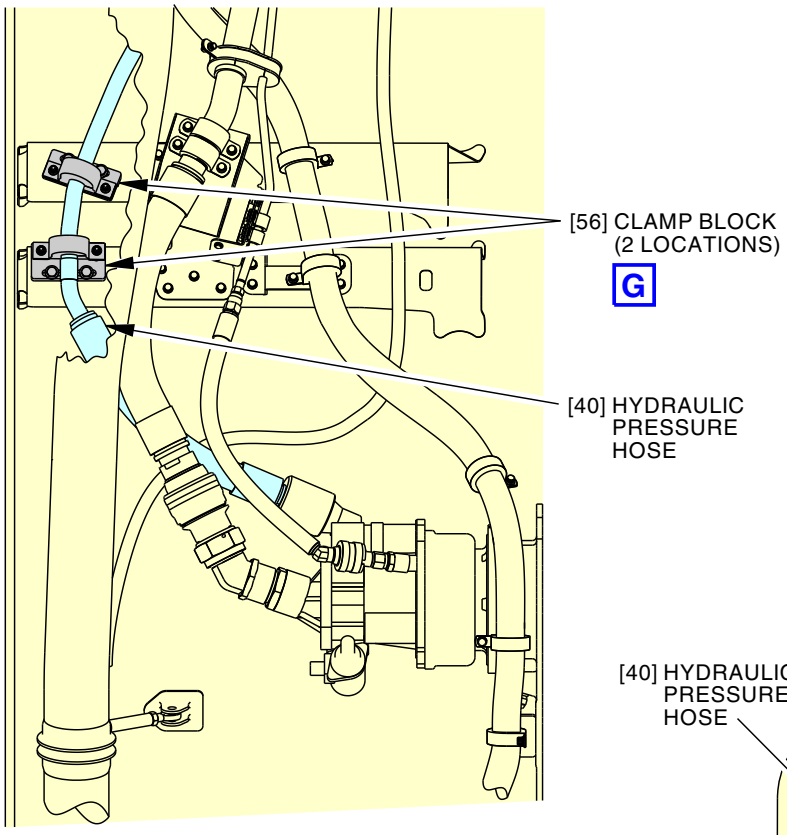
Left Side of Engine Installation
Figure 404/71-00-02-990-802-G00 (Sheet 4 of 6)

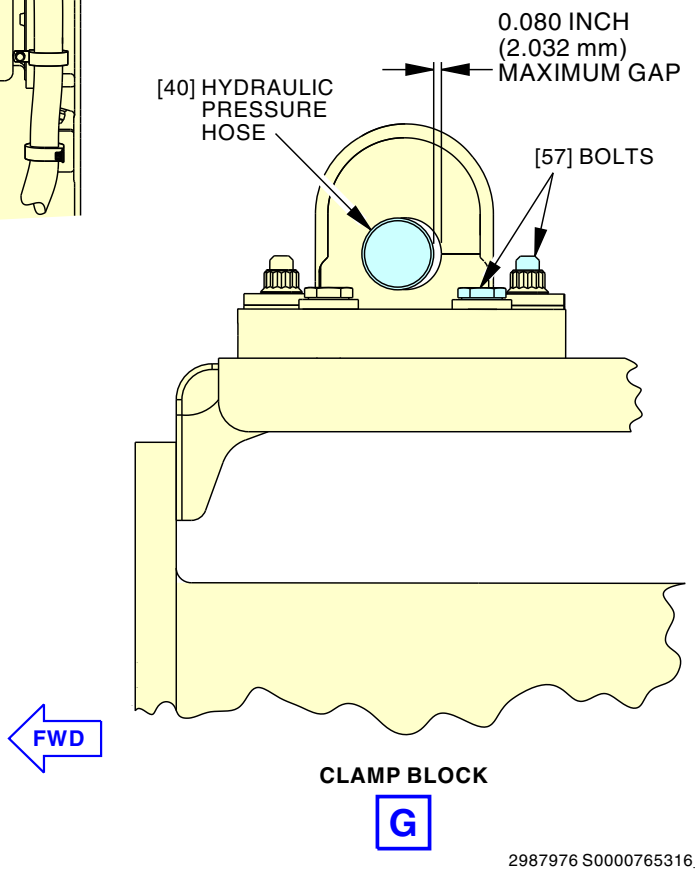
ECCN 9E991 BOEING PROPRIETARY - See title page for details



Left Side of Engine Installation
Figure 404/71-00-02-990-802-G00 (Sheet 5 of 6)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

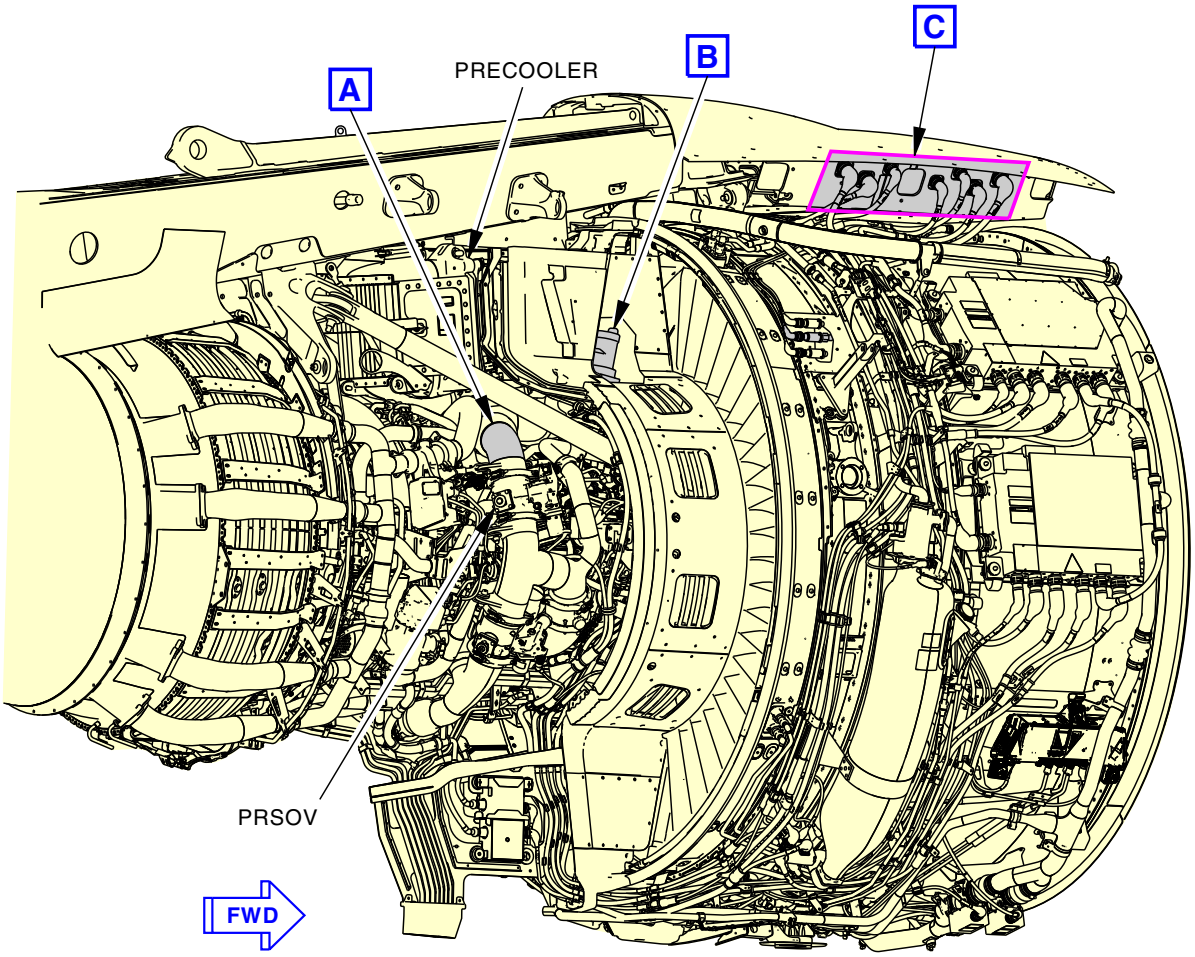




2987976 S0000765316_V1

Left Side of Engine Installation
Figure 404/71-00-02-990-802-G00 (Sheet 6 of 6)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

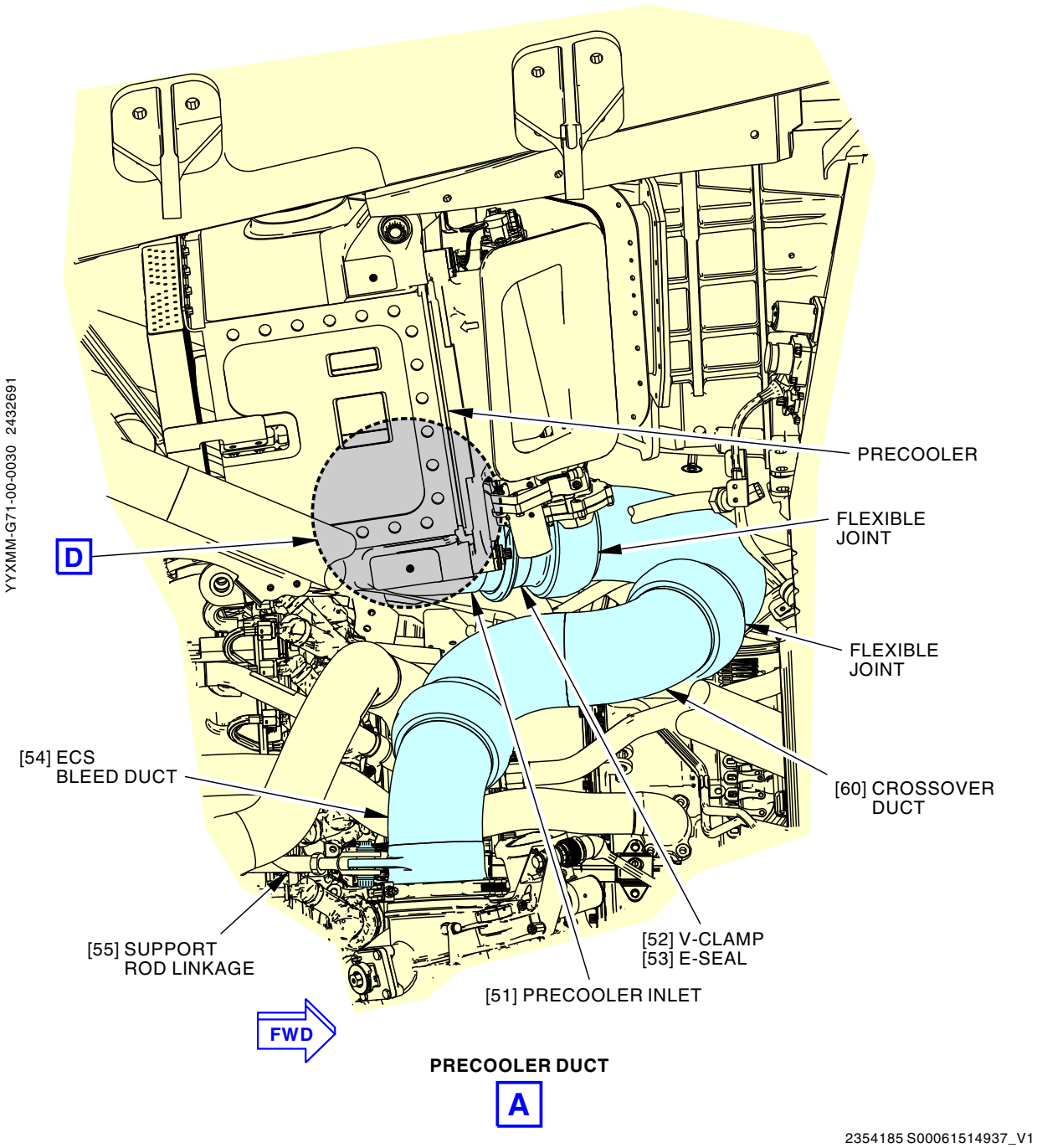


(TYPICAL)

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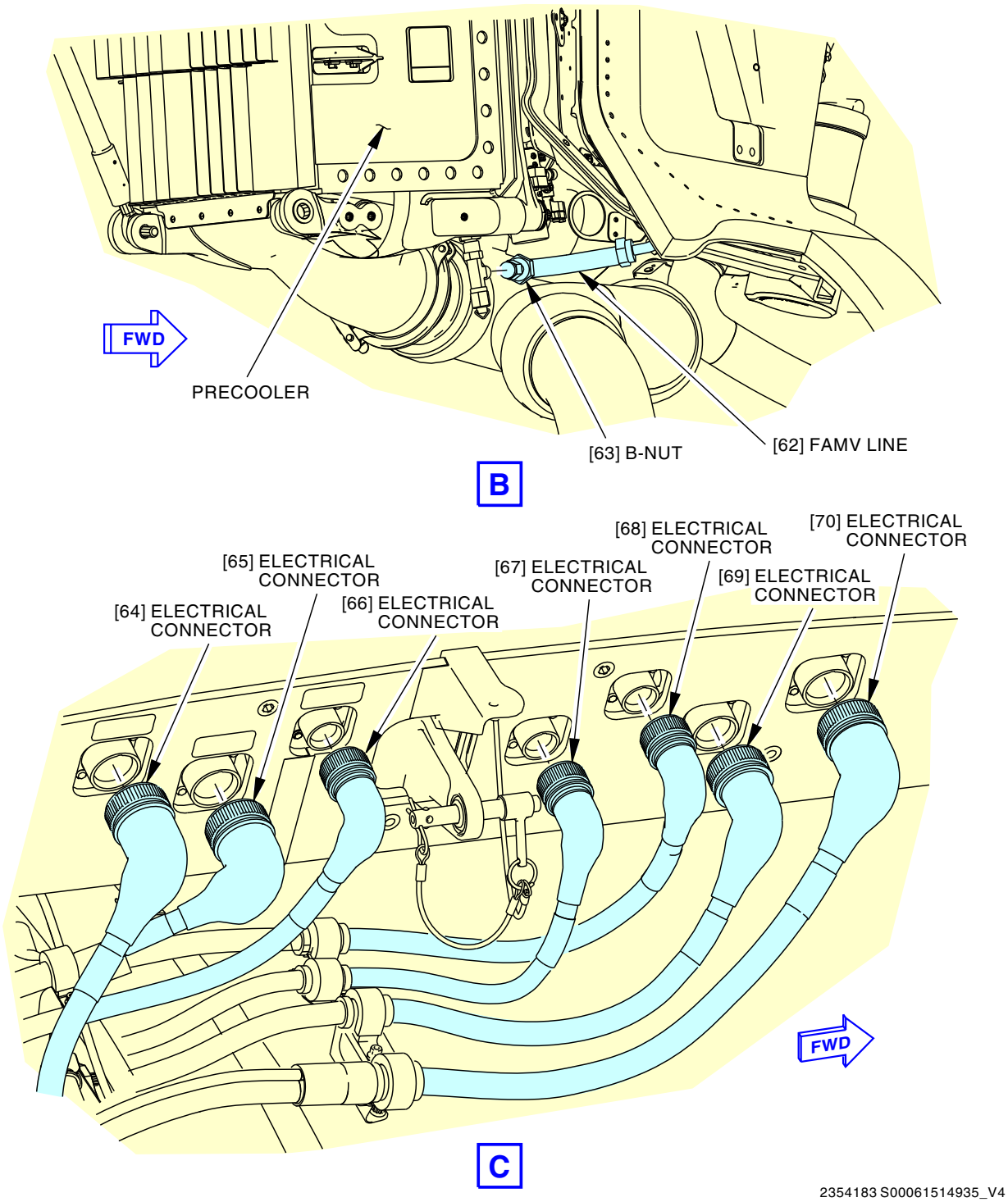
Right Side of Engine Installation
Figure 405/71-00-02-990-805-G00 (Sheet 1 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



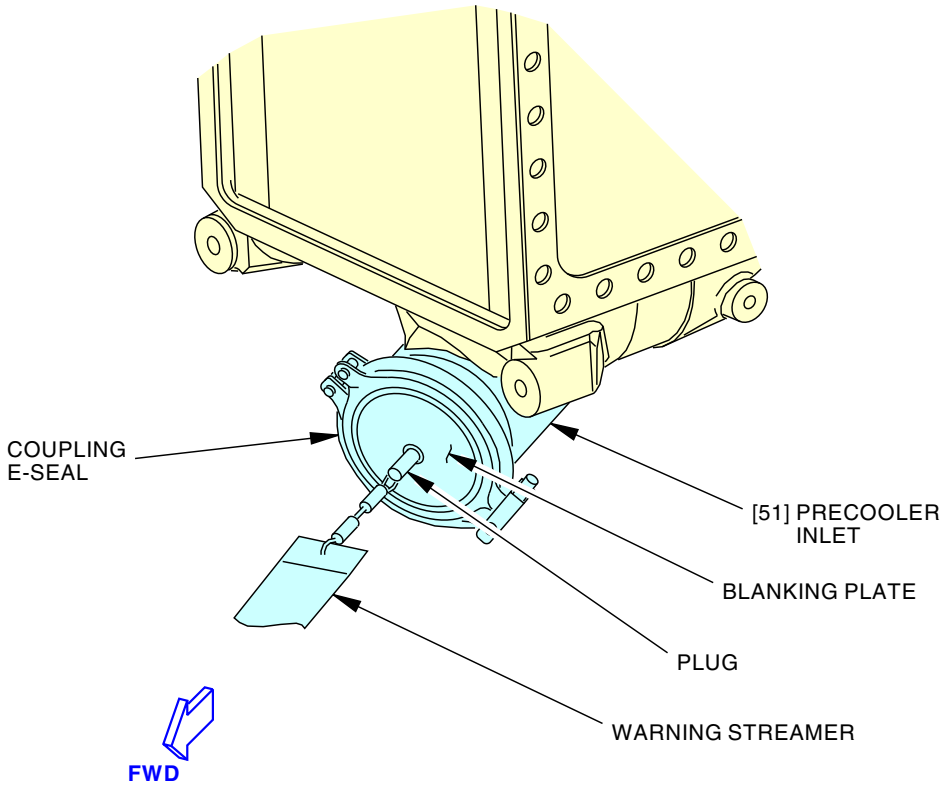
Right Side of Engine Installation
Figure 405/71-00-02-990-805-G00 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Right Side of Engine Installation
Figure 405/71-00-02-990-805-G00 (Sheet 3 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



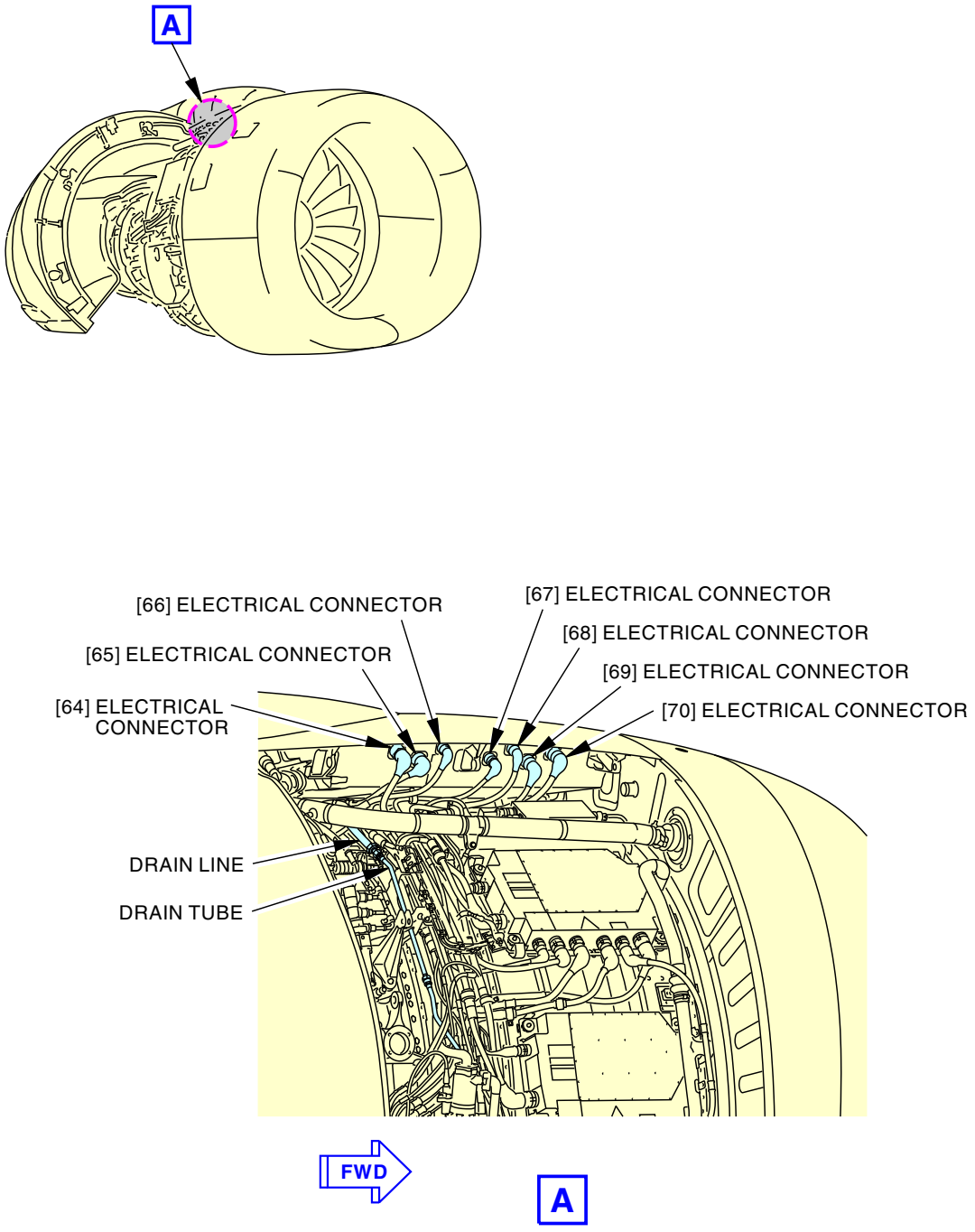
SPL-18258 INSTALLATION

D

2913921 S0000699687_V1

Right Side of Engine Installation
Figure 405/71-00-02-990-805-G00 (Sheet 4 of 4)

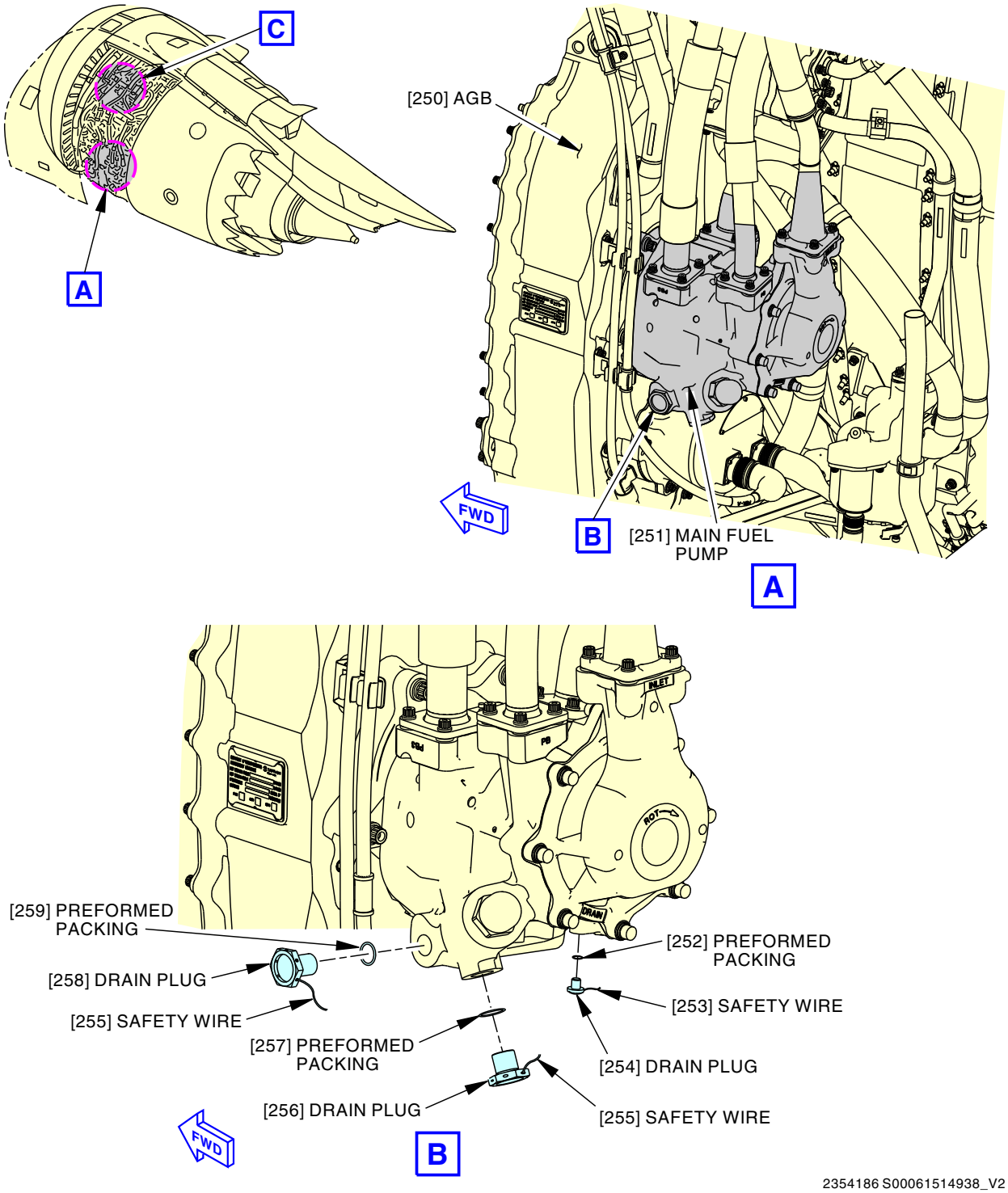
ECCN 9E991 BOEING PROPRIETARY - See title page for details



3012378 S0000786011_V1

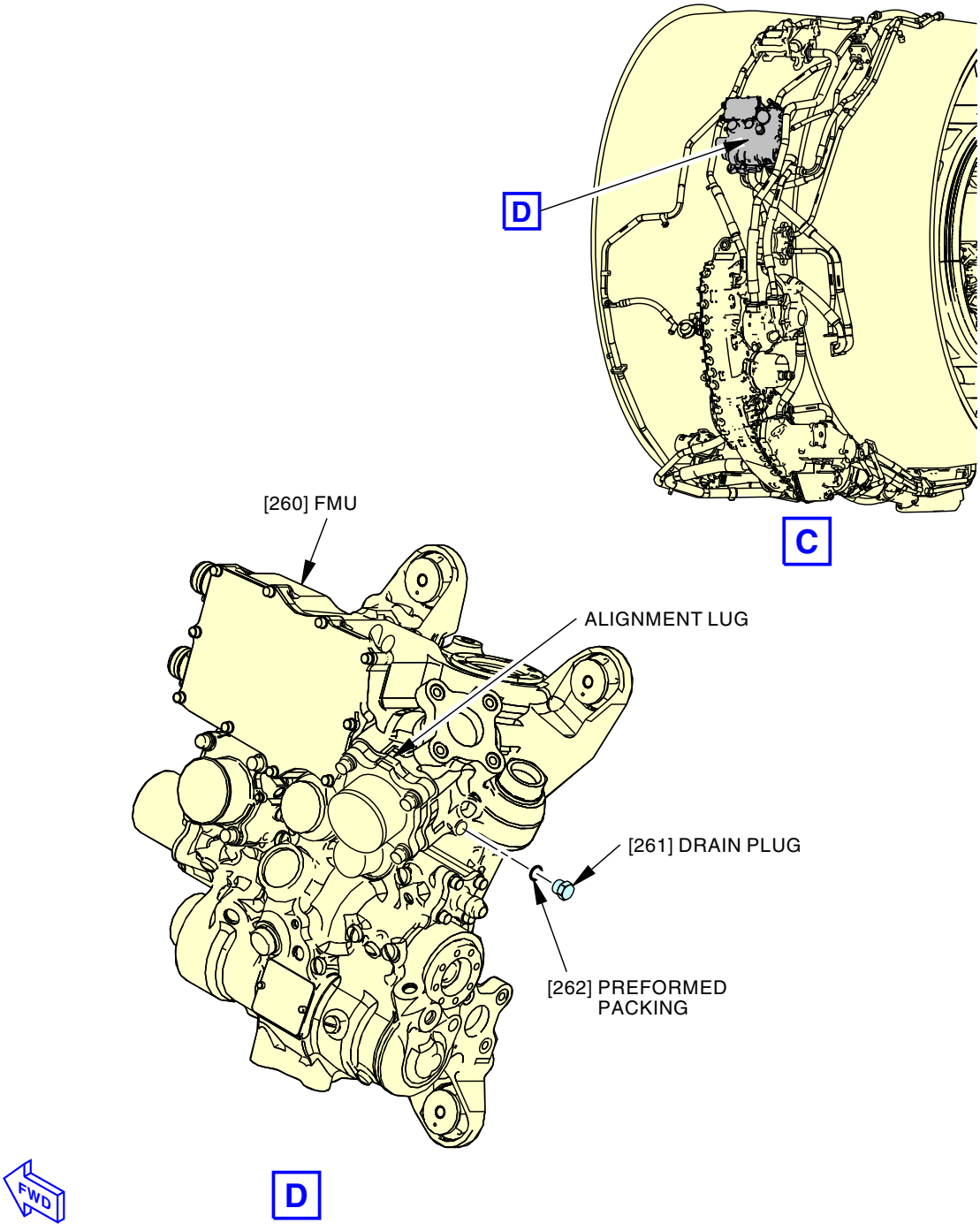
Fan Case Disconnects on the Right Side
Figure 406/71-00-02-990-820-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details



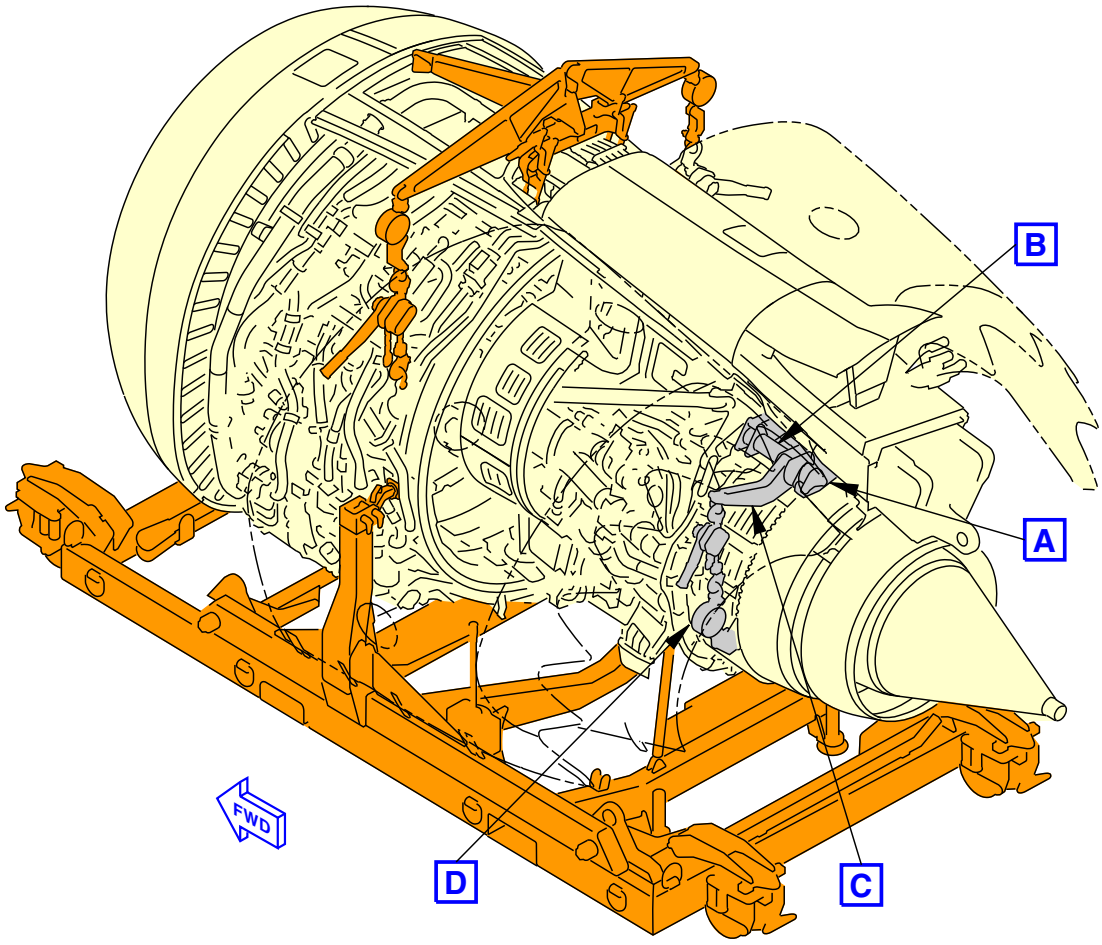
Engine Fuel Drain Plug Installation
Figure 407/71-00-02-990-806-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Engine Fuel Drain Plug Installation
Figure 407/71-00-02-990-806-G00 (Sheet 2 of 2)

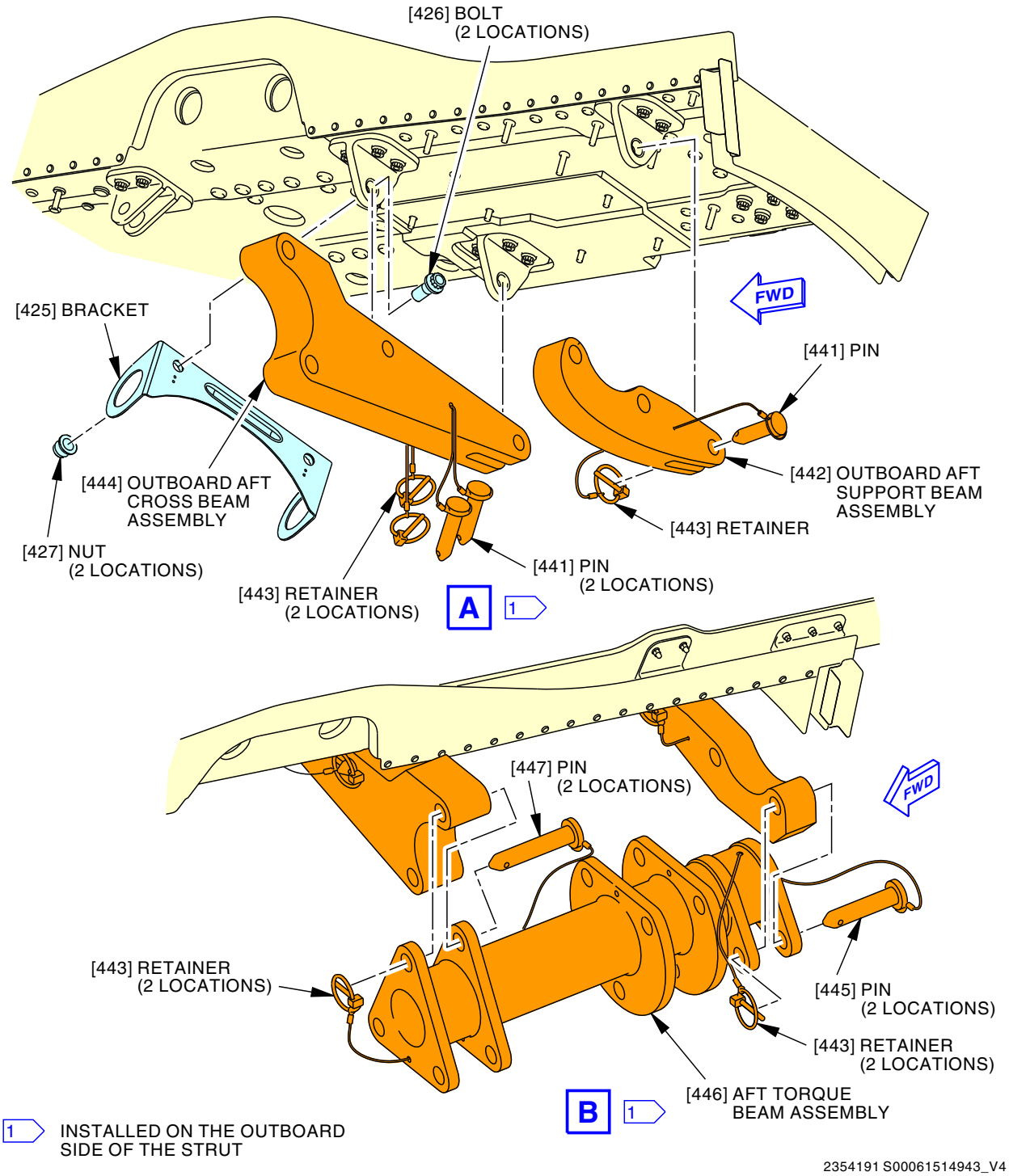
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2354187 S00061514939_V2

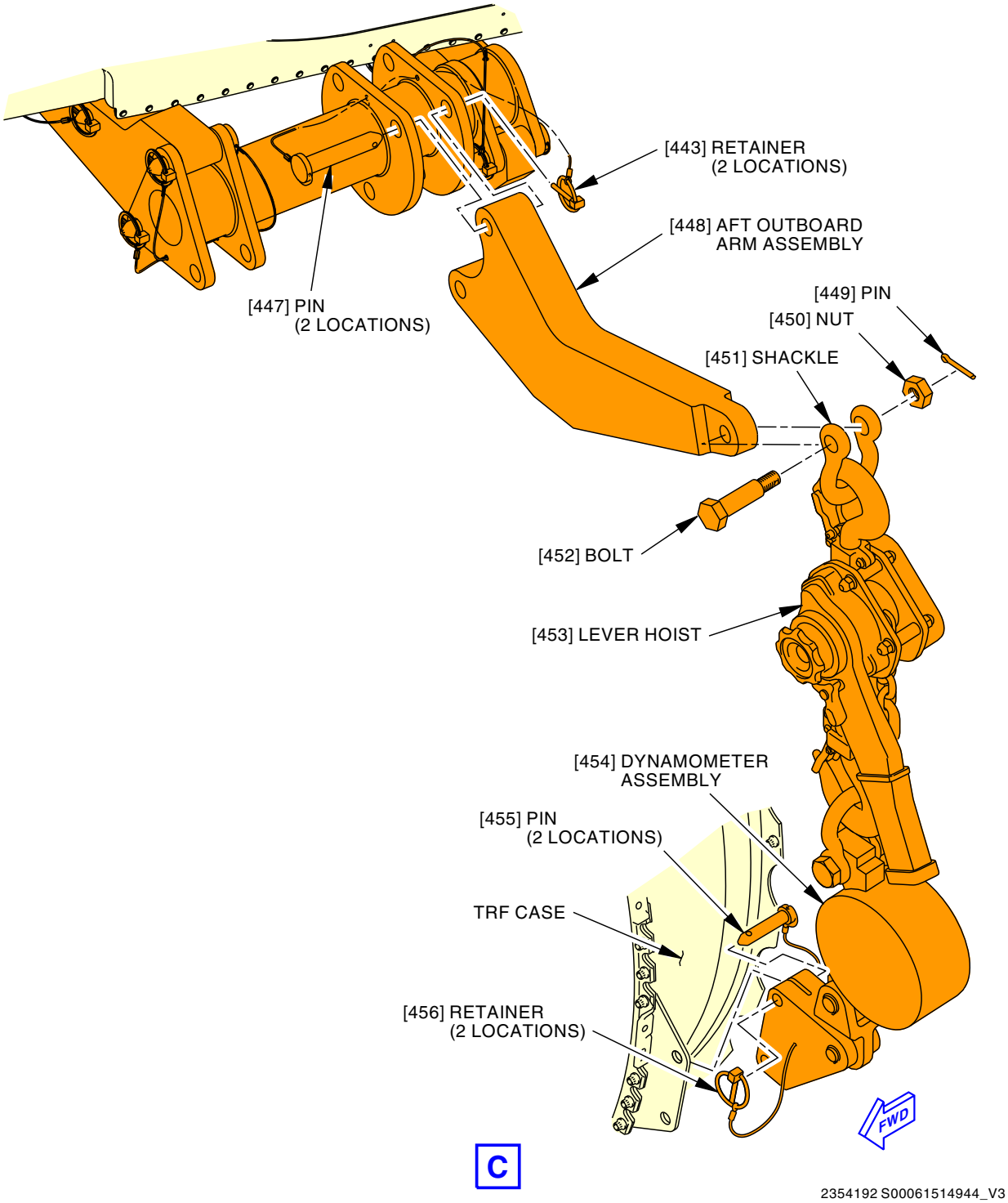
Aft Bootstrap Equipment Installation
Figure 408/71-00-02-990-809-G00 (Sheet 1 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



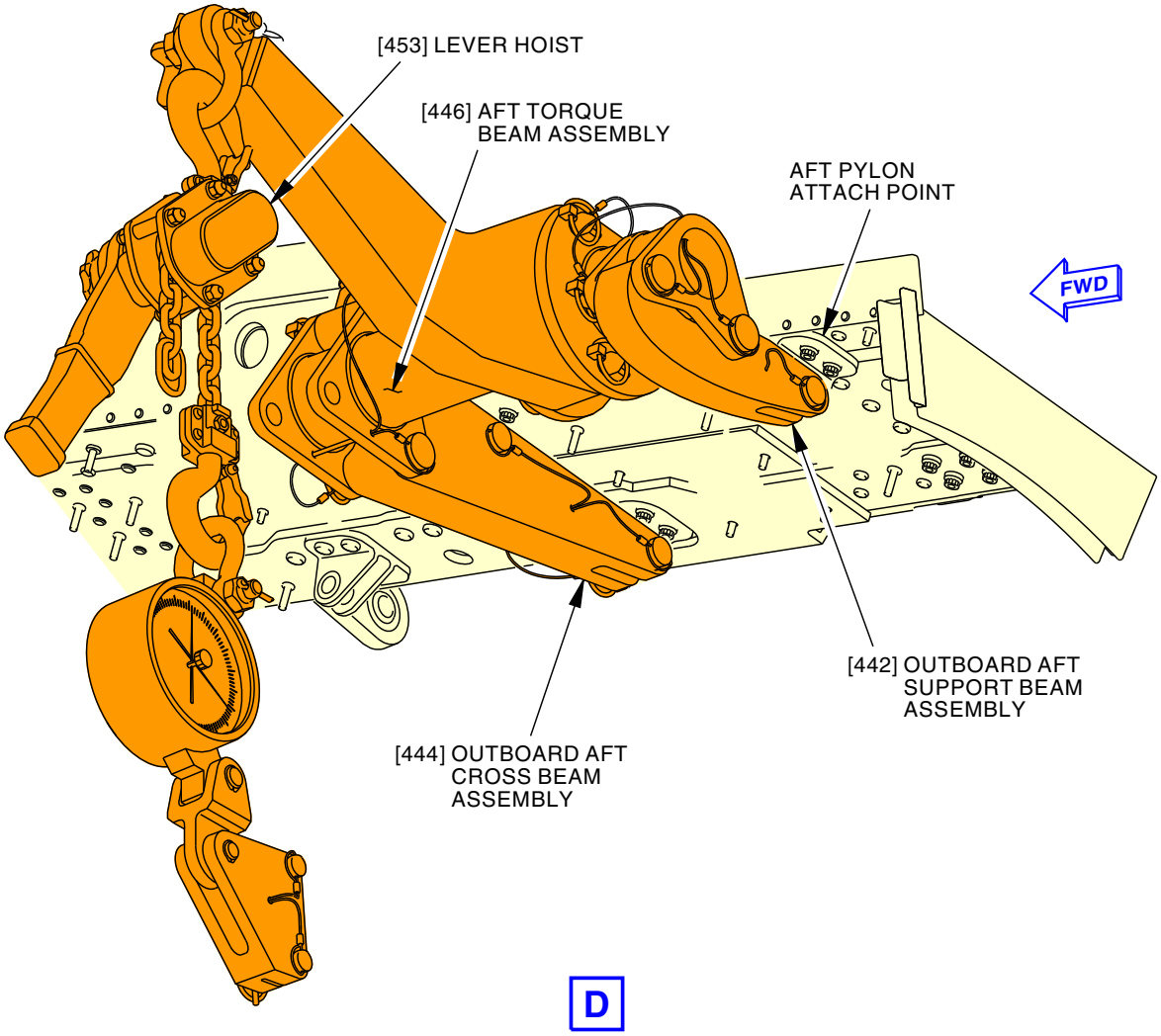
Aft Bootstrap Equipment Installation
Figure 408/71-00-02-990-809-G00 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Aft Bootstrap Equipment Installation
Figure 408/71-00-02-990-809-G00 (Sheet 3 of 4)

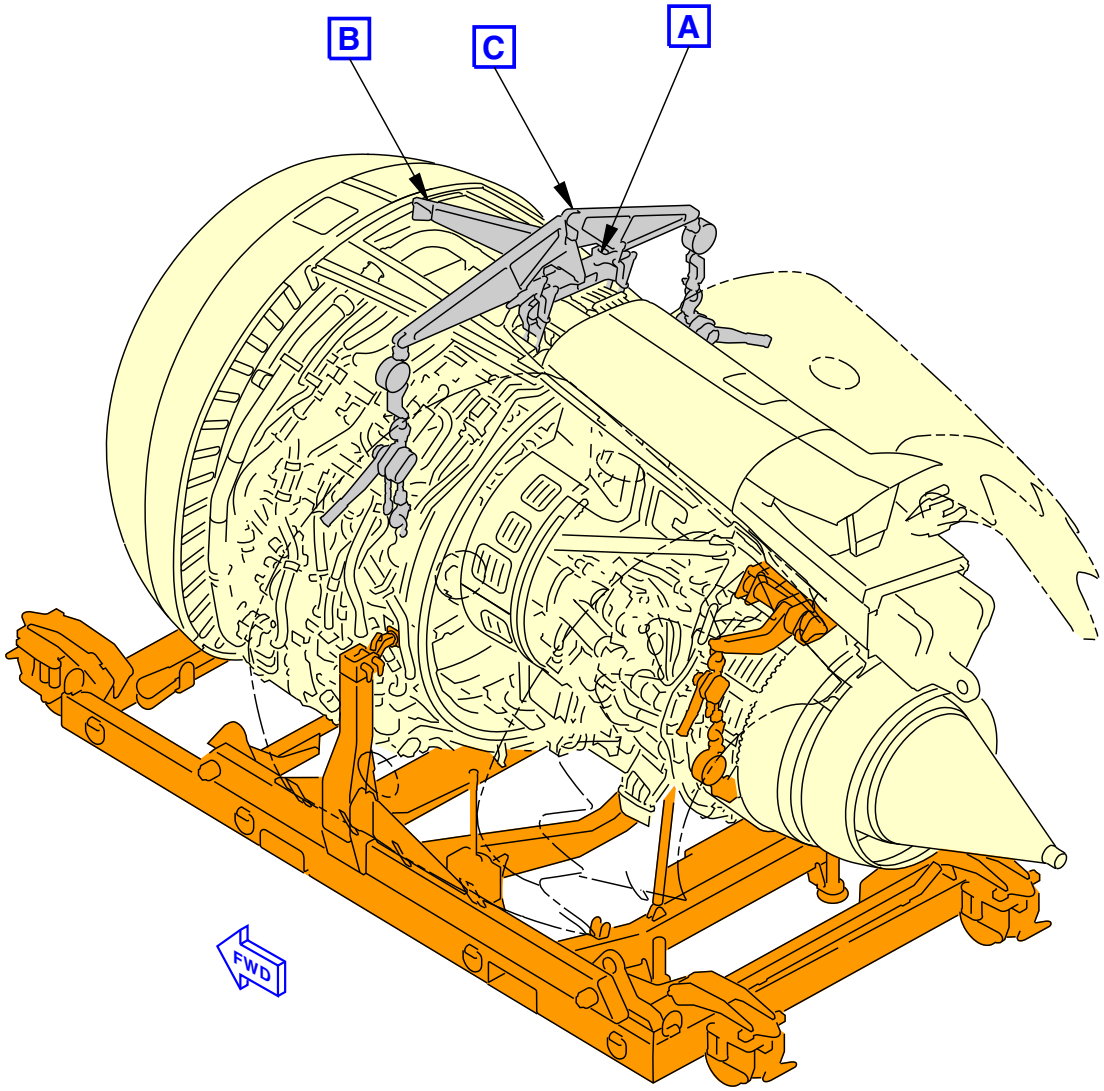
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2354190 S00061514942_V2

Aft Bootstrap Equipment Installation
Figure 408/71-00-02-990-809-G00 (Sheet 4 of 4)

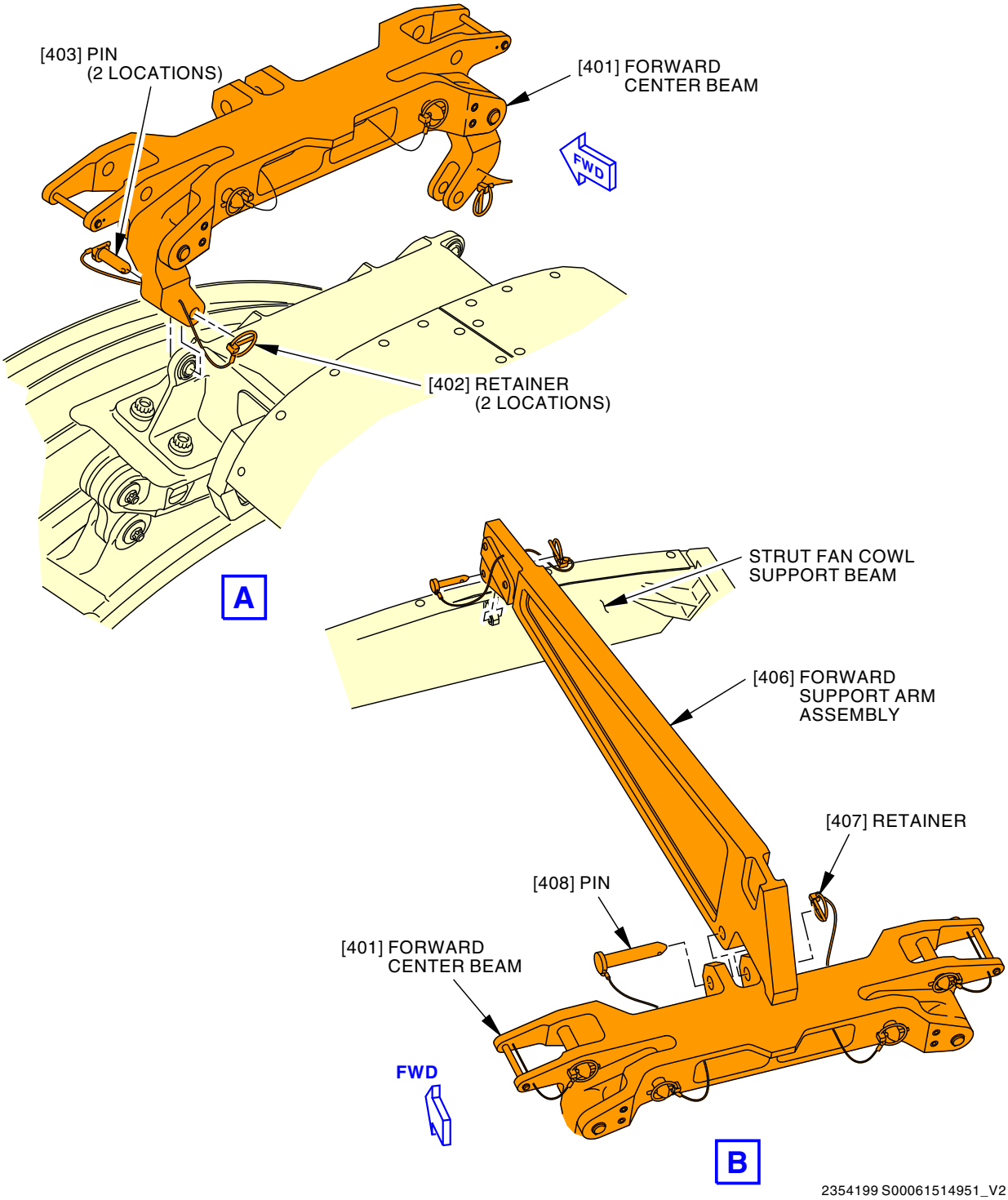
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2432304 S0000563253_V2

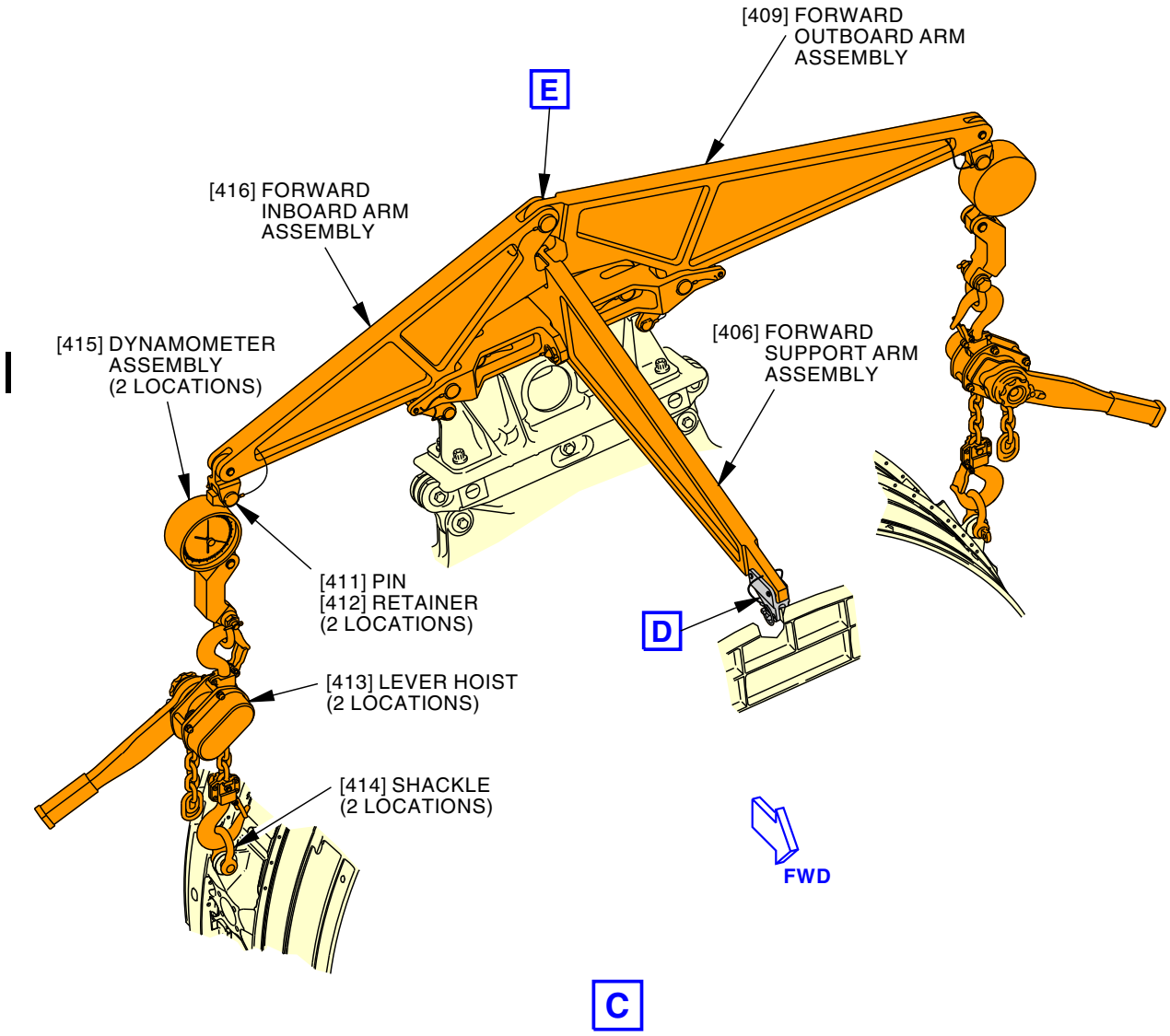
Forward Bootstrap Equipment Installation
Figure 409/71-00-02-990-811-G00 (Sheet 1 of 6)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Forward Bootstrap Equipment Installation
Figure 409/71-00-02-990-811-G00 (Sheet 2 of 6)

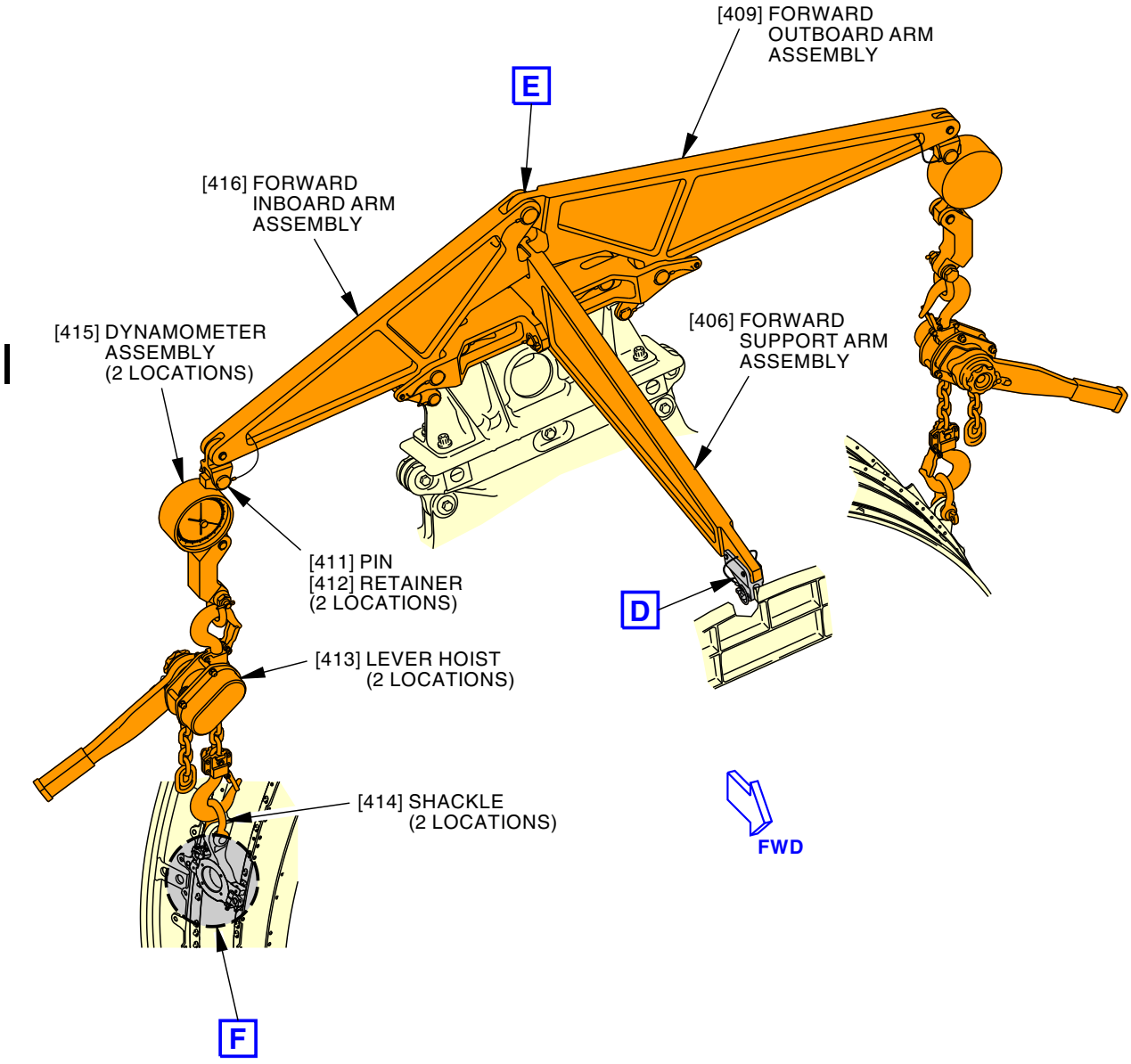
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2354195 S00061514947_V3

Forward Bootstrap Equipment Installation
Figure 409/71-00-02-990-811-G00 (Sheet 3 of 6)

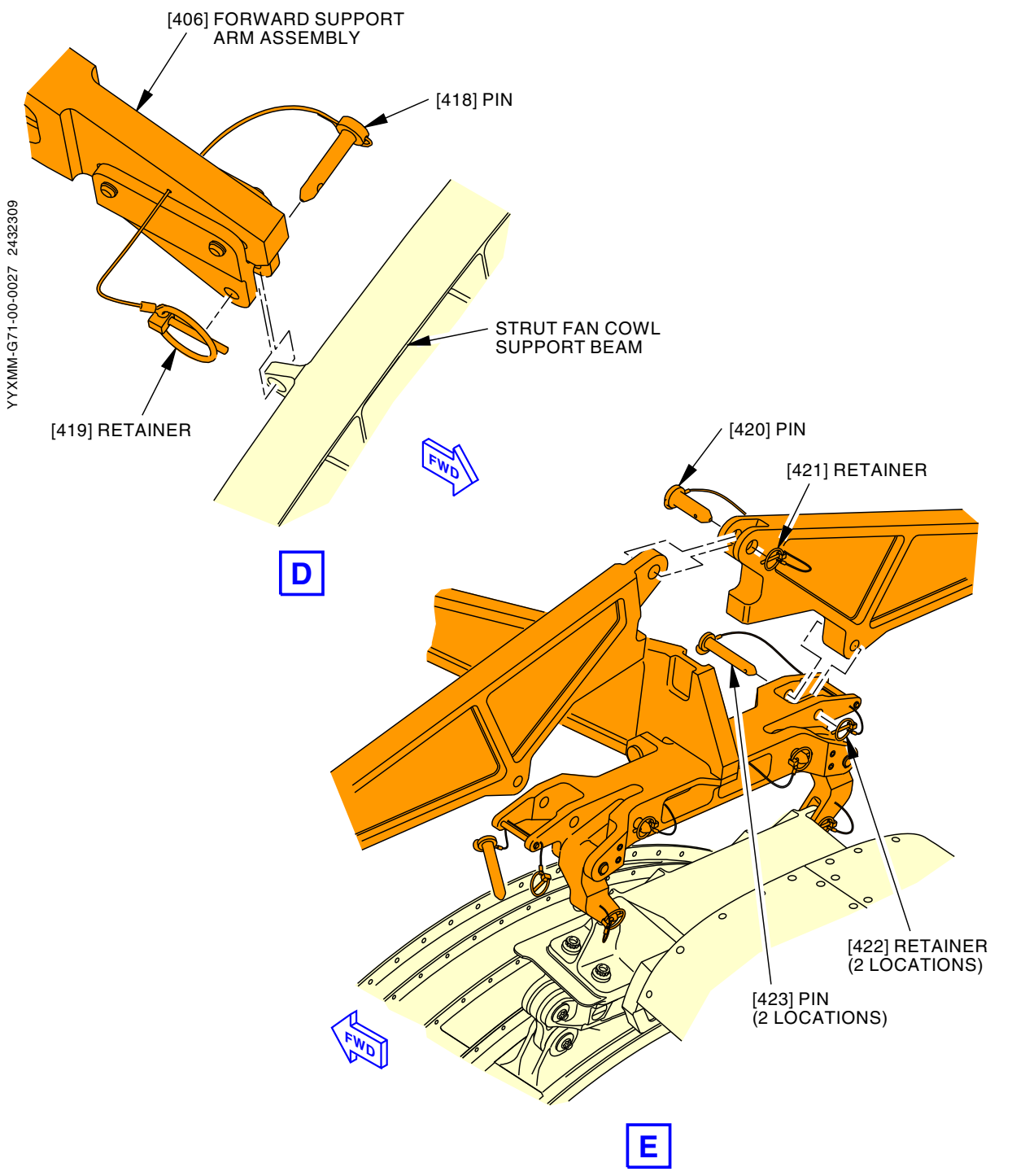
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2872175 S0000678476_V2

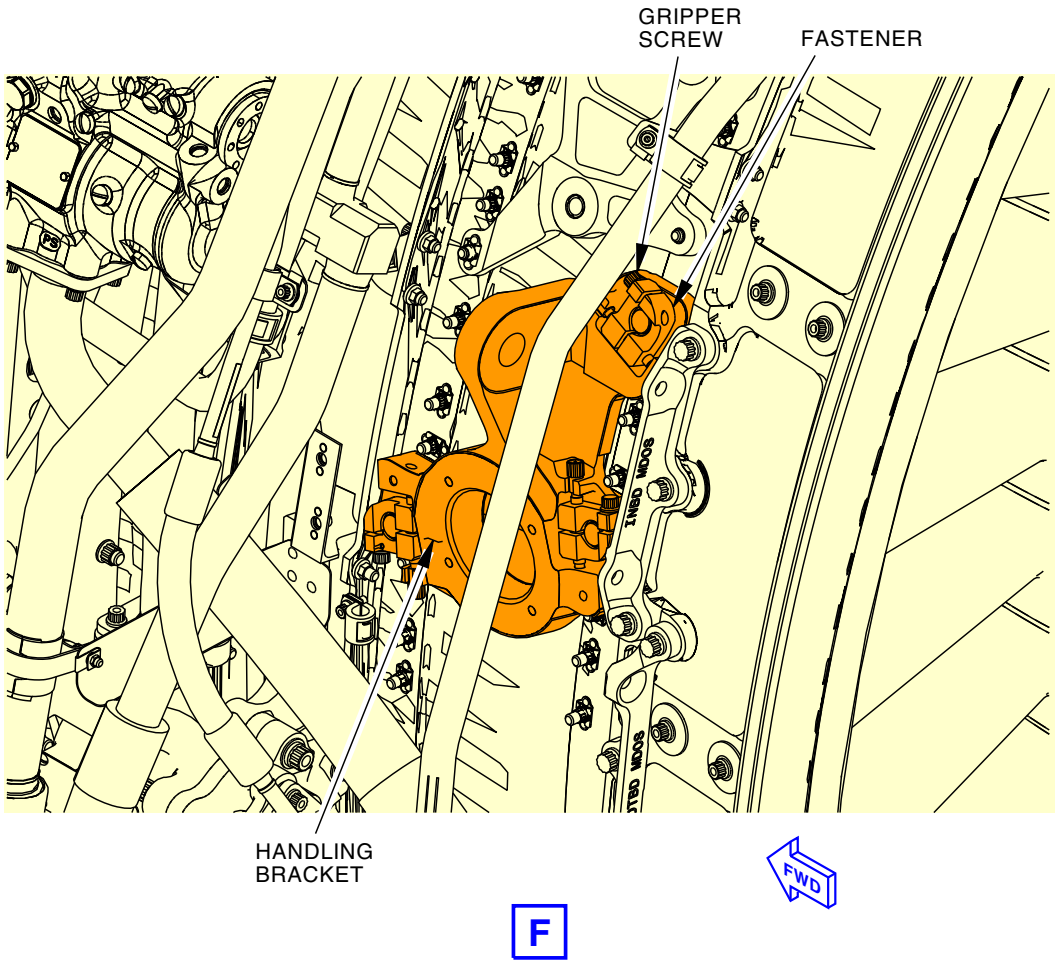
Forward Bootstrap Equipment Installation
Figure 409/71-00-02-990-811-G00 (Sheet 4 of 6)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Forward Bootstrap Equipment Installation
Figure 409/71-00-02-990-811-G00 (Sheet 5 of 6)

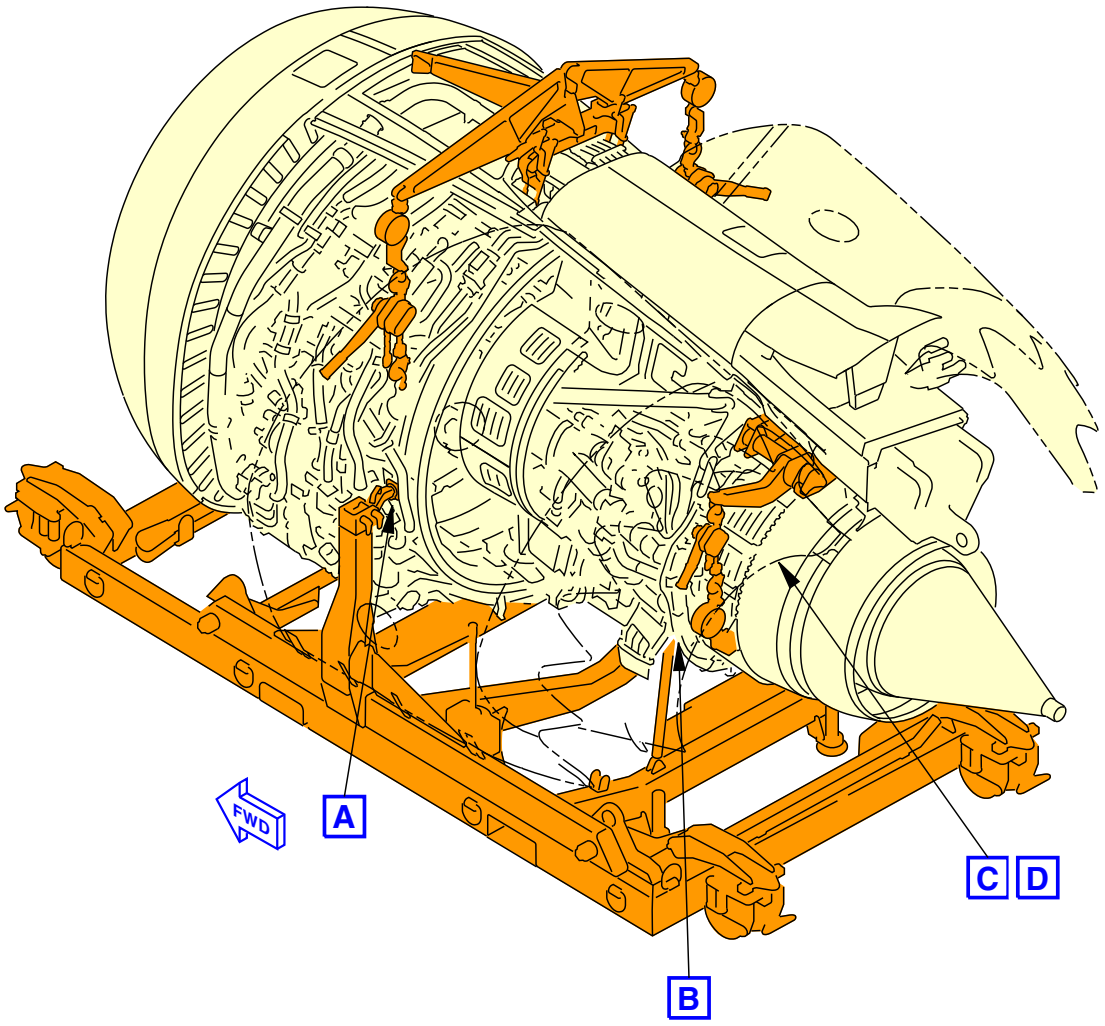
ECCN 9E991 BOEING PROPRIETARY - See title page for details



ICN-LEAP-1B-XXXXXX-B-F0301-XXXXX-A-001-02
2872189 S0000678477_V1

Forward Bootstrap Equipment Installation
Figure 409/71-00-02-990-811-G00 (Sheet 6 of 6)

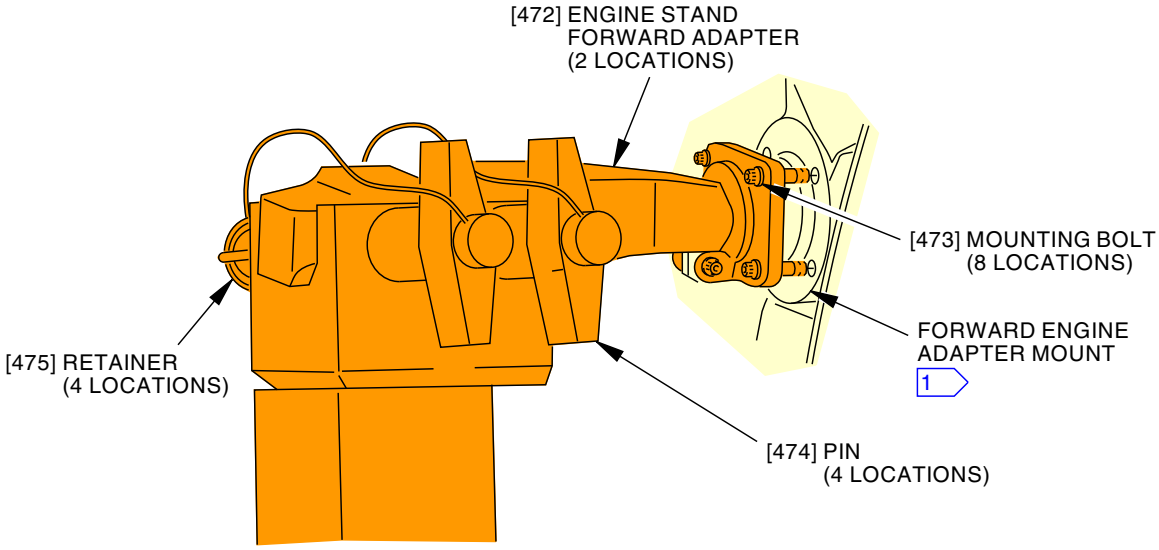
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2354201 S00061514953_V3

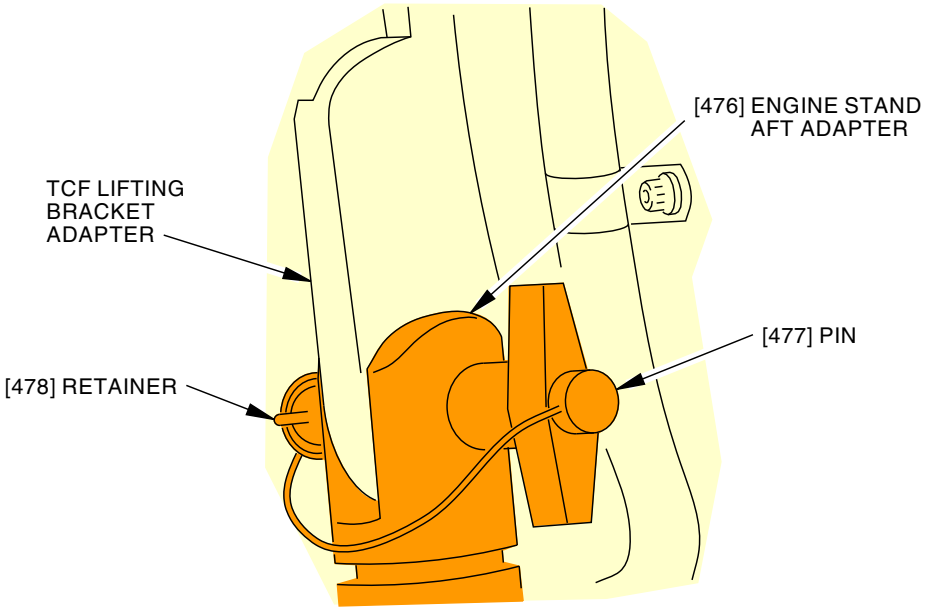
Engine and Transportation Stand Installation
Figure 410/71-00-02-990-812-G00 (Sheet 1 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



(LEFT SIDE IS SHOWN, RIGHT SIDE IS OPPOSITE)

A



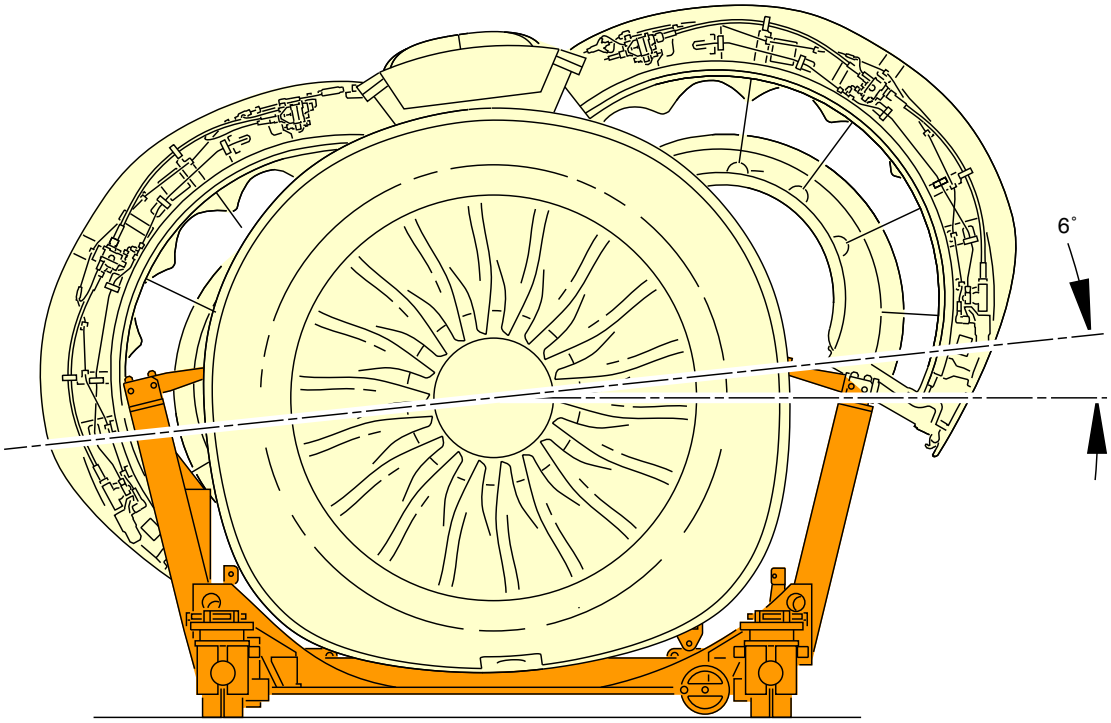
1 THIS IS THE HANDLING BRACKET FOR POST LEAP-1B SB 72-0181.

B

2354202 S00061514954_V5

Engine and Transportation Stand Installation
Figure 410/71-00-02-990-812-G00 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

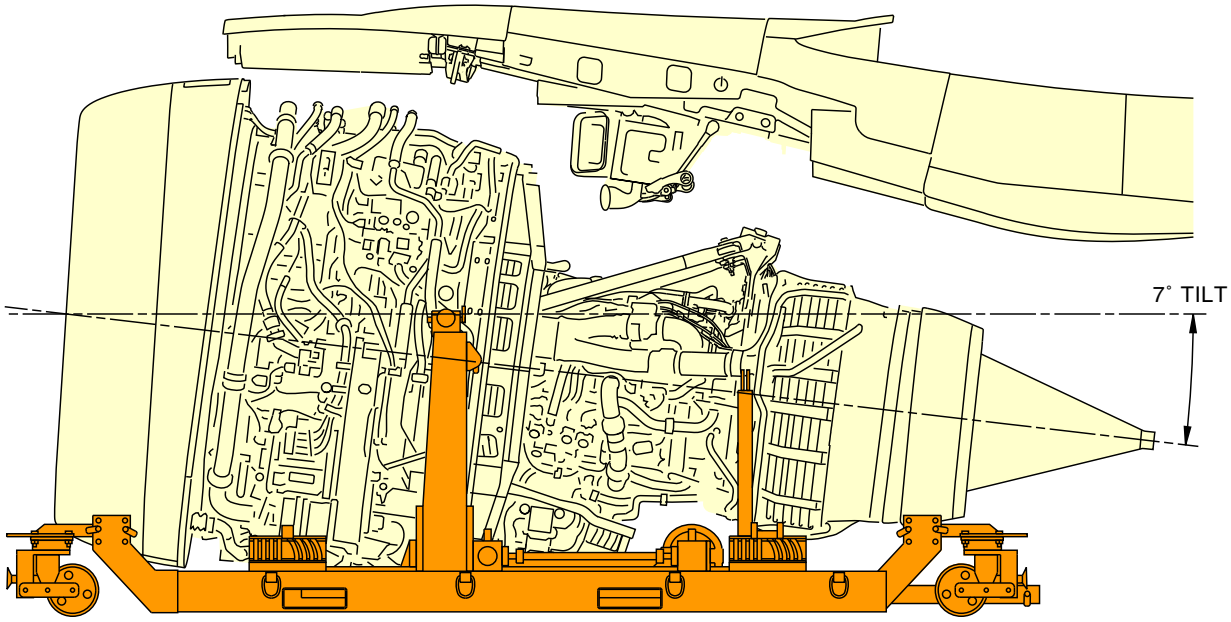


C

2354203 S00061514955_V2

Engine and Transportation Stand Installation
Figure 410/71-00-02-990-812-G00 (Sheet 3 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

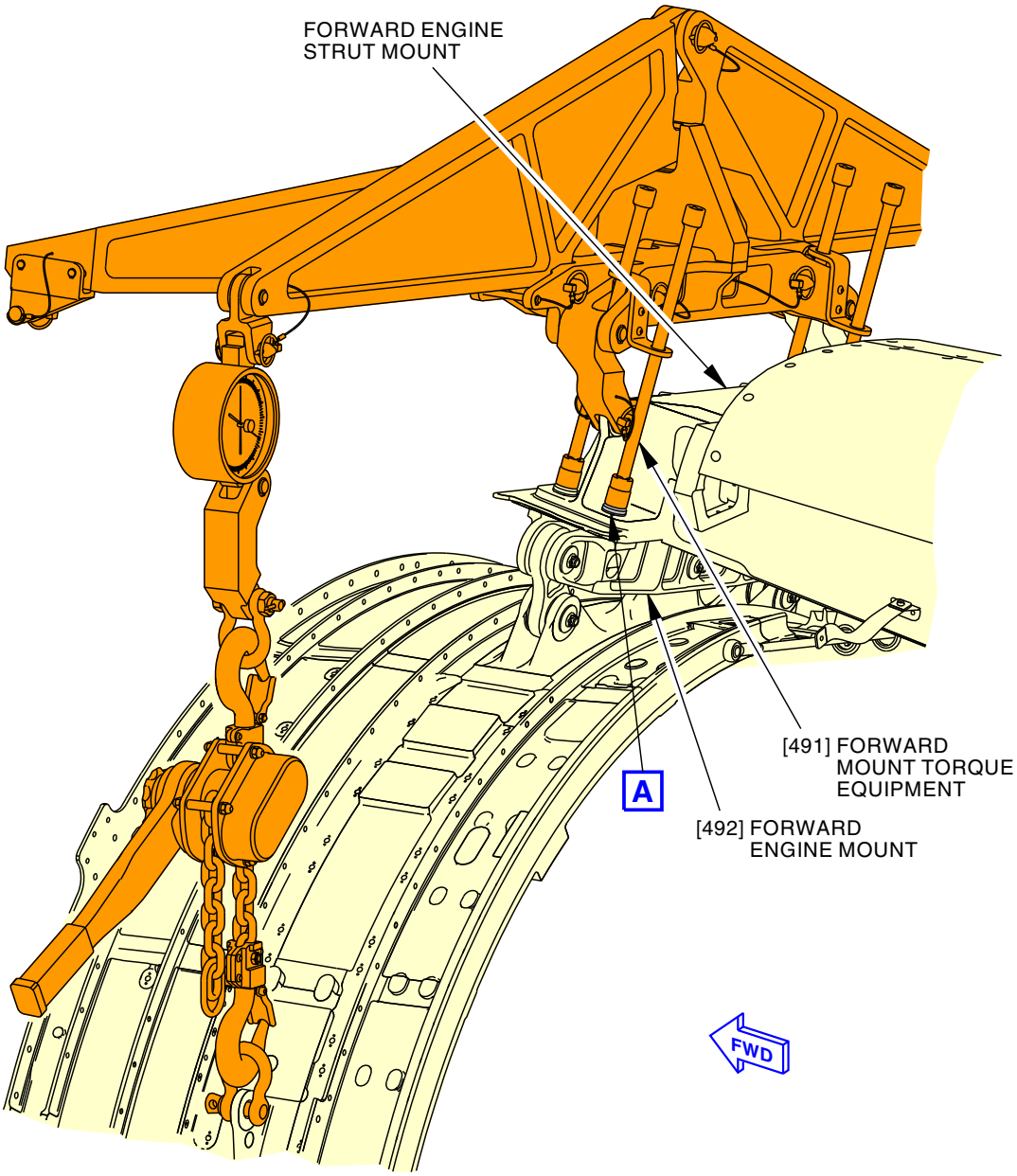


D

2434798 S0000564623_V2

Engine and Transportation Stand Installation
Figure 410/71-00-02-990-812-G00 (Sheet 4 of 4)

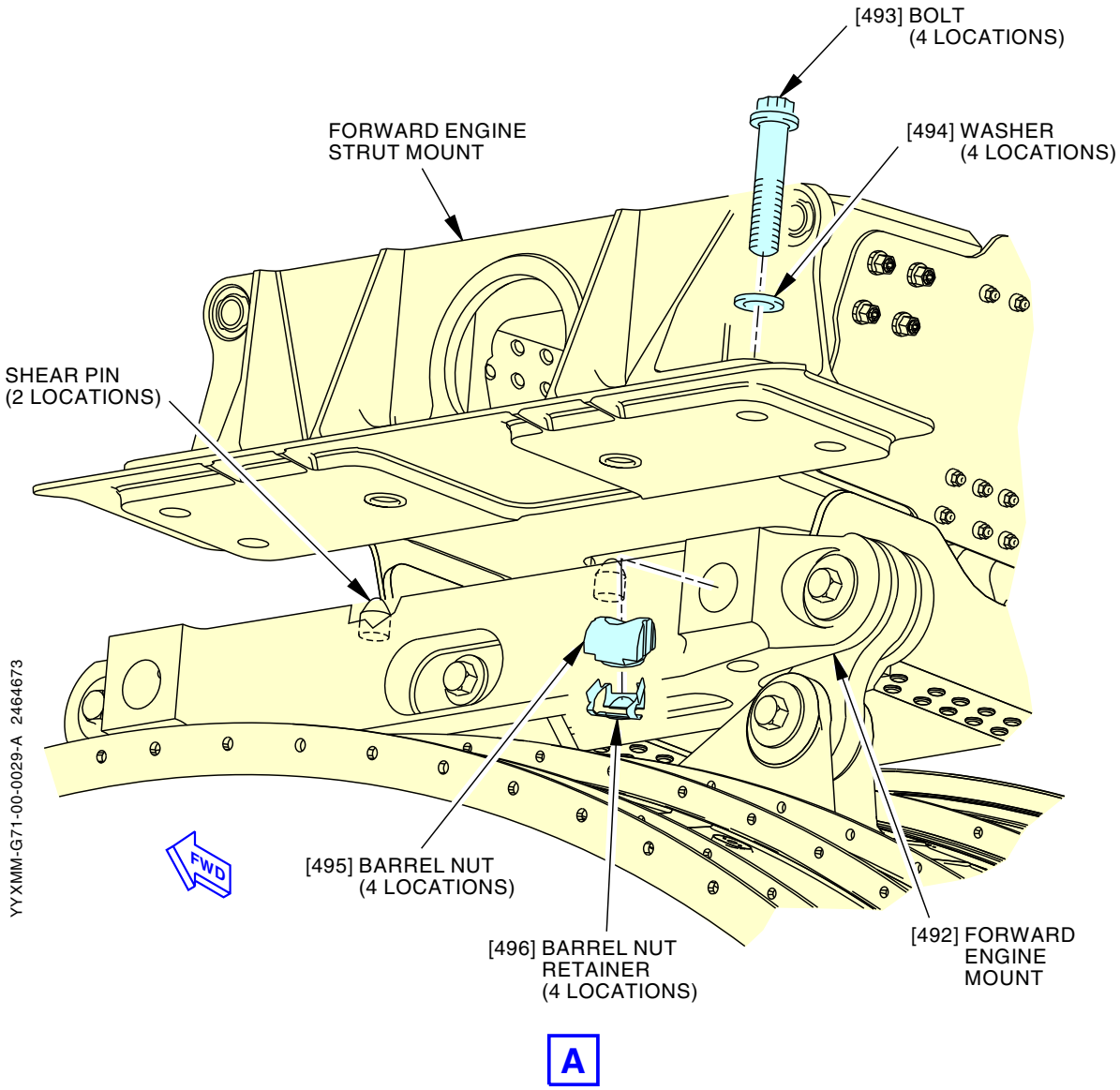
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2354198 S00061514950_V3

Forward Engine Mount Installation
Figure 411/71-00-02-990-813-G00 (Sheet 1 of 2)

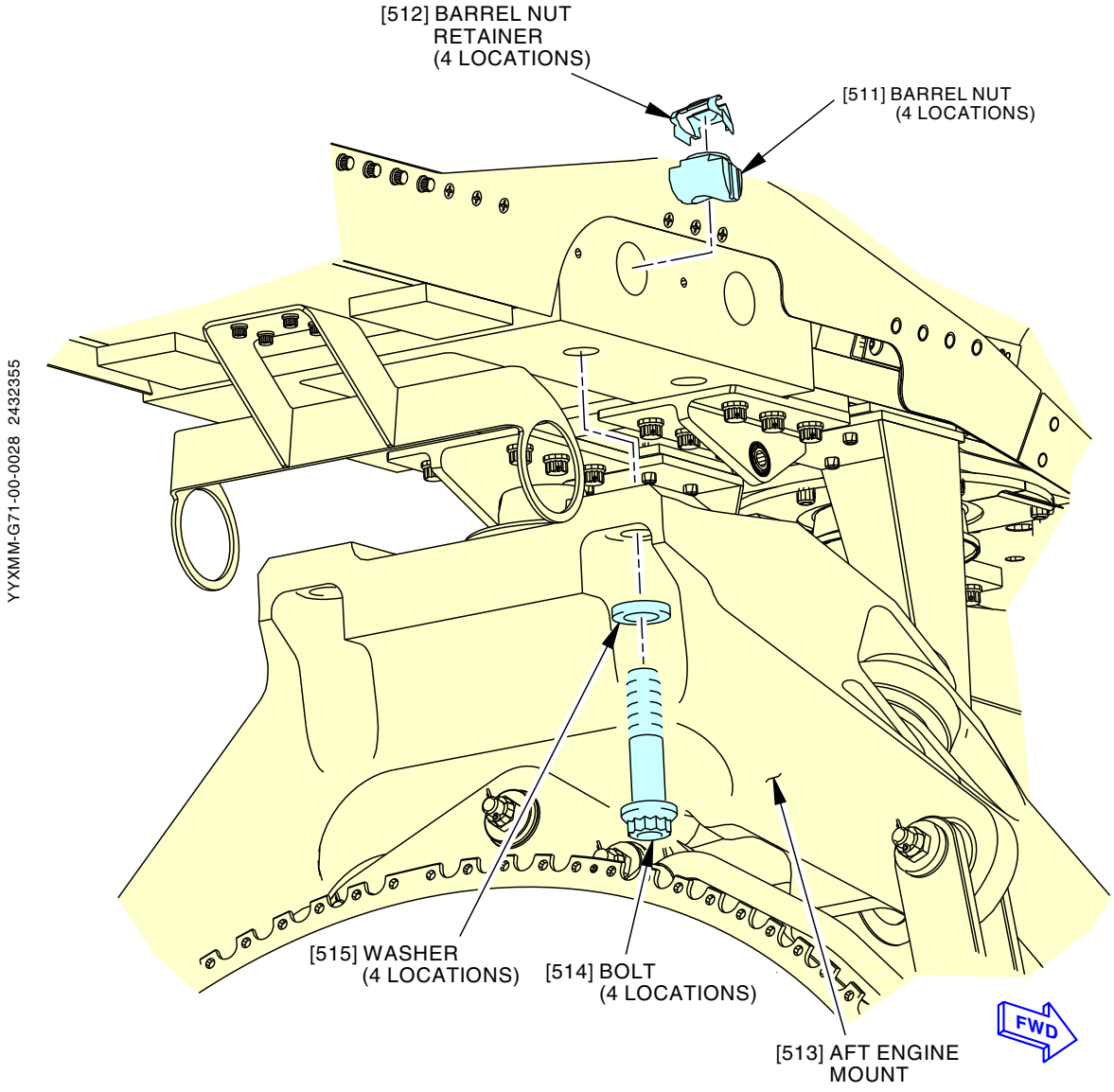
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2354204 S00061514956_V7

Forward Engine Mount Installation
Figure 411/71-00-02-990-813-G00 (Sheet 2 of 2)

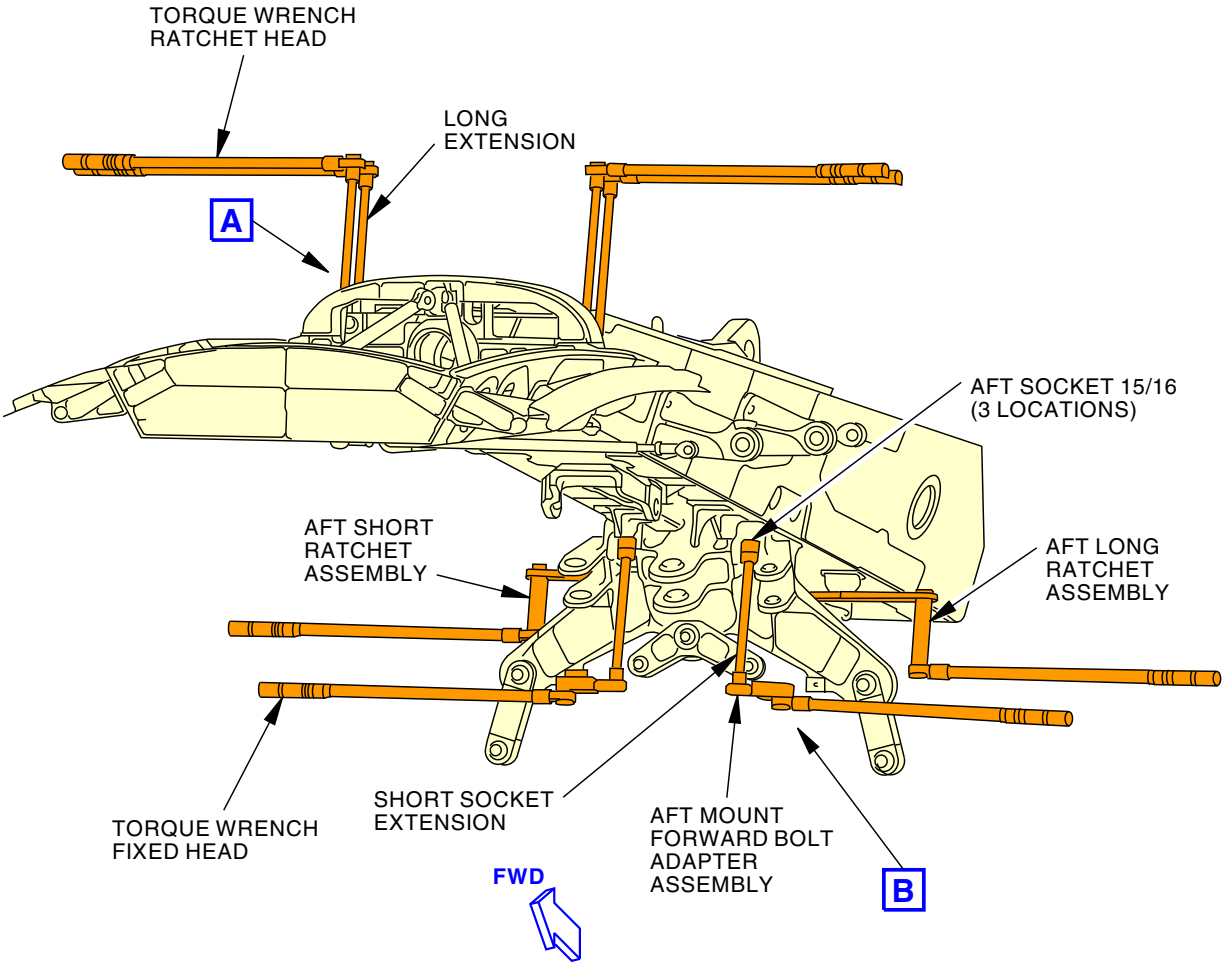
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2354205 S00061514957_V5

Aft Engine Mount Installation
Figure 412/71-00-02-990-814-G00

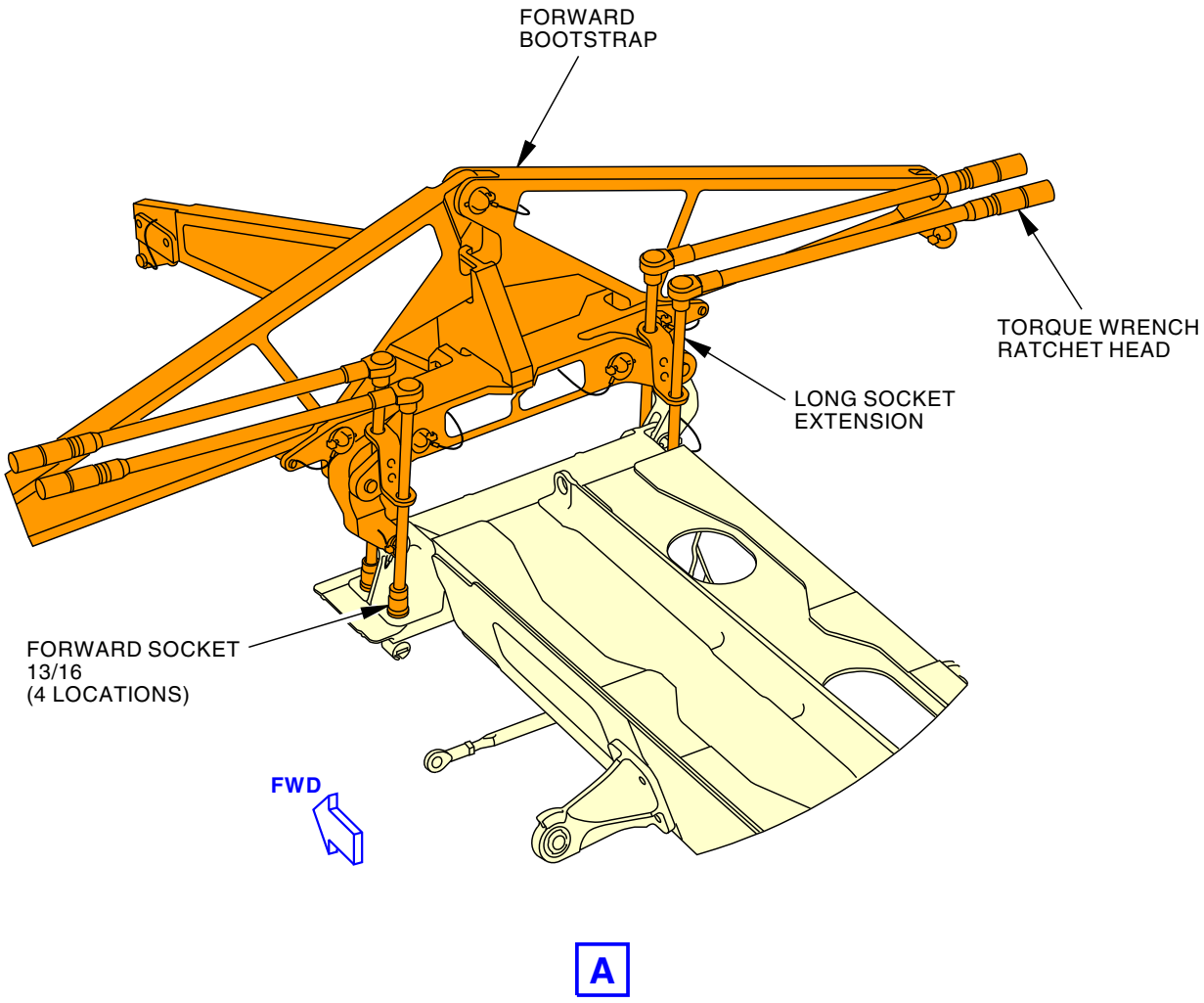
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2453743 S0000569587_V2

Engine Mount Bolts Torque Equipment Installation
Figure 413/71-00-02-990-817-G00 (Sheet 1 of 4)

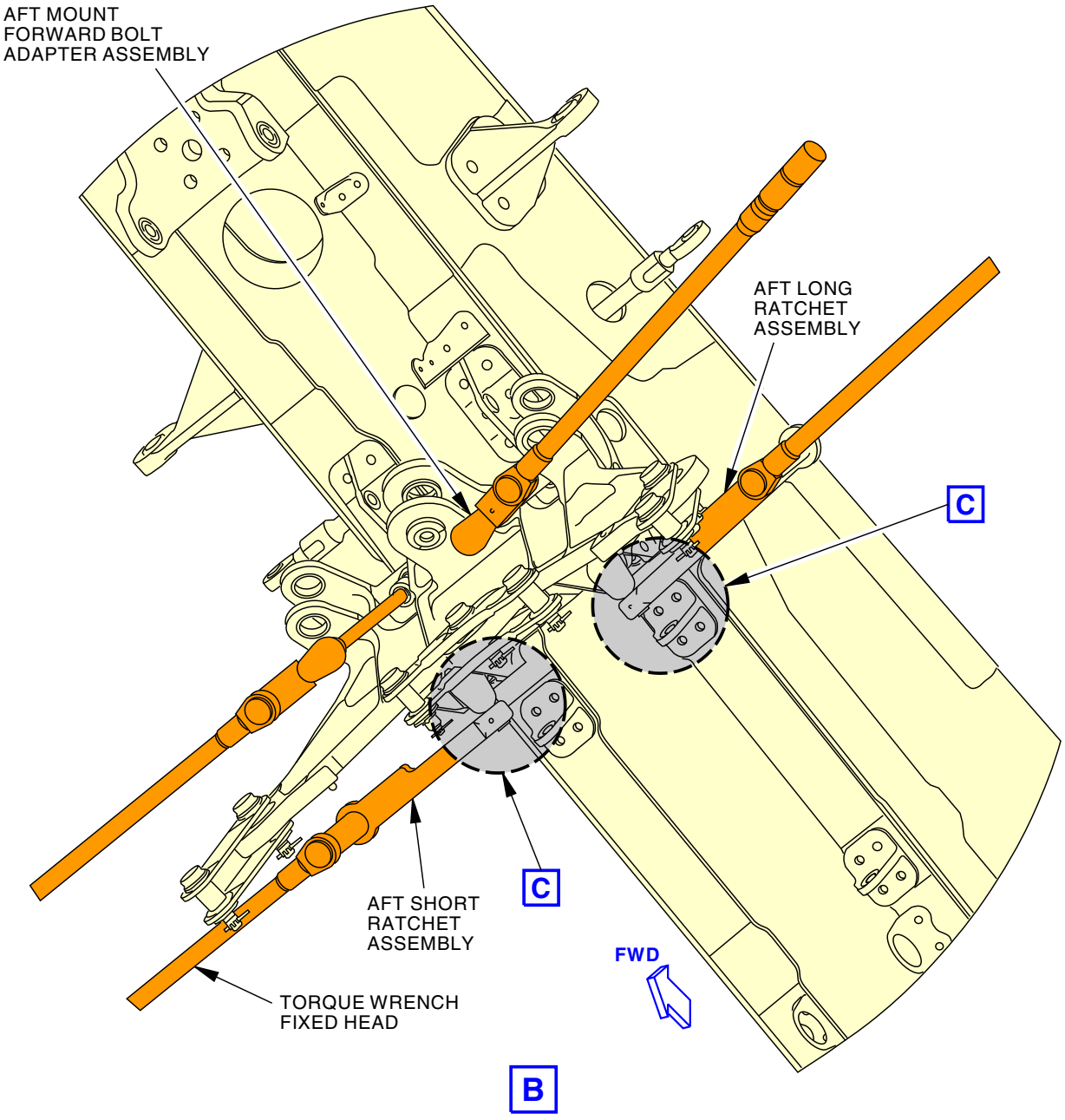
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2453744 S0000568639_V2

Engine Mount Bolts Torque Equipment Installation
Figure 413/71-00-02-990-817-G00 (Sheet 2 of 4)

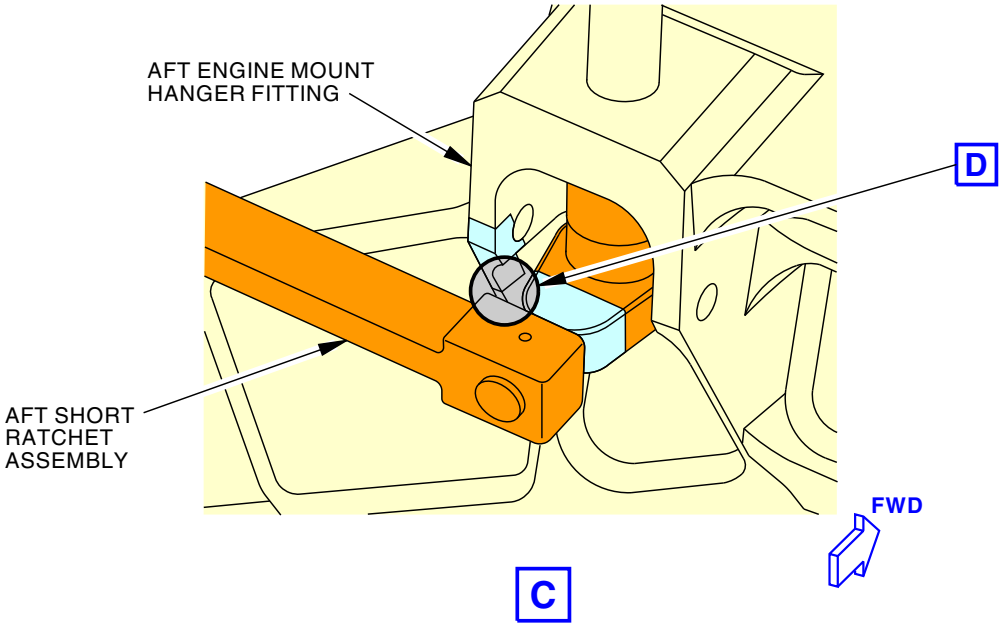
ECCN 9E991 BOEING PROPRIETARY - See title page for details

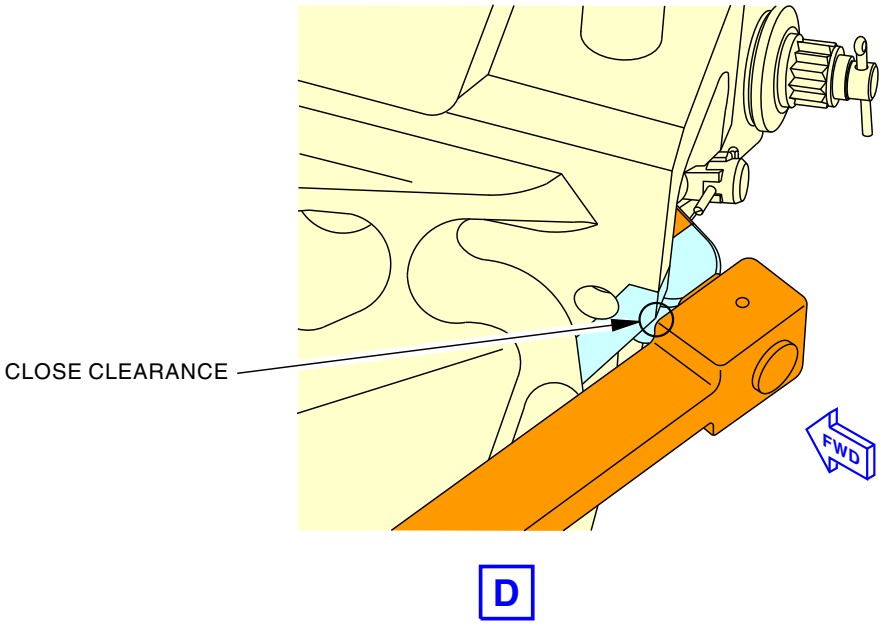


2453768 S0000569588_V2

Engine Mount Bolts Torque Equipment Installation
Figure 413/71-00-02-990-817-G00 (Sheet 3 of 4)

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TEFLON TAPE OR ANOTHER
APPROPRIATE MATERIAL

3010861 S0000784803_V1

Engine Mount Bolts Torque Equipment Installation
Figure 413/71-00-02-990-817-G00 (Sheet 4 of 4)

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TASK 71-00-02-400-801-G00

3. Power Plant - Installation

(Figure 401, Figure 404, Figure 405, Figure 406, Figure 407, Figure 408, Figure 409, Figure 410, Figure 411, Figure 412, and Figure 413)

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task gives the instructions to install the power plant.

NOTE: The total acoustic panel blockage for the engine installation must be recalculated when components are changed per SRM SUBJECT 54-00-01 .

(2) The power plant weighs approximately 7300 lb (3311 kg). Include the weight of the ground support equipment and calculate the load.

(3) Install the engine with the inlet cowl or without the inlet cowl installed. Without the inlet cowl installed, the aft loads will be slightly higher than the engine with the inlet cowl installed.

B. References

Reference	Title
08-20-02-580-801	Level the Airplane With a Plumb Bob and Inclinometers (P/B 201)
08-20-03-580-801	Level the Airplane With a Attitude Gage (P/B 201)
12-13-11-600-801	Engine Servicing (Oil Replenishing) (P/B 301)
12-13-21-600-801	IDG Servicing (Oil Fill) (P/B 301)
12-15-31-610-803	Main Landing Gear Strut Servicing, Airplane on Jacks (P/B 301)
20-40-11-910-801	Static Grounding (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
29-11-00-860-801	Hydraulic System A or B Pressurization (P/B 201)
32-00-01-480-801	Landing Gear Downlock Pins Installation (P/B 201)
36-00-00-860-801	Supply Pressure to the Pneumatic System (Selection) (P/B 201)
46-13-00-860-803	Client Credentials Check (P/B 201)
54-05-03-210-805	INTERNAL - GENERAL VISUAL: LEFT STRUT FORWARD AND AFT ENGINE MOUNT TO STRUT SHEAR PINS (P/B 201)
54-05-03-210-806	INTERNAL - GENERAL VISUAL: RIGHT STRUT FORWARD AND AFT ENGINE MOUNT TO STRUT SHEAR PINS (P/B 201)
54-05-03-210-807	EXTERNAL - GENERAL VISUAL: LEFT STRUT AFT ENGINE MOUNT ASSEMBLY (P/B 201)
54-05-03-210-808	EXTERNAL - GENERAL VISUAL: RIGHT STRUT AFT ENGINE MOUNT ASSEMBLY (P/B 201)
54-52-01-410-801	Forward Fairing Installation (P/B 401)
54-54-00-200-801	Forward Strut Fireseal Inspection (P/B 201)
54-54-01-200-801	Strut Thermal Barriers Inspection (P/B 601)
70-00-01-910-803-G00	Electrical Connector Disconnection and Connection (P/B 201)
71-00-00-700-810-G00	Test No. 34 - Menu Mode Hardware Code Entry Special Functions Test (P/B 501)
71-00-00-700-813-G00	Test No. 37 - Engine Serial Number Entry Special Functions Test (P/B 501)
71-00-00-800-804-G00	Power Plant Test Reference Table (P/B 501)
71-00-03-630-802-G00	Depreservation of an Engine on Wing (P/B 201)

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(Continued)

Reference	Title
71-11-01-000-802-G00	Inlet Ground Cooling Duct Cap and Cover Removal (P/B 201)
71-11-01-400-801-G00	Inlet Cowl Installation (P/B 401)
71-11-01-400-802-G00	Inlet Ground Cooling Duct Cap and Cover Installation (P/B 201)
71-11-04-400-801-G00	Fan Cowl Panels Installation (P/B 401)
71-11-11-400-801-G00	Fan Cowl Hold Open Rod Installation (P/B 201)
71-12-01-400-801-G00	Fan Cowl SDOS Actuators Installation (P/B 401)
71-21-00-200-801-G00	Forward Engine Mount Visual Inspection (P/B 601)
71-21-00-200-802-G00	Aft Engine Mount Visual Inspection (P/B 601)
71-21-03-200-801-G00	Engine Mount Bolts and Nuts Inspection (P/B 601)
71-71-01-400-801-G00	Drain Mast Installation (P/B 401)
73-21-00-470-801-G00	EEC System Configuration Data Functions Check (P/B 201)
73-21-00-470-803-G00	EEC Onboard Software Installation (P/B 201)
73-21-05-970-801-G00	Electronic Engine Control (EEC) Data Download (On-Wing) Using a PMAT (P/B 201)
73-21-09-700-801-G00	Data Entry Plug Configuration Check (P/B 601)
78-11-00-210-802-G00	Primary Nozzle Assembly and Primary Plug Assembly Inspection (P/B 601)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
78-31-01-280-801-G00	Thrust Reverser Rigging Check (P/B 601)
78-31-01-400-801-G00	Thrust Reverser Installation (P/B 401)
78-31-08-400-801-G00	Thrust Reverser Opening Actuator Installation (P/B 401)
80-11-01-610-802-G00	Engine Starter Servicing (Oil Fill) (P/B 301)
SRM 54-00-01	NACELLES/PYLONS - GENERAL
SWPM 20-20-00	ELECTRICAL BONDING PROCESSES
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-14548	Engine Anti-Ice Duct Cover/Support, LEAP-1B Part #: C71037-1 Supplier: 81205
SPL-14550	Equipment - Hold Open, Thrust Reverser Cowl, LEAP-1B Engine Part #: C78033-40 Supplier: 81205 Opt Part #: C78033-1 Supplier: 81205

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(Continued)

Reference	Description
SPL-14557	Stabilizer - Engine Mount, CFM LEAP-1B Part #: C71036-1 Supplier: 81205
SPL-14637	Torque Equipment - Engine Mount Bolt Part #: C71040-34 Supplier: 81205 Opt Part #: C71040-1 Supplier: 81205 Opt Part #: C71040-30 Supplier: 81205
SPL-14726	Engine Stand - LEAP-1B Part #: 956A8600G04 Supplier: 58828 Opt Part #: 956A8600G03 Supplier: 58828
SPL-15012	Bracket, Lifting - Frame, Turbine Center (TCF) Part #: 956A8667G04 Supplier: 58828
SPL-17099	Handling Brackets - Engine Fan Case Part #: 956A8018G02 Supplier: 58828
SPL-18258	Blanking Plate - PRSOV Part #: C36007-11 Supplier: 81205 Opt Part #: C36007-1 Supplier: 81205
SPL-18640	Blanking Plates - Starter Air Duct & Precooler, CFM Engine Series Part #: C36007-12 Supplier: 81205
STD-664	Pliers - Teflon-jawed (or Equivalent Soft-Jawed)
STD-858	Tag - DO NOT OPERATE
STD-3906	Mallet - Rubber

D. Consumable Materials

Reference	Description	Specification
D00006	Compound - Antiseize Pure Nickel Special - Never-Seez NSBT	
D00010	Compound - Thread Antiseize, High Temperature	MIL-PRF-907

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
38	Preformed packing	71-40-51-05-015	SIA ALL
53	E-seal	71-40-51-05-030	SIA ALL

F. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

G. 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

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H. Prepare for the Installation

SUBTASK 71-00-02-860-082-G00

(1) Make sure that the applicable engine circuit breakers are open.

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

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2
B	4	C00359	FUEL SPAR VALVE ENG 1

Make sure that these circuit breakers are open and have 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
A	4	C04008	ENGINE 1 ALTN PWR CHAN B
A	5	C04007	ENGINE 1 ALTN PWR CHAN A
B	8	C01103	ENGINE 1 START VALVE

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	20	C00297	FIRE PROTECTION EXTINGUISHERS RIGHT
B	22	C00296	FIRE PROTECTION EXTINGUISHERS LEFT
B	23	C01022	FIRE PROTECTION EXTINGUISHERS ALTN R
B	24	C01021	FIRE PROTECTION EXTINGUISHERS ALTN L
C	4	C00154	ENGINE 2 START VALVE
C	18	C00348	HYDRAULIC SYSTEM SHUTOFF VALVE ENG 2
C	19	C00347	HYDRAULIC SYSTEM SHUTOFF VALVE ENG 1
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT
D	7	C04010	ENGINE 2 ALTN PWR CHAN B
D	8	C04009	ENGINE 2 ALTN PWR CHAN A

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
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

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	6	C04035	AIR COND BLEED AIR CONTROL PRIMARY LEFT
B	6	C04036	AIR COND BLEED AIR CONTROL PRIMARY RIGHT
D	5	C04037	AIR COND BLEED AIR CONTROL BACKUP LEFT
D	6	C04038	AIR COND BLEED AIR CONTROL BACKUP RIGHT

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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 71-00-02-860-026-G00

(3) Make sure that the airplane is statically grounded (TASK 20-40-11-910-801).

NOTE: Use the approved ground lugs to ground the airplane.

SUBTASK 71-00-02-860-061-G00

(4) Make sure that the airplane is in a level position (TASK 08-20-03-580-801 or TASK 08-20-02-580-801).

NOTE: Inflate the Main Landing Gear (MLG) and Nose Landing Gear (NLG) struts when necessary. The airplane must be level (no more than ±0.5° in the pitch axis and ±1.0° about the roll axis).

SUBTASK 71-00-02-860-083-G00

(5) Make sure that the weight and balance Center of Gravity (CG) is in the forward section or install a tail jack.

SUBTASK 71-00-02-860-029-G00

(6) If the thrust reversers remain installed, make sure that the thrust reverser hold-open tools are properly installed (TASK 71-00-02-000-801-G00).

SUBTASK 71-00-02-020-014-G00

(7) If the hold open equipment, SPL-14550 (P/N C78033-1), is used, remove the No. 1 compression rod and bracket from the engine being installed as follows:

NOTE: It is not necessary to remove the No. 1 compression rod and bracket if the hold open equipment, SPL-14550 (P/N C78033-40), is used.

(a) Remove the rubber grommet from the inboard side of the No. 1 compression rod.

(b) Move the No. 1 compression rod in the outboard direction to remove the compression rod.

(c) Keep the compression rod and grommet for installation.

(d) Remove the two bolts [4] that attach the No. 1 compression rod support bracket [5].

(e) Keep the No. 1 compression rod support bracket [5] and two bolts [4] for installation.

SUBTASK 71-00-02-860-030-G00

(8) If the bolts [493], bolts [514], barrel nuts [495], and barrel nuts [511] are not new, do the inspection as follows (Figure 411 (Sheet 2), Figure 412 (Sheet 1)):

(a) Examine the bolts [493], bolts [514], barrel nuts [495], and barrel nuts [511] with a dye penetrant inspection (TASK 71-21-03-200-801-G00).

(b) Make sure that the bolts [493] and bolts [514] have the correct length.

NOTE: The length of the bolt is on the part number for the bolt in the Aircraft Illustrated Parts Catalog (AIPC).

SUBTASK 71-00-02-860-031-G00

(9) Examine the forward engine mount [492], aft engine mount [513], forward and aft strut mounts, and assembly for the conditions as follows:

(a) Discoloration, cracks, corrosion, or signs of worn areas.

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(b) Loose fasteners, damage thrust link clevis bushings, worn bearings, or signs of failures in the adjacent structure.

(c) Do the inspections of the components and areas as follows:

NOTE: These inspections are required by scheduled maintenance at the engine change.

1) Do this task: Forward Engine Mount Visual Inspection, TASK 71-21-00-200-801-G00.

2) Do this task: Aft Engine Mount Visual Inspection, TASK 71-21-00-200-802-G00.

3) Do this task: INTERNAL - GENERAL VISUAL: LEFT STRUT FORWARD AND AFT ENGINE MOUNT TO STRUT SHEAR PINS, TASK 54-05-03-210-805 or INTERNAL - GENERAL VISUAL: RIGHT STRUT FORWARD AND AFT ENGINE MOUNT TO STRUT SHEAR PINS, TASK 54-05-03-210-806.

4) Do this task: EXTERNAL - GENERAL VISUAL: LEFT STRUT AFT ENGINE MOUNT ASSEMBLY, TASK 54-05-03-210-807 or EXTERNAL - GENERAL VISUAL: RIGHT STRUT AFT ENGINE MOUNT ASSEMBLY, TASK 54-05-03-210-808.

5) Do this task: Primary Nozzle Assembly and Primary Plug Assembly Inspection, TASK 78-11-00-210-802-G00.

SUBTASK 71-00-02-200-001-G00

(10) Make sure that the fireseal is serviceable (TASK 54-54-00-200-801).

SUBTASK 71-00-02-200-002-G00

(11) Make sure that the strut thermal barriers are serviceable (TASK 54-54-01-200-801).

SUBTASK 71-00-02-860-032-G00

(12) Prepare the forward engine mount [492] and aft engine mount [513] for the installation of the engine as follows:

(a) Make sure that the surfaces of the forward engine mount [492] and aft engine mount [513] (that touch) are free of oil, grease, and other unwanted material.

(b) Apply Never-Seez NSBT compound, D00006, to the shear pins on the forward engine mount [492] and aft engine mount [513].

SUBTASK 71-00-02-860-033-G00

CAUTION STOP THE TORQUE PROCEDURE WHEN YOU CAN SEE A FULL BOLT THREAD ABOVE THE END OF THE NUT. IF THE BOLT GOES TOO FAR THROUGH THE INSTALLED NUT DURING THE SELF-LOCKING TORQUE CHECK, DAMAGE TO THE NUT RETAINER CAN OCCUR.

(13) Do a self-locking torque check of the barrel nuts [495] in the forward engine mount [492] and barrel nuts [511] in the aft engine mount [513] as follows:

(a) Apply Never-Seez NSBT compound, D00006, to the shank and to the threads of the bolts [493] and bolts [514].

(b) Install the bolts [493] and bolts [514] in the (captive) nuts to do a check of the self-locking torque as follows:

1) Make sure that the forward mount barrel nuts [495] self-locking torque is between 50.0 in-lb (5.6 N·m) - 400 in-lb (45 N·m).

2) Make sure that the aft mount barrel nuts [511] self-locking torque is between 70.0 in-lb (7.9 N·m) - 600 in-lb (68 N·m).

3) If the self-locking torque on the barrel nuts [495] and barrel nuts [511] is not within the limits specified above, replace the barrel nuts [495] and barrel nuts [511].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-02-860-034-G00

(14) If it is necessary, do this task: Inlet Cowl Installation, TASK 71-11-01-400-801-G00.

(a) If it is installed, remove the duct support, SPL-14548.

SUBTASK 71-00-02-860-035-G00

(15) If it is necessary, install the bootstrap equipment (TASK 71-00-02-000-801-G00).

I. Power Plant Installation

SUBTASK 71-00-02-860-037-G00

(1) Push the engine stand, SPL-14726, with the engine rearward from front of the strut until the engine stand is aligned under the strut.

SUBTASK 71-00-02-910-001-G00

(2) Lock the engine stand wheels.

SUBTASK 71-00-02-020-007-G00

(3) If it is installed, remove the transportation brace, SPL-14557, from the engine mounts.

SUBTASK 71-00-02-010-016-G00

(4) Attach the bootstrap equipment to the engine as follows:

(a) Refer to the power plant removal task for the bootstrap equipment installation (TASK 71-00-02-000-801-G00).

SIA ALL; PRE LEAP-1B SERVICE BULLETIN 72-0181

(b) Install the lever hoists [413] and dynamometer assembly [415] on the forward engine adapter mounts with the two shackles [414] (Figure 409).

NOTE: If it is necessary, use an extra shackle to attach the lever hoists to the forward engine adapter mounts.

SIA ALL; POST LEAP-1B SERVICE BULLETIN 72-0181

(c) Install the lever hoists [413] and dynamometer assembly [415] on the engine fan case handling bracket, SPL-17099, with the two shackles [414] (Figure 409).

NOTE: If it is necessary, use an extra shackle to attach the lever hoists to the handling brackets.

SIA ALL

(d) Install the lever hoist [453] and dynamometer assembly [454] on the TRF case bracket with the two pins [455] and two retainers [456] (Figure 409).

(e) Take up the slack in the hoist chains.

SUBTASK 71-00-02-010-017-G00

WARNING

MONITOR THE DYNAMOMETERS ON THE FORWARD AND THE AFT HOIST. MAKE SURE THAT THE LOADS ARE WITHIN THE LIMITS. IF THE LOADS ARE MORE THAN THE LIMITS, THE ENGINE CAN FALL. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(5) Disconnect the engine from the engine stand as follows (View A and View B, Figure 410):

(a) Disconnect the engine stand forward adapters [472] from the forward engine stand support arms.

(b) Remove the adapter pins [474] and retainers [475].

(c) Disconnect the engine stand aft adapters [476] from the TCF lifting bracket adapters, SPL-15012.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(d) Remove the adapter pins [477] and retainers [478].

(e) Move the two forward stand arms outwards.

(f) Make sure that the aft engine stand support columns are clear from the TCF lifting bracket adapters, SPL-15012.

(6) If the inlet cowl is installed on the engine, make sure that you do not exceed these dynamometer values:

(a) 3180 lb (1442 kg) on the forward outboard dynamometer

(b) 4100 lb (1860 kg) on the forward inboard dynamometer

(c) 2500 lb (1134 kg) on the aft dynamometer.

(7) If the inlet cowl is not installed on the engine, make sure that you do not exceed these dynamometer values:

(a) 3000 lb (1361 kg) on the forward outboard dynamometer

(b) 3500 lb (1588 kg) on the forward inboard dynamometer

(c) 2500 lb (1134 kg) on the aft dynamometer.

SUBTASK 71-00-02-860-038-G00

WARNING LET ONLY APPROVED PERSONS OPERATE THE LEVER HOISTS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

(8) Operate the forward lever hoists [413] and aft lever hoist [453] equally to lift the engine up to the strut as follows (View C, Figure 409 and View D, Figure 408):

(a) Make sure that all three dynamometers are continuously monitored when the lever hoists are operating.

NOTE: Operation of one hoist can affect the loads at the other two hoist locations.

(b) Make sure that the dynamometers do not have more the given limits below.

(c) Make sure that the engine is lifted slowly until it clears the engine stand.

(d) Use the forward lever hoists [413] and aft lever hoist [453] to change the roll of the engine to align the engine mount platform to the strut alignment.

(e) Use the aft lever hoist [453] to change the pitch of the engine.

(f) Lift the engine until there is approximately 6.0 in. (15.2 cm) between the engine mounts and strut mounts as follows:

1) Make sure that you monitor the clearance between the engine and thrust reversers while you lift the engine.

CAUTION MONITOR THE THRUST LINKS, THE PRECOOLER, AND THE HINGE BEAM FLANGE WHEN THE ENGINE MOVES OR TURNS. DO NOT MOVE OR TURN THE ENGINE TOO QUICKLY OR THE ENGINE CAN HIT AND CAUSE DAMAGE TO THESE COMPONENTS.

2) Make sure that the engine is clear from the thrust links, pre-cooler, and forward thrust reversers.

(g) Operate the forward lever hoists [413] and aft lever hoist [453] until the clearance is equal and mounts are aligned.

(h) Lift the engine until you have a clearance of 0.50 in. (1.27 cm) between the aft mount and aft strut mount.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(i) When the shear pin touches the surface of the aft mount strut, level the aft mount platform to the strut platform as follows:

1) Make sure that you monitor the loads and do not damage other components during usage.

NOTE: If the angular position of the aft mount is not aligned correctly, it will cause binding of the shear pins and lockup.

(j) Adjust the forward lever hoists [413] until the forward shear pins will engage the mount approximately 0.10 in. (0.25 cm) before the aft shear pin.

WARNING LET ONLY APPROVED PERSONS OPERATE THE LEVER HOISTS. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS OR DAMAGE TO THE EQUIPMENT CAN OCCUR.

WARNING MONITOR THE DYNAMOMETERS ON THE FORWARD AND THE AFT HOIST. MAKE SURE THAT THE LOADS ARE WITHIN THE LIMITS. IF THE LOADS ARE MORE THAN THE LIMITS, THE ENGINE CAN FALL. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(k) Lift the engine until you see no clearance between the upper and lower parts of the (forward and aft) engine mounts as follows:

NOTE: There is no specific load value that must be applied. The only limits are that the loads must be more than the applied engine load values and that the strut mating surfaces and engine mounts stay together.

SUBTASK 71-00-02-410-002-G00

(9) Install the forward engine mount [492] as follows (Figure 411):

(a) Make sure that the barrel nut retainers [496], bolts [493], washers [494], and barrel nuts [495] are not bent, cracks, have corrosion, or signs of worn areas.

(b) Lubricate the four bolts [493] and exterior cylindrical section of the barrel nuts [495] and barrel nut retainers [496] with Never-Seez NSBT compound, D00006.

NOTE: Do not apply compound to the barrel nuts thread locking feature.

(c) Install the four bolts [493], four washers [494], four barrel nuts [495], and four barrel nut retainers [496] that attach the forward engine strut mount to the forward engine mount [492].

1) Install the countersunk side of the washer next to the bolt head.

(d) Tighten the forward mount bolts [493] as follows:

1) Tighten to 50% of final torque each bolt [493] to 1043.0 in-lb (117.8 N·m) - 1107.0 in-lb (125.1 N·m) or 86.9 ft-lb (117.8 N·m) - 92.3 ft-lb (125.1 N·m).

2) Tighten the bolts [493] to a final torque of 2086.0 in-lb (235.7 N·m) - 2214.0 in-lb (250.1 N·m) or 173.8 ft-lb (235.6 N·m) - 184.5 ft-lb (250.1 N·m).

3) Make sure that the threads of the barrel nuts [495] are fully engaged and end of the forward mount bolts [493] chamfer extends out of the nuts.

SUBTASK 71-00-02-420-006-G00

(10) Install the aft engine mount [513] as follows (Figure 412):

(a) Make sure that the barrel nut retainers [512], bolts [514], washers [515], and barrel nuts [511] have no cracks, corrosion, or signs of worn areas.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) Lubricate the bolts [514] and exterior cylindrical section of the barrel nuts [511] and barrel nut retainers [512] with Never-Seez NSBT compound, D00006.

NOTE: Do not apply compound to the barrel nuts thread locking feature.

(c) Install the four bolts [514], four washers [515], four barrel nuts [511], and four barrel nut retainers [512] that attach the aft engine strut mount to the aft engine mount [513].

1) Install the countersunk side of the washer next to the bolt head.

(d) Tighten the aft mount bolts [514] as follows:

1) If the torque equipment, SPL-14637, is used, do this step:

NOTE: The indicated torque depends on the length of the torque wrench. The indicated torque must be calculated in accordance with the tool placard.

a) Make sure that Teflon tape or another appropriate material is applied to the wrench/ratchet head and aft engine mount fitting.

CAUTION

BE CAREFUL WHEN YOU LOOSEN OR TIGHTEN THE BOLTS WITH TORQUE EQUIPMENT ON THE AFT SIDE OF THE AFT ENGINE MOUNT. IF YOU DO NOT OBEY, DAMAGE TO THE HANGER FITTING OF THE AFT ENGINE MOUNT CAN OCCUR.

2) Tighten to 50% of final torque each bolt [514] to 1649.0 in-lb (186.3 N·m) - 1751.0 in-lb (197.8 N·m) or 137.4 ft-lb (186.3 N·m) - 145.9 ft-lb (197.8 N·m).

3) Tighten the bolts [514] to a final torque 3298.0 in-lb (372.6 N·m) - 3502.0 in-lb (395.7 N·m) or 274.8 ft-lb (372.6 N·m) - 291.8 ft-lb (395.6 N·m).

4) Make sure that the threads of the barrel nuts [511] are fully engaged and end of the aft mount bolts [514] chamfer extends out of the nuts.

5) If it is necessary remove applied Teflon tape or another appropriate material from the wrench/ratchet head and aft engine mount fitting.

SUBTASK 71-00-02-860-063-G00

(11) Move the engine stand forward out from below the engine and put the engine stand in the taxi position if the cradle and casters were lowered.

(a) Use the stand hydraulic device to lift the cradle until engine stand casters off the ground.

(b) Install the four pins in the cradle to activate the cradle damping.

(c) If it is necessary, put the wheel casters on the engine transportation stand to 3.15 in. (80 mm).

(d) Lower the engine stand with the stand hydraulic device.

(e) Make sure that the engine stand hydraulic actuators are fully retracted.

(f) Make sure that other parts of the engine transportation stand are in the stow positions.

SUBTASK 71-00-02-010-018-G00

(12) Remove the bootstrap equipment as follows:

(a) Remove the forward lever hoists [413] with the forward dynamometer assembly [415] and shackles [414] from the engine attached brackets and from bootstrap equipment (View C, Figure 409).

(b) Remove the pin [420] and retainer [421] that join the forward outboard arm assembly [409] and forward inboard arm assembly [416] to the top of the forward support arm assembly [406] (Views C and E, Figure 409).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(c) Remove the two pins [423] and two retainers [422] that attach the forward outboard arm assembly [409] and forward inboard arm assembly [416] to the forward center beam [401] (Views B, C, and E, Figure 409).

(d) Remove the forward outboard arm assembly [409] and forward inboard arm assembly [416] from the forward center beam [401].

(e) Remove the pin [408] and retainer [407] that attach the forward support arm assembly [406] to the forward center beam [401] (View B, Figure 409).

(f) Remove the pin [418] and retainer [419] that attach the other end of the forward support arm assembly [406] to the fan cowl support beam (View D, Figure 409).

(g) Remove the forward support arm assembly [406] from top of the forward center beam [401].

(h) Remove the two pins [403] and two retainers [402] that attach the forward center beam [401] to the forward mount brackets (View A, Figure 409).

(i) Remove the forward center beam [401] from top of the forward mount brackets.

(j) Remove the pin [455] and retainer [456] from the dynamometer assembly [454].

(k) Remove the aft lever hoist [453] with the aft dynamometer assembly [454] and shackle [451] from the engine attached brackets and from bootstrap equipment (View C, Figure 408).

(l) Remove the two pins [447] and two retainers [443] that attach the aft outboard arm assembly [448] to the aft torque beam assembly [446] (View C, Figure 408).

(m) Remove the four retainers [443], two pins [447], and two pins [445] from the aft torque beam assembly [446] (View B, Figure 408).

(n) Remove the aft torque beam assembly [446] from the outboard aft cross beam assembly [444] and outboard aft support beam assembly [442].

(o) Remove the two pins [441] and two retainers [443] that attach the outboard aft cross beam assembly [444] to the outboard forward strut two brackets (View A, Figure 408).

(p) Remove the pin [441] and retainer [443] that attach the outboard aft support beam assembly [442] to the outboard forward strut bracket (View A, Figure 408).

SUBTASK 71-00-02-080-008-G00

(13) Remove the handling brackets, SPL-17099, from the engine.

SIA ALL; PRE LEAP-1B SERVICE BULLETIN 72-0181

NOTE: The handling brackets are included on the fan frame shroud of the engine.

SIA ALL; POST LEAP-1B SERVICE BULLETIN 72-0181

NOTE: The handling brackets, SPL-17099, are tools, not installed on the fan frame shroud.

(a) For each handling brackets, SPL-17099, do these steps:

1) Fully loosen the two gripper screws and long gripper screw with the screw head.

NOTE: Gripper screws are captive screws.

2) Fully loosen the three double-threaded screws with the three screw heads.

3) Make sure that the three fasteners of the handling mount are fully opened.

4) Remove the handling mount from the fan frame shroud.

5) Store the handling mount in the engine stand, SPL-14726, storage box.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA ALL; PRE LEAP-1B SERVICE BULLETIN 72-0181

SUBTASK 71-00-02-080-005-G00

(14) Remove the engine stand forward adapters [472] from the forward engine adapter mounts (Figure 410).

SIA ALL

SUBTASK 71-00-02-860-081-G00

(15) Remove the engine stand forward adapters [472] from the handling brackets, SPL-17099 (Figure 410).

SUBTASK 71-00-02-080-006-G00

(16) Remove the TCF lifting bracket adapters, SPL-15012, from the turbine center frame.

J. Fan Case Connections on the Left Side

SUBTASK 71-00-02-210-003-G00

(1) Do a check of the installed engine data plate.

NOTE: The steps that follow relates to the interchangeability between engines that have the Electronic Engine Control (EEC) blower hardware and those that do not.

NOTE: The LEAP-1BXXGXX engine model designation is identified on the engine data plate, that is located on the RH side of the engine fan case.

SIA ALL; PRE LEAP-1B SERVICE BULLETIN 75-0010 OR PRE LEAP-1B SERVICE BULLETIN 75-0011

(a) If the engine installed is a LEAP-1BXXG05, do these steps:

1) Make sure that the ground cooling duct is on the inlet cowl.

2) If there is a cap and cover on the inlet ground cooling duct, remove them (TASK 71-11-01-000-802-G00).

3) Make sure that the EEC blower duct is connected to the inlet ground cooling duct.

a) If it is necessary to connect the EEC blower duct to the inlet ground cooling duct, do the applicable steps in this task: Inlet Cowl Installation, TASK 71-11-01-400-801-G00.

4) If it is installed, remove the INOP label from the EEC blower circuit breakers.

NOTE: Refer to Boeing service bulletin 737-71-1891 to remove INOP labels, remove collars, and close the EEC blower circuit breakers.

SIA ALL; AIRPLANES WITH POST LEAP-1B SB 75-0010 OR POST LEAP-1B SB 75-0011

(b) If the engine installed is a LEAP-1BXXG06, do these steps:

1) If there is an inlet ground cooling duct, make sure that you install the cap and cover (TASK 71-11-01-400-802-G00).

2) Make sure that the EEC blower circuit breakers are opened and labeled INOP.

NOTE: Refer to Boeing service bulletin 737-71-1891 to open the EEC blower circuit breaker, install collars, and install INOP labels.

SIA ALL

SUBTASK 71-00-02-010-020-G00

(2) Connect the main fuel supply hose [43] on the left side of the fan cowl support beam (Figure 404).

(a) Remove the protective caps from the main fuel supply hose [43] and on the fitting in the fan cowl support beam.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) Connect the main fuel supply hose [43] to the fan cowl support beam fitting.

(c) Tighten the B-nut to 1140.0 in-lb (128.8 N·m) - 1260.0 in-lb (142.4 N·m).

NOTE: Use two wrenches to tighten the B-nut. Use one wrench to hold the hose and the other wrench to tighten the B-nut.

SUBTASK 71-00-02-410-007-G00

CAUTION

BE CAREFUL WITH THE HYDRAULIC HOSE. DO NOT BEND OR PUT THE HOSE INTO A COIL TOO TIGHTLY. YOU CAN CAUSE A BLOCKAGE OF THE HOSE. IF YOU DO NOT OBEY THESE INSTRUCTIONS, YOU CAN CAUSE A FAILURE OF THE ENGINE-DRIVEN PUMP (EDP).

CAUTION

USE A WRENCH AND A BACK-UP WRENCH WHEN YOU TIGHTEN OR LOOSEN THE B-NUT FOR THE HYDRAULIC LINE. GALLING DAMAGE TO THE LINE OR HYDRAULIC FITTING CAN OCCUR IF YOU DO NOT USE A BACK-UP WRENCH.

CAUTION

DO NOT LET HYDRAULIC FLUID LEAKAGE COLLECT. IF YOU DO NOT MAKE THE AREA CLEAN, DAMAGE CAN OCCUR FROM THE HYDRAULIC FLUID.

(3) Connect the hydraulic pressure hose [40], hydraulic supply hose [41], and hydraulic case drain hose [42] to the left side of the fan cowl support beam as follows (Figure 404):

(a) Remove the protective caps from the hydraulic pressure hose [40], hydraulic supply hose [41], hydraulic case drain hose [42], and fan cowl support beam connectors.

(b) Align and connect the hydraulic pressure hose [40] end to the quick disconnect on the support beam and engage the mating threads.

NOTE: The hydraulic hoses are equipped with self-locking quick disconnect fittings.

(c) Hand tighten until the hydraulic pressure hose [40] end until the outer sleeve snaps forward.

NOTE: You will hear an audible click sound.

(d) Make sure that the outer sleeve snaps fully forward to prevent the axial movement of the sleeve.

CAUTION

MAKE SURE THAT YOU FULLY CONNECT THE COUPLING. IF YOU DO NOT, YOU CAN CAUSE DAMAGE TO THE HYDRAULIC PUMP.

(e) Make sure that the hydraulic pressure hose [40] quick-release fitting is properly connected both visually and by pulling the outer sleeve away from the male quick-release fitting.

1) Without applying axial force, make sure that the outer sleeve cannot be rotated counterclockwise.

NOTE: Without applying axial force, the outer sleeve should only rotate approximately 5 degrees in the clockwise direction.

2) Without turning the outer sleeve, apply axial force to the outer sleeve and make sure that there is little or no movement.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

3) If the outer sleeve rotates counterclockwise or pulls away from the male quick-release fitting, repeat the steps above to connect the hydraulic hose.

NOTE: The quick-release fitting is not properly installed.

4) Make sure that the outer sleeve is fully engaged with the lock tab on the male quick-release fitting (View H, Figure 404).

(f) Align and connect the hydraulic supply hose [41] end to the quick disconnect on the support beam and engage the mating threads.

(g) Hand tighten until the hydraulic supply hose [41] end until the outer sleeve snaps forward.

NOTE: You will hear an audible click sound.

(h) Make sure that the outer sleeve snaps fully forward to prevent the axial movement of the sleeve.

CAUTION

MAKE SURE THAT YOU FULLY CONNECT THE COUPLING. IF YOU DO NOT, YOU CAN CAUSE DAMAGE TO THE HYDRAULIC PUMP.

(i) Make sure that the hydraulic supply hose [41] quick-release fitting is properly connected both visually and by pulling the outer sleeve away from the male quick-release fitting.

1) Without applying axial force, make sure that the outer sleeve cannot be rotated counterclockwise.

NOTE: Without applying axial force, the outer sleeve should only rotate approximately 5 degrees in the clockwise direction.

2) Without turning the outer sleeve, apply axial force to the outer sleeve and make sure that there is little or no movement.

3) If the outer sleeve rotates counterclockwise or pulls away from the male quick-release fitting, repeat the steps above to connect the hydraulic hose.

NOTE: The quick-release fitting is not properly installed.

4) Make sure that the outer sleeve is fully engaged with the lock tab on the male quick-release fitting (View H, Figure 404).

(j) Align and connect the hydraulic case drain hose [42] end to the quick disconnect on the support beam and engage the mating threads.

(k) Hand tighten until the hydraulic case drain hose [42] end until the outer sleeve snaps forward.

NOTE: You will hear an audible click sound.

(l) Make sure that the outer sleeve snaps fully forward to prevent the axial movement of the sleeve.

CAUTION

MAKE SURE THAT YOU FULLY CONNECT THE COUPLING. IF YOU DO NOT, YOU CAN CAUSE DAMAGE TO THE HYDRAULIC PUMP.

(m) Make sure that the hydraulic case drain hose [42] quick-release fitting is properly connected both visually and by pulling the outer sleeve away from the male quick-release fitting.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Without applying axial force, make sure that the outer sleeve cannot be rotated counterclockwise.

NOTE: Without applying axial force, the outer sleeve should only rotate approximately 5 degrees in the clockwise direction.

2) Without turning the outer sleeve, apply axial force to the outer sleeve and make sure that there is little or no movement.

3) If the outer sleeve rotates counterclockwise or pulls away from the male quick-release fitting, repeat the steps above to connect the hydraulic hose.

NOTE: The quick-release fitting is not properly installed.

4) Make sure that the outer sleeve is fully engaged with the lock tab on the male quick-release fitting (View H, Figure 404).

SUBTASK 71-00-02-220-001-G00

(4) Make sure that the gap between the outer circumference of the hydraulic pressure hose [40] and each clamp block [44] is less than 0.080 in. (2.032 mm).

(a) Tighten the bolt [45] to 80.0 ±4.0 in-lb (9.0 ±0.5 N·m) on each clamp block [44].

SIA 006-999; SIA 001-005 POST SB 737-71-1883

SUBTASK 71-00-02-220-002-G00

(5) Make sure that the gap between the outer circumference of the hydraulic pressure hose [40] and each clamp block [56] is less than 0.080 in. (2.032 mm).

(a) Tighten the bolts [57] to 75 ±2 in-lb (8.47 ±0.23 N·m) on each clamp block [56].

SIA ALL

SUBTASK 71-00-02-410-008-G00

CAUTION

MAKE SURE THAT THE ELECTRICAL CONNECTORS AND RECEPTACLES ARE CLEAN AND CLEAR OF UNWANTED MATERIALS BEFORE YOU DISCONNECT, OR CONNECT THEM. CONTAMINATION OF THE ELECTRICAL CONNECTORS AND RECEPTACLES CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION

USE PLIERS THAT HAVE TEFLON JAWS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE PLIERS THAT HAVE METAL JAWS. METAL JAWS CAN CAUSE DAMAGE TO THE ELECTRICAL CONNECTORS.

(6) Connect the IDG power feeder harness [39] as follows (Figure 404):

(a) Remove the protective caps from the IDG power feeder harness [39] electrical connector and fan cowl support beam receptacle.

(b) Connect the IDG power feeder harness [39] to the fan cowl support beam receptacle (TASK 70-00-01-910-803-G00).

(c) Tighten the electrical connector to 450.0 in-lb (50.8 N·m) - 520.0 in-lb (58.8 N·m).

SIA 011-999; SIA 001-010 POST SB 737-24-1233

(d) Do these steps to connect the bonding jumper [46] to the IDG power feeder harness [39] clip:

1) Use the cleaning Procedure 1 to manually clean the bonding jumper [46] terminal and IDG power feeder harness [39] clip (SWPM 20-20-00).

2) Use the cleaning Procedure 5 to clean the fasteners (SWPM 20-20-00).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA 011-999; SIA 001-010 POST SB 737-24-1233 (Continued)

3) Install the screw [47], washers [49], and nut [48] that attach the bonding jumper [46] to the IDG power feeder harness [39] clip.

NOTE: Use the clip that is near to the fan cowl support beam bracket.

4) Measure the electrical bonding resistance between IDG power feeder harness [39] clip and fan cowl support beam bracket (SWPM 20-20-00).

a) Use an intrinsically safe approved bonding meter, COM-1550, to measure the bonding resistance.

b) Make sure that the resistance is 0.001 ohm (1.0 milliohm) or less.

SIA ALL

SUBTASK 71-00-02-020-006-G00

(7) If the blanking plate, SPL-18640, is installed, do these steps (View E, Figure 404):

(a) Remove the coupling from the starter duct inlet.

(b) Remove the blanking plate, SPL-18640.

(c) Remove the E-seal.

(d) Examine the duct opening for unwanted material.

SUBTASK 71-00-02-410-009-G00

(8) Connect the starter duct [36] to the starter duct inlet as follows (Figure 404):

(a) Remove the protective caps from the starter duct [36] and starter duct inlet.

(b) Install the coupling [37] and new preformed packing [38] that attach the starter duct [36] to the starter duct inlet.

(c) Tighten the coupling [37] to 85.0 in-lb (9.6 N·m) - 99.0 in-lb (11.2 N·m).

(d) Use the rubber mallet, STD-3906, and lightly tap the outer edge of the coupling [37].

(e) Tighten the coupling [37] again to 85.0 in-lb (9.6 N·m) - 99.0 in-lb (11.2 N·m).

K. Fan Case Connections on the Right Side

SUBTASK 71-00-02-410-006-G00

CAUTION

MAKE SURE THAT THE ELECTRICAL CONNECTORS AND RECEPTACLES ARE CLEAN AND CLEAR OF UNWANTED MATERIALS BEFORE YOU DISCONNECT, OR CONNECT THEM. CONTAMINATION OF THE ELECTRICAL CONNECTORS AND RECEPTACLES CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION

USE PLIERS THAT HAVE TEFLON JAWS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE PLIERS THAT HAVE METAL JAWS. METAL JAWS CAN CAUSE DAMAGE TO THE ELECTRICAL CONNECTORS.

(1) Use the teflon-jawed pliers, STD-664, to connect the electrical connectors on the right side of the raceway as follows (TASK 70-00-01-910-803-G00):

(a) Remove the protective covers from the electrical connectors and raceway electrical receptacles.

(b) Connect the electrical connector [64], electrical connector [65], and electrical connector [66] to the raceway electrical receptacles (Table 401).

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(c) Connect the electrical connector [67], electrical connector [68], electrical connector [69], and electrical connector [70] to the raceway electrical receptacles (Table 401).

Table 401/71-00-02-993-801-G00

ITEMS	ENGINE	LEFT STRUT		RIGHT STRUT	
Electrical Connectors	PLUG	WIRE BUNDLE	RECEPTACLE	WIRE BUNDLE	RECEPTACLE
[64]	DP41B	286A1168	D30260	286A1268	D30460
[65]	DP100	286A1164	D30234	286A1264	D30434
[66]	DP300	286A1166	D30220	286A1266	D30420
[67]	DP21B	286A1166	D30256	286A1266	D30456
[68]	DP200	286A1170	D30252	286A1270	D30452
[69]	DP21A	286A1170	D30212	286A1270	D30412
[70]	DP41A	286A1172	D30224	286A1272	D30424

(d) Tighten the electrical connectors (TASK 70-00-01-910-803-G00).

SUBTASK 71-00-02-410-010-G00

(2) Connect the strut drain line to the right side of the strut fitting (Figure 406).

L. Engine Core Connections

SUBTASK 71-00-02-400-001-G00

(1) Do this task: Drain Mast Installation, TASK 71-71-01-400-801-G00.

SUBTASK 71-00-02-410-005-G00

CAUTION BE CAREFUL WITH THE HYDRAULIC HOSE. DO NOT BEND OR PUT THE HOSE INTO A COIL TOO TIGHTLY. YOU CAN CAUSE A BLOCKAGE OF THE HOSE. IF YOU DO NOT OBEY THESE INSTRUCTIONS, YOU CAN CAUSE A FAILURE OF THE ENGINE-DRIVEN PUMP (EDP).

CAUTION USE A WRENCH AND A BACK-UP WRENCH WHEN YOU TIGHTEN OR LOOSEN THE B-NUT FOR THE HYDRAULIC LINE. GALLING DAMAGE TO THE LINE OR HYDRAULIC FITTING CAN OCCUR IF YOU DO NOT USE A BACK-UP WRENCH.

(2) Connect the FAMV line [62] under the precooler from the right side of the fan cowl support beam as follows (Figure 405):

(a) Remove the protective caps from the FAMV line [62] and from the hose fitting.

(b) Apply Never-Seez NSBT compound, D00006 (preferred), or compound, D00010 (alternate), to all male threads before connection the FAMV line [62].

(c) Connect the B-nut [63] on the FAMV line [62].

(d) Tighten the B-nut [63] to 256.0 in-lb (28.9 N·m) - 284.0 in-lb (32.1 N·m).

SUBTASK 71-00-02-020-005-G00

(3) If the blanking plate, SPL-18258, is installed, do these steps (View D, Figure 405):

(a) Remove the coupling from the precooler inlet [51].

(b) Remove the blanking plate, SPL-18258.

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(c) Remove the E-seal.

(d) Examine the inlet opening for unwanted material.

SUBTASK 71-00-02-420-002-G00

(4) Connect the crossover duct [60] on the precooler inlet [51] as follows (Figure 405):

(a) Remove the protective caps from the crossover duct [60] and precooler inlet [51].

(b) Align the crossover duct [60] to the precooler inlet [51].

(c) Install the V-clamp [52] and new E-seal [53] on the crossover duct [60].

(d) Tighten the V-clamp [52] to 115.0 in-lb (13.0 N·m) - 125.0 in-lb (14.1 N·m).

(e) Use the rubber mallet, STD-3906, and lightly tap the outer edge of the V-clamp [52].

(f) Tighten the V-clamp [52] again to 115.0 in-lb (13.0 N·m) - 125.0 in-lb (14.1 N·m).

SUBTASK 71-00-02-420-005-G00

(5) Install the thrust reverser No. 2 and No. 3 compression rods in the support brackets as follows (Figure 408):

(a) Apply Never-Seez NSBT compound, D00006, to the threads and shank of the bolts [426].

(b) Install the No. 3 compression rod bracket [425] to the lugs.

(c) Install the two bolts [426] and two nuts [427].

(d) Tighten the bolts [426] to 500 in-lb (56.5 N·m) - 700 in-lb (79.1 N·m).

(e) Install the No. 2 and No. 3 compression rods in the support brackets.

M. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-02-410-004-G00

(1) Install the thrust reverser opening actuator (Manual Door Opening System (MDOS)) brackets on both the inboard and outboard sides of the engine fan case as follows:

(a) Install each MDOS actuator bracket [21] with two bolts [22], two washers [23], two washers [24], and two nuts [25].

SIA ALL; PRE LEAP-1B SERVICE BULLETIN 72-0181

(b) Install the inboard and outboard MDOS actuator brackets [21] on the aft side of flange B13 on the fan case.

SIA ALL; POST LEAP-1B SERVICE BULLETIN 72-0181

(c) Install the inboard MDOS actuator bracket [21] on the on the aft side of the engine bridge bracket.

(d) Install the outboard MDOS actuator bracket [21] on the forward side of the lower engine bridge bracket.

SIA ALL

(e) Tighten the head of the two bolts [22] to 121 in-lb (14 N·m) - 151 in-lb (17 N·m).

SUBTASK 71-00-02-480-006-G00

(2) Attach the thrust reverser opening actuators (MDOS actuators) to the fan case brackets on the inboard and outboard sides of the engine (TASK 78-31-08-400-801-G00).

(a) Make sure that the thrust reverser opening actuators (MDOS actuators) are locked and support the weight of the thrust reversers.

SUBTASK 71-00-02-420-003-G00

(3) Install the applicable thumbnail fairing (TASK 54-52-01-410-801).

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SUBTASK 71-00-02-080-003-G00

(4) If the thrust reverser remains installed, remove the thrust reverser hold-open equipment [10] from the thrust reversers as follows (Figure 401):

(a) Back out the drive screws to move the pin holes to the lowest position on the left fitting assembly [7] and right fitting assembly [9].

(b) Remove the lynch pin [18] from the pivot pin [17].

(c) Remove the pivot pin [17] to disconnect the inboard arm assembly [8] from the outboard arm assembly [6].

(d) Remove the lynch pin [12] from the lower arm pin [11].

(e) Remove the lower arm pin [11] that attaches the outboard arm assembly [6] from the lower hole of the left fitting assembly [7].

(f) Remove the lynch pin [14] from the upper arm pin [13].

(g) Remove the upper arm pin [13] that attaches the outboard arm assembly [6] from the upper hole of the left fitting assembly [7].

(h) Remove the outboard arm assembly [6] from the left fitting assembly [7] and from the stop pin [19] and retaining ring [20] of the inboard arm assembly [8].

(i) Remove the lynch pin [12] from the lower arm pin [11].

(j) Remove the lower arm pin [11] that attaches the inboard arm assembly [8] from the lower hole of the right fitting assembly [9].

(k) Remove the lynch pin [14] from the upper arm pin [13].

(l) Remove the upper arm pin [13] that attaches the inboard arm assembly [8] from the upper hole of the right fitting assembly [9].

(m) Remove the inboard arm assembly [8] from the outboard side to the right fitting assembly [9].

(n) Remove the lynch pins [16] from the fitting brackets.

(o) Remove the pin assemblies [15] from the left fitting assembly [7] and right fitting assembly [9].

(p) Remove the left fitting assembly [7] and right fitting assembly [9] from the thrust reverser precooler fittings.

(q) Remove the thrust reverser hold-open equipment [10] from the thrust reversers.

SUBTASK 71-00-02-400-002-G00

(5) If necessary, install the thrust reverser. Do this task: Thrust Reverser Installation, TASK 78-31-01-400-801-G00

SUBTASK 71-00-02-410-015-G00

(6) Install the insulation blankets around the thrust reverser hold-open equipment fittings on thrust reverser upper bifurcation.

SUBTASK 71-00-02-420-007-G00

(7) If it is removed, install the thrust reverser No. 1 compression rod in the support bracket as follows (Figure 401):

(a) Install the No. 1 compression rod support bracket [5] with the two bolts [4].

(b) Tighten the two bolts [4] to 78.0 in-lb (8.8 N·m) - 82.0 in-lb (9.3 N·m).

(c) Install the No. 1 compression rod in the support bracket [5] from the outboard side.

(d) Install the rubber grommet on the inboard side of the No. 1 compression rod.

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SUBTASK 71-00-02-860-041-G00

(8) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

SUBTASK 71-00-02-210-001-G00

(9) Do a check of the fuel system for leaks.

CAUTION

DO NOT TURN THE FIRE HANDLE AFTER YOU PULLED IT UP. YOU WILL CAUSE THE FIRE BOTTLES TO RELEASE THEIR CONTENTS IF YOU TURN THE HANDLE.

(a) Put the applicable engine fire switch handle (DISCH LEFT or RIGHT) to its usual position.

1) Remove the DO NOT OPERATE tag from the engine fire switch handle (DISCH LEFT or RIGHT).

(b) For the applicable engine, remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
B	20	C00297	FIRE PROTECTION EXTINGUISHERS RIGHT
B	22	C00296	FIRE PROTECTION EXTINGUISHERS LEFT
B	23	C01022	FIRE PROTECTION EXTINGUISHERS ALTN R
B	24	C01021	FIRE PROTECTION EXTINGUISHERS ALTN L
C	18	C00348	HYDRAULIC SYSTEM SHUTOFF VALVE ENG 2
C	19	C00347	HYDRAULIC SYSTEM SHUTOFF VALVE ENG 1

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2
B	4	C00359	FUEL SPAR VALVE ENG 1

(c) Look at the FUEL QUANTITY indicator for the fuel quantity.

(d) Move the applicable L(R) START LEVER switch to the IDLE position.

(e) Pressurize the engine fuel pump system.

(f) Examine the fuel system on the engine for leaks.

NOTE: Look carefully at the connection for the main fuel supply line at the strut.

(g) Move the applicable L(R) START LEVER switch to the CUTOFF position.

SUBTASK 71-00-02-860-059-G00

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

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
A	6	C04035	AIR COND BLEED AIR CONTROL PRIMARY LEFT
B	6	C04036	AIR COND BLEED AIR CONTROL PRIMARY RIGHT
D	5	C04037	AIR COND BLEED AIR CONTROL BACKUP LEFT

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(Continued)

F/O Electrical System Panel, P6-4

Row	Col	Number	Name
D	6	C04038	AIR COND BLEED AIR CONTROL BACKUP RIGHT

SUBTASK 71-00-02-860-068-G00

(11) For the applicable engine, remove the safety tags and close these applicable 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

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 71-00-02-860-043-G00

(12) 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 71-00-02-860-044-G00

(13) For the left engine, remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	4	C04008	ENGINE 1 ALTN PWR CHAN B
A	5	C04007	ENGINE 1 ALTN PWR CHAN A

SUBTASK 71-00-02-860-045-G00

(14) For the right engine, remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	7	C04010	ENGINE 2 ALTN PWR CHAN B
D	8	C04009	ENGINE 2 ALTN PWR CHAN A

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SUBTASK 71-00-02-860-046-G00

(15) For the left engine, remove the safety tags and close these applicable circuit breakers:

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

SUBTASK 71-00-02-860-047-G00

(16) For the right engine, remove the safety tags and close these applicable circuit breakers:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
E	3	C01321	ENGINE FUEL ENGINE 2 HPSOV CONT
E	4	C01396	ENGINE FUEL ENGINE 2 HPSOV IND

SUBTASK 71-00-02-410-018-G00

(17) Do these tasks in sequence to safely close the left and right thrust reversers:

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.

(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: Thrust Reverser Activation After Ground Maintenance, TASK 78-31-00-440-801-G00.

SUBTASK 71-00-02-410-022-G00

(18) Install the Engine Build Up (EBU) bracket [601] and bracket [604] used to attach the fan cowl hold open rods to the left and right side of the engine fan case as follows (Figure 403):

(a) Lubricate the threads of the bolts [602] and shanks with Never-Seez NSBT compound, D00006.

(b) Align the EBU bracket [604] and bracket [601] on each side of the fan case module.

(c) Install the three bolts [602] and three washers [603] that attach the bracket [601] and bracket [604] to each side of the fan case.

(d) Tighten the bolts [602] to 194 in-lb (21.9 N·m) - 206 in-lb (23.3 N·m).

(19) Install the left and right fan cowl hold open rods. Do this task: Fan Cowl Hold Open Rod Installation, TASK 71-11-11-400-801-G00.

SUBTASK 71-00-02-410-023-G00

(20) Install the EBU bracket [609] and bracket [610] used to attach the fan cowl Spring Door Opening System (SDOS) to the left and right side of the engine fan case as follows(Figure 403):

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(a) Lubricate the threads of the bolts [605] and shanks with Never-Seez NSBT compound, D00006.

(b) Align the EBU bracket [609] and bracket [610] on each side of the fan case module.

(c) Install the three bolts [605], three washers [606], three washers [607], and three nuts [608] that attach the bracket [609] and bracket [610] to each side of the fan case.

(d) Tighten the nuts [608] to 107 in-lb (12.1 N·m) - 113 in-lb (12.8 N·m).

(21) Install the left and right SDOS. Do this task: Fan Cowl SDOS Actuators Installation, TASK 71-12-01-400-801-G00.

SUBTASK 71-00-02-410-017-G00

(22) Install the left and right fan cowl panels (TASK 71-11-04-400-801-G00).

SUBTASK 71-00-02-820-002-G00

(23) If the engine installed is a replacement engine, do a check of the thrust reverser rigging (TASK 78-31-01-280-801-G00).

NOTE: If the removed engine is the same engine installed, the thrust reverser rigging check is not required.

SUBTASK 71-00-02-610-004-G00

(24) Make sure that the starter is serviced with oil before engine run to ensure initial start lubrication.

NOTE: The starter can be serviced with oil either before it is installed on the gearbox or after installation.

NOTE: The engine starter must have oil in order to be operated. Initial servicing of the engine oil system does not provide enough oil to the starter for the starter to be operated.

(a) If unsure of oil quantity in starter, fill the starter with oil (TASK 80-11-01-610-802-G00).

SUBTASK 71-00-02-630-001-G00

(25) If it is necessary, do the depreservation of the engine (TASK 71-00-03-630-802-G00).

SUBTASK 71-00-02-610-001-G00

(26) If it is necessary, service the engine oil system (TASK 12-13-11-600-801).

SUBTASK 71-00-02-610-002-G00

(27) If it is necessary, service the Integrated Drive Generator (IDG) (TASK 12-13-21-600-801).

SUBTASK 71-00-02-440-002-G00

(28) Pressurize the pneumatic system on the engine (TASK 36-00-00-860-801).

SUBTASK 71-00-02-480-007-G00

WARNING

MAKE SURE THAT THE GROUND LOCKS ARE INSTALLED IN ALL THE LANDING GEARS BEFORE YOU PRESSURIZE THE HYDRAULIC SYSTEM. WITHOUT THE GROUND LOCKS, THE LANDING GEARS CAN RETRACT AND CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

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

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SUBTASK 71-00-02-860-066-G00

WARNING

KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES AND THE NOSE GEAR WHEN HYDRAULIC POWER IS SUPPLIED. THE AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND THE NOSE GEAR ARE SUPPLIED WITH POWER BY THE HYDRAULIC SYSTEMS. INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

CAUTION

DO NOT OPERATE THE EDP FOR MORE THAN 2 MINUTES UNLESS THE APPLICABLE FUEL TANK HAS A MINIMUM OF 1675 LBS (760 KG) OF FUEL IN IT. IF YOU OPERATE THE EDP FOR 2 MINUTES WITHOUT FUEL IN THE TANK, LET THE RESERVOIR TEMPERATURE CHANGE TO AMBIENT TEMPERATURE BEFORE YOU CONTINUE WITH THE TEST. IF YOU CONTINUE TO OPERATE THE EDP, THE HYDRAULIC FLUID BECOMES TOO HOT.

(30) Pressurize the hydraulic system (TASK 29-11-00-860-801).

SUBTASK 71-00-02-860-049-G00

(31) If it is necessary, remove the engine strut shock absorbing lanyard personnel equipment.

SUBTASK 71-00-02-440-004-G00

WARNING

ENSURE LEADING AND TRAILING EDGE FLAPS ARE CLEAR OF PERSONNEL AND OBSTRUCTIONS

(32) Do this task:Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

SUBTASK 71-00-02-860-050-G00

(33) Remove the DO NOT OPERATE tags from the thrust levers.

SUBTASK 71-00-02-860-051-G00

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

SUBTASK 71-00-02-860-052-G00

(35) If it is necessary, do the shock strut deflation (TASK 12-15-31-610-803).

SIA 015-999; SIA 001-014 POST SB 737-46-1029

SUBTASK 71-00-02-860-054-G00

(36) To determine whether the EECs have preloaded credentials, conduct Method 3 in this task: Client Credentials Check, TASK 46-13-00-860-803.

NOTE: This is only applicable when the ONS OS9.1 EEC is new and needs to generate client credential for the first time.

(a) If EEC client credentials generate with a current date and time, the EECs have preloaded credentials and no further action is needed to generate client credentials.

(b) If EEC client credentials do not generate with a current date and time, the EECs do not have preloaded credentials.

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SIA 015-999; SIA 001-014 POST SB 737-46-1029 (Continued)

1) If the installed EEC does not have preloaded credentials, generate the EEC client credential by performing Method 1 or Method 2 in this task: Client Credentials Check, TASK 46-13-00-860-803.

NOTE: If neither Method 1 or 2 can be performed, this task may be deferred. EEC data will not store to the Network File Server (NFS) until the EEC client credential is generated, but the data can be pulled via a Portable Maintenance Access Terminal (PMAT) from the EEC. This is the task: Electronic Engine Control (EEC) Data Download (On-Wing) Using a PMAT, TASK 73-21-05-970-801-G00

NOTE: Ensure all EEC credentials have a date and time stamp that occur after the date and time of the EEC installation.

SIA ALL

SUBTASK 71-00-02-860-079-G00

(37) Do this task: EEC System Configuration Data Functions Check, TASK 73-21-00-470-801-G00.

(a) Make sure that the EEC software part numbers are correct.

NOTE: Refer to the applicable Boeing and CFM Service Bulletin/Letters for EEC software to make sure that the software part numbers are compatible with the software on the opposite engine.

1) If the EEC software part numbers are not compatible with the EEC software on the opposite engine, install the compatible EEC software parts (TASK 73-21-00-470-803-G00).

2) Make sure that the EEC software version matches between the EEC channels for each engine.

3) Make sure that the EEC software version in the EECs match between the engines.

(b) Make sure that the Engine Serial Number (ESN) on display matches the ESN on the engine data plate.

1) If the ESN on the display does not match the ESN on the engine data plate, key in the correct ESN, do this task: Test No. 37 - Engine Serial Number Entry Special Functions Test, TASK 71-00-00-700-813-G00.

NOTE: The next engine start after one of the tasks that follow can have a longer pre-start motoring time than typical of cold engines. This is because the engine off time has been erased from EEC Non Volatile Memory (NVM).

- Install new EEC software.

- Enter new ESN.

- Install the engine on a new aircraft tail number.

- Install the engine on the opposite engine position on the same aircraft tail number.

- Install a data entry plug with new thrust rating, N1 trim, or engine configuration.

(c) Make sure that the menu mode hardware code is correct.

1) If it is necessary, do this task: Test No. 34 - Menu Mode Hardware Code Entry Special Functions Test, TASK 71-00-00-700-810-G00.

(d) Make sure that the auto-detected hardware configuration code is correct.

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(e) Make sure that the engine thrust rating on the display matches the engine thrust rating on the engine data plate.

1) If it is necessary, do this task: Data Entry Plug Configuration Check, TASK 73-21-09-700-801-G00.

(f) Make sure that the engine thrust rating matches the opposite engine's thrust rating.

(g) Make sure that the engine thrust rating is applicable to the airplane model.

NOTE: It is recommended to print or make a record of the EEC system configuration page for your airline's records.

N. Power Plant Installation Test

SUBTASK 71-00-02-710-001-G00

(1) 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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POWER PLANT (ENGINE PRESERVATION AND DEPRESERVATION) - MAINTENANCE PRACTICES

1. General

A. Use this Maintenance Practice in conjunction with the applicable Prolonged Parking procedures when storing an airplane (PROLONGED PARKING - MAINTENANCE PRACTICES, PAGEBLOCK 10-12-00/201).

B. This procedure contains these tasks:

(1) Inlet Cowl Lipskin Protective Coating Procedure

(2) Preservation of an engine (task selection)

(3) Preservation of an engine on wing for not more than 10 days

(4) Preservation of an engine on wing for not more than 30 Days

(5) Preservation of an engine on wing for not more than 3 months

(6) Preservation of an engine on wing for 30 days to 1 year

(7) Preservation of an engine on wing that has expired preservation

(8) Preservation renewal requirements

(9) Dry-out of an engine on-wing after an in-flight shutdown

(10) Depreservation of an engine on wing.

TASK 71-00-03-390-801-G00

2. Inlet Cowl Lipskin Protective Coating Procedure

(Figure 201)

A. General

(1) This task is to apply a protective coating on the inlet cowl lipskin to prevent corrosion.

NOTE: It is acceptable to leave the inlet cowl lipskin bare if the engine is preserved for 7 days or less.

NOTE: It is recommended checking the lipskins for visual appearance every two weeks for the first two months and reapplying protective coating as necessary. The aircraft operator may adjust their inspection schedule based on the operational environment and use of the aircraft.

(2) The task includes the procedure to remove the protective coating.

(3) These tasks should be performed if the engine (on wing) is preserved for more than 7 days.

(4) There are three methods to preserve the inlet cowl lipskin:

(a) Method 1 - Apply the corrosion preventative compound X20-18 compound, G51625.

to the lipskin.

NOTE: The X20-18 compound, G51625, can be left on the lipskin during engine idle runs if the engine anti-ice system is deactivated.

NOTE: If the engine anti-ice system is to be turned on during engine idle runs, the X20-18 compound, G51625, coating must be removed and reapplied after the engine run.

NOTE: The X20-18 compound, G51625, coating must be removed prior to return to service.

NOTE: Please refer to the supplier instructions for additional information regarding the application and removal of X20-18 compound, G51625.

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(b) Method 2 - Apply the peelable protective coating system, Protectapeel SC-1074B-1 coating, C50013/Protectapeel SC-1090 topcoat, C50014, PPG Z6160 coating, C50411/PPG Z6148 topcoat, C50412 or Gardo Protect 350 coating, C50410.

NOTE: Boeing recommends that peelable protective coatings be applied to the inlet lipskin when airplanes are stored indoors or when using a typical inlet cover that covers the inlet lipskin and nacelles.

NOTE: The consumable materials Protectapeel SC-1074B-1 coating, C50013 and Protectapeel SC-1090 topcoat, C50014 are now discontinued by the manufacturer. The coatings can still be used as a coating system and operators are encouraged to use any existing stock before using the alternative materials PPG Z6160 coating, C50411/PPG Z6148 topcoat, C50412 or Gardo Protect 350 coating, C50410.

NOTE: Protectapeel SC-1074B-1 coating, C50013/Protectapeel SC-1090 topcoat, C50014, PPG Z6160 coating, C50411/PPG Z6148 topcoat, C50412 or Gardo Protect 350 coating, C50410 must be removed prior to engine runs.

(c) Method 3 - Weekly inspection for corrosion and cleaning.

B. References

Reference	Title
20-10-34-110-802	Clean Bare, Clad, or Plated Metal with Solvent (P/B 701)
30-00-00-040-803	DDG 30-21-01A Engine Anti-Ice Valves Closed Inoperative - Preparation (P/B 901)
30-00-00-440-803	DDG 30-21-01A Engine Anti-Ice Valves Closed Inoperative - Restoration (P/B 901)
SOPM 20-30-03	General Cleaning Procedures

C. Tools/Equipment

Reference	Description
STD-1064	Scraper - Phenolic, Hard Resin

D. Consumable Materials

Reference	Description	Specification
B00130	Alcohol - Isopropyl	TT-I-735
C50013	Coating - Protective, Strippable, Sprayable - Protectapeel SC-1074B-1 (Use Until Stock Depleted)	
C50014	Topcoat - Protective, Water-Based Coating Protectapeel SC-1090 (Use Until Stock Depleted)	
C50410	Coating - Peelable - Gardo Protect 350	BAC5034-1
C50411	Coating - Basecoat, Peelable, Preservation - PPG Z6160	BAC5034-1
C50412	Topcoat - Water-Borne, Preservation - Z6148	BAC5034-1
G02356	Tape - Saint Gobain Rulon J Tape	
G02418	Water - De-ionized	
G50933	Cloth - Cleaning, Low-Lint Cloth (General Use)	A-A-59323 Type II (Supersedes MIL-C-85043)

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(Continued)

Reference	Description	Specification
G51625	Compound - Corrosion Preventive (AECI 3 X20-18)	

E. Location Zones

Zone	Area
412	Engine 1 - Nose Inlet Cowl
422	Engine 2 - Nose Inlet Cowl

F. Method 1 - Protective Coating Application.

WARNING MAKE SURE THAT YOU READ THE MANUFACTURER'S SAFETY DATA SHEET (MSDS) FOR THE MATERIALS YOU WILL USE, AND WEAR THE PROTECTIVE CLOTHING AND EQUIPMENT IF IT IS SPECIFIED. IF YOU DO NOT OBEY, INJURY TO PERSONS CAN OCCUR.

SUBTASK 71-00-03-100-002-G00

(1) If necessary, remove existing pitting, corrosion and surface oxidation using the applicable Structural Repair Manual (SRM) procedure. Make sure that the minimum thickness requirements per the SRM are met.

SUBTASK 71-00-03-100-003-G00

(2) Do these steps to prepare the lipskin for the application of X20-18 compound, G51625:

(a) Clean the lipskin with XS3 Aircraft Wash and XG5 Hard Surface Cleaner furnished from the X20-18 compound, G51625, vendor prior to application.

NOTE: X20-18 compound, G51625, will not remove corrosion but will act to assist in preventing future corrosion. It is acceptable to perform general solvent cleaning per Clean Bare, Clad, or Plated Metal with Solvent, TASK 20-10-34-110-802 as an alternative to the products recommended by Grantize.

(b) Remove any dust, dirt, unwanted material, oil, grease or moisture.

SUBTASK 71-00-03-950-003-G00

(3) Do these steps to mask the lipskin:

(a) Mask the inner and outer barrel assembly and the fan compartment.

(b) Make sure that the sealant common to the lipskin is protected.

(c) It is permitted for about 0.1 in. (2.54 mm) of the lipskin to be unprotected.

(d) Do not apply the protective coating to the acoustic barrel area.

SUBTASK 71-00-03-370-005-G00

(4) Do these steps to prepare for the application of X20-18 compound, G51625, to the lipskin:

(a) Make sure that the lipskin surface temperature is between 67.5 ±22.5°F (19.7 ±12.5°C).

(b) Avoid application of X20-18 compound, G51625, when the ambient humidity is above 90%.

(c) Apply a few drops of the X20-18 compound, G51625, to a soft cotton applicator. Do not saturate the applicator to the point of dripping.

NOTE: If the X20-18 compound, G51625, pours out in a cloudy or milky consistency, do not use it. Discard the remaining contents.

SUBTASK 71-00-03-370-006-G00

(5) Do these steps to apply X20-18 compound, G51625, to the lipskin:

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(a) Apply a thin film of X20-18 compound, G51625, to an area of 2.5 ±0.5 ft^2 (0.2 ±0.0 m^2) in a sweeping motion.

NOTE: Do not allow the X20-18 compound, G51625, to dry. Wipe the treated area immediately with a dry and soft cloth until all wet film is buffed off and no longer visible. Rotate the cloth as necessary when absorbency decreases.

NOTE: The initial application of theX20-18 compound, G51625, may remove remaining amounts of polishing residue if cleaning wasn't completed adequately. If only a small amount; proceed with application. Otherwise, repeat cleaning steps in previous section.

NOTE: Direct exposure to sunlight or warm surface temperatures can result in streaking.

(b) Repeat application process until entire lipskin is treated. The process is complete when three (3) coats are applied.

NOTE: Please allow a minimum of 30 minutes between coat applications.

NOTE: X20-18 compound, G51625, has a 12 hour cure time.

SUBTASK 71-00-03-370-007-G00

(6) It is recommended to repolish and reapply X20-18 compound, G51625, at a cycle of every ninety (90) days or after the surface loses its shine. Whichever occurs first.

NOTE: Boeing recommends a schedule for checking the lipskin visual appearance every two (2) weeks for the first two (2) months and then adjusting the schedule according to operator experience based on environment and use of airplane.

(a) To detect the presence of X20-18 compound, G51625, on bare metal surfaces, perform one of the following:

1) Use Rulon J tape, G02356, fold one end back to make a tab at the end. Firmly press the tape on a subject treated area and suspected untreated area. Pull the tab back slowly at a 90 degree angle to the surface. Noticeable ease in resistance will take place on a treated surface compared to a non-treated surface.

2) Spray clean de-ionized water, G02418, on the surface. Moisture will bead up on a treated surface when compared to a non-treated surface.

SUBTASK 71-00-03-950-004-G00

(7) Remove the masking material from the inner and outer barrels and the fan compartment.

SUBTASK 71-00-03-040-003-G00

(8) If engine idle runs will be performed throughout aircraft storage, it is required to deactivate the engine anti-ice system if X20-18 compound, G51625, is still applied to the lipskin. Deactivating the engine anti-ice system will allow the X20-18 compound, G51625, to be left on during engine runs.

NOTE: Make sure that the X20-18 compound, G51625, has cured for 12 hours before performing engine runs.

NOTE: Failure to keep the Engine Anti Ice deactivated during the entire engine run with AECI 3 applied to the lipskin would cause AECI 3 burning, and will result in permanent staining of the lipskin.

(a) Deactivate the engine anti-ice system with the engine anti-ice valve inoperative CLOSED (TASK 30-00-00-040-803).

NOTE: The system can be left deactivated throughout storage. There is no need to do the restoration procedure after each engine run.

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G. Method 2 - Protective Coating Application

WARNING

MAKE SURE THAT YOU READ THE MANUFACTURER'S SAFETY DATA SHEET (MSDS) FOR THE MATERIALS YOU WILL USE, AND WEAR THE PROTECTIVE CLOTHING AND EQUIPMENT IF IT IS SPECIFIED. IF YOU DO NOT OBEY, INJURY TO PERSONS CAN OCCUR.

SUBTASK 71-00-03-100-005-G00

(1) If necessary, remove existing pitting, corrosion and surface oxidation using the applicable SRM procedure. Make sure that the minimum thickness requirements per the SRM are met.

SUBTASK 71-00-03-110-001-G00

(2) Do these steps to clean the lipskin and get a water break free surface:

(a) Remove any dust, dirt, unwanted material, oil, grease or moisture (TASK 20-10-34-110-802).

SUBTASK 71-00-03-950-001-G00

(3) Do these steps to mask the lipskin:

(a) Mask the inner and outer barrel assembly and the fan compartment.

(b) Make sure that the sealant common to the lipskin is protected.

(c) It is permitted for about 0.1 in. (2.54 mm) of the lipskin to be unprotected.

(d) Do not apply the protective coating to the acoustic barrel area.

SUBTASK 71-00-03-370-001-G00

(4) Do these steps to prepare the basecoat Protectapeel SC-1074B-1 coating, C50013:

(a) Let the material get to 75 ±5°F (23.9 ±2.8°C).

(b) Mix the material to a homogeneous consistency.

(c) Standard spray equipment with an atomization pressure of 75 psi (517 kPa) and pot pressure of 5 psi (34.5 kPa) is recommended to get the proper fluid delivery.

SUBTASK 71-00-03-370-002-G00

(5) Do these steps to apply the basecoat Protectapeel SC-1074B-1 coating, C50013, to the lipskin:

(a) Apply a 4 mils (0.004 in.) layer in one application with the spray equipment.

(b) Let this layer dry for 1 hour.

NOTE: You can decrease this time with warm air or infrared lamps. Protect the area from freezing.

(c) Apply a second layer to get a total of 8 mils (0.008 in.) thickness.

SUBTASK 71-00-03-370-003-G00

(6) Do these steps to prepare the Protectapeel SC-1090 topcoat, C50014:

(a) Let the material get to 75 ±5°F (23.9 ±2.8°C).

(b) Mix the material to a homogeneous consistency.

(c) Apply the topcoat in two separate layers using standard spray equipment with an atomization pressure of 75 psi (517 kPa) and pot pressure of 5 psi (34.5 kPa).

SUBTASK 71-00-03-370-004-G00

(7) Do these steps to apply the Protectapeel SC-1090 topcoat, C50014, to the lipskin:

(a) Make sure the basecoat is dry (no gloss).

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(b) The temperature at the time of application and drying should be a minimum of 40 ±5°F (4.4 ±2.8°C). Protect the area from freezing.

(c) Dry apply the first layer of topcoat over the basecoat with a wide fan and the gun held about 18 in. (45.7 cm) from the surface.

1) This discontinuous layer should barely cover the black basecoat to minimize bubbles in the protective coating.

(d) Apply a second layer in a usual spray application to get a thickness of 3 mils (0.003 in.) of dry film.

(e) The basecoat and topcoat will fully dry together to make a rain resistant coating with these conditions:

NOTE: Lower temperatures and thicker protective coating layers will have longer dry times.

1) Two hours of drying time with conditions of 50% relative humidity and 70°F (21.1°C).

2) The lipskin can be dried outside if there is no direct rain and the temperature is about 50°F (10°C).

SUBTASK 71-00-03-370-008-G00

(8) Do these steps to prepare the PPG Z6160 coating, C50411:

NOTE: PPG Z6160 coating, C50411 can be used alone or for added exterior durability it can be over coated with Z6148 preservation topcoat.

(a) Let the PPG Z6160 coating, C50411 get to 70°F (21.11°C) – 80°F (26.67°C).

(b) Fully mix the PPG Z6160 coating, C50411 in the container.

NOTE: If a mechanical paint shaker is used, the recommended mix time is 5 minutes.

(c) Apply the basecoat with standard spray equipment.

NOTE: Use spray equipment with an atomization pressure of 75 psi (517 kPa) and a pot pressure of 5 psi (34 kPa) to make sure that the fluid is delivered correctly.

SUBTASK 71-00-03-370-009-G00

(9) Do these steps to apply the PPG Z6160 coating, C50411 to the lip skin:

(a) Apply a 4 mils (0.004 in.) layer in one application with the spray equipment.

(b) Let the first coat dry for one hour.

NOTE: Drying can be accelerated by the circulation of warm air.

(c) Apply a second 4 mils (0.004 in.) layer to achieve a total coating of 8 mils (0.008 in.) thickness.

(d) Let the second coat dry for one hour.

SUBTASK 71-00-03-370-010-G00

(10) Do these steps to prepare the PPG Z6148 topcoat, C50412:

(a) Let the material get to 70°F (21.11°C) – 80°F (26.67°C).

(b) Fully mix the PPG Z6160 coating, C50411 in the container.

NOTE: If a mechanical paint shaker is used, the recommended mix time is 5 minutes.

(c) Apply the topcoat with standard spray equipment.

NOTE: Use spray equipment with an atomization pressure of 75 psi (517 kPa) and a pot pressure of 5 psi (34 kPa) to make sure that the fluid is delivered correctly.

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SUBTASK 71-00-03-370-011-G00

(11) Do these steps to apply the PPG Z6148 topcoat, C50412 to the lip skin:

(a) Make sure that the basecoat is dry (no gloss).

(b) Apply a 2 mils (0.002 in.) layer in one application with the spray equipment.

(c) Allow to dry for two hours.

NOTE: Full cure is achieved in 16 hours.

SUBTASK 71-00-03-370-012-G00

(12) Do these steps to prepare the Gardo Protect 350 coating, C50410:

(a) Let the material get to 70°F (21.11°C) – 80°F (26.67°C).

(b) Fully mix the Gardo Protect 350 coating, C50410 in the container.

(c) Apply the coating with standard spray equipment.

NOTE: Use spray equipment with an atomization pressure of 75 psi (517 kPa) and a pot pressure of 5 psi (34 kPa) to make sure that the fluid is delivered correctly.

SUBTASK 71-00-03-370-013-G00

(13) Do these steps to apply the Gardo Protect 350 coating, C50410 to the lip skin:

(a) Apply a 2 mils (0.002 in.) - 3 mils (0.003 in.) layer in one application with the spray equipment.

(b) Allow to dry for 15 to 30 minutes.

SUBTASK 71-00-03-950-002-G00

(14) Remove the masking material from the inner and outer barrels and the fan compartment.

H. Method 3 - Weekly Inspection for Corrosion and Cleaning

SUBTASK 71-00-03-100-004-G00

(1) If a protective coating is not available, do the following at least once (1) weekly. Daily inspection and cleaning is preferred.

NOTE: Frequency of inspections will depend on the environmental condition that the airplane is stored in. Inspections and cleaning should be done at a frequency that ensures the lipskin does not have corrosive substance build up or prolonged moisture pooling on the lipskin surface.

(a) With a soft low-lint cleaning cloth, G50933, moisten with alcohol, B00130 (preferred), or with de-ionized water, G02418, clean the nose cowl lipskin (TASK 20-10-34-110-802).

(b) If corrosion is found, remove per the applicable SRM procedure. Make sure that the minimum thickness requirements per SRM are met.

I. Protective Coating Removal

SUBTASK 71-00-03-150-001-G00

(1) Do one of these steps to remove the protective coating from the lipskin:

(a) If X20-18 compound, G51625, was used, perform the following steps:

1) Clean the lipskin with XS3 Aircraft Wash and XG5 Hard Surface Cleaner furnished from the X20-18 compound, G51625, vendor.

NOTE: It is acceptable to perform general solvent cleaning per SOPM 20-30-03 as an alternative to the products recommended by Granitize.

2) Clean the surface until there are no signs of X20-18 compound, G51625, present on the lipskin.

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a) To detect the presence of X20-18 compound, G51625, on bare metal surfaces, perform one of the following:

<1> Use Rulon J tape, G02356, to make a tab at the end. Firmly press the tape on a subject treated area and suspected untreated area. Pull the tab back slowly at a 90 degree angle to the surface. Noticeable ease in resistance will take place on a treated compared to the untreated surface.

<2> Spray clean de-ionized water, G02418, on the surface. Moisture will bead up on a treated surface when compared to a non-treated surface.

3) Do this task if the aircraft will be put back into service: DDG 30-21-01A Engine Anti-Ice Valves Closed Inoperative - Restoration, TASK 30-00-00-440-803.

(b) If Protectapeel SC-1074B-1 coating, C50013/Protectapeel SC-1090 topcoat, C50014, PPG Z6160 coating, C50411/PPG Z6148 topcoat, C50412, or Gardo Protect 350 coating, C50410, was used, perform one of the following steps:

1) Use your hand to peel off the coating or use clean shop air.

a) Refer to the coating manufacturer's recommendations for more details.

2) Do not use hand tools harder than the aluminum lipskin to prevent damage.

CAUTION

SCRIBE MARKS OR CUTS WHICH GO INTO THE METAL SURFACE OF THE LIP SKIN CAN CAUSE DAMAGE TO THE LIP SKIN. THE DAMAGE CAUSES LOSS OF FATIGUE LIFE OF THE METAL.

3) You can use a hard resin phenolic scraper, STD-1064, to help you remove the peelable coating with these conditions:

a) The tool does not go completely through the coating.

b) The tool does not score or mar the lipskin.

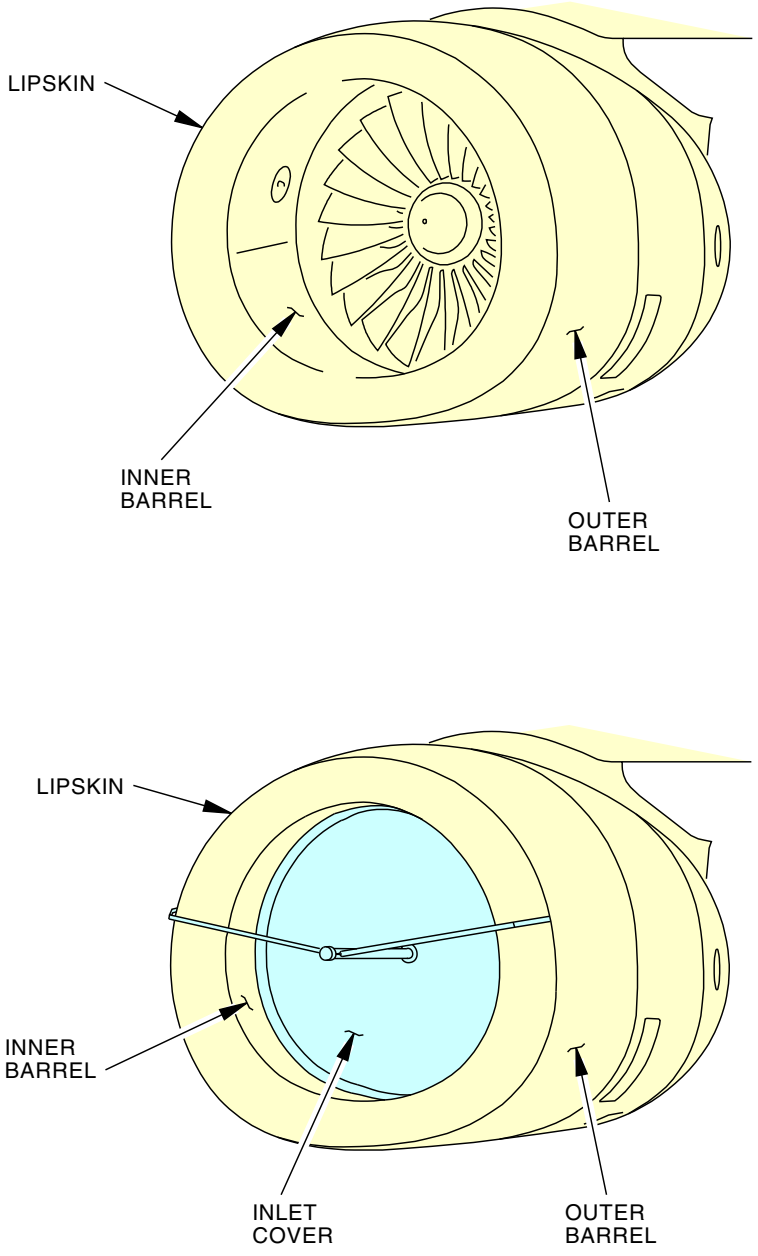
c) Use a scraper which has an adjustable depth of cut on the coating.

SUBTASK 71-00-03-110-002-G00

(2) Remove any residue or unwanted material (TASK 20-10-34-110-802).

——— END OF TASK ———

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Inlet Cowl Lipskin Protective Coating
Figure 201/71-00-03-990-820-G00

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TASK 71-00-03-620-801-G00

3. Preservation of an Engine (Task Selection)

A. General

(1) This task gives the instructions for the task selection for engine preservation.

(2) These tasks are recommended for installed engines that are not to be operated. Preservation instructions specific for engines that are not installed (off-wing) are available from the manufacturer.

B. Consumable Materials

Reference	Description	Specification
G02455 [CP2160]	Film, Vapor Barrier, Polyethylene	L-P-512
G02456 [CP2098]	Desiccant - Activated, Bagged, Packaging Use And Static Dehumidification	MIL-D-3464
G51486 [CP2109]	Tape - Plastic, Colored - 3M No. 471	
G51738 [CP2158]	Tape - Masking, Cloth Adhesive - tesa 4651	

C. Preservation of an Engine Task Selection

SUBTASK 71-00-03-620-001-G00

(1) Select the engine preservation procedure per the duration that the engine will be inoperative:

NOTE: Preservation renewal procedures are also covered in this instruction.

NOTE: An engine removed for shop-visit needs to be preserved for the duration the engine will be inoperative, including the shop-visit. Therefore, it is recommended to take into account the expected time engine will spend in shop visit when selecting the task for preservation before engine removal.

(a) Preservation of an engine for not more than 10 days, do this task: Preservation of an Engine on Wing for not more than 10 Days, TASK 71-00-03-600-801-G00.

(b) Preservation of up to 30 days, do this task: Preservation of an Engine on Wing for not more than 30 Days, TASK 71-00-03-620-802-G00.

(c) Preservation of up to 3 months, do this task: Preservation of an Engine on Wing for not more than 3 Months, TASK 71-00-03-620-806-G00.

(d) Preservation for 30 days to 1 year, do this task: Preservation of an Engine on Wing for 30 Days to 1 Year, TASK 71-00-03-630-801-G00.

(e) Preservation of an engine that has expired preservation, do this task: Preservation of an Engine on Wing That Has Expired, TASK 71-00-03-620-808-G00.

(f) Requirements for preservation renewal, do this task: Preservation Renewal Requirements, TASK 71-00-03-620-809-G00.

(g) Engine dry-out and re-lubrication procedure after the engine was shutdown in flight, do this task: Dry-Out Of An Engine On-Wing After An In-Flight Shutdown, TASK 71-00-03-800-801-G00.

(h) Depreservation of an engine to put back in operation, do this task: Depreservation of an Engine on Wing, TASK 71-00-03-630-802-G00.

SUBTASK 71-00-03-620-002-G00

(2) Preservation program guidelines:

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(a) The tasks give the instructions for the preservation and de-preservation for operable and non-operable engines.

NOTE: Engines that can be started are considered operable. Engines that cannot be started are considered non-operable.

(b) The preservation procedures for an operable engine give the minimum recommended steps that are necessary to prevent these conditions:

1) Corrosion
2) Entry of unwanted material into the engine
3) The effects of the climate and weather conditions.

(c) The preservation procedures for a non-operable engine give the minimum recommended steps that are necessary if you cannot start the engine.

(d) The de-preservation procedure puts the installed engine back in operation.

(e) The preservation procedures are different for different periods of non-operational time, different types of preservation procedures and if the power plant is operable or not operable.

(f) Power plant preservation is a flexible program that you can do, and must agree with the applicable weather and storage conditions.

(g) More care is necessary for a program for power plants that are operational in high humidity, in large temperature changes or near a salt water area than for the power plants that are in drier climates or less bad weather conditions.

(h) In case of engine storage in an environment with a humidity level that is higher than 70%, put in place desiccant bag, G02456 [CP2098],and humidity indicator card (locally manufactured) in the inlet and the exhaust in order to monitor the humidity level.

NOTE: The best condition for engine storage is to keep an environment with less than 70% of humidity.

1) Make sure that the desiccant bags are not in contact with the engine hardware.
2) If necessary, use vapor barrier film, G02455 [CP2160], to locally protect the engine hardware.
3) Attach humidity indicator card (locally manufactured) to monitor humidity level during the preservation period.
4) Make sure that the desiccant bags and humidity indicators are easily accessible.

(i) When you use desiccants, inspect and change them regularly as applicable, taking into account environmental conditions, to make sure that the desiccants give good protection.

1) If indication of important humidity or saturated desiccant bags is noted during inspection, consider reducing inspection interval and increasing quantity of desiccant bags.

(j) Install a vapor barrier film, G02455 [CP2160], in inlet and exhaust to seal the engine flow path.

NOTE: This will make sure that the desiccants give good protection.

(k) Do a schedule for the preservation programs for power plants that are not operated and also do a schedule for the preservation renewal procedures.

(l) Monitor the schedule regularly to make sure that you do the necessary procedure before the expiration time.

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CAUTION YOU MUST DO ALL THE APPLICABLE PRESERVATION PROCEDURES WHEN YOU PUT AN ENGINE INTO A PERIOD OF NON-OPERATION. IF YOU DO NOT, CORROSION AND GENERAL DETERIORATION OF THE CORE ENGINE AND THE FUEL SYSTEM CAN OCCUR.

(m) Examine the preservation of the power plant as the weather conditions and conditions of power plant protection change, and do the procedures necessary to keep the power plant in an operable condition.

NOTE: You cannot perform engine preservation and put the engines into storage without maintenance. You must do a schedule and apply it.

(n) Close the Variable Bleed Valve (VBV) doors when you do the preservation and store the power plant.

CAUTION DO NOT USE WHITE, GREY, YELLOW, RED OR GREEN TESA 4651 TAPE (CP2158) OR RED 3M 471 TAPE (CP2109). IF YOU DO NOT OBEY, DAMAGE TO THE PARTS CAN OCCUR.

1) Cover VBV grids with vapor barrier film, G02455 [CP2160], or blue 3M 471 tape, G51486 [CP2109], or blue, brown or black tesa 4651 tape, G51738 [CP2158].

2) Make sure that no unwanted material goes into the core engine inlet through the VBV.

(o) Make sure that you do the engine dry-out and re-lubrication procedure after an engine has had an in-flight shutdown (Dry-Out Of An Engine On-Wing After An In-Flight Shutdown, TASK 71-00-03-800-801-G00).

(p) Make sure that you do the engine dry-out and re-lubrication procedure when you do a preservation if the engine is not operable for a long time (Dry-Out Of An Engine On-Wing After An In-Flight Shutdown, TASK 71-00-03-800-801-G00).

(q) Make sure that you remove all tools and clean the work area after you do the preservation procedure.

END OF TASK

TASK 71-00-03-600-801-G00

4. Preservation of an Engine on Wing for not more than 10 Days

A. General

(1) This task gives the instructions on how to preserve an engine on wing for not more than 10 days.

B. References

Reference	Title
12-13-11-600-801	Engine Servicing (Oil Replenishing) (P/B 301)
12-13-11-600-803	Engine Oil Change Servicing (P/B 301)
71-00-00-910-803-G00	Start the Engine (Normal Start) (P/B 201)
71-00-00-910-806-G00	Stop the Engine (Usual Engine Stop) (P/B 201)
71-00-00-910-808-G00	Dry Motor Procedure (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-1517	Cover - Engine Exhaust Part #: 896812 Supplier: SBK11 Part #: C10006-1 Supplier: 81205
SPL-14650	Cover, Engine Inlet - LEAP 1B Part #: 892812 Supplier: SBK11 Part #: B737-104 Supplier: 1LE67 Part #: B737-153 Supplier: 1LE67 Part #: C10005-23 Supplier: 81205 Opt Part #: C10005-1 Supplier: 81205

D. Consumable Materials

Reference	Description	Specification
B00666	Solvent - Methyl Propyl Ketone	BMS11-9
G00252	Film - Polyethylene Film And Sheeting	ASTM D2103 (Supersedes L-P-512)
G00253	Material - Barrier Materials, Greaseproofed, Waterproof, Flexible, Heat-Sealable	MIL-PRF-121 (Supersedes MIL-B-121)
G00834	Cloth - Lint-free Cotton	
G00920	Tape - Waterproof, Packaging	ASTM D5486
G02456 [CP2098]	Desiccant - Activated, Bagged, Packaging Use And Static Dehumidification	MIL-D-3464

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. Preservation of an Engine on Wing for not more than 10 Days

SUBTASK 71-00-03-910-001-G00

(1) If the engine is operable but has not been operated at the idle-power speed for a minimum of three minutes during the last engine operation, do these steps:

NOTE: This step and the two steps that follow are not necessary if the engine was operated at ground idle during the last engine operation. Consider the engine preserved for 10 days from the time of the last engine operation.

(a) Do this task: Start the Engine (Normal Start), TASK 71-00-00-910-803-G00.

(b) Operate the engine at stable ground idle for 3 minutes.

(c) Do this task: Stop the Engine (Usual Engine Stop), TASK 71-00-00-910-806-G00.

(d) Dry motor the engine for 2 minutes in order to reduce risk of fuel nozzle coking (TASK 71-00-00-910-808-G00).

(e) In less than 1 hour after engine shutdown, do a check of the oil level on the oil tank sight glass.

(f) If the oil level is above the top of the oil tank sight glass, do the steps as follow:

1) Drain the oil tank down to -3QT sight glass indication (TASK 12-13-11-600-803).

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2) Do this task: Start the Engine (Normal Start), TASK 71-00-00-910-803-G00.

3) Operate the engine at stable ground idle for 3 minutes.

4) Do this task: Stop the Engine (Usual Engine Stop), TASK 71-00-00-910-806-G00.

5) Inspect again the oil level on the oil tank sight glass in less than 1 hour after engine shutdown.

6) If the oil level is still above the MAX level, repeat the steps above, until the oil level is visible on the oil tank sight glass.

7) At first opportunity, do the troubleshooting for the cause of oil over-servicing per the applicable IFIM procedure.

a) Until you complete troubleshooting, do not perform oil tank servicing on a cold engine (TASK 12-13-11-600-801).

NOTE: It is necessary to perform only oil tank servicing on warm engine (less than 1 hour after engine shutdown).

SUBTASK 71-00-03-640-001-G00

(2) If the engine is not operable and was shutdown in-flight (IFSD), dry out and lubricate the engine (TASK 71-00-03-800-801-G00).

NOTE: If the engine is non-operable, consider the engine preserved for 10 days from the time of last operation or the engine dry-out procedure.

SUBTASK 71-00-03-640-005-G00

(3) In case of engine storage in an environment with a humidity level that is higher than 70%, put in place desiccant bag, G02456 [CP2098], and humidity indicator card (locally manufactured) in the inlet and the exhaust in order to monitor the humidity level (TASK 71-00-03-620-801-G00).

NOTE: The best condition for engine storage is to keep an environment with less than 70% of humidity.

SUBTASK 71-00-03-480-001-G00

(4) Put the cover, SPL-14650, on the fan cowl entrance.

(a) If the engine inlet cover is not available, use barrier material, G00253, polyethylene film, G00252, or equivalent 6 MIL or thicker material, and tape, G00920.

1) When using plastic sheeting to cover the inlet, do the steps that follow:

a) Use a lint-free cloth, G00834, and solvent, B00666, to wipe the area where the tape will be used.

b) Cut approximately 70 in. (1.8 m) diameter circle from plastic sheet.

c) Tape the plastic circle on FWD edge of the acoustic panel behind the lipskin.

<1> Apply with at least 3 layers of overlapping tape around the perimeter of the inlet acoustic panel.

<2> Do not place plastic or tape over the lipskin or encase the lipskin with plastic.

d) Apply the tape across the diameter of the circular sheet to reduce the pillowing of the plastic sheeting.

SUBTASK 71-00-03-480-002-G00

(5) Put the exhaust cover, SPL-1517, on the tailpipe exit.

(a) If the engine exhaust cover is not available, use barrier material, G00253, polyethylene film, G00252, or equivalent 6 MIL or thicker material, and tape, G00920.

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1) Make sure that the drain holes or tubes are open and not covered, when applying plastic sheeting and tape to the exhaust.

——— END OF TASK ———

TASK 71-00-03-620-802-G00

5. Preservation of an Engine on Wing for not more than 30 Days

A. General

(1) This task gives the instructions to preserve the engine on wing for not more than 30 days.

(2) If engine was shutdown in flight, the engine must be dried out and re-lubricated within 24 hours.

B. References

Reference	Title
12-13-11-600-801	Engine Servicing (Oil Replenishing) (P/B 301)
12-13-11-600-803	Engine Oil Change Servicing (P/B 301)
36-11-04-000-801	PRSOV Removal (P/B 401)
71-00-00-910-803-G00	Start the Engine (Normal Start) (P/B 201)
71-00-00-910-806-G00	Stop the Engine (Usual Engine Stop) (P/B 201)
71-00-00-910-808-G00	Dry Motor Procedure (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-1517	Cover - Engine Exhaust Part #: 896812 Supplier: SBK11 Part #: C10006-1 Supplier: 81205
SPL-14650	Cover, Engine Inlet - LEAP 1B Part #: 892812 Supplier: SBK11 Part #: B737-104 Supplier: 1LE67 Part #: B737-153 Supplier: 1LE67 Part #: C10005-23 Supplier: 81205 Opt Part #: C10005-1 Supplier: 81205
SPL-18258	Blanking Plate - PRSOV Part #: C36007-11 Supplier: 81205 Opt Part #: C36007-1 Supplier: 81205
STD-3906	Mallet - Rubber

D. Consumable Materials

Reference	Description	Specification
B00666	Solvent - Methyl Propyl Ketone	BMS11-9
G00252	Film - Polyethylene Film And Sheeting	ASTM D2103 (Supersedes L-P-512)
G00253	Material - Barrier Materials, Greaseproofed, Waterproof, Flexible, Heat-Sealable	MIL-PRF-121 (Supersedes MIL-B-121)
G00834	Cloth - Lint-free Cotton	
G00920	Tape - Waterproof, Packaging	ASTM D5486

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(Continued)

Reference	Description	Specification
G02304	Tape - Moisture Barrier, Adhesive One-side	BMS8-346
G02455 [CP2160]	Film, Vapor Barrier, Polyethylene	L-P-512
G02456 [CP2098]	Desiccant - Activated, Bagged, Packaging Use And Static Dehumidification	MIL-D-3464
G51486 [CP2109]	Tape - Plastic, Colored - 3M No. 471	
G51738 [CP2158]	Tape - Masking, Cloth Adhesive - tesa 4651	

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. Preservation of an Engine on Wing for not more than 30 Days

SUBTASK 71-00-03-620-003-G00

CAUTION DO NOT SPRAY PRESERVATIVE OIL OR EQUIVALENT INTO THE ENGINE INLET, CORE COMPRESSOR, TURBINE, OR ENGINE EXHAUST. UNWANTED PARTICLES THAT STAY ON THE BLADES AND VANES WET WITH OIL CAN CAUSE DAMAGE TO THE ENGINE.

(1) If the engine is operable, do these steps:

(a) If the engine was shutdown in flight, dry out and re-lubricate the engine within 24 hours (TASK 71-00-03-800-801-G00).

(b) Do this task: Start the Engine (Normal Start), TASK 71-00-00-910-803-G00.

NOTE: This step and the steps to operate and shut down the engine are not necessary if the engine was operated at stable ground idle for 15-20 minutes during the last engine operation. Consider the engine preserved for 30 days from the last time of operation.

(c) Operate the engine at stable ground idle for 15-20 minutes.

(d) Do this task: Stop the Engine (Usual Engine Stop), TASK 71-00-00-910-806-G00.

(e) Dry motor the engine for 2 minutes, in order to reduce risk of fuel nozzle coking (TASK 71-00-00-910-808-G00).

(f) In less than 1 hour after engine shutdown, do a check of the oil level on the oil tank sight glass.

(g) If the oil level is above the top of the oil tank sight glass, do the steps as follow:

1) Drain the oil tank down to -3QT sight glass indication (TASK 12-13-11-600-803).

2) Do this task: Start the Engine (Normal Start), TASK 71-00-00-910-803-G00.

3) Operate the engine at stable ground idle for 3 minutes.

4) Do this task: Stop the Engine (Usual Engine Stop), TASK 71-00-00-910-806-G00.

5) Inspect again the oil level on the oil tank sight glass in less than 1 hour after engine shutdown.

6) If the oil level is still above the MAX level, repeat the steps above, until the oil level is visible on the oil tank sight glass.

7) At first opportunity, do the troubleshooting for the cause of oil over-servicing per the applicable IFIM procedure.

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a) Until you complete troubleshooting, do not perform oil tank servicing on a cold engine (TASK 12-13-11-600-801).

NOTE: It is necessary to perform only oil tank servicing on warm engine (less than 1 hour after engine shutdown).

(h) In case of engine storage in an environment with a humidity level that is higher than 70%, put in place desiccant bag, G02456 [CP2098], and humidity indicator card (locally manufactured) in the inlet and the exhaust in order to monitor the humidity level (TASK 71-00-03-620-801-G00).

NOTE: The best condition for engine storage is to keep an environment with less than 70% of humidity.

CAUTION

DO NOT USE WHITE, GREY, YELLOW, RED OR GREEN TESA 4651 TAPE (CP2158) OR RED 3M 471 TAPE (CP2109). IF YOU DO NOT OBEY, DAMAGE TO THE PARTS CAN OCCUR.

(i) Cover Variable Bleed Valve (VBV) grids with vapor barrier film, G02455 [CP2160], or blue 3M 471 tape, G51486 [CP2109] or blue, brown or black tesa 4651 tape, G51738 [CP2158].

(j) Put the cover, SPL-14650, on the entrance of the fan cowling.

1) If the engine inlet cover is not available, use barrier material, G00253, polyethylene film, G00252, or equivalent 6 MIL or thicker material, and tape, G00920.

a) When using plastic sheeting to cover the inlet, do the steps that follow:

<1> Use a lint-free cloth, G00834, and solvent, B00666, to wipe the area where the tape will be used.

<2> Cut approximately 70 in. (1.8 m) diameter circle from plastic sheet.

<3> Tape the plastic circle on FWD edge of the acoustic panel behind the lipskin.

<a> Apply with at least 3 layers of overlapping tape around the perimeter of the inlet acoustic panel.

<b> Do not place plastic or tape over the lipskin or encase the lipskin with plastic.

<4> Apply the tape across the diameter of the circular sheet to reduce the pillowing of the plastic sheeting.

(k) Put the exhaust cover, SPL-1517, on the exit of the tailpipe.

1) If the engine exhaust cover is not available, use barrier material, G00253, polyethylene film, G00252, or equivalent 6 MIL or thicker material, and tape, G00920.

a) Make sure that the drain holes or tubes are open and not covered, when applying plastic sheeting and tape to the exhaust.

SUBTASK 71-00-03-020-005-G00

(2) If the APU or external air will be used to operate the ECS during the time that the engine will be preserved on wing, remove the PRSOV and store it off of the airplane, do the steps that follow:

(a) Remove the PRSOV, do this task: PRSOV Removal, TASK 36-11-04-000-801.

(b) Use an E-seal and a coupling with a blanking plate, SPL-18258, and install on the crossover duct.

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1) When the coupling are in place, tighten the coupling.
   a) Tighten the coupling nut to 175 ±5 in-lb (20 ±1 N·m).
   b) Lightly tap the outer surface of the coupling with a rubber mallet, STD-3906.
   c) Tighten the coupling nut again to 175 ±5 in-lb (20 ±1 N·m).

(c) On the mix duct, cover the opening with a protective cover or polyethylene film, G00252, and tape, G00920.

SUBTASK 71-00-03-620-004-G00

(3) If the engine is not operable, do these steps:

(a) If the engine was shutdown in flight, dry out and re-lubricate the engine (TASK 71-00-03-800-801-G00).

(b) If engine is non-operable, consider the engine preserved for 30 days from the time of last operation or the engine dry-out procedure.

CAUTION

DO NOT USE WHITE, GREY, YELLOW, RED OR GREEN TESA 4651 TAPE (CP2158) OR RED 3M 471 TAPE (CP2109). IF YOU DO NOT OBEY, DAMAGE TO THE PARTS CAN OCCUR.

(c) Cover VBV grids with vapor barrier film, G02455 [CP2160], or blue 3M 471 tape, G51486 [CP2109] or blue, brown or black tesa 4651 tape, G51738 [CP2158].
   1) Make sure that no unwanted material goes into the core engine inlet through the VBV.

(d) Put a cap or protective cover on all strut, pipes, accessory openings and electrical connections.
   1) Make sure that the drain holes or tubes are open and not covered.

(e) Put the desiccant bag, G02456 [CP2098], bags (with humidity indicator) on both sides of the engine, but not in contact with the engine hardware.

(f) Seal front and back openings/exposed areas with vapor barrier film, G02455 [CP2160].
   1) Attach the film with moisture barrier tape, G02304.

(g) Put the cover, SPL-14650, on the entrance of the fan cowling.
   1) If the engine inlet cover is not available, use barrier material, G00253, polyethylene film, G00252, or equivalent 6 MIL or thicker material, and tape, G00920.
      a) When using plastic sheeting to cover the inlet, do the steps that follow:
         <1> Use a lint-free cloth, G00834, and solvent, B00666, to wipe the area where the tape will be used.
         <2> Cut approximately 70 in. (1.8 m) diameter circle from plastic sheet.
         <3> Tape the plastic circle on FWD edge of the acoustic panel behind the lipskin.
            <a> Apply with at least 3 layers of overlapping tape around the perimeter of the inlet acoustic panel.
            <b> Do not place plastic or tape over the lipskin or encase the lipskin with plastic.
         <4> Apply the tape across the diameter of the circular sheet to reduce the pillowing of the plastic sheeting.

(h) Put the exhaust cover, SPL-1517, on the exit of the tailpipe.

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1) If the engine exhaust cover is not available, use barrier material, G00253, polyethylene film, G00252, or equivalent 6 MIL or thicker material, and tape, G00920.

a) Make sure that the drain holes or tubes are open and not covered, when applying plastic sheeting and tape to the exhaust.

SUBTASK 71-00-03-160-002-G00

(4) Remove all tools and clean the work area.

——— END OF TASK ———

TASK 71-00-03-620-806-G00

6. Preservation of an Engine on Wing for not more than 3 Months

(Figure 202)

A. General

(1) This task gives the instructions on how to preserve the engine on wing for not more than 3 months.

(2) There are two procedures available for this task:

(a) The first procedure is to perform preservation after the last engine operation (or flight).

(b) The second procedure avoids the idle engine run after end of operations, by servicing the oil tank with preservation mixture before last scheduled flights and not more than one day before end of operations. The last flight or engine run will replace the idle run.

B. References

Reference	Title
12-13-11-170-801	Oil Tank Flushing (P/B 301)
12-13-11-600-801	Engine Servicing (Oil Replenishing) (P/B 301)
36-11-04-000-801	PRSOV Removal (P/B 401)
71-00-00-910-803-G00	Start the Engine (Normal Start) (P/B 201)
71-00-00-910-806-G00	Stop the Engine (Usual Engine Stop) (P/B 201)
71-00-00-910-808-G00	Dry Motor Procedure (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

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-1517	Cover - Engine Exhaust Part #: 896812 Supplier: SBK11 Part #: C10006-1 Supplier: 81205
SPL-14650	Cover, Engine Inlet - LEAP 1B Part #: 892812 Supplier: SBK11 Part #: B737-104 Supplier: 1LE67 Part #: B737-153 Supplier: 1LE67 Part #: C10005-23 Supplier: 81205 Opt Part #: C10005-1 Supplier: 81205

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(Continued)

Reference	Description
SPL-18258	Blanking Plate - PRSOV Part #: C36007-11 Supplier: 81205 Opt Part #: C36007-1 Supplier: 81205
STD-3906	Mallet - Rubber

D. Consumable Materials

Reference	Description	Specification
B00666	Solvent - Methyl Propyl Ketone	BMS11-9
D00599 [CP2442]	Oil - Engine	
D00662 [CP5075]	Additive, Corrosion Preventive	MIL-L-23699
D00664 [CP5067]	Oil - Corrosion Preventive, Lubricative System	MIL-PRF-6085
G00252	Film - Polyethylene Film And Sheeting	ASTM D2103 (Supersedes L-P-512)
G00253	Material - Barrier Materials, Greaseproofed, Waterproof, Flexible, Heat-Sealable	MIL-PRF-121 (Supersedes MIL-B-121)
G00834	Cloth - Lint-free Cotton	
G00920	Tape - Waterproof, Packaging	ASTM D5486
G02455 [CP2160]	Film, Vapor Barrier, Polyethylene	L-P-512
G02456 [CP2098]	Desiccant - Activated, Bagged, Packaging Use And Static Dehumidification	MIL-D-3464
G51486 [CP2109]	Tape - Plastic, Colored - 3M No. 471	
G51738 [CP2158]	Tape - Masking, Cloth Adhesive - tesa 4651	

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. 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

G. Prepare for the Preservation

SUBTASK 71-00-03-640-004-G00

(1) If it is necessary, do this task: Dry-Out Of An Engine On-Wing After An In-Flight Shutdown, TASK 71-00-03-800-801-G00.

NOTE: If engine was shutdown in flight, the engine must be dried out and re-lubricated within 24 hours per the dry out step in this task.

SUBTASK 71-00-03-010-001-G00

(2) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

(a) On the applicable engine, 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

H. Preservation of an Engine on Wing for not more than 3 Months (At the end of engine operation)

SUBTASK 71-00-03-680-001-G00

WARNING DO NOT TOUCH THE COMPONENTS OF THE OIL SYSTEM IF THE ENGINE IS HOT. THESE COMPONENTS STAY HOTTER THAN OTHER COMPONENTS. HOT COMPONENTS CAN BURN YOU.

WARNING DO NOT OPEN THE OIL SYSTEM UNTIL THE PRESSURE GOES TO ZERO. THE PRESSURE GOES TO ZERO APPROXIMATELY 5 MINUTES AFTER AN ENGINE STOPS. A PRESSURIZED OIL SYSTEM CAN RELEASE A SPRAY OF HOT OIL THAT CAN BURN YOU.

WARNING DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

CAUTION DO NOT LET OIL GET ON THE ENGINE OR OTHER COMPONENTS. IMMEDIATELY CLEAN THE OIL WHEN IT FALLS ON THEM. OIL CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION DO NOT SPRAY PRESERVATIVE OIL OR EQUIVALENT INTO THE ENGINE INLET, CORE COMPRESSOR, TURBINE, OR ENGINE EXHAUST. UNWANTED PARTICLES THAT STAY ON THE BLADES AND VANES WET WITH OIL CAN CAUSE DAMAGE TO THE ENGINE.

(1) Prepare the oil tank [1] as follows:

(a) Drain the oil tank [1] (TASK 12-13-11-170-801).

(b) Service the oil tank [1] with a minimum of 5 gal (19 l) mixture of engine oil, D00599 [CP2442], and lubrication system corrosion preventive oil, D00664 [CP5067], as follows (TASK 12-13-11-600-801):

1) Mix the engine oil, D00599 [CP2442], with 5% by volume of lubrication system corrosion preventive oil, D00664 [CP5067].

2) As an alternative, mix the engine oil, D00599 [CP2442], with 7% by volume of corrosion preventive additive, D00662 [CP5075].

(c) If it is necessary, fill the oil tank [1] with engine oil, D00599 [CP2442], after adding the lubrication system corrosion preventive oil, D00664 [CP5067], or corrosion preventive additive, D00662 [CP5075].

SUBTASK 71-00-03-600-004-G00

(2) As an alternative, prepare the oil tank [1] as follows:

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(a) Put 1 qt (0.95 l) of lubrication system corrosion preventive oil, D00664 [CP5067], directly into the oil tank [1].

1) If it is necessary, partially drain the oil tank [1] before adding the lubrication system corrosion preventive oil, D00664 [CP5067], to prevent over servicing.

(b) As an alternative, put 1.4 qt (1.3 l) of corrosion preventive additive, D00662 [CP5075], directly into the oil tank.

1) If it is necessary, partially drain the oil tank [1] before adding the corrosion preventive additive, D00662 [CP5075], to prevent over servicing.

SUBTASK 71-00-03-910-002-G00

(3) Do this task: Start the Engine (Normal Start), TASK 71-00-00-910-803-G00.

SUBTASK 71-00-03-910-003-G00

(4) Operate the engine at stable ground idle for 15-20 minutes.

SUBTASK 71-00-03-910-004-G00

(5) Do this task: Stop the Engine (Usual Engine Stop), TASK 71-00-00-910-806-G00.

SUBTASK 71-00-03-720-001-G00

(6) Dry motor the engine for 2 minutes, in order to reduce risk of fuel nozzle coking (TASK 71-00-00-910-808-G00).

SUBTASK 71-00-03-020-003-G00

(7) If the APU or external air will be used to operate the ECS during the time that the engine will be preserved on wing, it is recommended to remove the PRSOV and store it off the airplane do the steps that follow:

(a) Remove the PRSOV, do this task: PRSOV Removal, TASK 36-11-04-000-801.

(b) Use an E-seal and a coupling with a blanking plate, SPL-18258 and install on the crossover duct.

1) When the coupling are in place, tighten the coupling.

a) Tighten the coupling nut to 175 ±5 in-lb (20 ±1 N·m).

b) Lightly tap the outer surface of the coupling with a rubber mallet, STD-3906.

c) Tighten the coupling nut again to 175 ±5 in-lb (20 ±1 N·m).

(c) On the mix duct, cover the opening with a protective cover or polyethylene film, G00252 and tape, G00920.

SUBTASK 71-00-03-620-019-G00

(8) In case of engine storage in an environment with a humidity level that is higher than 70%, put in place desiccant bag, G02456 [CP2098], and humidity indicator card (locally manufactured) in the inlet and the exhaust in order to monitor the humidity level (TASK 71-00-03-620-801-G00).

NOTE: The best condition for engine storage is to keep an environment with less than 70% of humidity.

SUBTASK 71-00-03-620-020-G00

CAUTION

DO NOT USE WHITE, GREY, YELLOW, RED OR GREEN TESA 4651 TAPE (CP2158) OR RED 3M 471 TAPE (CP2109). IF YOU DO NOT OBEY, DAMAGE TO THE PARTS CAN OCCUR.

(9) Cover Variable Bleed Valve (VBV) grids with vapor barrier film, G02455 [CP2160], or blue 3M 471 tape, G51486 [CP2109] or blue, brown or black tesa 4651 tape, G51738 [CP2158].

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SUBTASK 71-00-03-480-003-G00

(10) Put the cover, SPL-14650 on the entrance of the fan cowling.

(a) If the engine inlet cover is not available, use barrier material, G00253, polyethylene film, G00252, or equivalent 6 MIL or thicker material, and tape, G00920.

1) When using plastic sheeting to cover the inlet, do the steps that follow:

a) Use a lint-free cloth, G00834, and solvent, B00666, to wipe the area where the tape will be used.

b) Cut approximately 70 in. (1.8 m) diameter circle from plastic sheet.

c) Tape the plastic circle on FWD edge of the acoustic panel behind the lipskin.

<1> Apply with at least 3 layers of overlapping tape around the perimeter of the inlet acoustic panel.

<2> Do not place plastic or tape over the lipskin or encase the lipskin with plastic.

d) Apply the tape across the diameter of the circular sheet to reduce the pillowing of the plastic sheeting.

SUBTASK 71-00-03-480-004-G00

(11) Put the exhaust cover, SPL-1517 on the engine exhaust.

(a) If the engine exhaust cover is not available, use barrier material, G00253, polyethylene film, G00252, or equivalent 6 MIL or thicker material, and tape, G00920.

1) Make sure that the drain holes or tubes are open and not covered, when applying plastic sheeting and tape to the exhaust.

SUBTASK 71-00-03-160-003-G00

(12) Remove all tools and clean the work area.

I. Alternate Procedure for Preservation of an Engine on Wing for not more than 3 Months (One day before the end of operations)

NOTE: Use this alternate procedure on the operable power plant before last scheduled flight(s) and not more than one day before end of operations.

SUBTASK 71-00-03-680-002-G00

WARNING DO NOT TOUCH THE COMPONENTS OF THE OIL SYSTEM IF THE ENGINE IS HOT. THESE COMPONENTS STAY HOTTER THAN OTHER COMPONENTS. HOT COMPONENTS CAN BURN YOU.

WARNING DO NOT OPEN THE OIL SYSTEM UNTIL THE PRESSURE GOES TO ZERO. THE PRESSURE GOES TO ZERO APPROXIMATELY 5 MINUTES AFTER AN ENGINE STOPS. A PRESSURIZED OIL SYSTEM CAN RELEASE A SPRAY OF HOT OIL THAT CAN BURN YOU.

WARNING DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

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(WARNING PRECEDES)

CAUTION DO NOT LET OIL GET ON THE ENGINE OR OTHER COMPONENTS. IMMEDIATELY CLEAN THE OIL WHEN IT FALLS ON THEM. OIL CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION DO NOT SPRAY PRESERVATIVE OIL OR EQUIVALENT INTO THE ENGINE INLET, CORE COMPRESSOR, TURBINE, OR ENGINE EXHAUST. UNWANTED PARTICLES THAT STAY ON THE BLADES AND VANES WET WITH OIL CAN CAUSE DAMAGE TO THE ENGINE.

CAUTION DO NOT USE THE CORROSION PREVENTIVE ADDITIVE CP5075 FOR THIS PROCEDURE. DAMAGE TO THE ENGINE CAN OCCUR.

CAUTION DO NOT USE PRESERVATIVE ADDITIVE CP5067 DURING ENGINE OPERATIONS FOR MORE THAN ONE DAY. DAMAGE TO THE ENGINE CAN OCCUR.

(1) Prepare the oil tank [1] as follows:

(a) Drain the oil tank [1] (TASK 12-13-11-170-801).

(b) Service the oil tank [1] with a mixture of engine oil, D00599 [CP2442], and lubrication system corrosion preventive oil, D00664 [CP5067], as follows (TASK 12-13-11-600-801):

CAUTION DO NOT USE THE CORROSION PREVENTIVE ADDITIVE CP5075 FOR THIS PROCEDURE. DAMAGE TO THE ENGINE CAN OCCUR.

1) Mix the engine oil, D00599 [CP2442], with 5% by volume of lubrication system corrosion preventive oil, D00664 [CP5067].

a) Do not use corrosion preventive additive, D00662 [CP5075].

(c) If it is necessary, fill the oil tank [1] with engine oil, D00599 [CP2442], after adding the lubrication system corrosion preventive oil, D00664 [CP5067].

SUBTASK 71-00-03-600-003-G00

(2) As an alternative, prepare the oil tank [1] as follows:

CAUTION DO NOT USE THE CORROSION PREVENTIVE ADDITIVE CP5075 FOR THIS PROCEDURE. DAMAGE TO THE ENGINE CAN OCCUR.

(a) Put 1 qt (0.95 l) of lubrication system corrosion preventive oil, D00664 [CP5067], directly into the oil tank [1].

1) Do not use corrosion preventive additive, D00662 [CP5075].

2) If it is necessary, partially drain the oil tank [1] before adding the lubrication system corrosion preventive oil, D00664 [CP5067], to prevent over servicing.

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SUBTASK 71-00-03-020-004-G00

(3) If the APU or external air will be used to operate the ECS during the time that the engine will be preserved on wing, it is recommended to remove the PRSOV and store it off of the airplane.Do the steps that follow:

(a) Remove the PRSOV, do this task: PRSOV Removal, TASK 36-11-04-000-801.

(b) Use an E-seal and a coupling with a blanking plate, SPL-18258 and install on the crossover duct.

1) When the coupling are in place, tighten the coupling.

a) Tighten the coupling nut to 175 ±5 in-lb (20 ±1 N·m).

b) Lightly tap the outer surface of the coupling with a rubber mallet, STD-3906.

c) Tighten the coupling nut again to 175 ±5 in-lb (20 ±1 N·m).

(c) On the mix duct, cover the opening with a protective cover or polyethylene film, G00252 and tape, G00920.

SUBTASK 71-00-03-160-004-G00

(4) Remove all tools and clean the work area.

SUBTASK 71-00-03-620-017-G00

(5) In case of engine storage in an environment with a humidity level that is higher than 70%, put in place desiccant bag, G02456 [CP2098], and humidity indicator card (locally manufactured) in the inlet and the exhaust in order to monitor the humidity level (TASK 71-00-03-620-801-G00).

NOTE: The best condition for engine storage is to keep an environment with less than 70% of humidity.

SUBTASK 71-00-03-620-018-G00

CAUTION

DO NOT USE WHITE, GREY, YELLOW, RED OR GREEN TESA 4651 TAPE (CP2158) OR RED 3M 471 TAPE (CP2109). IF YOU DO NOT OBEY, DAMAGE TO THE PARTS CAN OCCUR.

(6) Cover VBV grids with vapor barrier film, G02455 [CP2160], or blue 3M 471 tape, G51486 [CP2109] or blue, brown or black tesa 4651 tape, G51738 [CP2158].

SUBTASK 71-00-03-480-008-G00

(7) After the last flight, put the covers on the engine.

(a) Put the cover, SPL-14650 on the entrance of the fan cowling.

1) If the engine inlet cover is not available, use barrier material, G00253, polyethylene film, G00252, or equivalent 6 MIL or thicker material, and tape, G00920.

a) When using plastic sheeting to cover the inlet, do the steps that follow:

<1> Use a lint-free cloth, G00834 and solvent, B00666 to wipe the area where the tape will be used.

<2> Cut approximately 70 in. (1.8 m) diameter circle from plastic sheet.

<3> Tape the plastic circle on FWD edge of the acoustic panel behind the lipskin.

<a> Apply with at least 3 layers of overlapping tape around the perimeter of the inlet acoustic panel.

<b> Do not place plastic or tape over the lipskin or encase the lipskin with plastic.

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<4> Apply the tape across the diameter of the circular sheet to reduce the pillowing of the plastic sheeting.

(b) Put the exhaust cover, SPL-1517 on the engine exhaust.

1) If the engine exhaust cover is not available, use barrier material, G00253, polyethylene film, G00252, or equivalent 6 MIL or thicker material, and tape, G00920.

a) Make sure that the drain holes or tubes are open and not covered, when applying plastic sheeting and tape to the exhaust.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-03-410-001-G00

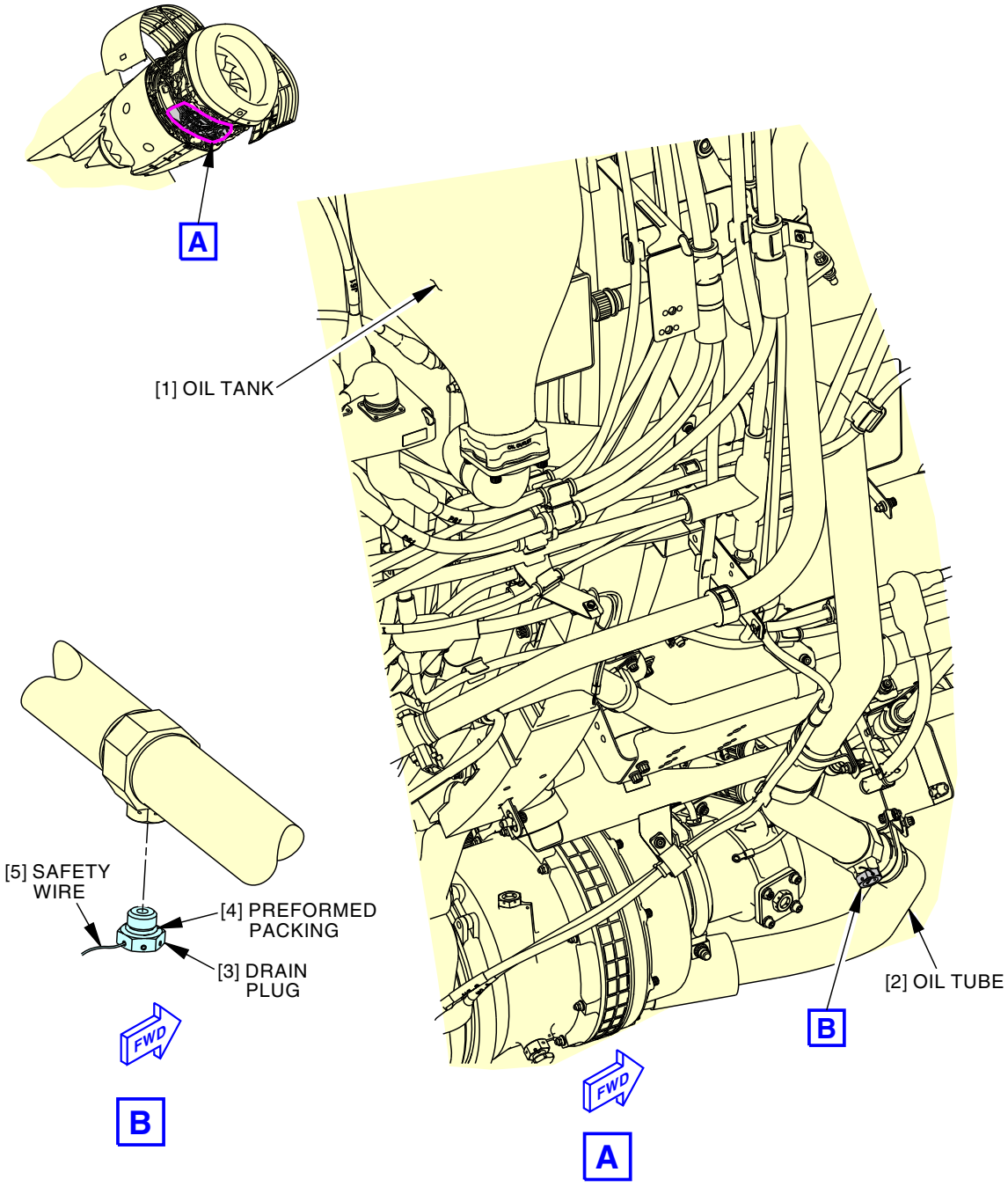
(1) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

(a) On the applicable engine, 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

——— END OF TASK ———

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Preservation Of An Engine On Wing For Not More Than Three Months
Figure 202/71-00-03-990-818-G00

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TASK 71-00-03-630-801-G00

7. Preservation of an Engine on Wing for 30 Days to 1 Year

A. General

(1) This task gives the instructions to preserve the engine for 30 days to one year while the engine is installed on wing.

(2) This task gives the instructions for an operable engine with “Menu Mode” procedure in the flight deck.

B. References

Reference	Title
12-13-11-600-803	Engine Oil Change Servicing (P/B 301)
36-11-04-000-801	PRSOV Removal (P/B 401)
71-00-00-700-801-G00	Test No. 25 - Fuel System Preservation Special Functions Test (P/B 501)
71-00-00-910-808-G00	Dry Motor Procedure (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)
73-11-01-000-801-G00	Main Fuel Pump Removal (P/B 401)
73-11-07-400-801-G00	Main Fuel Supply Hose Installation (P/B 401)
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)
80-11-01-610-802-G00	Engine Starter Servicing (Oil Fill) (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
SPL-1517	Cover - Engine Exhaust Part #: 896812 Supplier: SBK11 Part #: C10006-1 Supplier: 81205
SPL-14650	Cover, Engine Inlet - LEAP 1B Part #: 892812 Supplier: SBK11 Part #: B737-104 Supplier: 1LE67 Part #: B737-153 Supplier: 1LE67 Part #: C10005-23 Supplier: 81205 Opt Part #: C10005-1 Supplier: 81205
SPL-14906	Kit - Engine Preservation (On or Off-Wing) Part #: 956A1602P01 Supplier: 58828
SPL-18258	Blanking Plate - PRSOV Part #: C36007-11 Supplier: 81205 Opt Part #: C36007-1 Supplier: 81205
SPL-21586	Kit - Engine Preservation (On Wing) Part #: 956A1602P02 Supplier: 58828

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(Continued)

Reference	Description
STD-3906	Mallet - Rubber
STD-6638	Air Source - Compressed, Clean, Filtered, and Dry, 0 - 100 psi
STD-6646	Container - Fuel Resistant

D. Consumable Materials

Reference	Description	Specification
B00666	Solvent - Methyl Propyl Ketone	BMS11-9
D00599 [CP2442]	Oil - Engine	
D00623 [CP5066]	Oil - Fuel System, Corrosion Preventive	MIL-PRF-6081, Grade 1010
D00662 [CP5075]	Additive, Corrosion Preventive	MIL-L-23699
D00664 [CP5067]	Oil - Corrosion Preventive, Lubricative System	MIL-PRF-6085
G00252	Film - Polyethylene Film And Sheeting	ASTM D2103 (Supersedes L-P-512)
G00253	Material - Barrier Materials, Greaseproofed, Waterproof, Flexible, Heat-Sealable	MIL-PRF-121 (Supersedes MIL-B-121)
G00834	Cloth - Lint-free Cotton	
G00920	Tape - Waterproof, Packaging	ASTM D5486
G02455 [CP2160]	Film, Vapor Barrier, Polyethylene	L-P-512
G02456 [CP2098]	Desiccant - Activated, Bagged, Packaging Use And Static Dehumidification	MIL-D-3464
G51299	Card - Humidity Indicator, 10-40% Moisture Detection	MIL-I-8835
G51486 [CP2109]	Tape - Plastic, Colored - 3M No. 471	
G51738 [CP2158]	Tape - Masking, Cloth Adhesive - tesa 4651	

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. 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

G. Prepare for the Preservation

SUBTASK 71-00-03-840-001-G00

(1) 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

H. Preservation of an Engine on Wing for 30 Days to 1 Year

SUBTASK 71-00-03-600-001-G00

(1) Preservation of operable engines with “Menu Mode” in the flight deck.

NOTE: If the engine was shutdown in flight, dry out and re-lubricate the engine within 24 hours (TASK 71-00-03-800-801-G00).

(a) Examine the engine starter motor oil level.

1) If necessary, service the starter motor oil (TASK 80-11-01-610-802-G00).

NOTE: The engine starter must have oil to operate. The initial servicing of the engine oil system does not provide enough oil to the starter for operation.

WARNING DO NOT TOUCH THE COMPONENTS OF THE OIL SYSTEM IF THE ENGINE IS HOT. THESE COMPONENTS STAY HOTTER THAN OTHER COMPONENTS. HOT COMPONENTS CAN BURN YOU.

WARNING DO NOT OPEN THE OIL SYSTEM UNTIL THE PRESSURE GOES TO ZERO. THE PRESSURE GOES TO ZERO APPROXIMATELY 5 MINUTES AFTER AN ENGINE STOPS. A PRESSURIZED OIL SYSTEM CAN RELEASE A SPRAY OF HOT OIL THAT CAN BURN YOU.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(WARNING PRECEDES)

WARNING DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

WARNING DO NOT USE A SILICONE-BASED OIL WHEN YOU CONNECT THE OIL CART TO FLUSH THE OIL. KEEP CONTAMINATION OUT OF THE FUEL SYSTEM WHEN YOU CONNECT THE CART. IF YOU DO NOT OBEY THESE INSTRUCTIONS, YOU CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO THE ENGINE COMPONENTS.

CAUTION DO NOT LET OIL GET ON THE ENGINE OR OTHER COMPONENTS. IMMEDIATELY CLEAN THE OIL WHEN IT FALLS ON THEM. OIL CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION DO NOT SPRAY PRESERVATIVE OIL OR EQUIVALENT INTO THE ENGINE INLET, CORE COMPRESSOR, TURBINE, OR ENGINE EXHAUST. UNWANTED PARTICLES THAT STAY ON THE BLADES AND VANES WET WITH OIL CAN CAUSE DAMAGE TO THE ENGINE.

(b) Preserve the engine oil system:

1) Drain the oil tank.

NOTE: Refer to Engine Oil Change Servicing, TASK 12-13-11-600-803.

2) Replenish the oil tank up to the -3QT mark on the oil tank sight glass with a mixture of

a) Engine oil, D00599 [CP2442] and 7% (by volume) corrosion preventative additive, D00662 [CP5075] or

b) Engine oil, D00599 [CP2442] and 5% (by volume) lubrication system corrosion preventative oil, D00664 [CP5067].

(c) Preserve the engine fuel system:

1) Make sure to do this check of the circuit breakers before you do the wet motor procedure to prevent fuel leakage from the spar valve.

a) For engine 1, open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1

b) For engine 2 open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2

2) Make sure the position of the circuit breaker is not changed until the fuel system preservation is complete or fuel leakage from spar valve could occur.

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3) Make sure that these circuit breakers are open and have 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

4) Drain the main fuel pump.
   a) Refer to Main Fuel Pump Removal, TASK 73-11-01-000-801-G00 for the steps to drain the fuel pump.
5) Disconnect the main fuel supply hose from the main fuel pump.
   a) Refer to Main Fuel Pump Removal, TASK 73-11-01-000-801-G00 for the steps to disconnect the main fuel supply hose from the main fuel pump.
   b) Retain the gasket.
6) Connect the preservation kit, SPL-21586, or preservation kit, SPL-14906:
   a) Fill the reservoir with oil, D00623 [CP5066].
   b) Connect the reservoir to the main fuel pump using the adapter.
      <1> Tighten the four bolts to 109.31 in-lb (12.35 N·m) - 120.81 in-lb (13.65 N·m).
7) Put the main fuel pump hose cap on the main fuel supply hose using the retained gasket.
8) Pressurize the preservation kit, SPL-21586, or preservation kit, SPL-14906 reservoir:
   a) Close the main supply valve on the reservoir.
   b) Do one of the steps that follow:
      <1> Raise the tank higher than 3.0 ft (0.9 m) above the fuel pump inlet, or
      <2> Pressurize the tank between 20 psi (138 kPa) and 25 psi (172 kPa) using a clean, dry, and regulated air source, STD-6638.
9) Put a fuel resistant container, STD-6646 below the engine drain to collect the fuel.
10) Open the main supply valve on the preservation kit, SPL-21586, or preservation kit, SPL-14906 reservoir.
11) Open the supply valve of the main fuel pump adapter.
12) Do this task: Test No. 25 - Fuel System Preservation Special Functions Test, TASK 71-00-00-700-801-G00.

    NOTE: During this step, engine will be motored and fuel system preservation fluid mist will appear at the engine exhaust.

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13) Remove the remaining fuel and oil from the flow path:

a) Let the fuel drain for 15 minutes or until no fluid drips.

b) Make sure that there is a minimum of 3.7 gal (14.0 l) remains in the tank.

c) Make sure that the main supply valves on the preservation kit, SPL-21586, or preservation kit, SPL-14906 reservoir are open.

CAUTION DO NOT APPLY BOOST PUMP PRESSURE TO THE FUEL PUMP INLET WHEN YOU DRY-MOTOR THE ENGINE WITH THE DISCONNECTED FUEL LINE. FUEL WILL SPILL ON THE ENGINE AND CAUSE DAMAGE TO THE EQUIPMENT.

d) Dry motor the engine for two minutes to remove remaining fuel and oil from the flow path (TASK 71-00-00-910-808-G00).

14) Close the main supply valve of the main fuel pump adapter.

15) Rotate the fan rotor through a minimum of two complete turns if it did not turn during the dry motor.

16) Depressurize the preservation kit, SPL-21586, or preservation kit, SPL-14906 and drain all residual fluid.

17) Remove the main fuel pump adapter from the fuel pump inlet.

18) Reconnect the aircraft main fuel supply hose to the main fuel pump inlet port (TASK 73-11-07-400-801-G00).

(d) Install vapor barrier film, G02455 [CP2160] on all open pipes and struts.

CAUTION DO NOT USE WHITE, GREY, YELLOW, RED OR GREEN TESA 4651 TAPE (CP2158) OR RED 3M 471 TAPE (CP2109). IF YOU DO NOT OBEY, DAMAGE TO THE PARTS CAN OCCUR.

(e) Cover Variable Bleed Valve (VBV) grids with vapor barrier film, G02455 [CP2160], or blue 3M 471 tape, G51486 [CP2109], or blue, brown or black tesa 4651 tape, G51738 [CP2158].

1) Make sure that no unwanted material goes into the core engine inlet through the VBV.

(f) Install protective covers or caps on all open ports, tubes, hoses, and connectors.

NOTE: Drain holes or tubes remain open and should not be covered.

SUBTASK 71-00-03-020-002-G00

(2) If the Auxiliary Power Unit (APU) or external air will be used to operate the Environmental Control System (ECS) during the time that the engine will be preserved on wing, it is recommended to remove the Pressure Regulating and Shutoff Valve (PRSOV) and store it off of the airplane. Do the steps that follow:

(a) Remove the PRSOV, do this task: PRSOV Removal, TASK 36-11-04-000-801.

(b) Use an E-seal and a coupling with a blanking plate, SPL-18258 and install on the crossover duct.

1) When the coupling are in place, tighten the coupling.

a) Tighten the coupling nut to 175 ±5 in-lb (20 ±1 N·m).

b) Lightly tap the outer surface of the coupling with a rubber mallet, STD-3906.

c) Tighten the coupling nut again to 175 ±5 in-lb (20 ±1 N·m).

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(c) On the mix duct, cover the opening with a protective cover or polyethylene film, G00252 and tape, G00920.

I. Job Close-up

SUBTASK 71-00-03-840-002-G00

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.

(1) 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 71-00-03-480-009-G00

(2) Cover the inlet and exhaust of the engine.

(a) Place the desiccant bags, G02456 [CP2098] and humidity indicator card, G51299 in the inlet and exhausts of the engine:

1) Mark the date on the humidity indicator tags.

2) Attach the desiccant bags, G02456 [CP2098] in the inlet and exhaust of the engine.

3) Make sure that the desiccant bags, G02456 [CP2098] are not in contact with the engine hardware.

a) If necessary, use vapor barrier film, G02455 [CP2160] to protect locally the engine hardware.

NOTE: Humidity indicator cards and desiccant bags must be inspected at regular intervals in order to make sure they are still active. If indication of important humidity or saturated desiccant bags is noted during inspection, consider reducing inspection interval and increasing quantity of desiccant bags. As an example, start monitoring of the desiccant bags as follow in order to determine the effective interval for desiccant bags replacement. A suggested schedule is as follows:

<1> Second day after beginning of storage period.

<2> Fourteenth day after beginning of storage period.

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<3> Every three months after beginning of storage period.

b) Make sure the desiccant bags are accessible for inspection or replacement and do not significantly disturb the protective material.

(b) Seal the inlet and exhaust of the engine with vapor barrier film, G02455 [CP2160].

(c) Install the cover, SPL-14650 on the engine inlet and the exhaust cover, SPL-1517 on the rear of the engine.

1) If the engine inlet and exhaust covers are not available, use barrier material, G00253, polyethylene film, G00252, or equivalent 6 MIL or thicker material, and tape, G00920.

NOTE: The drain holes or tubes should not be capped or covered when applying plastic sheeting and tape to the exhaust.

a) When using plastic sheeting to cover the inlet, do the steps that follow:

<1> Use a lint-free cloth, G00834 and solvent, B00666 to wipe the area where the tape will be used.

<2> Cut approximately 70 in. (1.8 m) diameter circle from plastic sheet.

<3> Tape the plastic circle on FWD edge of the acoustic panel behind the lipskin. Apply with at least 3 layers of overlapping tape around the perimeter of the inlet acoustic panel.

NOTE: Do not place plastic or tape over the lipskin or encase the lipskin with plastic.

<4> Apply the tape across the diameter of the circular sheet to reduce the pillowing of the plastic sheeting.

(d) Put a tag on the engine to indicate the engine is preserved.

——— END OF TASK ———

TASK 71-00-03-620-808-G00

8. Preservation of an Engine on Wing That Has Expired

A. General

(1) This task gives the instructions on what to do with an engine on wing with an expired preservation period.

B. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

C. Preservation of an Engine on Wing That Has Expired

SUBTASK 71-00-03-600-002-G00

(1) If the engine preservation period is expired, contact your CFMI representative for instruction.

(a) Provide the following parameters:

NOTE: An engineering analysis must be used to analyze the situation applicable to each special case.

1) LEAP engine model and Engine Serial Number

2) Engine TSN and CSN

3) Date of last preservation task performed and reference of the task

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a) In case of multiple renewal procedure performed, provide complete history and dates

4) Date of next expected preservation or run

5) Total period of improper preservation

a) Detail if maximum extended period allowed in Preservation of an Engine on Wing That Has Expired, TASK 71-00-03-620-808-G00, has been reached

6) Confirm that the last preservation task was performed properly, with the following steps done, as applicable:

a) Oil system preserved

b) Fuel system preserved

c) VBVs were closed and/or sealed with a vapor barrier film or alternative grid protection

d) All open tubes, hoses and electrical connections were capped and plugged

e) Desiccant bags and humidity indicators were installed and monitoring history

f) Engine inlet and exhausts were sealed with vapor barrier film

g) Engine covers were installed (whole engine or inlet and exhaust only)

7) Desiccant bags replacement history and humidity indicators monitoring history

8) Engine storage locations and conditions with the information that follows:

a) Inside storage or outside storage

b) Temperature variation and humidity level encountered during out of operation period

c) Confirm exposure to windmilling if engine stored outside without cover

9) Date when the engine will be available for preservation (the latest possible, in order to know how long the period without preservation renewal will be)

10) In particular case of an engine which had an IFSD, confirmation that dry-out and re-lubrication were performed within 24 hours after IFSD

11) If the engine is going to shop visit.

——— END OF TASK ———

TASK 71-00-03-620-809-G00

9. Preservation Renewal Requirements

A. General

(1) This task provides the requirements for the preservation renewal.

(2) Before engine operation, refer to Inlet Cowl Lipskin Protective Coating Procedure, TASK 71-00-03-390-801-G00 for lipskin coating requirements during engine operation.

NOTE: It may be necessary to apply protective coating to the inlet cowl lipskin after engine operation if a renewal is performed.

B. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

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C. Preservation Renewal Requirements

SUBTASK 71-00-03-620-007-G00

(1) Preservation renewal for a period up to 10 days (Engine On-Wing).

(a) Operable engine:

1) Do the preservation for a period up to 10 days (Preservation of an Engine on Wing for not more than 10 Days, TASK 71-00-03-600-801-G00).

a) There is no limit on the number of times you can do this procedure.

2) For engine that has preservation period expired, do this task: Preservation of an Engine on Wing That Has Expired, TASK 71-00-03-620-808-G00.

(b) If applicable, apply protective coating to the inlet cowl lipskin. Do this task: Inlet Cowl Lipskin Protective Coating Procedure, TASK 71-00-03-390-801-G00.

(c) Non-operable engine:

1) No renewal is allowed, the engine must be serviced and operable before another preservation procedure is done.

SUBTASK 71-00-03-620-008-G00

(2) Preservation renewal of an engine for a period up to 30 days.

(a) Operable engine:

1) Two renewals are permitted.

2) Do the preservation for a period up to 30 days (Preservation of an Engine on Wing for not more than 30 Days, TASK 71-00-03-620-802-G00).

3) If the engine will not be operated for more than the subsequent 30 days, do one of the tasks that follow:

- Preservation of an Engine on Wing for not more than 3 Months, TASK 71-00-03-620-806-G00
- Preservation of an Engine on Wing for 30 Days to 1 Year, TASK 71-00-03-630-801-G00

4) For engine that has preservation period expired, do this task: Preservation of an Engine on Wing That Has Expired, TASK 71-00-03-620-808-G00.

5) If applicable, apply protective coating to the inlet cowl lipskin. Do this task: Inlet Cowl Lipskin Protective Coating Procedure, TASK 71-00-03-390-801-G00.

(b) Non-operable engine:

1) No renewal is allowed, the engine must be serviced and operable before another preservation procedure is done.

SUBTASK 71-00-03-620-009-G00

(3) Preservation renewal of an engine for a period up to 90 days.

(a) Operable engine:

1) One renewal is permitted.

2) Do the preservation for a period up to 90 days (Preservation of an Engine on Wing for not more than 3 Months, TASK 71-00-03-620-806-G00).

NOTE: it is not necessary to drain and service the oil tank to do the renewal procedure.

3) For engine that has preservation period expired, do this task: Preservation of an Engine on Wing That Has Expired, TASK 71-00-03-620-808-G00.

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4) If the engine will not be operated for more than the subsequent three months, the engine must then be preserved per the 30 days to 1 year procedure (Preservation of an Engine on Wing for 30 Days to 1 Year, TASK 71-00-03-630-801-G00).

5) If applicable, apply protective coating to the inlet cowl lipskin, do this task: Inlet Cowl Lipskin Protective Coating Procedure, TASK 71-00-03-390-801-G00.

(b) Non-operable engine:

1) No renewal is allowed, the engine must be serviced and operable before another preservation procedure is done.

SUBTASK 71-00-03-620-010-G00

(4) Preservation renewal of an engine for a period of 30 days up to 1 year.

(a) Operable engine:

1) Do the preservation renewal procedure again of the engine for a period of 30 days up to 1 year (Preservation of an Engine on Wing for 30 Days to 1 Year, TASK 71-00-03-630-801-G00).

NOTE: There is no limit to the number of times you can do this procedure.

2) For engine that has preservation period expired, do this task: Preservation of an Engine on Wing That Has Expired, TASK 71-00-03-620-808-G00.

3) If applicable, apply protective coating to the inlet cowl lipskin, do this task: Inlet Cowl Lipskin Protective Coating Procedure, TASK 71-00-03-390-801-G00.

(b) Non-operable engine:

1) No renewal is allowed, the engine must be serviced and operable before another preservation procedure is done.

——— END OF TASK ———

TASK 71-00-03-800-801-G00

10. Dry-Out Of An Engine On-Wing After An In-Flight Shutdown

A. General

(1) This task gives the instructions to dry and re-lubricate the engine sumps and the gearbox with hot air when you cannot operate the engine.

(2) This task gives the dry-out and lubrication steps that are necessary for the engine that had an in-flight shutdown.

(3) You must do this procedure not longer than 24 hours after landing.

(4) If the engine is to be operated within 24 hours after landing, operate the engine for a minimum of 15 minutes at a low idle.

(5) If the engine is run within 24 hours after landing, it is not necessary to do the dry-out and lubrication of the engine.

B. References

Reference	Title
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)
72-63-04-000-801-G00	Accessory Gearbox Manual Control Cover Removal (P/B 401)
72-63-04-400-801-G00	Accessory Gearbox Manual Control Cover Installation (P/B 401)
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)

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(Continued)

Reference	Title
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)
79-21-04-000-801-G00	Scavenge Screen Plugs Removal (P/B 201)
79-21-04-211-801-G00	Scavenge Screen Plug Inspection (P/B 201)
79-21-04-400-801-G00	Scavenge Screen Plugs 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-15019	Tool Set - Engine Sumps Relubrication and Dry Out Part #: 956A6622G01***ECD AUG 2023*** Supplier: 58828
STD-12345	Heater - Portable; maximum 400,000 BTU/hr output, output temperature range of 150 - 280 deg. F (66 - 138 deg. C)

D. Consumable Materials

Reference	Description	Specification
D00599 [CP2442]	Oil - Engine	
D00662 [CP5075]	Additive, Corrosion Preventive	MIL-L-23699
D00664 [CP5067]	Oil - Corrosion Preventive, Lubricative System	MIL-PRF-6085

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. 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

G. Prepare for the Dry-Out Of An Engine

SUBTASK 71-00-03-010-004-G00

(1) 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

H. Dry-Out Of An Engine On-Wing After An In-Flight Shutdown

SUBTASK 71-00-03-420-001-G00

(1) Remove the four scavenge screen plugs from the lubrication unit (TASK 79-21-04-000-801-G00).

SUBTASK 71-00-03-211-001-G00

(2) Inspect the four scavenge screen plugs (TASK 79-21-04-211-801-G00).

SUBTASK 71-00-03-490-001-G00

(3) If the engine core can turn, remove the manual control cover from the AGB (TASK 72-63-04-000-801-G00).

SUBTASK 71-00-03-760-001-G00

(4) Fill the oil container of the engine sumps relubrication and dry out tool set, SPL-15019, with dedicated mix oil as listed in the table below:

(a) Mix the engine oil, D00599 [CP2442], with 5% by volume of lubrication system corrosion preventive oil, D00664 [CP5067].

(b) Alternatively, mix the engine oil, D00599 [CP2442], with 7% by volume of corrosion preventive additive, D00662 [CP5075].

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SUBTASK 71-00-03-480-005-G00

WARNING MAKE SURE THAT YOU PUT ON PROTECTIVE GLOVES. THE AIR HOSES THAT ARE HOT, THE HOT FILTER AND THE HOT SOURCE CAN CAUSE INJURY.

(5) Install the relubrication and dry out tool set, SPL-15019, air adapter on the lubrication unit where the scavenge screen plugs go to.

SUBTASK 71-00-03-480-006-G00

(6) If the engine core can turn, attach a 3/4 inch drive hand tool to the manual control pad on the AGB.

SUBTASK 71-00-03-480-007-G00

(7) Connect the portable heater, STD-12345, and filter adapter to the relubrication and dry out tool set, SPL-15019, air adapter.

NOTE: A Portable heater with an output of 7143 lb (3240 kg) to 7804 lb (3540 kg) per hour / 119 lb (54 kg) to 130 lb (59 kg) per minute at a temperature of 302°F (150°C) to 329°F (165°C) is recommended.

SUBTASK 71-00-03-440-001-G00

(8) Turn on the portable heater, STD-12345.

SUBTASK 71-00-03-880-001-G00

(9) Increase the air temperature slowly and continuously from 302°F (150°C) to 325°F (163°C).

SUBTASK 71-00-03-880-002-G00

(10) Blow the hot air into the engine for 20 minutes and do these steps:

(a) Turn the fan rotor 3 to 4 times (full turn) by hand.

(b) Turn the engine core 3 to 4 times (full turn) with the 3/4 inch drive hand tool on the manual control pad.

SUBTASK 71-00-03-040-001-G00

(11) Turn off the portable heater, STD-12345.

SUBTASK 71-00-03-640-002-G00

(12) Re-lubricate the engine as follows:

(a) Turn on the portable heater, STD-12345.

(b) Increase the air temperature slowly and continuously from 302°F (150°C) to 325°F (163°C).

WARNING MAKE SURE THAT YOU PUT ON PROTECTIVE GLOVES. THE AIR HOSES THAT ARE HOT, THE HOT FILTER AND THE HOT SOURCE CAN CAUSE INJURY.

(c) Open the oil supply valve.

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SUBTASK 71-00-03-640-003-G00

WARNING

MAKE SURE THAT YOU WEAR HEAVY PROTECTIVE GLOVES WHEN YOU TURN THE FAN ROTOR. IF YOU DO NOT, INJURY CAN OCCUR.

(13) Turn the fan rotor and engine core approximately once every minute.

NOTE: Turn the fan rotor and the engine core until the oil container is empty. Approximately 5-6 minutes.

SUBTASK 71-00-03-040-002-G00

(14) Turn off the portable heater, STD-12345.

SUBTASK 71-00-03-080-003-G00

(15) Remove the re-lubrication tools as follows:

(a) Disconnect the hot air hose from the relubrication and dry out tool set, SPL-15019, air adapter.

(b) Let the engine temperature decrease to ambient temperature.

(c) Remove the relubrication and dry out tool set, SPL-15019, air adapter from the lubrication unit.

(d) Make sure that the oil supply valve is closed.

(e) Remove the 3/4 inch drive hand tool from the manual control pad on the AGB.

SUBTASK 71-00-03-410-004-G00

(16) If removed, install the manual control cover from the AGB (TASK 72-63-04-400-801-G00).

SUBTASK 71-00-03-410-005-G00

(17) Install the scavenge screen plugs on the lubrication unit (TASK 79-21-04-400-801-G00).

I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-03-410-006-G00

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.

(1) 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

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(Continued)

Number	Name/Location
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.

——— END OF TASK ———

TASK 71-00-03-630-802-G00

11. Depreservation of an Engine on Wing

A. General

(1) This task gives the instructions on how to return the engine that is on wing to service from preservation.

B. References

Reference	Title
12-13-11-600-801	Engine Servicing (Oil Replenishing) (P/B 301)
12-13-11-600-803	Engine Oil Change Servicing (P/B 301)
36-11-04-400-801	PRSOV Installation (P/B 401)
71-00-00-700-807-G00	Test No. 31 - Wet Motor Ground Test (P/B 501)
71-00-00-710-802-G00	Test No. 7 - Replacement Engine (Pretested Engine) Test (P/B 501)
71-00-00-910-808-G00	Dry Motor Procedure (P/B 201)
71-00-00-910-809-G00	Wet Motor Procedure (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)
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)
80-11-01-610-802-G00	Engine Starter Servicing (Oil Fill) (P/B 301)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. 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

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(Continued)

Number	Name/Location
426	Right Thrust Reverser, Engine 2

E. Prepare for the Depreservation

SUBTASK 71-00-03-840-003-G00

(1) 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
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

F. Depreservation of an Engine on Wing

SUBTASK 71-00-03-630-001-G00

(1) Depreserve the engine that has been preserved on wing for a period of up to 30 days as follows:

(a) Remove all moisture barrier material, seals, caps, covers, desiccant bags, as applicable, from the engine.

(b) Make sure that there are no foreign materials.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

CAUTION

MAKE SURE THAT YOU FOLLOW THE LIPSKIN COATING PROCEDURES BEFORE AN ENGINE OPERATION. IF YOU DO NOT FOLLOW INSTRUCTIONS, THE COATING CAN MELT AND GO INTO THE ENGINE. THIS CAN CAUSE ENGINE DAMAGE.

(c) If not already done, remove the lipskin protective coating from the inlet cowl lipskin (Inlet Cowl Lipskin Protective Coating Procedure, TASK 71-00-03-390-801-G00).

SUBTASK 71-00-03-420-002-G00

(2) If the PRSOV was removed and stored off the airplane do the following steps:

(a) Remove the coupling, blocking plate, and E-seal from the crossover duct.

(b) On the mix duct, remove the protective cover.

(c) Inspect the duct openings for unwanted material.

(d) Install the PRSOV, do this task: PRSOV Installation, TASK 36-11-04-400-801.

SUBTASK 71-00-03-630-003-G00

WARNING

DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

CAUTION

DO NOT LET OIL GET ON THE ENGINE OR OTHER COMPONENTS. IMMEDIATELY CLEAN THE OIL WHEN IT FALLS ON THEM. OIL CAN CAUSE DAMAGE TO EQUIPMENT.

(3) Depreserve the engine that has been preserved on wing for a period of up to three months as follows:

(a) Remove all moisture barrier material, seals, caps, covers and desiccant bags, as applicable, from the engine.

(b) Make sure that there are no foreign materials.

CAUTION

MAKE SURE THAT YOU FOLLOW THE LIPSKIN COATING PROCEDURES BEFORE AN ENGINE OPERATION. IF YOU DO NOT FOLLOW INSTRUCTIONS, THE COATING CAN MELT AND GO INTO THE ENGINE. THIS CAN CAUSE ENGINE DAMAGE.

(c) If not already done, remove the lipskin protective coating from the inlet cowl lipskin (Inlet Cowl Lipskin Protective Coating Procedure, TASK 71-00-03-390-801-G00).

(d) Connect the fuel supply to the engine.

(e) If applicable, reconnect the oil supply and scavenge lines.

(f) Make sure that you drain the oil tank and the accessory gearbox (TASK 12-13-11-600-803).

(g) Do this task: Engine Servicing (Oil Replenishing), TASK 12-13-11-600-801.

(h) Service the starter oil (TASK 80-11-01-610-802-G00).

NOTE: The engine starter must have oil to operate. The initial servicing of the engine oil system does not provide enough oil to the starter for operation.

(i) Do this task: Wet Motor Procedure, TASK 71-00-00-910-809-G00.

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1) As an alternative, do this task: Test No. 31 - Wet Motor Ground Test, TASK 71-00-00-700-807-G00.

NOTE: This test has a much higher fuel flow rate than the wet motor task. This will de-preserve the engine in less time.

(j) Examine the oil level (TASK 12-13-11-600-801).

(k) Dry motor the engine to remove the fuel from the combustion chamber (TASK 71-00-00-910-808-G00).

NOTE: If it is necessary, do the dry motor several times.

SUBTASK 71-00-03-630-002-G00

WARNING DO NOT LET THE OIL STAY ON YOUR SKIN. USE THE OIL IN AN AREA WITH GOOD VENTILATION. THE OIL IS POISONOUS AND CAN BE ABSORBED THROUGH YOUR SKIN. THE OIL FUMES CAN IRRITATE YOUR RESPIRATORY TRACT.

CAUTION DO NOT LET OIL GET ON THE ENGINE OR OTHER COMPONENTS. IMMEDIATELY CLEAN THE OIL WHEN IT FALLS ON THEM. OIL CAN CAUSE DAMAGE TO EQUIPMENT.

(4) Depreserve the engine that has been preserved on wing for a period from 30 days to not more than one year as follows:

(a) Remove all moisture barrier material, seals, caps, covers and desiccant bags, as applicable, from the engine.

(b) Make sure that there are no foreign materials.

CAUTION MAKE SURE THAT YOU FOLLOW THE LIPSKIN COATING PROCEDURES BEFORE AN ENGINE OPERATION. IF YOU DO NOT FOLLOW INSTRUCTIONS, THE COATING CAN MELT AND GO INTO THE ENGINE. THIS CAN CAUSE ENGINE DAMAGE.

(c) If not already done, remove the lipskin protective coating from the inlet cowl lipskin (Inlet Cowl Lipskin Protective Coating Procedure, TASK 71-00-03-390-801-G00).

(d) If applicable, connect the fuel supply to the engine.

(e) If applicable, reconnect the oil supply and scavenge lines.

(f) Make sure that you drain the oil tank and the accessory gearbox (TASK 12-13-11-600-803).

(g) Do this task: Engine Servicing (Oil Replenishing), TASK 12-13-11-600-801.

(h) Service the starter oil (TASK 80-11-01-610-802-G00).

NOTE: The engine starter must have oil to operate. The initial servicing of the engine oil system does not provide enough oil to the starter for operation.

(i) Do this task: Wet Motor Procedure, TASK 71-00-00-910-809-G00.

1) As an alternative, do this task: Test No. 31 - Wet Motor Ground Test, TASK 71-00-00-700-807-G00.

NOTE: This test has a much higher fuel flow rate than the wet motor task. This will de-preserve the engine in less time.

2) Do the wet motoring with the fuel sprays in view at the exhaust for at least 30 seconds.

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(j) Examine the oil level (TASK 12-13-11-600-801).

(k) Dry motor the engine to remove the fuel from the combustion chamber (TASK 71-00-00-910-808-G00).

NOTE: If it is necessary, do the dry motor several times.

SUBTASK 71-00-03-860-004-G00

(5) If the engine has been preserved on wing for a period from 90 days to not more than one year, do this task: Test No. 7 - Replacement Engine (Pretested Engine) Test, TASK 71-00-00-710-802-G00.

NOTE: If the engine that is being tested was preserved on wing do not erase faults.

SUBTASK 71-00-03-160-005-G00

(6) Clean the work area and clear the tools and items used to do the task.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-03-840-004-G00

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.

(1) 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.

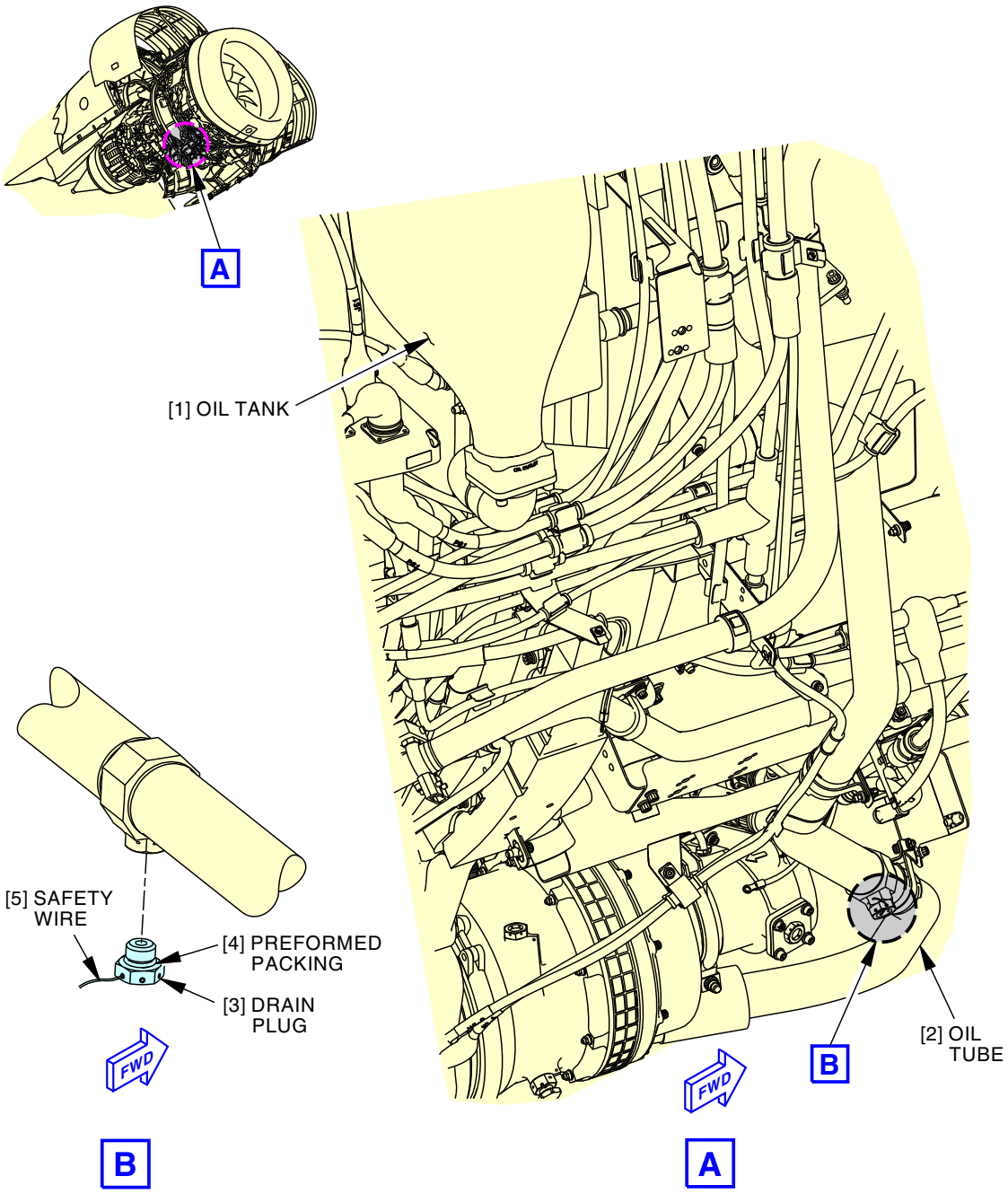
1) Close these access panels:

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.

END OF TASK

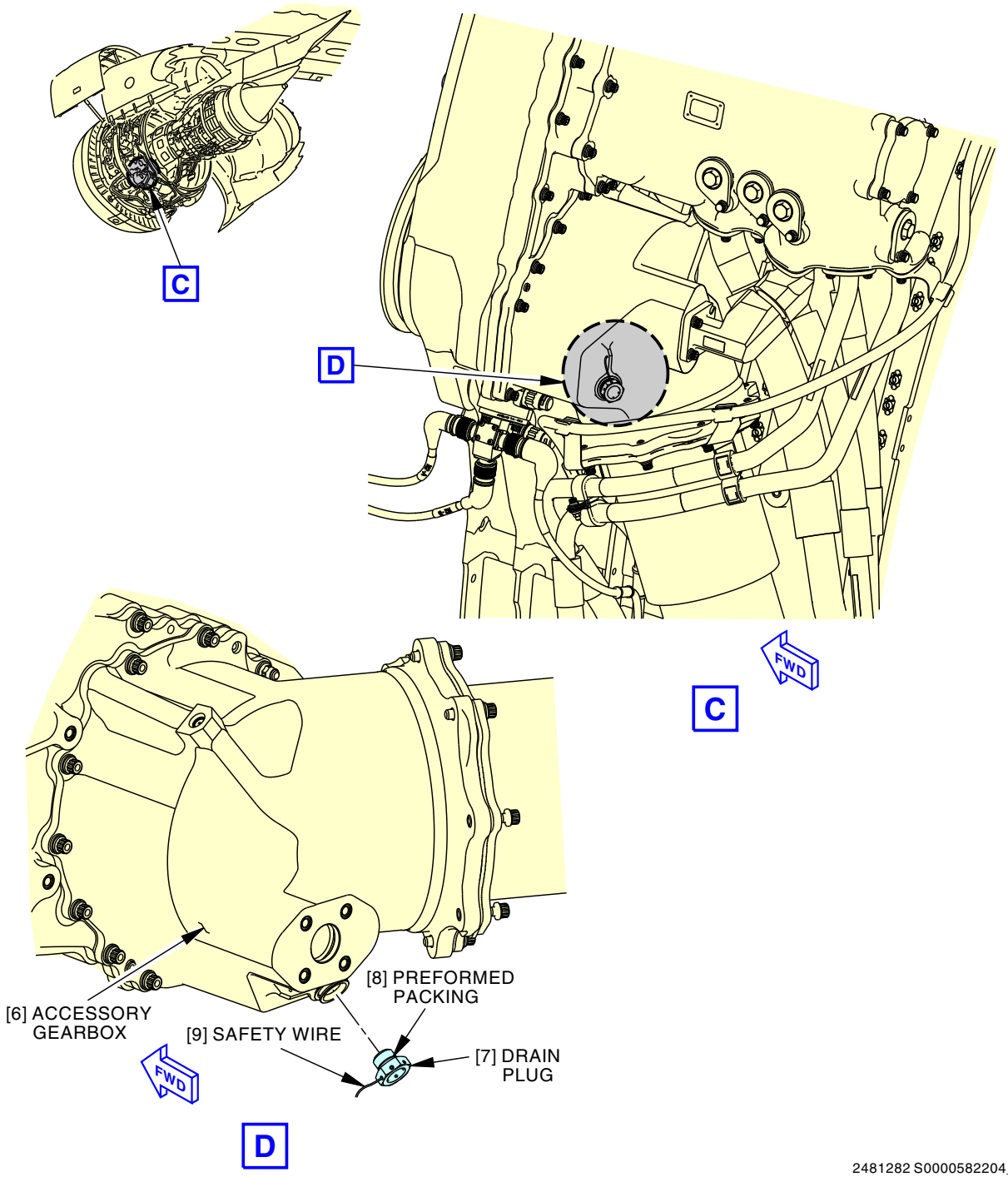
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Depreservation of an Engine On Wing
Figure 203/71-00-03-990-819-G00 (Sheet 1 of 2)

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Depreservation of an Engine On Wing
Figure 203/71-00-03-990-819-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

POWER PLANT - MAINTENANCE PRACTICES (ENGINE TRANSPORTATION)

1. General

A. This procedure has this task:

(1) The instructions to transport an engine.

TASK 71-00-04-500-801-G01

2. Engine Transportation

(Figure 201, Figure 202, Figure 203, and Figure 204)

A. General

(1) This task gives instructions for the transportation of an engine.

(2) Shipping stands should agree with the CFM specifications. There is a cradle on which the engine is attached and a base on which the cradle is installed through shock absorbers (Figure 201).

(3) Make sure that the shipping stands you use are in good condition and that they could not cause injuries to maintenance personnel or damage to the engines. It is recommended to regularly do an inspection of the engine shipping stands for safe continued operations.

(4) Refer to the documentation supplied by the manufacturer of CFM stands for more instructions.

(5) Make sure that the engine is preserved. If necessary, do the preservation of the engines. Period of up to 30 days or period of 30 to 365 days (TASK 71-00-03-620-802-G00 or TASK 71-00-03-630-801-G00).

(6) An engine can be transported in these configurations:

(a) An engine that has the Quick Engine Change (QEC) equipment items installed and that is ready for aircraft installation.

(b) An engine that has part of the QEC equipment items installed:

1) The QEC engine is without the inlet cowl, exhaust nozzle and plug.

(c) A bare engine without its QEC equipment items installed.

Table 201/71-00-04-993-803-G01 Shipping stand dimensions (base and cradle)

MANUFACTURE CRADLE BASE	HEIGHT WITH ENGINE	WIDTH BARE OR WITH QEC	LENGTH WITH BARE ENGINE	LENGTH WITH Quick Engine Change (QEC)	WEIGHT STAND ONLY	WEIGHT WITH BARE ENGINE	WEIGHT WITH QEC
CFM engine stand, SPL-14726	WITHOUT INLET: 96.4 in. (2449 mm) WITH INLET:101.4 in. (2576 mm)	98.4 in. (2499 mm)	194 in. (4928 mm)	228.3 in. (5799 mm)	5247 lb (2380 kg)	11,352 lb (5149 kg)	12,617 lb (5723 kg)

B. References

Reference	Title
71-00-03-620-802-G00	Preservation of an Engine on Wing for not more than 30 Days (P/B 201)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Reference	Title
71-00-03-630-801-G00	Preservation of an Engine on Wing for 30 Days to 1 Year (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-11132	Cover - Engine, Protective (Bare Configuration) Part #: 956A8657G03 Supplier: 58828 Opt Part #: 956A8657G02 Supplier: 58828
SPL-11641	Cover - Engine, Protective (Partial QEC Configuration) Part #: 956A8676G03 Supplier: 58828 Opt Part #: 956A8676G02 Supplier: 58828
SPL-14726	Engine Stand - LEAP-1B Part #: 956A8600G04 Supplier: 58828 Opt Part #: 956A8600G03 Supplier: 58828

D. Engine Transportation Cautions

CAUTION

OBEY ALL THE INSTRUCTIONS AND NECESSARY CONDITIONS GIVEN IN THIS PROCEDURE OTHERWISE ENGINE DAMAGE CAN OCCUR.

CAUTION

FOR ANY DEVIATION FROM THE INSTRUCTIONS GIVEN IN THIS PROCEDURE, CONTACT CFMI FOR ENGINE DISPOSITION. A DEVIATION CAN CAUSE ENGINE DAMAGE.

SUBTASK 71-00-04-760-001-G01

(1) Follow these cautions throughout this procedure, otherwise engine damage can occur.

SUBTASK 71-00-04-860-019-G01

(2) Make sure that the lower cover is installed before the engine on the shipping stand (engine stand, SPL-14726) (Figure 203 and Figure 204).

SUBTASK 71-00-04-860-020-G01

(3) Make sure that the engine drain box is removed (Figure 202).

E. Engine Protection During Shipment

SUBTASK 71-00-04-860-010-G01

CAUTION

INSTALL THE APPLICABLE COVER ON THE ENGINE BEFORE YOU SEND IT. UNWANTED DUST, RAIN OR OBJECTS CAN CAUSE DAMAGE DURING SHIPPING.

(1) Use the engine assy cover [11] (engine protective cover, SPL-11132) or quick engine change storage cover [12] (protective engine cover, SPL-11641) (Figure 203 and Figure 204).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Transportation in the Plant and Access Roads

SUBTASK 71-00-04-860-009-G01

(1) Do these steps to tow the engine in the cradle and base assembly:

(a) Release the four swivel locks of the casters when you tow the engine.

CAUTION

THE MAXIMUM SPEED LIMIT TO TOW THE ENGINE, CRADLE, AND BASE ASSEMBLY IS NOT MORE THAN 3 MPH (5 KPH) ON A SMOOTH AND HORIZONTAL SURFACE, OTHERWISE ENGINE DAMAGE CAN OCCUR.

(b) Tow the engine, cradle and base assembly at not more than 3 MPH (5 KPH).

(c) Use spring-type casters or pneumatic tires to tow the engine.

(d) Make sure that the cradle is free of attaching device to be sure that the shock absorbers operate satisfactorily.

(e) Use the caster braking system to prevent movement of the assembly when necessary.

G. Highway Transportation

SUBTASK 71-00-04-210-001-G01

(1) Inform the freight company of engine transportation requirements.

SUBTASK 71-00-04-970-001-G01

CAUTION

USE THE "AIR RIDE" (PNEUMATIC) OR THE ALTERNATIVE "HYDRAULIC WITH NITROGEN ACCUMULATORS" (HYDRO-PNEUMATIC) SUSPENSION. THIS YIELDS FILTRATION AT A NATURAL FREQUENCY OF THE ENGINE/STAND SUSPENDED-ASSEMBLY (FROM 7 HZ TO 10 HZ). IF YOU DO NOT FOLLOW THIS CAUTION, IT CAN CAUSE ENGINE DAMAGE AND REPAIRS WILL BE NECESSARY.

CAUTION

IF YOU USE ALTERNATIVE “HYDRO-PNEUMATIC” SUSPENSIONS, THE SPEED LIMIT IS 25 MI/H (40 KM/H). IF THE SPEED IS MORE THAN THIS LIMIT, DAMAGE TO THE ENGINE CAN OCCUR.

(2) Requirements for the shipment of the engine on trailer and truck.

(a) A maximum of two engines installed on stand can be transported on a single trailer.

(b) When a single engine is shipped, the trailer must be pneumatically suspended and the engine must be stowed over the rear axle of the trailer.

(c) When two engines are shipped, the tractor and the trailer must be pneumatically suspended.

(d) When engines are shipped on a towed trailer or wagon-bed truck, the axles must be pneumatically suspended.

NOTE: The shipping stands give protection against the shock and vibration loads which could occur during normal transportation.

SUBTASK 71-00-04-210-002-G01

(3) Do a check of the engine/cradle and cradle/base attaching devices.

SUBTASK 71-00-04-410-003-G01

(4) Attach the engine/cradle assembly to the base equipped with shock absorbers.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-00-04-420-007-G01

(5) Install the engine in flight direction in the transportation vehicle.

SUBTASK 71-00-04-860-011-G01

(6) Put the stand base on the truck bed and put the caster wheels and tow bars in "Storage Engine on Stand" position.

SUBTASK 71-00-04-860-012-G01

CAUTION ATTACH ONLY THE BOTTOM OF THE STAND TO THE TRUCK BASE. DO NOT ATTACH THE ENGINE CRADLE ASSEMBLY TO THE TRUCK BED. THIS IS TO BE SURE THAT THE SHOCK ABSORBERS OPERATE SATISFACTORILY.

(7) Use the correct tie-down points to secure the shipping stand base on the truck bed (Figure 201).

(a) Use a minimum of four tie-down straps to attach the base on the trailer.

1) Use six, eight, ten, or twelve tie-down straps when possible.

NOTE: As an alternative, you can use chains through forklift tunnels to attach the base to the truck bed.

CAUTION DO NOT ATTACH THE SHIPPING STAND WITH CHAINS THROUGH FORKLIFT TUNNELS. THIS WILL NOT STOP THE STAND TO MOVE IN THE Y DIRECTION. IF YOU DO NOT OBEY, DAMAGE TO THE ENGINE CAN OCCUR.

(b) Attach the tie-down straps to the air/truck tie-down rings and pull them along a diagonal across the trailer bed.

1) Attach the straps to the attaching points on the trailer bed.

H. Sea Transportation

SUBTASK 71-00-04-210-003-G01

(1) Inform the freight company of engine transportation requirements.

SUBTASK 71-00-04-860-013-G01

CAUTION IF THE ENGINE IS EXPOSED TO SALTY AIR MORE THAN EIGHT DAYS, INCLUDING LOADING AND UNLOADING FROM SHIP, ENGINE DAMAGE CAN OCCUR.

CAUTION THE ENGINE TO BE MOVED MUST BE INSTALLED ON A TRAILER BED WITH AN ACTIVE SUSPENSION SYSTEM. ENGINE DAMAGE CAN OCCUR IN CASE OF TRANSPORTATION OF AN ENGINE IN A CONTAINER NOT APPROVED.

(2) You can ship the engine on ferry boats in the conditions as follows:

(a) Obey the highway transportation conditions for sea transportation.

(b) The "Air Ride" suspension system of the vehicle must be on (air bottles inflated) during the sea transportation.

(c) Engine exposure to salty air must not be more than eight days, loading and unloading sequences included.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

I. Air Cargo Transportation

SUBTASK 71-00-04-210-004-G01

(1) Inform the freight company of engine transportation requirements.

SUBTASK 71-00-04-860-014-G01

(2) Make sure that caster wheels and tow bars are locked in stow position.

SUBTASK 71-00-04-860-015-G01

(3) Use a forklift truck to install the engine, cradle, and base assembly on a standard air cargo pallet.

SUBTASK 71-00-04-410-004-G01

CAUTION

ATTACH ONLY THE BASE OF THE STAND TO THE AIR CARGO PALLET. DO NOT ATTACH THE ENGINE CRADLE ASSEMBLY TO THE AIR CARGO PALLET. THIS IS TO BE SURE THAT THE SHOCK ABSORBERS OPERATE SATISFACTORILY. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT CAN OCCUR.

(4) Attach the tie-down straps from the base tie-down points to the pallet fitting points.

SUBTASK 71-00-04-420-008-G01

(5) Tighten and safety all tie-down straps.

J. Rail Transportation

SUBTASK 71-00-04-860-016-G01

(1) It is not recommended that you move an engine by rail.

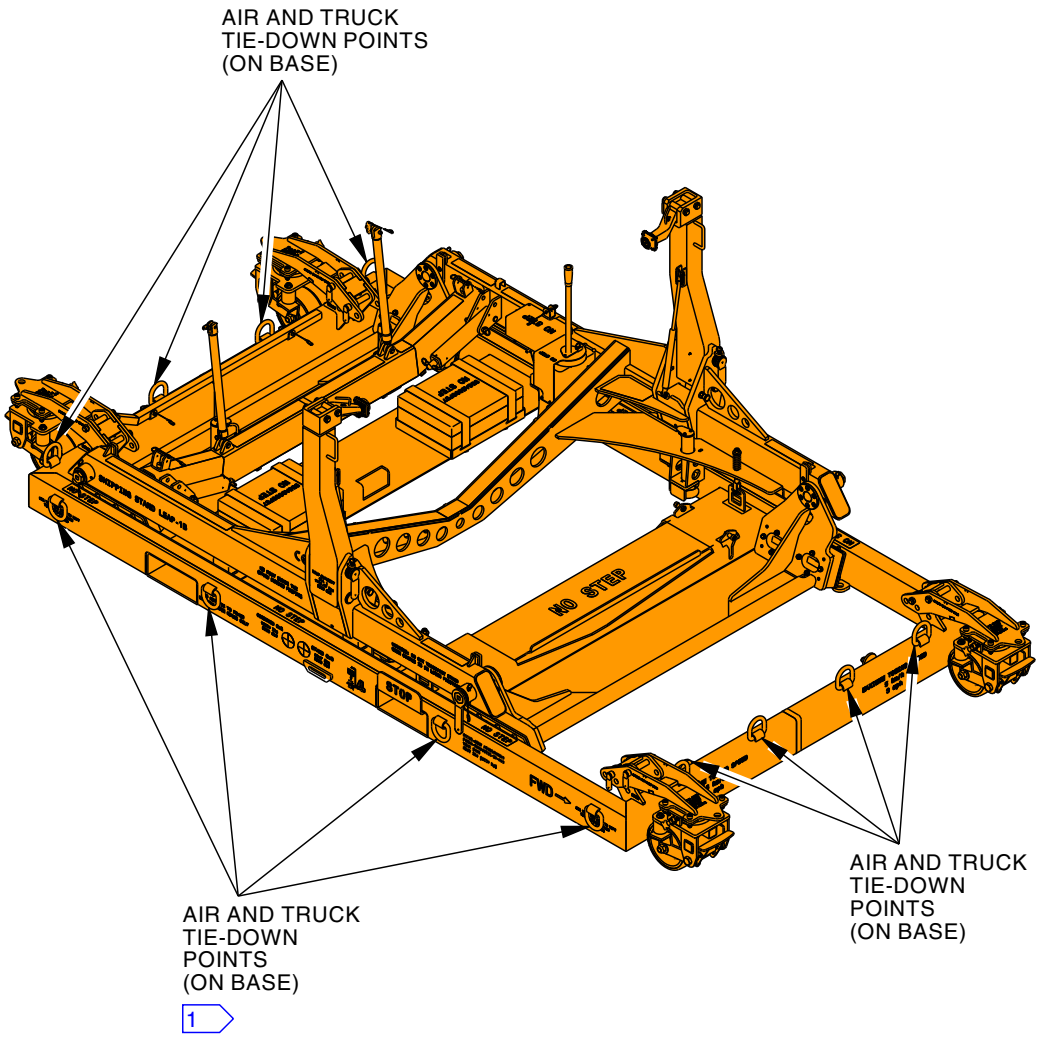
K. Transportation Issue

SUBTASK 71-00-04-860-017-G01

(1) For any transportation issue, contact CFM.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



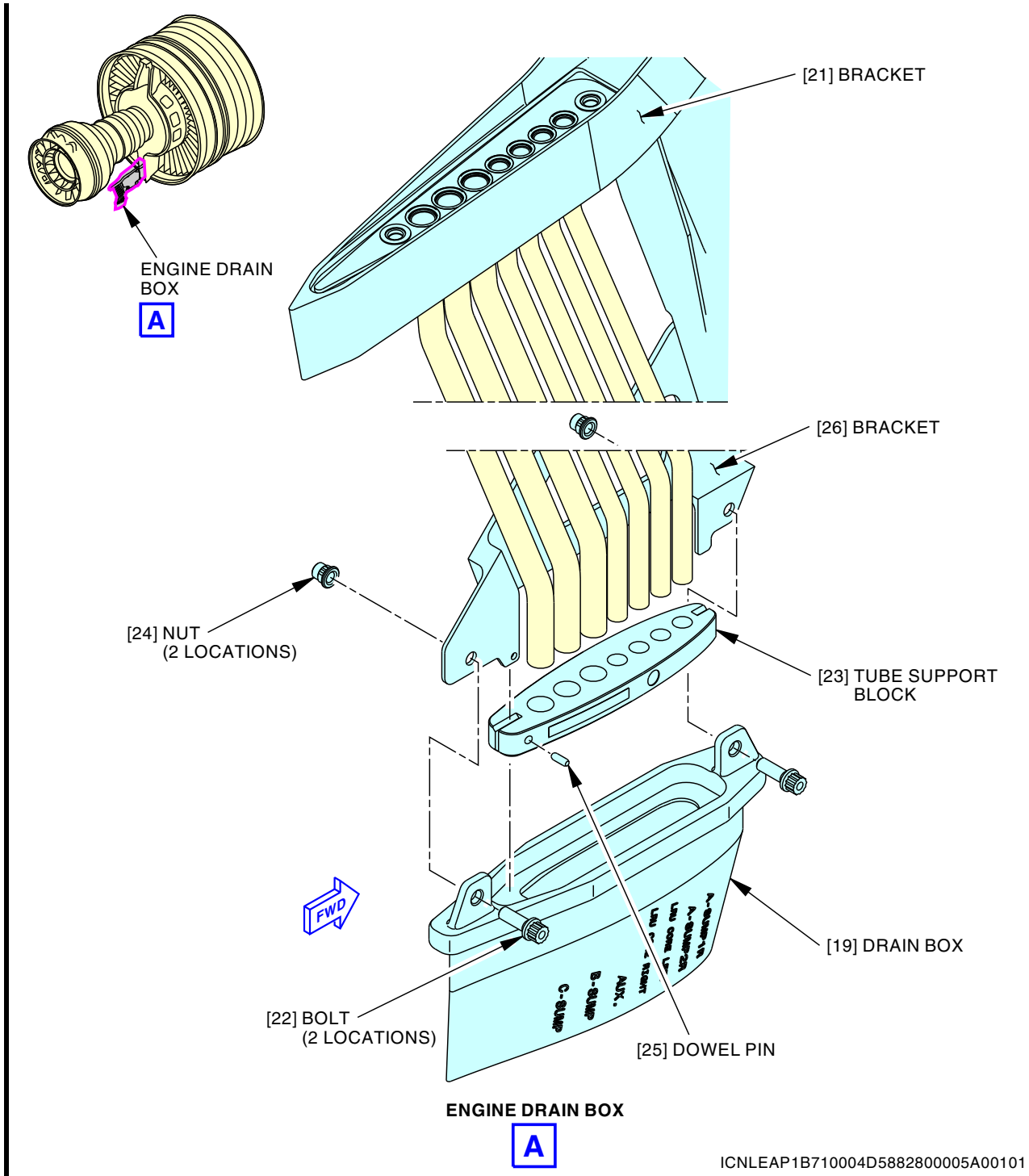
1 RIGHT TIE-DOWN POINTS SHOWN, LEFT TIE-DOWN POINTS OPPOSITE.

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3035901 S0000805530_V1

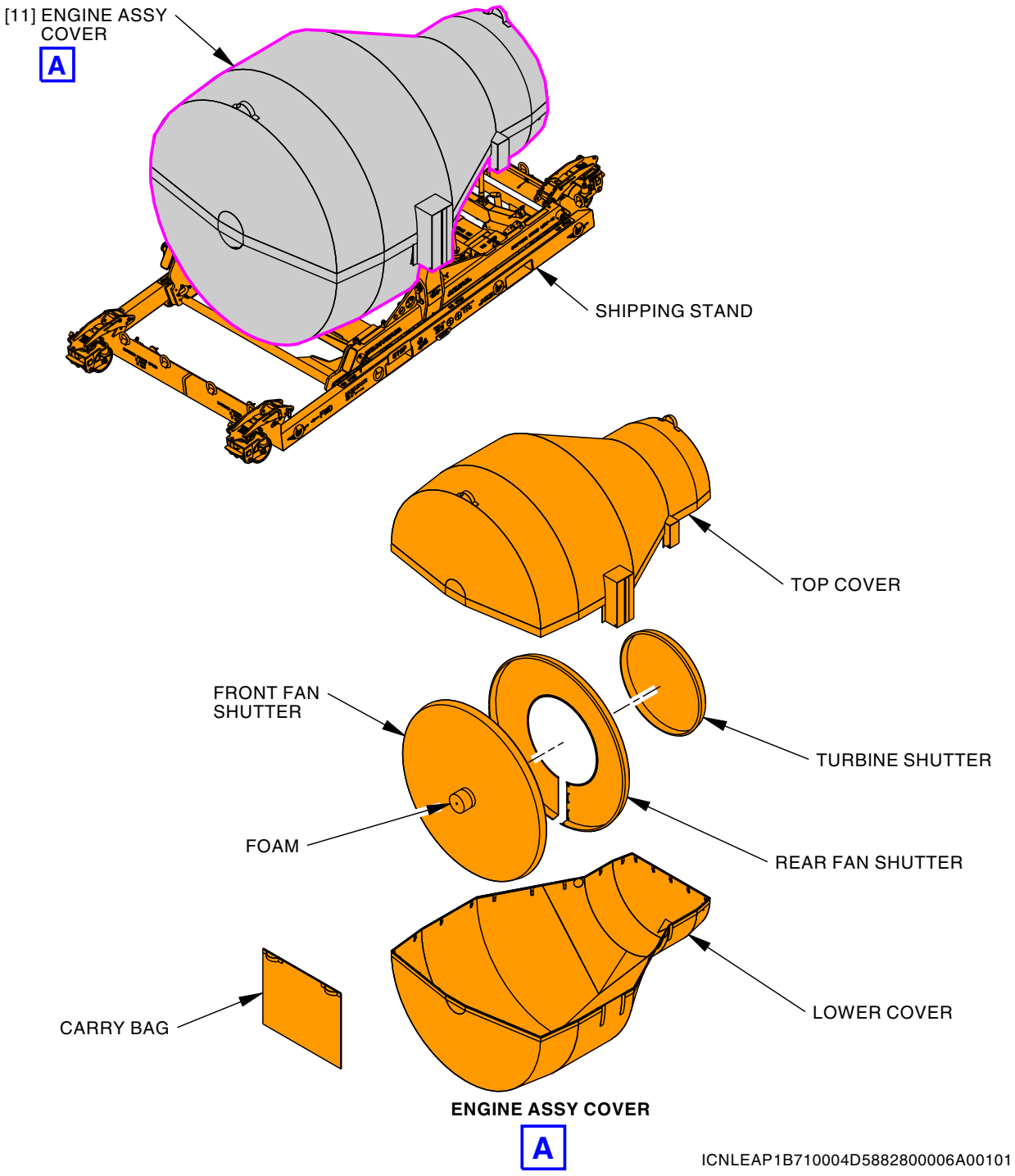
Tie-Down Locations
Figure 201/71-00-04-990-835-G01

ECCN 9E991 BOEING PROPRIETARY - See title page for details



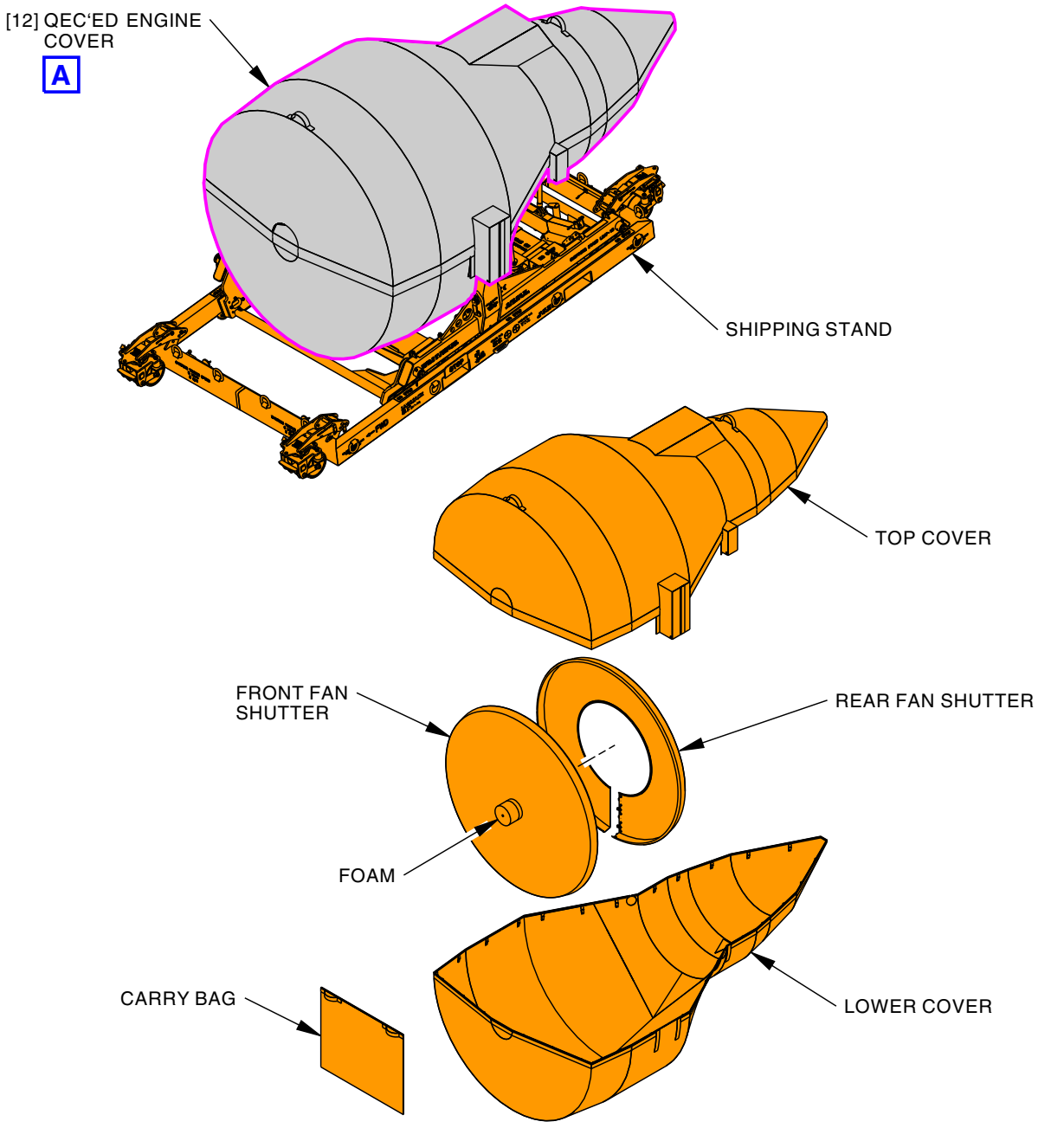
Engine Drain Box
Figure 202/71-00-04-990-836-G01

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Shipping Stand Cover
Figure 203/71-00-04-990-837-G01

ECCN 9E991 BOEING PROPRIETARY - See title page for details



QEC'ED ENGINE COVER

A

ICNLEAP1B710004D5882800007A00101

3035904 S0000805533_V1

Quick Engine Change Storage Cover
Figure 204/71-00-04-990-838-G01

ECCN 9E991 BOEING PROPRIETARY - See title page for details

ENGINE COWLING - INSPECTION/CHECK

1. General

A. This procedure has one task:

(1) Inlet Cowl Inspection.

TASK 71-11-00-200-801-G00

2. Inlet Cowl Inspection

A. General

(1) This task provides the detailed inspection of the inlet cowl fasteners, the A1 flange, and the inner barrel fasteners.

B. References

Reference	Title
71-11-01-400-801-G00	Inlet Cowl Installation (P/B 401)
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-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. 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

F. Prepare for the Inspection

SUBTASK 71-11-00-860-001-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-11-00-010-001-G00

(2) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) On the applicable engine, 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

SUBTASK 71-11-00-860-002-G00

(3) For the applicable engine, 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

G. Inlet Cowl Inspection

SUBTASK 71-11-00-211-001-G00

(1) Examine the inlet cowl fasteners for looseness and damage.

(a) If you find the loosen fastener, tighten the fastener to 291 in-lb (32.9 N·m) - 309 in-lb (34.9 N·m).

(b) If you find broken fastener, replace with the new fastener (TASK 71-11-01-400-801-G00).

SUBTASK 71-11-00-220-001-G00

(2) Examine the A1 flange for cracks and damage.

(a) If you find the cracks on the A1 flange, repair or replace the inlet cowl if it is not within the limits to fly.

NOTE: Contact Boeing for inspection interval on cracks if the inlet cowl is serviceable.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-00-860-003-G00

(1) For the applicable engine, remove the safety tags and close these applicable 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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
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 71-11-00-860-004-G00

(2) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

SUBTASK 71-11-00-410-001-G00

(3) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

(a) On the applicable engine, 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

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

ENGINE COWLING - REPAIR

1. General

A. This procedure has this task:

(1) Repair of the engine cowling TV-Chord assembly.

TASK 71-11-00-300-801-G00

2. Engine Cowling - TV-Chord Assembly Repair

(Figure 801 or Figure 802)

A. General

(1) This task is the instruction to repair the TV-Chord assembly rubstrip of the engine cowling.

(2) The TV-Chord rubstrip is located on the aft outer edge of the inlet and interfaces with the fan cowl V-blade. It protects the metallic TV-Chord from damage. If any damage to the metallic TV-Chord is found, blend per the limitations and requirements shown in Inlet Cowl Structure/SRM PROCEDURE 54-10-02-1A-1.

NOTE: Service history suggests that the worst rubstrip damage typically occurs between the 5 o'clock and 7 o'clock positions. This area is also where damage is most likely to occur on the TV-Chord. Boeing recommends prioritizing repairs to this area of the rubstrip to prevent damage to the metallic TV-Chord.

SIA 001-014

(3) If more than 1 in. (25 mm) of TSJ tape, G51451, is hanging loose, trim immediately.

SIA 015-999

(4) If more than 1 in. (25 mm) of wear strip, G51413, or LH TV-Chord PTFE, or RH TV-Chord PTFE, or LWR TV-Chord PTFE rubstrips is disbonded trim immediately.

SIA 001-014

(5) Damage (tear and/or peel) that is less than or equal to 0.375 in. (9.525 mm) wide, less than or equal to 3 in. (76 mm) long, and greater than or equal to 5 in. (127 mm) from the closest adjacent damage may be left as-is after any required trimming per Step (3).

SIA 015-999

(6) Damage (tear, peel, and/or disbond resulting in exposed TV-Chord substrate) that is less than or equal to 0.375 in. (9.525 mm) wide, less than or equal to 3 in. (76 mm) long, and greater than or equal to 5 in. (127 mm) from the closest adjacent damage may be left as-is after any required trimming per Step (3).

SIA ALL

(7) Perform repairs to damage that exceeds the dimensions provided in Step (4) within 400 flights of finding the damage.

B. References

Reference	Title
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)
SRM 54-10-02-1A-1	Inlet Cowl Structure

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-15157	Heat Gun - Thermogun
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
A01057	Adhesive - Hysol EA9394	BMS5-141
A50396	Sealant - Dapco 2200 Primerless Silicone Firewall Sealant	BMS5-63 Type II Class B-1/2
A50407	Adhesive - Epoxy, Two Part, Cures at Room Temperature	BAC5010 Type 94 (BMS5-109 Type II Class 2)
B00068	Alcohol - Denatured, Ethyl (Ethanol)	AMS 3002, MIL-E-51454 Type II
B00130	Alcohol - Isopropyl	TT-I-735
C00064	Coating - Aluminum Chemical Conversion	BAC5719 Type II Class A (MIL-DTL-5541 Class 1A)
C50240	Primer - Dow Corning PR-1200 Prime Coat Red	
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	
G50629	Tape - Nitto P-422 (Formerly Permacel) PTFE Film Tape	A-A-59474 (Supersedes MIL-I-23594)
G50961	Coating - Corrosion Inhibiting Epoxy Primer - (BAC 377 Yellow Color)	BMS10-11 Type I
G51413	Strip - Wear, P54 Grade 020, Light Duty	
G51451	Tape - Polymer Reinforced, PTFE - TSJ	
G51457	Tape - PTFE Skived Film - 3M 5481	

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	LWR PTFE rubstrip	71-11-01-10-300	SIA 015-999
2	LH PTFE rubsrip	71-11-01-10-280	SIA 015-999
3	RH PTFE rubsrip	71-11-01-10-290	SIA 015-999

F. Location Zones

Zone	Area
412	Engine 1 - Nose Inlet Cowl
422	Engine 2 - Nose Inlet Cowl

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. 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

H. Prepare for the Repair

SUBTASK 71-11-00-860-005-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-11-00-010-002-G00

(2) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

(a) On the applicable engine, 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

SIA 001-014

I. Repair of TV-Chord with TSJ tape

SUBTASK 71-11-00-300-001-G00

NOTE: The following procedures are all acceptable for repairing rubstrip damage.

(1) Procedure 1: Teflon tape application

(a) Clean the area to remove any contamination within the damage rubstrip area.

1) Rub the area and approximately 2 in. (51 mm) or more on all sides of the area with a clean cotton wiper, G00034, that is wet with one of the solvents that follow:

a) alcohol, B00068,

b) alcohol, B00130.

2) Wipe dry with a cotton wiper, G00034, before solvent evaporates.

a) If it is necessary repeat steps to completely remove contaminants.

(b) Apply a Teflon backed silicone adhesive tape such as 3M 5481 tape, G51457, or Nitto P-422 tape, G50629, to the damage area.

1) 3M 5481 tape, G51457, or Nitto P-422 tape, G50629, should extend to 0.5 in. (13 mm) - 1 in. (25 mm) beyond the damage area.

NOTE: It is permissible to wrap 3M 5481 tape, G51457, or Nitto P-422 tape, G50629, around the end/edge of the TV-Chord to prevent 3M 5481 tape, G51457, or Nitto P-422 tape, G50629, from peeling.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA 001-014 (Continued)

2) If 3M 5481 tape, G51457, or Nitto P-422 tape, G50629, becomes damaged, carefully remove 3M 5481 tape, G51457, or Nitto P-422 tape, G50629, and reapply with new 3M 5481 tape, G51457, or Nitto P-422 tape, G50629.

SUBTASK 71-11-00-300-004-G00

(2) Procedure 2: Re-bond peeled Polytetraflouroethylene (Teflon) (PTFE) to TV-Chord

(a) Re-bond peeled PTFE to the TV-Chord as follows:

1) Carefully lift the delaminated rubstrip from the end of the TV-Chord up to 12 in. (305 mm).

a) Lift only loose or peeled rubstrip ensuring to minimize amount of peel back.

2) Mask the V-groove in the TV-Chord to facilitate clean-up.

3) Apply Dapco 2200 firewall sealant, A50396, to the mating surfaces of the TV-Chord and rubstrip.

4) Apply the rubstrip to the TV-Chord and allow to cure for 4 hours.

a) Apply pressure to the rubstrip to form a smooth surface.

NOTE: Pressure must be applied within 30 minutes when Dapco 2200 firewall sealant, A50396, is applied to the surfaces.

5) Clean and remove squeeze out.

SUBTASK 71-11-00-300-002-G00

(3) Procedure 3: Bond new piece of PTFE to TV-Chord

(a) Bond new piece of PTFE to the TV-Chord as follows:

1) Carefully trim and remove the damaged section PTFE from the TV-Chord.

a) Make the trim cuts in the fore/aft direction, perpendicular to the aft edge of the TV-Chord.

2) Prepare the primed surface for bonding operation:

a) Rub the area with a clean cotton wiper, G00034, that is wet with one of the solvents that follow:

<1> alcohol, B00068,

<2> alcohol, B00130.

b) Wipe dry with cotton wiper, G00034, before solvent evaporates.

3) Apply thin coat of Dow Corning PR-1200 prime coat red, C50240, by spraying or using a clean brush to the areas that will be bonded.

a) Exercise care to minimize prime coat thickness.

b) Apply just enough primer to wet the surface, resulting in a uniform light pink color after drying.

c) Do not use if solutions turns cloudy or milky.

NOTE: It is acceptable to prime coat the areas 1 in. (25 mm) beyond the bond line.

4) Allow prime coat to air dry for a minimum of 60 minutes and a maximum of 12 hours.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA 001-014 (Continued)

5) Apply one layer of TSJ tape, G51451 (with silicone pressure sensitive adhesive on one side), to the top surface and along the entire length of the TV-Chord flush +0.0 in. (0.0 mm)/ -0.06 in. (2 mm) with the edge (Figure 801).
   a) Material may be butt-spliced with 0.06 in. (2 mm) maximum gaps.
      <1> Do not overlap TSJ tape, G51451, at splice locations.
   b) It is acceptable to slit TSJ tape, G51451, as required to prevent wrinkling or stretching.
      <1> Do not damage the assembly material or finish when trimming or splicing TSJ tape, G51451.
6) Use heat gun, COM-15157, and set to 250 ±10°F (121 ±6°C) to heat area for 10 to 30 seconds dwell time.
7) Squeeze or roll TSJ tape, G51451, onto the part surface while TSJ tape, G51451, is still warm to bond in place.

SIA 015-999

J. Repair of TV-Chord with P54 Strip or PTFE Rubstrips

NOTE: The following procedures are all acceptable for repairing rubstrip damage.

NOTE: The TV-Chord assemblies (314A6141-71/-72/-73) have specific P54 rubstrip details (314A6144-39/-40/-41) installed. wear strip, G51413, is not contoured to the TV-Chord surface, therefore wear strip, G51413, is only ideal to use in areas that is less than 12 in. (30.5 cm) in length. Assemblies are as follows:

- LH TV-Chord assy: 314A6141-71 + wear strip, G51413: 314A6144-39
- RH TV-Chord assy: 314A6141-72 + wear strip, G51413: 314A6144-40
- LWR TV-Chord assy: 314A6141-73 + wear strip, G51413: 314A6144-41.

SUBTASK 71-11-00-300-005-G00

(1) Procedure 1: PTFE, wear strip, G51413, surface preparation
   (a) Abrade the area to remove any adhesive, A50407, within the area where the damaged rubstrip was removed.
   (b) If base metal of fastener heads is exposed, touch up bared fastener head surfaces with coating, G50961.
      1) Rub the area with a clean cotton wiper, G00034, that is wet with one of the solvents that follow:
         a) alcohol, B00068,
         b) alcohol, B00130.
      2) Wipe dry with cotton wiper, G00034, before solvent evaporates.
      3) Apply liquid coating, G50961.
         a) Allow to dry prior to installing rubstrip.
   (c) If base metal of TV-Chord aft flange, excluding fastener heads, is exposed due to abrasion, apply coating, C00064, and coating, G50961.
      1) Rub the area with a clean cotton wiper, G00034, that is wet with one of the solvents that follow:
         a) alcohol, B00068,

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA 015-999 (Continued)

b) alcohol, B00130.

2) Wipe dry with cotton wiper, G00034, before solvent evaporates.

3) Apply coating, C00064, to the exposed surface.

a) Keep the surface wet until can be seen.

NOTE: The color will come in 2-3 minutes.

CAUTION THE COATING IS SOFT WHEN IT IS INITIALLY APPLIED. USE CARE WHEN THE SURFACE IS FLUSHED AND DRIED. IF YOU DO NOT USE CARE, YOU WILL SCRATCH, OR POSSIBLY REMOVE THE COATING.

4) Use cotton wiper, G00034, wet with water to remove only the excess liquid.

5) Air dry at room temperature.

6) Apply liquid coating, G50961.

a) Allow to dry prior to installing rubstrip.

SUBTASK 71-11-00-300-006-G00

(2) Procedure 2: PTFE, wear strip, G51413, or LWR PTFE rubstrip [1], LH PTFE rubsrip [2], RH PTFE rubsrip [3] application

(a) Bond new piece of PTFE, wear strip, G51413,new LWR PTFE rubstrip [1], new LH PTFE rubsrip [2], new RH PTFE rubsrip [3] to the TV-Chord as follows:

1) Carefully trim and remove the damaged section PTFE from the TV-Chord.

a) Make the trim cuts in the fore/aft direction, perpendicular to the aft edge of the TV-Chord.

2) Prepare the primed surface for bonding operation:

a) Rub the area with a clean cotton wiper, G00034, that is wet with one of the solvents that follow:

<1> alcohol, B00068,

<2> alcohol, B00130.

b) Wipe dry with cotton wiper, G00034, before solvent evaporates.

SUBTASK 71-11-00-300-007-G00

(3) Install wear strip, G51413, or LWR PTFE rubstrip [1], LH PTFE rubsrip [2], RH PTFE rubsrip [3].

(a) If the repair length is greater than or equal to 12 in. (30.5 cm) along the aft flange of the TV-Chord, use the applicable LWR PTFE rubstrip [1], LH PTFE rubsrip [2], RH PTFE rubsrip [3], or wear strip, G51413.

(b) Remove peel ply on the LWR PTFE rubstrip [1], LH PTFE rubsrip [2], RH PTFE rubsrip [3] or wear strip, G51413.

1) Mix part A and part B of adhesive, A50407, or Hysol EA9394 adhesive, A01057, before mixing part A and part B together.

NOTE: The pot life is approximately 40 minutes at 75°F (24°C).

2) Mix part A and part B in the proportions shown below:

a) Part A: 97 - 103

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SIA 015-999 (Continued)

b) Part B:16.5 - 17.5.

3) Apply a continuous layer of the mixed adhesive to each faying surface.

4) Assemble the parts and apply strong, constant pressure to make sure that all of the mating surfaces touch completely.

5) Bond rubstrip to TV-Chord within 5 minutes of applying adhesive.

6) Remove unwanted adhesive with 180 grit abrasive paper, G50381, before it cures.

a) Use a clean wiper wet with solvent.

b) Do not let solvent get into the bond line.

7) Cure under pressure as shown Figure 803.

(c) Make sure that the wear strip, G51413, is flush +0.00 in. (0.00 mm)/-0.06 in. (2 mm) from the aft edge of TV-Chord surface.

(d) If it is necessary, trim wear strip, G51413, or LWR PTFE rubstrip [1], LH PTFE rubsrip [2], RH PTFE rubsrip [3] to make sure that there is no overlap into the V-groove.

1) Trim wear strip, G51413, or LWR PTFE rubstrip [1], LH PTFE rubsrip [2], RH PTFE rubsrip [3] lengthwise and join smaller segments to meet 5 minutes requirement.

NOTE: Minimum 6 in. (15.2 cm) long repair recommended for durability.

(e) If it necessary, rework 6 in. (15.2 cm) length wear strip, G51413, or LWR PTFE rubstrip [1], LH PTFE rubsrip [2], RH PTFE rubsrip [3] with butt-splicing.

(f) Make sure that the butt spliced wear strips segments do not overlap and have 0.06 in. (2 mm) maximum gaps.

SIA ALL

K. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-00-410-002-G00

(1) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

(a) On the applicable engine, 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

SUBTASK 71-11-00-860-008-G00

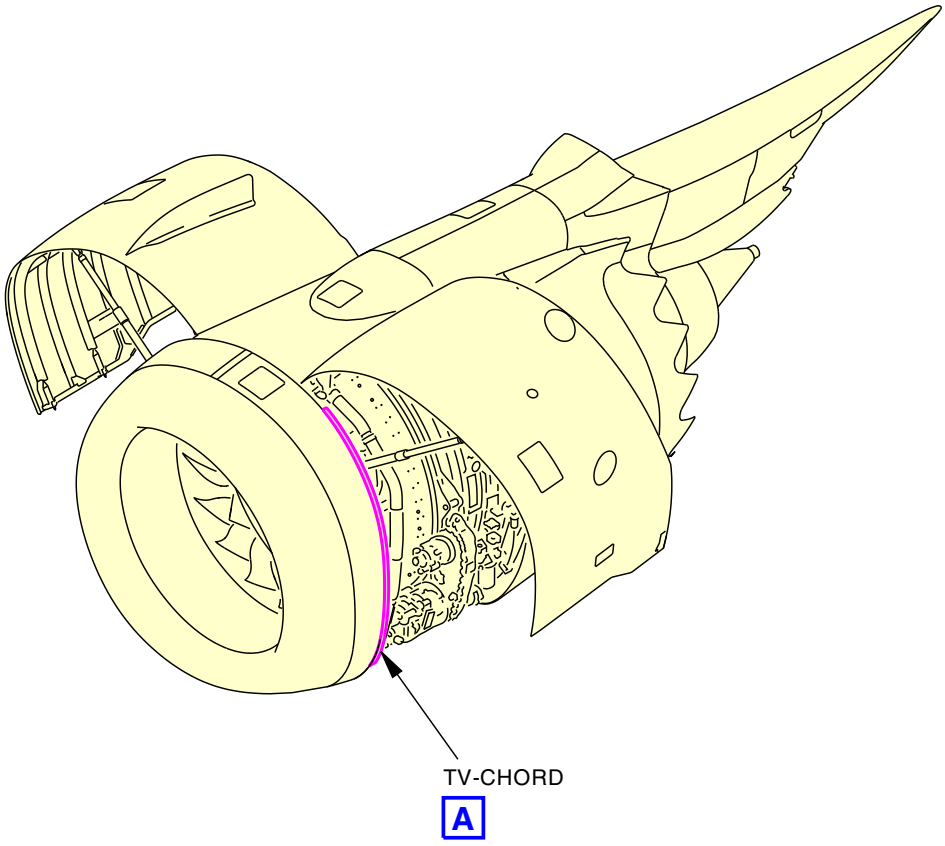
(2) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

END OF TASK

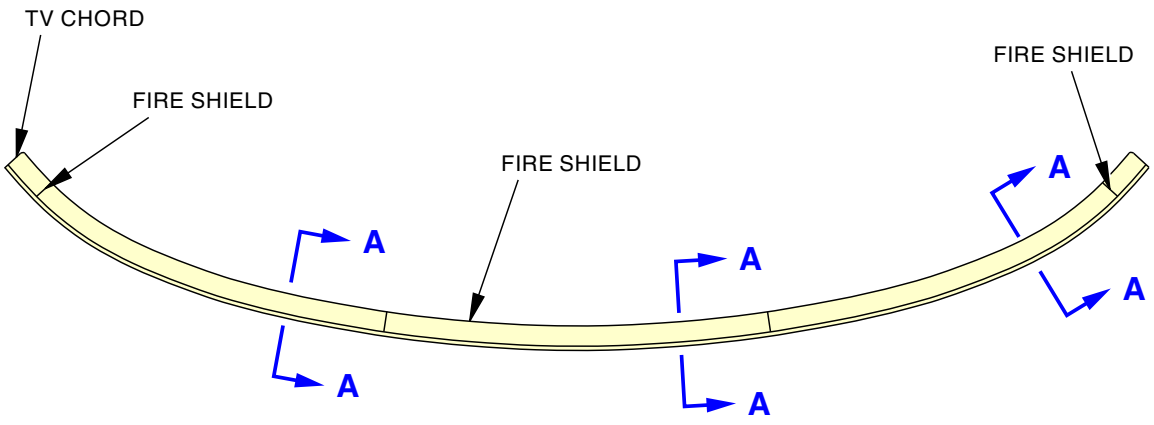
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2809062 S0000646121_V1

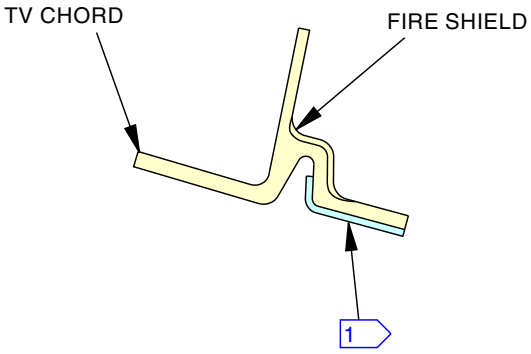
Engine TV-Chord Assembly Repair
Figure 801/71-11-00-990-801-G00 (Sheet 1 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



(LOWER CHORD)

A



A-A

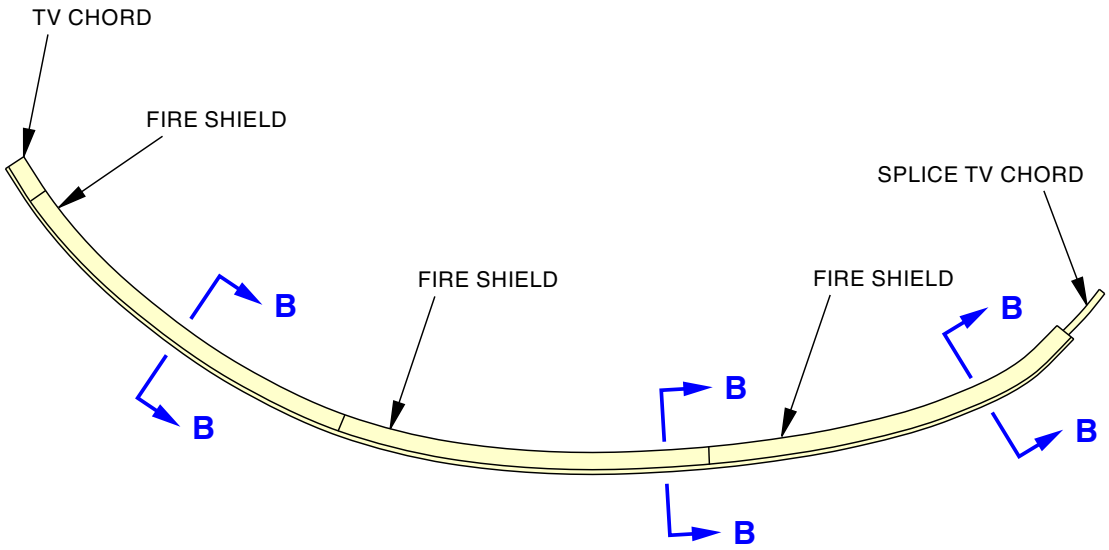
NOTE:

1 APPLY TSJ PTFE TAPE, REFER TO THE TAPE APPLICATION PROCEDURE DETAILS.

2809073 S0000646123_V2

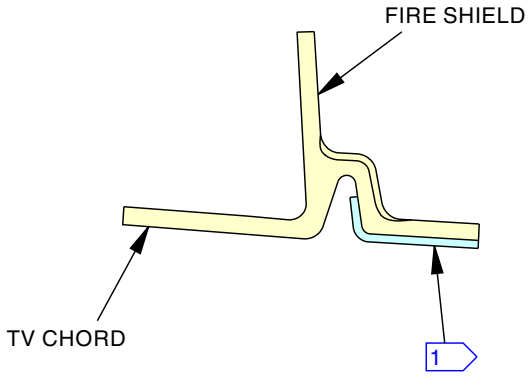
Engine TV-Chord Assembly Repair
Figure 801/71-11-00-990-801-G00 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



(LH TV-CHORD)

A



B-B

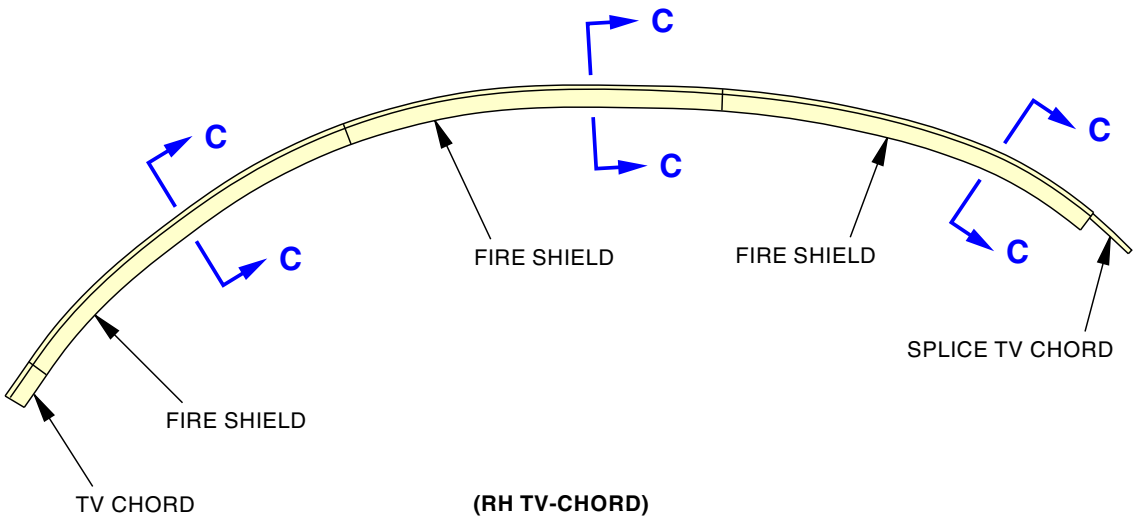
NOTE:

1 APPLY TSJ PTFE TAPE, REFER TO THE TAPE APPLICATION PROCEDURE DETAILS.

2809076 S0000646125_V2

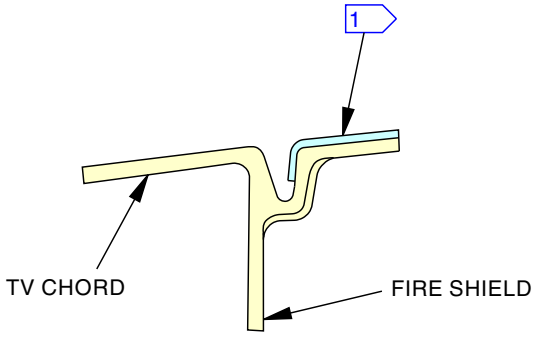
Engine TV-Chord Assembly Repair
Figure 801/71-11-00-990-801-G00 (Sheet 3 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



(RH TV-CHORD)

A



C-C

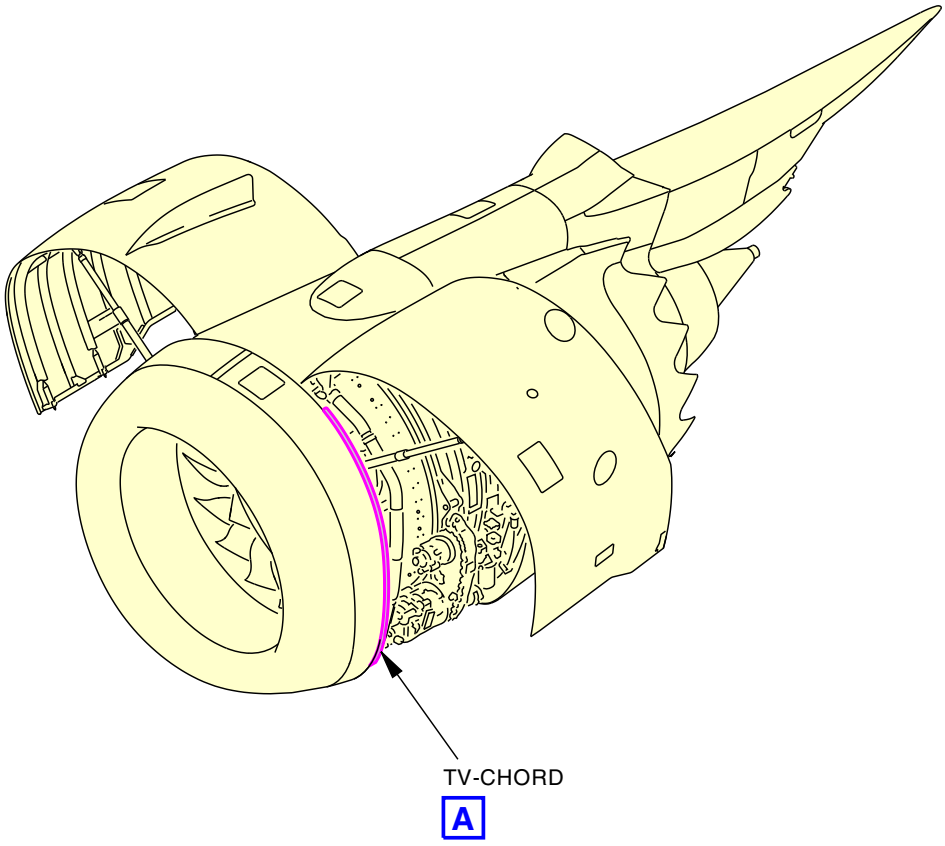
NOTE:

1 APPLY TSJ PTFE TAPE, REFER TO THE TAPE APPLICATION PROCEDURE DETAILS.

2809083 S0000646129_V2

Engine TV-Chord Assembly Repair
Figure 801/71-11-00-990-801-G00 (Sheet 4 of 4)

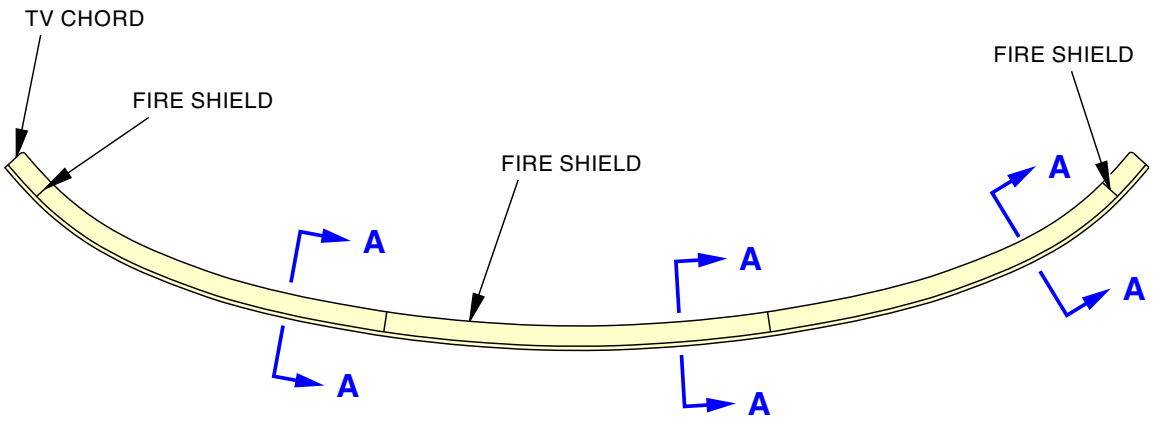
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2809062 S0000646121_V1

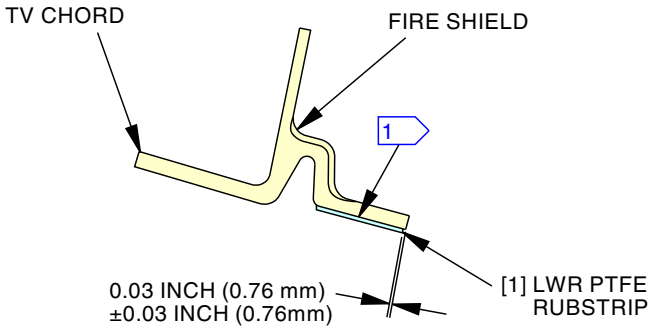
Engine TV-Chord Assembly Repair
Figure 802/71-11-00-990-802-G00 (Sheet 1 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



(LOWER CHORD)

A



A-A

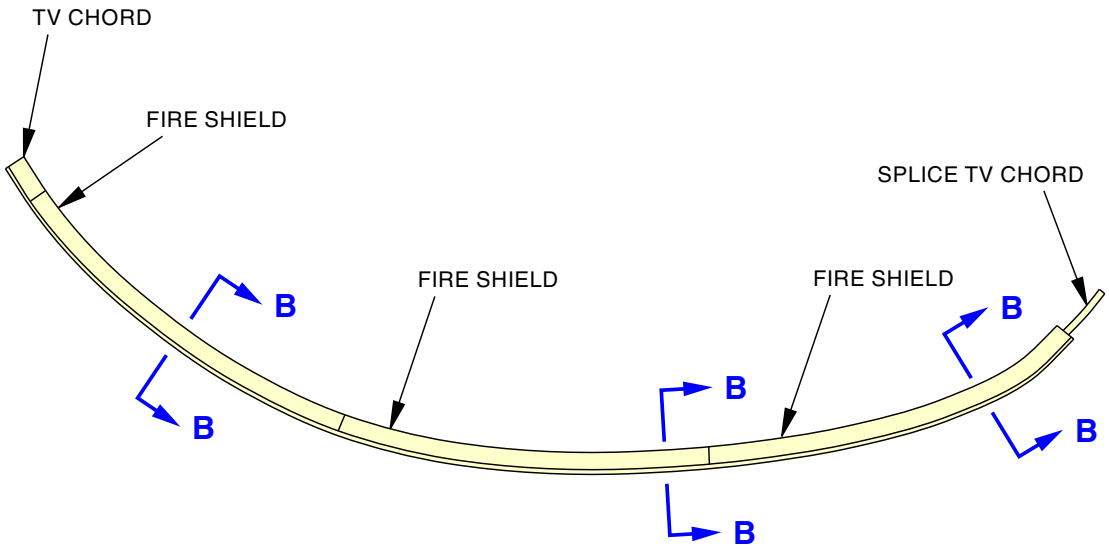
NOTE:

1 APPLY P54 PTFE WEAR STRIP OR
LOWER PTFE RUBSTRIP,
REFER TO RUBSTRIP APPLICATION DETAILS.

3000055 S0000775901_V1

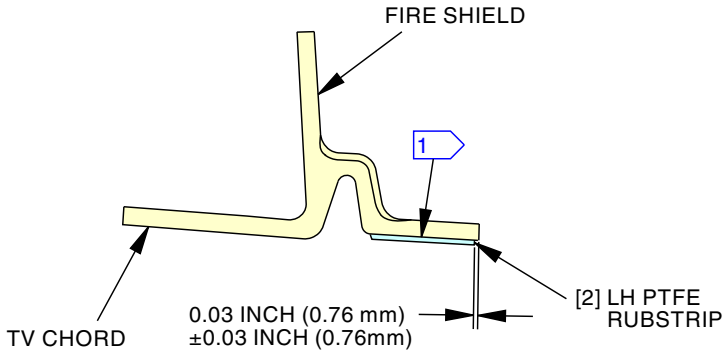
Engine TV-Chord Assembly Repair
Figure 802/71-11-00-990-802-G00 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



(LH TV-CHORD)

A



B-B

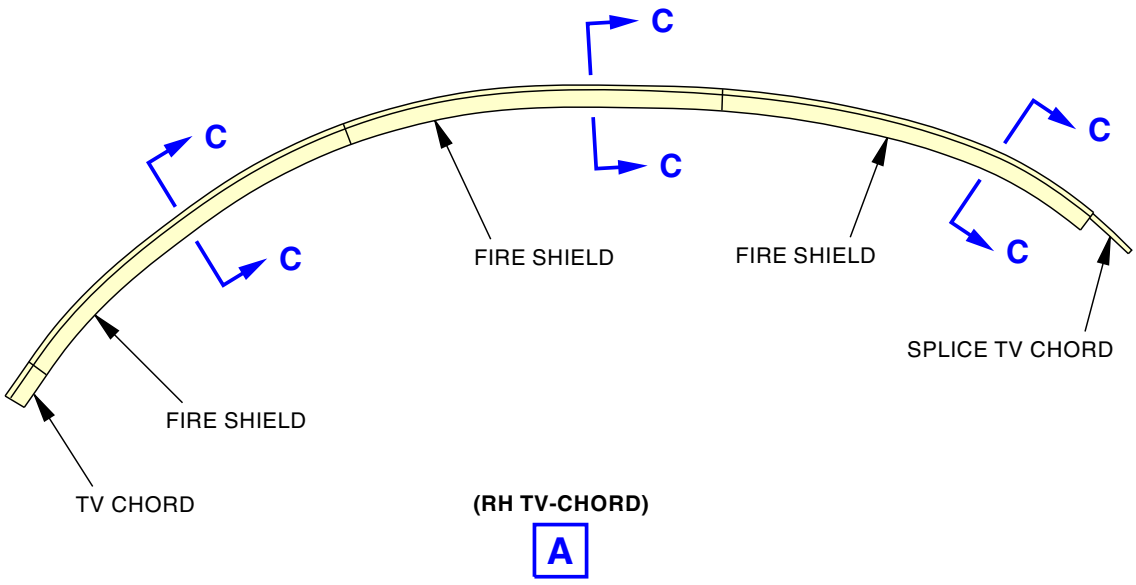
NOTE:

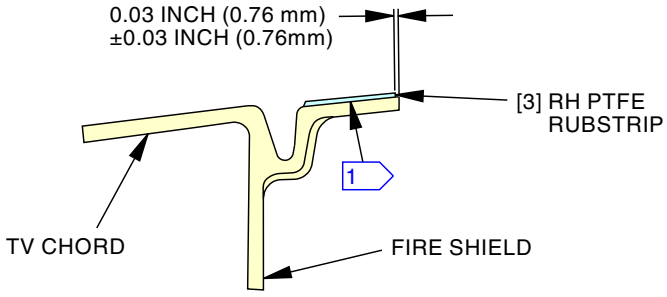
1 APPLY P54 PTFE WEAR STRIP OR
LH PTFE RUBSTRIP,
REFER TO RUBSTRIP APPLICATION DETAILS.

3000056 S0000775902_V1

Engine TV-Chord Assembly Repair
Figure 802/71-11-00-990-802-G00 (Sheet 3 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details





C-C

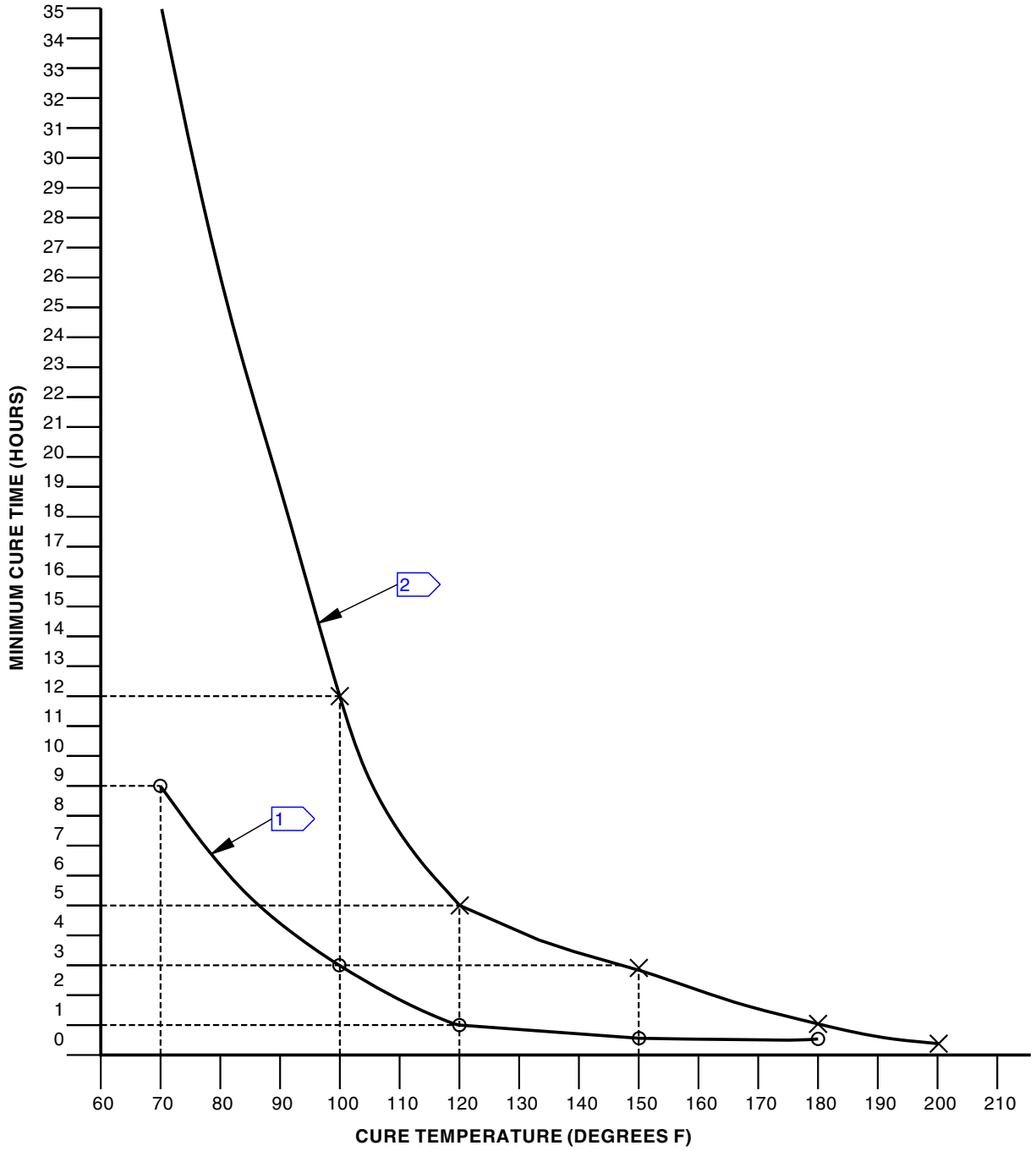
NOTE:

1 APPLY P54 PTFE WEAR STRIP OR
RH PTFE RUBSTRIP,
REFER TO RUBSTRIP APPLICATION DETAILS.

3000058 S0000775903_V1

Engine TV-Chord Assembly Repair
Figure 802/71-11-00-990-802-G00 (Sheet 4 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



1 CURE TO HANDLE
2 FULL CURE

3003413 S0000778872_V1

Adhesive Cure Time and Temperature
Figure 803/71-11-00-990-803-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

INLET COWL - MAINTENANCE PRACTICES

1. General

A. This procedure has these tasks:

(1) Inlet Ground Cooling Duct Cap and Cover Removal

(2) Inlet Ground Cooling Duct Cap and Cover Installation.

TASK 71-11-01-000-802-G00

2. Inlet Ground Cooling Duct Cap and Cover Removal

(Figure 201)

A. General

(1) This task gives the instructions to remove the inlet ground cooling duct cap and cover.

(2) The cap and cover are installed on the inlet ground cooling duct when the inlet is installed on a LEAP-1BXXG06 engine or higher GXX number engine. The LEAP-1BXXG06 engines and higher GXX number engines have the EEC blower system removed or partially removed.

(3) It is necessary to remove the cap and cover from the inlet ground cooling duct when an inlet assembly is installed on a LEAP-1BXXG05 engine with the EEC blower system installed.

B. Tools/Equipment

Reference	Description
STD-765	Scraper - Plastic

C. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Inlet Ground Cooling Duct Cap and Cover Removal

SUBTASK 71-11-01-020-006-G00

(1) Remove the cap [4] from the ground cooling duct [3] on the inlet aft bulkhead as follows:

(a) Remove the hose clamp [5].

(b) Use a knife and plastic scraper, STD-765, to carefully separate the sealant under the clamp bracket [6].

(c) Remove the clamp bracket [6].

(d) Use a knife and plastic scraper, STD-765, to carefully separate the fillet seal around the circumference of the cap [4] and ground cooling duct [3].

(e) Remove the cap [4] from the ground cooling duct [3].

SUBTASK 71-11-01-020-007-G00

(2) Remove the cover [1] from the ground cooling duct [3] on the inlet outer surface as follows:

(a) Remove the eight bolts [2] (P/N BACB30ZE3K5) that attach the cover [1] and the ground cooling duct [3] to the inlet outer surface.

(b) Use a knife and plastic scraper, STD-765, to carefully separate the fay surface seal under the cover [1].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(c) Remove the cover [1] from the ground cooling duct [3].

(d) Use the sealant, A00767 to wet install the four bolts [2] (P/N BACB30ZE3K5) in the four locations on the aft side of the ground cooling duct [3].

(e) Use the sealant, A00767 to wet install the four bolts [2] (P/N BACB30ZE3K4) in the four locations on the forward side of the ground cooling duct [3].

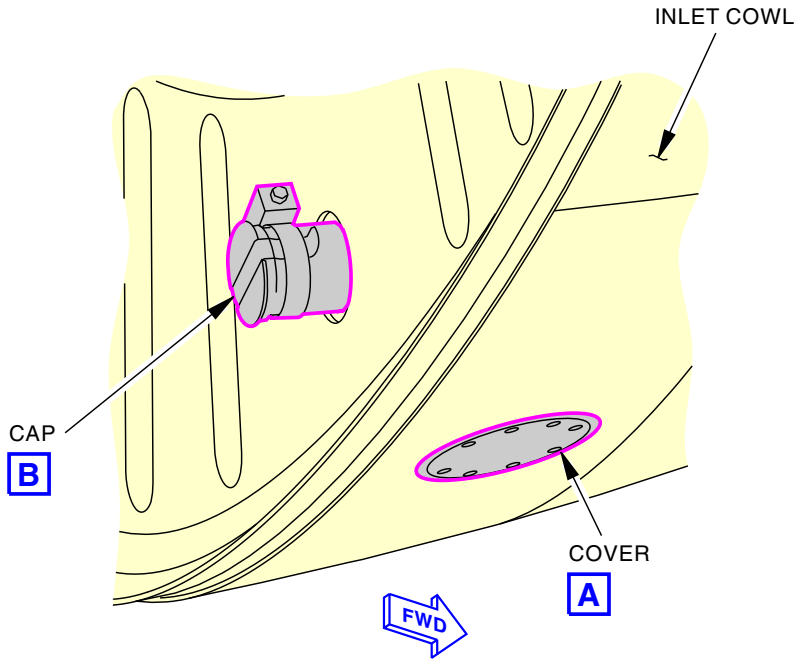
(f) Tighten the bolts [2] to 29.0 in-lb (3.3 N·m) - 31.0 in-lb (3.5 N·m).

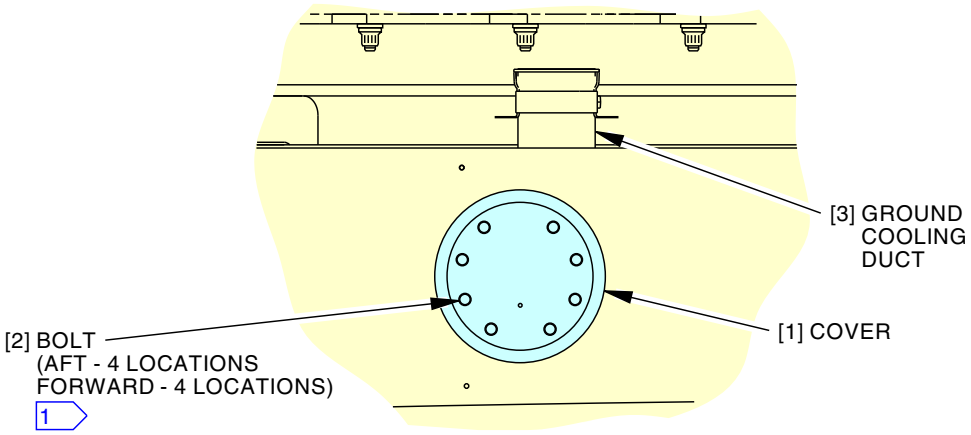
SUBTASK 71-11-01-100-001-G00

(3) Clean the ground cooling duct to remove any remaining sealant from the areas where the cap and the cover were installed.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details





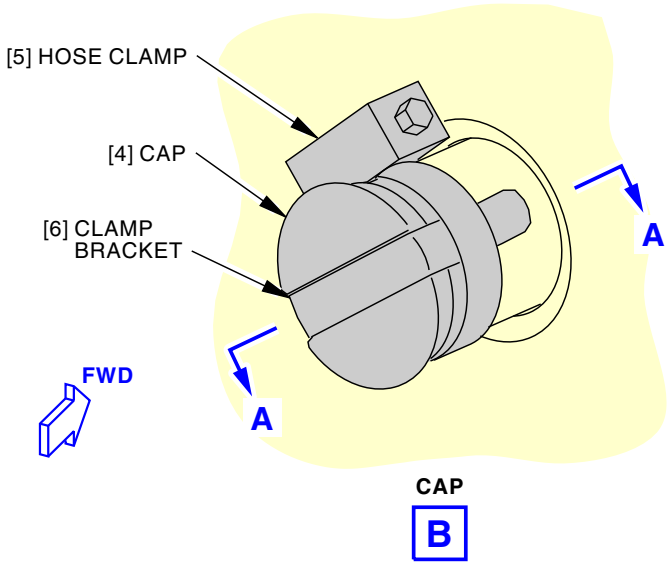
COVER
A

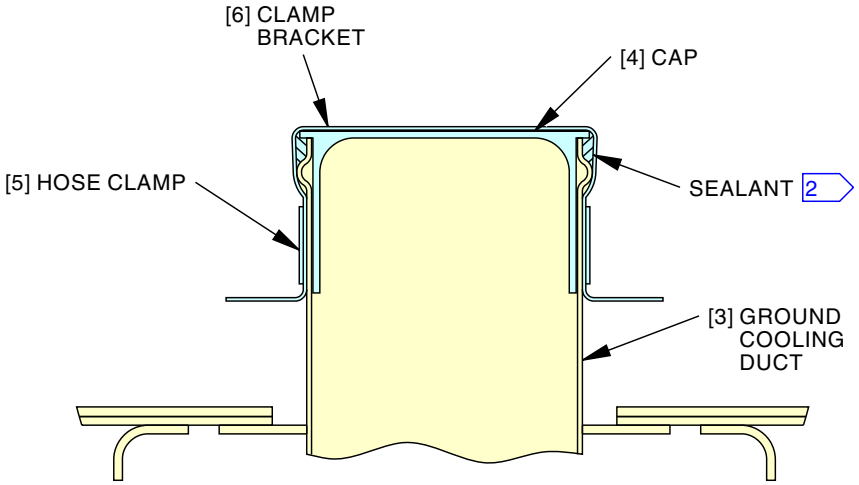
1 FORWARD AND AFT BOLTS BACB30ZE3K5 WITH COVER INSTALLED; WITH COVER REMOVED, AFT BOLTS ARE BACB30ZE3K5 AND FORWARD BOLTS ARE BACB30ZE3K4. ALL BOLTS ARE WET INSTALLED WITH BMS5-45 SEALANT.

2846105 S0000664920_V1

Inlet Ground Cooling Duct Cap and Cover Installation
Figure 201/71-11-01-990-809-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details





A-A

2 FILLET AROUND CIRCUMFERENCE UNDER CAP FLANGE. EXTEND SEALANT UNDER CLAMP BRACKET FROM THE CAP FLANGE TO THE DUCT BEAD; MAKE SURE THE SEALANT COMPLETELY FILLS THE SPACE UNDER THE CLAMP BRACKET.

2846119 S0000664921_V1

Inlet Ground Cooling Duct Cap and Cover Installation
Figure 201/71-11-01-990-809-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-11-01-400-802-G00

3. Inlet Ground Cooling Duct Cap and Cover Installation

(Figure 201)

A. General

(1) This task gives the instructions to install the inlet ground cooling duct cap and cover.

(2) It is necessary to install the cap and cover on the inlet ground cooling duct when an inlet assembly is installed on a LEAP-1BXXG06 engine or higher GXX number engine. The LEAP-1BXXG06 engines and higher GXX number engines have the EEC blower system removed or partially removed.

B. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45
A50396	Sealant - Dapco 2200 Primerless Silicone Firewall Sealant	BMS5-63 Type II Class B-1/2

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Cover	71-11-01-01-040	SIA 006-008
4	Cap	71-11-01-01-035	SIA 006-008

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Inlet Ground Cooling Duct Cap and Cover Installation

SUBTASK 71-11-01-010-007-G00

(1) If installed, remove the protective caps from the ends of the inlet ground cooling duct [3].

SUBTASK 71-11-01-420-005-G00

(2) Install the cover [1] over the open end of the ground cooling duct [3] at the inlet outer surface as follows:

(a) Remove the four bolts [2] (P/N BACB30ZE3K5, aft side) and four bolts [2] (P/N BACB30ZE3K4, forward side) that attach the ground cooling duct [3] to the inlet outer surface.

(b) Use the sealant, A00767 to apply a faying surface seal between the cover [1] and the ground cooling duct [3] on the inlet outer surface.

(c) Install the cover [1].

(d) Use the sealant, A00767 to wet install the eight bolts [2] (P/N BACB30ZE3K5) that attach the cover [1] and the ground cooling duct [3] to the inlet outer surface.

(e) Tighten the bolts [2] to 29.0 in-lb (3.3 N·m) - 31.0 in-lb (3.5 N·m).

SUBTASK 71-11-01-420-006-G00

(3) Install the cap [4] on the ground cooling duct [3] at the inlet aft bulkhead as follows:

(a) Install the cap [4] in the ground cooling duct [3].

(b) Use the Dapco 2200 firewall sealant, A50396 to apply a fillet seal under the cap [4] flange around the circumference of the cap [4].

(c) Install the clamp bracket [6] over the cap [4] and the ground cooling duct [3].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(d) Apply the Dapco 2200 firewall sealant, A50396 under both sides of the clamp bracket [6] from the cap [4] flange to the duct bead.

(e) Make sure that the sealant completely fills the space that extends under the clamp bracket [6].

(f) Install the hose clamp [5].

(g) Tighten the hose clamp [5] to 19.0 in-lb (2.1 N·m) - 21.0 in-lb (2.4 N·m).

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

INLET COWL - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) A removal of the inlet cowl

(2) An installation of the inlet cowl.

TASK 71-11-01-000-801-G00

2. Inlet Cowl Removal

(Figure 401, Figure 402, Figure 403)

A. General

(1) This task gives the instructions to remove the inlet cowl.

(2) Use the inlet cowl sling, SPL-2062, to remove the inlet cowl.

(a) Use the installation/removal frame equipment, SPL-14544, together with the boom hoist, SPL-2430, as an optional method to remove the inlet cowl.

(b) The optional method is useful where overhead lifting is not possible.

NOTE: This tool combination can also be easily transported as needed.

B. References

Reference	Title
54-52-01-010-801	Forward Fairing Removal (P/B 401)
71-11-01-000-802-G00	Inlet Ground Cooling Duct Cap and Cover Removal (P/B 201)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
73-21-06-000-801-G00	T12 Sensor Removal (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-2062	Sling - Inlet Cowl Part #: B71040-66 Supplier: 81205 Opt Part #: B71040-38 Supplier: 81205 Opt Part #: B71040-39 Supplier: 81205
SPL-2430	Hoist - Boom, Ground Based Part #: C20002-267 Supplier: 81205
SPL-14544	Installation/Removal Frame Equipment - Inlet Cowl, LEAP-1B Engine Part #: C71033-1 Supplier: 81205
STD-653	Platform - Engine and Strut Access
STD-664	Pliers - Teflon-jawed (or Equivalent Soft-Jawed)
STD-748	Rope - 12 ft (3.6 m) minimum
STD-858	Tag - DO NOT OPERATE
STD-1095	Crane - Lift, 2000 lb Capacity, 30 Foot Height

ECCN 9E991 BOEING PROPRIETARY - See title page for details

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. 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

F. Prepare for the Removal

SUBTASK 71-11-01-860-001-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-11-01-010-001-G00

(2) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

(a) On the applicable engine, 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

SUBTASK 71-11-01-010-009-G00

(3) Removal the thumbnail fairing (TASK 54-52-01-010-801).

SUBTASK 71-11-01-430-001-G00

CAUTION

MAKE SURE THAT THE ELECTRICAL CONNECTORS AND RECEPTACLES ARE CLEAN AND CLEAR OF UNWANTED MATERIALS BEFORE YOU DISCONNECT OR CONNECT THEM. CONTAMINATION OF THE ELECTRICAL CONNECTORS OR RECEPTACLES CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION

USE TEFLON-JAWED PLIERS TO LOOSEN THE ELECTRICAL CONNECTORS. DO NOT USE METAL-JAWED PLIERS. DAMAGE TO THE ELECTRICAL CONNECTORS COULD OCCUR.

(4) Use a teflon-jawed pliers, STD-664, to disconnect the T12-B electrical connector [30] and T12-A electrical connector [31] at the 11:30 o'clock position (TASK 73-21-06-000-801-G00).

(a) Disconnect the T12-B electrical connector [30] and T12-A electrical connector [31] from the T12-B electrical receptacle and T12-A electrical receptacle (View D, Figure 403).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) Put the protective covers on the T12-B electrical connector [30], T12-A electrical connector [31], T12-B electrical receptacle, and T12-A electrical receptacle.

SUBTASK 71-11-01-020-001-G00

(5) Disconnect the engine anti-ice duct [2] from the aft inlet cowl [1] at the 1:00 o'clock position (Figure 401).

(a) Remove the coupling [3] and seal [4] that attach the engine anti-ice duct [2] to the inlet cowl [1].

(b) Put the protective covers on the open ends of the engine anti-ice duct [2] and duct connection on the inlet cowl [1].

SIA ALL; LEAP-1BXXG05 ENGINES WITH THE EEC BLOWER SYSTEM INSTALLED (PRE LEAP-1B SERVICE BULLETIN 75-0010 AND PRE LEAP-1B SERVICE BULLETIN 75-0011)

SUBTASK 71-11-01-020-002-G00

(6) Disconnect the ground cooling duct [37] from the fan compartment ventilation duct [36] at the 7:00 o'clock position of the inlet cowl [1].

(a) Remove the clamp [38] that attaches the fan compartment ventilation duct [36] to the ground cooling duct [37].

(b) Put the protective caps on the open ends of the ground cooling duct [37] and fan compartment ventilation duct [36].

SIA ALL; LEAP-1BXXG06 ENGINE OR HIGHER GXX NUMBER ENGINE WITH THE EEC BLOWER SYSTEM REMOVED (POST LEAP-1B SERVICE BULLETIN 75-0010 OR POST LEAP-1B SERVICE BULLETIN 75-0011)

SUBTASK 71-11-01-010-008-G00

(7) If it is necessary, remove the ground cooling duct cap and cover as follows:

NOTE: This step is for inlet cowl with the ground cooling duct installed.

(a) Remove the inlet cap and cover for any of the following steps:

NOTE: The LEAP-1BXXGXX engine model designation is identified on the engine data plate, that is located on the RH side of the engine fan case.

1) If the same inlet is removed and reinstalled to replace the engine, and inlet will be installed on a spare LEAP-1BXXG05 engine.

2) If the inlet will be replaced and spare inlet does not have the cap and cover installed on the ground cooling duct, and spare inlet will be installed on the same LEAP-1BXXG06 engine or higher GXX number engine with the EEC blower system removed.

(b) If it is necessary, remove the cap and cover from the inlet ground cooling duct (TASK 71-11-01-000-802-G00).

SIA ALL

G. Inlet Cowl Removal

SUBTASK 71-11-01-490-001-G00

(1) Assemble the inlet cowl sling, SPL-2062 (Figure 402 (Sheet 1)).

(a) Put the long cable [19] through the two pulleys.

NOTE: The long cable is approximately 24.5 ft (294.0 in.) long in length and has a blue color code identifier.

(b) Connect the master (side) links [18] to the beam with the shackles [16].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(c) Connect the short cable [17] to the beam with the shackles [16].

NOTE: The short cable is approximately 7.2 ft (86.4 in.) long in length and has a white color code identifier.

(d) Connect the short cable [17] to the master link [11] with the lok-A-loys [10].

(e) Connect the dynamometer [12] to the master link [11].

SUBTASK 71-11-01-020-003-G00

(2) Use the engine and strut access platform, STD-653, for two persons that is necessary to remove the inlet cowl when the inlet cowl sling, SPL-2062, is used.

SUBTASK 71-11-01-480-004-G00

(3) If the optional removal tool is used, attach the installation/removal frame equipment, SPL-14544, to the boom hoist, SPL-2430 (Figure 402 (Sheet 2)).

SUBTASK 71-11-01-490-002-G00

(4) Install the inlet cowl sling, SPL-2062, on the inlet cowl [1] (Figure 402 (Sheet 1)).

(a) Install the forward and aft straps [21] with hoist pins [22] to the inlet cowl [1].

(b) Install the chain hoists [20] to the aft straps [21].

(c) With the 30 foot height (2000 lb capacity) lift crane, STD-1095, lift the inlet cowl sling, SPL-2062, and put it over the inlet cowl [1].

(d) Connect the chain hoists [20] to the master (side) links [18].

(e) Connect the long cable [19] to the forward straps [21].

(f) With the 30 foot height (2000 lb capacity) lift crane, STD-1095, and chain hoists [20] tighten the chains and cables.

WARNING GET SUFFICIENT AID FROM OTHER PERSONNEL AND EQUIPMENT TO HOLD THE COMPONENT DURING THE REMOVAL, AND INSTALLATION. THE COMPONENT IS HEAVY. THIS WILL PREVENT INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

WARNING MAKE SURE THAT THE WEIGHT OF THE INLET COWL AND THE SLING EQUIPMENT IS BALANCED WITH THE CRANE FORCE. IF THE WEIGHT AND FORCE ARE NOT BALANCED, THE COWL CAN MOVE QUICKLY WHEN YOU DISCONNECT THE INLET COWL. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(g) With the 30 foot height (2000 lb capacity) lift crane, STD-1095, lift the inlet cowl and sling up until the dynamometer indicates a preload of approximately 500 lb (227 kg).

NOTE: The inlet cowl weighs approximately 410 lb (186 kg). The sling equipment weighs approximately 100 lb (45 kg).

1) Monitor the load during adjustment.

2) Adjust the 30 foot height (2000 lb capacity) lift crane, STD-1095, and inlet cowl sling, SPL-2062, until all of the strap assemblies are not loose.

SUBTASK 71-11-01-480-005-G00

(5) If the optional removal tool is used, attach the installation/removal frame equipment, SPL-14544, to the inlet cowl [1] (Figure 402 (Sheet 2)).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-11-01-010-004-G00

WARNING

MAKE SURE THAT THE WEIGHT OF THE INLET COWL AND THE SLING EQUIPMENT IS BALANCED WITH THE CRANE FORCE. IF THE WEIGHT AND FORCE ARE NOT BALANCED, THE COWL CAN MOVE QUICKLY WHEN YOU DISCONNECT THE INLET COWL. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(6) Remove the inlet cowl [1] (Figure 403).

(a) Remove the 44 bolts [32], 44 spacers [33], 44 washers [35], and 44 nuts [34] that attach the inlet cowl [1] to the fan case flange.

(b) Remove the two brackets [29], four bolts [55], four spacers [33], four washers [35], and four nuts [34] at the 12:00 o'clock position.

NOTE: These brackets were also called the bolt retainer assemblies.

(c) If the inlet cowl [1] will be installed on a different engine, remove the two nuts [41] and two washers [40] from the two alignment pins [39] that install on the fan case flange at the 3:00 and 9:00 o'clock positions.

NOTE: There is no need to remove the alignment pins, washers, and nuts, if the inlet cowl is installed back onto the same engine.

(d) Install a rope - 12 ft (3.6 m) minimum, STD-748, around the inlet cowl [1] to guide the movement of the inlet cowl [1] when the inlet cowl sling, SPL-2062, is used.

(e) If the inlet support stand is used, lift the inlet cowl [1] to the inlet support stand.

1) Turn and put the inlet cowl [1] on top of the inlet support stand in an area that is away from the airplane.

2) Use the rope - 12 ft (3.6 m) minimum, STD-748, when using the inlet cowl sling, SPL-2062, to turn the inlet cowl [1] to the horizontal position until it is parallel with the inlet support stand.

3) Slowly lower the inlet cowl [1] until the attach ring rests evenly on the inlet support stand.

(f) If the ground platform is used, lift the inlet cowl [1] to the ground platform.

NOTE: Ground platform can be sand bags or a wood pallet.

1) Turn and put the inlet cowl [1] on top of the ground platform in an area that is away from the airplane.

2) Use the chain hoists when using the inlet cowl sling, SPL-2062, to turn the inlet cowl [1] to the horizontal position until it is parallel with the ground platform.

3) Slowly lower the inlet cowl [1] until the attach ring rests evenly on the ground platform.

(g) Disconnect the straps [21] from the inlet cowl [1] when the inlet cowl sling, SPL-2062, is used.

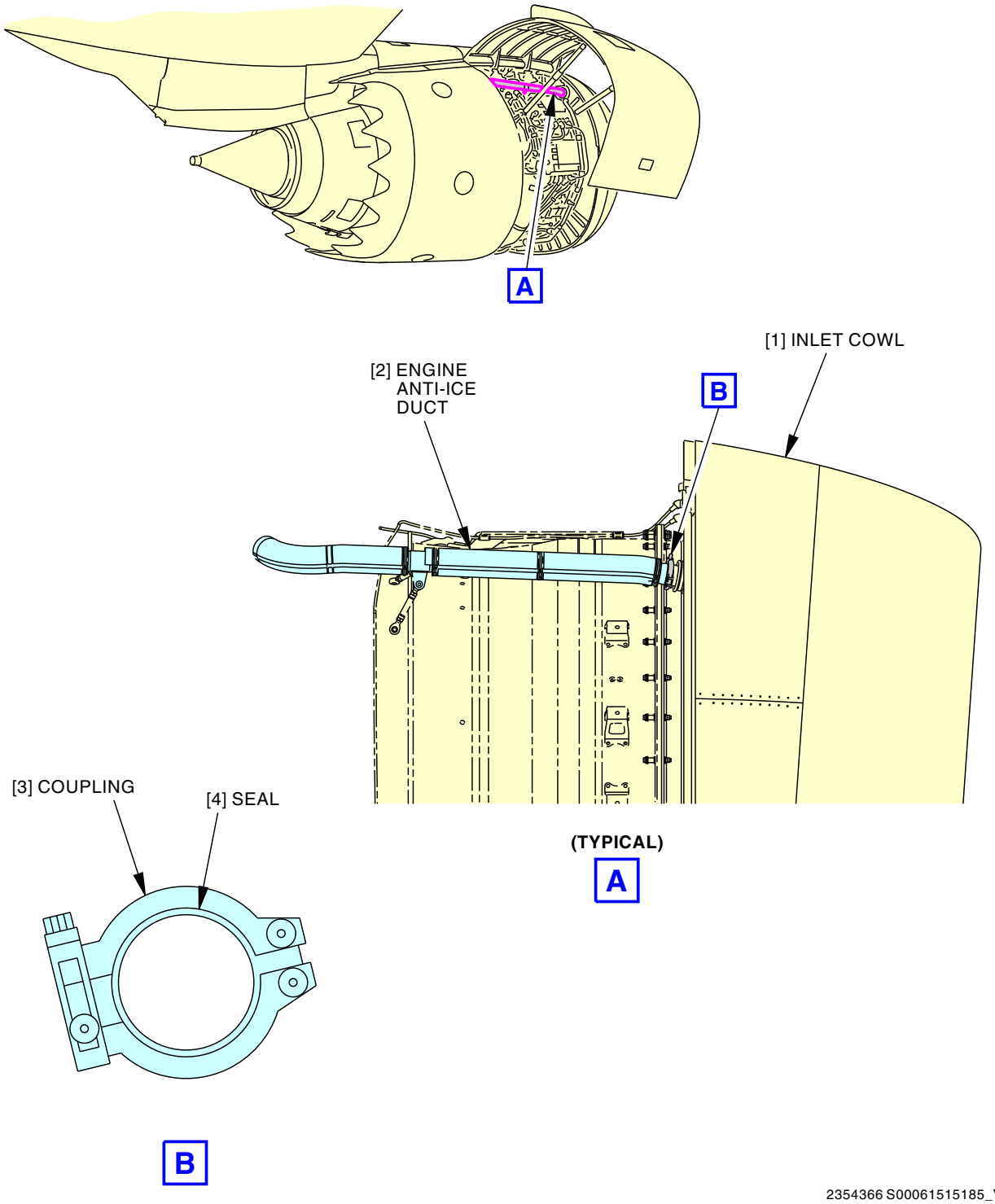
1) Remove the hoist pins [22] that attach the straps [21] to the inlet cowl [1].

(h) Remove the rope - 12 ft (3.6 m) minimum, STD-748, from the inlet cowl [1] when the inlet cowl sling, SPL-2062, is used.

(i) If the optional removal tool is used, disconnect the installation/removal frame equipment, SPL-14544, from the inlet cowl [1].

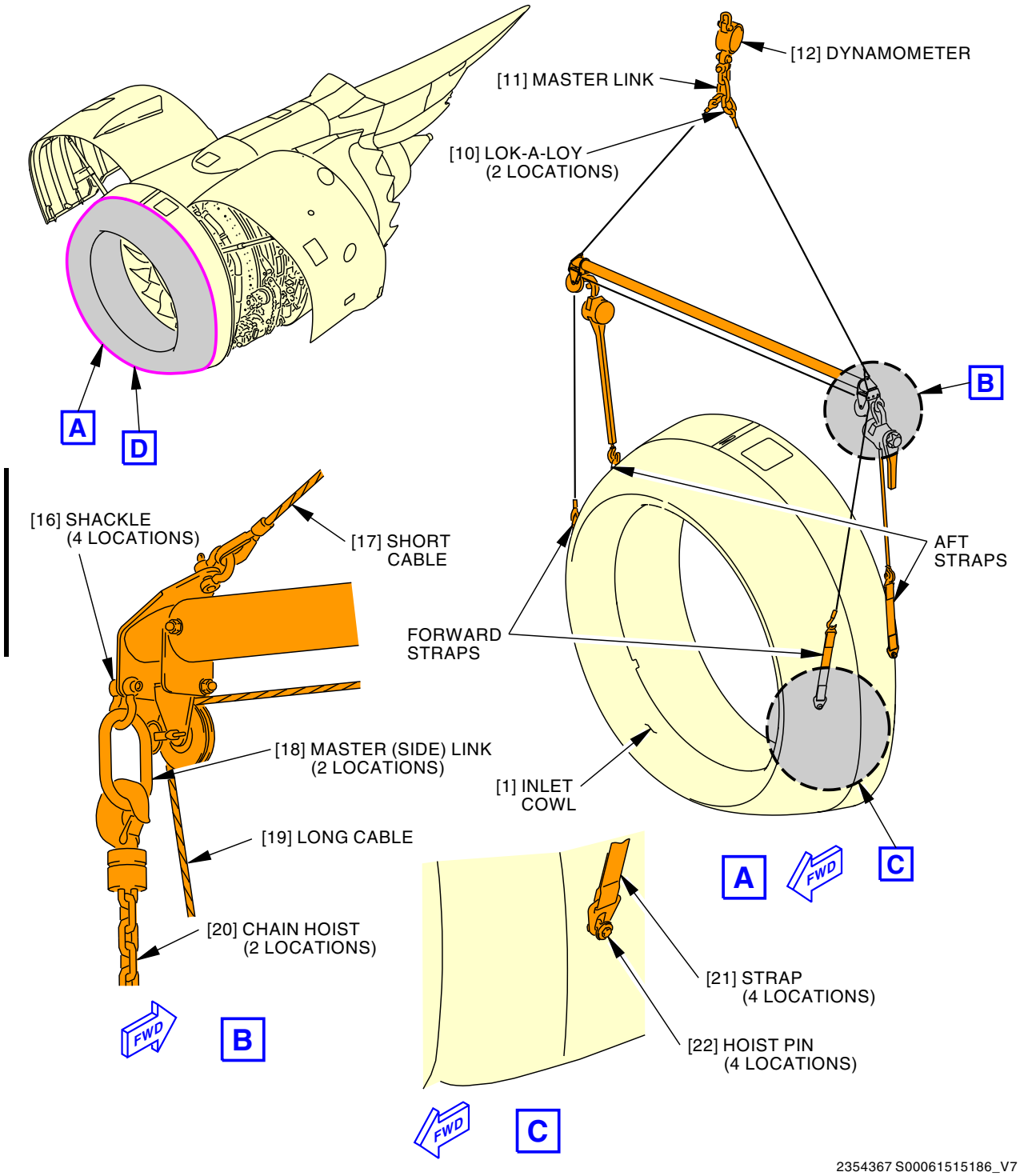
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



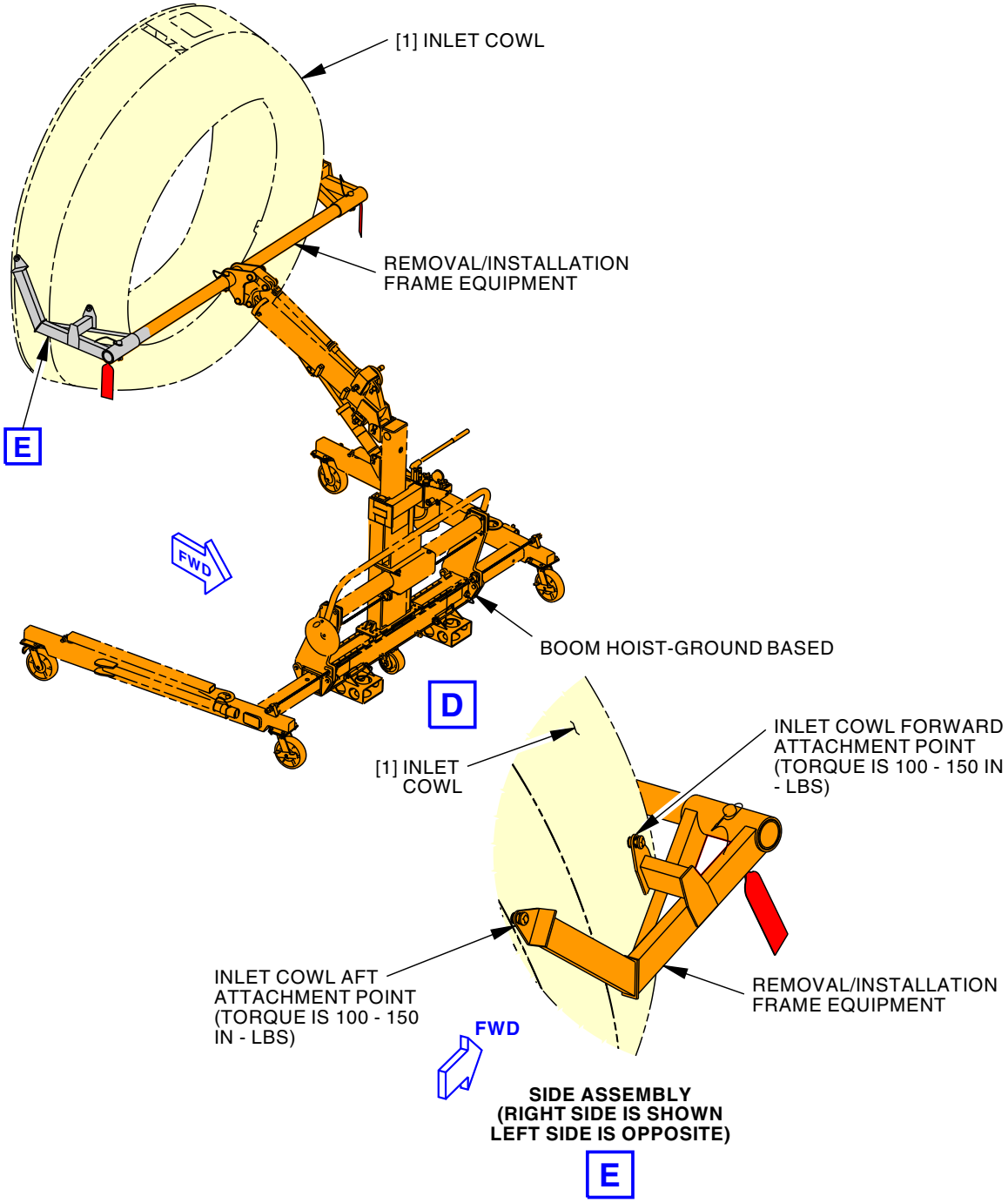
Engine Anti-Ice Duct Installation
Figure 401/71-11-01-990-801-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details



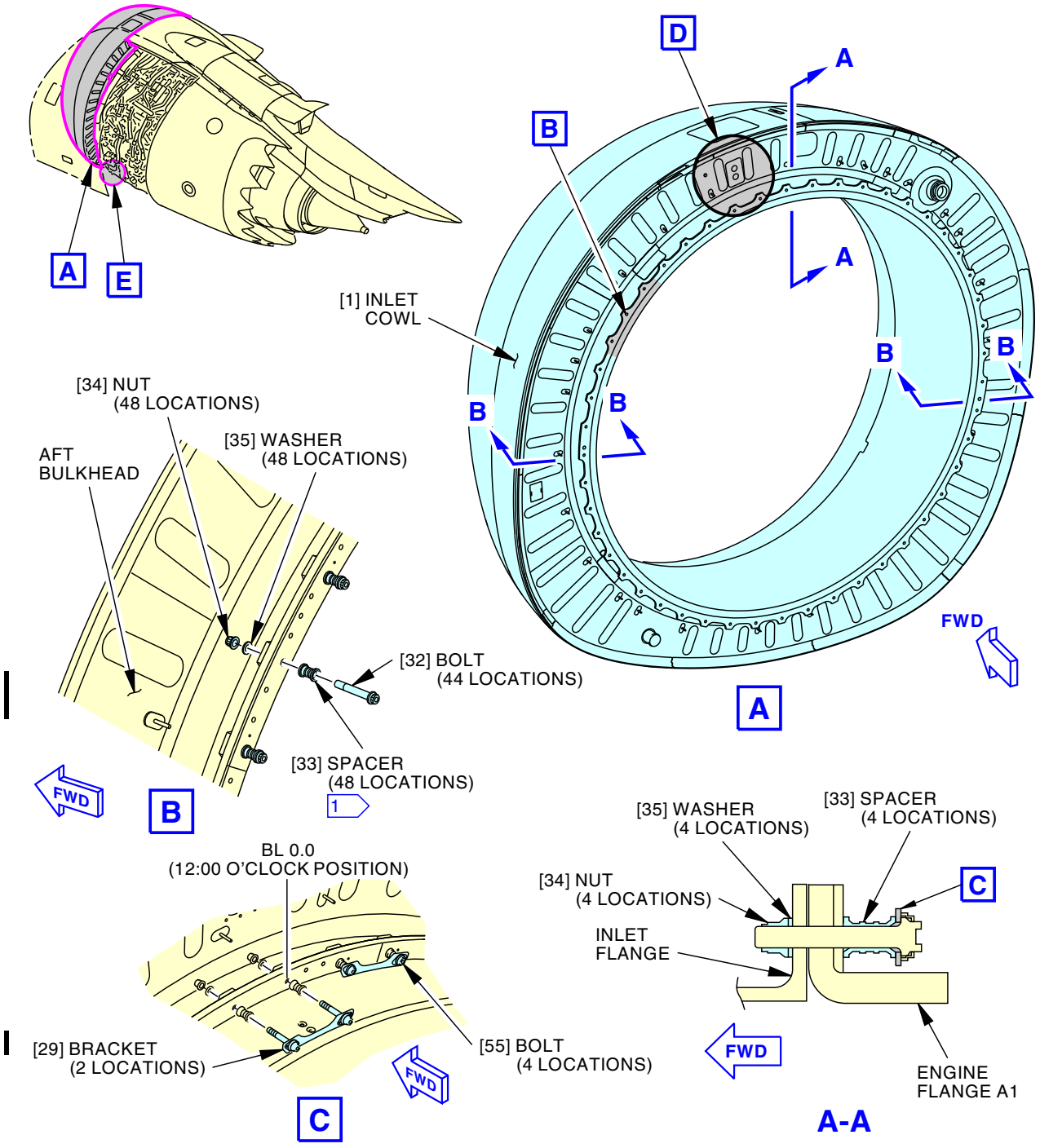
Inlet Cowl Tool Installation
Figure 402/71-11-01-990-802-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Inlet Cowl Tool Installation
Figure 402/71-11-01-990-802-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

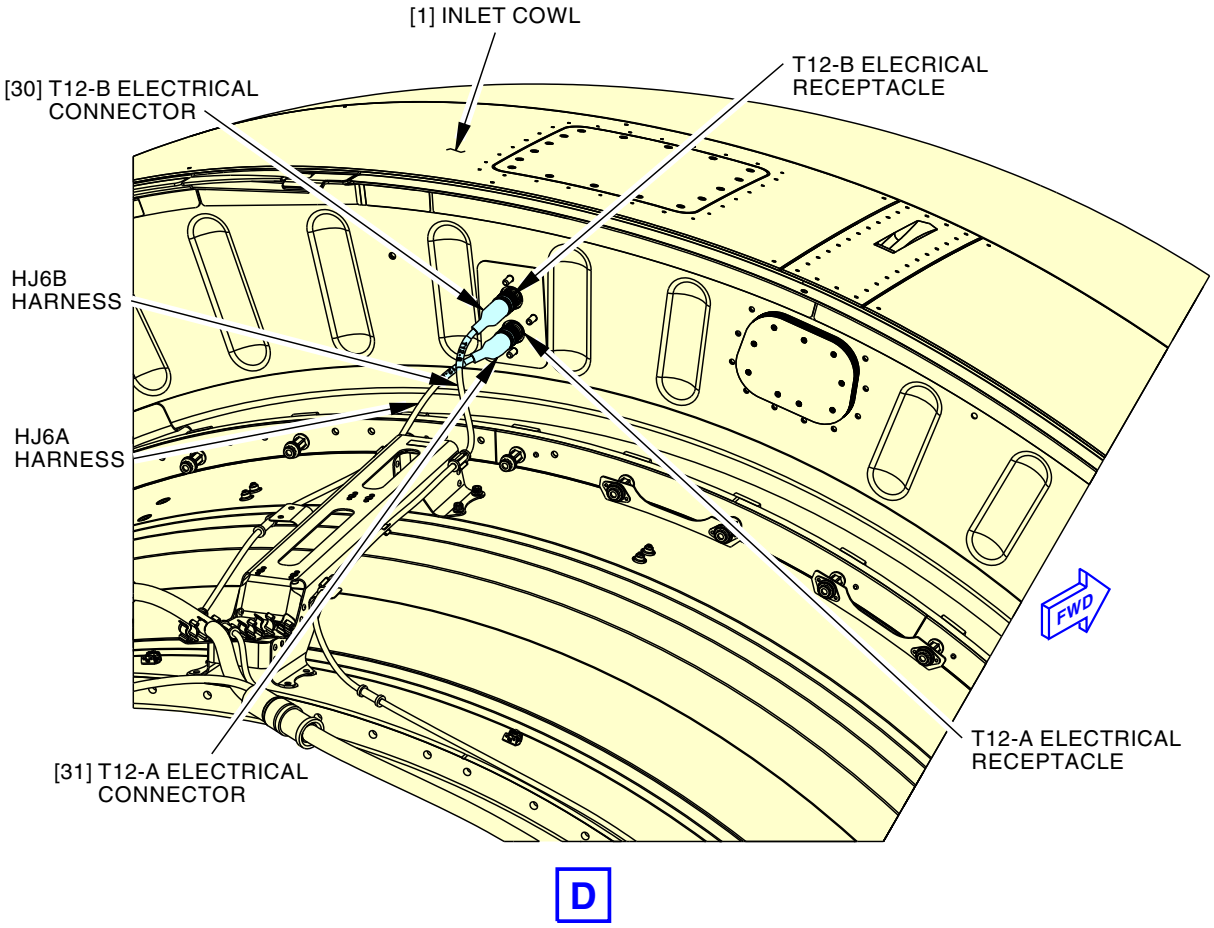


1 INCLUDE 4 LOCATIONS OF BOLT RETAINER ASSEMBLY (BRACKET [29])

2354368 S00061515187_V8

Inlet Cowl Installation
Figure 403/71-11-01-990-803-G00 (Sheet 1 of 4)

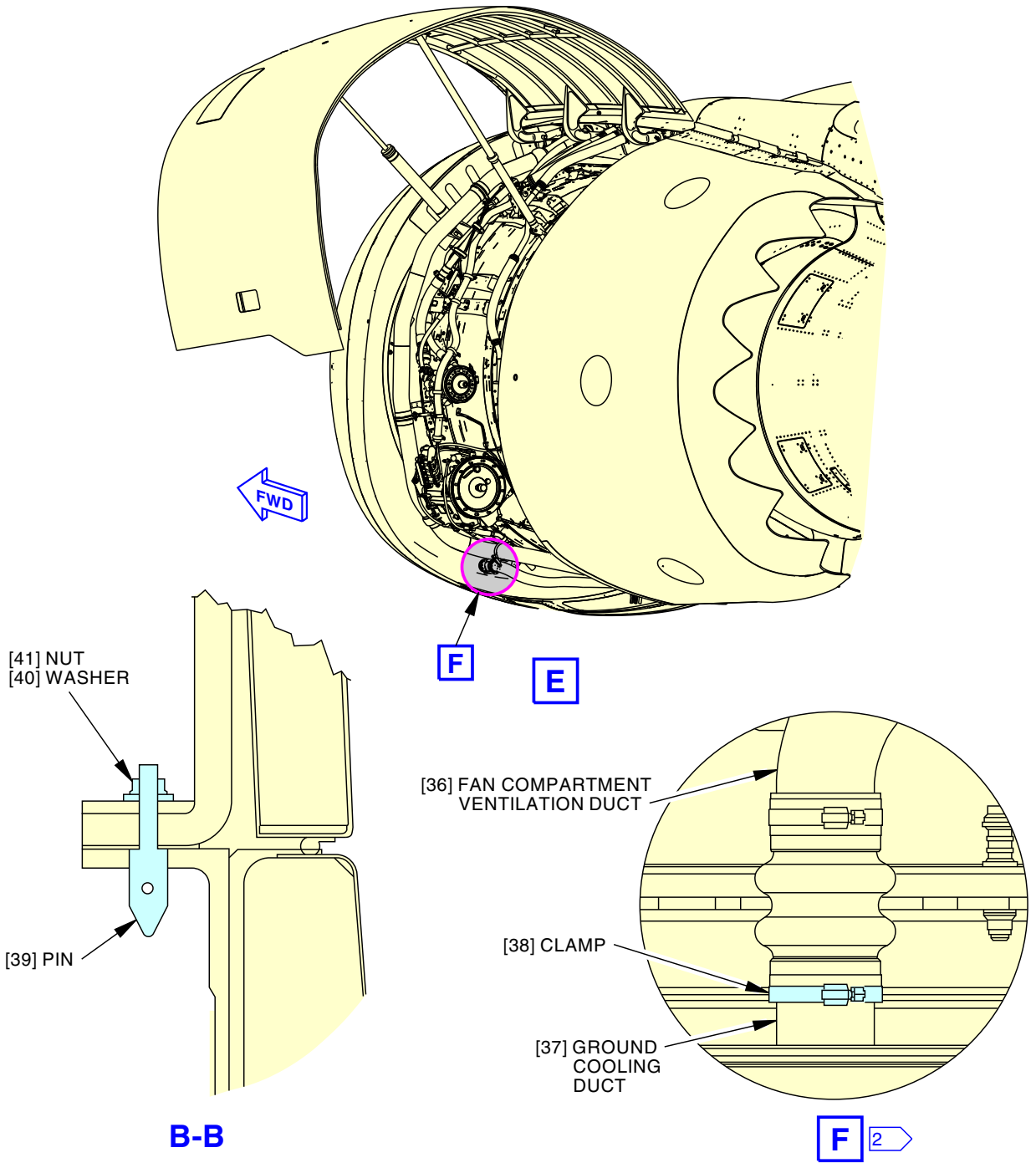
ECCN 9E991 BOEING PROPRIETARY - See title page for details



ICNLEAP1B711101D5882800001A00101
2972679 S0000751482_V1

Inlet Cowl Installation
Figure 403/71-11-01-990-803-G00 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

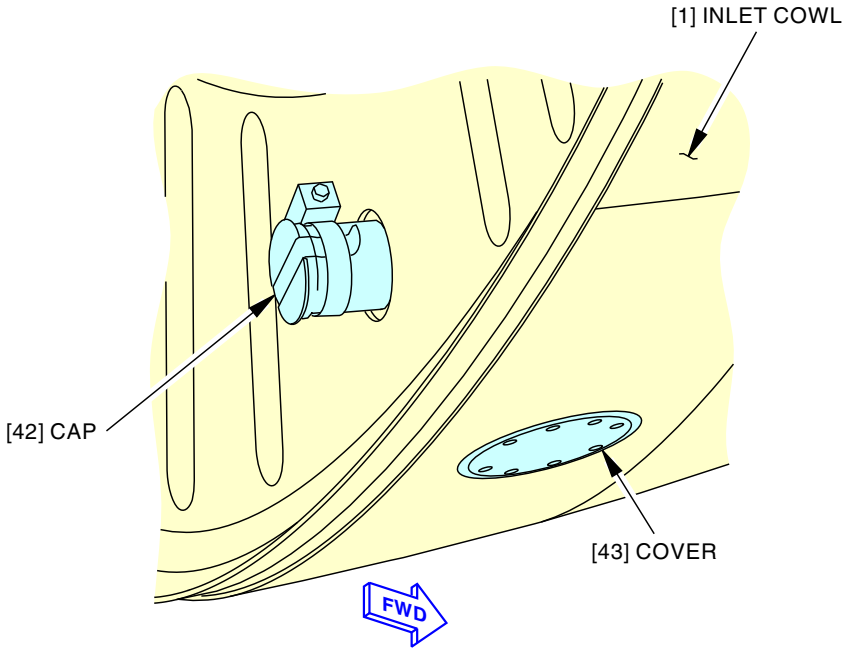


2 LEAP-1BXXG05 ENGINES WITH THE EEC BLOWER SYSTEM INSTALLED
(PRE LEAP-1B SERVICE BULLETIN 75-0010 AND PRE LEAP-1B SERVICE BULLETIN 75-0011)

2354369 S00061515188_V3

Inlet Cowl Installation
Figure 403/71-11-01-990-803-G00 (Sheet 3 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



F 3

3 LEAP-1BXXG05 ENGINES WITH THE EEC BLOWER SYSTEM REMOVED (POST LEAP-1B SERVICE BULLETIN 75-0010 AND POST LEAP-1B SERVICE BULLETIN 75-0011)

2886685 S0000686146_V2

Inlet Cowl Installation
Figure 403/71-11-01-990-803-G00 (Sheet 4 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-11-01-400-801-G00

3. Inlet Cowl Installation

(Figure 401, Figure 402, Figure 403)

A. General

(1) This task gives the instructions to install the inlet cowl.

NOTE: The total acoustic panel blockage for the engine installation must be recalculated when components are changed per SRM SUBJECT 54-00-01.

(2) You must use the inlet cowl sling, SPL-2062, to install the inlet cowl.

(a) You may use installation/removal frame equipment, SPL-14544, together with boom hoist, SPL-2430, as an optional method to install the inlet cowl.

(b) The optional method is useful where overhead lifting is not possible. This tool combination can also be easily transported as needed.

SIA ALL; AIRPLANES WITH INLET COWL WITH GROUND COOLING DUCT

(3) If the inlet is to be installed on a LEAP-1BXXG05 engine, the cap and cover must be removed from the ground cooling duct.

(4) If the inlet is to be installed on a LEAP-1BXXG06 engine or higher GXX number engine, the inlet must have the cap and cover installed on the ground cooling duct.

SIA ALL

B. References

Reference	Title
54-52-01-410-801	Forward Fairing Installation (P/B 401)
71-00-00-800-804-G00	Power Plant Test Reference Table (P/B 501)
71-00-03-390-801-G00	Inlet Cowl Lipskin Protective Coating Procedure (P/B 201)
71-11-01-000-802-G00	Inlet Ground Cooling Duct Cap and Cover Removal (P/B 201)
71-11-01-200-801-G00	Inlet Cowl Inspection (P/B 601)
71-11-01-211-801-G00	Inlet Cowl Attachment Ring Detailed Inspection (P/B 601)
71-11-01-400-802-G00	Inlet Ground Cooling Duct Cap and Cover Installation (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
73-21-06-400-801-G00	T12 Sensor Installation (P/B 401)
SRM 54-00-01	NACELLES/PYLONS - GENERAL

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-2062	Sling - Inlet Cowl Part #: B71040-66 Supplier: 81205 Opt Part #: B71040-38 Supplier: 81205 Opt Part #: B71040-39 Supplier: 81205
SPL-2430	Hoist - Boom, Ground Based Part #: C20002-267 Supplier: 81205

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Reference	Description
SPL-14544	Installation/Removal Frame Equipment - Inlet Cowl, LEAP-1B Engine Part #: C71033-1 Supplier: 81205
STD-583	Mallet - Non-metallic
STD-664	Pliers - Teflon-jawed (or Equivalent Soft-Jawed)
STD-748	Rope - 12 ft (3.6 m) minimum
STD-858	Tag - DO NOT OPERATE
STD-1095	Crane - Lift, 2000 lb Capacity, 30 Foot Height

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Inlet cowl	71-11-01-01-200	SIA ALL
		71-11-01-01-205	SIA ALL
4	Seal	30-21-12-01-355	SIA ALL

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. 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

G. Prepare for the Installation

SUBTASK 71-11-01-490-003-G00

(1) If the sling equipment is not assembled, use the sling assemble steps from the removal task to assemble the inlet cowl sling, SPL-2062.

SUBTASK 71-11-01-480-006-G00

(2) Install the inlet cowl sling, SPL-2062, on the inlet cowl [1] (Figure 402 (Sheet 1)).

(a) Install the forward and aft straps [21] with hoist pins [22] to the inlet cowl [1].

(b) Install the chain hoists [20] to the aft straps [21].

(c) With the 30 foot height (2000 lb capacity) lift crane, STD-1095, lift the inlet cowl sling, SPL-2062, and put it over the inlet cowl [1].

(d) Connect the chain hoists [20] to the master (side) links [18]

(e) Connect the long cable [19] to the forward strap [21].

SUBTASK 71-11-01-480-002-G00

(3) If the optional installation tool is used, make sure that the installation/removal frame equipment, SPL-14544, is attached to the boom hoist, SPL-2430.

SUBTASK 71-11-01-480-007-G00

(4) If the optional removal tool is used, attach the installation/removal frame equipment, SPL-14544, to the inlet cowl [1] (Figure 402 (Sheet 2))

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-11-01-420-003-G00

(5) If the alignment pins [39] were removed or were not installed on the fan case, install the two alignment pins [39], two washers [40], and two nuts [41] on the fan case flange at the 3:00 and 9:00 o'clock positions.

(a) Tighten the two nuts [41] to 52.0 in-lb (5.9 N·m) - 68.0 in-lb (7.7 N·m).

H. Inlet Cowl Installation

SUBTASK 71-11-01-200-001-G00

(1) Examine the inlet cowl (TASK 71-11-01-200-801-G00).

SUBTASK 71-11-01-211-002-G00

(2) Examine the inlet cowl attachment ring (TASK 71-11-01-211-801-G00).

NOTE: Scheduled maintenance requires this inspection when you remove and install the inlet cowl.

SUBTASK 71-11-01-490-004-G00

WARNING GET SUFFICIENT AID FROM OTHER PERSONNEL AND EQUIPMENT TO HOLD THE COMPONENT DURING THE REMOVAL, AND INSTALLATION. THE COMPONENT IS HEAVY. THIS WILL PREVENT INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

WARNING MAKE SURE THAT THE WEIGHT OF THE INLET COWL AND THE SLING EQUIPMENT IS BALANCED WITH THE CRANE FORCE. IF THE WEIGHT AND FORCE ARE NOT BALANCED, THE COWL CAN MOVE QUICKLY WHEN YOU DISCONNECT THE INLET COWL. THIS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(3) Lift the inlet cowl [1] with the inlet cowl sling, SPL-2062, from the inlet support stand or the ground platform.

(a) Adjust the 30 foot height (2000 lb capacity) lift crane, STD-1095, and straps [21] until the straps [21] are not loose.

(b) Install a rope - 12 ft (3.6 m) minimum, STD-748, around the inlet cowl [1] to guide the movement of the inlet cowl [1].

(c) Lift the inlet cowl [1] until you have sufficient clearance to turn the inlet cowl [1].

1) Use the chain hoists to turn the inlet cowl [1] to the vertical position.

SUBTASK 71-11-01-480-003-G00

(4) If the optional installation tool is used, lift the inlet cowl [1] with the installation/removal frame equipment, SPL-14544, and boom hoist, SPL-2430, from the inlet support stand or the ground platform.

SUBTASK 71-11-01-030-001-G00

(5) Install the inlet cowl [1] as follows:

(a) Position the inlet cowl [1] in front of the fan case flange.

(b) Move the inlet cowl [1] slowly to the fan case flange for alignment.

(c) Remove the rope - 12 ft (3.6 m) minimum, STD-748, from the inlet cowl [1] when the inlet cowl sling, SPL-2062, is used.

(d) Install the 44 bolts [32], 44 spacers [33], 44 washers [35], and 44 nuts [34] that attach the inlet cowl [1] to the fan case flange.

NOTE: The bolts must not be lubricated.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Install the two brackets [29] on the 12:00 o'clock position with the four bolts [55], four spacers [33], four washers [35], and four nuts [34].

NOTE: The bolts must not be lubricated.

2) Snug fit four bolts [32], four spacers [33], four washers [35], and four nuts [34] to 150.0 ±5.0 in-lb (16.9 ±0.6 N·m) in the following sequence: 3:00, 9:00, 6:00 and 12:00 o'clock positions.

3) Snug fit the 40 bolts [32], 40 spacers [33], 40 washers [35], and 40 nuts [34] to 150.0 ±5.0 in-lb (16.9 ±0.6 N·m).

4) Tighten the 48 nuts [34] to 290.0 in-lb (32.8 N·m) - 310.0 in-lb (35.0 N·m).

a) Do a check of the torque at first nut [34], if it is not within the specified range, tighten all nuts [34] again and re-check.

(e) Disconnect the straps [21] from the inlet cowl [1] when the inlet cowl sling, SPL-2062, is used.

1) Remove the hoist pins [22] that attach the straps [21] to the inlet cowl [1].

(f) If the optional installation tool is used, disconnect the installation/removal frame equipment, SPL-14544, from the inlet cowl [1].

SUBTASK 71-11-01-940-001-G00

(6) Move the 30 foot height (2000 lb capacity) lift crane, STD-1095, with the inlet cowl sling, SPL-2062, away from the airplane.

SUBTASK 71-11-01-940-002-G00

(7) If the optional installation tool is used, move the installation/removal frame equipment, SPL-14544, with the boom hoist, SPL-2430, away from the airplane.

SUBTASK 71-11-01-430-002-G00

(8) Connect the engine anti-ice duct [2] at the 1:00 o'clock position.

(a) Remove the protective caps from the ends of the engine anti-ice duct [2].

(b) Examine the new seal [4] and surfaces of the engine anti-ice duct [2] for scratches, cuts, pits, creases, and unwanted material.

(c) Install the seal [4] in the recess of the engine anti-ice duct [2].

1) Align the engine anti-ice duct [2] and duct of the inlet cowl [1].

(d) Install the coupling [3] that attaches the engine anti-ice duct [2] to the inlet cowl [1].

1) Turn the coupling bolt until it is outboard of the fan case.

2) Tighten the coupling [3] to 115.0 in-lb (13.0 N·m) - 125.0 in-lb (14.1 N·m).

3) Lightly hit the outer diameter of the coupling [3] with a non-metallic mallet, STD-583.

4) Tighten the coupling [3] again to 115.0 in-lb (13.0 N·m) - 125.0 in-lb (14.1 N·m).

SIA ALL; LEAP-1BXXG05 ENGINES WITH THE EEC BLOWER SYSTEM INSTALLED (PRE LEAP-1B SERVICE BULLETIN 75-0010 AND PRE LEAP-1B SERVICE BULLETIN 75-0011)

SUBTASK 71-11-01-420-001-G00

(9) Connect the ground cooling duct [37] to the fan compartment ventilation duct [36] at the 7:00 o'clock position.

NOTE: Do not install inlet cowl without the ground cooling duct, on a LEAP-1BXXG05 engine.

(a) If it is installed, remove the cap and cover from the inlet ground cooling duct [37] (TASK 71-11-01-000-802-G00).

(b) Remove the protective cap from the end of the fan compartment ventilation duct [36].

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SIA ALL; LEAP-1BXXG05 ENGINES WITH THE EEC BLOWER SYSTEM INSTALLED (PRE LEAP-1B SERVICE BULLETIN 75-0010 AND PRE LEAP-1B SERVICE BULLETIN 75-0011) (Continued)

(c) Install the clamp [38] that attaches the fan compartment ventilation duct [36] to the inlet cowl [1].

1) Tighten the clamp [38] to 19.0 in-lb (2.1 N·m) - 21.0 in-lb (2.4 N·m).

SIA ALL; LEAP-1BXXG06 ENGINE OR HIGHER GXX NUMBER ENGINE WITH THE EEC BLOWER SYSTEM REMOVED (POST LEAP-1B SERVICE BULLETIN 75-0010 OR POST LEAP-1B SERVICE BULLETIN 75-0011)

SUBTASK 71-11-01-410-006-G00

(10) Make sure that the cap and cover are installed on the ground cooling duct (TASK 71-11-01-400-802-G00).

NOTE: This step is for inlet cowl with the ground cooling duct installed.

SIA ALL

SUBTASK 71-11-01-430-003-G00

CAUTION MAKE SURE THAT THE ELECTRICAL CONNECTORS AND RECEPTACLES ARE CLEAN AND CLEAR OF UNWANTED MATERIALS BEFORE YOU DISCONNECT OR CONNECT THEM. CONTAMINATION OF THE ELECTRICAL CONNECTORS OR RECEPTACLES CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION USE PLIERS THAT HAVE TEFLON JAWS TO TIGHTEN THE ELECTRICAL CONNECTORS. DO NOT USE PLIERS THAT HAVE METAL JAWS. METAL JAWS CAN CAUSE DAMAGE TO THE ELECTRICAL CONNECTORS.

(11) Use a teflon-jawed pliers, STD-664, to connect the T12-B electrical connectors [30] and T12-A electrical connector [31] at the 11:30 o'clock position (TASK 73-21-06-400-801-G00).

(a) Remove the protective caps from the T12-B electrical connector [30], T12-A electrical connector [31], T12-B and T12-A receptacles.

(b) Connect the T12-B electrical connector [30] and T12-A electrical connector [31] to the T12-B and T12-A receptacles (View D, Figure 403).

NOTE: The T12-B and T12-A receptacles masterkey are oriented upwards.

(c) Turn the coupling rings on the electrical connectors 1/8 turn or until the teflon-jawed pliers, STD-664, slippage occurs.

NOTE: Do not over tighten the coupling ring.

SUBTASK 71-11-01-630-001-G00

CAUTION MAKE SURE THAT YOU FOLLOW THE INLET COWL LIPSKIN PROTECTIVE COATING PROCEDURE BEFORE YOU OPERATE THE ENGINE ANTI ICE SYSTEM. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION MAKE SURE THAT YOU FOLLOW THE INLET COWL LIPSKIN PROTECTIVE COATING PROCEDURE BEFORE THE AIRPLANE IS RETURNED TO SERVICE. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT CAN OCCUR.

(12) If necessary, remove the inlet cowl lipskin protective coating (Inlet Cowl Lipskin Protective Coating Procedure, TASK 71-00-03-390-801-G00).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-01-420-007-G00

(1) Install the thumbnail fairing (TASK 54-52-01-410-801).

SUBTASK 71-11-01-410-002-G00

(2) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

(a) On the applicable engine, 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

SUBTASK 71-11-01-860-002-G00

(3) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

J. Inlet Cowl Installation Test

SUBTASK 71-11-01-710-002-G00

(1) Do the applicable test(s) 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

INLET COWL - INSPECTION/CHECK

1. General

A. This procedure has these tasks:

(1) Inlet Cowl Inspection

(2) Inlet Cowl Attachment Ring Detailed Inspection

TASK 71-11-01-200-801-G00

2. Inlet Cowl Inspection

(Figure 601)

A. General

(1) This task provides the instructions on how to do a visual inspection of the inlet cowl delamination and damage to the areas that follow:

(a) Lip skin

(b) Inner barrel panel

(c) Outer barrel panel

(d) Aft bulkhead

(e) Anti-ice exhaust duct assembly.

B. References

Reference	Title
71-11-01-000-801-G00	Inlet Cowl Removal (P/B 401)
71-11-01-400-801-G00	Inlet Cowl Installation (P/B 401)
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-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. 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

F. Prepare for the Inspection

SUBTASK 71-11-01-860-003-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-11-01-010-005-G00

(2) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

(a) On the applicable engine, 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

G. Inlet Cowl Inspection

SUBTASK 71-11-01-220-001-G00

(1) Examine the inlet cowl lip skin as follows:

(a) Cracks, holes, punctures and loose or missing fasteners

1) If there are cracks, holes, punctures, repair or replace the inlet cowl (TASK 71-11-01-000-801-G00 and TASK 71-11-01-400-801-G00).

2) If there are loose or missing fasteners, install and/or tighten the fasteners (TASK 71-11-01-400-801-G00).

(b) Dents, disbond, delamination, nicks, scratches, or gouges

1) For the allowable damage limits for the lip skin, refer to the Structure Repair Manual (SRM).

NOTE: The SRM gives allowable limits for dents, disbond, delamination, nicks, scratches, or gouges of the lipskin.

2) If you find dents, disbond, delamination, nicks, scratches, or gouges, above the allowable limits, replace the inlet cowl (TASK 71-11-01-000-801-G00 and TASK 71-11-01-400-801-G00).

SUBTASK 71-11-01-220-002-G00

(2) Examine the inlet cowl inner barrel panel as follows:

(a) Cracks, holes, punctures and loose or missing fasteners

1) If there are cracks, holes, punctures, repair or replace the inlet cowl (TASK 71-11-01-000-801-G00 and TASK 71-11-01-400-801-G00).

2) If there are loose or missing fasteners, install and/or tighten the fasteners (TASK 71-11-01-400-801-G00).

(b) Dents, disbond, delamination, nicks, scratches, or gouges

1) For the allowable damage limits for the inner barrel panel, refer to the Structure Repair Manual (SRM).

NOTE: The SRM gives allowable limits for dents, disbond, delamination, nicks, scratches, or gouges of the inner barrel panel.

2) If you find dents, disbond, delamination, nicks, scratches, or gouges, above the allowable limits, replace the inlet cowl (TASK 71-11-01-000-801-G00 and TASK 71-11-01-400-801-G00).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-11-01-220-003-G00

(3) Examine the inlet cowl outer barrel panel as follows:

(a) Cracks, holes, punctures and loose or missing fasteners

1) If there are cracks, holes, punctures, repair or replace the inlet cowl (TASK 71-11-01-000-801-G00 and TASK 71-11-01-400-801-G00).

2) If there are loose or missing fasteners, install and/or tighten the fasteners (TASK 71-11-01-400-801-G00).

(b) Dents, disbond, delamination, nicks, scratches, or gouges

1) For the allowable damage limits for the outer barrel panel, refer to the Structure Repair Manual (SRM).

NOTE: The SRM gives allowable limits for dents, disbond, delamination, nicks, scratches, or gouges of the outer barrel panel.

2) If you find dents, disbond, delamination, nicks, scratches, or gouges, above the allowable limits, replace the inlet cowl (TASK 71-11-01-000-801-G00 and TASK 71-11-01-400-801-G00).

SUBTASK 71-11-01-210-001-G00

(4) Examine the inlet cowl aft bulkhead as follows:

(a) Cracks, holes, punctures, and loose or missing fasteners

1) If there are cracks, holes, punctures, repair or replace the inlet cowl (TASK 71-11-01-000-801-G00 and TASK 71-11-01-400-801-G00).

2) If there are loose or missing fasteners, install and/or tighten the fasteners (TASK 71-11-01-400-801-G00).

(b) Dents, nicks, scratches, gouges, or corrosion

1) For the allowable damage limits for the aft bulkhead, refer to the Structure Repair Manual (SRM).

NOTE: The SRM gives allowable limits for dents, nicks, scratches, gouges, or corrosion of the aft bulkhead.

2) If you find dents, nicks, scratches, gouges, or corrosion above the allowable limits, replace the inlet cowl (TASK 71-11-01-000-801-G00 and TASK 71-11-01-400-801-G00).

SUBTASK 71-11-01-210-002-G00

(5) Examine the inlet cowl anti-ice exhaust duct assembly as follows:

(a) If the anti-ice exhaust duct assembly is damaged, repair or replace the inlet cowl (TASK 71-11-01-000-801-G00 and TASK 71-11-01-400-801-G00).

SUBTASK 71-11-01-220-004-G00

(6) Examine the inlet cowl for delamination as follows:

(a) Delamination of the perforated face sheet is permitted if all the limits that follow are satisfied:

1) The delamination is more than 3.0 inches (76.2 mm) from the edges.

2) Each area of delamination is less than 4.00 inches by 4.00 inches (101.6 x 101.6 mm).

3) The total area of the delamination is less than 50.0 square-inches (1270 square-mm).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) If the delamination is in the permitted limits, do the followed-up maintenance scheduled inspection at the damaged areas.

(c) If the delamination is not in the permitted limits, repair the delamination or replace the inlet cowl (TASK 71-11-01-000-801-G00 and TASK 71-11-01-400-801-G00).

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-01-410-004-G00

(1) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

(a) On the applicable engine, 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

SUBTASK 71-11-01-860-004-G00

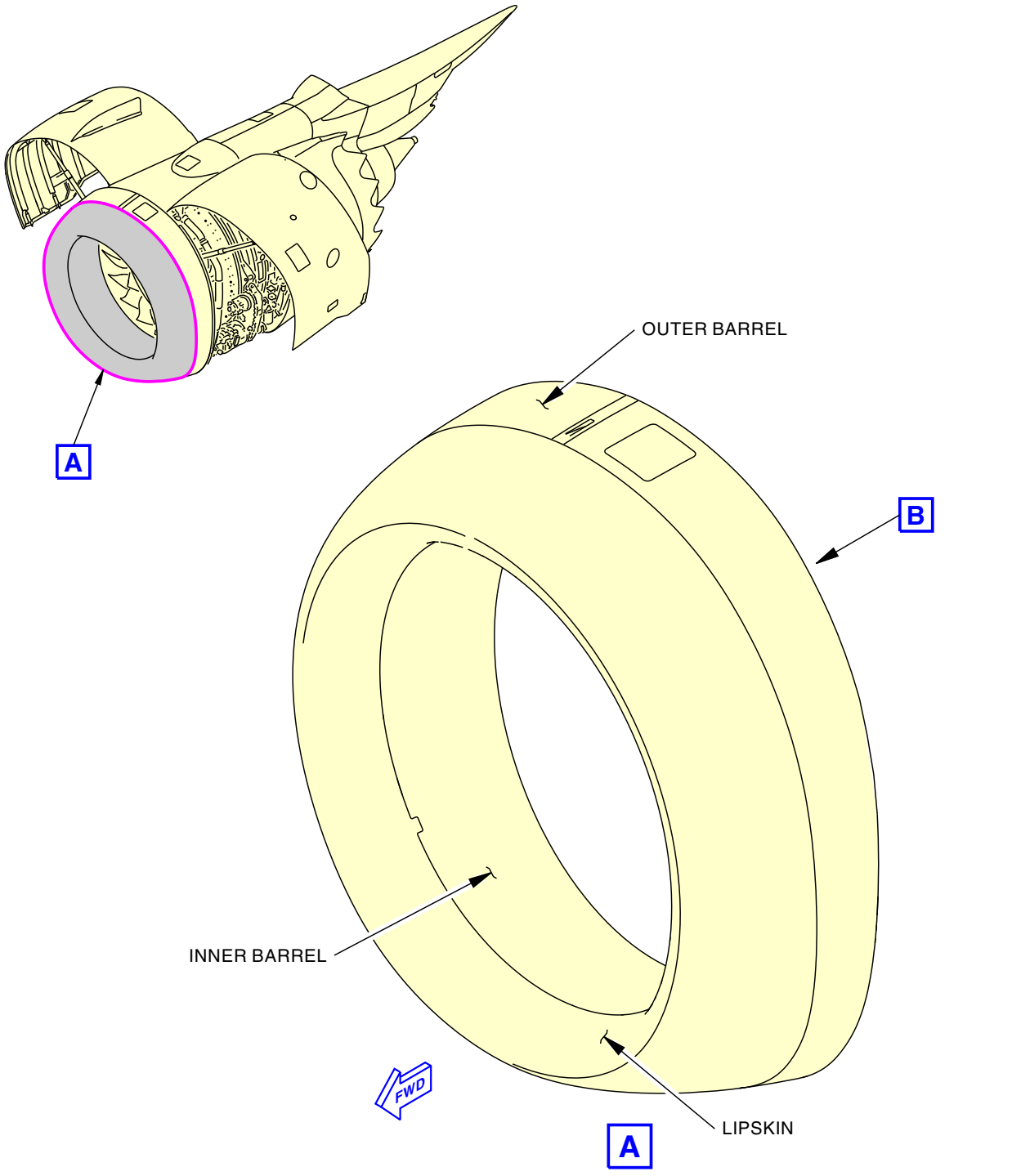
(2) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

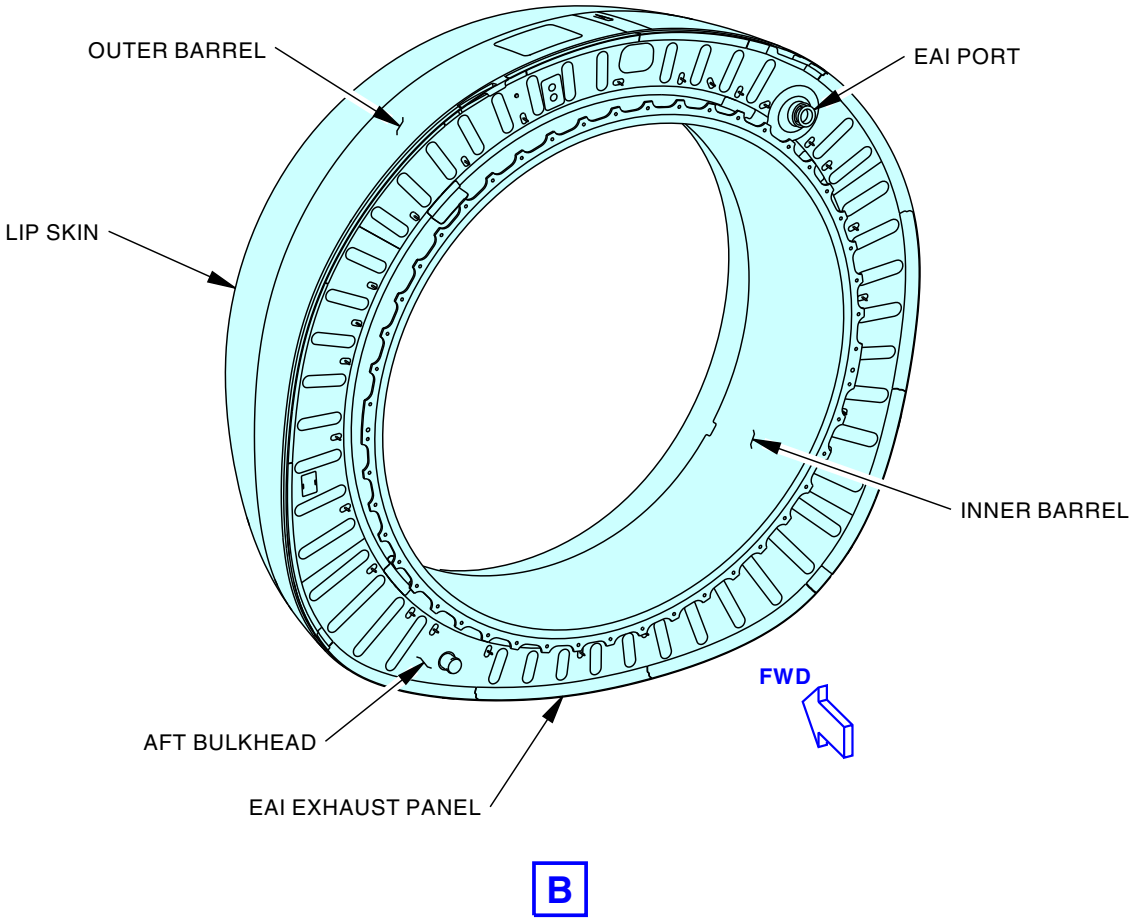
——— END OF TASK ———

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Inlet Cowl Inspection
Figure 601/71-11-01-990-805-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Inlet Cowl Inspection
Figure 601/71-11-01-990-805-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-11-01-211-801-G00

3. Inlet Cowl Attachment Ring Detailed Inspection

NOTE: This procedure is a scheduled maintenance task.

A. General

(1) This task provides the instructions on how to do a detailed inspection of the inlet cowl attachment ring.

(2) This inspection requires removal of the inlet cowl.

B. References

Reference	Title
71-11-01-000-801-G00	Inlet Cowl Removal (P/B 401)
71-11-01-400-801-G00	Inlet Cowl Installation (P/B 401)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
412	Engine 1 - Nose Inlet Cowl

D. Prepare for the Inspection

SUBTASK 71-11-01-000-001-G00

(1) Do this task to remove the inlet cowl: TASK 71-11-01-000-801-G00.

E. Inlet Cowl Attachment Ring Detailed Inspection

SUBTASK 71-11-01-211-001-G00

(1) Do a detailed inspection of the inlet cowl attachment ring for cracks.

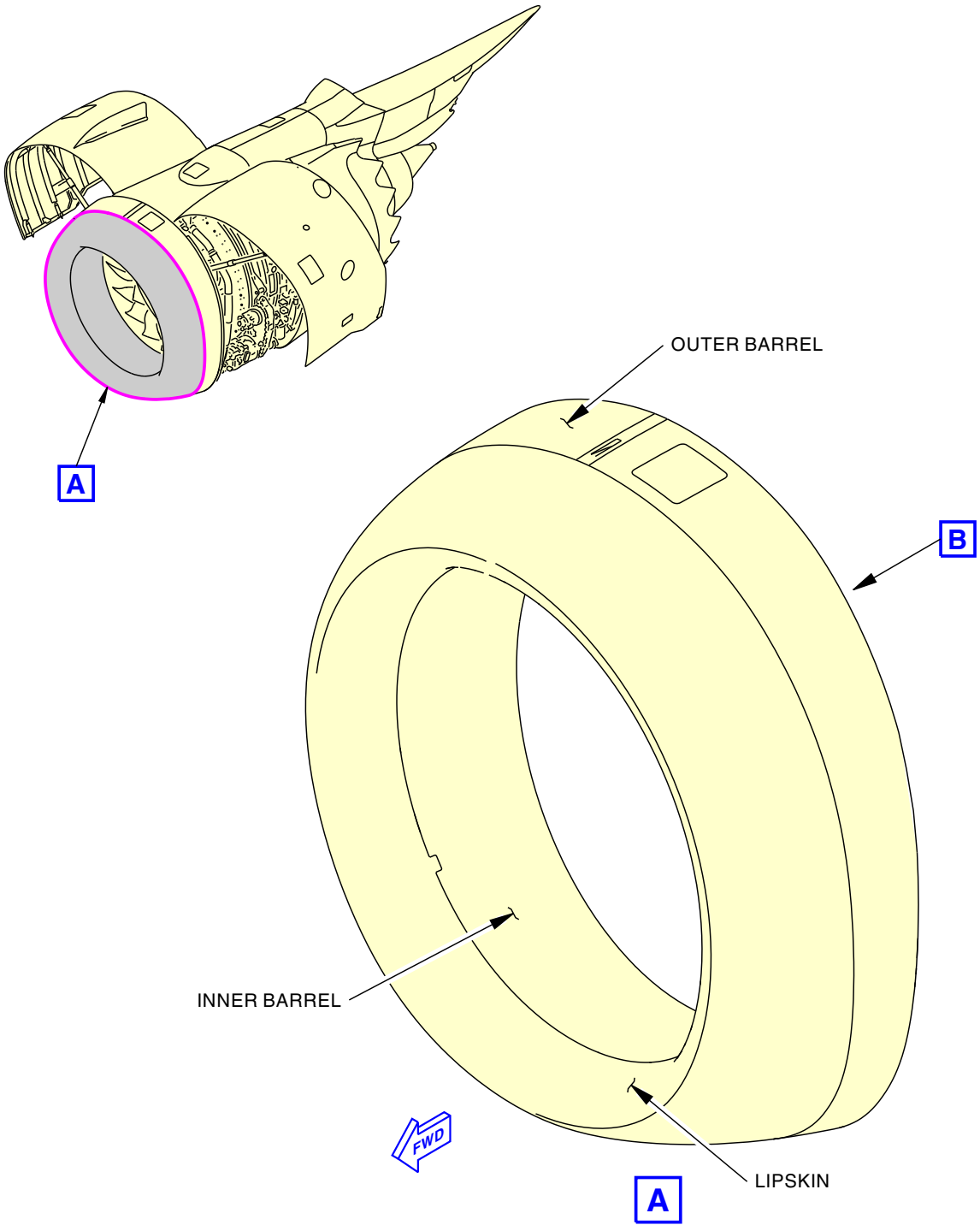
F. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-01-420-002-G00

(1) Do this task to install the inlet cowl: TASK 71-11-01-400-801-G00.

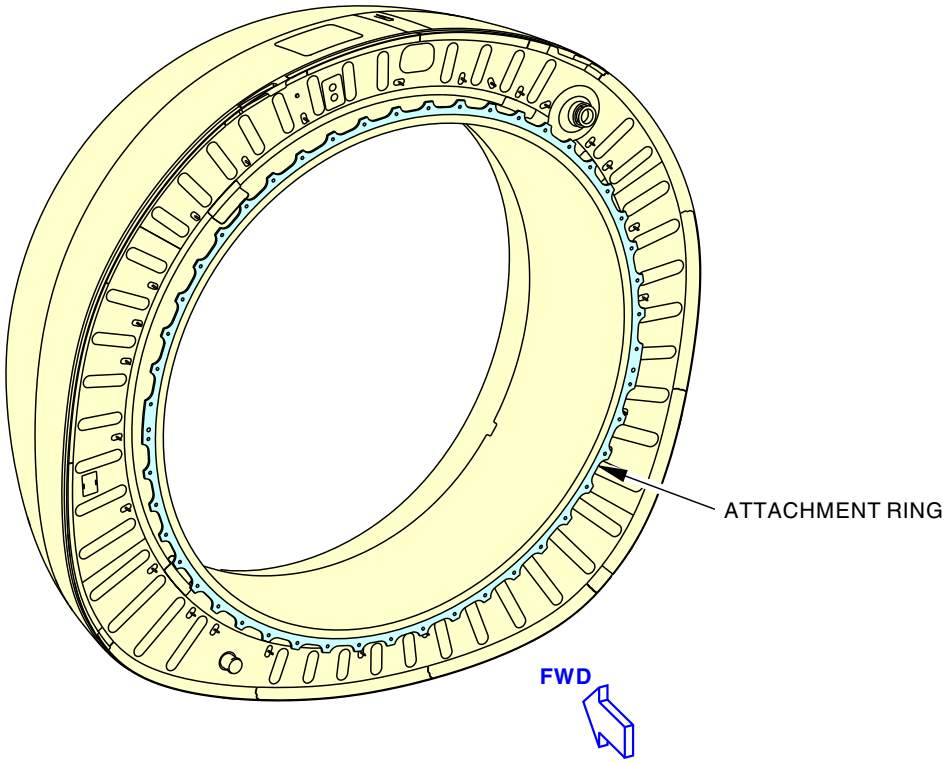
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Inlet Cowl Attachment Ring Detailed Inspection
Figure 602/71-11-01-990-807-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Inlet Cowl Attachment Ring Detailed Inspection
Figure 602/71-11-01-990-807-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FAN COWL CHINE - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) Fan cowl chine removal

(2) Fan cowl chine installation.

TASK 71-11-02-000-801-G00

2. Fan Cowl Chine Removal

(Figure 401)

A. General

(1) This task provides the instructions on how to remove the fan cowl chine.

(2) The fan cowl chine is installed on the inboard of the fan cowl panel.

(3) The fan cowl chines are not interchangeable on the fan cowl panel.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)

C. Tools/Equipment

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

Reference	Description
COM-11852	Rapid Desealer System Part #: RDS001 Supplier: 3FM31
STD-653	Platform - Engine and Strut Access
STD-765	Scraper - Plastic
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
A50110	Sealant - Fuel Tank	BMS5-45 Class B-2

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. Prepare for the Removal

SUBTASK 71-11-02-860-001-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-11-02-010-001-G00

(2) Open the applicable fan cowl panel (TASK 71-11-04-010-801-G00).

SUBTASK 71-11-02-490-001-G00

(3) Position the engine and strut access platform, STD-653 to get access to remove the fan cowl chine [1].

G. Fan Cowl Chine Removal

SUBTASK 71-11-02-020-001-G00

(1) Remove the fan cowl chine [1] from the applicable fan cowl panel as follows:

(a) Use a plastic scraper, STD-765 to cut the sealant around the edge of the fan cowl chine [1].

(b) Remove the eight bolts [2], the eight collars [3], and the eight washers [4] that attach the fan cowl chine [1] to the fan cowl self-locking nuts on the fan cowl panel.

(c) Remove the two bolts [5], the two collars [6], and the two washers [4] that attach the fan cowl chine [1] to the fan cowl self-locking nuts on the fan cowl panel.

NOTE: The first upper bolt of the tip of the fan cowl chine and the last bottom bolt of the end of the fan cowl chine.

SUBTASK 71-11-02-160-001-G00

(2) Remove the fay sealant from the fan cowl chine [1] and the skin interface with the rapid desealer, COM-11852.

SUBTASK 71-11-02-410-003-G00

(3) If the fan cowl panel will not install the fan cowl chine [1], do the steps that follow:

(a) Make sure that the surfaces of the fan cowl panel and the fan cowl chine holes are clean.

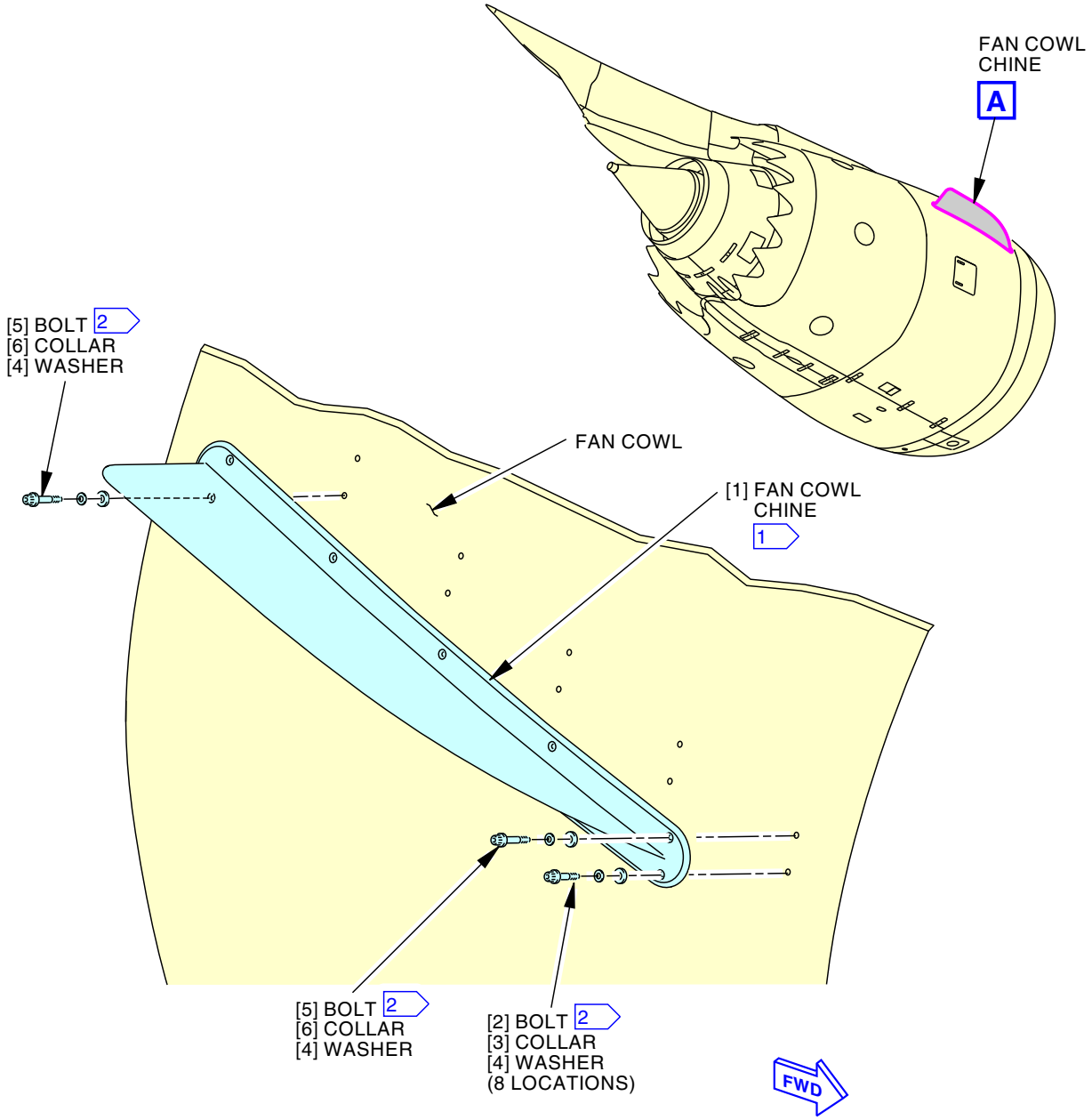
(b) Install the plug fasteners into the open holes on the skin.

(c) Apply the sealant, A50110 to the plug fasteners.

(d) Let the sealant, A50110 dry for 30 minutes.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



1 THE FAN COWL CHINE IS INSTALLED ON THE INBOARD SIDE OF THE FAN COWL PANEL. PANEL. THE FAN COWL CHINES ARE NOT INTERCHANGEABLE ON THE FAN COWL.

2 DESIGNATED BOND FASTENER RESISTANCE CHECK.

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Fan Cowl Chine Installation
Figure 401/71-11-02-990-801-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-11-02-400-801-G00

3. Fan Cowl Chine Installation

(Figure 401)

A. General

(1) This task provides the instructions on how to install the fan cowl chine.

(2) The fan cowl chine is installed on the fan cowl on the inboard of the fan cowl panel.

(3) The fan cowl chines are not interchangeable on the fan cowl panel.

B. References

Reference	Title
51-22-00-160-801	Prepare For Sealing (P/B 201)
51-22-00-390-802	Removable Faying (Mated) Surface Seal Application (P/B 201)
51-22-00-390-806	Fillet Seal Application (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (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
STD-653	Platform - Engine and Strut Access
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
A50110	Sealant - Fuel Tank	BMS5-45 Class B-2

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Fan cowl chine	71-11-02-01-020	SIA 001-007
		71-11-02-05-020	SIA ALL

F. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

G. Fan Cowl Chine Installation

SUBTASK 71-11-02-010-002-G00

(1) If the fan cowl panel had the fan cowl chine [1] plug fasteners installed, remove the plug fasteners from the fan cowl chine [1] holes on the skin.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-11-02-410-001-G00

(2) Do this task: Prepare For Sealing, TASK 51-22-00-160-801.

(a) Make sure that the surfaces of the fan cowl panel and the fan cowl chine are clean.

SUBTASK 71-11-02-420-001-G00

(3) Install the fan cowl chine [1] on the applicable fan cowl panel as follows:

NOTE: The fan cowl chine is installed on the inboard of the fan cowl panel. The fan cowl chines are not interchangeable on the fan cowl panel.

(a) Apply the part agent and the fay sealant to the fan cowl chine [1] and the skin interface (TASK 51-22-00-390-802).

NOTE: Do not remove the existing finish from the fan cowl panel.

(b) Put the fan cowl chine [1] on the surface of the fan cowl panel.

(c) Align the fan cowl chine bolt holes with the fan cowl panel bolt holes.

(d) Install the two bolts [5], the two collars [6], and the two washers [4] that attach the fan cowl chine [1] to the fan cowl self-locking nuts on the fan cowl panel.

NOTE: The first upper bolt of the tip of the fan cowl chine and the last bottom bolt of the end of the fan cowl chine.

NOTE: Install the washer under the collar.

(e) Install the eight bolts [2], the eight collars [3], and the eight washers [4] that attach the fan cowl chine [1] to the fan cowl self-locking nuts on the fan cowl panel.

NOTE: Install the washer under the collar.

(f) Tighten the bolts [2] and the bolts [5] to 87.3 in-lb (9.86 N·m) - 92.7 in-lb (10.47 N·m).

SUBTASK 71-11-02-760-001-G00

(4) Do the designated bond fastener resistance checks:

(a) Use an intrinsically safe approved bonding meter, COM-1550, to do a check of the bonding resistance between the fastener heads (bolts [5] and bolts [2]) and the structure (SWPM 20-20-00).

1) Make sure that the bonding resistance between the fastener head and the structure is 1.0 milliohm (0.001 ohm) or less.

(b) Use an intrinsically safe approved bonding meter, COM-1550, to do a check of the bonding resistance between the collars [3], collars [6], and the structure (SWPM 20-20-00).

1) Make sure that the bonding resistance between the locknut/collar and the structure where the locknut/collar is contacted is 1.5 milliohm (0.0015 ohm) or less.

SUBTASK 71-11-02-390-001-G00

(5) Apply the sealant, A50110 to the fan cowl chine [1] as follows:

(a) Apply the sealant, A50110 all around the fan cowl chine [1] surface interface to the fan cowl panel (TASK 51-22-00-390-806).

(b) Apply the sealant, A50110 to the countersunk areas on the heads of the bolts [2] and the bolts [5].

(c) Let the sealant, A50110 dry for 30 minutes.

SUBTASK 71-11-02-090-001-G00

(6) Move the engine and strut access platform, STD-653 away from the engine.

(a) Make sure that the work area is clean of all tools and other items.

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H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-02-410-002-G00

(1) Close the applicable fan cowl panel (TASK 71-11-04-410-801-G00).

SUBTASK 71-11-02-860-002-G00

(2) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FAN COWL CROSS ENGINE DEBRIS SHIELD - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) A removal of the fan cowl cross engine debris shield

(2) An installation of the fan cowl cross engine debris shield.

TASK 71-11-03-000-801-G00

2. Fan Cowl Cross Engine Debris Shield Removal

(Figure 401)

A. General

(1) This task gives the instructions to remove the fan cowl cross engine debris shields.

(2) The fan cowl cross engine debris shields are installed only on the inboard fan cowl panel of engine 1.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)

C. Tools/Equipment

Reference	Description
STD-653	Platform - Engine and Strut Access
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Prepare for the Removal

SUBTASK 71-11-03-860-001-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-11-03-010-001-G00

(2) Open the applicable right fan cowl panel (TASK 71-11-04-010-801-G00).

SUBTASK 71-11-03-480-001-G00

(3) Position the engine and strut access platform, STD-653 to get access to remove the fan cowl cross engine debris shields.

F. Fan Cowl Cross Engine Debris Shield Removal

SUBTASK 71-11-03-020-001-G00

(1) Remove the forward debris shield [1] from the applicable right fan cowl panel as follows:

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(a) Remove the bolt [4] and washer [5] at eight locations.

(b) Remove the bolt [6] and washer [7] at two locations.

(c) Remove the forward debris shield [1].

SUBTASK 71-11-03-020-002-G00

(2) Remove the aft upper debris shield [2] from the applicable right fan cowl panel as follows:

(a) Remove the bolt [8] and washer [9] at eight locations.

(b) Remove the aft upper debris shield [2].

SUBTASK 71-11-03-020-003-G00

(3) Remove the aft lower debris shield [3] from the applicable right fan cowl panel as follows:

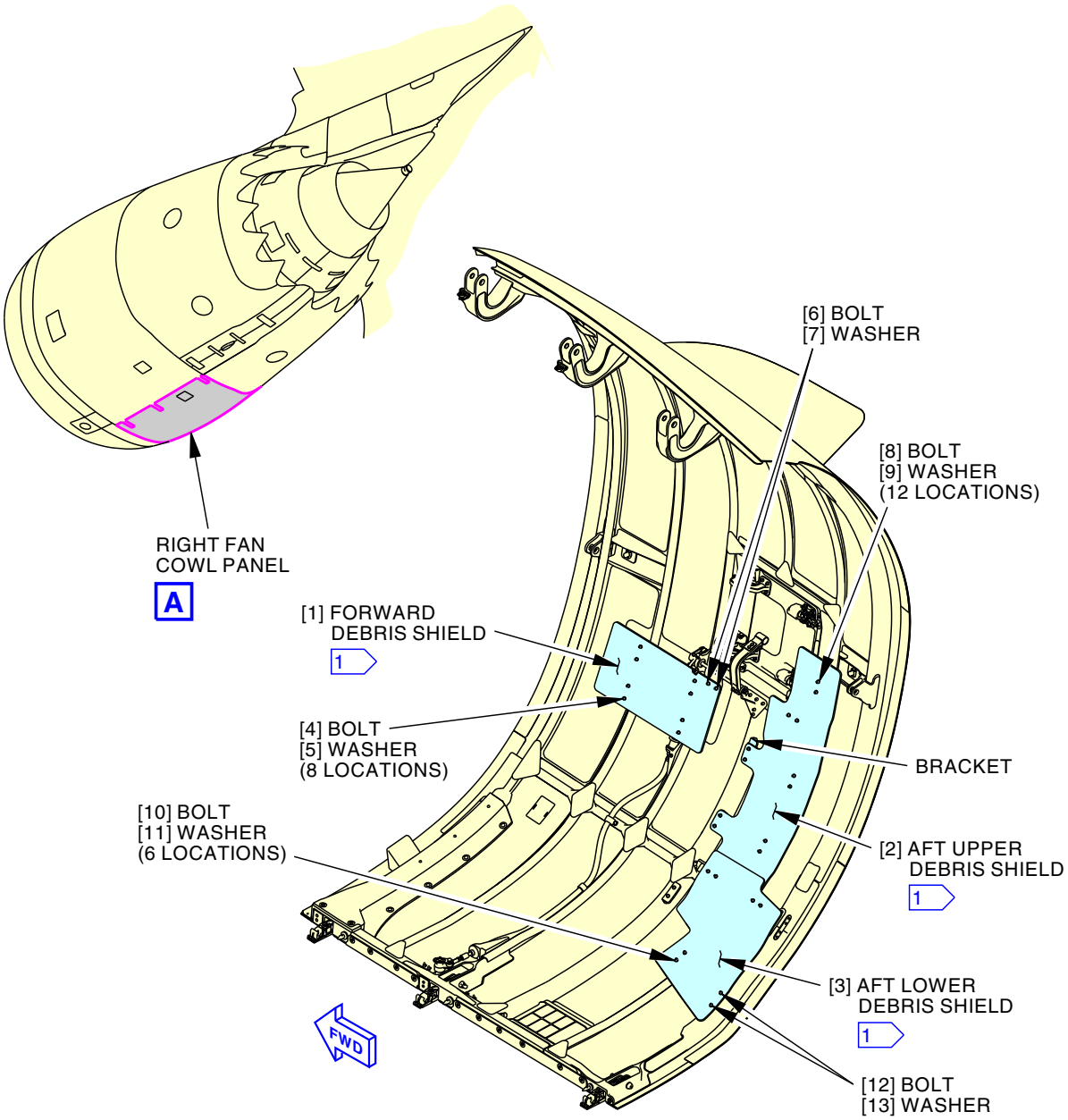
(a) Remove the bolt [12] and washer [11] at eight locations.

(b) Remove the bolt [12] and washer [13] at two locations.

(c) Remove the aft upper debris shield [2].

——— END OF TASK ———

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RIGHT FAN COWL PANEL
(TYPICAL)

A

1 THE FAN COWL CROSS ENGINE DEBRIS SHIELDS ARE INSTALLED ONLY ON THE INBOARD FAN COWL PANEL OF ENGINE 1.

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Fan Cowl Cross Engine Debris Shield Installation
Figure 401/71-11-03-990-801-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-11-03-400-801-G00

3. Fan Cowl Cross Engine Debris Shield Installation

(Figure 401)

A. General

(1) This task gives the instructions to install the fan cowl cross engine debris shields.

(2) The fan cowl cross engine debris shields are installed only on the inboard fan cowl panel of engine 1.

B. References

Reference	Title
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)

C. Tools/Equipment

Reference	Description
STD-653	Platform - Engine and Strut Access
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
C00259	Coating - Chemical And Solvent Resistant Finish, Corrosion Inhibiting Primer	BMS10-11 Type I
G50337	Shim - Laminated Polyimide, Square And Rectangular	BACS40V
G50888	Shim - Laminated, Aluminum Alloy, CRES And Titanium, Surface Bonded	BACS40R

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. Fan Cowl Cross Engine Debris Shield Installation

SUBTASK 71-11-03-420-001-G00

(1) Install the fan cowl cross engine debris shields on the applicable right fan cowl panel as follows:

(a) If it is necessary, install shim, G50337, or shim, G50888, between the debris shield and the debris shield brackets to meet the required maximum gap of 0.01 in. (0.25 mm) before the fasteners are installed.

1) Remove 0.003 in. (0.08 mm) laminations from the shim as necessary.

2) The maximum thickness of the shims must be 0.05 in. (1.27 mm).

3) Apply primer, C00259, to the shim mating surfaces.

(b) Install the forward debris shield [1] as follows:

1) Hold the forward debris shield [1] in its position on the fan cowl panel.

2) Install the bolt [4] and washer [5] at eight locations.

3) Install the bolt [6] and washer [7] at two locations.

(c) Install the aft upper debris shield [2] as follows:

1) Hold the aft upper debris shield [2] in its position on the fan cowl panel.

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2) Install the bolt [8] and washer [9] at eight locations.

(d) Install the aft lower debris shield [3] as follows:

1) Hold the aft lower debris shield [3] in its position on the fan cowl panel.

2) Install the bolt [10] and washer [11] at eight locations.

3) Install the bolt [12] and washer [13] at two locations.

SUBTASK 71-11-03-080-001-G00

(2) Move the engine and strut access platform, STD-653, away from the engine.

(a) Make sure that the work area is clean of all tools and other items.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-03-410-001-G00

(1) Close the applicable right fan cowl panel (TASK 71-11-04-410-801-G00).

SUBTASK 71-11-03-860-002-G00

(2) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FAN COWL PANELS - MAINTENANCE PRACTICES

1. General

A. This procedure has these tasks:

(1) Open the Fan Cowl Panels (Task Selection)

(2) Open the Fan Cowl Panels (Manual Method)

(3) Open the Fan Cowl Panels (Sling Method)

(4) Close the Fan Cowl Panels (Task Selection)

(5) Close the Fan Cowl Panels (Manual Method)

(6) Close the Fan Cowl Panels (Sling Method).

TASK 71-11-04-010-801-G00

2. Open the Fan Cowl Panels (Selection)

A. General

(1) The purpose of this task is to permit mechanics to select the applicable method to open the fan cowl panels.

(2) This task can be used for the left fan cowl panel, the right fan cowl panel, or both fan cowl panels.

NOTE: When only one of the fan cowl panels is opened, the other fan cowl panel will open slightly.

(3) When you close the fan cowl panels, put the left fan cowl panel into the closed position first.

NOTE: This will make sure that the latches and radial restraint pin engage correctly.

B. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

C. Open the Fan Cowl Panels (Selection)

SUBTASK 71-11-04-010-001-G00

(1) Do one of these tasks to open the applicable fan cowl panel:

(a) Do this task: Open the Fan Cowl Panels (Manual Method), TASK 71-11-04-010-803-G00.

(b) Do this task: Open the Fan Cowl Panels (Sling Method), TASK 71-11-04-010-804-G00.

——— END OF TASK ———

TASK 71-11-04-010-803-G00

3. Open the Fan Cowl Panels (Manual Method)

(Figure 201 and Figure 202 or Figure 203)

A. General

(1) This task gives the instructions to manually open the fan cowl panels.

(2) This task can be used for the left fan cowl panel, the right fan cowl panel, or both fan cowl panels.

NOTE: When only one of the fan cowl panels is opened, the other fan cowl panel will open slightly.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(3) When you close the fan cowl panels, put the left fan cowl panel into the closed position first.

NOTE: This will make sure that the latches and radial restraint pin engage correctly.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (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-20446	Clamp Set - HOR & SDOS Part #: C71043-1 Supplier: 81205

D. Location Zones

Zone	Area
413	Engine 1 - Fan Cowl, Left
414	Engine 1 - Fan Cowl, Right
423	Engine 2 - Fan Cowl, Left
424	Engine 2 - Fan Cowl, Right

E. Prepare for the Opening

CAUTION

RETRACT THE LEADING EDGE SLATS, AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THESE PRECAUTIONS, THE FAN COWL PANELS WILL HIT THE SLATS. DAMAGE WILL OCCUR.

SUBTASK 71-11-04-860-018-G00

(1) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 71-11-04-040-002-G00

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

F. Open the Fan Cowl Panels (Manual Method)

SUBTASK 71-11-04-010-004-G00

WARNING

DO NOT OPEN THE FAN COWL PANEL DURING AN ENGINE OPERATION. THE FORWARD LATCHES ARE IN THE DANGEROUS AREA ZONE OF THE ENGINE INLET. IF YOU GO INTO THE DANGEROUS AREA, THE ENGINE CAN PULL YOU IN. IF YOU DO NOT OBEY, INJURY OR DEATH CAN OCCUR.

WARNING

DO NOT OPEN THE FAN COWLS OR KEEP THEM OPEN WITH WINDS MORE THAN THE LIMIT. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Open the fan cowl latches (3 locations) at the 6:00 o'clock position as follows:

NOTE: The maximum wind allowable for opening the fan cowls is 40 knots.

NOTE: Start from the aft latch and work forward.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA 008-999; SIA 001-007 POST SB 737-71-1894

(a) For the right fan cowl panel, do the steps that follow:

1) Open the oil tank access door.

2) Pull the fan cowl latch indication system handle out through the oil tank access door opening.

NOTE: Pull the handle out will rotate the blade to uncover the center fan cowl latch.

SIA ALL

(b) Push the triggers to release the latches.

(c) Pull the handles down to release the latches from the keepers.

(d) Make sure that the fan cowl panels are disengaged completely from each other.

(e) Slowly push open the fan cowl panel.

SUBTASK 71-11-04-010-008-G00

(2) Do these steps to open the fan cowl panels:

(a) Manually hold the fan cowl panel and pull it away from the engine.

NOTE: At or near the lower portion of travel, the fan cowl will experience resistance and want to force itself closed. This is due to the internal mechanism of the SDOS.

1) Open the oil tank or IDG access door as necessary to use the inside door frame as a handle.

WARNING

WHEN THE FAN COWL IS OPENED, MAKE SURE THAT THE SPRING DOOR OPENING SYSTEM (SDOS) AND HOLD OPEN ROD (HOR) ARE LOCKED. DO NOT WORK UNDERNEATH THE COWL UNTIL YOU VERIFIED THE LOCKING MECHANISMS ARE LOCKED CORRECTLY. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(b) Continue lifting until you reach the full open position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

WARNING

MAKE SURE THAT YOU DO NOT HIT OR LEAN ON THE HOLD-OPEN ROD (HOR) OR THE SPRING DOOR OPENING SYSTEM (SDOS) ACTUATOR WHEN THE FAN COWL IS IN THE OPEN POSITION. THE HOR OR SDOS ACTUATOR CAN UNLOCK AND CAUSE THE FAN COWL TO LOWER. USE THE CLAMP SET SPL-20446 TO DECREASE THE RISK OF A COMPONENT TO UNLOCK. IF THE HOR OR SDOS UNLOCKS, INJURY TO PERSONNEL CAN OCCUR.

(c) Make sure that there is an audible and tactile click from the HOR and SDOS locking mechanisms when they engage.

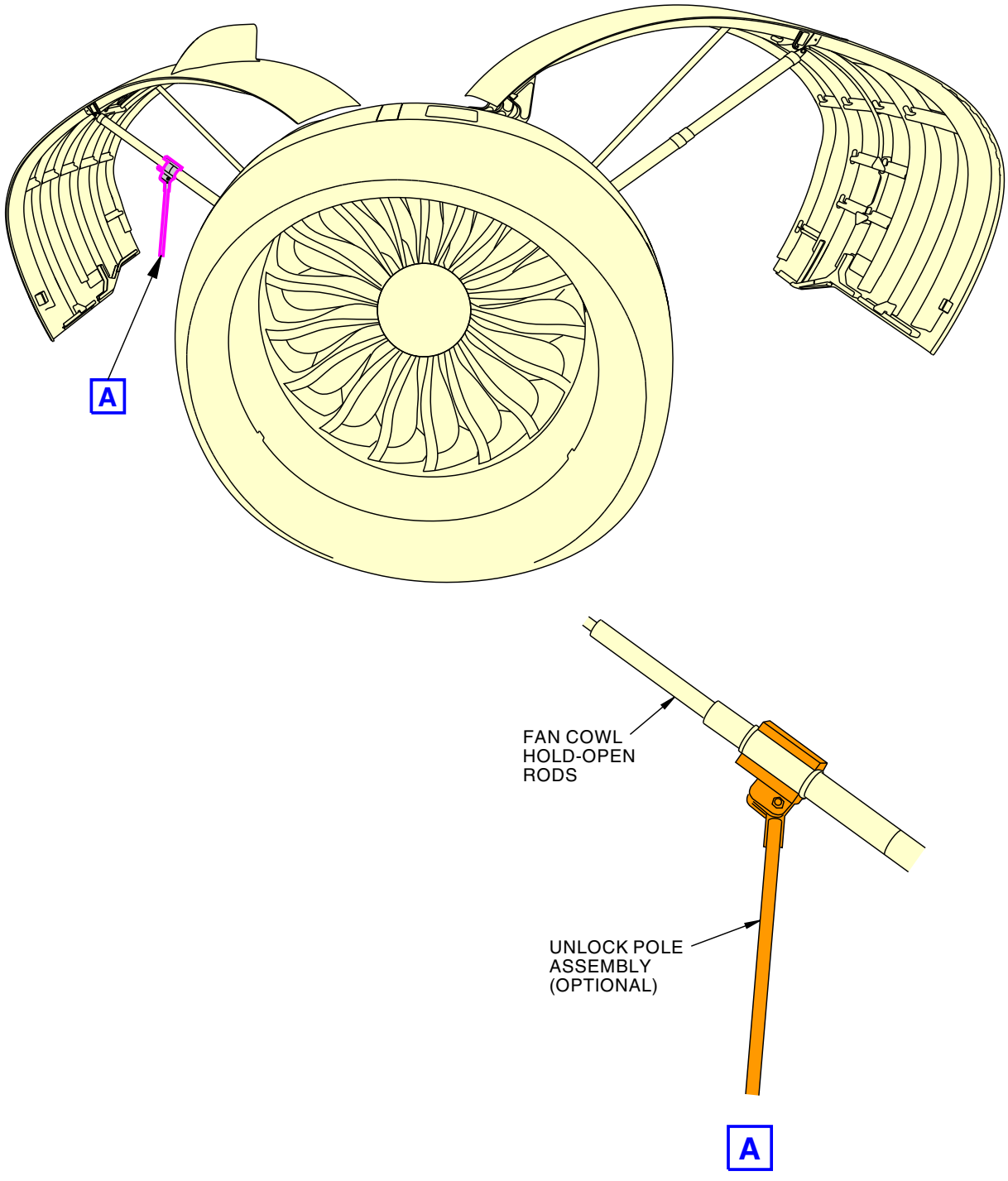
NOTE: It is recommended to shake the fan cowl at the bottom corners in a FWD/AFT motion to make sure that the locking mechanisms are locked correctly.

NOTE: If personnel are working near the HOR or SDOS, clamp, SPL-20446, can be used to prevent an inadvertent unlocking of the HOR or SDOS locking mechanisms.

NOTE: Alternatively, if the steps listed above cannot be completed, the sling method (TASK 71-11-04-010-804-G00) can be used to open the fan cowls. If the sling method is used as a result of the SDOS or HOR not securing properly in this procedure, the fan cowls should be closed using the manual method before using the sling method to open the cowls.

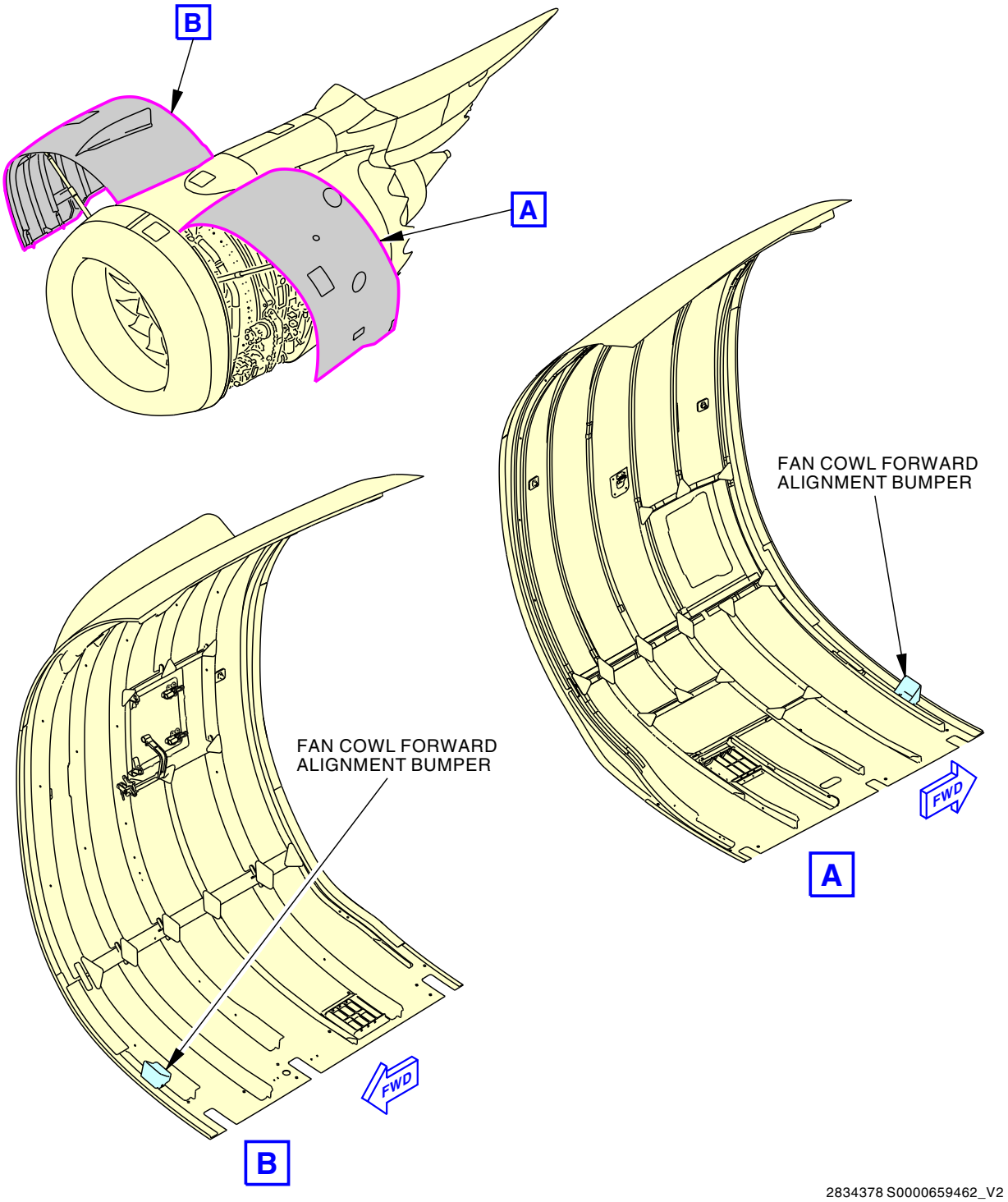
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fan Cowl Panels Opening and Closing (Manual Method)
Figure 201/71-11-04-990-802-G00

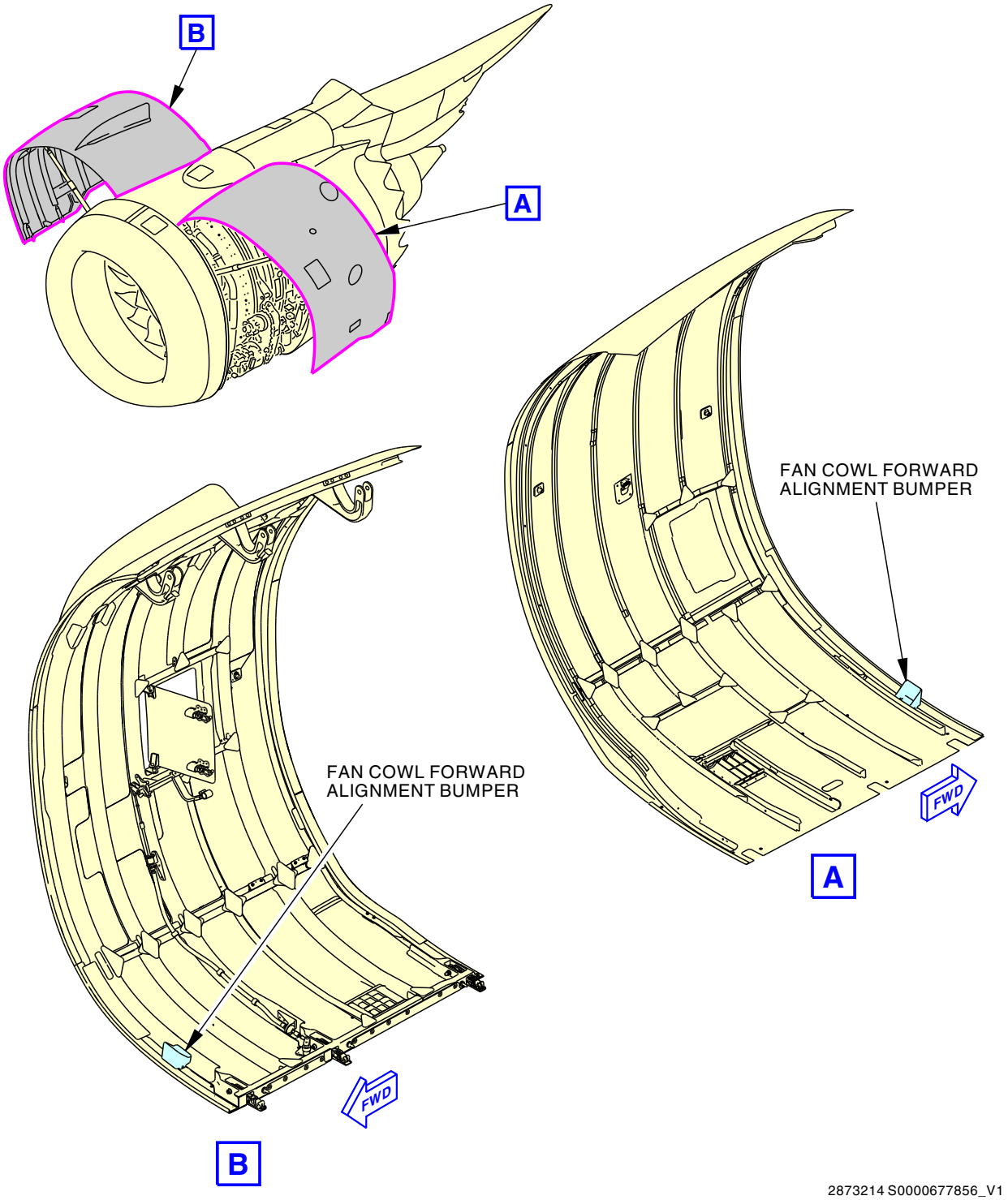
ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Cowl Panels Forward Alignment Bumpers
Figure 202/71-11-04-990-809-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2873214 S0000677856_V1

Fan Cowl Latch Indication Systems
Figure 203/71-11-04-990-811-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-11-04-010-804-G00

4. Open the Fan Cowl Panels (Sling Method)

(Figure 204 and Figure 202 or Figure 203)

A. General

(1) This task gives the instructions to open the fan cowl panel with the use of the fan cowl sling.

(2) You will need a special fan cowl sling, SPL-14546 and a hoist, STD-467 to do this task.

(3) This task can be used for the left fan cowl panel, the right fan cowl panel, or both fan cowl panels.

NOTE: When only one of the fan cowl panels is opened, the other fan cowl panel will open slightly.

(4) When you close the fan cowl panels, put the left fan cowl panel into the closed position first.

NOTE: This will make sure that the latches and radial restraint pin engage correctly.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (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-14546	Sling Eqpt - Fan Cowl, LEAP-1B Engine Part #: C71031-1 Supplier: 81205
STD-467	Hoist - 500 lb (226.8 kg)
STD-653	Platform - Engine and Strut Access

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Prepare for the Opening

CAUTION

RETRACT THE LEADING EDGE SLATS, AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THESE PRECAUTIONS, THE FAN COWL PANELS WILL HIT THE SLATS. DAMAGE WILL OCCUR.

SUBTASK 71-11-04-860-021-G00

(1) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 71-11-04-030-001-G00

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

SUBTASK 71-11-04-490-001-G00

(3) Move the engine and strut access platform, STD-653, next to the fan cowl panel.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Open the Fan Cowl Panels (Sling Method)

SUBTASK 71-11-04-010-005-G00

WARNING DO NOT OPEN THE FAN COWL PANEL DURING AN ENGINE OPERATION. THE FORWARD LATCHES ARE IN THE DANGEROUS AREA ZONE OF THE ENGINE INLET. IF YOU GO INTO THE DANGEROUS AREA, THE ENGINE CAN PULL YOU IN. IF YOU DO NOT OBEY, INJURY OR DEATH CAN OCCUR.

WARNING DO NOT OPEN THE FAN COWLS OR KEEP THEM OPEN WITH WINDS MORE THAN THE LIMIT. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Open the fan cowl latches (3 locations) at the 6:00 o'clock position as follows:

NOTE: The maximum wind allowable for opening the fan cowls is 40 knots.

NOTE: Start from the aft latch and work forward.

SIA 008-999; SIA 001-007 POST SB 737-71-1894

(a) For the right fan cowl panel, do the steps that follow:

1) Open the oil tank access door.

2) Pull the fan cowl latch indication system handle out through the oil tank access door opening.

NOTE: Pull the handle out will rotate the blade to uncover the center fan cowl latch.

SIA ALL

(b) Push the triggers to release the handles.

(c) Pull the handles down to release the latches from the keepers.

(d) Make sure that the fan cowl panels are disengaged completely from each other.

(e) Slowly push open the fan cowl panel.

SUBTASK 71-11-04-490-002-G00

(2) Attach the fan cowl sling, SPL-14546, to the applicable fan cowl panel as follows:

(a) Install the three bolts [3] that attach the three hoist pins [2] to the fan cowl Ground Support Equipment (GSE) lift points.

1) Tighten the bolts [3] to 15 in-lb (2 N·m) - 30 in-lb (3 N·m).

(b) Engage the hoist, STD-467, with the sling hoist plate.

(c) Put the hoist, STD-467, and the sling hoist plate above the fan cowl panel.

(d) Make sure that the fan cowl sling, SPL-14546, does not touch the surface of the fan cowl panel.

(e) Attach the three sling straps [4] to the sling link [6] with the three Lok-A-Loys [5].

NOTE: The sling straps [4], the sling link [6], and the three Lok-A-Loys [5] are part of the fan cowl sling, SPL-14546.

(f) Attach the sling straps [4] to the fan cowl panel.

(g) Attach a dynamometer and a master link on the sling link [6].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-11-04-860-003-G00

WARNING

MONITOR THE WEIGHT OF THE LOAD WHILE YOU PUT WEIGHT ON THE SLING. MAKE SURE THAT THE WEIGHT OF THE LOAD IS LESS THAN THE WEIGHT LIMIT. IF THE WEIGHT OF THE LOAD IS MORE THAN THE LIMIT, THE COMPONENT CAN BREAK. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(3) Lift slowly and adjust the hoist, STD-467, to hold the weight of the fan cowl panel.

NOTE: The fan cowl panel weighs approximately 160 lb (73 kg).

(a) Make sure that the fan cowl sling, SPL-14546, does not touch the surface of the fan cowl panel.

(b) Continue lifting until you reach the full open position.

WARNING

WHEN THE FAN COWL IS OPENED, MAKE SURE THAT THE SPRING DOOR OPENING SYSTEM (SDOS) AND HOLD OPEN ROD (HOR) ARE LOCKED. DO NOT WORK UNDERNEATH THE COWL UNTIL YOU VERIFIED THE LOCKING MECHANISMS ARE LOCKED CORRECTLY. INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Make sure that there is an audible click from the HOR and SDOS locking mechanisms when they engage.

NOTE: It is recommended to shake the fan cowl at the bottom corners in a FWD/AFT motion to make sure the locking mechanisms are locked correctly.

SUBTASK 71-11-04-080-001-G00

(4) If the HOR or SDOS will be removed, or if the locking mechanisms on both the HOR and SDOS did not engage properly, the fan cowl must continue to be held open using the hoist, STD-467, and the fan cowl sling, SPL-14546.

SUBTASK 71-11-04-090-001-G00

(5) If the HOR and SDOS will remain installed and the locking mechanisms on both the HOR and SDOS did engage properly, you can remove the hoist, STD-467 and the fan cowl sling, SPL-14546, if necessary:

(a) Disconnect the three sling straps [4] from the fan cowl panel.

1) Remove the three bolts [3] that attach the three hoist pins [2] to the fan cowl GSE lift points.

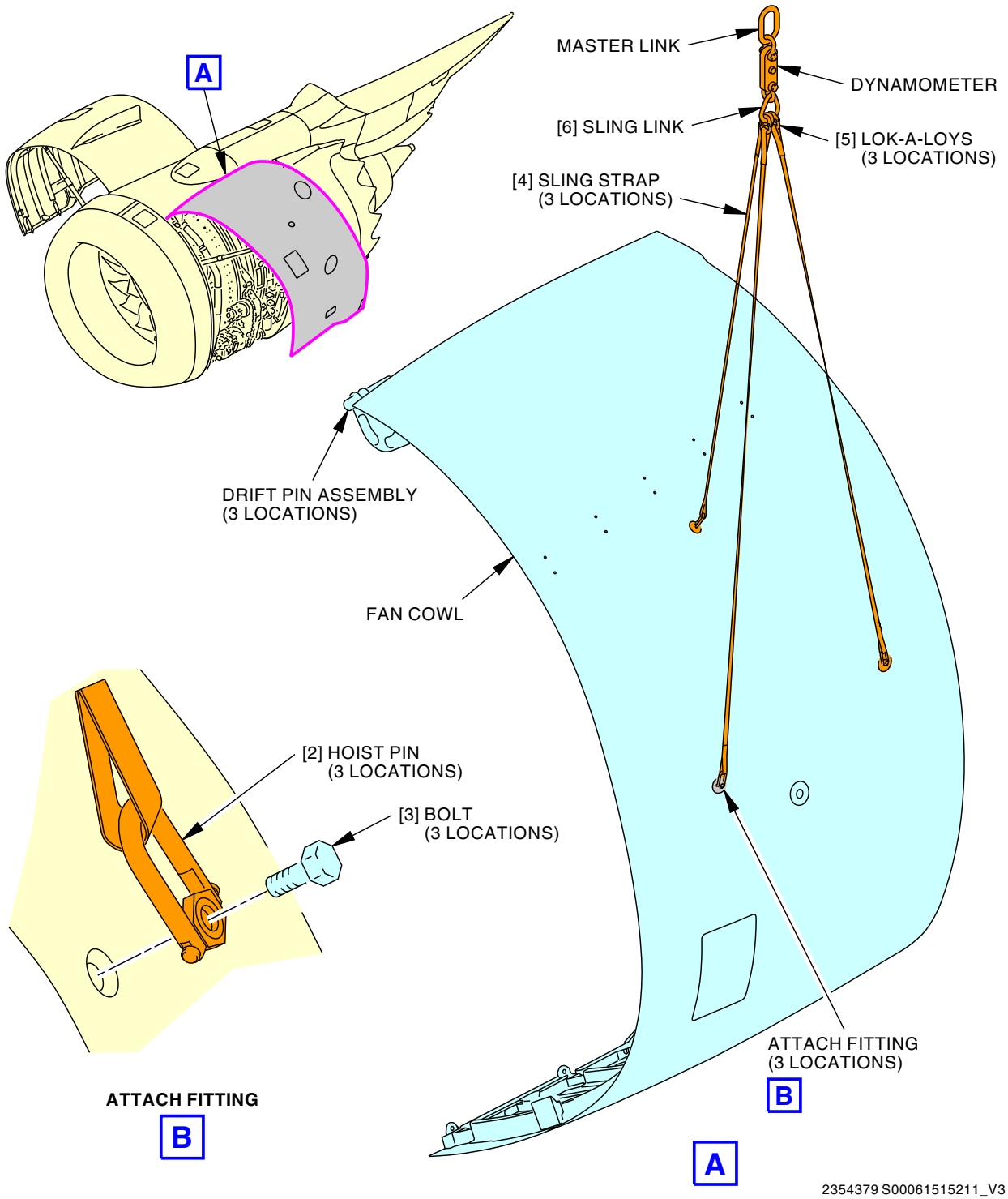
(b) Move the hoist, STD-467 away from the fan cowl panel.

SUBTASK 71-11-04-090-002-G00

(6) Move the engine and strut access platform, STD-653, away from the engine.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fan Cowl Panel Opening and Closing (Sling Method)
Figure 204/71-11-04-990-803-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-11-04-410-801-G00

5. Close the Fan Cowl Panels (Selection)

A. General

(1) The purpose of this task is to permit mechanics to select the applicable method to close the fan cowl panels.

(2) The procedure can be used for the left fan cowl panel or the right fan cowl panel.

B. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

C. Close the Fan Cowl Panels (Selection)

SUBTASK 71-11-04-410-001-G00

(1) Do one of these tasks to close the applicable fan cowl panel:

(a) Do this task: Close the Fan Cowl Panels (Manual Method), TASK 71-11-04-410-803-G00.

(b) Do this task: Close the Fan Cowl Panels (Sling Method), TASK 71-11-04-410-804-G00.

——— END OF TASK ———

TASK 71-11-04-410-803-G00

6. Close the Fan Cowl Panels (Manual Method)

(Figure 201 and Figure 202 or Figure 203)

A. General

(1) This task gives the instructions to manually close the fan cowl panels.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
71-11-05-821-801-G00	Fan Cowl Latch Adjustment (P/B 501)

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-10926	Unlock Pole - Fan Cowl Hold Open Rods Part #: C71041-1 Supplier: 81205

D. Location Zones

Zone	Area
413	Engine 1 - Fan Cowl, Left
414	Engine 1 - Fan Cowl, Right
423	Engine 2 - Fan Cowl, Left
424	Engine 2 - Fan Cowl, Right

ECCN 9E991 BOEING PROPRIETARY - See title page for details

E. Close the Fan Cowl Panels (Manual Method)

SUBTASK 71-11-04-420-002-G00

WARNING DO NOT CLOSE THE FAN COWL PANEL DURING AN ENGINE OPERATION. THE FORWARD LATCHES ARE IN THE HAZARD AREA ZONE OF THE ENGINE INLET. IF YOU GO INTO THE HAZARD AREA, YOU CAN GET PULLED INTO THE ENGINE. IF YOU DO NOT OBEY, DANGEROUS INJURY OR DEATH CAN OCCUR.

WARNING DO NOT TRY TO OPEN OR CLOSE THE FAN COWL PANEL IN HIGH WINDS OR GUST CONDITIONS OF MORE THAN 40 KNOTS. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT COULD OCCUR.

(1) Do these steps to close the fan cowl panels:

(a) Close the left fan cowl panel first.

(b) Lift the fan cowl slightly to relieve the weight from the SDOS and HOR collars.

WARNING HOLD THE FAN COWL PANEL WHILE YOU UNLOCK OR RETRACT THE HOLD-OPEN RODS. IF THE FAN COWL PANEL FALLS, INJURY TO PERSONS AND DAMAGE TO THE ENGINE COMPONENTS CAN OCCUR.

(c) Make sure that the weight of the fan cowl is fully supported while you disengage the SDOS and HOR lock collars.

(d) Use the unlock pole, SPL-10926, to pull the lock collar down to disengage the locking mechanism.

1) As an option, use a ladder as required to disengage the lock collar.

WARNING YOU MUST CONTROL THE WEIGHT AND RATE OF CLOSURE OF THE FAN COWL. FAILURE TO CONTROL THE RATE OF CLOSURE CAN CAUSE INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(e) While you support the fan cowl, lower it into the lower static position as follows:

NOTE: The SDOS will relieve some of the fan cowl weight, but it does not control the rate of closure. The mechanics must control the weight and rate of closure.

1) Open the oil tank or IDG access door as necessary to use the inside door frame as a handle.

2) Control the rate of closure as you lower the fan cowl.

NOTE: Near the last foot of travel for the fan cowl to reach the lower static position, the SDOS will no longer relieve the fan cowl weight. The mechanics must control the full weight and rate of closure of the fan cowl towards the end of travel.

3) Use the forward alignment bumper on the fan cowl to help closing it.

NOTE: The fan cowls naturally swing forward when opening and closing. The alignment bumper on each fan cowl helps to prevent strikes to the inlet cowl and engine components.

(f) Make sure that the forward fan cowl V-blade engages correctly with the inlet TV-chord.

(g) Make sure that the radial restraint pin engages the receiver at the bottom of the engine.

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(h) Push to seat the restraint pin.

(i) Repeat the steps above again to close the right-hand fan cowl panel.

(j) Make sure that the shear pins of the right-hand fan cowl panel engage with their respective bushings on the left-hand fan cowl panel.

SUBTASK 71-11-04-860-007-G00

CAUTION MAKE SURE THAT THE FAN COWLS ARE FULLY CLOSED AND YOU CORRECTLY LATCH THE THREE FAN COWL LATCHES. IF YOU DO NOT FULLY CLOSE AND CORRECTLY LATCH THE THREE FAN COWL LATCHES, DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Close the fan cowl latches (3 locations) at the 6:00 o'clock position as follows:

NOTE: Engage the latch hooks in the specific order.

(a) Engage the latch hook in the center keeper.

(b) Engage the latch hook in the forward keeper.

(c) Engage the latch hook in the aft keeper.

(d) Push the latch handles closed in the same order.

1) If the latch handles do not close smoothly, do this task: Fan Cowl Latch Adjustment, TASK 71-11-05-821-801-G00.

SIA 008-999; SIA 001-007 POST SB 737-71-1894

(e) For the right fan cowl panel, do the steps that follow:

1) Push the fan cowl latch indication system handle in through the oil tank access door opening.

2) Close the oil tank access door.

3) Make sure that you fully close and secure the oil tank access door.

SIA ALL

F. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-04-440-002-G00

(1) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

END OF TASK

TASK 71-11-04-410-804-G00

7. Close the Fan Cowl Panels (Sling Method)

(Figure 204 and Figure 202 or Figure 203)

A. General

(1) This task gives the instructions to close the fan cowl panels with the use of the fan cowl sling.

(2) You will need a special fan cowl sling, SPL-14546, and a hoist, STD-467, are necessary to do this task.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
71-11-05-821-801-G00	Fan Cowl Latch Adjustment (P/B 501)

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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-10926	Unlock Pole - Fan Cowl Hold Open Rods Part #: C71041-1 Supplier: 81205
SPL-14546	Sling Eqpt - Fan Cowl, LEAP-1B Engine Part #: C71031-1 Supplier: 81205
STD-467	Hoist - 500 lb (226.8 kg)
STD-653	Platform - Engine and Strut Access

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Close the Fan Cowl Panels (Sling Method)

WARNING DO NOT CLOSE THE FAN COWL PANEL DURING AN ENGINE OPERATION. THE FORWARD LATCHES ARE IN THE HAZARD AREA ZONE OF THE ENGINE INLET. IF YOU GO INTO THE HAZARD AREA, YOU CAN GET PULLED INTO THE ENGINE. IF YOU DO NOT OBEY, DANGEROUS INJURY OR DEATH CAN OCCUR.

WARNING DO NOT TRY TO OPEN OR CLOSE THE FAN COWL PANEL IN HIGH WINDS OR GUST CONDITIONS OF MORE THAN 40 KNOTS. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT COULD OCCUR.

SUBTASK 71-11-04-490-003-G00

(1) Move an engine and strut access platform, STD-653 next to the fan cowl panel.

SUBTASK 71-11-04-490-004-G00

(2) If it had not done so, attach the fan cowl sling, SPL-14546, to the applicable fan cowl panel as follows:

(a) Install the three bolts [3] that attach the three hoist pins [2] to the fan cowl Ground Support Equipment (GSE) lift points.

1) Tighten the bolts [3] to 15 in-lb (2 N·m) - 30 in-lb (3 N·m).

(b) Engage the hoist, STD-467, with the sling hoist plate.

(c) Put the hoist, STD-467, and the sling hoist plate above the fan cowl panel.

(d) Make sure that the fan cowl sling, SPL-14546, does not touch the surface of the fan cowl panel.

(e) Attach the three sling straps [4] to the sling link [6] with the three Lok-A-Loys [5].

NOTE: The sling straps [4], the sling link [6], and the three Lok-A-Loys [5] are part of the fan cowl sling, SPL-14546.

(f) Attach the sling straps [4] to the fan cowl panel.

(g) Attach a dynamometer and a master link on the sling link [6].

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SUBTASK 71-11-04-980-002-G00

(3) Close the fan cowl panels as follows:

(a) Close the left fan cowl panel first.

(b) Use the hoist, STD-467, to lift the fan cowl slightly to relieve the weight from the SDOS and HOR collars.

(c) Use the unlock pole, SPL-10926, to pull the lock collar down to disengage the locking mechanism.

1) As an option, use a ladder as required to disengage the lock collar.

WARNING YOU MUST CONTROL THE WEIGHT AND RATE OF CLOSURE OF THE FAN COWL. FAILURE TO CONTROL THE RATE OF CLOSURE CAN CAUSE INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(d) While you support the fan cowl, lower it into the lower static position.

(e) Use the forward alignment bumper on the fan cowl to help closing it.

NOTE: The fan cowls naturally swing forward when opening and closing. The alignment bumper on each fan cowl helps to prevent strikes to the inlet cowl and engine components.

(f) Make sure that the forward fan cowl V-blade engages correctly with the inlet TV-chord.

(g) Make sure that the radial restraint pin engages the receiver at the bottom of the engine then push to seat the pin.

(h) Repeat the steps above again to close the right-hand fan cowl panel.

(i) Make sure that the shear pins of the right-hand fan cowl panel engage with their respective bushings on the left-hand fan cowl panel.

SUBTASK 71-11-04-090-003-G00

(4) Remove the fan cowl sling, SPL-14546, as follows:

(a) Remove the three bolts [3] that attach the three hoist pins [2] to the fan cowl GSE lift points.

(b) Move the hoist, STD-467 away from the fan cowl panel.

(c) Disconnect the sling straps [4] from the sling hoist plate.

(d) Remove the sling hoist plate from the hoist, STD-467.

SUBTASK 71-11-04-410-003-G00

CAUTION MAKE SURE THAT THE FAN COWLS ARE FULLY CLOSED AND YOU CORRECTLY LATCH THE THREE FAN COWL LATCHES. IF YOU DO NOT FULLY CLOSE AND CORRECTLY LATCH THE THREE FAN COWL LATCHES, DAMAGE TO EQUIPMENT CAN OCCUR.

(5) Close the fan cowl latches (3 locations) at the 6:00 o'clock position as follows:

NOTE: Engage the latch hooks in the specific order.

(a) Engage the latch hook in the center keeper.

(b) Engage the latch hook in the forward keeper.

(c) Engage the latch hook in the aft keeper.

(d) Push the latch handles closed in the same order.

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1) If the latch handles do not close smoothly, do this task: Fan Cowl Latch Adjustment, TASK 71-11-05-821-801-G00.

SIA 008-999; SIA 001-007 POST SB 737-71-1894

(e) For the right fan cowl panel, do the steps that follow:

1) Push the fan cowl latch indication system handle in through the oil tank access door opening.

NOTE: Make sure that you do not force the handle back into the fan cowl. Check the blades if it is not easy to push the handle back.

2) Close the oil tank access door.

3) Make sure that you fully close and secure the oil tank access door.

SIA ALL

F. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-04-090-004-G00

(1) Move the engine and strut access platform, STD-653 away from the engine.

SUBTASK 71-11-04-440-003-G00

(2) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FAN COWL PANELS - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) Fan Cowl Panels Removal

(2) Fan Cowl Panels Installation.

TASK 71-11-04-000-801-G00

2. Fan Cowl Panels Removal

(Figure 401, Figure 402, and Figure 403)

A. General

(1) This task gives the instructions to remove the fan cowl panels.

(2) The removal task of the left and right fan cowl panels are the same.

(3) Use a special fan cowl sling, SPL-14546, and hoist, STD-467, to do this task.

(4) Each fan cowl panel weighs approximately 160 lb (73 kg).

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-010-804-G00	Open the Fan Cowl Panels (Sling Method) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)

C. Tools/Equipment

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

Reference	Description
SPL-14546	Sling Eqpt - Fan Cowl, LEAP-1B Engine Part #: C71031-1 Supplier: 81205
STD-467	Hoist - 500 lb (226.8 kg)
STD-748	Rope - 12 ft (3.6 m) minimum
STD-858	Tag - DO NOT OPERATE
STD-1144	Load Cell - 0-7500 pound capacity, +/- 2% Accuracy, 30 foot display cable length

D. Location Zones

Zone	Area
413	Engine 1 - Fan Cowl, Left
414	Engine 1 - Fan Cowl, Right
423	Engine 2 - Fan Cowl, Left
424	Engine 2 - Fan Cowl, Right

E. Prepare for the Removal

SUBTASK 71-11-04-860-009-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

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(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-11-04-860-010-G00

CAUTION RETRACT THE LEADING EDGE SLATS, AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THESE PRECAUTIONS, THE FAN COWL PANELS WILL HIT THE SLATS. DAMAGE WILL OCCUR.

(2) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 71-11-04-040-003-G00

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

SUBTASK 71-11-04-860-019-G00

(4) Make sure that the thrust reverser is closed and latched (TASK 78-31-00-010-802-G00).

SUBTASK 71-11-04-490-005-G00

WARNING DO NOT TRY TO REMOVE OR INSTALL THE FAN COWL PANELS IN HIGH WINDS OR GUST CONDITIONS OF MORE THAN 40 KNOTS. THE WINDS CAN CAUSE THE FAN COWL PANELS TO MOVE SUDDENLY. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(5) Attach the fan cowl sling, SPL-14546, to the applicable fan cowl panel [1] as follows (Figure 401):

(a) Hang the sling hoist plate (master link) onto the hoist, STD-467.

(b) Attach a Load Cell, STD-1144, to the sling link.

NOTE: The Load Cell, STD-1144, or equivalent, or similar capacity equipment is customer furnished equipment. The required minimum load cell capacity is 250 lb (113 kg).

(c) Attach the three sling straps [2] to the Load Cell, STD-1144, with the three Lok-A-Loys and sling link.

NOTE: The sling straps, sling link, and the three Lok-A-Loys are part of the fan cowl sling, SPL-14546.

(d) Set the Load Cell, STD-1144, to zero.

(e) Put the hoist, STD-467, and assembled fan cowl sling, SPL-14546, above the fan cowl panel [1].

1) Make sure that the fan cowl sling, SPL-14546, does not touch the surface of the fan cowl panel [1].

(f) Install the three hoist pins [3] on the fan cowl panel [1].

1) Install the three bolts [7] the through the three hoist pins [3] in the plug holes.

2) Tighten the bolts [7] to 10 in-lb (1 N·m) - 30 in-lb (3 N·m).

SUBTASK 71-11-04-010-006-G00

(6) Open the applicable fan cowl panel [1] (TASK 71-11-04-010-801-G00).

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F. Fan Cowl Panels Removal

SUBTASK 71-11-04-020-001-G00

WARNING GET SUFFICIENT AID FROM OTHER PERSONNEL AND EQUIPMENT TO HOLD THE COMPONENT DURING THE REMOVAL, AND INSTALLATION. THE COMPONENT IS HEAVY. THIS WILL PREVENT INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(1) Remove the fan cowl panel [1] from the engine as follows:

NOTE: Boeing does not recommend the removal of the fan cowl without the use of a crane and sling.

NOTE: The fan cowl panel weighs approximately 160 lb (73 kg).

(a) Attach the fan cowl sling, SPL-14546, to the applicable fan cowl panel [1] (TASK 71-11-04-010-804-G00).

(b) Install the rope - 12 ft (3.6 m) minimum, STD-748, on the latch [20].

NOTE: Use the rope - 12 ft (3.6 m) minimum, STD-748, to control the fan cowl panel's position when it is lifted.

WARNING MAKE SURE THAT THE SDOS ACTUATOR IS FULLY EXTENDED AND LOCKED. THE ACTUATOR CONTAINS STORED ENERGY. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURY CAN OCCUR.

WARNING BE CAREFUL AFTER YOU REMOVE THE SDOS ACTUATOR. DO NOT POINT THE ACTUATOR END AT A PERSON. THE ACTUATOR CONTAINS ENERGY OF A SPRING. THIS CAN CAUSE INJURY OR DEATH.

CAUTION ONCE THE FAN COWL SDOS ACTUATOR OR THE FAN COWL HOLD-OPEN ROD IS DETACHED FROM THE FAN COWL PANEL FITTING, IT WILL BE FREE TO FALL. CAREFULLY LOWER THE FAN COWL SDOS ACTUATOR OR HOLD-OPEN ROD UNTIL IT RESTS AGAINST THE ENGINE, IN A POSITION THAT DOES NOT ENDANGER PERSONNEL OR COULD CAUSE DAMAGE TO EQUIPMENT.

(c) Disconnect the fan cowl SDOS actuator [12] from the upper fan cowl panel fitting as follows:

1) Make sure that the fan cowl panel [1] is fully open and fan cowl SDOS actuator [12] is locked.

2) Remove the bolt [8], washer [9], bushing [10], washer [11], and nut [13] that attach the fan cowl SDOS actuator [12] to the upper fan cowl bracket fitting.

3) Carefully put the fan cowl SDOS actuator [12] in the space it occupies when the fan cowl panel [1] is closed.

(d) Disconnect the fan cowl hold-open rod [6] from the fan cowl panel fitting as follows:

1) Remove the bolt [14], washer [15], bushing [16], washer [17], and nut [18] that attach the fan cowl hold-open rod [6] to the fan cowl panel fitting.

2) Carefully put the fan cowl hold-open rod [6] in the space it occupies when the fan cowl panel [1] is closed.

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(e) Disconnect the bonding jumper [5] from the bracket on the forward and center hinge assembly.

WARNING DO NOT FULLY DISENGAGE THE FAN COWL FROM THE STRUT HINGES WHILE A MECHANIC IS UNDER THE COWLING. USE THE DRIFT PINS TO SECURE THE COWLING THEN REMOVE THE DRIFT PINS BY REACHING UNDER THE COWLING. INJURIES TO PERSONS CAN OCCUR.

(f) Disengage the quick-release pins [4] from the forward hinge assembly as follows:

1) Remove the safety pin from the end of the quick-release pin [4].
2) Release the quick-release pin [4] with the button on the end.
3) Remove the quick-release pin [4].
4) Install a drift from the sling kit at the forward hinge.
5) Do the steps above again to disengage the pin from the aft hinge assembly.

(g) Disengage and remove the quick-release pins [4] from the center hinge assembly.

(h) Use the fan cowl sling, SPL-14546, to adjust the position of the fan cowl panel [1] until the forward and aft drift pins can be removed easily.

(i) Make sure that the three sling straps remain tight and balance the weight of the fan cowl panel [1].

(j) Remove the forward and aft drift pins.

(k) Use the rope - 12 ft (3.6 m) minimum, STD-748, to control the position of the fan cowl panel [1].

(l) Move the fan cowl panel [1] away from the engine with the help of the rope - 12 ft (3.6 m) minimum, STD-748.

1) Put the fan cowl panel [1] on a clean, smooth surface.

a) Rest the fan cowl panel [1] on its hinge fittings and bottom edge.

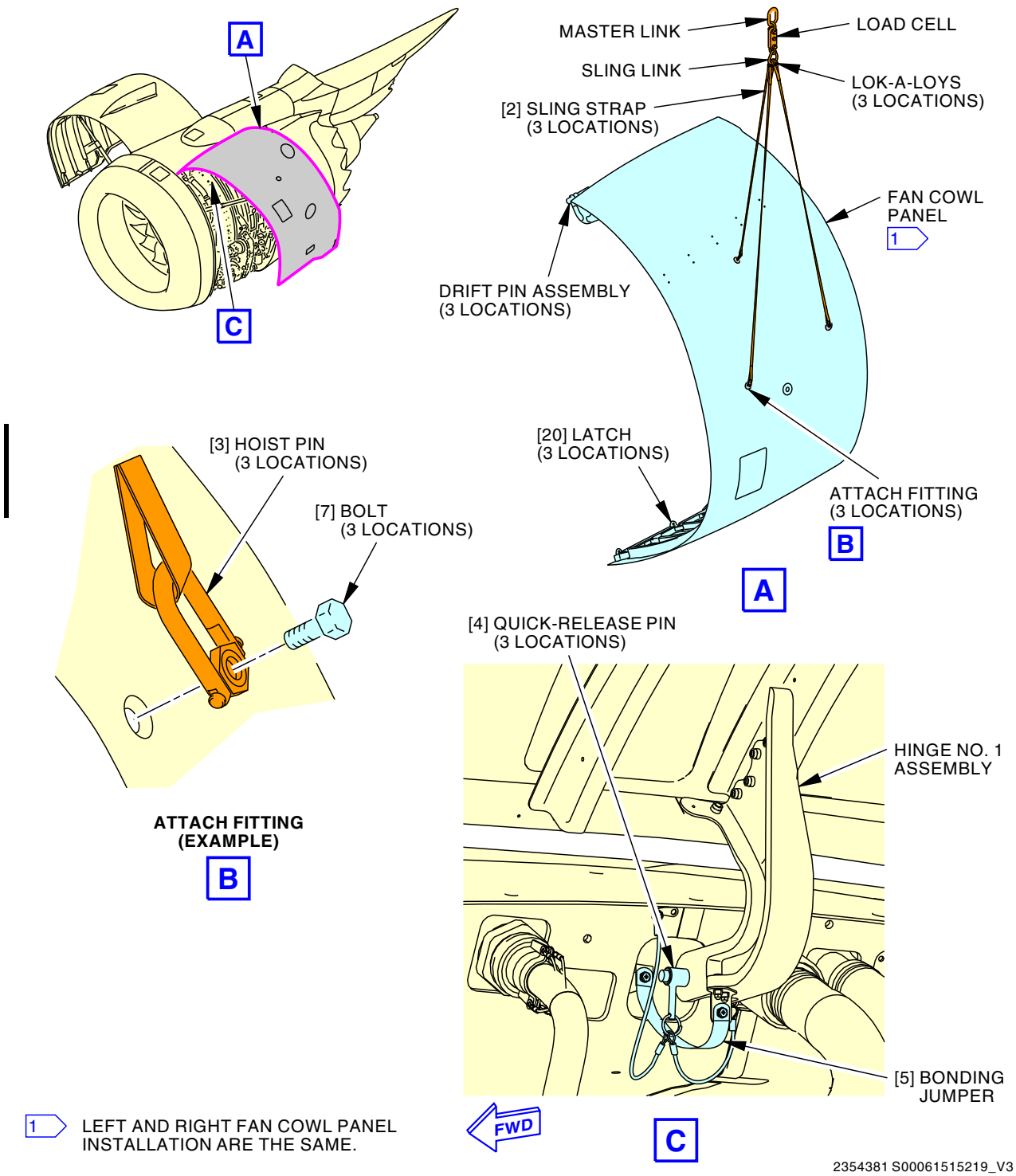
(m) Remove the rope - 12 ft (3.6 m) minimum, STD-748, from the latch [20] if the fan cowl panel [1] will not be re-installed.

SUBTASK 71-11-04-090-005-G00

(2) Remove the sling straps [2] and hoist pins [3] if the fan cowl panel [1] will not be re-installed.

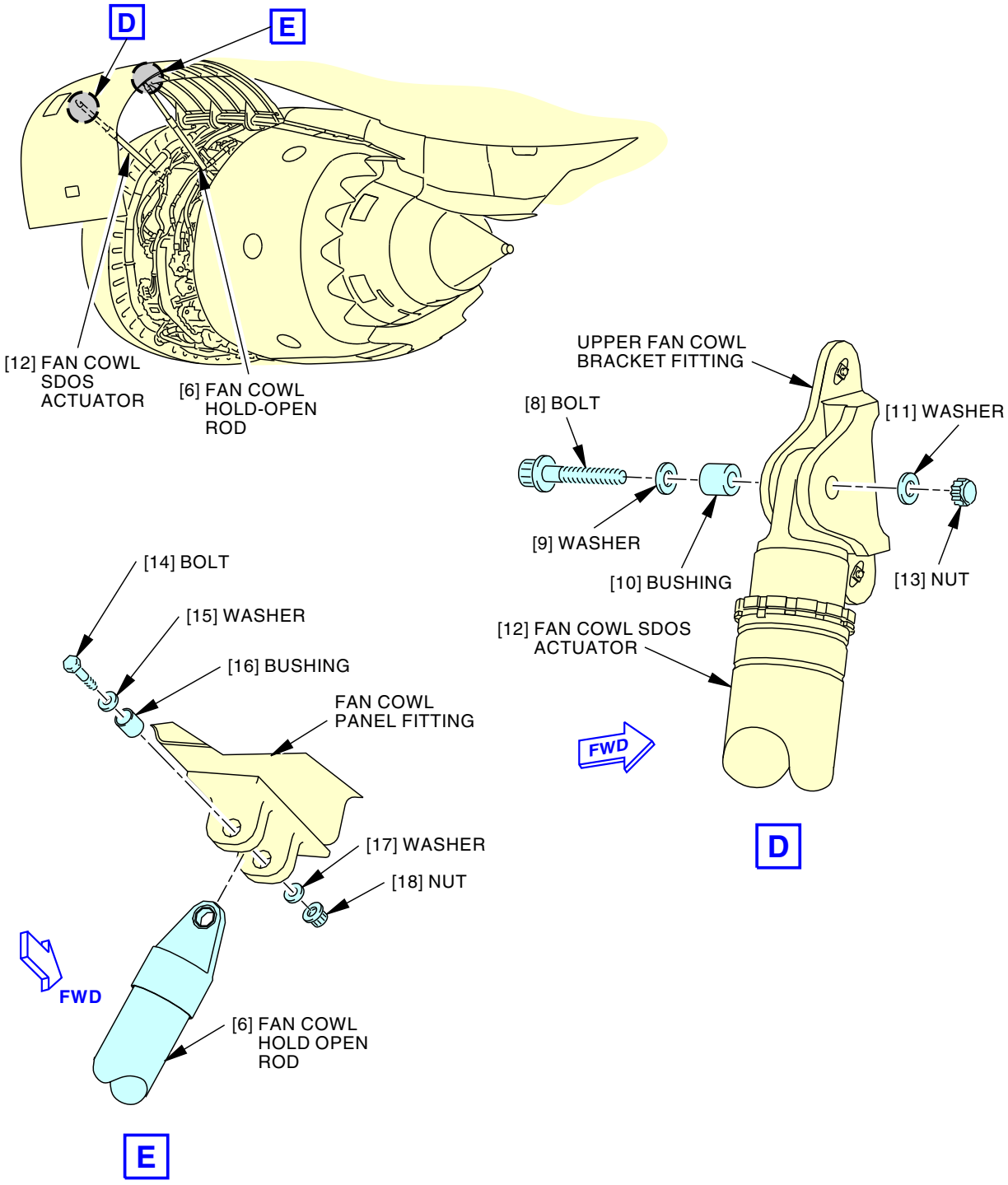
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fan Cowl Panels Installation
Figure 401/71-11-04-990-804-G00 (Sheet 1 of 2)

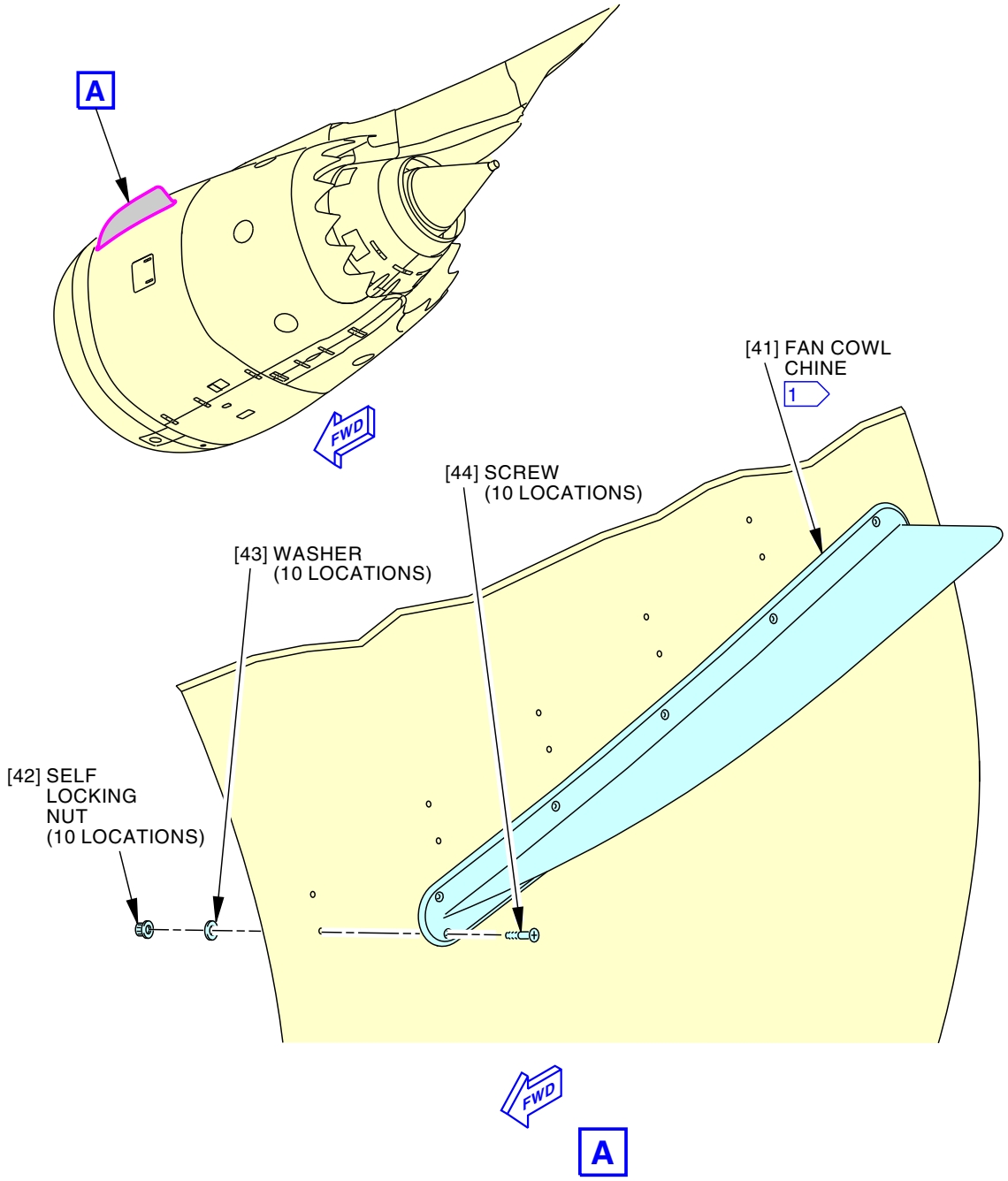
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2570589 S0000616399_V2

Fan Cowl Panels Installation
Figure 401/71-11-04-990-804-G00 (Sheet 2 of 2)

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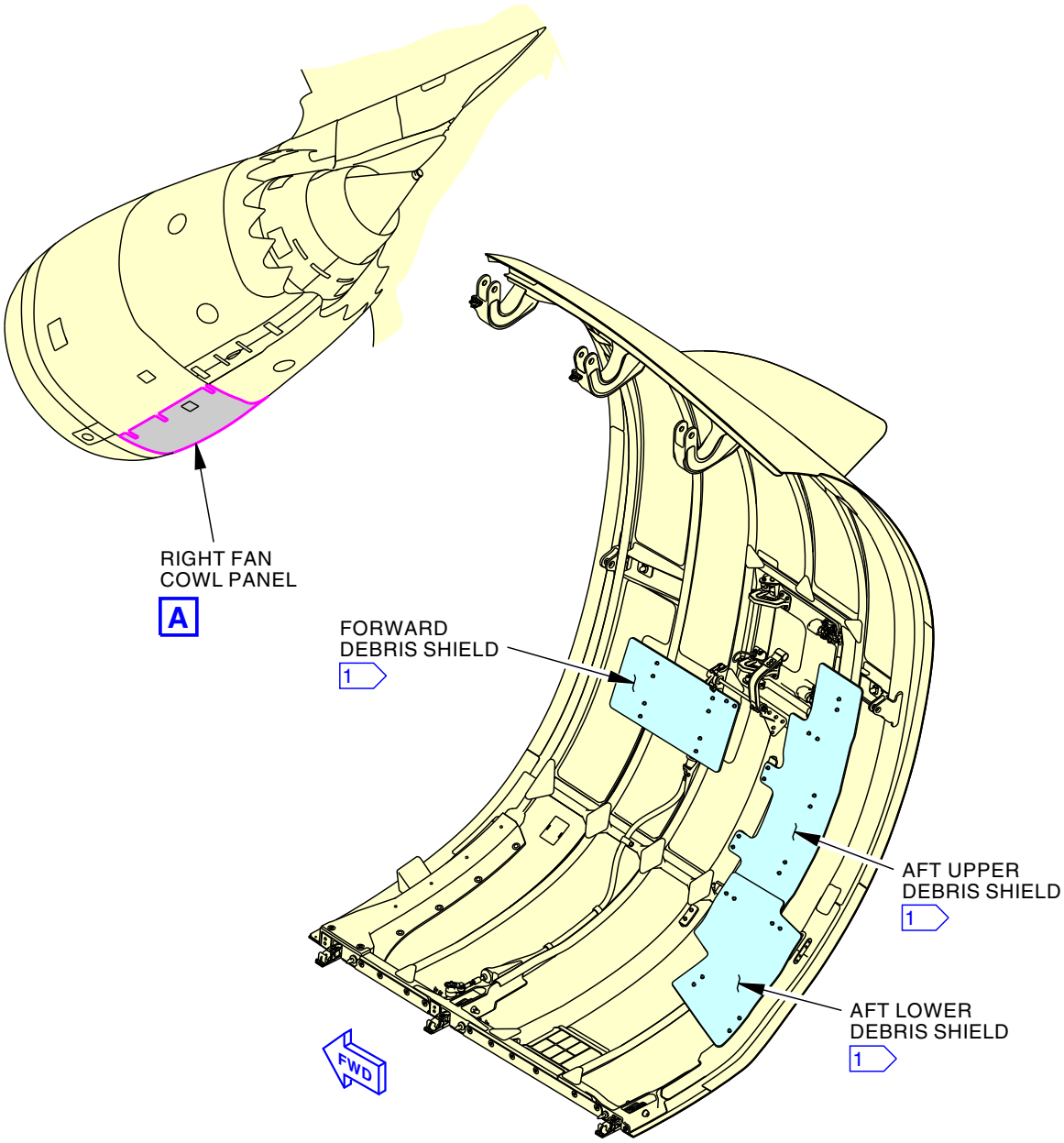


1 THE FAN COWL CHINE IS INSTALLED ON THE INBOARD SIDE OF THE ENGINE. THE FAN COWL CHINES ARE INTERCHANGEABLE ON THE FAN COWL.

2354385 S00061515223_V2

Fan Cowl Chine Provision Installation
Figure 402/71-11-04-990-806-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details



RIGHT FAN COWL PANEL (TYPICAL)

A

1 THE FAN COWL CROSS ENGINE DEBRIS SHIELDS ARE INSTALLED ONLY ON THE INBOARD FAN COWL PANEL OF ENGINE 1.

2848452 S0000666183_V1

Fan Cowl Cross Engine Debris Shield
Figure 403/71-11-04-990-810-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-11-04-400-801-G00

3. Fan Cowl Panels Installation

(Figure 401, Figure 402, and Figure 403)

A. General

(1) This task gives the instructions to install the fan cowl panels.

(2) The installation procedure of the left and the right fan cowl panels is the same.

(3) You will need a special fan cowl sling, SPL-14546 and a hoist, STD-467 to do this task.

(4) Each fan cowl panel weighs approximately 160 lb (73 kg).

B. References

Reference	Title
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
71-11-02-000-801-G00	Fan Cowl Chine Removal (P/B 401)
71-11-02-400-801-G00	Fan Cowl Chine Installation (P/B 401)
71-11-03-000-801-G00	Fan Cowl Cross Engine Debris Shield Removal (P/B 401)
71-11-03-400-801-G00	Fan Cowl Cross Engine Debris Shield Installation (P/B 401)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
71-11-05-821-801-G00	Fan Cowl Latch Adjustment (P/B 501)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)

C. Tools/Equipment

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

Reference	Description
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-14546	Sling Eqpt - Fan Cowl, LEAP-1B Engine Part #: C71031-1 Supplier: 81205
STD-467	Hoist - 500 lb (226.8 kg)
STD-748	Rope - 12 ft (3.6 m) minimum
STD-858	Tag - DO NOT OPERATE
STD-1144	Load Cell - 0-7500 pound capacity, +/- 2% Accuracy, 30 foot display cable length

D. Consumable Materials

Reference	Description	Specification
D00014	Grease - Molybdenum Disulfide, Low & High Temperature	MIL-G-21164 (NATO G-353)

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E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Fan cowl panel	71-11-04-01-040	SIA ALL
		71-11-04-01-045	SIA ALL
		71-11-04-01-050	SIA ALL
		71-11-04-01-055	SIA ALL

F. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

G. Prepare for the Installation

SUBTASK 71-11-04-860-017-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-11-04-860-020-G00

(2) Make sure that the thrust reverser is closed and latched (TASK 78-31-00-010-802-G00).

SUBTASK 71-11-04-020-002-G00

WARNING DO NOT TRY TO REMOVE OR INSTALL THE FAN COWL PANELS IN HIGH WINDS OR GUST CONDITIONS OF MORE THAN 40 KNOTS. THE WINDS CAN CAUSE THE FAN COWL PANELS TO MOVE SUDDENLY. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

WARNING MAKE SURE THAT ALL FAN COWL CROSS ENGINE DEBRIS SHIELDS ARE INSTALLED ON THE INBOARD FAN COWL PANEL OF ENGINE 1. OTHERWISE, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION MAKE SURE THAT THE FAN COWL CHINE IS INSTALLED ONLY ON THE INBOARD FAN COWL PANEL OF EACH ENGINE. THE INCORRECT INSTALLATION OF THE FAN COWL CHINE CAN CAUSE UNSATISFACTORY AIRPLANE PERFORMANCE.

(3) If the new fan cowl panel [1] is used, do the steps that follow:

NOTE: The fan cowls are interchangeable between engine position, but you must install the chine and the Cross Engine Debris (CED) shields in the correct location.

(a) Do a check to make sure whether the fan cowl panel requires to have the fan cowl chine installed.

NOTE: The fan cowl chine is installed only on the inboard fan cowl panel of each engine.

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1) If the fan cowl panel is to be used on the inboard of engine and if the fan cowl chine is not installed, install the fan cowl chine [41] (TASK 71-11-02-400-801-G00).

2) If the fan cowl panel is to be used on the outboard of engine and if the fan cowl chine is installed, remove the fan cowl chine [41] (TASK 71-11-02-000-801-G00).

(b) Do a check to make sure whether the fan cowl panel requires to have the fan cowl CED shields installed.

NOTE: The fan cowl CED shields are installed only on the inboard fan cowl of engine 1.

1) If the fan cowl panel is to be used on the inboard of engine 1 and if the fan cowl CED shields are not installed, install the fan cowl CED shields (TASK 71-11-03-000-801-G00).

2) If the fan cowl panel is to be used on the outboard of engine 2 and if the fan cowl CED shields are installed, remove the fan cowl CED shields (TASK 71-11-03-400-801-G00).

(c) If the fan cowl sling, SPL-14546 is not attached to the fan cowl panel [1], attach the fan cowl sling, SPL-14546 as follows (Figure 401):

1) Hang the sling hoist plate (master link) onto the hoist, STD-467.

2) Attach a Load Cell, STD-1144 to the sling link.

NOTE: The Load Cell, STD-1144 or equivalent or similar capacity equipment is customer furnished equipment. The required minimum load cell capacity is 250 lb (113 kg).

3) Attach the three sling straps [2] to the Load Cell, STD-1144 with the three Lok-A-Loys and the sling link.

NOTE: The sling straps [2], the sling link, and the three Lok-A-Loys are part of the fan cowl sling, SPL-14546.

4) Set the Load Cell, STD-1144 to zero.

5) Put the hoist, STD-467 and the assembled fan cowl sling, SPL-14546 above the fan cowl panel [1].

a) Make sure that the fan cowl sling, SPL-14546 does not touch the surface of the fan cowl panel [1].

WARNING MONITOR THE WEIGHT OF THE LOAD WHILE YOU PUT WEIGHT ON THE SLING. MAKE SURE THAT THE WEIGHT OF THE LOAD IS LESS THAN THE WEIGHT LIMIT. IF THE WEIGHT OF THE LOAD IS MORE THAN THE LIMIT, THE COMPONENT CAN BREAK. THIS CAN CAUSE INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

6) Adjust the hoist, STD-467 to hold the weight of the fan cowl panel [1].

NOTE: The fan cowl panel weighs approximately 160 lb (73 kg).

7) Install the three hoist pins [3] on the fan cowl panel [1].

a) Install the three bolts [7] through the three hoist pins [3] in the plug holes.

b) Tighten the bolts [7] to 10 in-lb (1 N·m) - 30 in-lb (3 N·m).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

H. Fan Cowl Panels Installation

SUBTASK 71-11-04-410-004-G00

WARNING

GET SUFFICIENT AID FROM OTHER PERSONNEL AND EQUIPMENT TO HOLD THE COMPONENT DURING THE REMOVAL, AND INSTALLATION. THE COMPONENT IS HEAVY. THIS WILL PREVENT INJURIES TO PERSONNEL, AND DAMAGE TO EQUIPMENT.

(1) Install the fan cowl panel [1] on the applicable engine as follows:

NOTE: Boeing does not recommend the installation of the fan cowl without the use of a crane and sling.

(a) If it is installed on the strut, remove the quick-release pins [4] from the hinge assemblies.

NOTE: Let the quick-release pins [4] hang by their lanyards.

(b) Apply the grease, D00014 to the quick-release pins [4].

(c) Install a rope - 12 ft (3.6 m) minimum, STD-748 on the latch [20].

NOTE: Use the rope to control the fan cowl panel's position when it is lifted

(d) Lift the fan cowl panel [1] with the hoist, STD-467.

(e) Adjust the sling strap [2] until the fan cowl panel [1] hangs at approximately 61 degrees (open position).

(f) Align the fan cowl panel [1] hinges with the strut hinge assemblies.

WARNING

DO NOT FULLY DISENGAGE THE FAN COWL FROM THE STRUT HINGES WHILE A MECHANIC IS UNDER THE COWLING. USE THE DRIFT PINS TO SECURE THE COWLING THEN REMOVE THE DRIFT PINS BY REACHING UNDER THE COWLING. INJURIES TO PERSONS CAN OCCUR.

(g) Install the drift pins from the sling tool kit into the forward and aft hinge assemblies.

(h) Insert the quick-release pins [4] in the center hinge assembly from the forward side.

1) Install the safety pin through the hole in the end of the quick-release pins [4].

(i) Remove the drift pin from the forward hinge assembly and insert the quick-release pins [4] from the aft side.

1) Install the safety pin through the hole in the end of the quick-release pins [4].

(j) Remove the drift pin from the aft hinge assembly and insert the quick-release pins [4] from the forward side.

1) Install the safety pin through the hole in the end of the quick-release pins [4].

(k) Connect the bonding jumper [5] to the bracket on the forward and center hinge assembly.

1) Use a intrinsically safe approved bonding meter, COM-1550 to make sure that the bonding resistance between the bonding jumper [5] and the bracket is 0.0010 ohm or less.

(l) Connect the fan cowl SDOS actuator [12] to the fan cowl panel fitting as follows:

1) Align the fan cowl SDOS actuator [12] end with the fan cowl panel fitting.

2) Install the bolts [8], the washers [9], the bushing [10], the washer [11], and the nut [13] that attach the fan cowl SDOS actuator [12] to the fan cowl panel fitting.

3) Tighten the nut [13] to 310.00 in-lb (35.0 N·m) - 330.00 in-lb (37.3 N·m).

(m) Connect the fan cowl hold-open rod [6] to the fan cowl panel fitting as follows:

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1) Align the fan cowl hold-open rod [6] end with the fan cowl panel fitting.

2) Install the bolt [14], the washer [15], the bushing [16], the washer [17], and the nut [18] that attach the fan cowl hold-open rods [6] to the fan cowl panel fitting.

3) Tighten the nut [18] to 107.0 in-lb (12.1 N·m) - 113.0 in-lb (12.8 N·m).

(n) Remove the rope - 12 ft (3.6 m) minimum, STD-748 from the latch [20].

SUBTASK 71-11-04-490-008-G00

(2) Remove the fan cowl sling, SPL-14546 as follows:

(a) Lower the hoist, STD-467 until there is no load on the fan cowl sling, SPL-14546.

(b) Slowly close the fan cowl panel [1] with the fan cowl sling, SPL-14546 attached.

1) Make sure that the fan cowl sling, SPL-14546, does not touch the surface of the fan cowl panel [1].

(c) Disconnect the three sling straps [2] from the sling link.

(d) Remove the sling hoist plate (master link) from the hoist, STD-467.

(e) Remove the three hoist pins [3] from the fan cowl panel [1].

1) Remove the three bolts [7] through the three hoist pins [3] in the plug holes.

I. Fan Cowl Panels Installation Test

SUBTASK 71-11-04-610-001-G00

(1) Close the applicable fan cowl panel [1] (TASK 71-11-04-410-801-G00).

SUBTASK 71-11-04-710-001-G00

(2) If the new fan cowl panel is used, do this task: Fan Cowl Latch Adjustment, TASK 71-11-05-821-801-G00.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-04-440-004-G00

(1) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

SUBTASK 71-11-04-860-014-G00

(2) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FAN COWL PANELS - ADJUSTMENT/TEST

1. General

A. This procedure has this task:

(1) Engine Side Radial Restraint Bracket Adjustment.

TASK 71-11-04-820-801-G00

2. Engine Side Radial Restraint Bracket Adjustment

(Figure 501)

A. General

(1) This task gives the instructions to adjust the engine side radial restraint bracket.

NOTE: Adjustment to the engine side radial restraint bracket can impact the fit-up of any future fan cowls doors installed with the adjusted bracket. Future installations may require additional engine side radial restraint bracket adjustments.

B. References

Reference	Title
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-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
413	Engine 1 - Fan Cowl, Left
414	Engine 1 - Fan Cowl, Right
423	Engine 2 - Fan Cowl, Left
424	Engine 2 - Fan Cowl, Right

E. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2

F. Prepare for the Adjustment

SUBTASK 71-11-04-860-022-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-11-04-010-009-G00

(2) On the applicable engine, open the left fan cowl panel (TASK 71-11-04-010-801-G00).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Open these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2

G. Engine Side Radial Restraint Bracket Adjustment

SUBTASK 71-11-04-020-003-G00

(1) Remove the engine side radial restraint bracket [1] from the applicable engine as follows:

(a) Remove the bolt [3], washer [4], washers [5], and nut [6] at 2 locations.

(b) Remove the bolt [8], washer [9], and washer [10] at 4 locations.

SUBTASK 71-11-04-020-004-G00

(2) Disassemble the engine side radial restraint bracket center fitting [11] from the engine side radial restraint flange [12] and radial restraint flange [20] as follows:

(a) Remove the bolt [16], washer [15] (if installed), washer [14] (if installed), and collar [13] or nut [13] at 4 locations.

(b) Remove the bolt [17], washer [15] (if installed), washer [14] (if installed), and collar [13] or nut [13] at 4 locations.

(c) Remove the shim [18] and filler [19].

SUBTASK 71-11-04-420-003-G00

(3) Re-assemble the engine side radial restraint bracket center fitting [11] to the engine side radial restraint flange [12] and radial restraint flange [20] as follows:

(a) Re-assemble the shim [18] and filler [19], all or in part to either side of the radial restraint bracket center fitting [11] to align hole with fan cowl door pin.

1) Use only one shim [18] and filler [19].

2) Make sure that the total thickness of the shim [18] and filler [19] assembled does not exceed 0.125 in. (3.175 mm)

NOTE: If the shim is damage or missing layers, replace the shim.

NOTE: You may change the grip length of the bolt [16] and bolt [17] a maximum of ±3 sizes to fit the shim thickness provided that all standard installation requirements are met.

(b) Install the bolt [16], washer [15] (if installed), washer [14] (if installed), and collar [13] or nut [13] at 4 locations.

(c) Install the bolt [17], washer [15] (if installed), washer [14] (if installed), and collar [13] or nut [13] at 4 locations.

SUBTASK 71-11-04-420-004-G00

(4) Install the engine side radial restraint bracket [1] to the applicable engine as follows:

(a) Install the bolt [3], washer [4], washers [5], and nut [6] at 2 locations.

(b) Install the bolt [8], washer [9], and washer [10] at 4 locations.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-04-410-006-G00

(1) On the applicable engine, close the left fan cowl panel (TASK 71-11-04-410-801-G00).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Close these access panels:

Number	Name/Location
413	Left Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2

SUBTASK 71-11-04-860-023-G00

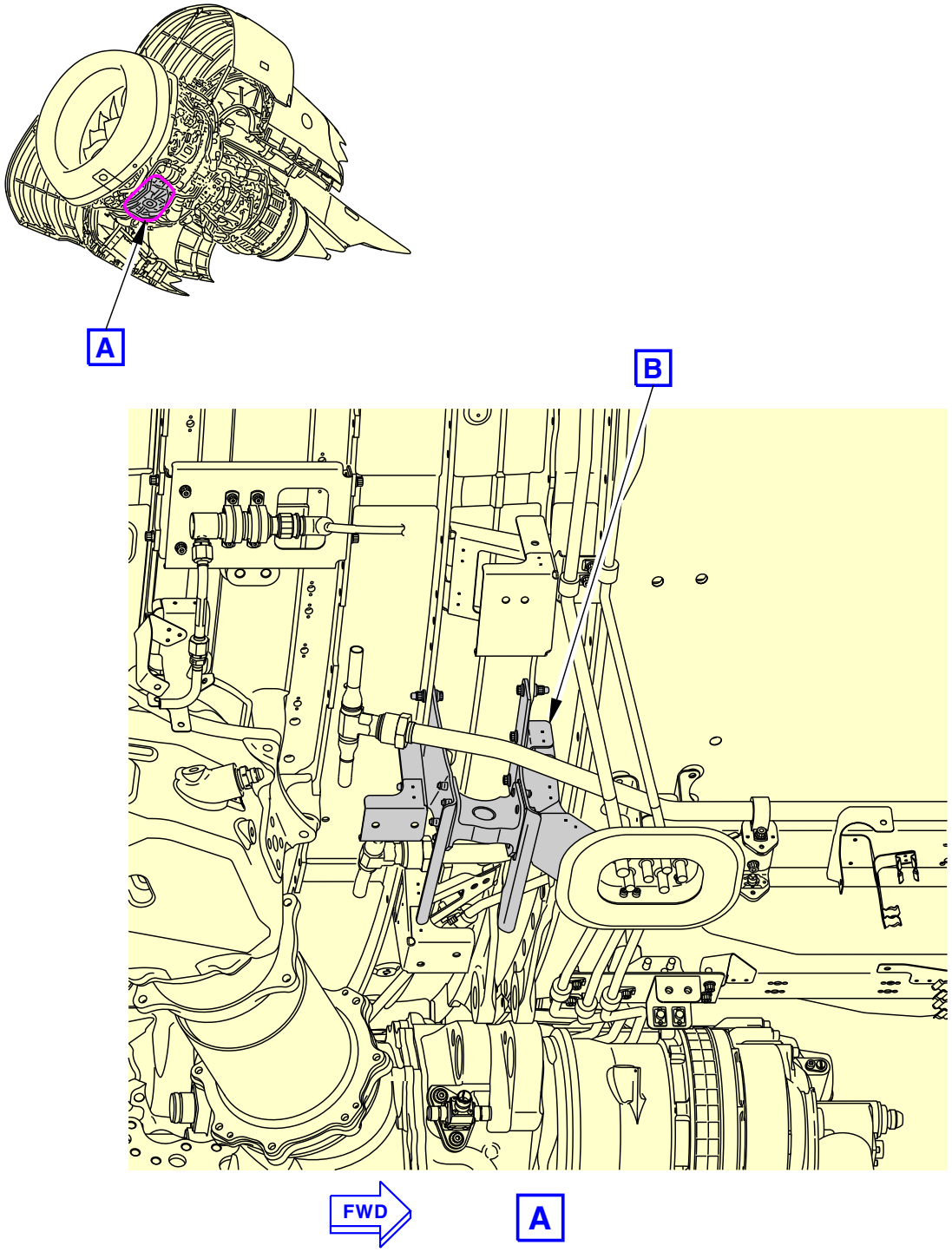
(2) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

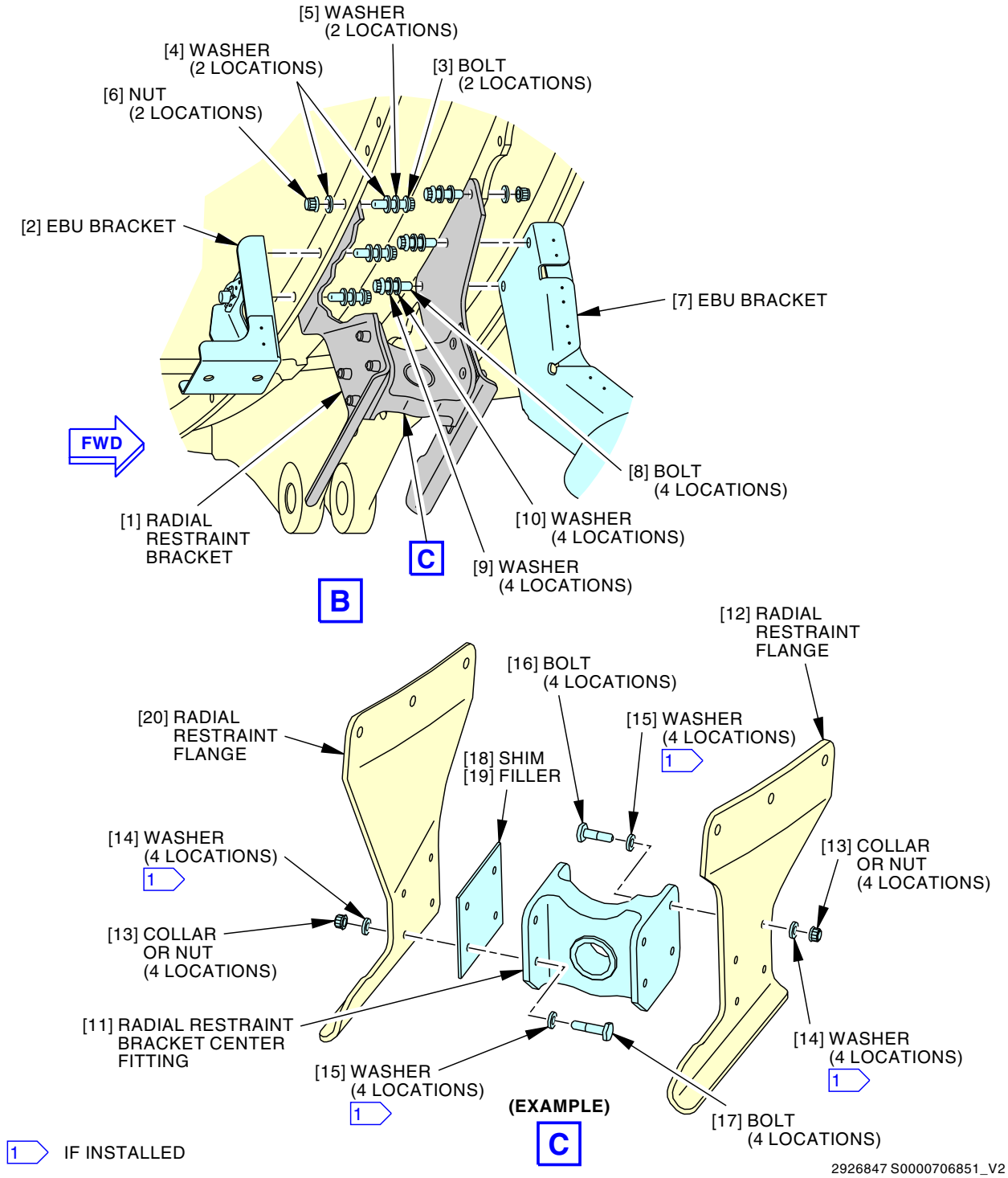
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Engine Side Radial Restraint Bracket Adjustment
Figure 501/71-11-04-990-812-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Engine Side Radial Restraint Bracket Adjustment
Figure 501/71-11-04-990-812-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FAN COWL PANELS - INSPECTION/CHECK

1. General

A. This procedure has one task:

(1) Fan cowl panels inspection.

TASK 71-11-04-200-801-G00

2. Fan Cowl Panels Inspection

A. General

(1) This task gives the instructions to do the visual inspection of the fan cowl panel.

B. References

Reference	Title
71-11-02-000-801-G00	Fan Cowl Chine Removal (P/B 401)
71-11-02-400-801-G00	Fan Cowl Chine Installation (P/B 401)
71-11-04-000-801-G00	Fan Cowl Panels Removal (P/B 401)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
71-11-04-400-801-G00	Fan Cowl Panels Installation (P/B 401)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
71-11-05-000-801-G00	Fan Cowl Latches Removal (P/B 401)
71-11-05-000-802-G00	Fan Cowl Latch Keeper Pin Removal (P/B 401)
71-11-05-400-801-G00	Fan Cowl Latches Installation (P/B 401)
71-11-05-400-802-G00	Fan Cowl Latch Keeper Pin Installation (P/B 401)
71-11-10-000-801-G00	Engine Oil Tank Access Door Removal (P/B 401)
71-11-10-400-801-G00	Engine Oil Tank Access Door Installation (P/B 401)
71-12-01-000-801-G00	Fan Cowl SDOS Actuators Removal (P/B 401)
71-12-01-400-801-G00	Fan Cowl SDOS Actuators Installation (P/B 401)

C. Tools/Equipment

Reference	Description
STD-653	Platform - Engine and Strut Access
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. 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

F. Prepare for the Inspection

SUBTASK 71-11-04-860-015-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-11-04-010-007-G00

(2) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

(a) On the applicable engine, 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

SUBTASK 71-11-04-490-009-G00

(3) Put the engine and strut access platform, STD-653 into position.

G. Fan Cowl Panels Inspection

SUBTASK 71-11-04-210-001-G00

(1) Examine the fan cowl panel for damage to the skin with the limits that follow:

(a) Examine the skin of the fan cowl panel for scores, cracks, gouges, nicks, and loose or missing fasteners.

1) If there are cracks and loose or missing fasteners, replace the fan cowl panel (TASK 71-11-04-000-801-G00 and TASK 71-11-04-400-801-G00).

2) If there are scores, cracks, gouges or nicks, refer to the Structural Repair Manual (SRM) for repair instructions.

SUBTASK 71-11-04-210-002-G00

(2) Examine the fan cowl panel for a delamination with the limits that follow:

(a) For the allowable damage limits for the fan cowl panel, refer to the SRM.

NOTE: The SRM gives allowable limits for delamination, dents, nicks, scratches, gouges, or corrosion in the fan cowl panel.

(b) If the delamination is not in the permitted limits, replace the fan cowl panel (TASK 71-11-04-000-801-G00 and TASK 71-11-04-400-801-G00).

SUBTASK 71-11-04-210-003-G00

(3) Examine the edge protection and locators of the fan cowl panel for cracks, gouges, nicks or loose or missing fasteners.

(a) If there are cracks, gouges, nicks, or loose or missing fasteners, replace the fan cowl panel (TASK 71-11-04-000-801-G00 and TASK 71-11-04-400-801-G00).

SUBTASK 71-11-04-210-004-G00

(4) Examine the fan cowl panel hinges for cracks, gouges, nicks or loose or missing fasteners.

(a) If there are cracks, gouges, nicks, or loose or missing fasteners, replace the fan cowl panel (TASK 71-11-04-000-801-G00 and TASK 71-11-04-400-801-G00).

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SUBTASK 71-11-04-210-005-G00

(5) Examine the latch housings of the fan cowl panel for cracks, gouges, nicks or loose or missing fasteners.

(a) If there are cracks, gouges, nicks, or loose or missing fasteners, replace the fan cowl panel latch (TASK 71-11-05-000-801-G00 and TASK 71-11-05-400-801-G00).

SUBTASK 71-11-04-210-006-G00

(6) Examine the latch keepers of the fan cowl panel for cracks, gouges, nicks or loose or missing fasteners.

(a) If there are cracks, gouges, nicks, or loose or missing fasteners replace the latch keepers (TASK 71-11-05-000-802-G00 and TASK 71-11-05-400-802-G00).

SUBTASK 71-11-04-210-007-G00

(7) Examine the oil tank and IDG access doors on the fan cowl panels for cracks, gouges, nicks or loose or missing fasteners.

(a) If there are cracks, gouges, nicks, or loose or missing fasteners, replace the oil tank access door (TASK 71-11-10-000-801-G00 and TASK 71-11-10-400-801-G00).

SUBTASK 71-11-04-210-008-G00

(8) Examine the fan cowl chine for cracks, gouges, nicks or loose or missing fasteners.

(a) If there are cracks, gouges, nicks, or loose or missing fasteners, replace the fan cowl chine (TASK 71-11-02-000-801-G00 and TASK 71-11-02-400-801-G00).

SUBTASK 71-11-04-210-009-G00

(9) Examine the Spring Door Opening System (SDOS) actuators for leaks (TASK 71-12-01-000-801-G00).

SUBTASK 71-11-04-900-001-G00

(10) If there is damage or leaks, replace the SDOS actuator (TASK 71-12-01-000-801-G00 and TASK 71-12-01-400-801-G00).

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-04-090-006-G00

(1) Remove the engine and strut access platform, STD-653.

NOTE: Make sure that the work area is clean of all tools and items used for the task.

SUBTASK 71-11-04-860-016-G00

(2) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

SUBTASK 71-11-04-410-005-G00

(3) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

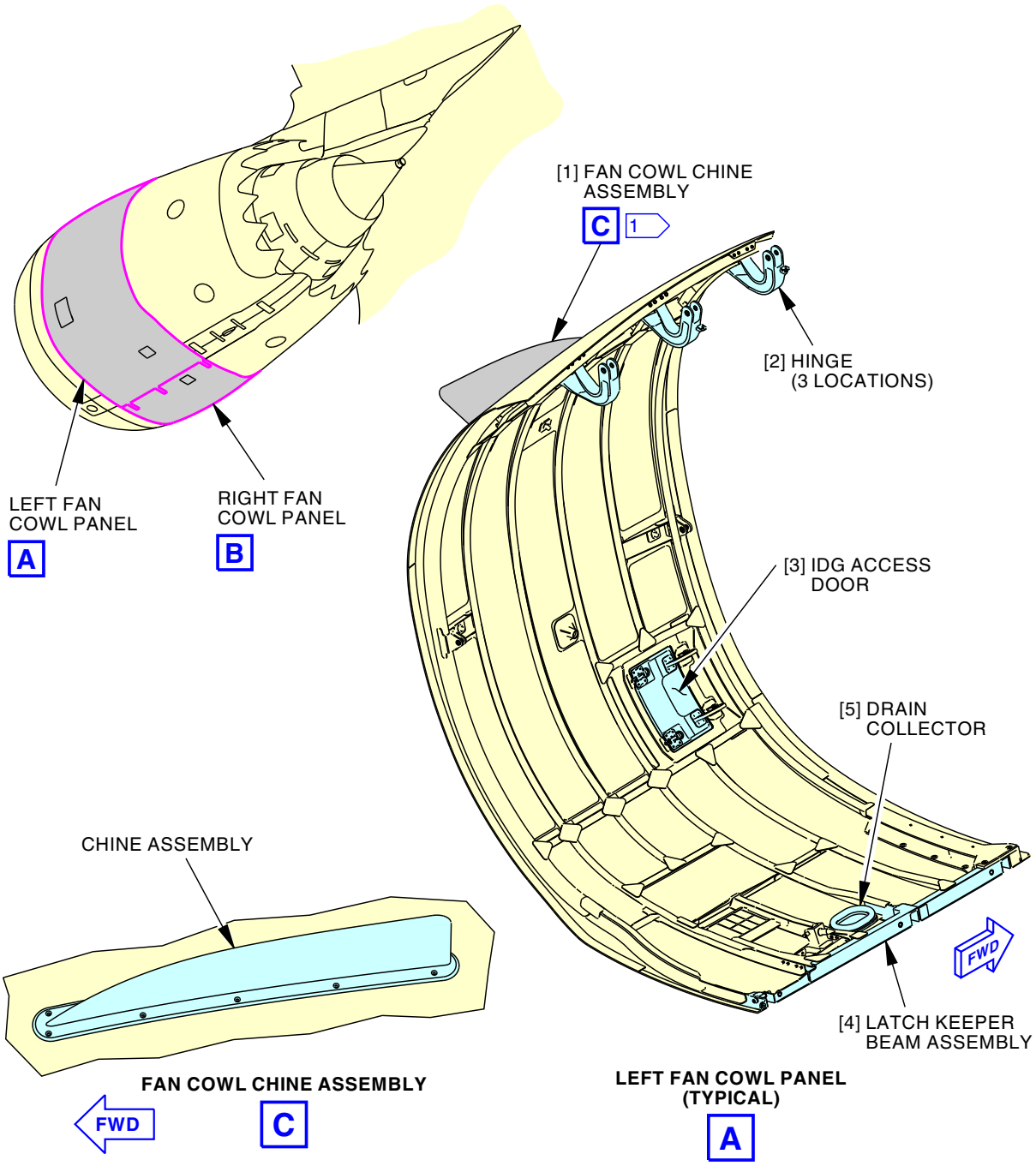
(a) On the applicable engine, close these access panels:

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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



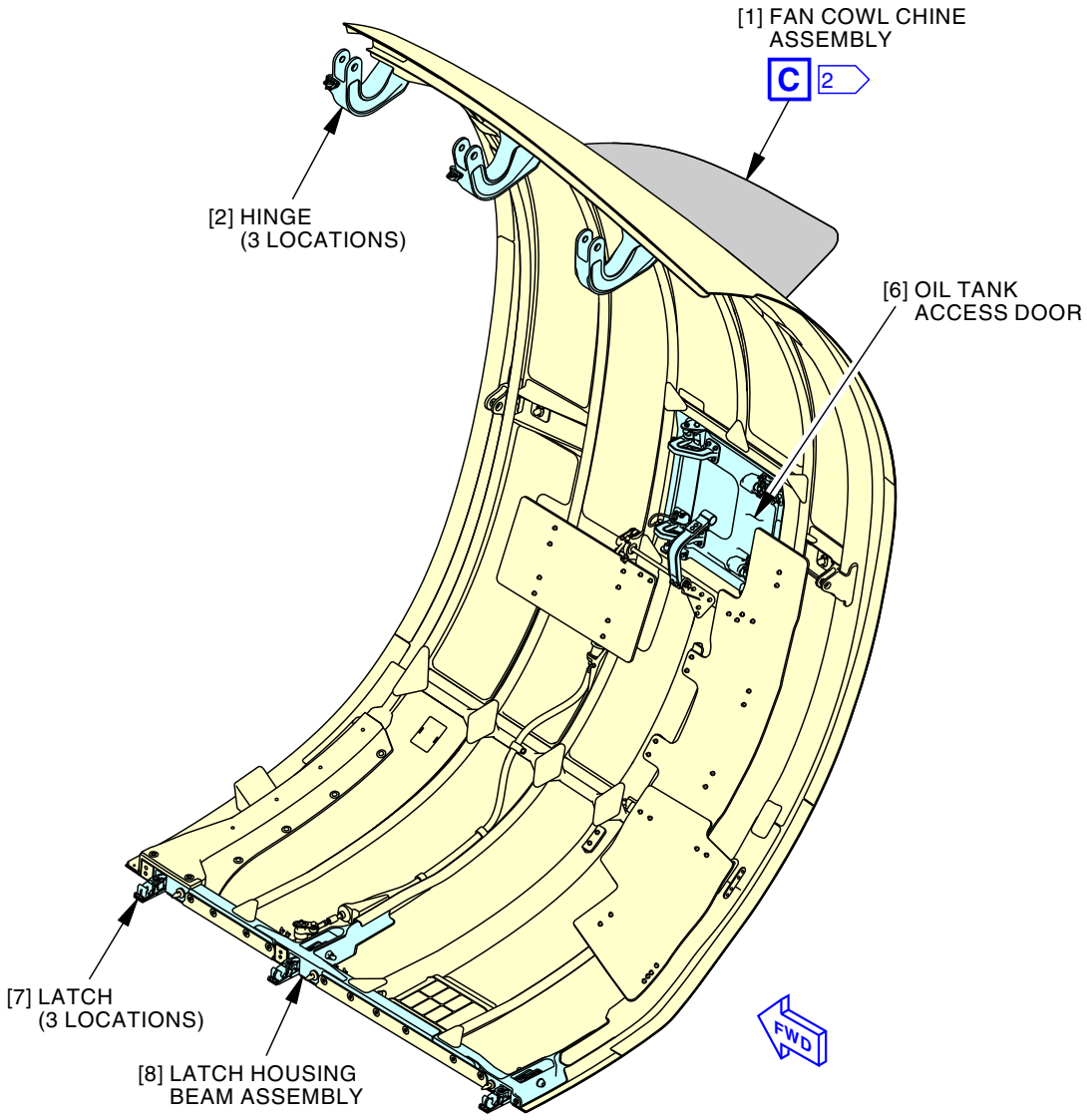
NOTE:

1 CHINE ASSEMBLY INSTALLED ON THE LEFT FAN COWL ON ENGINE 2.

2354386 S00061515227_V2

Fan Cowls Panels Inspection
Figure 601/71-11-04-990-807-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



RIGHT FAN COWL PANEL (TYPICAL)

B

NOTE:

2 CHINE ASSEMBLY INSTALLED ON THE RIGHT FAN COWL ON ENGINE 1.

2354387 S00061515228_V3

Fan Cowls Panels Inspection
Figure 601/71-11-04-990-807-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FAN COWL LATCHES AND KEEPERS - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) A removal of the fan cowl panel latches

(2) An installation of the fan cowl panel latches

(3) A removal of the fan cowl panel latch keeper pin

(4) An installation of the fan cowl panel latch keeper pin.

TASK 71-11-05-000-801-G00

2. Fan Cowl Latches Removal

(Figure 401)

A. General

(1) This task gives the instructions to remove the fan cowl latches.

(2) The fan cowl latch is referred to as the latch.

(3) The latches are installed on the latch housing beams at the 6:00 o'clock position of the right fan cowl panel.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Prepare for the Removal

SUBTASK 71-11-05-868-001-G00

CAUTION RETRACT THE LEADING EDGE SLATS, AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THESE PRECAUTIONS, THE FAN COWL PANELS WILL HIT THE SLATS. DAMAGE WILL OCCUR.

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

SUBTASK 71-11-05-010-001-G00

(2) Open the applicable right fan cowl panel (TASK 71-11-04-010-801-G00).

E. Fan Cowl Latches Removal

SIA 001-005

SUBTASK 71-11-05-020-005-G00

(1) Remove the No. 1 latch [1] from the latch housing beam as follows:

(a) Remove the thermal blanket at the No. 1 latch [1] to get access to the bolt [2].

(b) Remove the lockwire, nut [3], washer [4], washer [4A], and bolt [2] that attach the No. 1 latch [1] to the latch housing beam.

1) If it is necessary, remove the screws on the fan cowl structure to remove the bolt [2].

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SIA 001-005 (Continued)

(c) Remove the No. 1 latch [1].

SUBTASK 71-11-05-020-001-G00

(2) Remove the No. 2 latch [1] from the latch housing beam as follows:

(a) Remove the lockwire, nut [3], washer [4A], washer [4], and bolt [2] that attach the No. 2 latch [1] to the latch housing beam.

(b) Remove the No. 2 latch [1].

SUBTASK 71-11-05-020-002-G00

(3) Remove the No. 3 latch [5] from the latch housing beam as follows:

(a) Remove the lockwire, nut [7], washer [8A], washer [8] and bolt [6] that attach the No. 3 latch [5] to the latch housing beam.

(b) Remove the No. 3 latch [5].

SIA 006-999

SUBTASK 71-11-05-020-007-G00

(4) Remove the No. 1 latch [9] from the latch housing beam as follows:

(a) Remove the nut [13], washers [12], washer [11], and bolt [10] that attach the No. 1 latch [9] to the latch housing beam.

1) If it is necessary, remove the screws on the fan cowl structure to remove the bolt [10].

(b) Remove the No. 1 latch [9].

SUBTASK 71-11-05-020-008-G00

(5) Remove the No. 2 latch [9] from the latch housing beam as follows:

(a) Remove the nut [13], washers [12], washer [11], and bolt [10] that attach the No. 2 latch [9] to the latch housing beam.

(b) Remove the No. 2 latch [9].

SUBTASK 71-11-05-020-009-G00

(6) Remove the No. 3 latch [9] from the latch housing beam as follows:

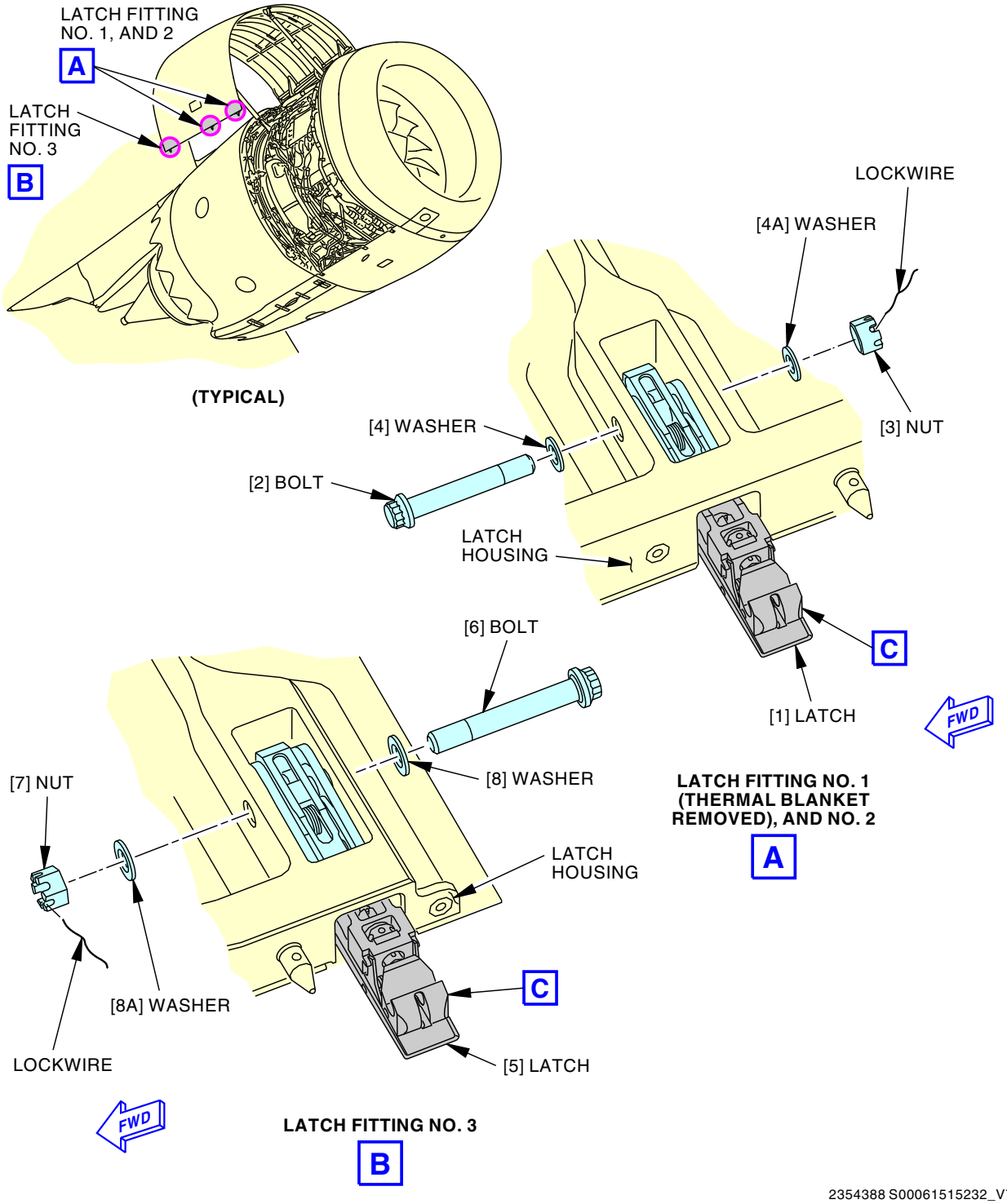
(a) Remove the nut [13], washers [12], washer [11], and bolt [10] that attach the No. 3 latch [9] to the latch housing beam.

(b) Remove the No. 3 latch [9].

SIA ALL

END OF TASK

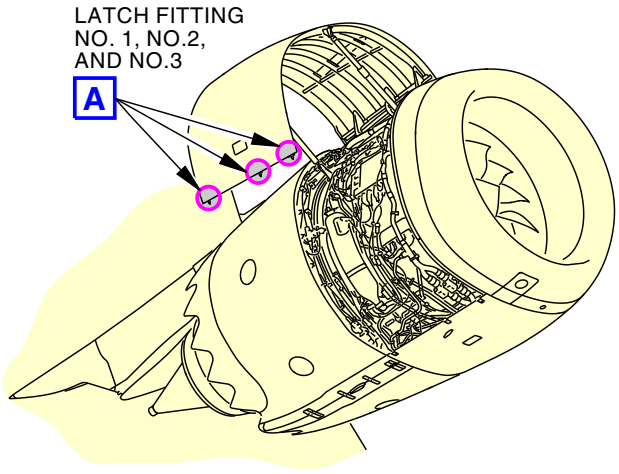
ECCN 9E991 BOEING PROPRIETARY - See title page for details



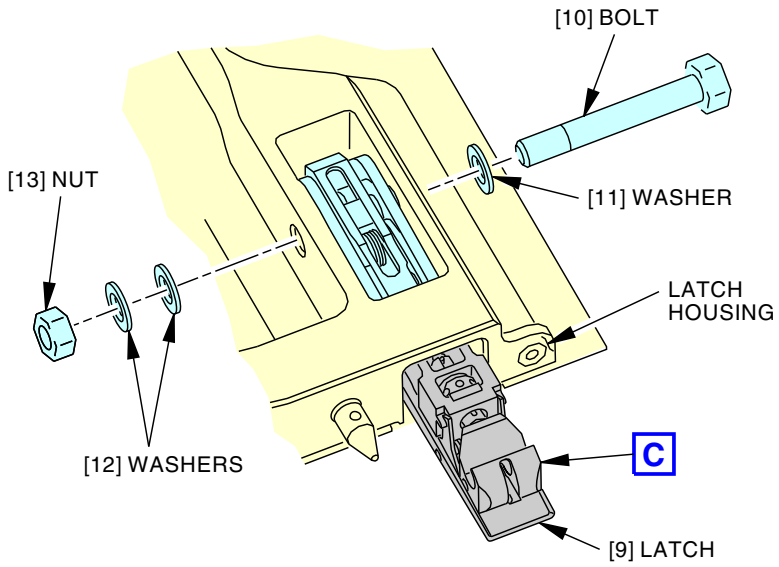
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Fan Cowl Latches Installation
Figure 401/71-11-05-990-801-G00 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



(TYPICAL)



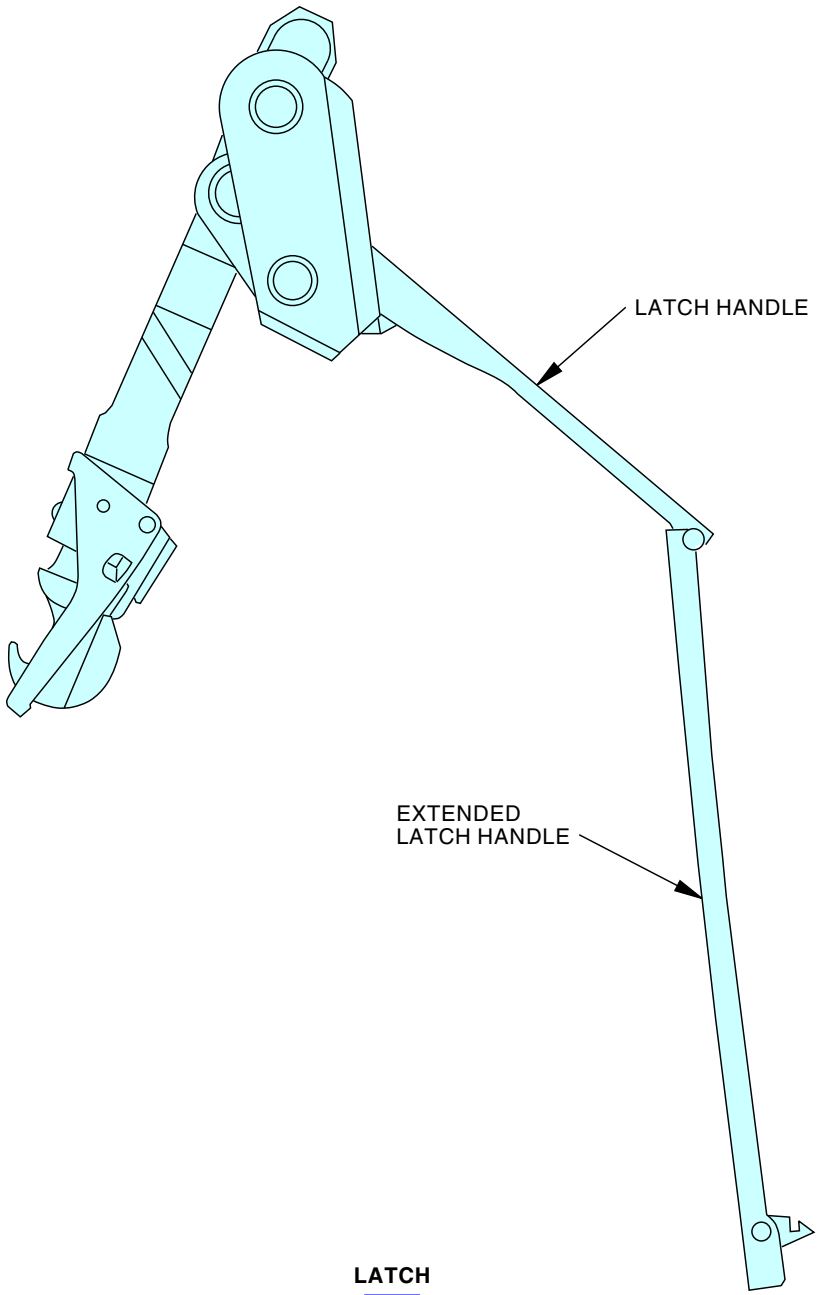
**LATCH FITTING NO. 1,
NO.2, AND NO.3**

A

3030916 S0000801806_V1

**Fan Cowl Latches Installation
Figure 401/71-11-05-990-801-G00 (Sheet 2 of 3)**

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2483416 S0000571099_V1

Fan Cowl Latches Installation
Figure 401/71-11-05-990-801-G00 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-11-05-400-801-G00

3. Fan Cowl Latches Installation

(Figure 401)

A. General

(1) This task gives the instructions to install the fan cowl latches.

(2) The fan cowl latch is referred to as the latch.

(3) You must do an adjustment of the latches after you install the latches.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
71-11-05-821-801-G00	Fan Cowl Latch Adjustment (P/B 501)

C. Consumable Materials

Reference	Description	Specification
A50110	Sealant - Fuel Tank	BMS5-45 Class B-2

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Latch	71-11-05-05-040	SIA 001-005
5	Latch	71-11-05-05-040	SIA 001-005
9	Latch	71-11-05-06-040	SIA 006-999

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. Fan Cowl Latches Installation

SIA 001-005

SUBTASK 71-11-05-420-005-G00

(1) Install the No. 1 latch [1] as follows:

(a) Put the No. 1 latch [1] in its position on the latch housing beam.

(b) Align the bolt hole with the latch holes on the latch housing beam.

(c) Install the bolt [2], washer [4], washer [4A], and nut [3] that attach the No. 1 latch [1] to the latch housing beam.

1) Tighten the nut [3] as required to obtain 0.01 in. (0.25 mm) - 0.04 in. (1.02 mm) axial movement between the bolt head and housing beam assembly.

NOTE: Axial movement can be checked by measuring the gap between the washer and the housing beam assembly with the bolt head in contact with the housing beam assembly or by measuring the gap between the bolt head and the housing beam assembly with the washer/nut in contact with the housing beam assembly.

2) Place a fillet of sealant, A50110, around the bolt shank between washer and housing beam assembly to dampen the washer movement.

3) Lockwire the nut [3].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA 001-005 (Continued)

4) If it is necessary, re-install the screws that were removed from the fan cowl structure.

(d) Install the thermal blanket at the No. 1 latch [1].

SUBTASK 71-11-05-420-001-G00

(2) Install the No. 2 latch [1] as follows:

(a) Put the No. 2 latch [1] in its position on the latch housing beam.

(b) Align the bolt hole with the latch holes on the latch housing beam.

(c) Install the bolt [2], washer [4], washer [4A], and nut [3] that attach the No. 2 latch [1] to the latch housing beam.

1) Tighten the nut [3] as required to obtain 0.01 in. (0.25 mm) - 0.04 in. (1.02 mm) axial movement between the bolt head and housing beam assembly.

NOTE: Axial movement can be checked by measuring the gap between the washer and the housing beam assembly with the bolt head in contact with the housing beam assembly or by measuring the gap between the bolt head and the housing beam assembly with the washer/nut in contact with the housing beam assembly.

2) Place a fillet of sealant, A50110, around the bolt shank between washer and housing beam assembly to dampen the washer movement.

3) Lockwire the nut [3].

SUBTASK 71-11-05-420-002-G00

(3) Install the No. 3 latch [5] as follows:

(a) Put the latch [5] in its position on the latch housing beam.

(b) Align the bolt hole with the latch holes on the latch housing beam.

(c) Install the bolt [6], washer [8], washer [8A], and nut [7] that attach the latch [5] to the latch housing beam.

1) Tighten the nut [7] as required to obtain 0.01 in. (0.25 mm) - 0.04 in. (1.02 mm) axial movement between the bolt head and housing beam assembly.

NOTE: Axial movement can be checked by measuring the gap between the washer and the housing beam assembly with the bolt head in contact with the housing beam assembly or by measuring the gap between the bolt head and the housing beam assembly with the washer/nut in contact with the housing beam assembly.

2) Place a fillet of sealant, A50110, around the bolt shank between washer and housing beam assembly to dampen the washer movement.

3) Lockwire the nut [7].

SIA 006-999

SUBTASK 71-11-05-420-007-G00

(4) Install the No. 1 latch [9] as follows:

(a) Put the No. 1 latch [9] in its position on the latch housing beam.

(b) Align the bolt hole with the latch holes on the latch housing beam.

(c) Install the bolt [10], washer [11], washers [12], and nut [13] that attach the No. 1 latch [9] to the latch housing beam.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA 006-999 (Continued)

1) Tighten the nut [13] to 140 in-lb (16 N·m) - 180 in-lb (20 N·m).

SUBTASK 71-11-05-420-008-G00

(5) Install the No. 2 latch [9] as follows:

(a) Put the No. 2 latch [9] in its position on the latch housing beam.

(b) Align the bolt hole with the latch holes on the latch housing beam.

(c) Install the bolt [10], washer [11], washers [12], and nut [13] that attach the No. 2 latch [9] to the latch housing beam.

1) Tighten the nut [13] to 140 in-lb (16 N·m) - 180 in-lb (20 N·m).

SUBTASK 71-11-05-420-009-G00

(6) Install the No. 3 latch [9] as follows:

(a) Put the No. 3 latch [9] in its position on the latch housing beam.

(b) Align the bolt hole with the latch holes on the latch housing beam.

(c) Install the bolt [10], washer [11], washers [12], and nut [13] that attach the No. 3 latch [9] to the latch housing beam.

1) Tighten the nut [13] to 140 in-lb (16 N·m) - 180 in-lb (20 N·m).

SIA ALL

G. Fan Cowl Latches Installation Test

SUBTASK 71-11-05-860-001-G00

(1) Open and close the fan cowl panels at least three times to see the latches are operated smoothly.

SUBTASK 71-11-05-820-001-G00

(2) Do this task: Fan Cowl Latch Adjustment, TASK 71-11-05-821-801-G00.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-05-410-001-G00

(1) Close the applicable right fan cowl panel (TASK 71-11-04-410-801-G00).

SUBTASK 71-11-05-865-001-G00

(2) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

——— END OF TASK ———

TASK 71-11-05-000-802-G00

4. Fan Cowl Latch Keeper Pin Removal

(Figure 402)

A. General

(1) This task gives the instructions to remove the fan cowl latch keeper pin.

(2) The fan cowl latch keeper is referred to as the latch keeper pin.

(3) The latch keeper pins are installed on the keeper beams at the 6:00 o'clock position of the left fan cowl panel.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Prepare for the Removal

SUBTASK 71-11-05-868-002-G00

CAUTION RETRACT THE LEADING EDGE SLATS, AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THESE PRECAUTIONS, THE FAN COWL PANELS WILL HIT THE SLATS. DAMAGE WILL OCCUR.

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

SUBTASK 71-11-05-010-002-G00

(2) Open the applicable left fan cowl panel (TASK 71-11-04-010-801-G00).

E. Fan Cowl Latch Keeper Pin Removal

SIA 001-005

SUBTASK 71-11-05-020-006-G00

(1) Remove the No. 1 latch keeper [14] from the keeper beam as follows:

(a) Remove the thermal blanket at the No. 1 latch keeper [14] to get access to the bolt [15].

(b) Remove the lockwire [18], nut [19], washer [17], washer [16], and bolt [15] that attach the No. 1 latch keeper [14] to the latch keeper beam.

SUBTASK 71-11-05-020-003-G00

(2) Remove the No. 2 latch keeper [14] from the keeper beam as follows:

(a) Remove the lockwire [18], nut [19], washer [17], washer [16], and bolt [15] that attach the No. 2 latch keeper [14] to the latch keeper beam.

SUBTASK 71-11-05-020-004-G00

(3) Remove the No. 3 latch keeper [20] from the keeper beam as follows:

(a) Remove the lockwire [24], nut [25], washer [23], washer [22], and bolt [21] that attach the No. 3 latch keeper [20] to the latch keeper beam.

SIA 006-999

SUBTASK 71-11-05-020-010-G00

(4) Remove the No. 1 latch keeper [26] from the keeper beam as follows:

(a) Remove the nut [30], washers [29], washer [28], and bolt [27] that attach the No. 1 latch keeper [26] to the latch keeper beam.

SUBTASK 71-11-05-020-011-G00

(5) Remove the No. 2 latch keeper [26] from the keeper beam as follows:

(a) Remove the nut [30], washers [29], washer [28], and bolt [27] that attach the No. 2 latch keeper [26] to the latch keeper beam.

SUBTASK 71-11-05-020-012-G00

(6) Remove the No. 3 latch keeper [31] from the keeper beam as follows:

ECCN 9E991 BOEING PROPRIETARY - See title page for details

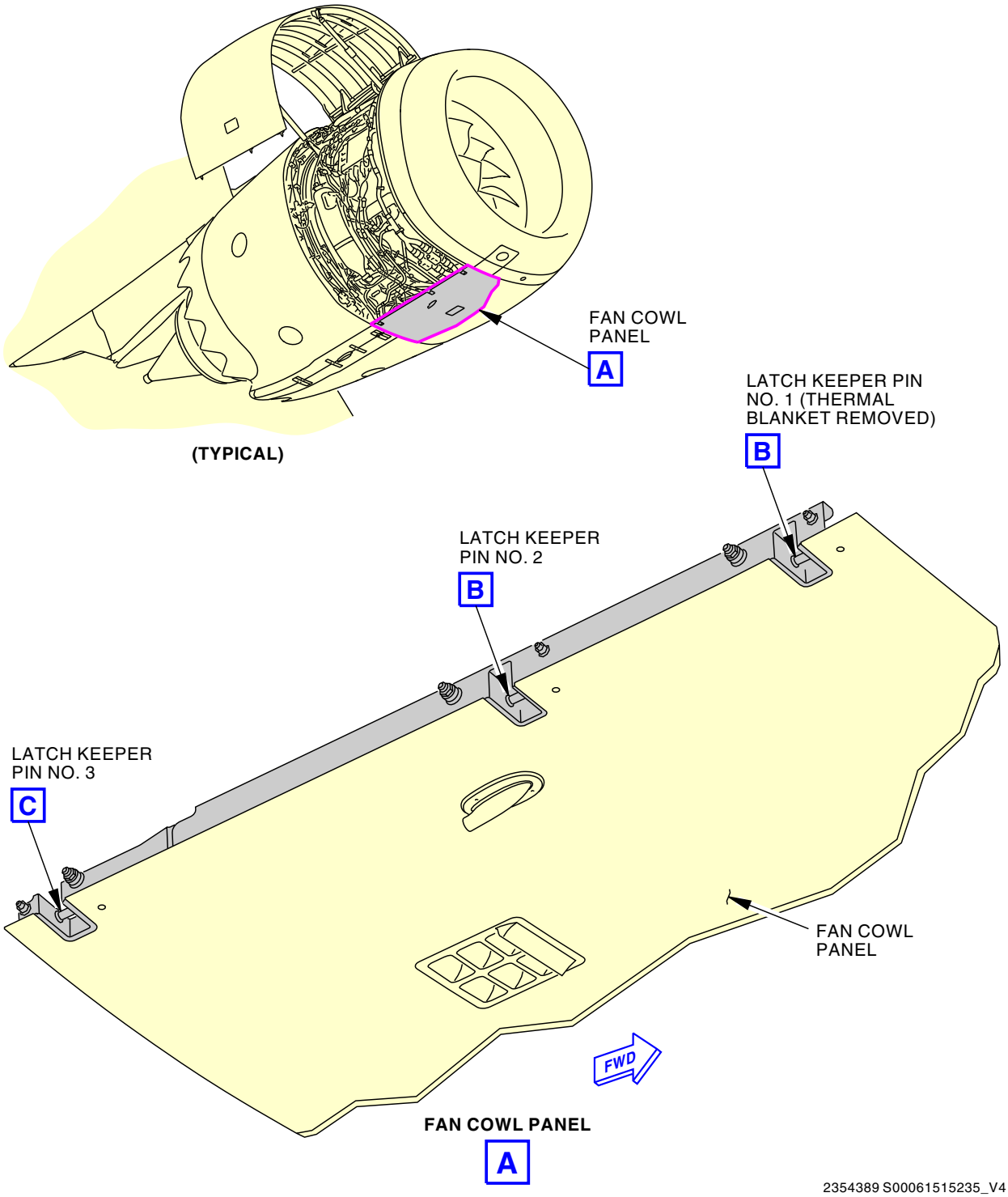
SIA 006-999 (Continued)

(a) Remove the nut [35], washers [34], washer [33], and bolt [32] that attach the No. 3 latch keeper [31] to the latch keeper beam.

SIA ALL

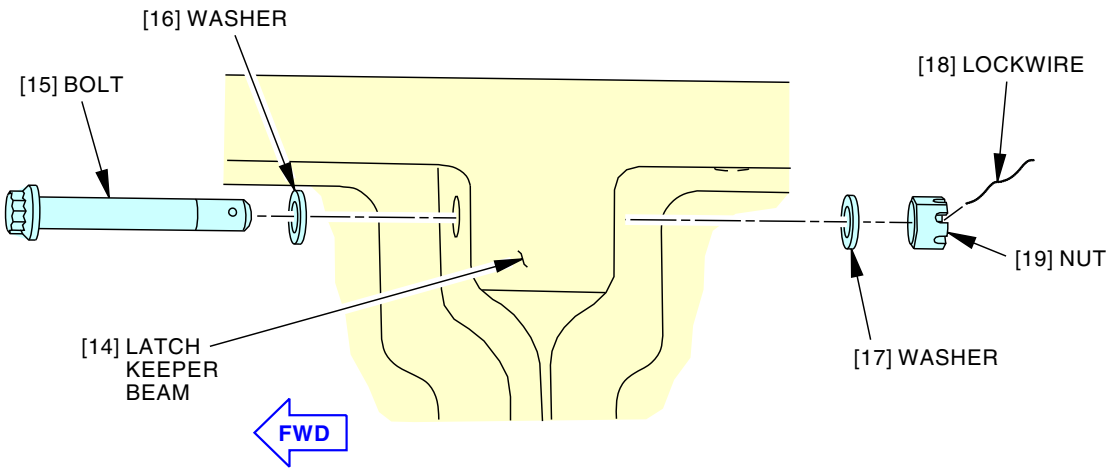
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



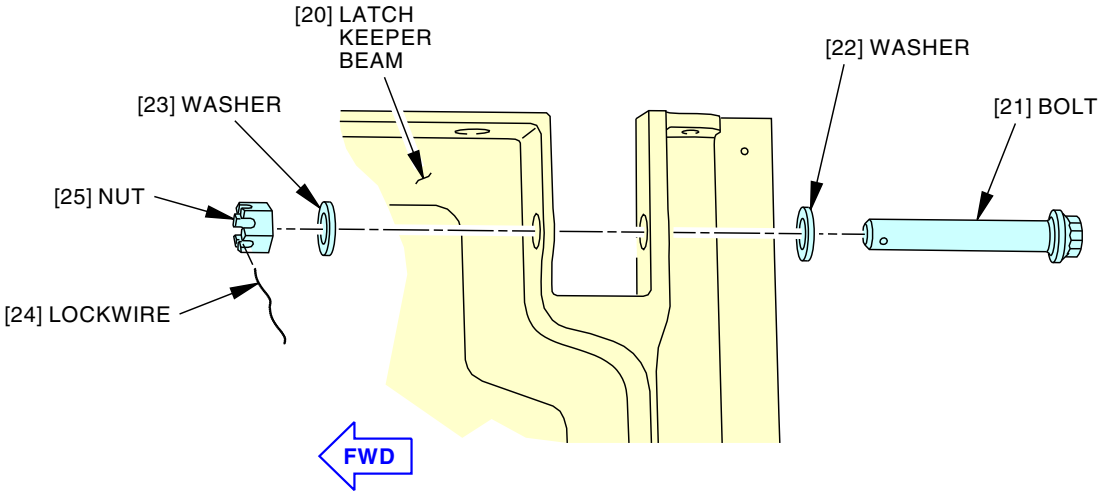
Fan Cowl Latch Keeper Pin Installation
Figure 402/71-11-05-990-802-G00 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



LATCH KEEPER PIN NO. 1 (THERMAL BLANKET REMOVED), AND NO. 2

B



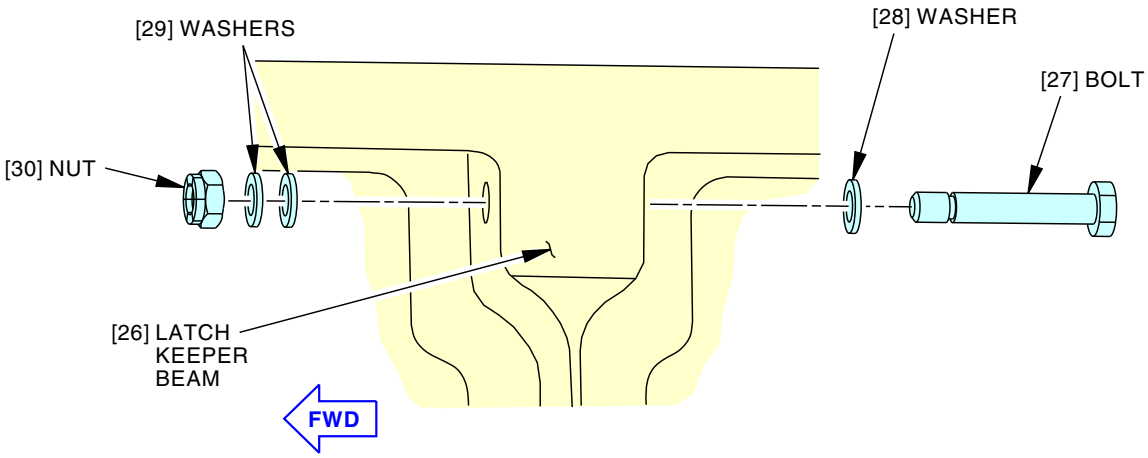
LATCH KEEPER PIN NO. 3

C

2354390 S00061515236_V5

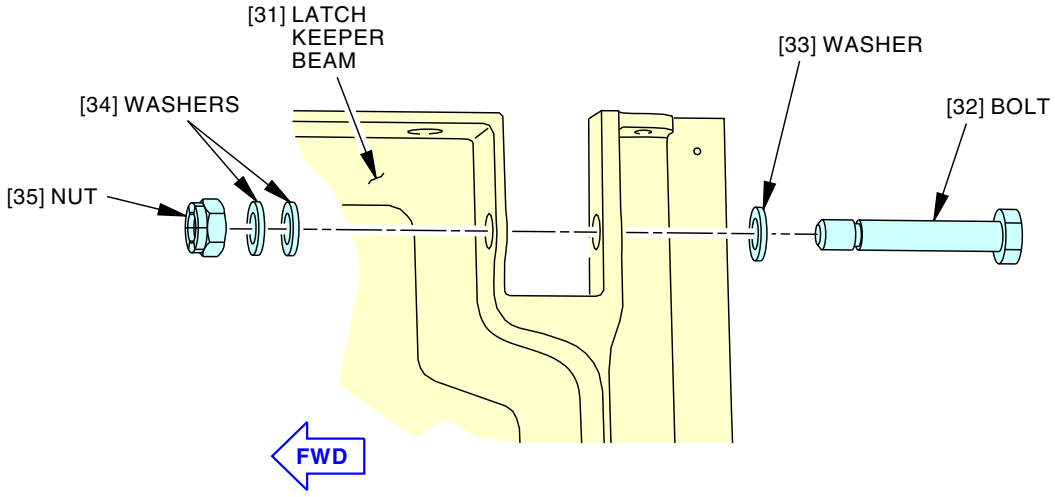
Fan Cowl Latch Keeper Pin Installation
Figure 402/71-11-05-990-802-G00 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



LATCH KEEPER PIN NO. 1 AND NO. 2

B



LATCH KEEPER PIN NO. 3

C

3034544 S0000804627_V1

Fan Cowl Latch Keeper Pin Installation
Figure 402/71-11-05-990-802-G00 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-11-05-400-802-G00

5. Fan Cowl Latch Keeper Pin Installation

(Figure 402)

A. General

(1) This task gives the instructions to install the fan cowl latch keeper pin.

(2) The fan cowl latch keeper pin is referred to as the latch keeper pin.

(3) The latch keeper pins are installed on the keeper beams at the 6:00 o'clock position of the left fan cowl panel.

(4) Do the fan cowl latch keeper adjustment after you install the latch keeper pin.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
71-11-05-821-801-G00	Fan Cowl Latch Adjustment (P/B 501)

C. Consumable Materials

Reference	Description	Specification
A50110	Sealant - Fuel Tank	BMS5-45 Class B-2

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
14	Latch keeper	71-11-05-01-100	SIA 001-005
20	Latch keeper	71-11-05-01-115	SIA 001-005
26	Latch keeper	71-11-05-02-200	SIA 006-999
		71-11-05-02-225	SIA 006-999
31	Latch keeper	71-11-05-02-250	SIA 006-999

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. Fan Cowl Latch Keeper Pin Installation

SIA 001-005

SUBTASK 71-11-05-420-006-G00

(1) Install the No. 1 latch keeper [14] as follows:

(a) Install the bolt [15], washer [16], washer [17], and nut [19] that attach the No. 1 latch keeper [14] to the latch keeper beam.

1) Torque the nut [19] as required to obtain 0.01 in. (0.25 mm) - 0.04 in. (1.02 mm) axial movement between the bolt head and housing beam assembly.

NOTE: Axial movement can be verified by measuring the gap between the washer and the housing beam assembly with the bolt head in contact with the housing beam assembly or by measuring the gap between the bolt head and the housing beam assembly with the washer/nut in contact with the housing beam assembly.

2) Place a fillet of sealant, A50110 around the bolt shank between washer and housing beam assembly to dampen the washer movement.

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SIA 001-005 (Continued)

(b) Install the lockwire [18] on the nut [19].

(c) Install the thermal blanket at the No. 1 latch keeper [14].

SUBTASK 71-11-05-420-003-G00

(2) Install the No. 2 latch keeper [14] as follows:

(a) Install the bolt [15], washer [16], washer [17], and nut [19] that attach the No. 2 latch keeper [14] to the latch keeper beam.

1) Torque the nut [19] as required to obtain 0.01 in. (0.25 mm) - 0.04 in. (1.02 mm) axial movement between the bolt head and housing beam assembly.

NOTE: Axial movement can be verified by measuring the gap between the washer and the housing beam assembly with the bolt head in contact with the housing beam assembly or by measuring the gap between the bolt head and the housing beam assembly with the washer/nut in contact with the housing beam assembly.

2) Place a fillet of sealant, A50110 around the bolt shank between washer and housing beam assembly to dampen the washer movement.

(b) Install the lockwire [18] on the nut [19].

SUBTASK 71-11-05-420-004-G00

(3) Install the No. 3 latch keeper [20] as follows:

(a) Install the bolt [21], washer [22], washer [23], and nut [25] that attach the No. 3 latch keeper [20] to the latch keeper housing beam.

1) Torque the nut [25] as required to obtain 0.01 in. (0.25 mm) - 0.04 in. (1.02 mm) axial movement between the bolt head and housing beam assembly.

NOTE: Axial movement can be verified by measuring the gap between the washer and the housing beam assembly with the bolt head in contact with the housing beam assembly or by measuring the gap between the bolt head and the housing beam assembly with the washer/nut in contact with the housing beam assembly.

2) Place a fillet of sealant, A50110 around the bolt shank between washer and housing beam assembly to dampen the washer movement.

(b) Install the lockwire [24] on the nut [25].

SIA 006-999

SUBTASK 71-11-05-420-010-G00

(4) Install the No. 1 latch keeper [26] as follows:

(a) Install the bolt [27], washer [28], washers [29], and nut [30] that attach the No. 1 latch keeper [26] to the latch keeper beam.

1) Tighten the nut [30] to 140 in-lb (16 N·m) - 180 in-lb (20 N·m).

SUBTASK 71-11-05-420-011-G00

(5) Install the No. 2 latch keeper [26] as follows:

(a) Install the bolt [27], washer [28], washers [29], and nut [30] that attach the No. 2 latch keeper [26] to the latch keeper beam.

1) Tighten the nut [30] to 140 in-lb (16 N·m) - 180 in-lb (20 N·m).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA 006-999 (Continued)

SUBTASK 71-11-05-420-012-G00

(6) Install the No. 3 latch keeper [31] as follows:

(a) Install the bolt [32], washer [33], washers [34], and nut [35] that attach the No. 3 latch keeper [31] to the latch keeper beam.

1) Tighten the nut [35] to 140 in-lb (16 N·m) - 180 in-lb (20 N·m).

SIA ALL

G. Fan Cowl Latch Keeper Pin Installation Test

SUBTASK 71-11-05-860-002-G00

(1) Open and close the fan cowl panels at least three times to see the keepers are engaged correctly.

SUBTASK 71-11-05-820-002-G00

(2) If it is necessary, do this task: Fan Cowl Latch Adjustment, TASK 71-11-05-821-801-G00.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-05-410-002-G00

(1) Close the applicable left fan cowl panel (TASK 71-11-04-410-801-G00).

SUBTASK 71-11-05-865-002-G00

(2) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FAN COWL LATCHES - ADJUSTMENT/TEST

1. General

A. This procedure has one task:

(1) Fan cowl latch adjustment.

TASK 71-11-05-821-801-G00

2. Fan Cowl Latch Adjustment

(Figure 501)

A. General

(1) This task gives the instructions to adjust the latch to the correct limits if you find the fan cowl panels are not in the aerodynamic smoothness.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (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-755	Scale - Spring, Push/Pull Type, 0 - 150lbs (0 - 68kg) Capacity

D. Consumable Materials

Reference	Description	Specification
C00259	Coating - Chemical And Solvent Resistant Finish, Corrosion Inhibiting Primer	BMS10-11 Type I

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. 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

G. Prepare for the Adjustment

SUBTASK 71-11-05-865-003-G00

CAUTION

RETRACT THE LEADING EDGE SLATS, AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THESE PRECAUTIONS, THE FAN COWL PANELS WILL HIT THE SLATS. DAMAGE WILL OCCUR.

(1) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-11-05-040-001-G00

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

SUBTASK 71-11-05-010-003-G00

(3) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

(a) On the applicable engine, 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

H. Fan Cowl Latch Adjustment

SUBTASK 71-11-05-720-001-G00

(1) Make sure that the shims on the latch are not damaged or missing.

(a) If the shims on the latch beam are damaged or missing, do these steps:

1) Remove the bolt (or shear pin), washer, and the nut that attach the shim to the latch beam.

2) Remove and discard the damaged shim(s).

3) Add new shim stock (0.003 in. (0.0762 mm) laminations) to the shim.

4) Apply primer, C00259, to the shim mating surfaces.

5) Install the shim on the latch beam with the bolt (or shear pin), washer, and nut.

NOTE: You can change the grip length (± 2 sizes) of bolt to fit the shim thickness.

a) Make sure that the solid face of the shim is visible.

SUBTASK 71-11-05-410-003-G00

(2) Close the fan cowl panels (TASK 71-11-04-410-801-G00).

SUBTASK 71-11-05-980-002-G00

(3) Make sure that the latches are installed in the correct position.

(a) If the latches are not in the correct position, adjust the latches.

1) Make sure that the end of the latch assembly gap at the latch slot is within 0.1800 ±0.0300 in. (4.5720 ±0.7620 mm).

2) Make sure that the fan cowl panel assembly surface and the latch surface is within 0.000 ±0.060 in. (0.000 ±1.524 mm).

SIA 006-999

SUBTASK 71-11-05-869-001-G00

(4) Do these steps to adjust the latches:

(a) Start with the middle latch, forward latch, then aft latch.

(b) Apply a force of 15.0 lbf (66.7 N) - 35.0 lbf (155.7 N) with hand pressure.

1) Use a spring scale, STD-755, at the end of the latch handle to close it.

2) Make sure that the scale force is measured between 0.90 in. (22.86 mm) - 1.10 in. (27.94 mm) from the end of the handle.

(c) If the force is not 15.0 lbf (66.7 N) - 35.0 lbf (155.7 N), do these steps to adjust the latches:

1) Keep the latch open to the free travel position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SIA 006-999 (Continued)

2) Put a 5/32 in. (4 mm) hexagonal wrench into the holes on top of the hook latch.

3) Turn the wrench in the aft direction to increase the latch tension or the forward direction to decrease the tension.

NOTE: Pushing in the hook latch will lower the resistance when turning the wrench.

(d) Repeat as necessary to make sure that all latches need 15.0 lbf (66.7 N) - 35.0 lbf (155.7 N) to close it.

SIA 001-005

SUBTASK 71-11-05-820-007-G00

(5) Do these steps to adjust the latches:

(a) Start with the middle latch, forward latch, then aft latch.

(b) Apply a force of 20.0 lbf (89.0 N) - 50.0 lbf (222.4 N) with hand pressure.

1) Use a spring scale, STD-755, at the end of the latch handle to close it.

2) Make sure that the scale force is measured between 0.90 in. (22.86 mm) - 1.10 in. (27.94 mm) from the end of the handle.

(c) If the force is not 20.0 lbf (89.0 N) - 50.0 lbf (222.4 N), do these steps to adjust the latches:

1) Keep the latch open to the free travel position.

2) Put a 5/32 in. (4 mm) hexagonal wrench into the holes on top of the hook latch.

3) Turn the wrench in the aft direction to increase the latch tension or the forward direction to decrease the tension.

NOTE: Pushing in the hook latch will lower the resistance when turning the wrench.

(d) Repeat as necessary to make sure that all latches need 20.0 lbf (89.0 N) - 50.0 lbf (222.4 N) to close it.

SIA ALL

SUBTASK 71-11-05-820-003-G00

(6) Measure and record the gap at the fan cowl split line at each of the latch location.

SUBTASK 71-11-05-820-004-G00

(7) If the gaps are not in the limits that follow, open the fan cowl panels (TASK 71-11-04-010-801-G00).

(a) If the gap at the fan cowl split line is not 0.04 in. (1.016 mm) - 0.32 in. (8.128 mm), remove or add 0.003 in. (0.0762 mm) laminations as it is necessary to get the correct gap.

1) Make sure to apply the primer, C00259, to the shim mating surfaces.

SUBTASK 71-11-05-410-004-G00

(8) If it is necessary, close the fan cowl panels (TASK 71-11-04-410-801-G00).

SUBTASK 71-11-05-860-003-G00

(9) Repeat all the steps above until the latch force, the gap between the shims and fan cowl panel, and the gap at the fan cowl split line are in the limits.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-05-410-005-G00

(1) 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

(a) On the applicable engine, close these access panels:

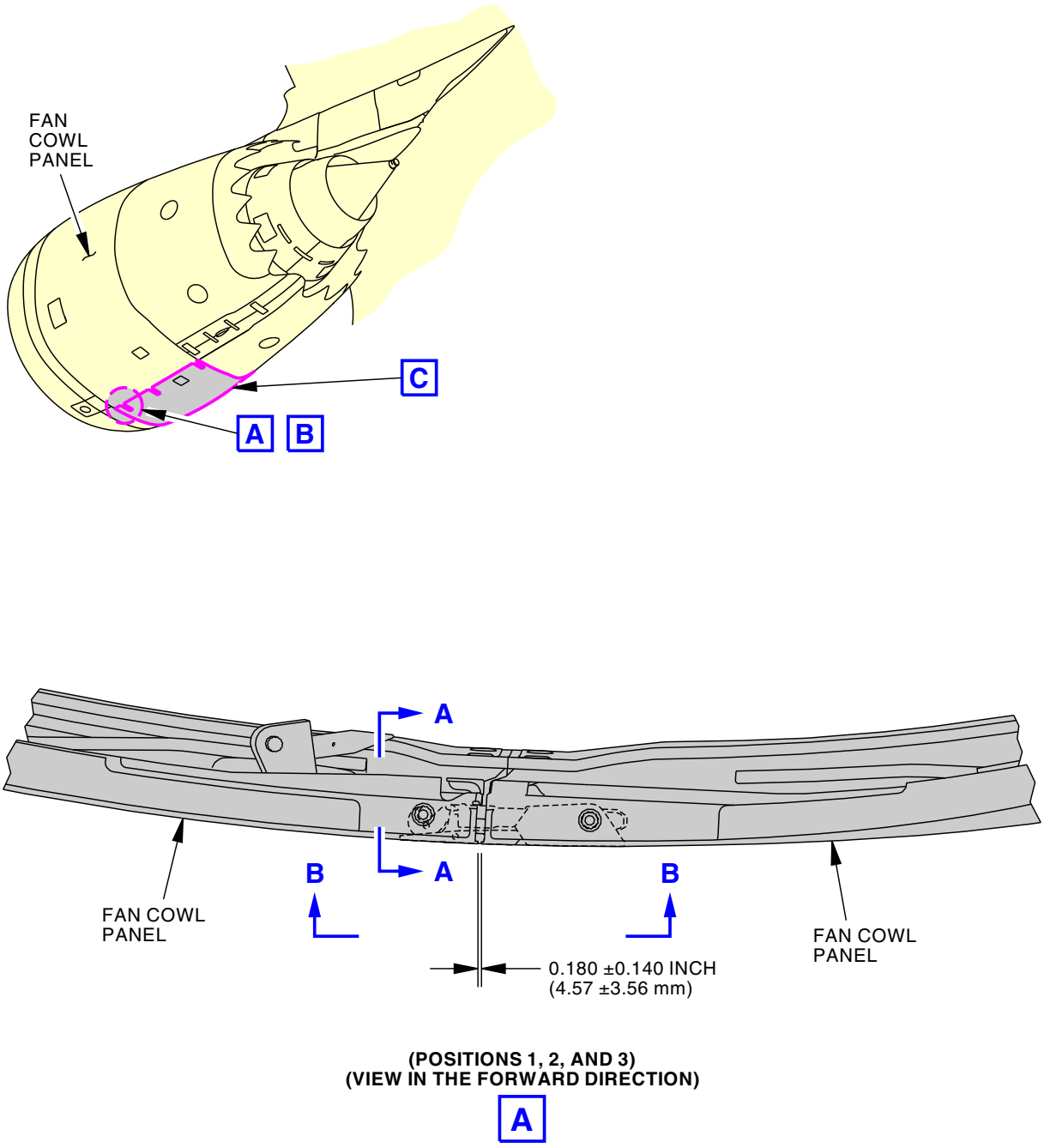
Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

SUBTASK 71-11-05-410-006-G00

(2) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



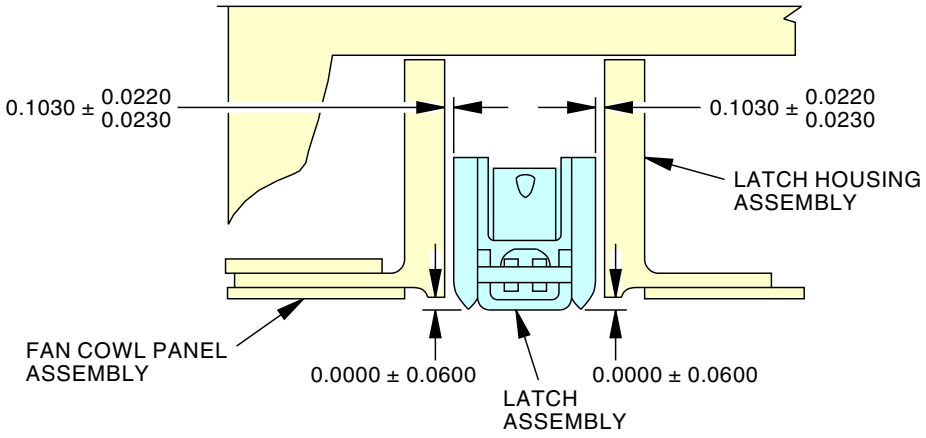
(POSITIONS 1, 2, AND 3)
(VIEW IN THE FORWARD DIRECTION)

A

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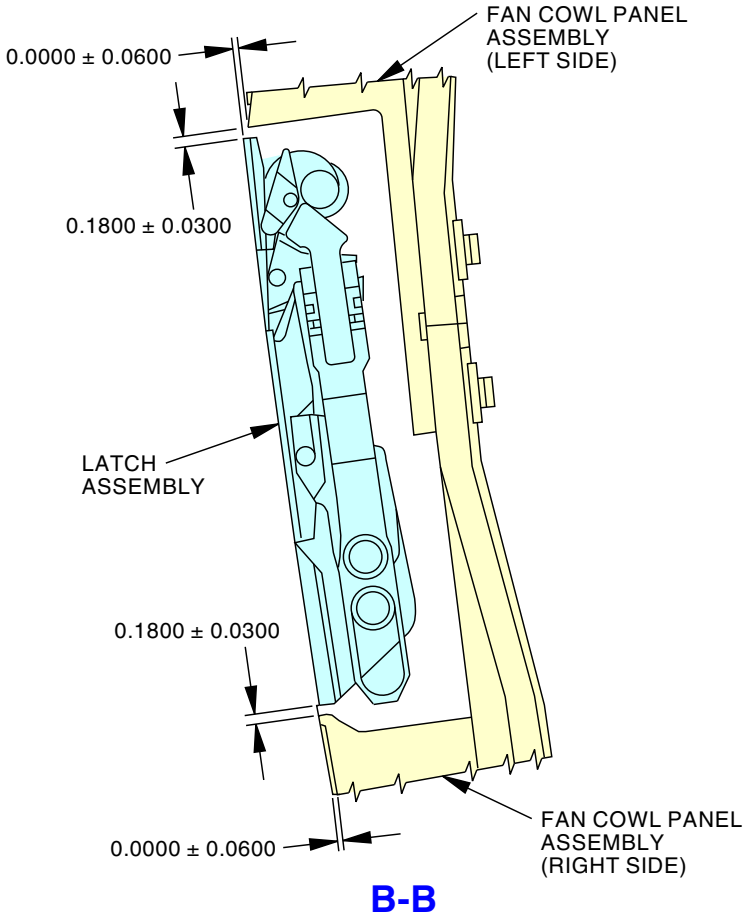
Fan Cowl Latches Adjustment
Figure 501/71-11-05-990-803-G00 (Sheet 1 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



(EXAMPLE)

A-A

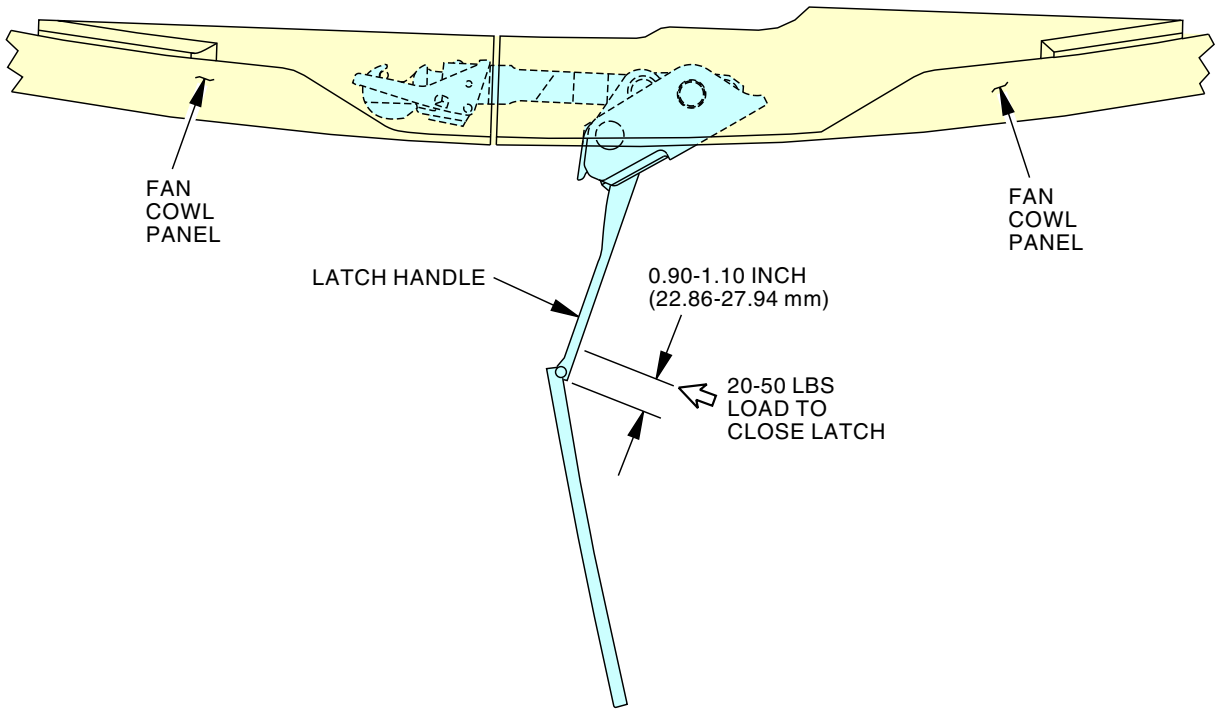


B-B

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Fan Cowl Latches Adjustment
Figure 501/71-11-05-990-803-G00 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



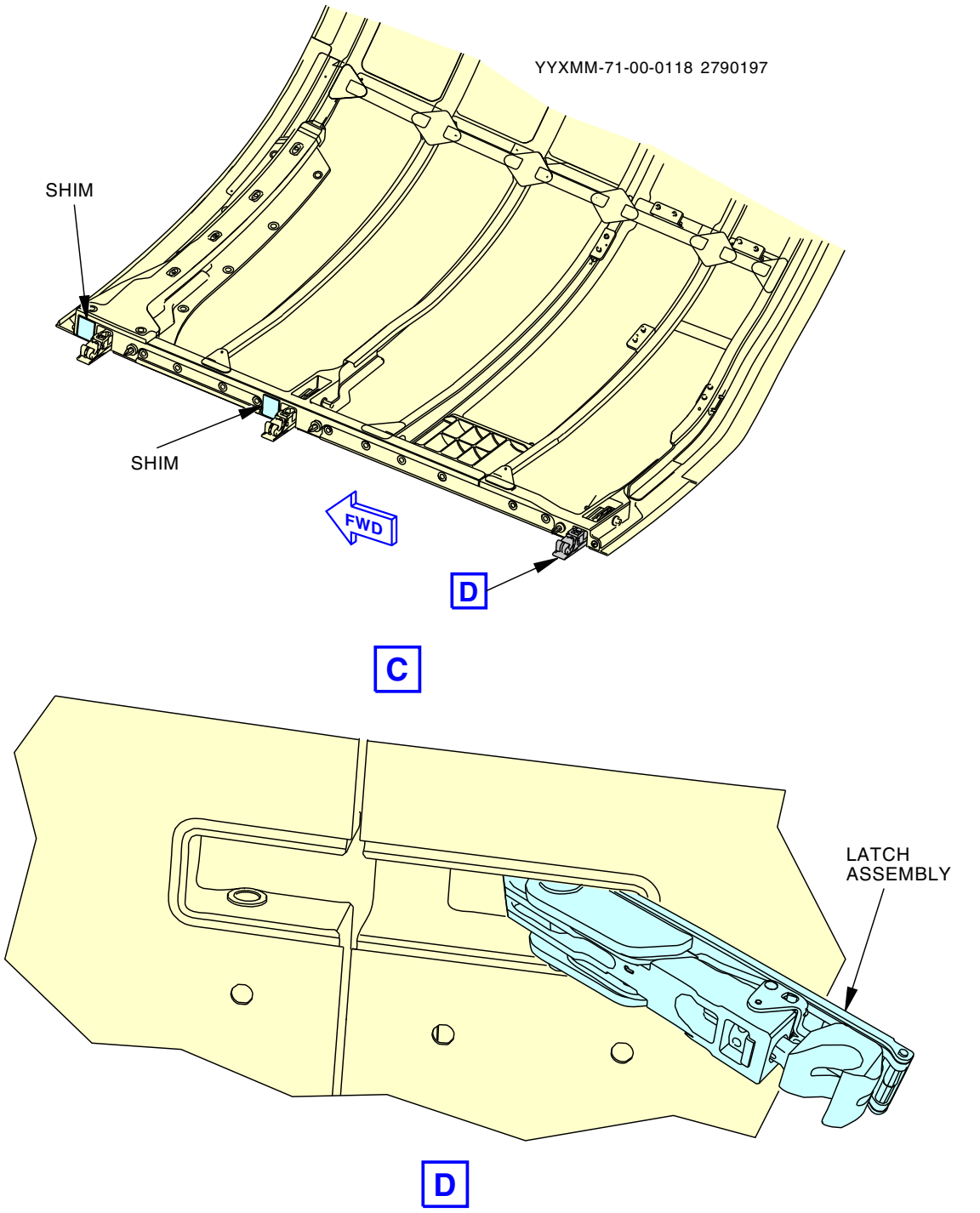
(POSITIONS 1, 2, AND 3)
(VIEW IN THE FORWARD DIRECTION)

B

2354393 S00061515242_V2

Fan Cowl Latches Adjustment
Figure 501/71-11-05-990-803-G00 (Sheet 3 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fan Cowl Latches Adjustment
Figure 501/71-11-05-990-803-G00 (Sheet 4 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FAN COWL LATCH INDICATION SYSTEM - MAINTENANCE PRACTICES

1. General

A. This procedure has these tasks:

(1) Fan Cowl Latch Indication System Removal

(2) Fan Cowl Latch Indication System Installation.

TASK 71-11-06-000-801-G00

2. Fan Cowl Latch Indication System Removal

(Figure 201)

A. General

(1) This task gives the instructions to remove these fan cowl latch indication system components:

(a) Forward fairing

(b) Blade

(c) Aft fairing

(d) Handle

(e) Cable.

(2) The fan cowl latch indication system is installed on the right fan cowl panel.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)

C. Tools/Equipment

Reference	Description
STD-765	Scraper - Plastic

D. Location Zones

Zone	Area
411	Engine 1 - Engine
414	Engine 1 - Fan Cowl, Right
421	Engine 2 - Engine
424	Engine 2 - Fan Cowl, Right

E. Prepare for the Removal

SUBTASK 71-11-06-860-001-G00

CAUTION

RETRACT THE LEADING EDGE SLATS, AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THESE PRECAUTIONS, THE FAN COWL PANELS WILL HIT THE SLATS. DAMAGE WILL OCCUR.

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

SUBTASK 71-11-06-010-001-G00

(2) Open the applicable right fan cowl panel (TASK 71-11-04-010-801-G00).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Fan Cowl Latch Indication System Removal

SUBTASK 71-11-06-020-001-G00

(1) Remove the forward fairing [1] as follow:

(a) Remove the two bolts [2] that attach the forward fairing [1] to the fan cowl.

(b) Use a plastic scraper, STD-765, to carefully separate the fillet seal and remove the forward fairing [1].

(c) Clean the fan cowl surface to remove the remaining fillet seal.

SUBTASK 71-11-06-020-002-G00

(2) Remove the blade [3] as follow:

(a) Remove the bolt [4] that attaches the blade [3] to the fan cowl.

(b) Remove the blade [3].

SUBTASK 71-11-06-020-003-G00

(3) Remove the outer aft fairing [5] as follow:

NOTE: The aft fairing has two parts, an outer aft fairing and an inner aft fairing. The inner aft fairing is bonded to the fan cowl surface with a fay surface seal. It is recommended that the inner aft fairing not be removed.

(a) Remove the two bolts [6] that attach the aft fairing [5] to the fan cowl.

(b) Remove the aft fairing [5].

SUBTASK 71-11-06-020-004-G00

(4) Remove the handle [7] as follow:

(a) Remove the two bolts [8], two nuts [9], two washers [10], and two washers [11] that attach the handle [7] to the handle shaft.

(b) Remove the handle [7].

SUBTASK 71-11-06-020-005-G00

(5) Remove the cable [12] as follow:

(a) Remove the bolt [29], nut [30], washer [31], washer [32], and bushing [33] from the lower crank assembly.

(b) Remove the self-locking nut [13] that attaches the cable [12] to the lower cable rod end.

(c) Remove the loop clamp [14], bolt [15], nut [16], washer [17], and washer [18] at three locations.

(d) Remove the spherical cap [19] and spherical seat [20].

(e) Pull the cable [12] up through the bracket [24].

(f) Remove the washer [21], spring [22], and washer [23].

(g) Remove the lockwire at the jam nut [25].

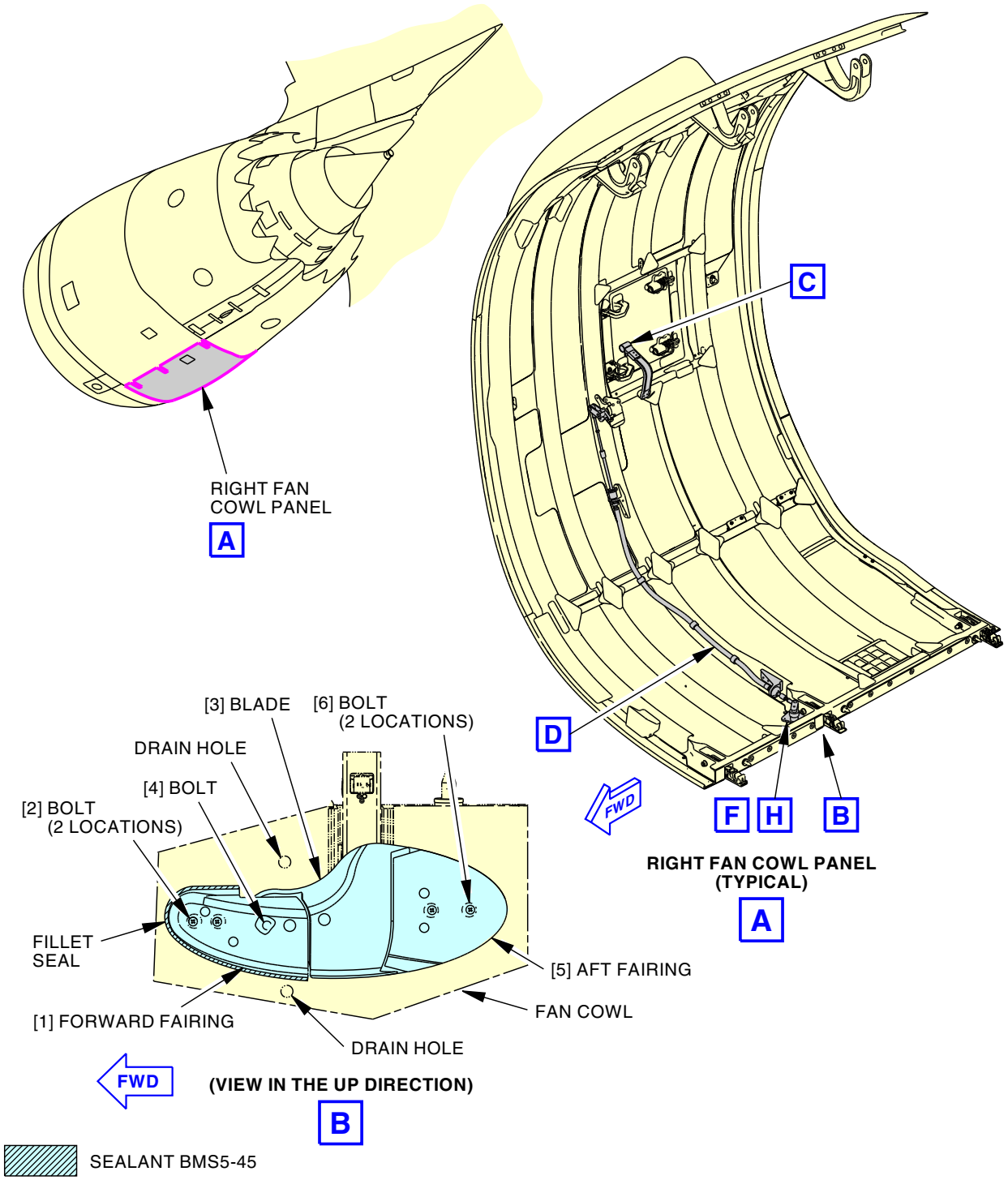
(h) Loosen the jam nut [25].

(i) Remove the bolt [29], nut [30], washer [31], washer [31], and bushing [33] from the upper crank assembly.

(j) Remove the cable [12].

——— END OF TASK ———

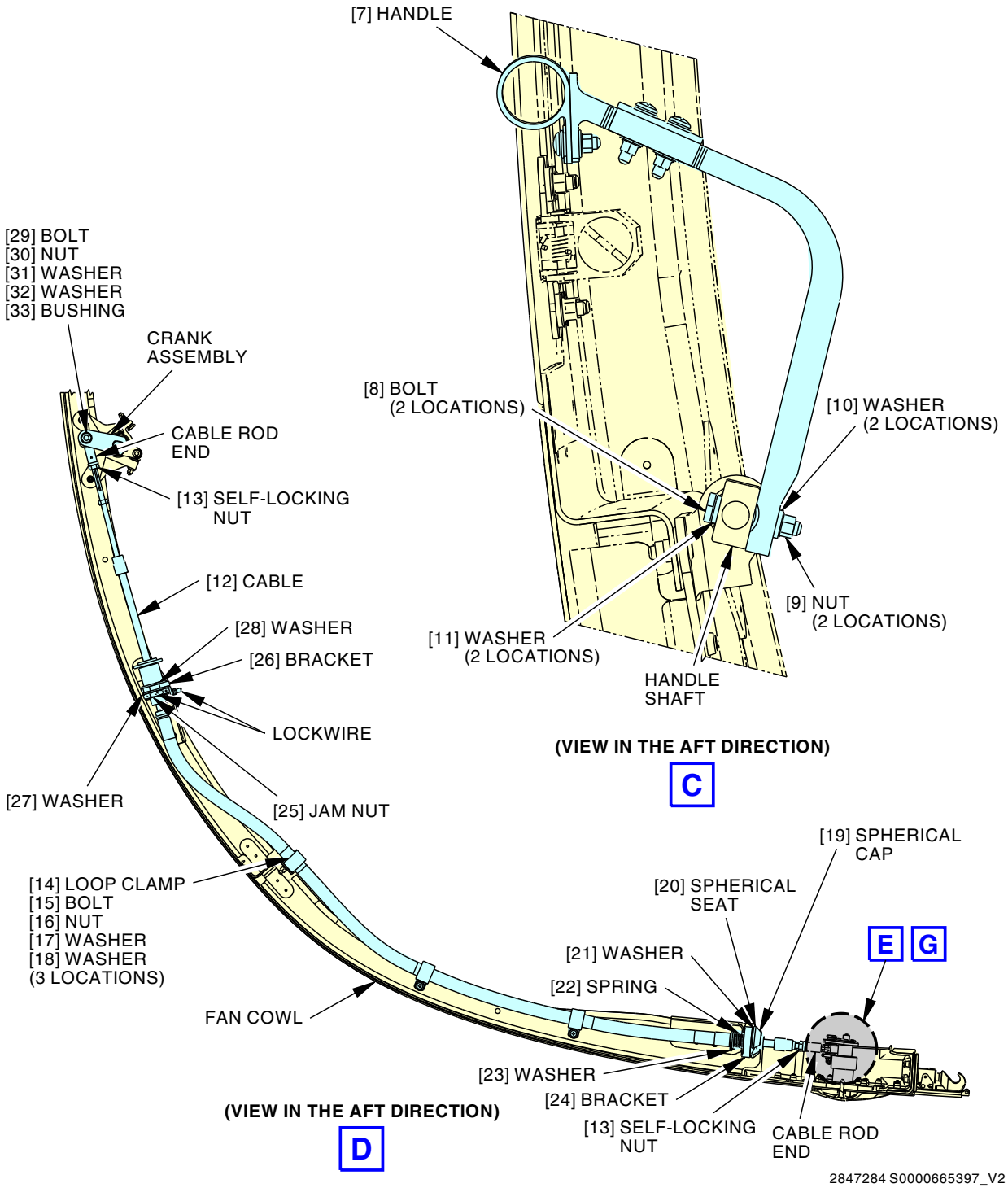
ECCN 9E991 BOEING PROPRIETARY - See title page for details



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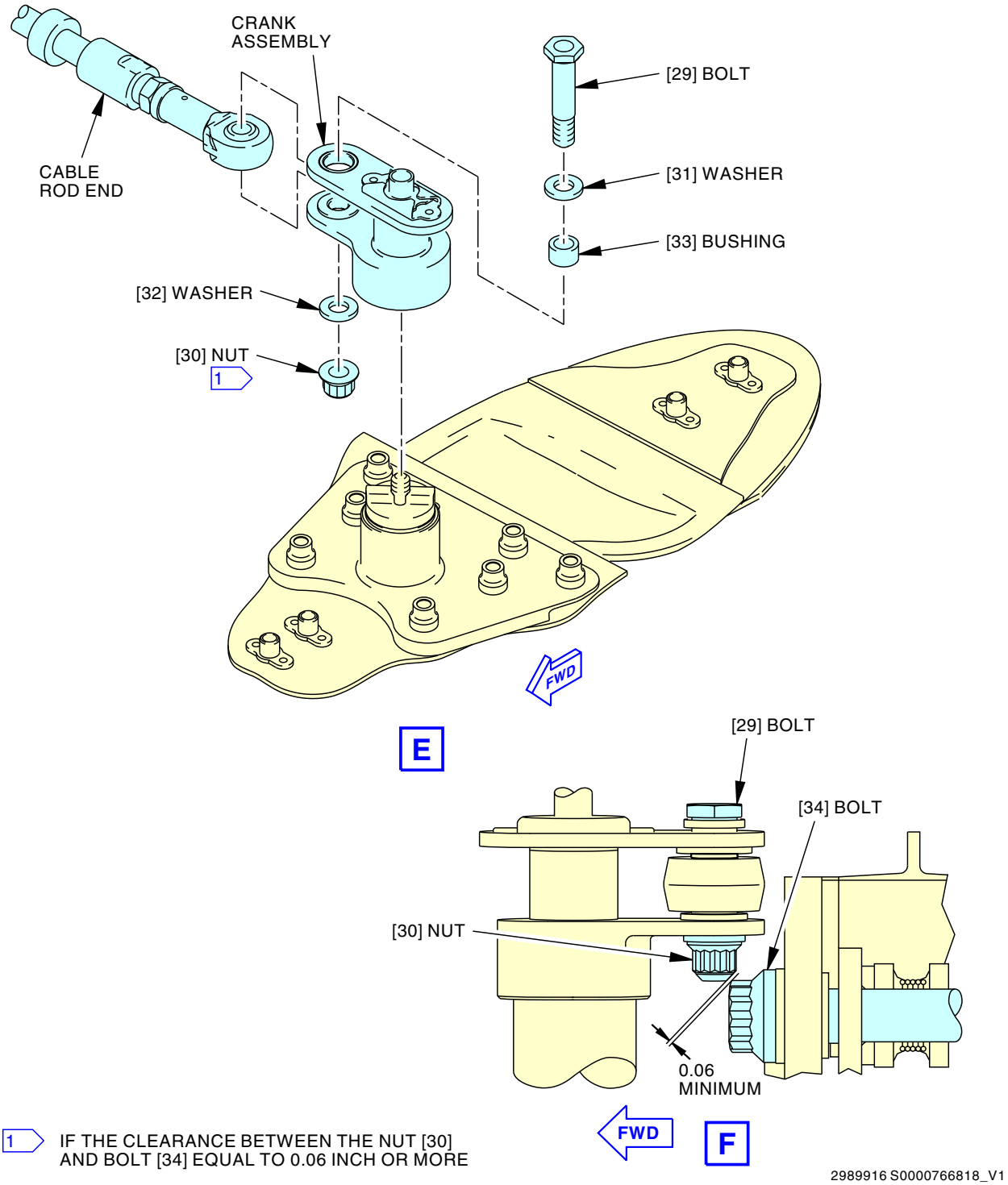
Fan Cowl Latch Indication System Installation
Figure 201/71-11-06-990-801-G00 (Sheet 1 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



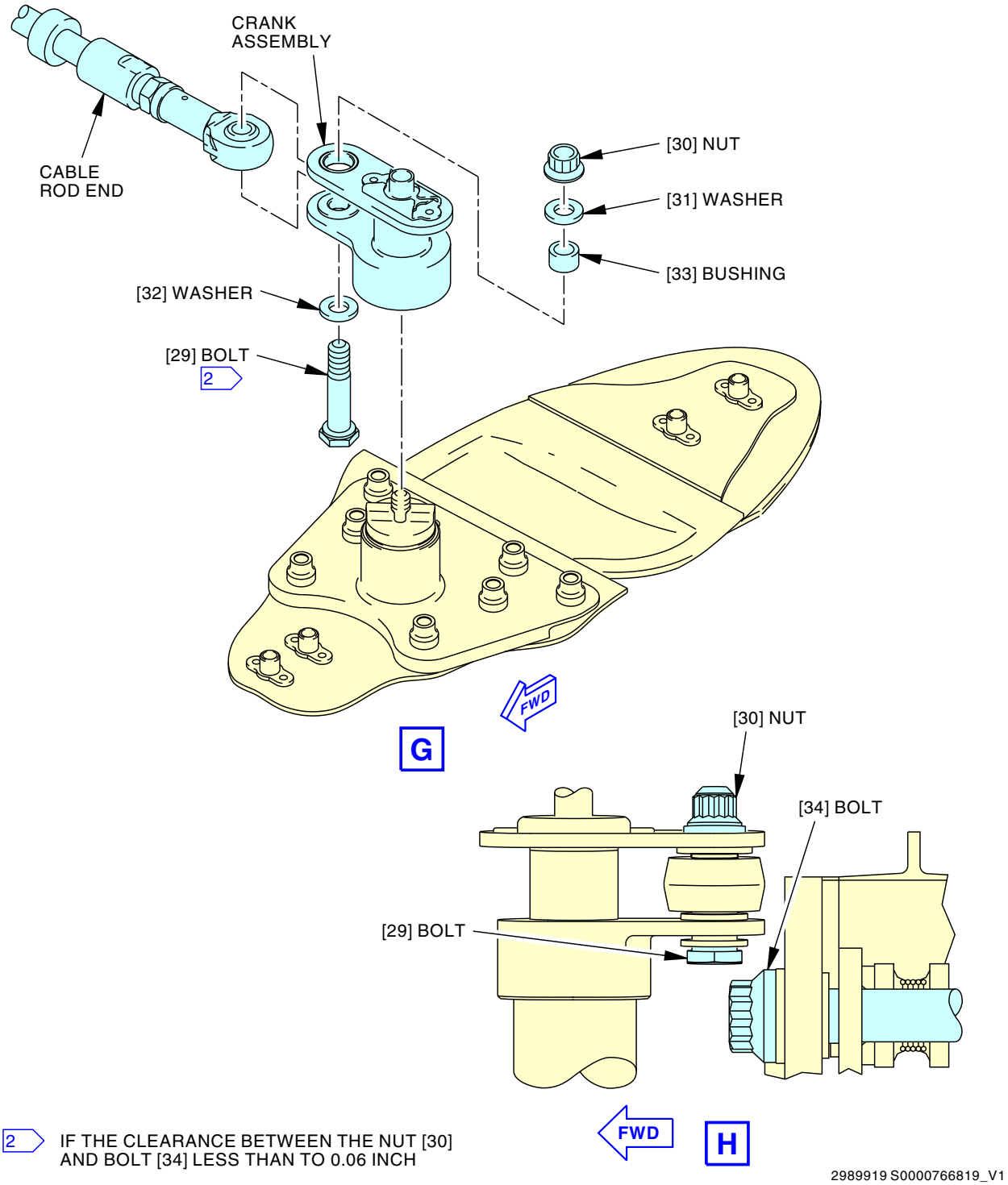
Fan Cowl Latch Indication System Installation
Figure 201/71-11-06-990-801-G00 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fan Cowl Latch Indication System Installation
Figure 201/71-11-06-990-801-G00 (Sheet 3 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fan Cowl Latch Indication System Installation
Figure 201/71-11-06-990-801-G00 (Sheet 4 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-11-06-400-801-G00

3. Fan Cowl Latch Indication System Installation

(Figure 201)

A. General

(1) This task gives the instructions to install these fan cowl latch indication system components:

(a) Forward fairing

(b) Blade

(c) Aft fairing

(d) Handle

(e) Cable.

(2) Do an adjustment of the fan cowl latch indication system after the fan cowl latch indication system is installed.

B. References

Reference	Title
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
71-11-06-720-801-G00	Fan Cowl Latch Indication System Rigging Check (P/B 501)

C. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45
B00130	Alcohol - Isopropyl	TT-I-735
G01048	Lockwire - MS20995C32, Corrosion Resistant Steel - 0.032 Inch (0.8128 mm) Diameter	NASM20995

D. Location Zones

Zone	Area
411	Engine 1 - Engine
414	Engine 1 - Fan Cowl, Right
421	Engine 2 - Engine
424	Engine 2 - Fan Cowl, Right

E. Fan Cowl Latch Indication System Installation

SUBTASK 71-11-06-420-001-G00

(1) Install the cable [12] as follow:

(a) Install the bolt [29], nut [30], washer [31], washer [32], and bushing [33] that attach the cable [12] to the upper crank assembly.

NOTE: It is not necessary to do a wet installation if the hole is already primed or if the bolt go through a bushing.

(b) Put the cable [12] into its position on the bracket [26].

(c) Make sure that the washer [27] and washer [28] are in the correct positions.

(d) Tighten the jam nut [25] to 160.0 in-lb (18.1 N·m).

(e) Install MS20995C32 lockwire, G01048, on the jam nut [25].

(f) Put the washer [21], spring [22], and washer [23] in their correct positions on the cable [12].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(g) Put the cable [12] down through the bracket [24].

(h) Install the spherical seat [20] and spherical cap [19].

(i) Install the self-locking nut [13] that attaches the cable [12] to the lower cable rod end.

(j) Install the bolt [29], nut [30], washer [31], washer [31], and bushing [33] that attach the cable [12] to the lower crank assembly.

NOTE: It is not necessary to do a wet installation if the hole is already primed or if the bolt go through a bushing.

(k) Make sure that the clearance between the nut [30] and bolt [34] is equal or more than 0.06 in. (1.52 mm) (View F, Figure 201).

1) If the clearance less than 0.06 in. (1.52 mm), do this step:

a) Change the direction of the bolt [29] and nut [30] (View H, Figure 201).

(l) Install the loop clamp [14], bolt [15], nut [16], washer [17], and washer [18] at three locations.

1) Tighten the fastener head to 35 in-lb (4 N·m).

SUBTASK 71-11-06-420-002-G00

(2) Install the handle [7] as follow:

(a) Install the two bolts [8], two nuts [9], two washers [10], and two washers [11] that attach the handle [7] to the handle shaft.

(b) Tighten the two bolts [8] to 35.0 in-lb (4.0 N·m).

SUBTASK 71-11-06-110-001-G00

(3) Clean the anti-static coatings on the forward fairing [1] and aft fairing [5] with alcohol, B00130.

SUBTASK 71-11-06-420-003-G00

(4) Install the aft fairing [5] as follow:

(a) Use sealant, A00767, to wet install the two bolts [6] that attach the aft fairing [5] to the fan cowl.

NOTE: It is not necessary to do a wet installation if the hole is already primed or if the bolt go through a bushing.

(b) Tighten the two bolts [6] to 18.0 in-lb (2.0 N·m) - 20.0 in-lb (2.3 N·m).

SUBTASK 71-11-06-420-004-G00

(5) Install the blade [3] as follow:

(a) Install the bolt [4] that attaches the blade [3] to the fan cowl.

(b) Tighten the bolt [4] to 18.0 in-lb (2.0 N·m) - 20.0 in-lb (2.3 N·m).

SUBTASK 71-11-06-420-005-G00

(6) Install the forward fairing [1] as follow:

(a) Use sealant, A00767, to wet install the two bolts [2] that attach the forward fairing [1] to the fan cowl.

NOTE: It is not necessary to do a wet installation if the hole is already primed or if the bolt go through a bushing.

(b) Tighten the two bolts [2] to 18.0 in-lb (2.0 N·m) - 20.0 in-lb (2.3 N·m).

(c) Use sealant, A00767, to apply a fillet seal to the external periphery of the forward fairing [1].

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SUBTASK 71-11-06-710-001-G00

(7) Do this task: Fan Cowl Latch Indication System Rigging Check, TASK 71-11-06-720-801-G00.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-06-410-001-G00

(1) Close the applicable right fan cowl panel (TASK 71-11-04-410-801-G00).

SUBTASK 71-11-06-860-002-G00

(2) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FAN COWL LATCH INDICATION SYSTEM - ADJUSTMENT/TEST

1. General

A. This procedure has this task:

(1) Fan Cowl Latch Indication System Rigging Check.

TASK 71-11-06-720-801-G00

2. Fan Cowl Latch Indication System Rigging Check

(Figure 501)

A. General

(1) This task gives the instructions to check the rigging of the fan cowl latch indication system.

(2) The fan cowl latch will need to be held flush with the fan cowl skin to allow cycling of the latch indication blade.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (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. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45

D. Location Zones

Zone	Area
411	Engine 1 - Engine
414	Engine 1 - Fan Cowl, Right
421	Engine 2 - Engine
424	Engine 2 - Fan Cowl, Right

E. Fan Cowl Latch Indication System Rigging Check

SUBTASK 71-11-06-040-001-G00

CAUTION

RETRACT THE LEADING EDGE FLAPS, AND DO THE DEACTIVATION PROCEDURE BEFORE YOU OPEN THE FAN COWL PANELS. IF YOU DO NOT OBEY THESE PRECAUTIONS, THE FAN COWL PANELS WILL HIT THE FLAPS. DAMAGE WILL OCCUR.

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

SUBTASK 71-11-06-010-003-G00

(2) Open the right fan cowl panel (TASK 71-11-04-010-801-G00).

SUBTASK 71-11-06-560-001-G00

(3) Hold the center fan cowl latch handle flush with the fan cowl skin.

SUBTASK 71-11-06-860-003-G00

(4) Push the latch indication system handle through the oil tank access door.

SUBTASK 71-11-06-410-002-G00

(5) Make sure that you close and secure the oil tank access door.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-11-06-220-001-G00

(6) Make sure that the bubble seal on the latch indication handle is compressed against the oil tank access door approximately 1/4 to 1/3 of the total compressible distance.

(a) If it is necessary, do these steps to add or remove the washer [4] at the lower stop:

1) Remove the bolt [1], nut [2], washer [3], washer [4], and washer [5].

2) Install the bolt [1], nut [2], washer [3], washer [4], and washer [5].

NOTE: It is not necessary to do a wet installation with the sealant, A00767 if the hole is already primed or if the bolt go through a bushing.

SUBTASK 71-11-06-210-001-G00

(7) With the crank arm against the lower stop, make sure that there is a consistent gap between the blade and the aft fairing.

(a) If it is necessary, loosen and tighten the self-locking nut on the upper cable rod end to adjust the cable.

SUBTASK 71-11-06-010-002-G00

(8) Open the oil tank access door.

SUBTASK 71-11-06-980-001-G00

(9) Pull the fan cowl latch indication system handle out through the oil tank access door opening.

NOTE: Pull the handle out will rotate the blade to uncover the center fan cowl latch.

SUBTASK 71-11-06-210-002-G00

(10) Make sure that the blade clears the fan cowl latch housing and does not contact the forward fairing.

SUBTASK 71-11-06-210-003-G00

(11) While the blade is in the deployed position, make sure that the crank arm touches the upper stop.

(a) If it is necessary, do these steps to add or remove the washer [9] at the upper stop:

1) Remove the bolt [6], nut [7], washer [8], washer [9], and washer [10].

2) Install the bolt [6], nut [7], washer [8], washer [9], and washer [10].

NOTE: It is not necessary to do a wet installation with the sealant, A00767, if the hole is already primed or if the bolt goes through the bushing.

SUBTASK 71-11-06-980-002-G00

(12) Hold the center latch handle flush with the fan cowl skin and do these steps:

(a) Move the handle from the deployed position to the stowed position and back to the deployed position again.

(b) Make sure that the fan cowl latch indication system operates correctly.

SUBTASK 71-11-06-980-003-G00

(13) Pull the fan cowl latch indication system handle out through the oil tank access door opening.

SUBTASK 71-11-06-410-003-G00

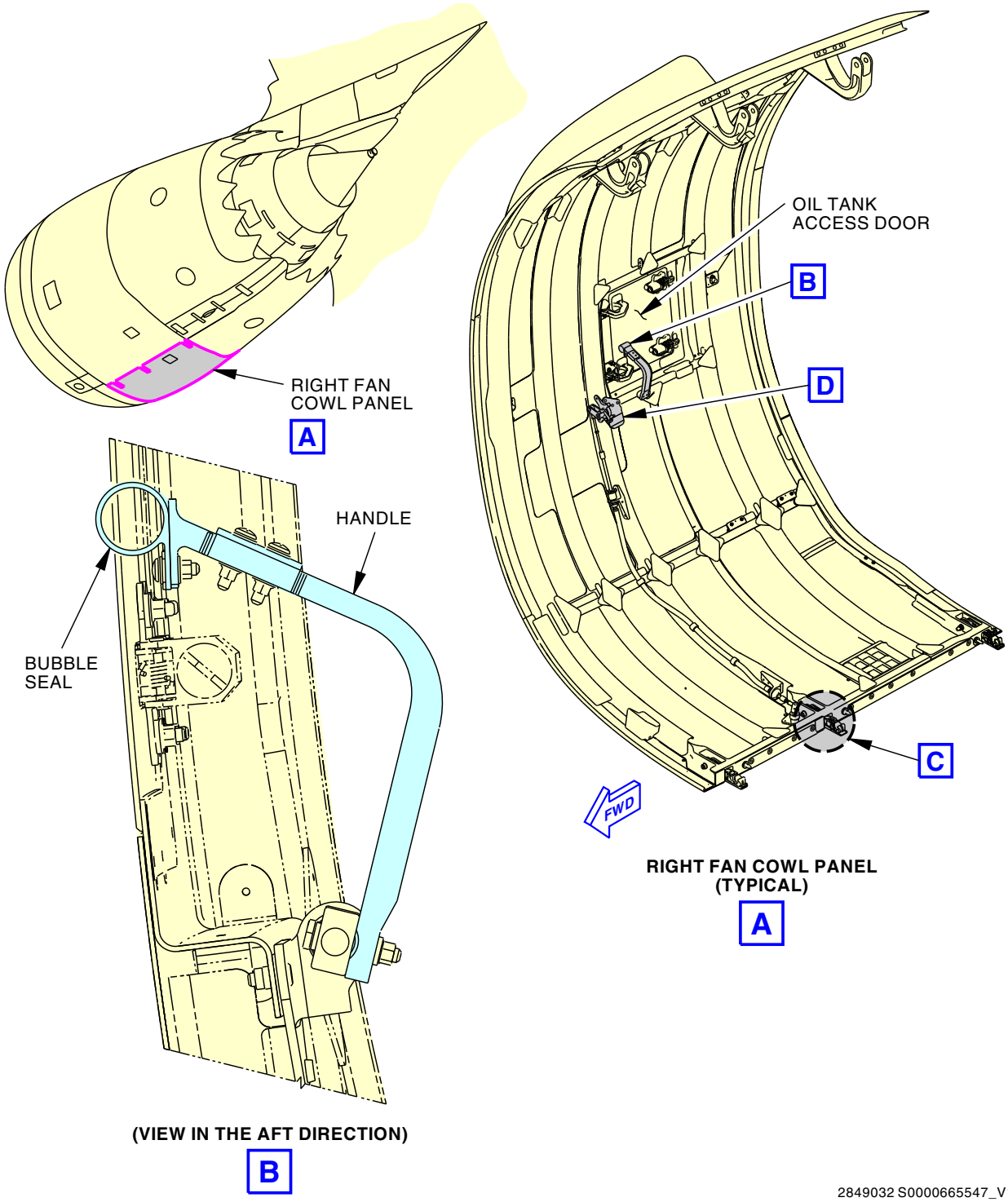
(14) Close the right fan cowl panel (TASK 71-11-04-410-801-G00).

SUBTASK 71-11-06-440-001-G00

(15) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

END OF TASK

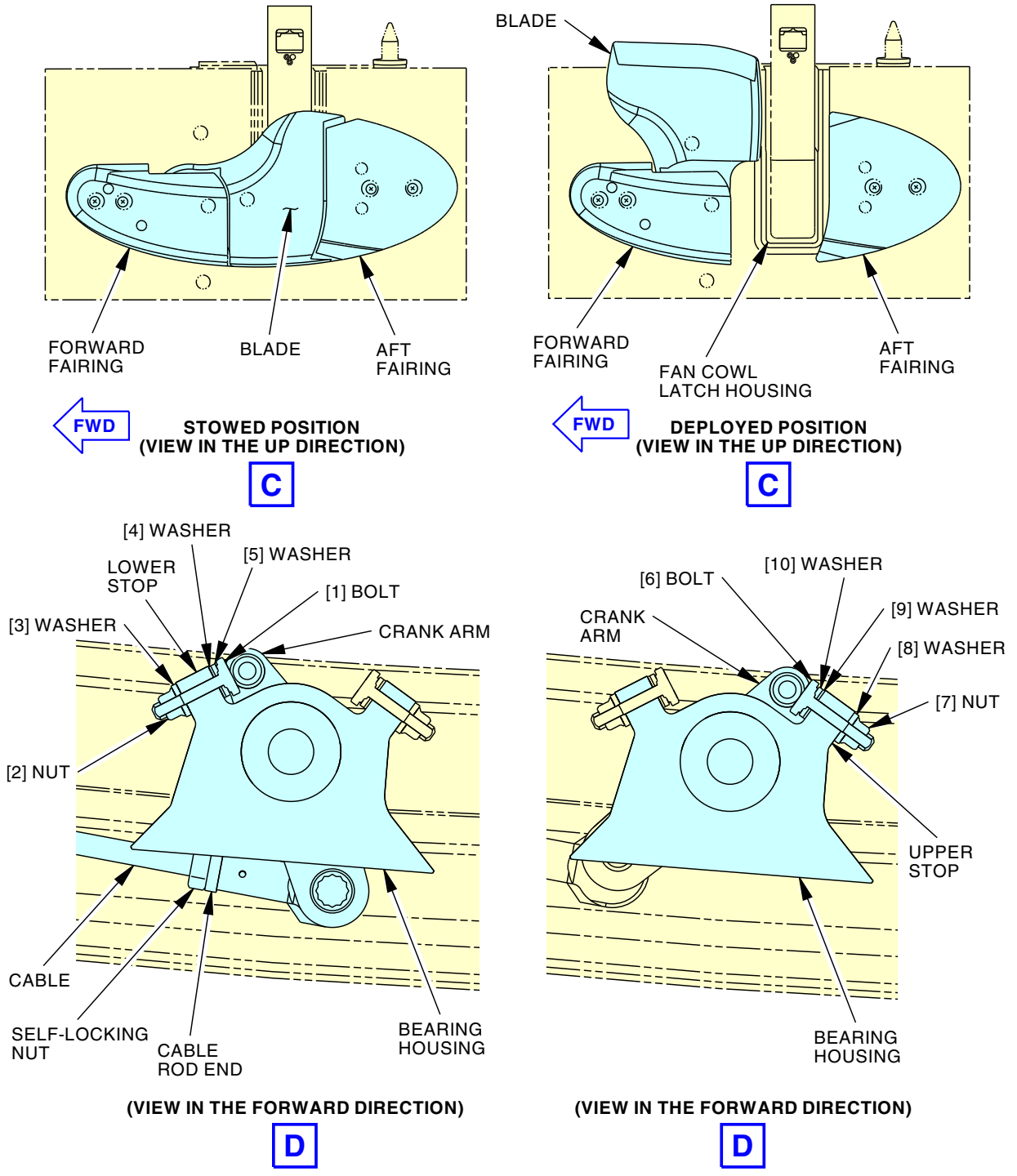
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2849032 S0000665547_V1

Fan Cowl Latch Indication System Rigging Check
Figure 501/71-11-06-990-802-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2849043 S0000665550_V1

Fan Cowl Latch Indication System Rigging Check
Figure 501/71-11-06-990-802-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

IDG ACCESS DOOR - MAINTENANCE PRACTICES

1. General

A. This procedure has two tasks:

(1) IDG access door removal

(2) IDG access door installation.

TASK 71-11-08-000-801-G00

2. IDG Access Door Removal

(Figure 201)

A. General

(1) This task gives the instructions on how to remove the IDG access door.

(2) The IDG access door is referred to as the access door.

(3) The access door is installed on the left fan cowl panel at the 4:00 o'clock position.

B. Tools/Equipment

Reference	Description
STD-653	Platform - Engine and Strut Access

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Access Panels

Number	Name/Location
413AL	IDG Access Door, Engine 1
423AL	IDG Access Door, Engine 2

E. Prepare for the Removal

SUBTASK 71-11-08-860-001-G00

(1) Move the engine and strut access platform, STD-653 next to the applicable left fan cowl panel.

F. IDG Access Door Removal

SUBTASK 71-11-08-010-001-G00

(1) Open the access door [1] as follows:

(a) Open the applicable access panels:

Number	Name/Location
413AL	IDG Access Door, Engine 1
423AL	IDG Access Door, Engine 2

(b) Push on the forward part of each latch button to release the latch.

(c) Put the access door [1] in the fully open position.

SUBTASK 71-11-08-869-001-G00

(2) Remove the access door [1] as follows:

(a) Hold the access door [1] open.

(b) Remove the nut [6], the two washers [5], the washer [3], and the bolt [2] that attach the lanyard [4] to the upper hinge fitting.

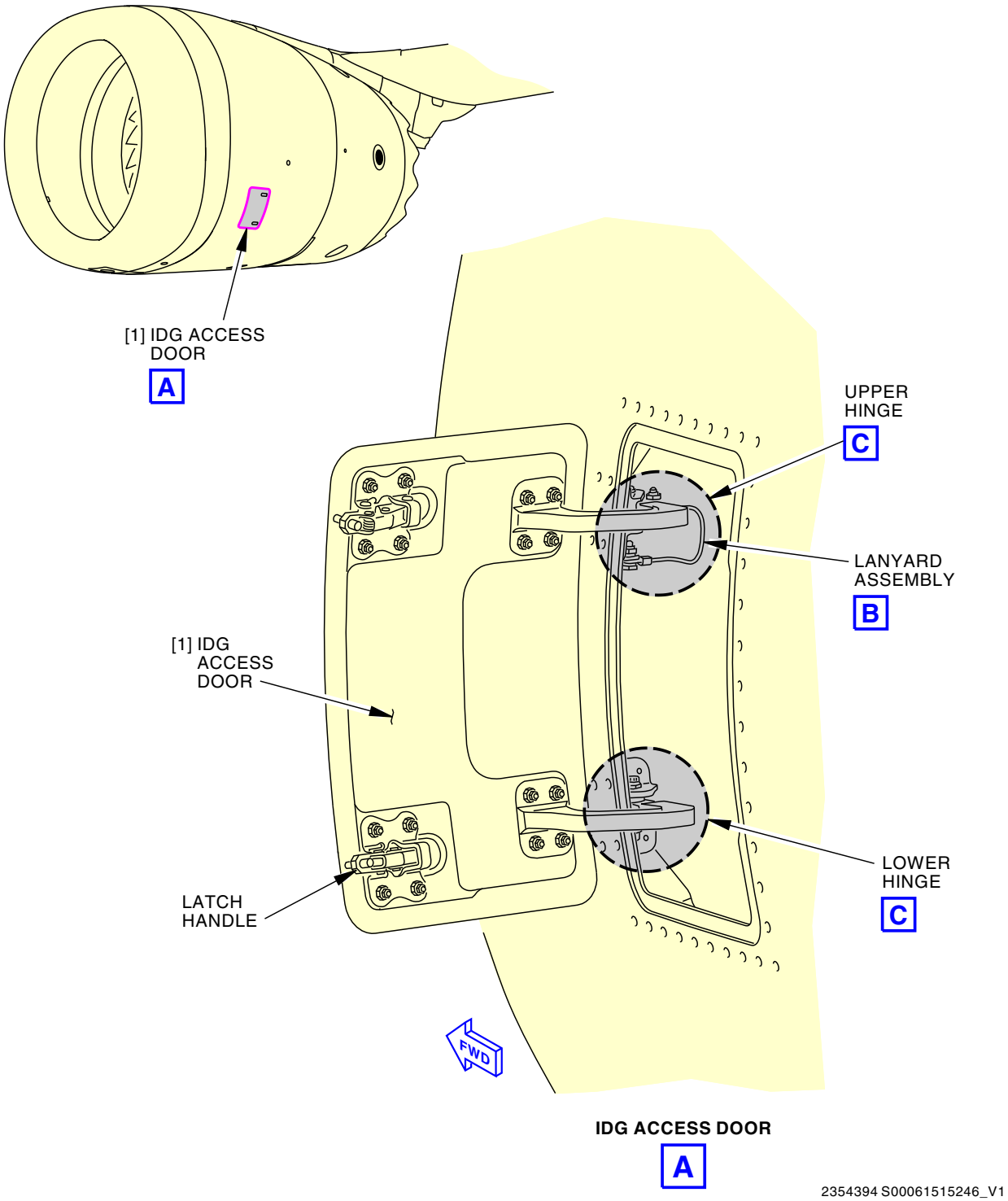
ECCN 9E991 BOEING PROPRIETARY - See title page for details

(c) Remove the two nuts [7], the two washers [8], the two washers [9], and the two bolts [10] that attach the upper and lower hinge fittings to the access door [1].

(d) Remove the access door [1] from the fan cowl panel.

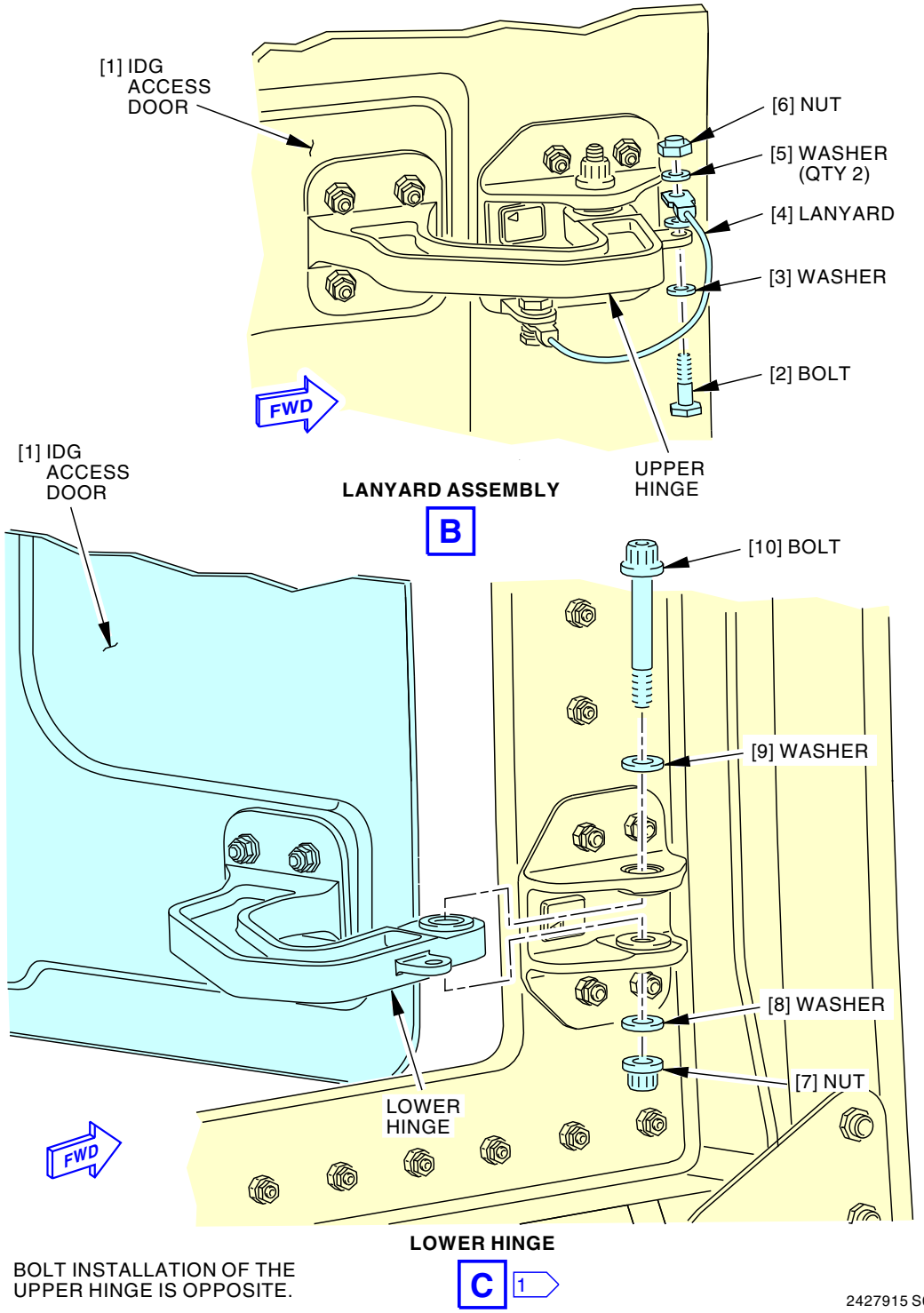
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



IDG Access Door Installation
Figure 201/71-11-08-990-801-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



IDG Access Door Installation
Figure 201/71-11-08-990-801-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-11-08-400-801-G00

3. IDG Access Door Installation

(Figure 201)

A. General

(1) This task gives the instructions on how to install the IDG access door.

(2) The IDG access door is referred to as the access door.

(3) The access door is installed on the left fan cowl panel at the 4:00 o'clock position.

B. Tools/Equipment

Reference	Description
STD-653	Platform - Engine and Strut Access

C. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Access door	71-11-08-01-120	SIA ALL

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. Access Panels

Number	Name/Location
413AL	IDG Access Door, Engine 1
423AL	IDG Access Door, Engine 2

G. IDG Access Door Installation

SUBTASK 71-11-08-420-001-G00

(1) Install the access door [1] as follows:

(a) Put the access door [1] in its opening position on the fan cowl panel.

(b) Align the hinge fitting bolt holes with the access door bolt holes.

(c) Install the two bolts [10], the two washers [9], the two washers [8], and the two nuts [7] that attach the upper and lower hinge fittings to the access door [1].

NOTE: Do not tighten the bolts at this time.

(d) Install the bolt [2], the washer [3], the two washers [5], and the nut [6] that attach the lanyard [4] to the upper hinge fitting.

1) Tighten the nut to 33 in-lb (3.7 N·m)-40 in-lb (4.5 N·m).

2) Fillet seal the ground stud and lanyard lug with sealant, A00767.

(e) Close and open the access door [1] to do a check on the clearance of the access door [1].

1) If it is necessary, adjust the hinge fittings.

2) Do a check on the clearance of the access door [1] again to make sure that the access door [1] operates smoothly.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(f) Tighten the nuts [7] to 90 in-lb (10.2 N·m) - 105 in-lb (11.9 N·m).

SUBTASK 71-11-08-410-001-G00

(2) Close the access door [1] as follows:

(a) Make sure that the latches are in the fully open position.

(b) Close these access panels:

Number	Name/Location
413AL	IDG Access Door, Engine 1
423AL	IDG Access Door, Engine 2

1) Press the aft part of the latch level while you push the access door [1] to close.

(c) Make sure that the access door [1] is fully closed.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-08-090-001-G00

(1) Move the engine and strut access platform, STD-653 away from the engine.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

ENGINE OIL TANK ACCESS DOOR - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) Engine oil tank access door removal

(2) Engine oil tank access door installation.

TASK 71-11-10-000-801-G00

2. Engine Oil Tank Access Door Removal

(Figure 401)

A. General

(1) This task gives the instructions to remove the engine oil tank access door.

B. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Access Panels

Number	Name/Location
414AR	Oil Tank Access / Pressure Relief Door, Engine 1
424AR	Oil Tank Access / Pressure Relief Door, Engine 2

E. Prepare for the Removal

SUBTASK 71-11-10-010-002-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-11-10-010-001-G00

(2) Open the access door [1] as follows:

(a) Open the applicable access panels:

Number	Name/Location
414AR	Oil Tank Access / Pressure Relief Door, Engine 1
424AR	Oil Tank Access / Pressure Relief Door, Engine 2

(b) Push on the forward button of each latch to release the latch.

(c) Put the access door [1] in the fully open position.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Engine Oil Tank Access Door Removal

SUBTASK 71-11-10-869-001-G00

(1) Remove the access door [1] as follows:

(a) Hold the access door [1] open.

(b) Remove the nut [6], the washers [5], the washer [3], and the bolt [2] that attach the lanyard [4] to the lower hinge fitting.

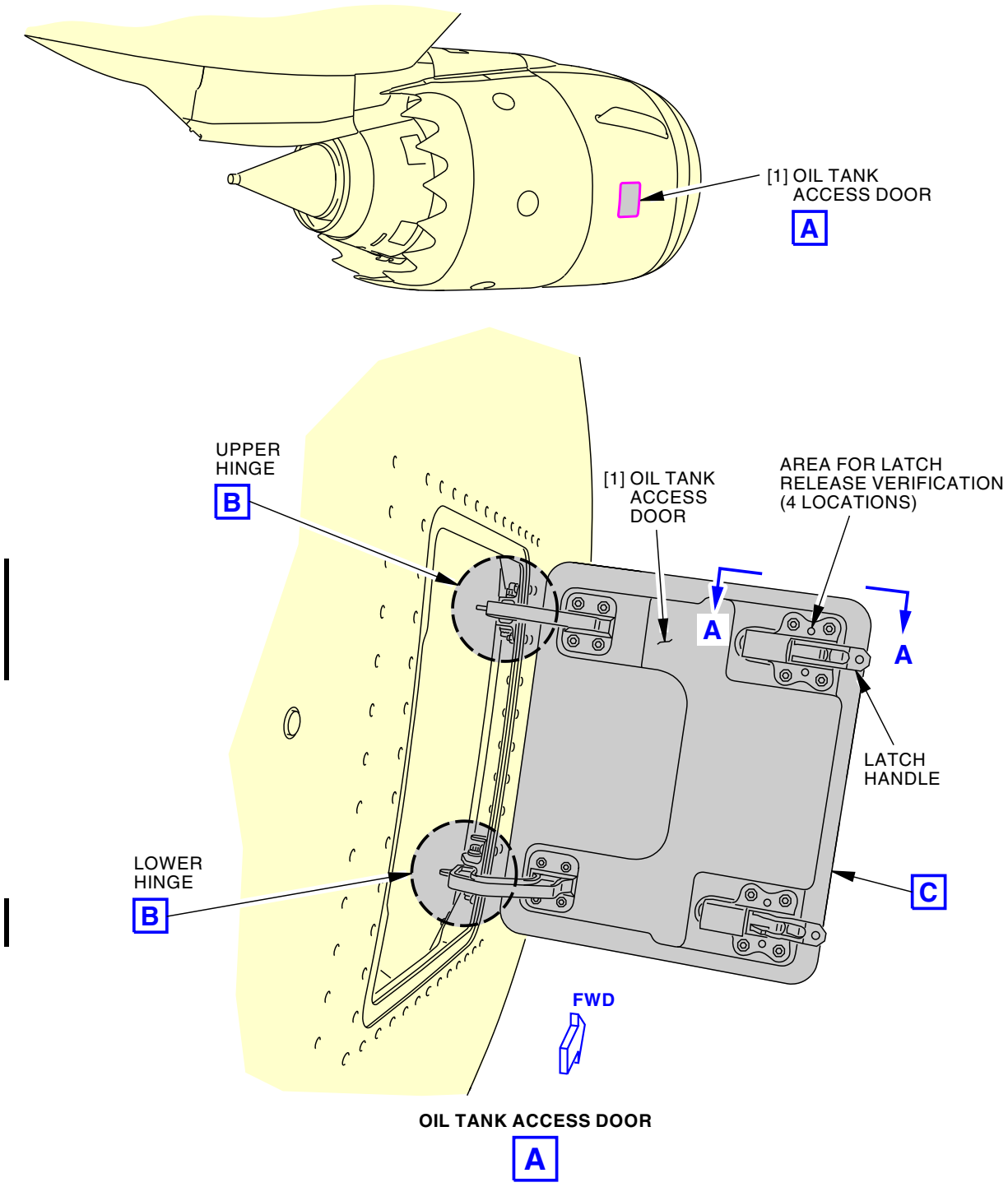
(c) Remove the nut [7], the washer [8], the washer [9], and the bolt [10] that attach the lower hinge fitting to the hinge clevis on the fan cowl.

(d) Remove the nut [7], the washer [8], the washer [9], and the bolt [10] that attach the upper hinge fitting to the hinge clevis on the fan cowl.

(e) Remove the access door [1] from the fan cowl panel.

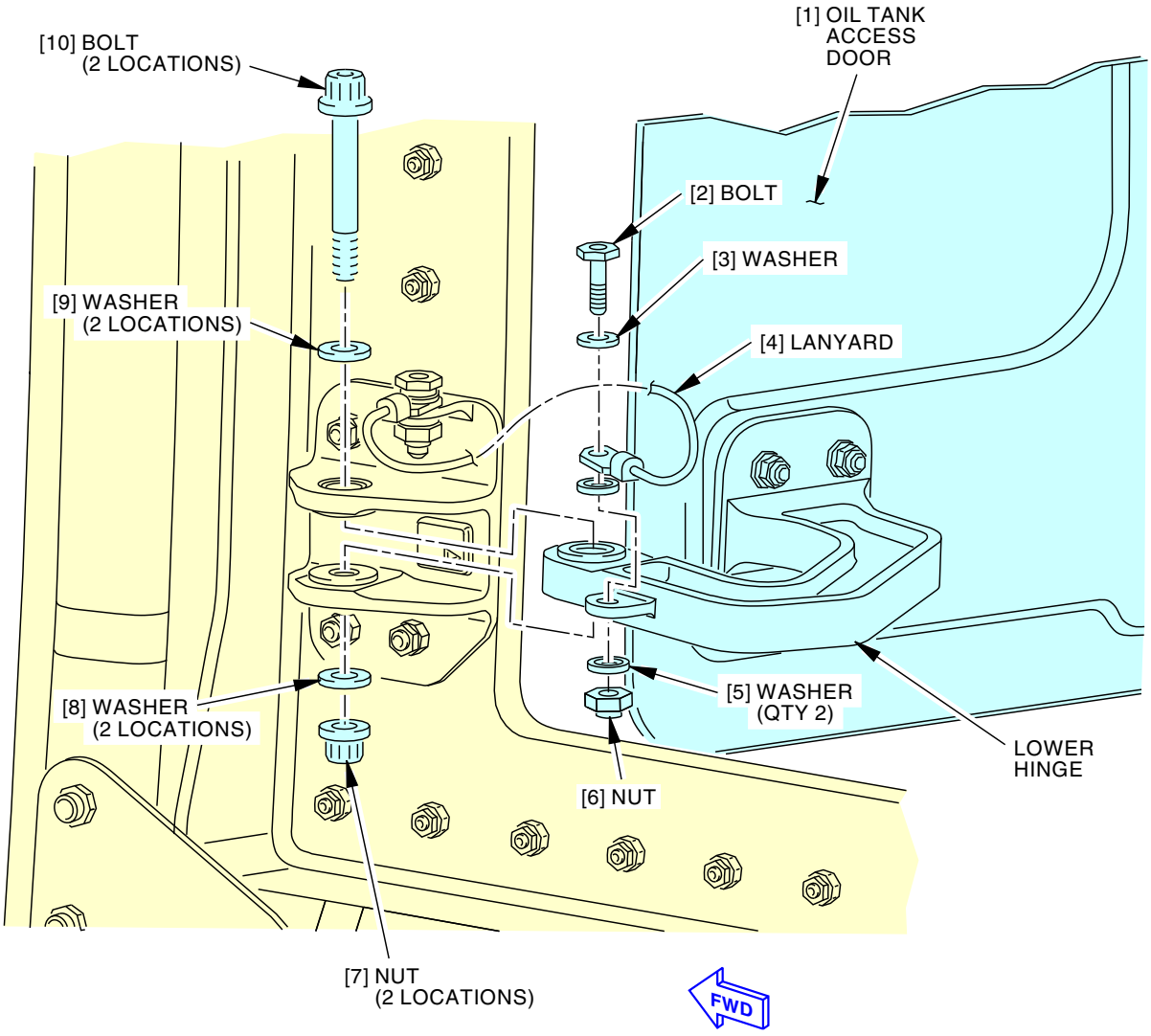
——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Engine Oil Tank Access Door Installation
Figure 401/71-11-10-990-801-G00 (Sheet 1 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



LOWER HINGE

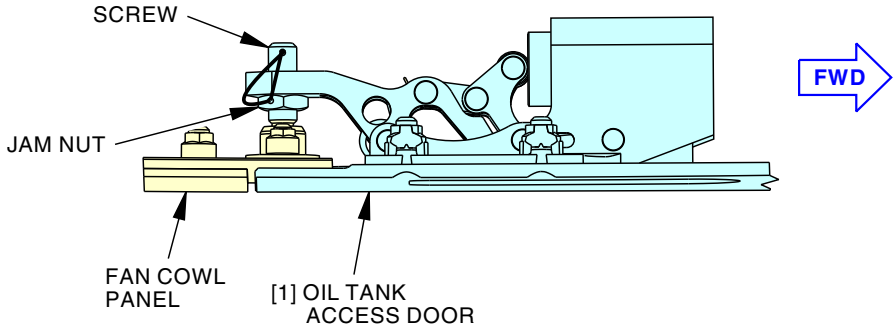
B 1

1 BOLT INSTALLATION OF THE UPPER HINGE IS OPPOSITE.

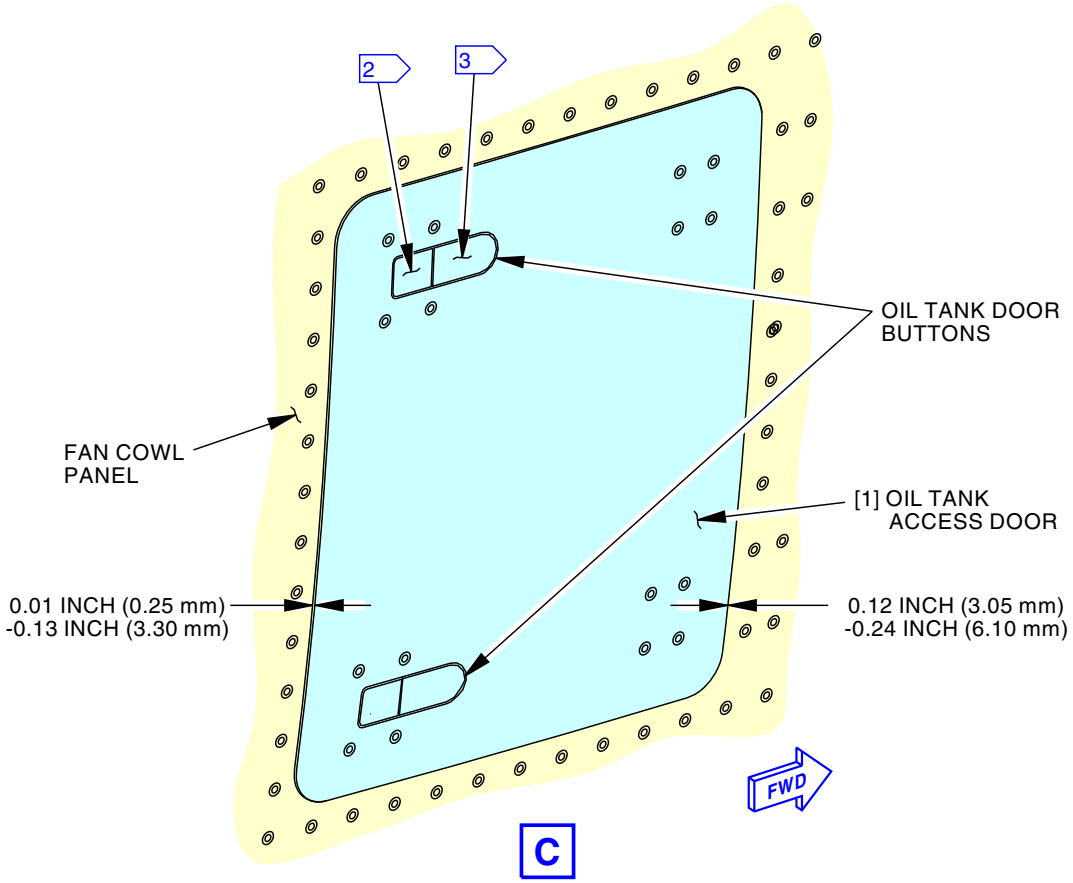
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Engine Oil Tank Access Door Installation
Figure 401/71-11-10-990-801-G00 (Sheet 2 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



A-A



2 PUSH CLOSE BUTTON
3 PUSH OPEN BUTTON

2568441 S0000615351_V2

Engine Oil Tank Access Door Installation
Figure 401/71-11-10-990-801-G00 (Sheet 3 of 3)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-11-10-400-801-G00

3. Engine Oil Tank Access Door Installation

(Figure 401)

A. General

(1) This task gives the instructions to install the engine oil tank access door.

B. References

Reference	Title
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-858	Tag - DO NOT OPERATE
STD-6371	Load Cell - 0 to 200 pound (91 kg) capability

D. Consumable Materials

Reference	Description	Specification
A00767	Sealant - Fuel Tank	BMS5-45
G50667	Lockwire - MS20995N20, Inconel - 0.020 Inch (0.508 mm) Diameter	NASM20995

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Access door	71-11-10-01-115	SIA 001-007

F. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

G. Access Panels

Number	Name/Location
414	Right Fan Cowl, Engine 1
414AR	Oil Tank Access / Pressure Relief Door, Engine 1
424	Right Fan Cowl, Engine 2
424AR	Oil Tank Access / Pressure Relief Door, Engine 2

H. Engine Oil Tank Access Door Installation

SUBTASK 71-11-10-420-001-G00

(1) Install the access door [1] as follows:

(a) Put the access door [1] in the open position on the fan cowl panel.

(b) Align the access door [1] hinge fitting bolt holes with the hinge clevis holes on the fan cowl.

(c) Install the bolt [10], the washer [9], the washer [8], and the nut [7] that attach the access door [1] upper hinge fitting to the hinge clevis on the fan cowl.

NOTE: Do not tighten the bolts at this time.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(d) Install the bolt [10], the washer [9], the washer [8], and the nut [7] that attach the access door [1] lower hinge fitting to the hinge clevis on the fan cowl.

NOTE: Do not tighten the bolts at this time.

(e) Install the bolt [2], the washer [3], the washers [5], and the nut [6] that attach the lanyard [4] to the lower hinge fitting.

1) Tighten the nut to 33 in-lb (3.7 N·m) - 40 in-lb (4.5 N·m).

2) Fillet seal the ground stud and lanyard lug with sealant, A00767.

(f) Close and open the access door [1] to do a check on the clearance of the access door [1].

1) Make sure that the clearance between the access door [1] and the fan cowl panel at the aft edge is 0.01 in. (0.25 mm) - 0.13 in. (3.30 mm).

2) Make sure that the clearance between the access door [1] and the fan cowl panel at the forward edge is 0.12 in. (3.05 mm) - 0.24 in. (6.10 mm).

3) If it is necessary, adjust the hinge fittings.

4) Do a check on the clearance of the access door [1] again to make sure that the access door [1] operates smoothly.

(g) Tighten the nuts [7] to 82.0 in-lb (9.3 N·m) - 88.0 in-lb (9.9 N·m).

I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-10-410-001-G00

(1) Close the access door [1] as follows:

(a) Make sure that the latches are in the fully open position.

(b) Close these access panels:

Number	Name/Location
414AR	Oil Tank Access / Pressure Relief Door, Engine 1
424AR	Oil Tank Access / Pressure Relief Door, Engine 2

1) Push the access door [1] to close.

NOTE: If the latch jams in the fully open position and cannot close, push the forward “PUSH OPEN” button to reset the latch.

2) Use a load cell, STD-6371, to push each aft “PUSH CLOSE” button until it is flushed with the access door [1].

a) Measure the closing force.

b) Make sure that the closing force is 24.2 lb (11.0 kg) - 35.0 lb (15.9 kg).

<1> If it is necessary to adjust the closing force, do these steps:

<a> Adjust the latch screw.

<b> Install the MS20995N20 lockwire, G50667, between the latch screw and jam nut.

SUBTASK 71-11-10-010-003-G00

(2) On the applicable engine, open the right fan cowl panel (TASK 71-11-04-010-801-G00).

(a) Open these access panels:

Number	Name/Location
414	Right Fan Cowl, Engine 1
424	Right Fan Cowl, Engine 2

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SUBTASK 71-11-10-750-001-G00

(3) Do a test of the release feature of each latch as follows:

(a) Release to open one latch of the oil tank door assembly.

(b) Use the load cell, STD-6371, to apply 85 lb (38.6 kg) - 103.5 lb (46.9 kg) evenly distributed on the two indicated areas of the latch that is closed.

NOTE: The indicated areas are marked with circular dots on the inside of the door on the latch.

(c) Make sure that the latch opens at the target applied force.

(d) Close the latch.

(e) Do the test of the release feature on the second latch.

SUBTASK 71-11-10-410-003-G00

(4) On the applicable engine, close the right fan cowl panel (TASK 71-11-04-410-801-G00).

(a) Close these access panels:

Number	Name/Location
414	Right Fan Cowl, Engine 1
424	Right Fan Cowl, Engine 2

SUBTASK 71-11-10-410-002-G00

(5) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

HOLD-OPEN RODS - MAINTENANCE PRACTICES

1. General

A. This procedure has these tasks:

(1) Fan cowl hold open rod removal

(2) Fan cowl hold open rod installation

(3) Fan cowl hold open rod inspection

(4) Fan cowl hold open rod cleaning.

TASK 71-11-11-000-801-G00

2. Fan Cowl Hold Open Rod Removal

(Figure 201)

A. General

(1) This task provides the instructions on how to remove the fan cowl hold open rod.

(2) Each fan cowl panel has a telescoped hold open rod. The fan cowl hold open rod is stowed in the vertical position on the aft end edge of the fan cowl panel when the fan cowl panel is closed.

(3) The removal task of the left side or the right side of the fan cowl hold open rod is the same.

B. References

Reference	Title
71-11-04-010-804-G00	Open the Fan Cowl Panels (Sling Method) (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-14546	Sling Eqpt - Fan Cowl, LEAP-1B Engine Part #: C71031-1 Supplier: 81205
STD-467	Hoist - 500 lb (226.8 kg)
STD-653	Platform - Engine and Strut Access
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. 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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

F. Prepare for the Removal

SUBTASK 71-11-11-860-001-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-11-11-010-005-G00

(2) On the applicable engine, open these access panels:

(TASK 71-11-04-010-804-G00)

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

NOTE: The fan cowl panels must continue to be held open using the hoist, STD-467, and fan cowl sling, SPL-14546, when the fan cowl hold open rod is removed.

SUBTASK 71-11-11-490-001-G00

(3) Put the engine and strut access platform, STD-653, inside the inside of the fan cowl panel.

G. Fan Cowl Hold Open Rod Removal

SUBTASK 71-11-11-020-001-G00

(1) Remove the fan cowl hold open rod [1] from the applicable fan cowl panel as follows:

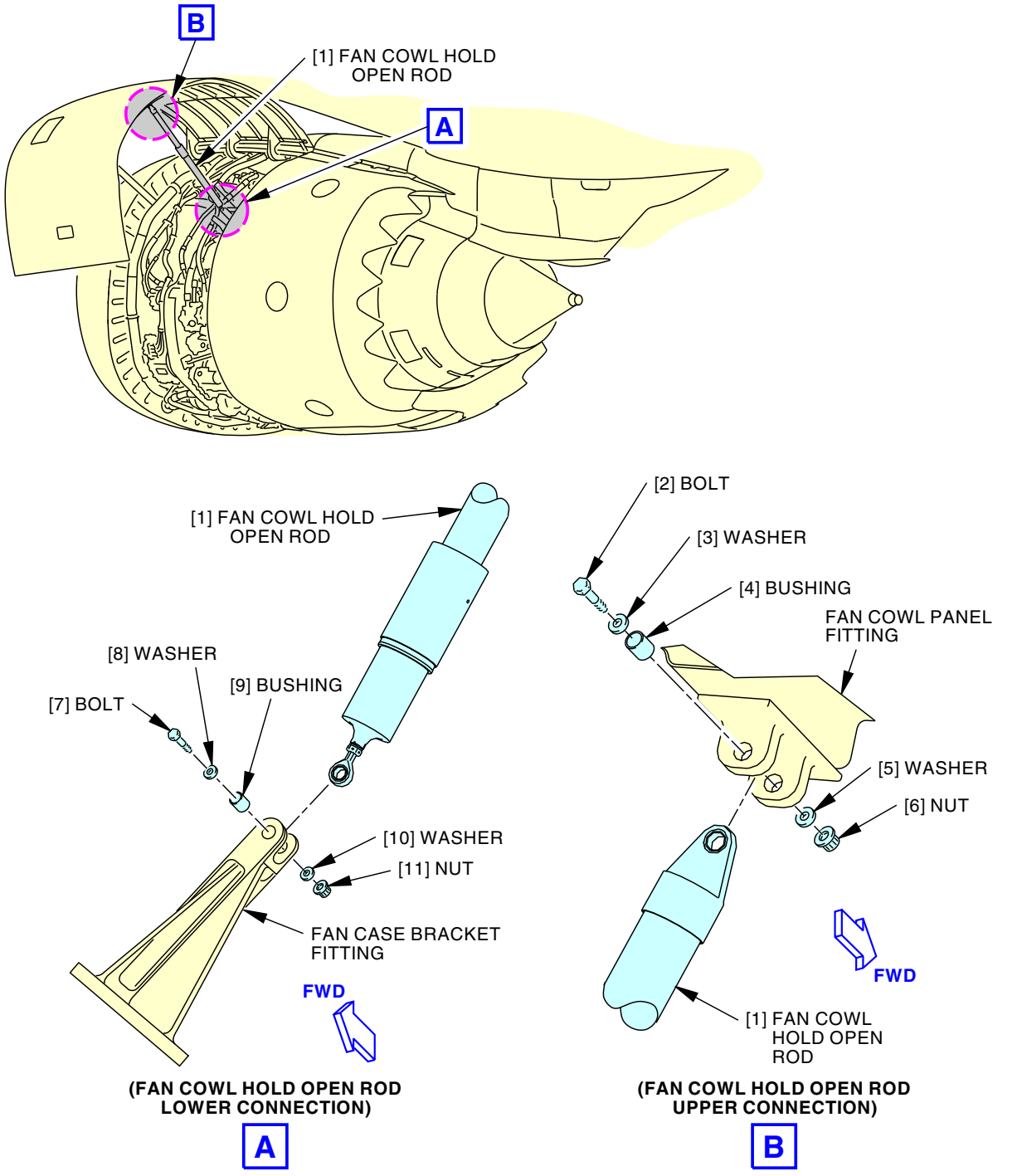
(a) Remove the nut [11], washer [10], bushing [9], washer [8], and bolt [7] that attach the fan cowl hold open rod [1] end to the fan case bracket fitting.

(b) Remove the nut [6], washer [5], bushing [4], washer [3], and bolt [2] that attach the fan cowl hold open rod [1] end to the fan cowl panel fitting.

(c) Remove the fan cowl hold open rod [1] from the fan cowl panel.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2354397 S00061515257_V3

Fan Cowl Hold Open Rod Installation
Figure 201/71-11-11-990-801-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-11-11-400-801-G00

3. Fan Cowl Hold Open Rod Installation

(Figure 201)

A. General

(1) This task provides the instructions on how to install the fan cowl hold open rod.

(2) The installation task of the left side or the right side of the fan cowl hold open rod is the same.

B. References

Reference	Title
71-11-04-410-804-G00	Close the Fan Cowl Panels (Sling Method) (P/B 201)

C. Tools/Equipment

Reference	Description
STD-653	Platform - Engine and Strut Access
STD-858	Tag - DO NOT OPERATE

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Fan cowl hold open rod	71-11-11-01-100	SIA ALL

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. 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

G. Fan Cowl Hold Open Rod Installation

SUBTASK 71-11-11-420-001-G00

(1) Install the fan cowl hold open rod [1] on the applicable fan case panel as follows:

(a) Install the bolt [2], washer [3], bushing [4], washer [5], and nut [6] that attach the fan cowl hold open rod [1] end to the fan cowl panel fitting.

1) Tighten the nut [6] to 161 in-lb (18.2 N·m) - 184 in-lb (20.8 N·m).

(b) Install the bolt [7], washer [8], bushing [9], washer [10], and nut [11] that attach the fan cowl hold open rod [1] end to the fan case bracket fitting.

1) Tighten the nut [11] to 303 in-lb (34.2 N·m) - 347 in-lb (39.2 N·m).

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-11-020-002-G00

(1) Move the engine and strut access platform, STD-653, away from the engine.

SUBTASK 71-11-11-410-008-G00

(2) On the applicable engine, close these access panels:

(TASK 71-11-04-410-804-G00)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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

SUBTASK 71-11-11-860-002-G00

(3) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

TASK 71-11-11-200-801-G00

4. Fan Cowl Hold-Open Rod Inspection

(Figure 202)

A. General

(1) This task provides the instructions on how to do a visual inspection of the fan cowl hold-open rod.

(2) You must open the fan cowl panels to do the inspection of the fan cowl hold-open rods.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
71-11-04-010-804-G00	Open the Fan Cowl Panels (Sling Method) (P/B 201)
71-11-04-410-804-G00	Close the Fan Cowl Panels (Sling Method) (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-14546	Sling Eqpt - Fan Cowl, LEAP-1B Engine Part #: C71031-1 Supplier: 81205
STD-467	Hoist - 500 lb (226.8 kg)

D. Location Zones

Zone	Area
411	Engine 1 - Engine

E. Access Panels

Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1

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(Continued)

Number	Name/Location
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

F. Prepare for the Inspection

SUBTASK 71-11-11-869-001-G00

(1) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 71-11-11-040-001-G00

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

SUBTASK 71-11-11-010-006-G00

(3) Do this task: Open the Fan Cowl Panels (Sling Method), TASK 71-11-04-010-804-G00.

NOTE: The fan cowl panels must continue to be held open using the hoist, STD-467, and the fan cowl sling, SPL-14546, when the HOR is removed.

(a) On the applicable engine, 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

G. Fan cowl Hold-Open Rods Inspection

SUBTASK 71-11-11-210-001-G00

(1) Visually examine the applicable the fan cowl hold open rod [1] for damage as follows:

(a) Make sure that there are no cracks in the fan cowl hold open rod [1] end.

(b) Extend the fan cowl hold open rod [1] to make sure that they operate smoothly:

1) For the applicable fan cowl hold open rod [1], disconnect the bolt [7] at the bracket assembly on the fan case.

2) Manually extend and retract the fan cowl hold open rod [1]

a) Make sure that the fan cowl hold open rod [1] operates smoothly.

(c) Make sure that there is no contamination on the fan cowl hold open rod [1].

1) If there is contamination on the fan cowl hold open rod [1], clean the fan cowl hold-open rod (TASK 71-11-11-100-801-G00).

(d) Make sure that there is no corrosion on the fan cowl on the body and end of the fan cowl hold open rod [1].

SUBTASK 71-11-11-960-001-G00

(2) If you find damage, replace the fan cowl hold-open rod (TASK 71-11-11-000-801-G00 and TASK 71-11-11-400-801-G00).

SUBTASK 71-11-11-210-002-G00

(3) Visually examine the bracket assemblies on the fan cowl for damage.

(a) Make sure that there is no crack in the fan case bracket fittings and bushings of the fan cowl.

(b) Make sure that there is no corrosion on the brackets and the bushings of the fan cowl.

(c) If you find damage to the brackets on the fan cowl, replace the brackets.

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SUBTASK 71-11-11-210-003-G00

(4) Visually examine the fan case bracket for damage as follows:

(a) Make sure that there are no cracks on the fan case bracket.

(b) Make sure that there is no corrosion on the fan case bracket.

(c) If you find damage to the brackets on the fan cowl, replace the fan case brackets.

SUBTASK 71-11-11-410-002-G00

(5) Do this task: TASK 71-11-11-400-801-G00.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-11-410-010-G00

(1) Do this task: Close the Fan Cowl Panels (Sling Method), TASK 71-11-04-410-804-G00.

(a) On the applicable engine, close these access panels:

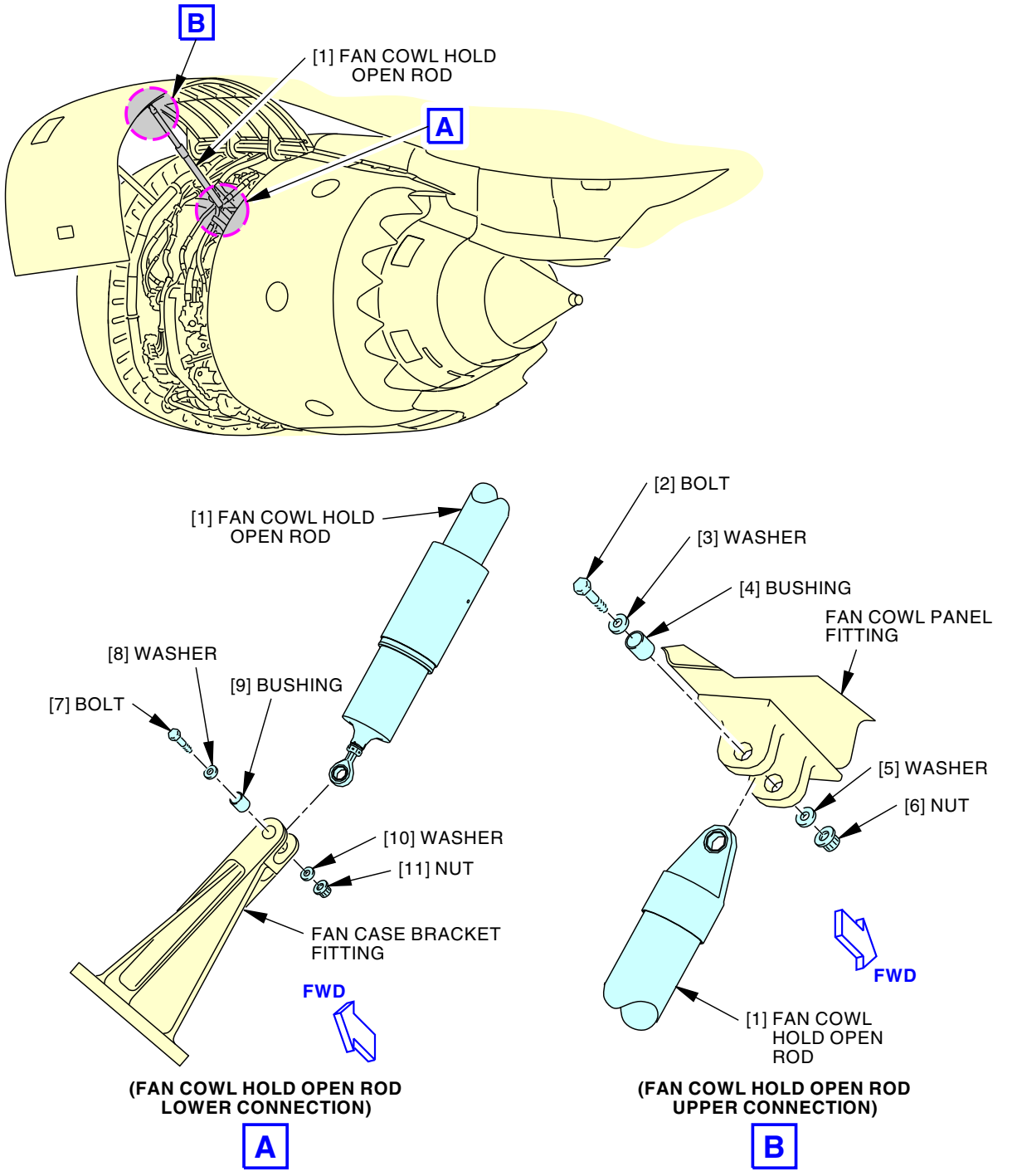
Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

SUBTASK 71-11-11-440-001-G00

(2) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

——— END OF TASK ———

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Fan Cowl Hold-Open Rods Inspection
Figure 202/71-11-11-990-803-G00

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TASK 71-11-11-100-801-G00

5. Fan Cowl Hold-Open Rod Cleaning

(Figure 203)

A. General

(1) This task provides the instructions on how to clean the fan cowl hold open rod.

(2) You must open the fan cowl panels to clean the fan cowl hold-open rods.

B. References

Reference	Title
27-81-00-040-801	Leading Edge Flaps and Slats - Deactivation (P/B 201)
27-81-00-440-801	Leading Edge Flaps and Slats - Activation (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
71-11-04-010-804-G00	Open the Fan Cowl Panels (Sling Method) (P/B 201)
71-11-04-410-804-G00	Close the Fan Cowl Panels (Sling Method) (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-14546	Sling Eqpt - Fan Cowl, LEAP-1B Engine Part #: C71031-1 Supplier: 81205
STD-467	Hoist - 500 lb (226.8 kg)

D. Consumable Materials

Reference	Description	Specification
B00090	Solvent - Inhibited Trichloroethane 1,1,1	MIL-T-81533
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
411	Engine 1 - Engine
421	Engine 2 - Engine

F. 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

G. Prepare for the Cleaning

SUBTASK 71-11-11-869-002-G00

(1) Do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

SUBTASK 71-11-11-040-002-G00

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

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SUBTASK 71-11-11-010-007-G00

(3) Do this task: Open the Fan Cowl Panels (Sling Method), TASK 71-11-04-010-804-G00.

NOTE: The fan cowl panels must continue to be held open using the hoist, STD-467, and the fan cowl sling, SPL-14546, when the HOR is removed.

(a) On the applicable engine, 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

H. Fan Cowl Hold-Open Rods Cleaning

SUBTASK 71-11-11-160-001-G00

(1) Clean the applicable fan cowl hold open rod [1] as follows:

(a) Make sure that the fan cowl hold open rod [1] is fully extended.

WARNING

DO NOT GET THE SOLVENT IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATHE IN THE FUMES FROM THE SOLVENT. MAKE SURE TO PUT ON PROTECTIVE SPLASH GOGGLES AND GLOVES WHEN USING THE SOLVENT. KEEP THE SOLVENT AWAY FROM SPARKS, FLAMES AND HEAT. THE SOLVENT IS POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY OR DAMAGE IF NOT HANDLED PROPERLY.

(b) Apply a large quantity of the solvent, B00090 to the fan cowl hold open rod [1].

(c) Extend and retract the fan cowl hold open rod [1] to flush the dirt, oil, or grease.

(d) Clean the bracket assemblies and the fittings.

(e) Dry the fan cowl hold open rod [1], the brackets, and the fittings with a clean dry cotton wiper, G00034.

(f) Extend and retract the fan cowl hold open rod [1] to make sure that it operates smoothly.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-11-410-009-G00

(1) Do this task: Close the Fan Cowl Panels (Sling Method), TASK 71-11-04-410-804-G00.

(a) On the applicable engine, close these access panels:

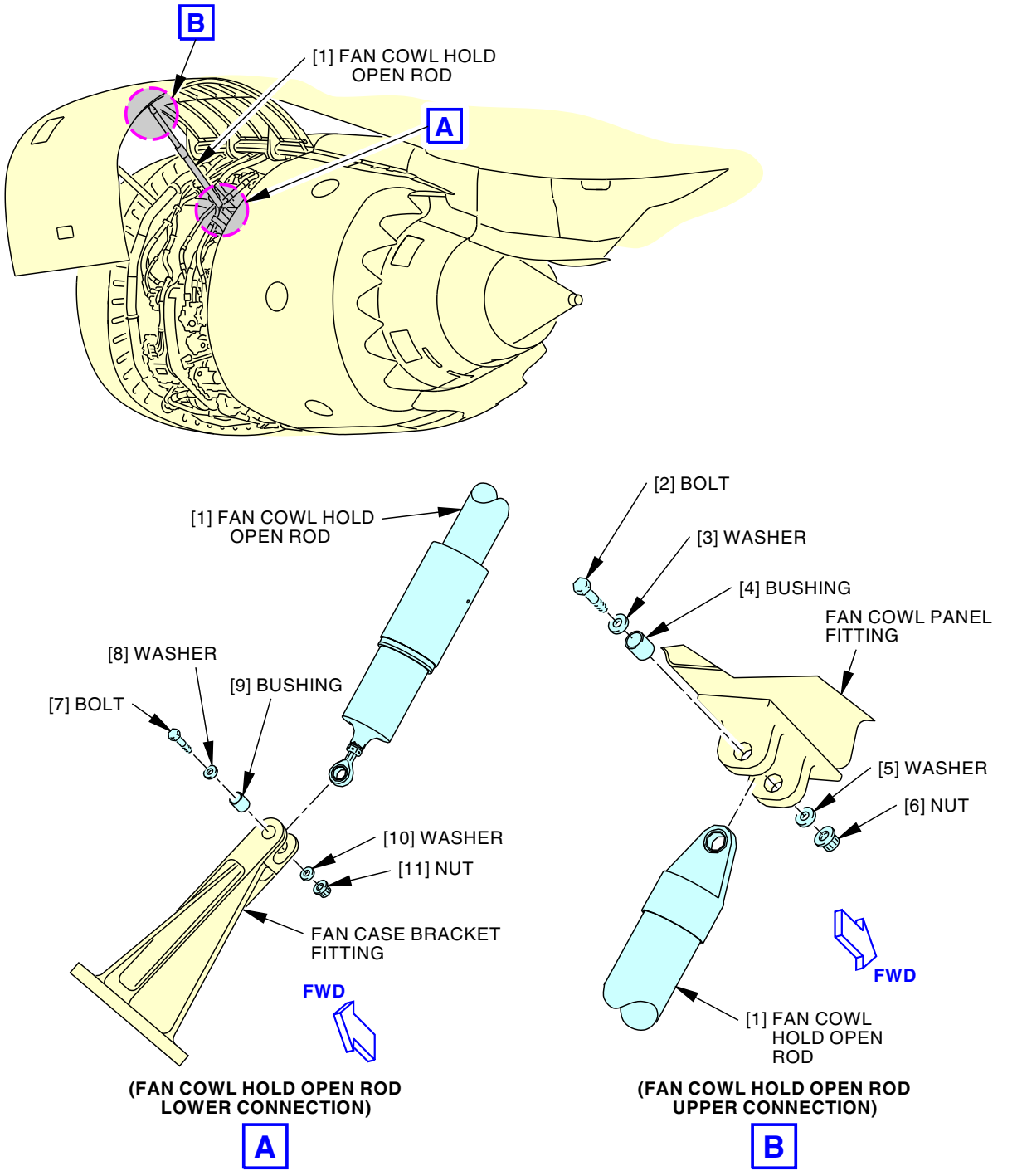
Number	Name/Location
413	Left Fan Cowl, Engine 1
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

SUBTASK 71-11-11-440-002-G00

(2) Do this task: Leading Edge Flaps and Slats - Activation, TASK 27-81-00-440-801.

END OF TASK

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Fan Cowl Hold Open Rod Cleaning
Figure 203/71-11-11-990-804-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FAN COWL ALIGNMENT BUMPER - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) Fan Cowl Alignment Bumper Removal

(2) Fan Cowl Alignment Bumper Installation.

TASK 71-11-12-000-801-G00

2. Fan Cowl Alignment Bumper Removal

(Figure 401 or Figure 402)

A. General

(1) This task gives the instructions to remove the fan cowl alignment bumper.

(2) The removal procedure of the left and the right fan cowl alignment bumper is the same.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
413	Engine 1 - Fan Cowl, Left
414	Engine 1 - Fan Cowl, Right
423	Engine 2 - Fan Cowl, Left
424	Engine 2 - Fan Cowl, Right

E. Prepare for the Removal

SUBTASK 71-11-12-860-001-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-11-12-010-001-G00

(2) Open the applicable fan cowl panel (TASK 71-11-04-010-801-G00).

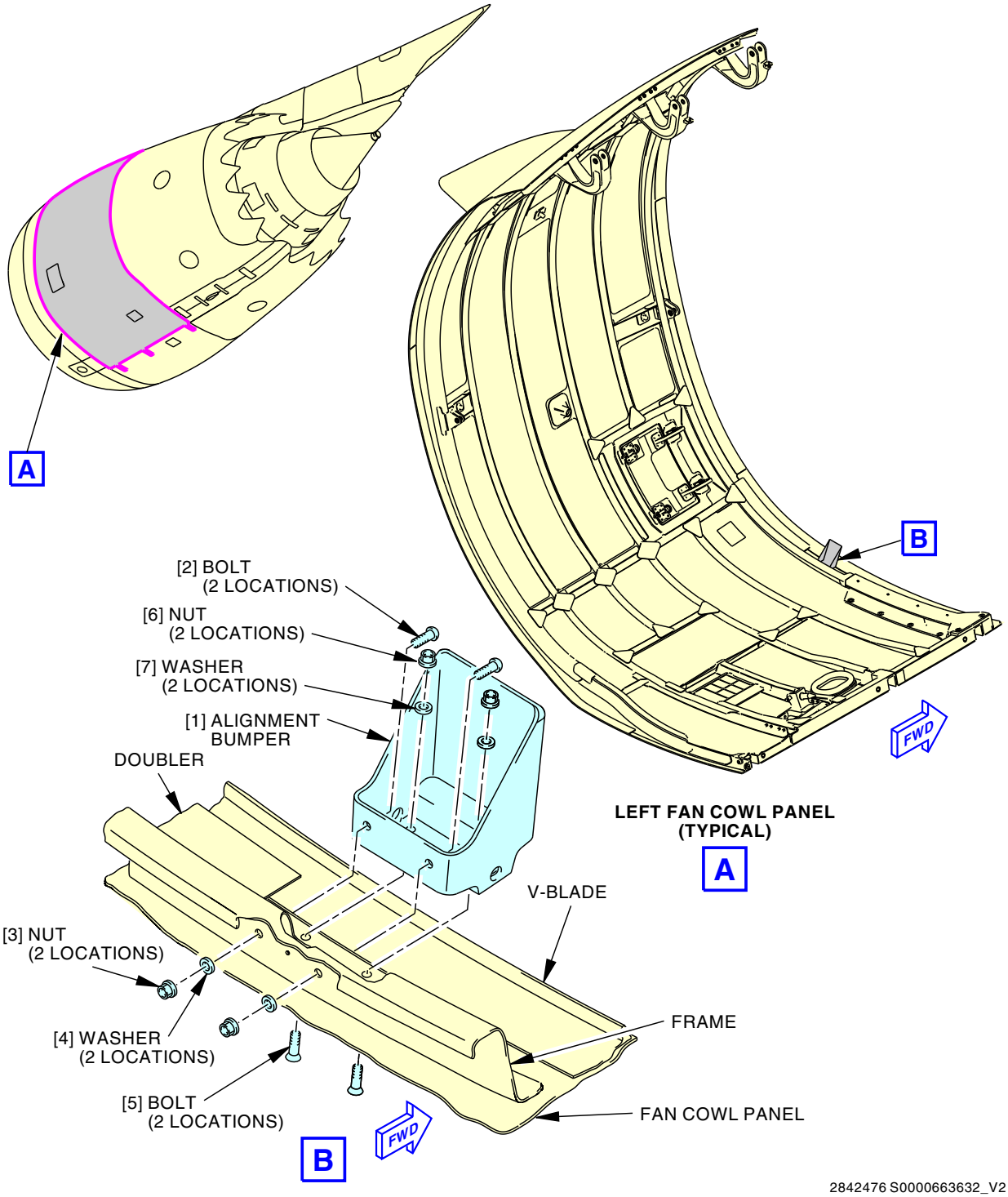
F. Fan Cowl Alignment Bumper Removal

SUBTASK 71-11-12-020-001-G00

(1) Remove the bolts [2], nuts [3], washers [4], bolts [5], nuts [6] and washers [7] that attach the alignment bumper [1] to the fan cowl panel.

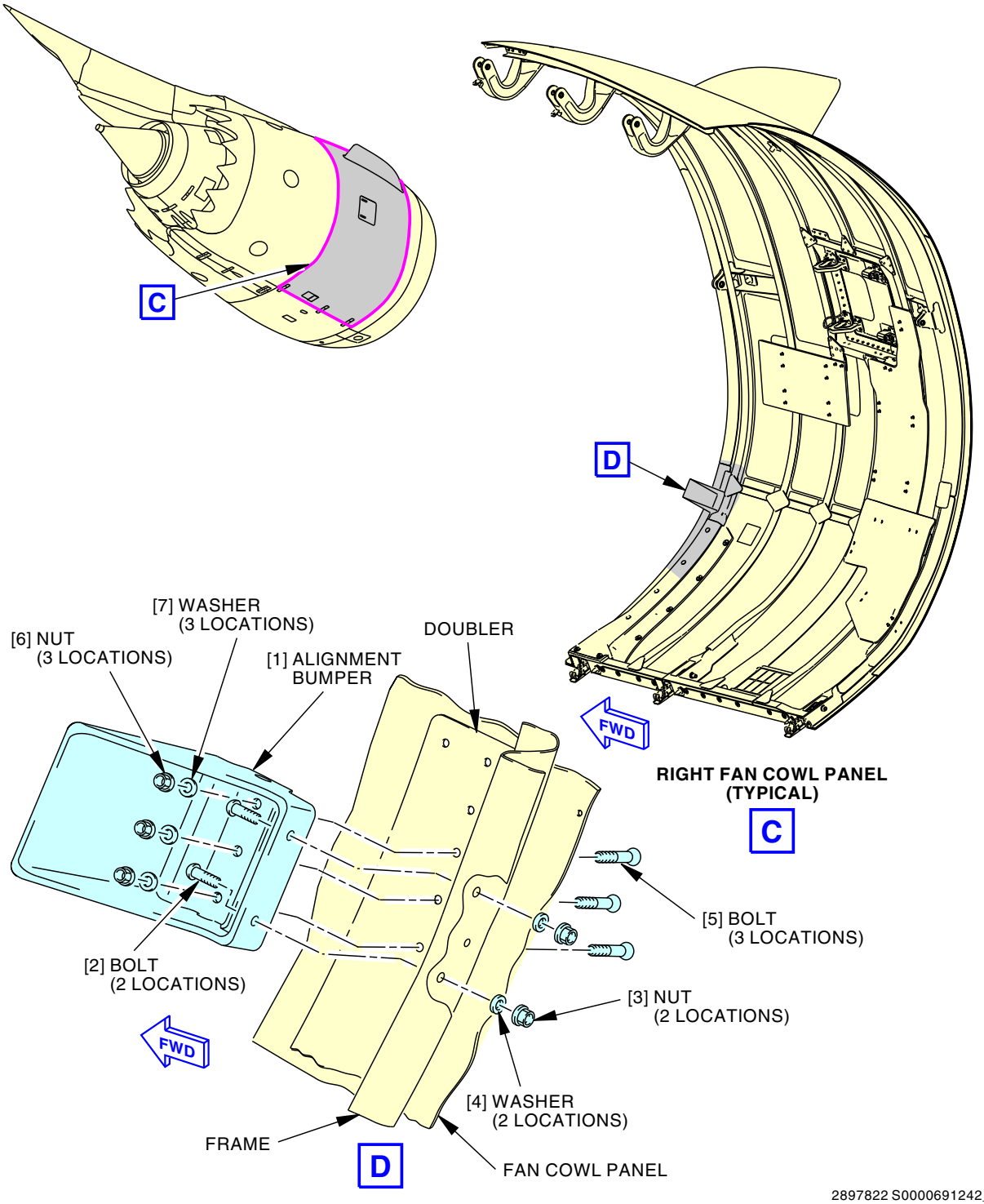
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Left Fan Cowl - Alignment Bumper Installation
Figure 401/71-11-12-990-801-G00

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Right Fan Cowl - Alignment Bumper Installation
Figure 402/71-11-12-990-802-G00

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TASK 71-11-12-400-801-G00

3. Fan Cowl Alignment Bumper Installation

(Figure 401 or Figure 402)

A. General

(1) This task gives the instructions to install the fan cowl alignment bumper.

(2) The installation procedure of the left and the right fan cowl alignment bumper is the same.

B. References

Reference	Title
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
A50467	Sealant - Fuel Tank	BMS5-45, Class A, Grade 1

E. 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

F. Prepare for the Installation

SUBTASK 71-11-12-860-002-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

G. Fan Cowl Alignment Bumper Installation

SUBTASK 71-11-12-020-002-G00

(1) Install the alignment bumper [1] on the applicable fan cowl panel as follows:

(a) Put the alignment bumper [1] in position on the fan cowl panel.

(b) Use the sealant, A50467 to wet install the bolts [2] with the nuts [3] and washers [4] that attach the alignment bumper [1] to the fan cowl panel.

(c) Use the sealant, A50467 to wet install the bolts [5] with the nuts [6] and washers [7] that attach the alignment bumper [1] to the fan cowl panel.

(d) Tighten the bolts [2] and bolts [5] to 15.0 in-lb (1.7 N·m) - 17.0 in-lb (1.9 N·m).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-11-12-410-001-G00

(1) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

(a) On the applicable engine, 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

SUBTASK 71-11-12-860-003-G00

(2) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FAN COWL SDOS ACTUATORS - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) A removal of the fan cowl SDOS actuators

(2) An installation of the fan cowl SDOS actuators.

TASK 71-12-01-000-801-G00

2. Fan Cowl SDOS Actuators Removal

(Figure 401, Figure 402 or Figure 403)

A. General

(1) This task gives the instructions to remove the fan cowl Spring Door Opening System (SDOS) actuators.

(2) Each fan cowl panel has one fan cowl SDOS actuator which is installed at the front end of the fan cowl panel bracket and the fan case fitting.

(3) The removal procedure of the left side or the right side of the fan cowl SDOS actuator is the same.

B. References

Reference	Title
71-11-04-010-804-G00	Open the Fan Cowl Panels (Sling Method) (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-14546	Sling Eqpt - Fan Cowl, LEAP-1B Engine Part #: C71031-1 Supplier: 81205
STD-467	Hoist - 500 lb (226.8 kg)
STD-653	Platform - Engine and Strut Access
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
G00440	Lockwire - MS20995C41, Corrosion Resistant Steel - 0.041 Inch (1.0414 mm) Diameter	NASM20995

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. 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

ECCN 9E991 BOEING PROPRIETARY - See title page for details

G. Prepare for the Removal

SUBTASK 71-12-01-860-001-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-12-01-010-003-G00

(2) Do this task: Open the Fan Cowl Panels (Sling Method), TASK 71-11-04-010-804-G00.

NOTE: The fan cowl panels must continue to be held open using the hoist, STD-467, and fan cowl sling, SPL-14546, when the SDOS is removed.

(a) On the applicable engine, 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

SUBTASK 71-12-01-490-001-G00

(3) Put the engine and strut access platform, STD-653, inside the fan cowl panel.

SUBTASK 71-12-01-210-002-G00

WARNING YOU MUST OBEY ALL INSTRUCTIONS OF THE VISUAL INSPECTION FOR THE SPRING DOOR OPENING SYSTEM (SDOS) ACTUATOR. THE ACTUATOR CONTAINS DANGEROUS ENERGY FROM THE SPRING. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURY TO PERSONNEL CAN OCCUR.

(4) Do a visual inspection of the fan cowl SDOS actuator [1].

(a) The fan cowl SDOS actuator [1] jammed or does not fully extend or retract (View A, Figure 402 or Figure 403).

NOTE: The forward part of the cowl will not fully open, or the black damper guide bushing is visible.

1) Not permitted.

(b) Separation of the tubes from the front support bush (View C, View A-A Figure 402 or Figure 403).

NOTE: There is a separation gap between the outer tube and front support bush.

1) Not permitted.

(c) Cracks on any part of the fan cowl SDOS actuator [1] (View A, View B, View C, View A-A Figure 402 or Figure 403).

1) Not permitted.

(d) Bent, buckled (kinked) or cracks on any part of the fan cowl SDOS actuator [1].

1) Not permitted.

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(e) One or more rivets missing, loose or protruding (View B, Figure 402 or Figure 403).

NOTE: The back end of the SDOS actuator is riveted with 6 rivets.

1) Not permitted.

(f) No damping action.

NOTE: Fan cowl closes rapidly. Leakage on the piston rod can be a sign of beginning damper oil loss.

1) Check the back end ventilation holes for oil accumulation.

a) Not permitted.

(g) Tabs missing from lock ring.

1) Not permitted.

(h) Nuts missing (View A, View B Figure 402 or Figure 403).

1) Not permitted.

SIA ALL; AIRPLANES WITH THE SDOS ACTUATORS P/N BOE-2001-901F

SUBTASK 71-12-01-210-004-G00

(5) Before you remove the SDOS actuators, secure the fan cowl SDOS actuator [1] with MS20995C41 lockwire, G00440 (View D, Figure 402 or Figure 403).

(a) Install a minimum of six independent lengths of lockwire as follows:

1) Install three independent lengths of lockwire on each side of the SDOS actuator.

2) Install the lockwires around the locking bracket pin and hinge point pin.

3) Cut out below the ball bearing of the back end.

4) Twist the ends of each length of lockwire together a minimum of ten times.

(b) Install one independent length of lockwire around the inner tube of the fan cowl SDOS actuator [1] as follows:

1) Wrap around the inner tube a minimum of three times over the six lockwires.

2) Twist the ends of the lockwire together a minimum of ten times.

SIA ALL; AIRPLANES WITH THE SDOS ACTUATORS P/N BOE-2001-901H AND ON

SUBTASK 71-12-01-210-003-G00

(6) If any of the above damage is seen, secure the fan cowl SDOS actuator [1] with MS20995C41 lockwire, G00440 (View D, Figure 402 or Figure 403).

(a) Install a minimum of six independent lengths of lockwire as follows:

1) Install three independent lengths of lockwire on each side of the SDOS actuator.

2) Install the lockwires around the hinge point pin.

3) Cut out below the ball bearing of the back end.

4) Twist the ends of each length of lockwire together a minimum of ten times.

(b) Install one independent length of lockwire around the inner tube of the fan cowl SDOS actuator [1] as follows:

1) Wrap around the inner tube a minimum of three times over the six lockwires.

2) Twist the ends of the lockwire together a minimum of ten times.

SIA ALL

ECCN 9E991 BOEING PROPRIETARY - See title page for details

H. Fan Cowl SDOS Actuators Removal

SUBTASK 71-12-01-870-001-G00

(1) Make sure that the applicable fan cowl panel is completely open.

SUBTASK 71-12-01-750-001-G00

(2) Make sure that you engage the lock mechanism on the hold-open rod and the SDOS.

SUBTASK 71-12-01-020-001-G00

WARNING MAKE SURE THAT THE SDOS ACTUATOR IS FULLY EXTENDED AND LOCKED. THE ACTUATOR CONTAINS STORED ENERGY. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURY CAN OCCUR.

WARNING BE CAREFUL AFTER YOU REMOVE THE SDOS ACTUATOR. DO NOT POINT THE ACTUATOR END AT A PERSON. THE ACTUATOR CONTAINS ENERGY OF A SPRING. THIS CAN CAUSE INJURY OR DEATH.

(3) Remove the fan cowl SDOS actuator [1] from the applicable fan cowl panel:

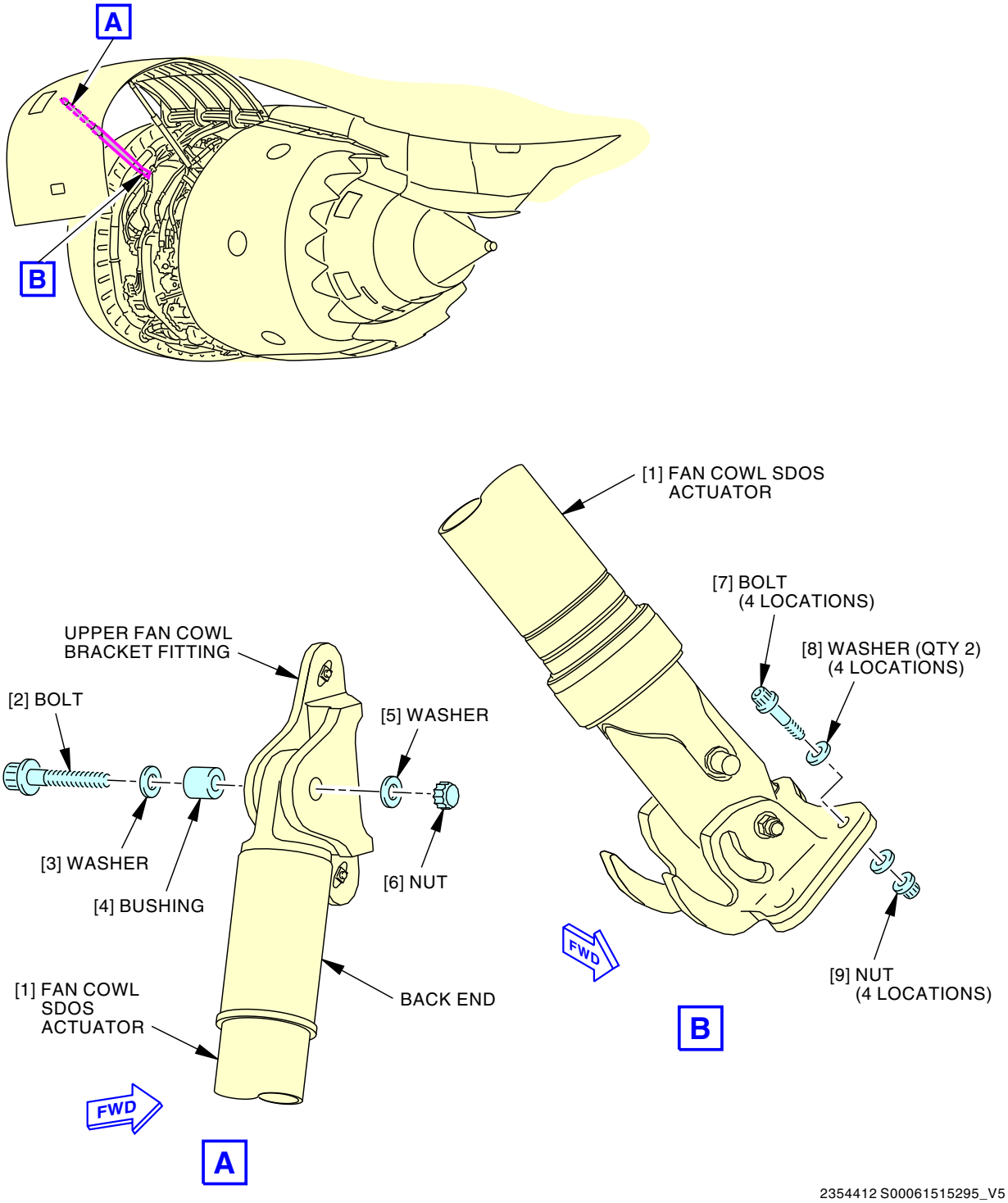
(a) Remove the bolts [7], washers [8], and nuts [9] that attach the fan cowl SDOS actuator [1] to the fan case bracket.

(b) Remove the bolt [2], washer [3], bushing [4], washer [5], and nut [6] that attach the fan cowl SDOS actuator [1] to the fan cowl panel bracket.

(c) Remove the fan cowl SDOS actuator [1] from the engine.

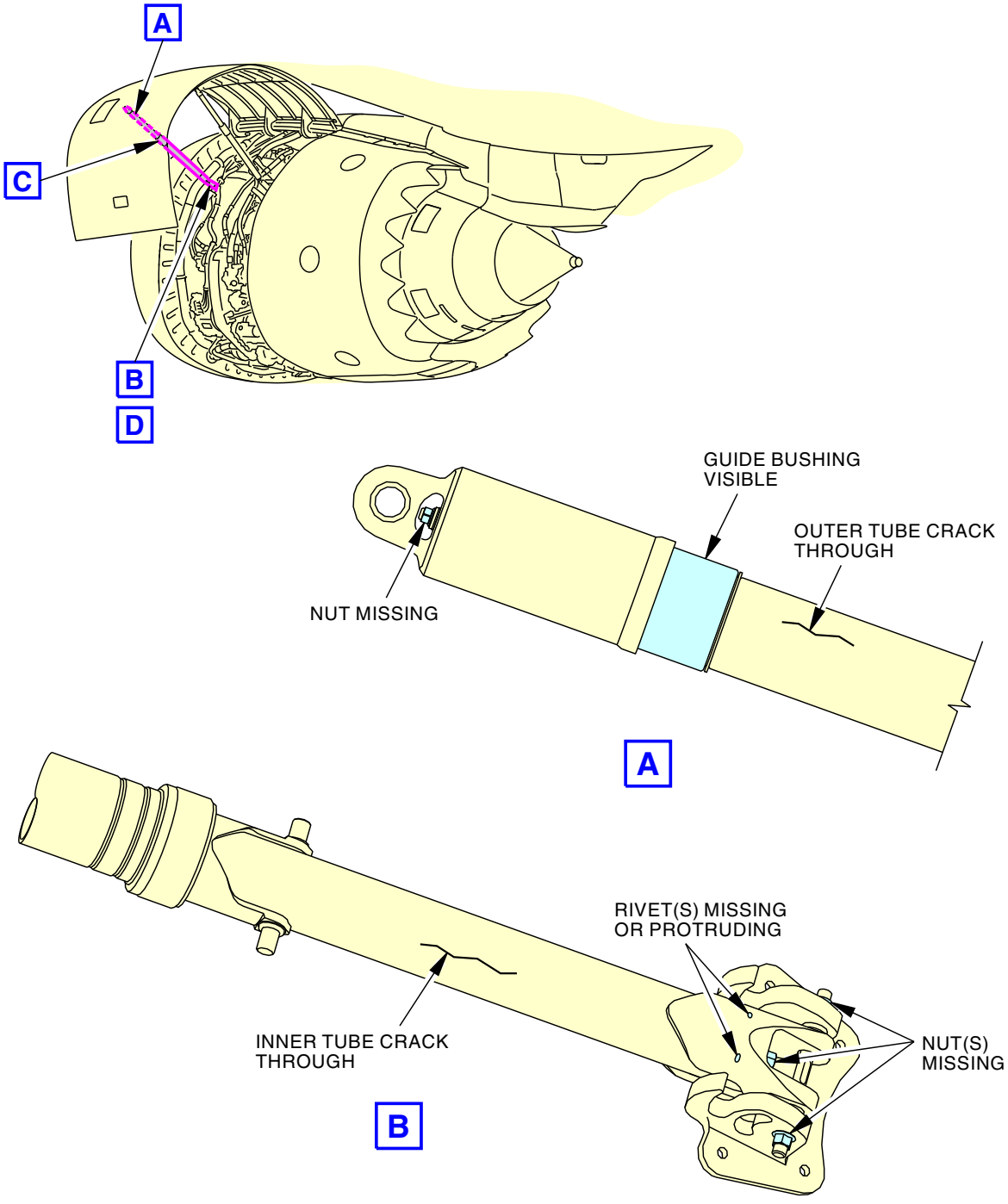
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



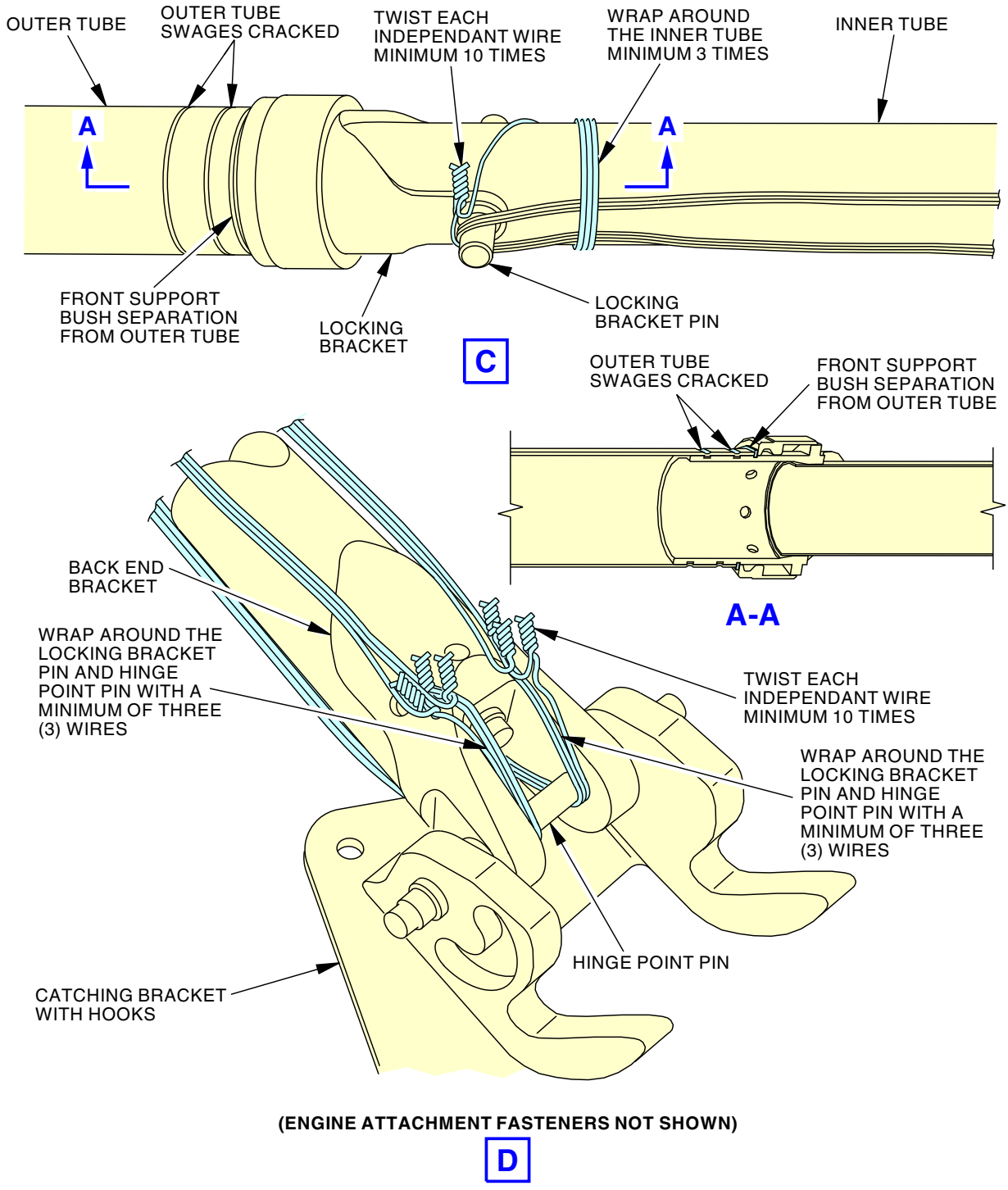
Fan Cowl SDOS Actuators Installation
Figure 401/71-12-01-990-801-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Fan Cowl SDOS Actuators Visual Inspection
Figure 402/71-12-01-990-805-G00 (Sheet 1 of 2)

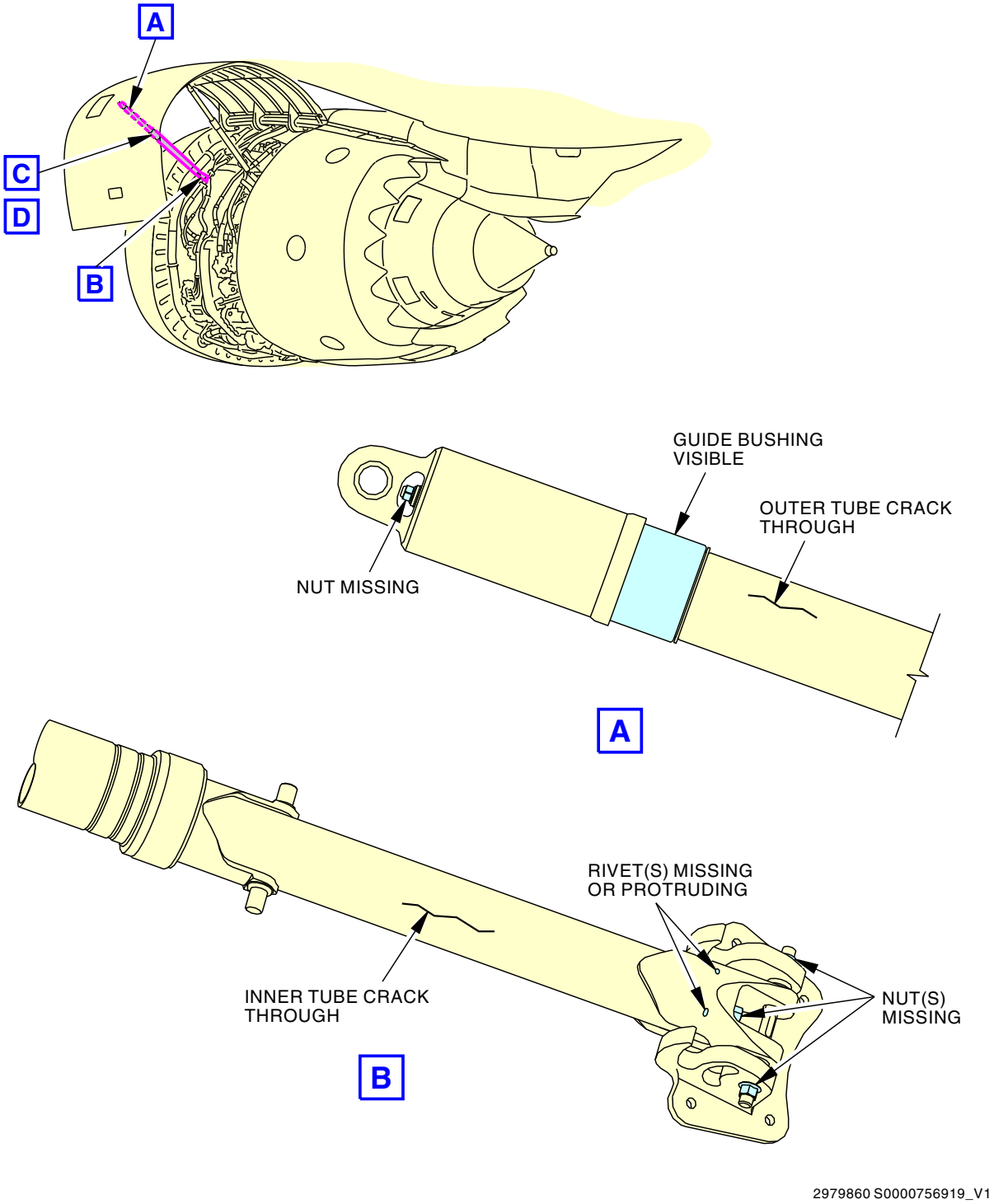
ECCN 9E991 BOEING PROPRIETARY - See title page for details



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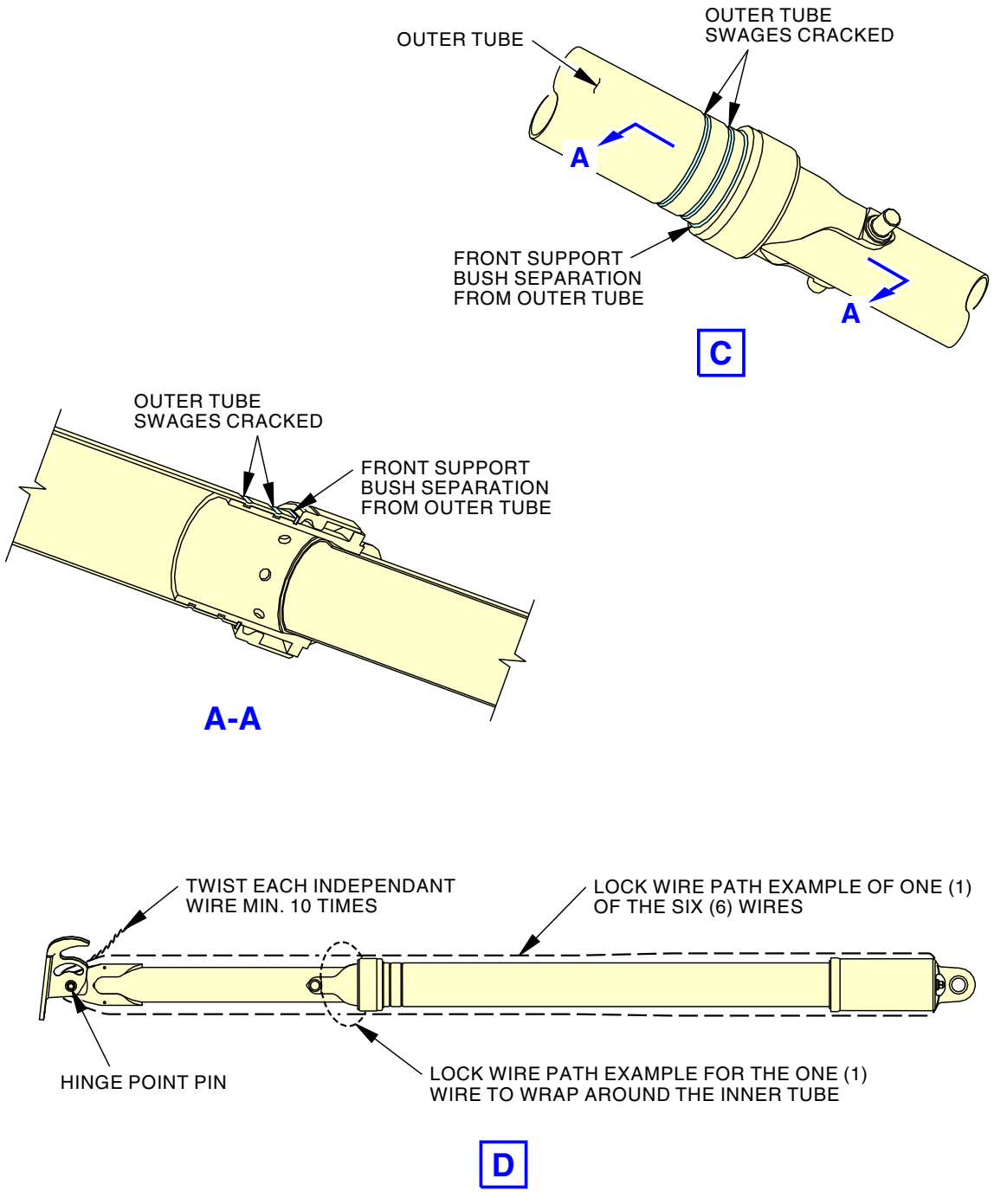
Fan Cowl SDOS Actuators Visual Inspection
Figure 402/71-12-01-990-805-G00 (Sheet 2 of 2)

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Fan Cowl SDOS Actuators Visual Inspection
Figure 403/71-12-01-990-804-G00 (Sheet 1 of 2)

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Fan Cowl SDOS Actuators Visual Inspection
Figure 403/71-12-01-990-804-G00 (Sheet 2 of 2)

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TASK 71-12-01-400-801-G00

3. Fan Cowl SDOS Actuators Installation

(Figure 401)

A. General

(1) This task gives the instructions for the installation of the fan cowl Spring Door Opening System (SDOS) actuators.

(2) The installation task of the left side or the right side of the fan cowl SDOS actuator is the same.

B. References

Reference	Title
71-11-04-410-804-G00	Close the Fan Cowl Panels (Sling Method) (P/B 201)

C. Tools/Equipment

Reference	Description
STD-653	Platform - Engine and Strut Access
STD-858	Tag - DO NOT OPERATE

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Fan cowl SDOS actuator	71-12-01-01-070	SIA 001-005
		71-12-01-01-225	SIA 006-999

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. 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

G. Fan Cowl SDOS Actuators Installation

SUBTASK 71-12-01-420-002-G00

(1) Before installation, make sure that two safety markers p/n 12299, are installed on the outer tube of the fan cowl SDOS actuator [1] (cowl door side).

NOTE: Refer to Boeing Service Bulletin 737-71-1911 to ensure the P/N BOE-2001-901J SDOS actuator is in compliance with FAA AD 2021-13-18.

(a) If the safety markers p/n 12299, are not installed, do applicable corrective action until the safety markers are installed.

SUBTASK 71-12-01-420-001-G00

(2) Install the fan cowl SDOS actuator [1] on the applicable fan case panel:

(a) Install the fan cowl SDOS actuator [1] to the fan cowl panel bracket with the bolt [2], washer [5], bushing [4], washer [3], and nut [6].

1) Tighten the nut [6] to 310.0 in-lb (35.0 N·m) - 330.0 in-lb (37.3 N·m).

(b) Install the fan cowl SDOS actuator [1] to the fan case bracket with the bolts [7], washers [8], and nuts [9].

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1) Make sure that the fan cowl SDOS actuator [1] is installed on the fan case bracket in the correct orientation (Figure 401).

2) Tighten the bolts [7] to 97.0 in-lb (11.0 N·m) - 103.0 in-lb (11.6 N·m).

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-12-01-010-002-G00

(1) Move the engine and strut access platform, STD-653, away from the engine.

SUBTASK 71-12-01-410-002-G00

(2) Do this task: Close the Fan Cowl Panels (Sling Method), TASK 71-11-04-410-804-G00.

(a) On the applicable engine, 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

SUBTASK 71-12-01-710-001-G00

(3) Cycle the fan cowl panel partially open and closed three times to make sure that the fan cowl SDOS actuator [1] works smoothly.

SUBTASK 71-12-01-860-002-G00

(4) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FAN COWL SDOS ACTUATORS - INSPECTION/CHECK

1. General

A. This procedure has this task:

(1) Fan Cowl SDOS Actuators Inspection.

TASK 71-12-01-200-801-G00

2. Fan Cowl SDOS Actuators Inspection

(Figure 601)

A. General

(1) This task gives the instructions to do the visual inspection of the fan cowl SDOS actuator.

B. References

Reference	Title
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)
71-12-01-000-801-G00	Fan Cowl SDOS Actuators Removal (P/B 401)
71-12-01-400-801-G00	Fan Cowl SDOS Actuators Installation (P/B 401)

C. Tools/Equipment

Reference	Description
STD-653	Platform - Engine and Strut Access
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. 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

F. Prepare for the Inspection

SUBTASK 71-12-01-860-003-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-12-01-860-004-G00

(2) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) On the applicable engine, 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

SUBTASK 71-12-01-480-001-G00

(3) Put the engine and strut access platform, STD-653 into position.

G. Fan Cowl SDOS Actuators Inspection

SUBTASK 71-12-01-210-001-G00

(1) Examine the fan cowl SDOS actuator for damage with the limits that follow:

(a) Scratches

1) Permitted.

(b) Dusty sliding surfaces

1) Permitted.

(c) Unit is sliding, but with increased friction, following fretting marks on the tube

1) Permitted until the next convenient maintenance opportunity for these conditions:

a) The rubbed off area on the inner tube is not more than 0.5 in^2 (3.2 cm^2), and not deeper than 0.02 in. (0.51 mm).

b) The rubbed off area on the outer tube is not more than 1.6 in^2 (10.3 cm^2), and not deeper than 0.02 in. (0.51 mm).

(d) Dents on the inner tube

1) Permitted until the next convenient maintenance opportunity if the dents on the inner tube is not more than 0.5 in^2 (3.2 cm^2) and 0.02 in. (0.51 mm) in depth.

(e) Dents on the outer tube

1) Permitted until the next convenient maintenance opportunity if the dents on the outer tube is not more than 1.0 in^2 (6.5 cm^2) and 0.012 in. (0.3 mm) in depth.

(f) Worn out or loose bearing on the back end

1) Permitted until the next convenient maintenance opportunity.

(g) Bent tubes

1) Permitted until the next convenient maintenance opportunity if the eccentricity is not more than 1.0 in. (25 mm).

(h) Rusty deposits on ball bearings

1) Permitted until the next convenient maintenance opportunity.

(i) Minor leakage on the piston rod

1) Permitted until the next convenient maintenance opportunity.

2) Oil loss that results in decreased SDOS damping during fan cowl closing is not permitted.

NOTE: Loss of sufficient oil will cause SDOS damping to no longer control the fan cowl closing rate for part or all of the closing distance.

a) Replace the SDOS actuator (TASK 71-12-01-000-801-G00 and TASK 71-12-01-400-801-G00).

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(j) Unit does not lock

1) Not permitted.

2) Replace the SDOS actuator (TASK 71-12-01-000-801-G00 and TASK 71-12-01-400-801-G00).

(k) Unit does not slide in or out anymore

1) Not permitted.

2) Replace the SDOS actuator (TASK 71-12-01-000-801-G00 and TASK 71-12-01-400-801-G00).

(l) Cracks on any part of the SDOS

1) Not permitted.

2) Replace the SDOS actuator (TASK 71-12-01-000-801-G00 and TASK 71-12-01-400-801-G00).

(m) Bent, buckled (kinked), or cracked tubes

1) Not permitted.

2) Replace the SDOS actuator (TASK 71-12-01-000-801-G00 and TASK 71-12-01-400-801-G00).

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-12-01-080-001-G00

(1) Remove the engine and strut access platform, STD-653.

NOTE: Make sure that the work area is clean of all tools and items used for the task.

SUBTASK 71-12-01-860-005-G00

(2) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

SUBTASK 71-12-01-860-006-G00

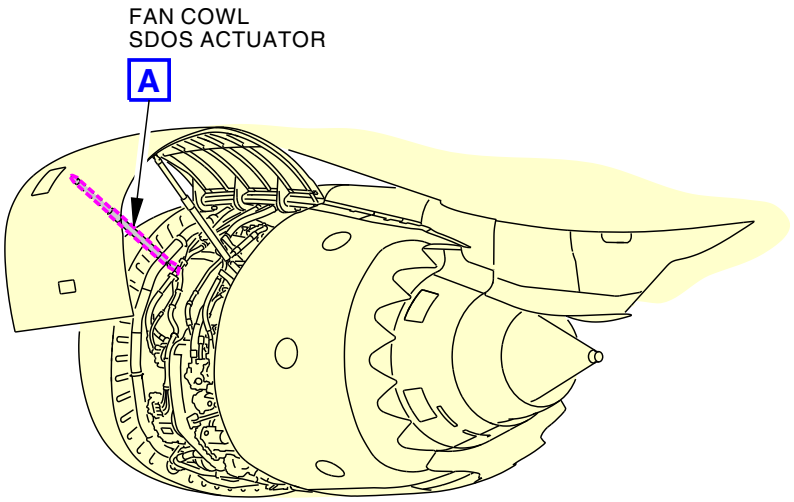
(3) Do this task: Close the Fan Cowl Panels (Selection), TASK 71-11-04-410-801-G00.

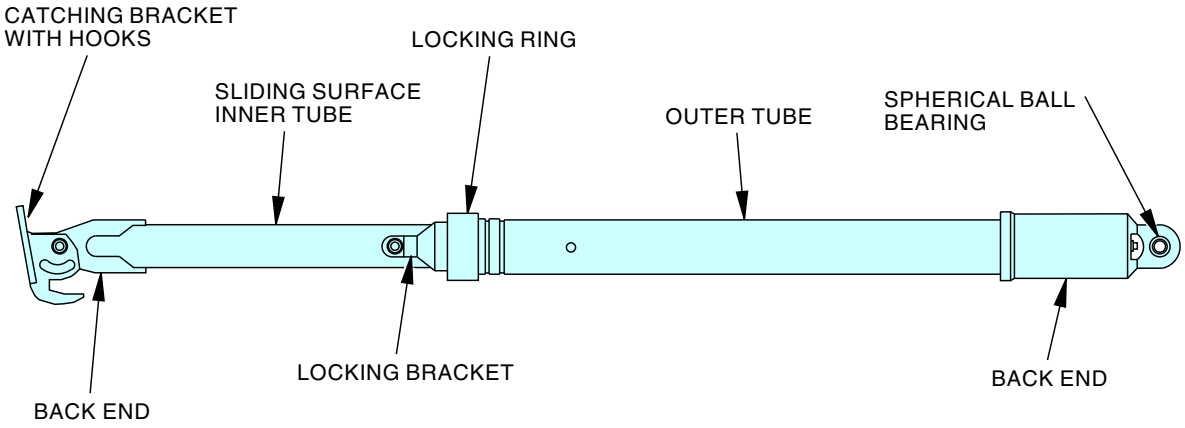
(a) On the applicable engine, close these access panels:

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

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details





FAN COWL SDOS ACTUATOR

A

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Fan Cowl SDOS Actuators Inspection
Figure 601/71-12-01-990-802-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

ENGINE MOUNTS - INSPECTION/CHECK

1. General

A. This procedure has these tasks:

(1) Forward engine mounts visual inspection

(2) Forward engine mounts detailed inspection

(3) Aft engine mount visual inspection

(4) Aft engine mount detailed inspection.

TASK 71-21-00-200-801-G00

2. Forward Engine Mount Visual Inspection

(Figure 601)

A. General

(1) This task provides the instructions on how to do a visual inspection of the forward engine mount.

(2) This task is used when the engine is off-wing.

B. References

Reference	Title
71-00-02-000-801-G00	Power Plant - Removal (P/B 401)
71-00-02-400-801-G00	Power Plant - Installation (P/B 401)
71-21-01-000-801-G00	Forward Engine Mount Removal (P/B 401)
71-21-01-400-801-G00	Forward Engine Mount Installation (P/B 401)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Prepare for the Inspection

SUBTASK 71-21-00-020-001-G00

(1) Do this task: Power Plant - Removal, TASK 71-00-02-000-801-G00.

E. Forward Engine Mount Visual Inspection

SUBTASK 71-21-00-212-001-G00

(1) Examine the forward engine mount for these signs of damage.

(a) Corrosion is not permitted.

(b) Cracks are not permitted.

(c) Nicks are not permitted.

(d) Dents are not permitted.

(e) Scratches are not permitted.

(f) Bushing movement is not permitted.

(g) Damage on the tension bolt is not permitted.

(h) Damage to the side link assembly is not permitted.

(i) Damage to the shear pin is not permitted.

(j) Damage to the bearing is not permitted.

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(k) Cracks to the bearing in the side link assembly is not permitted.

1) Cracks to the bearing ball are not permitted.

2) Seized bearing is not permitted.

3) Cracks in bearing are not permitted.

4) Bearing movement is not permitted.

5) All other types of damage to the bearing are not permitted.

(l) Fretting is not permitted.

NOTE: Fretting is caused when two adjacent pieces of metal rub one another.

(m) Pickup is not permitted.

NOTE: Pickup occurs when material is moved from one surface to a surface which it touches.

(n) High metal is not permitted.

NOTE: High metal is metal which is pushed above the surface adjacent to scratches or other damage.

SUBTASK 71-21-00-212-002-G00

(2) Examine the forward engine mount for worn areas.

(a) If you find signs of wear on the forward engine mount, do this task: TASK 71-21-00-211-801-G00.

SUBTASK 71-21-00-212-003-G00

(3) If damage is found on the forward engine mount, refer to the Structure Repair Manual for the allowable damage limits.

(a) Replace the forward engine mount, if it is more than the allowable damage limits.

1) Do this task: TASK 71-21-01-000-801-G00.

2) Do this task: TASK 71-21-01-400-801-G00.

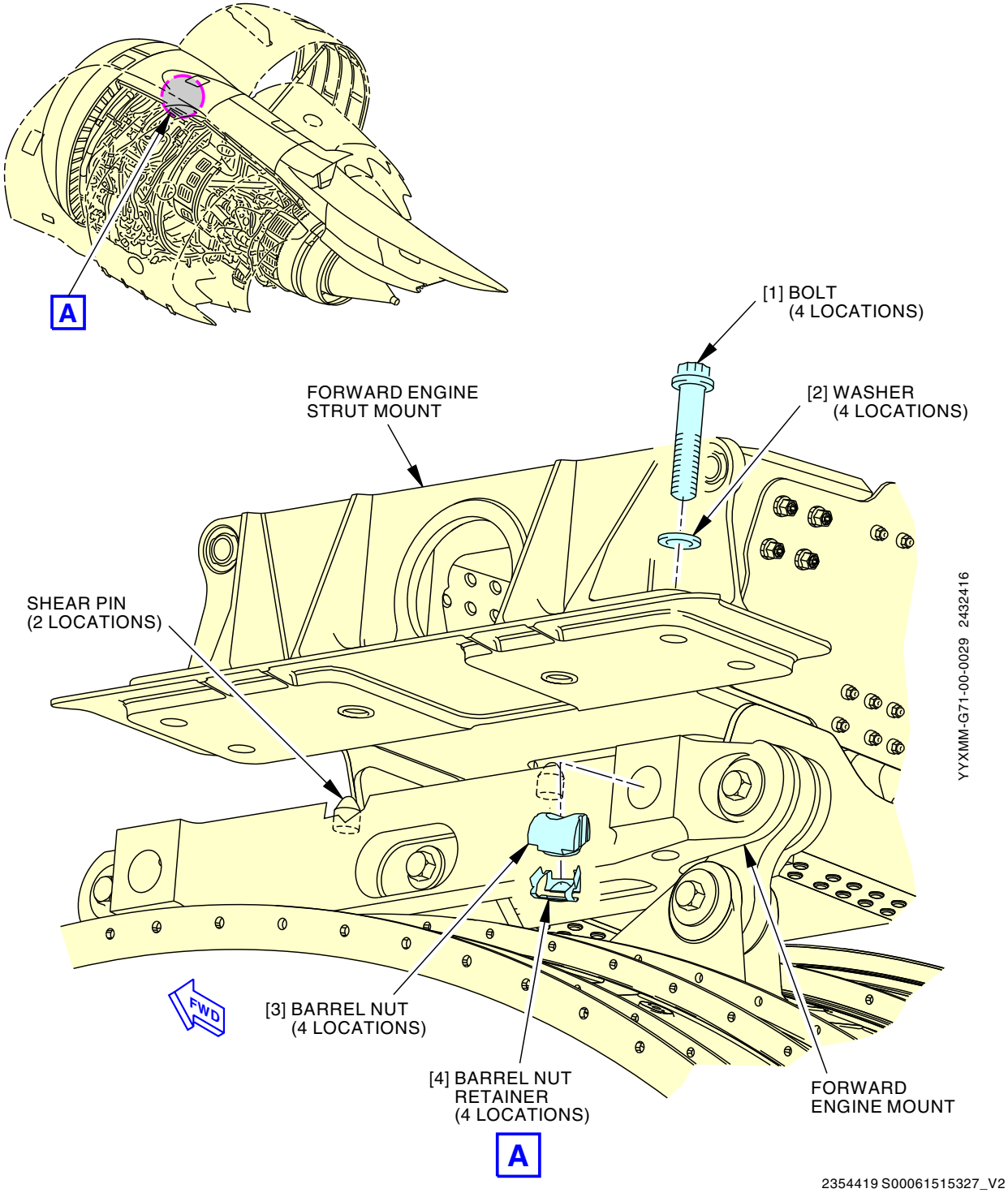
F. Put the Airplane Back to Its Usual Condition

SUBTASK 71-21-00-420-001-G00

(1) Do this task: Power Plant - Installation, TASK 71-00-02-400-801-G00.

——— END OF TASK ———

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Forward Engine Mount Inspection
Figure 601/71-21-00-990-801-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-21-00-211-801-G00

3. Forward Engine Mounts Detailed Inspection

(Figure 602)

A. General

(1) This task provides the instructions on how to do a detailed inspection of the forward engine mount.

(2) This task is used when the engine is off-wing.

B. References

Reference	Title
71-00-02-000-801-G00	Power Plant - Removal (P/B 401)
71-00-02-400-801-G00	Power Plant - Installation (P/B 401)
71-21-01-000-801-G00	Forward Engine Mount Removal (P/B 401)
71-21-01-400-801-G00	Forward Engine Mount Installation (P/B 401)

C. Prepare for the Inspection

SUBTASK 71-21-00-020-002-G00

(1) Do this task: Power Plant - Removal, TASK 71-00-02-000-801-G00.

D. Forward Engine Mounts Detailed Inspection

SUBTASK 71-21-00-211-001-G00

(1) Do a check of the component attach points for worn areas.

NOTE: If you find worn areas on the forward engine mount, refer to Component Maintenance Manual for wear limits and repair instructions.

(a) Examine the barrel nuts in the forward engine mount to make sure that they are free of damage.

(b) Examine the pin in the forward engine mount to make sure that they are free of damage.

(c) Examine the shear pins are free of damage.

(d) Examine the tension bolts are free of damage.

(e) Examine the forward engine mount left and right side links are free of damage.

(f) Make sure that they are free of damage and attached correctly.

(g) Examine the areas where the forward lower engine mount attaches to the engine fan case.

SUBTASK 71-21-00-211-002-G00

(2) If you find the component attach points are more than the wear limits, do these steps that follow:

(a) Replace the forward engine mount component, if it is necessary.

1) Do this task: TASK 71-21-01-000-801-G00.

2) Do this task: TASK 71-21-01-400-801-G00.

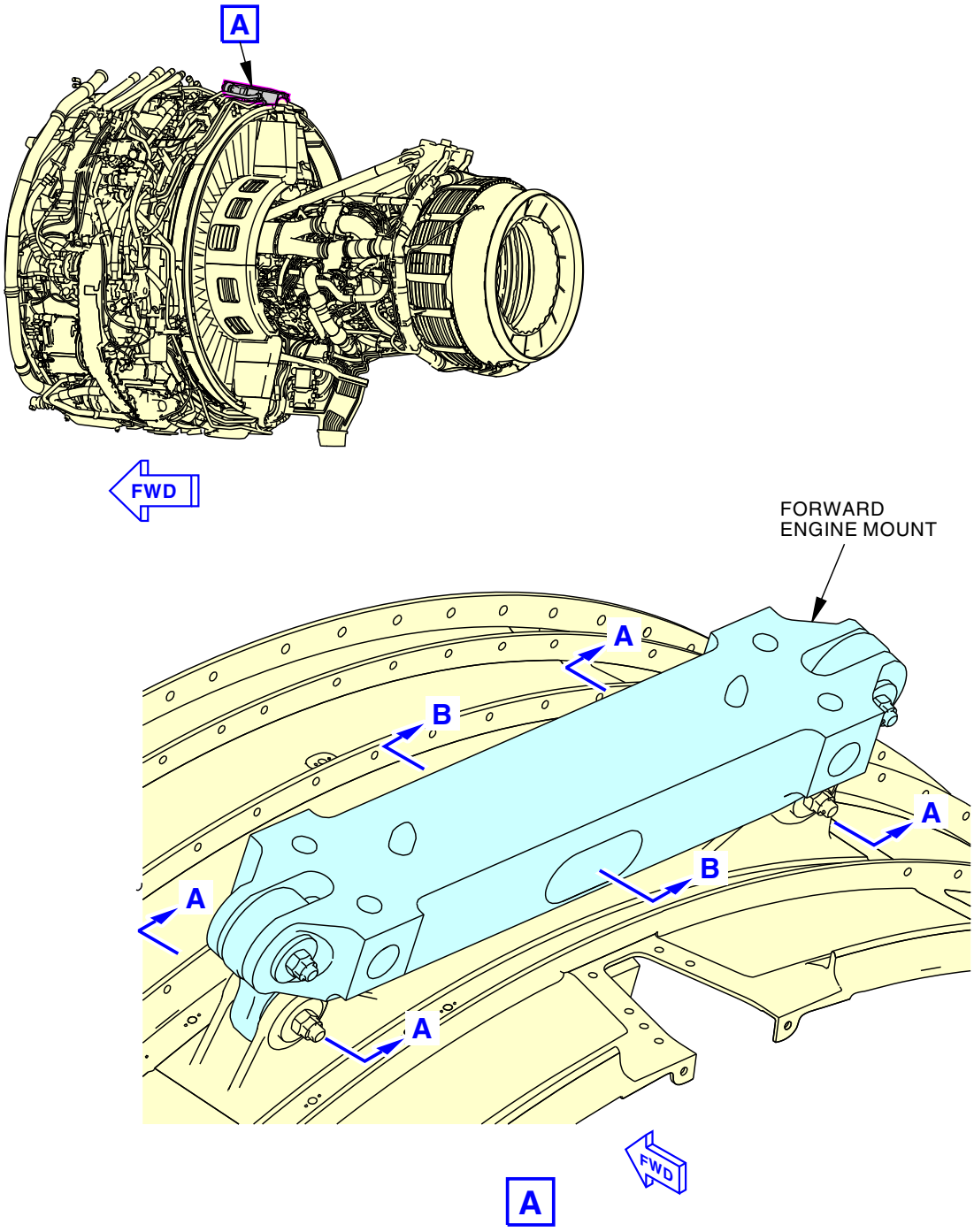
E. Put the Airplane Back to Its Usual Condition

SUBTASK 71-21-00-420-002-G00

(1) Do this task: Power Plant - Installation, TASK 71-00-02-400-801-G00.

END OF TASK

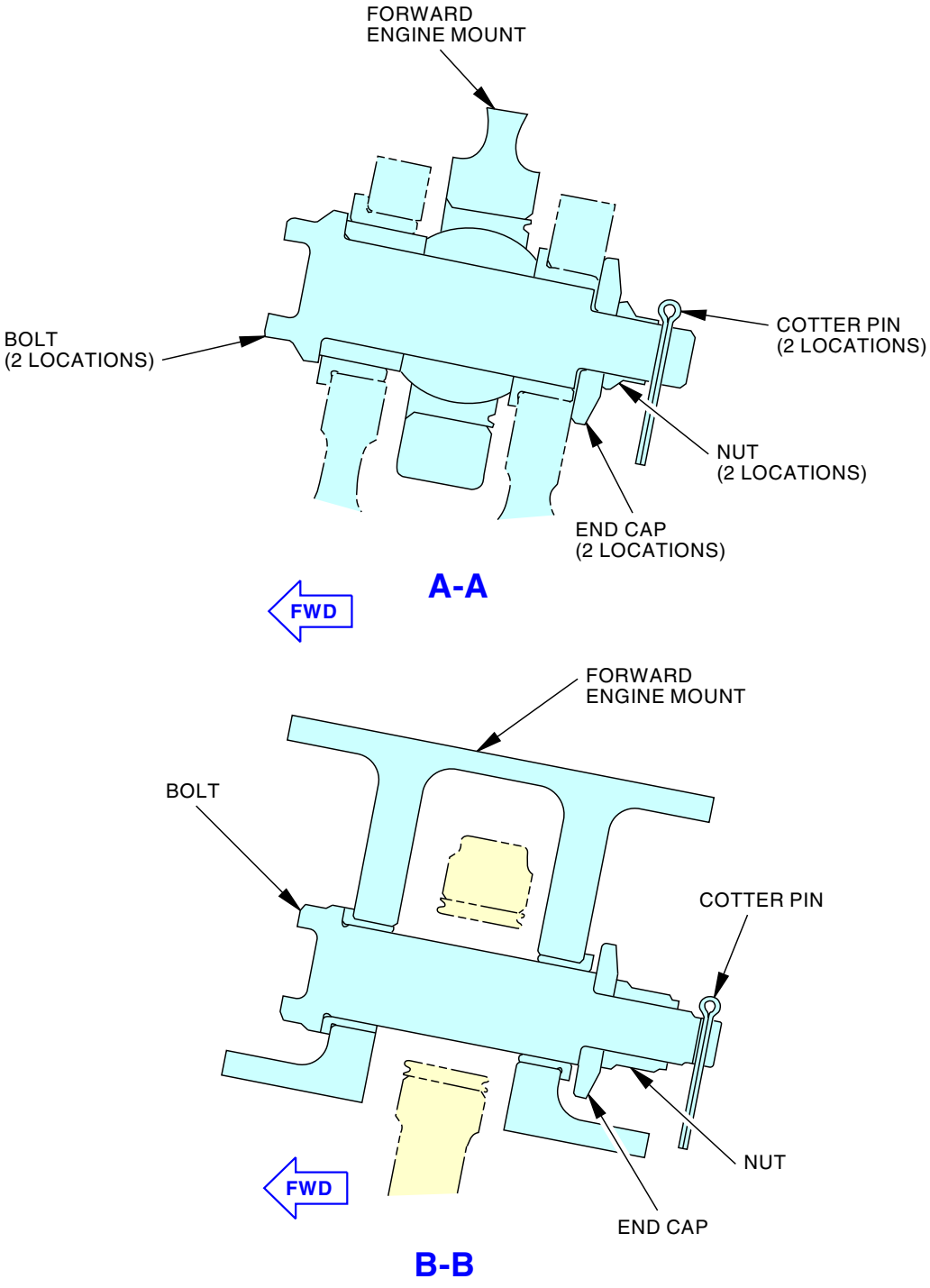
ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Forward Engine Mount Inspection
Figure 602/71-21-00-990-802-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Forward Engine Mount Inspection
Figure 602/71-21-00-990-802-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-21-00-200-802-G00

4. Aft Engine Mount Visual Inspection

(Figure 603)

A. General

(1) This task provides the instructions on how to do a visual inspection of the aft engine mount.

(2) This task is used when the engine is off-wing.

B. References

Reference	Title
71-00-02-000-801-G00	Power Plant - Removal (P/B 401)
71-00-02-400-801-G00	Power Plant - Installation (P/B 401)
71-21-02-000-801-G00	Aft Engine Mount Removal (P/B 401)
71-21-02-400-801-G00	Aft Engine Mount Installation (P/B 401)

C. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

D. Prepare for the Inspection

SUBTASK 71-21-00-020-003-G00

(1) Do this task: Power Plant - Removal, TASK 71-00-02-000-801-G00.

E. Aft Engine Mount Visual Inspection

SUBTASK 71-21-00-210-001-G00

(1) Examine the aft engine mount for these signs of damage:

(a) Corrosion is not permitted.

(b) Cracks are not permitted.

(c) Nicks are not permitted.

(d) Dents are not permitted.

(e) Scratches are not permitted.

(f) Bushing movement is not permitted.

(g) Damage on the tension bolt is not permitted.

(h) Damage to the side link assembly is not permitted.

(i) Damage to the shear pin is not permitted.

(j) Damage to the bearing is not permitted.

(k) Cracks to the bearing in the side link assembly is not permitted.

1) Cracks to the bearing ball are not permitted.

2) Seized bearing is not permitted.

3) Cracks in bearing are not permitted.

4) Bearing movement is not permitted.

5) All other types of damage to the bearing are not permitted.

(l) Fretting is not permitted.

NOTE: Fretting is caused when two adjacent pieces of metal rub one another.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(m) Pickup is not permitted.

NOTE: Pickup occurs when material is moved from one surface to a surface which it touches.

(n) High metal is not permitted.

NOTE: High metal is metal which is pushed above the surface adjacent to scratches or other damage.

SUBTASK 71-21-00-210-002-G00

(2) Examine the aft engine mount for worn areas.

(a) If you find signs of wear on the aft engine mount, do this task: TASK 71-21-00-211-802-G00.

SUBTASK 71-21-00-210-003-G00

(3) If damage is found on the aft engine mount, refer to the Structure Repair Manual for the allowable damage limits.

(a) Replace the aft engine mount, if it is more than the allowable damage limits.

1) Do this task: TASK 71-21-02-000-801-G00.

2) Do this task: TASK 71-21-02-400-801-G00.

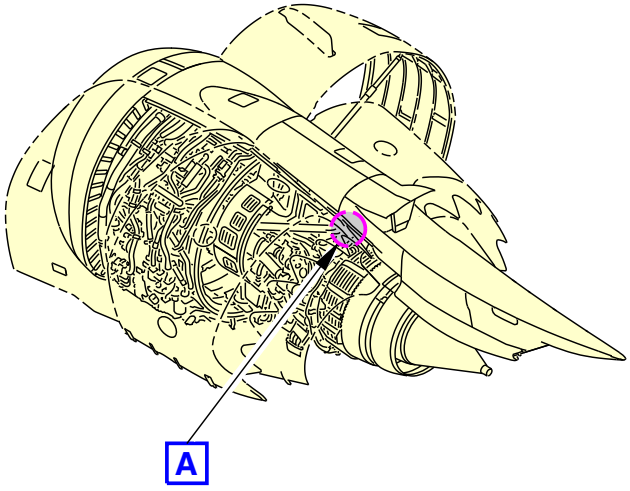
F. Put the Airplane Back to Its Usual Condition

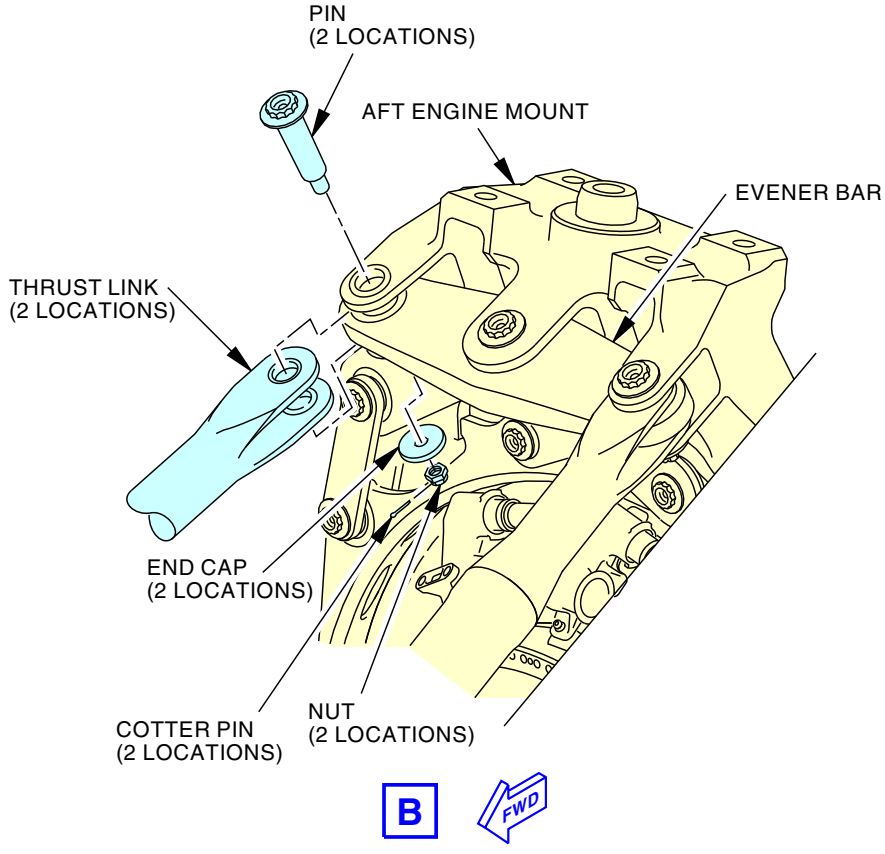
SUBTASK 71-21-00-420-003-G00

(1) Do this task: Power Plant - Installation, TASK 71-00-02-400-801-G00.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details





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Aft Engine Mount Inspection
Figure 603/71-21-00-990-803-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-21-00-211-802-G00

5. Aft Engine Mount Detailed Inspection

(Figure 604)

A. General

(1) This task gives the instructions to do a detailed inspection of the aft engine mount.

(2) This task is used when the engine is off-wing.

B. References

Reference	Title
71-00-02-000-801-G00	Power Plant - Removal (P/B 401)
71-00-02-400-801-G00	Power Plant - Installation (P/B 401)
71-21-02-000-801-G00	Aft Engine Mount Removal (P/B 401)
71-21-02-400-801-G00	Aft Engine Mount Installation (P/B 401)

C. Prepare for the Inspection

SUBTASK 71-21-00-020-004-G00

(1) Do this task: Power Plant - Removal, TASK 71-00-02-000-801-G00.

D. Aft Engine Mounts Detailed Inspection

SUBTASK 71-21-00-211-003-G00

(1) Do a check of the component attach points for worn areas.

NOTE: If you find worn areas on the aft engine mount, refer to Component Maintenance Manual for wear limits and repair instructions.

(a) Examine the barrel nuts in the aft engine mount to make sure that they are free of damage.

(b) Examine the pin in the aft engine mount to make sure that they are free of damage.

(c) Examine the bearing and bearing balls are free of damage.

(d) Examine the bushings are free of damage.

(e) Examine the bolts are free of damage.

(f) Examine the shoulder bolts are free of damage.

(g) Examine the even bars are free of damage.

(h) Examine the aft engine mount side links are free of damage.

(i) Examine the fittings are free of damage.

(j) Make sure that they are free of damage and attached correctly.

(k) Examine the areas where the aft engine mount attaches to the engine exhaust outer case.

SUBTASK 71-21-00-211-004-G00

(2) If you find the component attach points are more than the wear limits, do these steps that follow:

(a) Replace the aft engine mount component, if it is necessary.

(b) Do this task: Aft Mount Removal (TASK 71-21-02-000-801-G00).

(c) Do this task: Aft Mount Installation (TASK 71-21-02-400-801-G00).

ECCN 9E991 BOEING PROPRIETARY - See title page for details

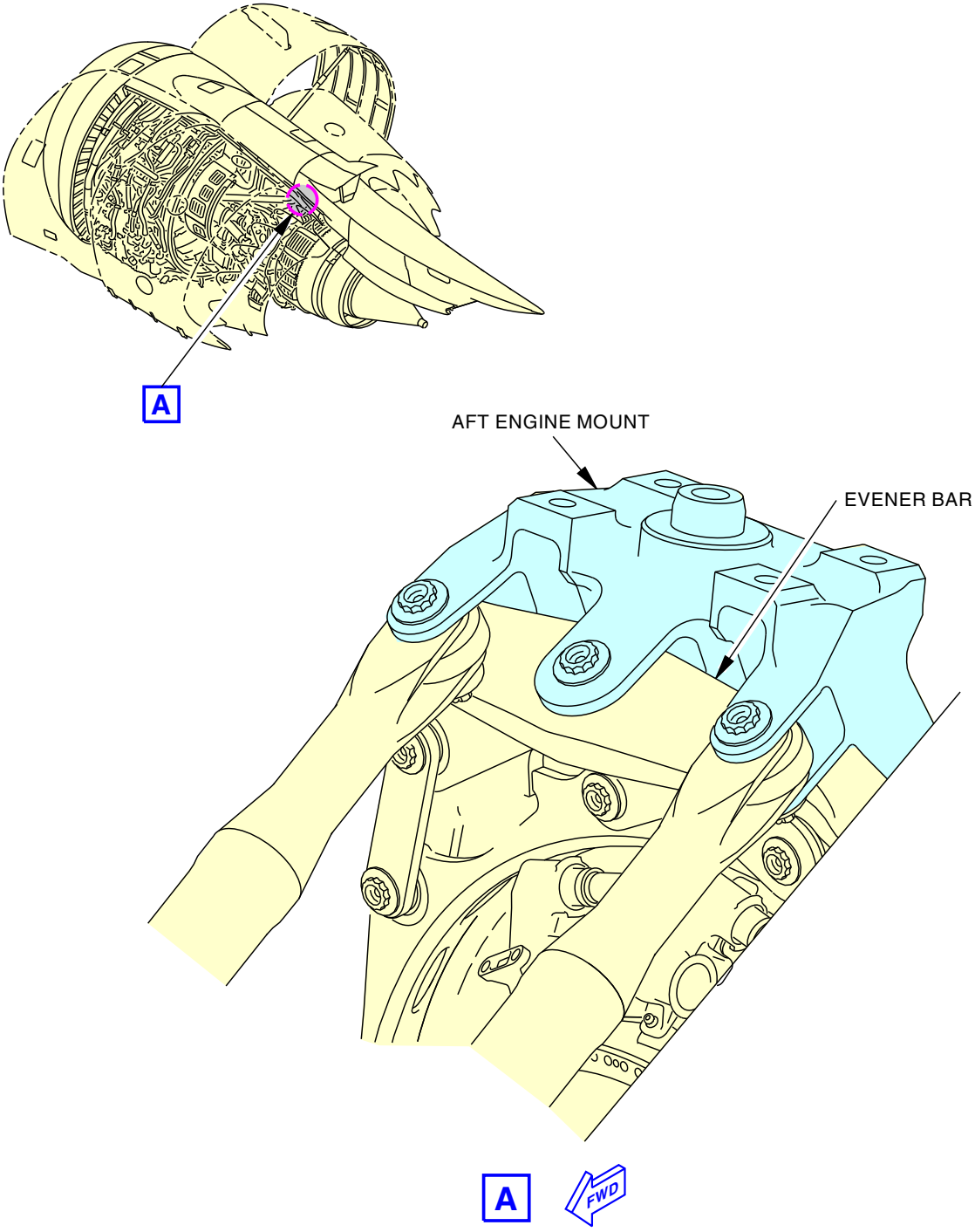
E. Put the Airplane Back to Its Usual Condition

SUBTASK 71-21-00-420-004-G00

(1) Do this task: Power Plant - Installation, TASK 71-00-02-400-801-G00.

——— END OF TASK ———

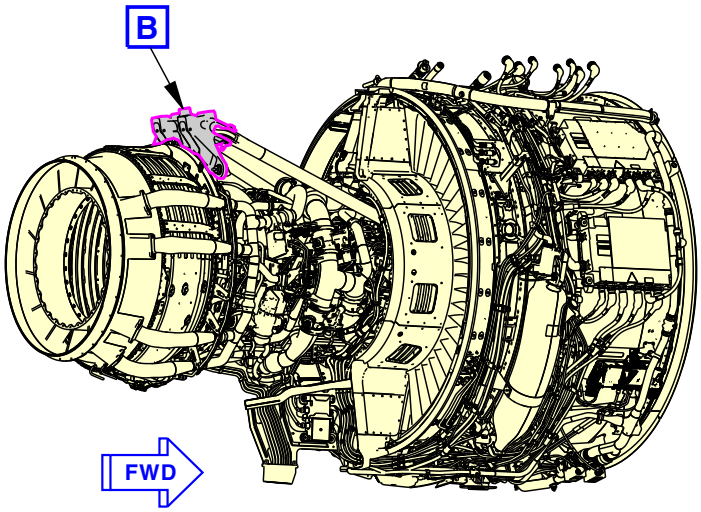
ECCN 9E991 BOEING PROPRIETARY - See title page for details



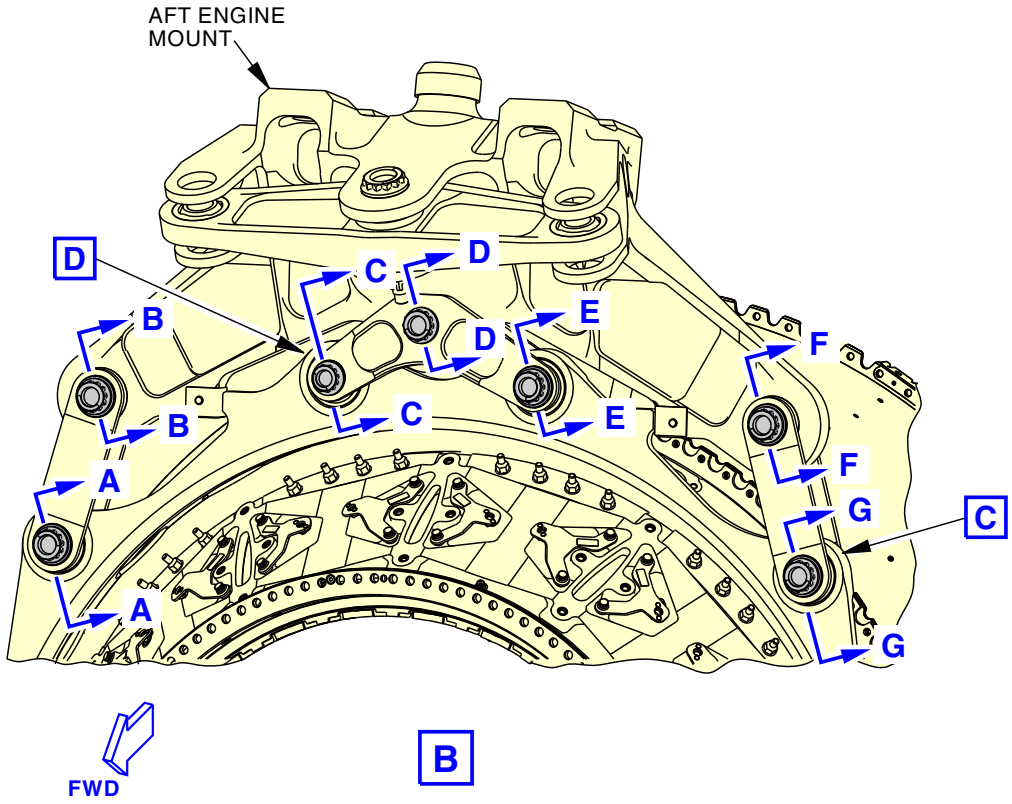
2354423 S00061515334_V1

Aft Engine Mount Inspection
Figure 604/71-21-00-990-804-G00 (Sheet 1 of 6)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



(TYPICAL)

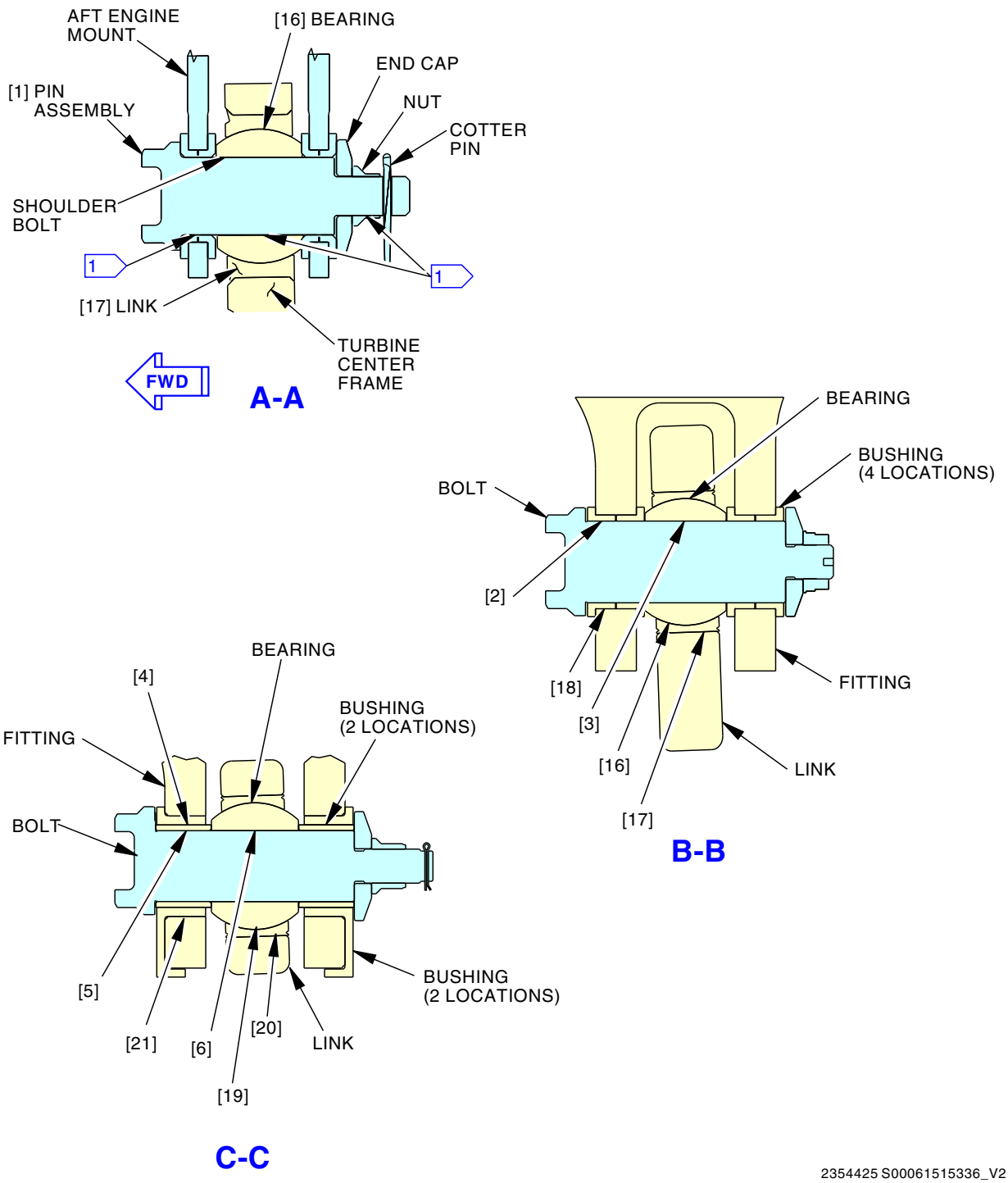


1 APPLY ANTI-SEIZE COMPOUND AS INDICATED.

2354424 S00061515335_V2

Aft Engine Mount Inspection
Figure 604/71-21-00-990-804-G00 (Sheet 2 of 6)

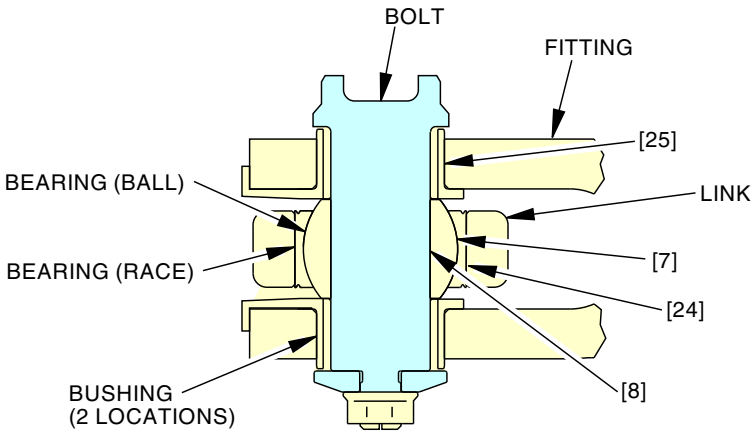
ECCN 9E991 BOEING PROPRIETARY - See title page for details



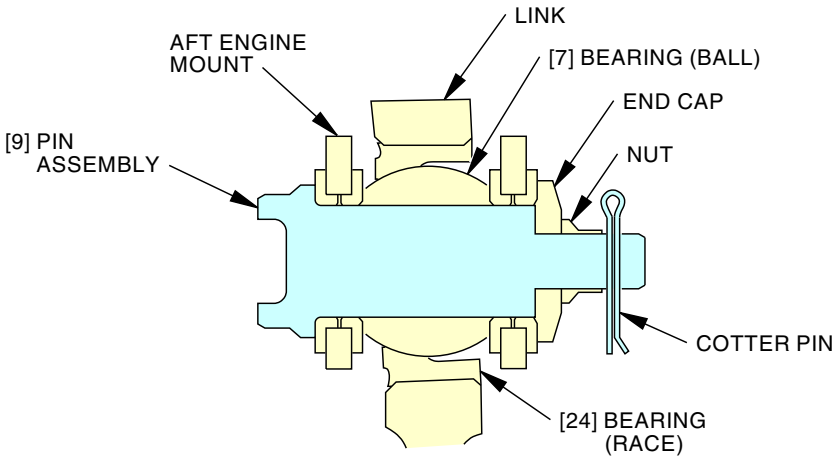
2354425 S00061515336_V2

Aft Engine Mount Inspection
Figure 604/71-21-00-990-804-G00 (Sheet 3 of 6)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



D-D

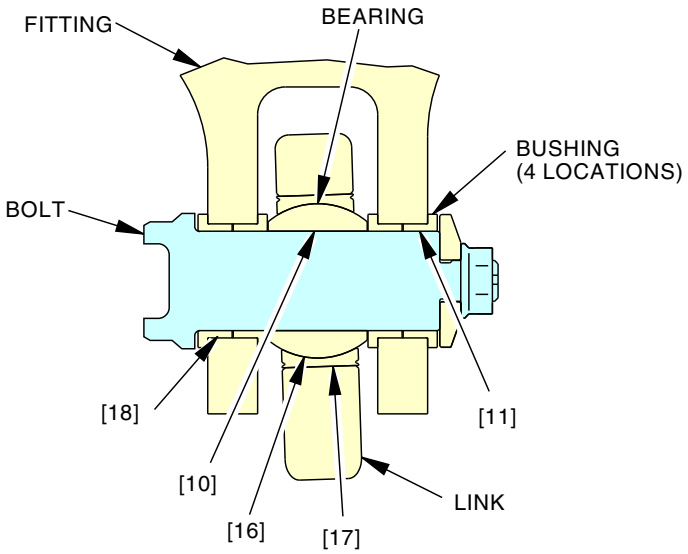


E-E

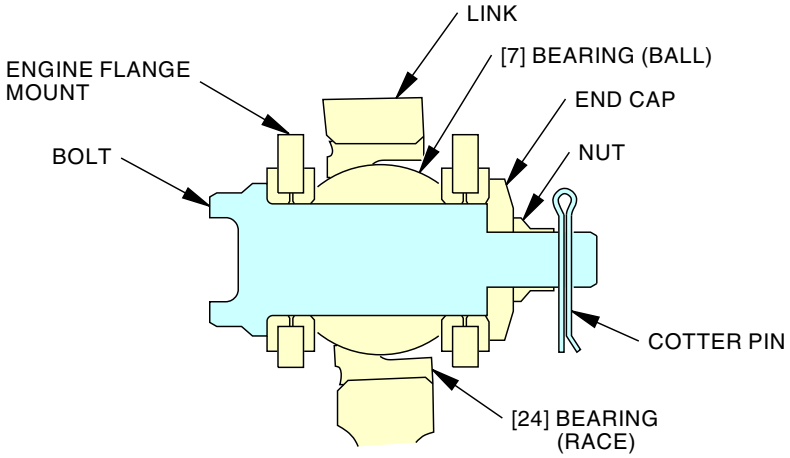
2354426 S00061515337_V1

Aft Engine Mount Inspection
Figure 604/71-21-00-990-804-G00 (Sheet 4 of 6)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



F-F

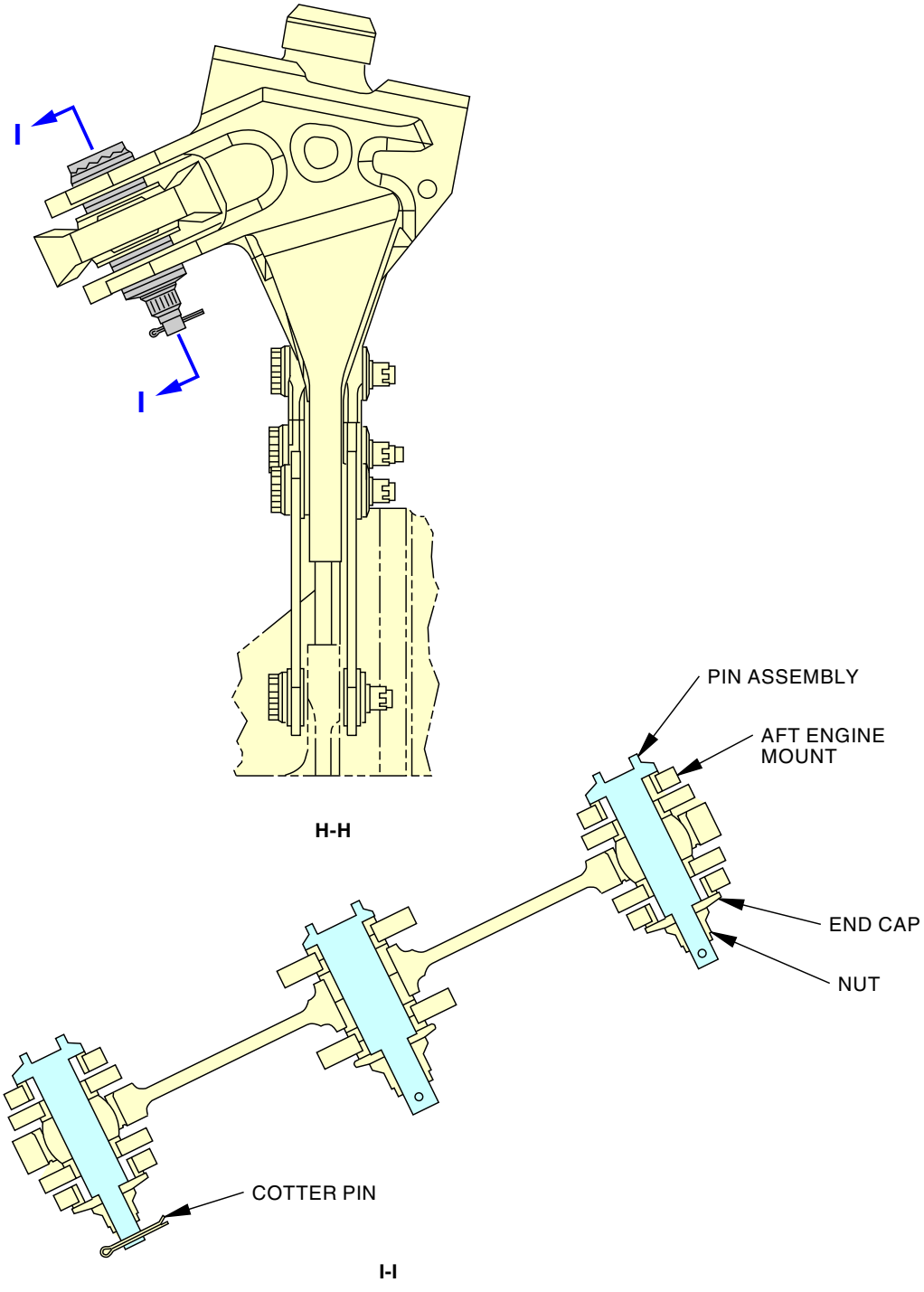


G-G

2354427 S00061515338_V1

Aft Engine Mount Inspection
Figure 604/71-21-00-990-804-G00 (Sheet 5 of 6)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Aft Engine Mount Inspection
Figure 604/71-21-00-990-804-G00 (Sheet 6 of 6)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

FORWARD ENGINE MOUNT - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) Forward engine mount removal

(2) Forward engine mount installation.

TASK 71-21-01-000-801-G00

2. Forward Engine Mount Removal

(Figure 401)

A. General

(1) This task provides the instructions to remove the forward engine mount.

B. References

Reference	Title
71-00-02-000-801-G00	Power Plant - Removal (P/B 401)

C. Tools/Equipment

Reference	Description
STD-653	Platform - Engine and Strut Access

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Prepare for the Removal

SUBTASK 71-21-01-010-001-G00

(1) Do this task: Power Plant - Removal, TASK 71-00-02-000-801-G00..

SUBTASK 71-21-01-490-001-G00

(2) Move the engine and strut access platform, STD-653 into its position.

F. Forward Engine Mount Removal

SUBTASK 71-21-01-020-001-G00

(1) Remove the forward engine mount [1] as follows:

(a) Remove the left and right attachments of the forward engine mount [1] to the mount links:

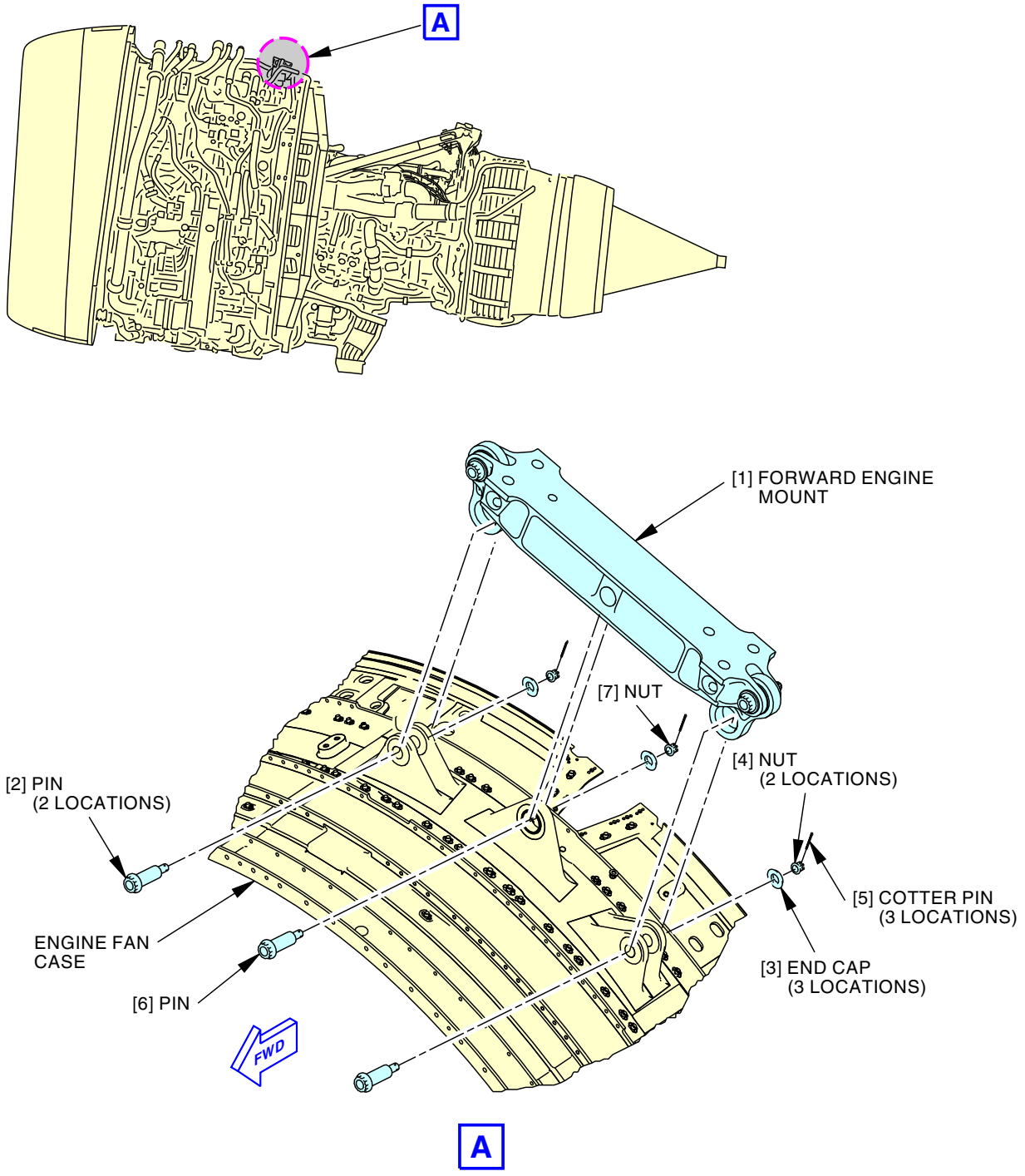
1) Remove the two cotter pins [5], the two nuts [4], the two end caps [3] and the two pins [2] that attach the forward engine mount [1] to the mount links.

(b) Remove the center attachment of the forward engine mount [1] to the fan case flange:

1) Remove the cotter pin [5], the nut [7], the end cap [3] and the pin [6] that attach the forward engine mount [1] to the fan case flange.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Forward Engine Mount Installation
Figure 401/71-21-01-990-802-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-21-01-400-801-G00

3. Forward Engine Mount Installation

(Figure 401)

A. General

(1) This task provides the instructions to install the forward engine mount.

B. References

Reference	Title
71-00-02-400-801-G00	Power Plant - Installation (P/B 401)

C. Tools/Equipment

Reference	Description
STD-653	Platform - Engine and Strut Access

D. Consumable Materials

Reference	Description	Specification
D00006	Compound - Antiseize Pure Nickel Special - Never-Seez NSBT	

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Forward engine mount	71-21-01-01-045	SIA ALL
5	Cotter pin	71-21-01-01-005	SIA ALL

F. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

G. Forward Engine Mount Installation

SUBTASK 71-21-01-420-001-G00

(1) Install the forward engine mount [1] as follows:

(a) Apply Never-Seez NSBT compound, D00006 on these components:

1) The shanks and threads of the pins [2] and pin [6]

2) Below the pin heads of the pins [2] and pin [6]

3) The bore of the bushings on the fan case

4) The flange face of the bushings

5) The bore and mating surface of the spherical bearings.

(b) Install the two pins [2], two end caps [3], and the two nuts [4], that attach the forward engine mount [1] to the left and the right mount links.

1) Install the pins [2] with the head forward.

NOTE: Make sure that the flat side of the end cap is against the shoulder of the bolt.

(c) Install the pin [6], end cap [3], nut [7], that attach the forward engine mount [1] to the center fan case flange.

1) Install the pin [6] with the head forward.

NOTE: Make sure that the flat side of the end cap is against the shoulder of the bolt.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(d) Tighten the nuts [4] and nut [7] to 170 in-lb (19 N·m) - 380 in-lb (43 N·m).

(e) Install the new cotter pins [5] in the nuts [4] and nut [7].

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-21-01-090-001-G00

(1) Move the engine and strut access platform, STD-653 away from the engine.

SUBTASK 71-21-01-410-001-G00

(2) Do this task: Power Plant - Installation, TASK 71-00-02-400-801-G00.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

AFT ENGINE MOUNT - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) A removal of the aft engine mount

(2) An installation of the aft engine mount.

TASK 71-21-02-000-801-G00

2. Aft Engine Mount Removal

(Figure 401, Figure 402)

A. General

(1) This task provides the instructions on how to remove the aft engine mount.

B. References

Reference	Title
71-00-02-000-801-G00	Power Plant - Removal (P/B 401)
71-21-04-000-801-G00	Thrust Links Removal (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-2107	Fixture - Lift, Engine Aft Mount Part #: C71024-20 Supplier: 81205 Opt Part #: C71024-1 Supplier: 81205 Opt Part #: C71024-10 Supplier: 81205
STD-653	Platform - Engine and Strut Access
STD-1194	Crane - Lift, 250 Lb (113 kg) Capacity, Lift Range 20 to 60 Inches (508-1524 Millimeters)
STD-7220	Hoist - Portable, 200-lb Capacity

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. Prepare for the Removal

SUBTASK 71-21-02-010-001-G00

(1) Do this task: Power Plant - Removal, TASK 71-00-02-000-801-G00.

SUBTASK 71-21-02-490-001-G00

(2) Move the engine and strut access platform, STD-653, into its position.

SUBTASK 71-21-02-010-002-G00

(3) Do this task: Thrust Links Removal, TASK 71-21-04-000-801-G00.

F. Aft Engine Mount Removal

SUBTASK 71-21-02-020-001-G00

(1) Disconnect the two thrust links [5] from the aft engine mount [1].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(a) Remove the two cotter pins [3], two nuts [2], two end caps [4], and two pins [6] from the thrust links [5].

SUBTASK 71-21-02-490-002-G00

(2) Attach the fixture, SPL-2107, to the top of the aft engine mount [1] as follows:

(a) Install the "SHORT LEG" to the front hole on the left side as marked on the strap.

(b) Install the "LONG LEG" to the aft hole on the right side as marked on the strap.

(c) Keep the straps loose.

SUBTASK 71-21-02-020-002-G00

WARNING

BE CAREFUL WHEN YOU MOVE THE COMPONENT. THE COMPONENT IS HEAVY. INJURIES TO PERSONS CAN OCCUR.

(3) Remove the aft engine mount [1] as follows:

(a) Remove the seven cotter pins [9] and loosen the four nuts [13], two nuts [11], and nut [8] one turn (View B and View E-E, Figure 401).

(b) Remove the two nuts [13], two end caps [12], two pins [14] from the aft engine mount [1] at the two outer locations (View B, Figure 401).

(c) Remove the nut [8] and nut [11] from the outer ends of the center link (View B, Figure 401).

1) Remove the end cap [7] and pin [16] from the aft engine mount [1] at the right inner location (view looks forward).

2) Remove the end cap [10] and pin [15] from the aft engine mount [1] at the left inner location (view looks forward).

(d) Connect the portable hoist, STD-7220, to the straps.

(e) Attach the portable hoist, STD-7220, to the 250 lb (113 kg) capacity crane, STD-1194.

(f) Adjust the portable hoist, STD-7220, to hold the weight of the aft engine mount [1].

(g) Lift the aft engine mount [1] slowly up and away of the engine.

SUBTASK 71-21-02-020-003-G00

(4) Remove the fixture, SPL-2107, from the aft engine mount [1].

(a) Lower the portable hoist, STD-7220, to loosen the straps.

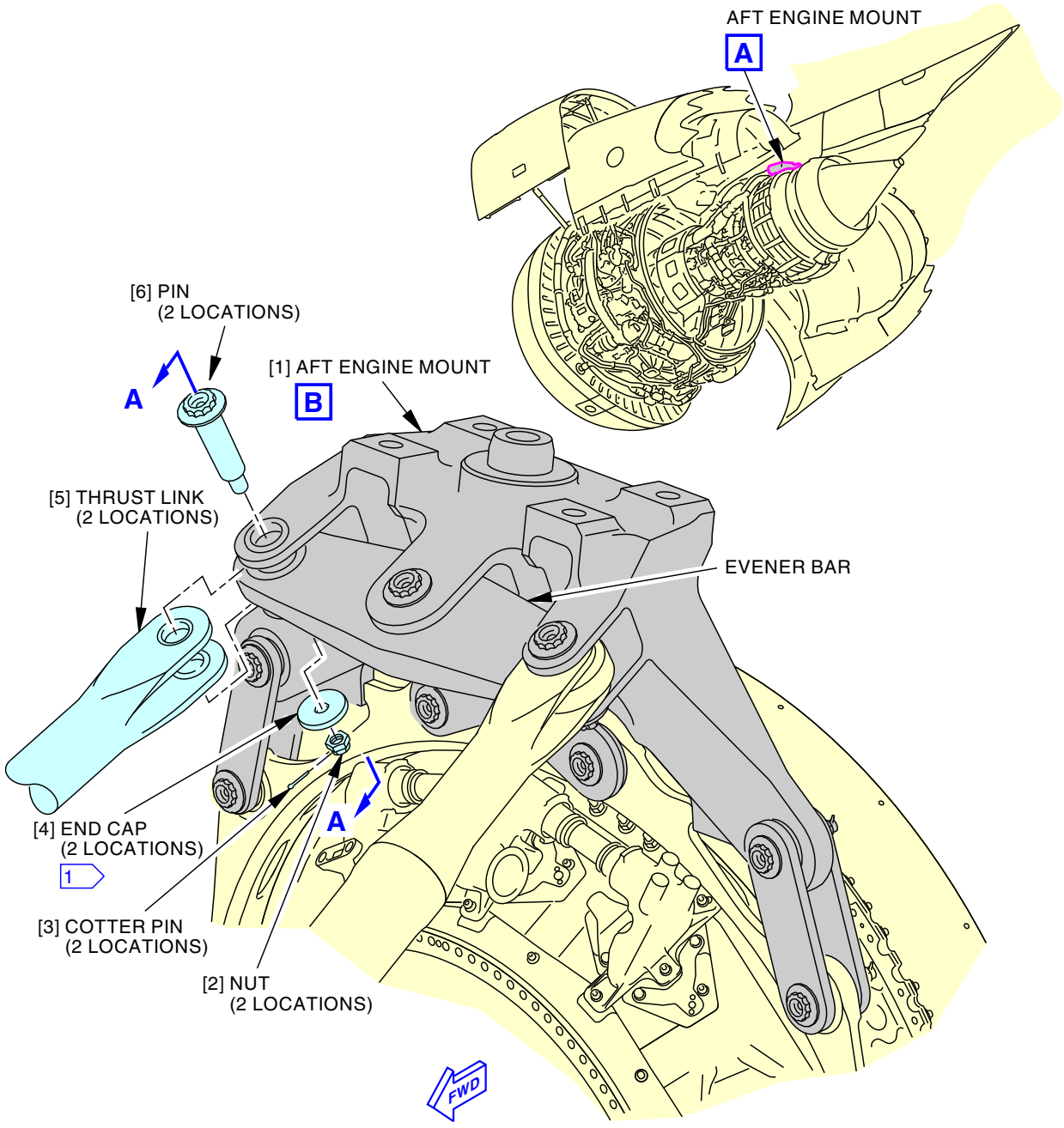
(b) Remove the "SHORT LEG" from the front hole on the left side as marked on the strap.

(c) Remove the "LONG LEG" from the aft hole on the right side as marked on the strap.

(d) Move the fixture, SPL-2107, away from the engine.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details



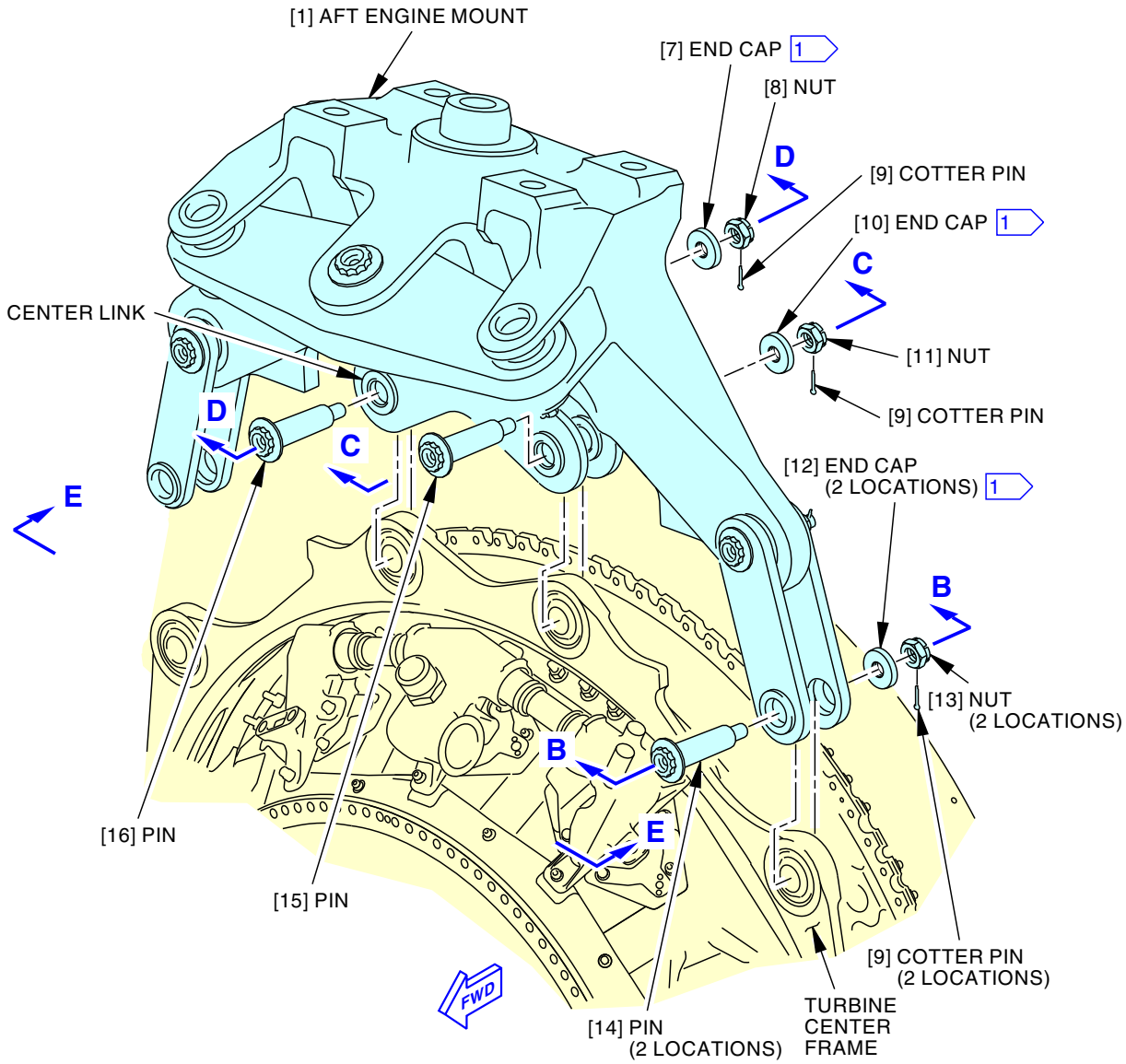
1 INSTALL THE END CAP WITH THE FLAT SIDE AGAINST THE SHOULDER OF THE PIN.

AFT ENGINE MOUNT
A

2354432 S00061515350_V5

Aft Engine Mount Installation
Figure 401/71-21-02-990-802-G00 (Sheet 1 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



AFT ENGINE MOUNT

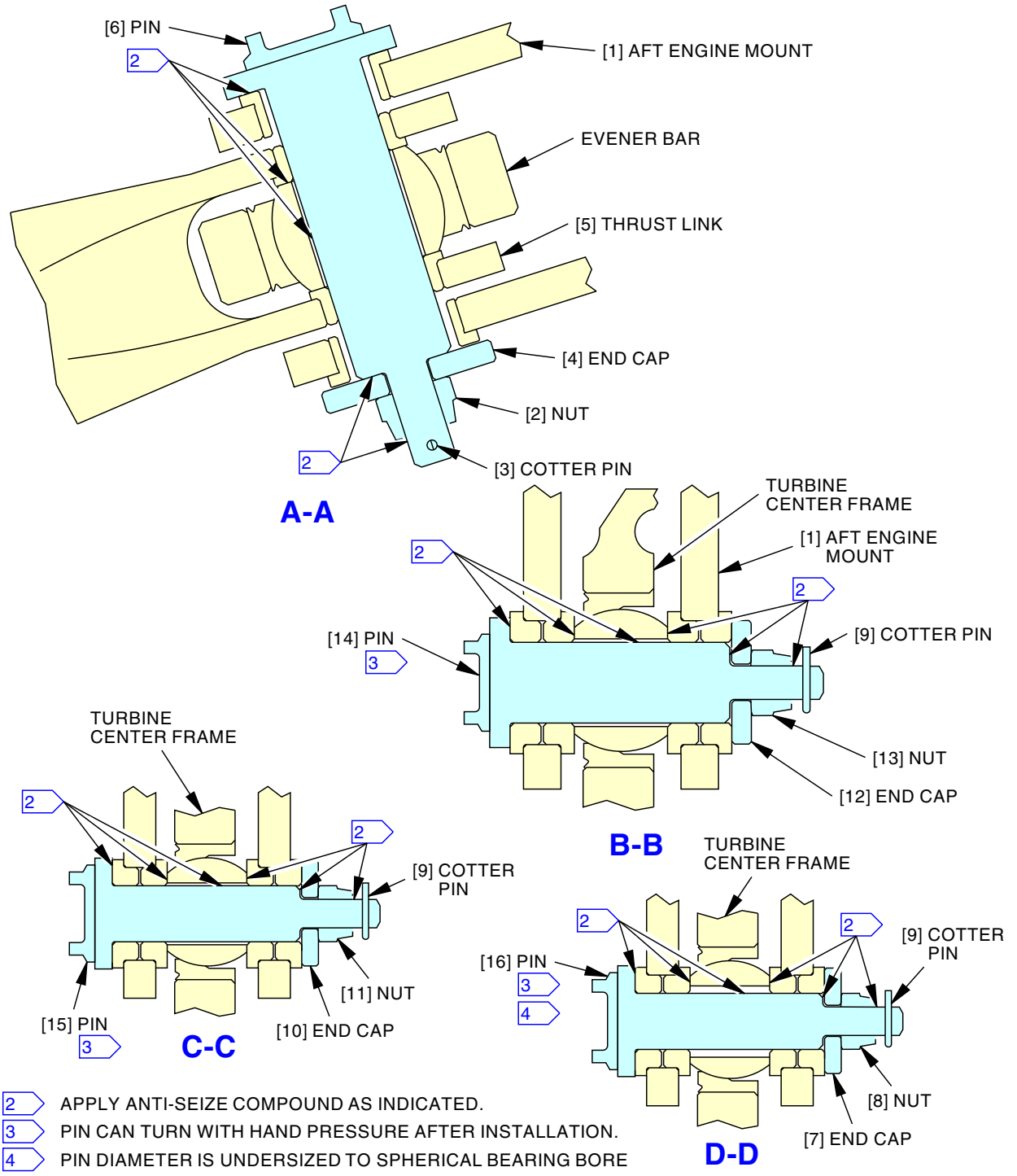
B

1 INSTALL THE END CAP WITH THE FLAT SIDE AGAINST THE SHOULDER OF THE PIN.

2427961 S0000561682_V6

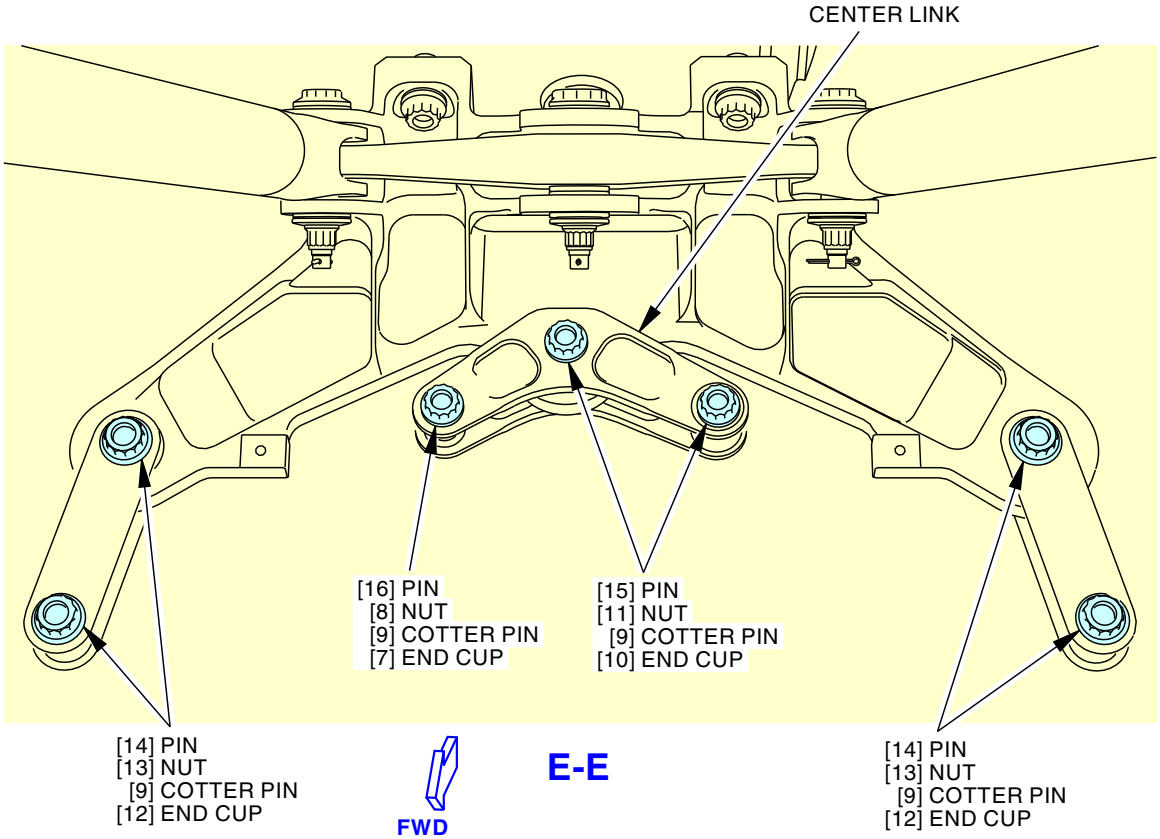
Aft Engine Mount Installation
Figure 401/71-21-02-990-802-G00 (Sheet 2 of 4)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Aft Engine Mount Installation
Figure 401/71-21-02-990-802-G00 (Sheet 3 of 4)

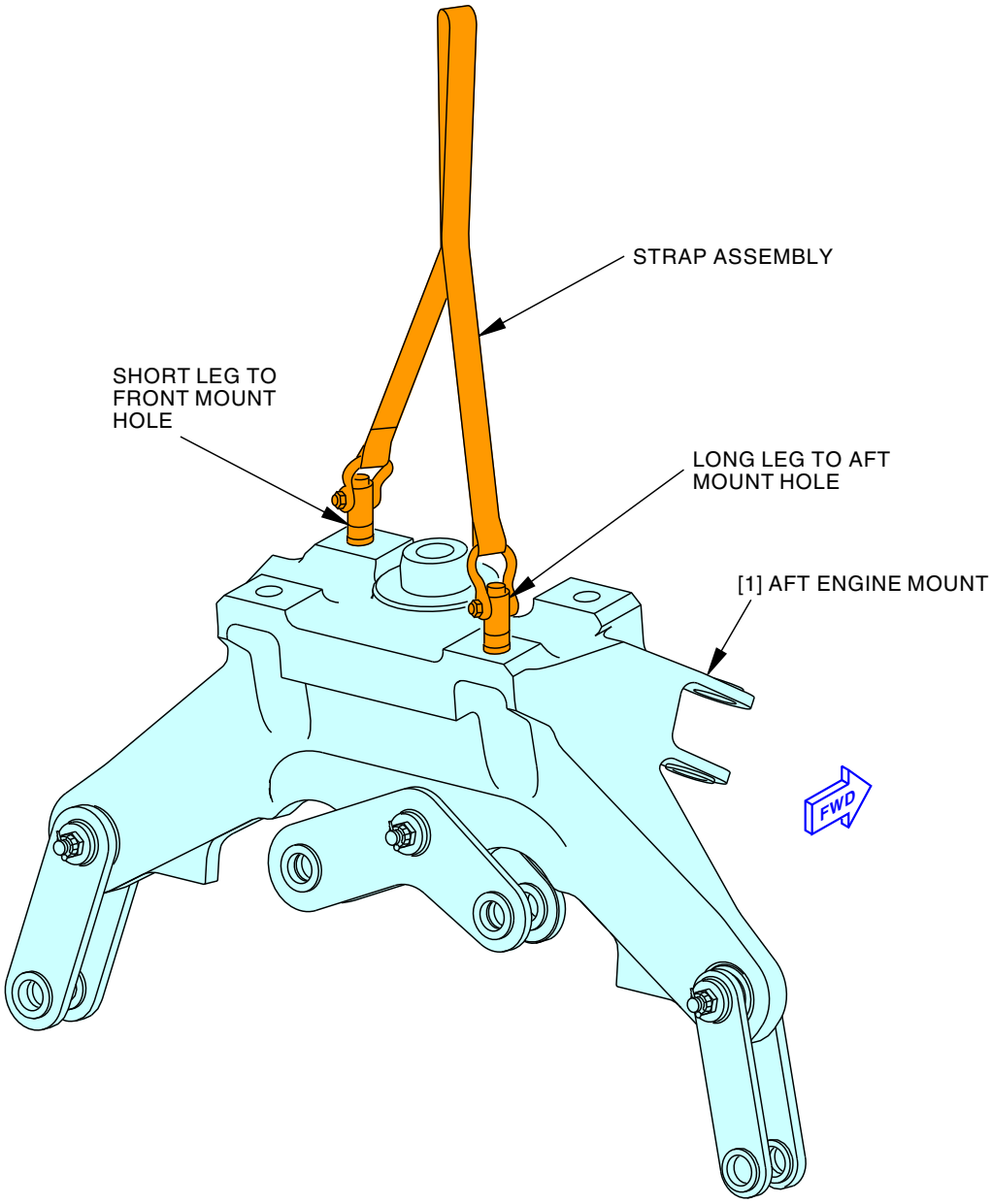
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2944650 S0000721012_V1

Aft Engine Mount Installation
Figure 401/71-21-02-990-802-G00 (Sheet 4 of 4)

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2354431 S00061515349_V2

Aft Engine Mount Installation Tool
Figure 402/71-21-02-990-801-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-21-02-400-801-G00

3. Aft Engine Mount Installation

(Figure 401, Figure 402)

A. General

(1) This task provides the instructions on how to install the aft engine mount.

B. References

Reference	Title
71-00-02-400-801-G00	Power Plant - Installation (P/B 401)
71-21-04-400-801-G00	Thrust Links 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-2107	Fixture - Lift, Engine Aft Mount Part #: C71024-20 Supplier: 81205 Opt Part #: C71024-1 Supplier: 81205 Opt Part #: C71024-10 Supplier: 81205
STD-653	Platform - Engine and Strut Access
STD-1194	Crane - Lift, 250 Lb (113 kg) Capacity, Lift Range 20 to 60 Inches (508-1524 Millimeters)
STD-7220	Hoist - Portable, 200-lb Capacity

D. Consumable Materials

Reference	Description	Specification
D00006	Compound - Antiseize Pure Nickel Special - Never-Seez NSBT	

E. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

F. Prepare for the Installation

SUBTASK 71-21-02-210-001-G00

(1) Do a check of the aft engine mount assembly for the correct installation of the evener bar.

(a) Make sure that the evener bar is installed with the slotted entry sides of the bearings facing up.

SUBTASK 71-21-02-490-003-G00

(2) Attach the fixture, SPL-2107, to the top of the aft engine mount [1] as follows:

(a) Install the "SHORT LEG" to the front hole on the left side as marked on the strap.

(b) Install the "LONG LEG" to the aft hole on the right side as marked on the strap.

(c) Connect the hoist to the straps.

(d) Attach the portable hoist, STD-7220, to the 250 lb (113 kg) capacity crane, STD-1194.

(e) Adjust the portable hoist, STD-7220, to hold the weight of the aft engine mount [1].

(f) Lift the aft engine mount [1] slowly to the top of the turbine center frame.

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G. Aft Engine Mount Installation

SUBTASK 71-21-02-420-001-G00

(1) Install the aft engine mount [1] on the turbine center frame as follows:

(a) Apply Never-Seez NSBT compound, D00006, to these components:

1) The shanks of the pins

2) Below the pin heads of the pins

3) The bore of the bushings

4) The flange face of the bushings

5) The bore of the spherical bearing balls

6) The flat surface of the spherical bearing balls.

(b) Align the aft engine mount [1] outer connections to the turbine center frame flanges.

(c) Install the two pins [14], two end caps [12], and two nuts [13] at the two outer locations.

1) Make sure that the end caps [12] with the flat side are installed against the shoulder of the pins.

(d) Align the aft engine mount [1] inner connections to the turbine center frame flanges.

(e) Install the pin [15], end cap [10], and nut [11] from the aft engine mount [1] at the left inner location (view looks forward).

1) Make sure that the end cap [10] with the flat side is installed against the shoulder of the pin.

(f) Install the pin [16], end cap [7], and nut [8] from the aft engine mount [1] at the right inner location (view looking forward).

1) Make sure that the end cap [7] with the flat side is installed against the shoulder of the pin.

(g) Tighten the nut [11] to 170 in-lb (19.2 N·m) - 380 in-lb (42.9 N·m) at the inner location (view looks forward).

1) Install a new cotter pin [9] on the nut [11].

(h) Tighten the nut [8] to 529 in-lb (60 N·m) - 621 in-lb (70.2 N·m).

1) Install a new cotter pin [9] on the nut [8].

(i) Tighten the two outer nuts [13] to 170 in-lb (19.2 N·m) - 380 in-lb (42.9 N·m).

1) Install the cotter pins [9] on the nuts [13].

(j) Tighten two inner nuts [13] on the outer link to 170 in-lb (19.2 N·m) - 380 in-lb (42.9 N·m).

1) Install the new cotter pins [9] on the nuts [13].

(k) Tighten the center nut [11] on the center link to the 170 in-lb (19.2 N·m) - 380 in-lb (42.9 N·m).

1) Install the new cotter pins [9] on the nut [11].

SUBTASK 71-21-02-420-002-G00

(2) Connect the two thrust links [5] to the aft engine mount [1] as follows:

(a) Align the thrust links [5] to the aft engine mount [1].

(b) Install the two pins [6], two end caps [4], and two nuts [2] on the thrust links [5].

1) Tighten the nuts [2] to 450 in-lb (50.8 N·m) - 650 in-lb (73.4 N·m).

a) Install new cotter pins [3] on the nuts [2].

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SUBTASK 71-21-02-080-001-G00

(3) Disconnect the fixture, SPL-2107, from the aft engine mount [1] as follows:

(a) Lower the portable hoist, STD-7220, to loosen the straps.

(b) Remove the "SHORT LEG" from the front hole on the left side as marked on the strap.

(c) Remove the "LONG LEG" from the aft hole on the right side as marked on the strap.

(d) Move the fixture, SPL-2107, away from the engine.

H. Put the Airplane Back to Its Usual Condition

SUBTASK 71-21-02-090-001-G00

(1) Remove fixture, SPL-2107, from the portable hoist, STD-7220.

SUBTASK 71-21-02-410-002-G00

(2) Do this task: Thrust Links Installation, TASK 71-21-04-400-801-G00.

SUBTASK 71-21-02-090-002-G00

(3) Remove the engine and strut access platform, STD-653.

SUBTASK 71-21-02-410-001-G00

(4) Do this task: Power Plant - Installation, TASK 71-00-02-400-801-G00.

——— END OF TASK ———

ECCN 9E991 BOEING PROPRIETARY - See title page for details

ENGINE MOUNT BOLTS AND NUTS - INSPECTION/CHECK

1. General

A. This procedure has one task:

(1) Engine mount bolts and nuts inspection.

TASK 71-21-03-200-801-G00

2. Engine Mount Bolts and Nuts Inspection

(Figure 601)

A. General

(1) This task provides the instructions on how to do an inspection of the forward and aft engine mount bolts and barrel nuts.

(2) This task is used when the engine is off-wing.

(3) You must remove the engine mount bolts and barrel nuts to do the inspection.

(4) The inspection of the forward and aft engine mount bolts are the same.

(5) You must have a certification in fluorescent dye penetrant inspection techniques to do this task.

(6) Use this task, or an equivalent inspection procedure, to do a fluorescent dye penetrant system inspection to a sensitivity level of Level 3 - High Sensitivity, according to the classifications given by Aerospace Material Specification (AMS) 2644.

NOTE: To do the inspection of the bolts and nuts, you must comply with AMS 2644, Inspection Material - Penetrant, and Boeing Specification Support Standard (BSS) 7039, Liquid Penetrant Inspection.

B. Tools/Equipment

Reference	Description
STD-122	Brush
STD-442	Gun - Heat, 180 deg. F (82 deg. C) Maximum Output Temperature
STD-569	Light - Black, Ultraviolet

C. Consumable Materials

Reference	Description	Specification
B00074	Solvent - Degreasing	MIL-PRF-680 (Supersedes P-D-680)
G00034	Cotton Wiper - Process Cleaning Absorbent Wiper (Cheesecloth, Gauze)	AMS3819 Class 1 Grade A or B Form 1 (Supersede BMS15-5 CL A)
G02036	Penetrant - Zyglo ZL-27A Fluorescent Post Emulsifiable Penetrant	AMS2644 Type I (Level 3 - High Sensitivity)
G50189 [CP3102]	Developer - Developer in Powder Form - Zyglo ZP 4B	
G50704 [C05-051]	Emulsifier - Zyglo ZE-4B Penetrant Emulsifier	AMS 2644

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

ECCN 9E991 BOEING PROPRIETARY - See title page for details

E. Engine Mount Bolts and Barrel Nuts Inspection

SUBTASK 71-21-03-211-001-G00

(1) Do a visual check of the engine mount bolts [1] and bolts [5] for damage as follows:

(a) Use the solvent, B00074, and a brush, STD-122, to clean the bolts [1], the bolts [5], the barrel nuts [3], and the barrel nuts [7].

(b) Use forced air to dry the engine mount bolts and barrel nuts.

(c) Surface damage is not permitted.

(d) Cracks are not permitted.

(e) Damage threads are not permitted.

(f) Corrosion is not permitted.

SUBTASK 71-21-03-211-002-G00

(2) Examine the engine mount bolts [1], the bolts [5], the barrel nuts [3], and the barrel nuts [7] with the dye penetrant for damage as follows:

(a) Use the solvent, B00074, and a brush, STD-122, to clean the bolts and nuts.

(b) Use forced air to dry the engine mount bolts and barrel nuts.

NOTE: The engine mount bolts and barrel nuts must be fully dry before you apply the penetrant.

1) Use a 180 deg. F (82 deg. C) maximum output temperature heat gun, STD-442 to apply 140.0°F (60.0°C) air to dry the engine mount bolts and barrel nuts.

(c) Apply the Zyglo ZL-27A penetrant, G02036 to the engine mount bolts and barrel nuts.

NOTE: Make sure that all the surfaces of the engine mount bolts and barrel nuts are covered with the Zyglo ZL-27A penetrant, G02036.

(d) Let the Zyglo ZL-27A penetrant, G02036, stay on the surface of the engine mount bolts and barrel nuts for a minimum of 10 minutes.

(e) Apply the Zyglo ZE-4B emulsifier, G50704 [C05-051] to the engine mount bolts and barrel nuts.

(f) Remove the engine mount bolts and barrel nuts from the Zyglo ZE-4B emulsifier, G50704 [C05-051].

(g) Let the Zyglo ZE-4B emulsifier, G50704 [C05-051] drain from the engine mount bolts and barrel nuts for a minimum of 2 minutes.

(h) Flush the Zyglo ZE-4B emulsifier, G50704 [C05-051] and Zyglo ZL-27A penetrant, G02036 from the engine mount bolts and barrel nuts with water.

(i) Dry the engine mount bolts and barrel nuts.

NOTE: The engine mount bolts and barrel nuts must be fully dry before you apply the developer.

1) Use a 180 deg. F (82 deg. C) maximum output temperature heat gun, STD-442 to apply 140.0°F (60.0°C) air to dry the engine mount bolts and barrel nuts.

(j) Apply the powder developer - Zyglo ZP 4B, G50189 [CP3102] to the engine mount bolts and barrel nuts.

(k) Let the powder developer - Zyglo ZP 4B, G50189 [CP3102] stay on the engine mount bolts and barrel nuts for 10 minutes.

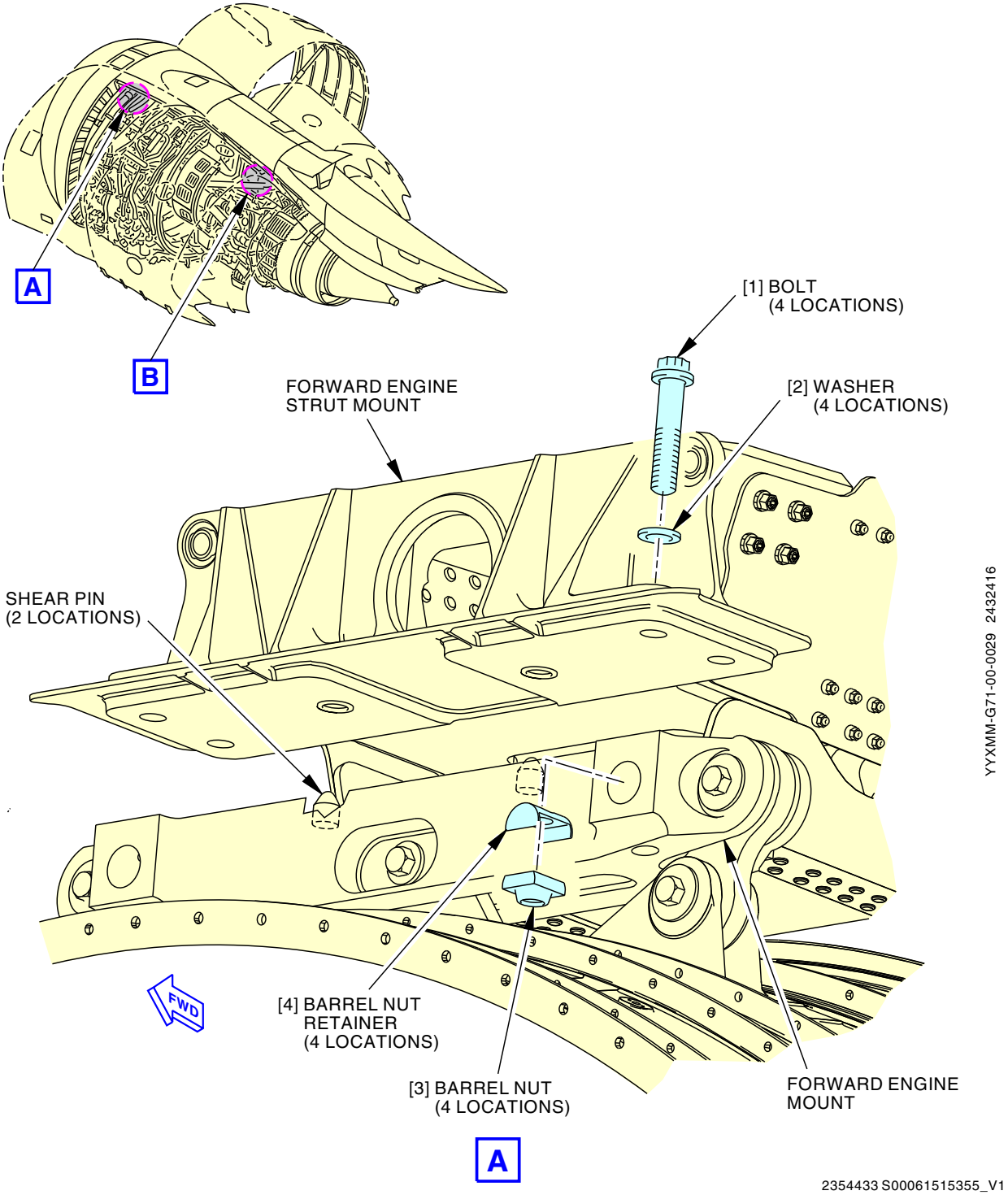
(l) Use a ultraviolet black light, STD-569 to examine the engine mount bolts and barrel nuts for cracks or other defects.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

1) Cracks are not permitted.
2) If you do not find crack on the engine mount bolts and barrel nuts, clean the bolts and barrel nuts with clean water and brush, STD-122 for 2 - 3 minutes.
3) Use forced air or a clean dry cotton wiper, G00034 to dry the bolts and barrel nuts.

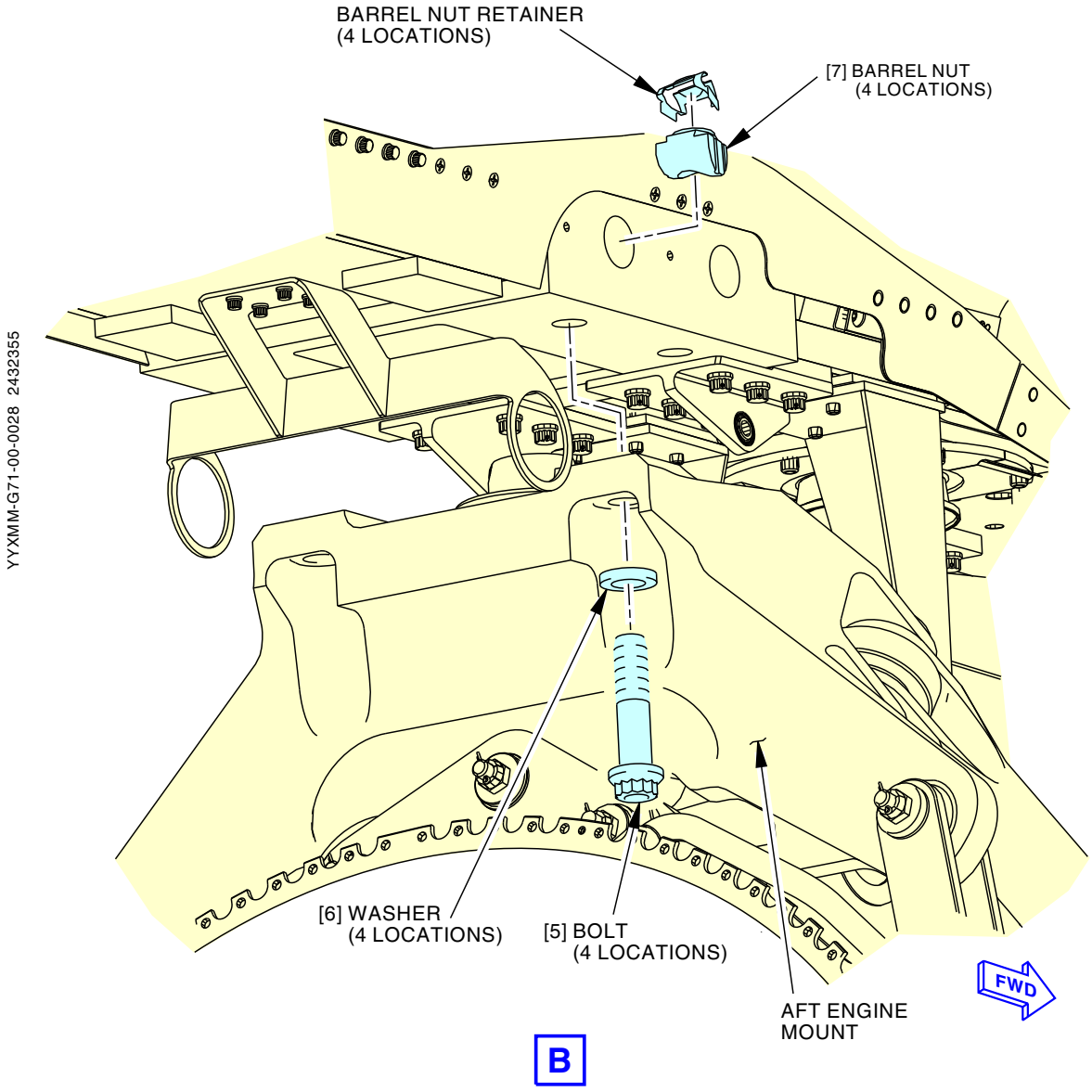
END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Engine Mount Bolts and Nuts Inspection
Figure 601/71-21-03-990-801-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



2354434 S00061515356_V1

Engine Mount Bolts and Nuts Inspection
Figure 601/71-21-03-990-801-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

THRUST LINKS - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks:

(1) Thrust Links Removal

(2) Thrust Links Installation.

TASK 71-21-04-000-801-G00

2. Thrust Links Removal

(Figure 401, Figure 402, and Figure 403)

A. General

(1) This task gives the instructions to remove the thrust link.

(2) The thrust links are installed between the fan frame and the aft engine mount.

(3) You can only remove one thrust link at a time when the power plant is installed.

(4) The removal procedures of the left and the right thrust links are the same.

(5) The upper thread protector, C71038-5, SPL-14641, lower thread protector, C71038-4, SPL-20763, and the link adjuster assembly, C71038-2, SPL-20764 are components of the thrust link equipment, SPL-23486.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
72-23-04-000-801-G00	Fan Frame Module Segment Shrouds Removal (P/B 401)
73-22-01-000-801-G00	Electronic Engine Control (EEC) Electrical Harness (HJ3A) Removal (P/B 401)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (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-14641	Upper Thread Protector, C71038-5 (included in C71038 eqpt) Part #: C71038-1 Supplier: 81205
SPL-20763	Lower Thread Protector, C71038-4 (included in C71038 eqpt) Part #: C71038-1 Supplier: 81205
SPL-20764	Link Adjuster Assy, C71038-2 (included in C71038-1 eqpt) Part #: C71038-1 Supplier: 81205
SPL-23486	Alignment/Thread Protector Equipment - Thrust Link Part #: C71038-1 Supplier: 81205
STD-653	Platform - Engine and Strut Access
STD-858	Tag - DO NOT OPERATE

ECCN 9E991 BOEING PROPRIETARY - See title page for details

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. 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

F. Prepare for the Removal

SUBTASK 71-21-04-860-001-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-21-04-010-001-G00

(2) 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
414	Right Fan Cowl, Engine 1
423	Left Fan Cowl, Engine 2
424	Right Fan Cowl, Engine 2

ECCN 9E991 BOEING PROPRIETARY - See title page for details

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 71-21-04-490-001-G00

(3) Put an engine and strut access platform, STD-653, in its position to get access to the thrust links.

SUBTASK 71-21-04-010-002-G00

(4) Disconnect the LPT/HPTACC hose from the VBV inlet.

(a) Loosen the saddle clamp.

SUBTASK 71-21-04-020-004-G00

(5) Remove the applicable shroud segment to get access to the thrust link [1] (Figure 403).

(a) For the right thrust link [1], remove the shroud 1 segment and the shroud 2 segment at the 1:00 and 3:00 o'clock positions (TASK 72-23-04-000-801-G00).

NOTE: You must remove the shroud 2 segment first before you remove the shroud 1 segment.

(b) For the left thrust link [1], remove the shroud 5 segment at the 9-12:00 o'clock position (TASK 72-23-04-000-801-G00).

(c) Remove the applicable VBV duct.

1) Do not remove the VBV inlet from the shroud.

SUBTASK 71-21-04-010-003-G00

(6) Disconnect the applicable wire bundles from the shroud segments (TASK 73-22-01-000-801-G00).

(a) Remove brackets from the shrouds.

G. Thrust Links Removal

SUBTASK 71-21-04-470-001-G00

(1) Install a link adjuster assembly, C71038-2, SPL-20764, as follows (Figure 402):

(a) Install a link adjuster assembly, C71038-2, SPL-20764, on the side of the aft engine mount opposite the thrust link [1] you will remove.

1) Tighten a link adjuster assembly, C71038-2, SPL-20764, until you can reduce the compressive force on the thrust link [1] and remove the thrust link [1].

NOTE: This will keep the aft engine mount angle in a correct position while remove the thrust link.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-21-04-020-001-G00

WARNING

BE CAREFUL WHEN YOU MOVE THE COMPONENT. THE COMPONENT IS HEAVY. INJURIES TO PERSONS CAN OCCUR.

(2) Remove the applicable thrust link [1] as follows (Figure 401):

(a) Disconnect the thrust links [1] from the aft engine mount as follows:

1) Remove the cotter pins [4] from the nuts [3].

2) Remove the pins [5], end caps [2], and nuts [3] at the end of the thrust links [1].

3) Install a upper thread protector, C71038-5, SPL-14641, on the pins [5] at the end of the thrust links [1].

(b) Disconnect the thrust links [1] from the fan frame thrust link fitting as follows:

1) Remove the cotter pins [10] from the nuts [9].

2) Remove the pin [6], end cap [8], and nut [9] at the end of the thrust link [1].

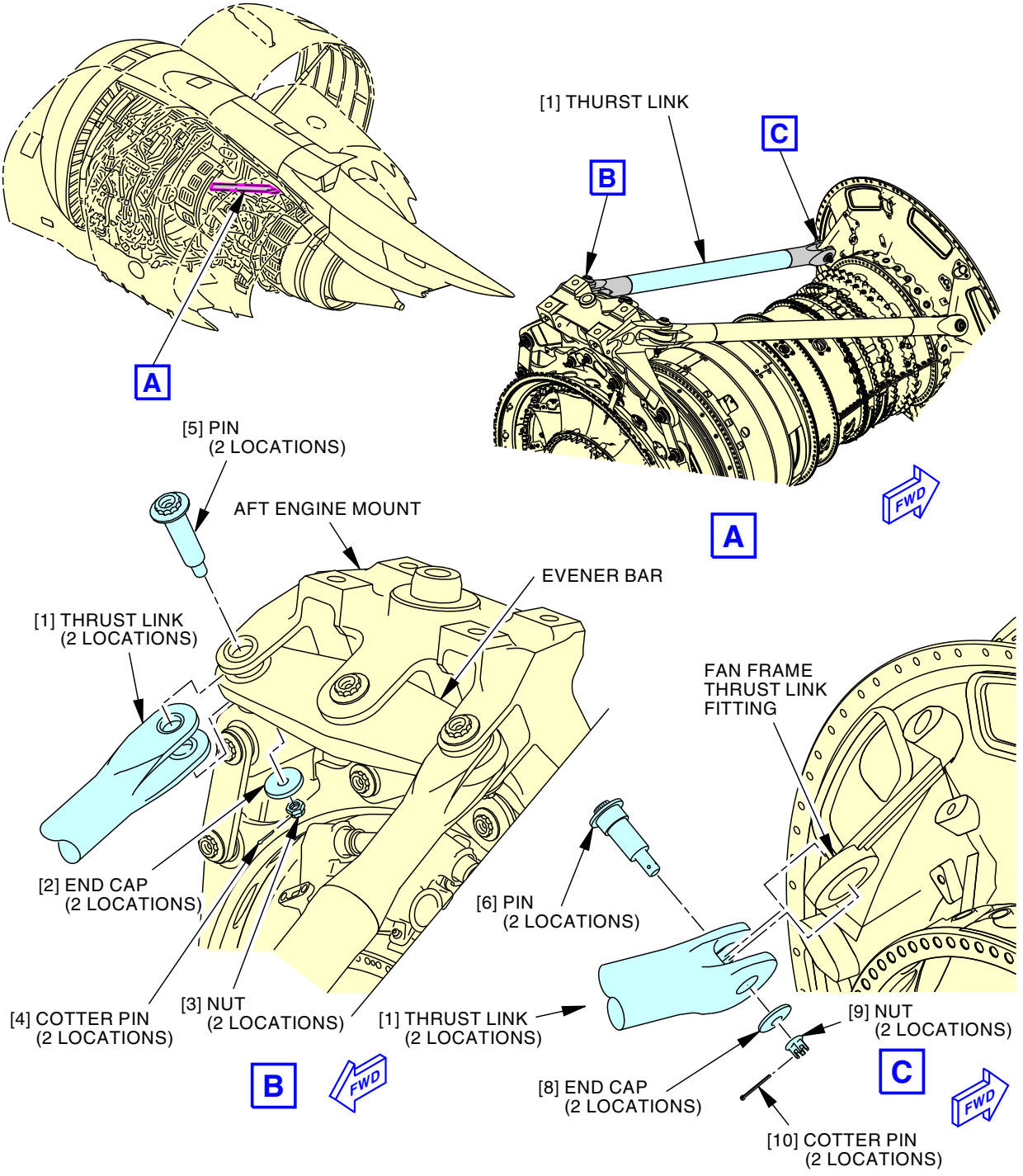
3) Install a lower thread protector, C71038-4, SPL-20763, on the pin [6] at the end of the thrust link [1].

(c) Remove the thrust link [1] in the down direction.

NOTE: You will need to slide the thrust link aft until the forward end clears the cables.

END OF TASK

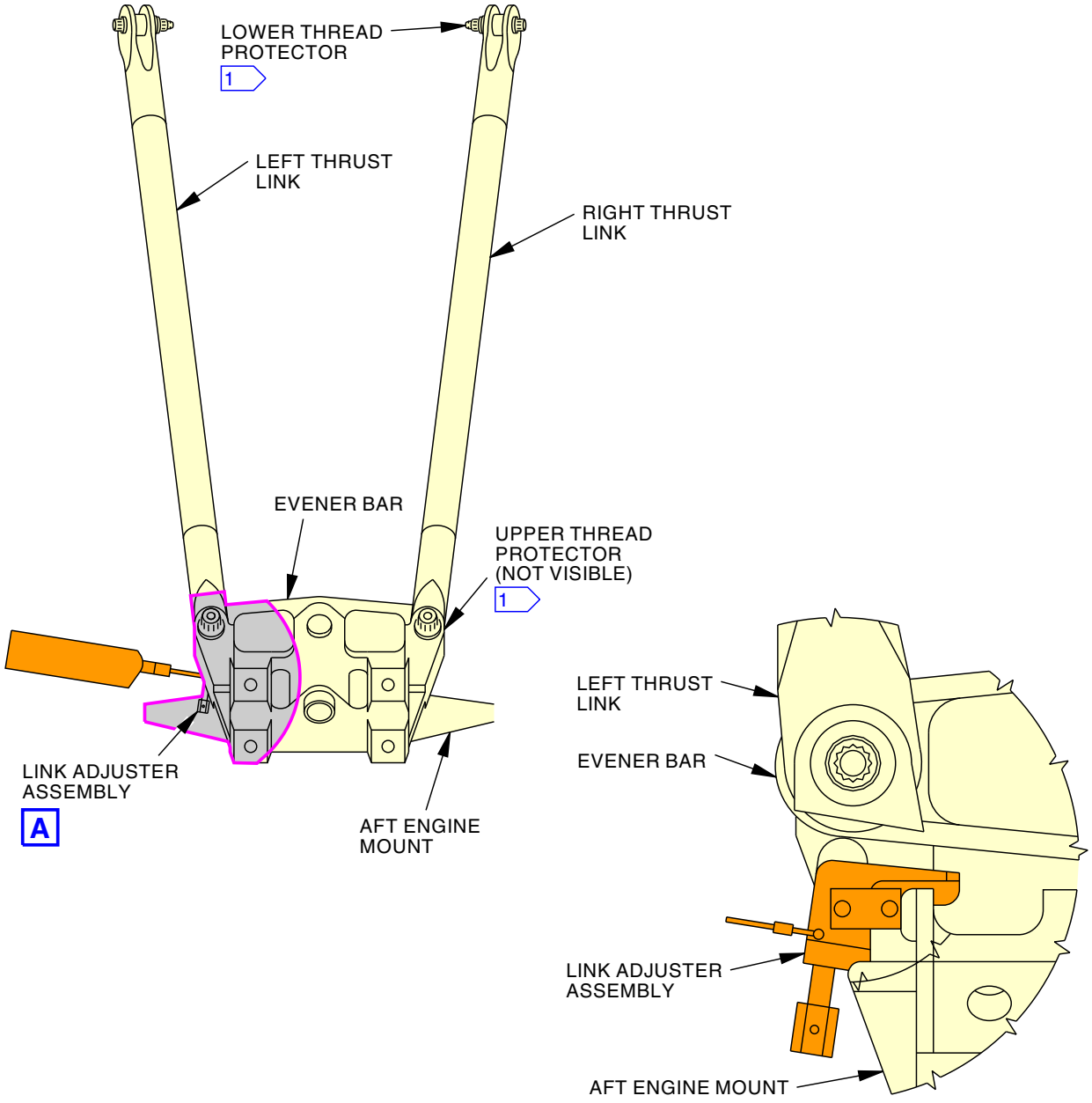
ECCN 9E991 BOEING PROPRIETARY - See title page for details



2354436 S00061515361_V6

Thrust Link Installation
Figure 401/71-21-04-990-802-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details



1 THREAD PROTECTOR IS USED FOR ALIGNMENT PURPOSE AND PROTECT THREADS DAMAGE.

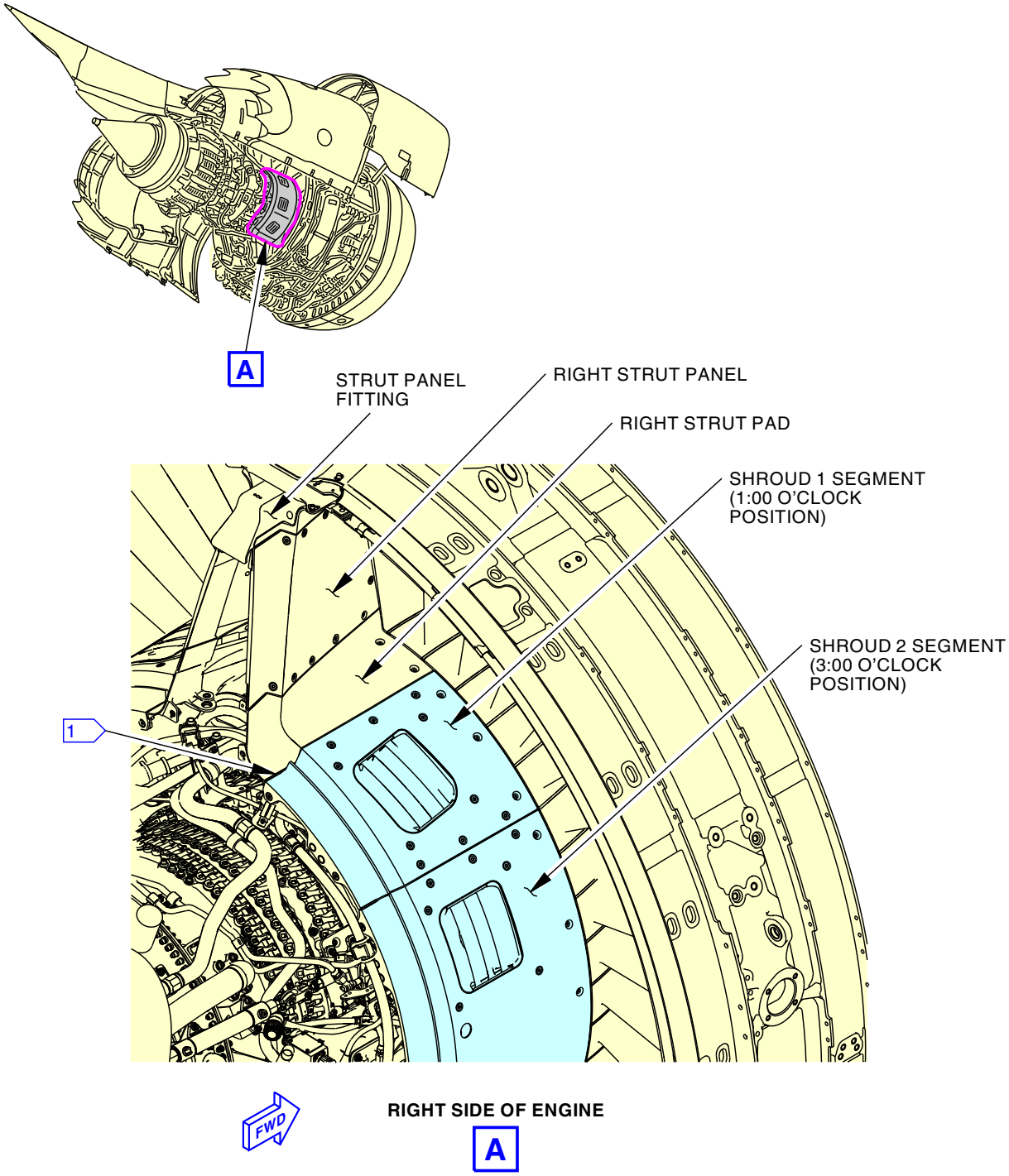
LINK ADJUSTER ASSEMBLY

A

2354435 S00061515360_V2

Thrust Link Installation Tool
Figure 402/71-21-04-990-801-G00

ECCN 9E991 BOEING PROPRIETARY - See title page for details

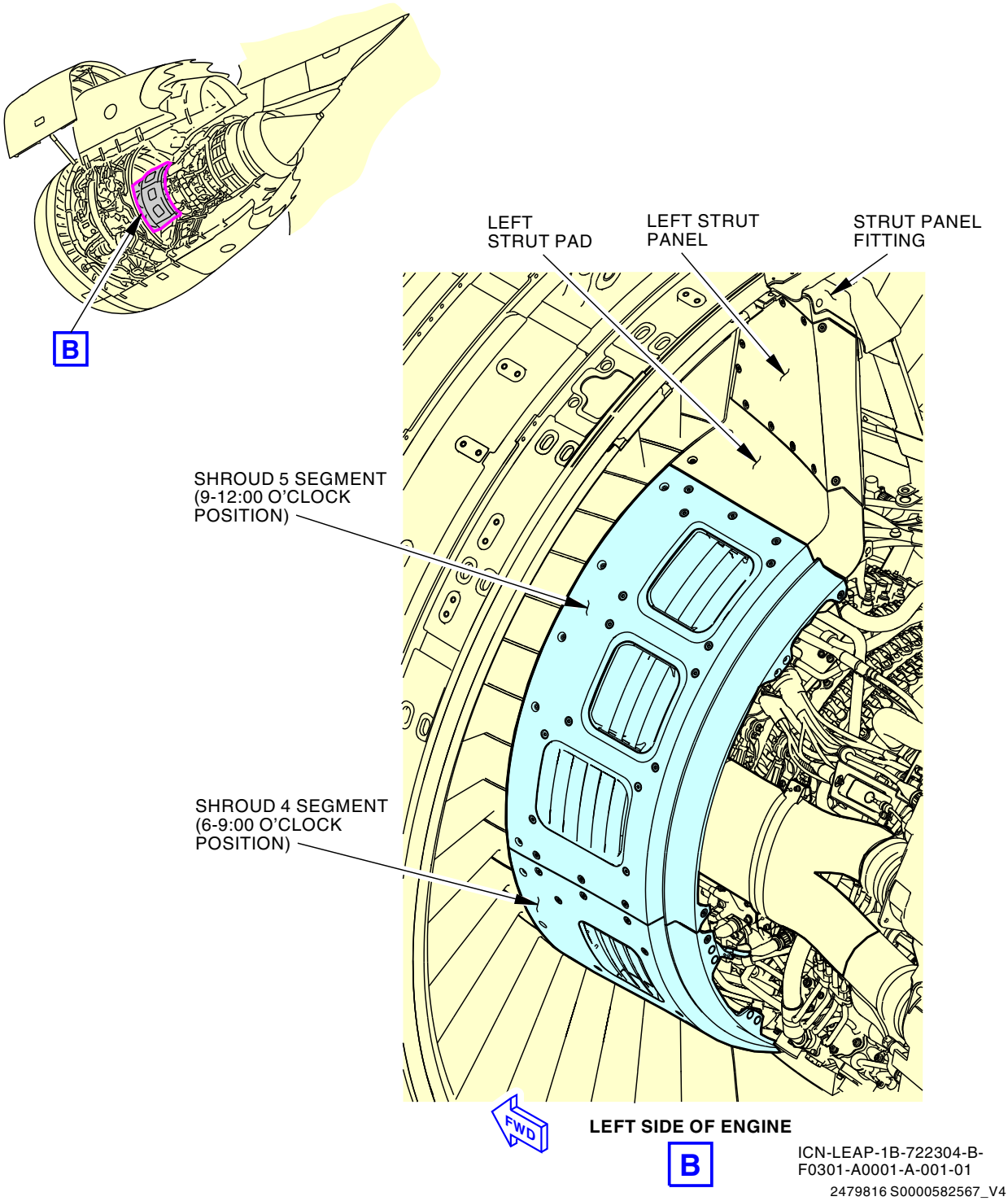


1 APPLY S/B BMS 5-63 FIREWALL SEALANT

2479761 S0000582566_V4

Strut Panels and Shroud Segments Firewall Sealant Installation
Figure 403/71-21-04-990-806-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Strut Panels and Shroud Segments Firewall Sealant Installation
Figure 403/71-21-04-990-806-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-21-04-400-801-G00

3. Thrust Links Installation

(Figure 401, Figure 402, and Figure 403)

A. General

(1) This task gives the instructions to install the thrust link.

(2) You can only install one thrust link at a time when the power plant is installed.

(3) You must use the thrust link alignment tool to install the thrust link on the engine.

(4) The installation procedures of the left and the right thrust links are the same.

(5) You must apply the firewall sealant at the strut panel and the shroud segment edge.

(6) The upper thread protector, C71038-5, SPL-14641, lower thread protector, C71038-4, SPL-20763, and the link adjuster assembly, C71038-2, SPL-20764 are components of the thrust link equipment, SPL-23486.

B. References

Reference	Title
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
72-23-04-400-801-G00	Fan Frame Module Segment Shrouds Installation (P/B 401)
73-22-01-400-801-G00	Electronic Engine Control (EEC) Electrical Harness (HJ3A) Installation (P/B 401)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (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-14641	Upper Thread Protector, C71038-5 (included in C71038 eqpt) Part #: C71038-1 Supplier: 81205
SPL-20763	Lower Thread Protector, C71038-4 (included in C71038 eqpt) Part #: C71038-1 Supplier: 81205
SPL-20764	Link Adjuster Assy, C71038-2 (included in C71038-1 eqpt) Part #: C71038-1 Supplier: 81205
SPL-23486	Alignment/Thread Protector Equipment - Thrust Link Part #: C71038-1 Supplier: 81205
STD-653	Platform - Engine and Strut Access
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
A00160	Sealant - Firewall - Hydraulic Fluid Resistant	BMS5-63
D00006	Compound - Antiseize Pure Nickel Special - Never-Seez NSBT	

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Thrust link	71-21-04-01-055	SIA 001-006

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(Continued)

AMM Item	Description	AIPC Reference	AIPC Effectivity
1 (cont.)		71-21-04-01-057	SIA 007
		71-21-04-01-060	SIA 001-006
		71-21-04-01-062	SIA 007
4	Cotter pin	71-21-04-01-005	SIA ALL
10	Cotter pin	71-21-04-01-010	SIA ALL

F. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

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. Thrust Links Installation

SUBTASK 71-21-04-640-001-G00

(1) Apply Never-Seez NSBT compound, D00006, to the threads, shank and below the head of the pin [5] and pin [6] to the bushings and bores.

SUBTASK 71-21-04-480-001-G00

(2) Make sure that you install a upper thread protector, C71038-5, SPL-14641, and lower thread protector, C71038-4, SPL-20763, on the applicable pin to protect the pin from alignment damage.

SUBTASK 71-21-04-420-001-G00

(3) Install the applicable thrust link [1].

(a) Put the thrust link [1] between the engine fitting and the aft engine mount.

(b) Connect the thrust link [1] to the aft engine mount as follows:

1) Align the aft end of the thrust link [1] with the aft engine mount and align the forward end with the thrust link fitting.

2) Install the pin [5] at the aft end of the thrust link [1].

a) Remove a upper thread protector, C71038-5, SPL-14641, from the pin [5].

b) Apply Never-Seez NSBT compound, D00006, to the threads of the pin [5].

3) Install the end cap [2] and nut [3].

a) Make sure that the flat side of the end cap [2] is against the shoulder of the pin.

(c) Connect the thrust link [1] to the fan frame thrust link fitting.

1) Install the pin [6] at the forward end of the thrust link [1].

ECCN 9E991 BOEING PROPRIETARY - See title page for details

a) Remove a lower thread protector, C71038-4, SPL-20763, from the pin [6].

b) Install the end cap [8] and nut [9].

c) Apply Never-Seez NSBT compound, D00006, to the threads of the nut [9].

<1> Make sure that Never-Seez NSBT compound, D00006, is not applied onto the Teflon liner of the spherical bearing ball.

2) Install the end cap [8] and nut [9].

a) Make sure that the flat side of the end cap [8] is against the shoulder of the pin.

(d) Tighten the two nuts [3] or the head of the pins to 450.0 in-lb (50.8 N·m) - 650.0 in-lb (73.4 N·m).

NOTE: You can apply the torque to the nut or the head of the pin.

1) Install the new cotter pin [4] on the nut [3].

(e) Tighten the two nut [9] or the head of the pins to 170.0 in-lb (19.2 N·m) - 380.0 in-lb (42.9 N·m).

NOTE: You can apply the torque to the nut or the head of the pin.

1) Install the new cotter pin [10] on the nut [9].

SUBTASK 71-21-04-470-002-G00

(4) Remove a link adjuster assembly, C71038-2, SPL-20764, as follows:

(a) Loosen a link adjuster assembly, C71038-2, SPL-20764, and remove from the side of the aft engine mount.

SUBTASK 71-21-04-940-001-G00

(5) Remove the protective cover around the thrust link.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-21-04-420-004-G00

(1) For the left thrust link [1], install the shroud 5 segment at the 9-12:00 o'clock position (TASK 72-23-04-400-801-G00).

SUBTASK 71-21-04-420-005-G00

(2) For the right thrust link [1], install the shroud 1 segment and the shroud 2 segment at the 1:00 and 3:00 o'clock positions (TASK 72-23-04-400-801-G00).

NOTE: You must install the shroud 1 segment before you install the shroud 2 segment.

SUBTASK 71-21-04-410-002-G00

(3) Connect the applicable wire bundle to the applicable shroud segments (TASK 73-22-01-400-801-G00).

NOTE: It is necessary to install brackets on the applicable shrouds.

SUBTASK 71-21-04-410-003-G00

(4) Connect the LPT/HPTACC hose to the VBV inlet.

(a) Tighten the saddle clamp to 52.25 in-lb (5.9 N·m) - 57.75 in-lb (6.5 N·m).

SUBTASK 71-21-04-860-003-G00

(5) Apply the firewall sealant (Figure 403).

(a) Clean the surfaces of the aft edge of the strut pad and the shroud 5 segment.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(b) For the left thrust link [1], apply sealant, A00160, to the aft edge of the left strut pad and the shroud 5 segment.

NOTE: The sealant, A00160, is to be flush between adjacent surfaces. Apply parting agent to shroud surfaces prior applying sealant.

(c) For the right thrust link [1], apply sealant, A00160, to the aft edge of the right strut pad and the shroud 1 segment.

NOTE: The sealant, A00160, is to be flush between adjacent surfaces. Apply parting agent to shroud surfaces prior applying sealant.

SUBTASK 71-21-04-090-001-G00

(6) Move an engine and strut access platform, STD-653, away from the engine.

SUBTASK 71-21-04-410-001-G00

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.

(7) 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 71-21-04-860-002-G00

(8) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

THRUST LINKS - INSPECTION/CHECK

1. General

A. This procedure has these tasks:

(1) Thrust Links Visual Inspection

(2) Thrust Links Detailed Inspection.

TASK 71-21-04-210-801-G00

2. Thrust Links Visual Inspection

(Figure 601)

A. General

(1) This task gives the instructions to do a visual inspection of the thrust links.

(2) The thrust links are installed between the inner fan frame and the aft engine mount.

(3) This task is used when the engine is off-wing.

B. References

Reference	Title
71-00-02-000-801-G00	Power Plant - Removal (P/B 401)
71-00-02-400-801-G00	Power Plant - Installation (P/B 401)
71-21-04-000-801-G00	Thrust Links Removal (P/B 401)
71-21-04-400-801-G00	Thrust Links Installation (P/B 401)

C. Prepare for the Inspection

SUBTASK 71-21-04-020-002-G00

(1) Do this task: Power Plant - Removal, TASK 71-00-02-000-801-G00.

D. Thrust Links Visual Inspection

SUBTASK 71-21-04-210-001-G00

(1) Examine the thrust links for damage:

NOTE: If damage is found on the thrust link, refer to the Structure Repair Manual for the allowable damage limits.

(a) Cracks are not permitted.

(b) Nicks are not permitted.

(c) Dents are not permitted.

(d) Scratches are not permitted.

(e) Pitting is not permitted.

(f) Fretting is not permitted.

NOTE: Fretting is caused when two adjacent pieces of metal rub one another.

(g) Pickup is not permitted.

NOTE: Pickup occurs when material is moved from one surface to a surface which it touches.

(h) High metal is not permitted.

NOTE: High metal is metal which is pushed above the surface adjacent to scratches or other damage.

(i) Bushing movement is not permitted.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

SUBTASK 71-21-04-210-002-G00

(2) Examine the thrust link for worn areas.

(a) If you find signs of wear on the thrust links, do this task: TASK 71-21-04-211-801-G00.

SUBTASK 71-21-04-210-003-G00

(3) If damage is found on the thrust link, refer to the Structure Repair Manual for the allowable damage limits.

(a) Replace the thrust link, if it is more than the allowable damage limits.

1) Do this task: TASK 71-21-04-000-801-G00.

2) Do this task: TASK 71-21-04-400-801-G00.

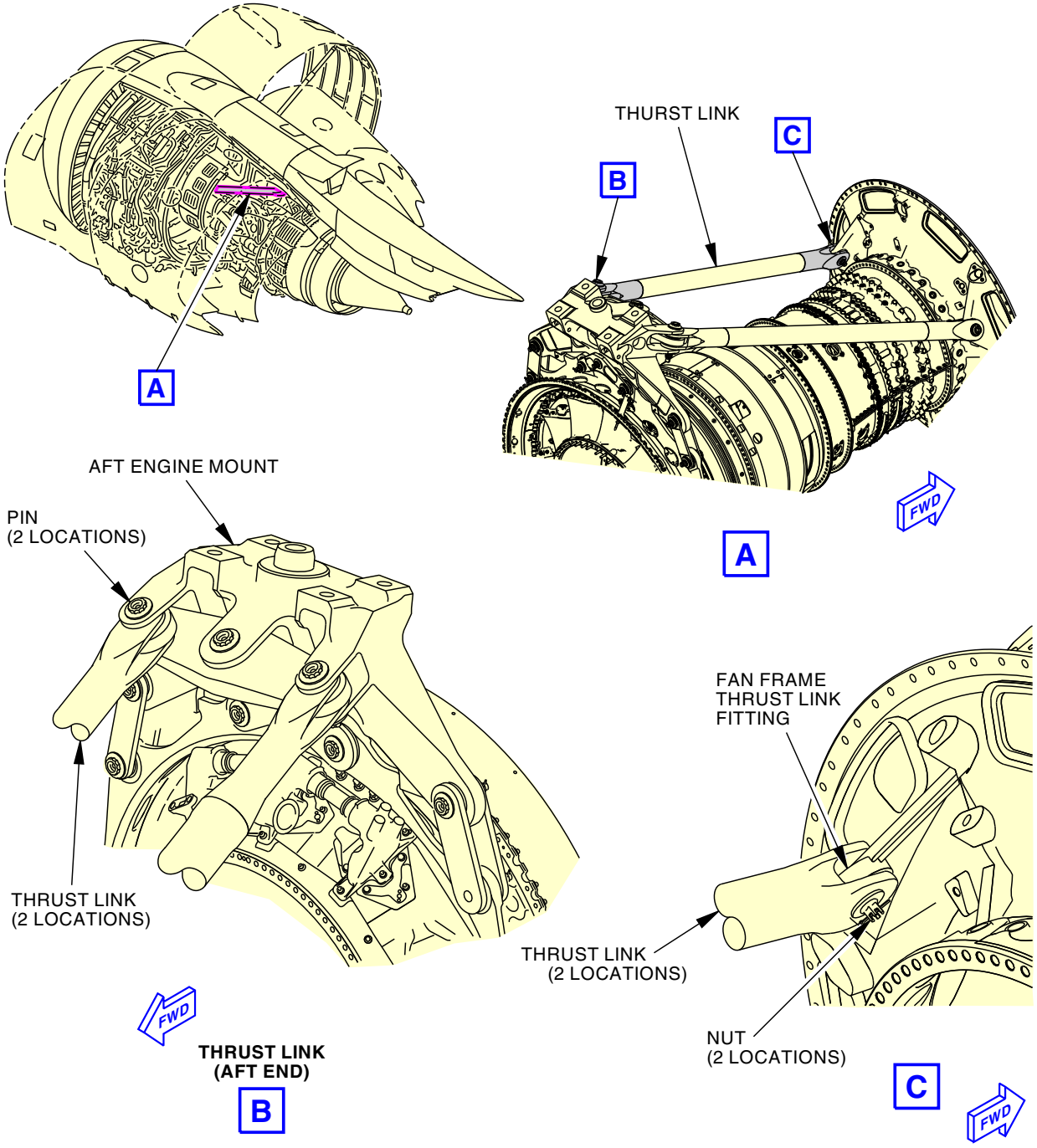
E. Put the Airplane Back to Its Usual Condition

SUBTASK 71-21-04-420-002-G00

(1) Do this task: Power Plant - Installation, TASK 71-00-02-400-801-G00.

——— END OF TASK ———

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Thrust Link Inspection
Figure 601/71-21-04-990-803-G00

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TASK 71-21-04-211-801-G00

3. Thrust Links Detailed Inspection

(Figure 602)

A. General

(1) This task gives the instructions to do a detailed inspection of the thrust link.

(2) You do this task after you remove the thrust link.

B. References

Reference	Title
71-00-02-000-801-G00	Power Plant - Removal (P/B 401)
71-00-02-400-801-G00	Power Plant - Installation (P/B 401)
71-21-04-000-801-G00	Thrust Links Removal (P/B 401)
71-21-04-400-801-G00	Thrust Links Installation (P/B 401)

C. Prepare for the Inspection

SUBTASK 71-21-04-020-003-G00

(1) Do this task: Power Plant - Removal, TASK 71-00-02-000-801-G00.

D. Thrust Links Detailed Inspection

SUBTASK 71-21-04-211-001-G00

(1) Do a check of the thrust link for worn areas as follows:

NOTE: If you find worn areas on the thrust link, refer to Component Maintenance Manual for wear limits and repair instructions.

(a) Examine the areas where the thrust links attach points to the aft and forward engine mount on the engine compressor case.

1) Examine the bearing and bearing balls are free of damage.

2) Examine the bushings are free of damage.

3) Examine the bolts are free of damage.

4) Examine the shoulder bolts are free of damage.

5) Examine the fittings are free of damage.

6) Make sure that they are free of damage and attached correctly.

(b) If you find the component attach points are more than the wear limits, do the steps that follows (Table 601).

1) Replace the worn component of the thrust links, if it is necessary (TASK 71-21-04-000-801-G00 and TASK 71-21-04-400-801-G00).

Table 601/71-21-04-993-801-G00 Thrust Link Wear Limits

			DIMENSION		WEAR LIMITS (INCHES)
INDEX NO.	PART NAME	DIM.	MIN	MAX	MAXIMUM CLEARANCE
1	BUSHING	ID	-	0.8755	0.0030
	PIN	OD	0.8720	-	

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Table 601/71-21-04-993-801-G00 Thrust Link Wear Limits (Continued)

			DIMENSION		WEAR LIMITS (INCHES)
INDEX NO.	PART NAME	DIM.	MIN	MAX	MAXIMUM CLEARANCE
2	BUSHING	ID	-	1.1904	0.0052
	PIN BUSHING	OD	1.1826	-	
3	BUSHING	ID	-	1.0025	0.0040
	PIN	OD	0.9965	-	

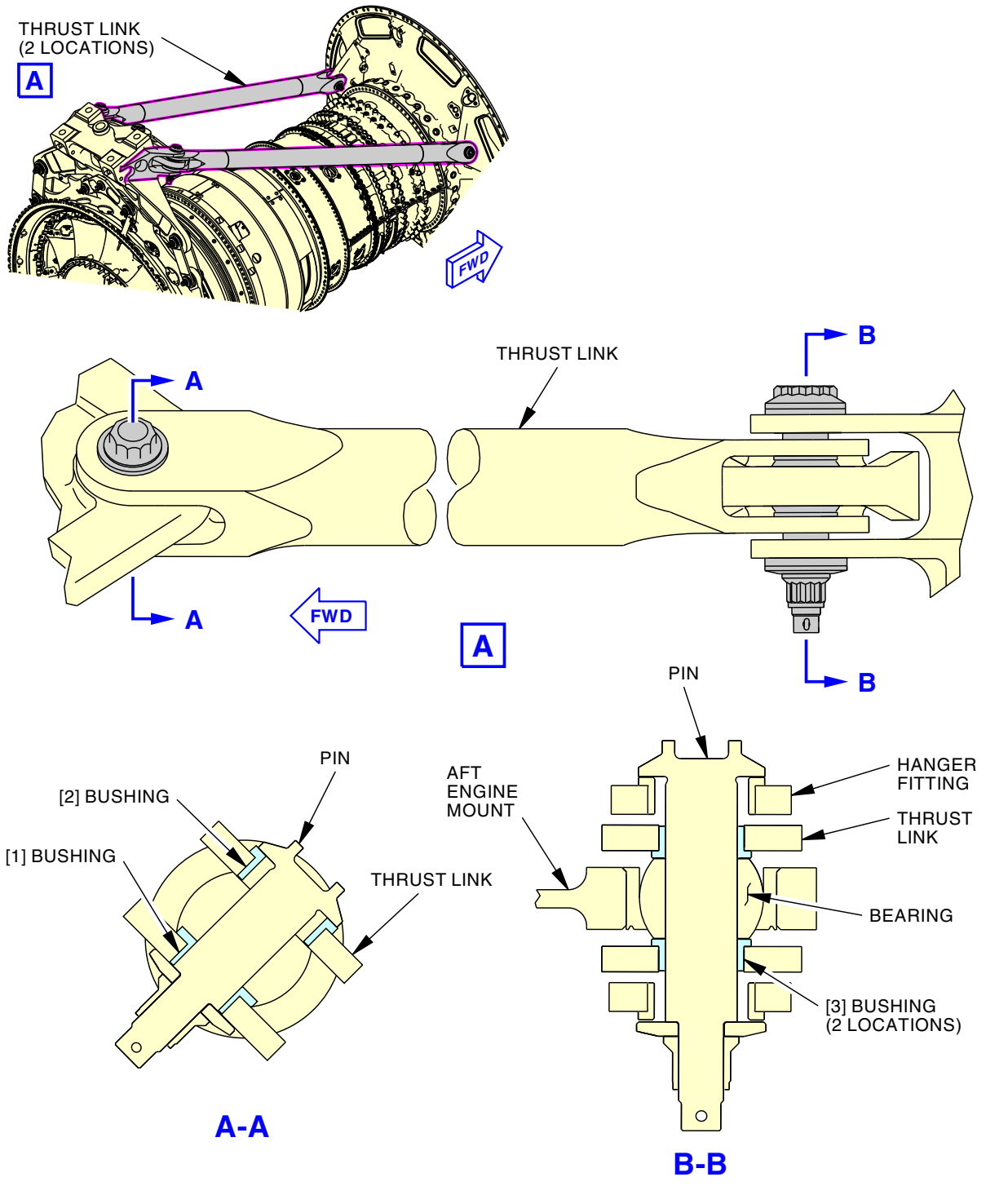
E. Put the Airplane Back to Its Usual Condition

SUBTASK 71-21-04-420-003-G00

(1) Do this task: Power Plant - Installation, TASK 71-00-02-400-801-G00.

——— END OF TASK ———

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Thrust Link Inspection
Figure 602/71-21-04-990-804-G00

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ENGINE VENTS AND DRAINS - INSPECTION/CHECK

1. General

A. This procedure has one task:

(1) Engine Vents and Drains Inspection.

TASK 71-71-00-200-801-G00

2. Engine Vents and Drains Inspection

(Figure 601 or Figure 602)

A. General

(1) This task gives the instructions to do the inspection of all engine vents and drains for leakage.

(2) This task contains data that lets you get an estimate of the condition of the Line Replaceable Unit (LRU) when you look at the rate of leakage from the engine vent and drain system.

(3) The leakage rate for the different drains is determined under the conditions as follows:

(a) Operation of the engine at minimum idle to monitor the fuel or oil leakage from the vents and drains.

(b) Operation of the engine at part power to isolate and monitor the oil leakage of specific accessory gearbox seals.

B. References

Reference	Title
24-11-00-700-801	IDG Oil System Static Leak Check (P/B 201)
24-11-11-000-801	Integrated Drive Generator (IDG) Removal (P/B 401)
24-11-11-400-801	Integrated Drive Generator (IDG) Installation (P/B 401)
29-00-00-790-801	Hydraulic System External Leakage Check (P/B 601)
70-00-04-000-801-G00	Preformed Packing Seal and Packing Retainer Removal (P/B 201)
70-00-04-400-801-G00	Preformed Packing Seal and Packing Retainer Installation (P/B 201)
71-00-00-710-801-G00	Test No. 5 - Part Power Leak Check (P/B 501)
71-00-00-730-802-G00	Test No. 15 - Actuator Operational Test (P/B 501)
71-00-00-790-803-G00	Test No. 3 - Wet Motor Leak Test (P/B 501)
71-00-00-790-804-G00	Test No. 4 - Idle Leak Test (P/B 501)
71-00-00-800-802-G00	Engine Operation Limits (P/B 201)
71-00-02-000-801-G00	Power Plant - Removal (P/B 401)
71-00-02-400-801-G00	Power Plant - Installation (P/B 401)
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)
72-64-01-000-801-G00	Accessory Gearbox Rotating Seals Removal (P/B 401)
72-64-01-400-801-G00	Accessory Gearbox Rotating-Seals Installation (P/B 401)
73-11-01-000-801-G00	Main Fuel Pump Removal (P/B 401)
73-11-01-400-801-G00	Main Fuel Pump Installation (P/B 401)
75-23-02-000-801-G00	Left Modulated Turbine Cooling (MTC) Valve Removal (P/B 401)
75-23-02-000-802-G00	Right Modulated Turbine Cooling (MTC) Valve Removal (P/B 401)

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(Continued)

Reference	Title
75-23-02-400-801-G00	Left Modulated Turbine Cooling (MTC) Valve Installation (P/B 401)
75-23-02-400-802-G00	Right Modulated Turbine Cooling (MTC) Valve Installation (P/B 401)
75-24-01-000-801-G00	Low Pressure Turbine Active Clearance Control (LPTACC) Valve Removal (P/B 401)
75-24-01-400-801-G00	Low Pressure Turbine Active Clearance Control (LPTACC) Valve Installation (P/B 401)
75-24-04-000-801-G00	High Pressure Turbine Active Clearance Control (HPTACC) Valve Removal (P/B 401)
75-24-04-400-801-G00	High Pressure Turbine Active Clearance Control (HPTACC) Valve Installation (P/B 401)
75-31-02-000-801-G00	Left Variable Stator Vane (VSV) Actuator Removal (P/B 401)
75-31-02-000-802-G00	Right Variable Stator Vane (VSV) Actuator Removal (P/B 401)
75-31-02-400-802-G00	Left Variable Stator Vane (VSV) Actuator Installation (P/B 401)
75-31-02-400-803-G00	Right Variable Stator Vane (VSV) Actuator Installation (P/B 401)
75-32-01-000-801-G00	Left Variable Bleed Valve Actuator Removal (P/B 401)
75-32-01-000-802-G00	Right Variable Bleed Valve Actuator Removal (P/B 401)
75-32-01-400-802-G00	Left Variable Bleed Valve Actuator Installation (P/B 401)
75-32-01-400-803-G00	Right Variable Bleed Valve Actuator Installation (P/B 401)
75-33-01-000-801-G00	Transient Bleed Valve Removal (P/B 401)
75-33-01-400-801-G00	Transient Bleed Valve Installation (P/B 401)
78-11-03-210-801-G00	Center Vent Tube Extension (CVTE) Inspection (P/B 601)
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)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)
79-00-00-200-804-G00	Drain Tubes Inspection and Cleaning (P/B 601)
79-00-00-220-801-G00	Engine Oil System (Oil Debris Monitoring System Sensor (ODMS), Scavenge Screen Plugs, Starter Magnetic Plug, and Oil Filter) Detailed Dimensional Check (P/B 601)
79-11-03-000-801-G00	Oil Tank Filler Cap Removal (P/B 401)
79-11-03-400-801-G00	Oil Tank Filler Cap Installation (P/B 401)
79-21-04-211-801-G00	Scavenge Screen Plug Inspection (P/B 201)
79-21-17-000-801-G00	Oil Eductor Valve Removal (P/B 401)
79-21-17-400-801-G00	Oil Eductor Valve 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-20664	Fixture - Leak Check Part #: 956A3624G01 Supplier: 58828
STD-203	Container - Oil Resistant, 1 U.S.-Gal (3.8 l)
STD-858	Tag - DO NOT OPERATE

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D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. 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

F. Prepare for the Inspection

SUBTASK 71-71-00-860-001-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

G. Engine Vents and Drains Inspection

SUBTASK 71-71-00-210-003-G00

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 OPEN THE OIL SYSTEM UNTIL THE PRESSURE GOES TO ZERO. THE PRESSURE GOES TO ZERO APPROXIMATELY 5 MINUTES AFTER AN ENGINE STOPS. A PRESSURIZED OIL SYSTEM CAN RELEASE A SPRAY OF HOT OIL THAT CAN BURN YOU.

WARNING DO NOT LET HOT OIL GET ON YOU. PUT ON CLOTHES, GOGGLES, AND OTHER EQUIPMENT FOR PROTECTION, OR LET THE ENGINE BECOME COOL. HOT OIL CAN BURN YOU.

WARNING DO NOT GET FUEL OR OIL ON YOUR SKIN. REMOVE THE FUEL OR OIL FROM YOUR SKIN IMMEDIATELY. IF YOU LET FUEL OR OIL STAY ON YOUR SKIN, IT CAN CAUSE INJURIES TO YOUR SKIN.

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(WARNING PRECEDES)

CAUTION DO NOT LET OIL GET ON THE ENGINE OR OTHER COMPONENTS. IMMEDIATELY CLEAN THE OIL WHEN IT FALLS ON THEM. OIL CAN CAUSE DAMAGE TO EQUIPMENT.

(1) Do a general visual inspection of the following engine drains and vents:

NOTE: You must identify the origin of the leak and do the corrective action for leakage which is not water.

(a) Inlet exhaust and inlet drain holes (Figure 601 (Sheet 1)).

1) Serviceable limit: 0

2) Corrective action:

a) Refer to the topic “Engine Vents and Drains Leakage Limits and Corrective Action” below for the threshold and serviceable limits.

(b) Fan cowl drain holes and starter exhaust vents (Figure 601 (Sheet 2)).

1) Serviceable limit: 0

a) The fan cowl drain holes and the starter exhaust vents do not have limits. Any flammable fluids need to be addressed in these location as there are ignition sources present in the fan compartment. Fuel leaks in particular must be inspected to ensure the integrity of the fuel supply system is maintained. Suction fuel feed capability must not be compromised (no fuel leakage is allowed from the fuel supply line).

2) Corrective action:

a) Refer to the topic “Engine Vents and Drains Leakage Limits and Corrective Action” below for the threshold and serviceable limits.

(c) Lower bifurcation drain scuppers and thrust reverser fan sleeve static ground drain (Figure 601 (Sheet 3))

1) Serviceable limit: 0

2) Corrective action:

a) Refer to the topic “Engine Vents and Drains Leakage Limits and Corrective Action” below for the threshold and serviceable limits.

(d) Main core compartment drains (Figure 601 (Sheet 3)).

1) Serviceable limit: 0

a) The main core compartment drain holes do not have explicit leakage limits. Flammable fluids need to be addressed in this location as there are ignition sources present in the core compartment.

2) Corrective action:

a) Refer to the topic “Engine Vents and Drains Leakage Limits and Corrective Action” below for the threshold and serviceable limits.

(e) Thrust reverser translating sleeve cowl drain No. 1 forward latch (Figure 601 (Sheet 3)).

NOTE: Water and hydraulic fluid may drain from the No. 1 forward latch drain.

1) Serviceable limit: 0

2) Corrective action:

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a) Refer to the topic “Engine Vents and Drains Leakage Limits and Corrective Action” below for the threshold and serviceable limits.

(f) Dry bay condensate drains (Figure 601 (Sheet 4)).

1) Serviceable limit: 0

2) Corrective action:

a) Refer to the topic “Engine Vents and Drains Leakage Limits and Corrective Action” below for the threshold and serviceable limits.

(g) Aft fairing compartment drain and aft fairing drain tube (Figure 601 (Sheet 5)).

1) Serviceable limits:

a) The aft fairing compartment drain directs fluid from the aft fairing compartment and out through a gap between the trailing edge fitting and the drain tube, which are concentric. Sources of flammable fluids coming out of the aft fairing compartment drains should be inspected. Use leakage limits for said components, for example, fuel tank and hydraulic tubing leaks.

b) The aft fairing drain tube drains fluid from the aft upper strut (strut to wing leakage zone) as well as the wing leading edge (adjacent to the engine). Any fuel leaking from the aft fairing drain tube must be inspected to ensure the integrity of the fuel supply system is maintained. Suction fuel feed capability must not be compromised (no fuel leakage is allowed from the fuel supply line).

2) Corrective action:

a) Refer to the topic “Engine Vents and Drains Leakage Limits and Corrective Action” below for the threshold and serviceable limits.

(h) Turbine case drain tubes (Figure 601 (Sheet 5)).

1) Serviceable limits:

a) The turbine case drains collect and drain flammable fluids from the engine core compartment and the engine core. Fuel leakage at the turbine case drains is expected following a wet motor procedure or if there is a no-light event where residual fuel from the engine core will drain through Turbine Rear Vane (TRV) drains into turbine case drains. If the engine has not experienced a recent wet motor maintenance task or aborted no-light off event, inspect for fluid leaks in engine core compartment.

2) Corrective action:

a) Refer to the topic “Engine Vents and Drains Leakage Limits and Corrective Action” below for the threshold and serviceable limits.

SUBTASK 71-71-00-210-002-G00

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 OPEN THE OIL SYSTEM UNTIL THE PRESSURE GOES TO ZERO. THE PRESSURE GOES TO ZERO APPROXIMATELY 5 MINUTES AFTER AN ENGINE STOPS. A PRESSURIZED OIL SYSTEM CAN RELEASE A SPRAY OF HOT OIL THAT CAN BURN YOU.

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(WARNING PRECEDES)

WARNING DO NOT LET HOT OIL GET ON YOU. PUT ON CLOTHES, GOGGLES, AND OTHER EQUIPMENT FOR PROTECTION, OR LET THE ENGINE BECOME COOL. HOT OIL CAN BURN YOU.

WARNING DO NOT GET FUEL OR OIL ON YOUR SKIN. REMOVE THE FUEL OR OIL FROM YOUR SKIN IMMEDIATELY. IF YOU LET FUEL OR OIL STAY ON YOUR SKIN, IT CAN CAUSE INJURIES TO YOUR SKIN.

CAUTION DO NOT LET OIL GET ON THE ENGINE OR OTHER COMPONENTS. IMMEDIATELY CLEAN THE OIL WHEN IT FALLS ON THEM. OIL CAN CAUSE DAMAGE TO EQUIPMENT.

(2) Do the visual inspection of the engine drain masts as follows:

(a) Do this task: Open the Fan Cowl Panels (Selection), TASK 71-11-04-010-801-G00.

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

(b) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-G00.

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

(c) Do a check of the fan drain mast [2] for signs of leakage (Figure 602 (Sheet 4) and Figure 602 (Sheet 5)).

(d) Do a check of the core drain mast [1] for sign of leakage (Figure 602 (Sheet 1), Figure 602 (Sheet 2) and Figure 602 (Sheet 3)).

1) When the engine starts, oil leakage at the core drain mast may be observed (very cold weather, engine not operated recently, or recently installed). These leaks are permitted if they stop after five minutes of engine idle run.

2) At engine shutdown, oil leakage from the sumps at the core drain mast may be observed.

a) Even if these leaks exceed the serviceable limit (given in 2.H.(6) and 2.H.(7)), they are permitted as long as they stop before 15 minutes and the total volume of oil is not more than 20 cc (20 ml), cumulated on all oil core drains, in case of multiple leakage sources.

<1> If the leak continues for more than fifteen minutes after engine shutdown or if the total volume of oil exceeds 20 cc (20 ml), refer to 2.G.(2).(i).

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b) It is permitted to continue operation for 5 flight cycles prior assessing the duration and volume of the oil leakage provided the 3 following conditions are met:

- oil leak is coming only from C-Sump drain
- oil consumption is below the troubleshooting limit of 0.36 qt (0.34 l) per flight hour (TASK 71-00-00-800-802-G00)
- there is no active oil leak or fumes or fogs from core drain mast at idle.

3) The following leakage rate limits apply to engines that are not operated and engines that are operated at all power settings.

SIA ALL; PRE LEAP-1B SERVICE BULLETIN 72-0180

NOTE: The markings on the drain mast are as follow:

- A-SUMP 1R: drain line from the A-Sump for the N°1 Roller Bearing
- A-SUMP 2R: drain line from the A-Sump for the N°3 Roller Bearing
- LRU CORE LEFT: drain line for the LRUs located on the left hand side of the engine
- LRU CORE RIGHT: drain line for the LRUs located on the right hand side of the engine
- AUX: drain line from the Turbine Center Frame (TCF)
- B-SUMP: drain line from the B-Sump
- C-SUMP: drain line from the C-Sump

SIA ALL; POST LEAP-1B SERVICE BULLETIN 72-0180

NOTE: The markings on the drain mast are as follow:

- A-S1: drain line from the A-Sump for the N°1 Roller Bearing
- A-S3: drain line from the A-Sump for the N°3 Roller Bearing
- LRU-L: drain line for the LRUs located on the left hand side of the engine
- LRU-R: drain line for the LRUs located on the right hand side of the engine
- AUX: drain line from the TCF
- B-S: drain line from the B-Sump
- C-S: drain line from the C-Sump.

SIA ALL

(e) If there are no signs of leakage, the engine is serviceable.

(f) Refer to the topic “Engine Vents and Drains Leakage Limits and Corrective Action” below for the threshold and serviceable limits.

1) For fuel leaks:

a) If the total leakage rate from the drains is less than the threshold limit, you can continue to operate the engine.

NOTE: Maintenance action is not necessary.

b) If the total leakage rate from the drains is more than the threshold limit, but less than the serviceable limit, corrective action must be done before 25 flight cycles.

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c) If the total leakage rate from the drains is more than the serviceable limit, you must do the corrective action.

2) For oil leaks:

a) If the leakage rate is less than the serviceable limit, you can continue to operate the engine.

b) If the leakage rate is more than the threshold limit, but less than the serviceable limit, you can continue to operate the engine until maintenance can be done.

c) If the leakage rate is more than the serviceable limit, maintenance must be done before you operate the engine again.

3) For hydraulic leaks:

a) If the total leakage rate from the strut drain is more than the serviceable limit, you must do the corrective action.

(g) If there is a sign of leakage from the fan drain mast [2], identify the origin of the leak as follows:

NOTE: These steps are not necessary if the fuel leakage rate is less than the threshold limit for the fan drain mast.

1) Put the 1 U.S.-gal (3.81 l) oil resistant container, STD-203, below the fan drain mast [2].

2) Install an oil and fuel resistant bottle to each drain line at the fan drain mast [2].

a) Make sure that the bottle is sealed.

3) Do this task: Test No. 4 - Idle Leak Test, TASK 71-00-00-790-804-G00.

a) Record the time of the engine start.

b) Run the engine at idle power for 5 minutes.

4) Monitor the drain for drops of oil or fuel.

5) Calculate the total engine operation time.

6) Identify leaks origin with the placard installed on oil tank (Figure 602 (Sheet 5) and Figure 602 (Sheet 6)).

7) Record the number of drops.

8) Change the number of drops per minute to cc's per hour.

NOTE: 20 drops equal to approximately one cc.

a) For example: 20 drops per minute x 60 = 1200 drops per hour / 20 = 60 cc's per hour.

9) Refer to the topic "Engine Vents and Drains Leakage Limits and Corrective Action" for the permitted leakage rate for the component.

(h) If there is a sign of leakage from the Integrated Drive Generator (IDG) drain pad (Figure 602 (Sheet 5)), identify the source of the leak as follows:

1) Do this task: IDG Oil System Static Leak Check, TASK 24-11-00-700-801.

NOTE: If there is a static leak, the leakage is from the IDG input shaft seal. If there is no static leak, the leakage is from the Accessory Gear Box (AGB) pad seal.

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(i) If there is a sign of leakage from the core drain mast [1], identify the origin of the leak as follows:

NOTE: These steps are not necessary if the fuel leakage rate is less than the threshold limit for the core drain mast.

1) Install the leak check fixture, SPL-20664, as an option to collect oil in case of leaks.
   a) Put the test tube holder on a work table and put all seven test tubes in each of the grommets of the rack.
   b) Install the tube holder in the rack on the top of the test tubes and tightly attach it with knobs.
   c) Identify the drain master and each of the collecting tubes with the diameter in table below:

Table 601/71-71-00-993-802-G00 Collecting Tubes Diameters

Drain Mast Tube	Diameter	Collecting Tube
A-SUMP 1R	0.3125 in. (7.9 mm)	4
A-SUMP 3R	0.3125 in. (7.9 mm)	4
LRU CORE LEFT	0.3125 in. (7.9 mm)	4
LRU CORE RIGHT	0.3125 in. (7.9 mm)	4
AUX.	0.41 in. (10.4 mm)	4
B-SUMP	0.41 in. (10.4 mm)	5
C-SUMP	0.44 in. (11.2 mm)	5

CAUTION MAKE SURE THAT THE O-RINGS DO NOT HAVE DAMAGES AND INSTALLATION IS CORRECT. IF YOU DO NOT OBEY, DAMAGE TO EQUIPMENT CAN OCCUR.

   d) Put each collecting tube into the related drain master tube until they touch the core drain mast [1].
   e) Put the rack below the core drain mast [1].
      <1> Make sure that the rack points in the FWD direction.
   f) Put the hoses into the holder in the related test tube.
      <1> Make sure that the marks on the core drain mast [1] match with the marks on the holder.
2) Install an oil and fuel resistant bottle to each drain line or at the core drain mast [1].
   a) Make sure that the bottle is sealed.
3) Do this task: Test No. 4 - Idle Leak Test, TASK 71-00-00-790-804-G00.
   a) Record the time of the engine start.
   b) Run the engine at idle power for 5 minutes.
4) Monitor the drain for drops of oil or fuel.
5) If the leak stops or is within acceptable limits, the engine is serviceable.
6) Calculate the total engine operation time.
7) Identify leaks origin with the number written and identification on drain mast (Figure 602 (Sheet 7) or Figure 602 (Sheet 8)).

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8) Record the number of drops or volume inside tooling tubes.

9) Change the number of drops per minute to cc's per hour.

NOTE: 20 drops equal to approximately one cc.

a) For example: 20 drops per minute x 60 = 1200 drops per hour / 20 = 60 cc's per hour.

10) Refer to the topic "Engine Vents and Drains Leakage Limits and Corrective Action" for the permitted leakage rate for the component.

11) If the leakage rate is more than the permitted limits:

a) If the leakage comes from the Engine Fuel equipment Left side or Right side, do these steps to identify leakage origin:

<1> Do this task: Test No. 15 - Actuator Operational Test, TASK 71-00-00-730-802-G00.

<2> Do an engine run at idle for 5 minutes.

<3> If the leak stops or is within acceptable limits, the engine is serviceable.

<4> If leaks does not stop and stay above the serviceable limit, do these steps:

<a> Open the left and right thrust reversers (TASK 78-31-00-010-801-G00).

<b> Refer to (Figure 602 (Sheet 9)) for the left LRU fuel drain leakage.

<c> Refer to Figure 602 (Sheet 10) for the right LRU fuel drain leakage.

H. Engine Vents, Drains, and Drain Masts Leakage Limits and Corrective Action

SUBTASK 71-71-00-220-001-G00

(1) Fuel drainage from core drain mast [1].

(a) Fluid: Fuel.

(b) Threshold limit: 180 cc/hr (60 drops per minute).

1) If the leakage is less than the threshold limit, no maintenance action is necessary.

2) If the leakage is more than the threshold limit and less than the serviceable limit, you can continue the engine in service for not more than 25 flight cycles before you replace the applicable component.

(c) Serviceable limit: 270 cc/hr (90 drops per minute).

(d) Replace the applicable component:

1) For the left Variable Stator Vane Actuator (VSVA), these are the tasks:

Left Variable Stator Vane (VSV) Actuator Removal, TASK 75-31-02-000-801-G00,

Left Variable Stator Vane (VSV) Actuator Installation, TASK 75-31-02-400-802-G00.

2) For the right VSVA, these are the tasks:

Right Variable Stator Vane (VSV) Actuator Removal, TASK 75-31-02-000-802-G00,

Right Variable Stator Vane (VSV) Actuator Installation, TASK 75-31-02-400-803-G00.

3) For the left VSVA, these are the tasks:

Left Variable Bleed Valve Actuator Removal, TASK 75-32-01-000-801-G00,

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Left Variable Bleed Valve Actuator Installation, TASK 75-32-01-400-802-G00.

4) For the right VSVA, these are the tasks:

Right Variable Bleed Valve Actuator Removal, TASK 75-32-01-000-802-G00,

Right Variable Bleed Valve Actuator Installation, TASK 75-32-01-400-803-G00.

5) For the Transient Bleed Valve (TBV), these are the tasks:

Transient Bleed Valve Removal, TASK 75-33-01-000-801-G00,

Transient Bleed Valve Installation, TASK 75-33-01-400-801-G00.

6) For the left Modulated Turbine Cooling (MTC) valve, these are the tasks:

Left Modulated Turbine Cooling (MTC) Valve Removal, TASK 75-23-02-000-801-G00,

Left Modulated Turbine Cooling (MTC) Valve Installation, TASK 75-23-02-400-801-G00.

7) For the right MTC valve, these are the tasks:

Right Modulated Turbine Cooling (MTC) Valve Removal, TASK 75-23-02-000-802-G00,

Right Modulated Turbine Cooling (MTC) Valve Installation, TASK 75-23-02-400-802-G00.

8) For the High Pressure Turbine Active Clearance Control (HPTACC) valve, these are the tasks:

High Pressure Turbine Active Clearance Control (HPTACC) Valve Removal, TASK 75-24-04-000-801-G00,

High Pressure Turbine Active Clearance Control (HPTACC) Valve Installation, TASK 75-24-04-400-801-G00.

9) For the Low Pressure Turbine Active Clearance Control (LPTACC) valve, these are the tasks:

Low Pressure Turbine Active Clearance Control (LPTACC) Valve Removal, TASK 75-24-01-000-801-G00,

Low Pressure Turbine Active Clearance Control (LPTACC) Valve Installation, TASK 75-24-01-400-801-G00.

SUBTASK 71-71-00-220-002-G00

(2) Engine oil drain system fan drain mast [2].

(a) Fluid: Oil.

(b) Serviceable limit: 20 cc/hr (7 drops per minute).

(c) Replace the applicable component:

1) Do these steps to replace the AGB rotating seal of the applicable pad for the fuel pump, hydraulic pump, hand cranking pad, or IDG:

Accessory Gearbox Rotating Seals Removal, TASK 72-64-01-000-801-G00,

Accessory Gearbox Rotating-Seals Installation, TASK 72-64-01-400-801-G00.

SUBTASK 71-71-00-220-003-G00

(3) Hydraulic drain system.

(a) Fluid: Hydraulic fluid.

(b) For the limits of the hydraulic engine-driven pump (TASK 29-00-00-790-801).

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SUBTASK 71-71-00-220-004-G00

(4) IDG input shaft seal and IDG cooling system.

(a) Fluid: Oil.

(b) Serviceable Limit: 1 cc/hr.

(c) For the IDG input shaft seal, replace the IDG (TASK 24-11-11-000-801 and TASK 24-11-11-400-801).

(d) For the IDG cooling system, repair or replace the components as it is necessary.

SUBTASK 71-71-00-220-006-G00

(5) Oil Tank Scupper.

(a) Fluid: Oil.

(b) Serviceable limit: Oil that flows from the oil tank servicing only.

(c) Corrective action:

1) Make sure that the oil tank cap is installed correctly.

2) Make sure that there is no oil leakage when you service the oil tank.

3) Make sure that there is no damage to the oil tank cap O-ring.

a) If there is damage to the O-ring, replace the oil tank cap O-ring (TASK 70-00-04-000-801-G00 and TASK 70-00-04-400-801-G00).

4) Make sure that there is no damage to the oil tank cap.

a) If there is damage to the oil tank cap, replace the oil tank cap (TASK 79-11-03-000-801-G00 and TASK 79-11-03-400-801-G00).

SUBTASK 71-71-00-220-007-G00

(6) A-Sump.

(a) Fluid: Oil.

(b) Serviceable limit: 40 cc/h for the A-Sump 1R and A-Sump 3R together.

(c) Continue-In-Service (C-I-S) limit: 540 cc/h for each A-Sump 1R and A-Sump 3R.

1) If the leak is less than the serviceable limit, no maintenance action is necessary.

2) If the leak at IDLE is more than the serviceable limit and less than the C-I-S limit with all the following conditions, then you can continue the engine in service for 150 cycles:

a) If cumulative oil leak (from A-Sump, B-Sump, C-Sump and Aux drains) is below 540 cc/h at IDLE.

b) If oil consumption is within serviceable limit (TASK 71-00-00-800-802-G00).

c) If there is no leak above 40 cc/h during stabilized high power (operate the engine at minimum of 70 percent N1 for 10 minutes (TASK 71-00-00-710-801-G00)).

NOTE: If there is a leak above 40 cc/h during stabilized high power or if leak rate increases at IDLE after stabilized high power (compared to first measurement at IDLE, see 2.G.(2).(i), contact CFM.

<1> Perform the following maintenance inspections within these 150 cycles:

<a> Oil filter cartridge inspection (TASK 79-00-00-220-801-G00).

<b> Drain tubes inspection (TASK 79-00-00-200-804-G00).

<c> Scavenge Screen Plug Inspection, TASK 79-21-04-211-801-G00.

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<d> Center Vent Tube Extension (CVTE) Inspection, TASK 78-11-03-210-801-G00.

<e> Do a check of the eductor air valve pop-out window to verify the position of the valve.

NOTE: If the pop-out is closed and you cannot read OPEN on the pop-out, it is necessary to replace the oil eductor valve (TASK 79-21-17-000-801-G00 and TASK 79-21-17-400-801-G00).

<2> After these 150 cycles, measure the leak again.

<3> If the leak at IDLE is more than the serviceable limit and less than the C-I-S limit with all the following conditions, then you can continue the engine in service for 150 cycles:

<a> If cumulative oil leak (from A-Sump, B-Sump, C-Sump and Aux drains) is below 540 cc/h at IDLE.

<b> If oil consumption is within serviceable limit (TASK 71-00-00-800-802-G00).

<c> If there is no leak above 40 cc/h during stabilized high power (operate the engine at minimum of 70 percent N1 for 10 minutes (TASK 71-00-00-710-801-G00)).

NOTE: If there is a leak above 40 cc/h during stabilized high power or if leak rate increases at IDLE after stabilized high power (compared to first measurement at IDLE, see 2.G.(2).(i), contact CFM.

<4> Perform the following maintenance inspections within these 150 cycles:

<a> Drain tubes inspection (TASK 79-00-00-200-804-G00).

<b> Center Vent Tube Extension (CVTE) Inspection, TASK 78-11-03-210-801-G00.

<5> After these 150 cycles, measure the leak again and apply recommendation in 2.H.(6) (c) 2) c) steps <3> to <5>.

3) If the leak is more than the C-I-S limit, contact CFM.

(d) Corrective action:

1) Replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

SUBTASK 71-71-00-220-008-G00

(7) B-Sump, C-Sump and Aux.

(a) Fluid: Oil.

(b) Serviceable limit : 80 cc/h for the B-Sump, C-Sump and Aux together.

(c) Continue-In-Service (C-I-S) limit: 540 cc/h for each B-Sump, C-Sump, and Aux.

1) If the leak is less than the serviceable limit, no maintenance action is necessary.

2) If the leak at IDLE is more than the serviceable limit and less than the C-I-S limit with all the following conditions, then you can continue the engine in service for 150 cycles:

a) If cumulative oil leak (from A-Sump, B-Sump, C-Sump and Aux drains) is below 540 cc/h at IDLE.

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b) If oil consumption is within serviceable limit (TASK 71-00-00-800-802-G00).

c) If there is no leak above 80 cc/h during stabilized high power (operate the engine at minimum of 70 percent N1 for 10 minutes (TASK 71-00-00-710-801-G00)).

NOTE: If there is a leak above 80 cc/h during stabilized high power or if leak rate increases at IDLE after stabilized high power (compared to first measurement at IDLE, see 2.G.(2).(i), contact CFM.

<1> Perform the following maintenance inspections within these 150 cycles:

<a> Oil filter cartridge inspection (TASK 79-00-00-220-801-G00).

<b> Drain tubes inspection (TASK 79-00-00-200-804-G00).

<c> Scavenge Screen Plug Inspection, TASK 79-21-04-211-801-G00.

<d> Center Vent Tube Extension (CVTE) Inspection, TASK 78-11-03-210-801-G00.

<e> Do a check of the eductor air valve pop-out window to verify the position of the valve.

NOTE: If the pop-out is closed and you cannot read OPEN on the pop-out, it is necessary to replace the oil eductor valve (TASK 79-21-17-000-801-G00 and TASK 79-21-17-400-801-G00).

<2> After these 150 cycles, measure the leak again.

<3> If the leak at IDLE is more than the serviceable limit and less than the C-I-S limit with all the following conditions, then you can continue the engine in service for 150 cycles:

<a> If cumulative oil leak (from A-Sump, B-Sump, C-Sump and Aux drains) is below 540 cc/h at IDLE.

<b> If oil consumption is within serviceable limit (TASK 71-00-00-800-802-G00).

<c> If there is no leak above 80 cc/h during stabilized high power (operate the engine at minimum of 70 percent N1 for 10 minutes (TASK 71-00-00-710-801-G00)).

NOTE: If there is a leak above 80 cc/h during stabilized high power or if leak rate increases at IDLE after stabilized high power (compared to first measurement at IDLE, see 2.G.(2).(i), contact CFM.

<4> Perform the following maintenance inspections within these 150 cycles:

<a> Drain tubes inspection (TASK 79-00-00-200-804-G00).

<b> Center Vent Tube Extension (CVTE) Inspection, TASK 78-11-03-210-801-G00.

<5> After these 150 cycles, measure the leak again and apply recommendation in 2.H.(7) (c) 2) c) steps <3> to <5>.

3) If the leak is more than the C-I-S limit, contact CFM.

(d) Corrective action:

1) Replace the engine (TASK 71-00-02-000-801-G00 and TASK 71-00-02-400-801-G00).

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SUBTASK 71-71-00-220-009-G00

(8) Service Disconnect (Strut) Drain.

(a) Fluid: Hydraulic fluid.

1) Serviceable limit: 30 cc/hr (10 drops per minute).

2) Corrective action:

a) Find and correct the hydraulic fluid leak, do this task: Hydraulic System External Leakage Check, TASK 29-00-00-790-801.

(b) Fluid: Fuel.

1) Threshold limit: 0 cc/hr.

2) Serviceable limit: 0 cc/hr.

3) Corrective action:

a) Find and correct the fuel leak, do this task: Test No. 3 - Wet Motor Leak Test, TASK 71-00-00-790-803-G00.

SUBTASK 71-71-00-220-010-G00

(9) Aft fairing drain.

(a) Fluid: Hydraulic fluid.

1) Serviceable limit: 30 cc/hr (10 drops per minute).

2) Corrective action:

a) Find and correct the hydraulic fluid leak, do this task: Hydraulic System External Leakage Check, TASK 29-00-00-790-801.

(b) Fluid: Fuel.

1) Threshold limit: 180 cc/hr (60 drops per minute).

a) If the leakage is less than the threshold limit, no maintenance action is necessary.

b) If the leakage is more than the threshold limit and less than the serviceable limit, you can continue the engine in service for not more than 25 flight cycles before you replace the applicable component.

NOTE: If fuel is coming from the strut/fuel supply line, you may not dispatch and the leak must be corrected.

2) Serviceable limit: 270 cc/ hr (90 drops per minute).

3) Corrective action:

a) Find and correct the fuel leak, do this task: Test No. 3 - Wet Motor Leak Test, TASK 71-00-00-790-803-G00.

SUBTASK 71-71-00-220-011-G00

(10) Fuel pump pad drain.

NOTE: Leakage from the drain of the Main Fuel Pump can be fuel or oil.

(a) Fluid: Oil.

1) Serviceable limit: 20 cc/hr (7 drops per minute).

2) Replace the applicable component:

a) Do these steps to replace the AGB rotating seal of the applicable pad for the fuel pump, hydraulic pump, hand cranking pad, or IDG:

Accessory Gearbox Rotating Seals Removal, TASK 72-64-01-000-801-G00,

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Accessory Gearbox Rotating-Seals Installation, TASK 72-64-01-400-801-G00.

(b) Fluid: Fuel.

1) Threshold limit: 180 cc/hr (60 drops per minute).

a) If the leakage is less than the threshold limit, no maintenance action is necessary.

b) If the leakage is more than the threshold limit and less than the serviceable limit, you can continue the engine in service for not more than 25 flight cycles before you replace the applicable component.

2) Serviceable limit: 270 cc/ hr (90 drops per minute).

3) Do these steps to replace the main fuel pump:

Main Fuel Pump Removal, TASK 73-11-01-000-801-G00,

Main Fuel Pump Installation, TASK 73-11-01-400-801-G00.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-71-00-840-001-G00

(1) Remove the leak check fixture, SPL-20664.

(a) Remove the hoses from the holder in the test tubes.

(b) Remove collecting tubes from the drain master tubes.

(c) Remove tubes holder from the rack.

SUBTASK 71-71-00-420-001-G00

(2) If it is necessary, re-install and tighten the witness tee-nut(s) to 145 in-lb (16 N·m).

SUBTASK 71-71-00-860-003-G00

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.

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.

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SUBTASK 71-71-00-860-004-G00

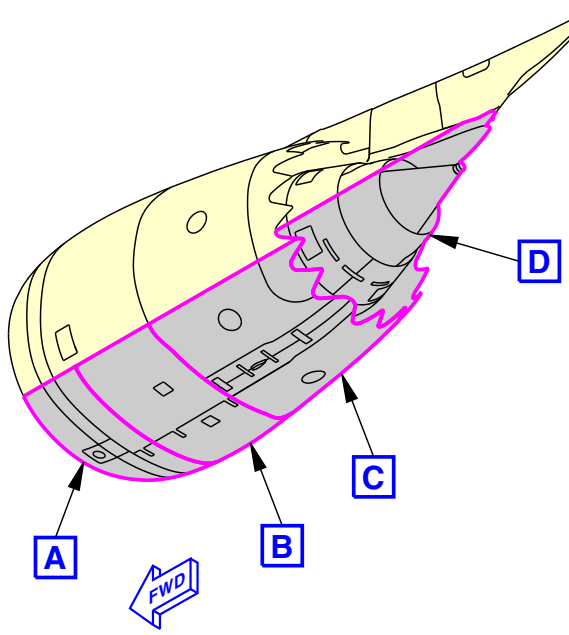
(4) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

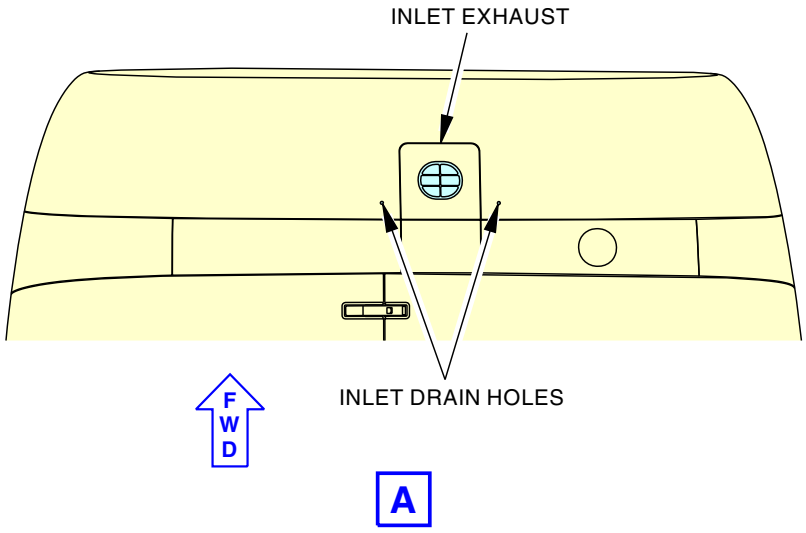
(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

END OF TASK

ECCN 9E991 BOEING PROPRIETARY - See title page for details

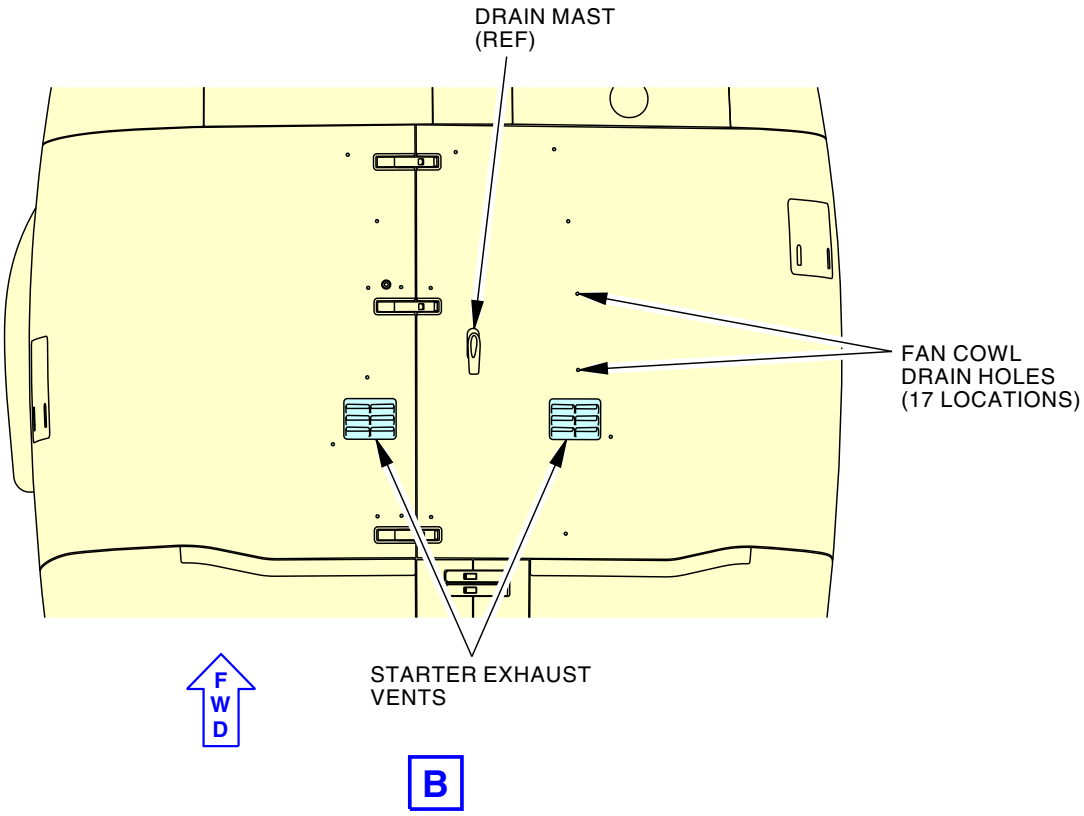




2955627 S0000732783_V1

Engine Drains and Vents Inspection
Figure 601/71-71-00-990-804-G00 (Sheet 1 of 5)

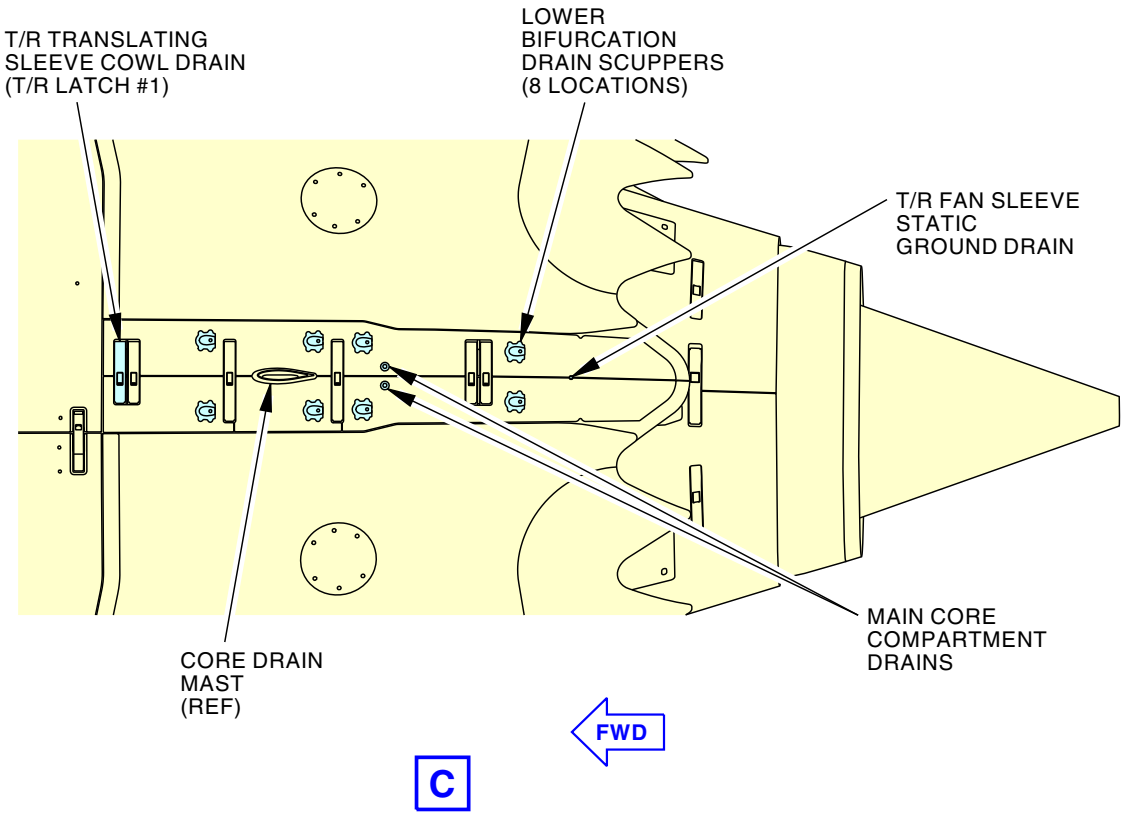
ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Engine Drains and Vents Inspection
Figure 601/71-71-00-990-804-G00 (Sheet 2 of 5)

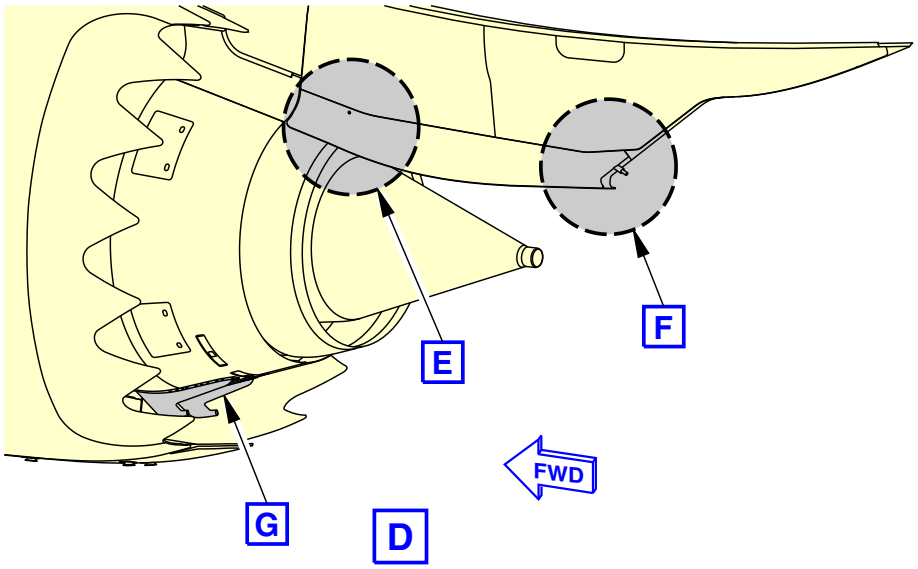
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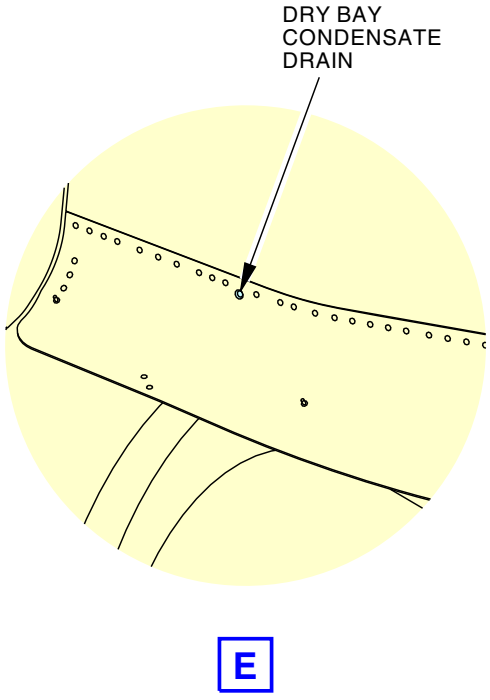


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Engine Drains and Vents Inspection
Figure 601/71-71-00-990-804-G00 (Sheet 3 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

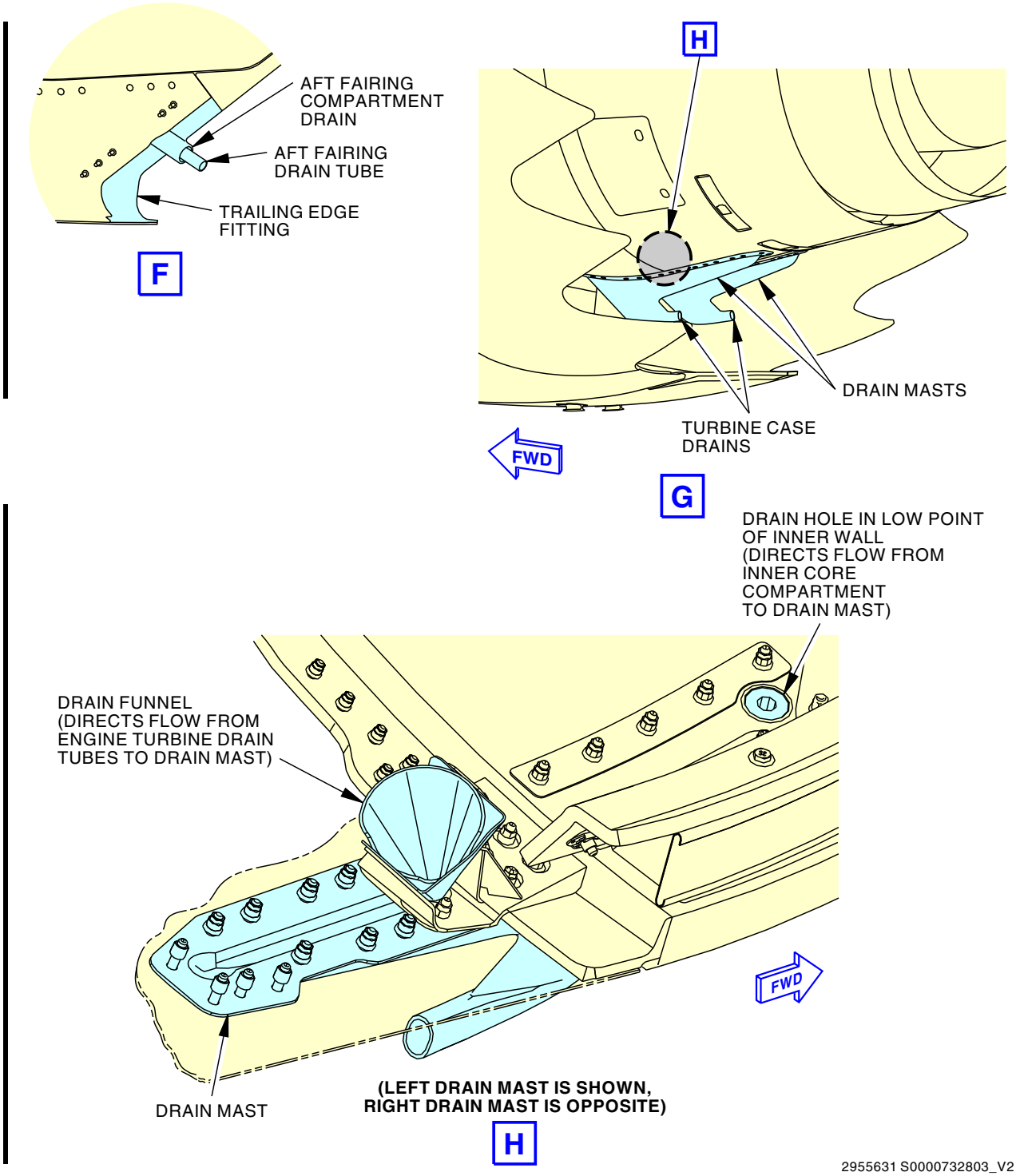




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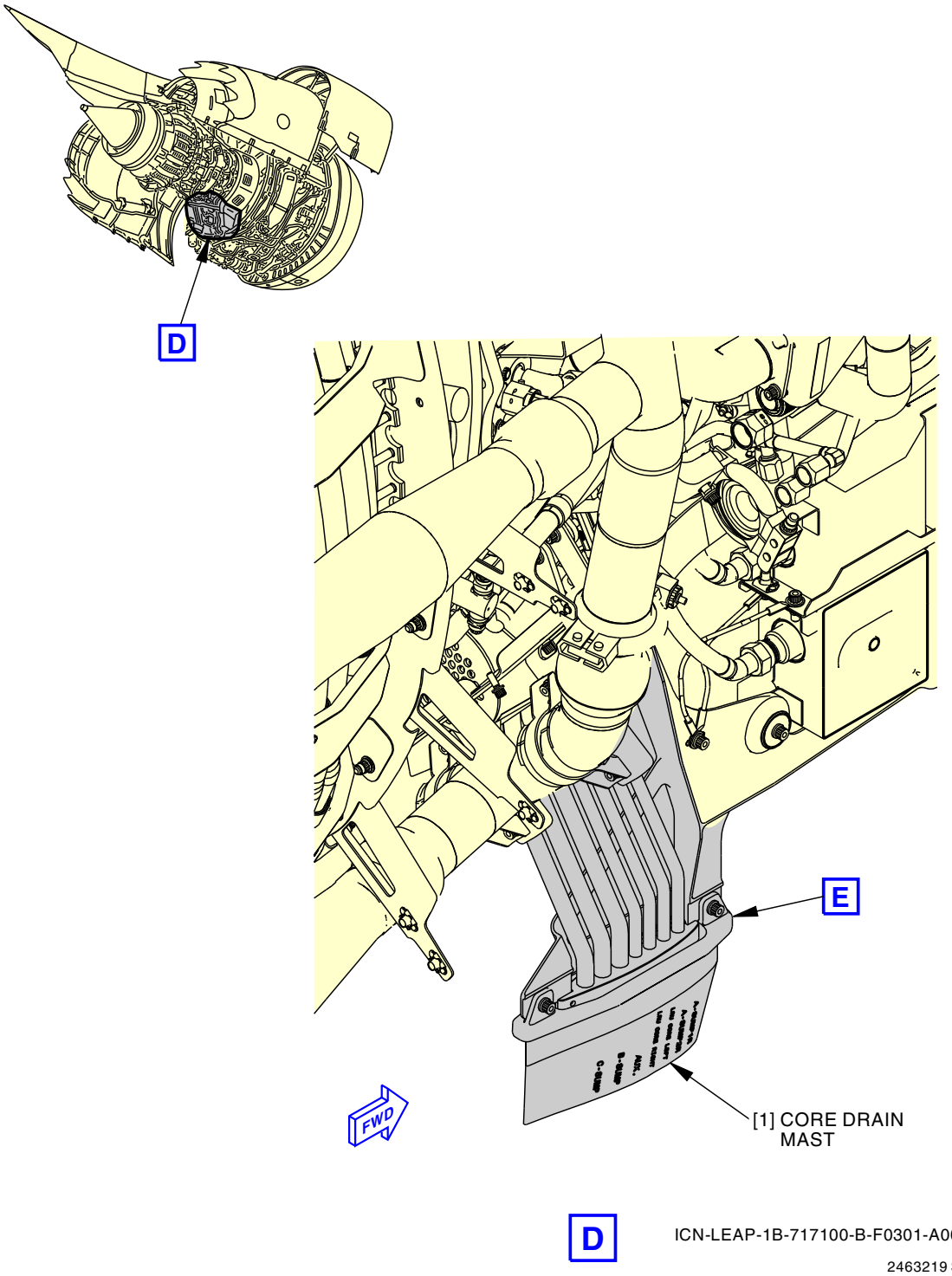
Engine Drains and Vents Inspection
Figure 601/71-71-00-990-804-G00 (Sheet 4 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



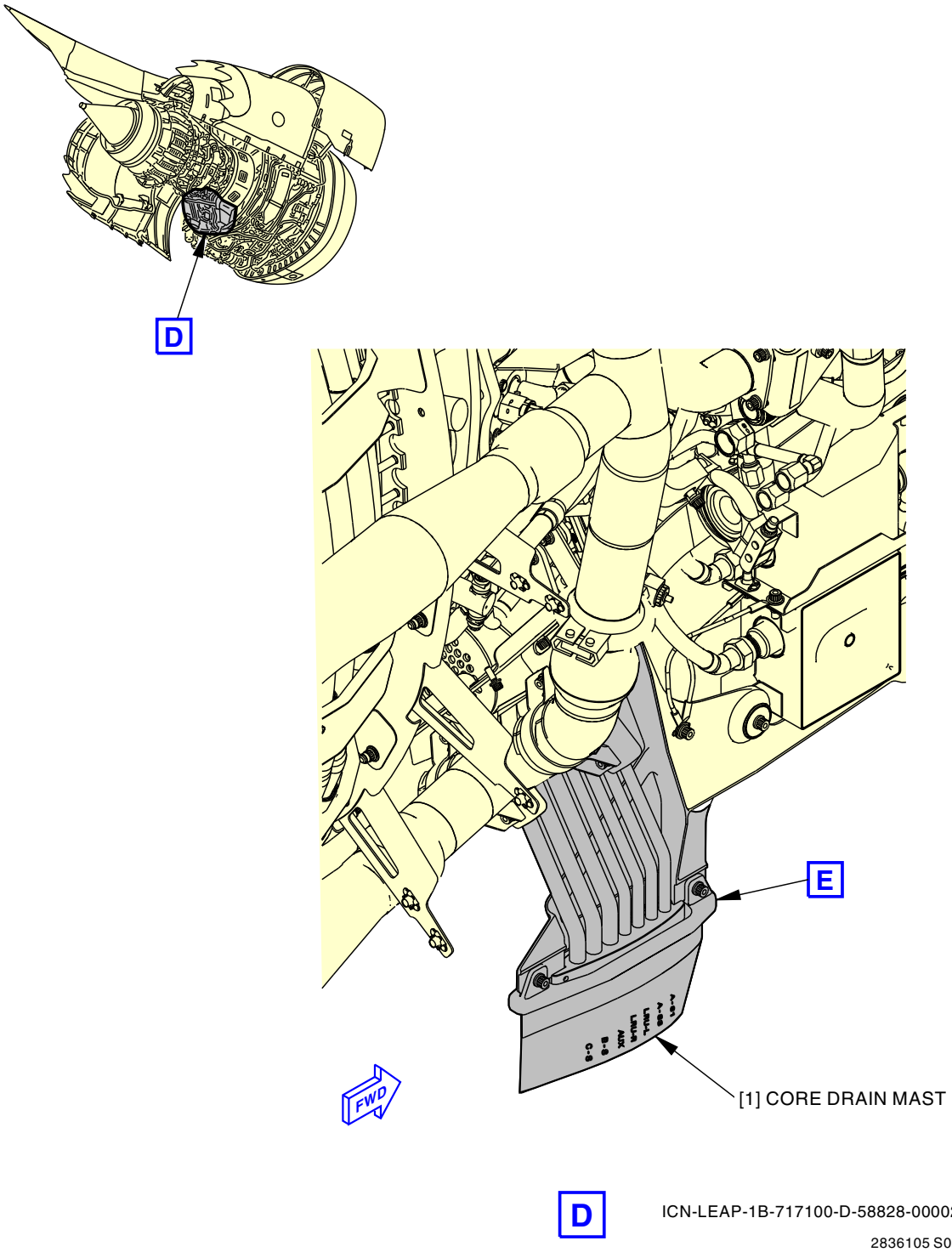
Engine Drains and Vents Inspection
Figure 601/71-71-00-990-804-G00 (Sheet 5 of 5)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



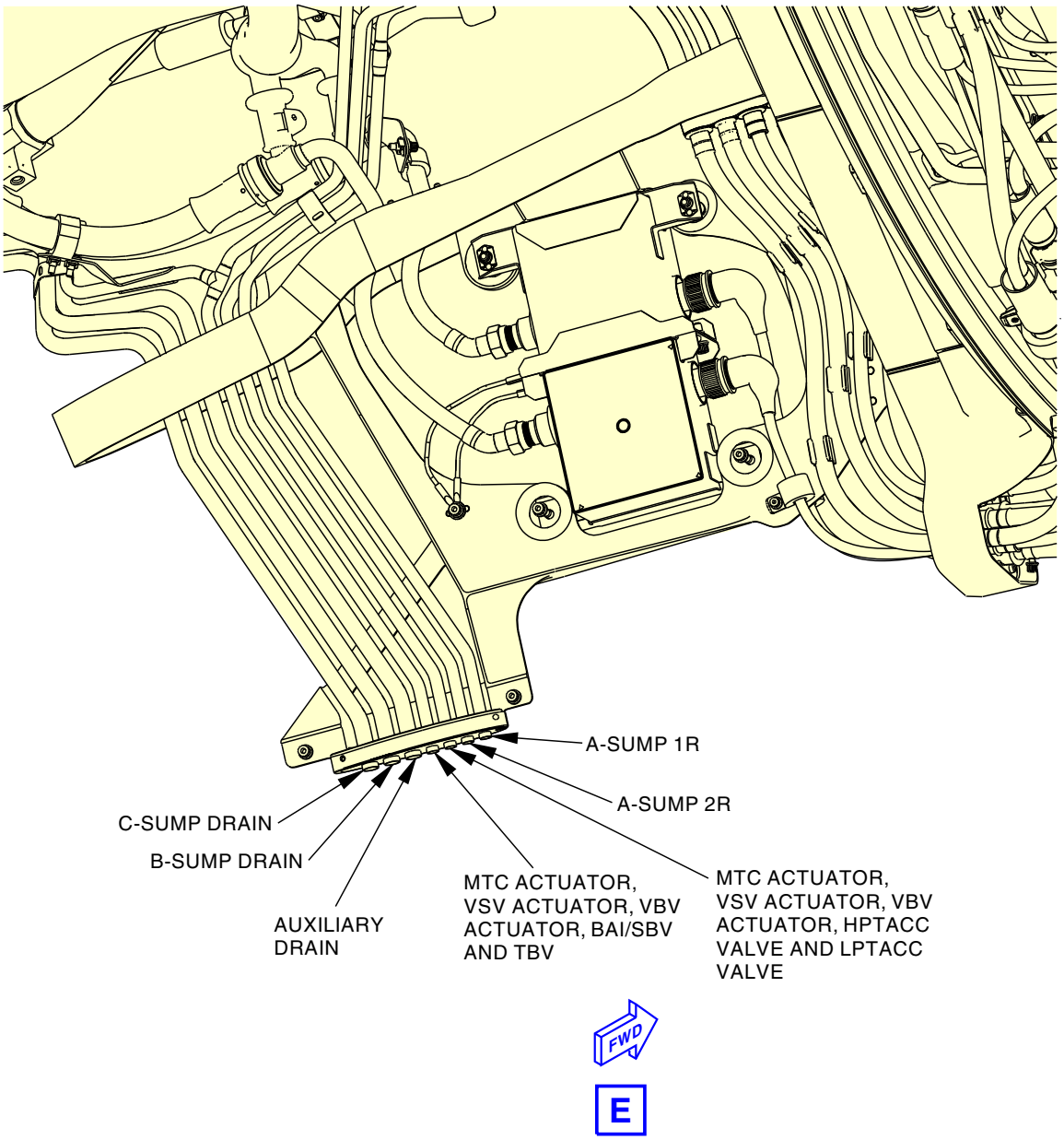
Engine Drain Masts Inspection
Figure 602/71-71-00-990-802-G00 (Sheet 1 of 10)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Engine Drain Masts Inspection
Figure 602/71-71-00-990-802-G00 (Sheet 2 of 10)

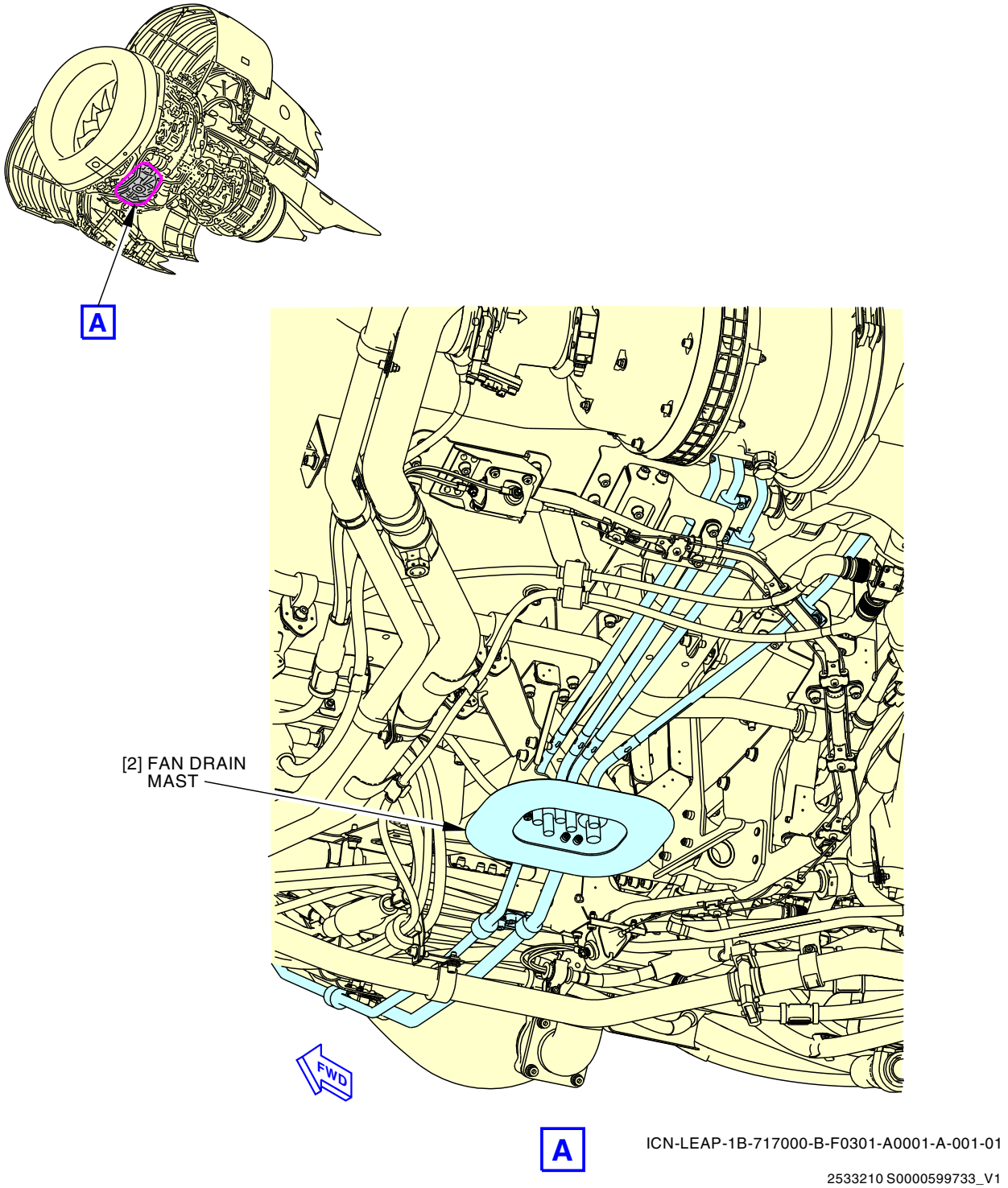
ECCN 9E991 BOEING PROPRIETARY - See title page for details



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2463221 S0000573545_V2

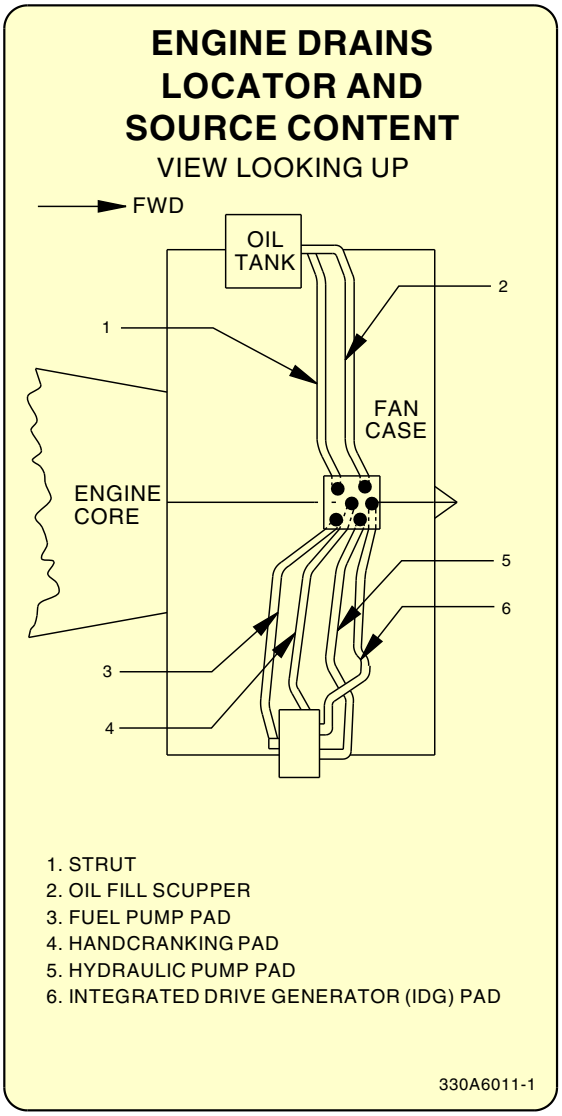
Engine Drain Masts Inspection
Figure 602/71-71-00-990-802-G00 (Sheet 3 of 10)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Engine Drain Masts Inspection
Figure 602/71-71-00-990-802-G00 (Sheet 4 of 10)

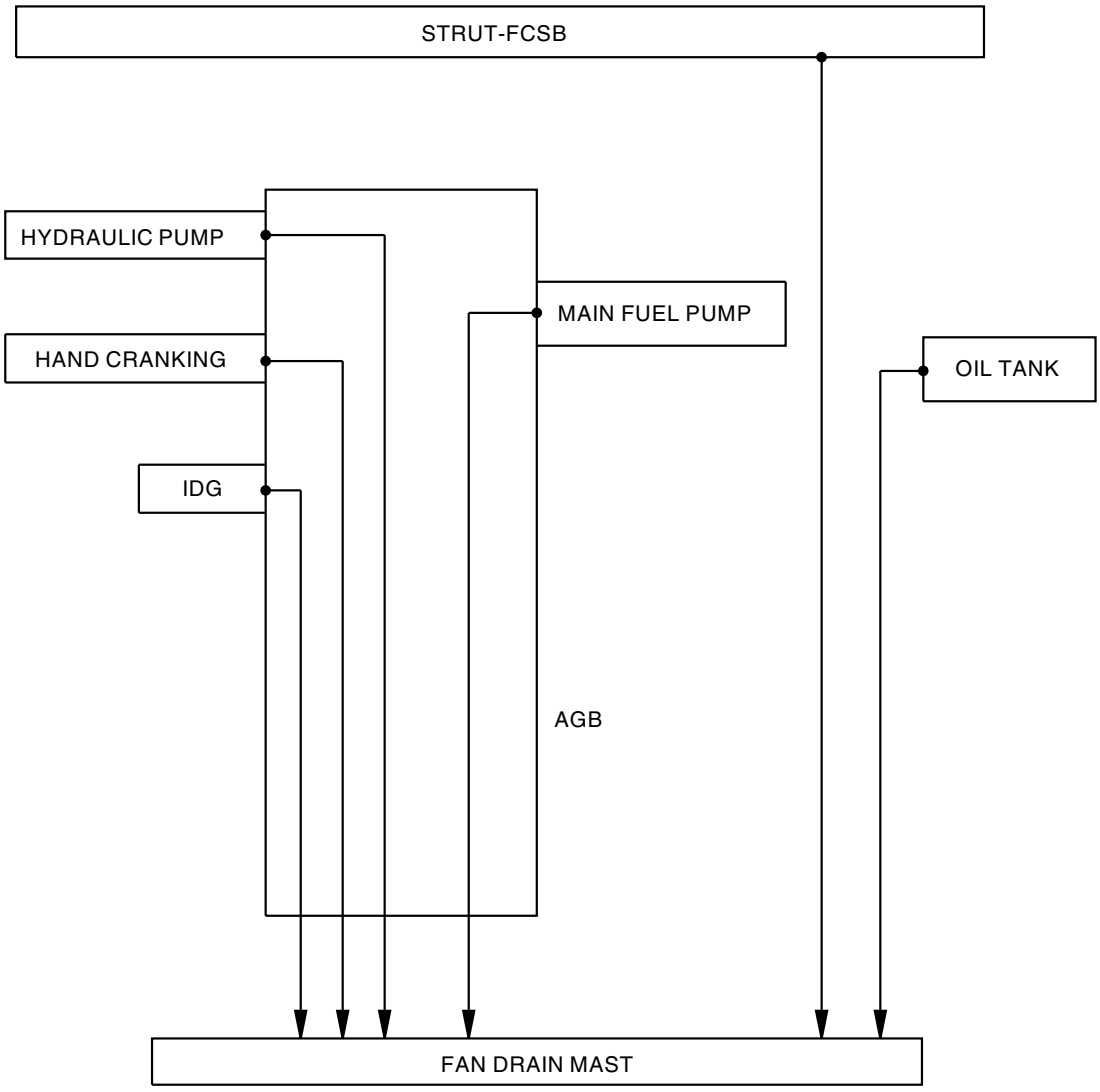
ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Engine Drain Masts Inspection
Figure 602/71-71-00-990-802-G00 (Sheet 5 of 10)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

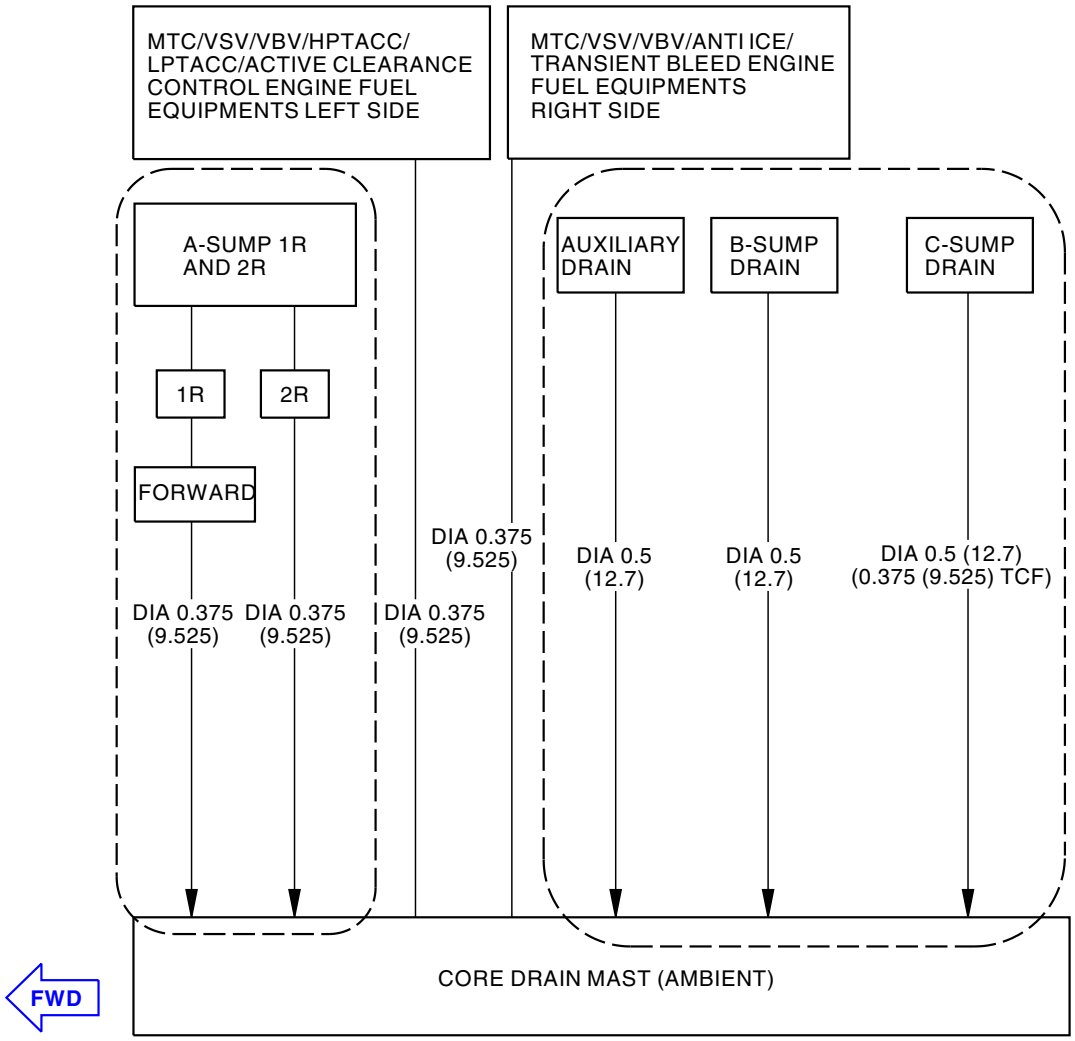


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Engine Drain Masts Inspection
Figure 602/71-71-00-990-802-G00 (Sheet 6 of 10)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



NOTE:

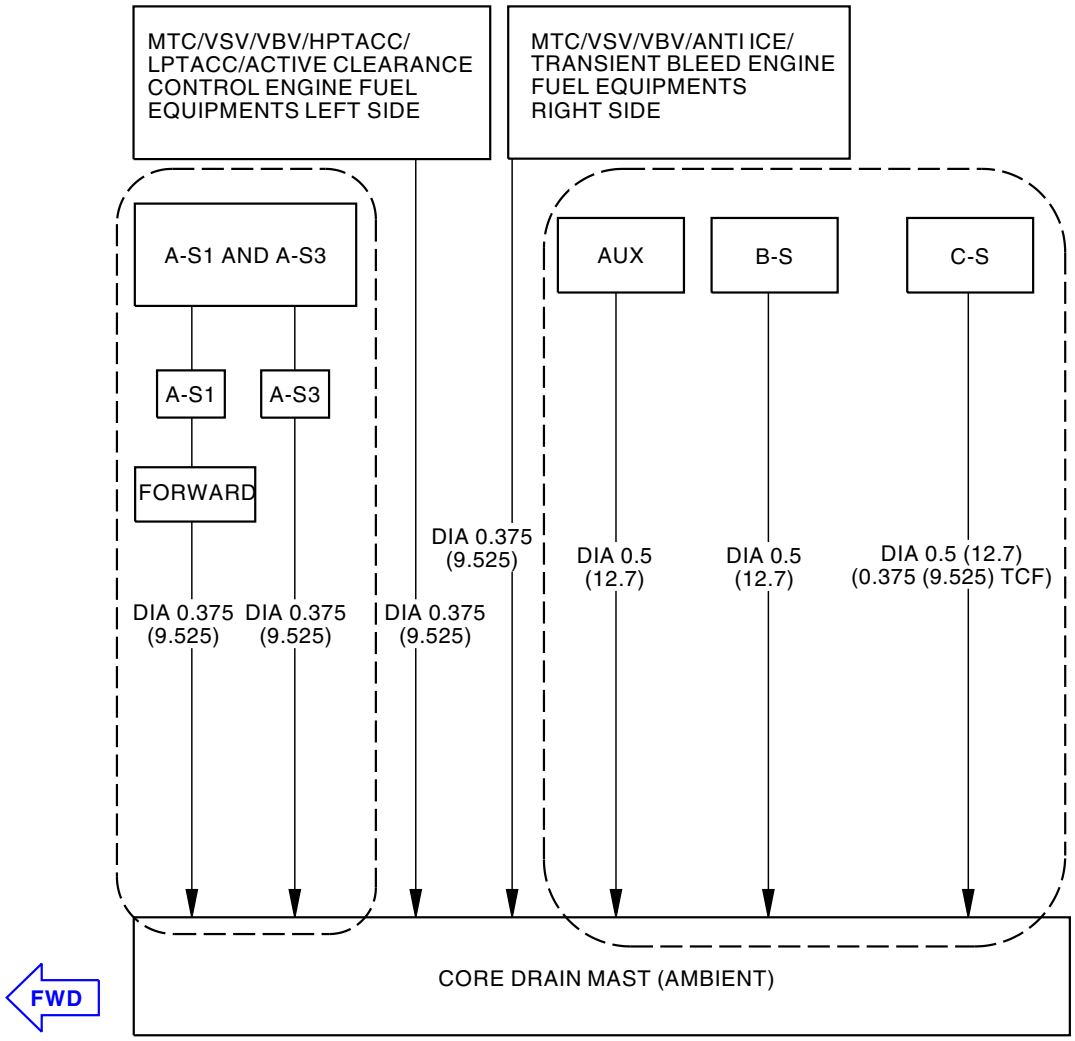
ALL DIMENSIONS ARE IN INCHES
(MILLIMETERS ARE IN PARENTHESES).

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Engine Drain Masts Inspection
Figure 602/71-71-00-990-802-G00 (Sheet 7 of 10)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



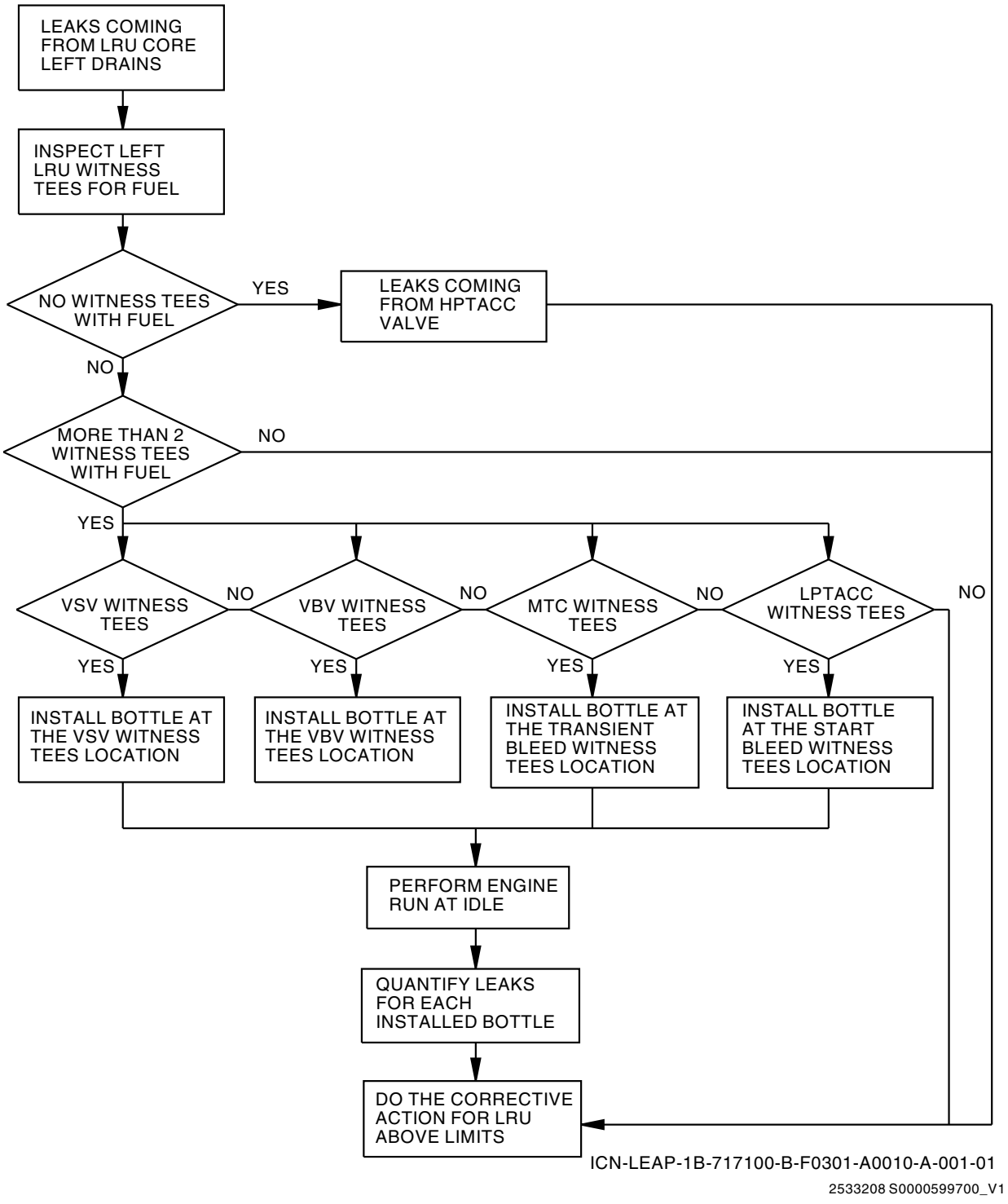
NOTE:

ALL DIMENSIONS ARE IN INCHES
(MILLIMETERS ARE IN PARENTHESES).

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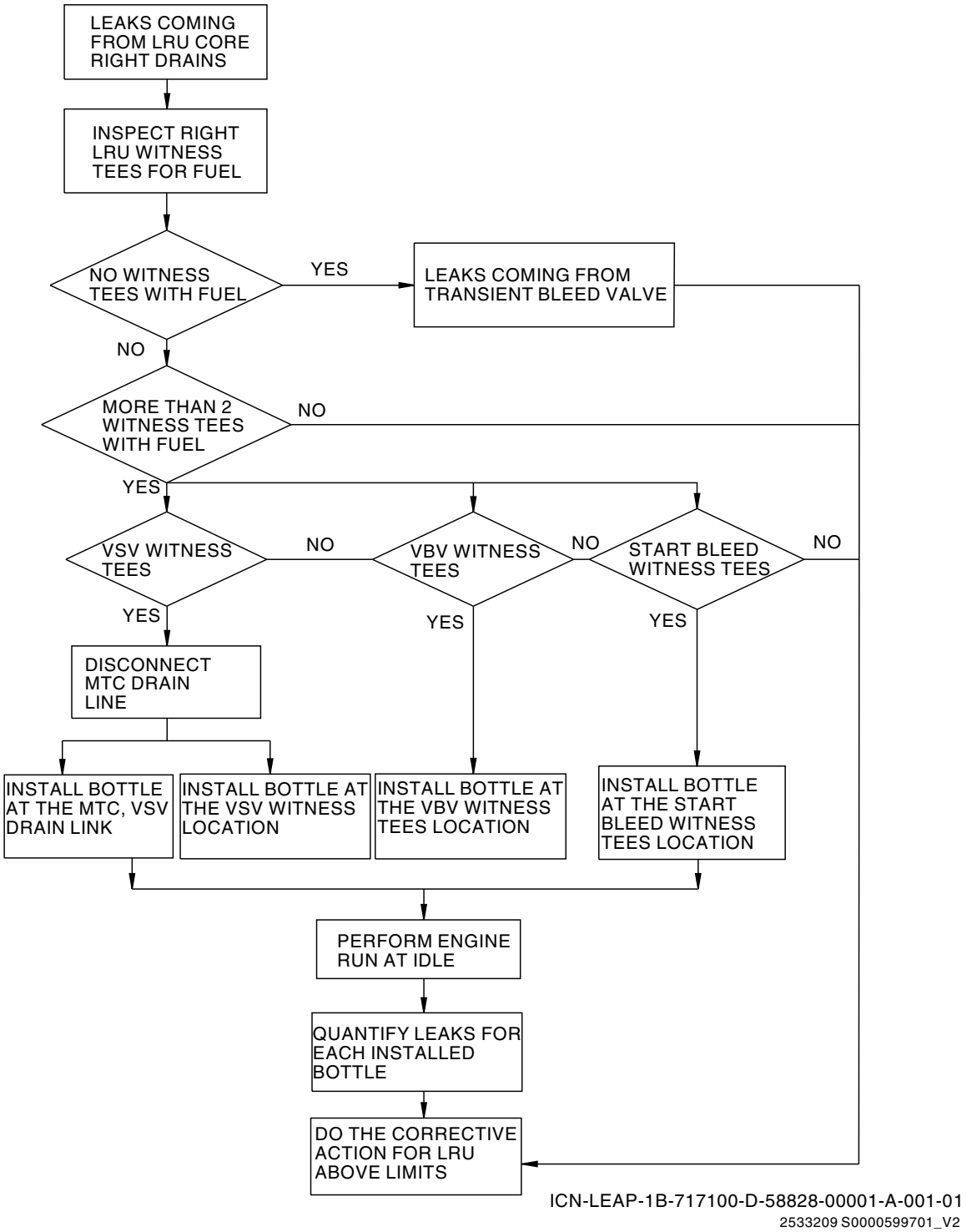
Engine Drain Masts Inspection
Figure 602/71-71-00-990-802-G00 (Sheet 8 of 10)

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Engine Drain Masts Inspection
Figure 602/71-71-00-990-802-G00 (Sheet 9 of 10)

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Engine Drain Masts Inspection
Figure 602/71-71-00-990-802-G00 (Sheet 10 of 10)

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DRAIN MAST - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) Drain mast removal

(2) Drain mast installation.

TASK 71-71-01-000-801-G00

2. Drain Mast Removal

(Figure 401)

A. General

(1) This task provides the instructions on how to remove the drain mast.

B. References

Reference	Title
71-11-04-010-801-G00	Open the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-801-G00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-040-801-G00	Thrust Reverser Deactivation For Ground Maintenance (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

E. 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

F. Prepare for the Removal

SUBTASK 71-71-01-860-001-G00

(1) Do these steps to make sure that the ENGINE START switch and the START LEVER switch are not operated:

(a) Make sure that the applicable ENGINE START switch, on the P5 overhead panel, is in the AUTO or OFF position.

1) Put a DO NOT OPERATE tag, STD-858, on the applicable ENGINE START switch.

(b) Make sure that the applicable START LEVER switch, on the P10 control stand, is in the CUTOFF position.

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1) Put a DO NOT OPERATE tag, STD-858, on the applicable START LEVER switch.

SUBTASK 71-71-01-860-002-G00

(2) 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
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

G. Drain Mast Removal

SUBTASK 71-71-01-020-001-G00

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 OPEN THE OIL SYSTEM UNTIL THE PRESSURE GOES TO ZERO. THE PRESSURE GOES TO ZERO APPROXIMATELY 5 MINUTES AFTER AN ENGINE STOPS. A PRESSURIZED OIL SYSTEM CAN RELEASE A SPRAY OF HOT OIL THAT CAN BURN YOU.

WARNING DO NOT LET HOT OIL GET ON YOU. PUT ON CLOTHES, GOGGLES, AND OTHER EQUIPMENT FOR PROTECTION, OR LET THE ENGINE BECOME COOL. HOT OIL CAN BURN YOU.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(WARNING PRECEDES)

WARNING

DO NOT LET THE OIL STAY ON YOUR SKIN. YOU CAN ABSORB POISONOUS MATERIALS FROM THE OIL THROUGH YOUR SKIN.

CAUTION

DO NOT LET OIL GET ON THE ENGINE OR OTHER COMPONENTS. IMMEDIATELY CLEAN THE OIL WHEN IT FALLS ON THEM. OIL CAN CAUSE DAMAGE TO EQUIPMENT.

(1) Remove the drain mast [1] as follows:

(a) Remove the two bolts [2] and the two nuts [3].

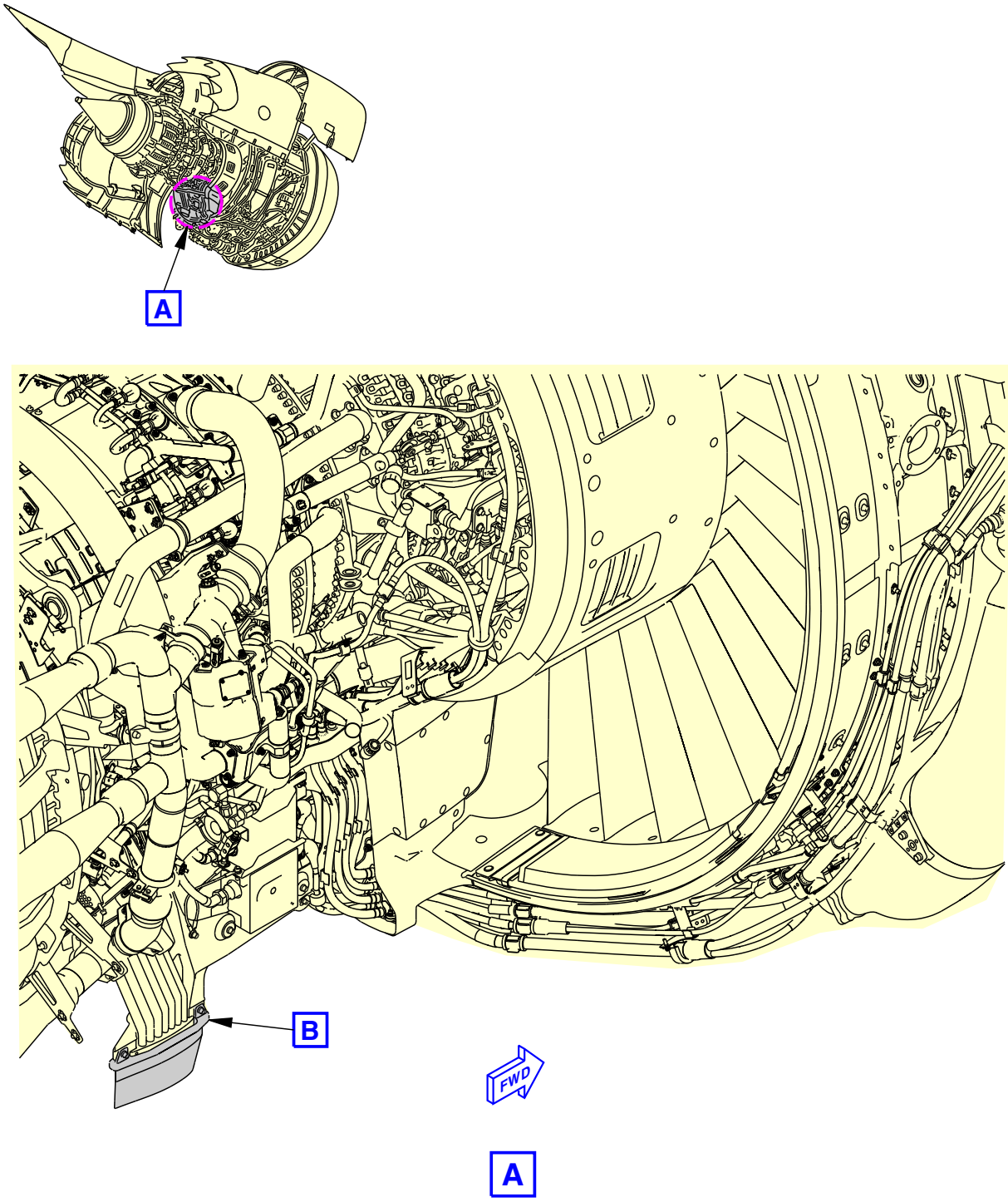
(b) Remove the drain mast [1] from the 6:00 o'clock bifurcation.

NOTE: It may require the dowel pin replacement for the installation of a new drain mast, refer to CFM SB LEAP-1B-72-00-0180.

(c) Install the protective covers on the drain mast [1] and the bifurcation.

END OF TASK

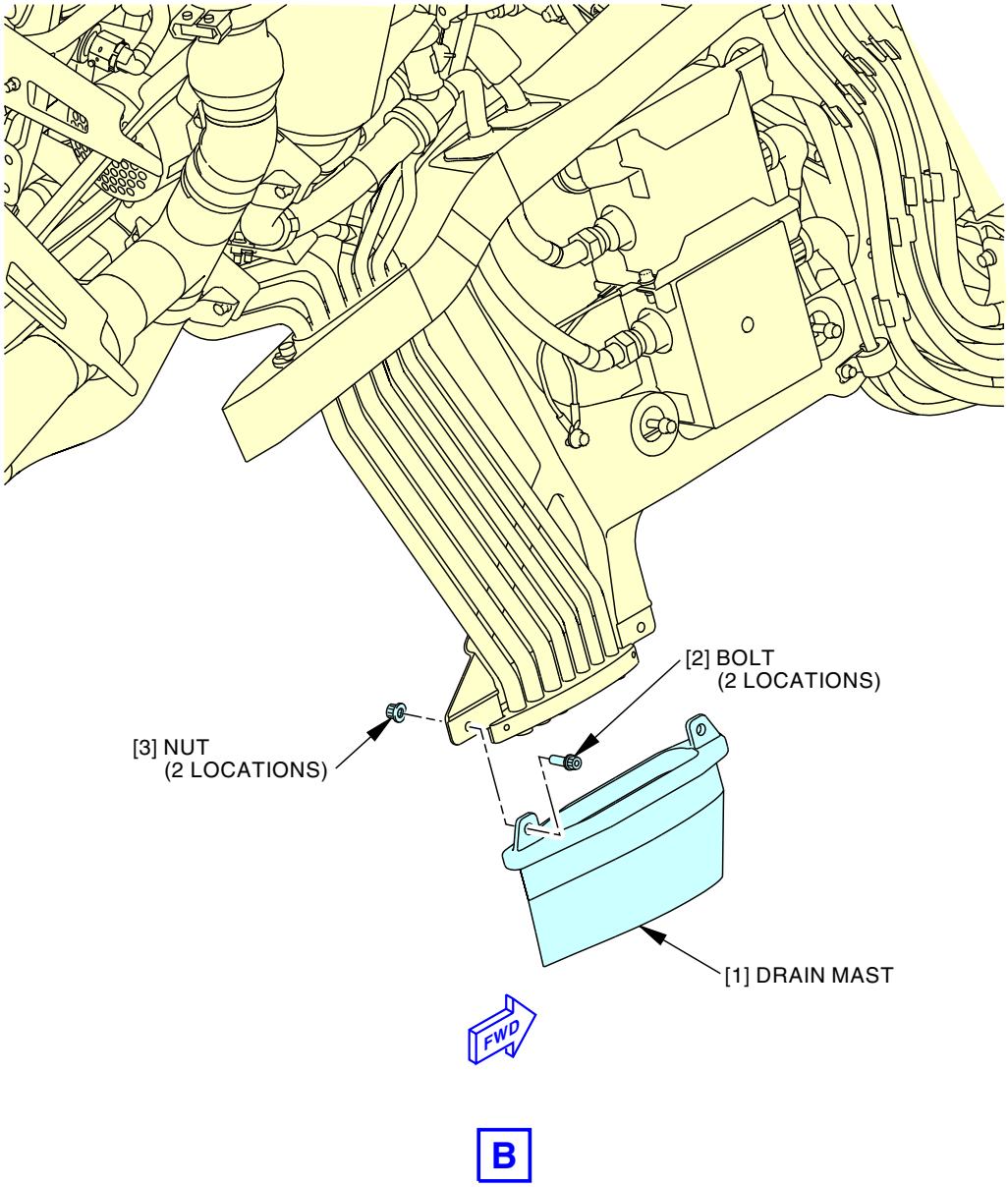
ECCN 9E991 BOEING PROPRIETARY - See title page for details



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Drain Mast Installation
Figure 401/71-71-01-990-801-G00 (Sheet 1 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details



Drain Mast Installation
Figure 401/71-71-01-990-801-G00 (Sheet 2 of 2)

ECCN 9E991 BOEING PROPRIETARY - See title page for details

TASK 71-71-01-400-801-G00

3. Drain Mast Installation

(Figure 401)

A. General

(1) This task provides the instructions on how to install the drain mast.

B. References

Reference	Title
71-11-04-410-801-G00	Close the Fan Cowl Panels (Selection) (P/B 201)
78-31-00-010-802-G00	Close the Thrust Reverser (Selection) (P/B 201)
78-31-00-440-801-G00	Thrust Reverser Activation After Ground Maintenance (P/B 201)

C. Tools/Equipment

Reference	Description
STD-858	Tag - DO NOT OPERATE

D. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Vaseline - Graphite Mineral	

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Drain mast	72-00-00-21-410	SIA ALL

F. Location Zones

Zone	Area
411	Engine 1 - Engine
421	Engine 2 - Engine

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. Drain Mast Installation

SUBTASK 71-71-01-420-001-G00

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.

ECCN 9E991 BOEING PROPRIETARY - See title page for details

(WARNING PRECEDES)

WARNING DO NOT OPEN THE OIL SYSTEM UNTIL THE PRESSURE GOES TO ZERO. THE PRESSURE GOES TO ZERO APPROXIMATELY 5 MINUTES AFTER AN ENGINE STOPS. A PRESSURIZED OIL SYSTEM CAN RELEASE A SPRAY OF HOT OIL THAT CAN BURN YOU.

WARNING DO NOT LET HOT OIL GET ON YOU. PUT ON CLOTHES, GOGGLES, AND OTHER EQUIPMENT FOR PROTECTION, OR LET THE ENGINE BECOME COOL. HOT OIL CAN BURN YOU.

WARNING DO NOT LET THE OIL STAY ON YOUR SKIN. YOU CAN ABSORB POISONOUS MATERIALS FROM THE OIL THROUGH YOUR SKIN.

CAUTION DO NOT LET OIL GET ON THE ENGINE OR OTHER COMPONENTS. IMMEDIATELY CLEAN THE OIL WHEN IT FALLS ON THEM. OIL CAN CAUSE DAMAGE TO EQUIPMENT.

(1) Install the drain mast [1] as follows:

(a) Remove the protective covers from the drain mast [1] and the bifurcation.

(b) Make sure that the mating faces are clean and clear of unwanted materials.

(c) Install the drain mast [1] in a correct position on the engine at the 6:00 o'clock bifurcation.

NOTE: It may require the dowel pin replacement for the installation of a new drain mast, refer to CFM SB LEAP-1B-72-00-0180.

(d) Lubricate the threads of the two bolts [2] with the graphite mineral vaseline, D00601 [CP2101].

(e) Install the two bolts [2] and the two nuts [3] on the drain mast [1].

(f) Tighten the nuts [3] to 109.25 in-lb (12.34 N·m) to - 120.75 in-lb (13.64 N·m).

(g) Clean the work area and clear the tools and other items.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-71-01-860-003-G00

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.

(1) 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

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(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 71-71-01-860-004-G00

(2) Do these steps to remove the DO NOT OPERATE tags, STD-858, from the applicable ENGINE START switch and START LEVER switch:

(a) On the P5 overhead panel, remove the DO NOT OPERATE tag, STD-858, from the applicable ENGINE START switch.

(b) On the P10 control stand, remove the DO NOT OPERATE tag, STD-858, from the applicable START LEVER switch.

——— END OF TASK ———

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