CHAPTER

71

POWER PLANT

BOEING

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

CHAPTER 71
POWER PLANT

Subject/Page	Date	COC
EFFECTIVE PAGES		
1 thru 7	Jun 15/2009	
8	BLANK	
71-CONTENTS		
1	Oct 15/2008	
2	Feb 15/2009	
3	Jun 15/2008	
4	Feb 15/2008	
5	Feb 15/2008	
O 6	Jun 15/2009	
O 7	Jun 15/2009	
8	Feb 15/2008	
9	Feb 15/2008	
10	Feb 15/2008	
O 11	Jun 15/2009	
O 12	Jun 15/2009	
O 13	Jun 15/2009	
14	BLANK	
71-00-00		
201	Oct 15/2008	
202	Oct 15/2008	
203	Oct 15/2008	
204	Oct 15/2008	
205	Oct 15/2008	
206	Oct 15/2008	
207	Oct 15/2008	
208	Oct 15/2008	
209	Oct 15/2008	
210	Oct 15/2008	
211	Oct 15/2008	
212	Oct 15/2008	
213	Oct 15/2008	
214	Oct 15/2008	
215	Oct 15/2008	
216	Oct 15/2008	
217	Oct 15/2008	
218	Oct 15/2008	
219	Oct 15/2008	
220	Oct 15/2008	
221	Oct 15/2008	
71-00-00 (cont)		
222	Oct 15/2008	
223	Oct 15/2008	
224	Oct 15/2008	
225	Oct 15/2008	
226	Oct 15/2008	
227	Oct 15/2008	
228	Oct 15/2008	
229	Oct 15/2008	
230	Oct 15/2008	
231	Feb 15/2009	
232	Oct 15/2008	
233	Oct 15/2008	
234	Oct 15/2008	
235	Oct 15/2008	
236	Oct 15/2008	
237	Oct 15/2008	
238	Oct 15/2008	
239	Feb 15/2009	
240	Feb 15/2009	
241	Oct 15/2008	
242	Oct 15/2008	
243	Oct 15/2008	
244	Oct 15/2008	
245	Oct 15/2008	
R 246	Jun 15/2009	
R 247	Jun 15/2009	
O 248	Jun 15/2009	
249	Oct 15/2008	
250	Oct 15/2008	
251	Oct 15/2008	
252	Oct 15/2008	
253	Oct 15/2008	
254	Oct 15/2008	
255	Oct 15/2008	
256	Feb 15/2009	
257	Feb 15/2009	
258	Feb 15/2009	
259	Oct 15/2008	
260	Oct 15/2008	
71-00-00 (cont)		
261	Oct 15/2008	
262	Oct 15/2008	
263	Oct 15/2008	
264	Oct 15/2008	
265	Oct 15/2008	
266	Oct 15/2008	
267	Oct 15/2008	
268	Oct 15/2008	
269	Oct 15/2008	
270	Oct 15/2008	
271	Oct 15/2008	
272	Oct 15/2008	
273	Oct 15/2008	
274	Oct 15/2008	
275	Oct 15/2008	
276	Oct 15/2008	
277	Oct 15/2008	
278	Oct 15/2008	
279	Oct 15/2008	
280	BLANK	
71-00-00		
501	Feb 15/2009	
502	Jun 10/2005	
R 503	Jun 15/2009	
O 504	Jun 15/2009	
O 505	Jun 15/2009	
O 506	Jun 15/2009	
507	Oct 10/2003	
508	Oct 10/2003	
509	Oct 10/2003	
510	Oct 10/2003	
511	Oct 10/2003	
512	Oct 10/2003	
513	Oct 10/2003	
514	Oct 10/2004	
515	Feb 10/2007	
516	Feb 10/2007	
517	Oct 10/2003	
518	Oct 10/2004	

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

71-EFFECTIVE PAGES

CHAPTER 71
POWER PLANT

Subject/Page	Date	COC
71-00-00 (cont)		
519	Jun 10/2004	
520	Oct 10/2003	
521	Jun 10/2004	
522	Oct 10/2006	
523	Feb 15/2009	
524	Feb 15/2009	
525	Oct 10/2006	
526	Feb 15/2009	
527	Feb 15/2009	
528	Feb 15/2009	
529	Feb 15/2009	
530	Feb 15/2009	
531	Feb 15/2009	
532	Feb 15/2009	
533	Feb 15/2009	
534	Feb 15/2009	
535	Feb 15/2009	
536	Feb 15/2009	
537	Feb 15/2009	
538	Feb 15/2009	
539	Feb 15/2009	
540	Feb 15/2009	
541	Feb 15/2009	
542	Feb 15/2009	
543	Feb 15/2009	
544	Feb 15/2009	
545	Oct 15/2008	
546	Feb 15/2009	
547	Oct 15/2008	
548	Feb 15/2009	
549	Oct 15/2008	
550	Oct 10/2007	
551	Oct 10/2007	
552	Oct 10/2007	
553	Oct 10/2007	
554	Jun 15/2008	
555	Oct 10/2007	
556	Oct 10/2007	
557	Jun 15/2008	
71-00-00 (cont)		
558	Oct 10/2007	
559	Oct 10/2007	
560	Oct 10/2007	
561	Oct 10/2007	
562	Oct 10/2007	
563	Oct 10/2007	
564	Feb 15/2009	
R 565	Jun 15/2009	
566	Oct 10/2007	
567	Oct 10/2007	
568	Oct 10/2007	
569	Oct 10/2007	
570	Oct 10/2007	
571	Oct 10/2007	
572	Oct 10/2007	
573	Oct 10/2007	
574	Oct 10/2007	
575	Oct 10/2007	
576	Oct 10/2007	
577	Oct 10/2007	
578	Oct 10/2007	
579	Oct 10/2007	
580	Oct 10/2007	
581	Oct 10/2007	
582	Oct 10/2007	
583	Oct 10/2007	
584	Oct 10/2007	
585	Oct 10/2007	
586	Oct 10/2007	
587	Oct 10/2007	
588	Oct 10/2007	
589	Oct 10/2007	
590	Oct 10/2007	
591	Oct 10/2007	
592	Oct 10/2007	
593	Oct 10/2007	
594	Oct 10/2007	
595	Oct 10/2007	
596	Oct 10/2007	
71-00-00 (cont)		
597	Oct 10/2007	
598	Oct 10/2007	
598.1	Oct 10/2007	
598.2	Oct 10/2007	
598.3	Oct 10/2007	
598.4	Oct 10/2007	
598.5	Oct 10/2007	
598.6	Oct 10/2007	
598.7	Oct 10/2007	
598.8	Oct 10/2007	
598.9	Oct 10/2007	
598.10	Oct 10/2007	
598.11	Oct 10/2007	
598.12	Oct 10/2007	
R 598.13	Jun 15/2009	
598.14	Feb 15/2009	
598.15	Feb 15/2009	
598.16	Feb 15/2009	
598.17	Feb 15/2009	
598.18	Feb 15/2009	
598.19	Feb 15/2009	
598.20	Feb 15/2009	
598.21	Feb 15/2009	
598.22	Feb 15/2009	
598.23	Feb 15/2009	
598.24	Feb 15/2009	
598.25	Feb 15/2009	
598.26	Feb 15/2009	
598.27	Feb 15/2009	
598.28	Feb 15/2009	
598.29	Feb 15/2009	
598.30	Feb 15/2009	
598.31	Oct 10/2007	
598.32	Feb 15/2009	
598.33	Feb 15/2009	
R 598.34	Jun 15/2009	
598.35	Feb 15/2009	
598.36	Feb 15/2009	
598.37	Oct 10/2007	

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

71-EFFECTIVE PAGES

CHAPTER 71
POWER PLANT

Subject/Page	Date	COC
71-00-00 (cont)		
598.38	Oct 10/2007	
598.39	Oct 10/2007	
598.40	Oct 10/2007	
598.41	Oct 10/2007	
598.42	Oct 10/2007	
598.43	Oct 10/2007	
598.44	Oct 10/2007	
598.45	Oct 10/2007	
598.46	Oct 10/2007	
R 598.47	Jun 15/2009	
598.48	Oct 10/2007	
598.49	Oct 10/2007	
598.50	Oct 10/2007	
598.51	Oct 10/2007	
598.52	Oct 10/2007	
598.53	Oct 10/2007	
598.54	Oct 10/2007	
598.55	Oct 10/2007	
598.56	Oct 10/2007	
598.57	Oct 10/2007	
598.58	Oct 10/2007	
598.59	Oct 10/2007	
598.60	Oct 10/2007	
598.61	Oct 10/2007	
598.62	Oct 10/2007	
598.63	Oct 10/2007	
598.64	Oct 10/2007	
598.65	Oct 10/2007	
598.66	Oct 10/2007	
598.67	Oct 10/2007	
598.68	Oct 10/2007	
598.69	Oct 10/2007	
598.70	Oct 10/2007	
598.71	Oct 10/2007	
598.72	BLANK	
71-00-00		
601	Oct 15/2008	
602	Jun 15/2008	
603	Jun 15/2008	
71-00-00 (cont)		
R 604	Jun 15/2009	
O 605	Jun 15/2009	
O 606	Jun 15/2009	
O 607	Jun 15/2009	
O 608	Jun 15/2009	
O 609	Jun 15/2009	
O 610	Jun 15/2009	
O 611	Jun 15/2009	
O 612	Jun 15/2009	
O 613	Jun 15/2009	
614	Jun 15/2008	
615	Jun 15/2008	
616	Jun 15/2008	
617	Jun 15/2008	
618	Jun 15/2008	
619	Jun 15/2008	
620	Jun 15/2008	
621	Jun 15/2008	
622	Jun 15/2008	
623	Jun 15/2008	
624	Jun 15/2008	
625	Jun 15/2008	
626	Jun 15/2008	
627	Jun 15/2008	
628	Jun 15/2008	
629	Jun 15/2008	
630	Jun 15/2008	
631	Jun 15/2008	
632	Jun 15/2008	
633	Jun 15/2008	
634	BLANK	
71-00-02		
401	Feb 15/2009	
402	Feb 15/2009	
403	Feb 15/2009	
404	Feb 15/2009	
405	Feb 15/2009	
406	Feb 15/2009	
407	Oct 15/2008	
71-00-02 (cont)		
408	Oct 10/2006	
409	Jun 15/2008	
410	Oct 10/2006	
411	Jun 15/2008	
412	Oct 10/2006	
413	Oct 10/2006	
414	Oct 10/2006	
415	Oct 10/2006	
416	Oct 10/2006	
417	Oct 10/2006	
418	Feb 10/2006	
419	Feb 10/2006	
420	Feb 10/2006	
421	Feb 10/2006	
422	Feb 10/2006	
423	Jun 10/2007	
424	Feb 10/2006	
425	Feb 10/2006	
426	Feb 10/2006	
427	Feb 10/2006	
428	Feb 10/2006	
429	Feb 10/2006	
430	Feb 10/2006	
431	Feb 10/2006	
432	Feb 10/2006	
433	Feb 10/2006	
434	Feb 10/2006	
435	Feb 10/2006	
436	Feb 10/2006	
437	Feb 10/2006	
438	Feb 10/2006	
439	Feb 10/2006	
440	Feb 10/2006	
441	Oct 15/2008	
442	Oct 15/2008	
443	Oct 15/2008	
444	Oct 15/2008	
445	Feb 15/2009	
446	Oct 15/2008	

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

71-EFFECTIVE PAGES

CHAPTER 71
POWER PLANT

Subject/Page	Date	COC
71-00-02 (cont)		
447	Oct 15/2008	
R 448	Jun 15/2009	
449	Jun 15/2008	
450	Jun 15/2008	
451	Jun 15/2008	
452	Jun 15/2008	
453	Oct 15/2008	
454	Jun 15/2008	
455	Jun 15/2008	
456	Jun 15/2008	
457	Oct 15/2008	
458	Jun 15/2008	
459	Feb 15/2009	
460	Oct 15/2008	
71-00-03		
201	Feb 15/2009	
202	Feb 15/2009	
203	Jun 15/2008	
204	Jun 15/2008	
205	Oct 10/2005	
206	Jun 15/2008	
207	Jun 15/2008	
208	Jun 15/2008	
209	Jun 10/2004	
210	Jun 10/2004	
211	Jun 10/2004	
212	Jun 10/2004	
213	Jun 15/2008	
214	Jun 10/2004	
215	Oct 15/2008	
216	Jun 10/2004	
217	Jun 10/2004	
218	Jun 10/2004	
219	Jun 15/2008	
R 220	Jun 15/2009	
221	Jun 15/2008	
R 222	Jun 15/2009	
223	Oct 10/2007	
224	Oct 10/2007	

Subject/Page	Date	COC
71-00-03 (cont)		
R 225	Jun 15/2009	
226	Oct 10/2007	
227	Oct 10/2007	
228	Oct 15/2008	
R 229	Jun 15/2009	
230	Oct 15/2008	
231	Feb 15/2009	
232	Oct 15/2008	
233	Oct 15/2008	
234	Oct 15/2008	
235	Oct 15/2008	
236	Oct 15/2008	
237	Oct 15/2008	
238	Oct 10/2005	
239	Oct 10/2005	
240	Oct 10/2005	
241	Oct 10/2005	
242	Oct 10/2005	
243	Oct 10/2005	
244	BLANK	
71-00-04		
201	Jun 15/2008	
202	Jun 10/2004	
203	Jun 10/2004	
204	Jun 10/2004	
205	Jun 10/2004	
206	Oct 10/2003	
207	Oct 10/2003	
208	Oct 10/2003	
209	Oct 10/2003	
210	Oct 10/2003	
211	Oct 10/2003	
212	Oct 10/2003	
71-00-07		
R 201	Jun 15/2009	
O 202	Jun 15/2009	
D 203	Jun 15/2009	
D 204	Jun 15/2009	
D 205	Jun 15/2009	

Subject/Page	Date	COC
71-00-07 (cont)		
D 206	BLANK	
71-11-01		
401	Feb 15/2009	
402	Oct 10/2006	
403	Jun 10/2004	
404	Jun 10/2005	
405	Oct 10/2003	
406	Oct 10/2003	
407	Oct 10/2003	
408	Oct 10/2003	
409	Feb 15/2009	
410	Feb 15/2009	
411	Jun 10/2004	
412	Oct 15/2008	
413	Oct 15/2008	
414	Oct 15/2008	
415	Oct 15/2008	
416	Jun 10/2004	
417	Jun 10/2004	
418	Feb 15/2009	
419	Jun 15/2008	
420	Oct 10/2007	
421	Oct 10/2007	
422	BLANK	
71-11-01		
601	Feb 15/2009	
602	Jun 10/2004	
603	Oct 10/2003	
604	Feb 15/2009	
71-11-01		
801	Jun 10/2004	
802	Jun 10/2004	
803	Jun 10/2004	
804	BLANK	
71-11-02		
201	Oct 10/2003	
202	Oct 10/2003	
203	Oct 10/2003	
204	Oct 10/2003	

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

71-EFFECTIVE PAGES

CHAPTER 71
POWER PLANT

Subject/Page	Date	COC
71-11-02 (cont)		
205	Oct 10/2003	
206	Feb 10/2004	
207	Oct 10/2003	
208	BLANK	
71-11-02		
401	Oct 10/2003	
402	Oct 10/2003	
403	Oct 10/2003	
404	Oct 10/2003	
405	Jun 10/2007	
406	Oct 10/2003	
407	Oct 10/2003	
408	Jun 15/2008	
409	Jun 15/2008	
410	Oct 10/2003	
411	Jun 10/2007	
412	Jun 15/2008	
413	Jun 15/2008	
414	Jun 10/2004	
71-11-02		
601	Feb 15/2009	
602	Oct 10/2003	
603	Feb 15/2009	
604	BLANK	
71-11-03		
401	Feb 15/2009	
402	Jun 15/2008	
403	Oct 10/2003	
404	Oct 10/2003	
405	Oct 10/2003	
406	BLANK	
71-11-03		
501	Feb 15/2009	
502	Oct 10/2003	
503	Oct 10/2003	
504	Oct 10/2003	
505	Oct 10/2003	
506	Oct 10/2003	

Subject/Page	Date	COC
71-11-04		
201	Feb 15/2009	
202	Jun 15/2008	
203	Jun 15/2008	
204	Oct 10/2003	
205	Oct 10/2003	
206	BLANK	
71-11-04		
401	Feb 10/2004	
402	Jun 10/2005	
403	Oct 10/2003	
404	Feb 15/2009	
405	Oct 10/2003	
406	BLANK	
71-11-04		
501	Feb 10/2004	
502	Jun 10/2004	
503	Oct 10/2003	
504	Oct 10/2003	
505	Feb 10/2004	
506	Oct 10/2003	
71-11-05		
201	Feb 10/2004	
202	Feb 10/2004	
203	Oct 10/2003	
204	Oct 10/2003	
71-11-05		
401	Feb 10/2004	
402	Jun 10/2005	
403	Oct 10/2003	
404	Feb 15/2009	
405	Jun 15/2008	
406	BLANK	
71-11-05		
501	Feb 10/2004	
502	Oct 10/2003	
503	Oct 10/2003	
504	Oct 10/2003	
505	Feb 10/2004	
506	Oct 10/2003	

Subject/Page	Date	COC
71-11-06		
201	Feb 15/2009	
202	Jun 10/2005	
203	Oct 10/2003	
204	BLANK	
71-11-06		
401	Feb 10/2004	
402	Jun 10/2005	
403	Oct 10/2003	
404	Feb 15/2009	
405	Oct 10/2003	
406	BLANK	
71-11-06		
501	Feb 10/2004	
502	Oct 10/2003	
503	Oct 10/2003	
504	Oct 10/2003	
505	Feb 10/2004	
506	Oct 10/2006	
507	Jun 10/2004	
508	Oct 10/2003	
71-11-07		
201	Feb 15/2009	
202	Jun 15/2008	
203	Feb 10/2004	
204	BLANK	
71-11-07		
401	Jun 10/2005	
402	Feb 10/2004	
403	Feb 15/2009	
404	Jun 10/2005	
71-11-07		
501	Feb 10/2004	
502	Feb 10/2004	
503	Oct 10/2003	
504	Oct 10/2003	
505	Feb 10/2004	
506	Oct 10/2006	
507	Jun 10/2004	
508	Oct 10/2003	

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

71-EFFECTIVE PAGES

CHAPTER 71
POWER PLANT

Subject/Page	Date	COC
71-11-08		
401	Jun 10/2005	
402	Oct 10/2003	
403	Feb 15/2009	
404	BLANK	
71-11-08		
801	Oct 10/2007	
802	Oct 10/2007	
803	Oct 10/2007	
804	BLANK	
71-11-09		
401	Feb 15/2008	
402	Feb 15/2008	
403	Feb 10/2005	
404	Feb 15/2008	
405	Feb 15/2008	
406	BLANK	
71-21-00		
R 601	Jun 15/2009	
602	Oct 10/2003	
R 603	Jun 15/2009	
R 604	Jun 15/2009	
R 605	Jun 15/2009	
O 606	Jun 15/2009	
O 607	Jun 15/2009	
R 608	Jun 15/2009	
O 609	Jun 15/2009	
O 610	Jun 15/2009	
O 611	Jun 15/2009	
O 612	Jun 15/2009	
R 613	Jun 15/2009	
O 614	Jun 15/2009	
O 615	Jun 15/2009	
R 616	Jun 15/2009	
O 617	Jun 15/2009	
O 618	Jun 15/2009	
O 619	Jun 15/2009	
O 620	Jun 15/2009	
O 621	Jun 15/2009	
O 622	Jun 15/2009	
71-21-00 (cont)		
O 623	Jun 15/2009	
O 624	Jun 15/2009	
A 625	Jun 15/2009	
A 626	BLANK	
71-21-01		
401	Jun 10/2007	
402	Jun 10/2007	
403	Feb 15/2009	
404	Feb 15/2009	
71-21-02		
401	Oct 10/2006	
402	Feb 15/2009	
403	Oct 10/2003	
404	Oct 10/2003	
405	Oct 10/2003	
406	Feb 15/2009	
407	Feb 15/2009	
408	BLANK	
71-21-02		
601	Oct 10/2007	
602	Oct 10/2007	
603	Oct 10/2007	
604	BLANK	
71-21-03		
401	Oct 10/2006	
402	Feb 10/2006	
403	Oct 10/2003	
404	Oct 10/2003	
R 405	Jun 15/2009	
406	Feb 15/2009	
407	Feb 10/2006	
408	BLANK	
71-51-00		
601	Feb 10/2004	
602	Feb 10/2004	
603	Oct 10/2003	
604	Oct 10/2003	
605	Oct 10/2003	
606	Oct 10/2003	
71-51-00 (cont)		
607	Oct 10/2003	
608	Oct 10/2003	
609	Oct 10/2003	
610	Feb 10/2004	
611	Oct 10/2003	
612	Jun 10/2005	
613	Jun 10/2005	
614	BLANK	
71-51-03		
401	Jun 10/2005	
402	Jun 10/2005	
403	Oct 10/2003	
404	Oct 10/2003	
405	Oct 10/2003	
406	Oct 10/2003	
407	Oct 10/2003	
408	Oct 10/2003	
409	Oct 10/2003	
R 410	Jun 15/2009	
411	Feb 15/2009	
412	Feb 15/2009	
71-71-00		
601	Feb 15/2009	
602	Feb 15/2009	
R 603	Jun 15/2009	
604	Oct 10/2007	
605	Oct 10/2007	
606	Oct 10/2007	
607	Jun 15/2008	
608	Jun 15/2008	
609	Oct 10/2007	
610	Feb 10/2004	
611	Feb 10/2004	
612	Feb 10/2004	
613	Feb 10/2004	
R 614	Jun 15/2009	
615	Feb 10/2004	
616	Feb 10/2004	
617	Feb 10/2004	

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

71-EFFECTIVE PAGES

CHAPTER 71
POWER PLANT

Subject/Page	Date	COC	Subject/Page	Date	COC	Subject/Page	Date	COC
71-71-00 (cont)								
618	Feb 10/2004							
619	Feb 10/2004							
620	Feb 10/2004							
621	Feb 10/2004							
622	Feb 10/2004							
R 623	Jun 15/2009							
R 624	Jun 15/2009							

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

71-EFFECTIVE PAGES

CHAPTER 71
POWER PLANT

71-CONTENTS

CHAPTER 71
POWER PLANT

71-CONTENTS

CHAPTER 71
POWER PLANT

71-CONTENTS

CHAPTER 71
POWER PLANT

71-CONTENTS

CHAPTER 71
POWER PLANT

71-CONTENTS

CHAPTER 71
POWER PLANT

CHAPTER 71
POWER PLANT

CHAPTER 71
POWER PLANT

CHAPTER 71
POWER PLANT

CHAPTER 71
POWER PLANT

CHAPTER 71
POWER PLANT

CHAPTER 71
POWER PLANT

CHAPTER 71
POWER PLANT

POWER PLANT - MAINTENANCE PRACTICES (OPERATION PROCEDURES)

1. General

A. This procedure has these tasks:

(1) The safety precautions for the power plant operation on the ground

(2) The operation limits for the power plant

(3) The procedure to prepare the engine for operation

(4) The start the engine procedure (Selection)

(5) The start the engine procedure (Normal Start)

(6) The start the engine procedure (Manual Override of the Engine Start Valve)

(7) The start the engine procedure (Engine Cross Bleed Start)

(8) The stop the engine procedure (Usual)

(9) The stop the engine procedure (Emergency)

(10) The dry motor procedure

(11) The wet motor procedure.

TASK 71-00-00-800-805-F00

2. Engine Ground Safety Precautions

(Figure 201, Figure 202, Figure 203, Figure 204, Figure 205, Figure 206)

A. General

(1) This task gives the safety precautions you must obey when you go near an engine that operates.

(2) Also included are precautions for airplane handling to make sure the airplane does not move during engine operation.

(3) For this task, the engine is defined as the basic CFM56-7B series engine while the power plant is defined as the engine with all cowls (inlet, fan, thrust reverser and exhaust) attached.

B. References

Reference	Title
71-00-00-800-803-F00	Inspection After an Engine Fire, Use of Fire Extinquishing Agents, or High Nacelle Temperature (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.

Reference	Description
COM-1616	Meter - Sound Level (Part #: 2100-10, Supplier: 90435, A/P Effectivity: 737-ALL) (Part #: CEL-254/K-1, Supplier: 01RN5, A/P Effectivity: 737-ALL) (Part #: CEL-254/K1, Supplier: 01RN5, A/P Effectivity: 737-ALL) (Opt Part #: 2400-10, Supplier: 90435, A/P Effectivity: 737-ALL)
SPL-1531	Guard - Engine Inlet, Engine Run-Up (Part #: C12001-38, Supplier: 81205, A/P Effectivity: 737-100, -200, -200C, -300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Opt Part #: C12001-35, Supplier: 81205, A/P Effectivity: 737-100, -200, -200C, -300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

(Continued)

Reference	Description
SPL-2109	Screen - Safety, CFM56-7 Engine Inlet (Part #: C71025-1, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
SPL-10051	Lanyard - Personnel Safety, Engine Maintenance, CFM56-7 (Part #: F80239-21, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

D. The Air Inlet

SUBTASK 71-00-00-580-001-F00

WARNING: ALL PERSONS MUST STAY OUT OF THE DANGEROUS AREAS THAT ARE FORWARD AND TO THE SIDES OF THE INLET COWL. ALL PERSONS MUST STAY AWAY FROM THE ENGINE SAFETY BARRIER WHEN THE ENGINE IS IN OPERATION. DURING ENGINE OPERATION, THERE IS SUFFICIENT SUCTION AT THE INLET COWL TO PULL A PERSON INTO THE ENGINE INLET. A FATAL INJURY COULD OCCUR.

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.

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

(b) The air which is near to the inlet cowl moves at a much higher velocity than air which 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 small until you go near the inlet, where the suction increases suddenly.

SUBTASK 71-00-00-580-002-F00

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

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

(b) Make sure the area 40 feet to each side and forward of the power plant is clean.

(c) Make sure the ground which is forward of the power plant is solid.

(d) Make sure the 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 this area.

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

1) This will prevent the suction of persons and large objects into the inlet by the engine.

SUBTASK 71-00-00-580-003-F00

WARNING: STAY AWAY FROM THE DANGER AREAS AT THE FRONT AND SIDES OF THE POWER PLANT DURING OPERATION. THE ENGINE CAN MAKE SUFFICIENT SUCTION TO PULL A PERSON INTO THE INLET COWL. IF YOU DO NOT OBEY THIS INSTRUCTION, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Obey the hazard areas near the air inlet that have 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 (Figure 206).

(b) Persons near the power plant during engine 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 power plant.

2) After the engine is stopped, make sure you see 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 71-00-00-580-004-F00

(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.

E. Engine Exhaust and Fan Discharge Air

SUBTASK 71-00-00-580-005-F00

WARNING: KEEP AWAY FROM THE FAN AND ENGINE EXHAUST DISCHARGE AREAS WHEN THE ENGINE OPERATES. IF YOU DO NOT OBEY THE INSTRUCTIONS, THE EXHAUST AND FAN DISCHARGE CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) Jet Velocity

(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 at an area where injury to persons or damage to equipment or other airplanes can be prevented.

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.

(c) The hazard areas are shown on these figures for minimum idle power (Figure 201), breakaway power (Figure 202), and takeoff power (Figure 203).

SUBTASK 71-00-00-580-006-F00

(2) Jet Exhaust Temperature

(a) The engine exhaust temperature is very hot at idle and takeoff power.

(b) The high temperature exhaust can be found a long distance behind the engine.

(c) The exhaust temperature is sufficient to damage bituminous (asphalt) pavement.

1) Concrete is the recommended material for the area behind the engines.

SUBTASK 71-00-00-580-007-F00

(3) Toxicity

(a) Tests show that there is a small concentration of carbon monoxide in the jet exhaust.

(b) The exhaust gas is bad 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.

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

SUBTASK 71-00-00-580-008-F00

(4) When the engine is started, fuel that collected in the turbine exhaust sleeve can ignite.

(a) Long flames are blown out of the engine exhaust.

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

SUBTASK 71-00-00-580-009-F00

(5) Thrust Reverser

(a) The thrust reverser is usually used during landing, but can also be used when the airplane is parked for maintenance checks of the thrust reverser.

(b) When the thrust reverser operates, the fan discharge air blows out of the sides of the power plant and goes forward.

(c) The hazard areas are shown in the figure for reverser minimum idle power (Figure 204), and breakaway-thrust power (Figure 205).

F. Entry Corridor

SUBTASK 71-00-00-580-010-F00

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 operation (idle operation only, such as during an idle leak check or to disconnect the ground air cart), use the entry/exit corridor to enter and exit the fan case area.

(a) Use the given entry and exit corridors (Figure 207).

SUBTASK 71-00-00-580-011-F00

(2) Asafety lanyard, SPL-10051, a screen, SPL-2109, or a guard, SPL-1531 is recommended for your safety.

(a) The lanyard, the screen, and the guard are not necessary to disconnect the ground air cart with the engines in operation.

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

SUBTASK 71-00-00-580-012-F00

(3) When you use the safety lanyard, attach the lanyard to the correct lanyard attach point on the fan case (Figure 207).

G. Engine Noise

SUBTASK 71-00-00-580-013-F00

WARNING: MAKE SURE ALL PERSONS USE THE APPROVED SAFETY EQUIPMENT FOR THEIR EARS WHEN THEY ARE NEAR NOISE THAT IS MORE THAN 84 DB. THIS WILL HELP PREVENT INJURY TO PERSONS.

(1) The jet engines make sufficient noise to cause damage to your ears.

(a) See these noise graphs for the limits (Figure 209 and Figure 210)

(b) Noise can have an unwanted effect on your ears. You will not be stable 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 ears. Your ears can become less sensitive to hear sound.

(d) If you listen to high quantities of noise for a long time, you can cause permanent damage to your ears. You can not hear sound.

(e) If you listen to very high quantities of noise for a short time, you can cause permanent damage to your ears. You can not hear sound.

(f) When you are near an engine in operation, always use ear protection to decrease the quantity of sound to your ears.

1) A cup-type, earmuff, hearing protection is recommended.

SUBTASK 71-00-00-580-014-F00

(2) There are two graphs, the noise time limits and the one engine operation noise contours.

(a) The noise countour graphs are guidelines for the amount of noise that is made by the engine at three 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 the graph (Figure 209)

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

1) Refer to the graph (Figure 210)

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. Compare this value with the noise time limits graph.

(g) Speak to a noise safety person to help you make the decision 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.

H. Engine Ignition Voltage

SUBTASK 71-00-00-580-015-F00

WARNING: DO NOT TOUCH THE ENGINE IGNITION SYSTEM WHILE THE SYSTEM OPERATES. THE IGNITION SYSTEM USES HIGH ENERGY WHICH IS DANGEROUS AND CAUSE ELECTRICAL SHOCKS. THE ELECTRIC SHOCK CAN KILL OR CAUSE INJURIES TO PERSONS.

(1) The engine ignition system supplies high energy and high voltage to start the engine.

(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.

I. Hot Engine Parts

SUBTASK 71-00-00-580-016-F00

(1) After engine operation, make sure you are very careful about heat from the hot section and the exhaust areas of the engine.

J. Fuel and Oil

SUBTASK 71-00-00-580-017-F00

WARNING: DO NOT LET FUEL OR OIL STAY ON YOUR SKIN. YOU CAN ABSORB POISONOUS MATERIALS FROM THE FUEL OR OIL THROUGH YOUR SKIN.

(1) Engine fuel and oil can cause injuries if it stays on your skin for a long time.

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

K. Pressurized Oil System

SUBTASK 71-00-00-580-018-F00

WARNING: DO NOT OPEN THE OIL SERVICE UNTIL THE PRESSURE GOES TO ZERO. THE PRESSURE GOES TO ZERO APPROXIMATELY 5 MINUTES AFTER AN ENGINE IS STOPPED. A PRESSURIZED OIL SYSTEM CAN RELEASE A SPRAY CAP AT THE ENGINE OIL TANK FOR A MINIMUM OF 5 MINUTES AFTER THE ENGINE IS STOPPED. IF YOU OPEN THE CAP TOO SOON, A SPRAY OF HOT ENGINE OIL CAN GET ON YOU AND CAUSE INJURY.

(1) Follow these steps when you must open the oil service cap:

(a) The oil pressure slowly decreases after the engine is stopped.

(b) Make sure you do not remove the cap from the engine oil tank for a minimum of 5 minutes after the engine is stopped.

L. Deicing Fluid

SUBTASK 71-00-00-580-019-F00

CAUTION: DO NOT APPLY DEICING FLUID WITH A SPRAY GUN IN THE ENGINE INLET. THE DEICING FLUID CAN CAUSE CONTAMINATION OF THE AIRFOILS AND OTHER COMPONENTS OR DETERIORATION OF THE ENGINE PERFORMANCE.

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

(a) Make sure you do not apply the deicing fluid into the engine inlet or exhaust. 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: Procedure to Prepare the Engine for Operation, TASK 71-00-00-700-818-F00.

M. Thrust Lever Movement

SUBTASK 71-00-00-980-001-F00

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 it is possible, the thrust lever movements must be slow and smooth.

N. Wind Direction

SUBTASK 71-00-00-560-001-F00

(1) Wind direction and speed can cause stability problems for the engine.

SUBTASK 71-00-00-560-002-F00

(2) Put the airplane in a position to limit the amount of crosswind into the engine inlet. Preferred relative wind direction and wind velocity limits during low power engine runs are shown in (Figure 211).

CAUTION: IF ENGINE RUNS ARE DONE OUT OF THE PREFERRED LIMITS (FIGURE 211), MONITOR N1, N2 AND EGT. ENGINE OVERHEAT OR STALL CAN OCCUR AND CAUSE ENGINE DAMAGE.

(a) Wind Limitations During Engine Ground Operations

1) Static ground operation of the engine is not permitted for these conditions:

a) Power settings that are more than 70%N1, and

b) Crosswinds that are more than 15 knots, or

c) All tailwinds that are more than 5 knots.

O. Dry Chemical Fire Extinguishing Agents

SUBTASK 71-00-00-800-002-F00

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) Dry chemical fire extinguishing agents are not recommended.

SUBTASK 71-00-00-800-003-F00

(2) If you use fire extinguishing agents, do this step:

(a) Do this task: Inspection After an Engine Fire, Use of Fire Extinquishing Agents, or High Nacelle Temperature, TASK 71-00-00-800-803-F00.

SUBTASK 71-00-00-160-004-F00

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 DAMAGE AND CAUSE CORROSION TO ENGINE PARTS.

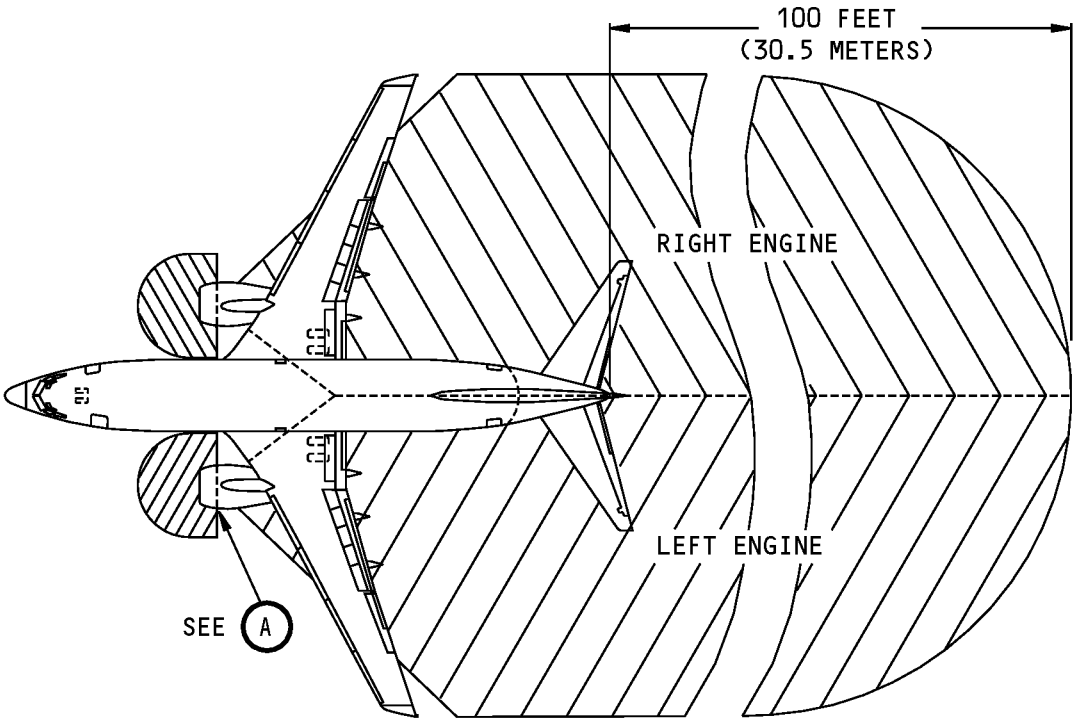
(3) Water is not recommended to remove the dry chemical fire extinguishing agents.

(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) The engine performance can decrease and corrosion and more damage could occur if the engine is not cleaned correctly.

END OF TASK



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 PERCENT.

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

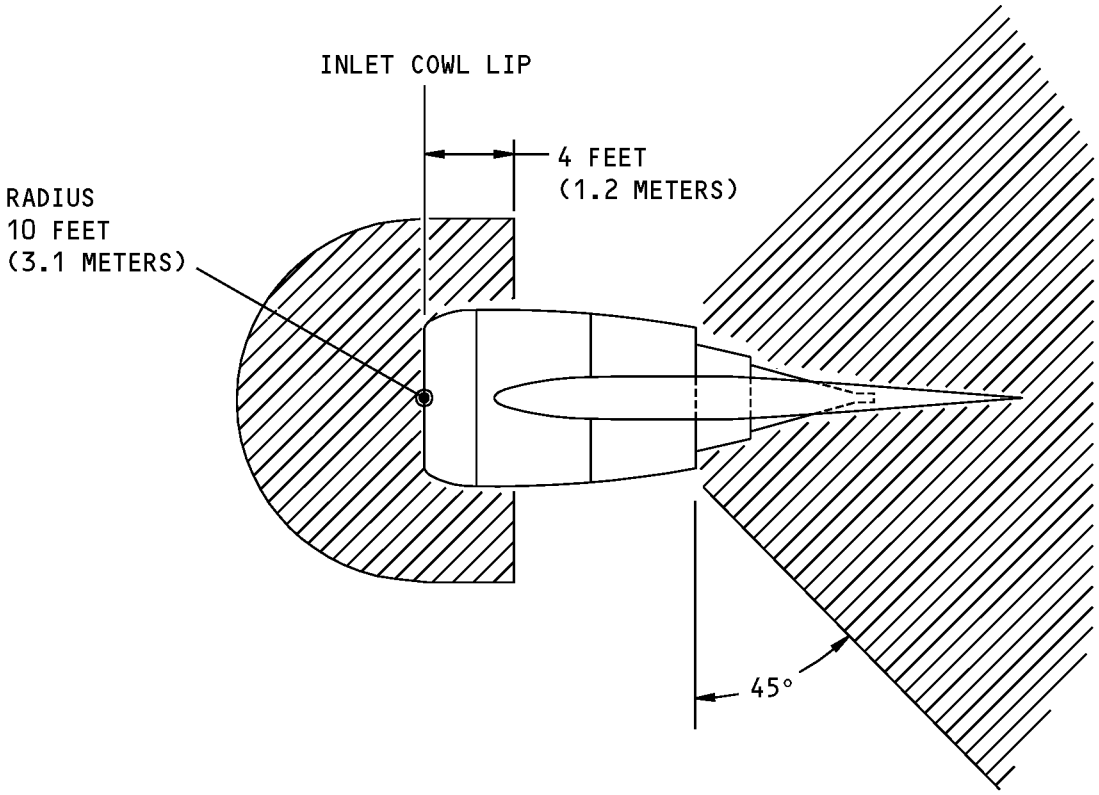
MAKE SURE THAT ALL PERSONS ARE SAFE BEFORE YOU START THE ENGINE.

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.

Minimum Idle - Power Hazard Area
Figure 201 (Sheet 1 of 2)/71-00-00-990-805-F00

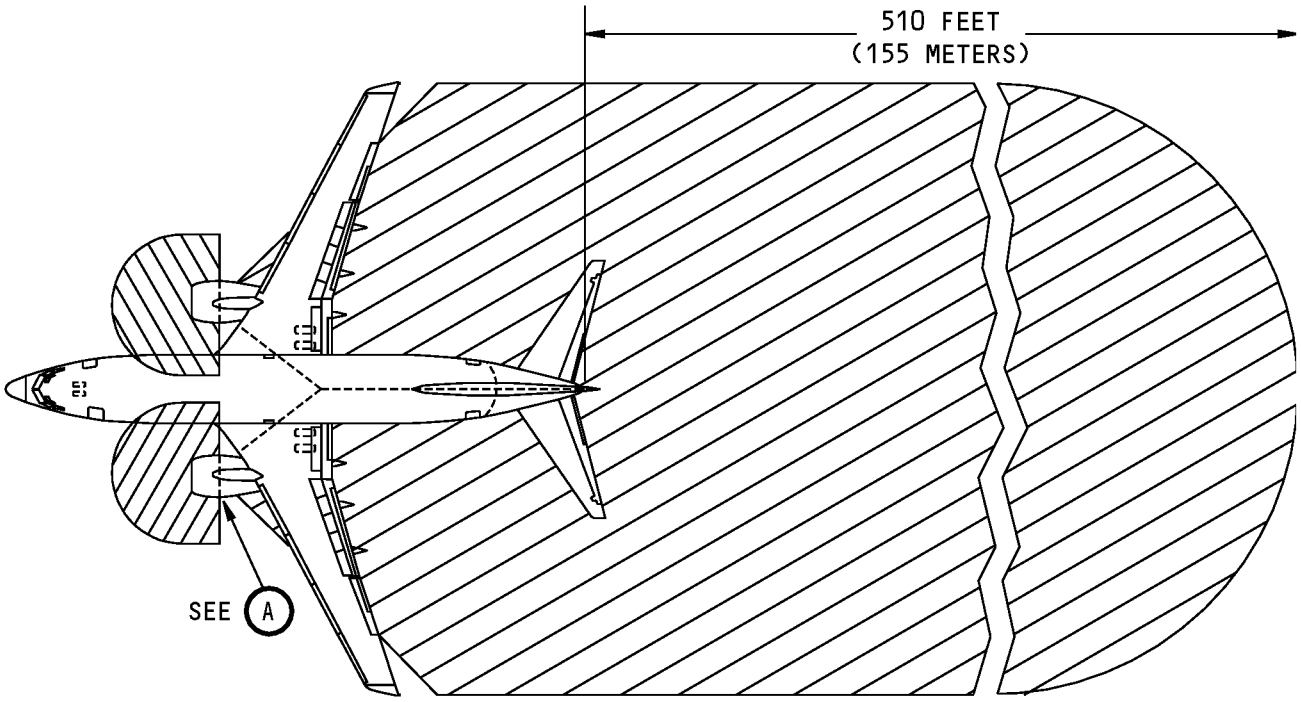


INLET HAZARD AREA

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.

Minimum Idle - Power Hazard Area
Figure 201 (Sheet 2 of 2)/71-00-00-990-805-F00



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 PERCENT.

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

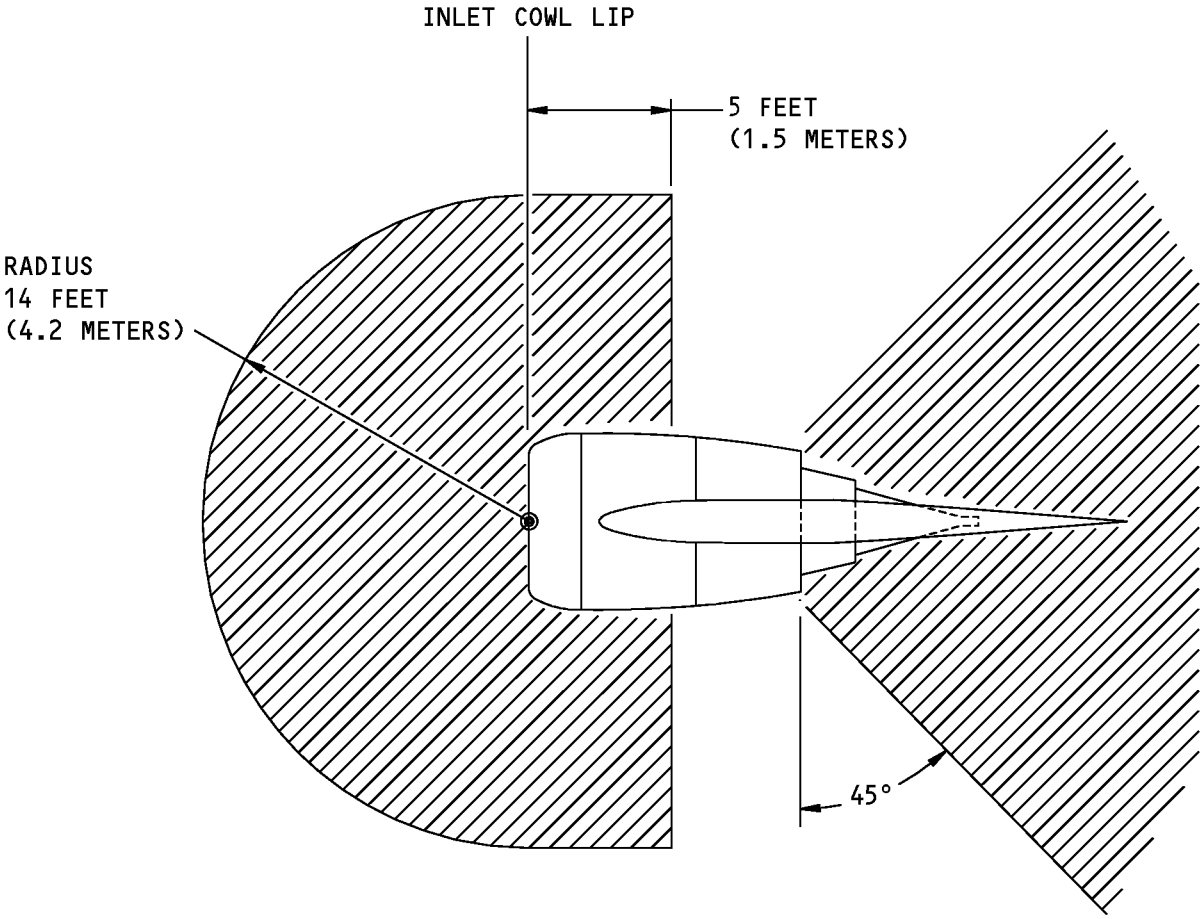
MAKE SURE THAT ALL PERSONS ARE SAFE BEFORE YOU START THE ENGINE.

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.

Breakaway Thrust - Power Hazard Area
Figure 202 (Sheet 1 of 2)/71-00-00-990-806-F00



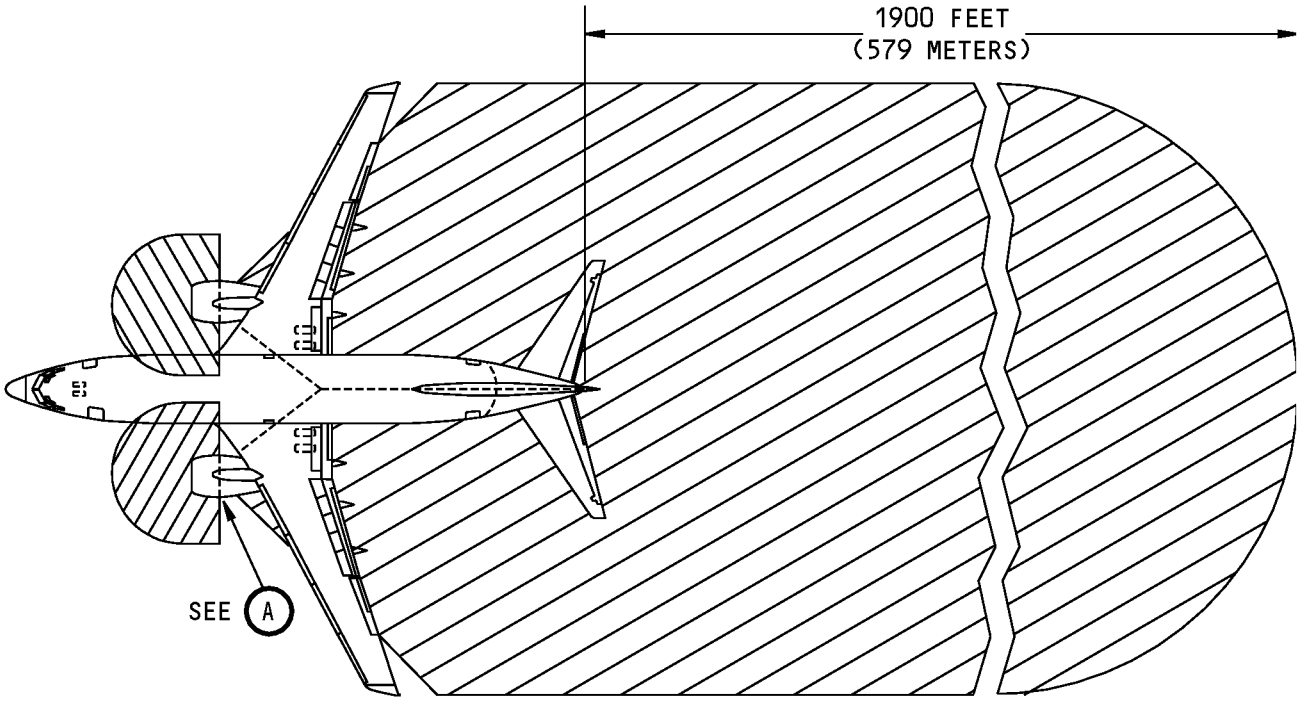
INLET HAZARD AREA

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.

G40784 S0006581719_V2

Breakaway Thrust - Power Hazard Area
Figure 202 (Sheet 2 of 2)/71-00-00-990-806-F00



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 PERCENT.

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

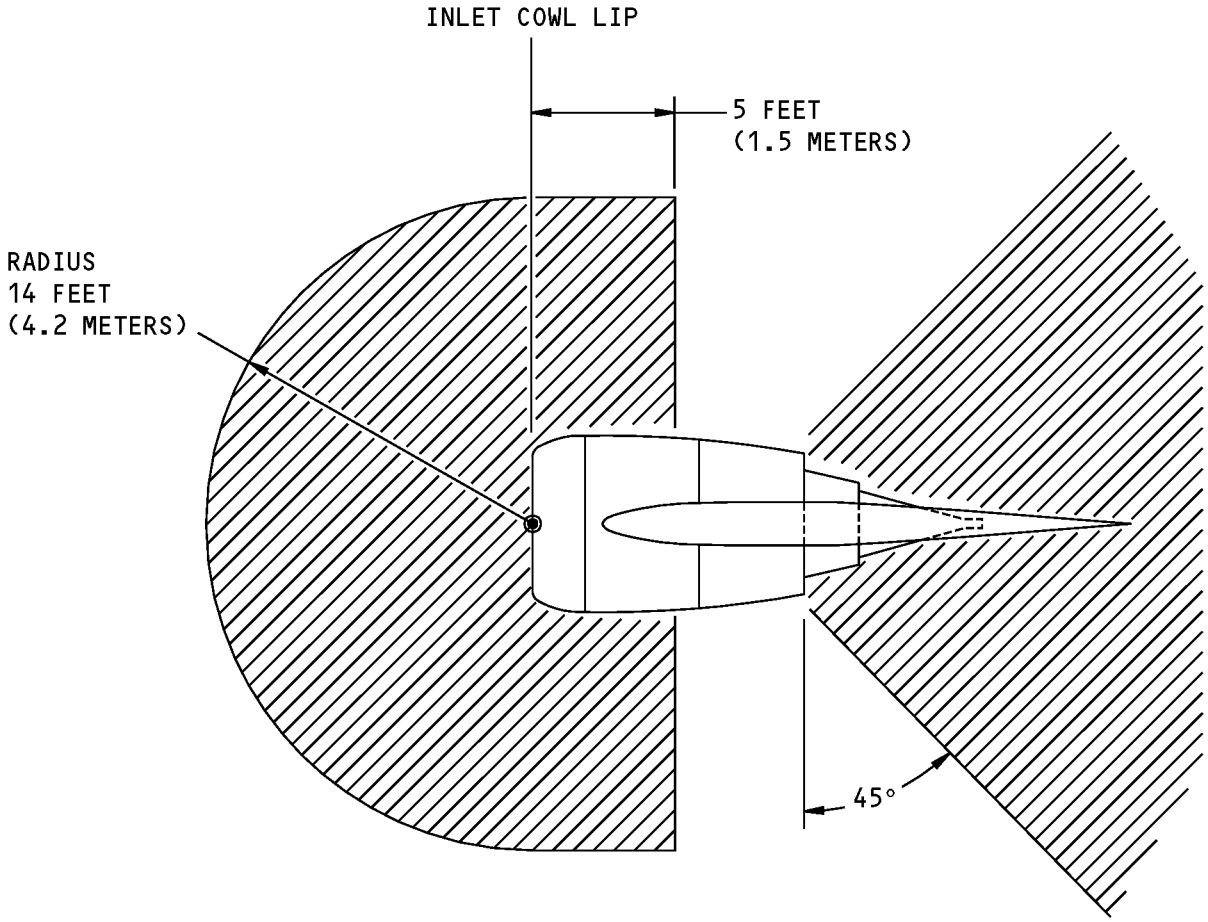
MAKE SURE THAT ALL PERSONS ARE SAFE BEFORE YOU START THE ENGINE.

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.

Takeoff Thrust - Power Hazard Area
Figure 203 (Sheet 1 of 2)/71-00-00-990-807-F00

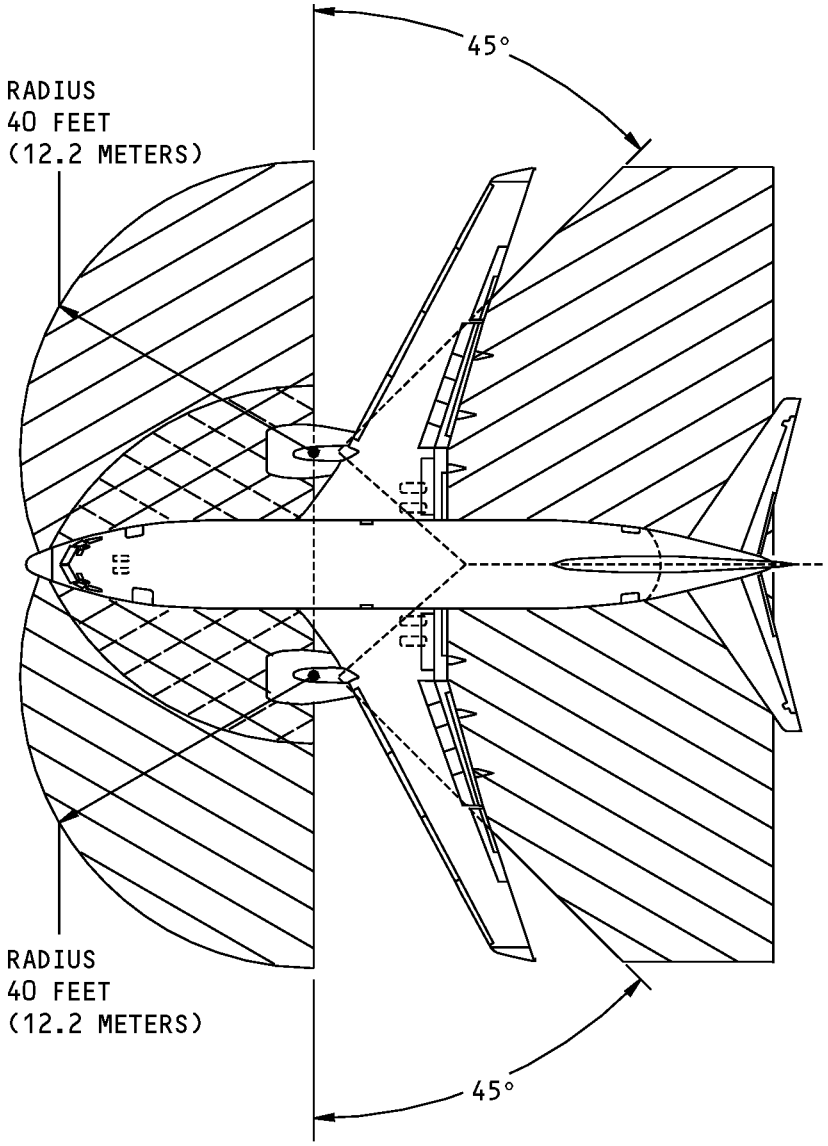


INLET HAZARD AREA

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.

Takeoff Thrust - Power Hazard Area
Figure 203 (Sheet 2 of 2)/71-00-00-990-807-F00



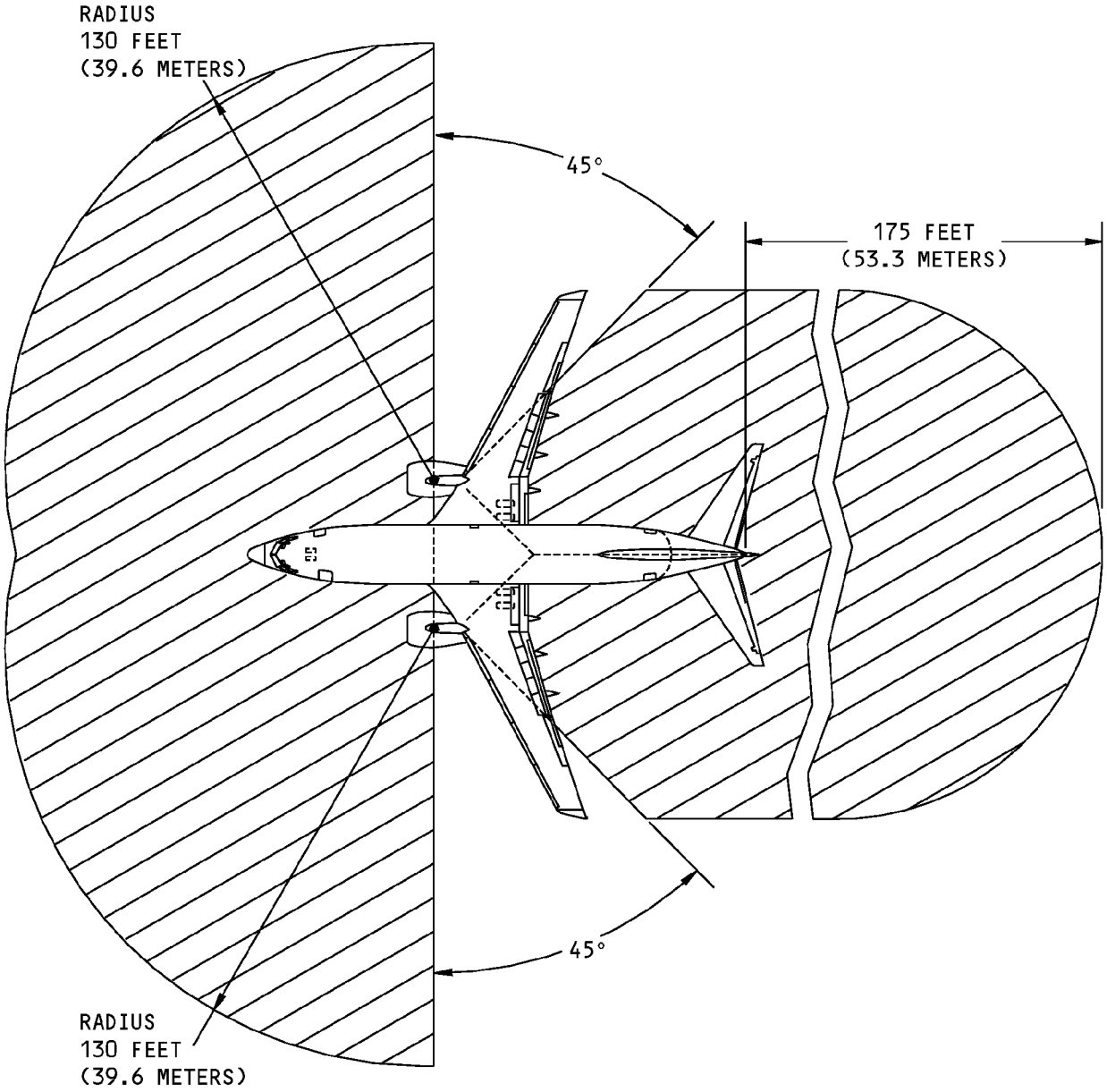
WARNING: MAKE SURE THAT ALL PERSONS ARE SAFE BEFORE YOU START THE ENGINE.

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.

Reverse Minimum Idle - Power Hazard Area
Figure 204/71-00-00-990-808-F00



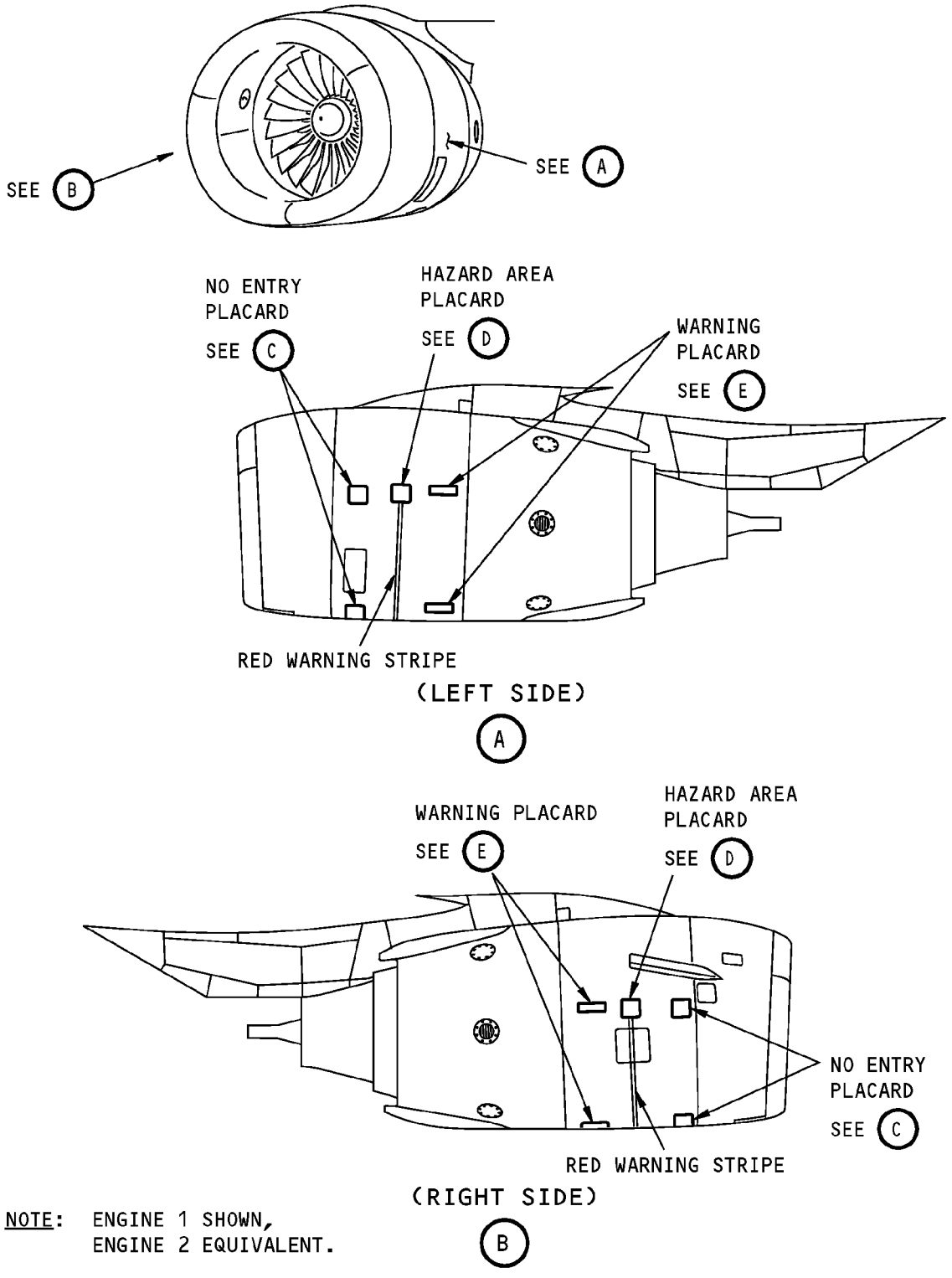
WARNING: MAKE SURE THAT ALL PERSONS ARE SAFE BEFORE YOU START THE ENGINE.

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.

Reverse Breakaway - Power Hazard Area
Figure 205/71-00-00-990-809-F00

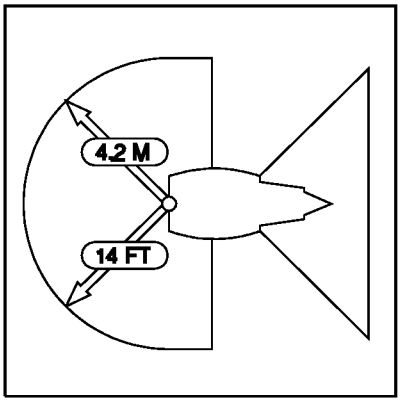


NOTE: ENGINE 1 SHOWN, ENGINE 2 EQUIVALENT.

Engine Inlet Hazard Areas
Figure 206 (Sheet 1 of 2)/71-00-00-990-810-F00

NO ENTRY PLACARD

C



HAZARD AREA PLACARD

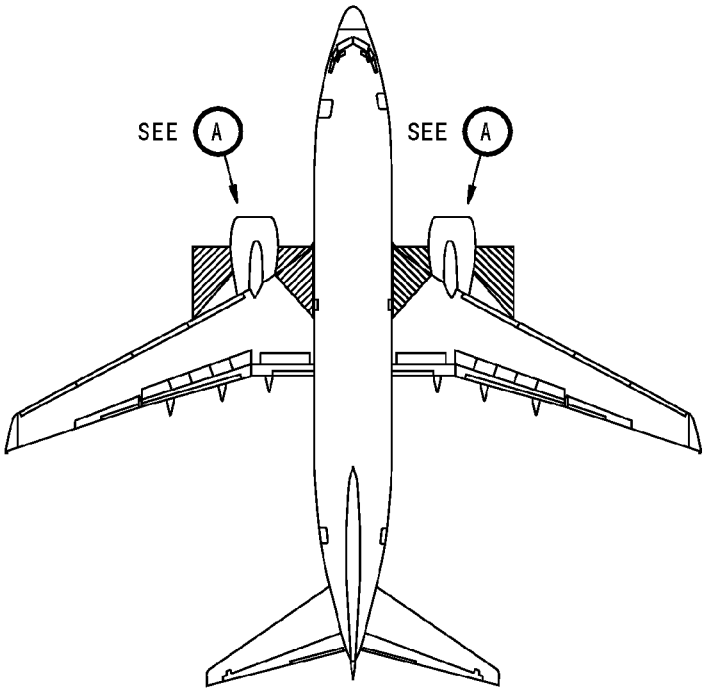
D

WARNING:
STAND CLEAR OF
HAZARD AREAS WHILE
ENGINE IS RUNNING

WARNING PLACARD

E

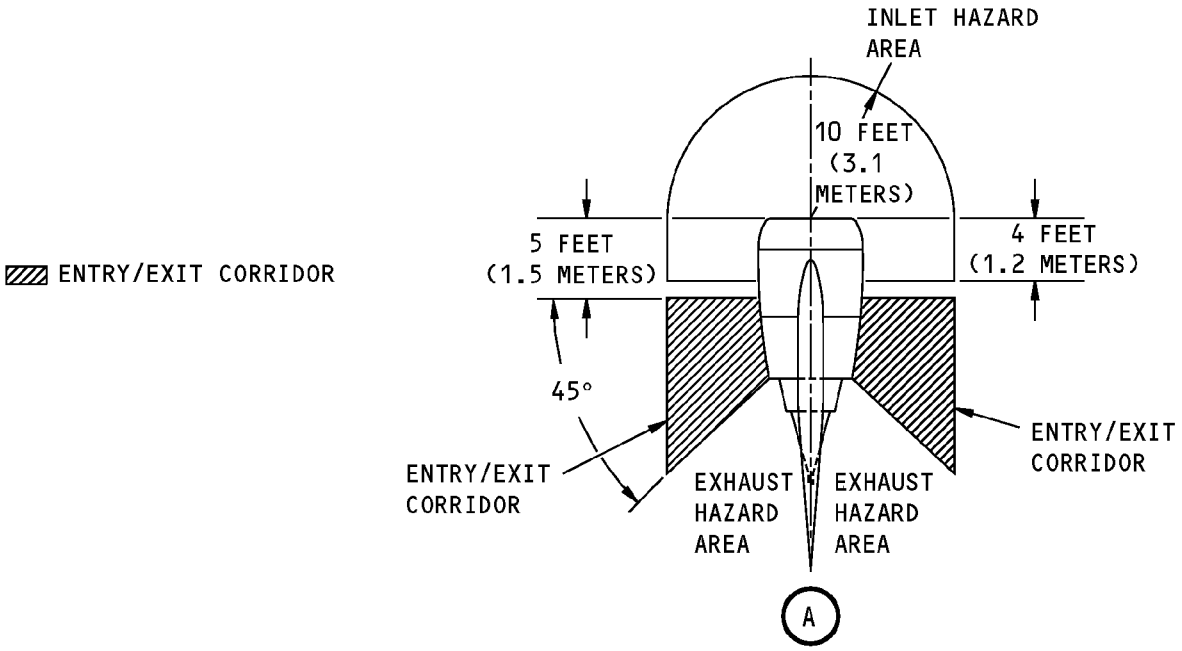
Engine Inlet Hazard Areas
Figure 206 (Sheet 2 of 2)/71-00-00-990-810-F00



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.
4. USE OF SAFETY LANYARD IS RECOMMENDED (SEE SHEET 2 AND 3).

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.

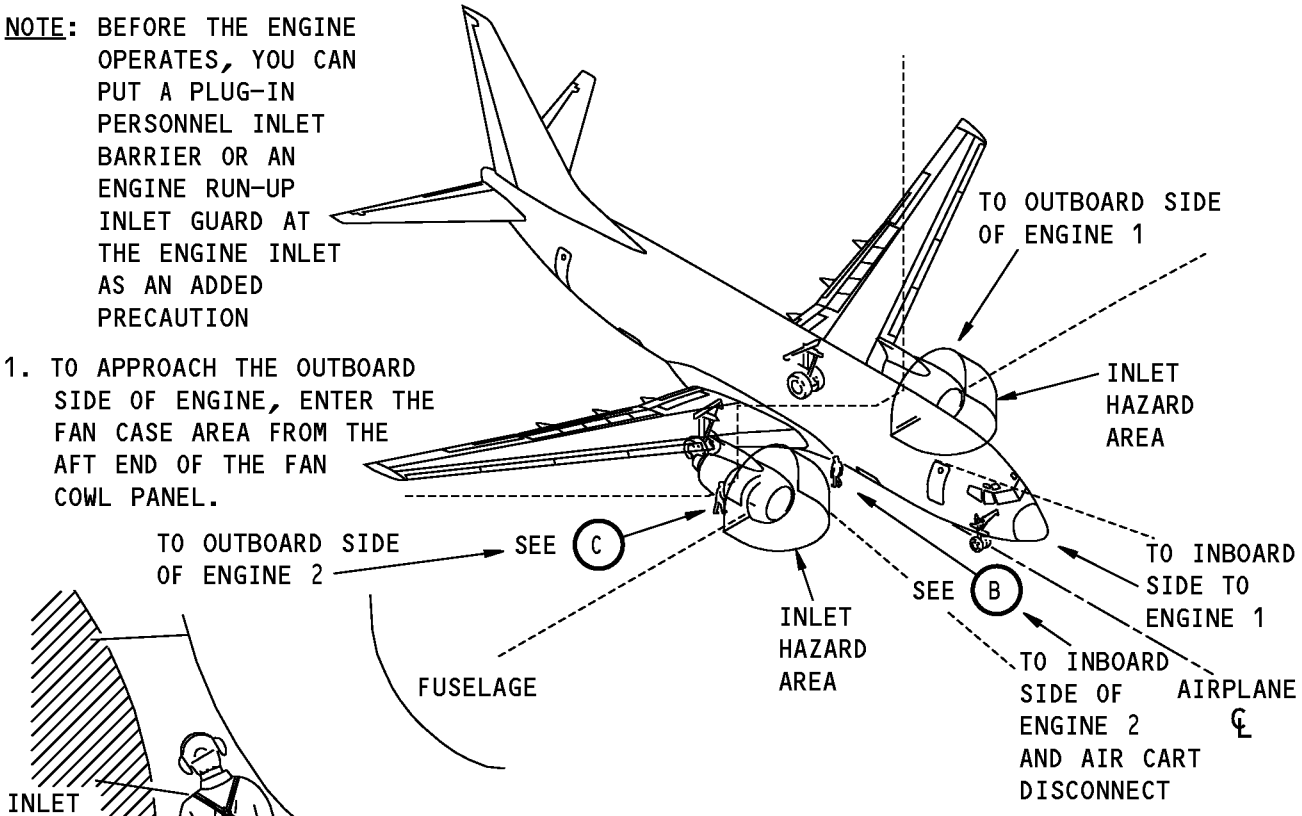


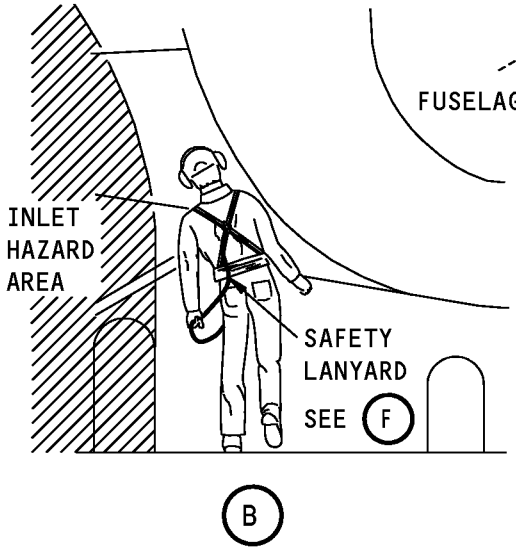
ENTRY/EXIT CORRIDOR (LOW IDLE)

Engine Maintenance Entry/Exit Corridors
Figure 207 (Sheet 1 of 3)/71-00-00-990-811-F00

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.



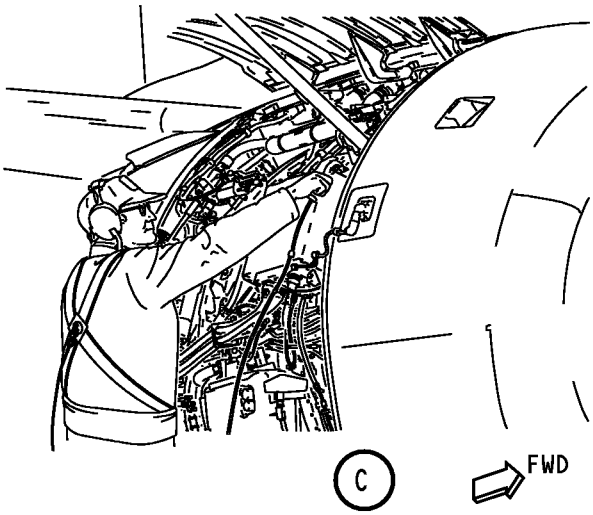


B

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.

NOTE: USE OF SAFETY LANYARD IS RECOMMENDED.

3. ATTACH A SAFETY LANYARD HOOK TO THE FORWARD ENGINE HANDLING MOUNT (SEE D FOR RIGHT SIDE LOCATION; E FOR LEFT SIDE LOCATION)

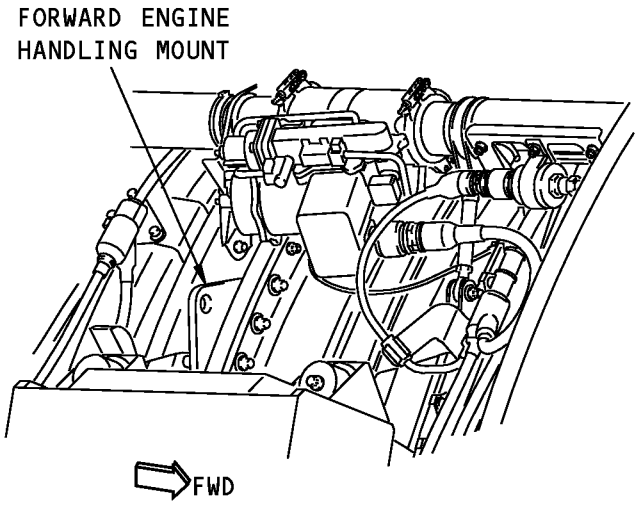


C

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

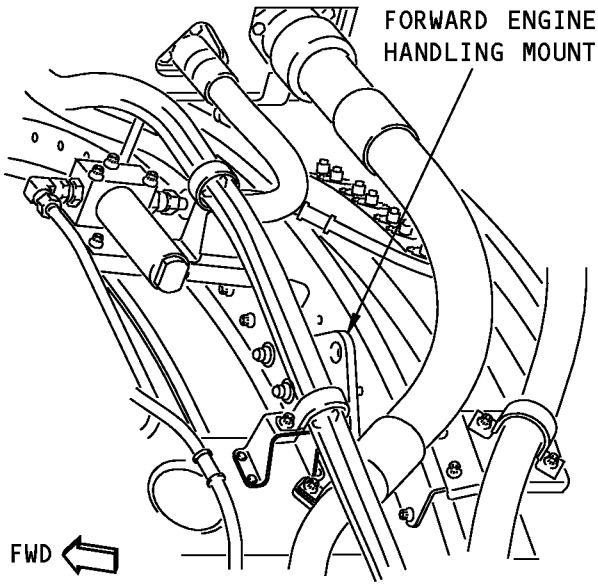
G40909 S0006581730_V2

Engine Maintenance Entry/Exit Corridors
Figure 207 (Sheet 2 of 3)/71-00-00-990-811-F00



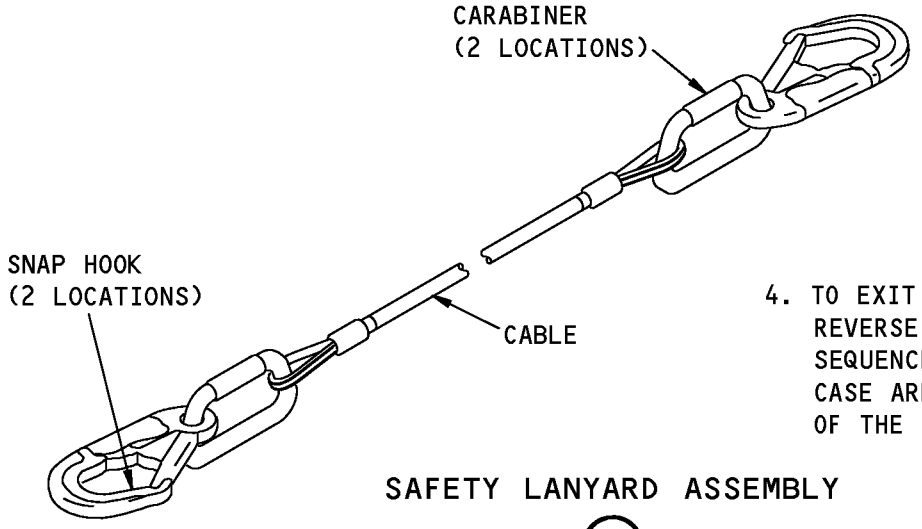
FORWARD ENGINE HANDLING MOUNT
LOCATION (RIGHT SIDE)

D



FORWARD ENGINE HANDLING MOUNT
LOCATION (LEFT SIDE)

E



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.

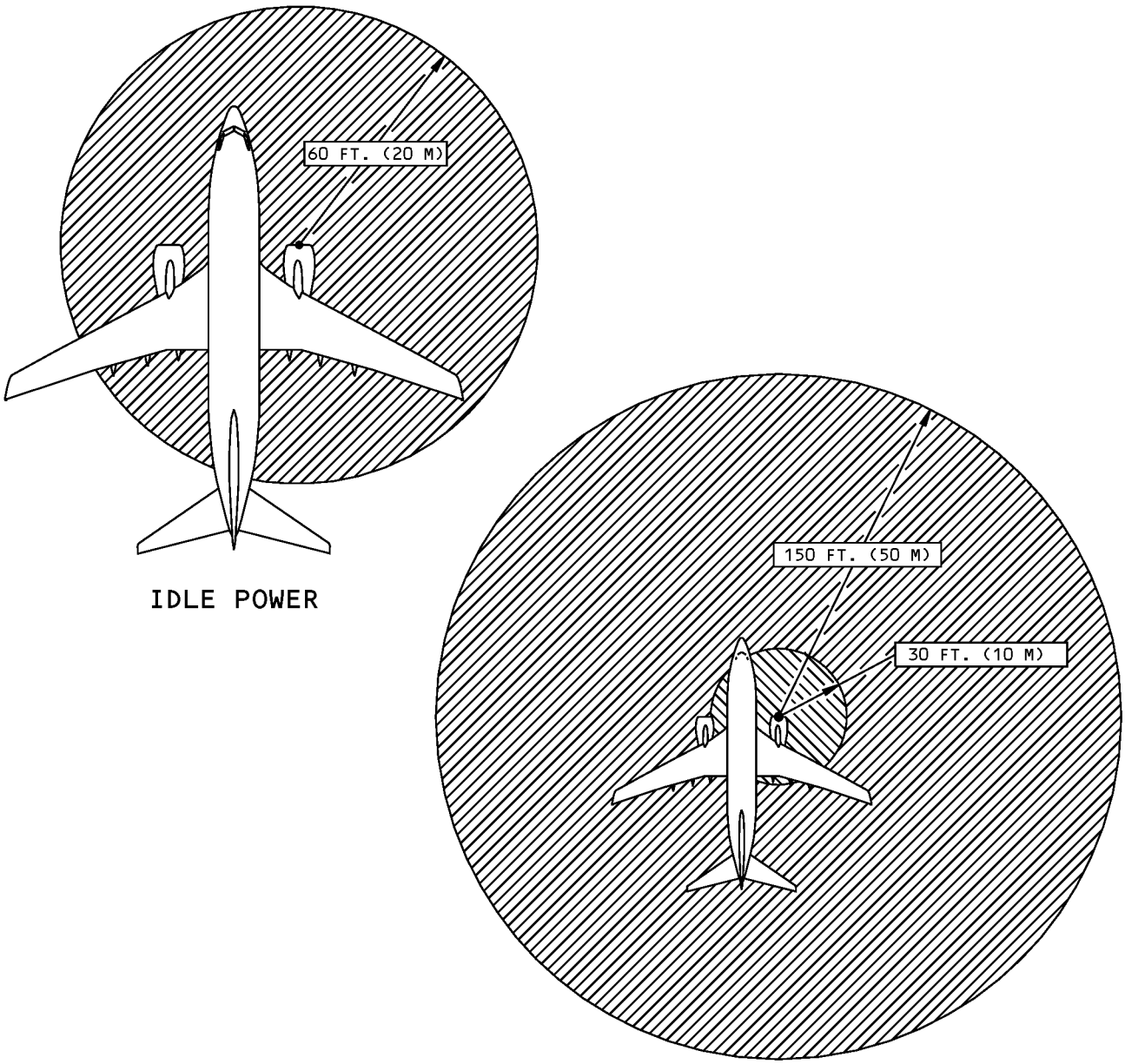
SAFETY LANYARD ASSEMBLY

F

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

G41479 S0006581731_V2

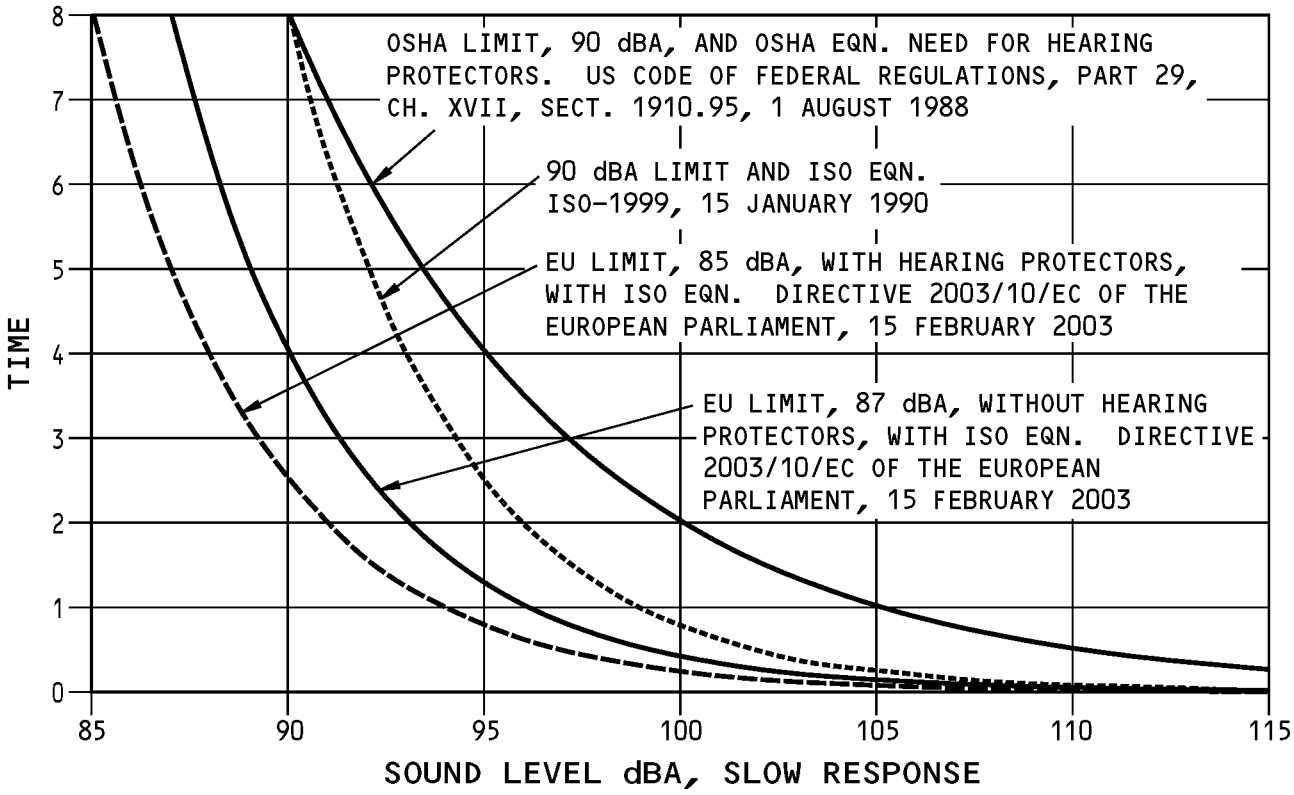
Engine Maintenance Entry/Exit Corridors
Figure 207 (Sheet 3 of 3)/71-00-00-990-811-F00



WARNING: EAR PROTECTION REQUIRED WITHIN THIS AREA.

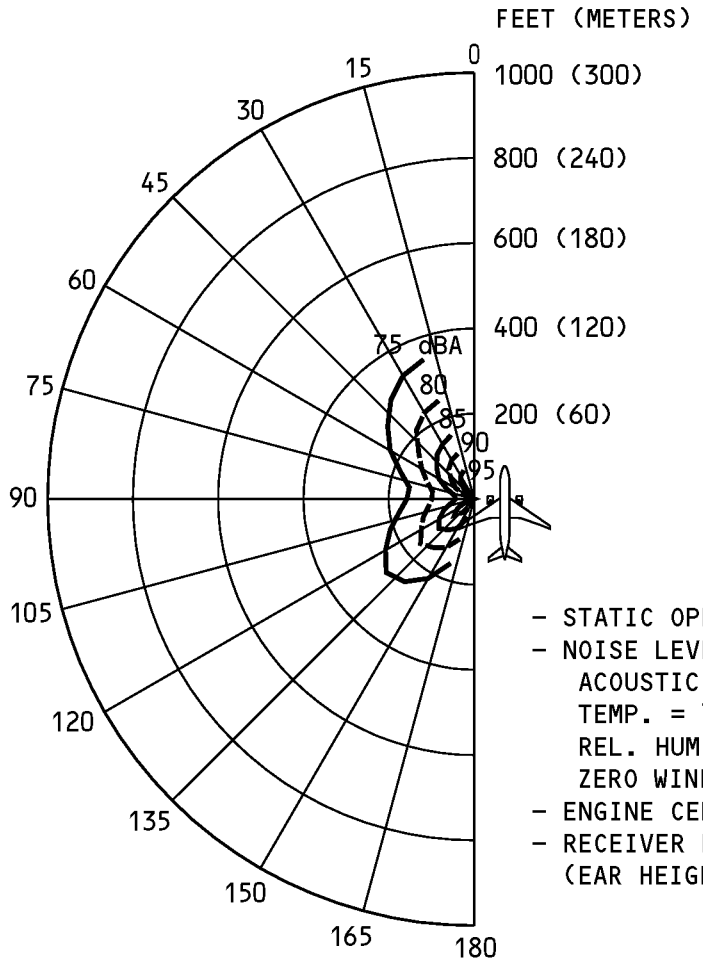
WARNING: PROLONGED EXPOSURE WITHIN THIS AREA OF MORE THAN SIX MINUTES, EVEN WITH EAR PROTECTION, CAN CAUSE EAR DAMAGE.

Engine Noise Hazard Areas
Figure 208/71-00-00-990-812-F00



Noise Time Limits
Figure 209/71-00-00-990-908-F00

SINGLE ENGINE OPERATING AT: GROUND IDLE THRUST
(ADD 3 dBA FOR TWO ENGINES) (837 LBS; N1C = 1,090 RPM)



- STATIC OPERATION, APU OFF, ECS PACKS OFF
- NOISE LEVELS OVER PAVED TERRAIN
  ACOUSTIC STANDARD DAY:
  TEMP. = 77 DEGREES F (25 DEGREES C);
  REL. HUMIDITY = 70%; 14.7 PSIA (760.2 mm Hg);
  ZERO WIND.
- ENGINE CENTERLINE HEIGHT = 9 FEET (2.7 METERS)
- RECEIVER HEIGHT = 5.25 FEET (1.60 METERS)
  (EAR HEIGHT)

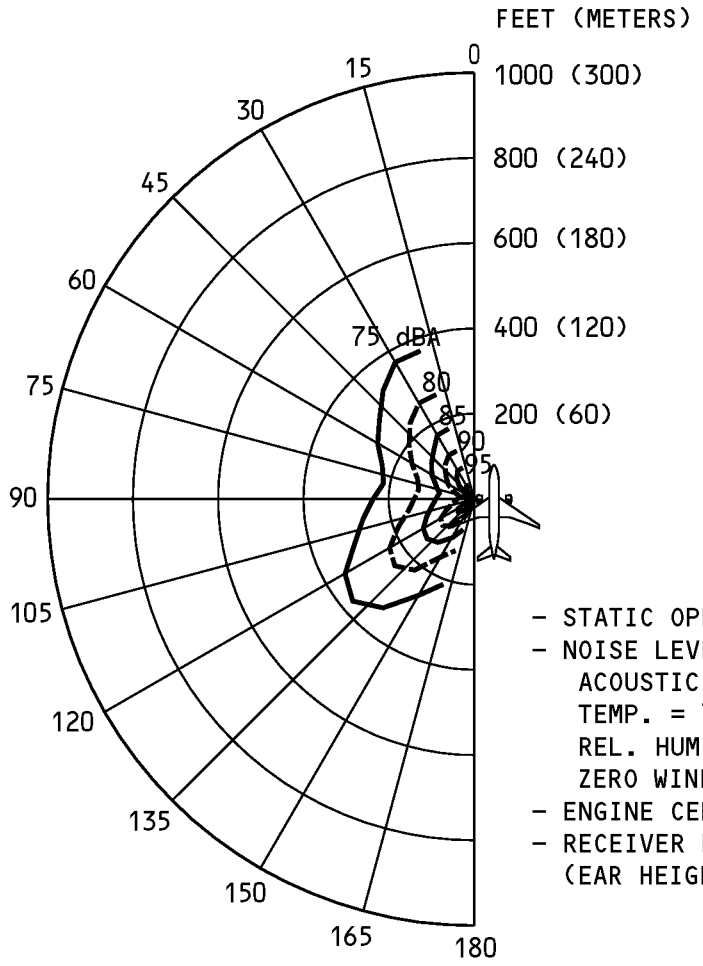
ACCURACY OF THE CONTOURS DECREASES AS THE DISTANCE FROM THE ENGINE INCREASES AND IS ABOUT ±5 dBA AT 2000 FEET (600 METERS) FROM THE ENGINE. NON-IDEALIZED METEOROLOGICAL CONDITIONS WOULD INCREASE THE TOLERANCE. BLOCKAGE OR REFLECTION EFFECTS OF THE AIRPLANE BODY AND WING OR BUILDING WALLS ARE NOT INCLUDED.

CFM56-7B GROUND RUN-UP dBA NOISE CONTOURS

N1C1090_DBA

Engine Noise Contours
Figure 210 (Sheet 1 of 3)/71-00-00-990-909-F00

SINGLE ENGINE OPERATING AT: BREAKAWAY THRUST
(ADD 3 dBA FOR TWO ENGINES) (2,291 LBS; N1C = 1,726 RPM; 174.2 KLB A/P)



- STATIC OPERATION, APU OFF, ECS PACKS OFF
- NOISE LEVELS OVER PAVED TERRAIN
  ACOUSTIC STANDARD DAY:
  TEMP. = 77 DEGREES F (25 DEGREES C);
  REL. HUMIDITY = 70%; 14.7 PSIA (760.2 mm Hg);
  ZERO WIND.
- ENGINE CENTERLINE HEIGHT = 9 FEET (2.7 METERS)
- RECEIVER HEIGHT = 5.25 FEET (1.60 METERS)
  (EAR HEIGHT)

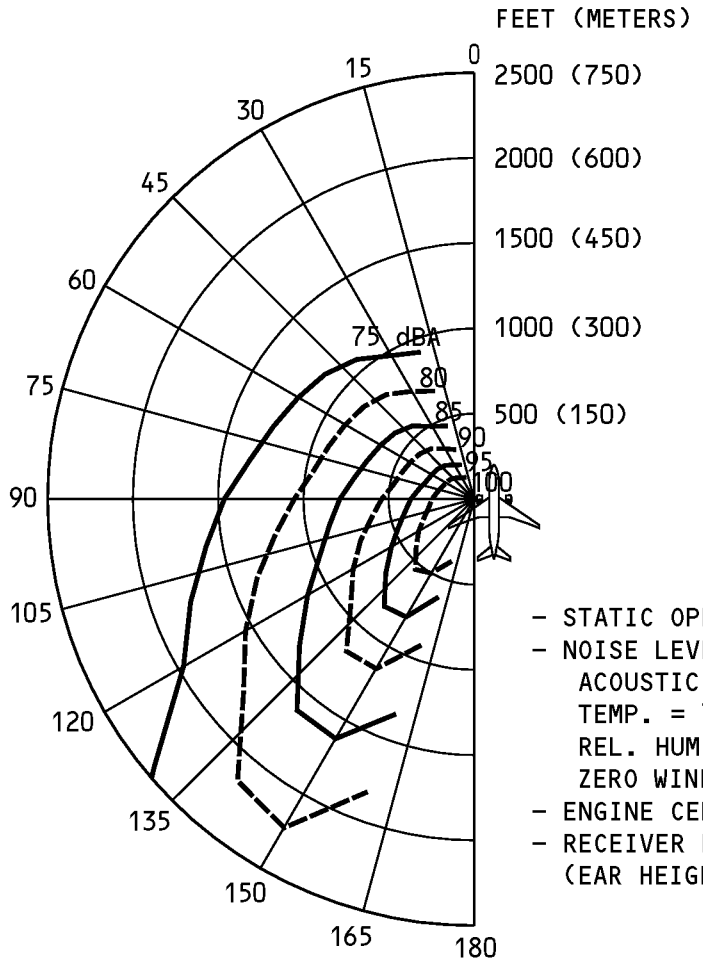
ACCURACY OF THE CONTOURS DECREASES AS THE DISTANCE FROM THE ENGINE INCREASES AND IS ABOUT ±5 dBA AT 2000 FEET (600 METERS) FROM THE ENGINE. NON-IDEALIZED METEOROLOGICAL CONDITIONS WOULD INCREASE THE TOLERANCE. BLOCKAGE OR REFLECTION EFFECTS OF THE AIRPLANE BODY AND WING OR BUILDING WALLS ARE NOT INCLUDED.

CFM56-7B GROUND RUN-UP dBA NOISE CONTOURS

N1C1726_DBA

Engine Noise Contours
Figure 210 (Sheet 2 of 3)/71-00-00-990-909-F00

SINGLE ENGINE OPERATING AT: TAKEOFF THRUST
(ADD 3 dBA FOR TWO ENGINES) (26,709 LBS; N1C = 5,127 RPM)



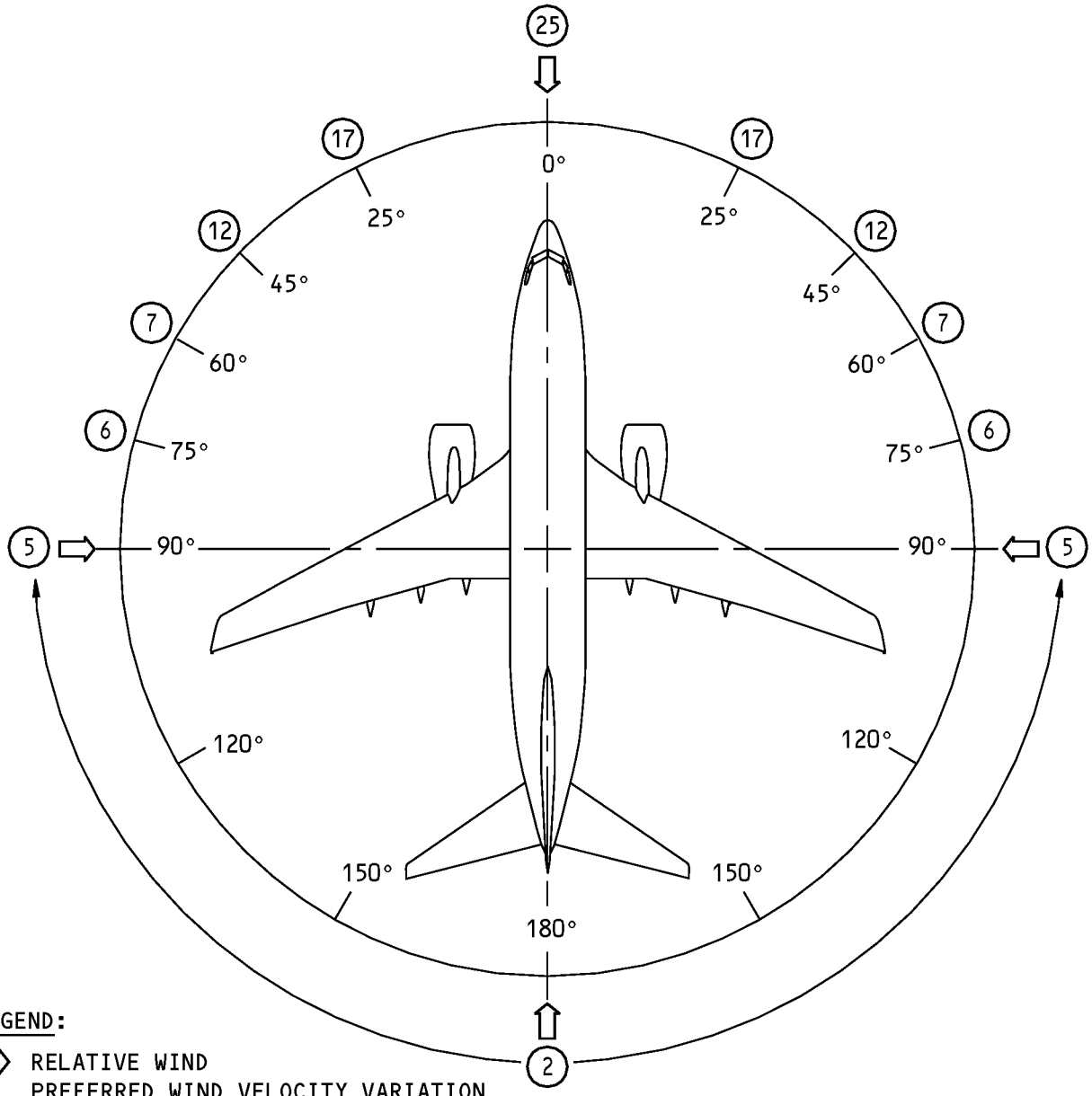
- STATIC OPERATION, APU OFF, ECS PACKS OFF
- NOISE LEVELS OVER PAVED TERRAIN
  ACOUSTIC STANDARD DAY:
  TEMP. = 77 DEGREES F (25 DEGREES C);
  REL. HUMIDITY = 70%; 14.7 PSIA (760.2 mm Hg);
  ZERO WIND.
- ENGINE CENTERLINE HEIGHT = 9 FEET (2.7 METERS)
- RECEIVER HEIGHT = 5.25 FEET (1.60 METERS)
  (EAR HEIGHT)

ACCURACY OF THE CONTOURS DECREASES AS THE DISTANCE FROM THE ENGINE INCREASES AND IS ABOUT ±5 dBA AT 2000 FEET (600 METERS) FROM THE ENGINE. NON-IDEALIZED METEOROLOGICAL CONDITIONS WOULD INCREASE THE TOLERANCE. BLOCKAGE OR REFLECTION EFFECTS OF THE AIRPLANE BODY AND WING OR BUILDING WALLS ARE NOT INCLUDED.

CFM56-7B GROUND RUN-UP dBA NOISE CONTOURS

N1C5127_DBA

Engine Noise Contours
Figure 210 (Sheet 3 of 3)/71-00-00-990-909-F00



LEGEND:

⇨ RELATIVE WIND
PREFERRED WIND VELOCITY VARIATION IS 4 KNOTS OR LESS.

(17) PREFERRED MAXIMUM WIND VELOCITY IN KNOTS.
EXAMPLE: 17 KNOTS MAXIMUM VELOCITY AT 25° RELATIVE TO AIRPLANE HEADING.

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

Preferred Relative Wind Direction and Velocity Limitations During Part Power Engine Runs
Figure 211/71-00-00-990-813-F00

TASK 71-00-00-800-806-F00

3. Engine Operation Limits

A. General

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

(2) If the engine operates above these limits, you must do the necessary maintenance for the engine.

(a) You can find the maintenance requirements in this task: POWER PLANT - INSPECTION/CHECK, PAGEBLOCK 71-00-00/601.

(b) If you do not know why the engine operated above the given limits, do the applicable fault isolation in the Fault Isolation Manual.

B. References

Reference	Title
71-00-00 P/B 601	POWER PLANT - INSPECTION/CHECK
71-00-00-210-801-F00	Inspection of the Engine After an Engine Stall or Possible Engine Stall (P/B 601)
71-00-00-800-804-F00	Inspection After Engine Operations Above the Limits and High Engine Stress (P/B 601)
71-71-00-200-801-F00	Engine Vents and Drains Inspection (P/B 601)

C. Starter Operation Limitations

SUBTASK 71-00-00-910-002-F00

(1) The starter air pressure during operation is approximately 25-55 psig (173-380 kPa) with the engine start valve open.

SUBTASK 71-00-00-910-003-F00

(2) Usual starter cycles during engine starts

(a) There is no limit to the number of engine starts that are permitted.

(b) The maximum time for each engine start must be less than 2 minutes.

(c) Wait a minimum of 10 seconds between each engine start.

SUBTASK 71-00-00-910-004-F00

(3) Extended starter operation limits

NOTE: As an example, the extended starter operation is used during the wet and dry motor procedures.

(a) For the first two extended starter operations, the maximum operation time must not be more than 15 minutes.

1) Wait a minimum of 2 minutes between each starter operation.

(b) After the two extended starter operations, the maximum time for each subsequent starter operation must not be more than 5 minutes.

1) Wait a minimum of 10 minutes between each subsequent engine start.

(c) If either of the first two extended starter operations is more than 15 minutes or if any of the subsequent starter operations is more than 5 minutes, the starter is not serviceable.

SUBTASK 71-00-00-910-005-F00

(4) Starter engagement speeds

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 30% N2 is permitted to clear a fire or after an EGT exceedance condition.

D. Engine Thrust Levels

SUBTASK 71-00-00-910-006-F00

(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) Do this task: Inspection After Engine Operations Above the Limits and High Engine Stress, TASK 71-00-00-800-804-F00.

(b) MAXIMUM CONTINUOUS

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

NOTE: This thrust is used only for emergency conditions and is the captain's decision.

(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 mode selections; approach idle and minimum idle.

2) Automatic selection between the two modes is done by the full authority digital engine control (FADEC) system based on inputs from the aircraft.

3) The idle speed changes with altitude.

4) APPROACH IDLE

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

b) To get this idle position, put the thrust levers in the idle position with the engine in the approach idle mode.

5) MINIMUM IDLE

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

b) To get this idle position, put the thrust levers to the idle position with the engine in the minimum idle mode.

c) 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 and anti-ice selection.

E. Exhaust Gas Temperature (EGT) Limits

SUBTASK 71-00-00-910-007-F00

(1) Ground start: 725 degrees C (1337 degrees F).

SUBTASK 71-00-00-910-008-F00

(2) At takeoff power, the engine EGT limit is 950 degrees C (1742 degrees F).

NOTE: Takeoff power is permitted for a total of 5 minutes.

SUBTASK 71-00-00-910-009-F00

(3) There is no time limit for EGT below 925 degrees C (1697 degrees F).

SUBTASK 71-00-00-910-010-F00

(4) A transient EGT indication to 960 degrees C (1760 degrees F) is permitted for a maximum of 20 seconds.

SUBTASK 71-00-00-910-011-F00

(5) An overtemperature condition occurs when the EGT goes above the limits.

(a) During engine operation, the indication that an overtemperature condition is or can occur is:

1) A fast increase in fuel flow

2) High engine speed, or

3) Engine temperatures that increase.

(b) When an overtemperature condition occurs or is about to occur, decrease the thrust to idle and stop the engine with the normal engine shutdown procedure.

NOTE: You must avoid the emergency stop procedure unless it is apparent that continued engine operation will cause additional engine damage.

(c) Use the common display system (CDS) to make a record of the time duration and maximum temperature for all engine overtemperature operations.

1) The temperature and the length of time will tell you what corrective action and inspection requirements are necessary.

2) Refer to this task: Engine Operation Above the Limits and High Engine Stress Inspection (TASK 71-00-00-800-804-F00).

F. Rotor Operation Speed Limits (Redline Speed Limits)

SUBTASK 71-00-00-910-012-F00

(1) The maximum N1 is 5382 rpm (104%).

SUBTASK 71-00-00-910-013-F00

(2) The maximum N2 is 15183 rpm (105%).

G. Fuel Specifications

SUBTASK 71-00-00-910-014-F00

(1) The fuels that agree with the specification that follow are authorized for use in this CFM56-7 engine (GE specification D50TF2) (Table 201).

Table 201/71-00-00-993-818-F00

SPECIFICATION	U.S. MILITARY	U.S. A.S.T.M.
PRIMARY FUELS	MIL-T-5624G Grades JP-1 and JP-5 MIL-T-83133 Grade JP-8	D 1655 Grades JET A and JET A1

SUBTASK 71-00-00-910-015-F00

(2) The engine will operate satisfactorily with all or a mixture of the fuels in the table.

H. Oil Pressure Limits

SUBTASK 71-00-00-910-016-F00

(1) The minimum oil pressure is 13 psig (76 kPa) at minimum idle.

SUBTASK 71-00-00-910-018-F00

(2) Under some conditions as given below, the oil pressure can go higher than the normal operation limits:

(a) Cold-soak conditions

(b) Sub-zero engine starts and takeoffs

SUBTASK 71-00-00-910-019-F00

(3) You must have a minimum of 13 psig (76 kPa) at minimum idle and the main oil pressure must stay in the normal operation limits as N2 increases.

SUBTASK 71-00-00-910-020-F00

(4) Use the given oil pressure limitations (Figure 212).

I. Oil Temperature Limits

SUBTASK 71-00-00-910-021-F00

(1) The maximum continuous oil temperature is 140 degrees C (284 degrees F).

SUBTASK 71-00-00-910-022-F00

(2) A limit of 311°F (155°C) is permitted for 45 minutes for all power settings.

SUBTASK 71-00-00-910-053-F00

(3) The minimum oil temperature is -40°F (-40°C) (for Type II oils).

NOTE: Refer to CFMI SB 79-001 for approved oil types and limits.

(a) Type I oils are permitted to -65°F (-54°C).

SUBTASK 71-00-00-910-023-F00

(4) After the engine has started, the oil temperature must show an increase in temperature before the takeoff thrust is set.

J. Oil Specifications

SUBTASK 71-00-00-910-024-F00

CAUTION: DO NOT USE TYPES OR BRANDS OF ENGINE OIL THAT ARE NOT APPROVED IN CFMI SB 79-001. IF YOU DO, DAMAGE TO THE ENGINE CAN OCCUR.

(1) See the CFMI Service Bulletin (SB 79-001) for engine oil specifications.

K. Oil Consumption Guidelines

SUBTASK 71-00-00-910-025-F00

(1) Normal oil consumption is less than 0.4 US quart/hour or 0.1 US gallon/hour (0.38 liters/hour).

SUBTASK 71-00-00-910-026-F00

(2) You must use the fault isolation manual (FIM) to find the cause for the oil consumption if one of the following conditions occur:

(a) The oil consumption shows a gradual increase.

(b) The oil consumption shows a sudden step increase.

(c) The oil consumption is more than 0.8 US quart/hour or 0.2 US gallon/hour (0.76 liters/hour).

SUBTASK 71-00-00-910-061-F00

(3) Use (Table 202) to find the maximum permitted oil consumption guideline.

Table 202/71-00-00-993-892-F00

MODEL 737-	WINGLET INSTALLED	FUEL ENDURANCE (HOURS)	OIL CONSUMPTION GUIDELINE US GAL/HR (LITER/HR)
HAP 101-999			
700	NO YES	11.62 14.0	0.30 (1.136) 0.25 (0.946)
HAP 001-013, 015-026, 028-054			
800	NO YES	10.75 11.23	0.33 (1.249) 0.31 (1.173)
HAP ALL			

L. Vibration Guidelines

SUBTASK 71-00-00-910-046-F00

(1) The maximum vibration level is 4.0 units as shown on the center DU.

SUBTASK 71-00-00-910-047-F00

(2) If the engine vibration is between 3.0 units and 4.0 units, refer to your airline's policy to find if it is necessary to identify and correct the cause of the vibration.

SUBTASK 71-00-00-910-048-F00

(3) If the engine vibration is 4.0 units or more on the LP rotor or 3.0 units or more on the HP rotor, use the Fault Isolation Manual to find the cause of the high vibration and do the corrective action.

M. Inlet Cowl Anti-Icing System Limits

SUBTASK 71-00-00-910-029-F00

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

SUBTASK 71-00-00-910-030-F00

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

N. Compressor Stall

SUBTASK 71-00-00-910-031-F00

(1) Compressor stalls are caused by an aerodynamic disruption of the usually smooth airflow through the compressor stages.

SUBTASK 71-00-00-910-032-F00

(2) The disruption of the airflow can be caused by these conditions:

(a) There is foreign object ingestion or damage (FOD).

(b) The airfoils are distorted.

(c) The variable stator vanes (VSV) are off-schedule.

SUBTASK 71-00-00-910-033-F00

(3) The indications that a compressor stall occurred or will occur are as follows:

(a) Unusual engine noises

(b) Flames from the engine exhaust

(c) In bad cases, flames from the engine inlet

(d) Engine performance parameters that are not stable

(e) Slow throttle response or no throttle response

(f) High EGT, or a quick EGT increase when the throttle is advanced.

SUBTASK 71-00-00-910-034-F00

CAUTION: USE CAUTION IF YOU CONTINUE TO OPERATE THE ENGINE. THE DECISION TO CONTINUE THE OPERATION OF AN ENGINE THAT HAD A BAD COMPRESSOR STALL (OR STALLS) MUST BE MADE WITH THE KNOWLEDGE THAT ADDITIONAL COMPRESSOR STALLS OR ADDITIONAL ENGINE DAMAGE CAN OCCUR.

CAUTION: IF THE ENGINE IS IN A STALL CONDITION, NEVER ADVANCE OR FAIL TO RETARD THE THRUST LEVER. ENGINE DESTRUCTION CAN OCCUR.

(4) If there is a compressor stall, do these steps:

(a) Quickly (in 1 or 2 seconds) move the forward thrust lever rearward to idle power to clear the compressor stall.

1) Make sure the EGT and the N2 decrease to normal idle indications.

2) Make sure the engine vibration levels are normal.

CAUTION: YOU MUST STOP THE ENGINE FOR THESE CONDITIONS: THERE IS A HIGH EGT, A QUICK EGT INCREASE OCCURS DURING A SLOW THROTTLE MOVEMENT, OR THE VIBRATION LEVEL IS HIGHER THAN PREVIOUS LEVELS.

(b) Slowly move the forward thrust lever forward to find if the stall will occur again.

1) Make sure the EGT, N1 and N2 indications follow the thrust lever movement and the vibration levels are satisfactory.

(c) If the compressor stall does not occur again, and the EGT and N2 indications are normal, continue with the engine operation.

(d) If the compressor stall occurs again, or if the stall does not clear satisfactorily, operate the engine at low idle power for 3 minutes and then stop the engine.

1) Record the operational conditions of the engine at the time the stall occurred to help with the troubleshooting.

(e) Do this task: (Inspection of the Engine After an Engine Stall or Possible Engine Stall, TASK 71-00-00-210-801-F00).

O. Leakage Limits

SUBTASK 71-00-00-910-035-F00

(1) For the permitted leakage from the engine vents and drains during all conditions, do this task: Engine Vents and Drains Inspection, TASK 71-71-00-200-801-F00.

P. Ignition Ground Use Limits

SUBTASK 71-00-00-910-036-F00

(1) The ignition must stay off during these conditions to prevent an overtemperature condition if there is a compressor stall:

(a) When the engine is in operation.

(b) After the engine is started.

Q. Thrust Reverser Limits

SUBTASK 71-00-00-910-037-F00

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 71-00-00-910-038-F00

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

SUBTASK 71-00-00-910-039-F00

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

(a) Motor the engine:

1) The thrust reverser halves can be open to a maximum motoring speed of 24-28% N2 rpm.

2) The fan cowl panels can be open up to a maximum motoring speed of 24-28% N2 rpm.

(b) Engine Operation:

1) The fan cowl panels can be open during an idle leak check for these conditions:

a) Forward thrust only

b) The engine is not operated at more than minimum idle rpm.

S. Start After Emergency Shutdown

SUBTASK 71-00-00-910-066-F00

(1) An emergency engine shutdown is an engine shutdown from the power levels that are more than the minimum idle because of a compressor stall or other emergency conditions.

(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.

(b) This procedure is not for flight operations.

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

SUBTASK 71-00-00-860-213-F00

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 not more than 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 in 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 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 71-00-00-800-004-F00

(1) The abbreviations that follow are used for test data, engine stations and performance parameters. These parameters must be measured and examined during engine tests and calculations (Table 203).

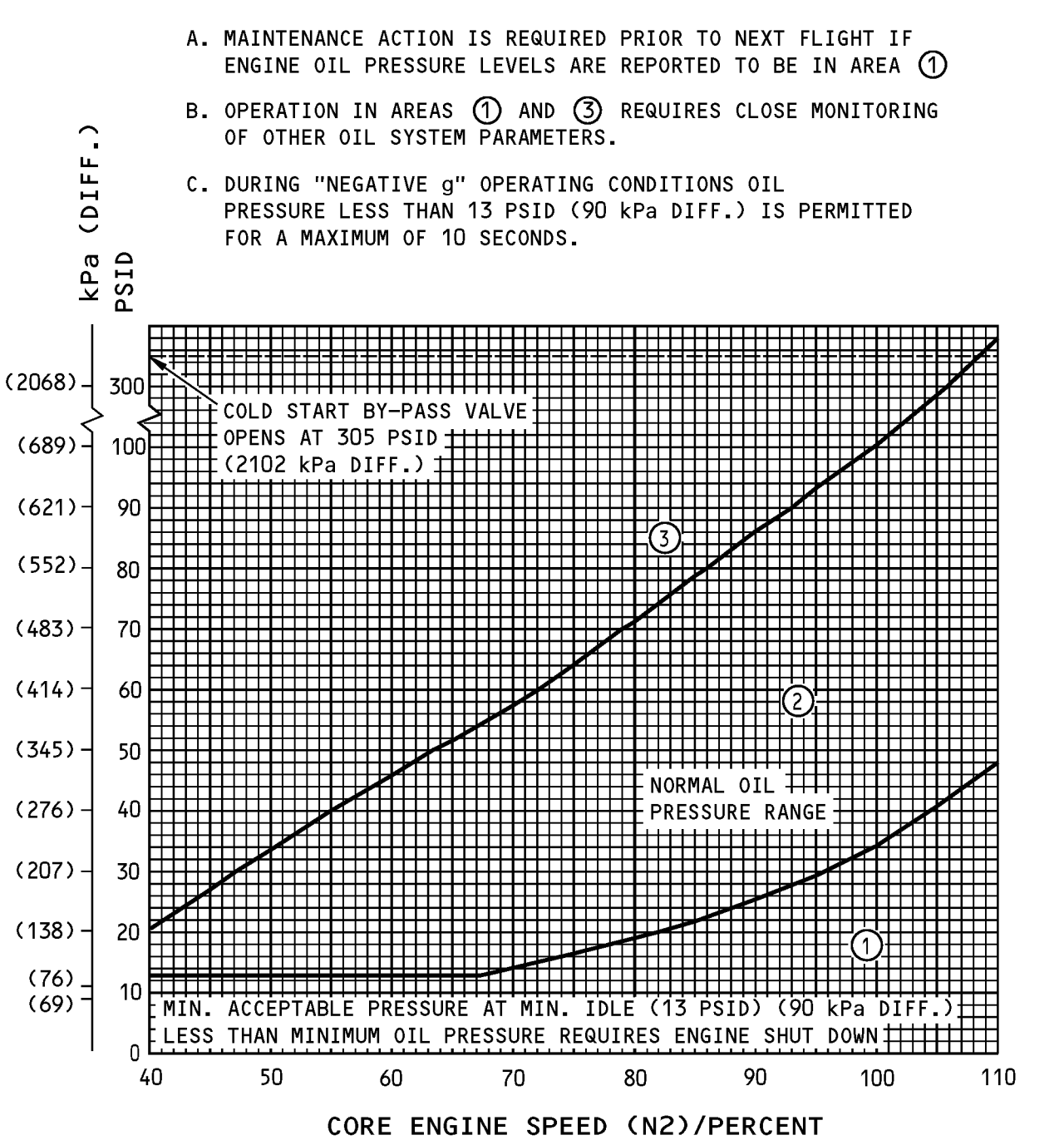
Table 203/71-00-00-993-819-F00 Engine Test Stations and Parameters

ABBREVIATIONS	TEST STATION OR PARAMETER DEFINITIONS
CDS	Common Display System
DU	Display Unit
EEC	Electronic Engine Control
EGT	Exhaust Gas Temperature
FADEC	Full Authority Digital Engine Control
FMV	Fuel Metering Valve
HMU	Hydromechanical Unit

(Continued)

ABBREVIATIONS	TEST STATION OR PARAMETER DEFINITIONS
HPSOV	High Pressure Shutoff Valve (Fuel)
LSK	Line Select Key
N1	LP System Rotor Speed
N2	HP System Rotor Speed
TRA	Thrust Lever Resolver Angle
P0	Ambient Pressure
PT25	HP Compressor Inlet Total Pressure
T25	HP Compressor Inlet Total Temperature
T3	HPC Discharge Total Temperature
VBV	Variable Bleed Valve
VSV	Variable Stator Vane
BSV	Burner Staging Valve
HPTACC	HP Turbine Active Clearance Control
LPTACC	LP Turbine Active Clearance Control
TBV	Transient Bleed Valve
OAT(TAT)	Outside Air Temperature (Total Air Temperature)
T2	Engine Inlet Total Temperature
T49.5	LPT Intermediate Total Temperature (EGT)
T5	LPT Discharge Total Temperature

END OF TASK



Oil Pressure versus N2% RPM
Figure 212/71-00-00-990-814-F00

TASK 71-00-00-700-818-F00

4. Procedure to Prepare the Engine for Operation

A. General

(1) This task has two paragraphs to help you prepare the engine for engine operation:

(a) Prepare for the Engine Operation

(b) Prepare the Engine Before a Start in Cold Weather

(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.

(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
12-11-00-650-802	Pressure Refuel Procedure (P/B 301)
12-13-11-600-801	Replenish the Engine Oil (P/B 301)
12-13-21-200-801	IDG Oil Level Check (P/B 301)
12-13-21-600-801	IDG Servicing (Oil Fill) (P/B 301)
24-22-00-860-811	Supply Electrical Power (P/B 201)
27-81-00-040-801	Deactivate the Leading Edge Flaps and Slats (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)
71-00-00 P/B 501	POWER PLANT - ADJUSTMENT/TEST
80-11-01-610-801-F00	Fill the Starter With Engine Oil (P/B 301)
80-11-01-680-801-F00	Drain the Starter Oil (P/B 301)

C. Tools/Equipment

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

Reference	Description
COM-1502	Chocks - Wheel (Part #: W88, Supplier: 9L752, A/P Effectivity: 737-ALL) (Part #: W92, Supplier: 9L752, A/P Effectivity: 737-ALL)
STD-1122	Thermometer - Alcohol, Ambient Temperature

D. Consumable Materials

Reference	Description	Specification
G50169 [CP2499]	Fluid - Deicer - KilFrost ABC3	

E. Access Panels

Number	Name/Location
413BL	Chip Detector/Pressure Relief Door, Engine 1
423BL	Chip Detector/Pressure Relief Door, Engine 2

F. Prepare for the Engine Operation

SUBTASK 71-00-00-860-014-F00

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

(a) 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.

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

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

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

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

(b) Record the airplane gross weight.

SUBTASK 71-00-00-860-015-F00

(2) If the first engine is to be set at or near takeoff (T/O) power, do these steps to use the data (Table 204):

(a) Get the center of gravity 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).

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

4) Make sure 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.

Table 204/71-00-00-993-881-F00

Minimum Gross Weight For Engine Operation (High Power)				
Airplane Model	Thrust		Minimum Gross Weight Lbs (Kgs)	CG (%MAC)
	Test Engine	Opposite Engine Percent N1		
HAP 101-999				
737-700	7B20	0	101,000 (45,820)	< 20
		0	87,000 (39,470)	< 15
		55 %N1	87,000 (39,470)	< 28
		62 %N1	90,000 (40,830)	-
		Takeoff Power	106,000 (48,080)	-
	7B22	0	108,000 (49,990)	< 20
		0	93,000 (42,190)	< 15
		55 %N1	92,000 (41,730)	< 27
		62 %N1	94,000 (42,640)	-
		Takeoff Power	114,000 (51,710)	-
	7B24	0	121,000 (54,890)	< 20
		0	104,000 (47,180)	< 15
		55 %N1	102,000 (46,270)	< 26
		62 %N1	104,000 (47,180)	< 31
		68 %N1	107,000 (48,540)	-
		Takeoff Power	127,000 (57,610)	-
	7B26	0	130,000 (58,970)	< 20
		0	112,000 (50,810)	< 15
		55 %N1	108,000 (48,990)	< 25
		62 %N1	111,000 (50,350)	< 30
		68 %N1	114,000 (51,710)	-
		Takeoff Power	137,000 (62,150)	-
HAP 001-013, 015-026, 028-054				
		0	136,000 (61,690)	< 20
		0	117,500 (53,300)	< 15

HAP 001-013, 015-026, 028-054 (Continued)

(Continued)

Minimum Gross Weight For Engine Operation (High Power)				
Airplane Model	Thrust		Minimum Gross Weight Lbs (Kgs)	CG (%MAC)
	Test Engine	Opposite Engine Percent N1		
737-800	7B24	55 %N1	92,000 (41,730)	< 20
		62 %N1	95,000 (43,100)	< 26
		68 %N1	98,000 (44,460)	< 32
		Takeoff Power	122,000 (55,340)	-
	7B26	0	127,000 (57,610)	< 15
		0	112,000 (50,810)	< 10
		62 %N1	102,000 (46,270)	< 24
		73 %N1	110,000 (49,990)	-
		Takeoff Power	132,000 (59,880)	-
	7B27	0	134,000 (60,790)	< 15
		0	117,000 (53,070)	< 10
		62 %N1	106,000 (48,080)	< 23
		73 %N1	115,000 (52,510)	< 33
		Takeoff Power	138,000 (62,600)	-
HAP ALL				

(d) If the engine(s) are to be operated at part power (not more than 75% N1), then use (Table 205).

NOTE: An approximate Manufacturer's Empty Weight (MEW) is used.

Table 205/71-00-00-993-891-F00

Minimum Gross Weight For Engine Operation (Part Power) One Or Two Engines Set To Not More Than 75% N1		
Airplane Model	Minimum Gross Weight Lbs (Kgs)	CG (%MAC)
HAP 101-999		
737-700	79,000 (35,834)	< 26
HAP 001-013, 015-026, 028-054		
737-800	85,000 (38,555)	< 24
HAP ALL		

SUBTASK 71-00-00-080-001-F00

WARNING: MAKE SURE THAT ALL ENGINE OPERATION AREAS ARE AS CLEAN AS POSSIBLE. ALL RAMPS, TAXIWAYS, RUNWAYS, AND OTHER OPERATIONS AREAS MUST BE VERY CLEAN TO PREVENT DAMAGE TO THE ENGINE, AIRPLANE AND INJURY TO PERSONS CAN OCCUR.

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

SUBTASK 71-00-00-080-002-F00

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

SUBTASK 71-00-00-860-016-F00

CAUTION: DO NOT OPERATE THE AIRPLANE HYDRAULIC SYSTEMS UNLESS THE FUEL QUANTITY IS HIGHER THAN THE LIMITS BELOW. IF YOU OPERATE THE HYDRAULIC SYSTEMS WITHOUT SUFFICIENT FUEL TO COVER THE HYDRAULIC HEAT EXCHANGERS, YOU CAN CAUSE DAMAGE TO THE AIRPLANE HYDRAULIC SYSTEMS.

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

(a) A minimum of 1675 pounds (760 kilograms) 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 12-11-00-650-802) .

SUBTASK 71-00-00-860-017-F00

(6) If not already done, do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 71-00-00-560-004-F00

(7) Put the airplane in a position to limit the amount of crosswind into the engine inlet. Preferred relative wind direction and wind velocity limits during low power engine runs are shown in (Figure 211).

CAUTION: IF ENGINE RUNS ARE DONE OUT OF THE PREFERRED LIMITS FIGURE 211, MONITOR N1, N2 AND EGT. ENGINE OVERHEAT OR STALL CAN OCCUR AND CAUSE ENGINE DAMAGE.

(a) Wind Limitations During Engine Ground Operations

1) Static ground operation of the engine is not permitted for these conditions:

a) Power settings that are more than 70%N1, and

b) Crosswinds that are more than 15 knots, or

c) All tailwinds that are more than 5 knots.

SUBTASK 71-00-00-860-018-F00

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

SUBTASK 71-00-00-860-019-F00

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

SUBTASK 71-00-00-480-001-F00

WARNING: MAKE SURE THAT THE LANDING GEAR GROUND SAFETIES AND THE WHEEL CHOCKS ARE IN THEIR POSITION. IF YOU DO NOT DO THIS, DAMAGE TO THE AIRPLANE AND INJURY TO PERSONS CAN OCCUR.

(10) Install the chocks, COM-1502 in front and to the rear of the nose gear and all the main gear tires .

(a) Make sure that the forward wheel chocks are 6-12 inches (152-305 mm) in front of the tires.

(b) Make sure that the aft wheel chocks are immediately behind the wheels, but do not touch the tires.

SUBTASK 71-00-00-210-002-F00

(11) 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

SUBTASK 71-00-00-210-003-F00

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

(a) Make sure the thrust reverser is stowed.

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

1) The fan cowl panels can be open for engine operation. Refer to the cowling limitations in this task: Engine Operation Limits (TASK 71-00-00-800-806-F00).

(c) If you find ice on these parts, you must remove the ice from the engine with hot air. Refer to this paragraph: Prepare the Engine Before a Start in Cold Weather.

SUBTASK 71-00-00-210-004-F00

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

SUBTASK 71-00-00-210-005-F00

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

(a) If it is low, do this task: Replenish the Engine Oil, TASK 12-13-11-600-801.

(b) The minimum indicated oil level necessary for airplane dispatch is 60% full plus the oil usage. To identify the necessary oil level for dispatch, refer to the procedure (TASK 12-13-11-600-801).

SUBTASK 71-00-00-210-006-F00

(15) Do this task: IDG Oil Level Check, TASK 12-13-21-200-801.

(a) If it is low, do this task: IDG Servicing (Oil Fill), TASK 12-13-21-600-801.

SUBTASK 71-00-00-860-020-F00

(16) Make sure these levers are in the correct position (Figure 213).

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

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

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

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

SUBTASK 71-00-00-860-021-F00

(17) 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

SUBTASK 71-00-00-860-178-F00

WARNING: MAKE SURE YOU OPEN THE CIRCUIT BREAKER FOR THE WEATHER RADAR SYSTEM BEFORE YOU RUN THE ENGINE. IF YOU DO NOT, YOU CAN CAUSE SERIOUS INJURY OR DEATH TO PERSONS AND DAMAGE TO EQUIPMENT.

(18) Open this circuit breaker and install safety tag:

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	13	C00120	WEATHER RADAR RT

SUBTASK 71-00-00-860-022-F00

(19) 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 71-00-00-860-023-F00

(20) Make sure 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 71-00-00-860-024-F00

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

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

SUBTASK 71-00-00-860-025-F00

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

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

SUBTASK 71-00-00-970-054-F00

(23) Do this check of the outside air temperature (OAT) in the 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 EEC BITE.

CAUTION: DO NOT USE THE TOTAL AIR TEMPERATURE (TAT) INDICATION FROM THE AIRPLANE FOR THE AMBIENT AIR TEMPERATURE. THE TAT CAN CAUSE AN INCORRECT N1 TARGET SELECTION.

(CAUTION PRECEDES)

CAUTION: DO NOT TAKE A MERCURY THERMOMETER ON THE AIRPLANE. MERCURY (FROM A BROKEN THERMOMETER) CAN CAUSE DAMAGE TO THE AIRPLANE COMPONENTS.

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

(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 71-00-00-860-175-F00

(24) If you operate the engine at high power, put the Probe Heat "A" or ''B'' switch on the overhead panel, P5, in 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 71-00-00-860-026-F00

WARNING: IF YOU MUST RETRACT THE FLAPS, MAKE SURE THAT PERSONS AND EQUIPMENT ARE CLEAR OF THE LEADING EDGE, THE TRAILING EDGE FLAPS AND FLAP DRIVE MECHANISMS. SERIOUS INJURY AND DAMAGE TO EQUIPMENT COULD OCCUR.

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

(25) If you operate the engine at high power, make sure the flaps are fully retracted.

(a) If the flaps are not retracted, do this task: Leading Edge Flaps and Slats Retraction, TASK 27-81-00-860-804.

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

SUBTASK 71-00-00-780-001-F00

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.

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

G. Prepare the Engine Before a Start in Cold Weather

SUBTASK 71-00-00-860-174-F00

(1) Make sure that the minimum oil temperature for the engine and the starter are in these limits:

(a) Engine Oil Type (CFMI SB 79-001)

1) Type II oils are permitted to -40 degrees C (-40 degrees F).

2) Type I oils are permitted to -54 degrees C (-65 degrees F).

(b) Starters (GEAE part number 1815M36P04) are permitted to a minimum of -40 degrees C (-40 degrees F) with Type I or II engine oils because of possible damage to turbine seals.

1) If the oil in the starter is below the limit, do these steps:

a) To drain the cold oil in the starter, do this task: Drain the Starter Oil, TASK 80-11-01-680-801-F00.

b) To fill the starter with warm oil, do this task: Fill the Starter With Engine Oil, TASK 80-11-01-610-801-F00.

(c) Starters (GEAE part number 1815M36P05 and on) are permitted to minimum of -54 degrees C (-65 degrees F).

SUBTASK 71-00-00-860-027-F00

(2) It is usually not necessary to increase the temperature of the engine before you do a start in cold weather. The procedure to start the engine will usually be sufficient, but it is possible that heat will be necessary for the conditions that follow:

(a) The rotors are locked with ice.

(b) Ice and snow are on the inlet cowl, fan cowl, and the external surfaces and joints of the thrust reversers.

(c) Ice is on the acoustic liners of the inlet cowl, the fan blades and the primary nozzle.

(d) The airplane has cold-soaked at -40°F (-40°C) or colder for more than one hour.

1) Refer to the heating procedure for HMUs with fluorocarbon seals (SUBTASK 71-00-00-880-003-F00).

SUBTASK 71-00-00-880-001-F00

(3) If snow or ice holds the fan cowl panels or the thrust reverser closed, apply heat to remove the snow and ice.

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

SUBTASK 71-00-00-080-003-F00

(4) Remove the all covers from the engine.

SUBTASK 71-00-00-860-028-F00

(5) Before you start the engine, make sure the N1 rotor turns freely.

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

SUBTASK 71-00-00-880-002-F00

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

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

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

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

SUBTASK 71-00-00-660-001-F00

(7) If it is necessary, deice or anti-ice the fan blades with the KilFrost ABC3 fluid, G50169 [CP2499].

WARNING: DEICING/ANTI-ICING FLUID IS DANGEROUS. USE RUBBER GLOVES AND EYE PROTECTION. KEEP THE FLUID AWAY FROM HEAT AND AN OPEN FLAME. PROVIDE ADEQUATE VENTILATION.

(WARNING PRECEDES)

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

(a) Prepare the deicing/anti-icing fluid with (Table 206):

NOTE: Hot water above 60°C (140°F) is more efficient.

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

Table 206/71-00-00-993-899-F00

CONCENTRATION OF HEATED WATER/DEICER FLUID (VOL %)		
OAT Deg C (Deg F)	**DEICING**	**ANTI-ICING**
-3 (27) and above	WATER HEATED TO 60 deg C MINIMUM OR HEATED MIX OF DEICER WITH WATER	50/50 WATER/DEICER
-4 to -7 (19 to 26)	50/50 HEATED WATER/DEICER	50/50 WATER/DEICER
-8 to -14 (7 to 18)	50/50 HEATED WATER/DEICER	25/75 WATER/DEICER
-15 to -17 (1 to 6)	50/50 HEATED WATER/DEICER	100% DEICER
-18 to -25 (-13 to 0)	75/25 HEATED WATER/DEICER	100% DEICER
-26 (-14) and below	SAE TYPE II FLUIDS CAN BE USED AS DEICING/ANTI- ICING AGENTS, PROVIDED A 7 deg C (13 deg F) 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 71-00-00-860-029-F00

(8) If the N2 rotor does not turn freely or the START VLV OPEN maintenance message does not come on after the start switch is put to the GRD position, apply external heat to the start valve or the engine (as given above) to remove all snow and ice.

SUBTASK 71-00-00-860-031-F00

(9) If the ambient temperature is less than -35 degrees C (-31 degrees F), let the engine run at the idle speed for a minimum of 2 minutes.

SUBTASK 71-00-00-860-032-F00

(10) 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.

(b) It can take some minutes for the oil pressure to become normal.

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

1) Find and correct the cause per the FIM.

(d) More warm-up time for the display units can be necessary before engine indications correctly show changing values. The display units can show less bright than normal.

SUBTASK 71-00-00-860-033-F00

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

(a) Turn on the inlet cowl TAI system immediately after the engine starts.

1) Put the applicable ENG 1 ANTI-ICE or ENG 2 ANTI-ICE switch to the ON position.

(b) If the engine is to be run for a long time, increase the engine speed to 70% N1 for 15 seconds at 30 minute intervals.

NOTE: This will prevent ice accumulations.

(c) If you do some of the tests in POWER PLANT - ADJUSTMENT/TEST, PAGEBLOCK 71-00-00/501, it can be necessary to turn off the engine anti-ice system.

1) Engine test data is done with no bleed air off-takes and no electrical loads.

SUBTASK 71-00-00-880-003-F00

(12) ENGINES POST-CFMI-SB 73-096

(HMU WITH FLUOROCARBON SEALS);

If the engines have been cold-soaked more than one hour at -40°F (-40°C) or below ambient temperature, it is necessary to do this engine/HMU heating procedure to prevent fuel leakage during the engine start:

(a) At the left fan cowl panel, use a flat blade screwdriver and do this step:

1) Open the applicable doors:

Number	Name/Location
413BL	Chip Detector/Pressure Relief Door, Engine 1
423BL	Chip Detector/Pressure Relief Door, Engine 2

(b) Using a Firebird BT400-46 Portable Diesel Heater, or equivalent system, heat the engine.

NOTE: For this procedure, the recommended heater is the Firebird BT400-46 Portable Diesel Heater from Aerotech Herman Nelson Incorporated, though an equivalent system is acceptable.

1) If it is necessary to preheat the heater, refer to manufacturer's operation manual.

2) With the heater at the engine, insert the flexible duct into the opening of the access door, and secure in the 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.

3) Adjust the temperature setting of the heater outlet air to not more than 175°F (79.44°C). Operate the heater per the manufacturer's operation manual.

(c) From the flight compartment, monitor the applicable oil temperature indicator. When this temperature is 70°F (21.1°C) or more, (this should take approximately 5 to 10 minutes depending on outside temperature), stop and remove the heater.

1) Remove the flexible duct from the chip detector access opening

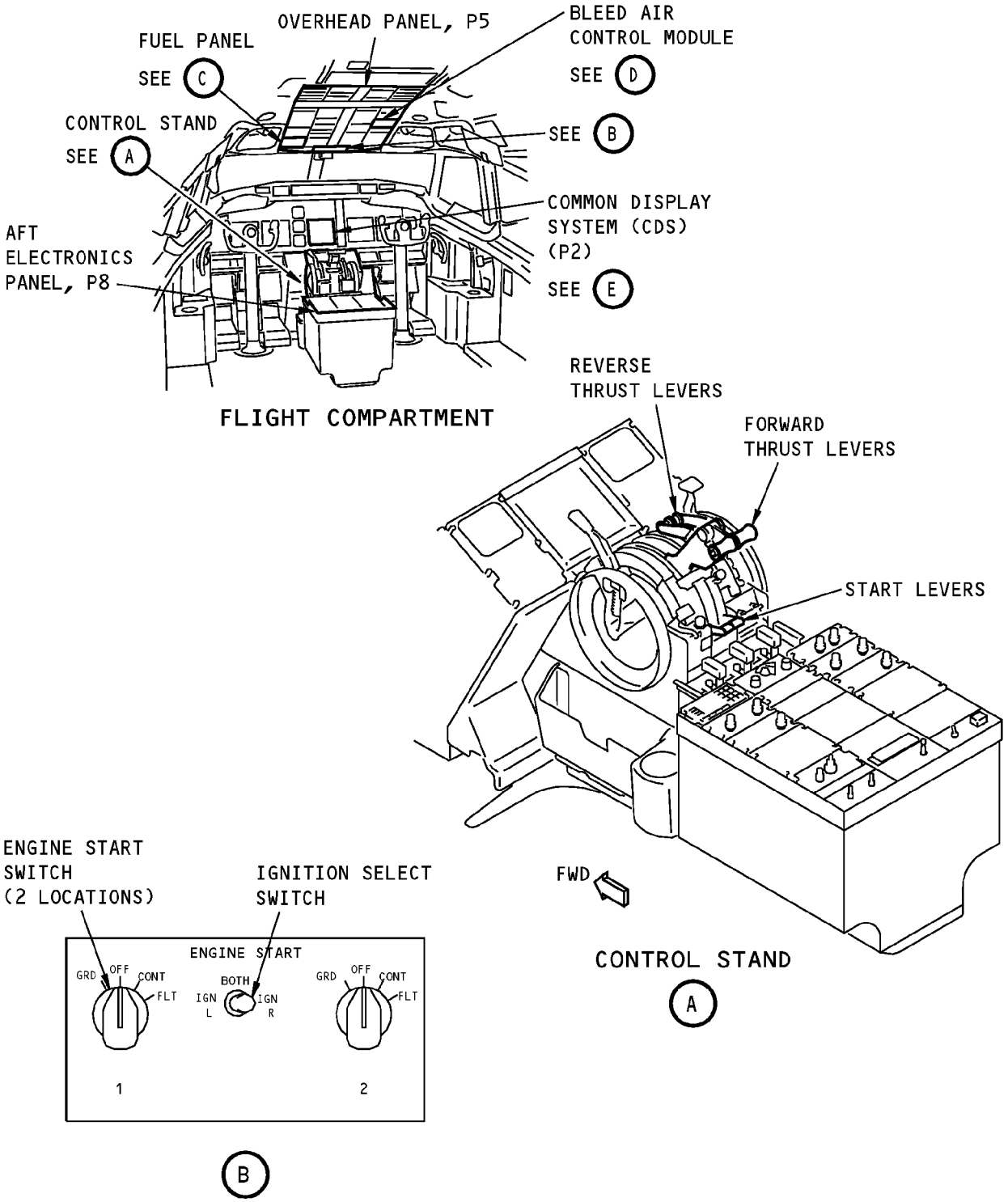
2) Close the applicable doors:

Number	Name/Location
413BL	Chip Detector/Pressure Relief Door, Engine 1
423BL	Chip Detector/Pressure Relief Door, Engine 2

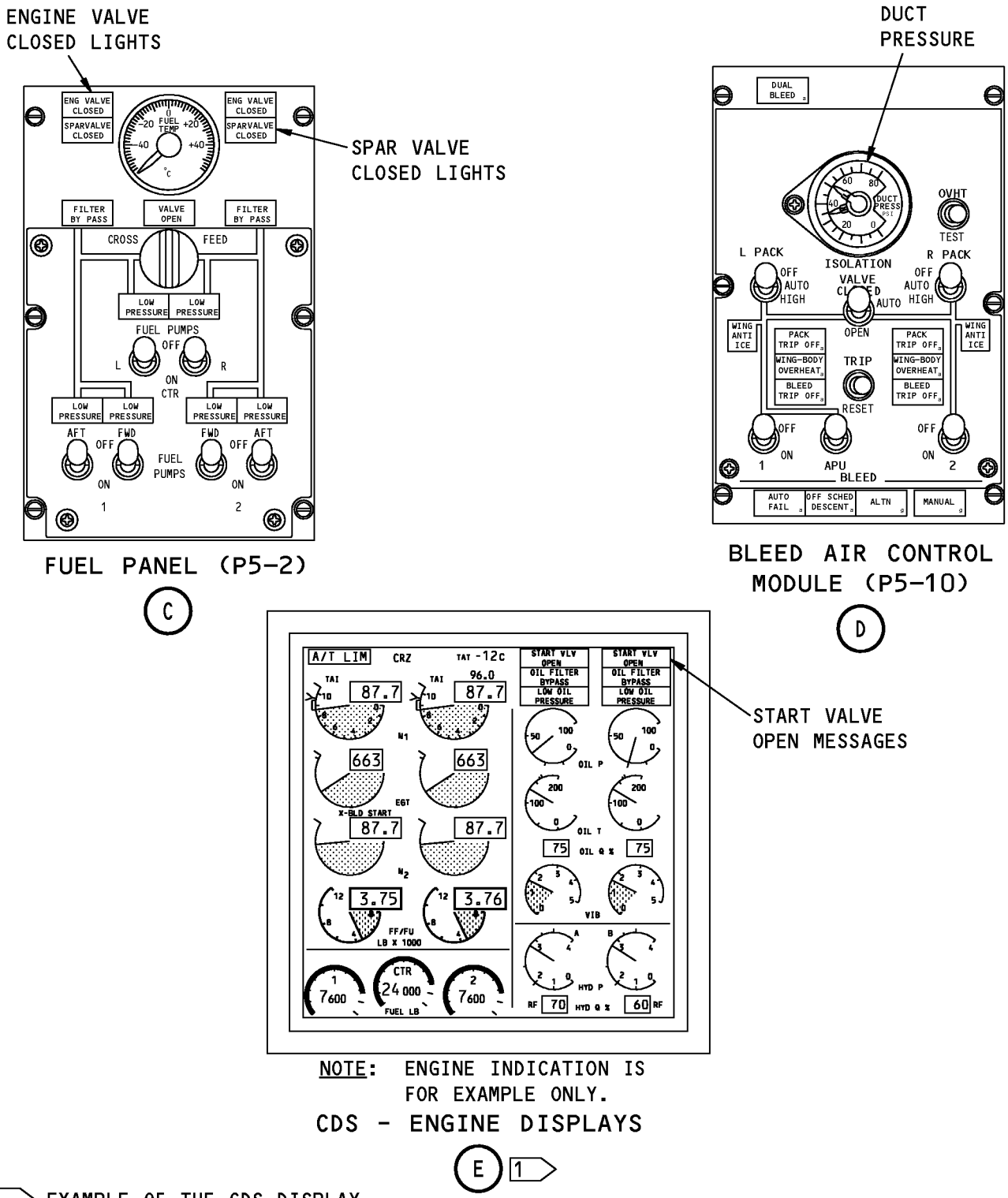
(d) Do the heating procedure again for the other engine. Start the engines as soon as possible after heating to make sure the engine does not cool off to below -40°F (-40°C).

(e) It is recommended to run the engines at idle for no less than five minutes to make sure the oil and fuel system are up to usual operating temperature.

——————— END OF TASK ———————



Engine Start Controls/Displays in the Flight Compartment
Figure 213 (Sheet 1 of 2)/71-00-00-990-815-F00



Engine Start Controls/Displays in the Flight Compartment
Figure 213 (Sheet 2 of 2)/71-00-00-990-815-F00

TASK 71-00-00-800-807-F00

5. Start the Engine Procedure (Selection)

A. General

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

B. Procedure

SUBTASK 71-00-00-910-040-F00

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

(a) Do this task: Start the Engine Procedure (Normal Start), TASK 71-00-00-800-808-F00.

(b) Do this task: Start the Engine Procedure (Manual Override of the Engine Start Valve), TASK 71-00-00-800-809-F00.

(c) Do this task: Start the Engine Procedure (Engine Cross Bleed Start), TASK 71-00-00-800-810-F00.

———————— END OF TASK ————————

TASK 71-00-00-800-808-F00

6. Start the Engine Procedure (Normal Start)

A. General

(1) This procedure has the steps that are necessary to start the engine under normal weather conditions.

(a) During cold weather, additional procedures such as preheating can be necessary.

(b) If it is necessary to start the engine in cold weather, refer to this paragraph: Prepare the Engine Before a Start in Cold Weather.

(2) On this airplane, the EEC (FADEC) control system controls the engine start operation as follows:

(a) In a normal start (enhanced manual mode), the EEC (FADEC) will automatically make the necessary corrections if there is an overtemperature, or if ignition does not occur. Control of the starter, ignition selection, and fuel-on is done with the flight deck switches or levers.

(b) The start monitoring function in the EEC will do these steps if an overtemperature condition occurred or is about to occur:

1) Cause the EGT display to show an overtemperature condition.

2) Turn the fuel flow off.

3) Turn the ignition off.

(c) If the engine does not start, the EEC will do these steps:

1) Turn the fuel flow off.

2) Turn the ignition off.

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

B. References

Reference	Title
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
410	Subzone - Engine 1
420	Subzone - Engine 2

D. Manual Start Procedure

SUBTASK 71-00-00-910-041-F00

(1) Do this task: Procedure to Prepare the Engine for Operation, TASK 71-00-00-700-818-F00.

SUBTASK 71-00-00-710-001-F00

(2) Do these steps to make sure 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 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 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 all the above lights go off.

SUBTASK 71-00-00-860-034-F00

CAUTION: 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.

(3) On the overhead panel, P5, put these switches to the ON position:

(a) HYD PUMPS A ENG 1

1) Make sure the low pressure light stays on.

(b) HYD PUMPS A ELEC 2

1) Make sure the low pressure light goes off.

(c) HYD PUMPS B ENG 2

1) Make sure the low pressure light stays on.

(d) HYD PUMPS B ELEC 1

1) Make sure the low pressure light goes off.

SUBTASK 71-00-00-860-035-F00

(4) Make sure the L PACK and R PACK switches on the aft overhead panel, P5, are in the OFF position.

SUBTASK 71-00-00-860-036-F00

(5) Make sure the WING ANTI-ICE, ENG 1 ANTI-ICE and ENG 2 ANTI-ICE switches on the aft overhead panel, P5, are in the OFF position.

SUBTASK 71-00-00-860-037-F00

(6) Make sure the BLEED AIR ISOLATION VALVE switch on the aft overhead panel, P5, is in the OPEN position.

SUBTASK 71-00-00-860-038-F00

(7) Put the BLEED 1 and BLEED 2 switches on the aft overhead panel, P5, to the applicable position as necessary.

SUBTASK 71-00-00-860-039-F00

(8) Make sure the ENG 1 and ENG 2 EEC switches on the aft overhead panel, P5, show ON.

SUBTASK 71-00-00-860-040-F00

(9) Make sure the two VIBRATION indications on the P2 panel are zero.

NOTE: A blank vibration indication is a sign of a system malfunction.

SUBTASK 71-00-00-860-204-F00

WARNING: DO NOT OPERATE ANY FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. FUEL VAPORS IN THE TANK MAY IGNITE AND CAUSE A FIRE OR EXPLOSION.

(10) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.

(a) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.

SUBTASK 71-00-00-860-042-F00

(11) To start Engine 1;

Put these switches on the overhead panel, P5, to the ON position:

NOTE: Make sure the LOW PRESSURE lights do not come on.

(a) FUEL PUMP 1 FWD

(b) FUEL PUMP 1 AFT.

SUBTASK 71-00-00-860-043-F00

(12) To start Engine 2;

Put these switches on the overhead panel, P5, to the ON position:

NOTE: Make sure the LOW PRESSURE lights do not come on.

(a) FUEL PUMP 2 FWD

(b) FUEL PUMP 2 AFT.

SUBTASK 71-00-00-860-044-F00

(13) On the overhead panel, P5, make sure the fuel crossfeed switch is in the open position.

SUBTASK 71-00-00-860-045-F00

(14) On the overhead panel, P5, put the GEN 1 and GEN 2 switches to the ON position:

NOTE: This step makes sure the generator control relays and the generator fields are closed before the generators are applied to the buses.

SUBTASK 71-00-00-860-046-F00

(15) 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, or;

(b) Put the ignition select switch to the BOTH position to start the engine with the two igniters.

SUBTASK 71-00-00-860-047-F00

(16) Put the ENGINE START switch for the applicable engine to the GRD position and release. Make sure these conditions occur:

NOTE: If you started the engine with battery power, only N1 and N2 indications will be available to help with the start. All other indications are available after 12-15% N2.

(a) On the center DU, the START VLV OPEN maintenance message comes on and you see the indications for N1 and N2.

(b) If the ground cart or the other engine supplies the pneumatic power, you see a decrease in the pneumatic manifold duct pressure.

(c) If the APU supplies the pneumatic power, you see a 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 that the N1 rotor starts to turn in the counterclockwise direction.

SUBTASK 71-00-00-860-048-F00

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.

(17) When the engine is at 25% N2 or the maximum motoring speed, move the start lever to the IDLE position.

(a) If the engine speed is less than 25% N2, you can move the start lever forward to the IDLE position when the engine is at its maximum motoring speed.

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 maximum motoring speed is 20% N2.

(b) Make sure you observe the starter limits in this task: (TASK 71-00-00-800-806-F00).

SUBTASK 71-00-00-860-049-F00

(18) Monitor the EGT and N2 carefully as the engine starts for all unusual conditions.

NOTE: Under normal conditions, the engine will start (EGT increases) in 10 seconds after the start lever is moved to the IDLE position. Also, the time from engine start to a stable idle must not take more than 120 seconds.

SUBTASK 71-00-00-860-050-F00

(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 (FADEC) will automatically close the FMV and turn the ignition off.

(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.

1) Make sure you observe the starter limits in this task: (TASK 71-00-00-800-806-F00).

(c) Put the start switch to the OFF position.

SUBTASK 71-00-00-860-051-F00

(20) Monitor the EGT, fuel flow, N1 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 71-00-00-860-052-F00

(21) The usual engine parameters for a standard day engine start are as follows:

(a) N1: approximately 20%

(b) N2: approximately 59%

(c) EGT: approximately 410 degrees C (770 degrees F)

NOTE: The EGT can be between 320 degrees C (608 degrees F) and 520 degrees C (968 degrees F) with different outside air temperatures, bleed air configurations and other engine conditions.

(d) Fuel flow: approximately 600 lb/hr (272 kg/hr).

SUBTASK 71-00-00-860-053-F00

(22) On the center DU, make sure that the applicable LOW OIL PRESSURE maintenance message goes out.

SUBTASK 71-00-00-860-054-F00

(23) Make sure the engine master caution light does not come on during the engine start.

SUBTASK 71-00-00-860-055-F00

(24) Make sure these conditions occur:

(a) The starter cutout occurs at or before 56% N2.

NOTE: When the cutout occurs, the start switch will move from the GRD to the OFF position.

(b) On the center DU, the START VLV OPEN maintenance message goes off.

(c) The manifold duct pressure increases.

SUBTASK 71-00-00-860-056-F00

(25) If the starter disengaged at more than 56% N2 or does not disengage, do these steps:

(a) Manually put the start switch to the OFF position.

(b) Look at the center DU to see if the START VLV OPEN maintenance message goes out.

(c) If the START VLV OPEN maintenance message does not go out, do these steps:

1) Put the ISOLATION VALVE to the CLOSED position.

2) Do the applicable step to remove the pneumatic source:

a) Put the applicable BLEED 1 or 2 switch to the OFF position.

b) Put the APU BLEED switch to the OFF position.

3) Move the start lever to the CUTOFF position to stop the engine.

4) Disconnect the ground air source (if used).

5) Refer to the FIM to find the cause.

SUBTASK 71-00-00-860-057-F00

(26) On the overhead panel, P5, make sure the applicable GENERATOR 1 DRIVE or GENERATOR 2 DRIVE light goes out.

SUBTASK 71-00-00-860-058-F00

CAUTION: IF THE ENGINE OIL PRESSURE IS LESS THAN 13 PSIG AFTER THE ENGINE STABILIZES AT THE IDLE SPEED, STOP THE ENGINE AND FIND THE CAUSE. DAMAGE TO THE ENGINE CAN OCCUR.

(27) Make sure there is a minimum of 13 psig oil pressure at the idle speed.

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 increases, the oil pressure will decrease.

SUBTASK 71-00-00-860-059-F00

(28) On the overhead panel, P5, move the APU BLEED switch to the OFF position.

SUBTASK 71-00-00-860-060-F00

(29) Let the engine run at the idle position for a minimum of 5 minutes before you accelerate the engine.

SUBTASK 71-00-00-860-181-F00

WARNING: IF ENGINE 2 OPERATES AT MORE THAN MINIMUM IDLE, DO NOT TRY TO DISCONNECT THE GROUND AIR CART FROM THE AIRPLANE. THE SERVICE CONNECTOR IS IN THE INLET HAZARD AREA FOR ENGINE 2FIGURE 201 . MAKE SURE THAT YOU OBEY THE HAZARD AREAS WITH ONE ENGINE OR TWO ENGINES IN OPERATION. SERIOUS INJURY TO PERSONS OR DAMAGE TO EQUIPMENT COULD OCCUR.

(30) Remove the pneumatic power if it is not necessary, do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

——————— END OF TASK ———————

TASK 71-00-00-800-809-F00

7. Start the Engine Procedure (Manual Override of the Engine Start Valve)

A. General

(1) This procedure has the steps that are necessary to manually override the engine start valve to start the engine.

(2) Start procedures that use the manual control of the engine start valve are very similar to the normal start procedures.

(3) You must stop the start during the manual override start procedure when the engine data is not satisfactory.

(4) Do each step of the procedure in sequence. If you stop the start, you must do each step of the sequence again.

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

(6) The manual override start is done with the fan cowl panels and the thrust reversers in the closed position.

B. Manual Override Start Procedure

SUBTASK 71-00-00-910-042-F00

(1) Do this task: Procedure to Prepare the Engine for Operation, TASK 71-00-00-700-818-F00.

SUBTASK 71-00-00-710-002-F00

(2) Do these steps to make sure 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 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 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 all the above lights go off.

SUBTASK 71-00-00-860-061-F00

CAUTION: 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.

(3) On the overhead panel, P5, put these switches to the ON position:

(a) HYD PUMPS A ENG 1

1) Make sure the low pressure light stays on.

(b) HYD PUMPS A ELEC 2

1) Make sure the low pressure light goes off.

(c) HYD PUMPS B ENG 2

1) Make sure the low pressure light stays on.

(d) HYD PUMPS B ELEC 1

1) Make sure the low pressure light goes off.

SUBTASK 71-00-00-860-062-F00

(4) Make sure the L PACK and R PACK switches on the overhead panel, P5, are in the OFF position.

SUBTASK 71-00-00-860-063-F00

(5) Make sure the WING ANTI-ICE, ENG 1 ANTI-ICE and ENG 2 ANTI-ICE switches on the overhead panel, P5, are in the OFF position.

SUBTASK 71-00-00-860-064-F00

(6) Make sure the BLEED AIR ISOLATION VALVE switch on the overhead panel, P5, is in the AUTO position.

SUBTASK 71-00-00-860-065-F00

(7) Put the BLEED 1 and BLEED 2 switches on the overhead panel, P5, to the applicable position as necessary.

SUBTASK 71-00-00-860-066-F00

(8) Make sure the ENG 1 and ENG 2 EEC switches on the overhead panel, P5, shows ON.

SUBTASK 71-00-00-860-067-F00

(9) Make sure the two VIBRATION indications on the P2 panel are zero.

NOTE: A blank vibration indication is a sign of a system malfunction.

SUBTASK 71-00-00-860-205-F00

WARNING: DO NOT OPERATE ANY FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. FUEL VAPORS IN THE TANK MAY IGNITE AND CAUSE A FIRE OR EXPLOSION.

(10) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.

(a) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.

SUBTASK 71-00-00-860-069-F00

(11) To start Engine 1;

Put these switches on the overhead panel, P5, to the ON position:

NOTE: Make sure the LOW PRESSURE lights do not come on.

(a) FUEL PUMP 1 FWD

(b) FUEL PUMP 1 AFT.

SUBTASK 71-00-00-860-070-F00

(12) To start Engine 2;

Put these switches on the overhead panel, P5, to the ON position:

NOTE: Make sure the LOW PRESSURE lights do not come on.

(a) FUEL PUMP 2 FWD

(b) FUEL PUMP 2 AFT.

SUBTASK 71-00-00-860-071-F00

(13) On the overhead panel, P5, make sure the fuel crossfeed switch is in the open position.

SUBTASK 71-00-00-860-072-F00

(14) On the overhead panel, P5, put the GEN 1 and GEN 2 switches to the ON position:

NOTE: This step makes sure the generator control relays and the generator fields are closed before the generators are applied to the buses.

SUBTASK 71-00-00-860-073-F00

(15) 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 to 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, or;

(b) Put the ignition select switch to the BOTH position to start the engine with the two igniters.

SUBTASK 71-00-00-860-074-F00

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.

(16) Make sure you have interphone communication between the persons on the ground and the persons in the flight compartment.

SUBTASK 71-00-00-860-075-F00

(17) Put the ENGINE START switch for the applicable engine to the GRD position and release.

SUBTASK 71-00-00-860-076-F00

WARNING: OBSERVE THE HAZARD AREAS, AND ESPECIALLY THE ENTRY/EXIT CORRIDOR. ENTRY INTO THE HAZARD AREA COULD CAUSE SERIOUS INJURY TO PERSONS OR POSSIBLE LOSS OF LIFE.

(18) Tell the person on the ground to manually open the start valve as follows (Figure 214):

(a) Push a 3/8-inch square drive extension through the guide port of the start valve manual override.

(b) Turn the valve 90 degrees clockwise to the OPEN position. Keep the valve in this position until the person in the flight compartment tells you to release the valve.

SUBTASK 71-00-00-860-077-F00

(19) Make sure these conditions occur:

NOTE: If you started the engine with battery power, only N1 and N2 indications will be available to help with the start. All other indications are available after 12-15% N2.

(a) On the center DU, you see the indications for N1 and N2.

(b) If the ground cart or the other engine supplies the pneumatic power, you see a decrease in the pneumatic manifold duct pressure.

(c) If the APU supplies the pneumatic power, you see a 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 (if this circuit is correct).

(d) The person on the ground sees that the N1 rotor starts to turn in the counterclockwise direction.

SUBTASK 71-00-00-860-078-F00

CAUTION: DO NOT MOVE THE START LEVER FORWARD UNTIL THE ENGINE IS AT 25% N2 OR THE MAXIMUM MOTORING SPEED. IF YOU DO, THE ENGINE CAN HAVE A HOT OR HUNG START. THIS CAN CAUSE DAMAGE TO THE ENGINE.

(20) When the engine is at 25% N2 or maximum motoring speed, move the start lever to the IDLE position.

(a) If the engine speed is less than 25% N2, you can move the start lever forward to the IDLE position when the engine is at its maximum motoring speed.

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 maximum motoring speed is 20% N2.

(b) Make sure you observe the starter limits in this task: (TASK 71-00-00-800-806-F00).

SUBTASK 71-00-00-860-079-F00

(21) Monitor the EGT and N2 carefully as the engine starts for all unusual conditions.

NOTE: Under normal conditions, the engine will start in 10 seconds after the start lever is moved to the IDLE position. Also, the time from engine start to a stable idle must not take more than 120 seconds.

SUBTASK 71-00-00-860-080-F00

(22) Do these steps if the engine does not start in 15 seconds:

NOTE: If the engine does not start after 15 seconds, the EEC (FADEC) will automatically close the FMV 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.

1) Make sure you observe the starter limits in this task: (TASK 71-00-00-800-806-F00).

(c) Put the ENGINE START switch to the OFF position.

SUBTASK 71-00-00-860-081-F00

(23) Monitor the EGT, fuel flow, N2, N1 and engine oil indications as the engine accelerates to the idle speed.

NOTE: Make sure the engine acceleration does not slow or stop before the idle speed.

SUBTASK 71-00-00-860-082-F00

(24) On the center DU, make sure that the applicable LOW OIL PRESSURE maintenance message goes out.

SUBTASK 71-00-00-860-083-F00

(25) Make sure the engine master caution light does not come on during the engine start.

SUBTASK 71-00-00-860-084-F00

(26) When you see 56% N2, tell the person on the ground to turn the start valve 90 degrees counterclockwise to the CLOSED position.

SUBTASK 71-00-00-860-085-F00

(27) On the overhead panel, P5, make sure the applicable GENERATOR 1 DRIVE or GENERATOR 2 DRIVE light goes out.

SUBTASK 71-00-00-860-086-F00

CAUTION: IF THE ENGINE OIL PRESSURE IS LESS THAN 13 PSIG AFTER THE ENGINE STABILIZED AT THE IDLE SPEED, STOP THE ENGINE AND FIND THE CAUSE. DAMAGE TO THE ENGINE CAN OCCUR.

(28) Make sure there is approximately 13 psig positive oil pressure at the idle speed.

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 increases, the oil pressure will decrease.

SUBTASK 71-00-00-860-087-F00

(29) The usual engine parameters for a standard day engine start are as follows:

(a) N1: approximately 20%

(b) N2: approximately 59%

(c) EGT: approximately 410 degrees C (770 degrees F)

NOTE: The EGT can be between 320 degrees C (608 degrees F) and 520 degrees C (968 degrees F) with different outside air temperatures, bleed air configurations and other engine conditions.

(d) Fuel flow: approximately 600 lb/hr (272 kg/hr).

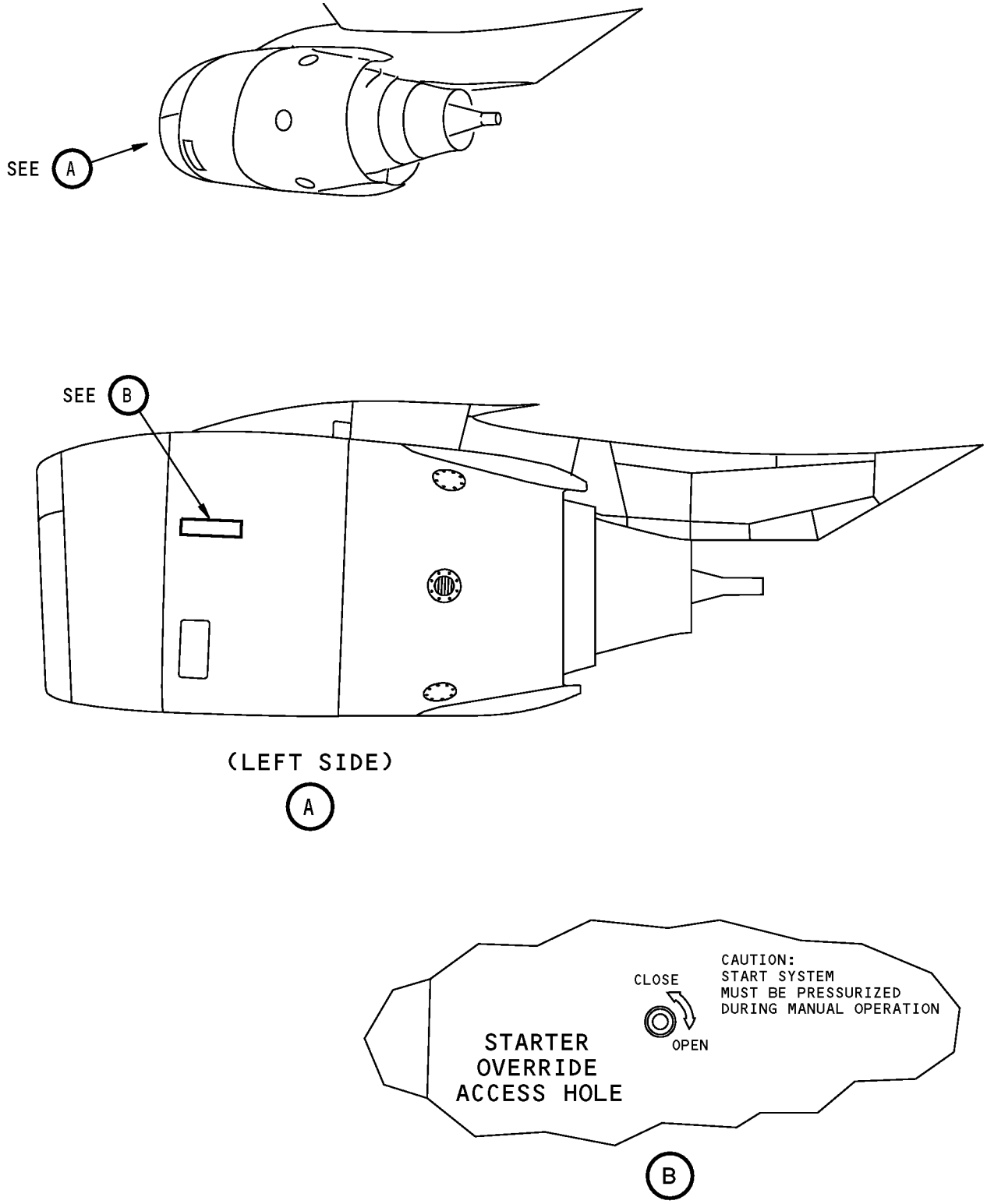
SUBTASK 71-00-00-860-088-F00

(30) On the overhead panel, P5, move the APU BLEED switch to the OFF position.

SUBTASK 71-00-00-860-089-F00

(31) Let the engine run at the idle position for a minimum of 5 minutes before you accelerate the engine..

END OF TASK



Engine Start Valve Manual Override Location
Figure 214/71-00-00-990-816-F00

TASK 71-00-00-800-810-F00

8. Start the Engine Procedure (Engine Cross Bleed Start)

A. General

(1) This procedure has the steps that are necessary to do the engine cross bleed start.

(2) You must monitor engine data for each engine during the start to make sure that they are in the limits.

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

(3) The EEC (FADEC) will automatically stop the automatic start procedure if the EGT, N1, or N2 rpm and acceleration are not satisfactory.

(4) You can manually stop the start procedure at all times.

(5) Do each step of the procedure in sequence. If you stop the cross bleed start, you must do each step of the sequence again.

(6) 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. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
410	Subzone - Engine 1
420	Subzone - Engine 2

D. Engine Cross Bleed Start Procedure

SUBTASK 71-00-00-910-043-F00

(1) Do this task: Procedure to Prepare the Engine for Operation, TASK 71-00-00-700-818-F00.

SUBTASK 71-00-00-860-090-F00

(2) Start the opposite engine. Use one of these tasks:

(a) Do this task: Start the Engine Procedure (Normal Start), TASK 71-00-00-800-808-F00.

(b) Do this task: Start the Engine Procedure (Manual Override of the Engine Start Valve), TASK 71-00-00-800-809-F00.

SUBTASK 71-00-00-860-091-F00

(3) If the APU supplies pneumatic pressure, put the BLEED APU switch on the P5 panel to the OFF position.

SUBTASK 71-00-00-860-092-F00

(4) If the operation of the APU is no longer necessary, do this task: APU Usual Shutdown, TASK 49-11-00-860-802.

SUBTASK 71-00-00-860-093-F00

(5) For the engine used for the cross-start, move the forward thrust lever forward until the manifold duct pressure (as seen on the overhead panel, P5, shows a minimum of 30 psig (207 kPa).

SUBTASK 71-00-00-860-094-F00

(6) Start the other engine. Use one of these tasks:

(a) Do this task: Start the Engine Procedure (Normal Start), TASK 71-00-00-800-808-F00.

(b) Do this task: Start the Engine Procedure (Manual Override of the Engine Start Valve), TASK 71-00-00-800-809-F00.

SUBTASK 71-00-00-860-095-F00

(7) After the engine operates at idle, decrease the power of the engine that was used for the cross-start to the idle position.

SUBTASK 71-00-00-860-096-F00

(8) On the overhead panel, P5, put the BLEED AIR ISOLATION VALVE switch to the AUTO position.

SUBTASK 71-00-00-860-097-F00

(9) On the overhead panel, P5, put the L PACK and R PACK switches to the AUTO position.

——————— END OF TASK ———————

TASK 71-00-00-700-819-F00

9. Stop the Engine Procedure (Usual Engine Stop)

A. General

(1) This task gives the instructions to stop the engine.

(2) This task also gives instructions if it is necessary to stop the engine in cold weather.

(3) If during this usual engine stop procedure you see signs that an internal engine fire, external engine fire, engine failure or stall is or will occur, do this task: Stop the Engine Procedure (Emergency Engine Stop), TASK 71-00-00-700-820-F00.

B. References

Reference	Title
24-22-00-860-812	Remove Electrical Power (P/B 201)
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 Procedure

SUBTASK 71-00-00-860-098-F00

(1) Move the thrust lever for the applicable engine to the minimum idle position.

SUBTASK 71-00-00-860-099-F00

CAUTION: DO NOT STOP THE ENGINE UNTIL THE ENGINE ROTORS AND CASES HAVE BECOME THERMALLY STABLE AND COOL AT IDLE SPEED. IF YOU DO NOT OBEY THIS INSTRUCTION, LOCKED TURBINE ROTORS AND DAMAGED TURBINE AIR SEALS CAN OCCUR.

(2) If you operated 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 low idle, operate the engine at low 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.

SUBTASK 71-00-00-780-002-F00

CAUTION: DO NOT STOP THE ENGINE WITHOUT AN ADDITIONAL SOURCE OF PNEUMATIC POWER TO MOTOR THE ENGINE. IF AN INTERNAL ENGINE FIRE OCCURS, YOU MUST DRY MOTOR THE ENGINE.

(3) If not already done, do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.

SUBTASK 71-00-00-860-100-F00

(4) Make sure these switches on the aft overhead panel, P5, are in the correct position:

NOTE: This will make sure a second pneumatic source is available if an internal engine fire occurs.

(a) The APU, and if applicable, the BLEED 1 OR BLEED 2 switches are in the ON position.

(b) The ISOLATION VALVE switch is in the OPEN position.

SUBTASK 71-00-00-860-101-F00

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.

(5) Set the applicable start lever on the control stand to the CUTOFF position.

SUBTASK 71-00-00-210-007-F00

(6) Monitor the EGT, N1, N2, and fuel flow indication as the engine stops.

NOTE: When the engine temperature and rotor speed decrease, you know that the fuel flow to the engine is stopped.

SUBTASK 71-00-00-210-008-F00

(7) Look for indications of fire after the engine is stopped.

SUBTASK 71-00-00-210-009-F00

(8) If you see signs of a fire, immediately, do this task: Stop the Engine Procedure (Emergency Engine Stop), TASK 71-00-00-700-820-F00.

NOTE: When the engine is stopped and all rotation stops, the EGT will usually increase due to temperature soak back.

SUBTASK 71-00-00-860-102-F00

(9) Put the L PACK and R PACK switches on the overhead panel, P5, to the OFF position.

SUBTASK 71-00-00-860-103-F00

(10) For Engine 1;

Put these switches on the overhead panel, P5, to the OFF position:

(a) FUEL PUMP 1 FWD

(b) FUEL PUMP 1 AFT.

SUBTASK 71-00-00-860-104-F00

(11) For Engine 2;

Put these switches on the overhead panel, P5, to the OFF position:

(a) FUEL PUMP 2 FWD

(b) FUEL PUMP 2 AFT.

SUBTASK 71-00-00-860-105-F00

(12) Make sure the fuel LOW PRESSURE maintenance message for the applicable engine comes on.

E. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-860-107-F00

(1) If they were 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 71-00-00-860-179-F00

(2) Do this task;

Remove the safety tag and close this circuit breaker:

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	13	C00120	WEATHER RADAR RT

SUBTASK 71-00-00-860-108-F00

(3) If pneumatic power is not necessary, do this task: Remove Pressure from the Pneumatic System, TASK 36-00-00-860-806.

SUBTASK 71-00-00-860-109-F00

(4) If electrical power is not necessary, do this task: Remove Electrical Power, TASK 24-22-00-860-812.

SUBTASK 71-00-00-080-004-F00

(5) When it is practical or operator policy, it is recommended that you install the engine inlet and exhaust covers on the engine.

F. Prepare the Engine After Shutdown in Cold Weather

SUBTASK 71-00-00-800-005-F00

(1) Make sure you install the engine inlet and exhaust covers on the engine when the temperature of the engine is decreased sufficiently (usually two to four hours).

NOTE: Snow and rain can enter the engine and make 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.

——————— END OF TASK ———————

TASK 71-00-00-700-820-F00

10. Stop the Engine Procedure (Emergency Engine Stop)

A. General

(1) This procedure has the steps that are necessary to stop the engine in an emergency.

(2) An emergency can be an internal engine fire, external engine fire or an engine failure or stall.

(3) In an emergency the engine is to be immediately isolated from the airplane fuel supply.

(4) If an internal fire can not be extinguished by motoring the engine or if motoring is not possible, extinguish the fire 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
71-00-00-800-803-F00	Inspection After an Engine Fire, Use of Fire Extinquishing Agents, or High Nacelle Temperature (P/B 601)

C. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
410	Subzone - Engine 1
420	Subzone - Engine 2

D. Emergency Engine Stop Procedure

SUBTASK 71-00-00-860-110-F00

CAUTION: DO NOT USE A FIRE EXTINGUISHING AGENT TO STOP THE FIRE UNLESS THE ENGINE DRY MOTOR PROCEDURE FAILS TO CONTROL 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 could or could not be above the redline limit. An EGT indication will not be available if the N2 speed is below 4%. A N2 speed above 4% is necessary to keep electrical power to the EEC (FADEC).

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 could cause corrosion. The engine could be damaged because the components of the engine do not become 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 center DU for indication of an engine shutdown.

(d) When the N2 speed decreases below 30%, do these steps:

CAUTION: DO NOT ENGAGE THE STARTER AGAIN AT N2 SPEEDS OF MORE THAN 30%. DAMAGE TO THE STARTER CAN OCCUR.

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 time 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: Inspection After an Engine Fire, Use of Fire Extinquishing Agents, or High Nacelle Temperature, TASK 71-00-00-800-803-F00.

SUBTASK 71-00-00-860-111-F00

(2) If the engine has an external engine fire (cowls open or closed), do these steps:

NOTE: The engine fire extinguishing system will have a good effect on a fire on the external surface of the engine with the cowls closed because the system is discharged in an enclosed volume under the cowl.

NOTE: The engine fire extinguishing system will not have a good effect on a fire on the external surface of the engine with the cowls open because the system is discharged in the air around 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 switch 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 Engine 1;

Put these switches on the overhead panel, P5, to the OFF position:

1) FUEL PUMP 1 FWD
2) FUEL PUMP 1 AFT.

(e) For Engine 2;

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 switch handle (DISCH 1 or 2) to the left or right and hold for 1 second.

NOTE: If you turn it to the left, you discharge the left fire extinguishing bottle. If you turn it to the right, you discharge the right fire extinguishing bottle.

(g) If the fire warning continues, do this step:

1) Turn the engine fire switch handle (DISCH 1 or 2) to the opposite position (left or right) and hold for 1 second.

(h) Report the use of fire extinguishing agents to identify the necessary correct maintenance actions.

SUBTASK 71-00-00-860-112-F00

(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.

(c) Find the type of failure.

NOTE: If loud noises, such as bangs, bumps, etc, are heard, do not start the engine.

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 the N1 and N2 rotors operate satisfactorily (TASK 71-00-00-700-821-F00).

NOTE: Do not dry motor the engine longer than the starter time limits.

2) Start the engine to make sure the N1, N2, and main oil pressure are satisfactory (TASK 71-00-00-800-807-F00).

(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 start the engine.

——————— END OF TASK ———————

TASK 71-00-00-700-821-F00

11. Dry Motor the Engine

A. General

(1) This procedure motors the engine with the starter but without fuel to the combustion chamber.

(2) Use this procedure to remove the fuel that is not burned from the engine after wet motoring.

NOTE: An oil puddle in the exhaust plug is usual. After engine dry or wet motoring, a large oil puddle in the exhaust plug is usual.

(3) Use this procedure for all maintenance operation where it is necessary to motor the engine unless the wet motor procedure is specified.

(4) The fan cowl panels and the thrust reversers can be open when you do this procedure.

B. References

Reference	Title
71-00-03 P/B 201	POWER PLANT - MAINTENANCE PRACTICES (PRESERVATION AND DEPRESERVATION)
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
410	Subzone - Engine 1
420	Subzone - Engine 2

D. Prepare for the Dry Motor Procedure

SUBTASK 71-00-00-860-113-F00

(1) Do this task: Procedure to Prepare the Engine for Operation, TASK 71-00-00-700-818-F00.

SUBTASK 71-00-00-010-011-F00

(2) If it is necessary, do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 71-00-00-010-012-F00

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 REVERSERS (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.

(3) For the applicable thrust reverser or thrust reversers, do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

SUBTASK 71-00-00-860-114-F00

(4) On the overhead panel, P5, make sure the L PACK and R PACK switches are in the OFF position.

SUBTASK 71-00-00-860-115-F00

(5) On the overhead panel, P5, make sure the WING ANTI-ICE, ENG 1 ANTI-ICE and ENG 2 ANTI-ICE switches are in the OFF position.

SUBTASK 71-00-00-860-116-F00

(6) On the overhead panel, P5, make sure the BLEED AIR ISOLATION VALVE switch is in the OPEN position.

SUBTASK 71-00-00-860-117-F00

(7) On the overhead panel, P5, make sure the BLEED 1 and BLEED 2 switches are in the OFF position.

SUBTASK 71-00-00-860-118-F00

(8) On the overhead panel, P5, make sure the ENG 1 and ENG 2 EEC switches shows ON.

SUBTASK 71-00-00-860-119-F00

(9) Make sure the two VIBRATION indications on the P2 panel are zero.

NOTE: A blank vibration indication is a sign of a system malfunction.

SUBTASK 71-00-00-860-120-F00

(10) For Engine 1, do this task;

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

SUBTASK 71-00-00-860-121-F00

(11) For Engine 2, do this task;

Open these circuit breakers and install safety tags:

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

SUBTASK 71-00-00-860-122-F00

CAUTION: THE FUEL PUMP AND THE HYDROMECHANICAL UNIT ARE FUEL LUBRICATED. DO NOT MOTOR THE ENGINE UNLESS THE BOOST PUMP PRESSURE IS APPLIED TO THE FUEL PUMP INLET.

CAUTION: DO NOT APPLY BOOST PUMP PRESSURE TO THE FUEL PUMP INLET IF YOU DRY MOTOR THE ENGINE FOR THIS TASK: PRESERVATION OF AN ENGINE FROM ONE MONTH TO ONE YEAR (ENGINE ON-WING)(POWER PLANT - MAINTENANCE PRACTICES (PRESERVATION AND DEPRESERVATION), PAGEBLOCK 71-00-03/201) . FUEL WILL SPILL ON THE ENGINE AND CAUSE DAMAGE TO THE EQUIPMENT.

(12) On the engine to be dry motored, apply the boost pump pressure to the fuel pump inlet as follows:

NOTE: Boost pump pressure is not necessary if you dry motor the engine for this procedure: Preservation of an Engine From One Month to One Year (Engine On-Wing) (POWER PLANT - MAINTENANCE PRACTICES (PRESERVATION AND DEPRESERVATION), PAGEBLOCK 71-00-03/201). Because the engine fuel line is disconnected and capped, 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, do this task;

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, do this task;

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 the applicable SPAR VALVE CLOSED light on the overhead panel, P5, comes on bright (valve in transition or when the valve does not agree with the commanded position) and then goes off (valve open).

1) 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, do this task;

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, do this task;

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 71-00-00-860-206-F00

WARNING: DO NOT OPERATE ANY FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. FUEL VAPORS IN THE TANK MAY IGNITE AND CAUSE A FIRE OR EXPLOSION.

(13) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.

(a) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.

SUBTASK 71-00-00-860-123-F00

(14) For Engine 1;

Put these switches of the overhead panel, P5, to the ON position:

(a) FUEL PUMP 1 FWD

(b) FUEL PUMP 1 AFT.

SUBTASK 71-00-00-860-124-F00

(15) For Engine 2;

Put these switches of the overhead panel, P5, to the ON position:

(a) FUEL PUMP 2 FWD

(b) FUEL PUMP 2 AFT.

SUBTASK 71-00-00-860-125-F00

(16) On the overhead panel, P5, make sure the fuel crossfeed switch is in the off position.

E. Dry Motor Procedure

SUBTASK 71-00-00-860-126-F00

(1) Turn the applicable engine start switch to the GRD position. Make sure these conditions occur:

(a) On the center DU, the START VLV OPEN maintenance message comes on.

(b) If the ground cart or the other engine supplies the pneumatic power, you see a decrease in the pneumatic manifold duct pressure.

(c) If the APU supplies the pneumatic power, you see a 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 (if this circuit is correct).

(d) On the center DU, you see an indication of N1 and N2.

(e) The person on the ground sees the N1 rotor starts to turn in the counterclockwise direction.

SUBTASK 71-00-00-860-127-F00

(2) As the engine turns, make sure you see a positive oil pressure indication.

SUBTASK 71-00-00-860-128-F00

(3) On the center DU, make sure the N2 speed becomes stable at 24-32%.

SUBTASK 71-00-00-910-044-F00

CAUTION: DO NOT OPERATE THE STARTER AT MORE THAN THE LIMITS. DAMAGE TO THE STARTER CAN OCCUR.

(4) As you motor the engine, make sure you obey the starter operation limits.

(a) The starter limits are given in this task: (TASK 71-00-00-800-806-F00).

SUBTASK 71-00-00-860-129-F00

(5) Put the applicable engine start switch to the OFF position to stop the dry motor procedure.

(a) On the center DU, make sure the START VLV OPEN maintenance message goes out.

SUBTASK 71-00-00-860-130-F00

(6) For Engine 1;

Put these switches of the overhead panel, P5, to the OFF position:

(a) FUEL PUMP 1 FWD

(b) FUEL PUMP 1 AFT.

SUBTASK 71-00-00-860-131-F00

(7) For Engine 2;

Put these switches of the overhead panel, P5, to the OFF position:

(a) FUEL PUMP 2 FWD

(b) FUEL PUMP 2 AFT.

SUBTASK 71-00-00-860-132-F00

(8) For engine 1, do this step:

Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1

SUBTASK 71-00-00-860-133-F00

(9) For engine 2, do this step:

Remove the safety tags and close these circuit breakers:

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, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2

SUBTASK 71-00-00-410-007-F00

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.

(10) If the thrust reverser were opened, do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

SUBTASK 71-00-00-410-008-F00

(11) If the fan cowl panels were opened, do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

——————— END OF TASK ———————

TASK 71-00-00-700-822-F00

12. Wet Motor the Engine

A. General

(1) This procedure motors the engine with the starter and fuel to the combustion chamber but without ignition.

(2) Only use this procedure for all maintenance operations that tell you to motor (wet motor procedure) the engine with fuel to the combustion chamber. Use the Dry Motor Procedure for all other motor procedures.

NOTE: An oil puddle in the exhaust plug is usual. After engine dry or wet motoring, a large oil puddle in the exhaust plug is usual.

(3) This procedure can be used with the wet motor leak check.

(4) This procedure can be done with the fan cowl panels and the thrust reversers open.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

C. Location Zones

Zone	Area
211	Flight Compartment - Left
212	Flight Compartment - Right
410	Subzone - Engine 1
420	Subzone - Engine 2

D. Prepare for the Wet Motor Procedure

SUBTASK 71-00-00-860-134-F00

(1) Do this task: Procedure to Prepare the Engine for Operation, TASK 71-00-00-700-818-F00.

SUBTASK 71-00-00-010-013-F00

(2) If it is necessary, do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 71-00-00-010-014-F00

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 REVERSERS (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.

(3) For the applicable thrust reverser or thrust reversers, do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

SUBTASK 71-00-00-860-135-F00

(4) On the overhead panel, P5, make sure the L PACK and R PACK switches are in the OFF position.

SUBTASK 71-00-00-860-136-F00

(5) On the overhead panel, P5, make sure the WING ANTI-ICE, ENG 1 ANTI-ICE and ENG 2 ANTI-ICE switches are in the OFF position.

SUBTASK 71-00-00-860-137-F00

(6) On the overhead panel, P5, make sure the BLEED AIR ISOLATION VALVE switch is in the OPEN position.

SUBTASK 71-00-00-860-138-F00

(7) On the overhead panel, P5, make sure the BLEED 1 and BLEED 2 switches are in the OFF position.

SUBTASK 71-00-00-860-139-F00

(8) On the overhead panel, P5, make sure the ENG 1 and ENG 2 EEC switches show ON.

SUBTASK 71-00-00-860-140-F00

(9) Make sure the two VIBRATION indications on the P2 panel are zero.

NOTE: A blank vibration indication is a sign of a system malfunction.

SUBTASK 71-00-00-860-142-F00

(10) For engine 1, do this step:

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

SUBTASK 71-00-00-860-143-F00

(11) For engine 2, do this step:

Open these circuit breakers and install safety tags:

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

SUBTASK 71-00-00-860-207-F00

WARNING: DO NOT OPERATE ANY FUEL PUMP IF THE LOW PRESSURE LIGHT COMES ON AND STAYS ON. FUEL VAPORS IN THE TANK MAY IGNITE AND CAUSE A FIRE OR EXPLOSION.

(12) To operate any of the fuel pumps, you must be in the flight compartment to continuously monitor the fuel quantity and the low pressure indication in the applicable tank.

(a) Immediately set the applicable fuel pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.

SUBTASK 71-00-00-860-144-F00

(13) For Engine1;

Put these switches on the overhead panel, P5, to the ON position:

(a) FUEL PUMP 1 FWD

(b) FUEL PUMP 1 AFT.

SUBTASK 71-00-00-860-145-F00

(14) For Engine 2;

Put these switches on the overhead panel, P5, to the ON position:

(a) FUEL PUMP 2 FWD

(b) FUEL PUMP 2 AFT.

SUBTASK 71-00-00-860-146-F00

(15) On the overhead panel, P5, make sure the fuel crossfeed switch is in the off position.

E. Wet Motor Procedure

SUBTASK 71-00-00-860-147-F00

(1) Turn the applicable engine start switch to the GRD position. Make sure these conditions occur:

(a) On the center DU, the START VLV OPEN maintenance message comes on.

(b) If the ground cart or the other engine supplies the pneumatic power, you see a decrease in the pneumatic manifold duct pressure.

(c) If the APU supplies the pneumatic power, you see a 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 (if this circuit is correct).

(d) On the center DU, you see an indication of N1 and N2.

(e) The person on the ground sees that the N1 rotor starts to turn in the counterclockwise direction.

SUBTASK 71-00-00-860-148-F00

CAUTION: MAKE SURE 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) At a minimum 20% N2, move the applicable start lever to the IDLE position. Make sure these conditions occur:

(a) The ENG VALVE CLOSED and SPAR VALVE CLOSED lights on the overhead panel, P5, 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.

SUBTASK 71-00-00-860-149-F00

(3) Motor the engine for a maximum of 15 seconds or until you can see fuel vapors from the primary nozzle.

SUBTASK 71-00-00-860-150-F00

(4) Put the applicable engine start lever to the CUTOFF position to stop the wet motor procedure.

SUBTASK 71-00-00-860-151-F00

(5) Continue to motor the engine for 60 seconds to remove all remaining fuel.

(a) On the center DU, make sure the fuel flow indication decreases to zero.

SUBTASK 71-00-00-860-152-F00

(6) Put the applicable engine start switch to the OFF position.

(a) On the center DU, make sure the START VLV OPEN maintenance message goes out.

SUBTASK 71-00-00-860-153-F00

(7) For Engine 1;

Put these switches on the overhead panel, P5, to the OFF position:

(a) FUEL PUMP 1 FWD

(b) FUEL PUMP 1 AFT.

SUBTASK 71-00-00-860-154-F00

(8) For Engine 2;

Put these switches on the overhead panel, P5, to the OFF position:

(a) FUEL PUMP 2 FWD

(b) FUEL PUMP 2 AFT.

SUBTASK 71-00-00-860-155-F00

(9) For engine 1, do this step:

Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT

SUBTASK 71-00-00-860-156-F00

(10) For engine 2, do this step:

Remove the safety tags and close these circuit breakers:

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

SUBTASK 71-00-00-410-009-F00

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.

(11) If the thrust reversers were opened, do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

SUBTASK 71-00-00-410-010-F00

(12) If they were opened, do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

END OF TASK

POWER PLANT - ADJUSTMENT/TEST

1. General

A. This procedure gives the necessary tests to make sure the engine operates correctly after components are repaired or replaced. The tests are given a number for positive identification. The steps that follows show the test numbers and the titles:

NOTE: Tests 4, 6, and 11 are not used.

(1) Test 1 - Pneumatic Leak Test

(2) Test 2 - Dry Motor Leak Check

(3) Test 3A - Idle-Power Leak Check

(4) Test 3B - Part-Power Leak Check

(5) Test 5 - Power Assurance Check

(6) Test 7 - Vibration Survey

(7) Test 8 - Acceleration Check

(8) Test 9 - Replacement Engine Test (Pretested)

(9) Test 10 - Replacement Engine Test (Untested)

(10) Test 12 - Actuators Test

(11) Test 13 - Engine Run - EEC BITE Check

(12) Test 14A - Fan Trim Balance (Three Shot Plot Procedure)

HAP 006-013, 015-026, 028-054, 101-999; HAP 001-005 POST SB 737-77-1056

(13) Test 14B - Fan Trim Balance (On Board Procedure)

HAP ALL

(14) If you do the EEC BITE Igniters Test, the BITE screen for some EEC software packages shows an incorrect reference "DO PROCEDURE: IGNITERS TEST AMM 71-00-00/501". Do the step that follows:

(a) Do this task: Audible Test of the Ignition System - EEC BITE Igniters Test, TASK 74-00-00-750-801-F00.

which includes the prepare for test procedures.

B. To make this procedure easy to use, symbols are given to some engine data and components at internal and external locations on the engine. These symbols are shown below:

Table 501/71-00-00-993-801-F00

ABBR.	NOMENCLATURES
AGB	Accessory Gearbox
AVM	Airborne Vibration Monitoring
BSV	Burner Staging Valve
CDS	Common Display System
CDU/FMC	Center Display Unit/Flight Management Computer
DEU	Display Electronic Unit
EDP	Engine Driven Pump (Hydraulic)
EEC	Electronic Engine Control (ECU)

(Continued)

ABBR.	NOMENCLATURES
EGT	Exhaust Gas Temperature
FADEC	Full Authority Digital Electronic Control
FFCC	Fan Frame Compressor Case (vibration sensor)
FMCS CDU	Flight Management Computer System Center Display Unit
HMU	Hydromechanical Unit
HPT	High Pressure Turbine
HPTACC	High Pressure Turbine Active Clearance Control
IDG	Integrated Drive Generator
LPT	Low Pressure Turbine
LPTACC	Low Pressure Turbine Active Clearance Control
LSK	Line Select Key
MPA	Maximum Power Assurance
MSG NBR	Message Number
N1	Low Pressure Rotor Speed
N2	High Pressure Rotor Speed
OAT(TAT)	Outside Air Temperature (Total Air Temperature)
QEC	Quick-Engine-Change
TBV	Transient Bleed Valve
TGB	Transfer Gearbox
VBV	Variable Bleed Valve
VSV	Variable Stator Vane

TASK 71-00-00-800-811-F00

2. Power Plant Test Reference Table

(Figure 501)

A. General

(1) This task gives the necessary tests that are to be done after the component is repaired or replaced.

B. References

Reference	Title
71-00-00-800-806-F00	Engine Operation Limits (P/B 201)
73-11-01 P/B 601	FUEL PUMP PACKAGE - INSPECTION/CHECK
73-21-00-700-802-F00	FADEC System Test (P/B 501)
73-21-00-700-804-F00	EEC TEST (P/B 501)
73-21-00-700-808-F00	IDENT/CONFIG (P/B 501)
74-00-00-750-801-F00	Audible Test of the Ignition System - EEC BITE Igniters Test (P/B 501)

(Continued)

Reference	Title
77-31-00-710-801-F00	Airborne Vibration Monitoring (AVM) System - Operational Test (P/B 501)

C. Procedure

SUBTASK 71-00-00-800-001-F00

(1) The table that follows shows the necessary tests that are to be done after the applicable component is repaired or replaced. The power plant tests are written to keep the engine ground run to a minimum (Table 502).

(a) To get access to this data digitally, use the referenced task links below to go to the applicable test.

(b) Test 1, (TASK 71-00-00-700-809-F00)

(c) Test 2, (TASK 71-00-00-700-810-F00)

(d) Test 3A, (TASK 71-00-00-700-801-F00)

(e) Test 3B, (TASK 71-00-00-700-823-F00)

(f) Test 5, (TASK 71-00-00-700-813-F00)

(g) Test 7, (TASK 71-00-00-700-814-F00)

(h) Test 9, (TASK 71-00-00-700-816-F00)

(i) Test 10, (TASK 71-00-00-700-817-F00)

(j) Test 12, (TASK 71-00-00-700-807-F00)

(k) Test 13, (TASK 71-00-00-700-808-F00)

(l) Footnote *[3], (TASK 73-21-00-700-808-F00)

(m) Footnote *[4], (TASK 73-21-00-700-802-F00)

(n) Footnote *[5], (TASK 74-00-00-750-801-F00)

(o) Footnote *[6], TASK 77-31-00-710-801-F00

(p) Footnote *[7], TASK 73-21-00-700-804-F00

(q) Footnote *[9], (TASK 77-31-00-710-801-F00)

(r) Footnote *[10], (TASK 73-21-00-700-804-F00)

Table 502/71-00-00-993-802-F00 Power Plant Test Reference Table

Component Repaired or Replaced	Tests *[1]
Accessory Gearbox	3B
AGB Rotating Seals	3B
Burner Staging Valve	12, 3A
Chip Detectors	None
Clogging Indicator	3A
EEC (FADEC)	*[4]
EEC Alternator	13, 3A (Do at the same time)
Engine (Pretested Engine)	9
Engine (Untested Engine)	10

(Continued)

Component Repaired or Replaced	Tests *[1]
Engine Driven Pump (Hydraulic)	2
Fan Blades	
Complete Set	7
Pair or Individual Blade	7 (Customer's Convenience)
Re-installation of blades in same position (Example: after blade re-lube)	None
FFCC Vibration Sensor	*[6]
Fuel Filter	3A
Fuel Filter Differential Pressure Switch	*[7], 3A
Fuel Flow Transmitter	13, 3A (Do at the same time)
Fuel Nozzles	3A
Fuel Nozzle Filter	3A
Fuel Pump Package	12, *[2], 13, 3A (Do 13,3A at same time)
Fuel System Pipes	3A
Handcranking Drive Cover	3A
HPTACC Valve	12, 3A
Hydromechanical Unit (HMU)	12, 13, 3A (Do 13, 3A at same time)
Identification Plug	*[7], *[3]
IDG	3A
IDG Air/Oil Cooler	3A
IDG Oil Cooler	3A
Igniter Plug	*[5]
Ignition Exciter	*[5]
Ignition Lead	*[5]
LPTACC Valve	12 and 3A
Lubrication Unit	3A
Main Oil/Fuel Heat Exchanger	3A
N1 Speed Sensor	13, 3A (Do at the same time)
N2 Speed Sensor	13, 3A (Do at the same time)
Oil Anti-Leak Valve	3A
Oil Filter Differntial Pressure Switch	*[7] and 3A
Oil Quantity Transmitter	3A

(Continued)

Component Repaired or Replaced	Tests *[1]
Oil Pressure Sensor	*[7] and 3A
Oil Scavenge Filter Assembly	*[7] and 3A
Oil Scavenge Filter Element	3A
Oil Supply Filter	3A
Oil System Pipes and Manifolds	3A
Oil Tank	3A
Oil Temperature Sensor	*[7] and 3A
Pneumatic Bleed Air Components and Tubes	1
PT25 Sensor	*[7]
Servo Fuel Heater	3A
Start Valve	1
Starter	1 and 3A
Starter Magnetic Plug Housing	3A
T12 Sensor	*[7]
T3 Sensor	*[7]
T49.5 Probe	*[7]
TCC Sensor	*[7]
Transfer Gearbox	3B
Transient Bleed Valve	12 and 3A
VBV Actuator	12 and 3A
VBV Doors	12
VBV System (Manual Operation)	3A
VSV Actuator	12 and 3A
VSV System (Manual Operation)	3A
Wire Harnesses	*[7] and 12

*[1] Do the tests in the sequence that they are listed for each component.

*[2] Test 12 is not necessary after the fuel pump assembly inspection procedure (PAGEBLOCK 73-11-01/601).

*[3] To make sure the identification and configuration are correct, do this task: IDENT/CONFIG, TASK 73-21-00-700-808-F00.

*[4] Do this task: FADEC System Test, TASK 73-21-00-700-802-F00.

*[5] Do this task: Audible Test of the Ignition System - EEC BITE Igniters Test, TASK 74-00-00-750-801-F00.

*[6] Do this task: Airborne Vibration Monitoring (AVM) System - Operational Test, TASK 77-31-00-710-801-F00.

*[7] Do this task: EEC TEST, TASK 73-21-00-700-804-F00.

SUBTASK 71-00-00-970-001-F00

(2) Prepare a data sheet to write the applicable engine data during the performance of the necessary engine tests (Figure 501).

SUBTASK 71-00-00-910-001-F00

(3) While you operate the engine, obey the safety precautions and limits for the correct engine operation (TASK 71-00-00-800-806-F00).

SUBTASK 71-00-00-730-003-F00

(4) If you do the igniters test per flagnote *[5], the BITE screen for some EEC software packages shows an incorrect reference "DO PROCEDURE: IGNITERS TEST AMM 71-00-00/501". Do the step that follows:

(a) Do this task: Audible Test of the Ignition System - EEC BITE Igniters Test, TASK 74-00-00-750-801-F00.

which includes the prepare for test procedures.

——————— END OF TASK ———————

DATE

AIRPLANE DATA		ENGINE DATA				
AIRPLANE NO.	FUEL TYPE	ENG POS	ENGINE MODEL	ENGINE S/N	HMU P/N	EEC P/N
		1				
TANK	FUEL QUANTITY	2				
NO. 1		REMARKS				
NO. 2						
CTR						
TOTAL						

ENGINE START DATA												
ENG POS	START LEVER ADV.		INITIAL FF	LIGHTUP TIME (SEC)	STARTER CUTOUT (%N2)	MAX. EGT (°C)	MAX. FF	TIME TO IDLE (SEC)	OIL			VIBRATION (UNITS)
	%N2	MOTORING TIME (SEC)							QTY	TEMP	PRESS	
1												
2												

HYDRAULICS				ADDITIONAL DATA REQUIREMENTS								
HYD SYS	HYD QTY	HYD SYS PRESS		ENG POS								
		EMDP	EDP									
A				1								
B				2								

TEST NO. 5 – POWER ASSURANCE CHECK					
ENG POS	OAT	TARGET (%N1)	RECORDED VALUES		
			%N1	%N2	EGT
1					
2					

Engine Data and Record Sheet
Figure 501 (Sheet 1 of 2)/71-00-00-990-803-F00

AIRPLANE NO.

DATE

TEST NO. 7 – VIBRATION SURVEY				
ENG POS	OAT	BARO	STATIC T.O. TARGET (%N1)	SELECTOR SWITCH POSITION

REMARKS; DISCREPANCIES _____

Engine Data and Record Sheet
Figure 501 (Sheet 2 of 2)/71-00-00-990-803-F00

TASK 71-00-00-700-809-F00

3. Test 1 - Pneumatic Leak Check

(Figure 502)

A. General

(1) This test motors the engine to do a check for air leaks in the pneumatic system ducts and joints.

B. References

Reference	Title
71-00-00-700-821-F00	Dry Motor the Engine (P/B 201)
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

C. Location Zones

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

D. Prepare for the Pneumatic Leak Check

SUBTASK 71-00-00-860-157-F00

(1) On the overhead panel, P5, make sure the applicable BLEED 1 or BLEED 2 switch is in the OFF position.

NOTE: This will close the applicable PRSOV.

SUBTASK 71-00-00-860-158-F00

(2) On the overhead panel, P5, make sure the applicable ENG ANTI-ICE 1 or ENG ANTI-ICE 2 switch is in the OFF position.

NOTE: This will close the applicable inlet cowl TAI valve.

SUBTASK 71-00-00-010-015-F00

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 REVERSERS (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.

(3) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

E. Pneumatic Leak Check

SUBTASK 71-00-00-790-007-F00

(1) Do this task: Dry Motor the Engine, TASK 71-00-00-700-821-F00.

(a) As you do the dry motor procedure, carefully look at these ducts and joints for leaks:

1) The starter duct (from the starter to the start valve and from the start valve to the strut interface).

2) The stages 5 and 9 pneumatic ducts (from the engine interfaces to the PRSOV and from the intersection manifold to the 12 o'clock location on the engine fan frame).

3) The inlet cowl TAI duct (from the 12 o'clock location on the engine fan frame to the inlet cowl TAI valve).

(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.

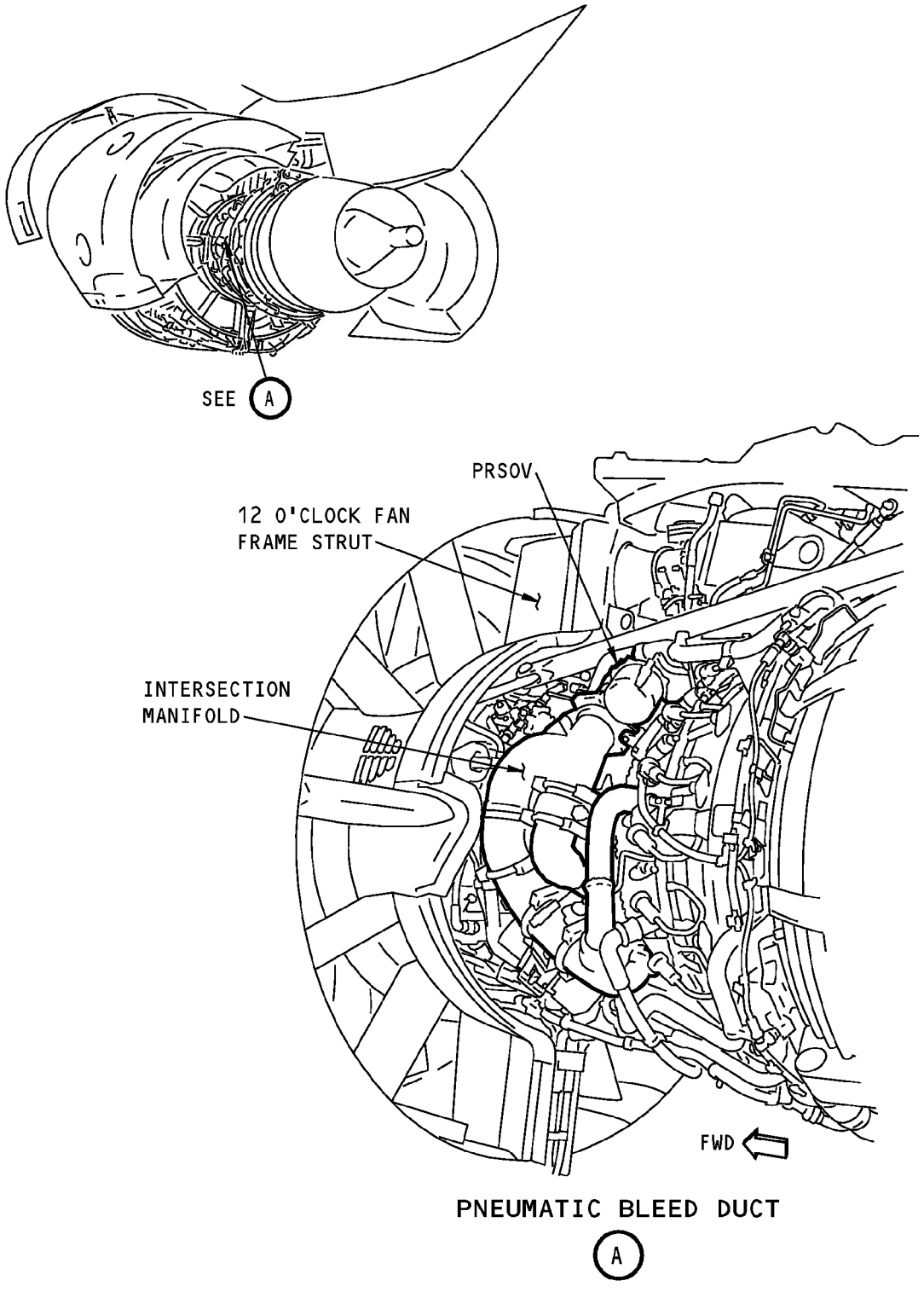
F. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-410-011-F00

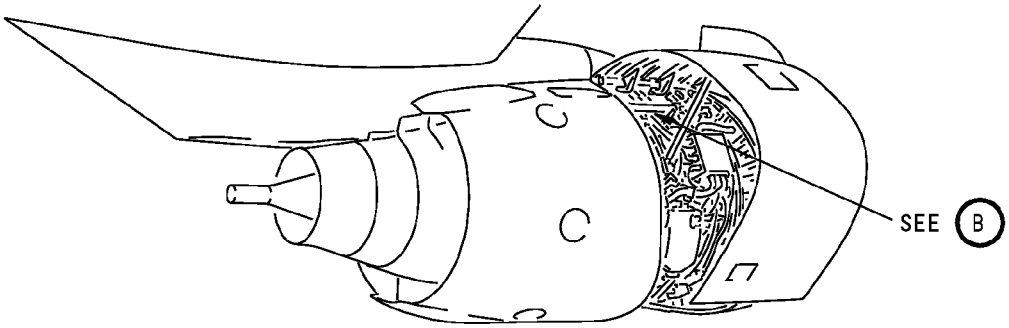
WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

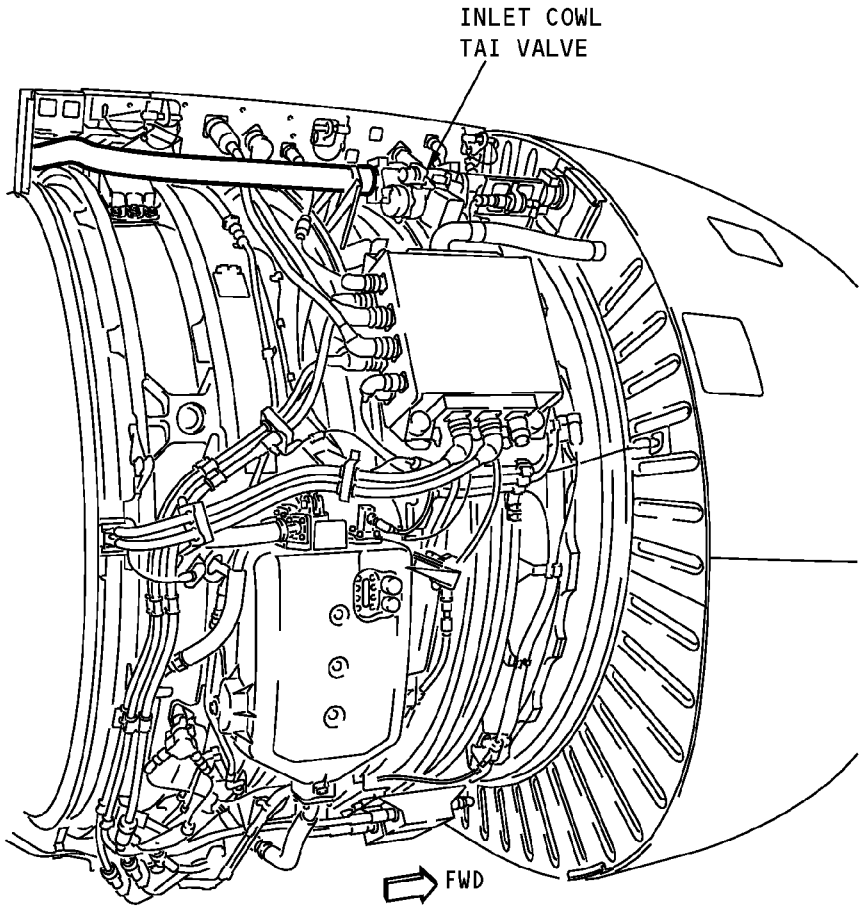
(1) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

——————— END OF TASK ———————



Engine Pneumatic Duct Locations
Figure 502 (Sheet 1 of 3)/71-00-00-990-804-F00

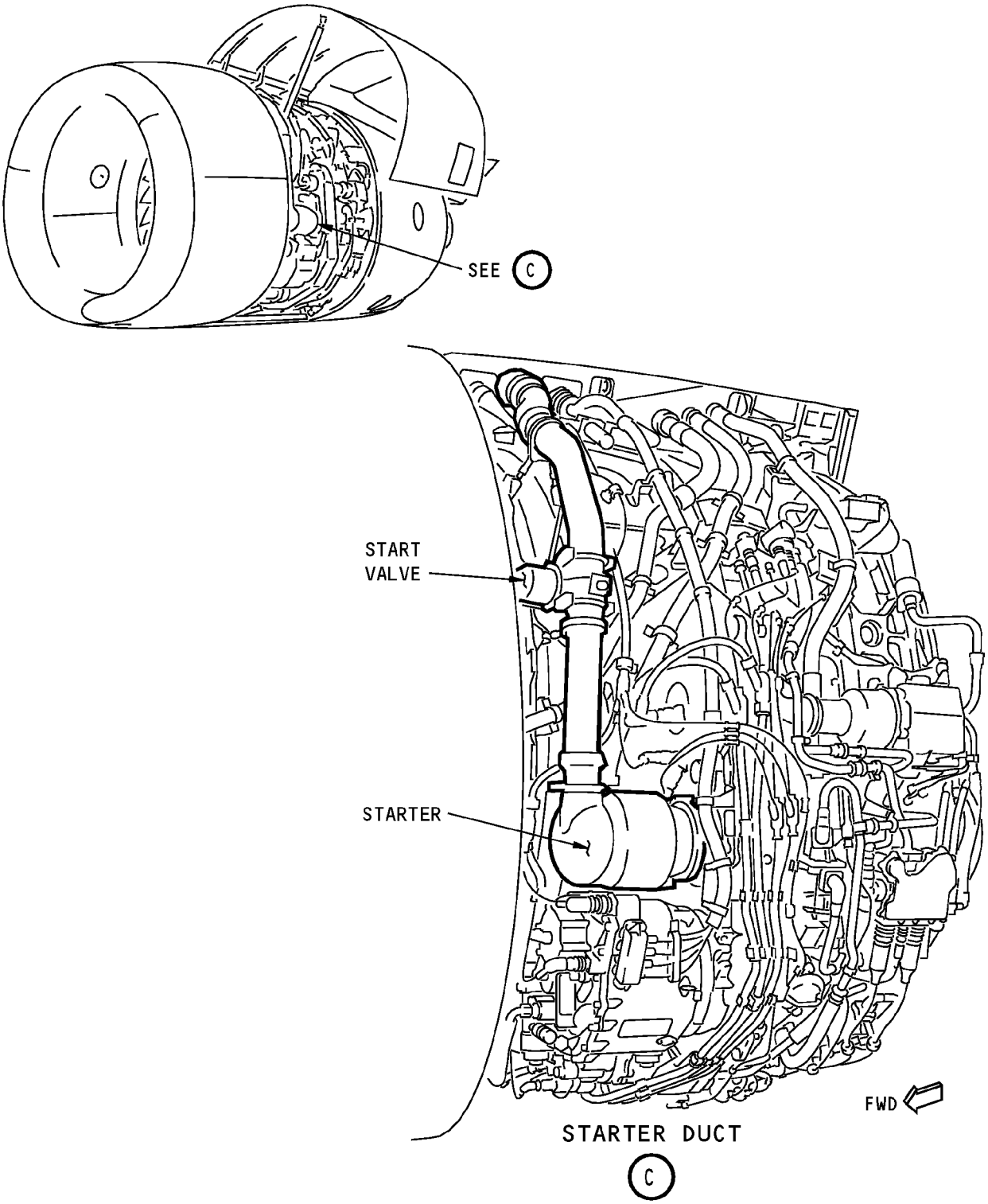




INLET COWL TAI DUCT

B

Engine Pneumatic Duct Locations
Figure 502 (Sheet 2 of 3)/71-00-00-990-804-F00



Engine Pneumatic Duct Locations
Figure 502 (Sheet 3 of 3)/71-00-00-990-804-F00

TASK 71-00-00-700-810-F00

4. Test 2 - Dry Motor Leak Test

A. General

(1) This check is to find leaks in some oil system components.

B. References

Reference	Title
71-00-00-700-821-F00	Dry Motor the Engine (P/B 201)
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

C. Consumable Materials

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

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 Procedure

SUBTASK 71-00-00-790-002-F00

CAUTION: DO NOT REPLACE AN IDLE POWER LEAK CHECK WITH THIS DRY MOTOR LEAK CHECK. YOU CANNOT USE THIS PROCEDURE TO FIND POSSIBLE ENGINE OIL AND FUEL LEAKS. IF YOU USE THIS PROCEDURE AS AN ALTERNATE TO THE IDLE POWER LEAK CHECK WHERE IT IS INDICATED, DAMAGE TO THE ENGINE CAN OCCUR.

(1) Obey this CAUTION when you do this task.

SUBTASK 71-00-00-010-001-F00

(2) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 71-00-00-010-002-F00

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 REVERSERS (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.

(3) To examine the areas of the engine below the thrust reverser, do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00

for the applicable thrust reverser or thrust reversers.

SUBTASK 71-00-00-160-001-F00

(4) Clean the areas to be examined with a cotton wiper, G00034.

F. Dry Motor Leak Check Procedure

SUBTASK 71-00-00-860-001-F00

CAUTION: DO NOT OPERATE THE STARTER MORE THAN THE STARTER LIMITS. IF YOU OPERATE THE STARTER MORE THAN THE LIMITS, DAMAGE TO THE STARTER COULD OCCUR.

(1) Do this task: Dry Motor the Engine, TASK 71-00-00-700-821-F00.

SUBTASK 71-00-00-790-003-F00

(2) Examine the applicable component or system while you motor the engine and after you stop the engine.

NOTE: When engine operates, some oil leak can occur at the aft sump rotating seal. After operation, an oil puddle in the exhaust is usual. When engine operations are done one after the other, it can cause a large oil puddle in the exhaust.

(a) If you find leakage, repair or replace the tubes, tube flanges, the fittings or components as it is necessary.

(b) Do the leak check again after you replace or repair the tubes, tube flanges, fittings or components.

G. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-410-001-F00

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 this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

SUBTASK 71-00-00-410-002-F00

(2) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

END OF TASK

TASK 71-00-00-700-801-F00

5. Test 3A - Idle-Power Leak Check

A. General

(1) This check is used to examine the engine components or system for leakage when the engine operates at the idle-power position.

(2) If the engine component or system is on the engine core area, you must close the thrust reversers before the engine operates. If the engine component or system is on the engine fan case, it is permitted to keep the fan cowl panels open when the engine operates.

(3) Make sure you obey the engine hazard areas and the open cowl limits in this task: (TASK 71-00-00-800-806-F00).

B. References

Reference	Title
71-00-00-700-819-F00	Stop the Engine Procedure (Usual Engine Stop) (P/B 201)
71-00-00-800-805-F00	Engine Ground Safety Precautions (P/B 201)
71-00-00-800-806-F00	Engine Operation Limits (P/B 201)
71-00-00-800-807-F00	Start the Engine Procedure (Selection) (P/B 201)
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)

(Continued)

Reference	Title
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

C. Consumable Materials

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

D. Prepare for the Procedure

SUBTASK 71-00-00-010-005-F00

(1) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 71-00-00-010-006-F00

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 REVERSERS (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.

(2) To examine the areas of the engine below the thrust reverser, do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00

for the applicable thrust reverser or thrust reversers.

SUBTASK 71-00-00-160-003-F00

(3) Clean the areas to be examined with a cotton wiper, G00034.

SUBTASK 71-00-00-010-007-F00

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) If you opened the thrust reversers, do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

(a) The fan cowl panels can be kept in the open position.

E. Idle-Power Leak Check Procedure

SUBTASK 71-00-00-860-003-F00

WARNING: MAKE SURE YOU OBEY ALL THE INSTRUCTIONS AND PRECAUTIONS WHEN YOU OPERATE AN ENGINE AT HIGH POWER. REFER TO THIS TASK: ENGINE GROUND SAFETY PRECAUTIONS ENGINE GROUND SAFETY PRECAUTIONS, TASK 71-00-00-800-805-F00 . IF YOU DO NOT OBEY THE INSTRUCTIONS AND PRECAUTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do this task: Start the Engine Procedure (Selection), TASK 71-00-00-800-807-F00.

(a) Let the engine become stable at the minimum idle thrust for five minutes.

(b) Make sure the engine operates in the operation limits (TASK 71-00-00-800-806-F00).

SUBTASK 71-00-00-860-004-F00

(2) Do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00.

SUBTASK 71-00-00-010-008-F00

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 REVERSERS (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.

(3) If it is necessary, do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

SUBTASK 71-00-00-790-006-F00

(4) Examine the applicable component or system for signs of fluid leakage.

(a) If you find leakage, repair or replace the tubes, tube flanges, the fittings or components as it is necessary.

(b) Look at the inside surfaces of the fan cowl panels or thrust reverser as applicable for new fuel, oil or hydraulic stains.

(c) Do the leak check again after you replace or repair the tubes, tube flanges, fittings or components.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-410-005-F00

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) If it is necessary, do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

SUBTASK 71-00-00-410-006-F00

(2) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

——————— END OF TASK ———————

TASK 71-00-00-700-823-F00

6. Test 3B - Part-Power Leak Check

A. General

(1) Some components of the engine do not have sufficient pressure when you do a leak check at idle power. This check will operate the engine at 70% N1 and do a leak check of these components.

(2) To do this check, you must close the fan cowl panels, and if applicable, the thrust reversers.

B. References

Reference	Title
71-00-00-700-819-F00	Stop the Engine Procedure (Usual Engine Stop) (P/B 201)
71-00-00-800-805-F00	Engine Ground Safety Precautions (P/B 201)
71-00-00-800-806-F00	Engine Operation Limits (P/B 201)
71-00-00-800-807-F00	Start the Engine Procedure (Selection) (P/B 201)
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

C. Consumable Materials

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

D. Prepare for the Procedure

SUBTASK 71-00-00-010-016-F00

(1) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 71-00-00-010-017-F00

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 REVERSERS (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.

(2) To examine the areas of the engine below the thrust reverser, do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00

for the applicable thrust reverser or thrust reversers.

SUBTASK 71-00-00-160-005-F00

(3) Clean the areas to be examined with a cotton wiper, G00034.

SUBTASK 71-00-00-010-018-F00

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) If you opened the thrust reversers, do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

SUBTASK 71-00-00-410-012-F00

(5) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

E. Part-Power Leak Check Procedure

SUBTASK 71-00-00-860-159-F00

WARNING: MAKE SURE YOU OBEY ALL THE INSTRUCTIONS AND PRECAUTIONS WHEN YOU OPERATE AN ENGINE AT HIGH POWER. REFER TO THIS TASK: ENGINE GROUND SAFETY PRECAUTIONS ENGINE GROUND SAFETY PRECAUTIONS, TASK 71-00-00-800-805-F00. IF YOU DO NOT OBEY THE INSTRUCTIONS AND PRECAUTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Do this task: Start the Engine Procedure (Selection), TASK 71-00-00-800-807-F00.

(a) Let the engine become stable at the minimum idle thrust for five minutes.

(b) Make sure the engine operates in the operation limits (TASK 71-00-00-800-806-F00).

(c) Make sure the PROBE HEAT "A" or "B" switch on the overhead panel, P5, is in 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 71-00-00-910-049-F00

(2) Do these steps to operate the engine at the 70% N1 power position:

(a) Slowly move the applicable forward thrust lever to the 70% N1 position.

1) Let the engine become stable at this speed for 2 minutes.

(b) Slowly move the thrust lever to the idle-power position.

1) Let the engine become stable at this speed for 3 minutes.

SUBTASK 71-00-00-860-160-F00

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.

(3) Do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00.

SUBTASK 71-00-00-860-161-F00

(4) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 71-00-00-010-019-F00

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 REVERSERS (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.

(5) If it is necessary, do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

SUBTASK 71-00-00-790-008-F00

(6) Examine the applicable component or system for signs of fluid leakage.

(a) If you find leakage, repair or replace the tubes, tube flanges, the fittings or components as it is necessary.

(b) Look at the inside surfaces of the fan cowl panels or thrust reverser as applicable for new fuel, oil or hydraulic stains.

(c) Do the leak check again after you replace or repair the tubes, tube flanges, fittings or components.

F. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-410-013-F00

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) If they were opened, do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

SUBTASK 71-00-00-410-014-F00

(2) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

END OF TASK

TASK 71-00-00-700-813-F00

7. Test 5 - Power Assurance Check

(Figure 503, Figure 504, Figure 505)

A. General

(1) The Power Assurance Check is not a good test for performance analysis of the engine. Do not use only the Power Assurance Check 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 a more reliable performance analysis by doing a test cell operation or on-wing performance trend monitoring.

(2) Do this test to make sure the engine will get takeoff power without the EGT or N2 at redline limits.

(3) For a specific %N1, this check will calculate the maximum EGT and the %N2 target values.

(4) This check can be done at one of three different N1 speeds; 65%, 70% or 75%. It is recommended that the initial check be done at 65% N1. If that test fails; or, if it is operator policy, then do a subsequent test at the higher N1 speeds.

(5) This procedure will also give the steps to adjust the EGT limit (make an altitude correction of the maximum EGT) when you operate the airplane at an airport above sea level. The actual EGT margin is based on the airplane route structure.

B. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
71-00-00-700-819-F00	Stop the Engine Procedure (Usual Engine Stop) (P/B 201)
71-00-00-800-805-F00	Engine Ground Safety Precautions (P/B 201)
71-00-00-800-807-F00	Start the Engine Procedure (Selection) (P/B 201)
73-21-00-700-808-F00	IDENT/CONFIG (P/B 501)
73-21-00-740-803-F00	EEC BITE TEST - RECENT FAULTS (P/B 501)

C. Tools/Equipment

Reference	Description
STD-1122	Thermometer - Alcohol, Ambient Temperature

D. Power Assurance Check

SUBTASK 71-00-00-970-005-F00

CAUTION: DO NOT USE THE TOTAL TEMPERATURE INDICATION FROM THE AIRPLANE FOR THE AMBIENT AIR TEMPERATURE. THIS WILL PREVENT AN INCORRECT TRIM TARGET SELECTION.

CAUTION: DO NOT PUT A MERCURY THERMOMETER ON THE AIRPLANE. MERCURY (FROM A BROKEN THERMOMETER) CAN CAUSE DAMAGE TO THE AIRPLANE COMPONENTS.

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

(a) Record the OAT on the data sheet.

SUBTASK 71-00-00-970-006-F00

(2) Use the OAT to get the %N1 Target speed, the Max EGT and Max %N2 for the applicable engine model and thrust rating (Figure 503, Figure 504, Figure 505).

NOTE: The 7B26 and 7B26/B1 engine models are equivalent in thrust rating. The 7B27 and 7B27/B3 engine models are equivalent in thrust rating.

(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 Ident/Config page, do this task: IDENT/CONFIG, TASK 73-21-00-700-808-F00

1) Record the trim level for the N1 Modifier Adjustment used in the Test Results.

SUBTASK 71-00-00-860-008-F00

(3) If not already done, do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 71-00-00-860-009-F00

WARNING: MAKE SURE YOU OBEY ALL THE INSTRUCTIONS AND PRECAUTIONS WHEN YOU OPERATE AN ENGINE AT HIGH POWER. REFER TO THIS TASK: ENGINE GROUND SAFETY PRECAUTIONS ENGINE GROUND SAFETY PRECAUTIONS, TASK 71-00-00-800-805-F00. IF YOU DO NOT OBEY THE INSTRUCTIONS AND PRECAUTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(4) Do this task: Start the Engine Procedure (Selection), TASK 71-00-00-800-807-F00.

(a) Make sure the BLEED 1 and BLEED 2 switches are in the OFF position.

(b) Set the applicable GEN switch to the OFF position and release.

NOTE: This will remove the load from the IDG, if it is not already removed.

1) Make sure the applicable GEN OFF BUS light comes on.

(c) Let the engine become stable at the idle-power position for five minutes.

SUBTASK 71-00-00-860-010-F00

(5) Make sure that the applicable switches on the overhead panel, P5, are in the OFF position:

(a) WING ANTI-ICE

(b) ENG ANTI-ICE 1 or 2.

SUBTASK 71-00-00-860-176-F00

(6) Make sure the PROBE HEAT "A" or ''B'' switch on the overhead panel, P5, is in 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 71-00-00-860-011-F00

(7) Monitor all engine parameters.

(a) Carefully monitor the EGT and N2 indications.

SUBTASK 71-00-00-860-165-F00

(8) Slowly move the applicable forward thrust lever to the N1 target speed that you got for the applicable MPA power level: 65%, 70% or 75% (Figure 503, Figure 504, Figure 505).

(a) It is recommended that the initial check be done at 65% N1. 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 the engine runs at the idle-power position for a minimum of 10 minutes before you increase the engine speed again.

SUBTASK 71-00-00-970-034-F00

(9) Let the engine become stable at this power assurance target for a minimum of three minutes.

SUBTASK 71-00-00-970-035-F00

(10) Record the %N1, %N2, and EGT parameters from the power assurance target on the data sheet.

SUBTASK 71-00-00-860-166-F00

(11) Slowly move the applicable forward thrust lever to the idle-power position.

SUBTASK 71-00-00-970-036-F00

(12) When this check is complete, make a decision if an additional check is necessary as follows:

(a) If the test was satisfactory, you can do one of these steps:

1) Do the above check again at the higher N1 speed; or,

2) Do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00.

(b) If the test is not satisfactory, do the above check again at the higher N1 speed.

E. Test Results

SUBTASK 71-00-00-860-012-F00

(1) If there is a difference between the N1 target and the N1 record, do these steps to adjust the N2 and EGT indications:

(a) Use these steps to find if there is a positive or negative difference between the N1 target and the N1 record:

1) If the N1 target is more than the N1 record, there is a positive difference.

2) If the N1 target is less than the N1 record, there is a negative difference.

(b) For each 0.1% of positive difference in N1, 0.8 degrees C must be added to the EGT, and 0.03% must be added to the N2 value that you recorded during the test.

(c) For each 0.1% of negative difference in N1, 0.8 degrees C must be subtracted from the EGT, and 0.03% must be subtracted from the N2 value that you recorded during the test.

Table 503/71-00-00-993-925-F00 Adjustments for Difference between N1 Target and N1 Record

Parameter	Correction Value/0.1 %N1
EGT	0.8 Degrees C
N2	0.03%

(d) This is an Example Calculation for a 7B20 engine using the MPA Test Table - 70% N1 (Figure 504) for an OAT of 10 degrees C:

HAP ALL; AIRPLANES WITH SINGLE ANNULAR COMBUSTOR (SAC) OR CFM56-7/3 ENGINES

Table 504/71-00-00-993-908-F00

FROM MPA TEST TABLE - 70% N1, OAT OF 10 DEG C

N1 TARGET = 69.4%, EGT MAX = 726 DEG C, N2 MAX = 91.8%

TEST DATA RECORDS, N1 RECORD = 69.7%, EGT RECORD = 695 DEG C, N2 RECORD = 81%

N1 TARGET < N1 RECORD, A NEGATIVE DIFFERENCE

N1 DIFF = N1 RECORD - N1 TARGET = 69.7 - 69.4 = 0.3

EGT ADJ = EGT RECORD - (0.8/0.1)(N1 DIFF) = 695 - (0.8/0.1)(0.3) = 692.6 DEG C

HAP ALL; AIRPLANES WITH SINGLE ANNULAR COMBUSTOR (SAC) OR CFM56-7/3 ENGINES (Continued)

(Continued)

N2 ADJ = N2 RECORD - (0.03/0.1)(N1 DIFF) = 81% - (0.03/0.1)(0.3) = 80.9%

FIND EGT AND N2 MARGINS WITH THE VALUES OF EGT ADJ AND N2 ADJ

EGT MARGIN = EGT MAX - EGT ADJ = 726 - 692.6 = 33.4 DEG C

N2 MARGIN = N2 MAX - N2 ADJ = 91.8 - 80.9 = 10.9%

HAP ALL

SUBTASK 71-00-00-970-037-F00

(2) To adjust the EGT margin for altitude, do these steps:

(a) Find the Altitude Correction Adjustment for the applicable engine and altitude in the table.

1) Use the highest altitude on the airplane's route structure.

2) The EGT corrections shown are for takeoff worst case flight condition and includes ambient temperature and altitude effects.

3) Linear interpolation is necessary for altitudes between the table values.

(b) Subtract the altitude adjustment value from the calculated EGT margin.

Table 505/71-00-00-993-911-F00 Altitude Adjustment Factors

ALTITUDE FEET	ENGINE MODEL *[1]								
	7B20	7B22	7B22/B1	7B24	7B24/B1	7B26 7B26/B1	7B26/B2	7B27 7B27/B3	7B27/B1
< 0	24	0	0	0	5	7	0	0	0
0	24	0	0	0	5	7	0	0	0
1000	24	0	0	0	6	7	0	2	0
2000	24	0	0	0	7	8	0	3	0
3000	24	0	0	0	7	8	0	5	0
4000	24	0	0	0	8	6	0	5	0
5000	24	0	0	0	5	4	0	0	0
6000	18	0	0	0	3	0	0	0	0
7000	12	0	0	0	0	0	0	0	0
8000	6	0	0	0	0	0	0	0	0
9000	0	0	0	0	0	0	0	0	0
> 9000	0	0	0	0	0	0	0	0	0

*[1] APPLICABLE TO ALL /3 AND /3F RATINGS

(c) To continue the same Example Calculation for altitude adjustment, assume the highest airport is at 4000 feet.

HAP ALL; AIRPLANES WITH SINGLE ANNULAR COMBUSTOR (SAC) OR CFM56-7/3 ENGINES

Table 506/71-00-00-993-912-F00

F0R A 7B20, 4000 FT ALTITUDE, ALTITUDE ADJUSTMENT FACTOR = 24

EGT MARGIN ALT = EGT MARGIN - ALTITUDE ADJUSTMENT FACTOR

= 33.4 - 24

= 9.4 DEG C

HAP ALL

SUBTASK 71-00-00-970-055-F00

(3) To adjust the EGT margin for N1 modifiers, do these steps:

(a) Find the N1 Modifier Adjustment for the applicable engine model and trim level.

1) To find the trim level, do this task: IDENT/CONFIG, TASK 73-21-00-700-808-F00.

(b) Add the adjustment to the calculated EGT margin.

Table 507/71-00-00-993-909-F00 N1 Modifier Adjustments

TRIM LEVEL	ENGINE MODEL *[1]							
	7B20	7B22	7B22/B1	7B24	7B24/B1	7B26 7B26/B1 7B26/B2	7B27 7B27/B3	7B27/B1
0	0	0	0	0	0	0	0	0
1	2	2	2	1	1	6	3	3
2	3	3	3	3	3	8	6	5
3	4	5	5	5	5	10	9	8
4	6	6	7	7	7	12	12	11
5	7	8	8	8	8	14	14	15
6	8	9	10	10	10	15	17	18
7	10	11	11	11	12	17	19	20

*[1] APPLICABLE TO ALL /3 AND /3F RATINGS

(c) To continue the same Example Calculation for N1 Modifier, assume the trim level is 4.

HAP ALL; AIRPLANES WITH SINGLE ANNULAR COMBUSTOR (SAC) OR CFM56-7/3 ENGINES

Table 508/71-00-00-993-910-F00

F0R A 7B20 WITH TRIM LEVEL OF 4, N1 MODIFIER ADJUSTMENT = 6

EGT MARGIN MODIFIED = EGT MARGIN ALT + N1 MODIFIER ADJUSTMENT

= 9.4 + 6

= 15.4 DEG C

HAP ALL

SUBTASK 71-00-00-970-038-F00

(4) If the 65% N1 power assurance check is not satisfactory, do the test again at 70% N1.

(a) If the 70% N1 power assurance check is not satisfactory, do the test again at 75% N1.

1) If the 75% N1 power assurance check is not satisfactory, do this task: EEC BITE TEST - RECENT FAULTS, TASK 73-21-00-740-803-F00.

a) If you find and correct the cause, do the test again at the first power level that failed.

b) If you do not find the cause, use your airline policy to make the decision if the engine must be replaced.

——————— END OF TASK ———————

OAT		%N1 TARGET	MAX EGT - °C							
			ENGINE MODEL [1]							
°F	°C	±0.5%	7B27/B1	7B27 7B27/B3	7B26 7B26/B1 7B26/B2	7B24/B1	7B24	7B22/B1	7B22	7B20
-40	-40	58.6	443	442	461	465	501	503	524	553
-38	-39	58.7	446	445	464	468	504	506	527	556
-36	-38	58.8	450	449	468	472	508	510	531	560
-35	-37	58.9	453	452	471	475	511	513	534	563
-33	-36	59.1	456	455	474	478	514	516	537	566
-31	-35	59.2	460	459	478	482	518	520	541	570
-29	-34	59.3	463	462	481	485	521	523	544	573
-27	-33	59.4	466	465	484	488	524	526	547	576
-26	-32	59.5	470	469	488	492	528	530	551	580
-24	-31	59.7	473	472	491	495	531	533	554	583
-22	-30	59.8	476	475	494	498	534	536	557	586
-20	-29	59.9	480	479	498	502	538	540	561	590
-18	-28	60.0	483	482	501	505	541	543	564	593
-17	-27	60.2	486	485	504	508	544	546	567	596
-15	-26	60.3	490	489	508	512	548	550	571	600
-13	-25	60.4	493	492	511	515	551	553	574	603
-11	-24	60.5	496	495	514	518	554	556	577	606
-9	-23	60.6	498	497	516	520	556	558	579	608
-8	-22	60.7	501	500	519	523	559	561	582	611
-6	-21	60.9	503	502	521	525	561	563	584	613
-4	-20	61.0	506	505	524	528	564	566	587	616
-2	-19	61.1	508	507	526	530	566	568	589	618
0	-18	61.2	511	510	529	533	569	571	592	621
1	-17	61.3	513	512	531	535	571	573	594	623
3	-16	61.5	516	515	534	538	574	576	597	626
5	-15	61.6	518	517	536	540	576	578	599	628
7	-14	61.7	521	520	539	543	579	581	602	631
9	-13	61.8	524	523	542	546	582	584	605	634
10	-12	61.9	526	525	544	548	584	586	607	636
12	-11	62.0	528	527	546	550	586	588	609	638
14	-10	62.2	531	530	549	553	589	591	612	641
16	-9	62.3	533	532	551	555	591	593	614	643
18	-8	62.4	536	535	554	558	594	596	617	646
19	-7	62.5	538	537	556	560	596	598	619	648
21	-6	62.6	541	540	559	563	599	601	622	651
23	-5	62.7	543	542	561	565	601	603	624	653
25	-4	62.9	546	545	564	568	604	606	627	656
27	-3	63.0	548	547	566	570	606	608	629	658
28	-2	63.1	550	549	568	572	608	610	631	660

[1] APPLICABLE TO ALL /3 AND /3F RATINGS GMM-1156640-00-A (MOD) G84819 S0006581785_V3

MPA Test Table - 65 Percent N1 Corrected Fan Speed
Figure 503 (Sheet 1 of 6)/71-00-00-990-820-F00

OAT		%N1 TARGET	MAX EGT - °C							
			ENGINE MODEL 1							
°F	°C	±0.5%	7B27/B1	7B27 7B27/B3	7B26 7B26/B1 7B26/B2	7B24/B1	7B24	7B22/B1	7B22	7B20
30	-1	63.2	552	551	570	574	610	612	633	662
32	0	63.3	555	554	573	577	613	615	636	665
34	1	63.4	557	556	575	579	615	617	638	667
36	2	63.5	559	558	577	581	617	619	640	669
37	3	63.7	561	560	579	583	619	621	642	671
39	4	63.8	563	562	581	585	621	623	644	673
41	5	63.9	565	564	583	587	623	625	646	675
43	6	64.0	567	566	585	589	625	627	648	677
45	7	64.1	570	569	588	592	628	630	651	680
46	8	64.2	572	571	590	594	630	632	653	682
48	9	64.3	574	573	592	596	632	634	655	684
50	10	64.4	576	575	594	598	634	636	657	686
52	11	64.6	578	577	596	600	636	638	659	688
54	12	64.7	579	578	597	601	637	639	660	689
55	13	64.8	581	580	599	603	639	641	662	691
57	14	64.9	583	582	601	605	641	643	664	693
59	15	65.0	585	584	603	607	643	645	666	695
61	16	65.1	586	585	604	608	644	646	667	696
63	17	65.2	588	587	606	610	646	648	669	698
64	18	65.3	590	589	608	612	648	650	671	700
66	19	65.4	592	591	610	614	650	652	673	702
68	20	65.6	594	593	612	616	652	654	675	704
70	21	65.7	596	595	614	618	654	656	677	706
72	22	65.8	598	597	616	620	656	658	679	708
73	23	65.9	600	599	618	622	658	660	681	710
75	24	66.0	602	601	620	624	660	662	683	712
77	25	66.1	604	603	622	626	662	664	685	714
79	26	66.2	606	605	624	628	664	666	687	716
81	27	66.3	608	607	626	630	666	668	689	718
82	28	66.4	611	610	629	633	669	671	692	721
84	29	66.5	613	612	631	635	671	673	694	723
86	30	66.6	615	614	633	637	673	675	696	725
88	31	66.8	617	616	635	639	675	677	698	727
90	32	66.9	619	618	637	641	677	679	700	729
91	33	67.0	621	620	639	643	679	681	702	731
93	34	67.1	623	622	641	645	681	683	704	733
95	35	67.2	625	624	643	647	683	685	706	735
97	36	67.3	628	627	646	650	686	688	709	738
99	37	67.4	630	629	648	652	688	690	711	740

1 APPLICABLE TO ALL /3 AND /3F RATINGS

GMM-1156641-00-A (MOD)

G84837 S0006581786_V3

MPA Test Table - 65 Percent N1 Corrected Fan Speed
Figure 503 (Sheet 2 of 6)/71-00-00-990-820-F00

OAT		%N1 TARGET	MAX EGT - °C							
			ENGINE MODEL 1							
°F	°C	±0.5%	7B27/B1	7B27 7B27/B3	7B26 7B26/B1 7B26/B2	7B24/B1	7B24	7B22/B1	7B22	7B20
100	38	67.5	632	631	650	654	690	692	713	742
102	39	67.6	634	633	652	656	692	694	715	744
104	40	67.7	637	636	655	659	695	697	718	747
106	41	67.8	639	638	657	661	697	699	720	749
108	42	67.9	641	640	659	663	699	701	722	751
109	43	68.0	643	642	661	665	701	703	724	753
111	44	68.1	645	644	663	667	703	705	726	755
113	45	68.2	647	646	665	669	705	707	728	757
115	46	68.4	649	648	667	671	707	709	730	759
117	47	68.5	651	650	669	673	709	711	732	761
118	48	68.6	653	652	671	675	711	713	734	763
120	49	68.7	655	654	673	677	713	715	736	765
122	50	68.8	657	656	675	679	715	717	738	767

1 APPLICABLE TO ALL /3 AND /3F RATINGS

GMM-1156641-00-A

G86614 S0006581787_V3

MPA Test Table - 65 Percent N1 Corrected Fan Speed
Figure 503 (Sheet 3 of 6)/71-00-00-990-820-F00

OAT		%N1 TARGET	MAX %N2 ENGINE MODEL [1]							
°F	°C	±0.5%	7B27/B1	7B27 7B27/B3	7B26 7B26/B1 7B26/B2	7B24/B1	7B24	7B22/B1	7B22	7B20
-40	-40	58.6	79.8	79.8	79.7	80.3	80.9	81.5	81.6	81.9
-38	-39	58.7	80.0	80.0	79.9	80.5	81.1	81.7	81.8	82.1
-36	-38	58.8	80.1	80.1	80.0	80.6	81.2	81.8	81.9	82.2
-35	-37	58.9	80.3	80.3	80.2	80.8	81.4	82.0	82.1	82.4
-33	-36	59.1	80.5	80.5	80.4	81.0	81.6	82.2	82.3	82.6
-31	-35	59.2	80.6	80.6	80.5	81.1	81.7	82.3	82.4	82.7
-29	-34	59.3	80.8	80.8	80.7	81.3	81.9	82.5	82.6	82.9
-27	-33	59.4	80.9	80.9	80.8	81.4	82.0	82.6	82.7	83.0
-26	-32	59.5	81.1	81.1	81.0	81.6	82.2	82.8	82.9	83.2
-24	-31	59.7	81.3	81.3	81.2	81.8	82.4	83.0	83.1	83.4
-22	-30	59.8	81.4	81.4	81.3	81.9	82.5	83.1	83.2	83.5
-20	-29	59.9	81.6	81.6	81.5	82.1	82.7	83.3	83.4	83.7
-18	-28	60.0	81.7	81.7	81.6	82.2	82.8	83.4	83.5	83.8
-17	-27	60.2	81.9	81.9	81.8	82.4	83.0	83.6	83.7	84.0
-15	-26	60.3	82.0	82.0	81.9	82.5	83.1	83.7	83.8	84.1
-13	-25	60.4	82.2	82.2	82.1	82.7	83.3	83.9	84.0	84.3
-11	-24	60.5	82.4	82.4	82.3	82.9	83.5	84.1	84.2	84.5
-9	-23	60.6	82.5	82.5	82.4	83.0	83.6	84.2	84.3	84.6
-8	-22	60.7	82.7	82.7	82.6	83.2	83.8	84.4	84.5	84.8
-6	-21	60.9	82.8	82.8	82.7	83.3	83.9	84.5	84.6	84.9
-4	-20	61.0	83.0	83.0	82.9	83.5	84.1	84.7	84.8	85.1
-2	-19	61.1	83.2	83.2	83.1	83.7	84.3	84.9	85.0	85.3
0	-18	61.2	83.3	83.3	83.2	83.8	84.4	85.0	85.1	85.4
1	-17	61.3	83.5	83.5	83.4	84.0	84.6	85.2	85.3	85.6
3	-16	61.5	83.7	83.7	83.6	84.2	84.8	85.4	85.5	85.8
5	-15	61.6	83.8	83.8	83.7	84.3	84.9	85.5	85.6	85.9
7	-14	61.7	84.0	84.0	83.9	84.5	85.1	85.7	85.8	86.1
9	-13	61.8	84.2	84.2	84.1	84.7	85.3	85.9	86.0	86.3
10	-12	61.9	84.3	84.3	84.2	84.8	85.4	86.0	86.1	86.4
12	-11	62.0	84.5	84.5	84.4	85.0	85.6	86.2	86.3	86.6
14	-10	62.2	84.6	84.6	84.5	85.1	85.7	86.3	86.4	86.7
16	-9	62.3	84.8	84.8	84.7	85.3	85.9	86.5	86.6	86.9
18	-8	62.4	85.0	85.0	84.9	85.5	86.1	86.7	86.8	87.1
19	-7	62.5	85.1	85.1	85.0	85.6	86.2	86.8	86.9	87.2
21	-6	62.6	85.3	85.3	85.2	85.8	86.4	87.0	87.1	87.4
23	-5	62.7	85.5	85.5	85.4	86.0	86.6	87.2	87.3	87.6
25	-4	62.9	85.6	85.6	85.5	86.1	86.7	87.3	87.4	87.7
27	-3	63.0	85.8	85.8	85.7	86.3	86.9	87.5	87.6	87.9
28	-2	63.1	86.0	86.0	85.9	86.5	87.1	87.7	87.8	88.1

[1] APPLICABLE TO ALL /3 AND /3F RATINGS

GMM-1156642-00-A (MOD)

H48528 S0006581788_V3

MPA Test Table - 65 Percent N1 Corrected Fan Speed
Figure 503 (Sheet 4 of 6)/71-00-00-990-820-F00

OAT		%N1 TARGET	MAX %N2							
			ENGINE MODEL [1]							
°F	°C	±0.5%	7B27/B1	7B27 7B27/B3	7B26 7B26/B1 7B26/B2	7B24/B1	7B24	7B22/B1	7B22	7B20
30	-1	63.2	86.1	86.1	86.0	86.6	87.2	87.8	87.9	88.2
32	0	63.3	86.3	86.3	86.2	86.8	87.4	88.0	88.1	88.4
34	1	63.4	86.5	86.5	86.4	87.0	87.6	88.2	88.3	88.6
36	2	63.5	86.6	86.6	86.5	87.1	87.7	88.3	88.4	88.7
37	3	63.7	86.8	86.8	86.7	87.3	87.9	88.5	88.6	88.9
39	4	63.8	87.0	87.0	86.9	87.5	88.1	88.7	88.8	89.1
41	5	63.9	87.1	87.1	87.0	87.6	88.2	88.8	88.9	89.2
43	6	64.0	87.3	87.3	87.2	87.8	88.4	89.0	89.1	89.4
45	7	64.1	87.4	87.4	87.3	87.9	88.5	89.1	89.2	89.5
46	8	64.2	87.6	87.6	87.5	88.1	88.7	89.3	89.4	89.7
48	9	64.3	87.8	87.8	87.7	88.3	88.9	89.5	89.6	89.9
50	10	64.4	87.9	87.9	87.8	88.4	89.0	89.6	89.7	90.0
52	11	64.6	88.1	88.1	88.0	88.6	89.2	89.8	89.9	90.2
54	12	64.7	88.3	88.3	88.2	88.8	89.4	90.0	90.1	90.4
55	13	64.8	88.4	88.4	88.3	88.9	89.5	90.1	90.2	90.5
57	14	64.9	88.6	88.6	88.5	89.1	89.7	90.3	90.4	90.7
59	15	65.0	88.8	88.8	88.7	89.3	89.9	90.5	90.6	90.9
61	16	65.1	88.9	88.9	88.8	89.4	90.0	90.6	90.7	91.0
63	17	65.2	89.1	89.1	89.0	89.6	90.2	90.8	90.9	91.2
64	18	65.3	89.2	89.2	89.1	89.7	90.3	90.9	91.0	91.3
66	19	65.4	89.4	89.4	89.3	89.9	90.5	91.1	91.2	91.5
68	20	65.6	89.6	89.6	89.5	90.1	90.7	91.3	91.4	91.7
70	21	65.7	89.7	89.7	89.6	90.2	90.8	91.4	91.5	91.8
72	22	65.8	89.9	89.9	89.8	90.4	91.0	91.6	91.7	92.0
73	23	65.9	90.0	90.0	89.9	90.5	91.1	91.7	91.8	92.1
75	24	66.0	90.2	90.2	90.1	90.7	91.3	91.9	92.0	92.3
77	25	66.1	90.3	90.3	90.2	90.8	91.4	92.0	92.1	92.4
79	26	66.2	90.5	90.5	90.4	91.0	91.6	92.2	92.3	92.6
81	27	66.3	90.6	90.6	90.5	91.1	91.7	92.3	92.4	92.7
82	28	66.4	90.8	90.8	90.7	91.3	91.9	92.5	92.6	92.9
84	29	66.5	90.9	90.9	90.8	91.4	92.0	92.6	92.7	93.0
86	30	66.6	91.1	91.1	91.0	91.6	92.2	92.8	92.9	93.2
88	31	66.8	91.3	91.3	91.2	91.8	92.4	93.0	93.1	93.4
90	32	66.9	91.4	91.4	91.3	91.9	92.5	93.1	93.2	93.5
91	33	67.0	91.6	91.6	91.5	92.1	92.7	93.3	93.4	93.7
93	34	67.1	91.7	91.7	91.6	92.2	92.8	93.4	93.5	93.8
95	35	67.2	91.9	91.9	91.8	92.4	93.0	93.6	93.7	94.0
97	36	67.3	92.0	92.0	91.9	92.5	93.1	93.7	93.8	94.1
99	37	67.4	92.2	92.2	92.1	92.7	93.3	93.9	94.0	94.3

[1] APPLICABLE TO ALL /3 AND /3F RATINGS

GMM-1156642-00-A (MOD)

H48571 S0006581789_V3

MPA Test Table - 65 Percent N1 Corrected Fan Speed
Figure 503 (Sheet 5 of 6)/71-00-00-990-820-F00

OAT		%N1 TARGET	MAX %N2 ENGINE MODEL 1							
°F	°C	±0.5%	7B27/B1	7B27 7B27/B3	7B26 7B26/B1 7B26/B2	7B24/B1	7B24	7B22/B1	7B22	7B20
100	38	67.5	92.3	92.3	92.2	92.8	93.4	94.0	94.1	94.4
102	39	67.6	92.5	92.5	92.4	93.0	93.6	94.2	94.3	94.6
104	40	67.7	92.6	92.6	92.5	93.1	93.7	94.3	94.4	94.7
106	41	67.8	92.8	92.8	92.7	93.3	93.9	94.5	94.6	94.9
108	42	67.9	92.9	92.9	92.8	93.4	94.0	94.6	94.7	95.0
109	43	68.0	93.1	93.1	93.0	93.6	94.2	94.8	94.9	95.2
111	44	68.1	93.2	93.2	93.1	93.7	94.3	94.9	95.0	95.3
113	45	68.2	93.4	93.4	93.3	93.9	94.5	95.1	95.2	95.5
115	46	68.4	93.5	93.5	93.4	94.0	94.6	95.2	95.3	95.6
117	47	68.5	93.7	93.7	93.6	94.2	94.8	95.4	95.5	95.8
118	48	68.6	93.8	93.8	93.7	94.3	94.9	95.5	95.6	95.9
120	49	68.7	94.0	94.0	93.9	94.5	95.1	95.7	95.8	96.1
122	50	68.8	94.1	94.1	94.0	94.6	95.2	95.8	95.9	96.2

1 APPLICABLE TO ALL /3 AND /3F RATINGS

GMM-1156644-00-A (MOD)

H48587 S0006581790_V3

MPA Test Table - 65 Percent N1 Corrected Fan Speed
Figure 503 (Sheet 6 of 6)/71-00-00-990-820-F00

OAT		%N1 TARGET	MAX EGT - °C							
			ENGINE MODEL [1]							
°F	°C	±0.5%	7B27/B1	7B27 7B27/B3	7B26 7B26/B1 7B26/B2	7B24/B1	7B24	7B22/B1	7B22	7B20
-40	-40	63.1	485	484	503	507	543	545	566	595
-38	-39	63.2	489	488	507	511	547	549	570	599
-36	-38	63.4	493	492	511	515	551	553	574	603
-35	-37	63.5	496	495	514	518	554	556	577	606
-33	-36	63.6	500	499	518	522	558	560	581	610
-31	-35	63.7	503	502	521	525	561	563	584	613
-29	-34	63.9	506	505	524	528	564	566	587	616
-27	-33	64.0	509	508	527	531	567	569	590	619
-26	-32	64.1	511	510	529	533	569	571	592	621
-24	-31	64.3	514	513	532	536	572	574	595	624
-22	-30	64.4	517	516	535	539	575	577	598	627
-20	-29	64.5	519	518	537	541	577	579	600	629
-18	-28	64.7	522	521	540	544	580	582	603	632
-17	-27	64.8	525	524	543	547	583	585	606	635
-15	-26	64.9	528	527	546	550	586	588	609	638
-13	-25	65.0	530	529	548	552	588	590	611	640
-11	-24	65.2	533	532	551	555	591	593	614	643
-9	-23	65.3	536	535	554	558	594	596	617	646
-8	-22	65.4	538	537	556	560	596	598	619	648
-6	-21	65.6	541	540	559	563	599	601	622	651
-4	-20	65.7	543	542	561	565	601	603	624	653
-2	-19	65.8	546	545	564	568	604	606	627	656
0	-18	65.9	549	548	567	571	607	609	630	659
1	-17	66.1	551	550	569	573	609	611	632	661
3	-16	66.2	554	553	572	576	612	614	635	664
5	-15	66.3	557	556	575	579	615	617	638	667
7	-14	66.4	559	558	577	581	617	619	640	669
9	-13	66.6	561	560	579	583	619	621	642	671
10	-12	66.7	564	563	582	586	622	624	645	674
12	-11	66.8	566	565	584	588	624	626	647	676
14	-10	66.9	569	568	587	591	627	629	650	679
16	-9	67.1	571	570	589	593	629	631	652	681
18	-8	67.2	574	573	592	596	632	634	655	684
19	-7	67.3	576	575	594	598	634	636	657	686
21	-6	67.4	579	578	597	601	637	639	660	689
23	-5	67.6	581	580	599	603	639	641	662	691
25	-4	67.7	584	583	602	606	642	644	665	694
27	-3	67.8	586	585	604	608	644	646	667	696
28	-2	67.9	588	587	606	610	646	648	669	698

[1] APPLICABLE TO ALL /3 AND /3F RATINGS

GMM-1156645-00-A (MOD)

G85094 S0006581791_V3

MPA Test Table - 70 Percent N1 Corrected Fan Speed
Figure 504 (Sheet 1 of 6)/71-00-00-990-821-F00

OAT		%N1 TARGET	MAX EGT - °C							
			ENGINE MODEL 1							
°F	°C	±0.5%	7B27/B1	7B27 7B27/B3	7B26 7B26/B1 7B26/B2	7B24/B1	7B24	7B22/B1	7B22	7B20
30	-1	68.1	591	590	609	613	649	651	672	701
32	0	68.2	593	592	611	615	651	653	674	703
34	1	68.3	595	594	613	617	653	655	676	705
36	2	68.4	598	597	616	620	656	658	679	708
37	3	68.6	600	599	618	622	658	660	681	710
39	4	68.7	602	601	620	624	660	662	683	712
41	5	68.8	605	604	623	627	663	665	686	715
43	6	68.9	607	606	625	629	665	667	688	717
45	7	69.0	609	608	627	631	667	669	690	719
46	8	69.2	611	610	629	633	669	671	692	721
48	9	69.3	613	612	631	635	671	673	694	723
50	10	69.4	616	615	634	638	674	676	697	726
52	11	69.5	618	617	636	640	676	678	699	728
54	12	69.6	621	620	639	643	679	681	702	731
55	13	69.8	623	622	641	645	681	683	704	733
57	14	69.9	625	624	643	647	683	685	706	735
59	15	70.0	627	626	645	649	685	687	708	737
61	16	70.1	630	629	648	652	688	690	711	740
63	17	70.2	632	631	650	654	690	692	713	742
64	18	70.4	634	633	652	656	692	694	715	744
66	19	70.5	637	636	655	659	695	697	718	747
68	20	70.6	639	638	657	661	697	699	720	749
70	21	70.7	641	640	659	663	699	701	722	751
72	22	70.8	644	643	662	666	702	704	725	754
73	23	70.9	646	645	664	668	704	706	727	756
75	24	71.1	648	647	666	670	706	708	729	758
77	25	71.2	651	650	669	673	709	711	732	761
79	26	71.3	653	652	671	675	711	713	734	763
81	27	71.4	655	654	673	677	713	715	736	765
82	28	71.5	657	656	675	679	715	717	738	767
84	29	71.7	660	659	678	682	718	720	741	770
86	30	71.8	662	661	680	684	720	722	743	772
88	31	71.9	664	663	682	686	722	724	745	774
90	32	72.0	666	665	684	688	724	726	747	776
91	33	72.1	668	667	686	690	726	728	749	778
93	34	72.2	670	669	688	692	728	730	751	780
95	35	72.3	673	672	691	695	731	733	754	783
97	36	72.5	675	674	693	697	733	735	756	785
99	37	72.6	677	676	695	699	735	737	758	787

1 APPLICABLE TO ALL /3 AND /3F RATINGS

GMM-1156645-00-A (MOD)

G85123 S0006581792_V3

MPA Test Table - 70 Percent N1 Corrected Fan Speed
Figure 504 (Sheet 2 of 6)/71-00-00-990-821-F00

OAT		%N1 TARGET	MAX EGT - °C							
			ENGINE MODEL 1							
°F	°C	±0.5%	7B27/B1	7B27 7B27/B3	7B26 7B26/B1 7B26/B2	7B24/B1	7B24	7B22/B1	7B22	7B20
100	38	72.7	679	678	697	701	737	739	760	789
102	39	72.8	681	680	699	703	739	741	762	791
104	40	72.9	684	683	702	706	742	744	765	794
106	41	73.0	686	685	704	708	744	746	767	796
108	42	73.1	688	687	706	710	746	748	769	798
109	43	73.3	690	689	708	712	748	750	771	800
111	44	73.4	692	691	710	714	750	752	773	802
113	45	73.5	695	694	713	717	753	755	776	805
115	46	73.6	697	696	715	719	755	757	778	807
117	47	73.7	699	698	717	721	757	759	780	809
118	48	73.8	701	700	719	723	759	761	782	811
120	49	73.9	703	702	721	725	761	763	784	813
122	50	74.1	705	704	723	727	763	765	786	815

1 APPLICABLE TO ALL /3 AND /3F RATINGS

GMM-1156646-00-A (MOD)

G86652 S0006581793_V3

MPA Test Table - 70 Percent N1 Corrected Fan Speed
Figure 504 (Sheet 3 of 6)/71-00-00-990-821-F00

OAT		%N1 TARGET	MAX %N2 ENGINE MODEL 1							
°F	°C	±0.5%	7B27/B1	7B27 7B27/B3	7B26 7B26/B1 7B26/B2	7B24/B1	7B24	7B22/B1	7B22	7B20
-40	-40	63.1	81.3	81.3	81.2	81.8	82.4	83.0	83.1	83.4
-38	-39	63.2	81.5	81.5	81.4	82.0	82.6	83.2	83.3	83.6
-36	-38	63.4	81.7	81.7	81.6	82.2	82.8	83.4	83.5	83.8
-35	-37	63.5	81.8	81.8	81.7	82.3	82.9	83.5	83.6	83.9
-33	-36	63.6	82.0	82.0	81.9	82.5	83.1	83.7	83.8	84.1
-31	-35	63.7	82.1	82.1	82.0	82.6	83.2	83.8	83.9	84.2
-29	-34	63.9	82.3	82.3	82.2	82.8	83.4	84.0	84.1	84.4
-27	-33	64.0	82.5	82.5	82.4	83.0	83.6	84.2	84.3	84.6
-26	-32	64.1	82.7	82.7	82.6	83.2	83.8	84.4	84.5	84.8
-24	-31	64.3	82.8	82.8	82.7	83.3	83.9	84.5	84.6	84.9
-22	-30	64.4	83.0	83.0	82.9	83.5	84.1	84.7	84.8	85.1
-20	-29	64.5	83.2	83.2	83.1	83.7	84.3	84.9	85.0	85.3
-18	-28	64.7	83.3	83.3	83.2	83.8	84.4	85.0	85.1	85.4
-17	-27	64.8	83.5	83.5	83.4	84.0	84.6	85.2	85.3	85.6
-15	-26	64.9	83.7	83.7	83.6	84.2	84.8	85.4	85.5	85.8
-13	-25	65.0	83.8	83.8	83.7	84.3	84.9	85.5	85.6	85.9
-11	-24	65.2	84.0	84.0	83.9	84.5	85.1	85.7	85.8	86.1
-9	-23	65.3	84.2	84.2	84.1	84.7	85.3	85.9	86.0	86.3
-8	-22	65.4	84.3	84.3	84.2	84.8	85.4	86.0	86.1	86.4
-6	-21	65.6	84.5	84.5	84.4	85.0	85.6	86.2	86.3	86.6
-4	-20	65.7	84.7	84.7	84.6	85.2	85.8	86.4	86.5	86.8
-2	-19	65.8	84.8	84.8	84.7	85.3	85.9	86.5	86.6	86.9
0	-18	65.9	85.0	85.0	84.9	85.5	86.1	86.7	86.8	87.1
1	-17	66.1	85.2	85.2	85.1	85.7	86.3	86.9	87.0	87.3
3	-16	66.2	85.3	85.3	85.2	85.8	86.4	87.0	87.1	87.4
5	-15	66.3	85.5	85.5	85.4	86.0	86.6	87.2	87.3	87.6
7	-14	66.4	85.7	85.7	85.6	86.2	84.8	87.4	87.5	87.8
9	-13	66.6	85.9	85.9	85.8	86.4	87.0	87.6	87.7	88.0
10	-12	66.7	86.0	86.0	85.9	86.5	87.1	87.7	87.8	88.1
12	-11	66.8	86.2	86.2	86.1	86.7	87.3	87.9	88.0	88.3
14	-10	66.9	86.4	86.4	86.3	86.9	87.5	88.1	88.2	88.5
16	-9	67.1	86.5	86.5	86.4	87.0	87.6	88.2	88.3	88.6
18	-8	67.2	86.7	86.7	86.6	87.2	87.8	88.4	88.5	88.8
19	-7	67.3	86.9	86.9	86.8	87.4	88.0	88.6	88.7	89.0
21	-6	67.4	87.0	87.0	86.9	87.5	88.1	88.7	88.8	89.1
23	-5	67.6	87.2	87.2	87.1	87.7	88.3	88.9	89.0	89.3
25	-4	67.7	87.4	87.4	87.3	87.9	88.5	89.1	89.2	89.5
27	-3	67.8	87.5	87.5	87.4	88.0	88.6	89.2	89.3	89.6
28	-2	67.9	87.7	87.7	87.6	88.2	88.8	89.4	89.5	89.8

1 APPLICABLE TO ALL /3 AND /3F RATINGS

GMM-1156645-00-A (MOD)

H49572 S0006581794_V3

MPA Test Table - 70 Percent N1 Corrected Fan Speed
Figure 504 (Sheet 4 of 6)/71-00-00-990-821-F00

OAT		%N1 TARGET	MAX %N2							
			ENGINE MODEL [1]							
°F	°C	±0.5%	7B27/B1	7B27 7B27/B3	7B26 7B26/B1 7B26/B2	7B24/B1	7B24	7B22/B1	7B22	7B20
30	-1	68.1	87.9	87.9	87.8	88.4	89.0	89.6	89.7	90.0
32	0	68.2	88.0	88.0	87.9	88.5	89.1	89.7	89.8	90.1
34	1	68.3	88.2	88.2	88.1	88.7	89.3	89.9	90.0	90.3
36	2	68.4	88.4	88.4	88.3	88.9	89.5	90.1	90.2	90.5
37	3	68.6	88.5	88.5	88.4	89.0	89.6	90.2	90.3	90.6
39	4	68.7	88.7	88.7	88.6	89.2	89.8	90.4	90.5	90.8
41	5	68.8	88.9	88.9	88.8	89.4	90.0	90.6	90.7	91.0
43	6	68.9	89.1	89.1	89.0	89.6	90.2	90.8	90.9	91.2
45	7	69.0	89.2	89.2	89.1	89.7	90.3	90.9	91.0	91.3
46	8	69.2	89.4	89.4	89.3	89.9	90.5	91.1	91.2	91.5
48	9	69.3	89.6	89.6	89.5	90.1	90.7	91.3	91.4	91.7
50	10	69.4	89.7	89.7	89.6	90.2	90.8	91.4	91.5	91.8
52	11	69.5	89.9	89.9	89.8	90.4	91.0	91.6	91.7	92.0
54	12	69.6	90.1	90.1	90.0	90.6	91.2	91.8	91.9	92.2
55	13	69.8	90.2	90.2	90.1	90.7	91.3	91.9	92.0	92.3
57	14	69.9	90.4	90.4	90.3	90.9	91.5	92.1	92.2	92.5
59	15	70.0	90.5	90.5	90.4	91.0	91.6	92.2	92.3	92.6
61	16	70.1	90.7	90.7	90.6	91.2	91.8	92.4	92.5	92.8
63	17	70.2	90.9	90.9	90.8	91.4	92.0	92.6	92.7	93.0
64	18	70.4	91.0	91.0	90.9	91.5	92.1	92.7	92.8	93.1
66	19	70.5	91.2	91.2	91.1	91.7	92.3	92.9	93.0	93.3
68	20	70.6	91.4	91.4	91.3	91.9	92.5	93.1	93.2	93.5
70	21	70.7	91.5	91.5	91.4	92.0	92.6	93.2	93.3	93.6
72	22	70.8	91.7	91.7	91.6	92.2	92.8	93.4	93.5	93.8
73	23	70.9	91.8	91.8	91.7	92.3	92.9	93.5	93.6	93.9
75	24	71.1	92.0	92.0	91.9	92.5	93.1	93.7	93.8	94.1
77	25	71.2	92.2	92.2	92.1	92.7	93.3	93.9	94.0	94.3
79	26	71.3	92.3	92.3	92.2	92.8	93.4	94.0	94.1	94.4
81	27	71.4	92.5	92.5	92.4	93.0	93.6	94.2	94.3	94.6
82	28	71.5	92.6	92.6	92.5	93.1	93.7	94.3	94.4	94.7
84	29	71.7	92.8	92.8	92.7	93.3	93.9	94.5	94.6	94.9
86	30	71.8	92.9	92.9	92.8	93.4	94.0	94.6	94.7	95.0
88	31	71.9	93.1	93.1	93.0	93.6	94.2	94.8	94.9	95.2
90	32	72.0	93.3	93.3	93.2	93.8	94.4	95.0	95.1	95.4
91	33	72.1	93.4	93.4	93.3	93.9	94.5	95.1	95.2	95.5
93	34	72.2	93.6	93.6	93.5	94.1	94.7	95.3	95.4	95.7
95	35	72.3	93.7	93.7	93.6	94.2	94.8	95.4	95.5	95.8
97	36	72.5	93.9	93.9	93.8	94.4	95.0	95.6	95.7	96.0
99	37	72.6	94.0	94.0	93.9	94.5	95.1	95.7	95.8	96.1

[1] APPLICABLE TO ALL /3 AND /3F RATINGS

GMM-1156648-00-A (MOD)

H49591 S0006581795_V3

MPA Test Table - 70 Percent N1 Corrected Fan Speed
Figure 504 (Sheet 5 of 6)/71-00-00-990-821-F00

OAT		%N1 TARGET	MAX %N2 ENGINE MODEL 1							
°F	°C	±0.5%	7B27/B1	7B27 7B27/B3	7B26 7B26/B1 7B26/B2	7B24/B1	7B24	7B22/B1	7B22	7B20
100	38	72.7	94.2	94.2	94.1	94.7	95.3	95.9	96.0	96.3
102	39	72.8	94.4	94.4	94.3	94.9	95.5	96.1	96.2	96.5
104	40	72.9	94.5	94.5	94.4	95.0	95.6	96.2	96.3	96.6
106	41	73.0	94.7	94.7	94.6	95.2	95.8	96.4	96.5	96.8
108	42	73.1	94.8	94.8	94.7	95.3	95.9	96.5	96.6	96.9
109	43	73.3	95.0	95.0	94.9	95.5	96.1	96.7	96.8	97.1
111	44	73.4	95.1	95.1	95.0	95.6	96.2	96.8	96.9	97.2
113	45	73.5	95.3	95.3	95.2	95.8	96.4	97.0	97.1	97.4
115	46	73.6	95.4	95.4	95.3	95.9	96.5	97.1	97.2	97.5
117	47	73.7	95.6	95.6	95.5	96.1	96.7	97.3	97.4	97.7
118	48	73.8	95.8	95.8	95.7	96.3	96.9	97.5	97.6	97.9
120	49	73.9	95.9	95.9	95.8	96.4	97.0	97.6	97.7	98.0
122	50	74.1	96.1	96.1	96.0	96.6	97.2	97.8	97.9	98.2

1 APPLICABLE TO ALL /3 AND /3F RATINGS

GMM-1156648-00-A (MOD)

H49601 S0006581796_V3

MPA Test Table - 70 Percent N1 Corrected Fan Speed
Figure 504 (Sheet 6 of 6)/71-00-00-990-821-F00

OAT		%N1 TARGET	MAX EGT - °C							
			ENGINE MODEL [1]							
°F	°C	±0.5%	7B27/B1	7B27 7B27/B3	7B26 7B26/B1 7B26/B2	7B24/B1	7B24	7B22/B1	7B22	7B20
-40	-40	67.6	516	515	534	538	574	576	597	626
-38	-39	67.8	519	518	537	541	577	579	600	629
-36	-38	67.9	522	521	540	544	580	582	603	632
-35	-37	68.0	525	524	543	547	583	585	606	635
-33	-36	68.2	527	526	545	549	585	587	608	637
-31	-35	68.3	530	529	548	552	588	590	611	640
-29	-34	68.5	533	532	551	555	591	593	614	643
-27	-33	68.6	536	535	554	558	594	596	617	646
-26	-32	68.7	538	537	556	560	596	598	619	648
-24	-31	68.9	541	540	559	563	599	601	622	651
-22	-30	69.0	544	543	562	566	602	604	625	654
-20	-29	69.2	547	546	565	569	605	607	628	657
-18	-28	69.3	549	548	567	571	607	609	630	659
-17	-27	69.4	552	551	570	574	610	612	633	662
-15	-26	69.6	555	554	573	577	613	615	636	665
-13	-25	69.7	558	557	576	580	616	618	639	668
-11	-24	69.8	560	559	578	582	618	620	641	670
-9	-23	70.0	563	562	581	585	621	623	644	673
-8	-22	70.1	565	564	583	587	623	625	646	675
-6	-21	70.3	568	567	586	590	626	628	649	678
-4	-20	70.4	570	569	588	592	628	630	651	680
-2	-19	70.5	573	572	591	595	631	633	654	683
0	-18	70.7	575	574	593	597	633	635	656	685
1	-17	70.8	578	577	596	600	636	638	659	688
3	-16	70.9	580	579	598	602	638	640	661	690
5	-15	71.1	583	582	601	605	641	643	664	693
7	-14	71.2	585	584	603	607	643	645	666	695
9	-13	71.3	588	587	606	610	646	648	669	698
10	-12	71.5	590	589	608	612	648	650	671	700
12	-11	71.6	593	592	611	615	651	653	674	703
14	-10	71.7	595	594	613	617	653	655	676	705
16	-9	71.9	598	597	616	620	656	658	679	708
18	-8	72.0	600	599	618	622	658	660	681	710
19	-7	72.1	603	602	621	625	661	663	684	713
21	-6	72.3	605	604	623	627	663	665	686	715
23	-5	72.4	608	607	626	630	666	668	689	718
25	-4	72.5	610	609	628	632	668	670	691	720
27	-3	72.7	613	612	631	635	671	673	694	723
28	-2	72.8	615	614	633	637	673	675	696	725

[1] APPLICABLE TO ALL /3 AND /3F RATINGS

GMM-1156649-00-A (MOD)

G85150 S0006581797_V3

MPA Test Table - 75 Percent N1 Corrected Fan Speed
Figure 505 (Sheet 1 of 6)/71-00-00-990-822-F00

OAT		%N1 TARGET	MAX EGT - °C							
			ENGINE MODEL 1							
°F	°C	±0.5%	7B27/B1	7B27 7B27/B3	7B26 7B26/B1 7B26/B2	7B24/B1	7B24	7B22/B1	7B22	7B20
30	-1	72.9	617	616	635	639	675	677	698	727
32	0	73.1	620	619	638	642	678	680	701	730
34	1	73.2	622	621	640	644	680	682	703	732
36	2	73.3	625	624	643	647	683	685	706	735
37	3	73.5	628	627	646	650	686	688	709	738
39	4	73.6	630	629	648	652	688	690	711	740
41	5	73.7	633	632	651	655	691	693	714	743
43	6	73.8	635	634	653	657	693	695	716	745
45	7	74.0	638	637	656	660	696	698	719	748
46	8	74.1	640	639	658	662	698	700	721	750
48	9	74.2	643	642	661	665	701	703	724	753
50	10	74.4	645	644	663	667	703	705	726	755
52	11	74.5	648	647	666	670	706	708	729	758
54	12	74.6	650	649	668	672	708	710	731	760
55	13	74.7	653	652	671	675	711	713	734	763
57	14	74.9	655	654	673	677	713	715	736	765
59	15	75.0	658	657	676	680	716	718	739	768
61	16	75.1	660	659	678	682	718	720	741	770
63	17	75.3	662	661	680	684	720	722	743	772
64	18	75.4	665	664	683	687	723	725	746	775
66	19	75.5	667	666	685	689	725	727	748	777
68	20	75.6	670	669	688	692	728	730	751	780
70	21	75.8	672	671	690	694	730	732	753	782
72	22	75.9	675	674	693	697	733	735	756	785
73	23	76.0	677	676	695	699	735	737	758	787
75	24	76.1	680	679	698	702	738	740	761	790
77	25	76.3	682	681	700	704	740	742	763	792
79	26	76.4	685	684	703	707	743	745	766	795
81	27	76.5	687	686	705	709	745	747	768	797
82	28	76.6	689	688	707	711	747	749	770	799
84	29	76.8	692	691	710	714	750	752	773	802
86	30	76.9	694	693	712	716	752	754	775	804
88	31	77.0	696	695	714	718	754	756	777	806
90	32	77.1	699	698	717	721	757	759	780	809
91	33	77.3	701	700	719	723	759	761	782	811
93	34	77.4	703	702	721	725	761	763	784	813
95	35	77.5	706	705	724	728	764	766	787	816
97	36	77.6	708	707	726	730	766	768	789	818

1 APPLICABLE TO ALL /3 AND /3F RATINGS

GMM-1156649-00-A (MOD)
GMM-1156650-00-A (MOD)

G85186 S0006581798_V3

MPA Test Table - 75 Percent N1 Corrected Fan Speed
Figure 505 (Sheet 2 of 6)/71-00-00-990-822-F00

OAT		%N1 TARGET	MAX EGT - °C							
			ENGINE MODEL 1							
°F	°C	±0.5%	7B27/B1	7B27 7B27/B3	7B26 7B26/B1 7B26/B2	7B24/B1	7B24	7B22/B1	7B22	7B20
99	37	77.8	710	709	728	732	768	770	791	820
100	38	77.9	712	711	730	734	770	772	793	822
102	39	78.0	715	714	733	737	773	775	796	825
104	40	78.1	717	716	735	739	775	777	798	827
106	41	78.2	720	719	738	742	778	780	801	830
108	42	78.4	722	721	740	744	780	782	803	832
109	43	78.5	724	723	742	746	782	784	805	834
111	44	78.6	726	725	744	748	784	786	807	836
113	45	78.7	729	728	747	751	787	789	810	839
115	46	78.8	731	730	749	753	789	791	812	841
117	47	79.0	733	732	751	755	791	793	814	843
118	48	79.1	735	734	753	757	793	795	816	845
120	49	79.2	737	736	755	759	795	797	818	847
122	50	79.3	739	738	757	761	797	799	820	849

1 APPLICABLE TO ALL /3 AND /3F RATINGS

GMM-1156650-00-A (MOD)

G86703 S0006581799_V3

MPA Test Table - 75 Percent N1 Corrected Fan Speed
Figure 505 (Sheet 3 of 6)/71-00-00-990-822-F00

OAT		%N1 TARGET	MAX %N2 ENGINE MODEL 1							
°F	°C	±0.5%	7B27/B1	7B27 7B27/B3	7B26 7B26/B1 7B26/B2	7B24/B1	7B24	7B22/B1	7B22	7B20
-40	-40	67.6	82.7	82.7	82.6	83.2	83.8	84.4	84.5	84.8
-38	-39	67.8	82.9	82.9	82.8	83.4	84.0	84.6	84.7	85.0
-36	-38	67.9	83.1	83.1	83.0	83.6	84.2	84.8	84.9	85.2
-35	-37	68.0	83.2	83.2	83.1	83.7	84.3	84.9	85.0	85.3
-33	-36	68.2	83.4	83.4	83.3	83.9	84.5	85.1	85.2	85.5
-31	-35	68.3	83.6	83.6	83.5	84.1	84.7	85.3	85.4	85.7
-29	-34	68.5	83.7	83.7	83.6	84.2	84.8	85.4	85.5	85.8
-27	-33	68.6	83.9	83.9	83.8	84.4	85.0	85.6	85.7	86.0
-26	-32	68.7	84.1	84.1	84.0	84.6	85.2	85.8	85.9	86.2
-24	-31	68.9	84.3	84.3	84.2	84.8	85.4	86.0	86.1	86.4
-22	-30	69.0	84.4	84.4	84.3	84.9	85.5	86.1	86.2	86.5
-20	-29	69.2	84.6	84.6	84.5	85.1	85.7	86.3	86.4	86.7
-18	-28	69.3	84.8	84.8	84.7	85.3	85.9	86.5	86.6	86.9
-17	-27	69.4	85.0	85.0	84.9	85.5	86.1	86.7	86.8	87.1
-15	-26	69.6	85.1	85.1	85.0	85.6	86.2	86.8	86.9	87.2
-13	-25	69.7	85.3	85.3	85.2	85.8	86.4	87.0	87.1	87.4
-11	-24	69.8	85.5	85.5	85.4	86.0	86.6	87.2	87.3	87.6
-9	-23	70.0	85.7	85.7	85.6	86.2	86.8	87.4	87.5	87.8
-8	-22	70.1	85.8	85.8	85.7	86.3	86.9	87.5	87.6	87.9
-6	-21	70.3	86.0	86.0	85.9	86.5	87.1	87.7	87.8	88.1
-4	-20	70.4	86.2	86.2	86.1	86.7	87.3	87.9	88.0	88.3
-2	-19	70.5	86.3	86.3	86.2	86.8	87.4	88.0	88.1	88.4
0	-18	70.7	86.5	86.5	86.4	87.0	87.6	88.2	88.3	88.6
1	-17	70.8	83.7	86.7	86.6	87.2	87.8	88.4	88.5	88.8
3	-16	70.9	86.9	86.9	86.8	87.4	88.0	88.6	88.7	89.0
5	-15	71.1	87.0	87.0	86.9	87.5	88.1	88.7	88.8	89.1
7	-14	71.2	87.2	87.2	87.1	87.7	88.3	88.9	89.0	89.3
9	-13	71.3	87.4	87.4	87.3	87.9	88.5	89.1	89.2	89.5
10	-12	71.5	87.5	87.5	87.4	88.0	88.6	89.2	89.3	89.6
12	-11	71.6	87.7	87.7	87.6	88.2	88.8	89.4	89.5	89.8
14	-10	71.7	87.9	87.9	87.8	88.4	89.0	89.6	89.7	90.0
16	-9	71.9	88.1	88.1	88.0	88.6	89.2	89.8	89.9	90.2
18	-8	72.0	88.2	88.2	88.1	88.7	89.3	89.9	90.0	90.3
19	-7	72.1	88.4	88.4	88.3	88.9	89.5	90.1	90.2	90.5
21	-6	72.3	88.6	88.6	88.5	89.1	89.7	90.3	90.4	90.7
23	-5	72.4	88.7	88.7	88.6	89.2	89.8	90.4	90.5	90.8
25	-4	72.5	88.9	88.9	88.8	89.4	90.0	90.6	90.7	91.0
27	-3	72.7	89.1	89.1	89.0	89.6	90.2	90.8	90.9	91.2
28	-2	72.8	89.3	89.3	89.2	89.8	90.4	91.0	91.1	91.4

1 APPLICABLE TO ALL /3 AND /3F RATINGS

GMM-1156651-00-A (MOD)

H49125 S0006581800_V3

MPA Test Table - 75 Percent N1 Corrected Fan Speed
Figure 505 (Sheet 4 of 6)/71-00-00-990-822-F00

OAT		%N1 TARGET	MAX %N2 ENGINE MODEL 1							
°F	°C	±0.5%	7B27/B1	7B27 7B27/B3	7B26 7B26/B1 7B26/B2	7B24/B1	7B24	7B22/B1	7B22	7B20
30	-1	72.9	89.4	89.4	89.3	89.9	90.5	91.1	91.2	91.5
32	0	73.1	89.6	89.6	89.5	90.1	90.7	91.3	91.4	91.7
34	1	73.2	89.8	89.8	89.7	90.3	90.9	91.5	91.6	91.9
36	2	73.3	89.9	89.9	89.9	90.4	91.0	91.6	91.7	92.0
37	3	73.5	90.1	90.1	90.0	90.6	91.2	91.8	91.9	92.2
39	4	73.6	90.3	90.3	90.2	90.8	91.4	92.0	92.1	92.4
41	5	73.7	90.4	90.4	90.3	90.9	91.5	92.1	92.2	92.5
43	6	73.8	90.6	90.6	90.5	91.1	91.7	92.3	92.4	92.7
45	7	74.0	90.8	90.8	90.7	91.3	91.9	92.5	92.6	92.9
46	8	74.1	90.9	90.9	90.8	91.4	92.0	92.6	92.7	93.0
48	9	74.2	91.1	91.1	91.0	91.6	92.2	92.8	92.9	93.2
50	10	74.4	91.3	91.3	91.2	91.8	92.4	93.0	93.1	93.4
52	11	74.5	91.4	91.4	91.3	91.9	92.5	93.1	93.2	93.5
54	12	74.6	91.6	91.6	91.5	92.1	92.7	93.3	93.4	93.7
55	13	74.7	91.8	91.8	91.7	92.3	92.9	93.5	93.6	93.9
57	14	74.9	91.9	91.9	91.8	92.4	93.0	93.6	93.7	94.0
59	15	75.0	92.1	92.1	92.0	92.6	93.2	93.8	93.9	94.2
61	16	75.1	92.3	92.3	92.2	92.8	93.4	94.0	94.1	94.4
63	17	75.3	92.4	92.4	92.3	92.9	93.5	94.1	94.2	94.5
64	18	75.4	92.6	92.6	92.5	93.1	93.7	94.3	94.4	94.7
66	19	75.5	92.8	92.8	92.7	93.3	93.9	94.5	94.6	94.9
68	20	75.6	92.9	92.9	92.8	93.4	94.0	94.6	94.7	95.0
70	21	75.8	93.1	93.1	93.0	93.6	94.2	94.8	94.9	95.2
72	22	75.9	93.2	93.2	93.1	93.7	94.3	94.9	95.0	95.3
73	23	76.0	93.4	93.4	93.3	93.9	94.5	95.1	95.2	95.5
75	24	76.1	93.6	93.6	93.5	94.1	94.7	95.3	95.4	95.7
77	25	76.3	93.7	93.7	93.6	94.2	94.8	95.4	95.5	95.8
79	26	76.4	93.9	93.9	93.8	94.4	95.0	95.6	95.7	96.0
81	27	76.5	94.1	94.1	94.0	94.6	95.2	95.8	95.9	96.2
82	28	76.6	94.2	94.2	94.1	94.7	95.3	95.9	96.0	96.3
84	29	76.8	94.4	94.4	94.3	94.9	95.5	96.1	96.2	96.5
86	30	76.9	94.5	94.5	94.4	95.0	95.6	96.2	96.3	96.6
88	31	77.0	94.7	94.7	94.6	95.2	95.8	96.4	96.5	96.8
90	32	77.1	94.9	94.9	94.8	95.4	96.0	96.6	96.7	97.0
91	33	77.3	95.0	95.0	94.9	95.5	96.1	96.7	96.8	97.1
93	34	77.4	95.2	95.2	95.1	95.7	96.3	96.9	97.0	97.3
95	35	77.5	95.3	95.3	95.2	95.8	96.4	97.0	97.1	97.4
97	36	77.6	95.5	95.5	95.4	96.0	96.6	97.2	97.3	97.6

1 APPLICABLE TO ALL /3 AND /3F RATINGS

GMM-1156651-00-A (MOD)
GMM-1156652-00-A (MOD)

H49245 S0006581801_V3

MPA Test Table - 75 Percent N1 Corrected Fan Speed
Figure 505 (Sheet 5 of 6)/71-00-00-990-822-F00

OAT		%N1 TARGET	MAX %N2 ENGINE MODEL 1							
°F	°C	±0.5%	7B27/B1	7B27 7B27/B3	7B26 7B26/B1 7B26/B2	7B24/B1	7B24	7B22/B1	7B22	7B20
99	37	77.8	95.7	95.7	95.6	96.2	96.8	97.4	97.5	97.8
100	38	77.9	95.8	95.8	95.7	96.3	96.9	97.5	97.6	97.9
102	39	78.0	96.0	96.0	95.9	96.5	97.1	97.7	97.8	98.1
104	40	78.1	96.1	96.1	96.0	96.6	97.2	97.8	97.9	98.2
106	41	78.2	96.3	96.3	96.2	96.8	97.4	98.0	98.1	98.4
108	42	78.4	96.4	96.4	96.3	96.9	97.5	98.1	98.2	98.5
109	43	78.5	96.6	96.6	96.5	97.1	97.7	98.3	98.4	98.7
111	44	78.6	96.7	96.7	96.6	97.2	97.8	98.4	98.5	98.8
113	45	78.7	96.9	96.9	96.8	97.4	98.0	98.6	98.7	99.0
115	46	78.8	97.1	97.1	97.0	97.6	98.2	98.8	98.9	99.2
117	47	79.0	97.2	97.2	97.1	97.7	98.3	98.9	99.0	99.3
118	48	79.1	97.4	97.4	97.3	97.9	98.5	99.1	99.2	99.5
120	49	79.2	97.6	97.6	97.5	98.1	98.7	99.3	99.4	99.7
122	50	79.3	97.7	97.7	97.6	98.2	98.8	99.4	99.5	99.8

1 APPLICABLE TO ALL /3 AND /3F RATINGS

GMM-1156652-00-A (MOD)

H49254 S0006581802_V3

MPA Test Table - 75 Percent N1 Corrected Fan Speed
Figure 505 (Sheet 6 of 6)/71-00-00-990-822-F00

TASK 71-00-00-700-814-F00

8. Test 7 - Vibration Survey

A. General

(1) This test gives the necessary data to make sure the engine vibration is in the permitted levels.

(2) If the vibration levels are above the permitted levels, install the test equipment or use the AVM flight history to isolate the source of the vibration.

(3) Use the vibration survey for fault isolation.

(4) This test should also be performed when a non pre-tested engine is installed or after a component replacement as it is specified in the Power Plant Test Reference Table.

(5) For engine vibration above 1.0 units, use operator policy for engine vibration management.

(a) Engine vibration in the 1.5-2.5 units can result in cabin and flight deck reports of engine related noise or vibration.

(6) For this procedure, the airborne vibration monitoring signal conditioner will be referred to as the AVM.

B. References

Reference	Title
71-00-00-700-819-F00	Stop the Engine Procedure (Usual Engine Stop) (P/B 201)
71-00-00-800-807-F00	Start the Engine Procedure (Selection) (P/B 201)
77-31-00-910-801-F00	ARINC 429 Data Bus Charts (P/B 201)
FIM 71-05 TASK 808	Engine Vibration, Vibration High - Fault Isolation

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-1562	Analyzer - Data Bus, ARINC 429 (Part #: 01-1404-00, Supplier: 41364, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Part #: 429EBP, Supplier: 41364, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Part #: 800-0630, Supplier: 1JSZ6, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER) (Part #: MODEL 429HBA, Supplier: 5J927, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Part #: TYPE 030/026, Supplier: $0494, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
COM-3932	System - Portable Engine Balancing (Part #: PBS-4100, Supplier: 26741, A/P Effectivity: 737-100, -200, -200C, -300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER)
SPL-2415	Box - Test, AVM (Part #: C77004-10, Supplier: 81205, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

D. Consumable Materials

Reference	Description	Specification
G00270	Tape - Scotch Flatback Masking 250	ASTM D6123 (Supersedes A-A-883)

E. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
211	Flight Compartment - Left
212	Flight Compartment - Right
411	Engine 1 - Engine
421	Engine 2 - Engine

F. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door

G. Prepare for the Test

SUBTASK 71-00-00-970-027-F00

(1) Find and record these conditions:

CAUTION: DO NOT USE THE TOTAL TEMPERATURE INDICATION FROM THE AIRPLANE FOR THE AMBIENT AIR TEMPERATURE. THIS WILL PREVENT AN INCORRECT TARGET SELECTION.

CAUTION: DO NOT PUT A MERCURY THERMOMETER ON THE AIRPLANE. MERCURY (FROM A BROKEN THERMOMETER) CAN CAUSE DAMAGE TO THE AIRPLANE COMPONENTS.

(a) Record the ambient air temperature (outside air temperature) in the shade of the wheel well for the nose gear.

(b) Record the barometric pressure.

(c) Use the OAT to find the N1 Takeoff (TO) speed:

1) Enter the OAT on the FMC N1 Limits Page.

a) Enter a slash (/) before you enter the number.

2) Select TO or alternately TO-B if available.

3) Find the N1 speed on the FMC Takeoff Ref Page and record on the data sheet.

4) Make sure the Thrust Mode Display shows TO.

5) Make sure the outer knob of the N1 Set Control is in the AUTO position on the P2 panel.

6) Make sure the Reference N1 Bug agrees with the N1 takeoff speed.

SUBTASK 71-00-00-010-021-F00

(2) If it is necessary to know individual rotor vibration values or you think the engine will be more than the vibration limits, do these steps to install the analyzer, COM-1562:

NOTE: If you will use the AVM flight history, continue to the next subtask to examine the balance weights in the AVM memory.

(a) Do this step:

Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

(b) Connect the box, SPL-2415 to the front panel of the AVM signal conditioner.

(c) Put the box, SPL-2415 outside and below the flight compartment.

(d) Put the analyzer, COM-1562 in the flight compartment.

(e) Open the right flight compartment window and put the box, SPL-2415 in the flight compartment.

(f) Use Scotch Flatback Masking Tape 250, G00270 to temporarily attach the cable to the side of the airplane.

(g) Connect the analyzer, COM-1562 to the box, SPL-2415.

(h) For an alternate analyzer, you can use theportable engine balancing system, COM-3932

1) To install this analyzer, refer to the task,Test 14C - Fan Trim Balance (Analyzer Procedure), TASK 71-00-00-750-805-F00.

HAP 023-026, 028-054, 101-999; HAP 001-013, 015-022 POST SB 737-77-1056 OR POST SB 737-77-1069

SUBTASK 71-00-00-970-087-F00

(3) If the test is to get vibration data for an on-board fan trim balance, make sure the balance weights installed on the engine agree with the AVM (Test 14B - Fan Trim Balance (On Board Procedure - Vibro-meter AVM S360N021-113, S360N021-114, and Universal AVM S362A001-1), TASK 71-00-00-750-803-F00)

HAP 001-011 PRE SB 737-77-1056

SUBTASK 71-00-00-970-089-F00

(4) If the test is to get vibration data for an on-board fan trim balance, make sure the balance weights installed on the engine agree with the AVM (Test 14B - Fan Trim Balance (On Board Procedure - Endevco AVM S360N021-213), TASK 71-00-00-750-804-F00).

HAP ALL

H. Vibration Survey

SUBTASK 71-00-00-860-163-F00

(1) Do this task: Start the Engine Procedure (Selection), TASK 71-00-00-800-807-F00.

NOTE: Make sure to avoid or limit a cross-wind condition in the Engine Ground Safety Precautions.

(a) Let the engine become stable at the idle position for a minimum of 2 minutes.

(b) Make sure that all the pneumatic bleeds and electrical loads are off.

(c) Make sure the PROBE HEAT "A" or ''B'' switch on the overhead panel, P5, is in 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.

(d) Make sure all engine indications are normal.

SUBTASK 71-00-00-970-028-F00

CAUTION: MAKE SURE THAT YOU DO NOT GO OVER THE 4 UNITS VIBRATION LIMIT FOR THE N1 ROTOR. ENGINE DAMAGE CAN OCCUR.

(2) Slowly move the forward thrust lever (in not less than 20 seconds) to the 80 ±2% N1 position.

(a) Let the engine become stable at this speed for a minimum of 5 minutes.

NOTE: This lets the engine become thermally stable and makes sure the vibration indications are accurate.

SUBTASK 71-00-00-970-029-F00

(3) Move the forward thrust lever (in not less than 20 seconds) to the 50 ±2% N1 position.

(a) Let the engine become stable at this speed for a minimum of 30 seconds.

SUBTASK 71-00-00-860-212-F00

(4) Move the forward thrust lever to the idle position.

(a) Let the engine become stable at this speed for a minimum of 15 seconds.

SUBTASK 71-00-00-970-030-F00

(5) Do a 2-minute acceleration of the engine from the minimum idle position to the Takeoff Power (TOP) N1 speed.

(a) Make sure the acceleration is slow with pauses at the lower fan speeds.

1) If this test is to get imbalance data, use this alternate acceleration procedure with the TOP speed for the current conditions:

CAUTION: DO NOT EXCEED THE TAKEOFF POWER SPEED FOR THE CURRENT CONDITIONS, ENGINE DAMAGE CAN OCCUR.

2) Pause for 1-2 minutes at each of the applicable fan speeds ±1%N1. Do not use the fan speeds which exceed the TOP speed.

NOTE: N1 and vibration levels must be stable for at least 30 seconds to capture data. N1 stable within 1% and vibration stable less than 0.1 units.

a) 64.0% N1

b) 81.5% N1

c) 86.5% N1

d) 91.0% N1

e) 94.5- 97.4% N1

(b) During the acceleration, monitor the applicable engine vibration indications.

(c) Record the N1% and the N2% where the maximum vibrations occur (if more than one).

(d) Let the engine become stable at the TOP speed for a minimum of 15 seconds.

SUBTASK 71-00-00-970-031-F00

(6) Do a 2-minute deceleration of the engine from the TOP speed to the minimum idle position.

(a) During the deceleration, monitor the applicable engine vibration indications.

(b) Record the N1% and the N2% where all the maximum vibrations occur (if more than one).

(c) Let the engine become stable at the idle speed for a minimum of 15 seconds.

SUBTASK 71-00-00-970-032-F00

(7) Do these steps to find the source of the vibration:

(a) Move the forward thrust lever for the applicable engine to the speed where the first maximum vibration indication occurred.

1) Let the engine become stable at this speed for 2 minutes.

(b) Use the analyzer, COM-1562 to record the vibration indication data from the No.1 bearing vibration sensor first and then the FFCC vibration sensor.

NOTE: To find the ARINC 429 labels for the vibration data refer to this task: ARINC 429 Data Bus Charts (TASK 77-31-00-910-801-F00).

NOTE: The display on the CDS shows a maximum vibration indication only. This maximum vibration can be from the No.1 bearing sensor or the FFCC vibration sensor. If you use the analyzer, COM-1562, you can get the N1 and N2 rotor vibration data from each sensor.

(c) If installed, use the portable engine balancing system, COM-3932 to find and record the vibration indication data from the No.1 bearing vibration sensor first and then the FFCC vibration sensor.

SUBTASK 71-00-00-970-033-F00

(8) Do the above step again for all of the high vibration points that you found (if there is more than one) during the engine acceleration.

SUBTASK 71-00-00-980-003-F00

(9) Slowly move the forward thrust lever to the idle position.

(a) Let the engine become stable at this speed for 3 minutes.

SUBTASK 71-00-00-860-164-F00

(10) Do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00.

HAP 023-026, 028-054, 101-999; HAP 001-013, 015-022 POST SB 737-77-1056 OR POST SB 737-77-1069

SUBTASK 71-00-00-970-088-F00

(11) If the test is to get vibration data for an on-board fan trim balance, view the flight history data(Test 14B - Fan Trim Balance (On Board Procedure - Vibro-meter AVM S360N021-113, S360N021-114, and Universal AVM S362A001-1), TASK 71-00-00-750-803-F00)

HAP 001-011 PRE SB 737-77-1056

SUBTASK 71-00-00-970-090-F00

(12) If the test is to get vibration data for an on-board fan trim balance, view the flight history data (Test 14B - Fan Trim Balance (On Board Procedure - Endevco AVM S360N021-213), TASK 71-00-00-750-804-F00).

HAP ALL

SUBTASK 71-00-00-810-001-F00

(13) If the vibration indications for the fan and low pressure turbine rotor (N1) is more than 4.0 units or is less than 4.0 units with engine noise or rumble, do the fault isolation procedure for high engine vibration FIM 71-05 TASK 808.

SUBTASK 71-00-00-810-002-F00

(14) If the vibration indications for the high pressure compressor and turbine (N2) is more than 4.0 units, do the fault isolation procedure for high engine vibration FIM 71-05 TASK 808.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-080-008-F00

(1) If you installed the portable engine balancing system, COM-3932, remove the analyzer.

SUBTASK 71-00-00-010-022-F00

(2) If you installed the analyzer, COM-1562, do these steps to remove the analyzer:

(a) Disconnect the analyzer, COM-1562 from the box, SPL-2415.

(b) Do this step:

open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

(c) Remove the box, SPL-2415 from the flight compartment window and close the window.

(d) Disconnect the box, SPL-2415 from the front panel of the airborne vibration monitor (AVM) signal conditioner.

(e) Remove the analyzer, COM-1562 from the flight compartment.

(f) Do this step:

Close this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

END OF TASK

TASK 71-00-00-700-824-F00

9. Test 8 - Acceleration Check

A. General

(1) The acceleration check is a good test for transient performance analysis of the engine.

(a) Do not use the test by itself to accept or reject an engine.

(2) Do this test to make sure the engine has usual acceleration performance.

B. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
71-00-00-700-819-F00	Stop the Engine Procedure (Usual Engine Stop) (P/B 201)
71-00-00-800-805-F00	Engine Ground Safety Precautions (P/B 201)
71-00-00-800-807-F00	Start the Engine Procedure (Selection) (P/B 201)
73-21-00-740-803-F00	EEC BITE TEST - RECENT FAULTS (P/B 501)
FIM 73-05 TASK 814	Engine is Slow to Accelerate - Fault Isolation

C. Tools/Equipment

Reference	Description
STD-1122	Thermometer - Alcohol, Ambient Temperature
STD-1139	Timer - Stop Watch, Accurate to 1 Second

D. Location Zones

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

E. Acceleration Check

SUBTASK 71-00-00-970-056-F00

CAUTION: DO NOT USE THE TOTAL TEMPERATURE INDICATION FROM THE AIRPLANE FOR THE AMBIENT AIR TEMPERATURE. THIS WILL PREVENT AN INCORRECT TRIM TARGET SELECTION.

CAUTION: DO NOT PUT A MERCURY THERMOMETER ON THE AIRPLANE. MERCURY (FROM A BROKEN THERMOMETER) CAN CAUSE DAMAGE TO THE AIRPLANE COMPONENTS.

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

(a) Record the OAT on the data sheet.

SUBTASK 71-00-00-970-057-F00

(2) Use the OAT to get the N1 target speed and the N2 starting point:

(a) For N1, use the MPA Test Table - 70% N1 Corrected Fan Speed (Figure 504).

(b) For N2, use the (Table 509).

(c) Record the N1 and N2 speeds for the OAT on the data sheet.

SUBTASK 71-00-00-860-182-F00

(3) If not already done, do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 71-00-00-860-183-F00

WARNING: MAKE SURE THAT YOU OBEY ALL THE INSTRUCTIONS AND PRECAUTIONS WHEN YOU OPERATE AN ENGINE AT HIGH POWER. REFER TO THIS TASK: ENGINE GROUND SAFETY PRECAUTIONS ENGINE GROUND SAFETY PRECAUTIONS, TASK 71-00-00-800-805-F00. IF YOU DO NOT OBEY THE INSTRUCTIONS AND PRECAUTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(4) Do this task: Start the Engine Procedure (Selection), TASK 71-00-00-800-807-F00.

(a) Make sure the BLEED 1 and BLEED 2 switches are in the OFF position.

(b) Set the applicable GEN switch to the OFF position and release.

NOTE: This will remove the load from the IDG, if it is not already removed.

1) Make sure the applicable GEN OFF BUS light comes on.

(c) Let the engine become stable at the idle-power position for five minutes.

SUBTASK 71-00-00-860-184-F00

(5) Make sure that the applicable switches on the overhead panel, P5, are in the OFF position:

(a) WING ANTI-ICE

(b) ENG ANTI-ICE 1 or 2.

SUBTASK 71-00-00-860-185-F00

(6) Make sure the PROBE HEAT "A" or ''B'' switch on the overhead panel, P5, is in 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 71-00-00-860-186-F00

(7) Monitor all engine parameters.

(a) Carefully monitor the EGT and N2 indications.

SUBTASK 71-00-00-700-001-F00

(8) To do the acceleration check with the N1 and N2 speeds, use a stopwatch, STD-1139 and do these thrust lever movements:

(a) Slowly move the applicable forward thrust lever to 5% N1 speed more than the N1 target speed that you got from the MPA Test Table (70% N1) (Figure 504).

(b) Mark the thrust lever position (control stand) with a piece of tape or pencil.

1) Minimize the amount of time spent at more than idle.

(c) To decelerate, slowly move the applicable forward thrust lever back to the N2 starting point +/-0.3% (Table 509).

(d) When the engine parameters are stable, quickly move the thrust lever to the marked position.

(e) Start the stopwatch at the initial thrust lever movement.

(f) Stop the stopwatch when N1 is at the N1 MPA target speed (not target + 5%).

(g) Slowly move the applicable thrust lever back to the idle position.

(h) Record the acceleration time on the data sheet.

(i) If the test is performed above sea level, subtract 0.25 seconds for each 1000 feet altitude from the recorded acceleration time.

1) Record the adjusted acceleration time on the data sheet.

(j) Make sure the adjusted acceleration time is less than 6.3 seconds.

(k) If the adjusted acceleration time is not in the limits, do this task: Engine is Slow to Accelerate - Fault Isolation, FIM 73-05 TASK 814.

SUBTASK 71-00-00-860-187-F00

(9) When the accelearation check is complete, do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00.

SUBTASK 71-00-00-860-188-F00

(10) Do this task: EEC BITE TEST - RECENT FAULTS, TASK 73-21-00-740-803-F00.

SUBTASK 71-00-00-860-189-F00

(11) The table below shows the N2/OAT Acceleration Test data (Table 509):

Table 509/71-00-00-993-882-F00

OAT Deg F (C)	%N2	OAT Deg F (C)	%N2	OAT Deg F (C)	%N2	OAT Deg F (C)	%N2
-40 (-40)	65.0	1 (-17)	68.1	43 (6)	71.1	84 (29)	74.0
-38 (-39)	65.1	3 (-16)	68.3	45 (7)	71.3	86 (30)	74.2
-36 (-38)	65.3	5 (-15)	68.4	46 (8)	71.4	88 (31)	74.3
-35 (-37)	65.4	7 (-14)	68.6	48 (9)	71.5	90 (32)	74.4
-33 (-36)	65.5	9 (-13)	68.7	50 (10)	71.7	91 (33)	74.5
-31 (-35)	65.7	10 (-12)	68.8	52 (11)	71.8	93 (34)	74.6
-29 (-34)	65.8	12 (-11)	69.0	54 (12)	71.9	95 (35)	74.8
-27 (-33)	66.0	14 (-10)	69.1	55 (13)	72.0	97 (36)	74.9
-26 (-32)	66.1	16 (-9)	69.2	57 (14)	72.2	99 (37)	75.0
-24 (-31)	66.2	18 (-8)	69.4	59 (15)	72.3	100 (38)	75.1

(Continued)

OAT Deg F (C)	%N2	OAT Deg F (C)	%N2	OAT Deg F (C)	%N2	OAT Deg F (C)	%N2
-22 (-30)	66.4	19 (-7)	69.5	61 (16)	72.4	102 (39)	75.3
-20 (-29)	66.5	21 (-6)	69.6	63 (17)	72.6	104 (40)	75.4
-18 (-28)	66.7	23 (-5)	69.7	64 (18)	72.7	106 (41)	75.5
-17 (-27)	66.8	25 (-4)	69.9	66 (19)	72.8	108 (42)	75.6
-15 (-26)	66.9	27 (-3)	70.0	68 (20)	72.9	109 (43)	75.7
-13 (-25)	67.1	28 (-2)	70.1	70 (21)	73.0	111 (44)	75.9
-11 (-24)	67.2	30 (-1)	70.3	72 (22)	73.2	113 (45)	76.0
-9 (-23)	67.4	32 (0)	70.4	73 (23)	73.3	115 (46)	76.1
-8 (-22)	67.5	34 (1)	70.5	75 (24)	73.4	117 (47)	76.2
-6 (-21)	67.6	36 (2)	70.6	77 (25)	73.5	118 (48)	76.3
-4 (-20)	67.8	37 (3)	70.8	79 (26)	73.7	120 (49)	76.5
-2 (-19)	67.9	39 (4)	70.9	81 (27)	73.8	122 (50)	76.6
0 (-18)	68.0	41 (5)	71.0	82 (28)	73.9		

END OF TASK

TASK 71-00-00-700-816-F00

10. Test 9 - Replacement Engine Test (Pretested)

A. General

(1) This test does 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 Boeing quick-engine-change (QEC) parts, that was operated satisfactorily in an approved test cell before it was installed on the airplane.

(3) If the replacement engine was not pretested, do this procedure: Test 10 - Replacement Engine Test (Untested) to do a check of the engine installation and operation.

(4) This procedure will do all the necessary checks for the Boeing QEC components on the engine.

B. References

Reference	Title
24-11-00-700-802	Operational Test For Number 1 IDG (P/B 501)
24-11-00-700-803	Operational Test For Number 2 IDG (P/B 501)
26-11-00-710-801	Engine Fire Detection - Operational Test (P/B 501)
29-11-00-860-804	Hydraulic System A or B Pressurization with an Engine-Driven Pump (EDP) (P/B 201)
30-21-00-710-801	Engine Cowl Anti-Icing - Operational Test (P/B 501)
36-00-00-860-801	Supply Pressure to the Pneumatic System (Selection) (P/B 201)
36-11-04-400-801	PRSOV Installation (P/B 401)
71-00-03-600-803-F00	Depreservation of an Engine On-Wing (Task Selection) (P/B 201)
71-71-00-200-801-F00	Engine Vents and Drains Inspection (P/B 601)

(Continued)

Reference	Title
73-21-00-700-804-F00	EEC TEST (P/B 501)
73-21-00-700-808-F00	IDENT/CONFIG (P/B 501)
73-21-00-700-809-F00	EEC Discretes Test (P/B 501)
73-21-00-740-803-F00	EEC BITE TEST - RECENT FAULTS (P/B 501)
73-21-00-800-801-F00	Erase All EEC Faults (P/B 501)

C. Location Zones

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

D. Replacement Engine Test (Pretested)

SUBTASK 71-00-00-630-001-F00

(1) If the replacement engine was preserved, do this task: Depreservation of an Engine On-Wing (Task Selection), TASK 71-00-03-600-803-F00.

SUBTASK 71-00-00-740-005-F00

(2) Do this task: Erase All EEC Faults, TASK 73-21-00-800-801-F00.

SUBTASK 71-00-00-740-001-F00

(3) Do this task: EEC TEST, TASK 73-21-00-700-804-F00.

SUBTASK 71-00-00-740-002-F00

(4) Do this task: IDENT/CONFIG, TASK 73-21-00-700-808-F00.

(a) Make sure the engine rating and airplane model are correct.

(b) Make sure the engine serial number is correct for the applicable engine.

1) If the engine serial number is different, enter the correct engine serial number.

(c) Get access to the IDENT/CONFIG screen for the other engine and make sure the engine rating as shown on the screen is the same.

SUBTASK 71-00-00-740-010-F00

(5) Do this task: EEC Discretes Test, TASK 73-21-00-700-809-F00.

SUBTASK 71-00-00-710-004-F00

(6) Do this task: Engine Fire Detection - Operational Test, TASK 26-11-00-710-801.

SUBTASK 71-00-00-710-005-F00

(7) Do this leak check of the bleed air regulator and PRSOV (TASK 36-11-04-400-801).

NOTE: This check can be done after the Idle-Power Leak Check.

(a) With the APU or external ground source, do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.

(b) Open the PRSOV.

(c) Make sure there is no leakage at the sense line connections of the bleed air regulator and PRSOV.

SUBTASK 71-00-00-720-002-F00

(8) Do this task: Test 12 - Actuators Test, TASK 71-00-00-700-807-F00.

(a) During the dry motor, make sure there is no leakage around the high stage valve, high stage regulator and precooler sense lines.

NOTE: This check can be done after the Idle-Power Leak Check.

SUBTASK 71-00-00-860-167-F00

(9) Do this task: Test 3A - Idle-Power Leak Check, TASK 71-00-00-700-801-F00.

(a) During engine operation, make sure the pressure of the high stage valve is more than 10 psig.

(b) Make sure there is no fuel leakage from the fuel inlet hose.

(c) Do this task: Hydraulic System A or B Pressurization with an Engine-Driven Pump (EDP), TASK 29-11-00-860-804.

1) Make sure there are no hydraulic leaks from the hydraulic supply, hydraulic pressure or the case drain lines.

(d) For engine 1, do this task: Operational Test For Number 1 IDG, TASK 24-11-00-700-802

1) Do the steps to re-connect the IDG after the engine is stopped in the steps that follow.

(e) For engine 2, do this task: Operational Test For Number 2 IDG, TASK 24-11-00-700-803

1) Do the steps to re-connect the IDG after the engine is stopped in the steps that follow.

(f) Do this task: Engine Cowl Anti-Icing - Operational Test, TASK 30-21-00-710-801.

1) Follow the steps in the test to stop the engine, and then complete the remaining steps.

(g) 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-F00.

(h) Re-connect the IDG.

SUBTASK 71-00-00-740-006-F00

(10) Do this task: EEC BITE TEST - RECENT FAULTS, TASK 73-21-00-740-803-F00.

(a) Look for maintenance messages in Flight Leg 0 in all dispatch categories.

NOTE: Flight Leg 0 will show the faults that occur during the most recent ground run of the engine. If the engine is started and stopped more than once, the data from previous ground runs is erased or replaced.

(b) Do the corrective action for all of the maintenance messages that you find.

SUBTASK 71-00-00-910-054-F00

(11) If you found and corrected maintenance messages or other problems, then do the applicable sections of the Replacement Engine Test again.

——————— END OF TASK ———————

TASK 71-00-00-700-817-F00

11. Test 10 - Replacement Engine Test (Untested)

A. General

(1) This test does the checks 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)

(b) Separation of a minor module flange (HPC Top or Bottom Case, Fan and Booster Module, No.1/2 Bearing Support Assembly, Inlet Gearbox, LPF Frame).

NOTE: Test 10 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) If the replacement engine was pretested, do this procedure: Test 9 - Replacement Engine Test (Pretested) to make sure the engine is installed and operates correctly.

(4) This procedure will do all the necessary checks for the Boeing QEC components on the engine.

B. References

Reference	Title
24-11-00-700-802	Operational Test For Number 1 IDG (P/B 501)
24-11-00-700-803	Operational Test For Number 2 IDG (P/B 501)
26-11-00-710-801	Engine Fire Detection - Operational Test (P/B 501)
29-11-00-860-804	Hydraulic System A or B Pressurization with an Engine-Driven Pump (EDP) (P/B 201)
30-21-00-710-801	Engine Cowl Anti-Icing - Operational Test (P/B 501)
36-00-00-860-801	Supply Pressure to the Pneumatic System (Selection) (P/B 201)
36-11-04-400-801	PRSOV Installation (P/B 401)
71-00-00-700-822-F00	Wet Motor the Engine (P/B 201)
71-00-03-600-803-F00	Depreservation of an Engine On-Wing (Task Selection) (P/B 201)
71-71-00-200-801-F00	Engine Vents and Drains Inspection (P/B 601)
73-11-02-000-801-F00	Fuel Filter Removal (P/B 401)
73-11-02-400-801-F00	Fuel Filter Installation (P/B 401)
73-21-00-700-804-F00	EEC TEST (P/B 501)
73-21-00-700-808-F00	IDENT/CONFIG (P/B 501)
73-21-00-700-809-F00	EEC Discretes Test (P/B 501)
73-21-00-740-803-F00	EEC BITE TEST - RECENT FAULTS (P/B 501)
73-21-00-800-801-F00	Erase All EEC Faults (P/B 501)
79-00-00-200-804-F00	Chip Detectors and Scavenge Screens Inspection (P/B 601)
79-21-06-000-801-F00	Scavenge Oil Filter Element Removal (P/B 401)
79-21-06-400-801-F00	Scavenge Oil Filter Element Installation (P/B 401)
80-11-01-200-801-F00	Starter Magnetic Plug Inspection (P/B 601)
80-11-01-200-802-F00	Starter 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

D. Replacement Engine Test (Untested)

SUBTASK 71-00-00-630-002-F00

(1) If the replacement engine was preserved, do this task: Depreservation of an Engine On-Wing (Task Selection), TASK 71-00-03-600-803-F00.

SUBTASK 71-00-00-740-007-F00

(2) Do this task: Erase All EEC Faults, TASK 73-21-00-800-801-F00.

SUBTASK 71-00-00-740-003-F00

(3) Do this task: EEC TEST, TASK 73-21-00-700-804-F00.

SUBTASK 71-00-00-740-004-F00

(4) Do this task: IDENT/CONFIG, TASK 73-21-00-700-808-F00.

(a) Make sure the engine rating and airplane model are correct.

(b) Make sure the engine serial number is correct for the applicable engine.

1) If the engine serial number is different, enter the correct engine serial number.

(c) Get access to the IDENT/CONFIG screen for the other engine and make sure the engine rating as shown on the screen is the same.

SUBTASK 71-00-00-740-011-F00

(5) Do this task: EEC Discretes Test, TASK 73-21-00-700-809-F00.

SUBTASK 71-00-00-710-006-F00

(6) Do this task: Engine Fire Detection - Operational Test, TASK 26-11-00-710-801.

SUBTASK 71-00-00-710-007-F00

(7) Do this leak check of the bleed air regulator and PRSOV (TASK 36-11-04-400-801).

NOTE: This check can be done after the Idle-Power Leak Check.

(a) With the APU or external ground source, do this task: Supply Pressure to the Pneumatic System (Selection), TASK 36-00-00-860-801.

(b) Open the PRSOV.

(c) Make sure there is no leakage at the sense line connections of the bleed air regulator and PRSOV.

SUBTASK 71-00-00-720-003-F00

(8) Do this task: Test 12 - Actuators Test, TASK 71-00-00-700-807-F00.

(a) During the dry motor, make sure there is no leakage around the high stage valve, high stage regulator and precooler sense lines.

NOTE: This check can be done after the Idle-Power Leak Check.

SUBTASK 71-00-00-860-168-F00

(9) Do this task: Wet Motor the Engine, TASK 71-00-00-700-822-F00.

(a) This procedure will make sure there are no leaks from the fuel filter, the fuel inlet line, and all other fuel tubes and hoses.

SUBTASK 71-00-00-210-046-F00

(10) During each of the tests that follow, look for the OIL FILTER BYP message and the fuel FILTER BY PASS light.

(a) The OIL FILTER BYP message is found on the CDS Panel (P2), above the Oil Pressure Displays.

(b) The fuel FILTER BY PASS light is found on the Fuel Panel (P5).

(c) In addition, look for other indications, messages, or lights (temperature, pressure, and etc.) that might indicate a possible engine problem.

SUBTASK 71-00-00-740-008-F00

(11) After each of the tests that follow, do these steps:

(a) Do this task: EEC BITE TEST - RECENT FAULTS, TASK 73-21-00-740-803-F00.

(b) Look for maintenance messages in Flight Leg 0 in all dispatch categories.

NOTE: Flight Leg 0 will show the faults that occur during the most recent ground run of the engine. If the engine is started and stopped more than once, the data from previous ground runs is erased or replaced.

(c) Do the corrective action for all of the maintenance messages that you find, after each engine shutdown.

SUBTASK 71-00-00-860-169-F00

(12) Do this task: Test 3A - Idle-Power Leak Check, TASK 71-00-00-700-801-F00.

(a) During engine operation, make sure the pressure of the high stage valve is more than 10 psig.

(b) Do this task: Hydraulic System A or B Pressurization with an Engine-Driven Pump (EDP), TASK 29-11-00-860-804.

1) Make sure there are no hydraulic leaks from the hydraulic supply, hydraulic pressure or the case drain lines.

(c) For engine 1, do this task: Operational Test For Number 1 IDG, TASK 24-11-00-700-802

1) Do the steps to re-connect the IDG after the engine is stopped in the steps that follow.

(d) For engine 2, do this task: Operational Test For Number 2 IDG, TASK 24-11-00-700-803

1) Do the steps to re-connect the IDG after the engine is stopped in the steps that follow.

(e) Do this task: Engine Cowl Anti-Icing - Operational Test, TASK 30-21-00-710-801.

1) Do the steps in the referenced test to stop the engine, and then complete the remaining steps in the test.

(f) 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-F00.

(g) Re-connect the IDG.

SUBTASK 71-00-00-720-004-F00

(13) Do this task: Test 7 - Vibration Survey, TASK 71-00-00-700-814-F00.

SUBTASK 71-00-00-720-005-F00

(14) Do this task: Test 5 - Power Assurance Check, TASK 71-00-00-700-813-F00.

SUBTASK 71-00-00-220-002-F00

(15) Do this task: Chip Detectors and Scavenge Screens Inspection, TASK 79-00-00-200-804-F00.

SUBTASK 71-00-00-220-003-F00

(16) Examine the scavenge oil filter element.

These are the tasks:

Scavenge Oil Filter Element Removal, TASK 79-21-06-000-801-F00,

Scavenge Oil Filter Element Installation, TASK 79-21-06-400-801-F00.

(a) The scavenge oil filter element should be new and installed at the shop level.

SUBTASK 71-00-00-220-005-F00

(17) Examine the fuel filter element.

These are the tasks:

Fuel Filter Removal, TASK 73-11-02-000-801-F00,

Fuel Filter Installation, TASK 73-11-02-400-801-F00.

(a) The fuel filter element should be new and installed at the shop level.

SUBTASK 71-00-00-220-006-F00

(18) Do this task: Starter Inspection, TASK 80-11-01-200-802-F00.

SUBTASK 71-00-00-220-007-F00

(19) Do this task: Starter Magnetic Plug Inspection, TASK 80-11-01-200-801-F00.

——————— END OF TASK ———————

TASK 71-00-00-700-807-F00

12. Test 12 - Actuators Test

A. General

(1) In this actuators test, the two channels of the EEC examine the hydraulic and electrical control loops.

(a) A control loop is defined as the path from the EEC to a monitored engine component and back to the EEC.

(2) During the test each channel of the EEC will cycle the control loops to the minimum and maximum positions.

(3) If a problem is found during the test, the CDU will show the applicable faults at the end of the test.

B. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
71-00-00-700-821-F00	Dry Motor the Engine (P/B 201)
71-00-00-800-806-F00	Engine Operation Limits (P/B 201)
FIM 73-05 TASK 803	Ch A(B) EEC Data not Available - Fault Isolation

C. Location Zones

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

D. Actuators Test

SUBTASK 71-00-00-840-001-F00

(1) Do these steps to prepare for the test:

(a) Make sure that the airplane has electrical power.

1) If it is necessary, do this task: Supply Electrical Power, TASK 24-22-00-860-811.

(b) Do the Prepare For The Dry Motor Procedure, (TASK 71-00-00-700-821-F00).

1) If the fuel was drained at the fuel filter on the fuel pump, make sure you provide boost pump pressure at fuel pump inlet.

NOTE: If you do not provide boost pump pressure at the fuel pump inlet (TASK 71-00-00-700-821-F00) before the start of the test sequence, the Actuators Test can fail and show maintenance messages.

2) Do not motor the engine at this time.

(c) For engine 1, do this step:

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	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A
A	6	C01017	FMCS CMPTR 1
D	2	C01372	DISPLAY CTR UPR
D	5	C01359	DISPLAY DEU 1 PRI
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
D	9	C01362	DISPLAY DEU 2 HOLDUP
D	10	C01361	DISPLAY DEU 1 HOLDUP
D	11	C01360	DISPLAY DEU 2 PRI

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
F	13	C01179	INDICATOR MASTER DIM SECT 7

(d) For engine 2, do this step:

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
D	2	C01372	DISPLAY CTR UPR
D	5	C01359	DISPLAY DEU 1 PRI
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
D	9	C01362	DISPLAY DEU 2 HOLDUP
D	10	C01361	DISPLAY DEU 1 HOLDUP
D	11	C01360	DISPLAY DEU 2 PRI

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
F	13	C01179	INDICATOR MASTER DIM SECT 7

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

(f) Make sure that the engine start switches are in the OFF position.

(g) Make sure that the forward thrust levers are at the idle position.

(h) Make sure that the thrust reversers are in the retracted (stowed) position.

SUBTASK 71-00-00-730-001-F00

(2) Do these steps to do the actuators test:

NOTE: It takes two persons to do this test. One person operates the FMCS CDU and the engine controls, and the other makes sure no one is injured when surfaces move and also monitors the engine.

NOTE: When engine operates, some oil leak can occur at the aft sump rotating seal. After operation, an oil puddle in the exhaust is usual. When engine operations are done one after the other, it can cause a large oil puddle in the exhaust.

(a) Make sure that all people and equipment are a safe distance from the engine before you start the test.

(b) If the CDU is not active from other engine ground tests, do these steps:

1) Get access to the CDU in the flight compartment.

2) Press the INIT REF key to show the PERF INIT screen on the CDU.

NOTE: The FMCS CDU does not support a type-ahead function. You must have the prompt on the CDU screen before you type in the response.

3) Push these line select keys (LSK) on the CDU:

a) INDEX

b) MAINT

NOTE: This LSK causes the MAINT BITE INDEX screen to show.

c) ENGINE

NOTE: This LSK causes the ENGINE/EXCEED BITE INDEX screen to show.

d) Applicable ENGINE X, (X = 1 or 2)

NOTE: This LSK causes the ENGINE X BITE TEST MAIN MENU to show. Also, the ENGINE X LSK automatically applies power to the EEC and causes the EEC to initialize. The CDU can show INITIALIZING EEC X and EEC SORTING FAULT HISTORY DATA, for a short time, just before the ENGINE X BITE TEST MAIN MENU shows.

e) GROUND TESTS

NOTE: This LSK causes the ENGINE X BITE TEST GROUND TEST menu to show.

f) If the FOR CH A ONLY or FOR CH B ONLY screen shows, push the INDEX LSK once, stop for 30 seconds, and then push the GROUND TESTS LSK again.

NOTE: The system has a 15-second timer for the FMCS CDU and EEC to initialize. Sometimes, this is not enough time and the system will show this problem.

g) If the FOR CH A ONLY or FOR CH B ONLY screen continues to show, do this task: Ch A(B) EEC Data not Available - Fault Isolation, FIM 73-05 TASK 803.

(c) Push the ACTUATORS TEST LSK.

NOTE: This will cause screen 1 of the ACTUATORS TEST to show. The screen contains a WARNING about the operation of the engine during this test.

(d) Push the START TEST LSK.

NOTE: You can stop the test at this time if you push the ABORT LSK. The screen will show the test is not completed because ABORT was selected.

(e) Use the interphone to tell the person at the engine that the engine will begin the dry motor procedure.

(f) Type "OK" on the CDU pad when you are ready to start the test.

(g) Push the CONTINUE LSK.

(h) Follow the instructions on the CDU test screen.

(i) Do these steps to do the dry motor procedure:

1) Turn the start switch to the GND position at the same time that you push the clock start button to measure the time.

NOTE: You must know the time limit for starter operation. Refer to the Engine Operation Limits (TASK 71-00-00-800-806-F00).

2) Make sure that the N2 speed becomes stable and is equal to or greater than the motor speed that shows on the CDU screen.

3) Push the CONTINUE LSK.

4) The test screen will show the time to do the test.

5) Make sure to observe that N2 did not go less than 20 percent at any time during the test. If this occurs, you must do the test again.

NOTE: If it is necessary, decrease the pneumatic load before you do the test again.

6) Turn the start switch to the OFF position when the test screen indication shows START SWITCH : OFF.

NOTE: The test screen will change at the end of the test to indicate when to turn the start switch to the OFF position.

7) Push the TEST RESULTS LSK.

(j) If faults are found, the test screen will show ACTUATORS TEST, the maintenance message number (MSG NBR) and a short description of the fault.

NOTE: If there is more than one fault, the page you are on and the total number of pages will show on the screen. Example: 1/2 shows you are on page 1 of 2 pages.

1) Do the corrective action in the Fault Isolation Manual for the fault that shows.

a) The actuators test is usually the repair confirmation.

(k) If it is necessary to do the actuators test again, do these steps:

1) Use the interphone to tell the person at the engine that the actuators test will begin again.

2) Stop for one minute for all faults to clear, and push the REPEAT TEST LSK.

3) Follow the instructions on the test screen again.

(l) If no faults are found, the test screen will show ACTUATORS TEST PASSED NO ACTUATORS TEST FAULTS.

(m) If you want to end the actuators test, push the END TEST LSK.

1) If the EEC was in dual channel operation, the test screen will show TEST COMPLETE, RETURN AIRPLANE TO NORMAL CONDITION.

2) If the EEC was in single channel operation, the test screen will show TEST COMPLETE, RETURN AIRPLANE TO NORMAL CONDITION, CH (A or B) INOP.

NOTE: To make sure the test results are accurate, it is necessary to do all EEC BITE Ground tests in dual channel operation. If you are in single channel operation, as soon as the GROUND TESTS Menu is selected, the test screen will show this condition.

3) If the single channel message is displayed, correct the single channel problem first.

a) Do the Actuators test again.

(n) If you wish to do other tests, push the INDEX LSK several times until the correct menu shows.

(o) If no other tests will be done, push the INIT REF key to go back to the PERF INIT screen.

SUBTASK 71-00-00-860-177-F00

(3) Do the procedure, Put The Airplane Back To Its Usual Condition from the Dry Motor Procedure (TASK 71-00-00-700-821-F00).

——————— END OF TASK ———————

TASK 71-00-00-700-808-F00

13. Test 13 - Engine Run - EEC BITE Check

A. General

(1) This procedure does a check of the control loops that are monitored by the EEC.

(a) A control loop is defined as the path from the EEC to a monitored engine component and back to the EEC.

(2) This check makes sure the wiring, connectors and monitored engine components are installed and operate correctly.

(3) To do this procedure, it is necessary to operate the engine.

B. References

Reference	Title
71-00-00-700-819-F00	Stop the Engine Procedure (Usual Engine Stop) (P/B 201)
71-00-00-800-807-F00	Start the Engine Procedure (Selection) (P/B 201)
73-21-00-740-803-F00	EEC BITE TEST - RECENT FAULTS (P/B 501)

C. Location Zones

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

D. Engine Run - EEC BITE Check

SUBTASK 71-00-00-730-002-F00

(1) Do these steps for the engine run test:

(a) For the applicable engine, do this task: Start the Engine Procedure (Selection), TASK 71-00-00-800-807-F00.

1) Let the engine become stable at the idle position for 2 minutes.

(b) Make sure that the ENGINE CONTROL light, on the overhead panel, P5, is OFF.

(c) Do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00.

(d) Make sure that the N2 display on the DEU goes to 0.0% before you continue with the procedure.

(e) Do this task: EEC BITE TEST - RECENT FAULTS, TASK 73-21-00-740-803-F00.

(f) Look for faults in Flight Leg 0.

NOTE: Flight Leg 0 is the most recent engine ground run.

1) If you do the Engine Run BITE Test after an HMU replacement, then maintenance messages 73-31161 or 73-31162 can show.

NOTE: The messages can be caused by air that gets into the HMU during the replacement. Once the system is operated, then the air is removed and the HMU should operate correctly.

a) If you find maintenance messages 73-31161 or 73-31162 after an HMU replacement, then do the Engine Run BITE Test again.

b) If the messages show after the second Engine Run BITE Test, then do the corrective action for the applicable message

2) Do the corrective action for the faults that you find.

——————— END OF TASK ———————

TASK 71-00-00-750-802-F00

14. Test 14A - Fan Trim Balance (Three Shot Plot Procedure)

A. General

(1) This trim balance procedure is done for these conditions:

(a) To decrease the fan or LPT vibration levels when they are equal to or more than 8.0 mils DA (double amplitude).

(b) When, after the replacement or the repair of a fan blade, the correction is more than 236 gram-inches (600 g-cm).

(2) The trim balance procedures will decrease the vibration levels of the fan and the LPT to less than 1.8 units on the airborne vibration monitor (AVM) during a ground operation at all engine operation speeds.

(3) For the calculation of the imbalance correction, the trim balance procedure uses the ground data recording of the vibrations from the No. 1 bearing and the FFCC (Fan Frame Compressor Case) vibration sensors.

(4) When an engine is installed on the wing, after an overhaul or after a replacement of a significant number of fan blades because of foreign object damage (FOD), it is recommended that you first do a vibration survey (TASK 71-00-00-700-814-F00).

(a) If the result of this vibration survey is not satisfactory, you can do this procedure to balance the engine.

HAP 001-011 PRE SB 737-77-1056

(b) Or Test 14B. To do this, do this task: Test 14B - Fan Trim Balance (On Board Procedure - Endevco AVM S360N021-213), TASK 71-00-00-750-804-F00.

HAP 023-026, 028-054, 101-999; HAP 001-013, 015-022 POST SB 737-77-1056 OR POST SB 737-77-1069

(c) Or Test 14B. To do this, do this task: Test 14B - Fan Trim Balance (On Board Procedure - Vibro-meter AVM S360N021-113, S360N021-114, and Universal AVM S362A001-1), TASK 71-00-00-750-803-F00.

HAP ALL

(5) The three-shot plot procedure can be used when there is no equipment available to find the phase angle of the imbalance. This method has the steps that follow:

(a) Use an engine run to find the quantity of the initial imbalance.

NOTE: When you do an engine run, you will operate the engine at 6 different speeds. At each speed you will record the quantity of imbalance from the front panel of the airborne vibration monitor (AVM) signal conditioner.

NOTE: For some ambient conditions, the higher speeds may not be reached. In this case, do the trim balance with a minimum of three speeds.

(b) Then use three engine runs to compare the initial imbalance with the quantities of the imbalances that are caused by three test weights which are put at three locations, 120 degrees apart. Each engine run consists of six individual speeds.

(c) Out of the six total engine speeds for each run, choose the three speeds that correspond to the three highest imbalances for the No. 1 bearing sensor and the three speeds that correspond to the three highest imbalances for the FFCC vibration sensor.

(d) For each of the six highest imbalance speeds (three from the No. 1 bearing and three from the FFCC vibration sensor), make a polar graph to find a resultant vector R1 and an angle X. Use this data to calculate the vector W6 and its sensitivity S.

(e) Put all six W6 vectors on a seventh polar graph, and use these points to find the final imbalance vector W7.

(f) The W7 vector tells you the necessary balance weight(s) and their locations.

(6) Definition of Terms and Symbols.

(a) Symbols (Table 510)

Table 510/71-00-00-993-846-F00

Symbol	Definition
A	Phase angle
dP1	Calculated vector (used to calculate W7)
FFCC	Fan Frame Compressor Case (vibration sensor)
P1, P2	Imbalance points (used to calculate W7)
R, W	Resultants
S	Sensitivity (The ratio of the imbalance weight (g-cm) to the vibration amplitude (mils DA) caused by a given imbalance weight for a given speed and sensor.)
SP1, SP2	Sensitivity for imbalance points P1, P2 (used to calculate W7)
U	Vibration amplitude or displacement vector

(Continued)

Symbol	Definition
W6	Balance correction weights for each of the six highest imbalance speeds
W7	Final balance correction weight (gives balance weight and location)
X	Angle

(b) Terms

1) Displacement vector - The displacement vector (U) is given in mils Double Amplitude (DA). The angular direction is given by the phase angle (A) expressed in degrees.

2) Balance Weights - screws of different lengths, attached radially on the spinner rear cone.

3) Engine run - the operation of the engine at six different engine speeds, which are done to find the imbalance quantities.

B. References

Reference	Title
71-00-00-700-819-F00	Stop the Engine Procedure (Usual Engine Stop) (P/B 201)
71-00-00-800-805-F00	Engine Ground Safety Precautions (P/B 201)
71-00-00-800-807-F00	Start the Engine Procedure (Selection) (P/B 201)

C. Tools/Equipment

Reference	Description
STD-585	Mat - Protective, 3/8 Inch Minimum Thickness, Minimum 42x60 Inches (1x1.5 meters) with Warning Streamers

D. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518

E. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
211	Flight Compartment - Left
212	Flight Compartment - Right
411	Engine 1 - Engine
421	Engine 2 - Engine

F. Do the Trim Balance Procedure

SUBTASK 71-00-00-720-001-F00

(1) If, during an engine run with the test weights installed, the engine becomes balanced (the fan and LPT vibration levels at the different speeds become lower than the recommended level of (1.8) units on the common display system (CDS)), you can stop the trim balance procedure. The test weights stay installed, and the airplane is put back to its usual condition.

SUBTASK 71-00-00-970-009-F00

(2) Use the table that follows to get the correct vibration units (Table 511):

Table 511/71-00-00-993-848-F00

Parameter	AVM
No. 1 BRG LP VIB	1 UNIT = 1.75 MILS DA (BELOW 2.5 UNITS) *[1]
No. 1 BRG HP VIB	1 UNIT = 0.569 IPS
FFCCV LP VIB	1 UNIT = 3.2 MILS DA (BELOW 2.5 UNITS) *[2]
FFCCV HP VIB	1 UNIT = 0.65 IPS
N1	10 - 120%
N2	5 - 115%
TIME	TENTHS OF HOURS

*[1] FOR UNITS > 2.5; MILS = 4.375 + (UNITS - 2.5) X 6.25

*[2] FOR UNITS > 2.5; MILS = 8.0 + (UNITS - 2.5) X 4.8

SUBTASK 71-00-00-970-010-F00

(3) If the vibration sensor for the No. 1 bearing does not operate, use the FFCC vibration sensor.

SUBTASK 71-00-00-970-011-F00

(4) Do these steps to record the initial balance screws:

CAUTION: MAKE SURE THAT YOU PUT A COVER ON THE LOWER SURFACES OF THE INLET COWL. TOOLS OR PARTS CAN FALL AND CAUSE DAMAGE TO THE INLET COWL SURFACE.

(a) Put the protective mat, STD-585 on the inner lower half of the inlet cowl.

(b) Record the type and location of the balance screws that are installed radially in the spinner rear cone (Figure 506, Figure 507).

CAUTION: MAKE SURE THAT YOU REMOVE THE TOOLS, PARTS AND UNWANTED MATERIAL FROM THE INLET. DAMAGE TO EQUIPMENT CAN OCCUR ON THE SUBSEQUENT ENGINE START.

(c) Remove the protective mat, STD-585 and all the other unwanted material from the inlet cowl.

SUBTASK 71-00-00-970-012-F00

(5) Find and record the conditions that follow:

CAUTION: DO NOT USE THE AIRPLANE TOTAL TEMPERATURE INDICATION TO GET THE AMBIENT AIR TEMPERATURE. THIS CAN HELP TO PREVENT AN INCORRECT N1 TRIM TARGET SELECTION.

CAUTION: DO NOT TAKE A MERCURY THERMOMETER ON THE AIRPLANE. MERCURY FROM A BROKEN THERMOMETER CAN CAUSE DAMAGE TO THE AIRPLANE COMPONENTS.

(a) Get the ambient air temperature (outside air temperature (OAT)) in the shade of the wheel well of the nose gear.

(b) Make sure the OAT agrees with the OAT on the TAKEOFF REF Page in the FMCS.

SUBTASK 71-00-00-970-014-F00

CAUTION: YOU MUST HAVE COMMUNICATION WITH THE PERSON IN THE ELECTRONIC EQUIPMENT COMPARTMENT WHEN YOU DO THIS PROCEDURE. IF YOU DO NOT, THE RESULTS OF THIS PROCEDURE WILL NOT BE ACCURATE.

(6) Get access to the AMV front panel display in the electronic equipment compartment.

NOTE: As you run the engine at different speeds, one person will use the AVM front panel display to record the vibration indications.

SUBTASK 71-00-00-970-015-F00

(7) Do the initial engine run as follows (Figure 508):

NOTE: For some ambient conditions, the higher speeds may not be reached. In this case, do the trim balance with a minimum of three speeds.

WARNING: MAKE SURE YOU OBEY ALL THE INSTRUCTIONS AND PRECAUTIONS WHEN YOU OPERATE AN ENGINE AT HIGH POWER. REFER TO THIS TASK: ENGINE GROUND SAFETY PRECAUTIONSENGINE GROUND SAFETY PRECAUTIONS, TASK 71-00-00-800-805-F00 . IF YOU DO NOT OBEY THE INSTRUCTIONS AND PRECAUTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Do this task: Start the Engine Procedure (Selection), TASK 71-00-00-800-807-F00.

1) Let the engine operate at the idle speed for 5 minutes.

2) Make sure the PROBE HEAT "A" or ''B'' switch on the overhead panel, P5, is in 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.

(b) Increase the speed of the engine slowly during a time of 20-30 seconds, until the speed is 80 ±2% N1 rpm.

1) Let the engine operate at this speed for a minimum of 5 minutes to make the temperature of the engine stable.

NOTE: The time to make the temperature stable can be decreased to a minimum of 3 minutes if the engine was operated less than 15 minutes before this procedure.

(c) Increase the speed of the engine slowly to the 96% N1.

1) Let the engine operate at this speed for 2 minutes.

2) Tell the person in the electronic equipment compartment to record the No. 1 bearing and FFCC vibration indications (U0) on a three-shot plot worksheet (Figure 508).

(d) If the vibration level is more than 1.8 units, do these steps:

1) As you monitor the No. 1 bearing and FFCC vibration indications, decrease the speed of the engine slowly and continuously until the vibration levels are at 1.8 units or lower.

NOTE: This will make sure that the vibration levels are not more than 6.0 mils during the balance procedure.

(e) Decrease the speed of the engine slowly to the second N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Tell the person in the electronic equipment compartment to record the No. 1 bearing and FFCC vibration indication (U0) on a three-shot plot worksheet.

(f) Decrease the speed of the engine slowly to the third N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Tell the person in the electronic equipment compartment to record the No. 1 bearing and FFCC vibration indications (U0) on a three-shot plot worksheet.

(g) Decrease the speed of the engine slowly to the fourth N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Tell the person in the electronic equipment compartment to record the No. 1 bearing and FFCC vibration indications (U0) on a three-shot plot worksheet.

(h) Decrease the speed of the engine slowly to the fifth N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Tell the person in the electronic equipment compartment to record the No. 1 bearing and FFCC vibration indications (U0) on a three-shot plot worksheet.

(i) Decrease the speed of the engine slowly to the sixth N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Tell the person in the electronic equipment compartment to record the No. 1 bearing and FFCC vibration indications (U0) on a three-shot plot worksheet.

(j) Decrease the speed to the idle power position.

1) Let the engine operate at the idle speed for 3 minutes.

(k) Do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00.

SUBTASK 71-00-00-970-016-F00

(8) Use the chart of the installed balance screws you recorded above (other than P07).

NOTE: If no balance weights are installed at a bolt hole, the bolt size is P07.

SUBTASK 71-00-00-970-017-F00

(9) Find three locations, that are 120 degrees apart, where the installed P07 balance screws can be removed and replaced with the P05 balance screws (Figure 506).

NOTE: As an example: Holes 2, 1, and 36 (at 0 degrees); holes 24, 25, and 26 (at 120 degrees); and holes 12, 13, and 14 (at 240 degrees).

SUBTASK 71-00-00-480-002-F00

(10) Install the balance screws at the first location as follows:

NOTE: In the above example, this would be at holes 2, 1, and 36 (at the 0 degree location).

CAUTION: MAKE SURE THAT YOU PUT A COVER ON THE LOWER SURFACE OF THE INLET COWL. DAMAGE TO THE INLET COWL SURFACES CAN OCCUR.

(a) Put the protective mat, STD-585 on the inner lower half of the inlet cowl.

(b) Remove the three P07 balance screws.

(c) Lubricate the three P05 balance screws with grease, D00601 [CP2101] and install them at the first location.

1) Tighten the screws to 68-74 pound-inches (7.6-8.4 Newton meters).

CAUTION: MAKE SURE THAT YOU REMOVE THE TOOLS, PARTS AND UNWANTED MATERIAL FROM THE INLET. DAMAGE TO EQUIPMENT CAN OCCUR ON THE SUBSEQUENT ENGINE START.

(d) Remove the protective mat, STD-585 and all other remaining unwanted material from the inlet cowl.

SUBTASK 71-00-00-970-018-F00

(11) Do the first engine run with the three P05 test balance screws added as follows (Figure 508):

NOTE: For some ambient conditions, the higher speeds may not be reached. In this case, do the trim balance with a minimum of three speeds.

WARNING: MAKE SURE YOU OBEY ALL THE INSTRUCTIONS AND PRECAUTIONS WHEN YOU OPERATE AN ENGINE AT HIGH POWER. REFER TO THIS TASK: ENGINE GROUND SAFETY PRECAUTIONS ENGINE GROUND SAFETY PRECAUTIONS, TASK 71-00-00-800-805-F00. IF YOU DO NOT OBEY THE INSTRUCTIONS AND PRECAUTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Do this task: Start the Engine Procedure (Selection), TASK 71-00-00-800-807-F00.

1) Let the engine operate at the idle speed for 3 minutes.

2) Make sure the PROBE HEAT "A" or ''B'' switch on the overhead panel, P5, is in 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.

(b) Increase the speed of the engine slowly during a time of 20-30 seconds, until the speed is 80 ±2% N1 rpm.

1) Let the engine operate at this speed for a minimum of 5 minutes to make the temperature of the engine stable.

NOTE: The time to make the temperature stable can be decreased to a minimum of 3 minutes if the engine was operated less than 15 minutes before this procedure.

(c) Increase the speed of the engine slowly to 96% N1.

1) Let the engine operate at this speed for 2 minutes.

2) Tell the person in the electronic equipment compartment to record the No. 1 bearing and FFCC vibration indications (U1) on a three-shot plot worksheet.

(d) If the vibration level is more than 1.8 units, do these steps:

1) As you monitor the No. 1 bearing and FFCC vibration indications, decrease the speed of the engine slowly and continuously until the vibration levels are at 1.8 units or lower.

NOTE: This will make sure that the vibration levels are not more than 6.0 mils DA during the balance procedure.

(e) Decrease the speed of the engine slowly to the second N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Tell the person in the electronic equipment compartment to record the No. 1 bearing and FFCC vibration indications (U1) on a three-shot plot worksheet.

(f) Decrease the speed of the engine slowly to the third N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Tell the person in the electronic equipment compartment to record the No. 1 bearing and FFCC vibration indications (U1) on a three-shot plot worksheet.

(g) Decrease the speed of the engine slowly to the fourth N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Tell the person in the electronic equipment compartment to record the No. 1 bearing and FFCC vibration indications (U1) on a three-shot plot worksheet.

(h) Decrease the speed of the engine slowly to the fifth N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Tell the person in the electronic equipment compartment to record the No. 1 bearing and FFCC vibration indications (U1) on a three-shot plot worksheet.

(i) Decrease the speed of the engine slowly to the sixth N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Tell the person in the electronic equipment compartment to record the No. 1 bearing and FFCC vibration indications (U1) on a three-shot plot worksheet.

(j) Decrease the speed to the idle power position.

1) Let the engine operate at the idle speed for 3 minutes.

(k) Do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00.

SUBTASK 71-00-00-080-005-F00

(12) Remove the P05 balance screws from the first location as follows:

NOTE: In the above example, this would be at holes 2, 1 and 36 (at the 0 degree location).

(a) Put the protective mat, STD-585 on the inner lower half of the inlet cowl.

(b) Remove the three P05 balance screws.

(c) Lubricate the initial P07 balance screws with grease, D00601 [CP2101] and install them again.

1) Tighten the screws to 68-74 pound-inches (7.6-8.4 Newton meters).

SUBTASK 71-00-00-480-003-F00

(13) Do these steps to install the P05 balance screws at the second location:

NOTE: In the above example, this would be at holes 24, 25 and 26 (at the 120 degree location).

(a) Remove the three P07 balance screws.

(b) Lubricate and the three P05 balance screws with grease, D00601 [CP2101] and install them at this location.

1) Tighten the screws to 68-74 pound-inches (7.6-8.4 Newton meters).

CAUTION: MAKE SURE THAT YOU REMOVE THE TOOLS, PARTS AND UNWANTED MATERIAL FROM THE INLET. DAMAGE TO EQUIPMENT CAN OCCUR ON THE SUBSEQUENT ENGINE START.

(c) Remove the protective mat, STD-585 and all other unwanted material from the inlet cowl.

SUBTASK 71-00-00-970-019-F00

(14) Do the second engine run with the three P05 at 120 degrees apart as follows (Figure 508):

WARNING: MAKE SURE YOU OBEY ALL THE INSTRUCTIONS AND PRECAUTIONS WHEN YOU OPERATE AN ENGINE AT HIGH POWER. REFER TO THIS TASK: ENGINE GROUND SAFETY PRECAUTIONS ENGINE GROUND SAFETY PRECAUTIONS, TASK 71-00-00-800-805-F00. IF YOU DO NOT OBEY THE INSTRUCTIONS AND PRECAUTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Do this task: Start the Engine Procedure (Selection), TASK 71-00-00-800-807-F00.

1) Let the engine operate at the idle speed for 3 minutes.

2) Make sure the PROBE HEAT "A" or ''B'' switch on the overhead panel, P5, is in 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.

(b) Increase the speed of the engine slowly during a time of 20-30 seconds, until the speed is 80 ±2% N1 rpm.

1) Let the engine operate at this speed for a minimum of 5 minutes to make the temperature of the engine stable.

NOTE: The time to make the temperature stable can be decreased to a minimum of 3 minutes if the engine was operated less than 15 minutes before this procedure.

(c) Increase the speed of the engine slowly to 96% N1.

1) Let the engine operate at this speed for 2 minutes.

2) Tell the person in the electronic equipment compartment to record the No. 1 bearing and FFCC vibration indications (U2) on a three-shot plot worksheet.

(d) If the vibration level is more than 1.8 units, do these steps:

1) As you monitor the No. 1 bearing and FFCC vibration indications, decrease the speed of the engine slowly and continuously until the vibration levels are at 1.8 units or lower.

NOTE: This will make sure that the vibration levels are not more than 6.0 mils during the balance procedure.

(e) Decrease the speed of the engine slowly to the second N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Tell the person in the electronic equipment compartment to record the No. 1 bearing and FFCC vibration indications (U2) on a three-shot plot worksheet.

(f) Decrease the speed of the engine slowly to the third N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Tell the person in the electronic equipment compartment to record the No. 1 bearing and FFCC vibration indications (U2) on a three-shot plot worksheet.

(g) Decrease the speed of the engine slowly to the fourth N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Tell the person in the electronic equipment compartment to record the No. 1 bearing and FFCC vibration indications (U2) on a three-shot plot worksheet.

(h) Decrease the speed of the engine slowly to the fifth N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Tell the person in the electronic equipment compartment to record the No. 1 bearing and FFCC vibration indications (U2) on a three-shot plot worksheet.

(i) Decrease the speed to the idle power position.

1) Let the engine operate at the idle speed for 3 minutes.

(j) Do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00.

SUBTASK 71-00-00-080-006-F00

(15) Remove the P05 balance screws from the second location as follows:

NOTE: In the above example, this would be at holes 24, 25 and 26 (at the 120 degree location).

(a) Put the protective mat, STD-585 on the inner lower half of the inlet cowl.

(b) Remove the three P05 balance screws.

(c) Lubricate the initial P07 balance screws with grease, D00601 [CP2101] and install them again.

1) Tighten the screws to 68-74 pound-inches (7.6-8.4 Newton meters).

SUBTASK 71-00-00-480-004-F00

(16) Install the P05 balance screws at the third location as follows:

NOTE: In the above example, this would be at holes 12, 13 and 14 (at the 240 degree location).

(a) Remove the three P07 balance screws.

(b) Lubricate and the three P05 balance screws with grease, D00601 [CP2101] and install them at this location.

1) Tighten the screws to 68-74 pound-inches (7.6-8.4 Newton meters).

CAUTION: MAKE SURE THAT YOU REMOVE THE TOOLS, PARTS AND UNWANTED MATERIAL FROM THE INLET. DAMAGE TO EQUIPMENT CAN OCCUR ON THE SUBSEQUENT ENGINE START.

(c) Remove the protective mat, STD-585 and all other unwanted material from the inlet cowl.

SUBTASK 71-00-00-970-020-F00

(17) Do the third engine run as follows (Figure 508):

WARNING: MAKE SURE YOU OBEY ALL THE INSTRUCTIONS AND PRECAUTIONS WHEN YOU OPERATE AN ENGINE AT HIGH POWER. REFER TO THIS TASK: ENGINE GROUND SAFETY PRECAUTIONS ENGINE GROUND SAFETY PRECAUTIONS, TASK 71-00-00-800-805-F00. IF YOU DO NOT OBEY THE INSTRUCTIONS AND PRECAUTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Do this task: Start the Engine Procedure (Selection), TASK 71-00-00-800-807-F00.

1) Let the engine operate at the idle speed for 3 minutes.

2) Make sure the PROBE HEAT "A" or ''B'' switch on the overhead panel, P5, is in the ON position.

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

(b) Increase the speed of the engine slowly during a time of 20-30 seconds, until the speed is 80 ±2% N1 rpm.

1) Let the engine operate at this speed for a minimum of 5 minutes to make the temperature of the engine stable.

NOTE: The time to make the temperature stable can be decreased to a minimum of 3 minutes if the engine was operated less than 15 minutes before this procedure. Also, the 5 minute time is not necessary if the trim balance procedure is started less than 5 minutes after the engine was operated at high power and was not stopped.

(c) Increase the speed of the engine slowly to 96% N1.

1) Let the engine operate at this speed for 2 minutes.

2) Record the No. 1 bearing and FFCC vibration indications (U3) on a three-shot plot worksheet.

(d) If the vibration level is more than 1.8 units, do these steps:

1) As you monitor the No. 1 bearing and FFCC vibration indications, decrease the speed of the engine slowly and continuously until the vibration levels are at 1.8 units or lower.

NOTE: This will make sure that the vibration levels are not more than 6.0 mils during the balance procedure.

(e) Decrease the speed of the engine slowly to the second N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Tell the person in the electronic equipment compartment to record the No. 1 bearing and FFCC vibration indications (U3) on a three-shot plot worksheet.

(f) Decrease the speed of the engine slowly to the third N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Tell the person in the electronic equipment compartment to record the No. 1 bearing and FFCC vibration indications (U3) on a three-shot plot worksheet.

(g) Decrease the speed of the engine slowly to the fourth N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Tell the person in the electronic equipment compartment to record the No. 1 bearing and FFCC vibration indications (U3) on a three-shot plot worksheet.

(h) Decrease the speed of the engine slowly to the fifth N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Tell the person in the electronic equipment compartment to record the No. 1 bearing and FFCC vibration indications (U3) on a three-shot plot worksheet.

(i) Decrease the speed to the idle power position.

1) Let the engine operate at the idle speed for 3 minutes.

(j) Do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00.

SUBTASK 71-00-00-970-021-F00

(18) To start the calculation for the final balance weight W7, do these steps to calculate the balance weights, W6, and their sensitivities S as follows:

NOTE: To calculate the balance weight W7, you must make six polar graphs, one for each of the three highest No. 1 bearing vibration imbalances and the three highest FFCC vibration sensor vibration imbalances recorded during the initial engine run U0. For each vibration imbalance (at a given engine speed), you will use the U0, U1, U2 and U3 values to find the resultant vector R1 and its angle X. Then, you will convert the resultant vector R1 and angle X to a balance weight W6 and a sensitivity S. Finally, you will use the balance weight W6 and the sensitivity S to make a seventh polar graph to find the final balance weight W7 and its angle on the spinner.

(a) From the initial engine run U0, choose only the three out of the six total N1 speeds that gave the highest indications for the No. 1 bearing.

(b) From the initial engine run U0, choose only the three out of the six total N1 speeds that gave the highest indications for the FFCC vibration sensor.

(c) For each of the six vibration indications (U0) you got from the above step, give each a letter A through F.

NOTE: As an example, the highest No. 1 bearing vibration indication U0 is A, the second-highest is B and the third-highest is C. For the FFCC vibration indication, the highest is D; the second-highest is E and the third-highest is F.

(d) Write each of the six vibration indications (A through F) on the worksheet under the correct data point index (Figure 509).

(e) Do these steps to write each of the six vibration indications (U0) on a polar graph:

1) For A, use an applicable graduation, on a polar graph such that U0 will use approximately 1/2 of the graph (Figure 510).

2) Draw a circle, with the center at the origin and with a radius that is equal to U0 (Figure 511).

3) Draw an arc for U1 on the polar graph as follows (Figure 512):

a) For U1, the center of the arc is the intersection of the U0 circle and the angle of the first P05 balance weights.

NOTE: In the above example, the angle for U1 is 0 degrees (the balance weights were put at holes 2, 1, and 36).

b) The radius of the circle is U1.

4) Draw an arc for U2 on the polar graph as follows (Figure 513):

a) For U2, the center of the arc is the intersection of the U0 circle and the angle of the second P05 balance weights.

NOTE: In the above example, the angle for U2 is 120 degrees (the balance weights were put at holes 24, 25, and 26).

b) The radius of the circle is U2.

5) Draw an arc for U3 on the polar graph as follows (Figure 514):

a) For U3, the center of the arc is the intersection of the U0 circle and the angle of the third P05 balance weights.

NOTE: In the above example, the angle for U3 is 240 degrees (the balance weights were put at holes 12, 13, and 14).

b) The radius of the circle is U3.

(f) Do these steps to find the vector R1 (Figure 515):

NOTE: R1 is the resultant vector R for the first vibration indication.

1) Make a vector, R1, from the origin of the graph to the intersection made by the three circles (U1, U2 and U3).

NOTE: If the three circles do not go through one point, use a point that is approximately in the center of the triangle made by the intersections of the three circles.

2) Measure the length of R1.

3) Measure clockwise the angle (X) from the 0-degree radial line to the vector R1.

4) Record the length of R1 and the angle X on the worksheet (Figure 509).

(g) Calculate the balance weight W6 as follows:

NOTE: The weight of the three P05 screws is 831.8 grams.

Table 512/71-00-00-993-921-F00

$$W6 = \frac{831.8 \times U0}{R1}$$

1) Write the balance weight, W6, on the worksheet (Figure 509).

2) Calculate the sensitivity as follows:

Table 513/71-00-00-993-922-F00

$$S = \frac{831.8}{R1}$$

3) Write the sensitivity, S, on the worksheet.

(h) Do the above steps again to find R1, X, W6 and S for the index points B through F.

NOTE: You will make a polar graph for each index point.

SUBTASK 71-00-00-970-022-F00

(19) Do these steps to find the final balance weight W7 and its location:

(a) Use an applicable graduation, on a polar graph that will include all of the balance weights (W6) that you calculated above (Figure 510).

(b) Put the six balance weights W6 (for the index points A through F) and their angles X on the polar graph.

NOTE: When you are done, you will have six points on the graph that correspond to the six index points. Each point was found by the angle X from the origin and the length of W6.

(c) Make a line (vector) between each point as it is shown on the illustration (Figure 516).

NOTE: As an example, A-B, A-C, A-D, etc.

NOTE: Each vector connects two points. These two points are identified as P1 and P2. As an example, for the A-C vector, A is P1 and C is P2.

(d) From the data on the worksheet (Figure 509), record the sensitivity of the index points P1 and P2 for each vector (Figure 516).

NOTE: As an example for AB: sensitivity of A (P1) = SP1, and the sensitivity of B (P2) = SP2.

(e) Add the two sensitivities for each vector (SP1 + SP2) and record them on the worksheet.

(f) Use the equation below to calculate the amplitude (U) of each vector. Record each amplitude on the worksheet (Figure 516).

Table 514/71-00-00-993-923-F00

$$U = \frac{\text{Length of Vector P1-P2}}{SP1 + SP2}$$

(g) Identify the vector with the largest amplitude U.

(h) For this vector, calculate the distance dP1.

Table 515/71-00-00-993-924-F00

$$dP1 = U \times (SP1)$$

(i) Record the value, dP1, on the worksheet (Figure 516).

(j) Start at point P1 of this vector and draw the value dP1 as a line on top of the vector P1-P2 (Figure 510).

(k) Draw a vector from the origin (the center of the graph) to the end of dP1 on P1-P2.

NOTE: This vector is W7.

(l) Measure and record the length (the imbalance weight (g-cm)) and the phase angle (A7) of W7 (Figure 516).

NOTE: To measure the phase angle, start at the 0 degree line and go clockwise.

SUBTASK 71-00-00-970-023-F00

(20) Make a selection of the balance screws as follows:

(a) Use the imbalance weight W7 to identify the balance screws that are necessary to balance the engine. (Figure 517).

(b) Use the phase angle A7 to see if the center of the balance weight is on or between the screw holes (Figure 517).

1) Get the part number(s) of the balance screw(s) from the applicable sheets of (Figure 518) for the balance weight centers on the screw holes, or (Figure 519) for balance weight centers between the screw holes.

(c) Write the balance screw(s) and location(s) on a balance screw location chart (See (Figure 501)).

SUBTASK 71-00-00-970-024-F00

(21) Do these steps to remove the P05 balance screws that were installed at 240 degrees:

CAUTION: MAKE SURE THAT YOU PUT A COVER ON THE LOWER SURFACE OF THE INLET COWL. DAMAGE TO THE INLET COWL SURFACES CAN OCCUR.

(a) Put the protective mat, STD-585 on the inner lower half of the inlet cowl.

(b) Remove the three P05 test weights.

(c) Lubricate the initial P07 balance screws with grease, D00601 [CP2101] and install them again.

1) Tighten the screws to 68-74 pound-inches (7.6-8.4 Newton meters).

SUBTASK 71-00-00-970-025-F00

(22) Install the new balance screws as follows:

(a) Lubricate the new balance screw(s) W7 with grease, D00601 [CP2101] and install on the spinner.

1) Tighten the screws to 68-74 pound-inches (7.6-8.4 Newton meters).

(b) Remove the protective mat, STD-585 and all the other remaining unwanted material from the inlet cowl.

SUBTASK 71-00-00-970-026-F00

(23) Do the last engine run as follows (Figure 508):

(a) Do a check to make sure the AVM system operates correctly (Ref TDF).

WARNING: MAKE SURE YOU OBEY ALL THE INSTRUCTIONS AND PRECAUTIONS WHEN YOU OPERATE AN ENGINE AT HIGH POWER. REFER TO THIS TASK: ENGINE GROUND SAFETY PRECAUTIONS ENGINE GROUND SAFETY PRECAUTIONS, TASK 71-00-00-800-805-F00. IF YOU DO NOT OBEY THE INSTRUCTIONS AND PRECAUTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(b) Do this task: Start the Engine Procedure (Selection), TASK 71-00-00-800-807-F00.

1) Let the engine operate at the idle speed for 3 minutes.

2) Make sure the PROBE HEAT "A" or ''B'' switch on the overhead panel, P5, is in 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.

(c) Increase the speed of the engine slowly during a time of 20-30 seconds, until the speed is 80 ±2% N1 rpm.

1) Let the engine operate at this speed for a minimum of 5 minutes to make the temperature of the engine stable.

NOTE: The time to make the temperature stable can be decreased to a minimum of 3 minutes if the engine was operated less than 15 minutes before this procedure.

(d) Increase the speed of the engine slowly to 96% N1.

1) Let the engine operate at this speed for 2 minutes.

2) Tell the person in the electronic equipment compartment to record the No. 1 bearing and FFCC vibration indication (U0) on a three-shot plot worksheet.

(e) If the vibration levels of the No. 1 bearing are more than 3.5 mils DA or the levels of the FFCC vibration sensor are more than 4.0 mils DA, do these steps:

1) Do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00.

2) Examine all of the data from the engine runs to make sure the calculations were done correctly.

3) Do a check of the fan blades for sufficient lubrication.

4) Examine the condition of all AVM system connectors.

NOTE: Dirty or wet connectors can cause incorrect vibration indications.

5) Do a check for accelerometer mounting brackets that are loose.

6) Make sure all of the leads are correctly attached (with clamps, tape, or other attachment means) at locations that are not less than 6 inches (15 cm) apart.

NOTE: Leads that are free to move or shake can cause incorrect vibration signals.

7) Install the initial balance screws again (Figure 506).

8) Do a second initial engine run again.

9) Compare the amplitude and phase angle indications of this second initial engine run with the results of the first initial engine run.

(f) Decrease the speed of the engine slowly to the second N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Record the No. 1 bearing and FFCC vibration indication (U0) on a three-shot plot worksheet.

(g) Decrease the speed of the engine slowly to the third N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Record the No. 1 bearing and FFCC vibration indications (U0) on a three-shot plot worksheet.

(h) Decrease the speed of the engine slowly to the fourth N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Record the No. 1 bearing and FFCC vibration indications (U0) on a three-shot plot worksheet.

(i) Decrease the speed of the engine slowly to the fifth N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Record the No. 1 bearing and FFCC vibration indications (U0) on a three-shot plot worksheet.

(j) Decrease the speed of the engine slowly to the sixth N1 speed.

1) Let the engine operate at this speed for 2 minutes.

2) Record the No. 1 bearing and FFCC vibration indications (U0) on a three-shot plot worksheet.

(k) Decrease the speed to the idle power position.

1) Let the engine operate at the idle speed for 3 minutes.

(l) Do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00.

SUBTASK 71-00-00-710-003-F00

(24) See if the vibration levels of the No. 1 bearing are not more than 3.5 mils DA and the levels of the FFCC vibration sensor are not more than 4.0 mils DA.

(a) If the vibration levels are not more than the limits, the trim balance procedure is completed.

1) Do the steps below to put the airplane back to its usual condition.

G. Put the Airplane Back to Its Usual Condition

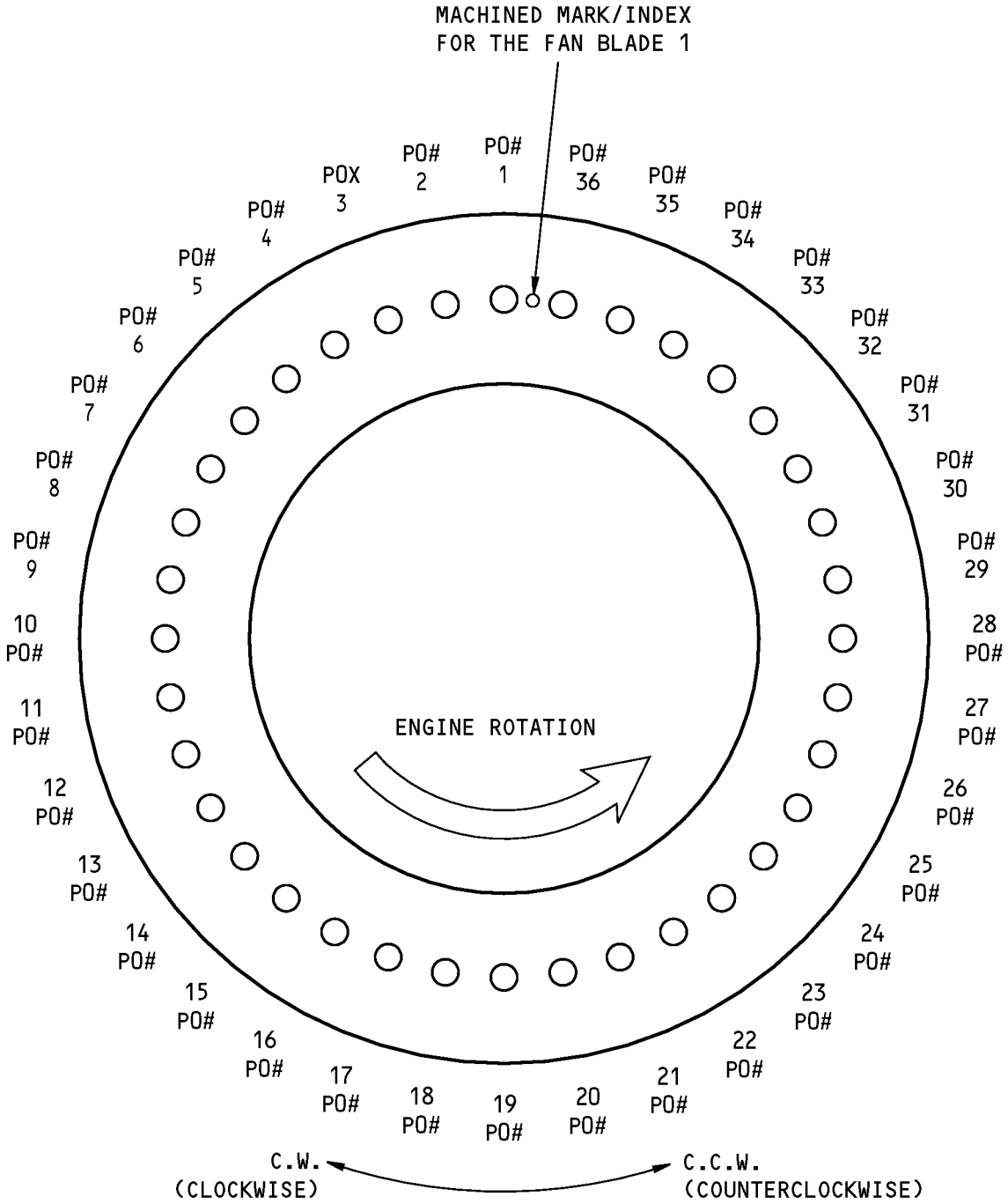
SUBTASK 71-00-00-010-020-F00

(1) Remove the access from the electronic equipment compartment.

SUBTASK 71-00-00-860-162-F00

(2) During a subsequent engine operation, do a check of the N1 and AVM indications to make sure they operate correctly.

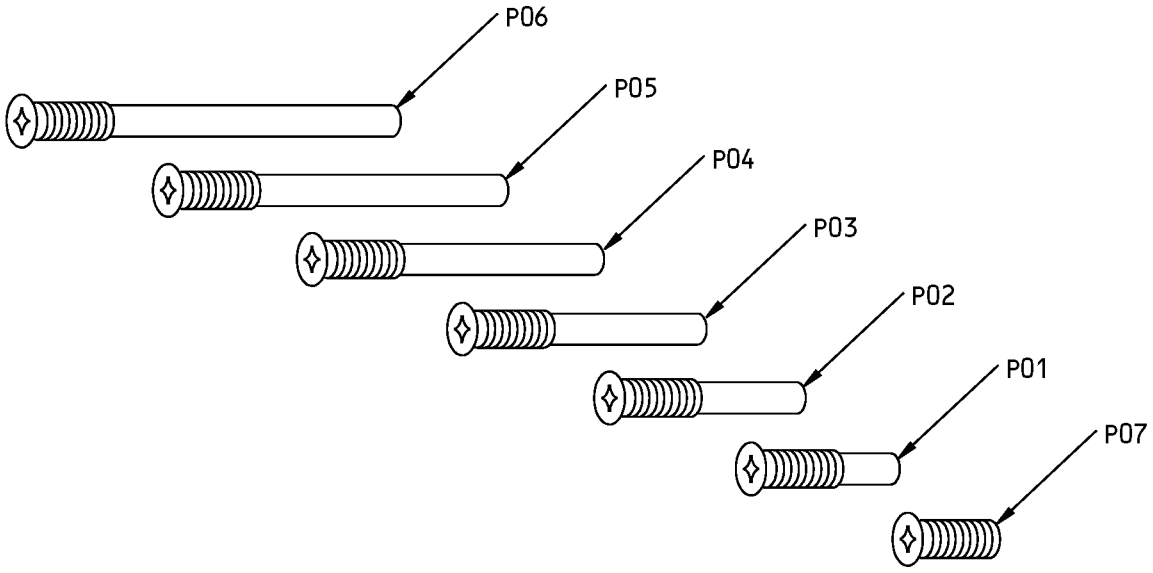
——————— END OF TASK ———————



(VIEW IN THE AFT DIRECTION)

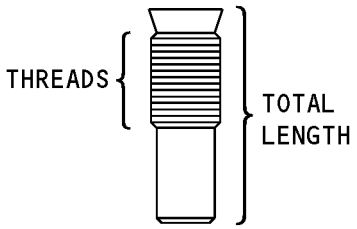
S-M56-MM-03715-00-B

Initial Balance Screw Location Chart
Figure 506/71-00-00-990-832-F00



P07 = INITIAL BALANCE SCREWS

BALANCE SCREW



PO#	(**)	TOTAL LENGTH IN.	TOTAL LENGTH MM	WEIGHT GRAMS	M.W.* GR-CM
P07	(P14)	0.8	20.3	6.6	0.0
P01	(P08)	1.3	33.0	10.0	65.0
P02	(P09)	1.8	45.7	13.4	125.7
P03	(P10)	2.3	58.4	16.8	183.8
P04	(P11)	2.8	71.1	20.2	237.5
P05	(P12)	3.3	83.8	23.6	280.1
P06	(P13)	3.8	96.5	27.4	318.8

* MOMENT WEIGHT RESULT (THE MOMENT WEIGHT OF EACH SCREW MINUS THE MOMENT WEIGHT OF SCREW P07)
** EQUIVALENT BALANCE SCREW

S-M56-MM-03716-00-B

Balance Screw Specifications
Figure 507/71-00-00-990-833-F00

VIBRATION SENSOR	N1 SPEED		INITIAL ENGINE RUN U0 (INITIAL WEIGHT)	FIRST ENGINE RUN U1 WITH 3 P05 ADDED	SECOND ENGINE RUN U2 WITH 3 P05 ADDED 120° APART	THIRD ENGINE RUN U3 WITH 3 P05 ADDED 240° APART	LAST ENGINE RUN WITH WEIGHT W7
	%	RPM					
NO. 1 BEARING	96.0	4968					
	92.0	4761					
	88.0	4554					
	84.0	4347					
	75.0	3881					
	65.0	3364					
FFCCV	96.0	4968					
	92.0	4761					
	88.0	4554					
	84.0	4347					
	75.0	3881					
	65.0	3364					

S-M56-MM-03717-00-B

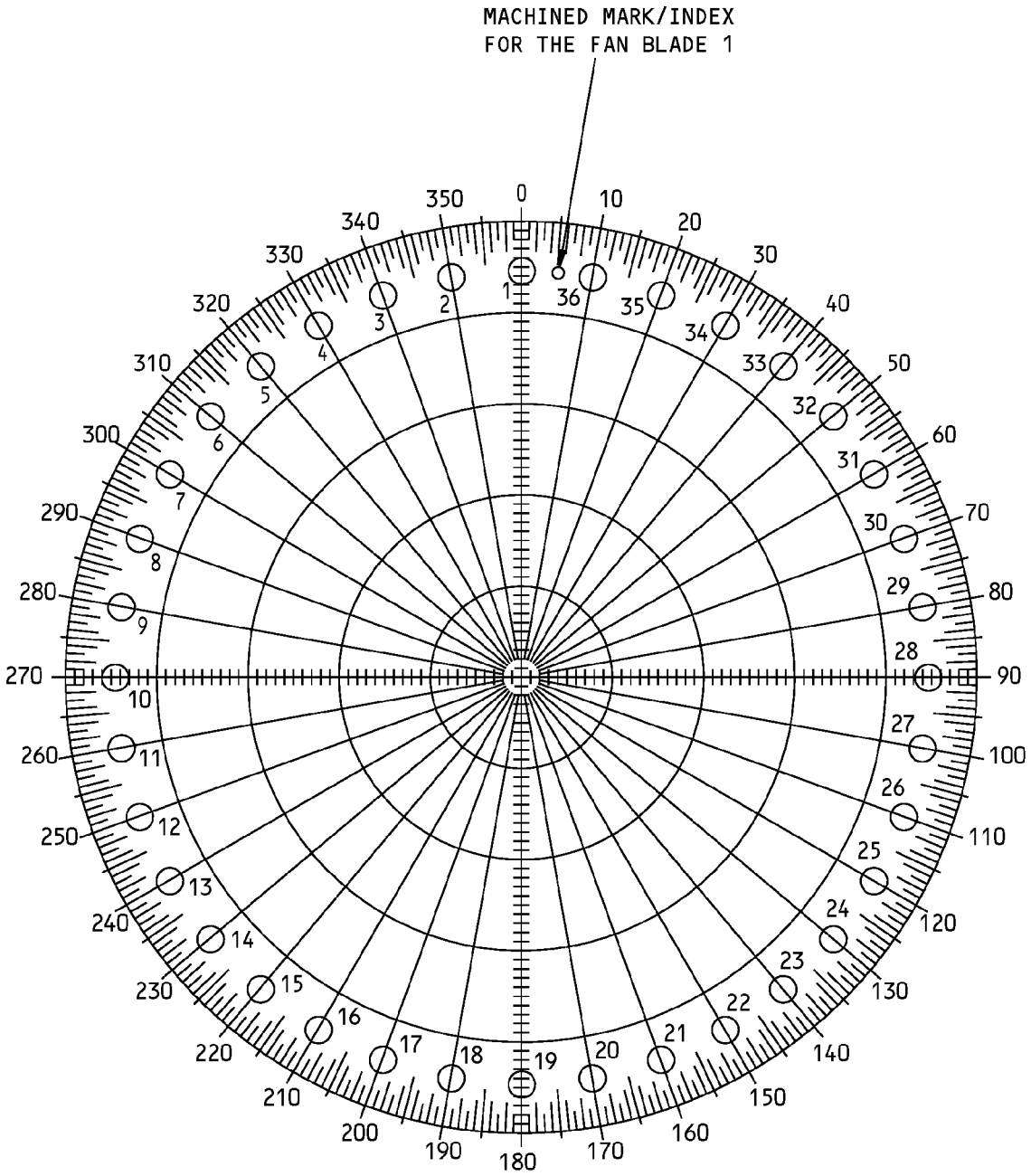
CFM56-7 TRIM BALANCE
3-SHOT PLOT - WORKSHEET

3-Shot Plot Worksheet
Figure 508/71-00-00-990-834-F00

DATA POINT INDEX	A	B	C	D	E	F
INITIAL IMBALANCE UO MILS D.A.						
RESULTANT R MILS D.A.						
ANGLE X DEGREES						
BALANCE WEIGHT W6 = $831.8 \times \frac{UO}{R1}$ G-CM						
SENSITIVITY $S = \frac{831.8}{R1}$						

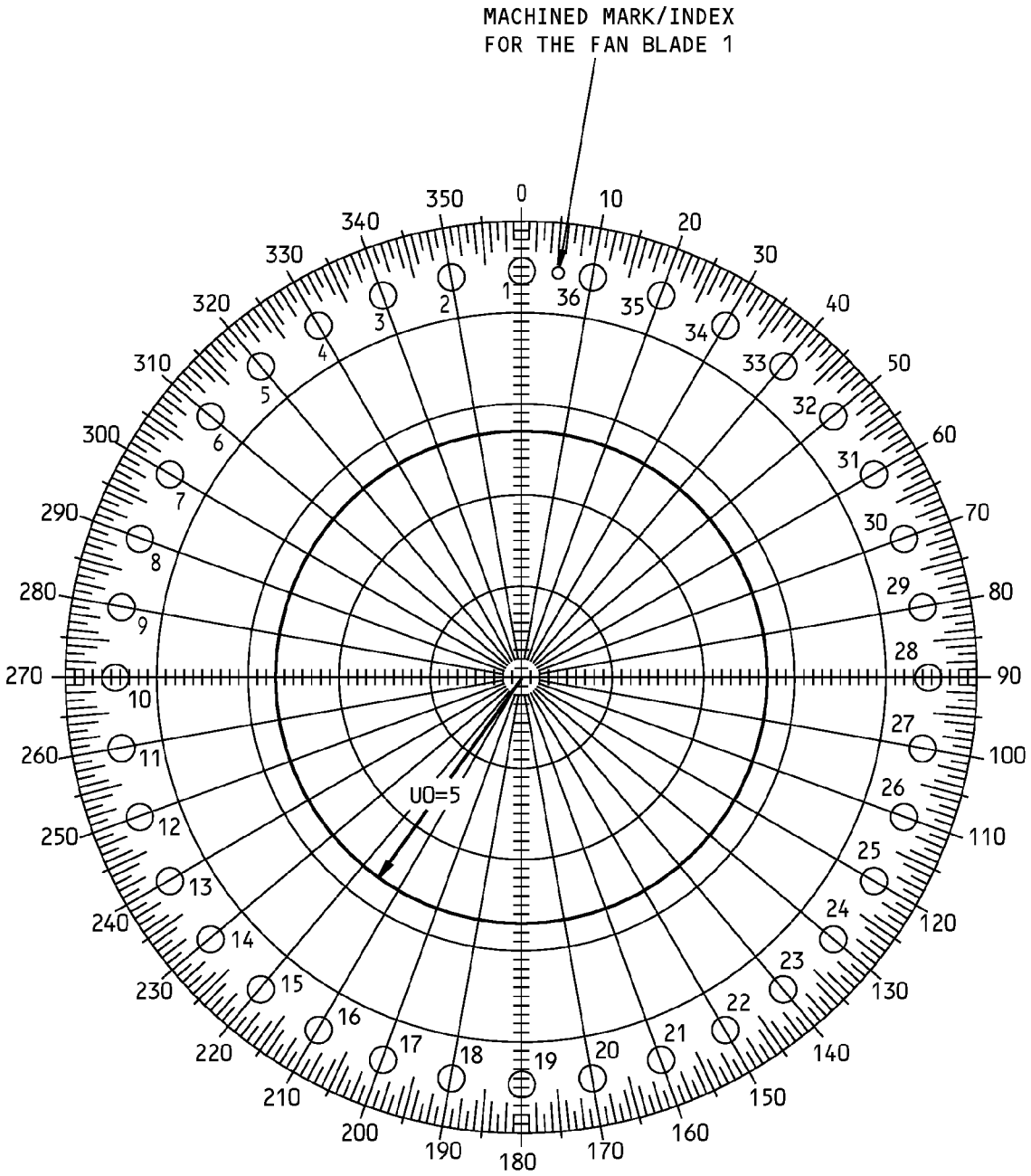
S-M56-MM-03718-00-B

3-Shot Plot Analysis Worksheet
Figure 509/71-00-00-990-835-F00



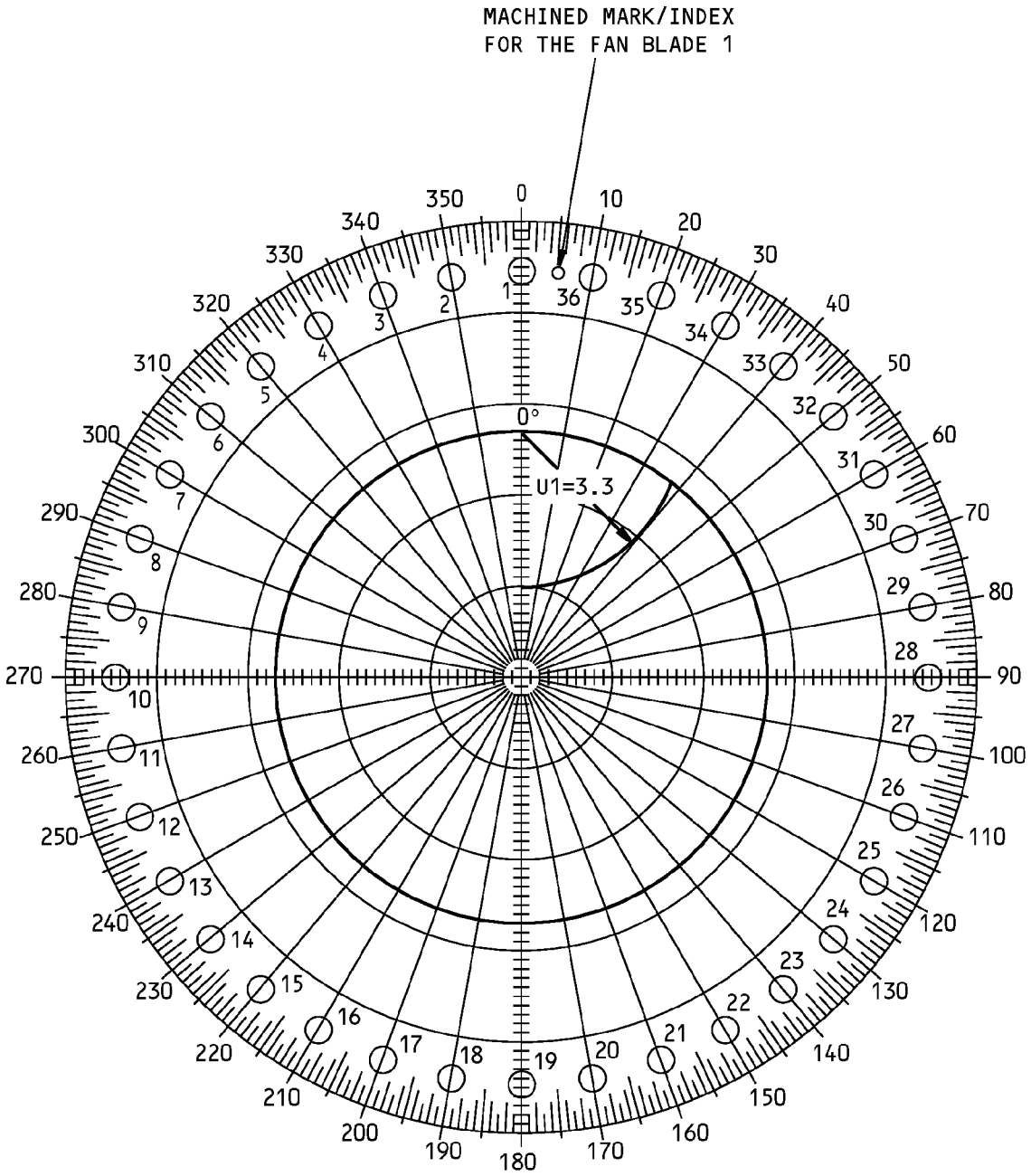
S-M56-MM-03719-00-B

Polar Graph for the Trim Balance
Figure 510/71-00-00-990-836-F00



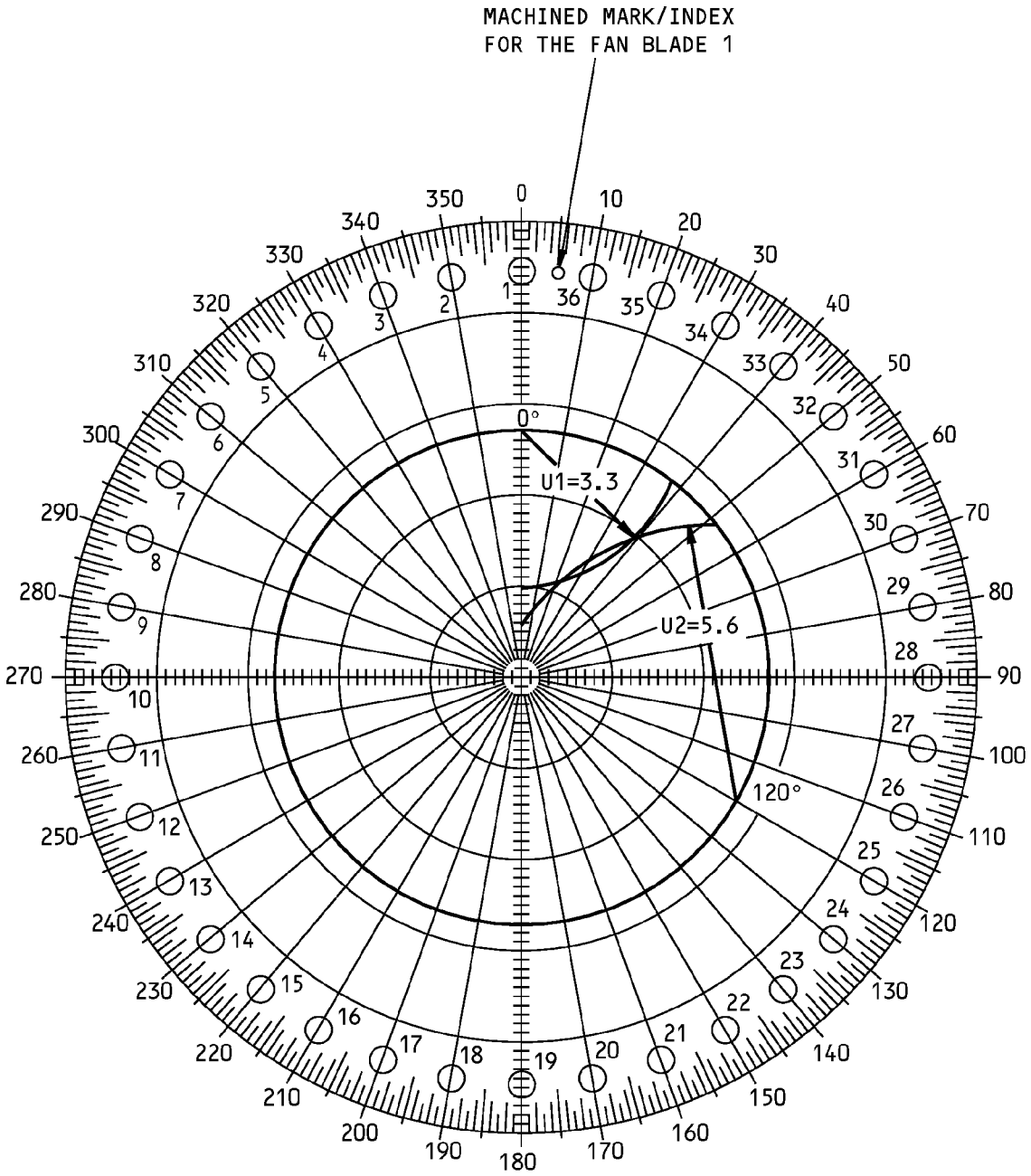
S-M56-MM-03720-00-B

Plot for the Initial Engine Run (Example)
Figure 511/71-00-00-990-837-F00



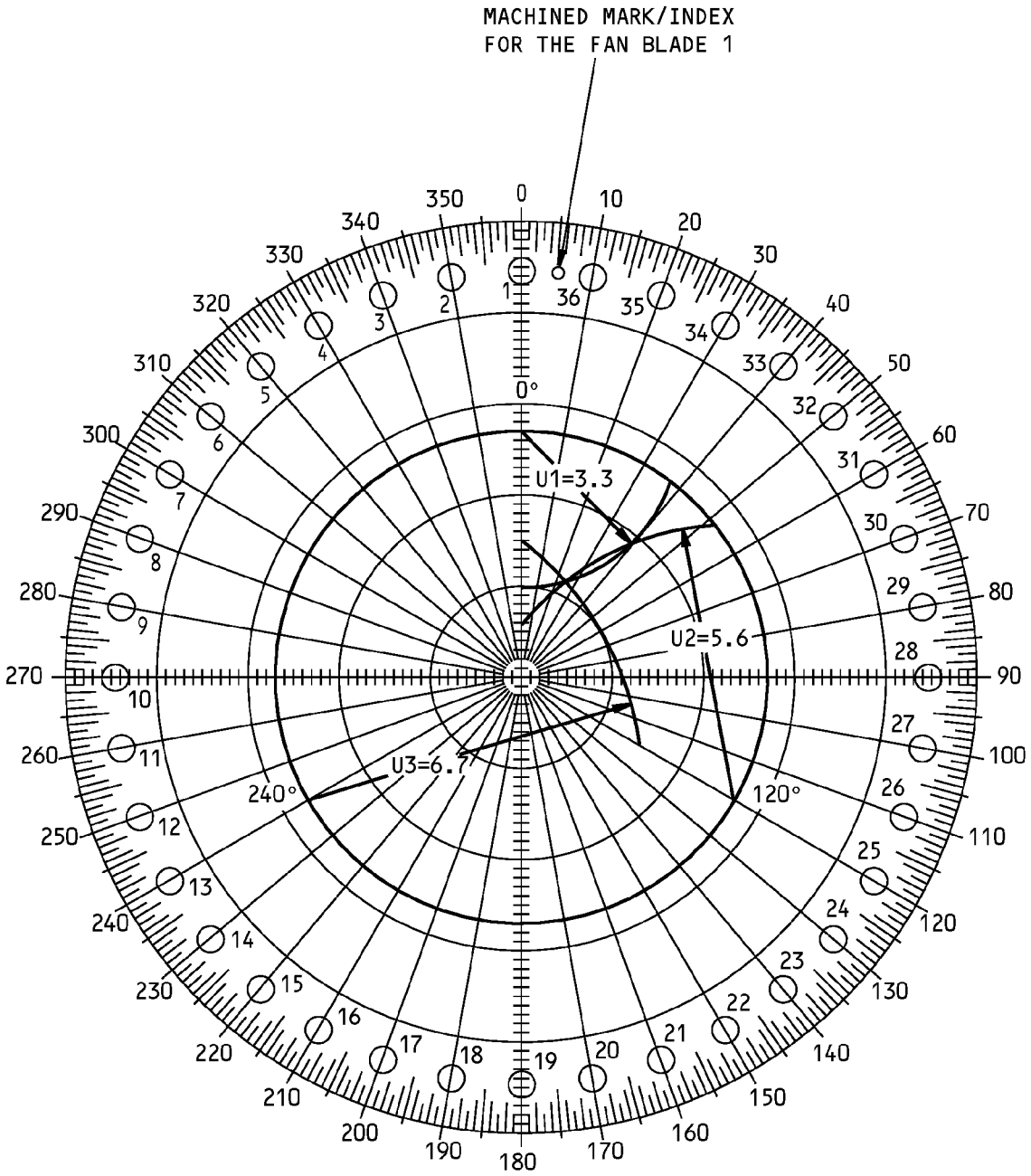
S-M56-MM-03721-00-B

Plot for the First Engine Run (Example)
Figure 512/71-00-00-990-838-F00



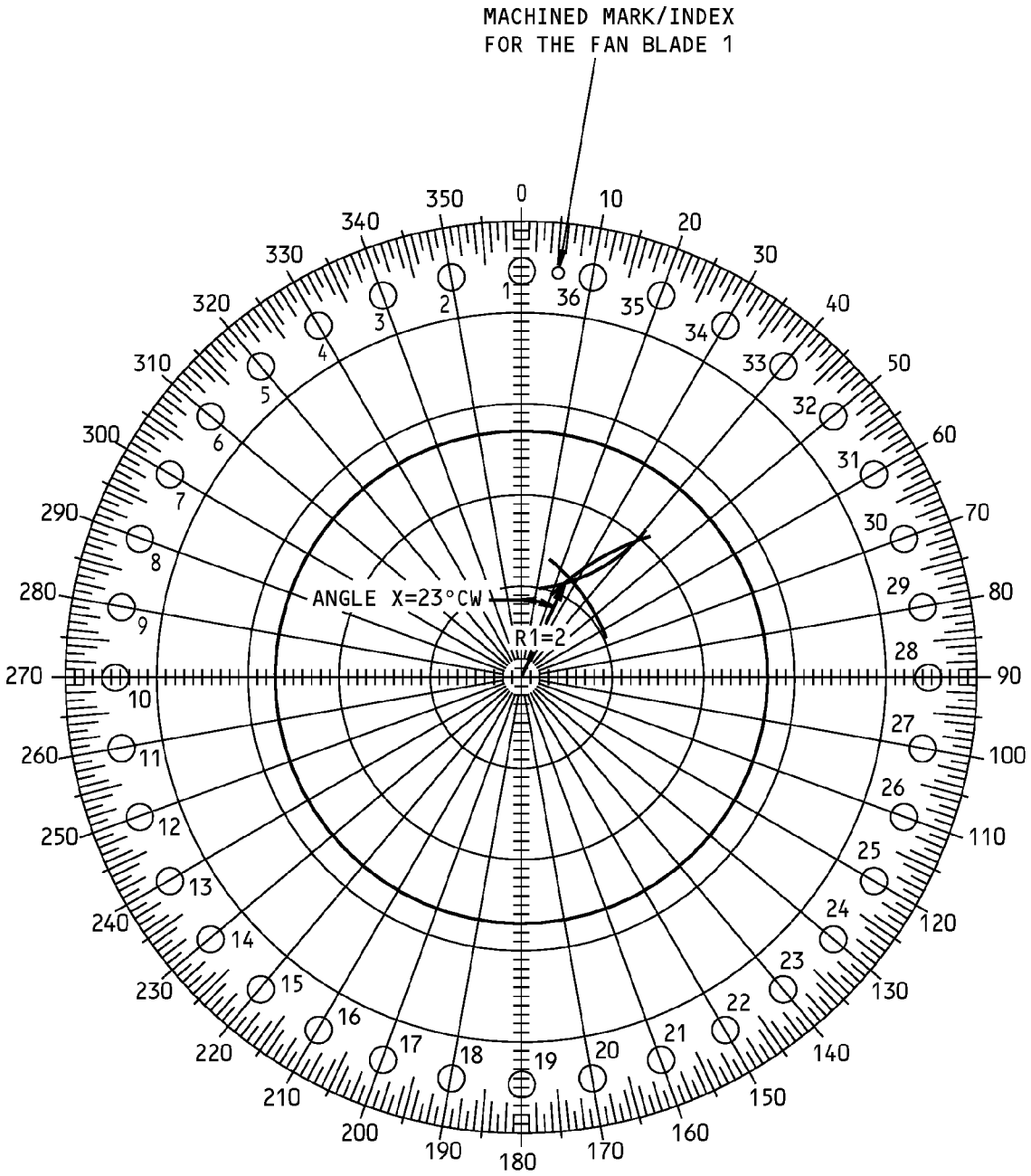
S-M56-MM-03722-00-B

Plot for the Second Engine Run (Example)
Figure 513/71-00-00-990-839-F00



S-M56-MM-03723-00-B

Plot for the Third Engine Run (Example)
Figure 514/71-00-00-990-840-F00



S-M56-MM-03724-00-B

Calculation of the Vector R
Figure 515/71-00-00-990-841-F00

VECTOR INDEX P1-P2	VECTOR LENGTH (G-CM)	VECTOR SENSITIVITY			AMPLITUDE (U) LENGTH P1-P2 / SP1+SP2 (MILS DA)	DISTANCE FROM P1 dP1= U x SP1 (G-CM)
		SENSIT SP1	SENSIT SP2	SP1+SP2		
A B						
A C						
A D						
A E						
A F						
B C						
B D						
B E						
B F						
C D						
C E						
C F						
D E						
D F						
E F						

S-M56-MM-03725-00-B

VECTOR	IMBALANCE WEIGHT (G-CM)	PHASE ANGLE A7
W7		

One Shot Initial Engine Run - Maximum Result Worksheet
Figure 516/71-00-00-990-842-F00

CALCULATED PHASE ANGLE (A)	LOCATION TO PUT THE CORRECTION WEIGHTS	CALCULATED PHASE ANGLE (A)	LOCATION TO PUT THE CORRECTION WEIGHTS
3–7	36–1	93–97	27–28
8–12	36	98–102	27
13–17	35–36	103–107	26–27
18–22	35	108–112	26
23–27	34–35	113–117	25–26
28–32	34	118–122	25
33–37	33–34	123–127	24–25
38–47	33	128–132	24
43–47	32–33	133–137	23–24
48–52	32	138–142	23
53–57	31–32	143–147	22–23
58–62	31	148–152	22
63–67	30–31	153–157	21–22
68–72	30	158–162	21
73–77	29–30	163–167	20–21
78–82	29	168–172	20
83–87	28–29	173–177	19–20
88–92	28	178–182	19

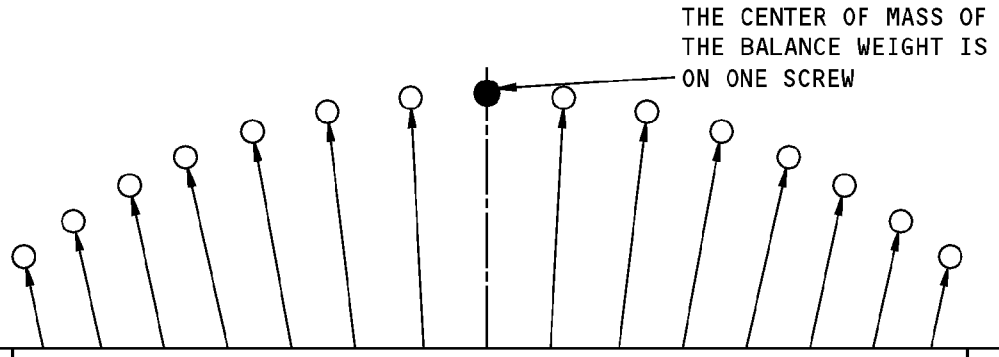
S-M56-MM-03726-00-B

Correction Weights and Their Location
Figure 517 (Sheet 1 of 2)/71-00-00-990-843-F00

CALCULATED PHASE ANGLE (A)	LOCATION TO PUT THE CORRECTION WEIGHTS	CALCULATED PHASE ANGLE (A)	LOCATION TO PUT THE CORRECTION WEIGHTS
182–187	18–19	273–277	9–10
188–192	18	278–282	9
193–197	17–18	283–287	8–9
198–202	17	288–292	8
203–207	16–17	293–297	7–8
208–212	16	298–302	7
213–217	15–16	303–307	6–7
218–222	15	308–312	6
223–227	14–15	313–317	5–6
228–232	14	318–322	5
233–237	13–14	323–327	4–5
238–242	13	328–332	4
243–247	12–13	333–337	3–4
248–252	12	338–342	3
253–257	11–12	343–347	2–3
258–262	11	348–352	2
263–267	10–11	353–357	1–2
268–272	10	358–2	1

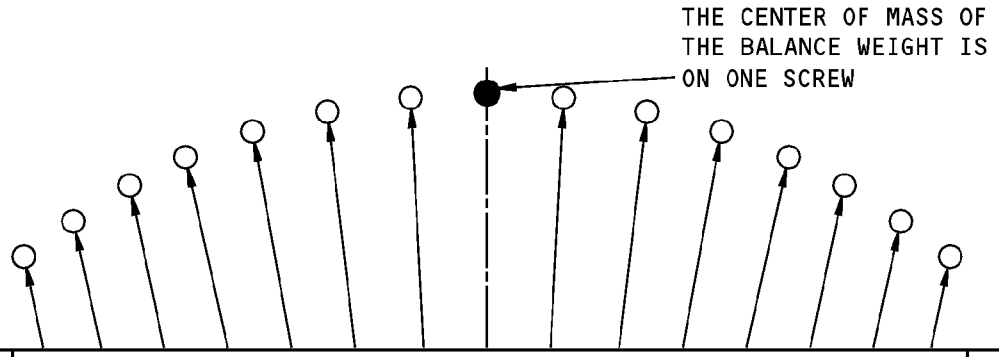
S-M56-MM-03727-00-B

Correction Weights and Their Location
Figure 517 (Sheet 2 of 2)/71-00-00-990-843-F00



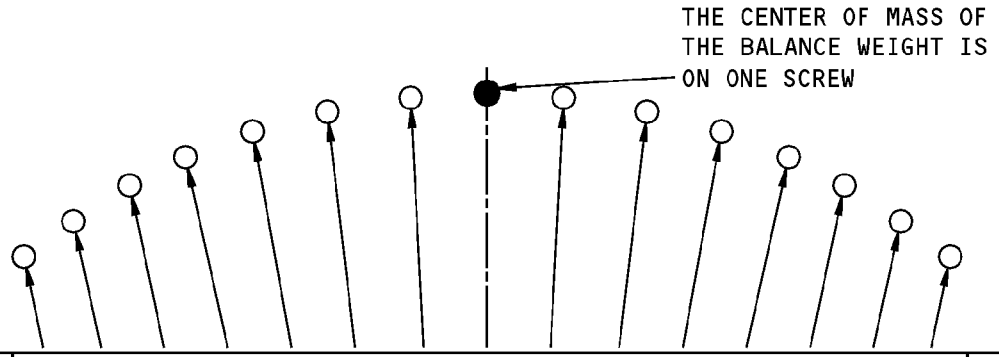
TARGET BALANCE WEIGHT GRAM-CM	SCREW TYPE 7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	SCREW QUANTITY
44	P01														P01	2
65								P01								1
65		P01												P01		2
84			P01										P01			2
86	P02														P02	2
100				P01								P01				2
113					P01						P01					2
122						P01				P01						2
125	P03														P03	2
126								P02								1
126		P02												P02		2
128							P01		P01							2
157	P01				P01						P01				P01	4
162			P02										P02			2
162	P04														P04	2
178					P01			P01			P01					3
183								P03								1
183		P03												P03		2

Balance Weights with the Center of Mass on One Screw
Figure 518 (Sheet 1 of 9)/71-00-00-990-844-F00



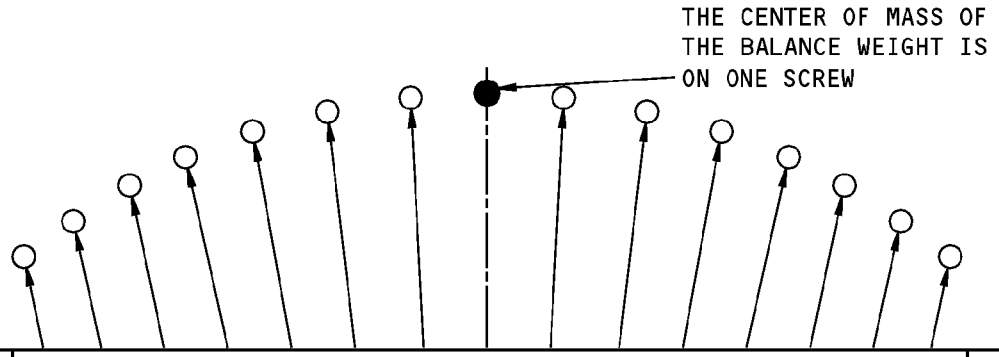
TARGET BALANCE WEIGHT GRAM-CM	SCREW TYPE 7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	SCREW QUANTITY
192	P05														P05	2
193				P02								P02				2
212	P02							P02							P02	3
218					P02						P02					2
218	P06														P06	2
227	P01							P03							P01	3
235			P03										P03			2
237						P02				P02						2
237.5								P04								1
237.5		P04												P04		2
248							P02		P02							2
248		P01						P03						P01		3
267			P01					P03					P01			3
280								P05								1
280				P03								P03				2
280		P05												P05		2
288			P02					P02					P02			3
305			P04										P04			2

Balance Weights with the Center of Mass on One Screw
Figure 518 (Sheet 2 of 9)/71-00-00-990-844-F00



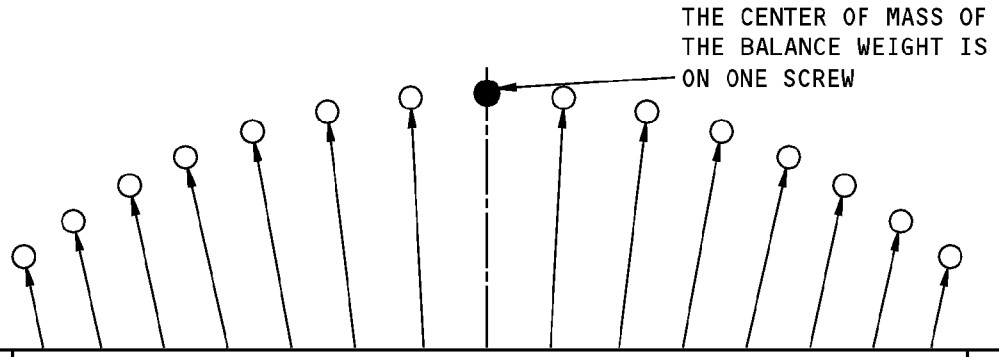
TARGET BALANCE WEIGHT GRAM-CM	SCREW TYPE 7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	SCREW QUANTITY
305						P01		P03		P01						3
317					P03						P03					2
319								P06								1
319		P06												P06		2
324	P01			P03								P03			P01	4
344						P03				P03						2
360							P03		P03							2
360			P05										P05			2
364				P04								P04				2
374							P02	P02	P02							3
382					P03			P01			P03					3
401					P02			P03			P02					3
408							P01	P05	P01							3
410			P06										P06			2
411					P04						P04					2
420						P02		P03		P02						3
430				P05								P05				2
439					P03	P01				P01	P03					4

Balance Weights with the Center of Mass on One Screw
Figure 518 (Sheet 3 of 9)/71-00-00-990-844-F00



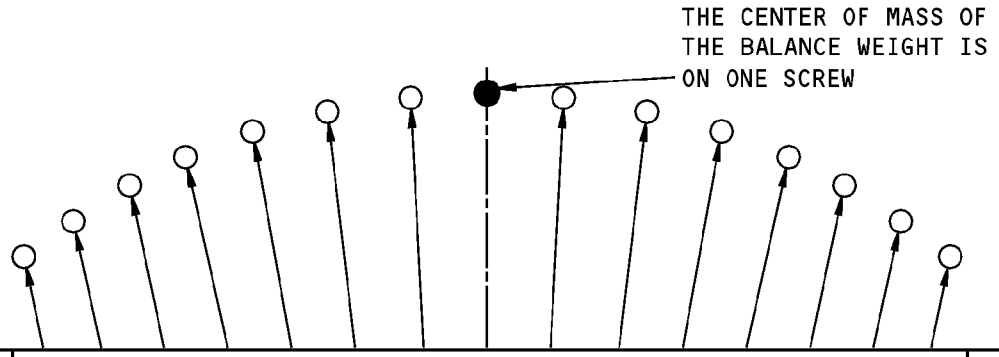
TARGET BALANCE WEIGHT GRAM-CM	SCREW TYPE 7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	SCREW QUANTITY
441						P01		P06		P01						3
446						P04				P04						2
468							P04		P04							2
472.5			P03					P04					P03			3
481			P02					P06					P02			3
485					P05						P05					2
485.5							P02	P04	P02							3
489				P06								P06				2
526						P05				P05						2
528							P02	P05	P02							3
547				P04				P03				P04				3
551							P05		P05							2
553					P06						P06					2
554			P03					P06					P03			3
592						P03	P02		P02	P03						4
597							P02	P06	P02							3
600						P06				P06						2
601.5				P04				P04				P04				3

Balance Weights with the Center of Mass on One Screw
Figure 518 (Sheet 4 of 9)/71-00-00-990-844-F00



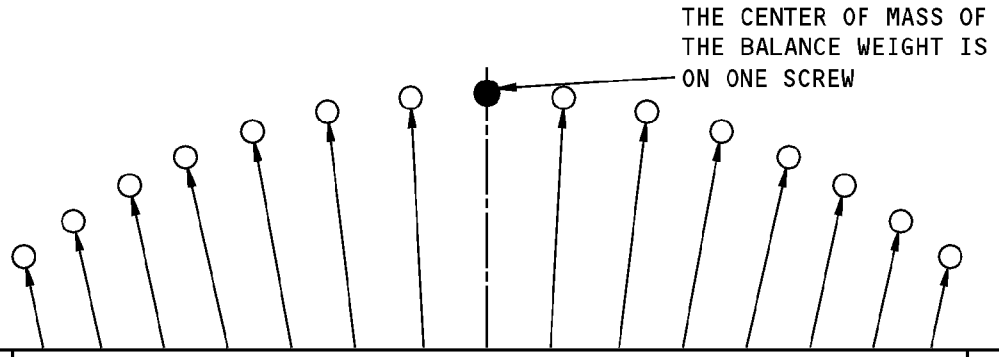
TARGET BALANCE WEIGHT GRAM-CM	SCREW TYPE															SCREW QUANTITY
	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	
602	P05		P06										P06		P05	4
628							P06		P06							2
640							P03	P05	P03							3
652						P05		P02		P05						3
681			P03			P04				P04			P03			4
691					P04			P05			P04					3
705.5							P04	P04	P04							3
709						P05		P03		P05						3
715			P02		P06						P06		P02			4
737				P06			P02		P02			P06				4
748							P04	P05	P04							3
763.5						P05		P04		P05						3
774			P06	P04								P04	P06			4
810				P04		P04				P04		P04				4
811							P06	P03	P06							3
832				P04			P04		P04			P04				4
843					P03	P05				P05	P03					4
845						P05		P06		P05						3

Balance Weights with the Center of Mass on One Screw
Figure 518 (Sheet 5 of 9)/71-00-00-990-844-F00



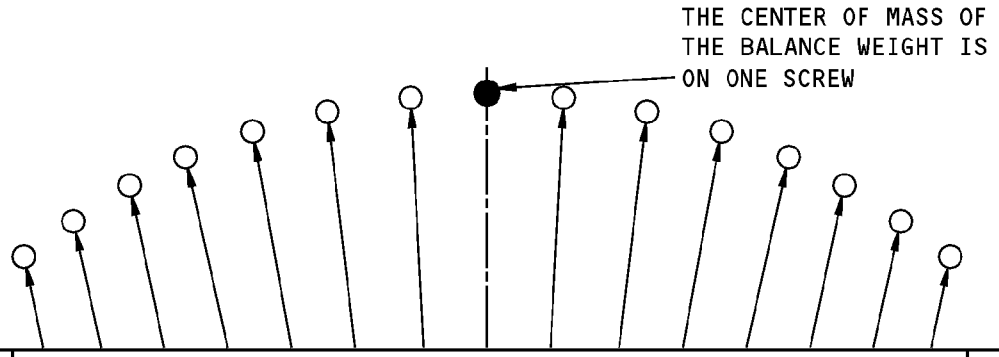
TARGET BALANCE WEIGHT GRAM-CM	SCREW TYPE															SCREW QUANTITY
	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	
865						P02	P06		P06	P02						4
870							P05	P06	P05							3
880				P03		P06				P06		P03				4
913			P05		P06						P06		P05			4
915				P04			P05		P05			P04				4
933			P04				P06		P06				P04			4
947							P06	P06	P06							3
960						P06	P03		P03	P06						4
981				P05			P05		P05			P05				4
992				P04			P06		P06			P04				4
1011					P04	P06				P06	P04					4
1036					P05		P05		P05		P05					4
1045				P06		P02		P06		P02		P06				5
1048						P02	P06	P03	P06	P02						5
1082					P03	P04		P06		P04	P03					5
1093						P05	P02	P06	P02	P05						5
1107.5		P04					P05	P06	P05					P04		5
1109	P04						P06	P06	P06						P04	5

Balance Weights with the Center of Mass on One Screw
Figure 518 (Sheet 6 of 9)/71-00-00-990-844-F00



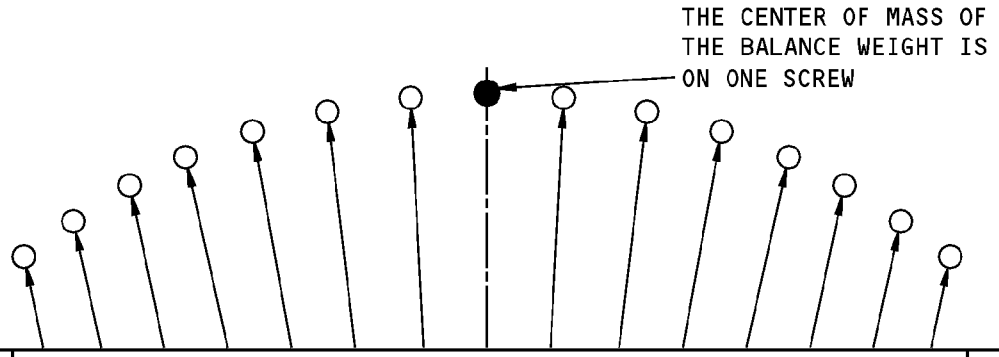
TARGET BALANCE WEIGHT GRAM-CM	SCREW TYPE															SCREW QUANTITY
	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	
1125						P04	P03	P06	P03	P04						5
1130		P03					P06	P06	P06					P03		5
1175						P03	P05	P05	P05	P03						5
1175			P06			P04		P06		P04			P06			5
1184.5		P04					P06	P06	P06					P04		5
1199		P05				P06		P06		P06				P05		5
1205						P05	P03	P06	P03	P05						5
1234				P05	P05			P06			P05	P05				5
1240						P06	P03	P06	P03	P06						5
1261				P05			P05	P05	P05			P05				5
1264					P03		P06	P06	P06		P03					5
1266		P06					P06	P06	P06					P06		5
1279						P06	P03	P06	P03	P06						5
1290			P06			P06		P05		P06			P06			5
1320				P06			P05	P05	P05			P06				5
1340					P06		P04	P06	P04		P06					5
1349				P05		P06		P06		P06		P05				5
1357						P05	P05	P05	P05	P05						5

Balance Weights with the Center of Mass on One Screw
Figure 518 (Sheet 7 of 9)/71-00-00-990-844-F00



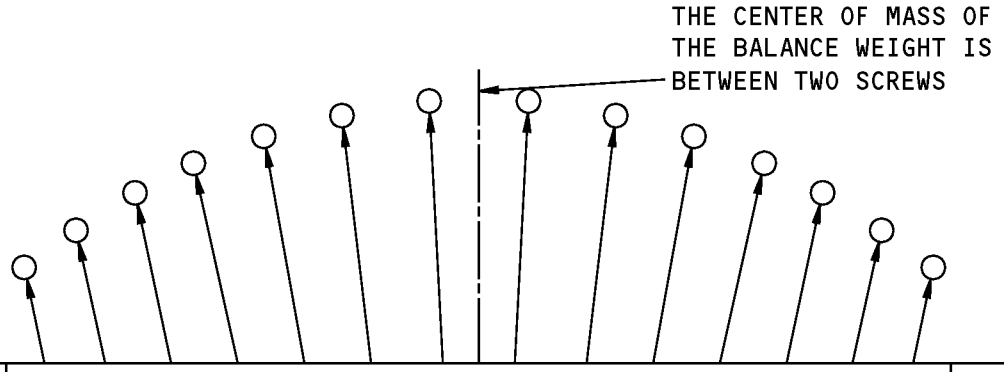
TARGET BALANCE WEIGHT GRAM-CM	SCREW TYPE 7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	SCREW QUANTITY
1357			P06				P06	P06	P06				P06			5
1393						P04	P06	P06	P06	P04						5
1404					P05	P06		P06		P06	P05					5
1423					P06		P05	P06	P05		P06					5
1431						P06	P05	P05	P05	P06						5
1463			P02	P05			P05	P06	P05			P05	P02			7
1470			P04		P02		P06	P06	P06		P02		P04			7
1508						P06	P06	P05	P06	P06						5
1547						P06	P06	P06	P06	P06						5
1688					P04	P04	P05	P05	P05	P04	P04					7
1727					P04	P04	P05	P06	P05	P04	P04					7
1748					P03	P06	P05	P05	P05	P06	P03					7
1842					P05	P05	P05	P05	P05	P05	P05					7
1881					P04	P06	P05	P06	P05	P06	P04					7
1910					P06	P05	P05	P05	P05	P05	P06					7
2032					P05	P06	P06	P06	P06	P06	P05					7
2100					P06	P06	P06	P06	P06	P06	P06					7
2216				P05	P06	P04	P04	P06	P04	P04	P06	P05				7

Balance Weights with the Center of Mass on One Screw
Figure 518 (Sheet 8 of 9)/71-00-00-990-844-F00



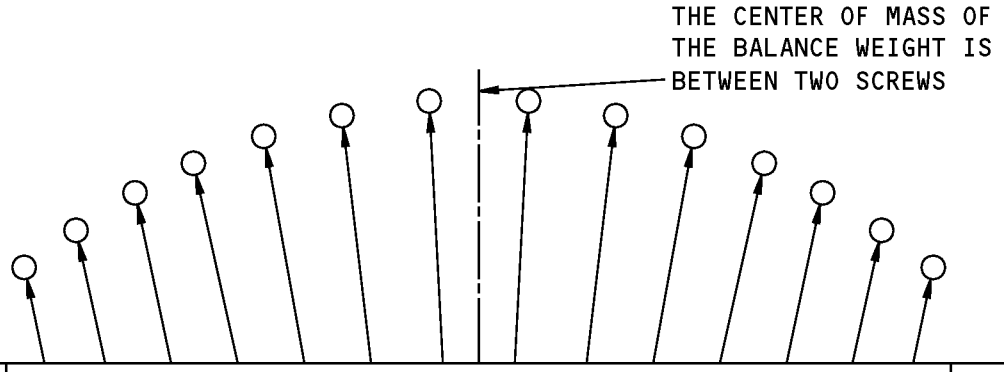
TARGET BALANCE WEIGHT GRAM-CM	SCREW TYPE															SCREW QUANTITY
	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	
2254				P06	P02	P06	P06	P06	P06	P06	P02	P06				9
2333				P06	P06	P03	P06	P06	P06	P03	P06	P06				9
2396				P06	P06	P06	P06	P02	P06	P06	P06	P06				9
2453				P06	P06	P06	P06	P03	P06	P06	P06	P06				9
2507.5				P06	P06	P06	P06	P04	P06	P06	P06	P06				9
2550				P06	P06	P06	P06	P05	P06	P06	P06	P06				9
2589				P06	P06	P06	P06	P06	P06	P06	P06	P06				9
2701			P04	P06	P06	P06	P06	P02	P06	P06	P06	P06	P04			11
2806			P06	P06	P06	P06	P06	P02	P06	P06	P06	P06	P06			11
2910			P05	P06	P06	P06	P06	P05	P06	P06	P06	P06	P05			11
2999			P06	P06	P06	P06	P06	P06	P06	P06	P06	P06	P06			11
3100.5		P04	P06	P06	P06	P06	P06	P03	P06	P06	P06	P06	P06	P04		13
3197.5		P04	P06	P06	P06	P06	P06	P05	P06	P06	P06	P06	P06	P04		13
3318		P06	P06	P06	P06	P06	P06	P06	P06	P06	P06	P06	P06	P06		13
3400	P06	P06	P06	P06	P06	P06	P06	P03	P06	P06	P06	P06	P06	P06	P06	15
3497	P06	P06	P06	P06	P06	P06	P06	P05	P06	P06	P06	P06	P06	P06	P06	15

Balance Weights with the Center of Mass on One Screw
Figure 518 (Sheet 9 of 9)/71-00-00-990-844-F00



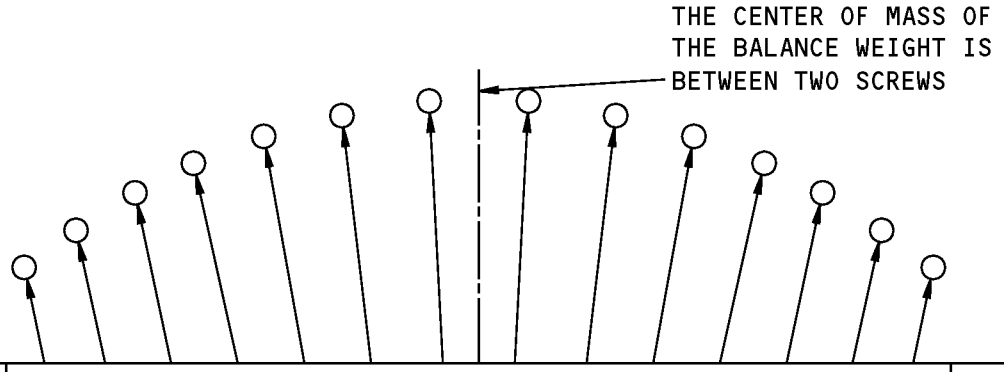
TARGET BALANCE WEIGHT GRAM-CM	SCREW TYPE 7	6	5	4	3	2	1	1	2	3	4	5	6	7	SCREW QUANTITY
55	P01													P01	2
75		P01											P01		2
92			P01									P01			2
106				P01							P01				2
106	P02													P02	2
118					P01					P01					2
126						P01			P01						2
130							P01	P01							2
145		P02											P02		2
156	P03													P03	2
173	P01				P01					P01				P01	4
178			P02									P02			2
190							P01	P02							2
193		P01			P01					P01			P01		4
201	P04													P04	2
206				P02							P02				2
211		P03											P03		2
229					P02					P02					2

Balance Weights with the Center of Mass between Two Screws
Figure 519 (Sheet 1 of 9)/71-00-00-990-845-F00



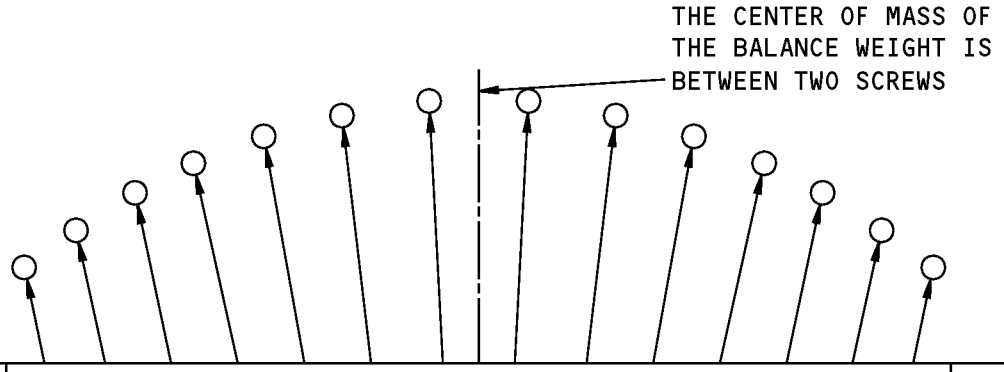
TARGET BALANCE WEIGHT GRAM-CM	SCREW TYPE 7	6	5	4	3	2	1	1	2	3	4	5	6	7	SCREW QUANTITY
237	P05													P05	2
244						P02			P02						2
251							P02	P02							2
260			P03									P03			2
270	P06													P06	2
271		P02				P01			P01				P02		4
272		P04											P04		2
301				P03							P03				2
308			P02				P01	P01				P02			4
309							P02	P03							2
321		P05											P05		2
326		P01					P02	P02					P01		4
334					P03					P03					2
336			P04									P04			2
343			P01				P02	P02				P01			4
355						P03			P03						2
366			P03	P01							P01	P03			4
367							P03	P03							2
367		P06											P06		2

Balance Weights with the Center of Mass between Two Screws
Figure 519 (Sheet 2 of 9)/71-00-00-990-845-F00



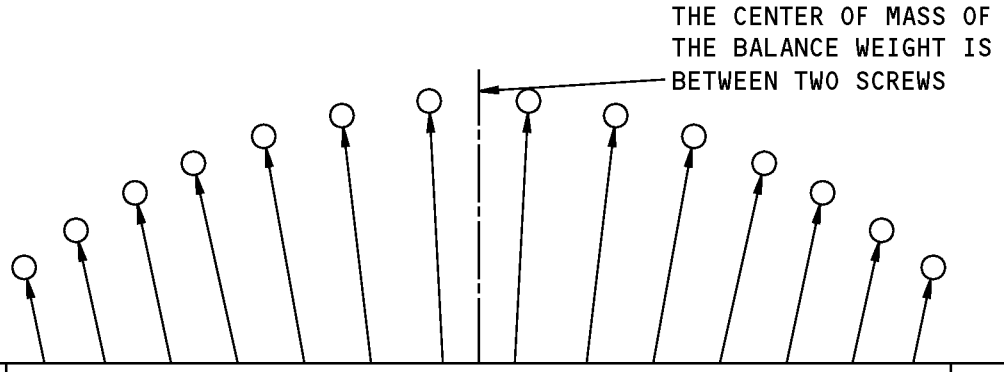
TARGET BALANCE WEIGHT GRAM-CM	SCREW TYPE 7	6	5	4	3	2	1	1	2	3	4	5	6	7	SCREW QUANTITY
384			P02	P02							P02	P02			4
389				P04							P04				2
396			P05									P05			2
405		P02	P03									P03	P02		4
420							P04	P03							2
422			P02			P02			P02			P02			4
430					P04					P04					2
440				P01	P03					P03	P01				4
453			P06									P06			2
459						P04			P04						2
459				P05							P05				2
461				P01		P03			P03		P01				4
473							P04	P04							2
500				P01		P03			P03		P01				4
502	P02		P05									P05		P02	4
508					P05					P05					2
516							P04	P05							2
524				P06							P06				2

Balance Weights with the Center of Mass between Two Screws
Figure 519 (Sheet 3 of 9)/71-00-00-990-845-F00



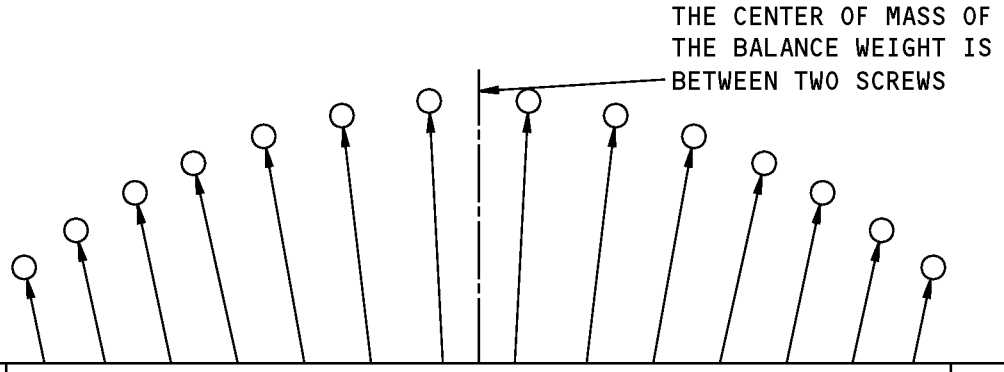
TARGET BALANCE WEIGHT GRAM-CM	SCREW TYPE 7	6	5	4	3	2	1	1	2	3	4	5	6	7	SCREW QUANTITY
532		P04	P03									P03	P04		4
541						P05			P05						2
548							P04	P04							2
558							P05	P05							2
580					P06					P06					2
596					P02		P03	P03		P02					4
597							P05	P06							2
619						P06			P06						2
627		P04				P03			P03				P04		4
638							P06	P06							2
660	P04					P04			P04					P04	4
689					P03	P03			P03	P03					4
702					P02		P04	P04		P02					4
713		P01					P06	P06					P01		4
717						P02	P04	P04	P02						4
723				P04	P03					P03	P04				4
747				P02		P05			P05		P02				4
768			P03		P05					P05		P03			4

Balance Weights with the Center of Mass between Two Screws
Figure 519 (Sheet 4 of 9)/71-00-00-990-845-F00



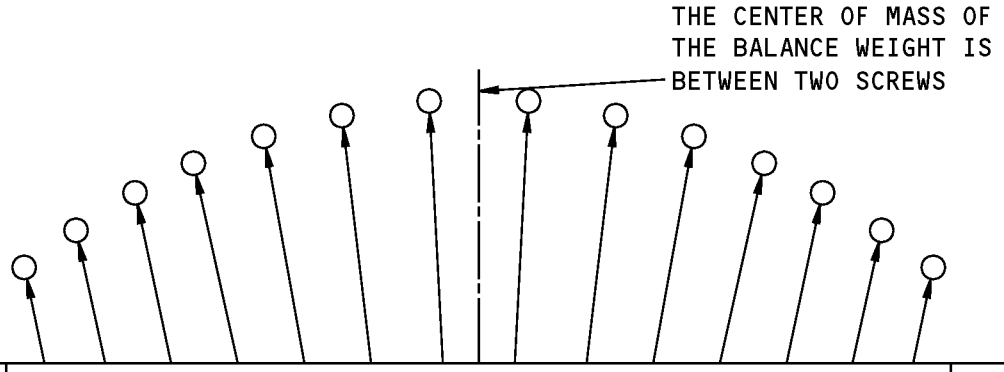
TARGET BALANCE WEIGHT GRAM-CM	SCREW TYPE 7	6	5	4	3	2	1	1	2	3	4	5	6	7	SCREW QUANTITY
787					P02		P05	P05		P02					4
791		P03			P06					P06			P03		4
792						P05	P02	P02	P05						4
820			P06				P03	P03				P06			4
826						P04	P03	P03	P04						4
848				P04		P04			P04		P04				4
848					P02	P06			P06	P02					4
867					P02		P06	P06		P02					4
870						P06	P02	P02	P06						4
882						P02	P06	P06	P02						4
889	P06					P06			P06					P06	4
891				P06			P03	P03			P06				4
926			P06				P04	P04				P06			4
932						P04	P04	P04	P04						4
947					P06		P03	P03		P06					4
971					P04	P05			P05	P04					4
988					P04		P05	P05		P04					4
1011		P06					P05	P05					P06		4

Balance Weights with the Center of Mass between Two Screws
Figure 519 (Sheet 5 of 9)/71-00-00-990-845-F00



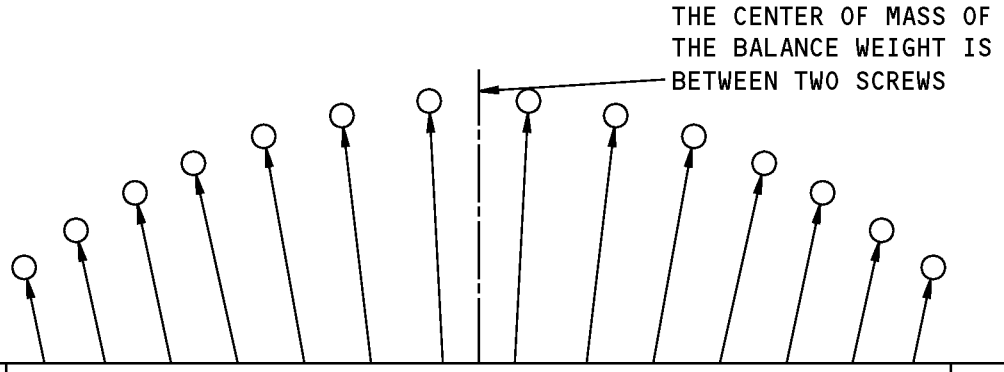
TARGET BALANCE WEIGHT GRAM-CM	SCREW TYPE 7	6	5	4	3	2	1	1	2	3	4	5	6	7	SCREW QUANTITY
1014						P05	P04	P04	P05						4
1017						P04	P05	P05	P04						4
1053					P06		P04	P04		P06					4
1067			P03		P03		P04	P04		P03		P03			6
1068					P04		P06	P06		P04					4
1077		P02				P04	P04	P04	P04				P02		6
1082				P06			P05	P05			P06				4
1099						P05	P05	P05	P05						4
1126		P02			P05		P04	P04		P05			P02		6
1138					P06		P05	P05		P06					4
1143				P06		P06			P06		P06				4
1162					P03	P03	P04	P04	P03	P03					6
1162				P06			P06	P06			P06				4
1179						P05	P06	P06	P05						4
1199					P06	P06			P06	P06					4
1220				P02		P05	P04	P04	P05		P02				6
1244		P04			P03		P06	P06		P03			P04		6
1257						P06	P06	P06	P06						4

Balance Weights with the Center of Mass between Two Screws
Figure 519 (Sheet 6 of 9)/71-00-00-990-845-F00



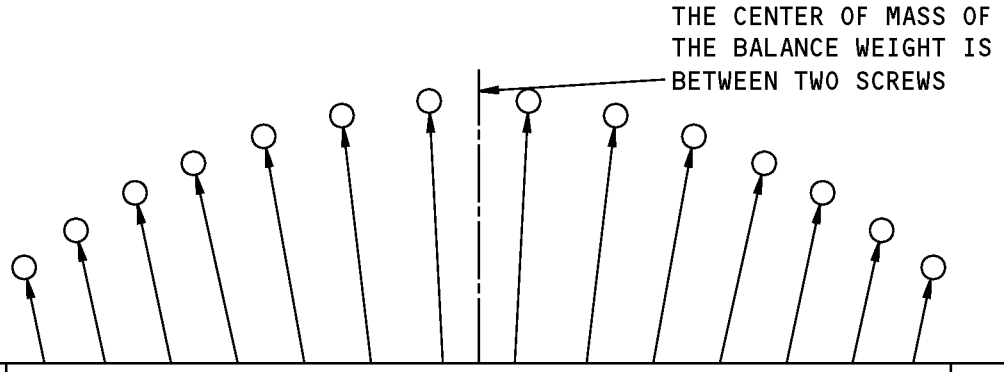
TARGET BALANCE WEIGHT GRAM-CM	SCREW TYPE 7	6	5	4	3	2	1	1	2	3	4	5	6	7	SCREW QUANTITY
1279		P03			P04		P06	P06		P04			P03		6
1305				P02		P05	P05	P05	P05		P02				6
1314		P06		P04			P05	P05			P04		P06		6
1320			P06		P02		P06	P06		P02		P06			6
1320			P03			P04	P06	P06	P04			P03			6
1329					P06	P06	P01	P01	P06	P06					6
1349			P01			P06	P06	P06	P06			P01			6
1400				P03		P05	P05	P05	P05		P03				6
1406					P02	P06	P05	P05	P06	P02					6
1416					P05	P05	P03	P03	P05	P05					6
1428			P04			P06	P04	P04	P06			P04			6
1445			P05		P05	P05			P05	P05		P05			6
1450					P06	P06	P02	P02	P06	P06					6
1457			P04		P06	P05			P05	P06		P04			6
1463				P02		P06	P06	P06	P06		P02				6
1527					P04	P04	P06	P06	P04	P04					6
1597					P06	P04	P05	P05	P04	P06					6
1672					P06	P06	P04	P04	P06	P06					6

Balance Weights with the Center of Mass between Two Screws
Figure 519 (Sheet 7 of 9)/71-00-00-990-845-F00



TARGET BALANCE WEIGHT GRAM-CM	SCREW TYPE 7	6	5	4	3	2	1	1	2	3	4	5	6	7	SCREW QUANTITY
1761				P04	P06	P05	P02	P02	P05	P06	P04				8
1831				P05	P06	P05	P02	P02	P05	P06	P05				8
1908				P03	P04	P06	P05	P05	P06	P04	P03				8
1981				P05	P05	P05	P04	P04	P05	P05	P05				8
1988				P03	P04	P06	P06	P06	P06	P04	P03				8
2066				P05	P04	P06	P05	P05	P06	P04	P05				8
2129				P06	P04	P05	P06	P05	P05	P04	P06				8
2131				P06	P04	P06	P05	P05	P06	P04	P06				8
2281				P06	P06	P06	P05	P05	P06	P06	P06				8
2361			P06	P03	P04	P06	P05	P05	P06	P04	P03	P06			10
2441			P06	P03	P04	P06	P06	P06	P06	P04	P03	P06			10
2519			P06	P05	P04	P06	P05	P05	P06	P04	P05	P06			10
2584			P06	P06	P04	P06	P05	P05	P06	P04	P06	P06			10
2692			P05	P05	P06	P06	P06	P06	P06	P06	P05	P05			10
2814			P06	P06	P06	P06	P06	P06	P06	P06	P06	P06			10
2907		P06	P05	P05	P05	P06	P05	P05	P06	P05	P05	P05	P06		12
3013		P05	P05	P05	P06	P06	P06	P06	P06	P06	P05	P05	P05		12
3101		P06	P06	P06	P06	P06	P05	P05	P06	P06	P06	P06	P06		12

Balance Weights with the Center of Mass between Two Screws
Figure 519 (Sheet 8 of 9)/71-00-00-990-845-F00



TARGET BALANCE WEIGHT GRAM-CM	SCREW TYPE														SCREW QUANTITY
	7	6	5	4	3	2	1	1	2	3	4	5	6	7	
3181		P06	P06	P06	P06	P06	P06	P06	P06	P06	P06	P06	P06		12
3301	P06	P06	P06	P06	P04	P06	P06	P06	P06	P04	P06	P06	P06	P06	14
3405	P06	P05	P06	P06	P06	P06	P06	P06	P06	P06	P06	P06	P05	P06	14
3451	P06	P06	P06	P06	P06	P06	P06	P06	P06	P06	P06	P06	P06	P06	14

Balance Weights with the Center of Mass between Two Screws
Figure 519 (Sheet 9 of 9)/71-00-00-990-845-F00

HAP 023-026, 028-054, 101-999; HAP 001-013, 015-022 POST SB 737-77-1056 OR POST SB 737-77-1069

TASK 71-00-00-750-803-F00

15. Test 14B - Fan Trim Balance (On Board Procedure - Vibro-meter AVM S360N021-113, S360N021-114, and Universal AVM S362A001-1)

A. General

(1) This trim balance procedure is done for these conditions:

(a) To decrease the fan or LPT vibration levels when they are equal to or more than 8 mils DA (double amplitude).

(b) When, after the replacement or the repair of a fan blade, the correction is more than 236 gram-inches (600 g-cm).

(2) The trim balance procedures should decrease the vibration levels of the fan and the LPT to less than 4.0 units on the airborne vibration monitor (AVM) during a ground operation at all engine operation speeds.

(3) This trim balance procedure uses the imbalance data recorded and calculated by the AVM during the last six flights from the No. 1 bearing and the FFCC (Fan Frame Compressor Case) vibration sensors.

(4) You can get this data from the front panel display of the AVM:

(a) The current imbalance data

(b) The current configuration of the balance weights and their installed locations (fan)

(c) The results of a calculation of a 1-plane balance (fan only)

(d) Also, you can enter the new weight values (if they have changed) for the fan.

(5) When an engine is installed on the wing, after an overhaul or after a replacement of a significant number of fan blades, it is recommended that you first do a vibration survey Test 7 - Vibration Survey, TASK 71-00-00-700-814-F00.

(a) If the result of this vibration survey is not satisfactory, you can do this procedure to balance the engine:

1) You can also do one of the other Fan Trim Balance procedures, or

2) Do a 3-shot plot trim balance procedure to decrease the engine vibration level Test 14A - Fan Trim Balance (Three Shot Plot Procedure), TASK 71-00-00-750-802-F00 .

B. Tools/Equipment

Reference	Description
STD-585	Mat - Protective, 3/8 Inch Minimum Thickness, Minimum 42x60 Inches (1x1.5 meters) with Warning Streamers

C. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
G02061	Marker - Permanent, Felt Tip Pen	

D. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right

HAP 023-026, 028-054, 101-999; HAP 001-013, 015-022 POST SB 737-77-1056 OR POST SB 737-77-1069 (Continued)

(Continued)

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

E. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door

F. Prepare for the Trim Balance Procedure

SUBTASK 71-00-00-860-170-F00

(1) Do this step:

Make sure that this circuit breaker is closed:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
A	2	C01076	ENGINE VIB MON

SUBTASK 71-00-00-010-025-F00

(2) Do this step:

Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 71-00-00-210-050-F01

(3) It is recommended to do a check of the balance weights installed on the engine and stored in the AVM.

(a) Record the balance weights installed on the engine.

(b) Use the Trim Balance Procedure to see the balance screw data in the AVM.

1) If it is necessary, change the balance weights in the the AVM to agree with the installed weights on the engine.

HAP 023-026, 028-054, 107-999; HAP 001-013, 015-022 POST SB 737-77-1056 OR POST SB 737-77-1069; HAP 101-106 POST SB 737-77-1069; AIRPLANES WITH S362A001 AVM

G. Trim Balance Procedure

SUBTASK 71-00-00-970-070-F00

(1) Follow these steps to get to the fan balancing menu on the AVM front panel:

(a) Push and release one of the four buttons to show SELF TEST? on the front panel display.

1) Refer to (Figure 522 or Figure 523 or Figure 524) to look at the AVM Balance Menu and do the balance procedure.

(b) Push and release the NO button three times until the BALANCE? option shows.

(c) Push and release the YES button to go to the balance menu.

(d) Push and release the YES button. This causes the BALANCE ENGINE 1? screen to show.

(e) To get the balance data for engine 1, push and release the YES button. This causes the IMBAL DATA READ? screen to show.

(f) To get the balance data for engine 2, do these steps:

1) Push and release the NO button. This causes the BALANCE ENGINE 2? screen to show.

2) Push and release the YES button. This causes the IMBAL DATA READ? screen to show.

SUBTASK 71-00-00-970-071-F00

(2) If you must look at historical balance data for other flights or trim balance runs, do these steps to go into the IMBAL DATA READ? menu to read the balance data:

NOTE: This menu item is not necessary for the trim balance calculation. This menu only shows the balance history for the last 6 flights or trim balance runs.

(a) Push and release the YES button. This causes the X FLIGHTS DISPLAY? screen to show.

NOTE: The X refers to the total number of flights in memory, and can be 1 through 6. If NO IMBAL DATA shows, there is no stored balance data in the AVM. If you push and release the NO button, the WEIGHTS CONFIG? screen will show.

(b) Push and release the YES button. This causes the FLIGHT X? screen to show.

NOTE: The X refers to the flight number, and can be 0 through 5, where 0 is the last flight. Use the UP and DOWN ARROW buttons to make a selection of the flight that you want to see the imbalance history on.

NOTE: Use only flight data recorded by this AVM unit while installed on this airplane.

(c) Push and release the YES button. The screen that shows gives the highest imbalance data for the selected flight that was recorded (Table 516).

NOTE: The definitions of the screen are given below.

NOTE: Use the UP and DOWN ARROW buttons to get one of the five other highest imbalance histories that was recorded during each flight.

HAP 023-026, 028-054, 107-999; HAP 001-013, 015-022 POST SB 737-77-1056 OR POST SB 737-77-1069; HAP 101-106 POST SB 737-77-1069

Table 516/71-00-00-993-884-F00

AVM Front Panel Display
E x x x . x %
n . n n / y y y
m . m m / z z z

HAP 023-026, 028-054, 107-999; HAP 001-013, 015-022 POST SB 737-77-1056 OR POST SB 737-77-1069; HAP 101-106 POST SB 737-77-1069; AIRPLANES WITH S362A001 AVM

1) Ex - Engine number

2) xx.x - N1 rotor speed in percent

3) n.nn - the fan displacement in mils DA

4) m.mm - the LPT displacement in mils DA

5) yyy - the phase angle for the fan in degrees

6) zzz - the phase angle for the LPT in degrees.

SUBTASK 71-00-00-860-200-F00

(3) If NO IMBAL DATA screen shows (no stored AVM data), you can do these steps to get the imbalance data:

(a) Do this task: Test 7 - Vibration Survey, TASK 71-00-00-700-814-F00.

1) Make sure to use the alternate acceleration procedure to get the imbalance data.

2) Pause for 1-2 minutes at each of the speed ranges shown.

SUBTASK 71-00-00-970-072-F00

(4) If it is necessary to read or change the balance screw data, do these steps to go into the WEIGHTS CONFIG? menu (Figure 520):

NOTE: This menu item is not necessary for the trim balance calculation. However, if you change the balance screw data to agree with the installed weights, then you can re-calculate new balance data. This menu item only shows the current balance weights installed. Also, if the installed weights change, you can change the balance weight data in the AVM.

(a) Use this menu to make sure the weights installed on the engine agree with the weights in the AVM memory.

1) If you can't read the part number on the balance screw, use the weight or length of the screw (Figure 507).

2) If the weights agree, then you can use the balance history to balance the fan.

(b) From the IMBAL DATA READ? screen, push and release the NO button. This causes the WEIGHTS CONFIG? screen to show.

(c) Follow these steps to read the installed balance weights that are stored in the AVM:

1) Push and release the YES button. This causes the READ ACTUAL CONFIG? screen to show.

NOTE: If you push and release the NO button, the RESET ACTUAL CONFIG? screen will show. The definition of this screen is given later.

2) Push and release the YES button. This causes the screen below to show (Table 517).

NOTE: This screen gives the imbalance weight installed at each hole. Only holes that have weight screws other than P14 are shown. The definitions of the screen are given below.

NOTE: If all holes have P14 balance screws, the Ex ALL LOC ARE P14 screen will show. P14 and P07 screws are equivalent.

HAP 023-026, 028-054, 107-999; HAP 001-013, 015-022 POST SB 737-77-1056 OR POST SB 737-77-1069; HAP 101-106 POST SB 737-77-1069; AIRPLANES WITH S362A001 AVM (Continued)

HAP 023-026, 028-054, 107-999; HAP 001-013, 015-022 POST SB 737-77-1056 OR POST SB 737-77-1069; HAP 101-106 POST SB 737-77-1069

Table 517/71-00-00-993-885-F00

AVM Front Panel Display
E x F A N
L o c x x
x x x x x x x

HAP 023-026, 028-054, 107-999; HAP 001-013, 015-022 POST SB 737-77-1056 OR POST SB 737-77-1069; HAP 101-106 POST SB 737-77-1069; AIRPLANES WITH S362A001 AVM

a) xx - the location number

b) xxxxxxxx - the actual weight configuration.

3) Use the UP and DOWN ARROW buttons to get the balance weight data at all other holes which do not have P14 screws.

NOTE: There are 36 holes on the fan spinner. P14 and P07 screws are equivalent.

(d) If you must change most of the balance screws to P14, follow these steps to reset all balance weights to P14:

1) Push and release the YES button. This causes the READ ACTUAL CONFIG? screen to show.

2) Push and release the NO button. This causes the RESET ACTUAL CONFIG? screen to show.

3) Push and release the YES button. This causes the SAVE NEW CONFIG? screen to show.

4) Push and release the YES button.

NOTE: If you do not want to reset the weight configuration, push and release the NO button.

NOTE: After the NO or YES buttons are pushed and released, the MODIFY ACTUAL CONFIG? screen will show.

(e) Follow these steps to change the balance weights in the AVM:

1) Push and release the YES button. This causes the READ ACTUAL CONFIG? screen to show.

2) Push and release the NO button. This causes the RESET ACTUAL CONFIG? screen to show.

3) Push and release the NO button. This causes the MODIFY ACTUAL CONFIG? screen to show.

4) Push and release the YES button. This causes the LOC. xx yyyyyyyy MODIFY? screen to show.

NOTE: The xx is the location number and the yyyyyyy is the installed balance screw.

5) Use the UP and DOWN ARROW buttons to get the balance weight data at the location you want. There are 36 holes on the fan spinner.

6) Push and release the YES button. This causes the LOC. xx MODXXX SAVE? screen to show.

7) Use the UP and DOWN ARROW buttons to change the screw weight (MODXXX).

NOTE: The UP ARROW increases the weight and the DOWN ARROW decreases the weight.

8) Push and release the YES button to keep the new balance weight in the AVM. This causes the LOC xx yyyyyyyy MODIFY? screen for the subsequent location to show.

a) If you do not want to keep the new balance weight, push and release the NO button. This causes the LOC xx yyyyyyy MODIFY? screen for the subsequent location to show.

9) Repeat the above steps to change the other weights.

10) To exit the MODIFY ACTUAL CONFIG? menu, push and release the NO button when the LOC xx yyyyyyy MODIFY? screen shows.

SUBTASK 71-00-00-970-073-F00

(5) To go into the BALANCE 1 PLANE COMPUTE? menu to calculate a 1-plane (fan) balance solution, follow these steps:

NOTE: This menu will do a 1-plane trim balance calculation.

(a) From the IMBAL DATA READ? screen, push and release the NO button two times. This causes the BALANCE 1 PLANE COMPUTE? screen to show.

(b) Push and release the YES button. This causes the BXX GENERIC COEFFS? screen to show.

(c) Push and release the YES button. This causes the COMPUTE IN PROGRESS screen to show.

(d) When the computation is completed, X FLIGHTS DISPLAY? screen to show.

NOTE: The X refers to the total number of flights or trim balance runs in memory, and is 1 through 6.

NOTE: If NO IMBAL DATA shows, there is no stored balance data in the AVM. If you push and release the NO button twice after the NO IMBAL DATA or X FLIGHTS DISPLAY? screens, the BALANCE ENGINE 2? screen will show (if the engine 1 menu was on) or the display will go off (if the engine 2 menu was on).

1) Push and release the YES button. This causes the FLIGHT 0? screen to show.

NOTE: Use the UP and DOWN ARROW buttons to select X Flight. Use only flight data recorded on this airplane.

(e) Push and release the YES button. This causes the screen shown below to show (Table 518).

NOTE: This screen gives the imbalance solution for each flight or trim balance run. The definitions of the screen are given below.

NOTE: Use the UP and DOWN ARROW buttons to get the imbalance solutions for each of the last 6 flights or trim balance runs that was recorded in the AVM.

HAP 023-026, 028-054, 107-999; HAP 001-013, 015-022 POST SB 737-77-1056 OR POST SB 737-77-1069; HAP 101-106 POST SB 737-77-1069

Table 518/71-00-00-993-886-F00

AVM Front Panel Display
n n n n / y y y X / 6 F x ?

HAP 023-026, 028-054, 107-999; HAP 001-013, 015-022 POST SB 737-77-1056 OR POST SB 737-77-1069; HAP 101-106 POST SB 737-77-1069; AIRPLANES WITH S362A001 AVM

1) nnnn - the fan balance weight solution (in gm-cm)
2) yyy - the fan balance weight position (in degrees)
3) X/6 - the number of speed ranges with valid data (0 to 6)
4) Fx - the flight number (0 to 5, with 0 the last flight or trim balance run)

(f) Push and release the YES button. This causes the BALANCE IN PROGRESS screen to show.

NOTE: If you push and release the NO button twice, the BALANCE ENGINE 2? screen will show (if the engine 1 menu was on) or the main menu will show (if the engine 2 menu was on).

(g) After a short time, one of these four screens will show on the display. The screen that is shown depends on the solution found.

1) If the SOLUTION FOUND DISPLAY? screen shows, there is a balance solution to balance the fan.
2) If the WEIGHT LIMIT EXCEEDED screen shows, the balance solution value calculated is too large to install on the fan.

NOTE: To exit this menu, push and release the NO button twice. The BALANCE ENGINE 2? screen will show (if the engine 1 menu was on) or the main menu will show (if the engine 2 menu was on).

3) If the NO CHANGE REQUIRED screen shows, the balance solution that is currently installed is satisfactory

NOTE: To exit this menu, push and release the NO button. The BAL FOR ENGINE 2? screen will show (if the engine 1 menu was on) or the display will go off (if the engine 2 menu was on).

4) If the NO IMBAL DATA ACQUIRED screen shows, there was a problem and the balance solution was not calculated.

NOTE: To exit this menu, push and release the NO button twice. The BALANCE ENGINE 2? screen will show (if the engine 1 menu was on) or the main menu will show (if the engine 2 menu was on).

(h) Push and release the YES button. This causes this screen to show (Table 519).

NOTE: The screen that shows gives the balance weight and its location that are necessary to balance the fan. The definitions of the screen are given below.

NOTE: Use the UP and DOWN ARROW buttons to get the imbalance weights that are necessary for the other holes on the fan (1 to 36). To exit this screen, push and release the NO button and the DISPLAY SOLUTION AGAIN? screen will show.

HAP 023-026, 028-054, 107-999; HAP 001-013, 015-022 POST SB 737-77-1056 OR POST SB 737-77-1069; HAP 101-106 POST SB 737-77-1069

Table 519/71-00-00-993-887-F00

AVM Front Panel Display
E x L o c . X X
R e m o v e
y y y y y y y y

HAP 023-026, 028-054, 107-999; HAP 001-013, 015-022 POST SB 737-77-1056 OR POST SB 737-77-1069; HAP 101-106 POST SB 737-77-1069; AIRPLANES WITH S362A001 AVM

1) XX - the location number (1 to 36)
2) yyyyyyyy - the actual weight that must be removed (installed).

NOTE: For a weight installation, the display shows Install instead of Remove.

(i) Record each new balance weight and its location on the fan spinner.

(j) After you use the DOWN ARROW button to show the last hole, the DISPLAY SOLUTION AGAIN? screen will show. To see the solution again, push and release the YES button.

(k) Push and release the NO button. This causes the SAVE NEW CONFIG? screen to show.

(l) Push and release the YES button to keep the new balance weight solution.

NOTE: After the YES button is pushed, the balance history in the AVM is erased. No balance solutions can be calculated.

1) If you do not want to keep the new balance weight solution, push and release the NO button. Do this if you want to calculate a solution for other flights.

(m) If the YES button is pushed, the BALANCE ENGINE 2? screen will show (if the engine 1 menu was on) or the main menu will show (if the engine 2 menu was on).

(n) If the NO button is pushed, the X FLIGHTS DISPLAY? screen will show.

(o) Push the NO button until TURN OFF DISPLAY? shows and then push the YES button.

(p) Install the new balance screws as follows (Figure 520):

NOTE: Do not remove non-P14 weights if they were not listed in the above solution.

CAUTION: MAKE SURE THAT YOU PUT A MAT ON THE LOWER SURFACE OF THE INLET COWL. DAMAGE TO THE INLET COWL SURFACES CAN OCCUR.

1) Put the protective mat, STD-585 on the inner lower half of the inlet cowl.
2) Find the number one weight location. This location is immediately to the left (CCW) of the machined dimple on the fan rear spinner cone.

a) Use a marker, G02061 to put a mark on this hole location to identify it as the number one weight location.

3) At the first hole where you will install a new balance screw, remove the installed balance screw.

4) Lubricate the new balance screw with grease, D00601 [CP2101] and install on the spinner.

a) Tighten the screw to 68-74 pound-inches (7.6-8.4 Newton meters).

5) Repeat the above steps to install all other balance screws.

6) Remove the protective mat, STD-585 and all the other unwanted material from the inlet cowl.

(q) Do the trim balance test at the end of this procedure.

HAP 101-999; AIRPLANES WITH S360N021-113 OR -114 AVM

H. Trim Balance Procedure

SUBTASK 71-00-00-970-042-F00

(1) Follow these steps to get to the fan balancing menu on the AVM front panel:

(a) Refer to (Figure 522 or Figure 523 or Figure 524) to look at the AVM Balance Menu and do the balance procedure.

SUBTASK 71-00-00-970-086-F00

(2) Push and release one of the four buttons to show SELF TEST? on the front panel display.

(3) Push and release the NO button three times until the BALANCE option shows.

(4) Push and release the YES button to go to the balance menu. This causes the BOEING GENERIC BXX (where XX = 01 to 99) screen to show.

(5) Push and release the YES button. This causes the BAL FOR ENGINE 1? screen to show.

(6) To get the balance data for engine 1, push and release the YES button. This causes the IMBAL DATA READ? screen to show.

(7) To get the balance data for engine 2, do these steps:

(a) Push and release the NO button. This causes the BAL FOR ENGINE 2? screen to show.

(b) Push and release the YES button. This causes the IMBAL DATA READ? screen to show.

SUBTASK 71-00-00-970-043-F00

(8) If you must look at historical balance data for other flights or trim balance runs, do these steps to go into the IMBAL DATA READ? menu to read the balance data:

NOTE: This menu item is not necessary for the trim balance calculation. This menu only shows the balance history for the last 6 flights or trim balance runs.

(a) Push and release the YES button. This causes the X FLIGHTS DISPLAY? screen to show.

NOTE: The X refers to the total number of flights in memory, and can be 1 through 6. If NO IMBAL DATA shows, there is no stored balance data in the AVM. If you push and release the NO button, the HOLE CONFIG? screen will show.

(b) Push and release the YES button. This causes the FLIGHT X? screen to show.

NOTE: The X refers to the flight number, and can be 0 through 5, where 0 is the last flight. Use the UP and DOWN ARROW buttons to make a selection of the flight that you want to see the imbalance history on.

(c) Push and release the YES button. The screen that shows gives the highest imbalance data for the selected flight that was recorded (Table 520).

NOTE: The definitions of the screen are given below.

NOTE: Use the UP and DOWN ARROW buttons to get one of the five other highest imbalance histories that was recorded during each flight.

Table 520/71-00-00-993-862-F00

AVM Front Panel Display
E 1 x x . x %
n . n n / y y y
m . m m / z z z

1) xxx - N1 rotor speed in percent
2) nnn - the fan displacement in mils
3) mmm - the LPT displacement in mils
4) yyy - the phase angle for the fan in degrees
5) zzz - the phase angle for the LPT in degrees.

SUBTASK 71-00-00-860-198-F00

(9) If the NO IMBAL DATA screen shows (no stored AVM data), you can do these steps to get the imbalance data:

(a) Do this task: Test 7 - Vibration Survey, TASK 71-00-00-700-814-F00.

1) Make sure to use the alternate acceleration procedure to get the imbalance data.
2) Pause for 1-2 minutes at each of the speed ranges shown.

SUBTASK 71-00-00-970-044-F00

(10) If it is necessary to read or change the balance screw data, do these steps to go into the HOLE CONFIG? menu (Figure 520):

NOTE: This menu item is not necessary for the trim balance calculation. However, if you change the balance screw data to agree with the installed weights, then you can re-calculate new balance data. This menu item only shows the current balance weights installed. Also, if the installed weights change, you can change the balance weight data in the AVM.

(a) Use this menu to make sure the weights installed on the engine agree with the weights in the AVM memory.

1) If you can't read the part number on the balance screw, use the weight or length of the screw (Figure 507).
2) If the weights agree, then you can use the balance history to balance the fan.

(b) From the IMBAL DATA READ? screen, push and release the NO button. This causes the HOLE CONFIG? screen to show.

HAP 101-999; AIRPLANES WITH S360N021-113 OR -114 AVM (Continued)

(c) Follow these steps to read the installed balance weights that are stored in the AVM:

1) Push and release the YES button. This causes the READ CONFIG DATA? screen to show.

NOTE: If you push and release the NO button, the RESET ACTUAL CONFIG? screen will show. The definition of this screen is given later.

2) Push and release the YES button. This causes the screen below to show (Table 521).

NOTE: This screen gives the imbalance weight installed at each hole. Only holes that have weight screws other than P07 are shown. The definitions of the screen are given below.

NOTE: If all holes have P07 balance screws, the E1 ALL HOLES ARE P07 screen will show.

HAP 101-999

Table 521/71-00-00-993-863-F00

AVM Front Panel Display
E 1 F A N
H o l e x x
P 0 X

HAP 101-999; AIRPLANES WITH S360N021-113 OR -114 AVM

a) xx - the hole number

b) P0X - the actual weight configuration.

3) Use the UP and DOWN ARROW buttons to get the balance weight data at all other holes which do not have P07 screws.

NOTE: There are 36 holes on the fan spinner.

(d) If you must change most of the balance screws to P07, follow these steps to reset all balance weights to P07:

1) Push and release the YES button. This causes the READ CONFIG DATA? screen to show.

2) Push and release the NO button. This causes the RESET ACTUAL CONFIG? screen to show.

3) Push and release the YES button. This causes the SAVE NEW CONFIG? screen to show.

4) Push and release the YES button.

NOTE: If you do not want to reset the weight configuration, push and release the NO button.

NOTE: After the NO or YES buttons are pushed and released, the MODIFY ACTUAL CONFIG? screen will show.

(e) Follow these steps to change the balance weights in the AVM:

1) Push and release the YES button. This causes the READ CONFIG DATA? screen to show.

2) Push and release the NO button. This causes the RESET ACTUAL CONFIG? screen to show.

3) Push and release the NO button. This causes the MODIFY ACTUAL CONFIG? screen to show.

4) Push and release the YES button. This causes the HOLE XX P0X MODIFY? screen to show.

NOTE: The XX is the hole number and the P0X is the installed balance screw.

NOTE: Use the UP and DOWN ARROW buttons to get the balance weight data at the hole you want. There are 36 holes on the fan spinner.

5) Push and release the YES button. This causes the HOLE XX MOD P0X SAVE? screen to show.

6) Use the UP and DOWN ARROW buttons to change the screw weight.

NOTE: The UP ARROW increases the weight and the DOWN ARROW decreases the weight.

7) Push and release the YES button to keep the new balance weight in the AVM. This causes the HOLE XX P0X MODIFY? screen for the subsequent hole to show.

a) If you do not want to keep the new balance weight, push and release the NO button. This causes the HOLE XX P0X MODIFY? screen for the subsequent hole to show.

8) Repeat the above steps to change the other weights.

9) To exit the MODIFY ACTUAL CONFIG? menu, push and release the NO button when the HOLE XX P07 MODIFY? screen shows.

SUBTASK 71-00-00-970-045-F00

(11) To go into the BALANCE 1 PLANE COMPUTE? menu to calculate a 1-plane (fan) balance solution, follow these steps:

NOTE: This menu will do a 1-plane trim balance calculation.

(a) From the IMBAL DATA READ? screen, push and release the NO button two times. This causes the BALANCE 1 PLANE COMPUTE? screen to show.

(b) Push and release the YES button. This causes the X FLIGHTS DISPLAY? screen to show.

NOTE: The X refers to the total number of flights or trim balance runs in memory, and is 1 through 6.

NOTE: If NO IMBAL DATA shows, there is no stored balance data in the AVM. If you push and release the NO button after the NO IMBAL DATA or X FLIGHTS DISPLAY? screens, the BAL FOR ENGINE 2? screen will show (if the engine 1 menu was on) or the display will go off (if the engine 2 menu was on).

1) Push and release the YES button. This causes the FLIGHT 0? screen to show.

NOTE: Use the UP and DOWN ARROW buttons to select X Flight. Use only flight data recorded on this airplane.

HAP 101-999; AIRPLANES WITH S360N021-113 OR -114 AVM (Continued)

(c) Push and release the YES button. This causes the screen shown below to show (Table 522).

NOTE: This screen gives the imbalance solution for each flight or trim balance run. The definitions of the screen are given below.

NOTE: Use the UP and DOWN ARROW buttons to get the imbalance solutions for each of the last 6 flights or trim balance runs that was recorded in the AVM.

HAP 101-999

Table 522/71-00-00-993-864-F00

AVM Front Panel Display
n n n n / y y y A A A F x ?

HAP 101-999; AIRPLANES WITH S360N021-113 OR -114 AVM

1) nnnn - the fan balance weight solution (in gm-cm)
2) yyy - the fan balance weight position (in degrees)
3) AAA - the identifier of the uploadable parameter set (B00 to B99)
4) Fx - the flight number (0 to 5, with 0 the last flight or trim balance run)

(d) Push and release the YES button. This causes the BALANCE IN PROGRESS screen to show.

NOTE: If you push and release the NO button, the BAL FOR ENGINE 2? screen will show (if the engine 1 menu was on) or the display will go off (if the engine 2 menu was on).

(e) After a short time, one of these four screens will show on the display. The screen that is shown depends on the solution found.

1) If the SOLUTION FOUND DISPLAY? screen shows, there is a balance solution to balance the fan.
2) If the WEIGHT LIMIT EXCEEDED screen shows, the balance solution value calculated is too large to install on the fan.

NOTE: To exit this menu, push and release the NO button. The BAL FOR ENGINE 2? screen will show (if the engine 1 menu was on) or the display will go off (if the engine 2 menu was on).

3) If the NO CHANGE REQUIRED screen shows, the balance solution that is currently installed is satisfactory

NOTE: To exit this menu, push and release the NO button. The BAL FOR ENGINE 2? screen will show (if the engine 1 menu was on) or the display will go off (if the engine 2 menu was on).

4) If the NO IMBAL DATA ACQUIRED screen shows, there was a problem and the balance solution was not calculated.

NOTE: To exit this menu, push and release the NO button. The BAL FOR ENGINE 2? screen will show (if the engine 1 menu was on) or the display will go off (if the engine 2 menu was on).

HAP 101-999; AIRPLANES WITH S360N021-113 OR -114 AVM (Continued)

(f) Push and release the YES button. This causes this screen to show (Table 523).

NOTE: The screen that shows gives the balance weight and its location that are necessary to balance the fan. The definitions of the screen are given below.

NOTE: Use the UP and DOWN ARROW buttons to get the imbalance weights that are necessary for the other holes on the fan (1 to 36). To exit this screen, push and release the NO button and the DISPLAY SOLUTION AGAIN? screen will show.

HAP 101-999

Table 523/71-00-00-993-865-F00

AVM Front Panel Display
E 1 H o l e X X
R e m P 0 X
I n s t P 0 Y

HAP 101-999; AIRPLANES WITH S360N021-113 OR -114 AVM

1) XX - the hole number (1 to 36)
2) P0X - the actual weight that must be removed
3) P0Y - the new weight that must be installed.

(g) Record each new balance screw and its location on the fan spinner.

(h) After you use the DOWN ARROW button to show the last hole,the DISPLAY SOLUTION AGAIN? screen will show. To see the solution again, push and release the YES button.

(i) Push and release the NO button. This causes the SAVE NEW CONFIG? screen to show.

(j) Push and release the YES button to keep the new balance weight solution.

NOTE: After the YES button is pushed, the balance history in the AVM is erased. No more balance solutions can be calculated.

1) If you do not want to keep the new balance weight solution, push and release the NO button. Do this if you want to calculate solutions for other flights.

(k) After the YES or NO button was pushed, the BAL FOR ENGINE 2? screen will show (if the engine 1 menu was on) or the display will go off (if the engine 2 menu was on).

(l) Install the new balance screws as follows (Figure 520):

NOTE: Do not remove non-P07 weights if they were not listed in the above solution.

CAUTION: MAKE SURE THAT YOU PUT A MAT ON THE LOWER SURFACE OF THE INLET COWL. DAMAGE TO THE INLET COWL SURFACES CAN OCCUR.

1) Put the protective mat, STD-585 on the inner lower half of the inlet cowl.
2) Find the number one hole. This hole is immediately left (CCW) of the machined dimple on the fan rear spiiner cone.
   a) Use a marker, G02061 to put a mark on this hole to identify it as the number one weight location.
3) At the first hole where you will install a new balance screw, remove the installed balance screw.

4) Lubricate the new balance screw with grease, D00601 [CP2101] and install on the spinner.
   a) Tighten the screw to 68-74 pound-inches (7.6-8.4 Newton meters).
5) Repeat the above steps to install all other balance screws.
6) Remove the protective mat, STD-585 and all the other unwanted material from the inlet cowl.

(m) Do the trim balance test at the end of this procedure.

HAP 023-026, 028-054, 101-999; HAP 001-013, 015-022 POST SB 737-77-1056 OR POST SB 737-77-1069

I. Trim Balance Test

SUBTASK 71-00-00-720-006-F00

(1) Do this task: Test 7 - Vibration Survey, TASK 71-00-00-700-814-F00.
   (a) This test is not necessary if the cause for the trim balance (initial imbalance) is less than 4.0 units.
   (b) Monitor the vibration levels on subsequent engine operation.
      1) If the vibration level does not change much, you can stop the monitoring.
      2) If the vibration level changes significantly, apply CFMI CESM No.7 to decrease and control the vibration.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-010-026-F00

(1) Do this task;

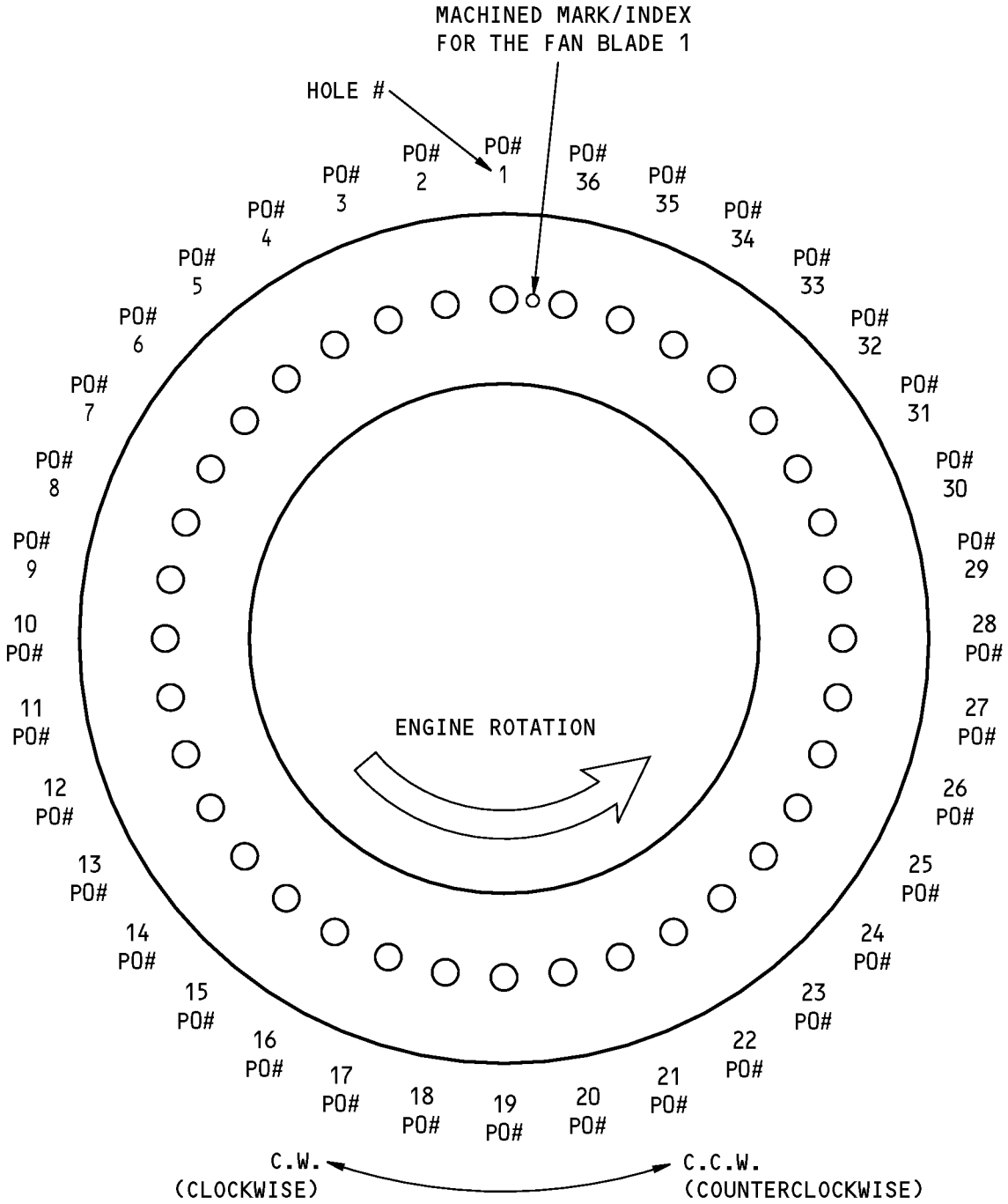
Close this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 71-00-00-860-171-F00

(2) During a subsequent engine operation, do a check of the N1 and AVM indications to make sure they operate correctly.

——————— END OF TASK ———————



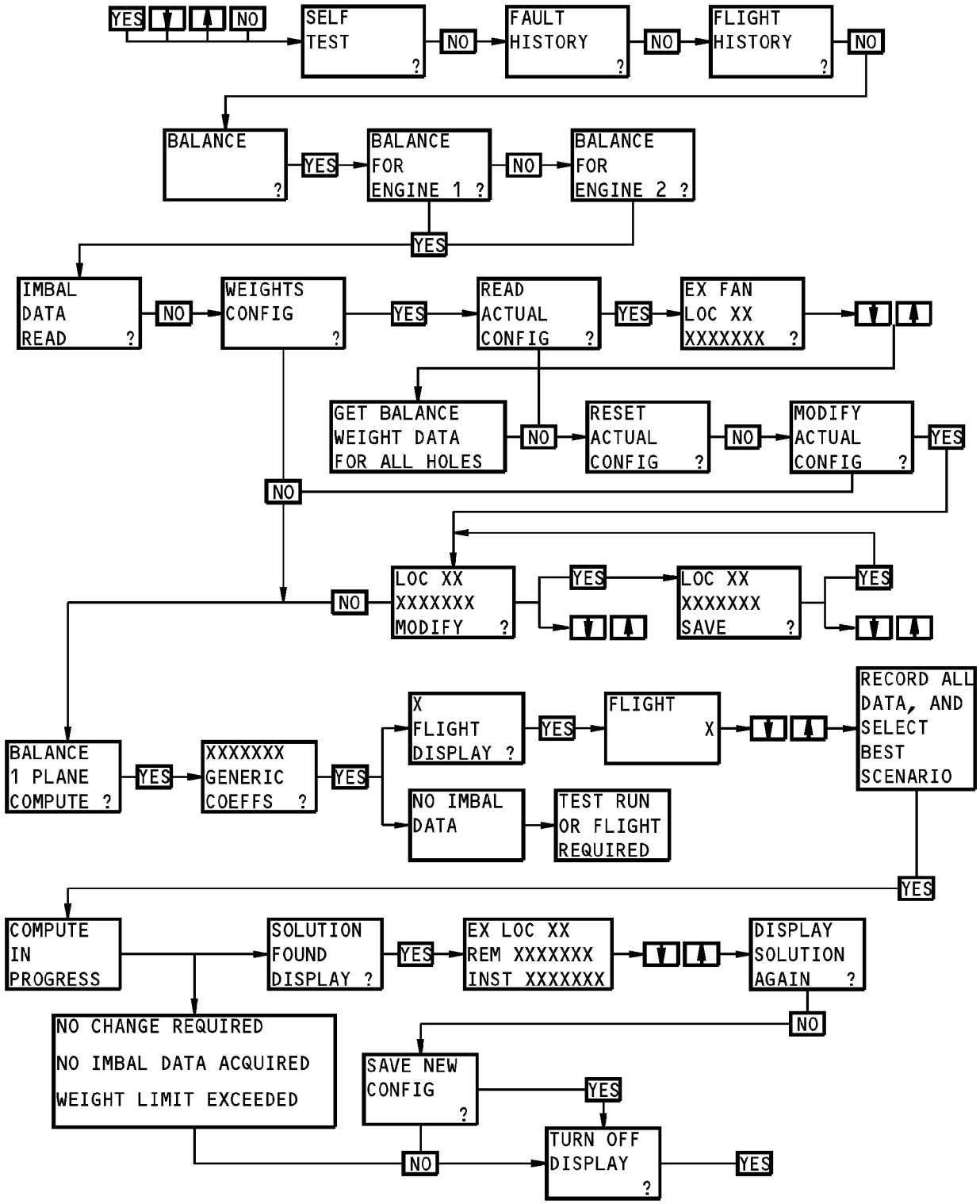
(VIEW IN THE AFT DIRECTION)

S-M56-MM-03715-00-B

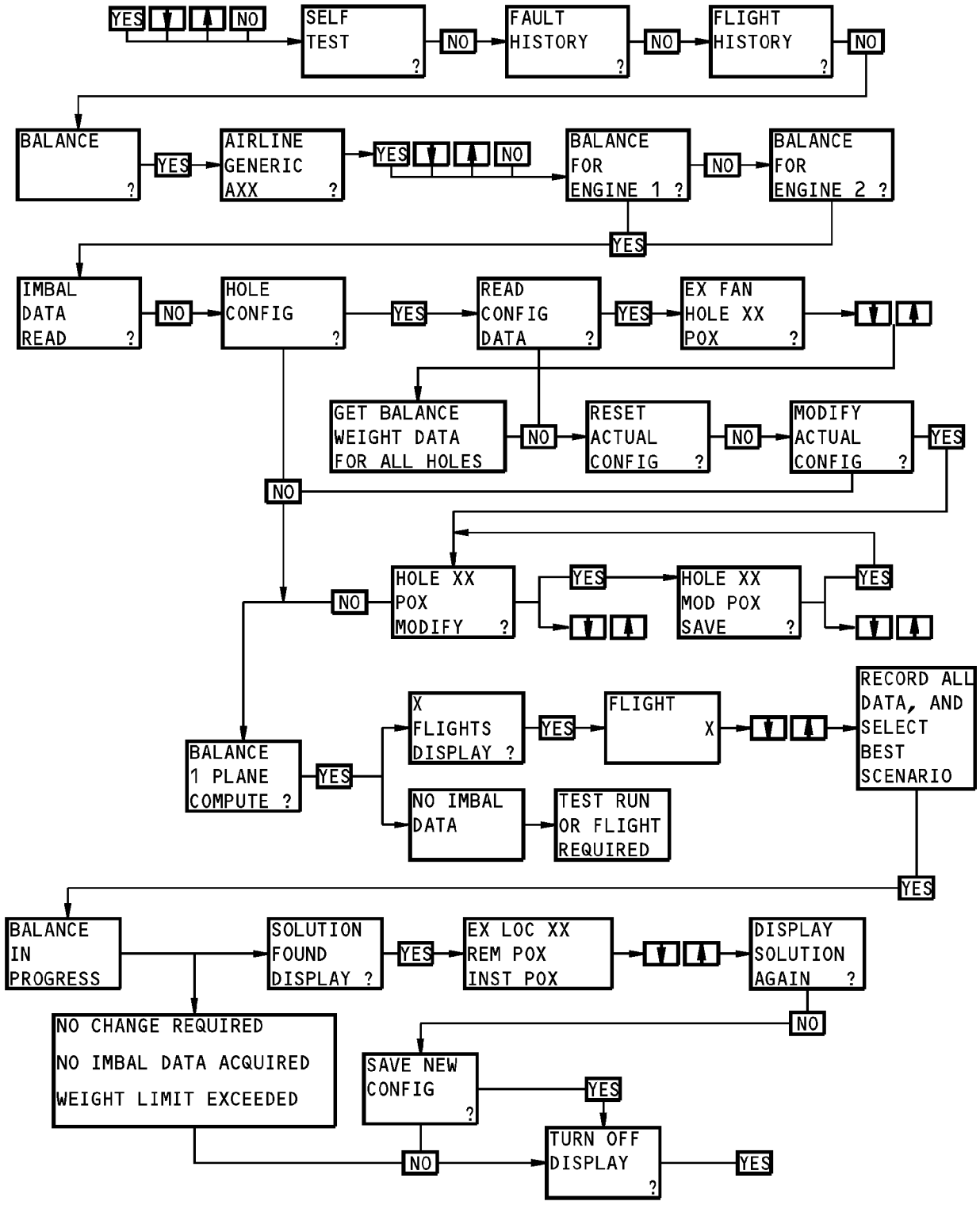
Initial Balance Screw Location Chart
Figure 520/71-00-00-990-856-F00

SOLUTION WEIGHT	EXISTING WEIGHT P01	EXISTING WEIGHT P02	EXISTING WEIGHT P03	EXISTING WEIGHT P04	EXISTING WEIGHT P05	EXISTING WEIGHT P06
P01	Rem. P01, add P02 (HOLE)	Rem. P02, add P03 (HOLE)	Rem. P03, add P04 (HOLE)	Rem. P04, add P05 (HOLE)	Rem. P05, add P06 (HOLE)	Add P01 (HOLE+1)
P02	Rem. P01, add P03 (HOLE)	Rem. P02, add P04 (HOLE)	Add P02 (HOLE+1)	Add P02 (HOLE+1)	Add P02 (HOLE+1)	Add P02 (HOLE+1)
P03	Rem. P01, add P04 (HOLE)	Rem. P02, add P05 (HOLE)	Add P03 (HOLE +1)	Add P03 (HOLE+1)	Add P03 (HOLE+1)	Add P03 (HOLE+1)
P04	Rem. P01, add P05 (HOLE)	Rem. P02, add P04 (HOLE) P02 (HOLE+1)	Rem. P03, add P04 (HOLE) P03 (HOLE+1)	Add P04 (HOLE+1)	Add P04 (HOLE+1)	Add P04 (HOLE+1)
P05	Rem. P01, add P06 (HOLE)	Rem. P02, add P05 (HOLE) P02 (HOLE+1)	Rem. P03, add P05 (HOLE) P03 (HOLE+1)	Rem. P04, add P05 (HOLE) P04 (HOLE+1)	Rem. P05, add P06 (HOLE) P03 (HOLE+1) P01 (HOLE-3)	Add P04 (HOLE+1) P01 (HOLE-5)
P06	Rem. P01, add P06 (HOLE) P01 (HOLE+1)	Rem. P02, add P06 (HOLE) P02 (HOLE+1)	Rem. P03, add P06 (HOLE) P03 (HOLE+1)	Rem. P04, add P06 (HOLE) P04 (HOLE+1)	Rem. P05, add P06 (HOLE) P04 (HOLE+1) P01 (HOLE-5)	Add P05 (HOLE+1) P01 (HOLE-5)

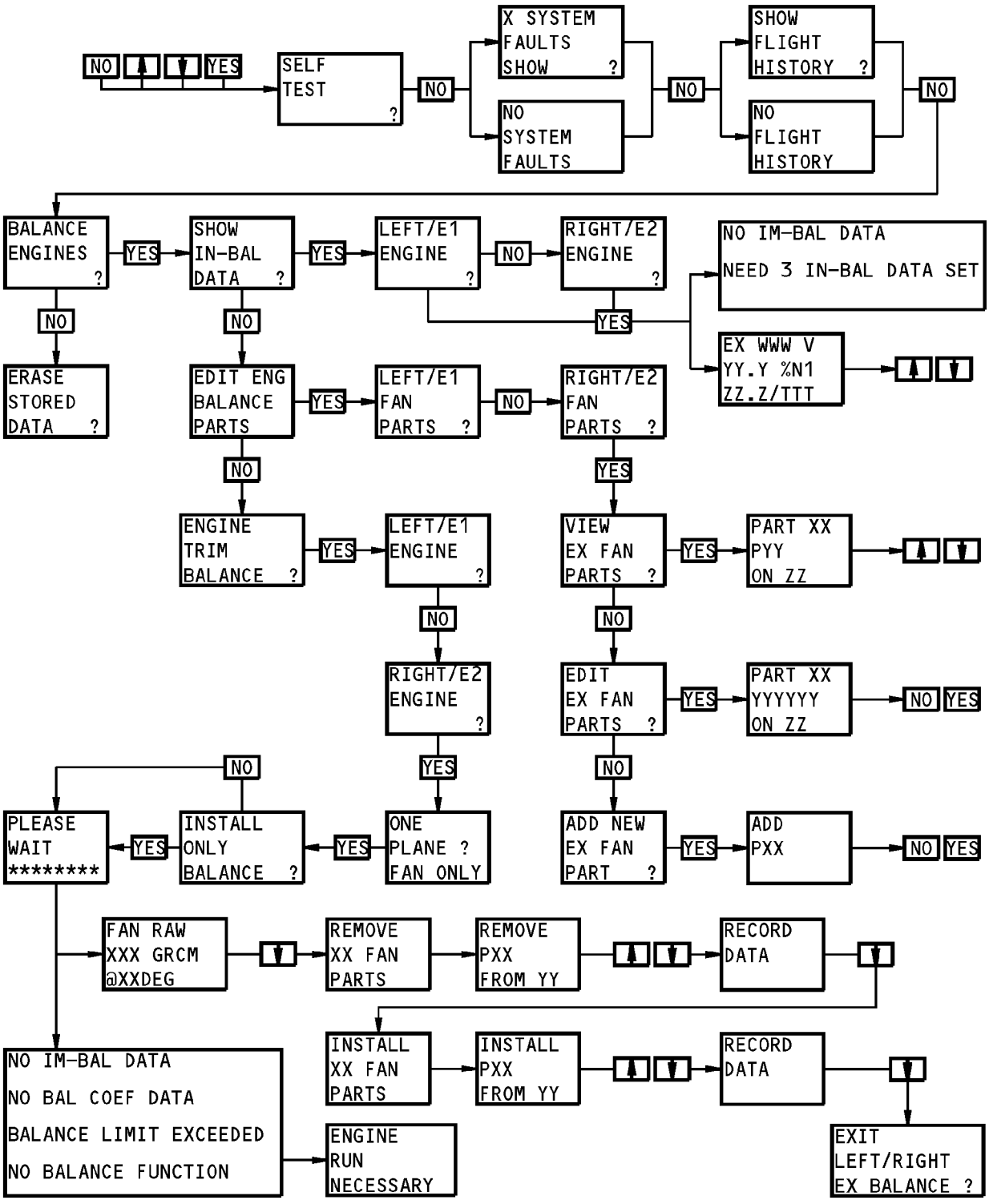
Trim Balance Weight Substitution Weight
Figure 521/71-00-00-990-861-F00



AVM Trim Balance Quick Reference Guide
Figure 522/71-00-00-990-893-F00



AVM Trim Balance Quick Reference Guide
Figure 523/71-00-00-990-894-F00



AVM Trim Balance Quick Reference Guide
Figure 524/71-00-00-990-895-F00

HAP 023-026, 028-054, 101-999; HAP 001-013, 015-022 POST SB 737-77-1056 OR POST SB 737-77-1069 (Continued)

HAP 001-011 PRE SB 737-77-1056

TASK 71-00-00-750-804-F00

16. Test 14B - Fan Trim Balance (On Board Procedure - Endevco AVM S360N021-213)

A. General

(1) This trim balance procedure is done for these conditions:

(a) To decrease the fan or LPT vibration levels when they are equal to or more than 8 mils DA (double amplitude).

(b) When, after the replacement or the repair of a fan blade, the correction is more than 236 gram-inches (600 g-cm).

(2) The trim balance procedures should decrease the vibration levels of the fan and the LPT to less than 4.0 units on the airborne vibration monitor (AVM) during a ground operation at all engine operation speeds.

(3) This trim balance procedure uses the imbalance data recorded in the AVM during the last flight from the No. 1 bearing and the FFCC (Fan Frame Compressor Case) vibration sensors.

NOTE: An engine start after the last flight causes the AVM to erase the imbalance data from the flight and to record the imbalance data for the engine ground run.

(4) You can get this data from the front panel display of the AVM:

(a) The current imbalance data from the last engine run

(b) The current configuration of the balance weights and their installed locations (fan only)

(c) The results of a calculation of a 1-plane balance (fan only)

(d) Also, you can record the new weight values (if they have changed) for the fan.

(5) Use this procedure for the AVM signal conditioner with this part number:

(a) Boeing part number - S360N021-213.

(b) Supplier part number - Endevco 6672M213.

(6) When an engine is installed on the wing, after an overhaul or after a replacement of a significant number of fan blades, it is recommended that you first do a vibration survey (TASK 71-00-00-700-814-F00).

(a) If the result of this vibration survey is not satisfactory, you can do one of two methods to balance the engine:

1) Do a 3-shot plot trim balance procedure to decrease the engine vibration level (TASK 71-00-00-750-802-F00); or,

2) Use this procedure to balance the engine with the AVM.

B. References

Reference	Title
71-00-00-700-819-F00	Stop the Engine Procedure (Usual Engine Stop) (P/B 201)
71-00-00-800-807-F00	Start the Engine Procedure (Selection) (P/B 201)

HAP 001-011 PRE SB 737-77-1056 (Continued)

C. Tools/Equipment

Reference	Description
STD-585	Mat - Protective, 3/8 Inch Minimum Thickness, Minimum 42x60 Inches (1x1.5 meters) with Warning Streamers

D. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
G02061	Marker - Permanent, Felt Tip Pen	

E. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
211	Flight Compartment - Left
212	Flight Compartment - Right
411	Engine 1 - Engine
421	Engine 2 - Engine

F. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door

G. Prepare for the Trim Balance Procedure

SUBTASK 71-00-00-860-172-F00

(1) Do this task;

Make sure that this circuit breaker is closed:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
A	2	C01076	ENGINE VIB MON

(a) If you want to use the current imbalance data but you must operate the engines to taxi the airplane to a maintenance area, do these steps:

NOTE: The AVM records over the current imbalance data with the new imbalance data from the last engine run.

(b) Open the above circuit breaker before the engine operation.

(c) Close the above circuit breaker after the engine operation.

SUBTASK 71-00-00-010-027-F00

(2) Do this task;

Open this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

HAP 001-011 PRE SB 737-77-1056 (Continued)

H. Procedure

SUBTASK 71-00-00-970-047-F00

(1) Follow these steps to get to the fan balancing menu on the AVM front panel:

(a) Push and release one of the four buttons to show SELF TEST? on the front panel display.

1) Refer to (Figure 527) to look at the AVM Balance Menu and do the balance procedure.

(b) Push and release the NO button three times until the BALANCE ENGINES? option shows.

(c) Push and release the YES button. This causes the SHOW IMBALANCE DATA? screen to show.

SUBTASK 71-00-00-970-048-F00

(2) If you must look at the current imbalance data, do these steps to go into the SHOW IMBALANCE DATA? menu to read the imbalance data:

NOTE: This menu item is not necessary for the trim balance calculation. This menu only shows the imbalance data from the last flight or engine ground run.

(a) Push and release the YES button. This causes the LEFT/E1 ENGINE? screen to show.

(b) To get the imbalance data for engine 1, push and release the YES button. This causes the screen below to show (Table 524):

NOTE: To get the imbalance data for engine 2, push and release the NO button. This causes the RIGHT/E2 ENGINE? screen to show. Then push and release the YES button.

NOTE: If the NO IM-BAL DATA screen shows, there is no imbalance data to view. If you push and release the NO button, the SHOW IM-BALANCE DATA? screen will show.

NOTE: If the NEED 3 IM-BAL DATA SET screen shows, the highest and most stable vibration imbalance was recorded at only one or two target engine speeds. This AVM uses the vibration data from a minimum of 3 target speeds.

1) This screen shows the highest and most stable fan and LPT imbalance data that was recorded at each of six target speeds during the last flight or trim balance run.

NOTE: The example 6 target speeds are given below (Table 525).

NOTE: To exit this menu, push and release the NO button. This will cause the SHOW IM-BALANCE DATA? screen to show.

NOTE: Use the UP and DOWN ARROW buttons to get the fan or LPT imbalance data for the five other target speeds that was recorded.

Table 524/71-00-00-993-869-F00

AVM Front Panel Display
E X W W W V
Y Y . Y % N 1
Z Z . Z / T T T

2) EX - Engine 1 (E1) or Engine 2 (E2)

3) WWW - FAN or LPT

4) V - the current target speed (1 through 6)
5) YYY - the engine speed where the imbalance was recorded
6) ZZZ - the fan or LPT displacement in mils DA
7) TTT - the phase angle for the fan or LPT in degrees

Table 525/71-00-00-993-870-F00

Target Speed Range (Example)	From (%N1)	To (%N1)
1	62.5	67.4
2	67.5	72.5
3	77.5	82.4
4	82.5	87.4
5	87.5	92.4
6	92.5	97.5

(c) If the NO IM-BAL DATA screen or the NEED 3 IM-BAL DATA SET screen shows, you can use these steps to do an engine run to get the data:

1) Do this task: Start the Engine Procedure (Selection), TASK 71-00-00-800-807-F00.
   a) Let the engine become stable at the idle-power position for a minimum of 2 minutes.
   b) Make sure the PROBE HEAT "A" switch on the overhead panel, P5, is in the ON position.

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

2) Slowly increase the engine speed to the first target speed range (Table 525).
   a) Let the engine become stable at a speed in the target range for a minimum of 30 seconds before you increase the engine to the subsequent target speed range.
3) Do the above steps again for all 6 target speed ranges.
   a) Do not use a fan speed which exceeds the Takeoff Power N1 speed for the current conditions.
4) Move the forward thrust levers to the idle-power position.
   a) Let the engine become thermally stable at this position for a minimum of 5 minutes.
5) Do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00.

SUBTASK 71-00-00-970-049-F00

(3) If it is necessary to read or change the balance parts data, do these steps to go into the EDIT ENG BALANCE PARTS? menu to read or change the installed balance weights, follow these steps (Figure 525):

NOTE: This menu item is not necessary for the INSTALL ONLY balance calculation. The INSTALL ONLY calculation does not use or update the balance weights in the AVM memory. This menu item is necessary for the REMOVE/INSTALL balance calculation. The REMOVE/INSTALL calculation uses the balance weights and updates the AVM memory to the solution.

NOTE: The imbalance data is found with the current weights on the engine. If the current weights change except to install the INSTALL ONLY or REMOVE/INSTALL solution, an engine ground run is necessary to find new imbalance data.

NOTE: This AVM uses a part number nomenclature. Each part identifies a given balance weight and its location on the fan. The parts are in numerical order, but the balance weight and fan location it includes are not always in numerical order.

(a) If you do the REMOVE/INSTALL balance calculation, use this menu to make sure the weights installed on the engine agree with the weights in the AVM memory.

NOTE: Read and edit the weights in the AVM memory before you do the REMOVE/INSTALL calculation.

1) If you can't read the part number on the balance screw, use the weight or length of the screw (Figure 507).

(b) From the SHOW IM-BALANCE DATA? screen, push and release the NO button. This causes the EDIT ENG BALANCE PARTS? screen to show.

(c) Push and release the YES button. This causes the LEFT/E1 FAN PARTS? screen to show.

NOTE: To view the data for engine 2, push and release the NO button. This causes the RIGHT/E2 FAN PARTS? screen to show.

(d) Push and release the YES button. This causes the VIEW EX FAN PARTS? screen (where X = 1 or 2) to show.

NOTE: If you push and release the NO button, the EDIT EX FAN PARTS? screen (where X = 1 or 2) will show. The definition of this screen is given later.

NOTE: If all holes have P07 balance screws, the NO FAN PARTS screen will show for 3 seconds.

(e) Follow these steps to read the installed balance weights that are stored in the AVM:

1) Push and release the YES button. This causes the screen below to show (Table 526).

NOTE: This screen gives the imbalance weight installed at each hole. The definition of the screen is given below.

Table 526/71-00-00-993-871-F00

AVM Front Panel Display
P A R T X X
P Y Y
O N Z Z

a) XX - the part number

b) PYY - the installed balance weight

c) ZZ - the bolt hole location (1 through 36).

2) Use the UP and DOWN ARROW buttons to get the other balance weights and their holes.

NOTE: The AVM displays only the balance weights, other than P07 screws, that are installed on the spinner. The part numbers show all the balance weight screws that are not P07.

NOTE: There are 36 holes on the fan spinner.

3) To exit this menu, push and release the NO button. This causes the VIEW EX FAN PARTS? screen (where X = 1 or 2) to show again.

(f) Follow these steps to change the balance weights in the AVM:

1) From the VIEW EX FAN PARTS? screen, push and release the NO button. This causes the EDIT EX FAN PARTS? screen (where X = 1 or 2) to show.

2) Push and release the YES button. This causes the display below to show the first part number (the fan balance weight installed at its fan blade hole (Table 527).

NOTE: The current balance weight flashes. To change the balance weight, use the UP and DOWN ARROW buttons.

NOTE: To remove the balance weight at this hole, push and release the UP or DOWN ARROW buttons until the word DELETE shows in the display. If all fan blade weights are removed from the AVM, the ADD NEW EX FAN PARTS? screen (where X = 1 or 2) will show. The definition of this screen is given later.

Table 527/71-00-00-993-872-F00

AVM Front Panel Display
P A R T X X Y Y Y Y Y Y Y Y O N Z Z

a) XX - the part number

b) YYYYYYYY - the balance weight selection field

c) ZZ - fan bolt hole number

3) When the correct balance weight is shown, push and release the YES button.

NOTE: If the correct balance weight is not shown, push and release the NO button. This causes the balance weight to flash again.

4) Make sure that the correct balance weight is shown and then push and release the YES button again.

5) Do the above steps again for all other part numbers.

6) If you changed the balance weight on the last part number and this new weight is correct (the display does not flash), push and release the YES button. This causes the EDIT EX FAN PARTS? screen (where X = 1 or 2) to show again.

a) If you did not change the balance weight on the last part number, push and release the NO button. This also causes the EDIT EX FAN PARTS? screen (where X = 1 or 2) to show again.

(g) Follow these steps to add new balance weights in the AVM:

NOTE: To add a new balance weight, you first choose the balance weight you want to add. Then you choose the correct fan blade hole for that balance weight.

1) From the VIEW EX FAN PARTS? screen, push and release the NO button two times. This causes the ADD NEW EX FAN PARTS? screen (where X = 1 or 2) to show.

2) Push and release the YES button. This causes the ADD PXX screen to show.

NOTE: The balance weight field flashes. To change the balance weight, use the UP and DOWN ARROW buttons.

3) Push and release the YES button. This causes the ADD PXX ON XX? screen to appear.

NOTE: The fan blade hole field flashes. To change the fan blade hole number, use the UP and DOWN ARROW buttons.

4) If the fan blade hole number is correct, push and release the YES button. This causes the ADD PXX ON XX? screen to show.

5) Make sure that the correct balance weight and fan blade hole location are shown and then push and release the YES button again. This causes the ADD NEW EX FAN PART? screen (where X = 1 or 2) to show again.

6) Do the above steps again for all other new balance weights you add.

7) After you add the last balance weight, push and release the NO button. This causes the ADD NEW EX FAN PARTS? screen (where X = 1 or 2) to show.

8) Push and release the NO button. This causes the EDIT ENG BALANCE PARTS? screen to show again.

SUBTASK 71-00-00-970-050-F00

(4) To calculate a 1-plane (fan) balance solution, follow these steps:

NOTE: This menu will do a 1-plane trim balance computation.

(a) From the SHOW IM-BALANCE DATA? screen, push and release the NO button TWO TIMES. This causes the ENGINE TRIM BALANCE? screen to show.

NOTE: If the NO BALANCE FUNCTION screen shows, there is an interface fault with the AVM.

(b) From the ENGINE TRIM BALANCE? screen, push and release the YES button. This causes the LEFT/E1 ENGINE? screen to show.

NOTE: To view the data for engine 2, push and release the NO button. This causes the RIGHT/E2 ENGINE? screen to show.

(c) Push and release the YES button. This causes the ONE PLANE? FAN ONLY screen to show.

(d) Push and release the YES button. This causes the INSTALL ONLY BALANCE? screen to show.

NOTE: There are two solutions to balance the engine. If you choose YES, the AVM will calculate the necessary balance weights and their locations to add to the fan to balance the engine. If you choose NO, the AVM will also calculate the necessary balance weights to add, but it will also tell you which currently-installed weights to remove. This option uses the fan parts that are stored in memory in the AVM.

(e) Push and release the NO (preferred) or YES (alternate) button. This causes the PLEASE WAIT screen to show.

NOTE: If the data is available, this screen will show for 5 to 8 seconds. If no data is available, the screen will show momentarily.

(f) After a short time, one of these five screens will show on the display. The screen shown depends on the solution found.

1) If the screen shown below shows, there was a trim balance solution found (Table 528).

NOTE: This screen gives the imbalance solution. The definitions of the screen are given below. All solutions are forward looking aft.

Table 528/71-00-00-993-873-F00

AVM Front Panel Display
F A N R A W
X X X X G R C M
@ @ Y Y Y D E G

a) XXXX - the fan balance weight solution (in gm-cm)

b) YYY - the fan balance weight position (in degrees)

2) If the NO IM-BAL DATA screen shows, there is no imbalance data to use to balance the fan.

NOTE: To exit this menu, push and release the NO button. The ENGINE TRIM BALANCE? screen will show.

3) If the NO BAL COEF DATA screen shows, the AVM could not read its balance coefficient data in memory.

NOTE: To exit this menu, push and release the NO button. The ENGINE TRIM BALANCE? screen will show.

4) If the BALANCE WEIGHT EXCEEDED screen shows, the balance solution value calculated is too large to install on the fan.

NOTE: To exit this menu, push and release the NO button. The ENGINE TRIM BALANCE? screen will show.

5) If the NO BALANCE FUNCTION screen shows, the AVM cannot calculate a trim balance solution.

NOTE: To exit this menu, push and release the NO button. The ENGINE TRIM BALANCE? screen will show.

(g) If you chose NO on the ''INSTALL ONLY BALANCE?'' screen push and release the DOWN ARROW button. This causes the REMOVE XX FAN PARTS screen to show where XX is the total number of fan parts.

NOTE: This screen tells you the total number of parts that you must remove. After all these parts are shown the subsequent screens will tell you what parts (balance weights and their locations) to add.

(h) Push and release the DOWN ARROW button. This causes this screen to show (Table 529).

Table 529/71-00-00-993-874-F00

AVM Front Panel Display
R E M O V E
P X X
F R O M Y Y

1) PXX - the actual balance weight that must be removed

2) YY - the fan location of this balance weight.

(i) Record each balance screw and its location that you must remove.

(j) Use the DOWN ARROW button to show all the other fan parts you must remove.

NOTE: After all of these fan parts are shown, the subsequent screens will show what fan parts to add to balance the engine. To see this data, push and release the DOWN ARROW button after the last fan part to be removed is shown.

(k) If you chose ''YES'' on the INSTALL ONLY BALANCE? screen or if you chose ''NO'' and recorded all the removed fan parts push and release the DOWN ARROW button. This causes the INSTALL XX FAN PARTS screen to show where XX is the total number of fan parts.

NOTE: The screen that shows tells you the number of parts you must install.

(l) Push and release the DOWN ARROW button. This causes this screen to show (Table 530).

Table 530/71-00-00-993-875-F00

AVM Front Panel Display
I N S T A L L
P X X
O N Y Y

1) PXX - the actual balance weight to install

2) YY - the fan location of this balance weight.

(m) Record each balance screw and its location that you must install.

(n) Use the UP and DOWN ARROW button to show the other new fan parts you must install.

(o) After all the fan parts to be installed are seen, when you push and release the DOWN ARROW button again, the EXIT XXXXX/EX BALANCE? screen (where XXXXX = LEFT or RIGHT and X = 1 or 2) will show.

(p) Push and release the YES button. This causes the ENGINE TRIM BALANCE? screen to show.

NOTE: If you do not want to exit this menu, push and release the NO button. This causes the ONE PLANE? FAN ONLY screen to show.

1) The next engine start stores the REMOVE/INSTALL solution in the AVM weights memory. The AVM weights memory is not changed with the INSTALL ONLY solution.

(q) Install the new balance screws as follows (Figure 525):

CAUTION: MAKE SURE THAT YOU PUT A MAT ON THE LOWER SURFACE OF THE INLET COWL. DAMAGE TO THE INLET COWL SURFACES CAN OCCUR.

1) Put the protective mat, STD-585 on the inner lower half of the inlet cowl.
2) Find the number one fan blade. This blade is immediately above the offset hole (machined dimple) on the fan disk bolt flange.
   a) Use amarker, G02061 to put a mark on this blade to identify it as the number one blade.
3) If you chose ''YES'' on the INSTALL ONLY? BALANCE screen, at the first hole where you will install a new balance screw look at the installed balance screw to see it is a P07 screw. If it is not a P07 screw do these steps:

   NOTE: See Figure 526.

   NOTE: If a balance weight is already installed you must add the weight from the new balance weight to the installed balance weight. Use the steps that follow to find what new balance weights to install and its location.

   a) Record the balance weight currently installed.
   b) Find the installed (existing) balance weight column on the top of the table.
   c) Find the row that corresponds to the balance weight you must add.
   d) Use the instructions that follow to add or remove balance weights.
4) If you chose ''NO'' on the INSTALL ONLY? BALANCE screen, at the first hole where you will install a new balance screw, remove the installed balance screw.
5) Lubricate the new balance screw with grease, D00601 [CP2101] and install on the spinner.
   a) Tighten the screw to 68-74 pound-inches (7.6-8.4 Newton meters).
6) Do the above steps to install all other balance screws.
7) Remove the protective mat, STD-585 and all the other unwanted material from the inlet cowl.

(r) Do the trim balance test at the end of this procedure.

SUBTASK 71-00-00-970-052-F00

(5) If you changed the fan balance weights, do these steps to erase the engine balance data in memory:

NOTE: The next engine start erases the imbalance data.

(a) From the SHOW IM-BALANCE DATA? screen, push and release the NO button three times. This causes the BALANCE ENGINES? screen to show.

(b) Push and release the NO button. This causes the ERASE STORED DATA? screen to show.

(c) Push and release the YES button two times. This causes the ERASE IM-BAL DATA? screen to show.

(d) Push and release the YES button. This causes the ARE YOU SURE? screen to show.

(e) Push and release the YES button. This causes the IM-BAL DATA ERASED screen to show.

I. Trim Balance Test

SUBTASK 71-00-00-720-007-F00

(1) Do this task: Test 7 - Vibration Survey, TASK 71-00-00-700-814-F00.

(a) This test is not necessary if the cause for the trim balance (initial imbalance) is less than 4.0 units.

(b) Monitor the vibration levels on subsequent engine operation.

1) If the vibration level does not change much, stop the monitoring.

2) If the vibration level changes significantly, apply CFMI CESM No. 7 to decrease and control the vibration.

J. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-010-028-F00

(1) Do this step:

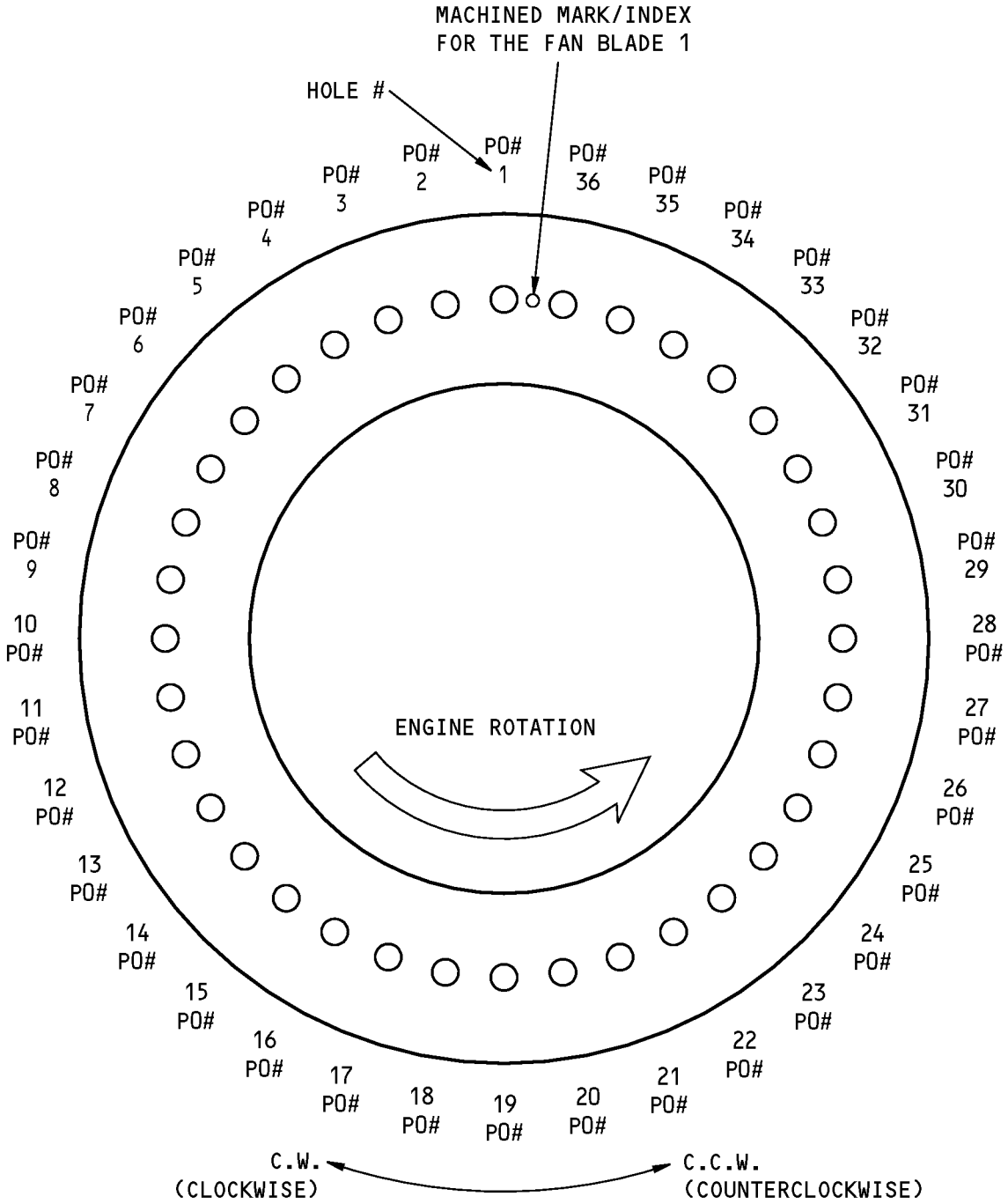
Close this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

SUBTASK 71-00-00-860-173-F00

(2) During a subsequent engine operation, do a check of the N1 and AVM indications to make sure they operate correctly.

END OF TASK



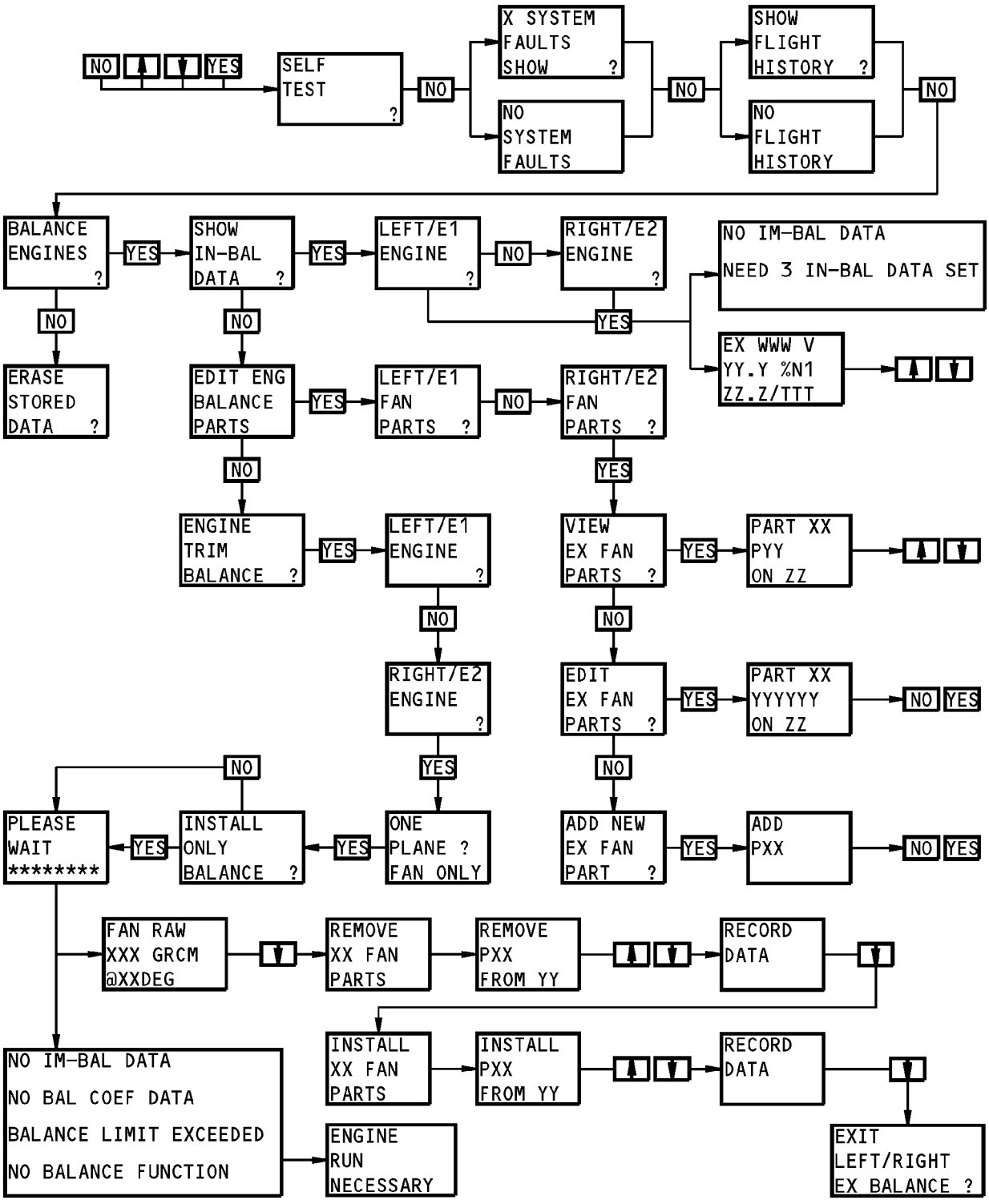
(VIEW IN THE AFT DIRECTION)

S-M56-MM-03715-00-B

Initial Balance Screw Location Chart
Figure 525/71-00-00-990-906-F00

SOLUTION WEIGHT	EXISTING WEIGHT P01	EXISTING WEIGHT P02	EXISTING WEIGHT P03	EXISTING WEIGHT P04	EXISTING WEIGHT P05	EXISTING WEIGHT P06
P01	Rem. P01, add P02 (HOLE)	Rem. P02, add P03 (HOLE)	Rem. P03, add P04 (HOLE)	Rem. P04, add P05 (HOLE)	Rem. P05, add P06 (HOLE)	Add P01 (HOLE+1)
P02	Rem. P01, add P03 (HOLE)	Rem. P02, add P04 (HOLE)	Add P02 (HOLE+1)	Add P02 (HOLE+1)	Add P02 (HOLE+1)	Add P02 (HOLE+1)
P03	Rem. P01, add P04 (HOLE)	Rem. P02, add P05 (HOLE)	Add P03 (HOLE +1)	Add P03 (HOLE+1)	Add P03 (HOLE+1)	Add P03 (HOLE+1)
P04	Rem. P01, add P05 (HOLE)	Rem. P02, add P04 (HOLE) P02 (HOLE+1)	Rem. P03, add P04 (HOLE) P03 (HOLE+1)	Add P04 (HOLE+1)	Add P04 (HOLE+1)	Add P04 (HOLE+1)
P05	Rem. P01, add P06 (HOLE)	Rem. P02, add P05 (HOLE) P02 (HOLE+1)	Rem. P03, add P05 (HOLE) P03 (HOLE+1)	Rem. P04, add P05 (HOLE) P04 (HOLE+1)	Rem. P05, add P06 (HOLE) P03 (HOLE+1) P01 (HOLE-3)	Add P04 (HOLE+1) P01 (HOLE-5)
P06	Rem. P01, add P06 (HOLE) P01 (HOLE+1)	Rem. P02, add P06 (HOLE) P02 (HOLE+1)	Rem. P03, add P06 (HOLE) P03 (HOLE+1)	Rem. P04, add P06 (HOLE) P04 (HOLE+1)	Rem. P05, add P06 (HOLE) P04 (HOLE+1) P01 (HOLE-5)	Add P05 (HOLE+1) P01 (HOLE-5)

Trim Balance Weight Substitution Weight
Figure 526/71-00-00-990-910-F00



AVM Trim Balance Quick Reference Guide
Figure 527/71-00-00-990-907-F00

TASK 71-00-00-750-805-F00

17. Test 14C - Fan Trim Balance (Analyzer Procedure)

A. General

(1) This procedure uses an engine run with parallel acquisition system for AVM data to balance the fan.

(2) The vibration analyzer monitors the No.1 Bearing and FFCCV vibration sensors continuously during the engine run and stores up to seven balance data points based on speed ranges and stability criteria.

(3) Specific N1 speed ranges must be used during the dynamic test.

(4) Stored balance data is available during the computation on balance menu and stored data menu.

B. References

Reference	Title
71-00-00-700-819-F00	Stop the Engine Procedure (Usual Engine Stop) (P/B 201)
71-00-00-800-805-F00	Engine Ground Safety Precautions (P/B 201)
71-00-00-800-807-F00	Start the Engine Procedure (Selection) (P/B 201)

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-3932	System - Portable Engine Balancing (Part #: PBS-4100, Supplier: 26741, A/P Effectivity: 737-100, -200, -200C, -300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER)
STD-585	Mat - Protective, 3/8 Inch Minimum Thickness, Minimum 42x60 Inches (1x1.5 meters) with Warning Streamers

D. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
G02061	Marker - Permanent, Felt Tip Pen	

E. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
211	Flight Compartment - Left
212	Flight Compartment - Right
411	Engine 1 - Engine
421	Engine 2 - Engine

F. Access Panels

Number	Name/Location
117A	Electronic Equipment Access Door

G. Prepare for the Trim Balance Procedure

SUBTASK 71-00-00-480-005-F00

(1) Install the test equipment

NOTE: Keep the AVM system available to monitor vibration in the flight compartment during the test in parallel with the vibration tracking system (analyzer).

(a) Use the vibration analyzer user manual of the manufacturer.

(b) Any vibration tracking system (analyzer) with these functions and specifications for a correct calculation is permitted:

1) Vibration level measurement and display

2) In broad band (BB) and/or narrow band (NB) with tracking filter controlled by the engine speeds of N1 and/or N2

3) Units and Kinetic Functions

a) NB N1 displacement in mils peak to peak

b) NB N2 speed in inch per sec peak

4) Rotational speed measurement and display

a) In % or in RPM (N1 or N2)

5) Imbalance measurement and display

a) For correct calculation, the measuement is done clockwise when forward looking aft (FLA)

b) The measurement unit in degrees from 12 o'clock position, 12:00 (FLA) is zero degrees and 3:00 (FLA) is 90 degrees

(c) Example Ground Support Equipment include:

1) portable engine balancing system, COM-3932

2) Trim Balance Software, CFMI 856A2678P01

H. Fan Trim Balance Procedure

SUBTASK 71-00-00-970-079-F00

(1) Find and record these conditions:

CAUTION: DO NOT USE THE TOTAL TEMPERATURE INDICATION FROM THE AIRPLANE FOR THE AMBIENT AIR TEMPERATURE. THIS WILL PREVENT AN INCORRECT TARGET SELECTION.

CAUTION: DO NOT PUT A MERCURY THERMOMETER ON THE AIRPLANE. MERCURY (FROM A BROKEN THERMOMETER) CAN CAUSE DAMAGE TO THE AIRPLANE COMPONENTS.

(a) Record the ambient air temperature (outside air temperature) in the shade of the wheel well for the nose gear.

(b) Record the barometric pressure.

(c) Use the OAT to find the N1 Takeoff (TO) speed:

1) Enter the OAT on the FMC N1 Limits Page.

a) Enter a slash (/) before you enter the number.

2) Select TO or alternately TO-B if available.

3) Find the N1 speed on the FMC Takeoff Ref Page and record on the data sheet.

4) Make sure the Thrust Mode Display shows TO.

5) Make sure the outer knob of the N1 Set Control is in the AUTO position on the P2 panel.

6) Make sure the Reference N1 Bug agrees with the N1 takeoff speed.

SUBTASK 71-00-00-860-201-F00

WARNING: MAKE SURE YOU OBEY ALL THE INSTRUCTIONS AND PRECAUTIONS WHEN YOU OPERATE AN ENGINE AT HIGH POWER. REFER TO THIS TASK: ENGINE GROUND SAFETY PRECAUTIONS ENGINE GROUND SAFETY PRECAUTIONS, TASK 71-00-00-800-805-F00. IF YOU DO NOT OBEY THE INSTRUCTIONS AND PRECAUTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Do this task: Start the Engine Procedure (Selection), TASK 71-00-00-800-807-F00.

(a) Let the engine become stable at the idle position for a minimum of 2 minutes.

(b) Make sure that all the pneumatic bleeds and electrical loads are off.

(c) Make sure the PROBE HEAT "A" or ''B'' switch on the overhead panel, P5, is in 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.

(d) Make sure all engine indications are normal.

SUBTASK 71-00-00-970-074-F00

CAUTION: MAKE SURE THAT YOU DO NOT GO OVER THE 4 UNITS (10 MILS) VIBRATION LIMIT FOR THE N1 ROTOR. ENGINE DAMAGE CAN OCCUR.

(3) Slowly move the forward thrust lever (in not less than 20 seconds) to the 80 ±2% N1 position.

(a) Let the engine become stable at this speed for a minimum of 5 minutes.

NOTE: This lets the engine become thermally stable and makes sure the vibration indications are accurate.

(b) Do a check of the vibration analyzer for correct operation.

(c) Slowly move the forward thrust lever (in not less than 20 seconds) to the idle position.

1) Let the engine become stable at this speed for a minimum of 30 seconds.

SUBTASK 71-00-00-970-075-F00

CAUTION: DO NOT EXCEED THE TAKEOFF POWER SPEED FOR THE CURRENT CONDITIONS. ENGINE DAMAGE CAN OCCUR.

(4) Do a 2-minute acceleration of the engine from the minimum idle position to the Takeoff Power (TOP) N1 speed.

(a) Let the engine become stable at this speed for a minimum of 15 seconds.

SUBTASK 71-00-00-970-076-F00

(5) Do a 3-minute deceleration of the engine from the TOP to the minimum idle position as follows:

(a) Let the engine become stable at each speed for a minimum of 30 seconds to acquire vibration data and record the data (+/- 30 rpm of N1 target) (Table 531).

(b) Decrease the speed of the engine slowly and continuously to the subsequent lower N1 speed 93% (4813 rpm).

(c) Decrease the speed of the engine slowly and continuously to the subsequent lower N1 speed 89% (4606 rpm).

(d) Decrease the speed of the engine slowly and continuously to the subsequent lower N1 speed 85% (4399 rpm).

(e) Decrease the speed of the engine slowly and continuously to the subsequent lower N1 speed 78% (4037 rpm).

(f) Decrease the speed of the engine slowly and continuously to the subsequent lower N1 speed 70% (3623 rpm).

(g) Decrease the speed of the engine slowly and continuously to the subsequent lower N1 speed 66% (3416 rpm).

(h) Continue the slow decel to idle and let the engine become stabe for 3 minutes.

(i) Do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00.

Table 531/71-00-00-993-896-F00 Vibration Analyzer Data

VIBE SENSOR	N1 SPEED		AMPLI˜ TUDE (MILS DA)	SENSITIVITY (MULTIPLY BY)	BALANCE WEIGHT (GR-CM)	ANGLE (DEG)	PHASE LAG (DEG)	CALCU˜ LATE ANGLE (DEG)
	%	RPM	A	[1]	A v 1mF	B	D	B + D
NO.1 BEAR˜ ING	T/O			TBD			TBD	
	93			325			327	
	89			358			317	
	84			273			255	
	72			248			297	
	60			388			286	
FFCCV	T/O							
	93			161			304	
	89			173			316	
	84			196			313	
	72			283			297	
	60			632			298	

SUBTASK 71-00-00-970-077-F00

(6) Do these steps for the imbalance calculations (Software Method):

NOTE: Use the GSEM -15 to do the trim balance with the software.

(a) The Software Method uses the CFMI Trim Balance Software 856A2678P01 with the vibration analyzer. The software can be used with any ground analyzer to calculate weight correction.

NOTE: Ths procedure which will correct most of the imbalance is not subject of only one trial.

It is not possible to make only one phase angle matrix to apply to all systems because each trim balance system operates differently and has different related phase angles. One shot run followed by one vectorial run can be necessary to locate weight correction.

(b) Examine the current weights location.

1) Record the weights location in the software.

(c) Enter the vibration data from the (Table 531) to the software data (Table 532).

(d) The software gives the balance screw set to install.

Table 532/71-00-00-993-897-F00 Trim Balance Software Data

N1 SPEED %	N1 SPEED RPM	NO.1 BEARING SENSOR				FFCCV SENSOR			
		AMPL	PHASE	LAG	SENS	AMPL	PHASE	LAG	SENS
T/O									
93	4800			327	325			304	161
87	4500			305	328			320	182
78	4050			329	236			296	217
67	3450			272	413			304	481
61	3150			286	300			298	632

SUBTASK 71-00-00-970-078-F00

(7) Do the imbalance calculations with the Hand Calculation Method (One Speed, One Sensor):

(a) The Hand Calculation Method uses the worksheet (Table 533).

NOTE: Ths procedure which will correct most of the imbalance is not subject of only one trial.

It is not possible to make only one phase angle matrix to apply to all systems because each trim balance system operates differently and has different related phase angles. One shot run followed by one vectorial run can be necessary to locate weight correction.

(b) Examine the Current Weights Location.

1) Record the weights location in the worksheet Area 1.

2) Use Figure 518 or Figure 519 to find the total weight (F) and the location (Figure 510).

a) If you can't read the part number on the balance screw, use the weight or length of the screw (Figure 507).

(c) Examine the vibration data and find the maximum vibration and Fan Balance Coefficient.

1) Record the %N1, sensor, vibration (A) and phase angle (B) from the maximum vibration in the worksheet Area 2.

2) Record the sensitivity (C) for the sensor and the coefficient phase (D) from the maximum vibration in the worksheet Area 3.

(d) Do the Weight Calculation for the fan imbalnce

1) Multiply the amplitude of the vibration (Area 2) with the senstivity (Area 3) and record in Area 4.

(e) Do the Angular Location

1) Add the location of the current weights (Area 1) with the coefficient phase (Area 3) and record in Area 5.

(f) Find the applicable balance screw set to install for the Total Weight Calculation.

1) Use Figure 518 or Figure 519 to find the applicable holes to install the calculated imbalance.

2) If the current balance screw configuration is all P07, install the imbalance weight calculated above.

3) If the current balance screw configuration is not all P07, do a vector calculation with the current weight configuration (F) and the calculated imbalance weight (E).

4) Use polar graph paper (Figure 510) to add vectors E and F.

5) Use the Total Weight Calculation and Figure 518 or Figure 519 to find the applicable screw set to install.

Table 533/71-00-00-993-898-F00 Hand Calculation Worksheet

AREA	TASK	
1	EXAMINE CURRENT WEIGHT LOCATION P0__ at ____ , ____ , ____ P0__ at ____ , ____ , ____ P0__ at ____ , ____ , ____ P0__ at ____ , ____ , ____ P0__ at ____ , ____ , ____ P0__ at ____ , ____ , ____ P07 at all other locations	 = ____ gr-cm = (F) at ____ deg
2	VIBRATION DATA RECORDED %N1 = _____ Sensor (No.1 Bearing/FFCCV) _____ Vib = _____ mils Phase = _____ Deg = (A) = (B)	
3	FAN BALANCE COEFFICIENT Sensitivity = _____ gr-cm/mils Coefficient Phase = _____ Deg = (C) = (D)	
4	WEIGHT CALCULATION Weight To Add = (A) x (C) = _____ gr-cm = (E)	
5	ANGULAR LOCATION Weight Location = (B) + (D) = _____ Deg	
6	HOLES Use Angular Location to center the weights around the applicable hole. The tolerance is about 100 gr-cm/5 Deg	
7	TOTAL WEIGHT CALCULATION If the current weight location is all P07, the new weights to install = (E) gr-cm If the current weight location is not all P07, the new weights to install = (E) + (F) gr-cm	

SUBTASK 71-00-00-860-202-F00

(8) Install the new balance screws as follows (Figure 528):

CAUTION: MAKE SURE THAT YOU PUT A MAT ON THE LOWER SURFACE OF THE INLET COWL. DAMAGE TO THE INLET COWL SURFACES CAN OCCUR.

(a) Put the protective mat, STD-585 on the inner lower half of the inlet cowl.

(b) Find the number one fan blade. This blade is immediately above the offset hole (machined dimple) on the fan disk bolt flange.

1) Use amarker, G02061 to put a mark on this blade to identify it as the number one blade.

(c) At the first hole where you will install a new balance screw, remove the installed balance screw.

(d) Lubricate the new balance screw with grease, D00601 [CP2101] and install on the spinner.

1) Tighten the screw to 68-74 pound-inches (7.6-8.4 Newton meters).

(e) Do the above steps to install all other balance screws.

(f) Remove the protective mat, STD-585 and all the other unwanted material from the inlet cowl.

(g) Do the trim balance test at the end of this procedure.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-080-007-F00

(1) Remove the vibration analyzer equipment.

(2) Do this step:

Close this access panel:

Number	Name/Location
117A	Electronic Equipment Access Door

J. Trim Balance Test

SUBTASK 71-00-00-720-008-F00

(1) Do this task: Test 7 - Vibration Survey, TASK 71-00-00-700-814-F00.

(a) This test is not necessary if the cause for the trim balance (initial imbalance) is less than 4.0 units.

(b) Monitor the vibration levels on subsequent engine operation.

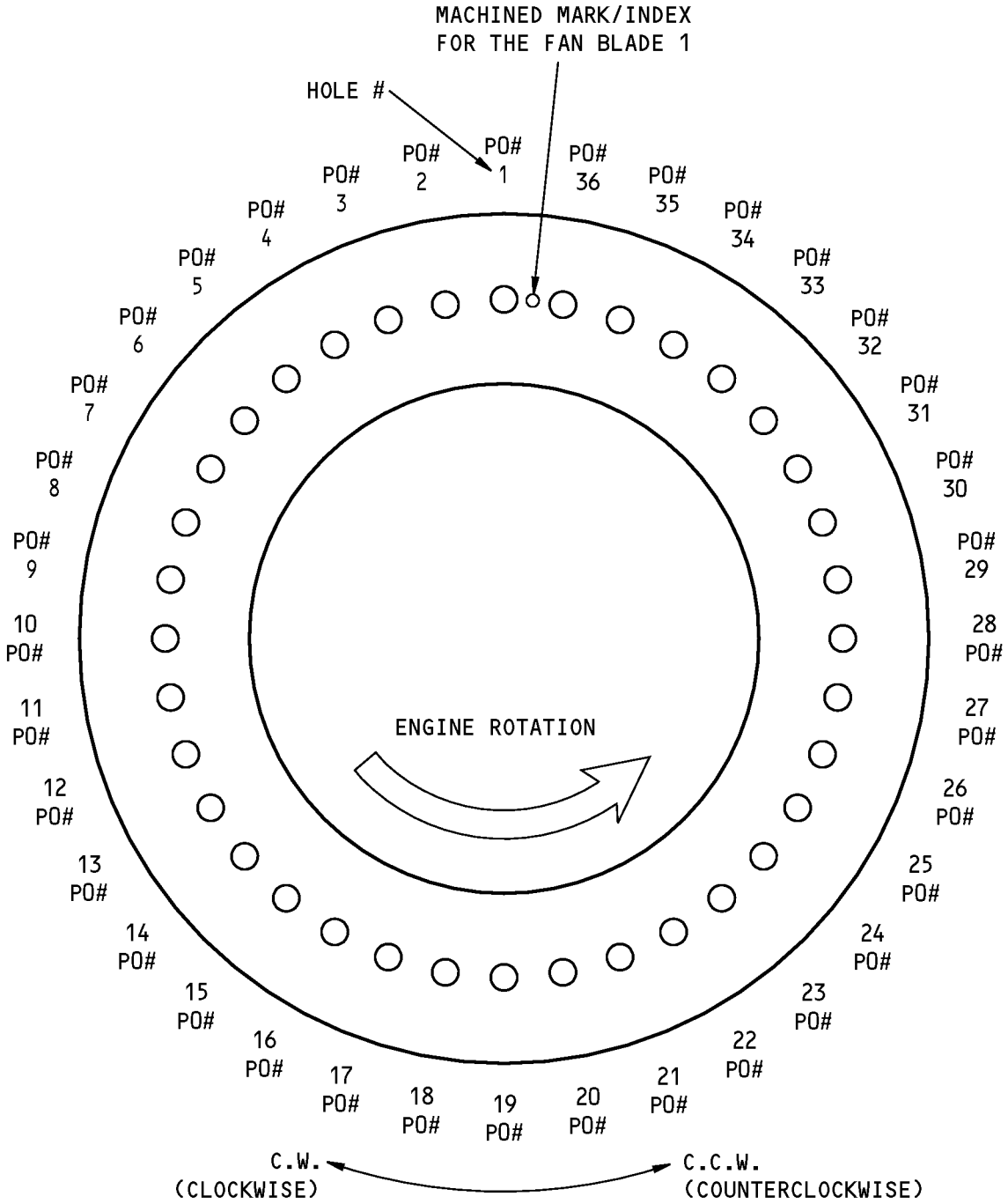
1) If the vibration level does not change much, you can stop the monitoring.

2) If the vibration level changes significantly, apply CFMI CESM No.7 to decrease and control the vibration.

SUBTASK 71-00-00-860-203-F00

(2) During a subsequent engine operation, do a check of the N1 and AVM indications to make sure they operate correctly.

END OF TASK



(VIEW IN THE AFT DIRECTION)

S-M56-MM-03715-00-B

Initial Balance Screw Location Chart
Figure 528/71-00-00-990-905-F00

TASK 71-00-00-750-806-F00

18. Test 14D - Two-Plane Trim Balance

A. General

(1) The function of this procedure is to reduce the vibration level of the turbine rear frame (TRF). However, most of the engines are correctly balanced with the fan trim balance procedure only.

(a) After the fan trim balance procedure, it is optional and anticipated extremely rare that this procedure be tried to reduce airplane interior audible and tactile perceived vibration or noise reported during flight main phases of cruise or climb.

(2) This procedure uses a temporary TRF accelerometer and vibration analyzer to install clips on the last Low Pressure Turbine (LPT) stage blades (4th stage).

(3) This procedure can be applied in the following cases:

(a) A fan trim balance procedure has been done and cabin noise has been reported during the subsequent flight.

(b) LPT imbalance can be a possible cause of excitation transmitted to the airplane structure at the same time with low indicated vibration levels (1.0 Unit or less).

B. References

Reference	Title
71-00-00-700-819-F00	Stop the Engine Procedure (Usual Engine Stop) (P/B 201)
71-00-00-800-805-F00	Engine Ground Safety Precautions (P/B 201)
71-00-00-800-807-F00	Start the Engine Procedure (Selection) (P/B 201)
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

C. Tools/Equipment

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

Reference	Description
COM-3932	System - Portable Engine Balancing (Part #: PBS-4100, Supplier: 26741, A/P Effectivity: 737-100, -200, -200C, -300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER)
SPL-4054	Pliers - Set, Install/Remove, LPT Balance Clips (Part #: 856A3786, Supplier: 58828, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

D. Consumable Materials

Reference	Description	Specification
G02061	Marker - Permanent, Felt Tip Pen	

E. Location Zones

Zone	Area
117	Electrical and Electronics Compartment - Left
118	Electrical and Electronics Compartment - Right
211	Flight Compartment - Left
212	Flight Compartment - Right
411	Engine 1 - Engine

(Continued)

Zone	Area
421	Engine 2 - Engine

F. Prepare for the Trim Balance Procedure

SUBTASK 71-00-00-700-002-F00

(1) If the last result of a fan trim balance procedure is not satisfactory, you must balance the fan again to the lowest vibration level on the No. 1 bearing (or FFCCV) sensor.

NOTE: Do not try to balance the LPT if the fan was not balanced to approximately 1.5 mils (cockpit indication 0.6 Units) or less. When you balance the LPT, the fan vibration levels will not change more.

SUBTASK 71-00-00-010-029-F00

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 REVERSERS (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.

(2) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

SUBTASK 71-00-00-480-006-F00

(3) Once the fan vibration level is at the lowest level, install the TRF vibration sensor (Figure 529).

(a) Install the slave TRF vibration sensor, 856A2681G01 on the aft side of the TRF on bolt holes 44-45.

NOTE: The slave sensor is an accelerometer with integral lead (mesh shield) and an extension cable.

(b) Make sure the cable is connected correctly to the TRF sensor.

(c) Route the TRF sensor cable toward the FFCCV sensor.

1) Tie down the cable every 8 inches (20 cm).

(d) Remove the connector DP1101 from the FFCCV vibration sensor and install a protective cap on the FFCCV sensor.

(e) Install the FFCCV connector DP1101 to the TRF extension cable and secvre this connection to the engine.

(f) Note this data on the two-plane trim balance and the TRF sensor:

1) Because of sensor sensitivity differences (TRF 50 pC/G, FFCCV 100 pC/G), the indicated vibration amplitude levels of the TRF is one-half of the real or actual levels but the phase values are identical.

2) No correction for the amplitude levels by the operator is necessary with this procedure. The operator uses the indicated or recorded values directly.

3) The trim balance coefficients account for the sensitivity differences and automatically does the correction.

4) Hole No. 1 is the first hole (Clockwise) aft looking forward (ALF) from the 12 o'clock TRF mark.

SUBTASK 71-00-00-480-007-F00

(4) Install the vibration analyzer portable engine balancing system, COM-3932 856A2679 to the AVM front panel with the breakout cable (Figure 530).

NOTE: Keep the AVM system available to monitor vibration in the flight compartment during the test in parallel with the vibration tracking system (analyzer).

(a) Use the vibration analyzer user manual of the manufacturer.

SUBTASK 71-00-00-410-017-F00

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.

(5) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

G. Two-plane Trim Balance Procedure

SUBTASK 71-00-00-970-080-F00

(1) Find and record these conditions:

CAUTION: DO NOT USE THE TOTAL TEMPERATURE INDICATION FROM THE AIRPLANE FOR THE AMBIENT AIR TEMPERATURE. THIS WILL PREVENT AN INCORRECT TARGET SELECTION.

CAUTION: DO NOT PUT A MERCURY THERMOMETER ON THE AIRPLANE. MERCURY (FROM A BROKEN THERMOMETER) CAN CAUSE DAMAGE TO THE AIRPLANE COMPONENTS.

(a) Record the ambient air temperature (outside air temperature) in the shade of the wheel well for the nose gear.

(b) Record the barometric pressure.

(c) Use the OAT to find the N1 Takeoff (TO) speed:

1) Enter the OAT on the FMC N1 Limits Page.

a) Enter a slash (/) before you enter the number.

2) Select TO or alternately TO-B if available.

3) Find the N1 speed on the FMC Takeoff Ref Page and record on the data sheet.

4) Make sure the Thrust Mode Display shows TO.

5) Make sure the outer knob of the N1 Set Control is in the AUTO position on the P2 panel.

6) Make sure the Reference N1 Bug agrees with the N1 takeoff speed.

SUBTASK 71-00-00-860-208-F00

WARNING: MAKE SURE YOU OBEY ALL THE INSTRUCTIONS AND PRECAUTIONS WHEN YOU OPERATE AN ENGINE AT HIGH POWER. REFER TO THIS TASK: ENGINE GROUND SAFETY PRECAUTIONS ENGINE GROUND SAFETY PRECAUTIONS, TASK 71-00-00-800-805-F00. IF YOU DO NOT OBEY THE INSTRUCTIONS AND PRECAUTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Do this task: Start the Engine Procedure (Selection), TASK 71-00-00-800-807-F00.

(a) Let the engine become stable at the idle position for a minimum of two minutes.

(b) Make sure that all the pneumatic bleeds and electrical loads are off.

(c) Make sure the PROBE HEAT "A" or ''B'' switch on the overhead panel, P5, is in 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.

(d) Make sure all engine indications are normal.

SUBTASK 71-00-00-970-081-F00

CAUTION: MAKE SURE THAT YOU DO NOT GO OVER THE 4 UNITS (10 MILS) VIBRATION LIMIT FOR THE N1 ROTOR. ENGINE DAMAGE CAN OCCUR.

(3) Slowly move the forward thrust lever (in not less than 20 seconds) to the 80 ±2% N1 position.

(a) Let the engine become stable at this speed for a minimum of five minutes.

NOTE: This lets the engine become thermally stable and makes sure the vibration indications are accurate.

(b) Do a check of the vibration anlayzer for correct operation.

(c) Slowly move the forward thrust lever (in not less than 20 seconds) to the idle position.

1) Let the engine become stable at this speed for a minimum of 30 seconds.

SUBTASK 71-00-00-970-082-F00

CAUTION: DO NOT EXCEED THE TAKEOFF POWER SPEED FOR THE CURRENT CONDITIONS, ENGINE DAMAGE CAN OCCUR.

(4) Do a two-minute acceleration of the engine from the minimum idle position to the Takeoff Power (TOP) N1 speed.

(a) Let the engine become stable at this speed for a minimum of 15 seconds.

SUBTASK 71-00-00-970-083-F00

(5) Do this deceleration of the engine from the TOP to the minimum idle position as follows:

(a) Let the engine become stable at each speed for a minimum of 30 seconds to acquire vibration data and record the data.

1) Record the vibration data [amplitude and angle] at each of the speeds.

NOTE: The PBS4100 and CFMI analyzer automatically acquires the amplitude and phases of the vibration at each N1 speed.

2) Use (Table 534) or (Table 535) for the appliable analyzer.

(b) Decrease the speed of the engine slowly and continuously to the subsequent lower N1 speed 95% (4750 RPM).

(c) Decrease the speed of the engine slowly and continuously to the subsequent lower N1 speed 92% (4700 RPM).

(d) Decrease the speed of the engine slowly and continuously to the subsequent lower N1 speed 90% (4500 RPM).

(e) Decrease the speed of the engine slowly and continuously to the subsequent lower N1 speed 87% (4350 RPM).

(f) Decrease the speed of the engine slowly and continuously to the subsequent lower N1 speed 85% (4250 RPM).

(g) Decrease the speed of the engine slowly and continuously to the subsequent lower N1 speed 82% (4100 RPM).

(h) Decrease the speed of the engine slowly and continuously to the subsequent lower N1 speed 80% (4000 RPM).

(i) Decrease the speed of the engine slowly and continuously to the subsequent lower N1 speed 60% (3000 RPM).

(j) Continue the slow decel to idle and let the engine become stable for three minutes.

(k) Make sure the vibration analyzer has acquired several data points at each of the N1 speeds. If not, do the engine operation for the decel sequence again.

(l) After satisfactory data acquisiton, stop the engine. do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00

Table 534/71-00-00-993-905-F00 LPT One-Shot Trim Balance - PBS4100

VIB SENSOR	N1 SPEED		AMPLI˜ TUDE (MILS DA)	SENSITIVITY (MULTIPLY BY)	BALANCE WEIGHT	ANGLE (DEG)	PHASE LAG (DEG)	CALCU˜ LATE ANGLE (DEG)
	%	RPM						
TRF	T/O							
	95	4750		969			106	
	92	4600		982			106	
	90	4500		978			112	
	87	4350		971			123	
	85	4200		989			131	
	82	4100		1013			143	
	80	4000		1031			151	
	60	3000		1165			184	
NO.1 BEAR˜ ING	T/O							
	95	4750						
	92	4600						
	90	4500						
	87	4300						
	85	4250						
	82	4100						
	80	4000						
	60	3000						

Table 535/71-00-00-993-906-F00 LPT One-Shot Trim Balance - CFMI Analyzer

VIB SENSOR	N1 SPEED		AMPLI˜ TUDE (MILS DA)	SENSITIVITY (MULTIPLY BY)	BALANCE WEIGHT	ANGLE (DEG)	PHASE LAG (DEG)	CALCU˜ LATE ANGLE (DEG)
	%	RPM						
	100	5000		704			282	
	TOP							

(Continued)

VIB SENSOR	N1 SPEED		AMPLI˜ TUDE (MILS DA)	SENSITIVITY (MULTIPLY BY)	BALANCE WEIGHT	ANGLE (DEG)	PHASE LAG (DEG)	CALCU˜ LATE ANGLE (DEG)
	%	RPM						
TRF	92	4600		398			289	
	68	3400		463			39	
	64	3200		791			46	
	60	3000		586			62	
NO.1 BEAR˜ ING	100	5000		1233			121	
	TOP							
	92	4600		844			310	
	68	3400		1422			247	
	62	3400		1744			350	
	60	3000		869			236	

SUBTASK 71-00-00-970-084-F00

(6) Examine the fan vibration level for the No. 1 Bearing sensor; if the maximum fan vibration is more than 1.5 mils DA, do these steps:

(a) Stop the two-plane trim balance procedure.

(b) Remove the TRF sensor and re-connect the FFCCV vibration sensor.

(c) Do a fan trim balance to reduce the fan vibration level.

(d) If the maximum fan vibration is less than 1.5 mils DA, then continue with the two-plane trim balance to the next step.

SUBTASK 71-00-00-970-085-F00

(7) Calculate the LPT single trim or two-plane trim balance with the No. 1 Bearing and TRF sensor data per the manufacturer's procedure.

NOTE: For the CFMI analyzer, use the GSEM-17 manual to do the trim balance with the software.

(a) Issue the "trim balance" report.

(b) This procedure does not show the LPT or two-plane balance hand calculation resolution and assumes the operator knows the single plane or two-plane balance.

(c) There are several softwares available to calculate more easily the trim balance solution using the recorded data. Refer to CFMI for further assistance for LPT single plane or two-plane calculations.

(d) For the calculation, do not forget to account for the LPT clips installed on the engine during the data acquisition.

(e) If it is necessary, do these steps to find the number of consecutive LPT clips to install:

1) Find the imbalance weight of the balance solution.

2) Use the imbalance and (Table 536) to find the number of LPT clips.

NOTE: It is permitted to install a maximum of 20 LPT clips on the whole 4th-stage LPT.

a) Record the number of clips to install.

(f) If it is necessary, do these steps to find the target angle where to center the LPT clips:

1) Find the target angle of the balance solution.

2) Find the LPT blade position (Figure 531) which matches the target angle.

a) The LPT blade No. 1 is aligned with zero degrees fan trim balance reference. The LPT blade No. 1 and fan blade No. 1 are roughly aligned.

b) Count the LPT blades in the engine rotation clockwise when you look at the 4th-stage LPT from the aft.

c) Record the LPT blade position for the target angle.

3) Alternate LPT angle locator:

a) Locate the fan trim balance screw on the fan spinner cone which agrees with the target angle. Don't use the fan blade, use the balance screw (36).

b) Turn the fan rotor to put the this balance screw at the 6 o'clock position.

c) At the LPT, the blade located at the 6 o'clock position is at the target angle.

Table 536/71-00-00-993-907-F00 4th Stage LPT Clip Weights

CONSECUTIVE CLIPS	IMBALANCE cm.g	CONSECUTIVE CLIPS	IMBALANCE cm.g
1	62	11	675
2	124	12	734
3	186	13	794
4	248	14	853
5	309	15	911
6	371	16	969
7	432	17	1026
8	493	18	1083
9	554	19	1140
10	614	20	1195

SUBTASK 71-00-00-860-209-F00

(8) If the engine had LPT balance clips installed before the trim balance, do these steps to remove the LPT clips (Figure 532):

NOTE: Remove the LPT clips that are not part of the balance solution. A maximum of twenty clips is permitted on the whole 4th-stage LPT. For convenience, any installed clips can be removed before you start the two-plane balance.

WARNING: MAKE SURE THAT THE PRIMARY NOZZLE AND PRIMARY PLUG ARE SUFFICIENTLY COOL. IF THE NOZZLE AND PLUG ARE TOO HOT, INJURIES CAN OCCUR TO PERSONS WHEN THEY REMOVE OR INSTALL LPT CLIPS.

(a) Put the LPT blade with the clip to the 6 o'clock position.

(b) Use the LPT balance clip pliers, SPL-4054 and engage the tool head over the blade tip shroud on the forward side of the clip.

(c) Engage the rear tool head onto the clip and safety the clip.

(d) Remove the tool with the clip from the LPT.

SUBTASK 71-00-00-860-210-F00

(9) Install the number of clips on all target LPT blades as follows (Figure 533):

(a) Find the No. 1 fan blade. This blade is immediately above the offset hole (machined dimple) on the fan disk bolt flange.

CAUTION: USE ONLY APPROVED MARKING MATERIALS ON THE FAN BLADES AND LPT. IF YOU DO NOT USE APPROVED MARKING MATERIALS, DAMAGE TO EQUIPMENT CAN OCCUR.

1) Use a marker, G02061 to put a mark on this blade to identify it as the No. 1 fan blade.

(b) Turn the No. 1 fan blade until its leading edge is aligned with the fan case drain hole located at 6 o'clock position.

(c) Find the No. 1 LPT blade. This blade is most closely aligned to the 6 o'clock engine weld line of the TRF.

1) Use a marker, G02061 to put a mark on this LPT blade to identify it as the No. 1 LPT blade.

2) Mark the LPT blade which agrees with the LPT target angle.

(d) Mark the LPT blades where to install the consecutive clips.

(e) Put the first LPT blade tip on which you will put a clip to the 6 o'clock position.

(f) Prepare the clip and holding tool of the LPT balance clip pliers, SPL-4054 as follows:

1) Engage the clip holding wire into the holding rod and turn the rod end fitting until the clip holding wire is held by the holding rod.

2) Use your two hands to twist the clip holding wire down and to the right.

NOTE: Make sure the axis of the holding rod and the clip are parallel.

CAUTION: WHEN YOU DO THESE STEPS, BE CAREFUL NOT TO BREAK THE WIRE WELD. IF THE WIRE WELD BREAKS, THE CLIP CAN FALL INTO THE TURBINE. DAMAGE TO EQUIPMENT CAN OCCUR.

(g) Put the clip in position on the blade tip shroud as follows:

1) With the clip holding tool, engage the clip vertically between the two blades to cover two blade tip shrouds.

2) To move the bent end of the clip over the front edge of the blade tip shroud, push the rod forward, then pull the rod back.

3) Make the rear edge of the clip touch the rear edge of the blade tip shroud and move the clip down until it engages on the shroud.

(h) Crimp the clip with the LPT balance clip pliers, SPL-4054 as follows:

CAUTION: HOLD THE CRIMPING PLIERS PERPENDICULAR TO THE BLADE TIP SHROUD TO MAKE SURE IT IS IN THE CORRECT POSITION. DAMAGE TO EQUIPMENT CAN OCCUR.

1) Engage the head jaws of the crimping jaws between the two blades and let the jaws rest on the clip.

2) Push the crimping pliers forward and up against the blade.

3) Put the pliers on the engine centerline and let the pliers jaws come down around the clip.

4) Press the trigger of the tool handle to crimp the clip.

5) Remove the crimping pliers as follows:

   a) Release the trigger to open the pliers jaws.

   b) Lift the pliers handle to disengage the tool head rear jaw from the clip, then push forward to disengage the front jaw.

   c) Lift the pliers head and pull back to remove the tool.

6) Make sure the clip is installed correctly with the rear end of the balance clip fully bent on the blade platform.

7) If the balance clip is installed correctly, move the clip holding wire up and down to break it off at the weld point.

   a) Make sure that the removal of the holding wire is satisfactory.

8) If the installation of the balance clip or the removal of the holding wire is not satisfactory, replace the balance clip as follows:

   a) Move the blade tips that have balance clips installed to the 6 o'clock position.

   CAUTION: BE CAREFUL WHEN YOU REMOVE THE BALANCE CLIPS. IF YOU ARE NOT CAREFUL, YOU CAN CAUSE DAMAGE TO THE BLADE TIP DURING REMOVAL.

   b) Engage the tool head over the blade tip shroud on the right side of the clip.

   c) Move the tool head left and engage the clip retaining pin of the tool between the clip and rear of the blade tip shroud.

   d) Engage the rear end of the clip in the window of the tool head lower jaw.

   e) Press the trigger of the tool handle to unlock the anti-rotation plate.

   f) Push the tool rod forward and slightly up to tilt the tool end fitting and uncrimp the clip.

   CAUTION: WHEN YOU REMOVE THE TOOL AND THE CLIP, MAKE SURE THAT YOU TURN THE TOOL CLOCKWISE TO KEEP THE CLIP OUT OF THE TURBINE. THE CLIP CAN FALL INTO THE TURBINE IF YOU TURN THE TOOL COUNTERCLOCKWISE. DAMAGE TO EQUIPMENT CAN OCCUR.

   g) Turn the tool clockwise a quarter of a turn and pull it back together with the clip.

   h) Remove the balance clip.

H. Trim Balance Test

SUBTASK 71-00-00-720-009-F00

(1) Do the engine operation again from the Two-Plane Trim Balance Procedure.

   (a) Record the values of vibration amplitudes and phase angle for the No. 1 Bearing and TRF sensors.

   (b) If the trim balance is satisfactory, Put The Airplane Back To Its Uusal Condition.

I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-010-030-F00

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 REVERSERS (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.

(1) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

SUBTASK 71-00-00-010-031-F00

(2) Do these steps to remove the test equipment:

(a) Remove the vibration analyzer equipment.

(b) Do these steps to remove the TRF sensor:

1) Disconnect the FFCCV connector DP1001 from the TRF sesnor cable.

2) Remove the protective cap from the FFCCV sensor.

3) Connect the FFCCV connector DP1001 to the FFCCV.

4) Remove the TRF sensor and cable from the TRF.

5) It is not permitted to put the engine back in service for these conditions:

a) The TRF sensor and cables are installed on the engine.

b) The FFCCV sensor is disconnected.

SUBTASK 71-00-00-410-018-F00

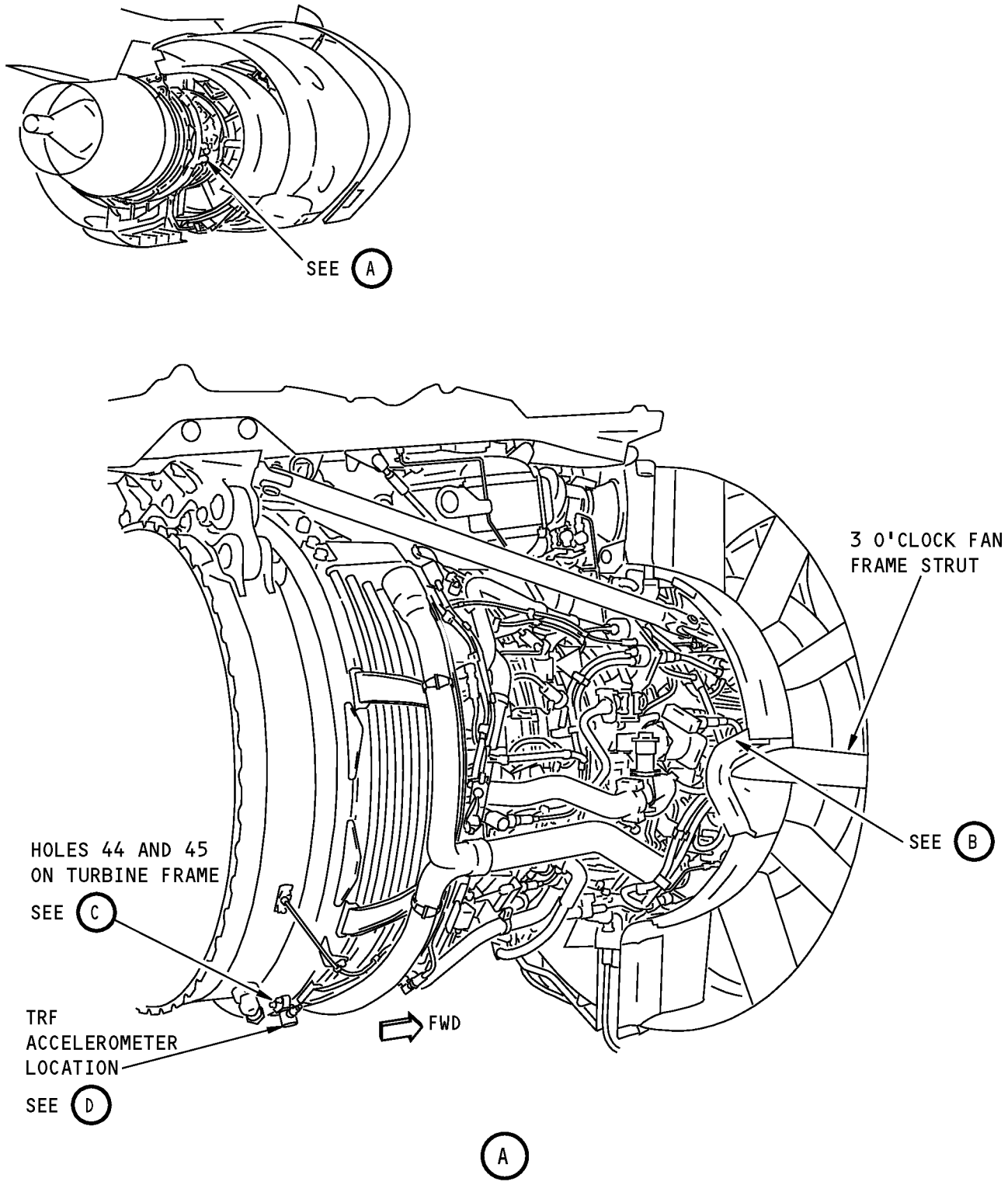
WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

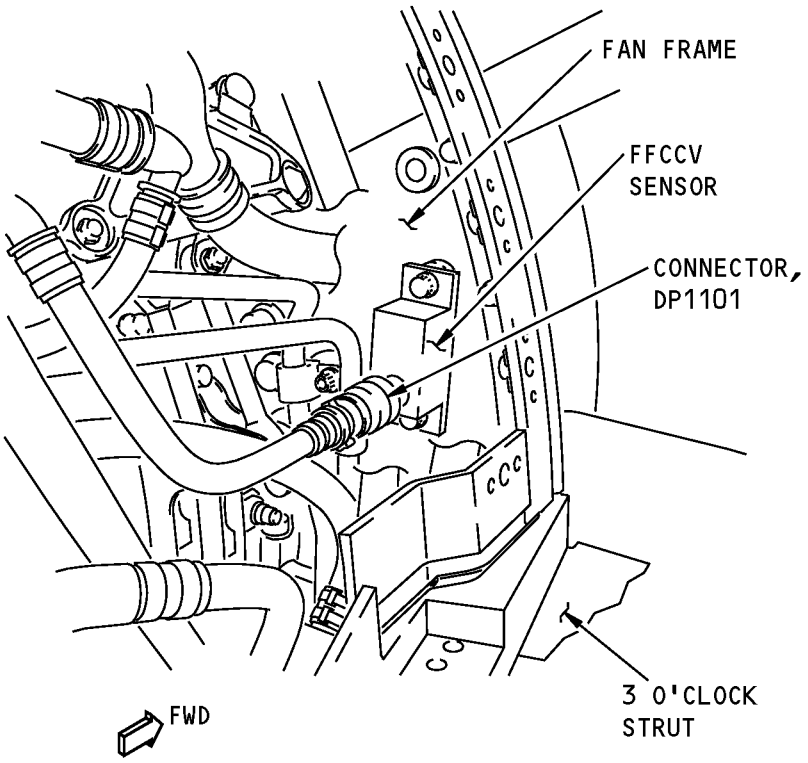
SUBTASK 71-00-00-860-211-F00

(4) During a subsequent engine operation, do a check of the N1 and AVM indications to make sure they operate correctly.

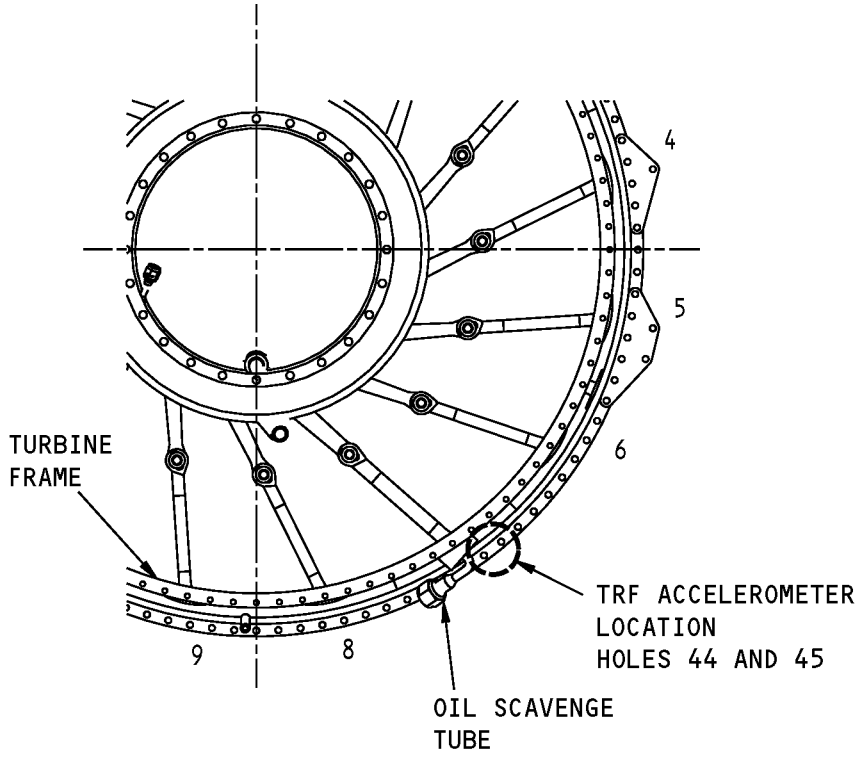
——————— END OF TASK ———————



TRF Accelerometer Installation
Figure 529 (Sheet 1 of 3)/71-00-00-990-900-F00

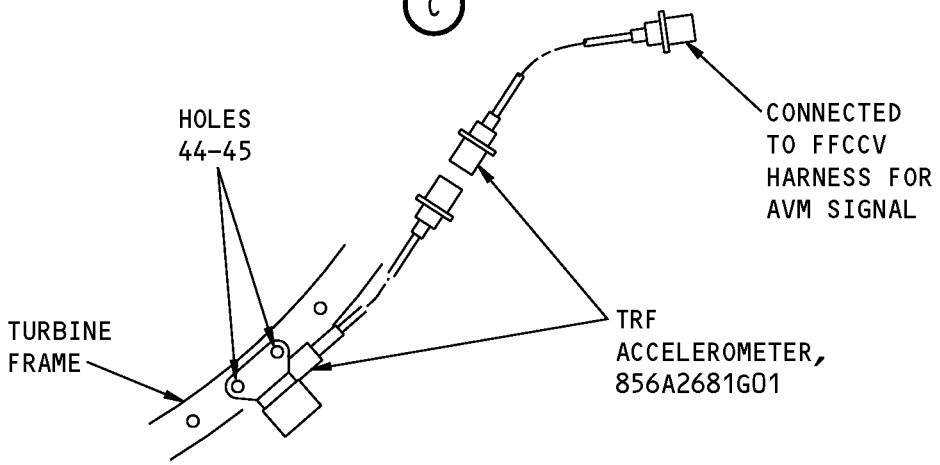


TRF Accelerometer Installation
Figure 529 (Sheet 2 of 3)/71-00-00-990-900-F00



HOLES 44 AND 45 ON TURBINE FRAME
(AFT VIEW)

C

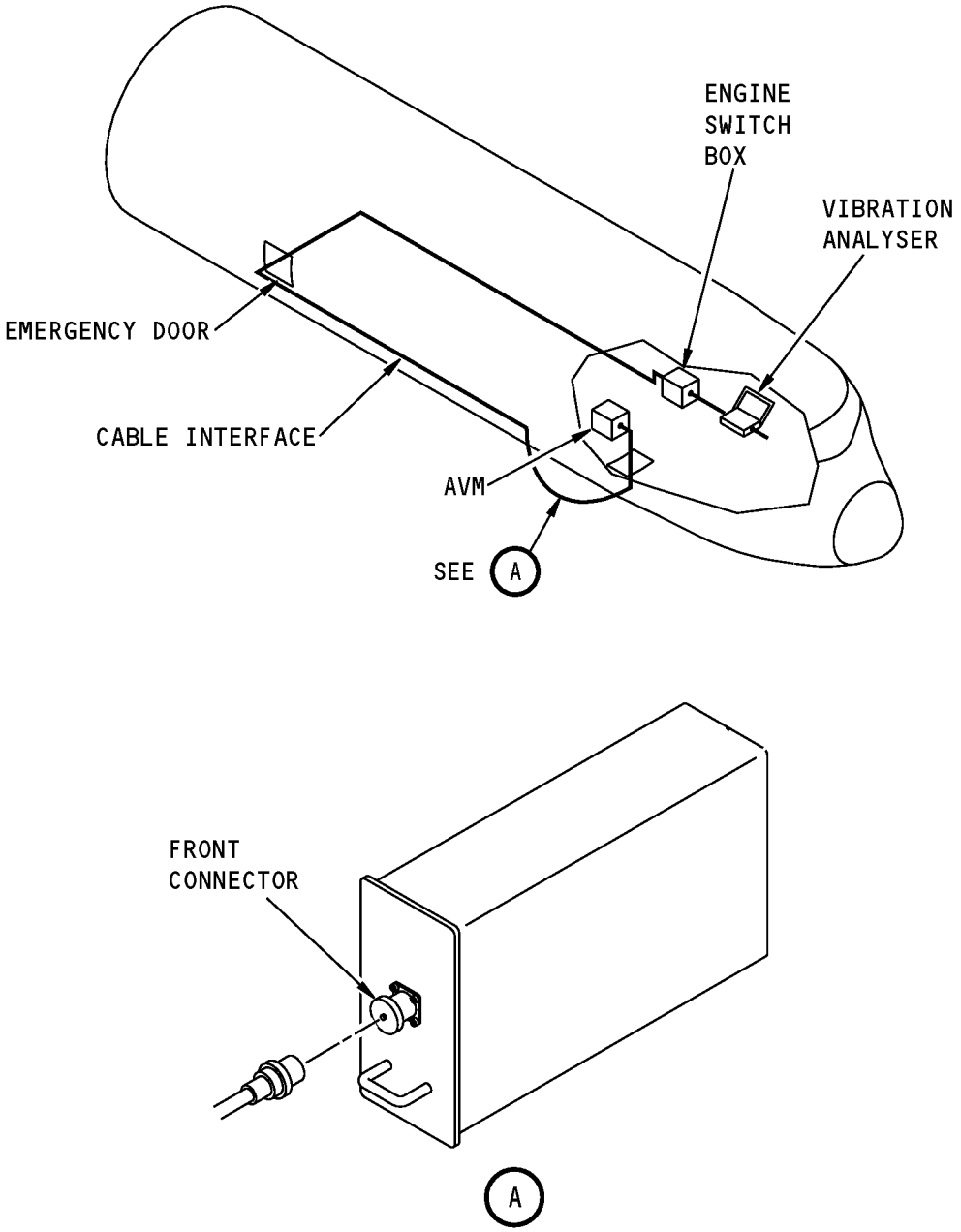


TRF ACCELEROMETER LOCATION
(AFT VIEW)

D

MM-00165-00-B

TRF Accelerometer Installation
Figure 529 (Sheet 3 of 3)/71-00-00-990-900-F00



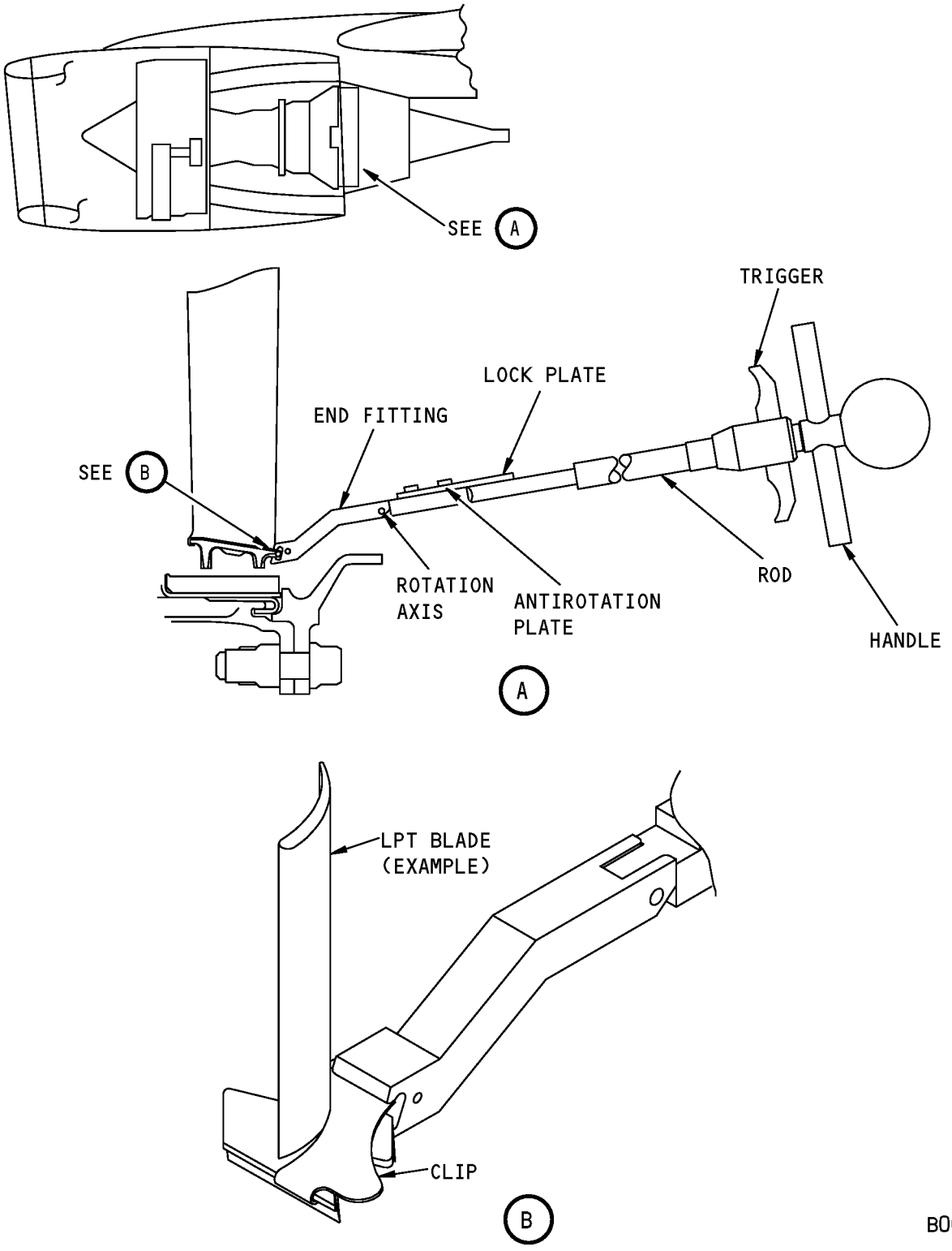
AVM CONNECTION IN THE MAIN EQUIPMENT CENTER

MM-00166-00-B

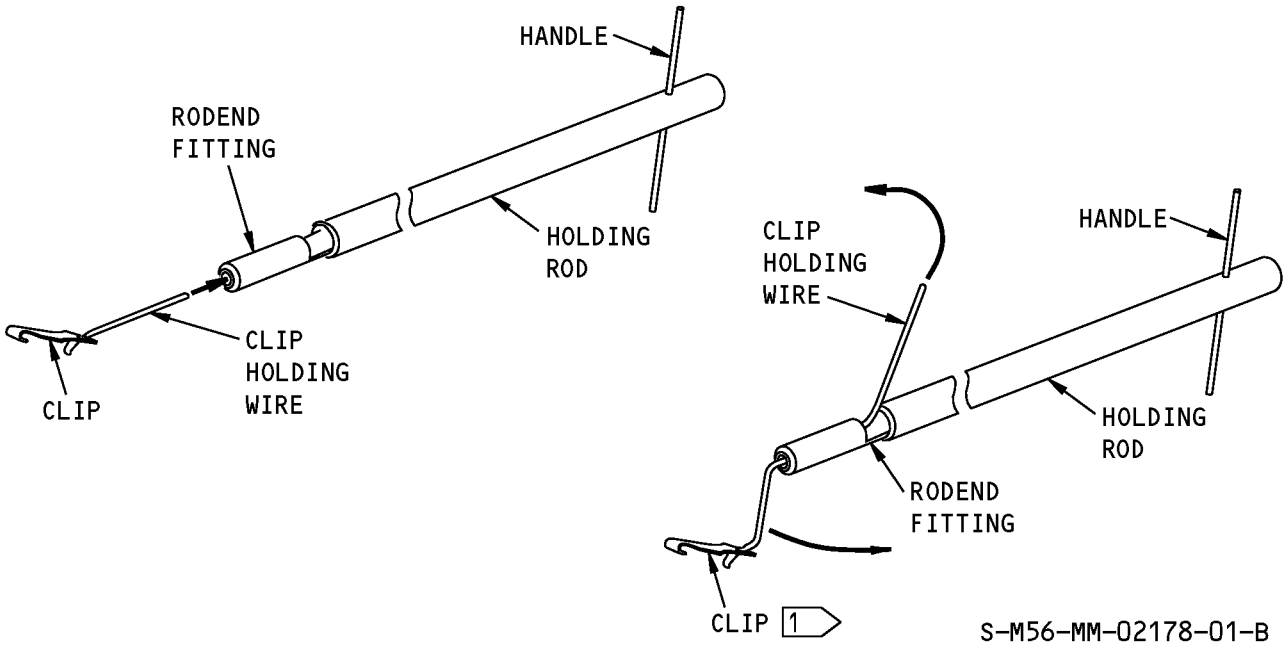
Trim Balance Kit Installation
Figure 530/71-00-00-990-901-F00

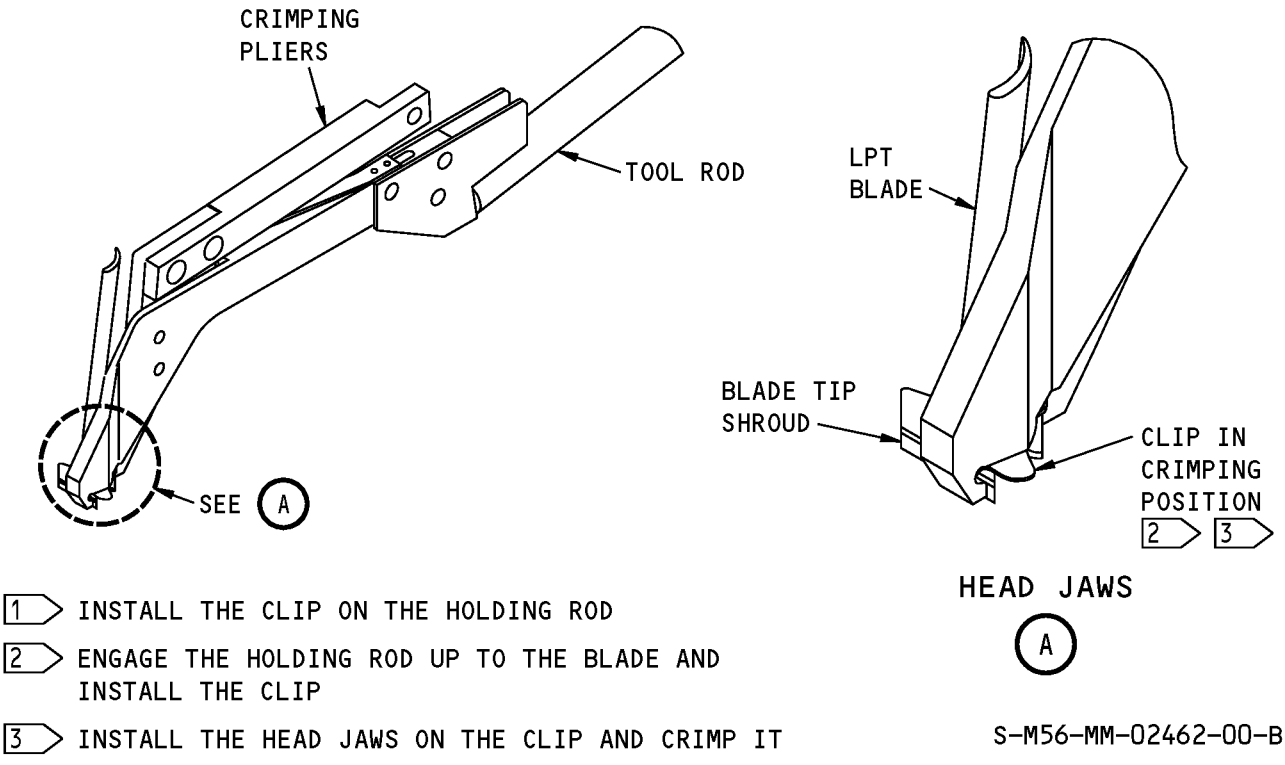
LPT BLADE POSITION	ANGLE	LPT BLADE POSITION	ANGLE	LPT BLADE POSITION	ANGLE	LPT BLADE POSITION	ANGLE
1	0.0	45	241.8	89	123.6	133	5.4
2	357.3	46	239.1	90	120.9	134	2.7
3	354.6	47	236.4	91	118.2		
4	351.9	48	233.7	92	115.5		
5	349.3	49	231.0	93	112.8		
6	346.6	50	228.4	94	110.1		
7	343.9	51	225.7	95	107.5		
8	341.2	52	223.0	96	104.8		
9	338.5	53	220.3	97	102.1		
10	335.8	54	217.6	98	99.4		
11	333.1	55	214.9	99	96.7		
12	330.4	56	212.2	100	94.0		
13	327.8	57	209.6	101	91.3		
14	325.1	58	206.9	102	88.7		
15	322.4	59	204.2	103	86.0		
16	319.7	60	201.5	104	83.3		
17	317.0	61	198.8	105	80.6		
18	314.3	62	196.1	106	77.9		
19	311.6	63	193.4	107	75.2		
20	309.0	64	190.7	108	72.5		
21	306.3	65	188.1	109	69.9		
22	303.6	66	185.4	110	67.2		
23	300.9	67	182.7	111	64.5		
24	298.2	68	180.0	112	61.8		
25	295.5	69	177.3	113	59.1		
26	292.8	70	174.6	114	56.4		
27	290.1	71	171.9	115	53.7		
28	287.5	72	169.3	116	51.0		
29	284.8	73	166.6	117	48.4		
30	282.1	74	163.9	118	45.7		
31	279.4	75	161.2	119	43.0		
32	276.7	76	158.5	120	40.3		
33	274.0	77	155.8	121	37.6		
34	271.3	78	153.1	122	34.9		
35	268.7	79	150.4	123	32.2		
36	266.0	80	147.8	124	29.6		
37	263.3	81	145.1	125	26.9		
38	260.6	82	142.4	126	24.2		
39	257.9	83	139.7	127	21.5		
40	255.2	84	137.0	128	18.8		
41	252.5	85	134.3	129	16.1		
42	249.9	86	131.6	130	13.4		
43	247.2	87	129.0	131	10.7		
44	244.5	88	126.3	132	8.1		

Two-Plane Trim Balance LPT Angle
Figure 531/71-00-00-990-902-F00



LPT Clip Removal
Figure 532/71-00-00-990-903-F00





1 INSTALL THE CLIP ON THE HOLDING ROD

2 ENGAGE THE HOLDING ROD UP TO THE BLADE AND INSTALL THE CLIP

3 INSTALL THE HEAD JAWS ON THE CLIP AND CRIMP IT

LPT Clip Installation
Figure 533/71-00-00-990-904-F00

POWER PLANT - INSPECTION/CHECK

1. General

A. This procedure has these tasks:

(1) An inspection after Foreign Object Damage (FOD)

(2) An inspection after an engine fire, the use of fire extinquishing agents, or high nacelle temperature

(3) An inspection after operation above the limits and high engine stress

(a) N1 and N2 overspeeds

(b) EGT overtemperature

(c) Low or zero oil pressure

(d) High oil consumption

(e) High oil temperature

(4) An inspection after an engine stall or a possible engine stall

(5) An inspection after an in-flight windmilling

(6) An inspection after a hard landing

(7) An inspection after high G-loads during transportation

(8) An inspection of an engine after volcanic ash ingestion

(9) A check of the Engine Exceedances page

(10) A inspection on the nacelle structure hot air rupture condition.

B. Refer to AMM 72-00-00/601 for the borescope inspection of the engine.

TASK 71-00-00-800-802-F00

2. Foreign Object Damage Inspection

A. General

(1) This procedure gives the steps to do an inspection after a birdstrike or Foreign Object Damage (FOD).

(2) You must do a visual inspection when foreign objects have gone into the engine. A borescope inspection can be necessary.

(3) The borescope inspection is necessary for these conditions.

(a) For FOD with normal engine parameters:

1) FOD caused missing material to the fan blades.

2) or if signs of unwanted material entered the booster inlet.

(b) For FOD with abnormal engine parameters.

(4) After a birdstrike, do the visual inspection, the gaspath inspection (see if a borescope inspection is necessary) and the birdstrike inspection.

B. References

Reference	Title
24-11-21-000-801	Integrated Drive Generator (IDG) Air/Oil Cooler Removal (P/B 401)
24-11-21-400-801	Integrated Drive Generator (IDG) Air/Oil Cooler Installation (P/B 401)
71-00-00-700-813-F00	Test 5 - Power Assurance Check (P/B 501)
71-00-00-700-814-F00	Test 7 - Vibration Survey (P/B 501)
71-00-02-000-801-F00	Power Plant Removal (P/B 401)

(Continued)

Reference	Title
71-00-02-400-801-F00	Power Plant Installation (P/B 401)
71-11-01-200-801-F00	Inlet Cowl Inspection (P/B 601)
71-11-02-200-801-F00	Fan Cowl Panels Inspection (P/B 601)
72-00-00-200-803-F00	Borescope Inspection of the Booster Blades and Vanes (P/B 601)
72-00-00-200-804-F00	Borescope Inspection of the HP Compressor Blades (P/B 601)
72-00-00-200-805-F00	Borescope Inspection of the Combustion Chamber (P/B 601)
72-00-00-200-808-F00	Borescope Inspection of the Stage 1-3 LPT Blades (P/B 601)
72-00-00-200-809-F00	Borescope Inspection of the Stage 4 LPT Blades (P/B 601)
72-21-01-200-801-F00	Spinner Cone and Retaining Flange Inspection (P/B 601)
72-21-02-200-801-F00	Fan Module Inspection (P/B 601)
72-21-03-200-801-F00	Stage 1 Booster Vane Assembly Inspection (Visual) (P/B 601)
72-23-01-200-801-F00	Outlet Guide Vanes (OGV) Inspection (P/B 601)
72-24-02-200-801-F00	Abradable Shroud (Detail) Inspection (P/B 601)
73-21-05-200-801-F00	T12 Sensor Inspection/Check (P/B 601)
78-11-00-210-802-F00	Primary Nozzle Assembly and Primary Plug Assembly Inspection (P/B 601)
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

C. Location Zones

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

D. Procedure

SUBTASK 71-00-00-100-001-F00

(1) If you find signs of a birdstrike, follow these steps before you continue:

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.

WARNING: DO NOT LET THE BIRD CARCASS OR OTHER PIECES OF THE BIRD TOUCH YOUR SKIN. DISCARD THE BIRD PIECES IN A PLASTIC DISPOSAL BAG. THE BIRD PIECES CAN CONTAIN INFECTIOUS MATERIALS (BACTERIA AND VIRUSES). THEY CAN CAUSE ILLNESSES, AND INJURIES TO PERSONNEL.

(a) (a) Before you touch any of the bird remains, put on protective equipment.

1) 1) Wear vinyl or latex gloves below the usual cut-resistant gloves.

2) 2) A protective mask (FSP2 type) and protective goggles are recommended.

3) 3) Use a disposable coverall if there is a risk of body contact with the bird remains.

(b) Remove the bird pieces and put them in a hermetically sealed plastic bag.

1) Using a lint free cloth, clean the area with isopropyl alcohol.

2) Do not use pressurized air or water to clean the engine parts.

3) If you used tools to remove the organic debris, clean the tools with isopropyl alcohol.

4) Do not touch your face, eyes, nose ETC with your gloves.

5) Remove the gloves and disposable coveralls and put them in the same plastic bag.

6) Carefully wash your hands with soap and water.

(c) Contact the local medical authorities to get more data and recommendation about the destruction of organic debris.

NOTE: In all cases, operators and maintenance personnel should comply with the recommendations of the local medical authorities. The requirements of the relevant medical authority take precedence over any CFM guidelines in these matters and their advice must always be sought.

SUBTASK 71-00-00-210-010-F00

(2) Do a visual inspection of the engine inlet and the engine exhaust areas.

(a) Look for obvious signs of severe 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.

These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

SUBTASK 71-00-00-210-011-F00

(3) Examine the IDG air/oil cooler for damage.

(a) Look for oil stains that come from the cooler. If you find stains, replace the cooler.

These are the tasks:

Integrated Drive Generator (IDG) Air/Oil Cooler Removal, TASK 24-11-21-000-801,

Integrated Drive Generator (IDG) Air/Oil Cooler Installation, TASK 24-11-21-400-801.

(b) Look for damage to the cooler fins.

1) It is permitted to have small dents in the fins if there is no oil leakage.

2) Large dents and broken fins are not permitted. If you find this damage, replace the cooler.

These are the tasks:

Integrated Drive Generator (IDG) Air/Oil Cooler Removal, TASK 24-11-21-000-801,

Integrated Drive Generator (IDG) Air/Oil Cooler Installation, TASK 24-11-21-400-801.

SUBTASK 71-00-00-210-012-F00

(4) Examine the external areas of the spinner front and rear cones (not removed) for damage.

(a) If you find damage, use the limits from this procedure: Spinner Cone and Retaining Flange Inspection, TASK 72-21-01-200-801-F00.

SUBTASK 71-00-00-210-013-F00

(5) Examine the external areas of the fan blades (not removed) and look for these types of damage.

(a) Leading edge distortion

(b) Bends

(c) Cracks

(d) If you find damage, use the limits from this procedure: Fan Module Inspection, TASK 72-21-02-200-801-F00.

SUBTASK 71-00-00-210-051-F01

(6) Examine the external areas of the fan blade platforms (not removed) and look for these types of damage (Ref to Fan Module Inspection, TASK 72-21-02-200-801-F00):

(a) Tears

(b) Distortion

(c) Cracks

(d) ENGINES WITH POST SB 72-0324 AND 72-0485

1) If you find damage, do these steps:

a) Remove the fan blades adjacent to the damaged platforms.

b) Look for the sign of tear.

<1> No tear is permitted.

SUBTASK 71-00-00-210-014-F00

(7) Examine the fan inlet case for wear on the abradable material. To examine it, do this task: Abradable Shroud (Detail) Inspection, TASK 72-24-02-200-801-F00

SUBTASK 71-00-00-210-015-F00

(8) Examine the splitter fairing and the inlet guide vanes of the booster for damage. To examine them, do this task: Stage 1 Booster Vane Assembly Inspection (Visual), TASK 72-21-03-200-801-F00.

SUBTASK 71-00-00-010-023-F00

WARNING: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSER: RETRACT THE LEADING EDGE, DO THE DEACTIVATION PROCEDURES FOR LEADING EDGE AND THE THRUST REVERSERS (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(9) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

SUBTASK 71-00-00-210-016-F00

(10) Examine the fan outlet guide vanes (OGV) and the seals of the fan OGV inner shroud for damage. To examine them, do this task: Outlet Guide Vanes (OGV) Inspection, TASK 72-23-01-200-801-F00

SUBTASK 71-00-00-210-017-F00

(11) Examine the T12 sensor probe for damage. To examine it, do this task: T12 Sensor Inspection/Check, TASK 73-21-05-200-801-F00

SUBTASK 71-00-00-220-001-F00

(12) Gaspath Inspection.

(a) FOD with normal engine parameters.

NOTE: It is normal to have fluctuations on engine parameters [such as N1, N2, EGT] because of the impact of the bird in the engine flow path. These fluctuations are normal engine parameters if there were no engine exceedances and if these fluctuations are shown during a short time.

1) Do these steps if one of more of these conditions apply:

NOTE: The borescope inspection can be delayed 25 hours or 10 cycles (use the first limit to occur) if the FOD did not cause missing material on the fan blades. The service extension is only permitted on one engine if the airplane had a dual-engine FOD.

a) FOD has caused missing material to the fan blades.

b) You see signs that unwanted material went into the booster inlet.

NOTE: To see signs that occurred, look for damage or unwanted material on the spinner front or rear cones, the Stage 1 booster vane or the splitter fairing.

2) Do a borescope inspection of the Stages 1, 3 and 8 HPC blades. To do this inspection, do this task: Borescope Inspection of the HP Compressor Blades, TASK 72-00-00-200-804-F00

a) If you find damage, do a borescope inspection of the remaining HPC blades. To do this inspection, do this task: Borescope Inspection of the HP Compressor Blades, TASK 72-00-00-200-804-F00

HAP ALL; AIRPLANES WITH SINGLE ANNULAR COMBUSTOR (SAC) ENGINES

3) Do this task: Borescope Inspection of the Combustion Chamber, TASK 72-00-00-200-805-F00.

a) If you find damage, do a borescope inspection of the Stages 1-4 LPT blades. To examine them, do these steps:

<1> Do this task: Borescope Inspection of the Stage 1-3 LPT Blades, TASK 72-00-00-200-808-F00.

<2> Do this task: Borescope Inspection of the Stage 4 LPT Blades, TASK 72-00-00-200-809-F00.

HAP ALL

(b) FOD with abnormal engine parameters.

1) If, along with the FOD, there was a surge, a stall or a flameout, do these steps:

a) Do a borescope inspection of the fan booster. To do this inspection, do this task: Borescope Inspection of the Booster Blades and Vanes, TASK 72-00-00-200-803-F00.

b) Do a borescope inspection of the Stages 1, 3 and 8 HPC blades. To do this inspection, do this task: Borescope Inspection of the HP Compressor Blades, TASK 72-00-00-200-804-F00.

c) If you find damage, do a borescope inspection of the remaining HPC blades. To do this inspection, do this task: Borescope Inspection of the HP Compressor Blades, TASK 72-00-00-200-804-F00.

HAP ALL; AIRPLANES WITH SINGLE ANNULAR COMBUSTOR (SAC) ENGINES

d) Do a borescope inspection of the dome area in the combustion chamber. To do this inspection, do this task: Borescope Inspection of the Combustion Chamber, TASK 72-00-00-200-805-F00.

HAP ALL

e) If you find damage, do a borescope inspection of the Stages 1-4 LPT blades. To examine them: do this task: Borescope Inspection of the Stage 1-3 LPT Blades, TASK 72-00-00-200-808-F00

and, do this task: Borescope Inspection of the Stage 4 LPT Blades, TASK 72-00-00-200-809-F00

f) Do this task: Test 5 - Power Assurance Check, TASK 71-00-00-700-813-F00.

SUBTASK 71-00-00-210-019-F00

(13) Birdstrike Inspection.

(a) Examine the inlet cowl at the location where the bird hit.

1) To do this inspection, do this task: Inlet Cowl Inspection, TASK 71-11-01-200-801-F00.

(b) Examine the fan cowl panels for damage.

1) To do this inspection, do this task: Fan Cowl Panels Inspection, TASK 71-11-02-200-801-F00.

(c) If there is an indication of a subsequent engine imbalance, examine the exhaust nozzle and plug for signs of damage.

1) If you see damage, do this task: Primary Nozzle Assembly and Primary Plug Assembly Inspection, TASK 78-11-00-210-802-F00.

(d) If there are indications that the engine is not balanced, do this task: Test 7 - Vibration Survey, TASK 71-00-00-700-814-F00.

E. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-010-024-F00

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 this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

END OF TASK

TASK 71-00-00-800-803-F00

3. Inspection After an Engine Fire, Use of Fire Extinguishing Agents, or High Nacelle Temperature

A. General

(1) This procedure gives the data for these inspections:

(a) The inspection after an engine fire

(b) The inspection that follows the use of fire extinquishing agents on the engine

(c) The inspection after the nacelle temperature was above the limits.

B. References

Reference	Title
12-13-11-600-801	Replenish the Engine Oil (P/B 301)
12-13-11-600-803	Drain the Engine Oil (P/B 301)
29-11-11-000-801-001	Hydraulic Systems A and B Engine-Driven Pump (EDP) Removal (P/B 401)
29-11-11-400-801-001	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)
71-00-00-700-809-F00	Test 1 - Pneumatic Leak Check (P/B 501)
71-00-00-700-821-F00	Dry Motor the Engine (P/B 201)
71-00-00-800-807-F00	Start the Engine Procedure (Selection) (P/B 201)

(Continued)

Reference	Title
71-00-02-000-801-F00	Power Plant Removal (P/B 401)
71-00-02-400-801-F00	Power Plant Installation (P/B 401)
72-00-00-100-803-F00	Clean the Engine Gas-Path With Pure Water (P/B 701)
72-00-00-100-804-F00	Clean the Engine Gas-Path with Cleaning Solution (P/B 701)
72-00-00-200-807-F00	Borescope Inspection of the HPT Blades (P/B 601)
72-00-00-200-808-F00	Borescope Inspection of the Stage 1-3 LPT Blades (P/B 601)
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)

C. Tools/Equipment

Reference	Description
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. Procedure

SUBTASK 71-00-00-210-020-F00

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.

These are the tasks:

Hydraulic Systems A and B Engine-Driven Pump (EDP) Removal, TASK 29-11-11-000-801-001,

Hydraulic Systems A and B Engine-Driven Pump (EDP) Installation, TASK 29-11-11-400-801-001.

(d) If you do not find metallic particles, do this task: EDP Case Drain Filter Element Installation, TASK 29-11-51-400-801.

SUBTASK 71-00-00-210-021-F00

(2) Examine the engine for the cause of the engine fire or an engine that become too hot.

(a) If you find external damage to the engine, replace the engine.

These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

1) Use the CFMI Engine Shop Manual to do a full inspection of the removed engine.

(b) 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 1 - Pneumatic Leak Check, TASK 71-00-00-700-809-F00.

SUBTASK 71-00-00-210-022-F00

(3) Use the applicable procedure given below after a fire extinquishing agent was used on the external areas of the engine (engine cowls open or closed):

(a) If carbon dioxide (CO2) gas was used:

1) On areas of the engine that were cold, no subsequent procedure is necessary.

2) On areas of the engine that were hot, you must replace the engine components

NOTE: Use the CFMI Engine Shop Manual to examine the removed components for damage.

(b) If foam was used:

CAUTION: DO NOT LET THE FOAM GO IN HOLES ON THE ENGINE. FOAM THAT STAYS ON THE ENGINE CAN CAUSE CORROSION OF THE ENGINE PARTS.

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:

CAUTION: DO NOT USE WATER TO REMOVE THE POWDER FROM THE ENGINE. THE DRY AGENTS MIX WITH WATER AND MAKE A COMPOUND THAT CAN CAUSE CORROSION. DO NOT LET THE AGENTS GO INTO HOLES ON THE ENGINE. COMPOUNDS THAT STAY CAN CAUSE CORROSION IN THE ENGINE.

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 materials were used:

1) In-flight use of the fire extinquishing system in the nacelle is permitted without special cleaning.

(e) If halogen materials were used on the ground:

WARNING: DO NOT BREATHE THE GAS FROM THE FIRE EXTINQUISHING AGENT IN THE ENGINE AFTER IT IS USED. DO NOT LET THE AGENT TOUCH YOUR SKIN. YOU MUST HAVE A GOOD FLOW OF AIR AT THE LOCATION WHERE THE AGENT WAS USED. THE AGENT IS DANGEROUS AFTER IT IS USED. IF YOU DO NOT OBEY THESE PRECAUTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(WARNING PRECEDES)

CAUTION: DO NOT LET TITANIUM COMPONENTS TOUCH MATERIALS THAT CONTAIN HALOGEN. 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 gases:

CAUTION: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSERS: RETRACT THE LEADING EDGE, DO THE DEACTIVATION PROCEDURES FOR THE THE LEADING EDGE AND THE THRUST REVERSERS (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

a) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

2) If the engine was operated at or above the maximum continuous power at the time the agent was used, do these steps:

CAUTION: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSERS: RETRACT THE LEADING EDGE, DO THE DEACTIVATION PROCEDURES FOR THE THE LEADING EDGE AND THE THRUST REVERSERS (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

a) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

b) Clean the external areas of the engine with clean water from the combustion case to the aft end.

SUBTASK 71-00-00-210-023-F00

(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-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

(b) If the fire was contained in the exhaust area, use the EGT overtemperature limits.

1) If the temperature is in area A:

a) Use the Fault Isolation Manual to find the cause of the internal engine fire.

2) If the temperature is in areas B, C or D:

a) Do this task: Borescope Inspection of the HPT Blades, TASK 72-00-00-200-807-F00.

b) Do an inspection of the Stage 1 LPT blades. To do this inspection, do this task: Borescope Inspection of the Stage 1-3 LPT Blades, TASK 72-00-00-200-808-F00.

c) Use the Fault Isolation Manual to find the cause of the internal engine fire.

SUBTASK 71-00-00-210-024-F00

(5) Do one of the procedures given below after the fire extinquishing agents have been used on the internal area of the engine:

(a) If carbon dioxide (CO_2) gas was used:

1) Replace the engine.

These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

NOTE: Use the CFMI Engine Shop Manual to do an inspection of the areas where the cardon 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: Clean the Engine Gas-Path With Pure Water, TASK 72-00-00-100-803-F00.

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 the Engine, TASK 71-00-00-700-821-F00.

3) Replace the engine.

These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

NOTE: Use the CFMI 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 the Engine, TASK 71-00-00-700-821-F00.

4) Replace the engine.

These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

NOTE: Use the CFMI Engine Shop Manual to do an inspection of the removed engine.

(d) If halogen materials were used:

1) If you can operate the engine before 3 hours, do these steps:

a) Dry motor the engine for 5 minutes. To dry motor the engine, do this task: Dry Motor the Engine, TASK 71-00-00-700-821-F00.

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 the Engine, TASK 71-00-00-700-821-F00.

d) Clean the engine. To clean it, do this task: Clean the Engine Gas-Path with Cleaning Solution, TASK 72-00-00-100-804-F00.

e) Change the engine oil.

These are the tasks:

Drain the Engine Oil, TASK 12-13-11-600-803,

Replenish the Engine Oil, TASK 12-13-11-600-801.

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 Procedure (Selection), TASK 71-00-00-800-807-F00

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-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

NOTE: Use the CFMI Engine Shop Manual to clean and do an inspection of the removed engine.

——————— END OF TASK ———————

TASK 71-00-00-800-804-F00

4. Inspection After Engine Operations Above the Limits and High Engine Stress

(Figure 601, Figure 602, Figure 603, Figure 604)

A. General

(1) This procedure gives the necessary inspections then these conditions occur:

(a) N1 and N2 Overspeeds

(b) Overtemperature

(c) Low or zero oil pressure

(d) Oil consumption that is more than the limits

(e) High oil temperature

B. References

Reference	Title
12-13-11-600-801	Replenish the Engine Oil (P/B 301)
12-13-11-600-803	Drain the Engine Oil (P/B 301)
71-00-00-700-813-F00	Test 5 - Power Assurance Check (P/B 501)
71-00-00-800-806-F00	Engine Operation Limits (P/B 201)
71-00-02-000-801-F00	Power Plant Removal (P/B 401)
71-00-02-400-801-F00	Power Plant Installation (P/B 401)
72-00-00-200-803-F00	Borescope Inspection of the Booster Blades and Vanes (P/B 601)
72-00-00-200-804-F00	Borescope Inspection of the HP Compressor Blades (P/B 601)
72-00-00-200-807-F00	Borescope Inspection of the HPT Blades (P/B 601)
72-00-00-200-808-F00	Borescope Inspection of the Stage 1-3 LPT Blades (P/B 601)
72-00-00-200-809-F00	Borescope Inspection of the Stage 4 LPT Blades (P/B 601)
72-24-02-200-801-F00	Abradable Shroud (Detail) Inspection (P/B 601)
79-00-00-200-804-F00	Chip Detectors and Scavenge Screens Inspection (P/B 601)
79-21-03-000-802-F00	Oil Supply Filter Removal (P/B 401)
79-21-03-400-801-F00	Oil Supply Filter Installation (P/B 401)
79-21-04-000-801-F00	Scavenge Oil Filter Assembly Removal (P/B 401)
79-21-04-400-801-F00	Scavenge Oil Filter Assembly Installation (P/B 401)
FIM 71-06 TASK 801	Engine Overspeed, N1 Over Redline - Fault Isolation
FIM 71-06 TASK 802	Engine Overspeed, N2 Over Redline - Fault Isolation

(Continued)

Reference	Title
FIM 71-06 TASK 805	Engine Overtemperature, EGT Over Redline (Not During Engine Start), No Engine Surge or Stall - Fault Isolation
FIM 79-05 TASK 802	Engine Oil Pressure is High - Fault Isolation
FIM 80-05 TASK 802	Engine Start - Engine Overtemperature, EGT Red, Engine Had An Automatic Shutdown - Fault Isolation
FIM 80-05 TASK 807	Engine Start - Engine Overtemperature, EGT Red, Engine Did Not Have An Automatic Shutdown - Fault Isolation

C. Location Zones

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

D. Overspeed

SUBTASK 71-00-00-210-025-F00

(1) N1 Overspeed

(a) If you do not have the exceedance data, refer to the applicable fault isolation task for N1 overspeed in the Fault Isolation Manual. Do this task: Engine Overspeed, N1 Over Redline - Fault Isolation, FIM 71-06 TASK 801.

(b) If the N1 overspeed was between 104 and 105.8 percent:

1) Do a visual inspection of the engine inlet and the engine exhaust areas:

a) Look for obvious signs of severe 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 pieces in the exhaust area.

b) If you find indications of severe engine damage or failure, replace the engine.

These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

2) Do this task: Borescope Inspection of the Stage 4 LPT Blades, TASK 72-00-00-200-809-F00.

3) Examine the N1 rotor for free movement as follows:

WARNING: BE CAREFUL WHEN YOU TURN THE FAN BLADES. MAKE SURE YOU ARE IN A STABLE POSITION. YOU MUST WEAR HEAVY PROTECTIVE GLOVES TO PREVENT DAMAGE TO YOUR HANDS. IF YOU DO NOT OBEY THESE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

a) Turn the fan blades with your hand.

b) If the bearings are rough, if there are unusual noises, or if the rotor does not turn smoothly, replace the engine.

These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

NOTE: It is permitted to have light rub marks on the seals and shrouds.

c) Examine the abradable shroud material on the fan case. If you find damage, do this task: Abradable Shroud (Detail) Inspection, TASK 72-24-02-200-801-F00.

4) Do a borescope inspection of the Stage 4 booster blades. To do this inspection, do this task: Borescope Inspection of the Booster Blades and Vanes, TASK 72-00-00-200-803-F00.

5) Do an inspection of the Stage 1 LPT blades. To do this inspection, do this task: Borescope Inspection of the Stage 1-3 LPT Blades, TASK 72-00-00-200-808-F00.

6) Refer to the Fault Isolation Manual to find and correct the cause of the N1 overspeed.

(c) If the N1 overspeed was more than 105.8 percent:

1) Replace the engine.

These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

SUBTASK 71-00-00-210-026-F00

(2) N2 Overspeed

(a) If you do not have the exceedance data, refer to the applicable fault isolation task for N2 overspeed in the Fault Isolation Manual. Do this task: Engine Overspeed, N2 Over Redline - Fault Isolation, FIM 71-06 TASK 802.

(b) If the N2 overspeed is between 105 and 105.8 percent:

1) Do a visual inspection of the engine inlet and the engine exhaust areas:

a) Look for obvious signs of severe 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 pieces in the exhaust area.

b) If you find indications of severe engine damage or failure, replace the engine.

These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

2) Do a borescope inspection of the Stages 1, 3 and 8 HPC blades. To do this inspection, do this task: Borescope Inspection of the HP Compressor Blades, TASK 72-00-00-200-804-F00.

3) Do this task: Borescope Inspection of the HPT Blades, TASK 72-00-00-200-807-F00.

4) Refer to the Fault Isolation Manual to find and correct the cause of the N2 overspeed.

(c) If the N2 overspeed was more than 105.8 percent:

1) Replace the engine.

These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

E. Engine Overtemperature (Starting)

SUBTASK 71-00-00-970-039-F00

(1) If you do not have the exceedance data, refer to the applicable fault isolation task for EGT overtemperature in the Fault Isolation Manual. Do this task: Engine Start - Engine Overtemperature, EGT Red, Engine Did Not Have An Automatic Shutdown - Fault Isolation, FIM 80-05 TASK 807 or Engine Start - Engine Overtemperature, EGT Red, Engine Had An Automatic Shutdown - Fault Isolation, FIM 80-05 TASK 802.

SUBTASK 71-00-00-210-027-F00

(2) Record a point that corresponds to the maximum EGT and the time the EGT was over the limit on the chart (Figure 601).

SUBTASK 71-00-00-210-028-F00

(3) If the point is in area A, do the corrective action as follows:

(a) Use the Fault Isolation Manual to find and correct the cause of the hot start before the subsequent flight.

(b) If you find that the N1 rotor stopped during the hot start, do a borescope inspection for the Stage 1 LPT blades. To do this inspection, do this task: Borescope Inspection of the Stage 1-3 LPT Blades, TASK 72-00-00-200-808-F00.

(c) 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 problem.

SUBTASK 71-00-00-210-029-F00

(4) If the point is in area B, do the corrective action as follows:

(a) Do these tasks to do a borescope inspection of the HPT blades and the Stage 1 LPT blades.

1) Do this task: Borescope Inspection of the HPT Blades, TASK 72-00-00-200-807-F00.

2) Do this task: Borescope Inspection of the Stage 1-3 LPT Blades, TASK 72-00-00-200-808-F00.

(b) Use the Fault Isolation Manual to find and correct the cause of the hot start before the subsequent flight.

(c) 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 problem.

SUBTASK 71-00-00-210-030-F00

(5) If the point is in area C, do the corrective action as follows before the next flight:

(a) Do these tasks to do a borescope inspection of the HPT blades and the Stage 1 LPT blades.

1) Do this task: Borescope Inspection of the HPT Blades, TASK 72-00-00-200-807-F00.

2) Do this task: Borescope Inspection of the Stage 1-3 LPT Blades, TASK 72-00-00-200-808-F00.

(b) Use the Fault Isolation Manual to find and correct the cause of the hot start.

F. Engine Overtemperature (Takeoff, Climb, Cruise, Max Continuous)

SUBTASK 71-00-00-800-006-F00

(1) There are many causes for an EGT overtemperature. Some examples are given below:

(a) N1 overspeed

(b) Too much bleed air

(c) Deterioration of the engine

(d) A temperature inversion during a takeoff

(e) A engine warm-up time that is not sufficient before the takeoff.

SUBTASK 71-00-00-970-040-F00

(2) If you do not have the exceedance data, refer to the applicable fault isolation task for EGT Overtemperature in the Fault Isolation Manual. Do this task: Engine Overtemperature, EGT Over Redline (Not During Engine Start), No Engine Surge or Stall - Fault Isolation, FIM 71-06 TASK 805.

SUBTASK 71-00-00-210-031-F00

(3) Follow these instructions for the applicable power range where the engine overtemperature occurred:

(a) Takeoff - Put points on the graph to show the maximum EGT and the total cumulative time the EGT was over the 950 degrees C redline limit (Figure 602).

1) Find if there was an Area A, B, C or D takeoff exceedance.

NOTE: No maintenance action is necessary when the maximum EGT is between 950 and 960 degrees C for less than 20 second (Transient) when takeoff or go around power is set (Figure 602).

(b) Climb, Cruise, or Max Continuous - Put points on the graph to show the maximum EGT and the total cumulative time the EGT was over the 925 degrees C limit (Figure 602, Figure 603).

NOTE: If the flight crew has logged an EGT indication above the 925 degrees C climb, cruise, or max continuous power limit, maintenance personnel should be concerned with the total time the engine was at 925 degrees C or above regardless of the time that has elapsed since takeoff power was reduced to climb, cruise, or max continuous power.

NOTE: If the temperature was between 925 and 950 degrees C for less than five minutes no exceedance has occurred, and no maintenance action is necessary.

NOTE: If the temperature was between 925 and 950 degrees C for at least than five minutes but less than ten minutes, an Area A exceedance has occurred, and the maintenance action for Area A is recommended.

NOTE: If the climb, cruise, or max continuous power EGT was greater than 950 degrees C for any amount of time or if it was greater than 925 degrees C for more than ten minutes, an Area D exceedance has occurred, and the engine should be removed.

SUBTASK 71-00-00-210-032-F00

(4) If the point is in area A, do the corrective action as follows:

(a) Do a visual inspection of the engine inlet and engine exhaust before the subsequent flight.

(b) Identify and correct the cause for the EGT overtemperature at the first available opportunity.

1) Refer to the Fault Isolation Manual to find the cause.

2) If a second overtemperature occurs and you have not found the cause for the first overtemperature, you must find, and if possible, correct the cause for the overtemperature before the subsequent flight.

3) If you have found, but not corrected, the cause for the first or second overtemperatures, you can have 10 more overtemperatures in area A before you must correct the cause.

SUBTASK 71-00-00-210-033-F00

(5) If the point is in area B, do the corrective action as follows:

(a) Do a visual inspection of the engine inlet and the engine exhaust before the subsequent flight.

(b) Identify and correct the cause for the EGT overtemperature at the first available opportunity.

1) Refer to the Fault Isolation Manual to find the cause.

2) If a second EGT overtemperature occurs and you have not found the cause for the first overtemperature, you must find, and if possible, correct the cause for the overtemperature before the subsequent flight.

3) If you have found, but not corrected, the cause for the first or second EGT overtemperatures, you can have 10 more overtemperatures in areas A and B before you must correct the cause of the overtemperature.

(c) If you cannot find the cause for the overtemperature, do these steps before the subsequent flight:

1) Do this task: Borescope Inspection of the HPT Blades, TASK 72-00-00-200-807-F00.

2) Do an inspection of the Stage 1 LPT blades. To do this inspection, do this task: Borescope Inspection of the Stage 1-3 LPT Blades, TASK 72-00-00-200-808-F00.

3) You can defer the borescope inspections for up to 10 cycles if no more overtemperatures occur.

4) Do this task: Test 5 - Power Assurance Check, TASK 71-00-00-700-813-F00.

5) If you have found, but not corrected, the cause for the first or second EGT overtemperatures, you can have 10 more overtemperatures in areas A and B before you must correct the cause of the overtemperature.

(d) If you cannot correct the cause for the EGT overtemperature on-wing (this includes engine deterioration), do the next step.

(e) You can have a maximum of 10 EGT overtemperatures in areas A and B together before you must remove the engine for an EGT overtemperature inspection.

These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

NOTE: Use the CFMI Engine Shop Manual to do an inspection of the removed engine.

SUBTASK 71-00-00-210-034-F00

(6) If the point is in area C, do the corrective action as follows:

(a) Do a visual inspection of the engine inlet and the engine exhaust.

(b) Refer to the Fault Isolation Manual to find and correct the cause of the EGT overtemperature before the subsequent flight.

(c) If you found and corrected the cause for the EGT overtemperature, do these steps before the subsequent flight:

1) If the EGT overtemperature time in area C was less than 5 seconds, use the limits for area B if you obey these steps:

a) You find and correct the cause of the EGT overtemperature before the subsequent flight.

b) Before the subsequent 10 cycles, do this task: Borescope Inspection of the HPT Blades, TASK 72-00-00-200-807-F00.

c) Before the subsequent 10 cycles, do a borescope inspection of the Stage 1 LPT blades. To do the inspection, do this task: Borescope Inspection of the Stage 1-3 LPT Blades, TASK 72-00-00-200-808-F00.

d) You have a successful Power Assurance Check before the engine goes in service again.

2) If the EGT overtemperature time in area C was more than 5 seconds, you must remove the engine for an overtemperature inspection before the subsequent 15 cycles.

These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

a) If one more EGT overtemperature occurs before the 15 cycle limit, follow the overtemperature instructions given for area D.

(d) If you cannot find the cause, do these steps before the subsequent flight:

1) Do this task: Borescope Inspection of the HPT Blades, TASK 72-00-00-200-807-F00.

2) Do a borescope inspection of the Stage 1 LPT blades. To do the inspection, do this task: Borescope Inspection of the Stage 1-3 LPT Blades, TASK 72-00-00-200-808-F00.

3) Do this task: Test 5 - Power Assurance Check, TASK 71-00-00-700-813-F00.

4) If the EGT overtemperature time in area C was more than 5 seconds, replace the engine before the subsequent 15 cycles.

These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

a) If one more EGT overtemperature occurs before the 15 cycle limit, follow the overtemperature instructions given for area D.

SUBTASK 71-00-00-210-035-F00

(7) If the point is in area D, do the corrective action before the subsequent flight as follows:

NOTE: You must remove the engine if you have an EGT overtemperature in area D. Use the steps below for instructions on the one revenue-flyback allowance.

(a) Do a visual inspection of the engine inlet and the engine exhaust.

(b) Identify and correct the cause for the EGT overtemperature (if possible).

1) Refer to the Fault Isolation Manual to find the cause.

(c) If you cannot find the cause for the overtemperature, do these steps:

1) Do this task: Borescope Inspection of the HPT Blades, TASK 72-00-00-200-807-F00.

2) Do an inspection of the Stage 1 LPT blades. To do this inspection, do this task: Borescope Inspection of the Stage 1-3 LPT Blades, TASK 72-00-00-200-808-F00.

3) Do this task: Test 5 - Power Assurance Check, TASK 71-00-00-700-813-F00.

4) If the damage from the borescope inspection is more than the limits, replace the engine.

These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

NOTE: Use the CFMI Engine Shop Manual to do an inspection of the removed engine.

5) If the damage from the borescope inspection is in the limits, one non-revenue flight is permitted before you must replace the engine.

G. Takeoff Power Kept for More than 5 Minutes

SUBTASK 71-00-00-210-036-F00

(1) There is no inspection necessary if the EGT limits are obeyed.

(a) Refer to (Figure 602) for the EGT limits.

H. Low or Zero Oil Pressure

SUBTASK 71-00-00-210-037-F00

(1) The oil pressure is in zone A (less than 13 psid (90 kPa differential)) (Figure 604):

NOTE: During negative g conditions, an oil pressure of less than 13 psid (90 kPa differential) is permitted for a maximum of 10 seconds.

(a) At cruise or takeoff power for more than 10 seconds, replace the engine.

These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

(b) At idle power for more than 30 seconds, replace the engine.

These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

(c) If the engine was operated within the above time limits with zero oil pressure or very low oil pressure, do these steps:

1) Do this task: Chip Detectors and Scavenge Screens Inspection, TASK 79-00-00-200-804-F00.

2) If unwanted material is found, do these steps:

a) Replace the oil supply filter.

These are the tasks:

Oil Supply Filter Removal, TASK 79-21-03-000-802-F00,

Oil Supply Filter Installation, TASK 79-21-03-400-801-F00.

b) Replace the scavenge oil filter assembly.

These are the tasks:

Scavenge Oil Filter Assembly Removal, TASK 79-21-04-000-801-F00,

Scavenge Oil Filter Assembly Installation, TASK 79-21-04-400-801-F00.

3) Refer to the Fault Isolation Manual to find and correct the cause of the low oil pressure.

SUBTASK 71-00-00-210-038-F00

(2) If the pressure is in zone B:

(a) Refer to the Fault Isolation Manual to find and correct the cause of the low oil pressure.

(b) Monitor the oil temperature and the pressure.

SUBTASK 71-00-00-210-039-F00

(3) If the pressure is in zone D:

(a) Use the Fault Isolation Manual to find and correct the cause of the high oil pressure. Do this task: Engine Oil Pressure is High - Fault Isolation, FIM 79-05 TASK 802.

I. High Oil Consumption

SUBTASK 71-00-00-810-003-F00

(1) Refer to the Fault Isolation Manual if these conditions occur:

(a) Oil use shows a slow and continuous increase.

(b) Oil use increases suddenly.

(c) Oil use is more than 0.20 gallons/hr (0.76 liters/hr).

SUBTASK 71-00-00-800-007-F00

(2) For the oil consumption guidelines, refer to the Engine Operation Limits, (TASK 71-00-00-800-806-F00).

J. High Oil Temperature

SUBTASK 71-00-00-910-050-F00

(1) The maximum oil temperature for continuous engine operation is 284 degrees F (140 degrees C).

SUBTASK 71-00-00-910-051-F00

(2) Oil temperatures between 284 degrees F and 311 degrees F (140 degrees C and 155 degrees C) is permitted for 15 minutes without an inspection.

SUBTASK 71-00-00-810-005-F00

(3) If the oil temperature is more than 311 degrees F (155 degrees C), do these steps:

(a) Refer to the Fault Isolation Manual to find and correct the cause of the high oil temperature.

(b) Do this task: Drain the Engine Oil, TASK 12-13-11-600-803.

(c) Do this task: Replenish the Engine Oil, TASK 12-13-11-600-801.

(d) Examine the magnetic chip detectors on the lubrication unit for metal particles. To examine the magnetic chip detectors, do this task: Chip Detectors and Scavenge Screens Inspection, TASK 79-00-00-200-804-F00.

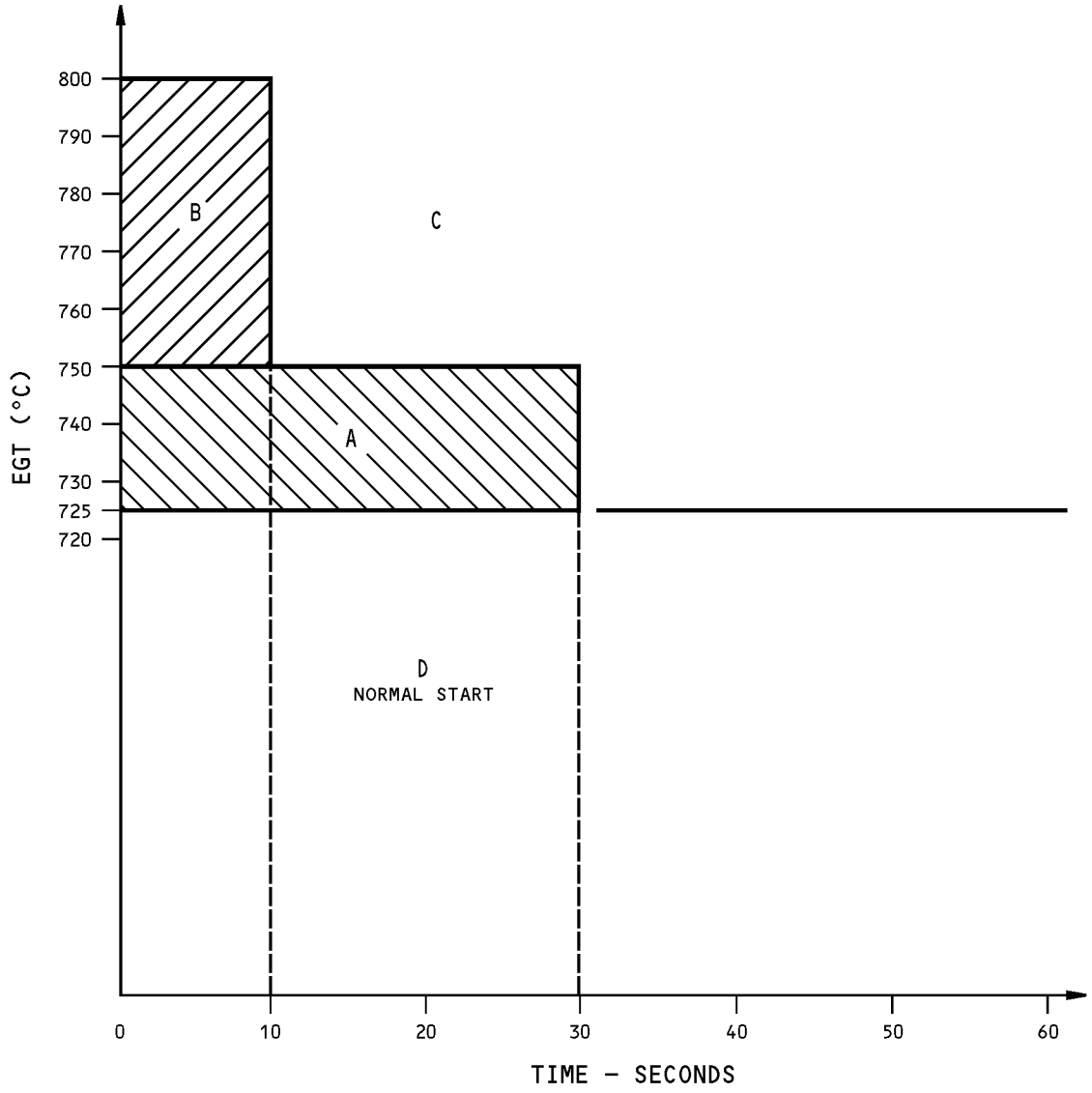
1) If the engine is serviceable, replace the oil supply filter.

These are the tasks:

Oil Supply Filter Removal, TASK 79-21-03-000-802-F00,

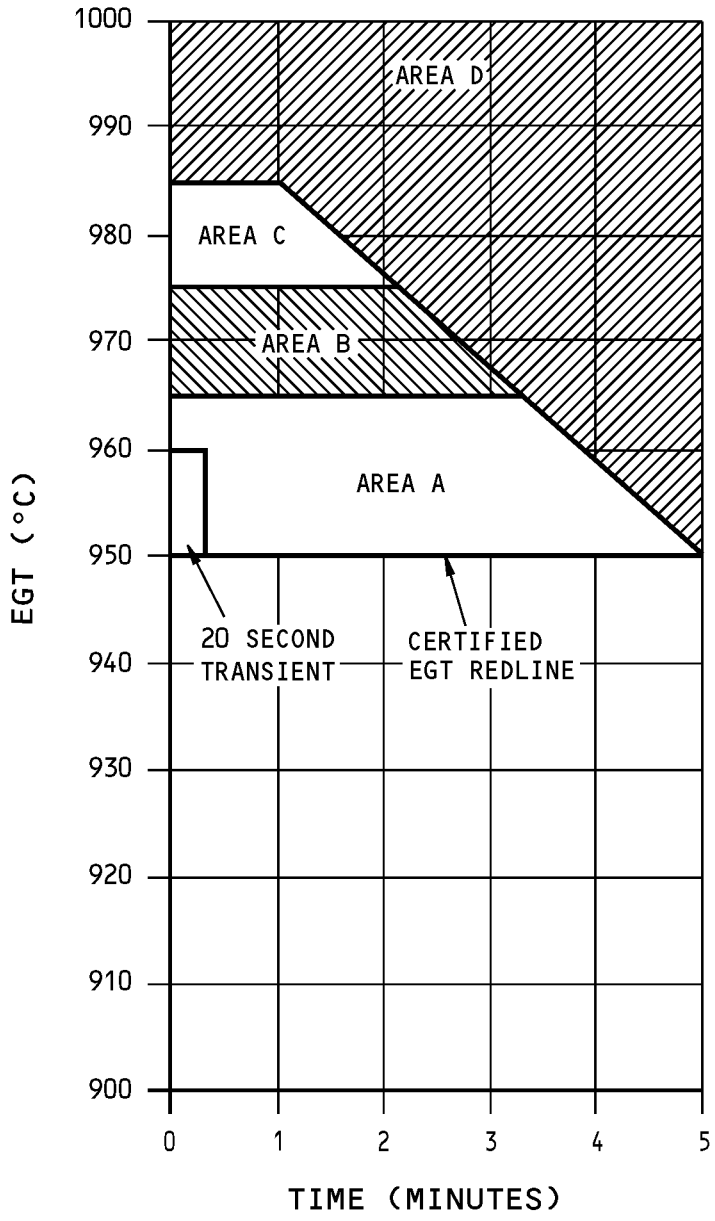
Oil Supply Filter Installation, TASK 79-21-03-400-801-F00.

END OF TASK

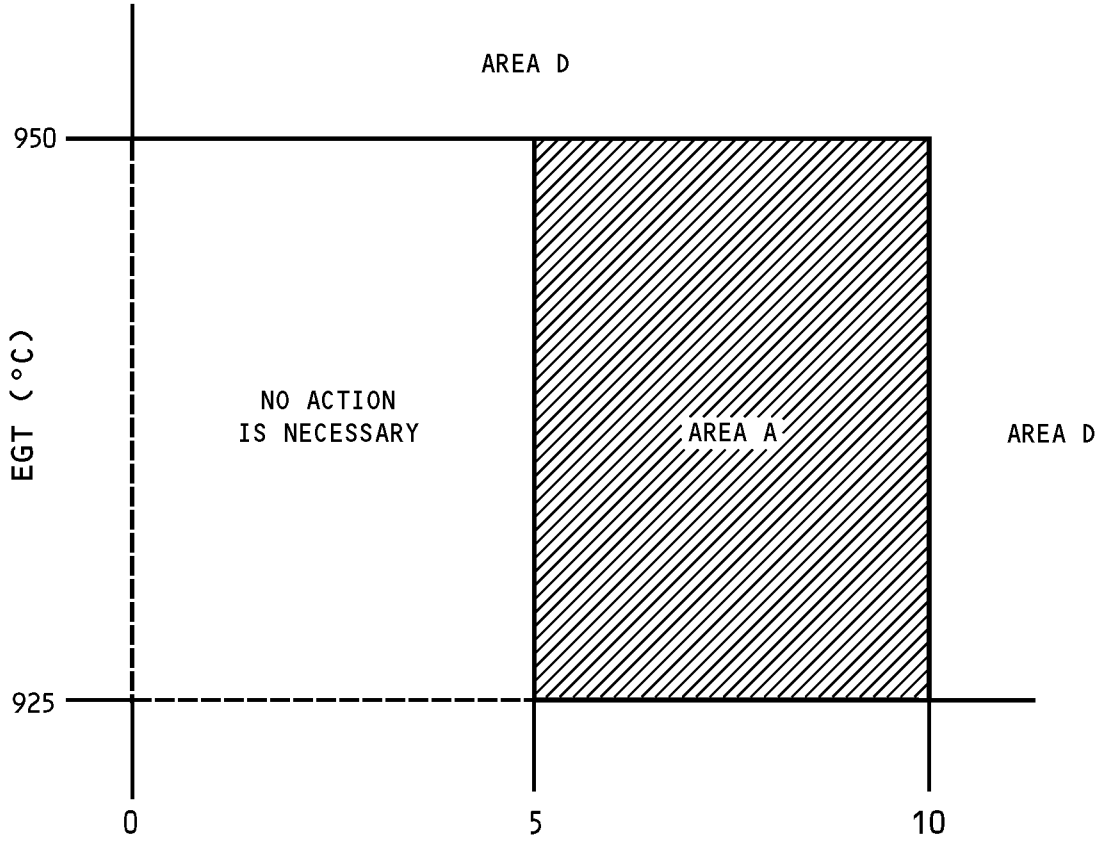


S-M56-MM-0335-(1)-00-B

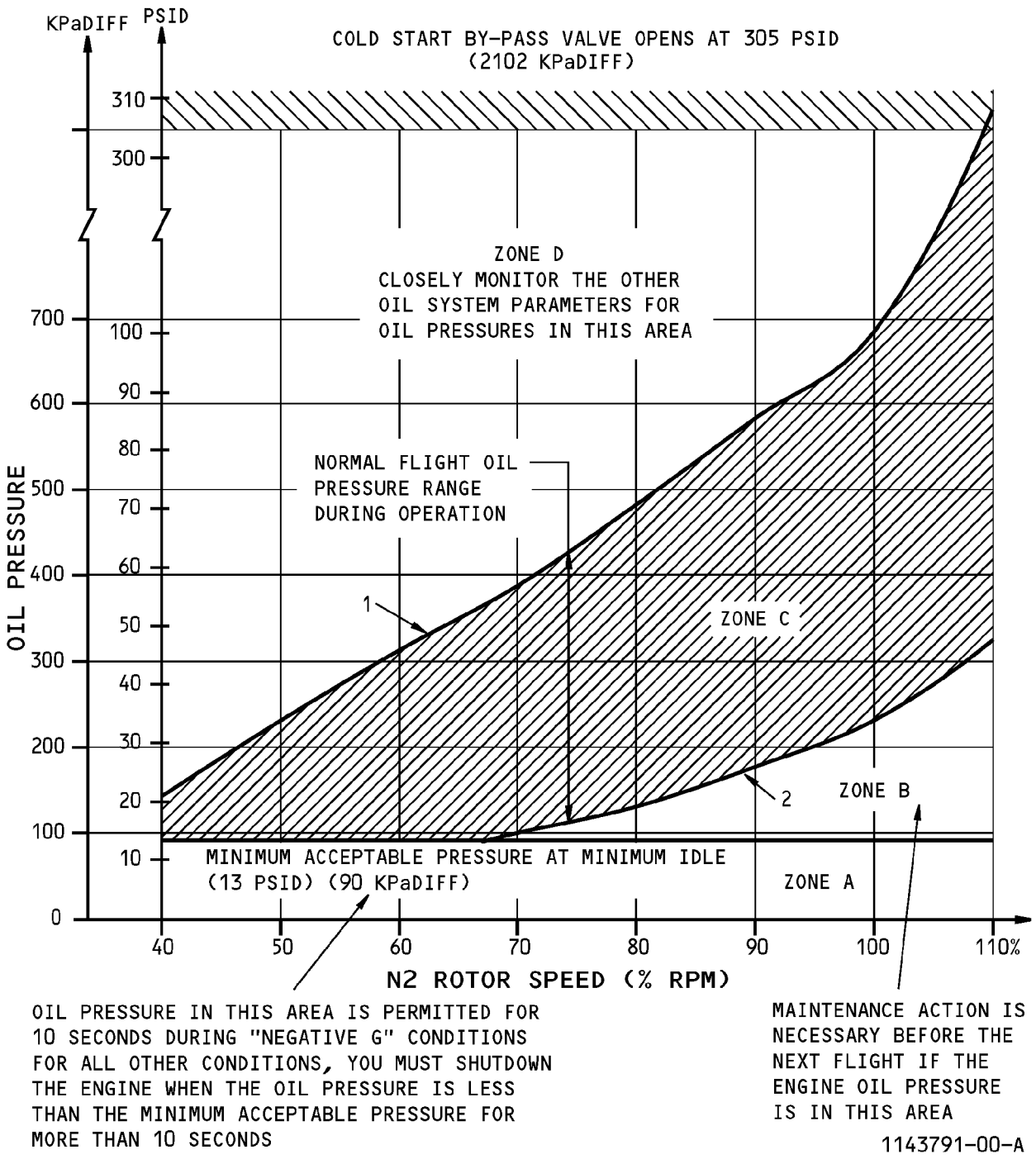
Exhaust Gas Temperature (EGT) Overtemperature Inspection (Starting)
Figure 601/71-00-00-990-850-F00



Exhaust Gas Temperature (EGT) Overtemperature Inspection Takeoff
Figure 602/71-00-00-990-851-F00



Exhaust Gas Temperature (EGT) Overtemperature Inspection (Climb, Cruise or Max Continuous Power)
Figure 603/71-00-00-990-852-F00



Oil Pressure Out-of-Limit Inspection Requirements
Figure 604/71-00-00-990-883-F00

TASK 71-00-00-210-801-F00

5. Inspection of the Engine After an Engine Stall or Possible Engine Stall

A. General

(1) This procedure gives the inspection after you have or think you have an engine stall condition.

B. References

Reference	Title
72-00-00-200-803-F00	Borescope Inspection of the Booster Blades and Vanes (P/B 601)
72-00-00-200-804-F00	Borescope Inspection of the HP Compressor Blades (P/B 601)
72-00-00-200-807-F00	Borescope Inspection of the HPT Blades (P/B 601)
72-00-00-200-808-F00	Borescope Inspection of the Stage 1-3 LPT Blades (P/B 601)
72-21-02-200-801-F00	Fan Module Inspection (P/B 601)
72-24-02-200-801-F00	Abradable Shroud (Detail) Inspection (P/B 601)

C. Location Zones

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

D. Inspection of an Engine After an Engine Stall or Possible Engine Stall

SUBTASK 71-00-00-210-041-F00

(1) Do this task: Fan Module Inspection, TASK 72-21-02-200-801-F00.

SUBTASK 71-00-00-210-042-F00

(2) Do this task: Abradable Shroud (Detail) Inspection, TASK 72-24-02-200-801-F00.

SUBTASK 71-00-00-210-043-F00

(3) Visually examine the exhaust area for metal particles.

SUBTASK 71-00-00-290-001-F00

(4) Do a borescope inspection of these components:

(a) The Stage 4 booster blades. To do this inspection, do this task: Borescope Inspection of the Booster Blades and Vanes, TASK 72-00-00-200-803-F00.

(b) The Stages 1, 3 and 8 HPC blades. To do this inspection, do this task: Borescope Inspection of the HP Compressor Blades, TASK 72-00-00-200-804-F00.

1) If you find damage, do an inspection of the remaining HPC blades.

(c) Do this task: Borescope Inspection of the HPT Blades, TASK 72-00-00-200-807-F00.

(d) The Stage 1 LPT blades. To do this inspection, do this task: Borescope Inspection of the Stage 1-3 LPT Blades, TASK 72-00-00-200-808-F00.

SUBTASK 71-00-00-810-006-F00

(5) Refer to the Fault Isolation Manual to find and correct the cause of the engine stall.

END OF TASK

TASK 71-00-00-210-802-F00

6. Inspection of the Engine After In-Flight Windmilling

A. General

(1) This procedure gives the inspection after an in-flight windmilling condition.

B. References

Reference	Title
71-00-00-700-813-F00	Test 5 - Power Assurance Check (P/B 501)
71-00-03-600-801-F00	Dry-Out and Lubrication of the Engine (P/B 201)
79-00-00-200-804-F00	Chip Detectors and Scavenge Screens Inspection (P/B 601)
79-21-03-000-802-F00	Oil Supply Filter Removal (P/B 401)
79-21-03-400-801-F00	Oil Supply Filter Installation (P/B 401)
79-21-04-000-801-F00	Scavenge Oil Filter Assembly Removal (P/B 401)
79-21-04-400-801-F00	Scavenge Oil Filter Assembly Installation (P/B 401)

C. Location Zones

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

D. Procedure

SUBTASK 71-00-00-910-052-F00

(1) If the lubrication system was in operation before the in-flight shutdown, there is no time limit for windmilling.

SUBTASK 71-00-00-210-044-F00

(2) If the engine windmills for more than 6 hours without the operation of the lubrication system, do these steps:

(a) Examine these components for unwanted material:

1) Do this task: Chip Detectors and Scavenge Screens Inspection, TASK 79-00-00-200-804-F00.

(b) If unwanted material is found, do these steps:

1) Replace the oil supply filter.

These are the tasks:

Oil Supply Filter Removal, TASK 79-21-03-000-802-F00,

Oil Supply Filter Installation, TASK 79-21-03-400-801-F00.

2) Replace the scavenge oil filter assembly.

These are the tasks:

Scavenge Oil Filter Assembly Removal, TASK 79-21-04-000-801-F00,

Scavenge Oil Filter Assembly Installation, TASK 79-21-04-400-801-F00.

(c) Do this task: Test 5 - Power Assurance Check, TASK 71-00-00-700-813-F00.

(d) Do this task: Chip Detectors and Scavenge Screens Inspection, TASK 79-00-00-200-804-F00.

SUBTASK 71-00-00-600-002-F00

(3) If the engine is operable, operate the engine at idle for a minimum of 15-20 minutes and not later than 24 hours after landing.

SUBTASK 71-00-00-600-001-F00

(4) If the engine is not operable, do this task: Dry-Out and Lubrication of the Engine, TASK 71-00-03-600-801-F00

no later than 24 hours after landing.

——————— END OF TASK ———————

TASK 71-00-00-200-803-F00

7. Inspection Of The Engine After A Hard Landing (More Than The Limits)

A. General

(1) This procedure gives the inspection after a hard landing (more than the limits)..

B. References

Reference	Title
72-00-00-200-804-F00	Borescope Inspection of the HP Compressor Blades (P/B 601)
72-24-02-200-801-F00	Abradable Shroud (Detail) Inspection (P/B 601)
72-56-00-200-802-F00	Turbine Frame Assembly Engine Mounting Lugs Inspection (P/B 601)

C. Location Zones

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

D. Inspection Of The Engine After A Hard Landing (More Than The Limits)

SUBTASK 71-00-00-210-052-F00

(1) Visually examine these components for damage:

(a) Inlet cowl, exhaust sleeve and exhaust nozzle and all the fasteners.

(b) Abradable material on the fan inlet case (Abradable Shroud (Detail) Inspection, TASK 72-24-02-200-801-F00)

(c) The forward and aft engine mounts on the engine.

(d) Accessory components attached for the engine.

(e) All ducts, tubes, hoses and fittings (look for leaks, cracks or distortion).

(f) The aft flange on the turbine frame (Turbine Frame Assembly Engine Mounting Lugs Inspection, TASK 72-56-00-200-802-F00).

SUBTASK 71-00-00-290-004-F00

(2) Do a borescope inspection of the 1st-,3rd-, and 8th-stage HPC blades.

(a) Use this procedure: (Borescope Inspection of the HP Compressor Blades, TASK 72-00-00-200-804-F00)

——————— END OF TASK ———————

TASK 71-00-00-210-803-F00

8. Inspection of the Engine After High G-Loads During Transportation

A. General

(1) This procedure gives the inspection after high G loads were applied to the engine during transportation.

B. References

Reference	Title
71-00-00-700-813-F00	Test 5 - Power Assurance Check (P/B 501)
71-00-02-000-801-F00	Power Plant Removal (P/B 401)

(Continued)

Reference	Title
71-00-02-400-801-F00	Power Plant Installation (P/B 401)
79-00-00-200-804-F00	Chip Detectors and Scavenge Screens Inspection (P/B 601)
79-21-06-000-801-F00	Scavenge Oil Filter Element Removal (P/B 401)
79-21-06-400-801-F00	Scavenge Oil Filter Element Installation (P/B 401)

C. Location Zones

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

D. Inspection of the Engine After High G-Loads During Transportation

SUBTASK 71-00-00-210-047-F00

(1) Visually examine the surfaces of the engine and flange areas for damage such as buckling, deformation and cracks.

SUBTASK 71-00-00-210-045-F00

WARNING: BE CAREFUL WHEN YOU TURN THE FAN BLADES. MAKE SURE YOU ARE IN A STABLE POSITION. YOU MUST WEAR HEAVY PROTECTIVE GLOVES TO PREVENT DAMAGE TO YOUR HANDS. IF YOU DO NOT OBEY THESE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) To examine the fan rotor, turn the fan blades with your hand.

(a) If the bearings are rough, if there are unusual noises, or if the rotor does not turn smoothly, replace the engine.

These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

NOTE: It is permitted to have light rub marks on the seals and shrouds.

(b) If the seal or the shroud has rubbed but is serviceable, you can operate the engine if this check is satisfactory:

1) Do this task: Test 5 - Power Assurance Check, TASK 71-00-00-700-813-F00.

(c) Examine these components for signs of bearing damage:

1) Do this task: Chip Detectors and Scavenge Screens Inspection, TASK 79-00-00-200-804-F00.

2) If signs of bearing damage is found, replace the engine.

These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

(d) If unwanted material other than bearing material is found, do these steps:

1) Replace the filter element for the scavenge oil filter.

These are the tasks:

Scavenge Oil Filter Element Removal, TASK 79-21-06-000-801-F00,

Scavenge Oil Filter Element Installation, TASK 79-21-06-400-801-F00.

END OF TASK

TASK 71-00-00-200-802-F00

9. Inspection of the Engine After Volcanic Ash, Dust or Sand Ingestion

A. General

(1) This procedure gives the inspection of the engine after volcanic ash, dust or sand ingestion.

B. References

Reference	Title
12-13-11-600-801	Replenish the Engine Oil (P/B 301)
12-13-11-600-803	Drain the Engine Oil (P/B 301)
71-00-00-700-821-F00	Dry Motor the Engine (P/B 201)
72-00-00-200-804-F00	Borescope Inspection of the HP Compressor Blades (P/B 601)
72-00-00-200-806-F00	Borescope Inspection of the HPT Nozzle Guide Vanes (P/B 601)
72-00-00-200-807-F00	Borescope Inspection of the HPT Blades (P/B 601)
72-00-00-200-815-F00	Borescope Inspection of the HPT Shrouds (P/B 601)
79-21-06-000-801-F00	Scavenge Oil Filter Element Removal (P/B 401)
79-21-06-400-801-F00	Scavenge Oil Filter Element Installation (P/B 401)

C. Location Zones

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

D. Procedure

SUBTASK 71-00-00-210-048-F00

(1) If the engines have flown through or operated in volcanic ash or severe dust or sand conditions, do these steps for the inspection:

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 conditions that are more than normal.

(a) Do a visual inspection of the engine inlet and the engine exhaust areas for signs of damage or erosion.

1) Repair or replace the applicable component if the damage is more than the limits.

(b) Do a borescope inspection of these HPC and HPT components and look for this damage:

NOTE: Examine all stages of the HPC. The aft stages of the HPC will be the most affected by 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 reduced engine stall margin.

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 CFMI.

4) Do this task: Borescope Inspection of the HP Compressor Blades, TASK 72-00-00-200-804-F00.

5) Do this task: Borescope Inspection of the HPT Nozzle Guide Vanes, TASK 72-00-00-200-806-F00.

6) Do this task: Borescope Inspection of the HPT Blades, TASK 72-00-00-200-807-F00.

7) Do this task: Borescope Inspection of the HPT Shrouds, TASK 72-00-00-200-815-F00.

SUBTASK 71-00-00-290-002-F00

(2) If the engines have been exposed to volcanic ash or severe dust or sand conditions on the ground but have not flown through these condition, do these steps for the inspection:

NOTE: Do not water wash an engine that has been exposed to volcanic ash or severes dust or sand. Particles can collect on the HPT nozzle and blade cooling paths. Material can collect in the rotor spools and cause rotor imbalance.

(a) Examine the engine inlet and exhaust for ash, dust or sand particles that collected in the engine.

1) Vacuum the particles from all accessible areas in the engine inlet and exhaust.

(b) To dry motor the engine for two minutes, do this task: Dry Motor the Engine, TASK 71-00-00-700-821-F00

(c) Do a borescope inspection of the HPC and HPT at the 6 o'clock positions and look for ash, dust or sand.

1) If loose material is still present in the engine flowpath, dry motor the engine for two minutes.

2) Do the borescope inspection of the HPC and HPT for loose material.

3) Do the two minute dry motor and borescope inspection again until all the loose material is removed.

SUBTASK 71-00-00-900-001-F00

(3) Replace these items:

(a) Replace the scavenge oil filter element.

These are the tasks:

Scavenge Oil Filter Element Removal, TASK 79-21-06-000-801-F00,

Scavenge Oil Filter Element Installation, TASK 79-21-06-400-801-F00.

(b) Drain and replace the engine oil.

1) Do this task: Drain the Engine Oil, TASK 12-13-11-600-803.

2) Do this task: Replenish the Engine Oil, TASK 12-13-11-600-801.

SUBTASK 71-00-00-810-007-F00

(4) Monitor the operation of the engine to find if the performance parameters are usual.

(a) If an engine parameter is unusual, do the Fault Isolation for the applicable engine parameter.

SUBTASK 71-00-00-290-003-F00

(5) At not more than 400-800 cycles, it is recommended to do a one time borescope inspection of HPT components to make sure the HPT nozzles and HPT blades are serviceable.

END OF TASK

TASK 71-00-00-740-801-F00

10. Engine Exceedance Page Check

A. General

(1) This task finds and resets the engine exceedances on the FMCS Control Display Unit (CDU).

(a) It also includes a procedure to reset the red box display on the center display unit (center DU) if it stays ON after you reset the exceedance or the CDU shows no current exceedance.

(2) These engine parameters with exceedances are stored in non-volatile memory of the Display Electronics Units (DEU).

(a) N1

(b) N2

(c) EGT RED LIMIT

(d) EGT HOT START.

B. Location Zones

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

C. Engine Exceedance Page Check

SUBTASK 71-00-00-860-180-F00

(1) Do this step:

Make sure that these circuit breakers are closed:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
D	5	C01359	DISPLAY DEU 1 PRI

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	9	C01362	DISPLAY DEU 2 HOLDUP
D	10	C01361	DISPLAY DEU 1 HOLDUP
D	11	C01360	DISPLAY DEU 2 PRI

SUBTASK 71-00-00-740-009-F00

(2) Do these steps to get the engine exceedances on the FMCS CDU:

NOTE: The FMCS CDU does not support a type-ahead function. You must have the prompt on the FMCS CDU screen before you type in the response.

(a) Push the INIT REF function key.

(b) If the POS INIT display shows, then push the line select key (LSK) adjacent to the INDEX prompt.

NOTE: This makes the INIT/REF INDEX show.

(c) Push the line select key (LSK) adjacent to the MAINT prompt.

(d) From the MAINT BITE INDEX, push the LSK adjacent to the ENGINE prompt.

NOTE: This LSK causes the ENGINE/EXCEED BITE INDEX screen to show.

(e) Push the EXCEEDANCES LSK.

NOTE: This LSK causes the ENGINE EXCEEDANCE page to show. The exceedances are stored by the DEU. The DEU uses data from the EEC to compile the exceedances.

(f) Push the ENGINE X EXCEEDANCES LSK for the applicable engine.

(g) If the current exceedances were not reset during the last flight, the screen shows the CURRENT EXCEEDS SUMMARY with the exceedances.

1) Push the EVENTS LSK to get more data on the event on the CURRENT EXCEEDANCES page.

NOTE: The screen shows one exceedance per page. The page number and total pages show in the upper right corner.

2) Use the NEXT PAGE and PREV PAGE keys to get to the applicable exceedance.

3) Record the data for the exceedance.

4) Push the RESET LSK to reset the exceedance.

a) Do the above steps again to record and reset the current exceedances.

(h) If there were no exceedances during the last flight or if they were reset, the screen shows a LSK for CURRENT EXCEEDANCES and for FLIGHT LEG EXCEEDANCES.

1) If you push the CURRENT EXCEEDANCES LSK, the screen shows NO EXCEEDANCES.

a) Push the INDEX LSK to go back to the previous menu.

NOTE: Use the INDEX LSK at any time to go the applicable menu.

2) Push the FLIGHT LEG EXCEEDANCES LSK, to show the flight legs with the exceedances.

3) Push the applicable LEG X LSK, to show the exceedance data.

NOTE: The screen can show five legs on a page and one exceedance per page. Use the NEXT PAGE and PREV PAGE keys to go to all of the legs and exceedances. The DEUs can show ten exceedances per leg and keep nine legs with exceedances.

4) Record the data for the exceedances.

5) Push the INDEX LSK to go to another LEG.

a) Do the above steps again to record the exceedances for all of the flight legs.

6) Push the INDEX LSK to go to another LEG.

7) To erase all the exceedances for this engine, push the INDEX LSK to go to show the BULK ERASE LSK.

a) Push the BULK ERASE LSK.

b) PUSH the YES LSK.

(i) To go to the exceedances for the other engine, push the INDEX LSK several times until the correct menu shows.

(j) To exit the ENGINE EXCEEDANCES page, push the INIT REF key.

(k) If you reset the current exceedances but the center DU continues to show the red box for an exceedance, continue to the subsequent step.

D. Reset the Red Box Alert (Engine Exceedance)

SUBTASK 71-00-00-070-001-F00

(1) Do this procedure if the red box alert stays on the center DU, the CURRENT EXCEEDANCES are reset and the CDU shows NO EXCEEDANCES in CURRENT EXCEEDANCES.

SUBTASK 71-00-00-070-002-F00

(2) To reset the red box alert display for an engine exceedance on the CDU, do these steps:

(a) Push the INIT REF key to exit the CDU Maintenance session.

(b) To isolate the DEU2, do this step:

Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	9	C01362	DISPLAY DEU 2 HOLDUP
D	11	C01360	DISPLAY DEU 2 PRI

(c) Get access to the CURRENT EXCEEDANCES page on the CDU.

(d) If the screen still sho CURRENT EXCEEDANCES, reset them.

(e) Push the INIT REF key to exit the CDU Maintenance session.

(f) Do this step:

Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	9	C01362	DISPLAY DEU 2 HOLDUP
D	11	C01360	DISPLAY DEU 2 PRI

(g) To isolate the DEU1, do this step:

Open these circuit breakers and install safety tags:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
D	5	C01359	DISPLAY DEU 1 PRI

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	10	C01361	DISPLAY DEU 1 HOLDUP

(h) Get access to the CURRENT EXCEEDANCES page on the CDU.

(i) If the screen still shows CURRENT EXCEEDANCES, reset them.

(j) Push the INIT REF key to exit the CDU Maintenance session.

(k) Do this step:

Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
D	5	C01359	DISPLAY DEU 1 PRI

F/O Electrical System Panel, P6-1

Row	Col	Number	Name
D	10	C01361	DISPLAY DEU 1 HOLDUP

(l) Make sure that the red box alert does not show.

END OF TASK

TASK 71-00-00-200-804-F00

11. Nacelle Structure Hot Air Duct Rupture Conditional Inspection

A. General

(1) This task provides the instrcuctions on how to examine the airplane nacelle structure for possible structural damage caused by a ruptured duct below the strut that has occurred for which there was a subsequent deployment of the affected Thrust Reverser.

B. Location Zones

Zone	Area
400	Powerplant and Nacelle Struts

C. Procedure

SUBTASK 71-00-00-210-053-F00

(1) Contact Boeing for specifics of information related to the inspection of the inner wall for both location and the method of inspection.

D. Put the Airplane Back to Its Usual Condition

SUBTASK 71-00-00-410-019-F00

(1) Install the components you removed if they are servicable, or install replacement parts.

END OF TASK

POWER PLANT - REMOVAL/INSTALLATION

1. General

A. This procedure contains scheduled maintenance task data.

B. This procedure includes these tasks:

(1) Power Plant Removal

(2) Power Plant Installation

C. The procedure to remove the power plant can be divided into steps. If you have four persons to remove the power plant, use the table below to help you remove the power plant more quickly:

Table 401/71-00-02-993-817-F00 Power Plant Removal Sequence

Step	Recommended Number of Persons	Description
1	4	Level the airplane, Deactivate/open circuit breakers (as applicable)
2	4	Remove the fan cowl panels
3	1	Open the thrust reversers, Do the core area disconnects on the right side
	1	Open the thrust reversers (2nd person) Do the core area disconnects on the left side
	1	Do the fan case disconnects on the right side, Install the ground support equipment
	1	Do the fan case disconnects on the left side, Install the ground support equipment (2nd person)
4	4	Remove the power plant.

D. The procedure to install the power plant can also be divided into steps. If you have four persons to install the power plant, use the table below to help you install the power plant more quickly:

Table 402/71-00-02-993-818-F00 Power Plant Installation Sequence

Step	Recommended Number of Persons	Description
1	4	Install the power plant.
2	1	Do the fan case disconnects on the right side, Close the thrust reversers
	1	Do the fan case disconnects on the left side, Close the thrust reversers (2nd person)
	1	Do the core area connections of the right side, Remove the ground support equipment
	1	Do the core area connections on the left side, Remove the ground support equipment (2nd person)
3	4	Install the fan cowl panels
4	4	Close circuit breakers/activate systems

E. When you replace a power plant, you can remove the inlet cowl and install it on the replacement power plant.

(1) You can remove the inlet cowl when the power plant is still attached to the strut or you can remove the inlet cowl when the power plant is attached to the dolly.

(a) If you remove the inlet cowl when it is attached to the strut, the inlet cowl attach bolt at the 12 o'clock location will be difficult to remove.

(b) If you remove the inlet cowl when it is attached to the dolly, the inlet cowl attach bolts between the 4 and 8 o'clock locations will be difficult to remove.

(2) It is recommended that you remove the inlet cowl attach bolts between the 4 and 8 o'clock locations before you lower the power plant from the strut. When the power plant is attached to the dolly, remove the remaining bolts and remove the inlet cowl.

(3) Use the procedure in AMM 71-11-01/401 to remove and install the inlet cowl.

TASK 71-00-02-000-801-F00

2. Power Plant Removal

A. General

(1) To remove the power plant, you must follow these topics:

(a) Prepare the Airplane for the Removal of the Power Plant

(b) Fan Case Disconnects on the Left Side

(c) Fan Case Disconnects on the Right Side

(d) Engine Core Disconnects on the Left Side

(e) Engine Core Disconnects on the Right Side

(f) Remove the Power Plant.

(2) To remove the power plant, you must deactivate the pneumatic system and remove electrical power from the applicable engine.

(3) During the power plant removal, install protective covers to all tube ends, ducts, electrical connectors, fuel fittings and hydraulic fittings.

(4) When you remove a power plant, do not disconnect hoses and tubes other than those specifically shown. When these hoses and tubes are disconnected, they can be installed incorrectly during the installation. This can cause the incorrect operation of a component or system.

(5) This procedure uses bootstrap equipment to remove the power plant from the strut.

(6) The power plant, when removed from the strut, weighs approximately 6700 pounds (3070 kg).

B. References

Reference	Title
08-21-02-580-801	Make the Airplane Level (P/B 201)
08-21-03-580-801	Make the Airplane Level (P/B 201)
12-15-31-610-802	Main Landing Gear Shock Strut Servicing (P/B 301)
20-40-11-910-801	Static Grounding (P/B 201)
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
29-11-00-860-805	Hydraulic System A or B Power Removal (P/B 201)
54-52-01-010-801	Forward Fairing Removal (P/B 401)
71-11-02-000-801-F00	Remove the Fan Cowl Panel (Selection) (P/B 401)
78-31-00-010-801-F00	Open 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-2111	Base - Universal Transportation, CFM56 Engine (Part #: AM-2563-227, Supplier: 9M323, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
COM-2118	Cradle - Transport, CFM56-7 Engine (Part #: AM-2811-4800, Supplier: 9M323, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
COM-4953	Cradle - Engine, CFM56-7 (Part #: FB70077-100ISSB, Supplier: KCWD9, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Opt Part #: FB70077-100, Supplier: KCWD9, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
COM-4954	Stand - Transportation, Engine, CFM56-7 (Part #: FB70077-200, Supplier: KCWD9, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
COM-6276	Cradle - Engine, CFM56-7 (Part #: 114702-1, Supplier: 08118, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
COM-6277	Stand - Transportation, Engine, CFM56-7 (Part #: 114701-1, Supplier: 08118, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
SPL-2110	Kit - Bootstrap, CFM56-7 Engine (Part #: C71020-91, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
SPL-2417	Pump - Hand, Opening System, Thrust Reverser (Part #: A78019-21, Supplier: 81205, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Part #: B54001-30, Supplier: 81205, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Part #: C78005-21, Supplier: 81205, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
SPL-2433	Equipment - Hold Open, Thrust Reverser Cowl, CFM56-7 Engine (Part #: C78019-15, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
STD-1054	Container - Fuel Resistant, 5 Gallon (19 Liters)

D. Consumable Materials

Reference	Description	Specification
D00623 [CP5066]	Oil - Fuel System, Corrosion Preventive	MIL-PRF-6081, Grade 1010
G00270	Tape - Scotch Flatback Masking 250	ASTM D6123 (Supersedes A-A-883)
G02345 [CP8001]	Lockwire - Inconel (0.032 inch Dia.)	NASM20995˜ N32
G50065 [CP8006]	Cable, Safety, Stainless Steel, 0.8mm (0.032inch) Diameter	

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
41	Packing	73-11-01-01-065	HAP ALL

F. Location Zones

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

G. Prepare the Airplane for the Removal of the Power Plant

SUBTASK 71-00-02-580-001-F00

(1) Make sure the airplane is as close to a 1.5 degree nose-down attitude as possible.

(a) If it is necessary to change the attitude of the airplane, do one of these tasks:

1) Do this task: Make the Airplane Level, TASK 08-21-02-580-801.

2) Do this task: Make the Airplane Level, TASK 08-21-03-580-801.

SUBTASK 71-00-02-860-001-F00

(2) Do this task: Static Grounding, TASK 20-40-11-910-801.

SUBTASK 71-00-02-860-002-F00

(3) Make sure the engine start lever is in the CUTOFF position.

(a) Install a DO-NOT-OPERATE tag on the applicable engine start lever.

SUBTASK 71-00-02-860-003-F00

(4) If not already done, do this task: Supply Electrical Power, TASK 24-22-00-860-811.

SUBTASK 71-00-02-860-004-F00

(5) Make sure the FUEL VALVE CLOSED (engine fuel shutoff valve) light on the fuel control panel (P5 overhead panel) is dim.

NOTE: The light for the engine fuel shutoff valve has three positions: 1) bright when the valve is in transition or when it does not agree with the commanded position; or 2) dim when the valve is closed; or 3) off when the valve is opened.

SUBTASK 71-00-02-860-005-F00

(6) For engine 1, do this step:

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
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A
B	8	C01103	ENGINE 1 START VALVE

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1
E	5	C01320	ENGINE FUEL ENGINE 1 HPSOV CONT

SUBTASK 71-00-02-860-006-F00

(7) For engine 2, do this step:

Open these circuit breakers and install safety tags:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2
E	3	C01321	ENGINE FUEL ENGINE 2 HPSOV CONT

SUBTASK 71-00-02-860-007-F00

(8) Do this task: Hydraulic System A or B Power Removal, TASK 29-11-00-860-805.

SUBTASK 71-00-02-860-008-F00

(9) Put the HYD PUMPS ENG switch on the pilot's overhead panel, P5, in the OFF position for the applicable engine.

SUBTASK 71-00-02-010-001-F00

(10) Do this task: Remove the Fan Cowl Panel (Selection), TASK 71-11-02-000-801-F00.

SUBTASK 71-00-02-010-002-F00

WARNING: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSER: RETRACT THE LEADING EDGE, DO THE DEACTIVATION PROCEDURES FOR THE THE LEADING EDGE AND THE THRUST REVERSERS (FOR GROUND MAINTENANCE), AND OPEN THE FAN COWL PANEL. IF YOU DO NOT OBEY THE ABOVE SEQUENCE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(11) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

SUBTASK 71-00-02-860-009-F00

WARNING: REMOVE THE ELECTRICAL POWER BEFORE YOU DISCONNECT A FUEL, HYDRAULIC OR ELECTRICAL LINE. AN ACCIDENTAL OPERATION OF THE PRESSURIZED FLUIDS OR ELECTRICAL CIRCUITS CAN CAUSE A FIRE. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

(12) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.

(a) Install a DO-NOT-OPERATE tag from the BAT switch on the pilot's overhead panel, P5.

SUBTASK 71-00-02-480-001-F00

(13) Do these steps to install the hold open equipment, SPL-2433 between the two thrust reversers and the strut (Figure 401):

NOTE: The hold-open equipment consists of a strut attach beam [4], two arm supports [2], two beam assemblies [5], two retention pins [6] and lockpins [1] and [3]. The hold-open equipment is symmetrical between the inboard and outboard sides.

(a) Use two lockpins [1] to attach the strut attach beam [4] to the two clevis brackets on the strut.

(b) Attach the two arm supports [2] to the strut attach beam [4] as follows:

WARNING: MAKE SURE YOU CORRECTLY ENGAGE EACH ARM SUPPORT INTO THE STRUT ATTACH BEAM. IF YOU DO NOT, THE HOLD-OPEN RODS WILL NOT HOLD THE WEIGHT OF THE THRUST REVERSER. INJURIES TO PERSONS CAN OCCUR.

1) Engage the inboard end of the arm support [2] into the strut attach beam [4].
2) As you hold the arm support [2], use a lockpin [3] to attach the arm support [2] to the strut attach beam [4].
3) Do the above steps again for the other arm support [2].

(c) Use the retention pins [6] to attach the beam assemblies [5] to the arm supports [2].

NOTE: Make sure the longer side of the beam assembly faces forward.

CAUTION: MAKE SURE YOU TURN THE ADJUSTMENT PINS MORE THAN HALFWAY INTO THE BEAM ASSEMBLY. IF YOU DO NOT, THE THRUST REVERSERS WILL NOT BY FULLY OPEN. THIS COULD CAUSE ENGINE COMPONENTS TO HIT THE THRUST REVERSER. DAMAGE TO EQUIPMENT CAN OCCUR.

(d) Turn the two adjustment pins on each beam assembly [5] until they rest in the compression-rod receiver cups on the thrust reversers.

1) Make sure the you turn the adjustment pins more than halfway into the beam assembly [5].

(e) Make sure the two arm supports [2] are correctly engaged and that all lockpins [1] and [3] and the retention pins [6] are correctly installed.

(f) Slowly lower each thrust reverser until its weight is held by the hold-open equipment.

SUBTASK 71-00-02-020-001-F00

(14) Do these steps to disconnect the opening actuators for the thrust reversers (Figure 402):

(a) Remove the dust cap and connect the thrust reverser hand pump opening system, SPL-2417 to the opening actuator.

(b) Open the return valve on the pump. Let the thrust reverser lower slowly until its weight is held by the hold-open equipment.

(c) Disconnect the pump from the opening actuator.

1) Install the dust cap.

(d) Push up on the actuator lock collar to disengage the lock.

(e) Disconnect the opening actuators [21] at the lower end.

1) Remove the bolt [22], washers [23] and [26], bushing [24], alignment washer [25], and the nut [27].

(f) Temporarily attach the lower end of the actuator [21] to the thrust reverser with a tie.

(g) Do the above steps again for the other opening actuator.

SUBTASK 71-00-02-420-001-F00

(15) If you will remove Engine 2, apply Scotch Flatback Masking Tape 250, G00270 around the edge of the thrust reverser latches to keep them in the closed position.

NOTE: This will give clearance for the dolly on the inboard side.

SUBTASK 71-00-02-420-002-F00

WARNING: MAKE SURE YOU APPLY PROTECTIVE COVERS OR TAPE AROUND THE FIRE SEALS ON THE TOP AFT SURFACE OF THE THRUST REVERSER INNER SURFACE. IF YOU DO NOT, INJURIES TO A PERSON'S HANDS CAN OCCUR WHEN THE AFT MOUNT BOLTS ARE REMOVED.

(16) Apply protective covers or Scotch Flatback Masking Tape 250, G00270 around the fire seals on the top aft surface of the thrust reverser inner cowl.

H. Fan Case Disconnects on the Left Side

NOTE: All the disconnects on the left side of the fan case are found at the service disconnect panel on the left side of the fan cowl support beam. When you disconnect the fuel supply line, it is necessary to drain all the remaining fuel in this line. This fuel is drained from the engine fuel filter.

SUBTASK 71-00-02-680-001-F00

(1) Do these steps to drain the fuel supply line (Figure 403):

(a) Put a 5 gallon (19 liters) fuel resistant container, STD-1054 below the fuel filter drain plug [42].

(b) Remove the drain plug [42] and let the fuel drain.

NOTE: The drain plug has a 13/16-inch fitting.

(c) Remove and discard the packing [41] from the drain plug [42].

(d) Lubricate a new packing [41] with oil, D00623 [CP5066] and install it on the drain plug [42].

(e) Lubricate the threads of the drain plug [42] with oil, D00623 [CP5066].

(f) Install the drain plug [42].

1) Tighten the drain plug [42] to 45-55 pound-inches (5.0-6.2 Newton meters).

(g) Attach lockwire, G02345 [CP8001] or cable, G50065 [CP8006] to the drain plug [42].

SUBTASK 71-00-02-020-002-F00

(2) Disconnect the electrical connectors DP1234 and D30038 (Figure 404):

SUBTASK 71-00-02-020-003-F00

(3) Do these steps to disconnect the starter duct:

(a) Remove the coupling [61] at the top end of the duct.

NOTE: The seal [62] will be removed later.

SUBTASK 71-00-02-020-004-F00

(4) Do these steps to disconnect the hydraulic lines:

(a) Disconnect the quick disconnect couplings on the hydraulic case drain, hydraulic supply and hydraulic pressure lines.

(b) Install the protective covers on these hydraulic lines and their mating receptacles.

SUBTASK 71-00-02-020-005-F00

(5) Disconnect the fuel supply line at the fan cowl support beam.

(a) FUEL HOSE WITH A B-NUT FITTING;

Disconnect the B-nut from the strut fitting.

NOTE: Use two wrenches to loosen the B-nut. Use one to hold the hose and use the other to loosen the nut.

(b) Install the protective covers on the fuel supply line and strut fitting.

SUBTASK 71-00-02-020-022-F00

(6) Disconnect the DP0502 connector from the fuel flow transmitter (Figure 409).

(a) This permits more clearance for the left dynamomter.

I. Fan Case Disconnects on the Right Side

NOTE: All the disconnects on the right side of the fan case are found at the service disconnect panel on the right side of the fan cowl support beam.

SUBTASK 71-00-02-020-006-F00

(1) Disconnect the eight electrical connectors (Figure 405):

NOTE: There are eight electrical connectors on the right side of the strut. These connectors are, from forward to aft, the DP1104, DP0256, DP1328, DP1620, DP1552, DP0112, DP0324, and DP0460. The removal instructions for all the connectors are equivalent.

SUBTASK 71-00-02-020-007-F00

CAUTION: USE TWO WRENCHES TO LOOSEN THE COUPLING NUTS. USE ONE TO HOLD THE FITTINGS, AND THE OTHER TO LOOSEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(2) Do these steps to disconnect the strut drain line:

(a) Disconnect the hose [82] at the drain tube [81] on the engine fan case.

(b) Install protective covers on the hose [82] and the drain tube [81].

J. Engine Core Disconnects on the Left Side

SUBTASK 71-00-02-020-008-F00

CAUTION: USE TWO WRENCHES TO LOOSEN THE COUPLING NUTS. USE ONE TO HOLD THE FITTINGS, AND THE OTHER TO LOOSEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(1) Do these steps to disconnect the pressure sense line from the side of the precooler (Figure 406):

(a) Disconnect the pressure sense line between the hose [101] and the tube [102].

(b) Install protective covers on the hose [101] and the tube [102].

SUBTASK 71-00-02-020-009-F00

(2) Do these steps to disconnect the 450 degrees F temperature sense line from the side of the precooler:

(a) Disconnect the 450 degrees F temperature sense line between the hose [104] and the tube [103].

(b) Install protective covers on the hose [104] and the tube [103].

SUBTASK 71-00-02-020-021-F00

(3) It can be necessary to disconnect the fire extinguishing tube [100] from the strut and left side of the precooler.

(a) When you lower the engine, the fire extinguishing tube [100] can cause damage to the precooler seal [123].

(b) If the tube [100] is removed, install a protective cover on the strut connector.

K. Engine Core Disconnects on the Right Side

SUBTASK 71-00-02-020-010-F00

(1) Do these steps to disconnect the 390 degrees F temperature sense line from the side of the precooler (Figure 407):

(a) Disconnect the 390 degrees F temperature sense line between the hose [124] and the tube [121].

(b) Install protective covers on the hose [124] and the tube [121].

SUBTASK 71-00-02-020-011-F00

(2) Do these steps to disconnect the pneumatic duct from the precooler:

(a) Disconnect the coupling [122] that attaches the 5th-stage pneumatic duct to the precooler inlet header.

NOTE: The seal [123] will be removed later.

L. Remove the Power Plant

SUBTASK 71-00-02-010-003-F00

(1) For the thumbnail fairing, do this task: Forward Fairing Removal, TASK 54-52-01-010-801.

SUBTASK 71-00-02-980-001-F00

(2) Put the fan cowl panel pins in the strut to keep them away from the engine removal equipment.

SUBTASK 71-00-02-480-002-F00

(3) Install the forward bootstrap equipment from the bootstrap kit, SPL-2110 as follows (Figure 408):

NOTE: The forward bootstrap consists of an inboard arm [143], an outboard arm [145], two braces [142], two dynamometers [147] and two lever hoists [148].

NOTE: Make sure the inboard arm [143] is always on the inboard side of the power plant and the outboard arm [145] is always on the outboard side.

NOTE: In most locations the lockpins are permanently attached to the bootstrap equipment.

(a) Use the lockpin [141] to attach the inboard arm [143] to the strut attach fitting.

NOTE: The inboard arm has a shear pin below the strut attach fitting to temporarily hold the arm in its correct position. The arm will not fall.

1) Attach the safety pin to the end of the lockpin [141].

(b) Use the lockpin [146] to attach the outboard arm [145] to the strut attach fitting.

NOTE: The outboard arm also has a shear pin below the strut attach fitting to temporarily hold the arm in its correct position. The arm will not fall.

1) Attach the safety pin to the end of the lockpin [146].

(c) Use the lockpin [144] to attach the inboard arm [143] and the outboard arm [145] together at the top location.

1) Attach the safety pin to the end of the lockpin [144].

(d) Do these steps to install a brace [142] between the inboard arm [143] and the strut:

NOTE: There are two braces on the forward bootstrap. They consist of a metal rod with a clevis on one end and a permanently attached lockpin at the other end. The two braces are the same.

1) Put the brace [142] aft lockpin in the keyed slot of the inboard arm [143].

2) Turn the brace [142] 90 degrees until the clevis at the forward end of the brace is aligned with the attach point on the right forward strut.

NOTE: Look at the aft side of the inboard arm [143] to make sure the lockpin has turned and is engaged.

3) Use the lockpin [149] to attach the clevis on the forward end of the brace [142] to the strut.

a) Attach the safety pin to the end of the lockpin [149].

(e) Do the above step again for the other brace [142].

(f) Make sure the inboard arm [143], the outboard arm [145], the two braces [142] and all lockpins [141], [144], [146] and [149] are installed correctly.

(g) Attach a lever hoist [148] to each arm.

WARNING: MAKE SURE THERE ARE NO SPIRAL TWISTS IN THE LEVER HOIST CHAINS BETWEEN THE LEVER HOIST HOUSING AND ITS LOWER BLOCK (THE ATTACH POINT FOR THE DYNAMOMETER). IF YOU SEE A TWIST IN THE CHAIN, YOU MUST REMOVE IT. IF YOU DO NOT REMOVE IT, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(h) Make sure the chains on the lever hoists [148] do not have a spiral twist between the lever hoist housing and the lower block.

1) To remove the spiral twist, extend the chain until the twist is removed.

(i) Attach a dynamometer to each lever hoist [148].

NOTE: The two dynamometers must face forward. To do this, the left dynamometer must be installed upside down.

SUBTASK 71-00-02-480-014-F00

(4) Do these steps to attach the forward bootstrap equipment to the engine (Figure 409):

NOTE: The forward bootstrap equipment is attached directly to a cradle-to-engine bracket at the bootstrap attach point on the power plant.

(a) Get the cradle-to-engine attach brackets [163] from the storage box on the cradle assembly.

(b) Examine the bolts [162] for signs of damage before the installation.

1) Look at the area from the bolt head to the threads for signs of stretching and necking.

2) Do not use damaged bolts [162]. Replace the bolt if damage is found.

(c) Install the cradle-to-engine attach brackets [163] in the fan case.

1) Make sure the brackets [163] are fully engaged before you install the bolts [162].

2) Install the four bolts [162] to attach the brackets [163] to the fan case.

a) Do not use power tools to install the four bolts [162].

b) Tighten the bolts [162] to 84-120 pound-inches (9.5-13.5 Newton-meters).

(d) Attach each forward dynamometer [147] to its cradle-to-engine attach bracket [163].

NOTE: An attach fitting is permanently attached to each forward dynamometer.

NOTE: The preferred attach fitting [C71020-91] is the "banana link".

NOTE: If it is necessary, adjust the length of the lever hoists [148].

1) Use one lockpin [161] for each side.

2) Attach the safety pin to the end of each lockpin [161].

3) For the left forward dynamometer [147], make sure the connector DP0502 is removed from the fuel flow transmitter.

(e) Use the lever hoists [148] to remove the slack from the forward bootstrap, but do not apply an load on the power plant at this time.

SUBTASK 71-00-02-480-003-F00

(5) Install the aft bootstrap equipment from the bootstrap kit, SPL-2110 as follows (Figure 410):

NOTE: The aft bootstrap consists of two support braces [186] and [188], a support beam [184], one dynamometer [183] and one lever hoist [182]. The aft bootstrap equipment can only be installed with the lever hoist and dynamometer on the outboard location.

(a) Attach the support brace [188] to the forward side of the two bootstrap attach brackets [181] on the bottom of the strut.

NOTE: The support braces [186] and [188] must be installed with the longer arm on the outboard side. The location of the braces is opposite between Engine 1 and Engine 2.

(b) Attach the other support brace [186] to the aft side of the two bootstrap attach brackets [181] on the bottom of the strut.

(c) Attach the support brace [188] and the support brace [186] together on the inboard side of the strut with the lockpin assembly [185].

1) Attach the safety pin to the end of the lockpin assembly [185].

(d) Slide the support beam [184] in between the two support braces [186] and [188] until the inboard end engages the inboard lockpin assembly [185].

(e) Attach the support beam [184] to the two support braces [186] and [188] at the outboard location with the lockpin [187].

1) Attach the safety pin to the end of the lockpin [187].

(f) Make sure the two support braces [186] and [188] and the support beam [184] are installed correctly.

(g) Attach a lever hoist [182] to the end of the support beam [184] with the lockpin [189].

1) Attach the safety pin to the end of the lockpin [189].

WARNING: MAKE SURE THERE ARE NO SPIRAL TWISTS IN THE LEVER HOIST CHAIN BETWEEN THE LEVER HOIST HOUSING AND ITS LOWER BLOCK (THE ATTACH POINT FOR THE DYNAMOMETER). IF YOU SEE A TWIST IN THE CHAIN, YOU MUST REMOVE IT. IF YOU DO NOT REMOVE IT, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(h) Make sure the chain on the lever hoist [182] does not have a spiral twist between the lever hoist housing and the lower block.

1) To remove the spiral twist, extend the chain until the twist is removed.

(i) Attach a dynamometer [183] to the lever hoist [182].

SUBTASK 71-00-02-480-005-F00

(6) Do these steps to attach the aft bootstrap equipment to the engine (Figure 411):

NOTE: The aft bootstrap equipment is attached directly to the power plant at one location.

(a) Do these steps to attach the engine attach bracket [202] to the turbine rear frame:

1) Attach the engine attach bracket [202] to the two engine flange brackets [204] and [205] with the two lockpins [203].

2) Attach the safety pin to the end of each lockpin [203].

(b) Use the lockpin [201] to attach the dynamometer [183] to the engine attach bracket [202].

NOTE: If it is necessary, adjust the length of the lever hoist [182].

1) Attach the safety pin to the end of the lockpin [201].

(c) Use the lever hoist [182] to remove the slack from the aft bootstrap, but do not apply an load on the power plant at this time.

SUBTASK 71-00-02-480-006-F00

CAUTION: MAKE SURE YOU DO ALL THE STEPS GIVEN BELOW TO PREPARE THE DOLLY AND CRADLE ASSEMBLY FOR THE POWER PLANT REMOVAL. IF YOU DO NOT, THE POWER PLANT CAN HIT AND DAMAGE THE PRECOOLER AND STRUT AS IT IS REMOVED.

(7) AGSE CRADLE;

Do these steps to prepare the cradle, COM-2118 and base, COM-2111 for the power plant removal (Figure 412):

NOTE: After the bootstrap equipment is installed on the airplane, you must use all four persons to remove the power plant.

(a) If not already done, remove the diagonal braces from the cradle, COM-2118. To remove them, disconnect the lockpins at each end of the diagonal brace.

1) Put the diagonal braces in their storage position on the base, COM-2111.

CAUTION: MAKE SURE YOU REMOVE THE EYE-BOLTS BEFORE YOU MOVE THE CRADLE AND DOLLY UNDER THE ENGINE. IF YOU DO NOT, THE EYE-BOLTS CAN HIT THE THRUST REVERSER DURING THE ENGINE REMOVAL. DAMAGE TO THE THRUST REVERSER CAN OCCUR.

(b) Remove the eye-bolts from each forward cradle arm.

(c) Make sure the lockpin [221] on each angle bracket [222] is removed.

(d) Do these steps to prepare the forward cradle arms:

1) Slide the left trunnion outboard to fully retract it.

2) On the right trunnion, loosen the spanner nut and fully retract the right trunnion outboard.

CAUTION: MAKE SURE THE TWO FORWARD CRADLE ARMS ARE IN THE OUTBOARD POSITION. IF THEY ARE NOT, DAMAGE TO EQUIPMENT CAN OCCUR IF THE DOLLY HITS THE POWER PLANT OR INLET.

(e) Make sure the arms on the cradle, COM-2118 are in the outboard position.

1) Remove the lockpins at the bottom of each arm and let the arms pivot out.

SUBTASK 71-00-02-490-001-F00

(8) F.BROWN CRADLE;

Do these steps to prepare the engine cradle, COM-4953and transportation stand, COM-4954 for the power plant removal (Figure 413):

(a) Remove the two transportation arms from the cradle.

NOTE: This step is not necessary if the inlet cowl is removed.

(b) Lift the rear support arm from the stowage position and rest it against the right side of the cradle.

(c) Remove the forward trunnions from their clamps.

(d) Put the forward clamp assemblies to the stowed position.

1) Remove the hinge pin and put the clamp assembly to the stowed position.

2) Install the hinge pin.

SUBTASK 71-00-02-490-003-F00

(9) STANLEY AVIATION CRADLE;

Prepare the engine cradle, COM-6276 and transportation stand, COM-6277for the power plant removal per the vendor manual.

SUBTASK 71-00-02-480-007-F00

CAUTION: BE CAREFUL WHEN YOU MOVE THE DOLLY BELOW THE POWER PLANT. DAMAGE TO EQUIPMENT CAN OCCUR IF THE DOLLY HITS THE POWER PLANT OR INLET.

(10) Put the applicable cradle and base below the power plant.

NOTE: Under some ground surface and airplane weight conditions, it could be necessary to lift the airplane to get sufficient clearance between the aft engine mount and the precooler. To get this clearance, extend the main and nose landing gear shock struts with dry air or nitrogen (TASK 12-15-31-610-802).

CAUTION: MAKE SURE THE CRADLE ARMS DO NOT HIT THE THRUST REVERSERS WHEN YOU MOVE THE CRADLE REARWARD. DAMAGE TO EQUIPMENT CAN OCCUR.

(a) AGSE CRADLE;

Put the cradle, COM-2118 and base, COM-2111 in front of the power plant and move it rearward until the cradle is in its correct position under the engine.

NOTE: When the cradle is in the correct position it will not be aligned with the centerline of the engine. The aft end of the cradle will be slightly outboard from a centerline alignment.

NOTE: It is very important to align the cradle with the engine. If they are not aligned, it can be difficult to move the engine from the strut to the cradle.

1) If it is necessary, you can use the cradle steering bars to turn the castors. This will let the cradle move in a side-to-side movement.

(b) F.BROWN;

Put the engine cradle, COM-4953and transportation stand, COM-4954 in front of the power plant and move it aft until the cradle is in its correct position below the engine.

1) Use the castor steering arms.
2) Stop when the center of the forward arms are in line with the forward engine-to-cradle attach brackets.
3) Put the forward clamp assemblies to the installation position.
   a) Remove the hinge pin and put the clamp assembly to the installation position.
   b) Install the hinge pin and the safety pin.
   c) Loosen the collar nuts and open the clamp assembly.

(c) STANLEY AVIATION CRADLE;

Put the engine cradle, COM-6276 and transportation stand, COM-6277 in its correct position under the engine per the vendor manual.

SUBTASK 71-00-02-820-002-F00

(11) Before you apply a load to the bootstrap equipment, make sure all dynamometers are set to the zero position.

SUBTASK 71-00-02-480-008-F00

CAUTION: DO NOT APPLY MORE THAN 3850 POUNDS (1750 KG) TO THE FORWARD INBOARD DYNAMOMETER, 3350 POUNDS (1520 KG) TO THE FORWARD OUTBOARD DYNAMOMETER AND 1300 POUNDS (590 KG) TO THE AFT DYNAMOMETER. IF YOU APPLY MORE THAN THE LIMITS, DAMAGE TO THE POWER PLANT, WING AND STRUT CAN OCCUR.

CAUTION: ONE PERSON MUST OBSERVE EACH DYNAMOMETER WHEN THE LEVER HOISTS ARE OPERATED. LOADS THAT ARE CHANGED AT ONE HOIST CAN AFFECT THE LOADS AT OTHER HOIST LOCATIONS. BECAUSE OF THIS, THE LOADS CAN GO ABOVE THE MAXIMUM BOOTSTRAP LOADS IF NOT MONITORED CAREFULLY.

(12) Apply a load to the lever hoists as follows:

(a) Apply a load to the lever hoists until each dynamometer reads as follows:

NOTE: The load values given below include the necessary preload force and the weight of the engine.

1) The forward inboard dynamometer [147] reads 3700 ±100 pounds (1682 ±45 kilograms).

2) The forward outboard dynamometer [147] reads 3200 ±100 pounds (1454 ±45 kilograms).

3) The aft dynamometer [183] reads 1100 ±100 pounds (500 ±45 kilograms).

SUBTASK 71-00-02-020-012-F00

(13) Disconnect the forward engine mounts as follows (Figure 414):

(a) Loosen all four forward mount bolts [241] one-half turn until you see a clearance under the bolt heads.

NOTE: Use an 11/16-inch socket to loosen the bolts.

(b) Remove the four forward mount bolts [241].

NOTE: Make sure that the engine mount surfaces continue to touch the strut mating surfaces as you remove the bolts [241].

1) Remove the washers [244].

SUBTASK 71-00-02-020-013-F00

(14) Disconnect the aft engine mounts as follows (Figure 415):

(a) Loosen all four aft mount bolts [263] one-half turn until you see a clearance under the bolt heads.

NOTE: Use a 15/16-inch socket to loosen the bolts [263].

(b) Remove the four aft engine mount bolts [263].

NOTE: Make sure that the engine mount surfaces continue to touch the strut mating surfaces as you remove the bolts [263].

(c) Remove the washers [262].

SUBTASK 71-00-02-020-014-F00

CAUTION: WHEN YOU LOWER THE ENGINE, MAKE SURE THAT ALL TUBES, WIRES AND DUCTS BETWEEN THE STRUT AND ENGINE ARE DISCONNECTED. DAMAGE TO THE ENGINE AND STRUT CAN OCCUR.

(CAUTION PRECEDES)

CAUTION: MAKE SURE THE AFT END OF THE ENGINE IS ALWAYS HIGHER THAN THE FRONT. IF IT IS NOT, THE FIRE SHIELD ON THE FAN COWL SUPPORT BEAM CAN HIT THE INLET COWL. DAMAGE TO THE FIRE SHIELD CAN OCCUR.

(15) Do these steps to lower the power plant into the applicable cradle (Figure 416, Figure 417):

(a) Slowly decrease the load on the three lever hoists [148] and [182] until the engine mounts are free of the shear pins [242] and [264].

(b) Carefully monitor the power plant to make sure that all disconnects and separation points have been made.

(c) When the engine is free of the separation points and disconnect locations, turn the engine in the horizontal direction until it is parallel to the ground.

(d) AGSE CRADLE;

Do these steps to engage the engine with the cradle (Figure 412):

1) Lower the engine into the cradle until the forward cradle arms can swing back to the vertical position with the trunnions clear.

2) Install the lower lockpins which hold the forward arms in the vertical position.

3) Examine and re-position the stand if necessary to align the trunnion shafts with the cradle-to-engine attach bracket [163].

a) If the trunnions are aligned with the brackets, lock the wheel castors on the cradle.

4) Slide the left trunnion into the cradle-to-engine attach bracket [163] until it is fully engaged.

a) Install the lockpin [221] and lockpin [224].

5) Slide the right trunnion into the cradle-to-engine attach bracket [163] until it is fully engaged.

a) Install the lockpin [221] and lockpin [224].

6) Continue to lower the aft end of the engine until you can engage the aft support arm with the clevis on the turbine rear frame (TRF).

a) Install the lockpin [281] to attach the support arm to the TRF

7) With the engine still be suspended by the bootstrap, adjust the engine position to make sure the bottom of the trunnion mounts are in full contact with the angle bracket [221] along the full length of the angle bracket.

8) Thread the right forward arm spanner nut outboard until it rests against the angle bracket. Tighten the spanner nut with the wrench to force the forward cradle arms outboard to restrict deflection.

a) Make sure the left trunnion is indexed against the pin while you adjust the spanner nut.

b) Lock the spanner nut with the set screw.

CAUTION: ADJUST THE RIGHT TRUNNION UNTIL THE PIN FULLY ENGAGES FOR THE LEFT AND RIGHT TRUNNION. IF IT DOES NOT FULLY ENGAGE, THE CRADLE WILL NOT HOLD THE ENGINE IF THE LATERAL LOADS BECOME HIGH. DAMAGE TO EQUIPMENT CAN OCCUR.

9) Make sure the trunnions are adjusted correctly.

a) The bottom of the trunnion mounts are in full contact with the angle bracket [221] along the full length of the angle bracket.

b) If unpinned, the trunnions slide in and out.

c) The four cap screw heads should have an approximate gap of 0.01 inch (0.254 mm) under each head and lockwire installed.

10) Tighten the collar on the aft mount support arm and tighten the set screw.

(e) F.BROWN CRADLE;

Do these steps to engage the engine with the cradle (Figure 413):

1) Lower the engine until the forward engine-to-cradle attach brackets [163] are approximately 2 inches (50.8 mm) above the forward clamps on the cradle.

2) Install the forward trunnions into the uniball sockets located at the center of the forward engine-to-cradle attach brackets [163].

3) Continue to lower the engine until the trunnions go in the bottom of the forward clamps.

4) As each trunnion reaches a horizontal position, do these steps to lock the clamps:

a) Close the top clamp over the trunnions.

b) Put the swing bolts in the lock position and tighten the collar nuts.

c) Tighten the collar nuts to 100 ft-lbs (135 N.m).

d) Make sure the end of the trunnions are correctly installed in the uniball sockets.

5) Continue to lower the aft end until you can engage the support arm with the clevis on the turbine rear frame.

a) Use a lockpin to attach the support arm to the turbine rear frame.

b) Attach the safety pin to the end of the lockpin.

(f) STANLEY AVIATION CRADLE;

Engage the engine with the cradle per the vendor manual.

SUBTASK 71-00-02-020-015-F00

(16) Do these steps to disconnect the bootstrap equipment from the power plant (Figure 409, Figure 411):

(a) For the forward bootstrap equipment, remove the lockpin [161] that attaches each forward dynamometer [147] to its cradle-to-engine attach bracket [163].

(b) For the aft bootstrap equipment, remove the lockpin [201] that attaches the dynamometer [183] to the engine attach bracket [202].

SUBTASK 71-00-02-020-016-F00

(17) Do these steps to remove the seal from the top of the engine pneumatic duct and the starter duct.

NOTE: Keep the seals for the installation.

(a) Remove the seal [123] from the top of the engine pneumatic duct (Figure 407).

(b) Remove the seal [62] from the starter duct (Figure 404).

(c) Install protective covers on the openings on the precooler control valve, precooler, engine pneumatic and starter ducts.

SUBTASK 71-00-02-020-017-F00

(18) Remove the power plant from the work area (Figure 417).

CAUTION: BE CAREFUL WHEN YOU MOVE THE POWER PLANT AWAY FROM THE AIRPLANE. DAMAGE TO THE THRUST REVERSERS AND POWER PLANT CAN OCCUR IF THE POWER PLANT HITS THE THRUST REVERSERS.

(a) To remove the power plant, move it forward until it is free of the thrust reversers.

SUBTASK 71-00-02-080-001-F00

(19) Remove the two lockpins [203] and remove the engine attach bracket [202] from the turbine rear frame (Figure 411).

SUBTASK 71-00-02-080-002-F00

(20) If it is necessary, remove the bootstrap equipment from the strut (Figure 408, Figure 410).

SUBTASK 71-00-02-560-001-F00

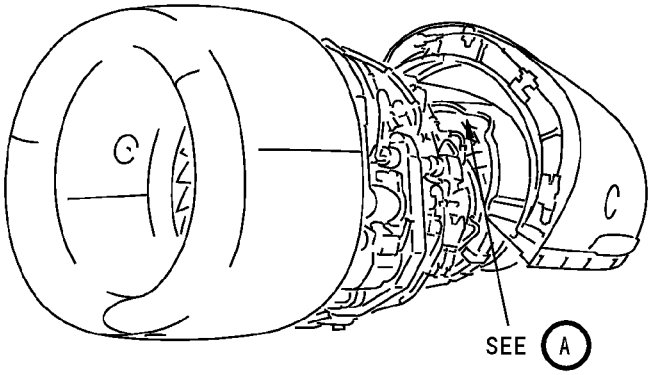
(21) If you move the engine, do these steps:

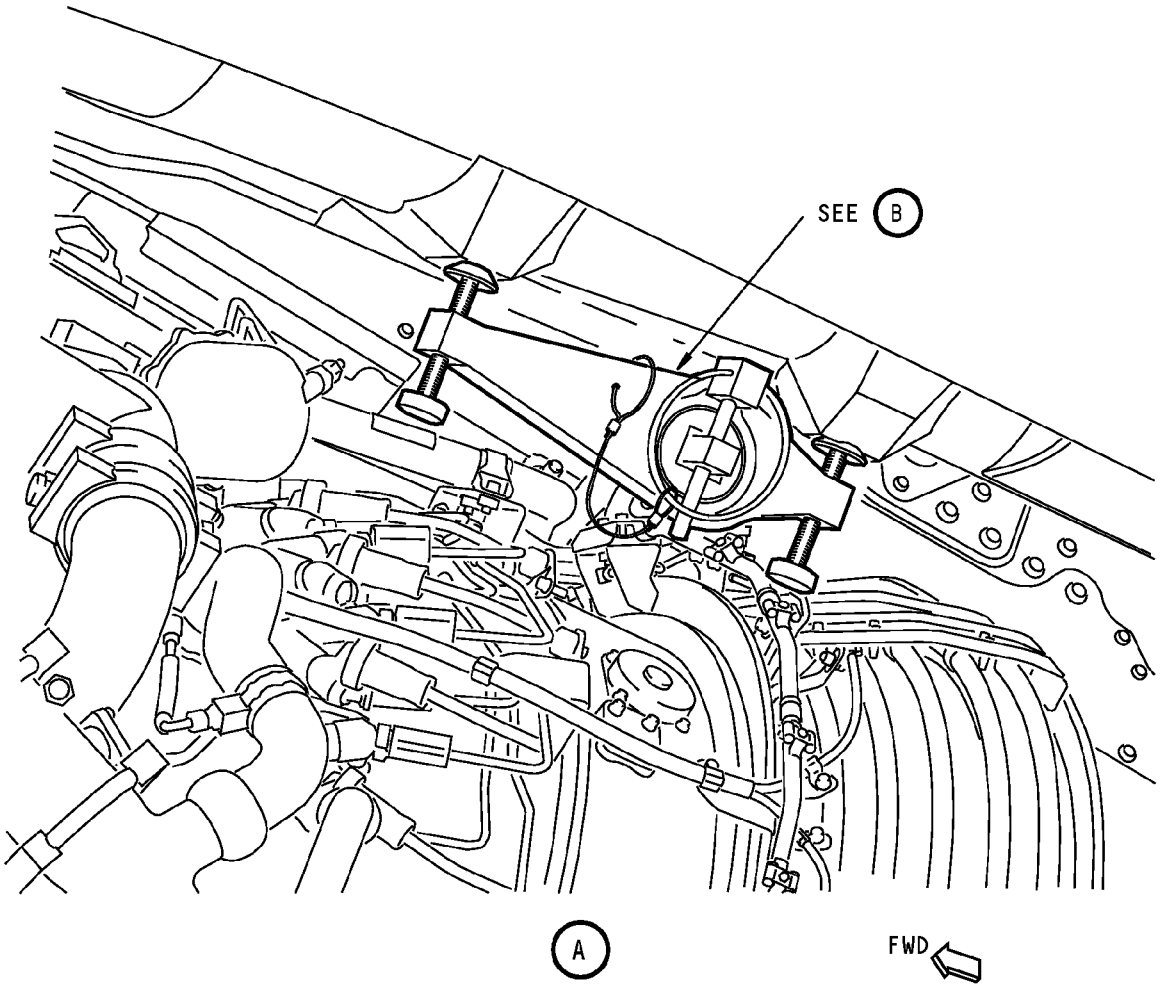
(a) AGSE CRADLE;

Install the eye-bolt for the diagonal brace on the forward cradle arms.

(b) Install the diagonal brace on the forward cradle arms.

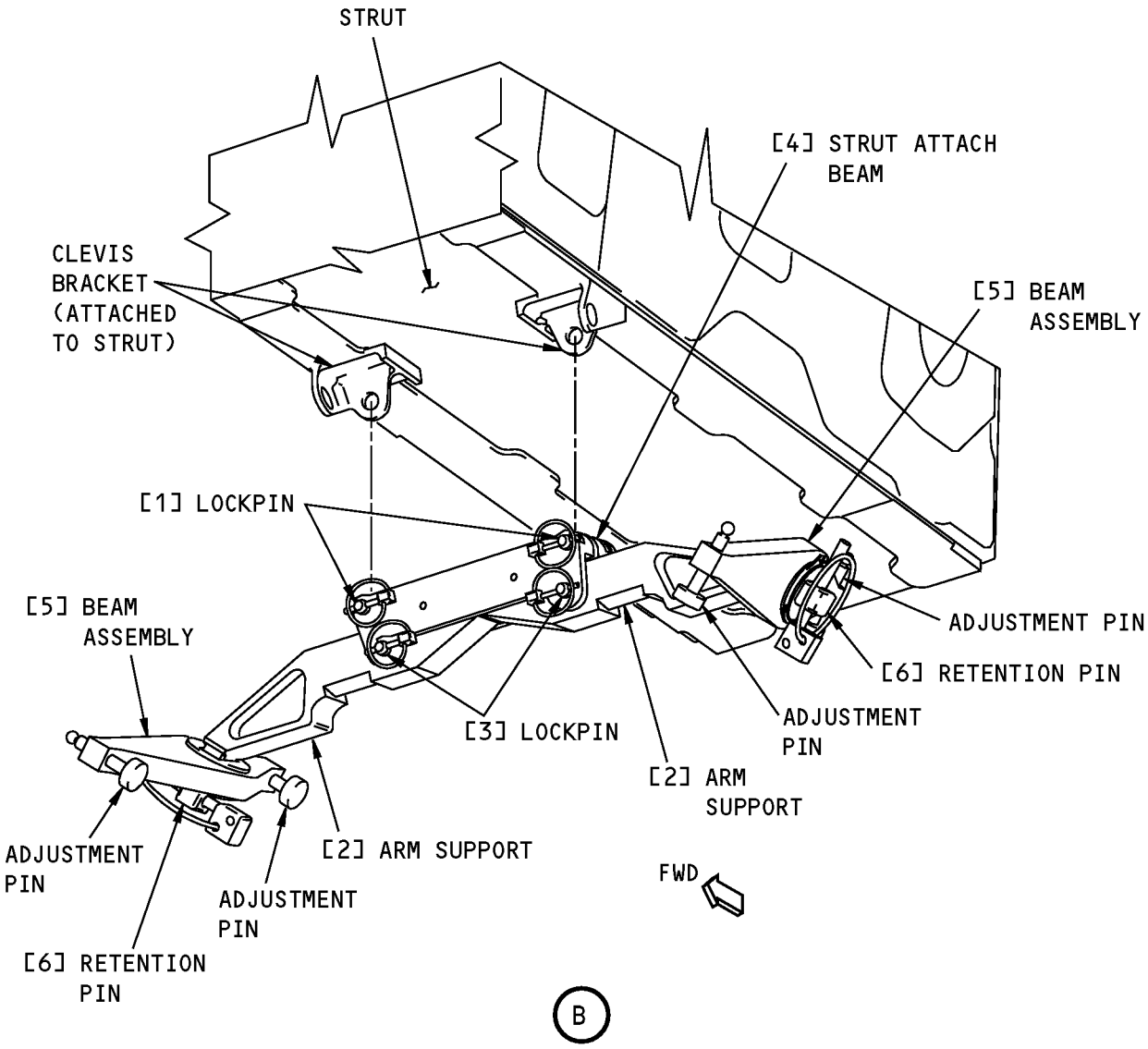
——————— END OF TASK ———————



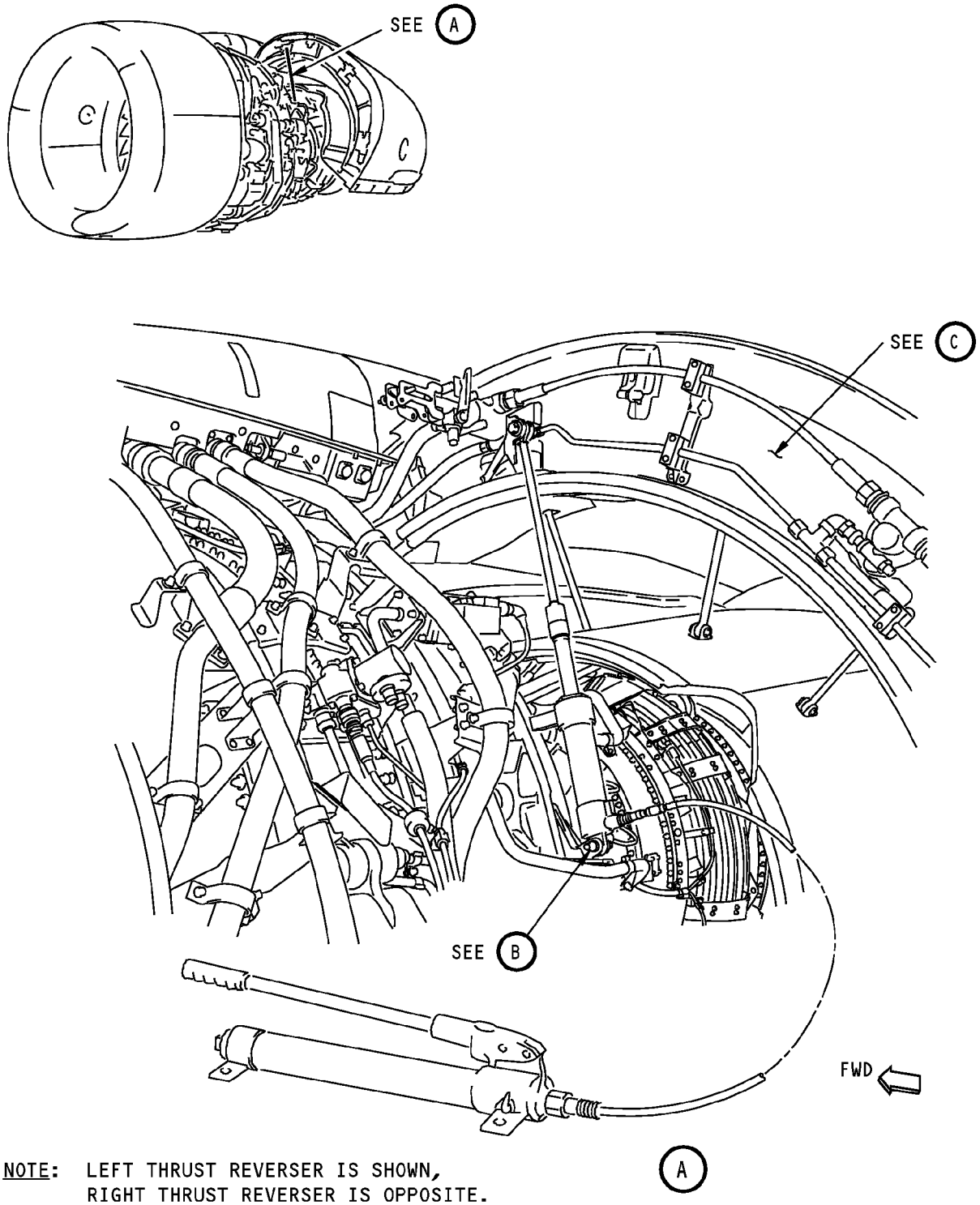


NOTE: VIEW FROM INSIDE THRUST REVERSER

Thrust Reverser Hold-Open Equipment
Figure 401 (Sheet 1 of 2)/71-00-02-990-801-F00

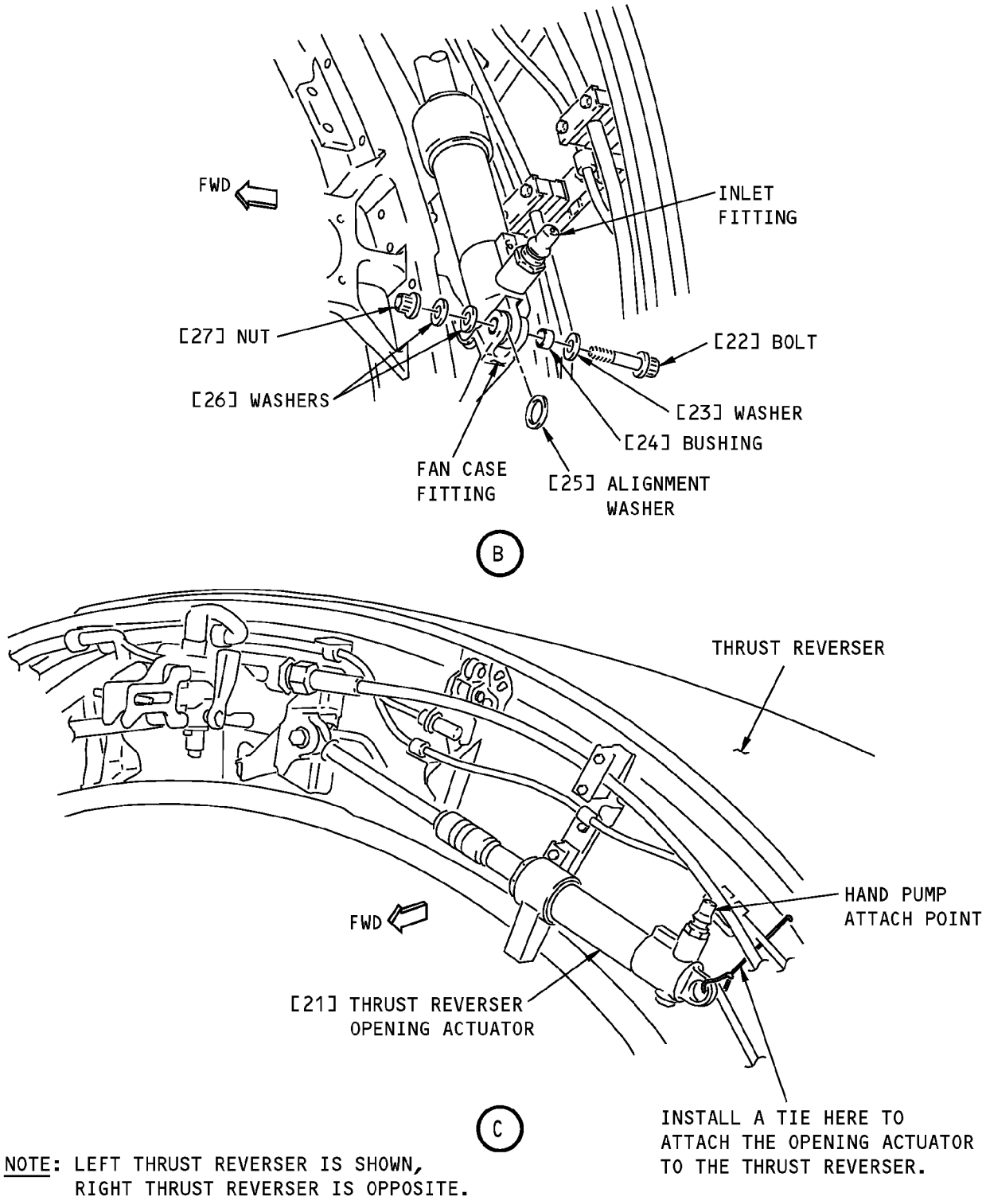


Thrust Reverser Hold-Open Equipment
Figure 401 (Sheet 2 of 2)/71-00-02-990-801-F00

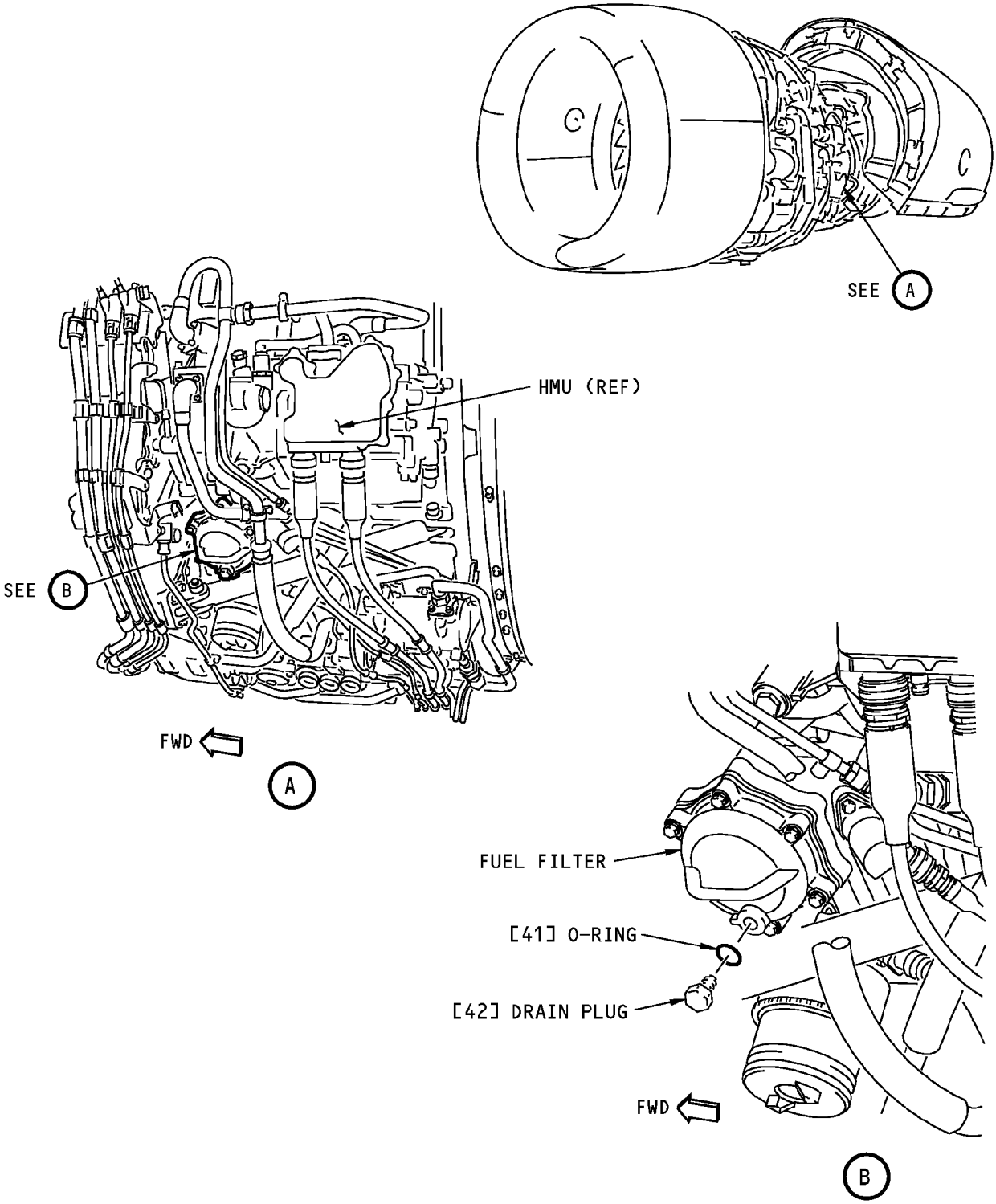


NOTE: LEFT THRUST REVERSER IS SHOWN,
RIGHT THRUST REVERSER IS OPPOSITE.

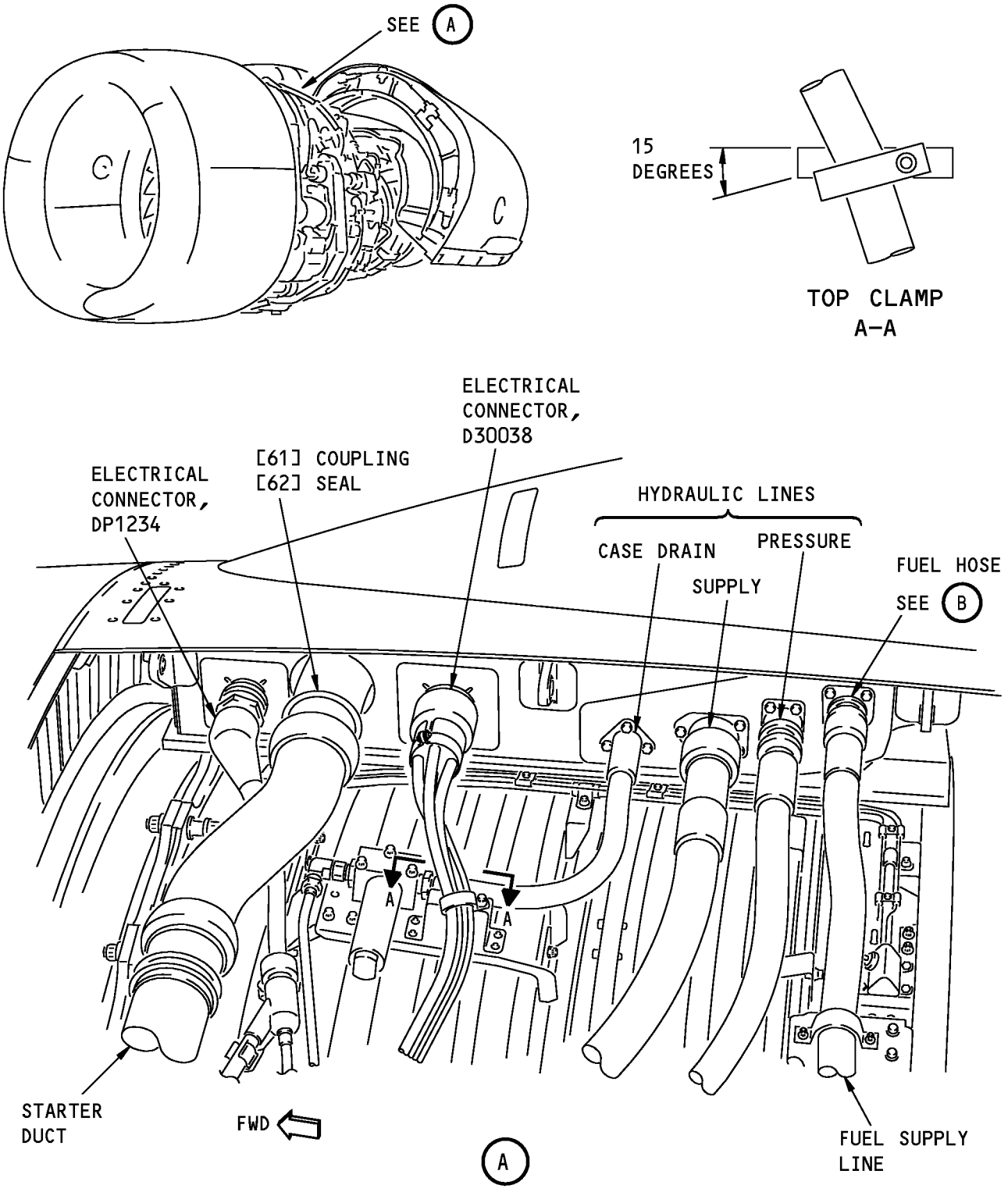
Thrust Reverser Hold-Open Actuator Disconnections
Figure 402 (Sheet 1 of 2)/71-00-02-990-802-F00



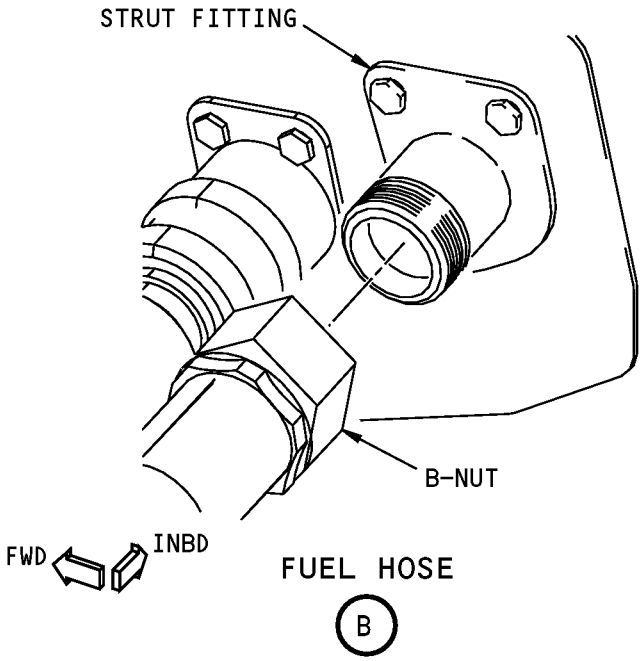
Thrust Reverser Hold-Open Actuator Disconnections
Figure 402 (Sheet 2 of 2)/71-00-02-990-802-F00



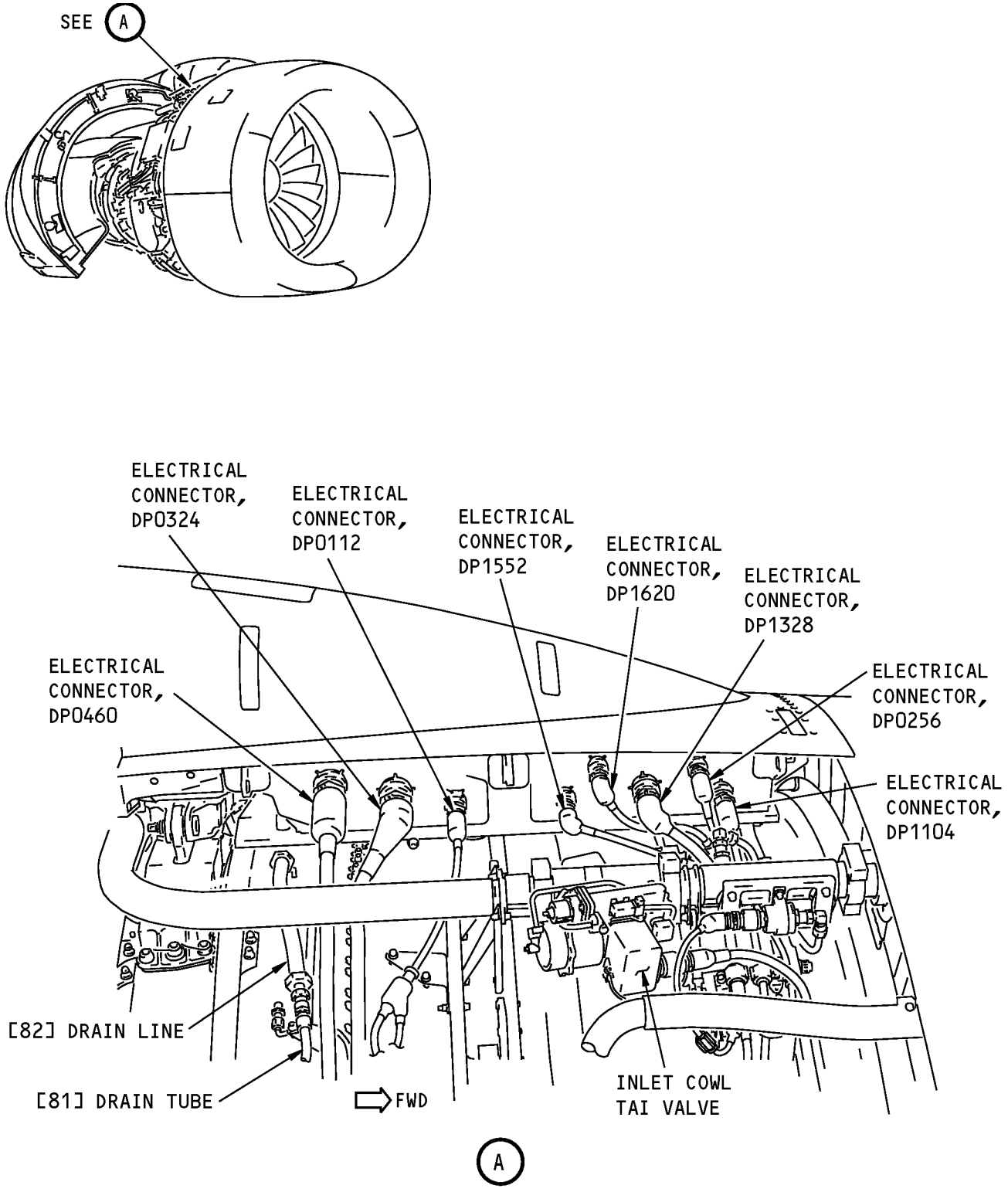
Fuel Filter Drain Location
Figure 403/71-00-02-990-803-F00



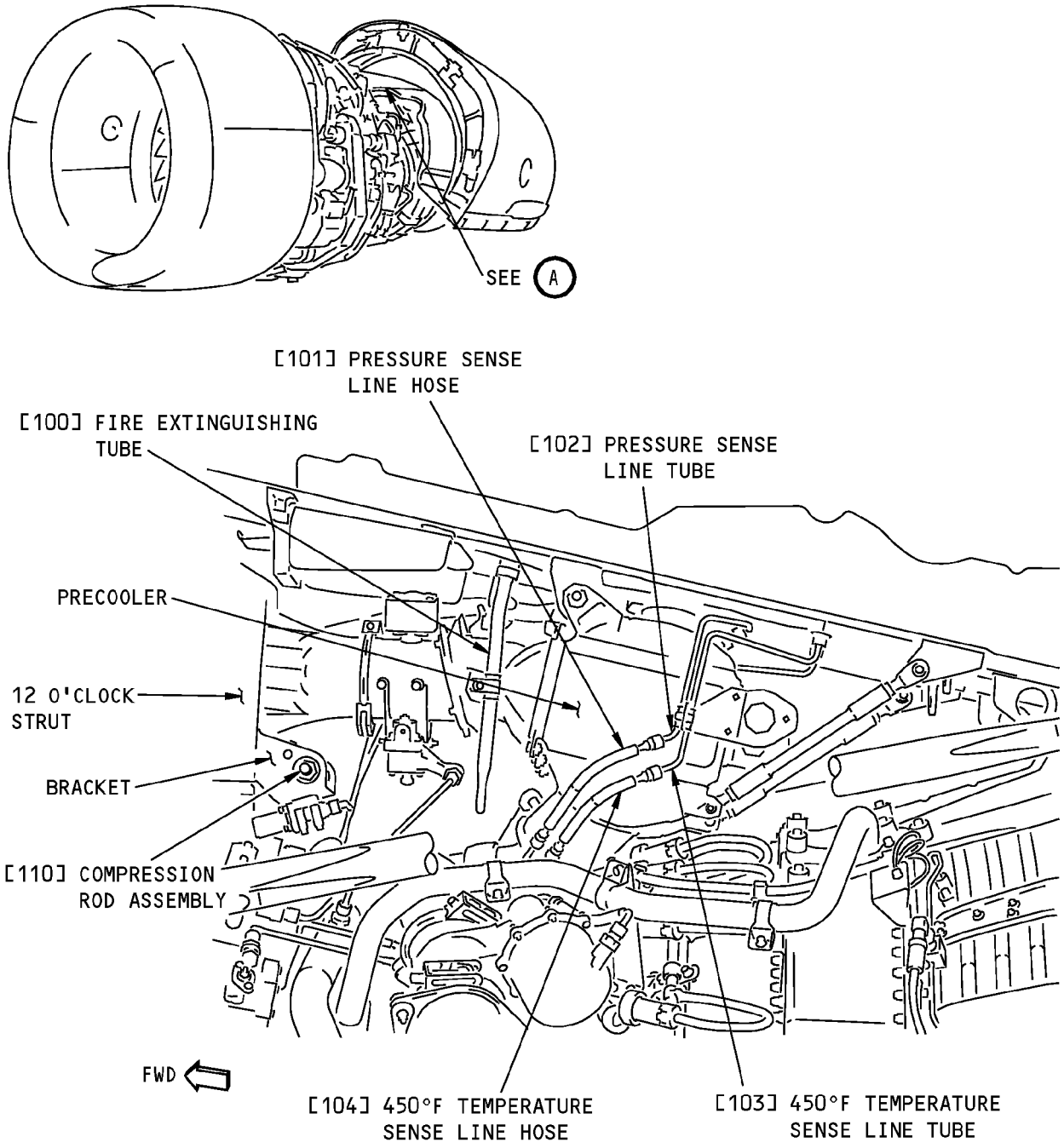
Fan Case Disconnects on the Left Side
Figure 404 (Sheet 1 of 2)/71-00-02-990-804-F00



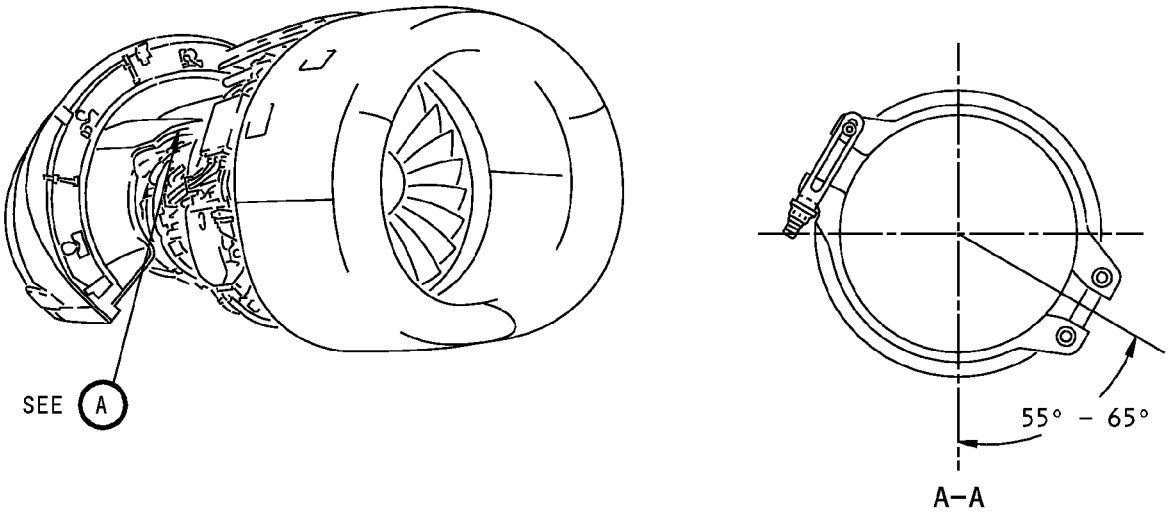
Fan Case Disconnects on the Left Side
Figure 404 (Sheet 2 of 2)/71-00-02-990-804-F00

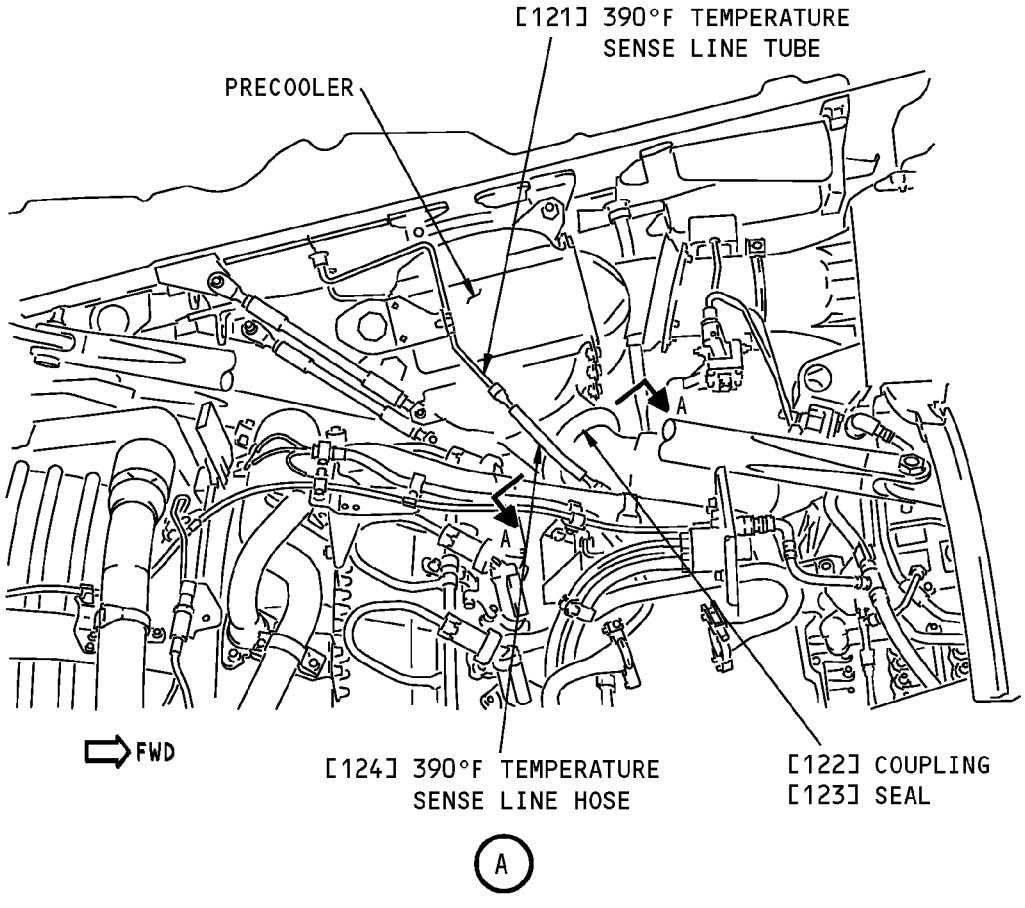


Fan Case Disconnects on the Right Side
Figure 405/71-00-02-990-805-F00

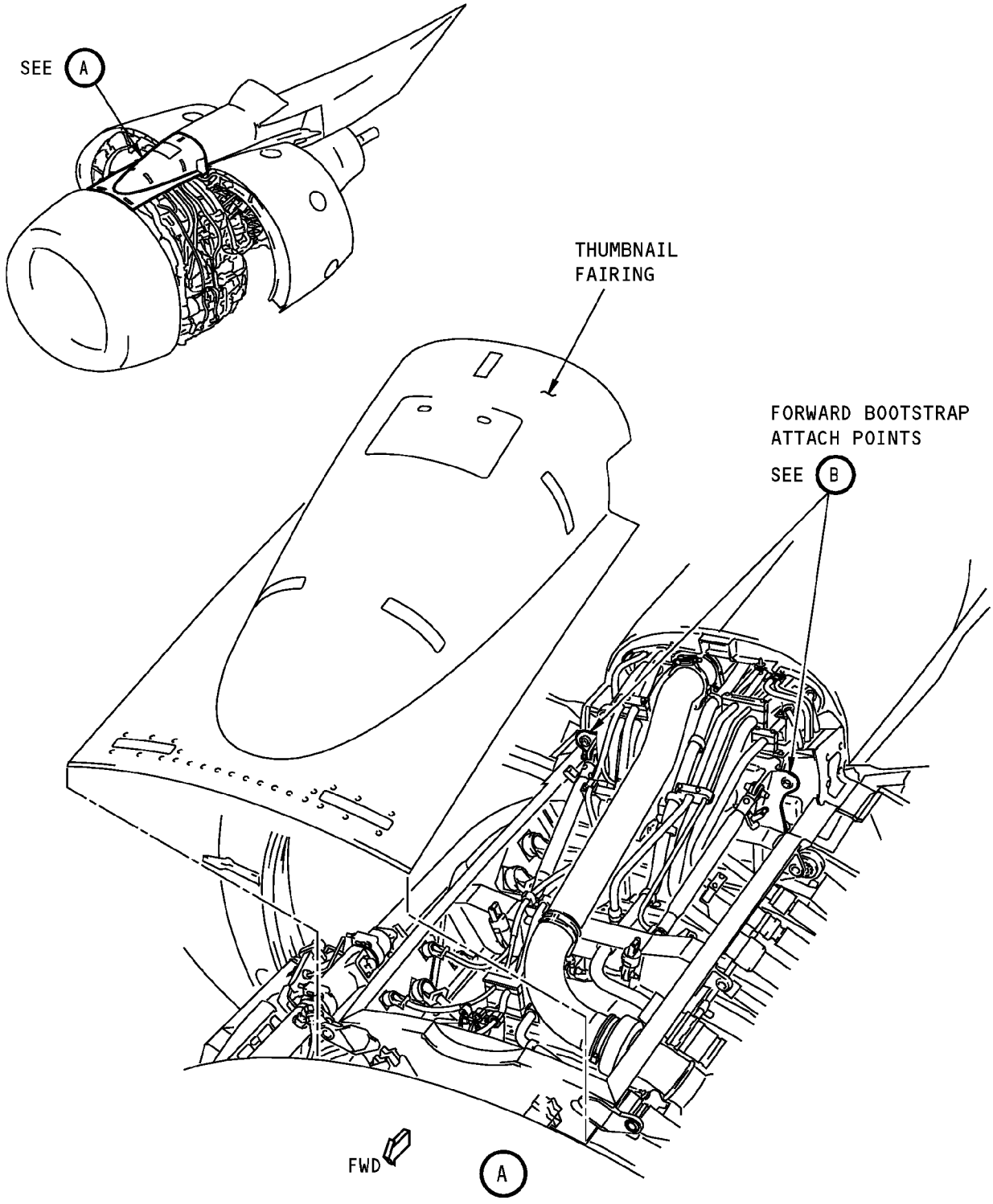


Core Area Disconnects on the Left Side
Figure 406/71-00-02-990-806-F00

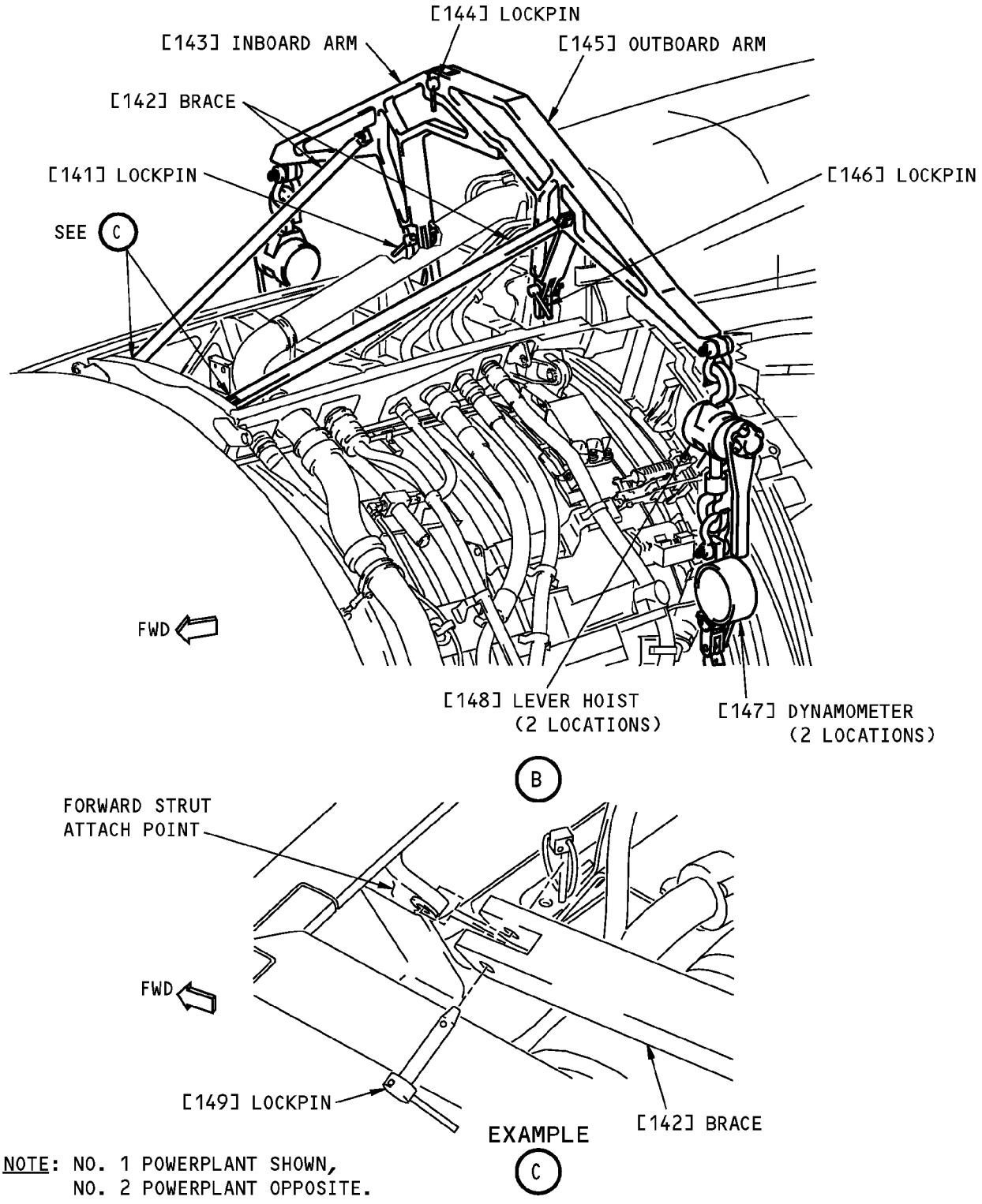




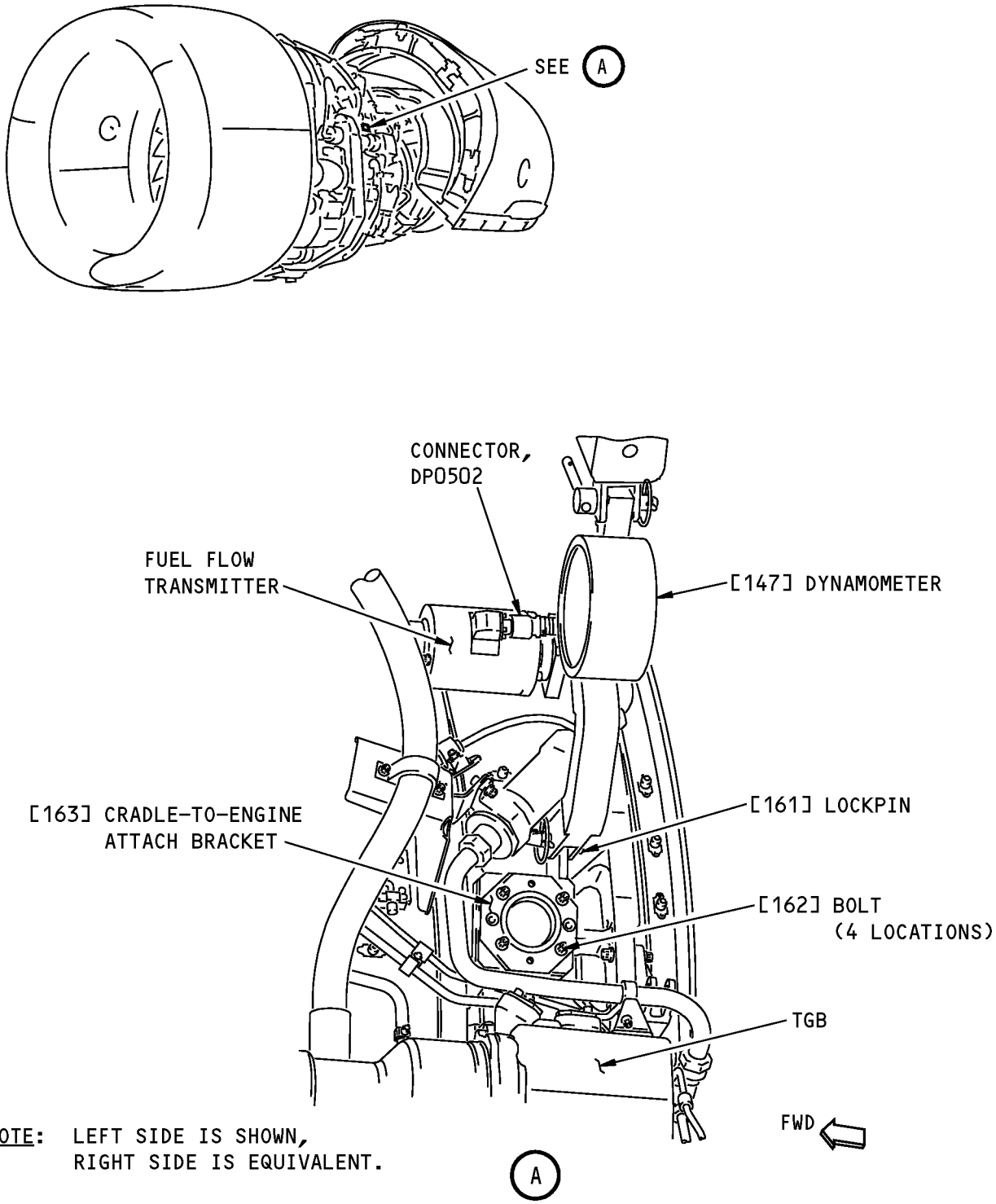
Core Area Disconnects on the Right Side
Figure 407/71-00-02-990-807-F00



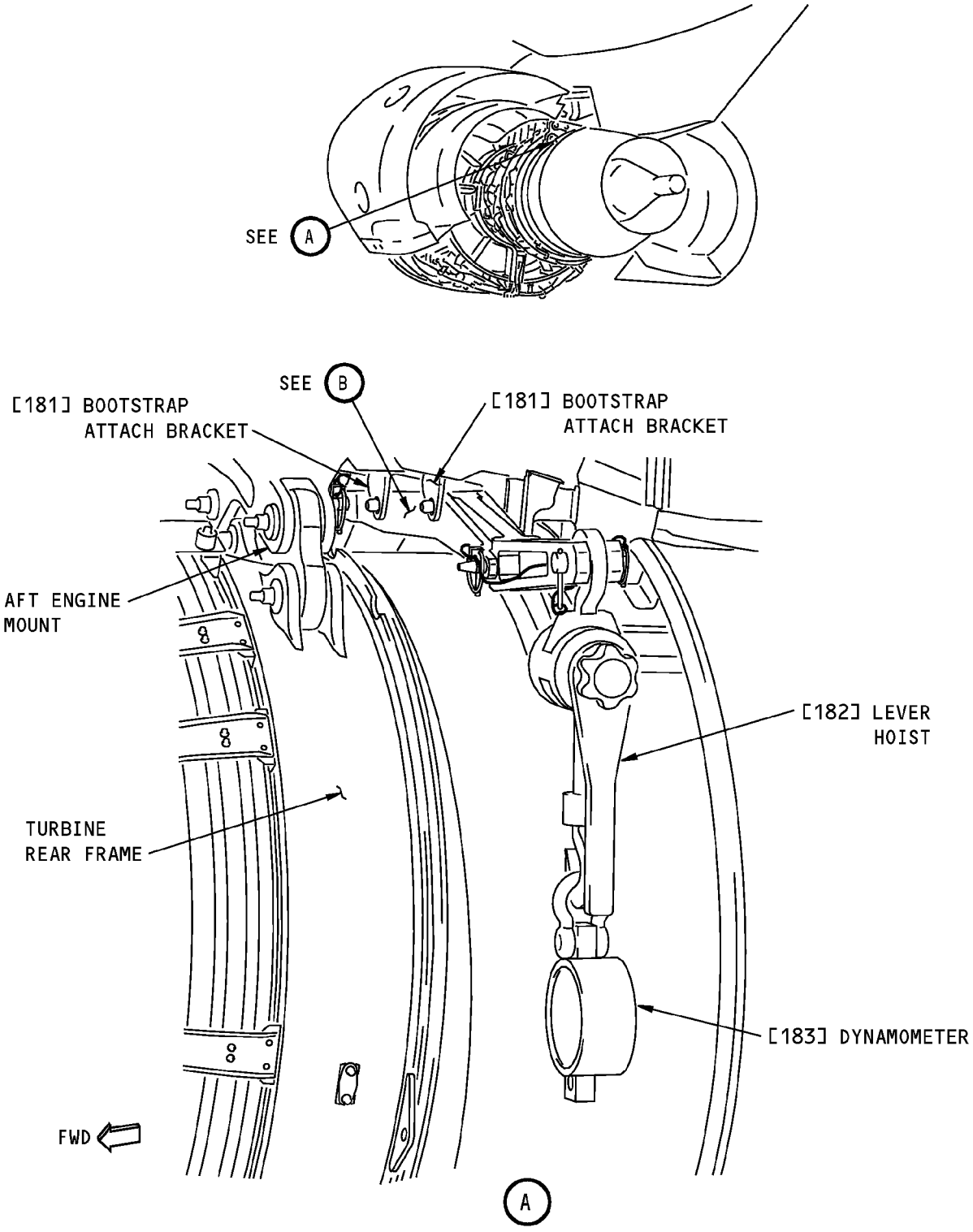
Forward Bootstrap Equipment Installation
Figure 408 (Sheet 1 of 2)/71-00-02-990-808-F00



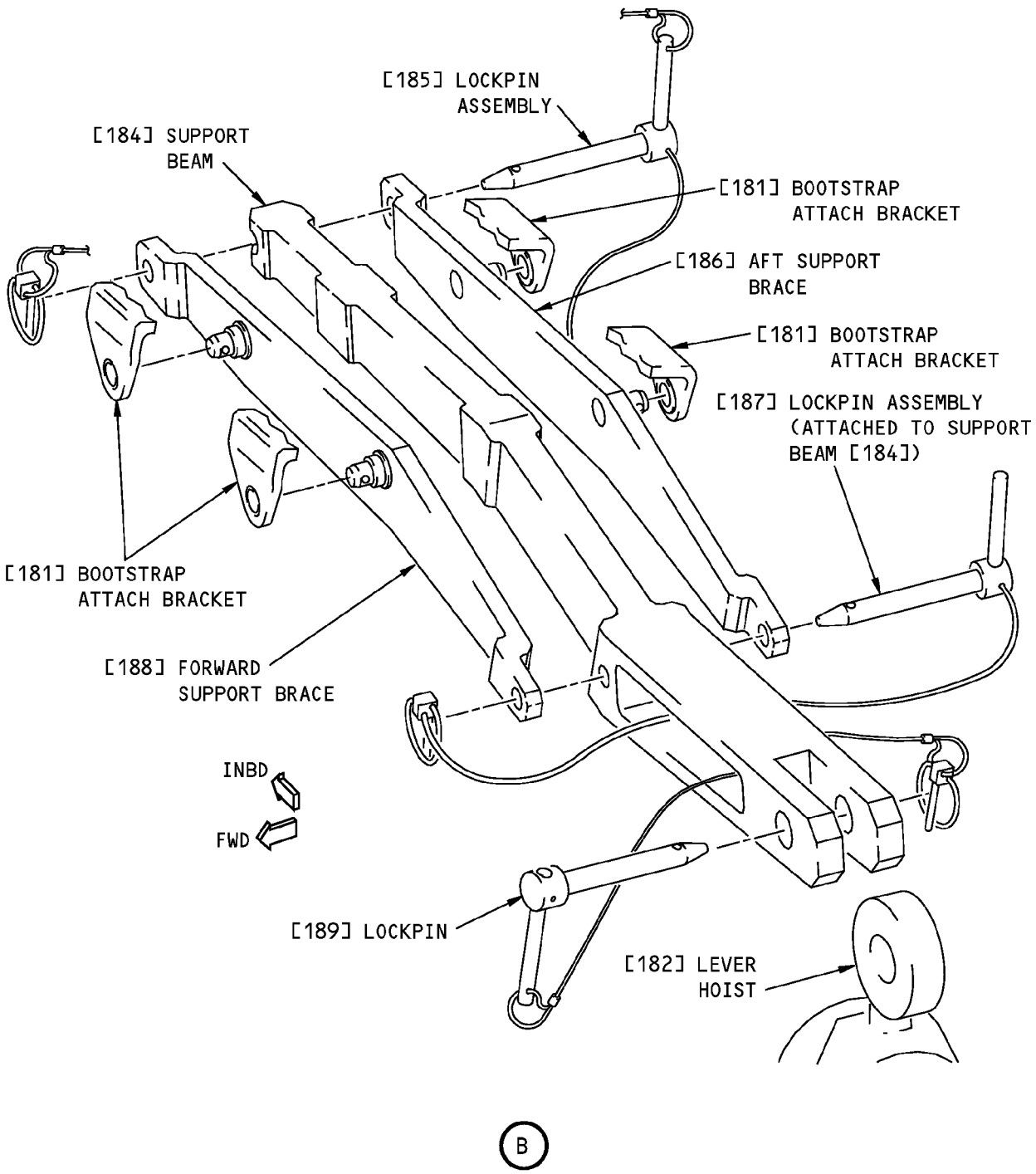
Forward Bootstrap Equipment Installation
Figure 408 (Sheet 2 of 2)/71-00-02-990-808-F00



Forward Power Plant Attach Points
Figure 409/71-00-02-990-809-F00

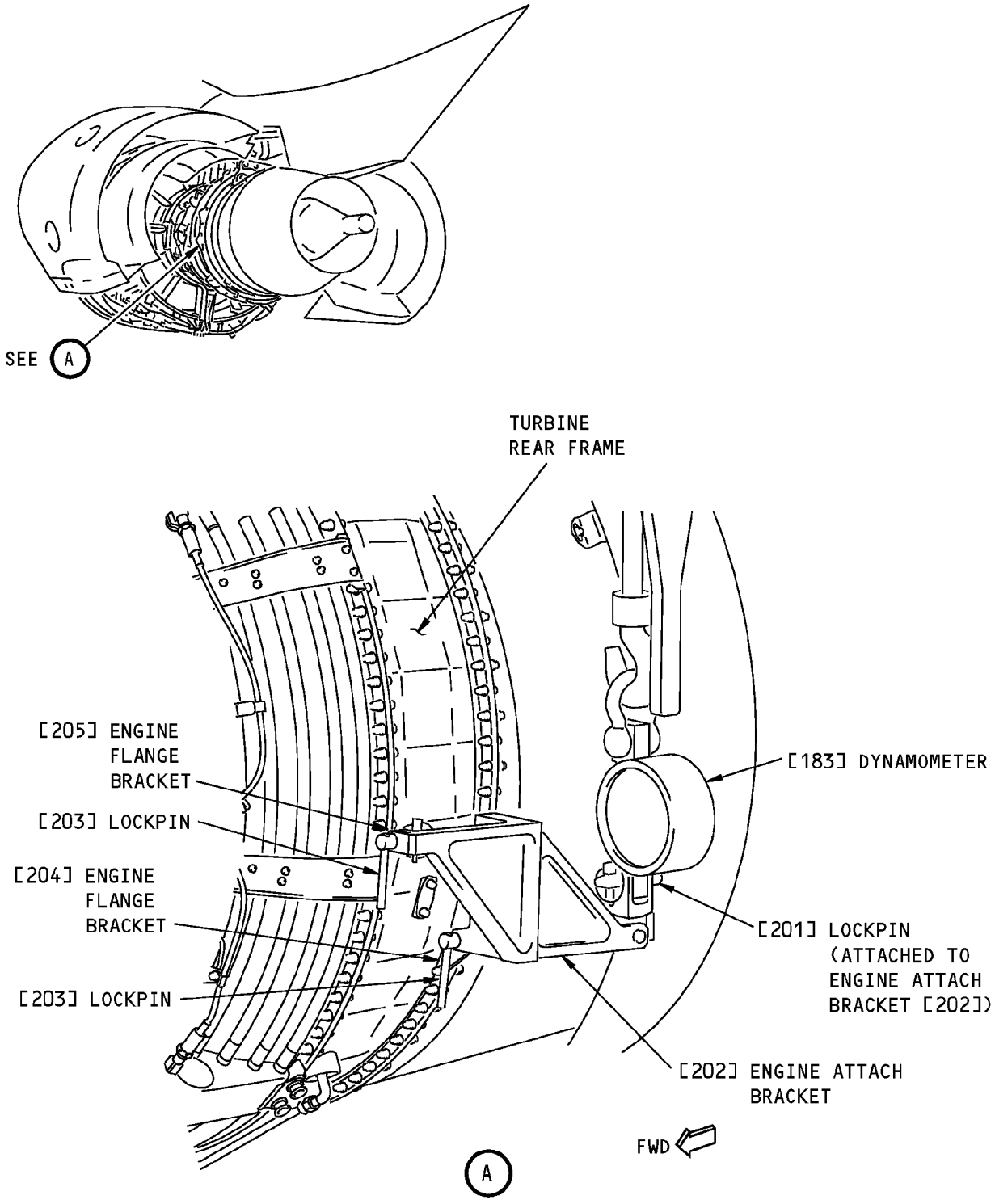


Aft Bootstrap Equipment Installation
Figure 410 (Sheet 1 of 2)/71-00-02-990-810-F00

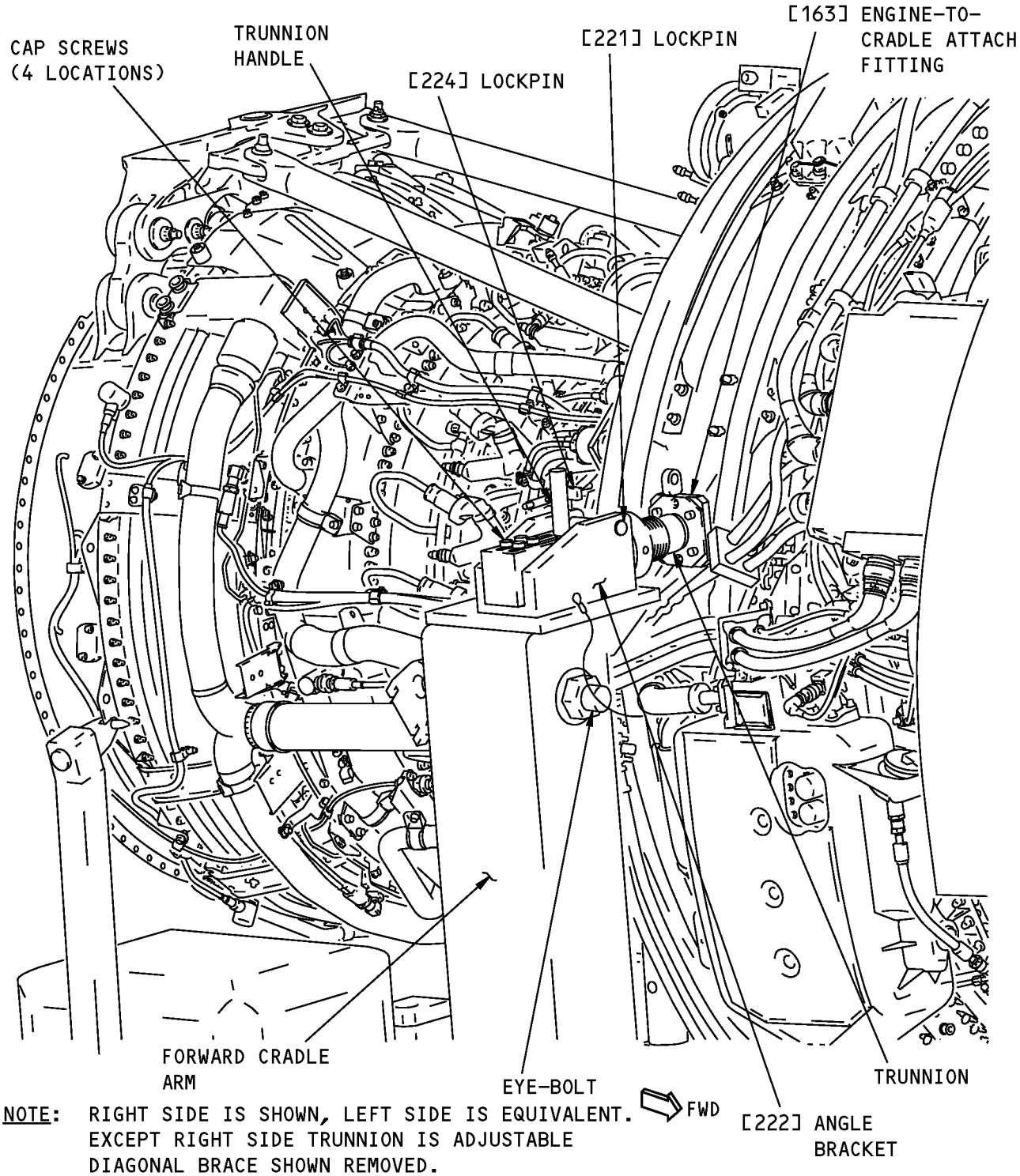


NOTE: ENGINE 1 IS SHOWN,
ENGINE 2 IS OPPOSITE.

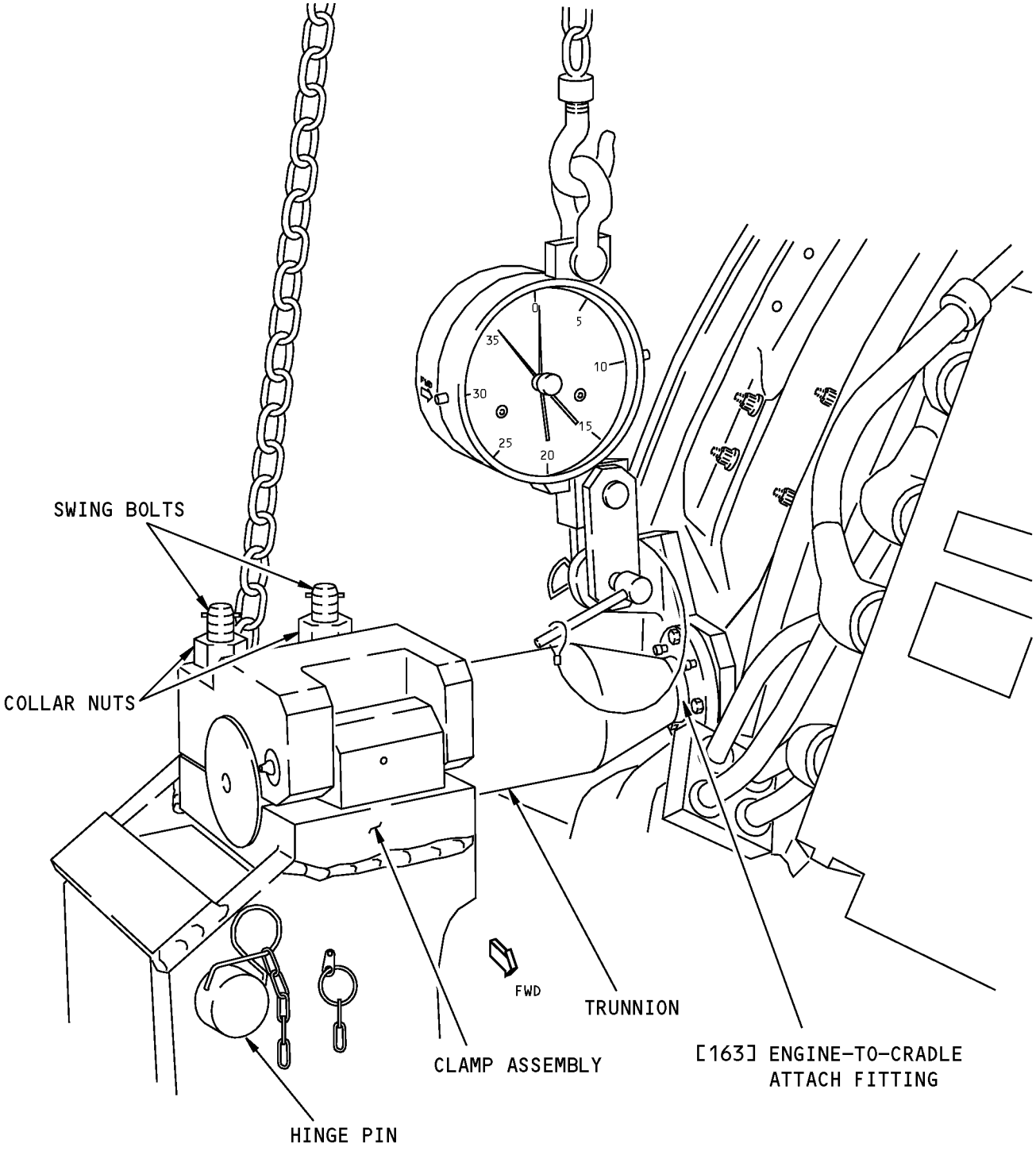
Aft Bootstrap Equipment Installation
Figure 410 (Sheet 2 of 2)/71-00-02-990-810-F00



Aft Power Plant Attach Points
Figure 411/71-00-02-990-811-F00

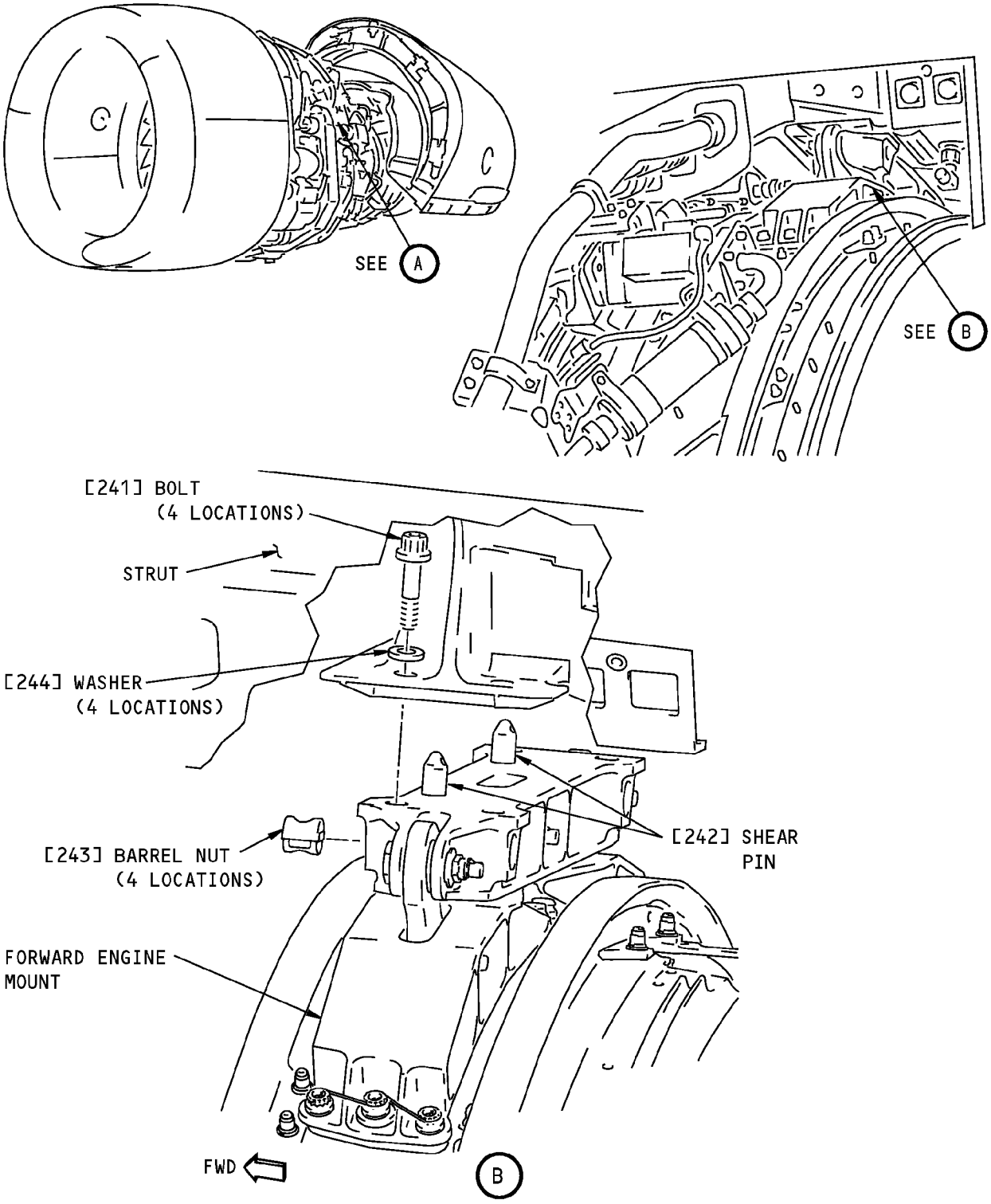


Fan Case Attach Points to the AGSE Cradle Assembly
Figure 412/71-00-02-990-812-F00

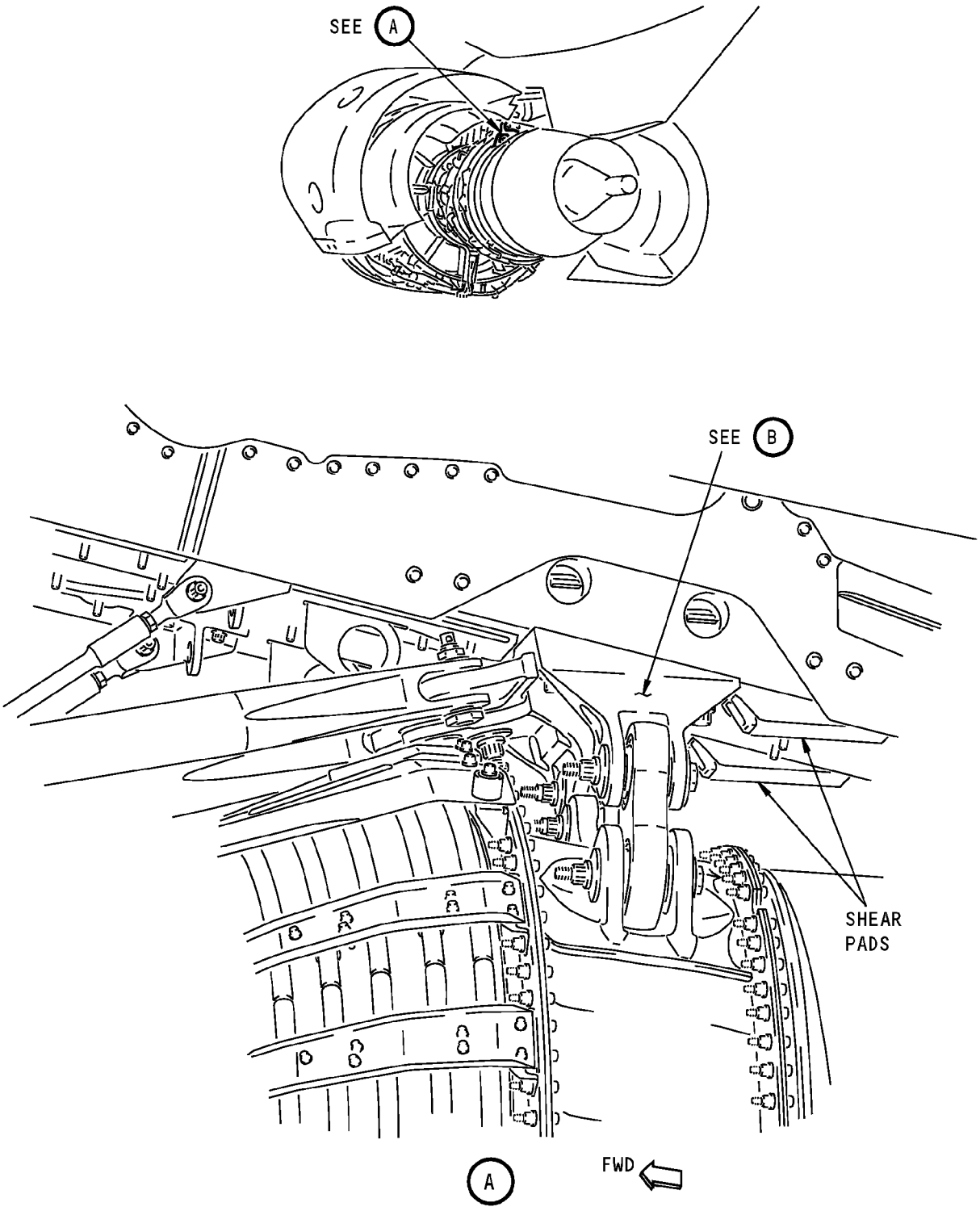


NOTE: RIGHT SIDE IS SHOWN, LEFT SIDE IS OPPOSITE.

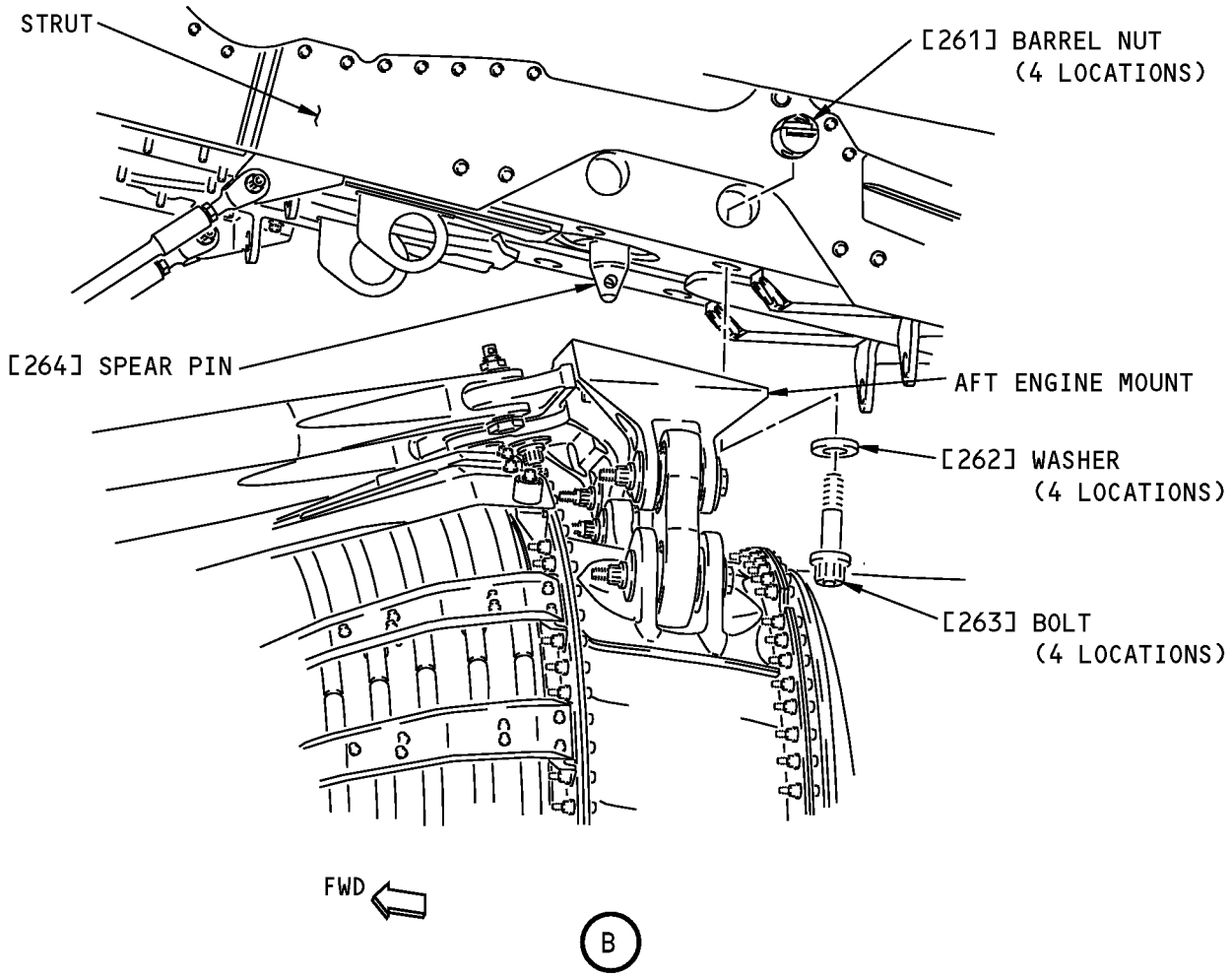
Fan Case Attach Points to the F.Brown Cradle Assembly
Figure 413/71-00-02-990-821-F00



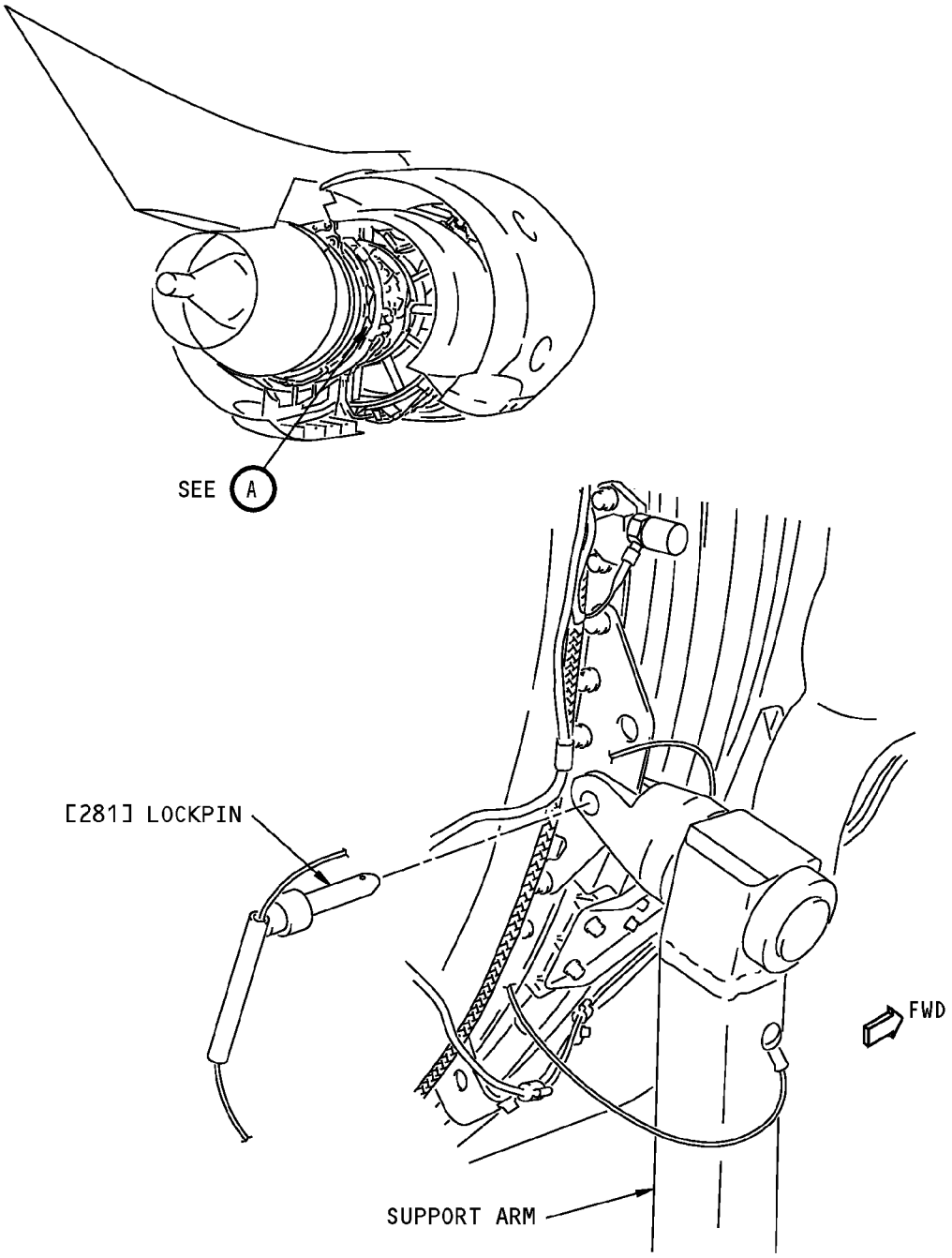
Forward Engine Mount Installation
Figure 414/71-00-02-990-813-F00



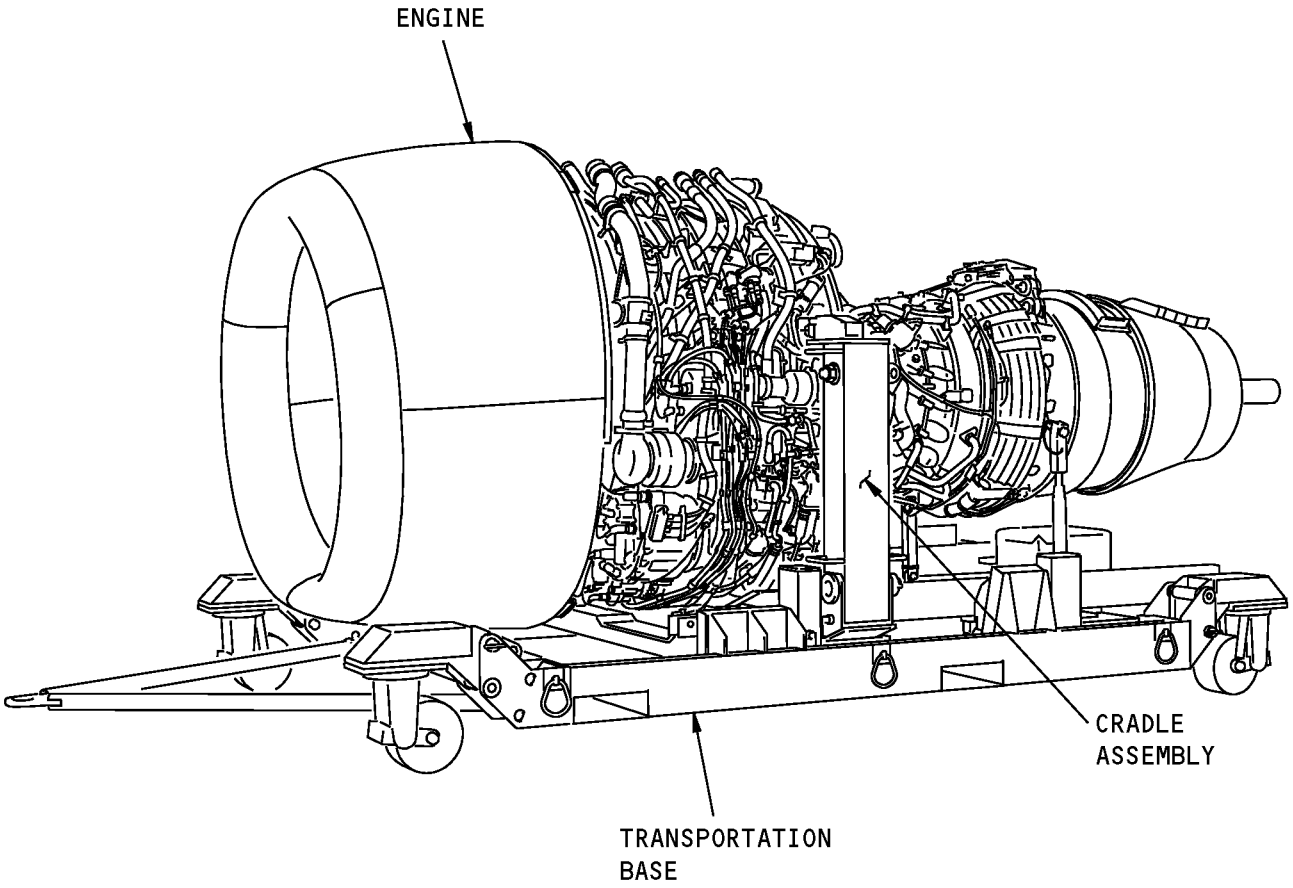
Aft Engine Mount Installation
Figure 415 (Sheet 1 of 2)/71-00-02-990-814-F00



Aft Engine Mount Installation
Figure 415 (Sheet 2 of 2)/71-00-02-990-814-F00



Turbine Frame Attach Point to the Cradle Assembly
Figure 416/71-00-02-990-815-F00



Removed Power Plant with Attached Transportation Base
Figure 417/71-00-02-990-816-F00

TASK 71-00-02-400-801-F00

3. Power Plant Installation

A. General

(1) You must do these topics to install the power plant:

(a) Prepare the Power Plant for the Installation

(b) Install the Power Plant

(c) Fan Case Connections on the Left Side

(d) Fan Case Connections on the Right Side

(e) Core Area Connections on the Left Side

(f) Core Area Connections on the Right Side

(g) Put the Airplane Back To Its Usual Condition

(2) To help you install the power plant more quickly, use the steps and the table found in the front of this procedure (Table 402).

B. References

Reference	Title
12-13-11-600-801	Replenish the Engine Oil (P/B 301)
12-13-21-600-801	IDG Servicing (Oil Fill) (P/B 301)
12-15-31-610-802	Main Landing Gear Shock Strut Servicing (P/B 301)
21-00-01-100-801	Oil Contamination Removal from Air Conditioning and Pneumatic Systems (P/B 201)
24-22-00-860-811	Supply Electrical Power (P/B 201)
26-11-01-211-801	Engine Fire Detector Inspection (P/B 601)
54-52-01-410-801	Forward Fairing Installation (P/B 401)
54-54-00-200-802	Forward Strut Fireseal Inspection (P/B 601)
70-40-01-230-801-F00	Fluorescent Penetrant Inspection (Portable Post-Emulsifiable) (P/B 201)
70-40-01-910-801-F00	Fluorescent Penetrant Inspection (Water Washable) (P/B 201)
71-00-00-740-801-F00	Engine Exceedance Page Check (P/B 601)
71-00-00-750-803-F00	Test 14B - Fan Trim Balance (On Board Procedure - Vibro-meter AVM S360N021-113, S360N021-114, and Universal AVM S362A001-1) (P/B 501)
71-00-00-750-804-F00	Test 14B - Fan Trim Balance (On Board Procedure - Endevco AVM S360N021-213) (P/B 501)
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
71-00-03-600-803-F00	Depreservation of an Engine On-Wing (Task Selection) (P/B 201)
71-11-02-400-801-F00	Install the Fan Cowl Panel (Selection) (P/B 401)
73-21-60-470-801-F00	EEC Software Load (P/B 201)
77-31-00-970-805-F00	Download The Advanced AVM (AAVM) Bearing Data With The Ground Support Software (GSS) (P/B 201)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

C. Tools/Equipment

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

Reference	Description
COM-2111	Base - Universal Transportation, CFM56 Engine (Part #: AM-2563-227, Supplier: 9M323, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
COM-2118	Cradle - Transport, CFM56-7 Engine (Part #: AM-2811-4800, Supplier: 9M323, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
COM-4953	Cradle - Engine, CFM56-7 (Part #: FB70077-100ISSB, Supplier: KCWD9, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Opt Part #: FB70077-100, Supplier: KCWD9, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
COM-4954	Stand - Transportation, Engine, CFM56-7 (Part #: FB70077-200, Supplier: KCWD9, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
COM-6276	Cradle - Engine, CFM56-7 (Part #: 114702-1, Supplier: 08118, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
COM-6277	Stand - Transportation, Engine, CFM56-7 (Part #: 114701-1, Supplier: 08118, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
SPL-2106	Wrench - CFM56-7 Engine Aft Mount Nut (Part #: C71022-6, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
SPL-2110	Kit - Bootstrap, CFM56-7 Engine (Part #: C71020-91, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
SPL-2417	Pump - Hand, Opening System, Thrust Reverser (Part #: A78019-21, Supplier: 81205, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Part #: B54001-30, Supplier: 81205, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Part #: C78005-21, Supplier: 81205, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
SPL-2433	Equipment - Hold Open, Thrust Reverser Cowl, CFM56-7 Engine (Part #: C78019-15, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
STD-3906	Mallet - Rubber

D. Consumable Materials

Reference	Description	Specification
A00160	Sealant - Firewall - Hydraulic Fluid Resistant	BMS5-63
D00006	Compound - Antiseize Pure Nickel Special - Never-Seez NSBT-8N	MIL-PRF-907F
D00015	Grease - Aircraft Bearing (Use BMS 3-24 until existing stocks are depleted, BMS 3-33 supersedes BMS 3-24)	BMS3-24 (Superseded by BMS 3-33)
G00270	Tape - Scotch Flatback Masking 250	ASTM D6123 (Supersedes A-A-883)

E. Location Zones

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

(Continued)

Zone	Area
410	Subzone - Engine 1
420	Subzone - Engine 2

F. Prepare for the Power Plant Installation

SUBTASK 71-00-02-210-010-F00

(1) Make sure the configuration of the engine to be installed is compatible with the airplane and thrust reversers.

NOTE: Refer to Boeing SB 737-71-1588 for concurrent requirements necessary for installation of a Tech Insertion (TI) CFM56-7BXX/3 engine or CFM56-7BXX SAC engine incorporating CFM-SB 72-0583 on 737-600/700/800/900/BBJ airplanes from Line Positions 1 through 2229.

NOTE: Refer to Boeing SB 737-71-1551 for concurrent requirements necessary for installation of TI CFM56-7BXX/3 engine or CFM56-7BXX SAC engine incorporating CFM-SB 72-0583 on 737-700/800 airplanes from Line Positions 2230 through 2252.

NOTE: Refer to Boeing SB 737-71-1582 for concurrent requirements necessary for installation of non-TI engine (CFM56-7BXX) engine or CFM56-7BXX SAC engines incorporating CFM-SB 72-0583 on airplanes delivered with TI engines (CFM56-7BXX/3) on 737-600/700/800/900/BBJ airplanes from Line Positions 2253 and on and all 737-900ER airplanes.

NOTE: A Tech Insertion (TI) engine has a ''/3'' after the thrust rating on the engine data plate. An example of a Singular Annular Combustor (SAC) Engine with TI is CFM56-7B22/3. An example of a non-TI engine is CFM56-7B22. The ''XX'' in CFM56-7BXX/3 is the thrust rating of the engine.

(a) Make sure the Flight Management Computer MEDB Software, thrust reverser configuration, and the opposite engine EEC software are compatible with the new engine.

1) Refer to the task EEC Software Load, TASK 73-21-60-470-801-F00

SUBTASK 71-00-02-860-010-F00

(2) If not already done, do this topic: Prepare for the Removal of the Power Plant.

SUBTASK 71-00-02-900-001-F00

(3) Do these steps to install the compression rod assembly [110] on the 12 o'clock strut of the replacement engine (Figure 406):

NOTE: If you re-install the same engine or if the replacement engine has a compression rod installed, this step is not necessary. The compression rod assembly is installed loosely in the bracket with the thrust reverser open. When the thrust reverser closes, the receiver cups capture the rod and moves the rod to the center of the receiver cups.

(a) For compression rods with stop rings, do these steps to remove the compression rod assembly [110] from the removed engine:

1) To remove one of the stop rings, remove the two bolts on a ring half.

2) Remove the rod assembly from the bracket.

(b) To install the compression rod assembly [110] on the replacement engine, do these steps.

1) Put the rod assembly (with one stop ring installed) in the bracket.

2) Loosely install the removed stop ring on the compression rod with the two bolts.

3) Apply sealant, A00160 between the stop ring and the compression rod and to the threads of the two bolts.

4) Tighten the two bolts to 20-25 pound-inches (2.26-2.82 Newton meters).

HAP 001, 006, 007

(c) If the compression rod assembly [110] is installed with a lanyard and no stop rings, do these steps:

1) Remove the bolt from the bracket on the removed engine and remove the rod assembly with the lanyard and clip.

2) Put the rod assembly and in the bracket on the replacement engine.

3) Put the clip on the bracket and install the bolt.

HAP ALL

SUBTASK 71-00-02-230-001-F00

(4) If the same forward and aft mount bolts [241] and [263] from the removal procedure are used again, do this task: Fluorescent Penetrant Inspection (Water Washable), TASK 70-40-01-910-801-F00 or Fluorescent Penetrant Inspection (Portable Post-Emulsifiable), TASK 70-40-01-230-801-F00.

NOTE: This inspection is necessary if it is the operator's policy to reuse the mount bolts.

SUBTASK 71-00-02-210-003-F00

(5) Do this check of the self-locking feature of the four barrel nuts [243] of the forward engine mount (Figure 414):

(a) Apply Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [241].

(b) Make sure the locking torque on the barrel nuts [243] is between 32-300 pound-inches (3.6-33.9 Newton meters)

NOTE: Apply only the torque in the above torque range to prevent wear on the barrel nut threads. It is not necessary to find the breakaway torque.

(c) If the self-locking torque on the barrel nuts [243] is not in the above range, replace the barrel nuts [243].

SUBTASK 71-00-02-210-004-F00

(6) Do this check of the self-locking feature of the four barrel nuts [261] of the aft engine mount (Figure 414, Figure 415):

(a) Apply Never-Seez NSBT-8N compound, D00006 to the threads of the bolts [263].

(b) Make sure the locking torque on the barrel nuts [261] is between 70-600 pound-inches (7.9-67.8 Newton meters)

NOTE: Apply only the torque in the above torque range to prevent wear on the barrel nut threads. It is not necessary to find the breakaway torque.

(c) If the self-locking torque on the barrel nuts [261] is not in the above range, replace the barrel nuts [261].

SUBTASK 71-00-02-212-001-F01

(7) Do a check of the aft engine mount for the correct installation of the center link:

(a) From the left side of the engine, look at the aft face of the center link.

HAP 001-013, 015-026, 028-030 PRE SB 737-71A1462

(b) UNMARKED CENTER LINK WITHOUT POCKETS;

Look at the center bearing for loader relief slots.

1) The loader relief slots of the center bearing should be on the aft face of the center link.
2) The loader relief slots are located 180 degrees apart and are used to install the spherical bearing in the bearing race.

(c) UNMARKED CENTER LINK WITH POCKETS;

Look at the pockets between the center bearing and the outer bearings. The larger pocket should be on the left side on the aft face of the center link.

1) The loader relief slots of the center bearing should be on the aft face of the center link.

HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-71A1462

(d) MARKED CENTER LINK;

Look for the AFT mark on the left side of the center link.

1) Look for the L mark on the left side and look for the R mark on the right side.

HAP ALL

(e) If the center link installation is not correct, remove the aft engine mount and re-install the center link.

SUBTASK 71-00-02-210-007-F00

(8) Do a visual check for worn wires at the forward transponder of the upper engine fire detector.

(a) Do this task Engine Fire Detector Inspection, TASK 26-11-01-211-801.

HAP 001-013, 015-026, 028 PRE SB 737-28-1179

SUBTASK 71-00-02-210-008-F00

(9) Do a check of the Fuel Control Module, P5-2 and the installed HMU for the correct operation of the ENG VLV CLOSED light.

NOTE: The ENGINE VALVE CLOSED light will stay ON bright during engine operation if the P5-2 module and the HMU are not compatible

(a) If the P5-2 module is replaced by the service bulletin, no action is necessary.

(b) If the P5-2 module is not replaced by the service bulletin, do the applicable step:

1) If the installation HMU has a part number that ends with P07 and prior, no action is necessary.
2) If the installation HMU has a part number that ends with P08 and on (CFM-SB-73-067), do one of these steps:

a) Change the P5-2 module, refer to the service bulletin.
b) Change the P08 HMU to a P07 HMU, refer to CFM-SB-73-068.

HAP ALL

G. Install the Power Plant

SUBTASK 71-00-02-640-001-F00

(1) Lubricate the shear pin [264] on the strut interface of the aft engine mount with Never-Seez NSBT-8N compound, D00006 (Figure 415).

(a) Before you lubricate the shear pin [264], do a visual check of the shear pin for damage.

SUBTASK 71-00-02-640-002-F00

(2) Lubricate the two shear pins [242] on the forward engine mount with Never-Seez NSBT-8N compound, D00006 (Figure 414).

(a) Before you lubricate the shear pins [242], do a visual check of the shear pins for damage.

SUBTASK 71-00-02-480-009-F00

(3) If the bootstrap equipment is not already installed, install the bootstrap kit, SPL-2110 on the strut (Figure 408, Figure 409, Figure 410, Figure 411).

SUBTASK 71-00-02-080-009-F00

(4) If the three dynamometers [147] and [183] are attached to the lever hoists [148] and [182], remove them temporarily.

NOTE: When the dynamometers are removed, you can use the lever hoist hooks as plumb bobs to help align the engine with the strut.

SUBTASK 71-00-02-820-004-F00

(5) If not already done, disconnect the diagonal braces from the left and right forward cradle arms on the dolly.

SUBTASK 71-00-02-080-010-F00

CAUTION: MAKE SURE YOU REMOVE THE EYE-BOLTS. IF YOU DO NOT, THE EYE-BOLTS CAN HIT THE FORWARD EDGE OF THE THRUST REVERSER. DAMAGE TO EQUIPMENT CAN OCCUR.

(6) AGSE CRADLE;

Remove the eye-bolts from the arms of the cradle, COM-2118.

SUBTASK 71-00-02-480-010-F00

(7) AGSE CRADLE;

Put the base, COM-2111 and cradle, COM-2118, with the power plant installed, below the strut (Figure 417) as follows:

NOTE: When the cradle is in its correct position under the strut, it will not be aligned with the centerline of the strut.

(a) Move the dolly/power plant in front of the strut and move it rearward until it is below the strut and the lever hoist hooks are aligned with the cradle-to-engine attach brackets [163] and the engine attach bracket [202].

NOTE: It can be necessary to extend the chains on the lever hoists.

NOTE: It is very important to align the cradle with the engine. If they are not aligned, it can be difficult to move the engine from the cradle to the strut.

(b) If the cradle-to-engine attach brackets [163] and the engine attach bracket [202] are not aligned with the lever hoists [148] and [182], follow these steps to adjust the position of the cradle:

1) Make sure the castors are not locked. If they are locked, unlock them.
2) Adjust the position of the cradle. To adjust it, use the cradle steering bars to turn the castors from side to side.
3) Do a check to see if the lever hoist hooks are aligned.
4) If the hooks are not aligned, continue to adjust the position of the cradle.
5) If the hooks are aligned, lock the wheel castors on the cradle.

SUBTASK 71-00-02-490-002-F00

(8) F.BROWN CRADLE;

Put the engine cradle, COM-4953 and transportation stand, COM-4954, with the power plant installed, below the strut as follows:

(a) Move the dolly/power plant in front of the strut and move it aft until it is below the strut and the lever hoist hooks are aligned with the cradle-to-engine attach brackets [163].

1) Make sure that all castors have brakes and steering locks off.

2) When the cradle is aligned, lock the castors.

SUBTASK 71-00-02-490-004-F00

(9) STANLEY AVIATION CRADLE;

Put the engine cradle, COM-6276 and transportation stand, COM-6277, with the power plant installed, below the strut per the vendor manual.

SUBTASK 71-00-02-820-014-F00

WARNING: MAKE SURE THERE ARE NO SPIRAL TWISTS IN THE LEVER HOIST CHAINS BETWEEN THE LEVER HOIST HOUSING AND ITS LOWER BLOCK (THE ATTACH POINT FOR THE DYNAMOMETER). IF YOU SEE A TWIST IN THE CHAIN, YOU MUST REMOVE IT. IF YOU DO NOT REMOVE IT, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(10) Make sure the chains on the three lever hoists [148] and [182] do not have a spiral twist between the lever hoist housing and the lower block (the lower block attaches the chain to the dynamometer.

(a) To remove a spiral twist, extend the chain until the twist is removed.

SUBTASK 71-00-02-480-015-F00

(11) Attach the dynamometers [148] to the lever hoists [147] (Figure 408).

NOTE: The two dynamometers must face forward. To do this, the left dynamometer must be installed upside down.

SUBTASK 71-00-02-480-016-F00

(12) Attach the dynamometer [183] to the lever hoist [182] (Figure 410).

SUBTASK 71-00-02-480-011-F00

(13) Attach each forward dynamometer [147] to the cradle-to-engine attach bracket [163] with the lockpin [161] (Figure 409).

NOTE: If it is necessary, adjust the length of the two lever hoists [148].

(a) Attach the safety pin to the end of each lockpin [161].

SUBTASK 71-00-02-480-012-F00

(14) Attach the aft dynamometer [183] to the engine attach bracket [202] with a lockpin [201] (Figure 411).

NOTE: If it is necessary, adjust the length of the lever hoist [182].

(a) Attach the safety pin to the end of each lockpin [201].

SUBTASK 71-00-02-820-005-F00

(15) Make sure the forward and aft bootstrap and all engine attach brackets are installed correctly.

SUBTASK 71-00-02-820-006-F00

(16) Before you apply a load to the bootstrap equipment, make sure all dynamometers are set to the zero position.

SUBTASK 71-00-02-080-015-F00

CAUTION: ONE PERSON MUST MONITOR EACH DYNAMOMETER WHEN YOU OPERATE THE LEVER HOISTS. WHEN YOU CHANGE THE LOADS AT ONE HOIST, THE LOADS CAN CHANGE AT OTHER HOISTS. THIS CAN CAUSE LOADS THAT ARE HIGHER THAN THE MAXIMUM BOOTSTRAP LOADS. DAMAGE TO EQUIPMENT CAN OCCUR.

(17) AGSE CRADLE;

Do these steps to disconnect the engine from the cradle, COM-2118 (Figure 412):

CAUTION: DO NOT APPLY MORE THAN 3850 LB (1746 KG) TO THE FORWARD INBOARD DYNAMOMETER, AND 3350 LB (1520 KG) TO THE FORWARD OUTBOARD DYNAMOMETER. IF YOU APPLY MORE THAN THE LIMITS, DAMAGE TO THE POWER PLANT, WING, AND STRUT CAN OCCUR.

(a) Use the forward lever hoists [148] and the aft lever hoist [182] to slowly lift the weight of the engine from the cradle.

(b) Use the aft lever hoist [182] and adjust the load to disconnect the aft support arm from the TRF.

1) Remove the lockpin [281] and move the support arm to rest on the cradle.

(c) Do these steps to disconnect the forward cradle arms from the engine:

1) Remove the lock wire from the four cap screws.

2) Loosen the four cap screws to permit the trunnions to slide when the retaining pins [221] are removed.

3) Disengage the spanner nut on the right trunnion. Thread the nut inboard almost to the end of the threaded shaft.

4) If it is necessary, use the forward lever hoist [142] and adjust the load to remove the lockpin [221] from each trunnion.

5) Slide the trunnions away from the engine until stopped by the capscrews. The end support balls should be clear of the engine-to-cradle attach bracket [163].

6) Remove the lower lockpins from each forward cradle arm and turn the arms to the outboard position.

SUBTASK 71-00-02-420-020-F00

CAUTION: ONE PERSON MUST MONITOR EACH DYNAMOMETER WHEN YOU OPERATE THE LEVER HOISTS. WHEN YOU CHANGE THE LOADS AT ONE HOIST, THE LOADS CAN CHANGE AT OTHER HOISTS. THIS CAN CAUSE LOADS THAT ARE HIGHER THAN THE MAXIMUM BOOTSTRAP LOADS. DAMAGE TO EQUIPMENT CAN OCCUR.

(18) F.BROWN CRADLE;

Do these steps to disconnect the engine from the engine cradle, COM-4953(Figure 413):

CAUTION: DO NOT APPLY MORE THAN 3850 LB (1746 KG) TO THE FORWARD INBOARD DYNAMOMETER, AND 3350 LB (1520 KG) TO THE FORWARD OUTBOARD DYNAMOMETER. IF YOU APPLY MORE THAN THE LIMITS, DAMAGE TO THE POWER PLANT, WING, AND STRUT CAN OCCUR.

(a) Do these steps to center the engine/cradle:

1) Use the forward lever hoists [148] and the aft lever hoist [182] to slowly lift the engine/cradle and base until just free of the floor.

2) Lower the engine/cradle down to the floor.

3) Engage the foot brakes on the transportation base.

(b) Use the forward lever hoists [148] and the aft lever hoist [182] to slowly lift the weight of the engine from the cradle.

(c) Do these steps to release the forward clamp assemblies.

1) Loosen the collar nuts.

2) Move the swing bolts to the unlock position.

3) Open the clamp assemblies.

(d) Use the aft lever hoist [182] and adjust the load to disconnect the aft support arm from the TRF.

1) Remove the lockpin and move the support arm to rest on the cradle.

(e) Remove the forward trunniions from the engine:

1) Continue to lift the engine until the trunnions become loose in their cradle clamp sockets.

2) Remove the trunnions from the engine and store them safely to one side.

(f) Put the forward clamp assemblies to the stowed position:

1) Close the clamp assembly.

2) Put the swing bolts in the lock position and tighten the collar nuts.

3) Remove the hinge pin and put the clamp assembly to the stowed position.

4) Install the hinge pin and the safety pin.

SUBTASK 71-00-02-420-021-F00

CAUTION: ONE PERSON MUST MONITOR EACH DYNAMOMETER WHEN YOU OPERATE THE LEVER HOISTS. WHEN YOU CHANGE THE LOADS AT ONE HOIST, THE LOADS CAN CHANGE AT OTHER HOISTS. THIS CAN CAUSE LOADS THAT ARE HIGHER THAN THE MAXIMUM BOOTSTRAP LOADS. DAMAGE TO EQUIPMENT CAN OCCUR.

(19) STANLEY AVIATION CRADLE;

Disconnect the engine from the engine cradle, COM-6276 per ther vendor manual.

SUBTASK 71-00-02-820-017-F00

(20) Slowly increase the load on the three dynamometers [147] and [183] to raise the engine. Make sure you observe these areas:

(a) The forward side of the fan cowl support beam and the aft side of the inlet cowl at the 12:00 location

(b) The fire extinquishing tube and the precooler inlet duct flange

(c) The forward side of the thrust reversers and the aft side of the fan case at the 12:00 position

(d) The top of the exhaust nozzle and the bottom of the strut fairing.

SUBTASK 71-00-02-820-018-F00

(21) Use the forward outboard lever hoist [147] to roll the engine until it is parallel to the engine mounts on the strut (approximately 6 degrees)

SUBTASK 71-00-02-820-019-F00

(22) As you continue to raise the engine, raise the aft end slightly higher than the forward end. This will keep the above interference areas to a minimum.

NOTE: The forward mount can move in a forward and aft direction. Make sure the forward mount remains free as you engage the forward shear pins [242].

(a) If the forward mount binds, lower the engine until the shear pins [242] are free.

SUBTASK 71-00-02-820-020-F00

(23) As you engage the shear pins [242] and [264], make sure the engine mount surfaces are parallel with the strut.

SUBTASK 71-00-02-970-001-F00

(24) Record the applied engine load from each dynamometer [147] and [183]. This data will be used when the preload is applied later.

SUBTASK 71-00-02-820-021-F00

(25) Continue to raise the engine until the engine mounts are 0.25-0.5 inches (6-13 mm) below the strut. Make sure the aft mount surfaces are parallel to the mating strut surface.

(a) If they are not, use the forward lever hoists [147] to adjust the alignment of the aft mount.

(b) When you get the correct alignment, use the aft lever hoist [182] to raise the aft mount against the mating strut surface.

SUBTASK 71-00-02-820-022-F00

(26) Slowly raise the two forward lever hoists [147] equally until the forward mount is engaged with the mating strut surfaces.

SUBTASK 71-00-02-210-006-F00

(27) Examine the strut fireseal to make sure it is not pinched between the engine fan case and the strut.

(a) If it is pinched, gently push the fireseal up, into the strut.

(b) To examine the forward strut fireseal, do this task: Forward Strut Fireseal Inspection, TASK 54-54-00-200-802.

SUBTASK 71-00-02-820-023-F00

(28) Apply a preload to the lever hoists [148] and [182] as follows:

CAUTION: DO NOT APPLY MORE THAN 3850 POUNDS (1750 KG) TO THE FORWARD INBOARD DYNAMOMETER, 3350 POUNDS (1520 KG) TO THE FORWARD OUTBOARD DYNAMOMETER AND 1300 POUNDS (590 KG) TO THE AFT DYNAMOMETER. IF YOU APPLY MORE THAN THE LIMITS, DAMAGE TO THE POWER PLANT, WING AND STRUT CAN OCCUR.

(a) Apply loads to the three dynamometers [147] and [183] that are more than the applied engine load values that you recorded earlier.

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 the engine mounts stay together.

SUBTASK 71-00-02-820-024-F00

(29) If after the preload is applied there is a clearance between the forward or aft mounts, follow these steps to remove it:

(a) If there is a clearance in the aft mount, first shake the aft mount. If the clearance remains, use the applicable forward lever hoist [148] to roll the engine to the side with the clearance.

NOTE: As an example, if the clearance is on the inboard side, decrease the load on the outboard forward lever hoist [148] to roll the engine to the inboard position.

SUBTASK 71-00-02-420-004-F00

(30) Do these steps to attach the power plant to the strut:

NOTE: Before you tighten the eight bolts that attach the power plant to the strut, you must do a check of the self-locking feature on the forward and aft barrel nuts. If not already done, refer to the procedure, Prepare For The Power Plant Installation.

(a) Do these steps to loosely install the forward engine mount to the strut (Figure 414):

1) Put a washer [244] on each bolt [241].

NOTE: Make sure the countersunk side of the washer is adjacent to the bolt head.

2) Apply Never-Seez NSBT-8N compound, D00006 to the threads and shank of the bolts [241].

3) Apply Never-Seez NSBT-8N compound, D00006 to the external cylindrical area of the barrel nuts [243].

NOTE: Do not apply the Never-Seez NSBT-8N compound, D00006 to the self locking feature of the barrel nut.

4) Install the barrel nuts [243] in the holes on the forward mount.

NOTE: Make sure the indexing retainer is correctly installed in the indexing recess on the forward mount.

5) Install the four bolts [241] and four washers [244] in the forward engine mount.

(b) Install, but do not torque the bolts [241].

(c) Do these steps to loosely install the aft engine mount to the strut (Figure 415):

1) Install a washer [262] on each bolt [263].

NOTE: Make sure the countersunk side of the washer is adjacent to the bolt head.

2) Apply Never-Seez NSBT-8N compound, D00006 to the threads and shank of the bolts [263].

3) Apply Never-Seez NSBT-8N compound, D00006 to the external cylindrical area of the barrel nuts [261].

NOTE: Do not apply the Never-Seez NSBT-8N compound, D00006 to the self locking feature of the barrel nut.

4) Install the four bolts [263] and four washers [262] in the aft engine mount.

(d) Install, but do not torque the bolts [263].

SUBTASK 71-00-02-420-005-F00

(31) Apply the initial torque with wrench, SPL-2106 as follows:

(a) Cross-tighten the forward engine mount bolts [241] to 540-660 pound-inches (61-74 Newton meters) (45-55 pounds-foot).

(b) Cross-tighten the aft engine mount bolts [263] to 960-1170 pound-inches (109-132 Newton meters) (80-98 pounds-foot).

SUBTASK 71-00-02-420-006-F00

(32) Apply the final torque as follows:

(a) Tighten the forward engine mount bolts [241] to 1080-1320 pound-inches (122-149 Newton meters) (90-110 pounds-foot).

(b) Tighten the aft engine mount bolts [263] to 1920-2340 pound-inches (217-264 Newton meters) (160-195 pounds-foot).

SUBTASK 71-00-02-080-003-F00

(33) Remove the dolly from the work area.

SUBTASK 71-00-02-080-004-F00

(34) Remove the load from the lever hoists [148] and [182].

SUBTASK 71-00-02-080-005-F00

(35) Disconnect the bootstrap equipment from the power plant as follows (Figure 409):

(a) Do these steps to disconnect the forward bootstrap equipment:

1) Disconnect the lockpin [161] that attaches the forward dynamometer [147] to the cradle-to-engine attach bracket [163] (Figure 409).

2) Remove the 4 bolts [162] that attach the cradle-to-engine attach bracket [163] to the fan case.

3) Remove the bracket [163].

4) Do the above steps again for the other forward bootstrap attach point.

(b) Do these steps to disconnect the aft bootstrap equipment (Figure 411):

1) Disconnect the lockpin [201] that attaches the aft dynamometer [183] to the engine attach bracket [202].

2) Disconnect the two lockpins [203] that attach the aft engine attach bracket [202] to the engine flange brackets [204] and [205].

3) Remove the bracket [202].

(c) Put all removed brackets in the storage box on the cradle.

SUBTASK 71-00-02-080-006-F00

(36) Do these steps to remove the forward bootstrap equipment from the strut (Figure 408):

(a) Remove the dynamometer [147] and the lever hoist [148] from each forward arm.

(b) Release the brace [142] from the inboard arm [143] as follows:

NOTE: There are two braces [142] on the forward bootstrap. They consist of a metal rod with a clevis on one end and a permanently attached lockpin at the other end.

1) Disconnect the lockpin [149] that attaches the clevis on the forward end of the brace [142] to the strut.

2) Turn the brace [142] 90 degrees until the brace lockpin is aligned with the keyed slot in the inboard arm [143].

3) Move the brace [142] forward until it is disengaged from the inboard arm [143].

(c) Do the above step again to release the other brace [142].

(d) Disconnect the lockpin [144] that attaches the outboard arm [145] to the inboard arm [143] at the top location.

NOTE: Each arm has a shear pin below the strut attach fitting to temporarily hold the arm in its installed position. The arms will not fall.

(e) To remove the outboard arm [145], disconnect the lockpin [146] at the strut attach fitting.

(f) To remove the inboard arm [143], disconnect the lockpin [141] at the strut attach fitting.

SUBTASK 71-00-02-410-001-F00

(37) For the thumbnail fairing, do this task: Forward Fairing Installation, TASK 54-52-01-410-801.

SUBTASK 71-00-02-080-007-F00

(38) Do these steps to remove the aft bootstrap equipment from the strut (Figure 410):

(a) Disconnect the lockpin [189] and remove the dynamometer [183] and the lever hoist [182] from the support beam [184].

(b) To disconnect the support beam [184], hold it as you disconnect the outboard lockpin [187].

1) Slide the support beam [184] out until it is free of the support braces [186] and [188].

(c) Remove the lockpin assembly [185] that attaches the support braces [186] and [188] together at the inboard location.

(d) Remove the support brace [188].

(e) Remove the support brace [186].

NOTE: The strut attach brackets are permanently attached to the strut and are not removed.

SUBTASK 71-00-02-860-011-F00

(39) If the main and nose landing gear shock struts were extended for clearance between the dolly and the thrust reverser, retract the struts to their usual service band limits.

(a) Do this task: Main Landing Gear Shock Strut Servicing, TASK 12-15-31-610-802.

H. Fan Case Connections on the Left Side

NOTE: All the connections on the left side of the fan case are found at the service disconnect panel on the left side of the fan cowl support beam.

SUBTASK 71-00-02-020-018-F00

(1) Connect the harness connector DP1234 to the strut receptacle (Figure 404).

SUBTASK 71-00-02-211-001-F00

(2) Do these steps to connect the harness connector D30038 to the strut receptacle (Figure 404).

(a) Measure the distance from the end of the connector to the top clamp on the engine. This distance must be 13.5–14.0 inches (34.3-35.6 cm)

1) If the distance is more than 14.0 inches (35.6 cm), do these steps:

a) Loosen the clamps on the engine that hold the IDG power cable and adjust the cable where necessary.

b) Make sure that the top clamp is approximately 15 degrees below the horizontal axis.

2) If the distance is correct, install the harness connector D30038 to the strut receptacle.

SUBTASK 71-00-02-420-007-F00

(3) Do these steps to connect the starter duct to the strut:

(a) Install the seal [62] on the internal groove of the starter duct.

(b) Install the coupling [61] at the top end of the starter duct.

(c) Orient the coupling [61] to give the maximum clearance with the engine and adjacent components.

(d) Do these steps to tighten the coupling [61]:

1) Tighten the coupling [61] to the torque specified on the part.

2) Lightly hit the surface of the coupling [61] with a rubber mallet, STD-3906.

3) Tighten the coupling [61] again to the torque specified on the part.

SUBTASK 71-00-02-420-008-F00

(4) Do these steps to connect the hydraulic lines:

(a) Remove the protective covers from the hydraulic lines.

(b) Connect the quick disconnect couplings on the hydraulic case drain, hydraulic supply and hydraulic pressure lines.

SUBTASK 71-00-02-420-009-F00

(5) Do these steps to connect the fuel supply line:

(a) Remove the protective covers for the fuel supply line and strut fitting.

(b) FUEL HOSE WITH A B-NUT FITTING;

Do these steps:

1) Use your hand to connect the fuel hose to the strut fitting.

2) Tighten the B-nut to 1140-1260 pound-inches (128.8-142.4 Newton meters).

NOTE: Use two wrenches to tighten the B-nut. Use one to hold the hose and use the other to tighten the nut.

3) Loosen the B-nut and re-tighten the B-nut to the above torque value.

SUBTASK 71-00-02-420-019-F00

(6) Connect the DP0502 connector to the fuel flow transmitter (Figure 409).

I. Fan Case Connections on the Right Side

NOTE: All the connections on the right side of the fan case are found at the service disconnect panel on the right side of the fan cowl support beam.

SUBTASK 71-00-02-020-019-F00

(1) Connect the electrical harness connectors to their mating receptacles (Figure 405).

NOTE: There are eight electrical connectors on the right side of the strut. They are, from forward to aft, the DP1104, DP0256, DP1328, DP1620, DP1552, DP0112, DP0324 and DP0460. The connection instructions for all the connectors are equivalent.

SUBTASK 71-00-02-420-010-F00

(2) Do these steps to connect the strut drain line:

(a) Remove the protective covers for the strut drain line.

CAUTION: USE TWO WRENCHES TO TIGHTEN THE TUBE COUPLING NUT. USE ONE TO HOLD THE NIPPLE, AND THE OTHER TO TIGHTEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE TUBE AND NIPPLE CAN OCCUR.

(b) Connect the hose [82] to the tube [81].

J. Core Area Connections on the Left Side

SUBTASK 71-00-02-420-011-F00

(1) Do these steps to connect the pressure sense line on the side of the precooler (Figure 406):

(a) Remove the protective covers from the pressure sense line tube [102] and the pressure sense line hose [101].

CAUTION: USE TWO WRENCHES TO TIGHTEN THE TUBE COUPLING NUT. USE ONE TO HOLD THE NIPPLE, AND THE OTHER TO TIGHTEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE TUBE AND NIPPLE CAN OCCUR.

(b) Connect the pressure sense line tube [102] to the pressure sense line hose [101].

1) Tighten the tube coupling nut to 133-147 pound-inches (15.0-16.6 Newton meters).

SUBTASK 71-00-02-420-012-F00

(2) Do these steps to connect the 450 degrees F temperature sense line on the side of the precooler:

(a) Remove the protective covers from the 450 degrees F temperature sense line tube [103] and the 450 degrees F temperature sense line hose [104].

CAUTION: USE TWO WRENCHES TO TIGHTEN THE TUBE COUPLING NUT. USE ONE TO HOLD THE NIPPLE, AND THE OTHER TO TIGHTEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE TUBE AND NIPPLE CAN OCCUR.

(b) Connect the 450 degrees F temperature sense line tube [103] to the 450 degrees F temperature sense line hose [104].

1) Tighten the tube coupling nut to 133-147 pound-inches (15.0-16.6 Newton meters).

SUBTASK 71-00-02-420-018-F00

(3) If previously disconnected or removed, install the fire extinguishing tube [100] to the strut.

(a) Make sure the fire extinguishing tube [100] is clamped on the left side of the precooler.

K. Core Area Connections on the Right Side

SUBTASK 71-00-02-420-013-F00

(1) Do these steps to connect the engine pneumatic duct to the precooler (Figure 407):

(a) Install the seal [123] on the internal groove of the pneumatic duct.

(b) Loosely install the coupling [122].

NOTE: Make sure the seal [123], which was previously installed, is still in its correct position.

(c) Orient the coupling [122] as shown in VIEW A-A.

(d) Do these steps to tighten the coupling [122]:

1) Tighten the coupling [122] to the torque given on the part.

2) Lightly hit the surface of the coupling [122] with a rubber mallet, STD-3906.

3) Tighten the coupling [122] again to the torque specified on the part.

SUBTASK 71-00-02-420-014-F00

(2) Do these steps to connect the 390 degrees F temperature sense line on the side of the precooler:

(a) Remove the protective covers from the 390 degrees F temperature sense line tube [121] and the 390 degrees F temperature sense line hose [124].

CAUTION: USE TWO WRENCHES TO TIGHTEN THE TUBE COUPLING NUT. USE ONE TO HOLD THE NIPPLE, AND THE OTHER TO TIGHTEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, DAMAGE TO THE TUBE AND NIPPLE CAN OCCUR.

(b) Connect the 390 degrees F temperature sense line tube [121] to the 390 degrees F temperature sense line hose [124].

1) Tighten the tube coupling nut to 133-147 pound-inches (15.0-16.6 Newton meters).

L. Put the Airplane Back To Its Usual Condition

SUBTASK 71-00-02-860-012-F00

(1) Do these steps to connect the opening actuators [21] for the thrust reversers (Figure 402):

(a) Disconnect the opening actuator [21] from its temporary attach point on the thrust reversers.

(b) Apply grease, D00015 to the shank of the bolt [22].

NOTE: Do not get the grease on the threads of the bolt.

(c) Connect the bottom end of the actuator [21] to the engine fan case.

1) Use the bolt [22], washers [23] and [26], bushing [24], alignment washer [25], and nut [27].

a) Make sure the alignment washer [25] is installed with the teflon surface against the actuator spherical bearing.

b) Tighten the nut [27] to 370-690 pound-inches (41.8-77.9 Newton meters).

(d) Remove the dust cap and connect the thrust reverser hand pump opening system, SPL-2417 to the actuator.

(e) Close the return valve on the pump and extend the actuator [21] slightly until the thrust reverser weight is removed from the thrust reverser hold-open equipment.

(f) Disconnect the hand pump from the opening actuator. Install the dust cap.

(g) Do these steps to engage the locking collar on the opening actuator:

1) Listen for the "click" sound of the lock collar.

2) Make sure you see the work LOCKED on the bottom of the extended piston.

3) Make sure you can see the red band on the actuator rod.

(h) Do the above steps again for the other actuator [21].

SUBTASK 71-00-02-080-008-F00

(2) Do these steps to remove the hold open equipment, SPL-2433 from the thrust reversers and the strut (Figure 401):

WARNING: MAKE SURE ALL THE WEIGHT OF THE THRUST REVERSERS IS HELD BY THE TWO OPENING ACTUATORS. IF THEY ARE NOT, THE THRUST REVERSERS CAN MOVE SUDDENLY WHEN YOU REMOVE THE HOLD-OPEN RODS. INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Make sure the weight of the thrust reversers is held by the two opening actuators.

(b) Turn the two adjustment pins on each beam assembly [5] until they disengage from the compression-rod receiver cups on the thrust reversers.

(c) Remove the lockpin [3] and disengage the arm support [2] (with the beam assembly [5]) from the strut attach beam [4].

(d) Do the above step again for the other arm support [2].

(e) Remove the two lockpins [1] that attach the strut attach beam [4] to the clevis brackets on the strut.

(f) Remove the retention pins [6] from each arm support [2] to release the beam assemblies [5].

(g) Make sure you keep all lockpins with the hold-open rod assembly.

SUBTASK 71-00-02-420-015-F00

(3) If Engine 2 was installed, remove the Scotch Flatback Masking Tape 250, G00270 from the edges of the thrust reverser.

SUBTASK 71-00-02-420-016-F00

(4) Remove the protective covers or Scotch Flatback Masking Tape 250, G00270 from the fire seals on the top aft location on the thrust reverser inner surface.

SUBTASK 71-00-02-630-001-F00

(5) If the engine preservation procedure has been done, do this task: Depreservation of an Engine On-Wing (Task Selection), TASK 71-00-03-600-803-F00.

SUBTASK 71-00-02-610-001-F00

(6) Make sure the engine oil system is serviced correctly.

(a) Do this task: Replenish the Engine Oil, TASK 12-13-11-600-801.

SUBTASK 71-00-02-610-002-F00

(7) Make sure the oil system for the integrated drive generator (IDG) is serviced correctly.

(a) Do this task: IDG Servicing (Oil Fill), TASK 12-13-21-600-801.

SUBTASK 71-00-02-010-004-F00

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.

(8) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

SUBTASK 71-00-02-410-002-F00

(9) Do this task: Install the Fan Cowl Panel (Selection), TASK 71-11-02-400-801-F00.

SUBTASK 71-00-02-940-001-F00

CAUTION: DO NOT LEAVE TOOLS OR OTHER OBJECTS IN THE ENGINE INLET OR AROUND THE POWER PLANT. IF THESE OBJECTS GO THROUGH THE ENGINE, DAMAGE TO THE ENGINE CAN OCCUR.

(10) Remove all objects from the engine inlet and work area around the power plant.

SUBTASK 71-00-02-860-013-F00

(11) For engine 1, do this step:

Remove the safety tags and close these circuit breakers:

CAPT Electrical System Panel, P18-2

Row	Col	Number	Name
A	1	C00458	ENGINE 1 IGNITION RIGHT
A	3	C00153	ENGINE 1 IGNITION LEFT
A	4	C01390	ENGINE 1 ALTN PWR CHAN B
A	5	C01314	ENGINE 1 ALTN PWR CHAN A
B	8	C01103	ENGINE 1 START VALVE

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	4	C00359	FUEL SPAR VALVE ENG 1
E	5	C01320	ENGINE FUEL ENGINE 1 HPSOV CONT

SUBTASK 71-00-02-860-014-F00

(12) For engine 2, do this step:

Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-2

Row	Col	Number	Name
C	4	C00154	ENGINE 2 START VALVE
D	4	C00459	ENGINE 2 IGNITION RIGHT
D	6	C00151	ENGINE 2 IGNITION LEFT
D	7	C01391	ENGINE 2 ALTN PWR CHAN B
D	8	C01315	ENGINE 2 ALTN PWR CHAN A

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2
E	3	C01321	ENGINE FUEL ENGINE 2 HPSOV CONT

SUBTASK 71-00-02-860-015-F00

(13) Remove the DO-NOT-OPERATE tags from the start levers.

SUBTASK 71-00-02-860-016-F00

(14) Remove the DO-NOT-OPERATE tag from the HYD PUMPS ENG switch on the pilot's overhead panel, P5, for the applicable power plant.

SUBTASK 71-00-02-860-018-F00

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

(a) Remove the DO-NOT-OPERATE tag from the BAT switch on the pilot's overhead panel, P5.

SUBTASK 71-00-02-860-017-F00

(16) Do these steps to reset the FMCS CDU:

(a) On the FMCS CDU in the flight compartment, get access to the Configuration Report as follows:

1) Push the INIT/REF button.
2) Push the MAINT button.
3) Push the ENGINE button
4) Push the ENGINE 1 or ENGINE 2 button for the applicable engine.
5) Push the IDENT/CONFIG button.
6) Push the ENG S/N button.
7) Write the new engine serial number in the FMCS CDU.

CAUTION: AFTER THE CONTINUE BUTTON IS PUSHED, DO NOT PUSH THE INIT/REF BUTTON OR REMOVE POWER FROM THE EEC CHANNELS. IF YOU DO, YOU COULD CORRUPT THE NON-VOLATILE MEMORY IN THE EEC. DAMAGE TO EQUIPMENT CAN OCCUR.

8) Push the CONTINUE button.

NOTE: After approximately 10 seconds, the IDENT/CONFIG screen shows. Make sure the new engine serial number is correct.

(b) For the applicable engine, do these steps to erase all stored faults in the EEC:

1) Push the ERASE button.

CAUTION: AFTER THE ERASE ALL BUTTON IS PUSHED, DO NOT PUSH THE INIT/REF BUTTON OR REMOVE POWER FROM THE EEC CHANNELS. IF YOU DO, YOU COULD CORRUPT THE NON-VOLATILE MEMORY IN THE EEC. DAMAGE TO EQUIPMENT CAN OCCUR.

2) Push the ERASE ALL button.

NOTE: After approximately 10 seconds, the IDENT/CONFIG screen shows. Make sure the new engine serial number is correct.

SUBTASK 71-00-02-210-001-F00

(17) Make sure the engine thrust rating shown on the IDENT/CONFIG screen is correct.

(a) Get access to the IDENT/CONFIG screen for the other engine and make sure the engine thrust rating as shown on the screen is the same.

(b) Make sure the EEC software version of the two engines are compatible. Refer to the task, EEC Software Load, TASK 73-21-60-470-801-F00.

1) Intermix of some EEC software versions is not permitted.

2) Some EEC software versions must be installed on both engines at the same time.

3) Some EEC software versions require concurrent changes to the airplane configuration.

SUBTASK 71-00-02-210-005-F00

(18) For the applicable engine, do this task: Engine Exceedance Page Check, TASK 71-00-00-740-801-F00.

(a) If you find Exceedances, reset them.

SUBTASK 71-00-02-210-002-F00

(19) Do a check of the fan balance screws on the engine and in the AVM to make sure they agree.

NOTE: This step is not used for the Vibration Monitor (AVM) S360N021-203.

HAP 006-011 PRE SB 737-77-1056; AIRPLANES WITH ENDEVCO -213 AVM

(a) To read the AVM, get access to the EDIT ENG BALANCE PARTS? screen, (TASK 71-00-00-750-804-F00).

NOTE: The check of the screws is not necesaary if you only do the INSTALL ONLY solution when you do the on board trim balance.

HAP 023-026, 028-054, 101-999; HAP 001-013, 015-022 POST SB 737-77-1056 OR POST SB 737-77-1069

(b) AIRPLANES WITH VIBRO-METER AVM;

To read the AVM, get access to the trim balance menu, (TASK 71-00-00-750-803-F00) and continue to read the balance screw data.

HAP 048-053, 107-999; HAP 001-013, 015-026, 028-047, 054, 101-106 POST SB 737-77-1069

SUBTASK 71-00-02-740-001-F00

(20) If the engine was replaced with a different engine, erase the AAVM memory (TASK 77-31-00-970-805-F00):

HAP ALL

SUBTASK 71-00-02-710-001-F00

(21) Do the tests that are listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00).

(a) If it is necessary, clear and bleed the applicable pack to prevent cabin odor (oil) following an engine change.

1) Do the steps to remove the oil contamination from the applicable engine pneumatic ducts (TASK 21-00-01-100-801).

——————— END OF TASK ———————

POWER PLANT - MAINTENANCE PRACTICES (PRESERVATION AND DEPRESERVATION)

1. General

A. This procedure contains scheduled maintenance task data.

B. This procedures has these tasks:

(1) Dry-Out and Lubrication of the Engine Procedure

(2) Inlet Cowl Lipskin Protective Coating Procedure

(3) Preservation of an Engine (Task Selection)

(4) Depreservation of an Engine (Task Selection)

(5) Preservation of an Engine for Not More Than 10 Days (Engine On-Wing)

(6) Preservation Renewal of an Engine for Not More Than 10 Days (Engine On-Wing)

(7) Preservation of an Engine for Not More Than One Month (Engine On-Wing)

(8) Preservation Renewal of an Engine for Not More Than One Month (Engine On-Wing)

(9) Depreservation of an Engine, which was Preserved for Not More Than One Month (Engine On-Wing)

(10) Preservation of an Engine for Not More Than Three Months (Engine On-Wing)

(11) Preservation Renewal of an Engine for Not More Than Three Months (Engine On-Wing)

(12) Depreservation of an Engine, which was Preserved for Not More Than Three Month (Engine On-Wing)

(13) Preservation of an Engine from One Month to Not More Than One Year (Engine On-Wing)

(14) Preservation Renewal of an Engine from One Month to Not More Than One Year (Engine On-Wing)

(15) Depreservation of an Engine, which was Preserved from 1 Month to Not More Than One Year (Engine On-Wing)

(16) Preservation of an Engine for More Than the One Year Preservation Time Limit (Engine On-Wing)

C. These instructions are applicable only to power plants that are installed (on-wing).

(1) There are different instructions available from CFMI that are used for engines that are not installed (off-wing).

D. These tasks give the instructions for the preservation, preservation renewal and depreservation for a serviceable and a non-serviceable engine.

NOTE: For this procedure, a serviceable engine is defined as an engine that you can start. A non-serviceable engine is defined as an engine that you cannot be started.

(1) The preservation procedures for a serviceable engine give the minimum recommended steps that are necessary to prevent these conditions:

(a) Corrosion

(b) Entry of unwanted material into the engine

(c) The effects of the climate and weather conditions.

(2) The preservation procedures for a non-serviceable engine give the minimum recommended steps that are necessary if you cannot start the engine.

(3) The preservation renewal procedure, if it is permitted, gives the instructions for the renewal of the preservation time.

(4) The depreservation 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 serviceable or not serviceable.

(1) Power plant preservation is a flexible program that you can do, and must agree with the applicable weather and storage conditions.

(2) More care is necessary for a program for power plants that are operational in high humidity or large temperature changes or near a salt water area, than for the power plants that are in drier climates or less bad weather conditions.

(3) You must do a schedule for the preservation programs for power plants that are not serviceable to do the preservation renewal procedures and monitor the schedule regularly to make sure that you did the necessary procedure before the expiration time.

(4) You must 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 a serviceable condition.

NOTE: You cannot do the preservation of engines and put them into storage without maintenance. You must do a schedule and apply it.

(5) When you use dessicants you must change them regularly, applicable to environmental conditions, to make sure the dessicant gives good protection.

(6) You must close the variable bleed valve (VBV) doors when you do the preservation and store the power plant.

NOTE: Make sure that no unwanted material goes into the core engine inlet through the VBV's.

(7) You must do the engine dry-out procedure after an engine had an in- flight shutdown, or when you do the preservation for a long time an engine is not serviceable.

TASK 71-00-03-600-801-F00

2. Dry-Out and Lubrication of the Engine

(Figure 201, Figure 202, Figure 203, Figure 204)

A. General

(1) This task is to dry the forward sump, aft sump, and the gearbox of the engine with hot air when the engine can not be operated.

WARNING: DO THE DRY-OUT PROCEDURE IN AN AREA WITH A GOOD AIRFLOW. KEEP CLEAR OF THE ENGINE EXHAUST AREA. DO NOT BREATHE THE OIL MIST FROM THE ENGINE EXHAUST. IF YOU DO NOT OBEY THESE PRECAUTIONS, INJURY TO PERSONS CAN OCCUR

CAUTION: IF AN IN-FLIGHT SHUTDOWN OCCURRED ON THE APPLICABLE ENGINE AND THE ENGINE WILL NOT BE OPERATED FOR 24 HOURS AFTER A LANDING, YOU MUST DO THE ENGINE DRY-OUT PROCEDURE AS QUICKLY AS POSSIBLE. IF YOU DO NOT DO THE ENGINE DRY-OUT PROCEDURE IMMEDIATELY AFTER A LANDING, CONDENSATION CAN CAUSE CORROSION DAMAGE ON THE COMPONENTS WET WITH OIL.

(2) This task gives the dry-out and lubrication steps that are necessary for the engine that had a in-flight shutdown.

NOTE: You must do this procedure not longer than 24 hours after landing.

(3) If the engine is to be operated in the 24 hours after it landed, run the engine for a minimum of 15 to 20 minutes at low idle.

(4) If the engine run is performed in the 24 hours after landing, it is not necessary to do the Dry-Out and Lubrication of the Engine.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
72-63-01-000-801-F00	Handcranking Drive Cover Removal (P/B 201)
72-63-01-400-801-F00	Handcranking Drive Cover Installation (P/B 201)
79-00-00-200-804-F00	Chip Detectors and Scavenge Screens Inspection (P/B 601)
79-21-05-400-804-F00	Magnetic Chip Detector (MCD) 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-2251	Adapter - Filter, Engine Dry Out (Part #: 856A2659G01, Supplier: 58828, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
SPL-2253	Adapter - Air, Dry Out Engine Sumps (Part #: 856A3810G01, Supplier: 58828, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
SPL-2448	Set - Tool, Engine Sumps, Drying and Relube (Part #: 856A3620G02, Supplier: 58828, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
STD-585	Mat - Protective, 3/8 Inch Minimum Thickness, Minimum 42x60 Inches (1x1.5 meters) with Warning Streamers
STD-1085	Gloves - Insulated

D. Consumable Materials

Reference	Description	Specification
D00599 [CP2442]	Oil - Engine (CFMI SB 79-001)	
D00662 [CP5075]	Additive, Corrosion Preventive	

E. Location Zones

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

F. Prepare for the Dry-Out and Lubrication Procedure

SUBTASK 71-00-03-620-001-F00

(1) For engines that are removed from the airplane, use the CFMI Engine Shop Manual, Section 72-00-00, page 1201.

SUBTASK 71-00-03-040-001-F00

(2) For engines that are installed on the wing of the airplane, do these steps:

(a) Install a DO-NOT-OPERATE tag on the applicable start switch.

(b) Put the applicable start lever in the CUTOFF position

1) Install a DO-NOT-OPERATE tag.

(c) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 71-00-03-880-001-F00

(3) Find a hot air source with the specifications that follow:

NOTE: Use a ground air cart or high flow space heater.

(a) Output flow capacity - 120-130 PPM (55-60 KGPM).

(b) Temperature - 300-325 Degree F (150-165 Degree C).

SUBTASK 71-00-03-480-001-F00

(4) Install the core engine sealing plate as follows (Figure 201):

(a) Do this task: Handcranking Drive Cover Removal, TASK 72-63-01-000-801-F00.

(b) Install the core engine sealing plate with its bolts [1].

(c) Tighten the bolts to 97-106 pound-inches (11-12 Newton meters).

SUBTASK 71-00-03-700-001-F00

CAUTION: IDENTIFY THE INITIAL POSITIONS OF THE CHIP DETECTORS. IF YOU DO NOT IDENTIFY THE INITIAL POSITIONS OF THE CHIP DETECTORS BEFORE YOU REMOVE THEM, INCORRECT ANALYSIS CAN OCCUR.

(5) To examine the chip detectors, do this task: Chip Detectors and Scavenge Screens Inspection, TASK 79-00-00-200-804-F00.

SUBTASK 71-00-03-480-002-F00

(6) Prepare the relubrication manifold from tool set, SPL-2448 as follows (Figure 202):

(a) Remove the protective covers from the relubrication manifold openings.

(b) Remove the knurled protectors from the pushers.

(c) Examine the O-rings on the pushers.

1) Replace the O-rings if you find damage.

(d) Remove the knurled bolts from the relubrication manifold.

(e) Remove the lubrication manifold from the plate.

(f) Remove the pushers from the plate.

CAUTION: DO NOT APPLY FORCE TO THE PUSHER TO INSTALL IT INTO THE LUBRICATION UNIT. IF YOU APPLY FORCE TO THE PUSHER, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(g) Carefully install one of the pushers (with locking pins) into the aft sump hole of the lubrication unit housing.

1) Align the pusher keys with the lubrication unit sleeve keyways.

2) Push until the pusher is fully in the hole.

3) Turn the pusher one quarter of a turn clockwise to engage in the keyways.

(h) Make sure the pusher is in its locked position:

1) Pull the pusher down.

2) Lightly turn the pusher from side to side to make sure the pusher is 'snapped' down.

(i) Set the plate (from aft side) into the groove of the pusher.

(j) Move the plate forward to engage the pusher.

CAUTION: DO NOT APPLY FORCE TO THE PUSHER TO INSTALL IT INTO THE LUBRICATION UNIT. IF YOU APPLY FORCE TO THE PUSHER, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(k) Carefully install one of the pushers (without locking pins) into the forward sump hole of the lubrication unit housing.

1) Push until the pusher is fully in the hole.

(l) Hold the pusher tightly with one hand.

(m) Push the plate forward with your other hand until it move into the pusher groove.

CAUTION: DO NOT APPLY FORCE TO THE PUSHER TO INSTALL IT INTO THE LUBRICATION UNIT. IF YOU APPLY FORCE TO THE PUSHER, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(n) Carefully install the last pusher (with locking pins) into the TGB/AGB hole of the lubrication unit housing:

1) Align the pusher keys with the lubrication unit sleeve keyways.

2) Push until the pusher is fully in the hole.

3) Turn the pusher one quarter of a turn clockwise to engage the key in the keyways.

(o) Make sure the pusher is in its locked position:

1) Pull the pusher down.

2) Lightly turn the pusher from side to side.

NOTE: This is to make sure the pusher is 'snapped' down.

(p) Push the plate forward into the groove of the last pusher.

1) Make sure the plate fully engages all three pushers.

(q) Remove the protective covers from the air filter openings.

(r) Install the relubrication manifold on the three pushers with the air supply connector pointed aft.

(s) Attach the manifold to the plate with the 4 knurled bolts.

1) Use your hand to tighten the bolts.

(t) Make sure the manifold is fully against the plate.

(u) Fill the oil container of the relubrication tool set with one of these solutions:

1) Use 1.7 pints (800 ml) of additive, D00662 [CP5075].

2) To make the alternate oil solution, do these steps:

a) Use 0.85 pints (400 ml) of anti-corrosion additive (CP2309).

b) Use 0.85 pints (400 ml) of oil, D00599 [CP2442].

(v) Connect the air pressure supply line to the nipple of the oil container.

(w) Connect the oil supply line to the nipple of the oil container.

(x) Make sure the oil supply valve is closed.

G. The Power Plant Dry-Out Procedure

SUBTASK 71-00-03-600-001-F00

(1) Do the power plant dry-out procedure as follows (Figure 203):

(a) Use the adapter, SPL-2251 to examine the air filter for unwanted material.

1) Blow dry, filtered, compressed air through hoses to remove all unwanted material.

(b) Do these steps to install the air adapter, SPL-2253 on the engine exhaust plug:

1) Install the half flanges on the engine exhaust plug.
2) Tighten the screw and torque to 425-470 lb in. (47.5-52.5 N.m).
3) Put the tubing at the end of exhaust plug.
4) Attach the tubing to the half flanges with the four threaded rods.
5) Tighten the four nuts.

(c) Do these steps to install the first hose of the adapter, SPL-2251 to the hot air source:

1) Install one end to the hot air supply outlet.
2) Install the other end to the air filter inlet.
3) Attach each hose end with a clamp.

(d) Do these steps to install the second hose of the adapter, SPL-2251 to the air adapter, SPL-2253:

1) Install one end to the air filter outlet.
2) Install the other end to the air adapter, SPL-2253.
3) Attach each hose end with a clamp.

(e) Install the protective mat, STD-585 in the inlet on the full lower half of the inlet cowl.

WARNING: STAY CLEAR OF THE RELUBRICATION MANIFOLD INSTALLED ON THE LUBRICATION UNIT BY A MINIMUM OF 20 FEET (6 METERS). THE RELUBRICATION MANIFOLD BLOWS HOT AIR AND CAN CAUSE INJURY TO PERSONS.

(f) Turn on the hot air source.

1) Let the pressure increase slowly to the operation level.
2) The air temperature must be 300-325 degrees F (150-165 degrees C).

(g) Do the dry-out cycle for a minimum of 20 minutes.

WARNING: DO NOT MANUALLY TURN THE FAN ROTOR WITHOUT GOOD GLOVES. MAKE SURE YOU ARE ON A SAFE SURFACE WHILE YOU TURN THE FAN. BE VERY CAREFUL WHILE YOU TURN THE FAN TO PREVENT INJURY.

1) Use insulated gloves, STD-1085 to turn the fan rotor slowly in a counterclockwise direction.

NOTE: One full turn in the usual operational direction.

2) Turn the fan rotor slowly one full turn every five minutes for 20 minutes.

(h) Turn off the hot air source when you complete the cycle time.

(i) Remove the hot air source hose from the adapter, SPL-2251.

(j) Remove the air adapter, SPL-2253 from the engine exhaust plug.

H. The Lubrication Procedure

SUBTASK 71-00-03-480-003-F00

(1) Do the lubrication procedure as follows (Figure 204):

(a) Move the hot air source hose to the air supply connector of the relubrication manifold.

1) Attach the hose end with a clamp.

(b) Turn on the hot air source.

1) Let the pressure increase slowly to the operation level.
2) The air temperature must be 300-325 degrees F (150-165 degrees C).

WARNING: STAY CLEAR OF THE ENGINE EXHAUST AREA. IF YOU BREATHE THE OIL MIST FROM THE ENGINE EXHAUST, INJURY CAN OCCUR.

(c) Open the oil supply valve when you see hot air move from the engine exhaust.

WARNING: DO NOT MANUALLY TURN THE FAN ROTOR WITHOUT GOOD GLOVES. MAKE SURE YOU ARE ON A SAFE SURFACE WHILE YOU TURN THE FAN. BE VERY CAREFUL WHILE YOU TURN THE FAN TO PREVENT INJURY.

(d) Use insulated gloves, STD-1085 to turn the fan rotor slowly in a counterclockwise direction.

NOTE: One full turn in the usual operational direction.

(e) Turn the N2 rotor slowly one full turn each minute.

(f) Move the fan rotor until the oil container is empty.

NOTE: This usually takes five to six minutes.

(g) Do these steps when the oil container is empty:
1) Close the oil supply valve.
2) Shut off the hot air source.

I. The Dry-Out and Lubrication Equipment Removal

SUBTASK 71-00-03-080-001-F00

(1) Do these steps to remove the Dry-Out and Lubrication Equipment (Figure 201, Figure 202).
(a) Remove the hot air source hose from the relubrication manifold and the air filter outlet.
(b) Remove the hose from the air filter inlet and the hot air source.
(c) Remove the oil supply line from the oil container.
(d) Remove the air pressure supply line from the oil container.
(e) Do these steps to remove the relubrication manifold and plate:
1) Remove the four knurled bolts
2) Remove the relubrication manifold.
3) Remove the forward sump pusher while you move the plate:
a) Push the pusher in and turn one quarter turn counterclockwise to release the locking keys.
4) Do these steps to remove the aft sump pusher and the TGB/AGB pusher.
a) Push each pusher in and turn one quarter turn counterclockwise to release the locking keys.
5) Install protective covers on the relubrication manifold openings.
(f) Examine the air filter for unwanted material.
(g) Clean the air filter if there is unwanted material on it.
(h) Install protective covers on the air filter openings.

SUBTASK 71-00-03-410-001-F00

(2) Do this task: Magnetic Chip Detector (MCD) Installation, TASK 79-21-05-400-804-F00.

SUBTASK 71-00-03-080-002-F00

(3) Remove the core engine sealing plate as follows:

(a) Remove the bolts [1].

(b) Remove the plate.

SUBTASK 71-00-03-410-002-F00

(4) Do this task: Handcranking Drive Cover Installation, TASK 72-63-01-400-801-F00.

J. Put the Engine Back to its Usual Condition

SUBTASK 71-00-03-840-001-F00

(1) Do these steps:

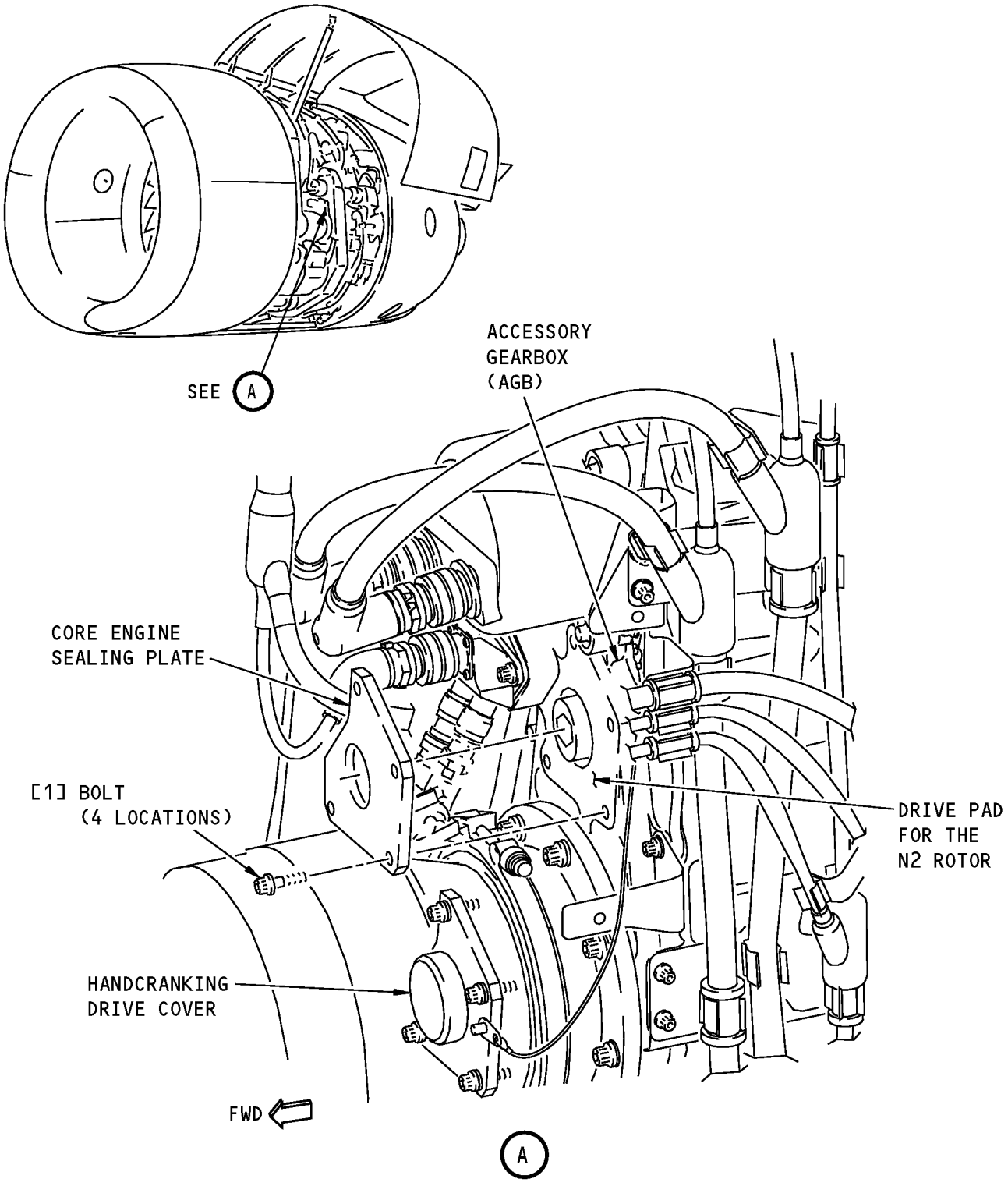
(a) Remove the protective mat, STD-585 from the inlet cowl.

(b) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

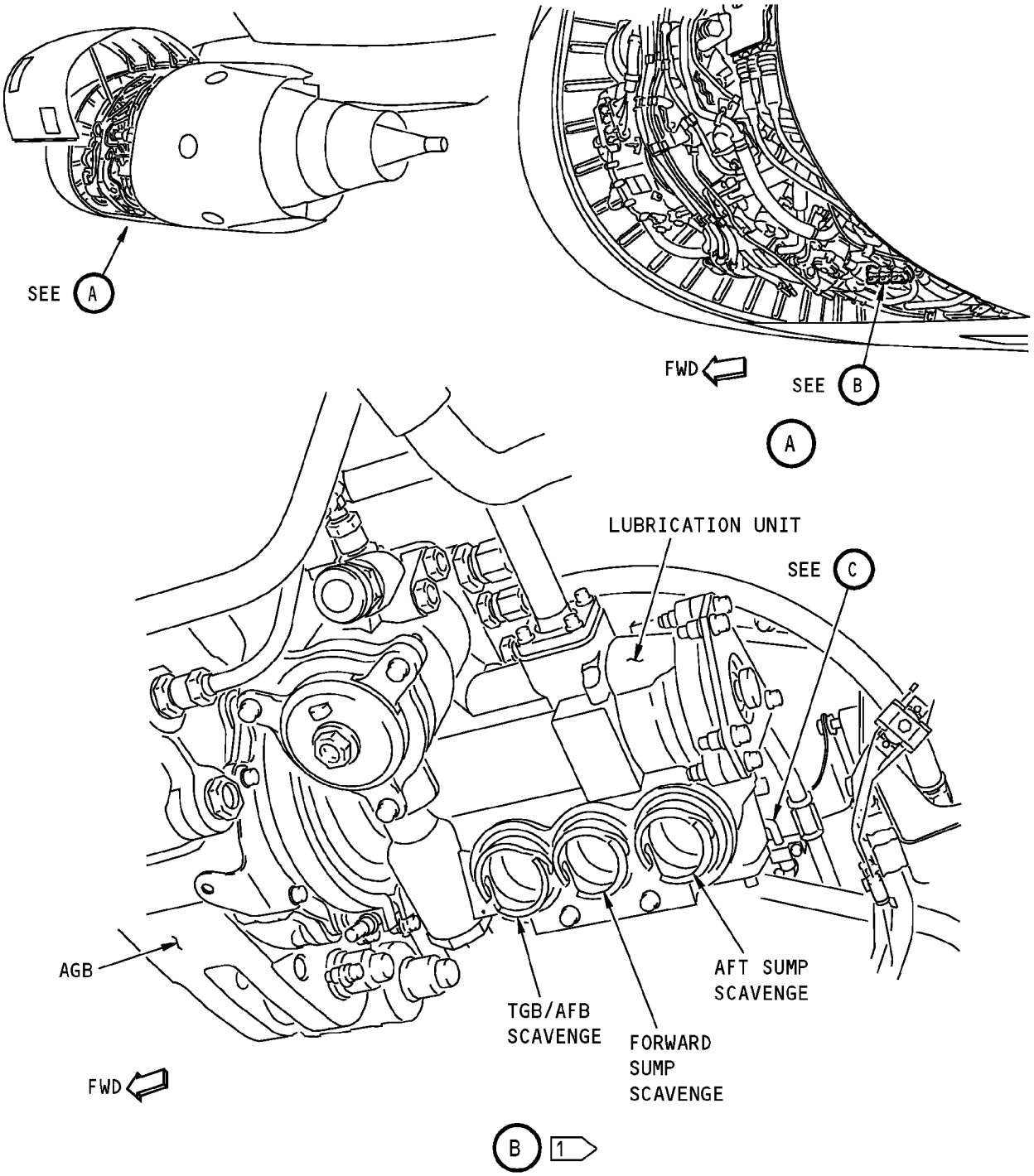
(c) Remove the DO-NOT-OPERATE tag on the applicable start switch.

(d) Remove the DO-NOT-OPERATE tag from the start lever.

—————— END OF TASK ——————

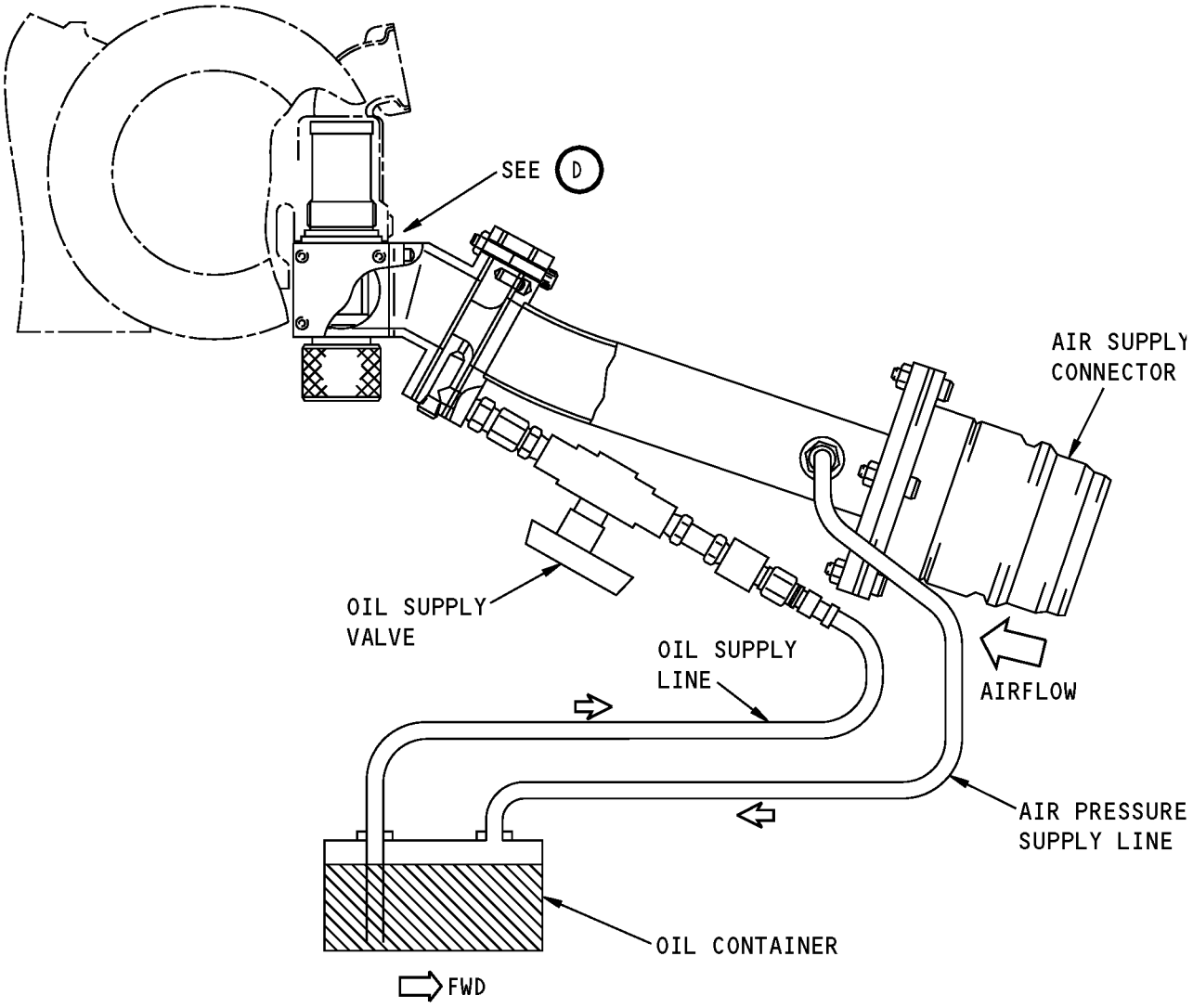


Core Engine Sealing Plate Installation
Figure 201/71-00-03-990-801-F00

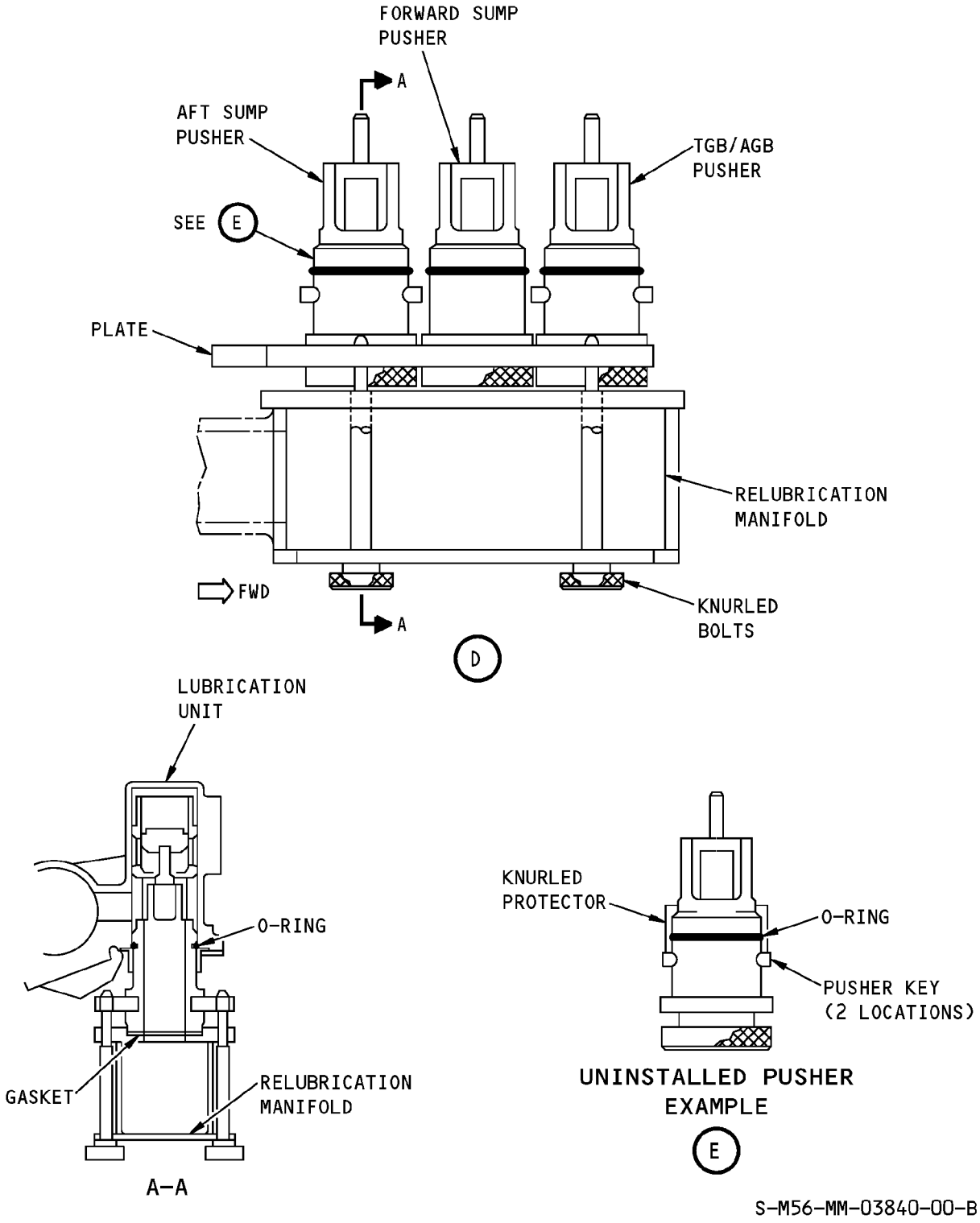


1 CHIP DETECTORS REMOVED

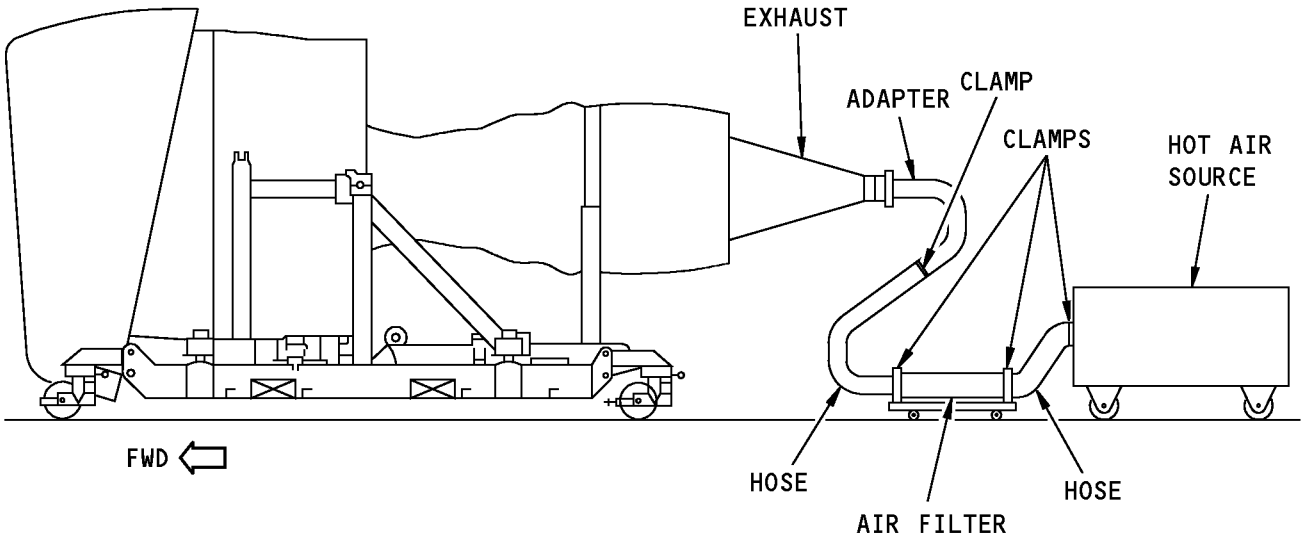
Engine Sumps Relubrication Manifold Tool Set
Figure 202 (Sheet 1 of 3)/71-00-03-990-802-F00



Engine Sumps Relubrication Manifold Tool Set
Figure 202 (Sheet 2 of 3)/71-00-03-990-802-F00



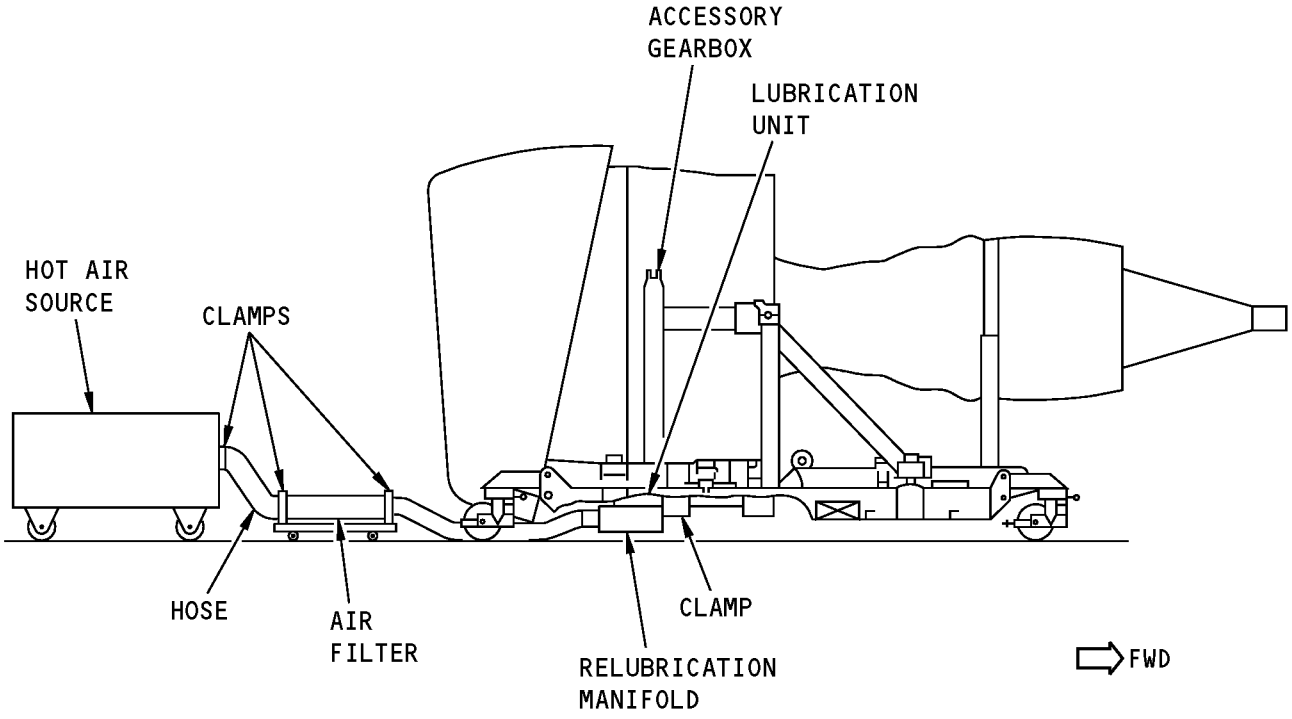
Engine Sumps Relubrication Manifold Tool Set
Figure 202 (Sheet 3 of 3)/71-00-03-990-802-F00



ENGINE OFF WING LAYOUT
(ENGINE ON WING LAYOUT IS EQUIVALENT)

S-M56-MM-03841-00
G83977 S0006581985_V2

Dry-Out Equipment General Layout
Figure 203/71-00-03-990-803-F00



ENGINE OFF WING LAYOUT
(ENGINE ON WING LAYOUT IS EQUIVALENT)

S-M56-MM-03843-00-B

Relubrication Equipment General Layout
Figure 204/71-00-03-990-804-F00

TASK 71-00-03-600-815-F00

3. Inlet Cowl Lipskin Protective Coating Procedure

(Figure 205)

A. General

(1) This task is to apply a protective coating on the inlet cowl lipskin to prevent corrosion.

(2) The task includes the procedure to remove the protective coating.

(3) This task should be done if the engine (on-wing) is preserved for more than 30 days.

(4) If the protective coating is applied, and it is necessary to operate the engine, the coating must be removed before engine operation.

B. Consumable Materials

Reference	Description	Specification
B00666	Solvent - Methyl Propyl Ketone	BMS 11-9
C50013	Coating - Protective, Strippable, Sprayable - Spraylat SC-1074B-1	
C50014	Topcoat - Protective, Water-Based Coating For SC-1074B-1 - Spraylat SC-1090	
G00834	Cloth - Lint-free Cotton	
G02356	Tape - Teflon - Rulon J	

C. Location Zones

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

D. Protective Coating Application

SUBTASK 71-00-03-100-001-F00

(1) Do these steps to clean the lipskin and get a water break free surface:

(a) Use a lint-free cloth, G00834 and solvent, B00666 to wipe the lipskin.

(b) Remove any dust, dirt, unwanted material, oil, grease or moisture.

SUBTASK 71-00-03-950-003-F00

(2) 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 inch (2.54 mm) of the lipskin to be unprotected.

(d) Apply Rulon J tape, G02356 to the three radial seams of the lipskin.

(e) Do not apply the protective coating to the acoustic barrel area.

SUBTASK 71-00-03-370-001-F00

(3) Do these steps to prepare the basecoat Spraylat SC-1074B-1 coating, C50013:

(a) Let the material get to 70-80 degrees F (21.1-26.7 degrees 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-F00

(4) Do these steps to apply the basecoat Spraylat SC-1074B-1 coating, C50013 to the lipskin:

(a) Apply a 4 mils (0.004 inch) 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 inch) thickness.

SUBTASK 71-00-03-370-003-F00

(5) Do these steps to prepare the Spraylat SC-1090 topcoat, C50014:

(a) Let the material get to 70-80 degrees F (21.1-26.7 degrees 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-F00

(6) Do these steps to apply the Spraylat SC-1090 topcoat, C50014 to the lipskin:

(a) Make sure the basecoat is dry (no gloss).

(b) The temperature at the time of application and drying should be a minimum of 40 degrees F (4.4 degrees 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 inches (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 inch) of dry film.

(e) The basecoat and topcoat will fully dry together to make a rain resistant coating with these conditions:

1) Two hours of drying time with conditions of 50% relative humidity and 70 degrees F (21.1 degrees C).

2) The lipskin can be dried outside if there is no direct rain and the temperature is about 50 degrees F (10 degrees C).

SUBTASK 71-00-03-950-004-F00

(7) Remove the masking material from the inner and outer barrels and the fan compartment.

E. Protective Coating Removal

SUBTASK 71-00-03-000-001-F00

(1) Do these steps to remove the protective coating from the lipskin:

(a) Use your hand to peel off the coating or use clean shop air.

1) Refer to the coating manufacturer's recommendations for more details.

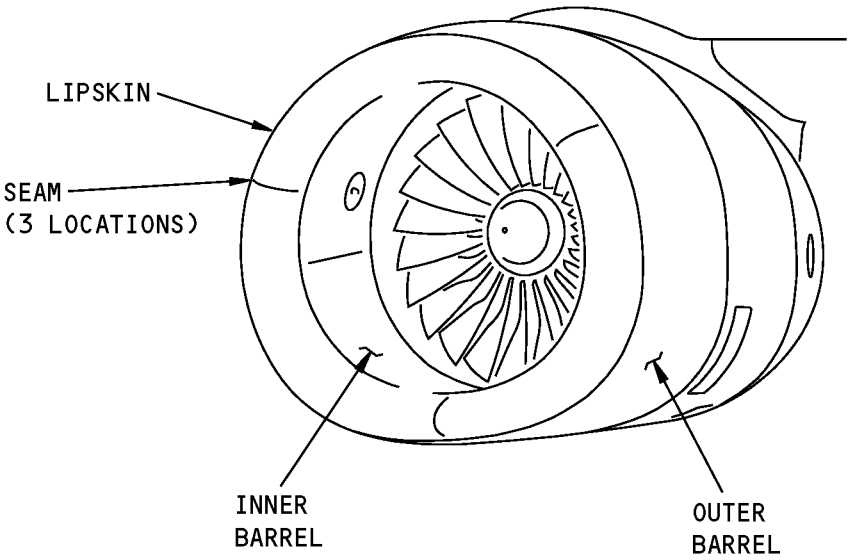
(b) Do not use hand tools harder than the aluminum lipskin to prevent damage.

CAUTION: SCRIBE MARKS OR CUTS WHICH GO INTO THE METAL SURFACE OF THE LIPSKIN CAN CAUSE DAMAGE TO THE LIPSKIN. THE DAMAGE CAUSES LOSS OF FATIGUE LIFE OF THE METAL.

(c) You can use a scribe to help you remove the peelable coating with these conditions:

1) The tool does not go completely through the coating.
2) The tool does not score or mar the lipskin.
3) Use a scribe which has an adjustable depth of cut on the coating.

———————— END OF TASK ————————



Inlet Cowl Lipskin Protective Coating
Figure 205/71-00-03-990-808-F00

TASK 71-00-03-600-802-F00

4. Preservation of An Engine On-Wing (Task Selection)

A. General

(1) The purpose of this task is to permit you to select the applicable method to do the engine preservation.

(2) This procedure is used for an engine that is installed on the airplane (on-wing).

B. Location Zones

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

C. Procedure

SUBTASK 71-00-03-620-002-F00

(1) From the time specification for the preservation tasks, select the applicable task to do the engine preservation:

(a) Do this task: Preservation of an Engine for Not More Than 10 Days (Engine On-Wing), TASK 71-00-03-600-804-F00.

(b) Do this task: Preservation of an Engine for Not More Than One Month (Engine On-Wing), TASK 71-00-03-600-806-F00.

(c) Do this task: Preservation of an Engine for Not More Than Three Months (Engine On-Wing), TASK 71-00-03-600-809-F00.

(d) Do this task: Preservation of an Engine From One Month to One Year (Engine On-Wing), TASK 71-00-03-600-811-F00.

———————— END OF TASK ————————

TASK 71-00-03-600-803-F00

5. Depreservation of an Engine On-Wing (Task Selection)

A. General

(1) The purpose of this task is to permit you to select the applicable method to do the engine depreservation.

(2) This procedure is used for an engine that is installed on the airplane (on-wing).

B. Location Zones

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

C. Procedure

SUBTASK 71-00-03-630-001-F00

(1) From the time specification for the depreservation tasks, select the applicable task to do the engine depreservation:

(a) Do this task: Depreservation of an Engine, which was Preserved for Not More Than One Month (Engine On-Wing), TASK 71-00-03-600-808-F00.

(b) Do this task: Depreservation of an Engine, which was Preserved for Not More Than Three Months (Engine On-Wing), TASK 71-00-03-600-816-F00.

(c) Do this task: Depreservation of an Engine, which was Preserved From One Month to Not More Than One Year (Engine On-Wing), TASK 71-00-03-600-813-F00.

END OF TASK

TASK 71-00-03-600-804-F00

6. Preservation of an Engine for Not More Than 10 Days (Engine On-Wing)

A. General

(1) This procedure is used for an engine that is installed on the airplane (on-wing).

(2) This task gives the instructions for a serviceable and a non-serviceable power plant.

B. References

Reference	Title
71-00-00-700-819-F00	Stop the Engine Procedure (Usual Engine Stop) (P/B 201)
71-00-00-800-807-F00	Start the Engine Procedure (Selection) (P/B 201)

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-1501	Kit - Engine Cover (Part #: BBJ-2001-JB-R, Supplier: $0797, A/P Effectivity: 737-600, -700, -800, -900, -BBJ)
COM-1516	Cover - Engine Inlet, CFM56-7 (Part #: WL14L96A, Supplier: 8M213, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER)
COM-1517	Cover - Engine Exhaust, CFM56-7 (Part #: WL15L96A, Supplier: 8M213, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER)

D. Location Zones

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

E. Power Plant Preservation (Serviceable)

SUBTASK 71-00-03-860-001-F00

(1) If the engine has not been started and operated at the idle-power speed for a minimum of 3 minutes during the last engine operation, do these steps:

(a) Do this task: Start the Engine Procedure (Selection), TASK 71-00-00-800-807-F00.

1) Let the engine become stable for 3 minutes at low idle.

(b) Do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00.

SUBTASK 71-00-03-480-004-F00

(2) Install the engine cover kit, COM-1501 (prefered) or inlet cover, COM-1516 (alternate) and the exhaust cover, COM-1517 (alternate) to prevent fan windmilling and to prevent foreign object damage (FOD).

F. Power Plant Preservation (Not Serviceable)

SUBTASK 71-00-03-620-003-F00

(1) If the engine had an in-flight shutdown, do this task: Dry-Out and Lubrication of the Engine, TASK 71-00-03-600-801-F00.

SUBTASK 71-00-03-480-005-F00

(2) Install the engine cover kit, COM-1501 (prefered) or inlet cover, COM-1516 (alternate) and the exhaust cover, COM-1517 (alternate) to prevent fan windmilling and to prevent foreign object damage (FOD).

SUBTASK 71-00-03-550-001-F00

(3) When this task is done, the engine is preserved for 10 days from the time of its last operation or from the completion of the engine dry-out procedure, as applicable.

———————— END OF TASK ————————

TASK 71-00-03-600-805-F00

7. Preservation Renewal of an Engine for Not More Than 10 Days (Engine On-Wing)

A. General

(1) This procedure is used for an engine that is installed on the airplane (on-wing).

(2) This task gives the instructions for a serviceable and a non-serviceable power plant.

B. Location Zones

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

C. Serviceable Engine

SUBTASK 71-00-03-620-004-F00

(1) Do this task: Preservation of an Engine for Not More Than 10 Days (Engine On-Wing), TASK 71-00-03-600-804-F00.

(a) There is no limit on the number of times you can do this procedure.

D. Not Serviceable Power Plant

SUBTASK 71-00-03-620-005-F00

(1) You must do one of these procedures:

(a) The preservation procedure of a non-serviceable power plant for not more than 1 month (TASK 71-00-03-600-806-F00).

NOTE: This will permit a preservation for not more than 30 days maximum from the time of the last engine operation or from the time the engine dry-out procedure was done.

(b) The preservation procedure from one month to not more than one year for a non-serviceable power plant (TASK 71-00-03-600-811-F00) if you will do the preservation renewal procedure.

———————— END OF TASK ————————

TASK 71-00-03-600-806-F00

8. Preservation of an Engine for Not More Than One Month (Engine On-Wing)

A. General

(1) This procedure is used for an engine that is installed on the airplane (on-wing).

(2) This task gives the instructions for a serviceable and a non-serviceable power plant.

B. References

Reference	Title
71-00-00-700-819-F00	Stop the Engine Procedure (Usual Engine Stop) (P/B 201)
71-00-00-800-807-F00	Start the Engine Procedure (Selection) (P/B 201)
75-32-00-730-801-F00	VBV Actuation System - Manual Operation (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-1501	Kit - Engine Cover (Part #: BBJ-2001-JB-R, Supplier: $0797, A/P Effectivity: 737-600, -700, -800, -900, -BBJ)
COM-1516	Cover - Engine Inlet, CFM56-7 (Part #: WL14L96A, Supplier: 8M213, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER)
COM-1517	Cover - Engine Exhaust, CFM56-7 (Part #: WL15L96A, Supplier: 8M213, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER)

D. Consumable Materials

Reference	Description	Specification
G02304	Tape - Moisture Barrier	BMS8-346
G02455 [CP2160]	Film, Vapor Barrier, Polyethylene	L-P-512
G02456 [CP2098]	Dessicant - Activated, Bagged, Packaging Use And Static Dehumidification	MIL-D-3464

E. Location Zones

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

F. Power Plant Preservation (Serviceable).

SUBTASK 71-00-03-860-002-F00

(1) If the engine was not started and operated at idle power for a minimum of 3 minutes during the last engine operation, do these steps:

NOTE: Under these conditions, consider the engine to be preserved for 30 days from the time of the last engine operation.

(a) Do this task: Start the Engine Procedure (Selection), TASK 71-00-00-800-807-F00.

1) Let the engine become stable for 15-20 minutes at idle.

(b) Do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00.

SUBTASK 71-00-03-480-006-F00

(2) Install the kit, COM-1501 (prefered) or inlet cover, COM-1516 (alternate) and the exhaust cover, COM-1517 (alternate) to prevent fan windmilling and to prevent foreign object damage (FOD).

(a) Before you install the front cover, make sure the outer edge of the front cover and the inlet are dry.

SUBTASK 71-00-03-210-001-F00

(3) To prevent corrosion from moisture buildup at the inlet, make sure the front cover and the inlet are dry.

(a) If it is necessary, wipe the cover and the inlet dry.

(b) Do this check after the first seven days.

(c) Do the check again every three days thereafter.

G. Power Plant Preservation (Not Serviceable).

SUBTASK 71-00-03-620-006-F00

(1) If the engine had an in-flight shutdown, do this task: Dry-Out and Lubrication of the Engine, TASK 71-00-03-600-801-F00.

SUBTASK 71-00-03-980-001-F00

(2) If not already done, do this task: VBV Actuation System - Manual Operation, TASK 75-32-00-730-801-F00

to close the doors.

SUBTASK 71-00-03-950-001-F00

(3) Install the film, G02455 [CP2160] on the VBV bleed grills.

SUBTASK 71-00-03-910-001-F00

(4) If you remove engine components, make sure you install protective covers on all accessory units that you remove.

SUBTASK 71-00-03-910-002-F00

(5) Install protective covers on all disconnect lines and electrical connections.

SUBTASK 71-00-03-480-024-F00

(6) Seal the inlet and exhaust openings with the film, G02455 [CP2160].

(a) Attach the film, G02455 [CP2160] with moisture barrier tape, G02304.

(b) To cover the inlet opening, apply the tape at the inner barrel ring (Figure 205).

(c) Do not apply tape to or on the inlet cowl lipskin.

SUBTASK 71-00-03-480-007-F00

(7) Put the dessicant, G02456 [CP2098] on each side of the engine, but do not touch the engine hardware.

SUBTASK 71-00-03-480-008-F00

(8) Install a water proof cover on the engine and attach it tightly.

SUBTASK 71-00-03-550-002-F00

(9) When this task is done, the engine is preserved for 30 days from the time of its last operation or from the completion of the engine dry-out procedure, as applicable.

END OF TASK

TASK 71-00-03-600-807-F00

9. Preservation Renewal of an Engine for Not More Than One Month (Engine On-Wing)

A. General

(1) This procedure is used for an engine that is installed on the airplane (on-wing).

(2) This task gives the instructions for a serviceable and a non-serviceable power plant.

B. Location Zones

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

C. Serviceable Power Plant

SUBTASK 71-00-03-630-002-F00

(1) You can use this procedure a maximum of two times (for a total of 60 days).

(a) To preserve the engine for more than 30 days, you can do this task again, or;

(b) If the power plant will be kept for more than the subsequent 30 days, you must do one of the procedures that follow:

1) Do this task: Preservation of an Engine for Not More Than Three Months (Engine On-Wing) (Serviceable Engine) (TASK 71-00-03-600-809-F00).

2) Do this task: Preservation of an Engine from One Month to One Year (Engine On-Wing) (Serviceable Engine) (TASK 71-00-03-600-811-F00).

D. Not Serviceable Power Plant

SUBTASK 71-00-03-620-007-F00

(1) A preservation renewal procedure is not permitted.

SUBTASK 71-00-03-620-008-F00

(2) Do this task: Preservation of an Engine from One Month to One Year (Engine On-Wing) (Not Serviceable Engine) (TASK 71-00-03-600-811-F00).

——————— END OF TASK ———————

TASK 71-00-03-600-808-F00

10. Depreservation of an Engine, which was Preserved for Not More Than One Month (Engine On-Wing)

A. General

(1) This procedure is used for an engine that is installed on the airplane (on-wing).

(2) This task gives the instructions for a serviceable or a non-serviceable power plant.

B. Consumable Materials

Reference	Description	Specification
G02304	Tape - Moisture Barrier	BMS8-346
G02455 [CP2160]	Film, Vapor Barrier, Polyethylene	L-P-512
G02456 [CP2098]	Dessicant - Activated, Bagged, Packaging Use And Static Dehumidification	MIL-D-3464

C. Location Zones

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

D. Power Plant Depreservation

SUBTASK 71-00-03-630-003-F00

(1) Remove the waterproof cover or engine bag (as applicable), film, G02455 [CP2160] and dessicant, G02456 [CP2098].

SUBTASK 71-00-03-630-004-F00

(2) Make sure that all of the moisture barrier tape, G02304 is removed from the inlet and exhaust areas and that there is no unwanted material.

END OF TASK

TASK 71-00-03-600-809-F00

11. Preservation of an Engine for Not More Than Three Months (Engine On-Wing)

A. General

(1) This procedure is used for an engine that is installed on the airplane (on-wing).

(2) This task gives the instructions for a serviceable power plant.

B. References

Reference	Title
12-13-11-600-801	Replenish the Engine Oil (P/B 301)
12-13-11-600-803	Drain the Engine Oil (P/B 301)
71-00-00-700-819-F00	Stop the Engine Procedure (Usual Engine Stop) (P/B 201)
71-00-00-800-807-F00	Start the Engine Procedure (Selection) (P/B 201)

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-1501	Kit - Engine Cover (Part #: BBJ-2001-JB-R, Supplier: $0797, A/P Effectivity: 737-600, -700, -800, -900, -BBJ)
COM-1516	Cover - Engine Inlet, CFM56-7 (Part #: WL14L96A, Supplier: 8M213, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER)
COM-1517	Cover - Engine Exhaust, CFM56-7 (Part #: WL15L96A, Supplier: 8M213, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER)

D. Consumable Materials

Reference	Description	Specification
D00599 [CP2442]	Oil - Engine (CFMI SB 79-001)	
D00662 [CP5075]	Additive, Corrosion Preventive	
D00664 [CP5067]	Oil - Corrosion Preventive, Lubricative System	MIL-PRF-6085

E. Location Zones

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

F. Power Plant Preservation

SUBTASK 71-00-03-680-001-F00

(1) If you did not do this task, , do this task: Drain the Engine Oil, TASK 12-13-11-600-803.

SUBTASK 71-00-03-620-009-F00

(2) To fill the oil tank with preservation oil, do this task: Replenish the Engine Oil, TASK 12-13-11-600-801

Fill the oil tank with 20 quarts (19 liters) of one of the preservation oils given below:

NOTE: This step may be done just before the last ground run/flight.

(a) Engine oil oil, D00599 [CP2442]and at least 5 percent by volume of oil, D00664 [CP5067] or;

(b) Engine oil oil, D00599 [CP2442] and at least 7 percent by volume of additive, D00662 [CP5075] (CP2859).

SUBTASK 71-00-03-860-003-F00

(3) If the engine is not scheduled to operate for a flight:

(a) Do this task: Start the Engine Procedure (Selection), TASK 71-00-00-800-807-F00.

(b) Let the engine become stable for 15-20 minutes at the idle.

SUBTASK 71-00-03-860-004-F00

(4) Do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00.

SUBTASK 71-00-03-620-020-F00

(5) After the last flight or the ground run, do the step that follows:

(a) To prevent corrosion of the inlet cowl lipskin, apply the protective coating. To apply the coating, do this task: Inlet Cowl Lipskin Protective Coating Procedure, TASK 71-00-03-600-815-F00.

SUBTASK 71-00-03-480-009-F00

(6) Install the engine cover kit, COM-1501 (prefered) or inlet cover, COM-1516 (alternate) and the exhaust cover, COM-1517 (alternate) to prevent fan windmilling and to prevent foreign object damage (FOD).

SUBTASK 71-00-03-970-003-F00

(7) Attach a tag to the power plant that shows that the oil system preservation was done with preservation oil.

(a) Include the date of the preservation procedure.

———————— END OF TASK ————————

TASK 71-00-03-600-810-F00

12. Preservation Renewal of an Engine for Not More Than Three Months (Engine On-Wing)

A. Location Zones

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

B. Preservation Renewal

SUBTASK 71-00-03-620-010-F00

(1) A preservation renewal procedure is not permitted.

SUBTASK 71-00-03-620-011-F00

(2) If the power plant will be kept preserved for longer than 3 months, do this task: Preservation of an Engine From One Month to One Year (Engine On-Wing), TASK 71-00-03-600-811-F00.

——————— END OF TASK ———————

TASK 71-00-03-600-816-F00

13. Depreservation of an Engine, which was Preserved for Not More Than Three Months (Engine On-Wing)

A. General

(1) This procedure gives instructions for the depreservation of an installed power plant that is serviceable.

B. References

Reference	Title
12-13-11-600-801	Replenish the Engine Oil (P/B 301)
71-00-00-700-801-F00	Test 3A - Idle-Power Leak Check (P/B 501)
71-00-00-700-822-F00	Wet Motor the Engine (P/B 201)

C. Consumable Materials

Reference	Description	Specification
G02304	Tape - Moisture Barrier	BMS8-346
G02455 [CP2160]	Film, Vapor Barrier, Polyethylene	L-P-512
G02456 [CP2098]	Dessicant - Activated, Bagged, Packaging Use And Static Dehumidification	MIL-D-3464

D. Location Zones

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

E. Power Plant Depreservation

SUBTASK 71-00-03-080-004-F00

(1) Remove the waterproof cover, film, G02455 [CP2160] and dessicant, G02456 [CP2098].

(a) Make sure you remove all of the moisture barrier tape, G02304 from the inlet and exhaust areas and that there is no unwanted material.

SUBTASK 71-00-03-630-006-F00

(2) Remove the protective coating from the inlet cowl lipskin. To remove the coating, do this task: Inlet Cowl Lipskin Protective Coating Procedure, TASK 71-00-03-600-815-F00.

NOTE: Make sure to remove the protective coating on the inlet cowl lipskin. Engine operation will melt the protective coating and then the melted coating could enter the engine.

SUBTASK 71-00-03-610-004-F00

(3) Do a check of the oil tank level. If necessary, to fill the tank, do this task: Replenish the Engine Oil, TASK 12-13-11-600-801.

SUBTASK 71-00-03-790-003-F00

(4) Do this task: Wet Motor the Engine, TASK 71-00-00-700-822-F00.

SUBTASK 71-00-03-790-004-F00

(5) Do this task: Test 3A - Idle-Power Leak Check, TASK 71-00-00-700-801-F00.

(a) Operate the engine at idle for ten minutes before you stop the engine.

——————— END OF TASK ———————

TASK 71-00-03-600-811-F00

14. Preservation of an Engine From One Month to One Year (Engine On-Wing)

(Figure 206, Figure 207)

A. General

(1) This procedure is used for an engine that is installed on the airplane (on-wing).

(2) This task gives the instructions for a serviceable or a non-serviceable power plant.

B. References

Reference	Title
12-13-11-600-801	Replenish the Engine Oil (P/B 301)
12-13-11-600-803	Drain the Engine Oil (P/B 301)
24-22-00-860-811	Supply Electrical Power (P/B 201)
24-22-00-860-812	Remove Electrical Power (P/B 201)
70-30-01-910-802-F00	Seals (Preformed Packings and O-Rings) and Gaskets (P/B 201)
71-00-00-700-819-F00	Stop the Engine Procedure (Usual Engine Stop) (P/B 201)
71-00-00-700-821-F00	Dry Motor the Engine (P/B 201)
71-00-00-700-822-F00	Wet Motor the Engine (P/B 201)
71-00-00-800-807-F00	Start the Engine Procedure (Selection) (P/B 201)
72-00-00-980-801-F00	Turn the N2 Rotor (P/B 201)
73-11-02-000-801-F00	Fuel Filter Removal (P/B 401)
73-11-02-400-801-F00	Fuel Filter Installation (P/B 401)
75-32-00-730-801-F00	VBV Actuation System - Manual Operation (P/B 201)
79-21-04-000-801-F00	Scavenge Oil Filter Assembly Removal (P/B 401)
79-21-04-400-801-F00	Scavenge Oil Filter Assembly Installation (P/B 401)

C. Tools/Equipment

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

Reference	Description
COM-1537	Cart - Servicing, Engine Oil (Part #: PF53361-2PWS, Supplier: 94861, A/P Effectivity: 737-ALL) (Part #: PF53361-8PWS, Supplier: 94861, A/P Effectivity: 737-ALL) (Part #: PF53481-8PWS, Supplier: 94861, A/P Effectivity: 737-ALL) (Part #: PF55451-2WS, Supplier: 94861, A/P Effectivity: 737-ALL) (Part #: PF55451-7WS, Supplier: 94861, A/P Effectivity: 737-ALL)
SPL-2178	Unit - Engine, Preservation/False Metering Valve Signal (Part #: 856A1480G01, Supplier: 58828, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
STD-1054	Container - Fuel Resistant, 5 Gallon (19 Liters)
STD-1055	Container - Oil Resistant, 5 Gallon (19 Liters)

(Continued)

Reference	Description
STD-3938	Container - Oil Resistant, 10 gallon (38 l)

D. Consumable Materials

Reference	Description	Specification
D00599 [CP2442]	Oil - Engine (CFMI SB 79-001)	
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518
D00623 [CP5066]	Oil - Fuel System, Corrosion Preventive	MIL-PRF-6081, Grade 1010
D00662 [CP5075]	Additive, Corrosion Preventive	
D00664 [CP5067]	Oil - Corrosion Preventive, Lubricative System	MIL-PRF-6085
D00672 [CP5070]	Grease - Petrolatum	VV-P-236
G02304	Tape - Moisture Barrier	BMS8-346
G02345 [CP8001]	Lockwire - Inconel (0.032 inch Dia.)	NASM20995~ N32
G02455 [CP2160]	Film, Vapor Barrier, Polyethylene	L-P-512
G02456 [CP2098]	Dessicant - Activated, Bagged, Packaging Use And Static Dehumidification	MIL-D-3464
G50065 [CP8006]	Cable, Safety, Stainless Steel, 0.8mm (0.032inch) Diameter	

E. Location Zones

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

F. Power Plant Preservation (Serviceable)

SUBTASK 71-00-03-910-003-F00

(1) Obey these WARNING and CAUTIONS when you do this procedure:

CAUTION: DO NOT APPLY A SPRAY OF PRESERVATIVE OIL OR AN EQUIVALENT OIL INTO THE ENGINE INLET, CORE COMPRESSOR OR TURBINE, OR ENGINE EXHAUST.

CAUTION: DIRT PARTICLES THAT ATTACH TO THE WET BLADES AND VANES CAN DECREASE ENGINE PERFORMANCE DURING THE SUBSEQUENT ENGINE OPERATION.

CAUTION: DO NOT USE SILICONE BASE OILS IN THE FUEL SYSTEM. SILICONE BASE OILS CAN CAUSE DAMAGE TO THE FUEL SYSTEM.

(a) Do not apply a spray of preservation oil into the inlet, compressor, turbine, or exhaust.

SUBTASK 71-00-03-680-002-F00

(2) If not already done, do this task: Drain the Engine Oil, TASK 12-13-11-600-803.

SUBTASK 71-00-03-620-012-F00

(3) To fill the oil tank with preservation oil, do this task: Replenish the Engine Oil, TASK 12-13-11-600-801

Fill the oil tank with 20 quarts (19 liters) of one of the preservation oils given below:

(a) oil, D00599 [CP2442] and at least 5 percent by volume of oil, D00664 [CP5067] (CP2851), or;

(b) oil, D00599 [CP2442] and at least 7 percent by volume of additive, D00662 [CP5075] (CP2859).

SUBTASK 71-00-03-860-005-F00

(4) Do this task: Start the Engine Procedure (Selection), TASK 71-00-00-800-807-F00.

(a) Let the engine become stable for 15-20 minutes at the idle.

SUBTASK 71-00-03-860-006-F00

(5) Do this task: Stop the Engine Procedure (Usual Engine Stop), TASK 71-00-00-700-819-F00.

SUBTASK 71-00-03-480-010-F00

(6) If you remove an engine component, make sure you install protective covers and gaskets on all openings.

SUBTASK 71-00-03-620-013-F00

(7) Do these steps to do the engine fuel system preservation:

(a) If not already done, do this task: Supply Electrical Power, TASK 24-22-00-860-811.

(b) Make sure the applicable start lever is in the CUTOFF position.

1) Install a DO-NOT-OPERATE tag on the applicable engine start lever.

(c) Make sure the SPAR VALVE CLOSED light on the overhead panel, (P5), is dim.

NOTE: The light for the engine spar valve has three positions: 1) bright when the valve is in transition or when it does not agree with the commanded position; or 2) dim when the valve is closed; or 3) off when the valve is opened.

(d) Do these steps to drain the fuel supply line (Figure 206):

1) Put a 5 gallon (19 liters) fuel resistant container, STD-1054 below the fuel filter drain plug [22].

2) Remove the drain plug [22] and let the fuel drain.

NOTE: The drain plug has a 13/16-inch fitting.

3) Remove and discard the O-ring [21] from the drain plug [22].

4) Lubricate a new O-ring [21] with grease, D00672 [CP5070] and install it on the drain plug [22].

5) Lubricate the threads of the drain plug [22] with grease, D00601 [CP2101].

6) Install the drain plug [22].

a) Tighten the drain plug [22] to 45-55 pound-inches (5.0-6.2 Newton meters).

7) Attach lockwire, G02345 [CP8001] or cable, G50065 [CP8006] to the drain plug [22].

(e) Disconnect the fuel inlet line at the engine fuel tube (Figure 207).

1) Remove the bolts [31] that attach the fuel inlet line to the engine fuel tube.

2) Remove the gasket [32] from the fuel inlet line.

a) Keep the gasket [32] for the later installation.

3) Install a protective cover on the fuel inlet line.

(f) Connect a temporary line from the engine oil servicing cart, COM-1537 to the engine fuel tube to supply oil, D00623 [CP5066] at 50 psi (345 kPa) maximum pressure.

1) If a pressurized oil cart is not available, a 42 quart (40 liter) gravity flow container is permitted if the container is 1.0 ft (305 mm) above the fuel pump.

CAUTION: USE 2 WRENCHES TO REMOVE OR INSTALL THE TUBE COUPLING NUTS. ONE WRENCH TO HOLD THE UNION AND ONE TO LOOSEN OR TIGHTEN COUPLING NUT. THIS WILL PREVENT DAMAGE TO THE HARDWARE.

(g) Disconnect the line from the PCR port on the hydro-mechanical unit (HMU).

(h) Install a temporary hose drain line 118 inches (3 meters) long from the PCR port on the HMU and put the other end of the hose in a 10 gallon (38 l) oil resistant container, STD-3938. Attach the end of the hose to the container to prevent fluid leakage.

(i) Do this task: Dry Motor the Engine, TASK 71-00-00-700-821-F00.

1) Make sure you dry motor the engine for 2 minutes.

(j) After the engine stops, remove the temporary drain line from the PCR port on the HMU.

(k) Do these steps to tighten the coupling nut:

1) Install the PCR line to the PCR port.

CAUTION: USE 2 WRENCHES TO TIGHTEN THE TUBE COUPLING NUTS. ONE WRENCH TO HOLD THE UNION AND ONE TO TIGHTEN THE COUPLING NUT. DAMAGE TO EQUIPMENT CAN OCCUR.

2) Tighten the coupling nut to 270-300 pound-inches (30-35 Newton meters).

(l) Do these steps to let the preservation fluid flow in the engine:

1) Make sure to do this check of the circuit breakers before you do the wet motor procedure to prevent fuel leakage.

2) 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

3) Do this task: Wet Motor the Engine, TASK 71-00-00-700-822-F00.

4) Wet motor the engine for 5 seconds or until you see a spray of the preservation fluid out the engine exhaust nozzle.

5) Move the engine start lever to the CUTOFF position and continue to motor for two minutes.

6) Put the applicable engine start switch to the CONT position.

NOTE: When you stop the engine with the ENGINE START switch in the CONT position, the EEC will command the VSV's to the full open position and the VBV's to the full close position.

7) Let the engine stop completely.

8) Put the applicable engine start switch to the OFF position.

9) Remove the safety tags and close these circuit breakers:

F/O Electrical System Panel, P6-3

Row	Col	Number	Name
B	3	C00360	FUEL SPAR VALVE ENG 2
B	4	C00359	FUEL SPAR VALVE ENG 1

(m) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.

(n) Remove the temporary oil supply line from the engine fuel tube.

(o) Do this step to make sure that the gasket [32] is clean and serviceable:

1) Do this task: Seals (Preformed Packings and O-Rings) and Gaskets, TASK 70-30-01-910-802-F00.

(p) Install the four bolts [31] to attach the fuel inlet line to the engine fuel tube.

(q) Tighten the bolts [31] to 55-60 pound-inches (6.2-6.8 Newton meters).

SUBTASK 71-00-03-980-002-F00

(8) If the VBV doors are open, do this task: VBV Actuation System - Manual Operation, TASK 75-32-00-730-801-F00

to close them.

SUBTASK 71-00-03-480-011-F00

(9) Put the film, G02455 [CP2160] on the VBV bleed grills..

SUBTASK 71-00-03-480-012-F00

(10) Install protective covers on all disconnect lines and electrical connections.

SUBTASK 71-00-03-620-021-F00

(11) To prevent corrosion of the inlet cowl lipskin, apply the protective coating. To apply the coating, do this task: Inlet Cowl Lipskin Protective Coating Procedure, TASK 71-00-03-600-815-F00.

SUBTASK 71-00-03-480-013-F00

(12) Seal the inlet and exhaust openings with the film, G02455 [CP2160].

(a) Attach the film, G02455 [CP2160] with moisture barrier tape, G02304.

(b) To cover the inlet opening, apply the tape at the inner barrel ring (Figure 205).

(c) Do not apply tape to or on the inlet cowl lipskin.

SUBTASK 71-00-03-480-015-F00

(13) Put the dessicant, G02456 [CP2098] on each side of the engine, but do not let it touch the engine hardware.

NOTE: The dessicant must be replaced at regular intervals based on the weather conditions. Install the dessicant such that it gives sufficient protection to the engine and also permit access for replacement without damage to the engine protective cover.

SUBTASK 71-00-03-480-016-F00

(14) Install a waterproof cover on the full power plant.

(a) Tightly attach the waterproof cover to the engine.

SUBTASK 71-00-03-970-001-F00

(15) Attach a tag to the power plant that shows that the fuel system and oil system preservation was done with preservation oil.

(a) Include the date of the preservation procedure.

G. Power Plant Preservation (Not Serviceable)

NOTE: If you can motor the engine, do this task: Preservation of an Engine From Three Months to One Year (Engine On-Wing) (Serviceable).

SUBTASK 71-00-03-620-014-F00

(1) Do these steps to prepare for the procedure:

(a) If not already done, do this task: Supply Electrical Power, TASK 24-22-00-860-811.

(b) Make sure the applicable start lever is in the CUTOFF position.

1) Install a DO-NOT-OPERATE tag on the applicable engine start lever.

(c) Make sure the SPAR VALVE CLOSED light on the overhead panel, (P5), is dim.

NOTE: The light for the engine spar valve has three positions: 1) bright when the valve is in transition or when it does not agree with the commanded position; or 2) dim when the valve is closed; or 3) off when the valve is opened.

(d) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.

SUBTASK 71-00-03-680-004-F00

(2) Do these steps to drain the fuel system (Figure 206):

(a) Put a 5 gallon (19 liters) fuel resistant container, STD-1054 below the fuel pump.

(b) Disconnect the filter upstream pressure sensing tube from the fuel filter housing.

NOTE: The filter upstream pressure sensing tube is the lower sensing tube. The other end of this tube is connected to the fuel filter differential pressure switch.

1) Let the fuel drain into the container.

(c) Remove the drain plug [22] and let the fuel drain.

NOTE: The drain plug has a 13/16-inch fitting.

(d) Remove and discard the O-ring [21] from the drain plug [22].

(e) Lubricate a new O-ring [21] with grease, D00672 [CP5070] and install it on the drain plug [22].

(f) Lubricate the threads of the drain plug [22] with grease, D00601 [CP2101].

(g) Install the drain plug [22].

1) Tighten the drain plug [22] to 45-55 pound-inches (5.0-6.2 Newton meters).

(h) Attach lockwire, G02345 [CP8001] or cable, G50065 [CP8006] to the drain plug [22].

SUBTASK 71-00-03-010-001-F00

(3) Disconnect the fuel inlet line at the engine fuel tube (Figure 207).

(a) Remove the bolts [31] that attach the fuel inlet line to the engine fuel tube.

(b) Remove the gasket [32] from the fuel inlet line.

1) Keep the gasket [32] for the subsequent installation.

2) Install a protective cover on the engine fuel tube.

SUBTASK 71-00-03-010-002-F00

(4) Do these steps to drain the lube flow screen assembly (Figure 206):

(a) Remove the lube flow screen assembly [23] from the fuel pump, and drain the fuel into a 5 gallon (19 liters) fuel resistant container, STD-1054.

(b) Remove and discard the preformed packings [24,25] from the screen assembly.

(c) Lightly lubricate the new packings [24,25] with oil, D00599 [CP2442]

(d) Install the new packings on the lube flow screen assembly.

SUBTASK 71-00-03-010-003-F00

(5) Remove the fuel filter. To remove it, do this task: Fuel Filter Removal, TASK 73-11-02-000-801-F00

SUBTASK 71-00-03-620-019-F00

(6) Do these steps to pump preservation oil into the lube flow screen port on the fuel pump.

CAUTION: DO NOT USE SILICON BASED OIL IN THE FUEL SYSTEM. IF YOU USE SILICON BASED OILS YOU CAN CAUSE DAMAGE TO THE ENGINE.

(a) Connect a temporary line from the engine oil servicing cart, COM-1537 to the lube flow screen port to supply oil, D00623 [CP5066] at 50 psi (345 kPa) maximum pressure.

1) Make sure that the oil cart has a 10 micron filter.

2) Tighten the connector to 45-55 pound-inches (5.0-6.2 Newton meters).

(b) Pump filtered oil into the lube flow screen port until oil flows from the filter upstream pressure sensing port and the fuel filter housing.

1) Continue to pump oil into the port until no fuel is mixed with the oil.

(c) Connect the filter upstream pressure sensing tube to the fuel filter housing.

1) Tighten the connector to 45-55 pound-inches (5.0-6.2 Newton meters).

(d) Install a new fuel filter. To install it, do this task: Fuel Filter Installation, TASK 73-11-02-400-801-F00

(e) Remove the PHP port plug [26] from the fuel pump.

(f) Pump filtered oil into the lube flow screen port until oil flows from the PHP port.

1) Continue to pump oil into the port until no fuel is mixed with the oil.

(g) Disconnect the oil cart from the lube flow screen port.

(h) Install the lube flow screen assembly [23] with the new packings [24 and 25] in the fuel pump.

1) Tighten the lube flow screen assembly to 90-110 inch-pounds (10.2-12.4 newton-meters).

2) Install lockwire, G02345 [CP8001] or cable, G50065 [CP8006] to the lube flow screen assembly.

SUBTASK 71-00-03-620-022-F00

(7) Do these steps to pump preservation oil into the PHP port on the fuel pump.

(a) Connect a temporary line from the engine oil servicing cart, COM-1537 to the PHP port to supply oil, D00623 [CP5066] at 50 psi (345 kPa) maximum pressure.

1) Tighten the connector to 45-55 inch-pounds (5.0-6.2 newton-meters).

CAUTION: USE TWO WRENCHES TO DISCONNECT THE COUPLING NUT. ONE WRENCH TO HOLD THE UNION AND ONE TO LOOSEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, YOU CAN CAUSE DAMAGE TO THE EQUIPMENT.

(b) Disconnect the hose from the PCR port on the HMU.

1) Install a temporary drain line to the PCR port to direct unwanted fluid in to the container.

(c) Disconnect the J6 electrical connector from the receptacle identified CH B on the HMU. If it is necessary, use soft nose pliers.

1) Connect the unit, SPL-2178 to the HMU receptacle identified as CH B.

NOTE: The Engine Preservation/False Metering Valve Signal Unit will cause the Fuel Metering Valve (FMV) open to let preservation oil flow to the fuel nozzles.

(d) Pump filtered oil into the PHP port until oil flows from the PCR port.

1) Continue to pump oil into the port until no fuel is mixed with the oil.

(e) Remove the unit, SPL-2178 from the HMU receptacle.

1) Connect the J6 electrical connector to the receptacle identified CH B on the HMU.

(f) Remove the temporary drain line to the PCR port.

(g) Connect the PCR hose to the PCR port on the HMU.

CAUTION: USE TWO WRENCHES TO TIGHTEN THE COUPLING NUT. ONE WRENCH TO HOLD THE UNION AND ONE TO TIGHTEN THE COUPLING NUT. IF YOU DO NOT USE TWO WRENCHES, YOU CAN CAUSE DAMAGE TO THE EQUIPMENT.

1) Tighten the PCR hose coupling to 180-200 pound-inches (20.3-22.6 Newton meters).

(h) Disconnect the hose from the LPTCC port on the HMU.

1) Install a temporary drain line to the LPTCC port to direct unwanted fluid into the container.

(i) Pump filtered oil into the PHP port until oil flows from the LPTCC port.

1) Continue to pump oil into the port until no fuel is mixed with the oil.

(j) Disconnect the cart from the PHP port.

(k) Install the PHP port plug [27] with a new packing [28] in the fuel pump.

1) Tighten the PHP port plug [27] to 45-55 inch-pounds (5.0-6.2 newton-meters).

(l) Remove the temporary drain line from the LPTCC port.

(m) Connect the LPTCC hose to the LPTCC port on the HMU.

1) Tighten the LPTCC hose coupling to 180-200 inch-pounds(20.3-22.6 newton-meters).

SUBTASK 71-00-03-430-001-F00

(8) Do these steps to install the fuel inlet line:

(a) Make sure that the gasket [32] is clean and serviceable:

1) Do this task: Seals (Preformed Packings and O-Rings) and Gaskets, TASK 70-30-01-910-802-F00.

(b) Install the four bolts [31] to attach the fuel inlet line to the engine fuel tube.

(c) Tighten the bolts [31] to 55-60 inch-pounds (6.2-6.8 newton-meters).

SUBTASK 71-00-03-210-002-F00

(9) Make sure that these connections are made and do not leak:

(a) Filter upstream pressure sensing line

(b) Lube flow screen assembly

(c) PHP port plug

(d) PCR port hose

(e) LPTCC port hose

SUBTASK 71-00-03-620-024-F00

(10) Close the VBV doors. To close them, do this task: VBV Actuation System - Manual Operation, TASK 75-32-00-730-801-F00

(a) Install film, G02455 [CP2160] over the VBV Bleed Grills.

SUBTASK 71-00-03-620-015-F00

(11) Do the preservation procedure for the engine lubrication system:

(a) Recommended Procedure.

1) Do this task: Dry-Out and Lubrication of the Engine, TASK 71-00-03-600-801-F00.

(b) Alternate Procedure.

1) Do these steps to drain the engine lubrication system:

a) For the engine oil tank and the accessory gearbox (AGB), do this task: Drain the Engine Oil, TASK 12-13-11-600-803.

b) For the oil circuit, do this task: Scavenge Oil Filter Assembly Removal, TASK 79-21-04-000-801-F00.

c) Put a oil resistant container (5 gal)(19 Liters), STD-1055 below the oil supply filter.

d) Remove the oil filter drain plug and let the oil drain fully.

2) Do this task: Scavenge Oil Filter Assembly Installation, TASK 79-21-04-400-801-F00.

3) Make sure the drain plug for the oil supply filter is installed.

4) Do the preservation procedure for the engine lubrication system.

a) Use a engine oil servicing cart, COM-1537 and fill the locations that follow with the fluid mixtures given below at a maximum pressure of 50 psi (345 kPa). (Table 201)

b) oil, D00599 [CP2442] and 5 percent by volume of oil, D00664 [CP5067] (CP2851), or oil, D00599 [CP2442] and 7 percent by volume of additive, D00662 [CP5075] (CP2859).

Table 201/71-00-03-993-807-F00

Location	Oil Fill Qty.
Oil Supply to AGB	6 quarts (6 liters)
Oil Supply to Fwd Sump	2 quarts (2 liters)
Oil Supply to Aft Sump	1 quart (1 liter)
Oil Tank	20 quarts (20 liters)
Lube Unit	Make parts wet
Oil Supply to Scavenge Oil Filter	0.5 pint (0.24 liter)

<1> You can disconnect the oil supply tubes at the lubrication unit (Figure 208).

5) Do these steps to turn the fan and core rotors by hand while you pump the oil in.

a) For the N2 rotor, do this task: Turn the N2 Rotor, TASK 72-00-00-980-801-F00.

b) Continue to turn the rotors for 1 minute until all of the oil is added.

c) After the oil is added, install protective covers on all the lube system ports, tube openings, drains, and vents to seal the lube system.

SUBTASK 71-00-03-480-017-F00

(12) Make sure all disconnect lines and electrical connections have protective covers installed.

SUBTASK 71-00-03-620-025-F00

(13) To prevent corrosion of the inlet cowl lipskin, apply the protective coating. To apply the coating, do this task: Inlet Cowl Lipskin Protective Coating Procedure, TASK 71-00-03-600-815-F00.

SUBTASK 71-00-03-480-018-F00

(14) Seal the inlet and exhaust openings with the film, G02455 [CP2160].

(a) Attach the film, G02455 [CP2160] with moisture barrier tape, G02304.

(b) To cover the inlet opening, apply the tape at the inner barrel ring (Figure 205).

(c) Do not apply tape to or on the inlet cowl lipskin.

SUBTASK 71-00-03-480-019-F00

(15) Put the dessicant, G02456 [CP2098] on one side of the engine, but do not let it touch the engine hardware.

NOTE: The dessicant, G02456 [CP2098] must be replaced at regular intervals based on the weather conditions. Install the dessicant, G02456 [CP2098] such that it gives sufficient protection to the engine and also permit access for replacement without damage to the engine protective cover.

SUBTASK 71-00-03-480-020-F00

(16) Install a waterproof cover on the power plant.

(a) Use moisture barrier tape, G02304 to tightly attach the waterproof cover.

SUBTASK 71-00-03-970-002-F00

(17) Attach a tag to the power plant to show that the preservation procedure for the fuel and oil system are completed.

(a) Include the date of preservation procedure.

SUBTASK 71-00-03-860-009-F00

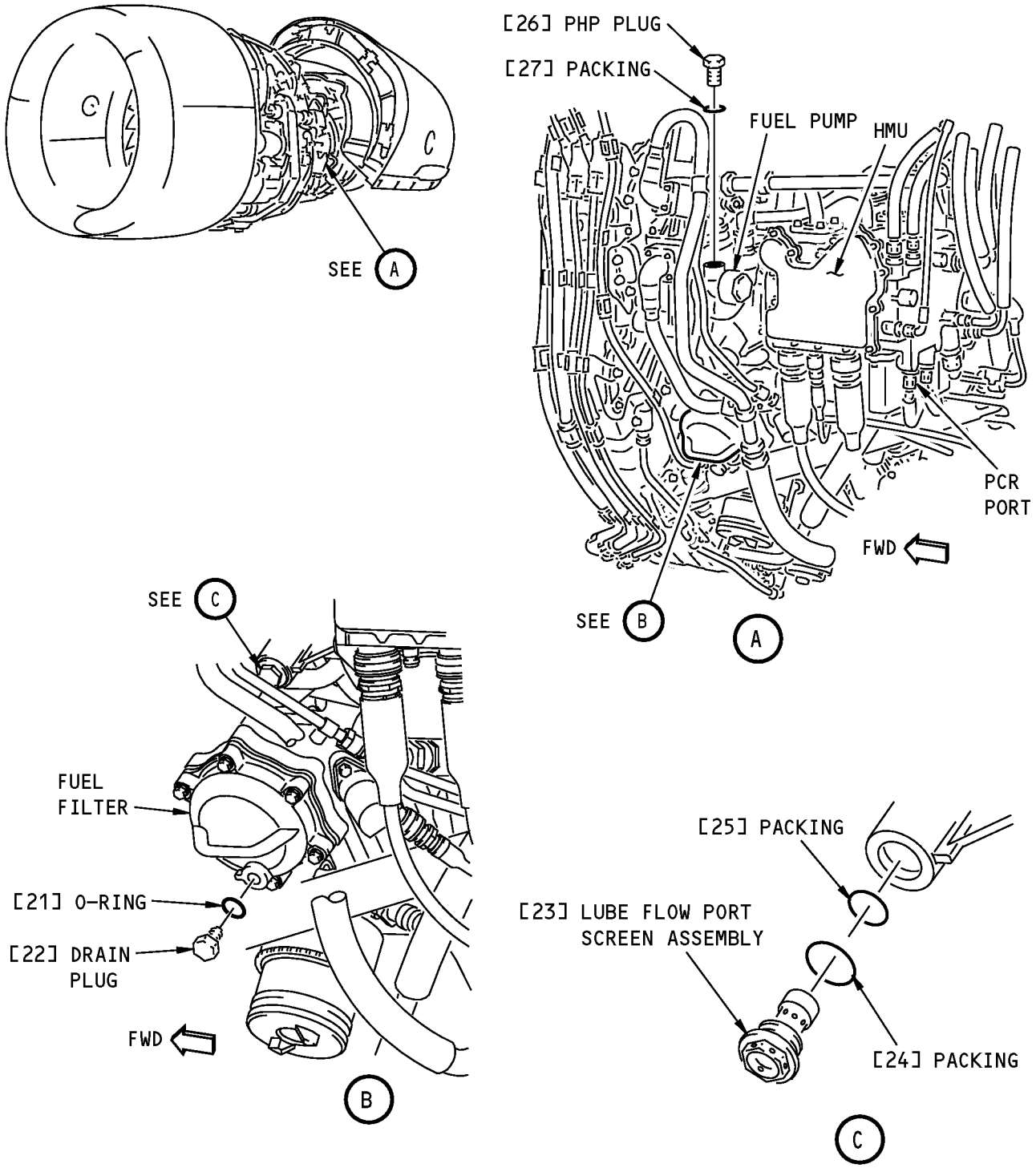
(18) Make sure the applicable start lever is in the CUTOFF position.

(a) Install a DO-NOT-OPERATE tag on the applicable engine start lever.

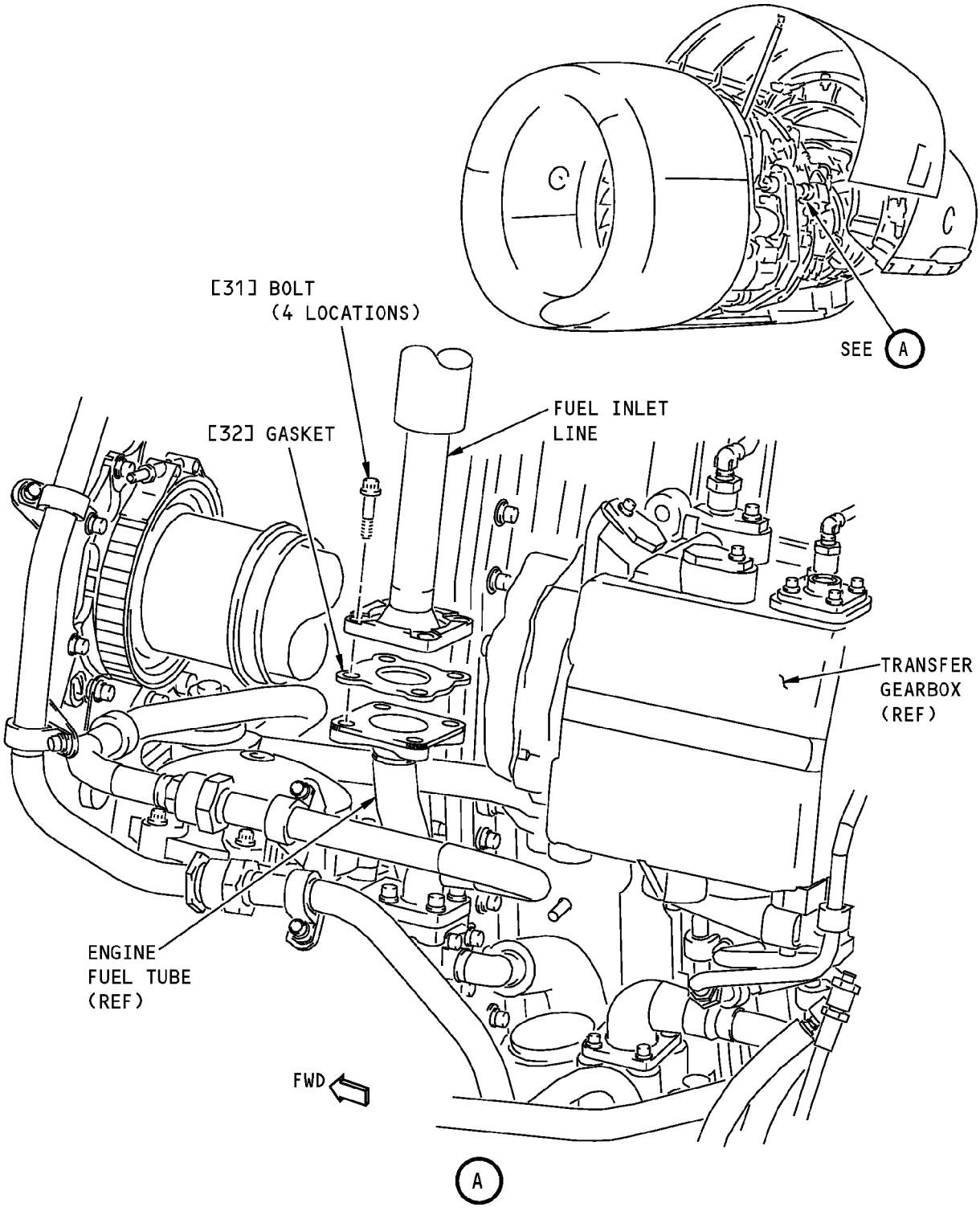
SUBTASK 71-00-03-860-010-F00

(19) If you want electrical power on, do this task: Supply Electrical Power, TASK 24-22-00-860-811.

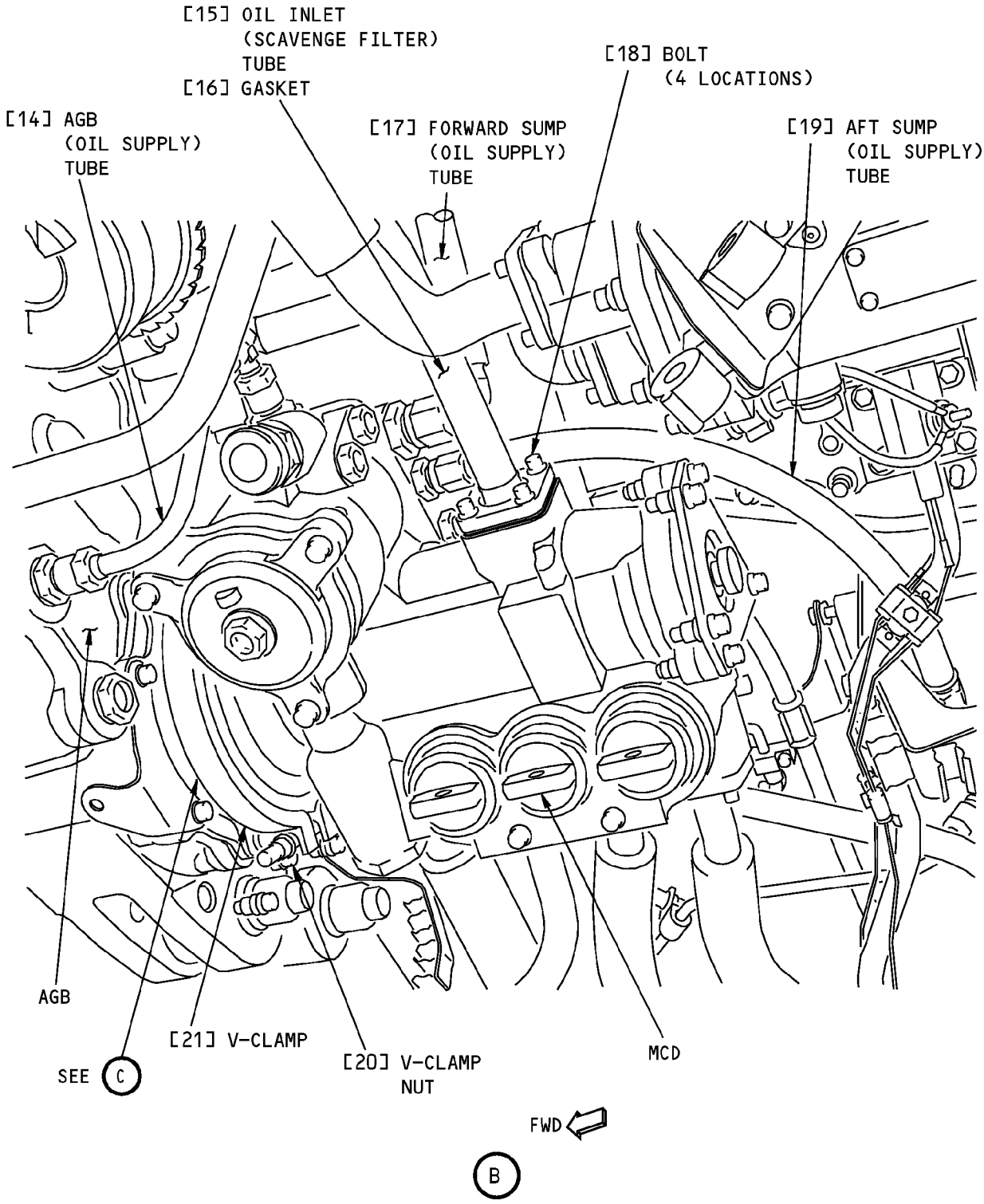
——————— END OF TASK ———————



Fuel Filter Drain and Fuel Pump/HMU Ports
Figure 206/71-00-03-990-805-F00



Fuel Inlet Line Disconnect Point
Figure 207/71-00-03-990-806-F00



Oil Supply Tube Location
Figure 208/71-00-03-990-809-F00

TASK 71-00-03-600-812-F00

15. Preservation Renewal of an Engine From One Month to Not More Than One Year (Engine On-Wing)

A. General

(1) This procedure is used for an engine that is installed on the airplane (on-wing).

(2) This task gives the instructions for a serviceable or a non-serviceable power plant.

B. Location Zones

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

C. Serviceable Power Plant

SUBTASK 71-00-03-620-016-F00

(1) Do this task: Preservation of an Engine From One Month to One Year (Engine On-Wing), TASK 71-00-03-600-811-F00.

(a) There is no limit on the number of times you can do this procedure.

(b) It is necessary to operate the engine to do this procedure.

1) Before engine operation, remove the protective coating on the inlet cowl lipskin. To remove the coating, do this task: Inlet Cowl Lipskin Protective Coating Procedure, TASK 71-00-03-600-815-F00.

NOTE: Engine operation will melt the protective coating on the inlet cowl lipskin. The melted coating could enter the engine.

2) After the necessary engine operation, re-apply the protective coating. To apply the coating, do this task: Inlet Cowl Lipskin Protective Coating Procedure, TASK 71-00-03-600-815-F00.

D. Not Serviceable Power Plant

SUBTASK 71-00-03-620-017-F00

(1) A preservation renewal procedure is not permitted.

(a) You must make the power plant serviceable and do the preservation procedure for a serviceable power plant before 365 days preservation time is expired.

——————— END OF TASK ———————

TASK 71-00-03-600-813-F00

16. Depreservation of an Engine, which was Preserved From One Month to Not More Than One Year (Engine On-Wing)

A. General

(1) This procedure gives instructions for the depreservation of an installed power plant that is serviceable.

(2) Depreservation includes fluid replacement in the oil and fuel systems.

B. References

Reference	Title
12-13-11-600-801	Replenish the Engine Oil (P/B 301)
12-13-11-600-803	Drain the Engine Oil (P/B 301)
71-00-00-700-801-F00	Test 3A - Idle-Power Leak Check (P/B 501)

(Continued)

Reference	Title
71-00-00-700-822-F00	Wet Motor the Engine (P/B 201)

C. Consumable Materials

Reference	Description	Specification
G02304	Tape - Moisture Barrier	BMS8-346
G02455 [CP2160]	Film, Vapor Barrier, Polyethylene	L-P-512
G02456 [CP2098]	Dessicant - Activated, Bagged, Packaging Use And Static Dehumidification	MIL-D-3464

D. Location Zones

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

E. Power Plant Depreservation

SUBTASK 71-00-03-080-003-F00

(1) Remove the waterproof cover, film, G02455 [CP2160] and dessicant, G02456 [CP2098].

(a) Make sure you remove all of the moisture barrier tape, G02304 from the inlet and exhaust areas and that there is no unwanted material.

SUBTASK 71-00-03-630-005-F00

(2) Remove the protective coating from the inlet cowl lipskin. To remove the coating, do this task: Inlet Cowl Lipskin Protective Coating Procedure, TASK 71-00-03-600-815-F00.

NOTE: Make sure to remove the protective coating on the inlet cowl lipskin. Engine operation will melt the protective coating and then the melted coating could enter the engine.

SUBTASK 71-00-03-410-003-F00

(3) Install the accessory units that you removed.

SUBTASK 71-00-03-410-004-F00

(4) Connect the lines and electrical connections that you removed.

SUBTASK 71-00-03-610-001-F00

(5) Do this task: Drain the Engine Oil, TASK 12-13-11-600-803.

(a) Make sure you drain the oil tank and the accessory gearbox.

SUBTASK 71-00-03-610-002-F00

(6) Do this task: Replenish the Engine Oil, TASK 12-13-11-600-801.

SUBTASK 71-00-03-790-001-F00

(7) Do this task: Wet Motor the Engine, TASK 71-00-00-700-822-F00.

(a) Examine the fuel and lube system lines, fitting, and accessories for leakage.

SUBTASK 71-00-03-610-003-F00

(8) Do this task: Replenish the Engine Oil, TASK 12-13-11-600-801.

SUBTASK 71-00-03-790-002-F00

(9) Do this task: Test 3A - Idle-Power Leak Check, TASK 71-00-00-700-801-F00.

(a) Operate the engine at idle for 10 minutes before you stop the engine.

END OF TASK

TASK 71-00-03-600-814-F00

17. Preservation of an Engine for More Than the One Year Preservation Time Limit (Engine On-Wing)

A. General

(1) This procedure is used for an engine that is installed on the airplane (on-wing).

(2) This procedure is for a power plant that remained preserved for more than the long term preservation time limit (365 days).

B. Location Zones

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

C. Procedure

SUBTASK 71-00-03-620-018-F00

(1) If the engine preservation period of 365 days expired, please refer to your CFMI representative for instructions.

NOTE: Engineering analysis must be used to evaluate the situation. Several factors must be analyzed: the total time beyond the preservation time limit, the engine storage location (outside or inside), the humidity level, the temperature changes, how often the dessicant was changed, and other factors.

SUBTASK 71-00-03-620-026-F00

(2) If the preservation period of 365 days expires on the inlet cowl lipskin, do these steps:

(a) Remove the protective coating on the lipskin.

(b) Examine the lipskin for signs of corrosion.

(c) If it is necessary, you can re-apply the protective coating to preserve the lipskin for another 365 days.

END OF TASK

POWER PLANT - MAINTENANCE PRACTICES (ENGINE TRANSPORTATION)

1. General

A. This procedure has this task:

(1) The instructions when you transport an engine.

TASK 71-00-04-500-801-F00

2. Engine Transportation

(Figure 201)

A. General

(1) An engine can be transported in these configurations:

(a) An engine that has the QEC (Quick Engine Change) 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.

B. References

Reference	Title
71-00-02-000-801-F00	Power Plant Removal (P/B 401)
71-00-02-400-801-F00	Power Plant Installation (P/B 401)

C. Tools/Equipment

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

Reference	Description
COM-2111	Base - Universal Transportation, CFM56 Engine (Part #: AM-2563-227, Supplier: 9M323, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
COM-2118	Cradle - Transport, CFM56-7 Engine (Part #: AM-2811-4800, Supplier: 9M323, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

D. Prepare To Move The Engine

SUBTASK 71-00-04-800-001-F00

CAUTION: USE ONLY THE BASE AND CRADLE SHOWN BELOW FOR ENGINE TRANSPORTATION. IF YOU USE THE WRONG BASE AND CRADLE ASSEMBLY, ENGINE DAMAGE CAN OCCUR.

(1) The CFM56-7 engine must be installed only in the CFMI approved base base, COM-2111 and cradle, COM-2118.

(a) CFMI approved tools (Table 201).

Table 201/71-00-04-993-805-F00

DESIGNATION	REFERENCE	SUPPLIER
Cradle	AM2811	AGSE
Base	AM2563	AGSE

(Continued)

DESIGNATION	REFERENCE	SUPPLIER
Bare Engine Cover	856A3700G01	CFMI
QEC Engine Cover	856A3700G02	CFMI

(b) Suppliers Address (Table 202).

Table 202/71-00-04-993-806-F00

SUPPLIER ADDRESS	ADDRESS
AGSE	1265 N. KRAEMER BLVD ANAHEIM CA, 92806 USA
CFMI	SNECMA Dept KXSO BP 1936 77019 MELUN CEDEX FRANCE

SUBTASK 71-00-04-510-001-F00

CAUTION: OBEY ALL THE NECESSARY PROCEDURES GIVEN BELOW. USE THE CORRECT LIFT AND ATTACH POINTS TO PREVENT RAPID MOVEMENT OF THE ENGINE DURING TRANSPORTATION. IF YOU DO NOT OBEY THIS CAUTION, ENGINE DAMAGE CAN OCCUR.

(2) The removal and installation of the engine is the operator's responsibility.

These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

SUBTASK 71-00-04-800-002-F00

CAUTION: USE A PROTECTIVE COVER TO PROTECT THE ENGINE FROM FOREIGN OBJECT DAMAGE, DUST, AND RAIN DURING SHIPMENT, OR ENGINE DAMAGE CAN OCCUR.

(3) Do these steps to protect the engine during transportation:

(a) Make sure the engine is preserved before transportation.

(b) For a bare engine, use the protective cover 856A3700G01.

(c) For a QEC or partial QEC engine, use the protective cover 856A3700G02.

SUBTASK 71-00-04-800-003-F00

(4) After you transport the engine, do these steps:

(a) Examine the general condition of the engine.

(b) Make sure there is no water, dust or unwanted objects in the engine.

E. Tow Limits For An Engine Installed In The Base and Cradle

SUBTASK 71-00-04-560-001-F00

(1) Do these steps to tow the engine in the cradle and base assembly:

(a) Release the 4 swivel locks provided on casters.

CAUTION: THE MAXIMUM SPEED LIMIT TO TOW THE ENGINE, CRADLE, AND BASE ASSEMBLY IS NOT MORE THAN 3 MPH (5 KM/H) ON A SMOOTH AND HORIZONTAL SURFACE, OR ENGINE DAMAGE CAN OCCUR.

(CAUTION PRECEDES)

CAUTION: THE CRADLE MUST BE FREE OF ALL RESTRAINT SYSTEMS WHICH PREVENT THE FULL TRAVEL OF THE SHOCK ABSORBERS, OR ENGINE DAMAGE COULD OCCUR.

(b) Tow the engine, cradle and base assembly at not more than 3 MPH (5 KM/H).

(c) Use casters braking system to hold the base assembly after you tow the engine.

F. Road Transportation

SUBTASK 71-00-04-510-002-F00

CAUTION: REFER A DEVIATION FROM THE ROAD CARGO TRANSPORTATION REQUIREMENTS TO CFMI FOR ENGINE DISPOSITION. A DEVIATION CAN RESULT IN ENGINE DAMAGE.

(1) Inform the freight company of engine transportation requirements.

SUBTASK 71-00-04-510-003-F00

CAUTION: YOU MUST OBEY THE INSTRUCTIONS AND NECESSARY CONDITIONS THAT FOLLOW OR ENGINE DAMAGE CAN OCCUR.

CAUTION: MAKE SURE YOU USE A PNEUMATIC SUSPENSION SYSTEM AS FOLLOWS. TRANSPORT THE ENGINE ONLY ON NON-OBSTRUCTED ROADS OR ENGINE DAMAGE CAN OCCUR.

(2) Shipment by tractor and semi-trailer:

(a) If you use a semi-trailer with one engine installed above the trailer axle, the trailer must have pneumatic suspension.

(b) If you use a semi-trailer with two or more engines installed on the trailer, both the tractor and the trailer must have pneumatic suspension.

SUBTASK 71-00-04-510-004-F00

(3) Shipment by towed trailer or wagon-bed truck:

(a) If you use a trailer or a wagon-bed truck, the two axles must have a pneumatic suspension system.

NOTE: It is recommended to use Air Ride type suspension or an alternate hydraulic type suspension with nitrogen accumulators.

SUBTASK 71-00-04-510-005-F00

(4) Preparation and installation of the engine:

(a) Make sure that the engine and cradle fasteners are in good condition.

(b) Make sure that the cradle and base fasteners are in good condition.

(c) Lock the caster wheels and move the tow bars into the stowed position.

WARNING: DO NOT LIFT THE BASE AND CRADLE ASSEMBLY BY ITS HOIST POINTS WHEN AN ENGINE IS INSTALLED IN IT. THESE HOIST POINTS ARE USED ONLY TO LIFT AN EMPTY BASE AND CRADLE ASSEMBLY. IF YOU USE THE HOIST POINTS TO LOAD THE ENGINE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(WARNING PRECEDES)

CAUTION: BE CAREFUL WHEN YOU MOVE AN ENGINE. PREVENT RAPID MOVEMENT OF THE ENGINE DURING TRANSPORTATION OR ENGINE DAMAGE CAN OCCUR.

(d) Use a fork lift truck to lift the engine, cradle and base assembly on to the trailer.

NOTE: Put the assembly lengthwise on the trailer.

CAUTION: BE CAREFUL WHEN YOU LOAD THE ENGINE, CRADLE AND BASE ASSEMBLY ON TO THE TRAILER BED. INSUFFICIENT CLEARANCE BETWEEN THE LOWEST PART OF THE ENGINE CRADLE AND THE TRAILER BED CAN CAUSE ENGINE DAMAGE.

(e) Make sure the minimum clearance between the cradle and the trailer bed is 4 inches (102 mm).

CAUTION: IF YOU USE SHIMS TO GET THE CORRECT CLEARANCE, MAKE SURE YOU PUT THE SHIMS BELOW THE BASE. MAKE SURE THAT THE SHIMS ARE NOT INSTALLED BELOW THE CRADLE FRAME, OR ENGINE DAMAGE CAN OCCUR.

1) If it is necessary, install shims below the base side beams to get the correct clearance.

SUBTASK 71-00-04-510-006-F00

(5) Tiedown procedures:

CAUTION: ATTACH ONLY THE BASE TO THE BED OF THE TRAILER BY THE TIEDOWN POINTS. THE ENGINE AND CRADLE ASSEMBLY MUST BE FREE OF ALL FASTENER SYSTEM WHICH PREVENT THE FULL TRAVEL OF THE SHOCK ABSORBERS, OR DAMAGE TO THE ENGINE BEARINGS COULD OCCUR.

CAUTION: IF INCORRECT TIEDOWN PROCEDURES ARE USED, DAMAGE TO THE MAIN ENGINE BEARINGS COULD OCCUR.

(a) Recommended tiedown procedure (Figure 202):

1) Attach the tiedown straps or chains to the rings on the stand base.
2) Pull the tiedown straps or chains diagonally across the trailer bed.
3) Attach the tiedown straps or chains to the fitting points on the trailer bed.
4) Tighten and safety all tiedown straps or chains.

(b) Alternative tiedown procedure (Figure 203):

1) Put the tiedown straps or chains through the fork lift tunnels on the base.
2) Pull the tiedown straps or chains forward and aft along the sides of the trailer bed.
3) Attach the tiedown straps or chains to the fitting points on the trailer bed.
4) Tighten and safety all tiedown straps or chains.

G. Sea Transportation

SUBTASK 71-00-04-510-007-F00

CAUTION: REFER A DEVIATION FROM THE SEA CARGO TRANSPORTATION REQUIREMENTS TO CFMI FOR ENGINE DISPOSITION. A DEVIATION CAN RESULT IN ENGINE DAMAGE.

(1) Inform the freight company of engine transportation requirements.

SUBTASK 71-00-04-510-008-F00

CAUTION: MAKE SURE THAT THE TIME THE ENGINE IS EXPOSED TO SALTY AIR IS NOT MORE THAN EIGHT DAYS, WHICH INCLUDES THE TIME TO PUT THE LOAD ON AND REMOVE THE LOAD FROM SEA TRANSPORTATION. IF THE EXPOSURE TIME IS MORE THAN EIGHT DAYS, ENGINE DAMAGE CAN OCCUR.

CAUTION: YOU MUST OBEY THE INSTRUCTIONS AND NECESSARY CONDITIONS THAT FOLLOW OR ENGINE DAMAGE CAN OCCUR.

(2) Shipment of the engine, cradle and base assembly procedure:

(a) Make sure the applicable cover is in position and correctly attached.

CAUTION: THE ENGINE TO BE MOVED MUST BE INSTALLED ON A TRAILER BED WITH AN ACTIVE SUSPENSION SYSTEM. TRANSPORTATION OF AN ENGINE IN A CONTAINER IS NOT APPROVED. ENGINE DAMAGE CAN OCCUR.

(b) Make sure the instructions and conditions for Road Transportation were followed above.

(c) Make sure the trailer suspension system is active and its bottles inflated during all of the sea transportation.

SUBTASK 71-00-04-510-009-F00

(3) Loading requirements

WARNING: DO NOT LIFT THE BASE AND CRADLE ASSEMBLY BY ITS HOIST POINTS WHEN AN ENGINE IS INSTALLED IN IT. THESE HOIST POINTS ARE USED ONLY TO LIFT AN EMPTY BASE AND CRADLE ASSEMBLY. IF YOU USE THE HOIST POINTS TO LOAD THE ENGINE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION: BE CAREFUL WHEN YOU MOVE AN ENGINE. PREVENT RAPID MOVEMENT OF THE ENGINE DURING TRANSPORTATION, OR ENGINE DAMAGE CAN OCCUR.

(a) If it is possible, use a tractor to tow the trailer on board the ship through its cargo doors.

(b) If the cargo doors are not applicable, lift the trailer on board the ship using a crane.

NOTE: It is recommended that you transport the engine in a dry area of the ship's cargo area.

H. Rail Transportation

SUBTASK 71-00-04-510-010-F00

(1) It is not recommended that you move an engine by rail.

I. Air Cargo Transportation

SUBTASK 71-00-04-510-011-F00

CAUTION: REFER A DEVIATION FROM THE AIR CARGO TRANSPORTATION REQUIREMENTS TO CFMI FOR ENGINE DISPOSITION. A DEVIATION CAN RESULT IN ENGINE DAMAGE.

(1) Inform the freight company of engine transportation requirements.

SUBTASK 71-00-04-510-012-F00

CAUTION: YOU MUST OBEY THE INSTRUCTIONS AND NECESSARY CONDITIONS THAT FOLLOW OR ENGINE DAMAGE CAN OCCUR.

(2) Installation of the engine:

CAUTION: USE THE AIRCRAFT ACCESSIBILITY CHART ONLY AS AN AID. THIS CHART DOES NOT CONSIDER THE WEIGHT LOADING APPLICATIONS. THE CAPACITY TO CARRY THE ENGINE MUST BE CONFIRMED WITH THE AIRFRAME MANUFACTURER IN COMPLIANCE WITH THE AIRCRAFT LOADING SPECIFICATIONS.

(a) Use the airplane accessibility chart to identify applicable airplane used for engine shipment (Table 205).

NOTE: The interior dimensions in some types or series of aircraft is different between operators.

(b) Make sure that caster wheels and tow bars are locked in stowed position (Figure 204).

WARNING: DO NOT LIFT THE BASE AND CRADLE ASSEMBLY BY ITS HOIST POINTS WHEN AN ENGINE IS INSTALLED IN IT. THESE HOIST POINTS ARE USED ONLY TO LIFT AN EMPTY BASE AND CRADLE ASSEMBLY. IF YOU USE THE HOIST POINTS TO LOAD THE ENGINE, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION: BE CAREFUL WHEN YOU MOVE AN ENGINE. PREVENT RAPID MOVEMENT OF THE ENGINE DURING TRANSPORTATION OR ENGINE DAMAGE CAN OCCUR.

(c) Use a fork lift truck to install the engine, cradle and base assembly on a standard air cargo pallet.

CAUTION: IF YOU USE SHIMS TO GET THE CORRECT CLEARANCE, MAKE SURE YOU PUT THE SHIMS BELOW THE BASE. MAKE SURE THAT THE SHIMS ARE NOT INSTALLED BELOW THE CRADLE FRAME OR ENGINE DAMAGE CAN OCCUR.

(d) Make sure the minimum clearance between the cradle and the pallet is 4 inches (102 mm).

1) If the clearance is less than the limit, install shims below the base side beams to get the correct clearance.

(e) Attach the tiedown straps between the transportation base rings and the pallet fitting points.

(f) Tighten and safety all tie down straps.

(g) Move the engine and pallet to the airplane and load it in the aircraft.

1) Load the engine in compliance with the Aircraft Loading Specifications.

SUBTASK 71-00-04-800-004-F00

(3) Dimensions and weigth for the base and cradle:

(a) The base and cradle without an engine installed (Table 203):

Table 203/71-00-04-993-807-F00

Dimensions	Size
Length	171.5 inches (435.6 cm)
Length (Casters up)	169.5 inches (430.5 cm)
Width	96 inches (243.8 cm)
Height	62.5 inches (158.7 cm)
Height (With arms stowed)	24 inches (61 cm)

(Continued)

Dimensions	Size
Weight	4420 pounds (2005 kg)

(b) The base and cradle with an engine installed (Table 204).

Table 204/71-00-04-993-808-F00

Dimensions	Size
Length	171.5 inches (435.6 cm)
Length (Casters up)	169.5 inches (430.5 cm)
Width	96 inches (243.8 cm)
Height (Casters up)	87.6 inches (222.5 cm)
Height (Casters down)	91.1 inches (231.4 cm)
Weight	10,850 pounds (4922 kg)

SUBTASK 71-00-04-800-005-F00

(4) Possible airplane access is identified with a X.

NOTE: Use this chart only as a guide.

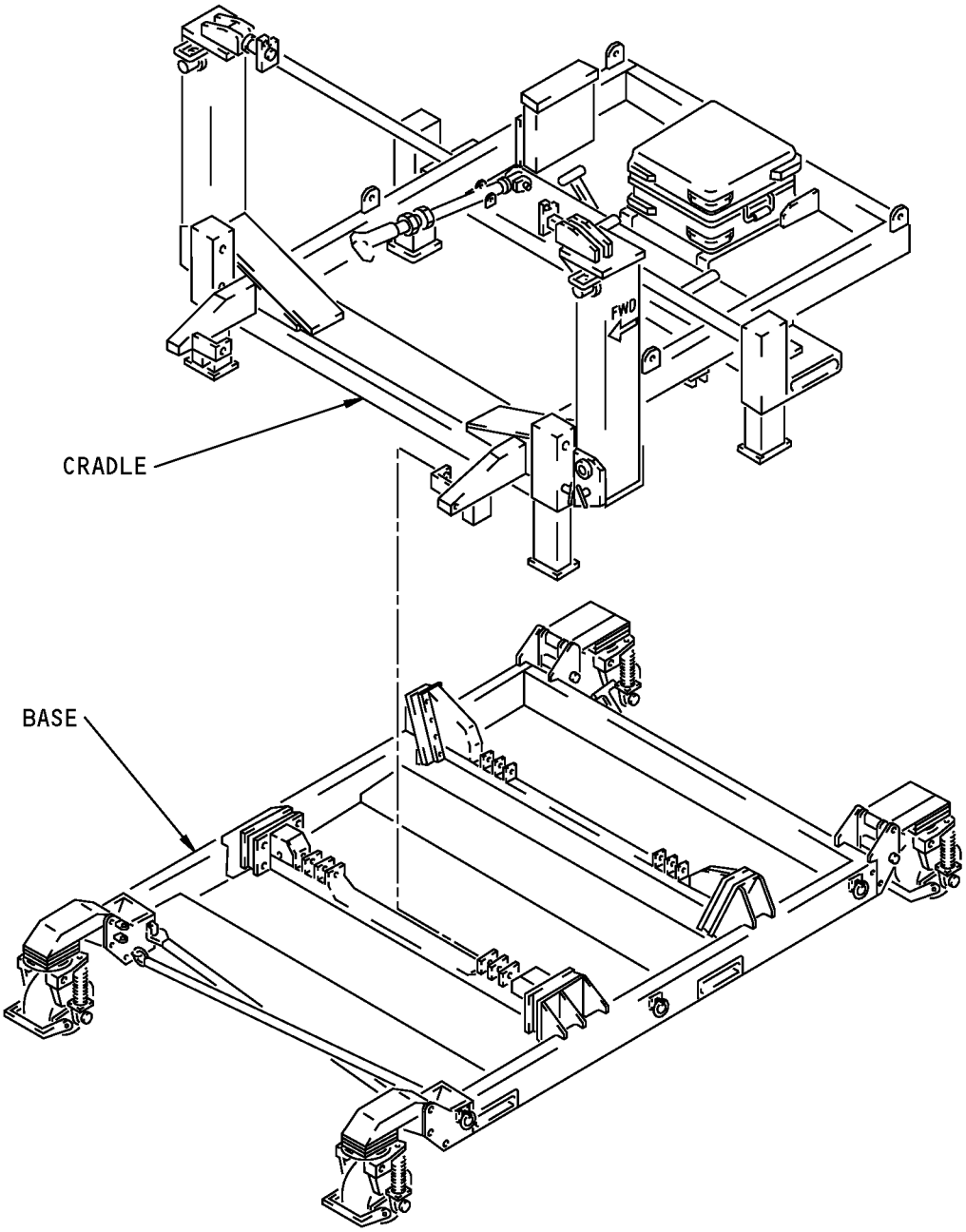
Table 205/71-00-04-993-809-F00

Aircraft Accessibility	Bare Engine	Partial QEC	QEC
DC8F,-52, -54			
DC9F	X	X	X
DC10F, -30			
DC10, -20, -30			
DC10, -10			
B707-320C	X	X	X
B707-320B	X	X	X
B720	X	X	X
B727QC	X	X	X
B727-223 STRETCH	X	X	X
B727-023 PAX	X	X	X
B737F			
B737-200 PAX			
B737-300 PAX			
B737-400 PAX			

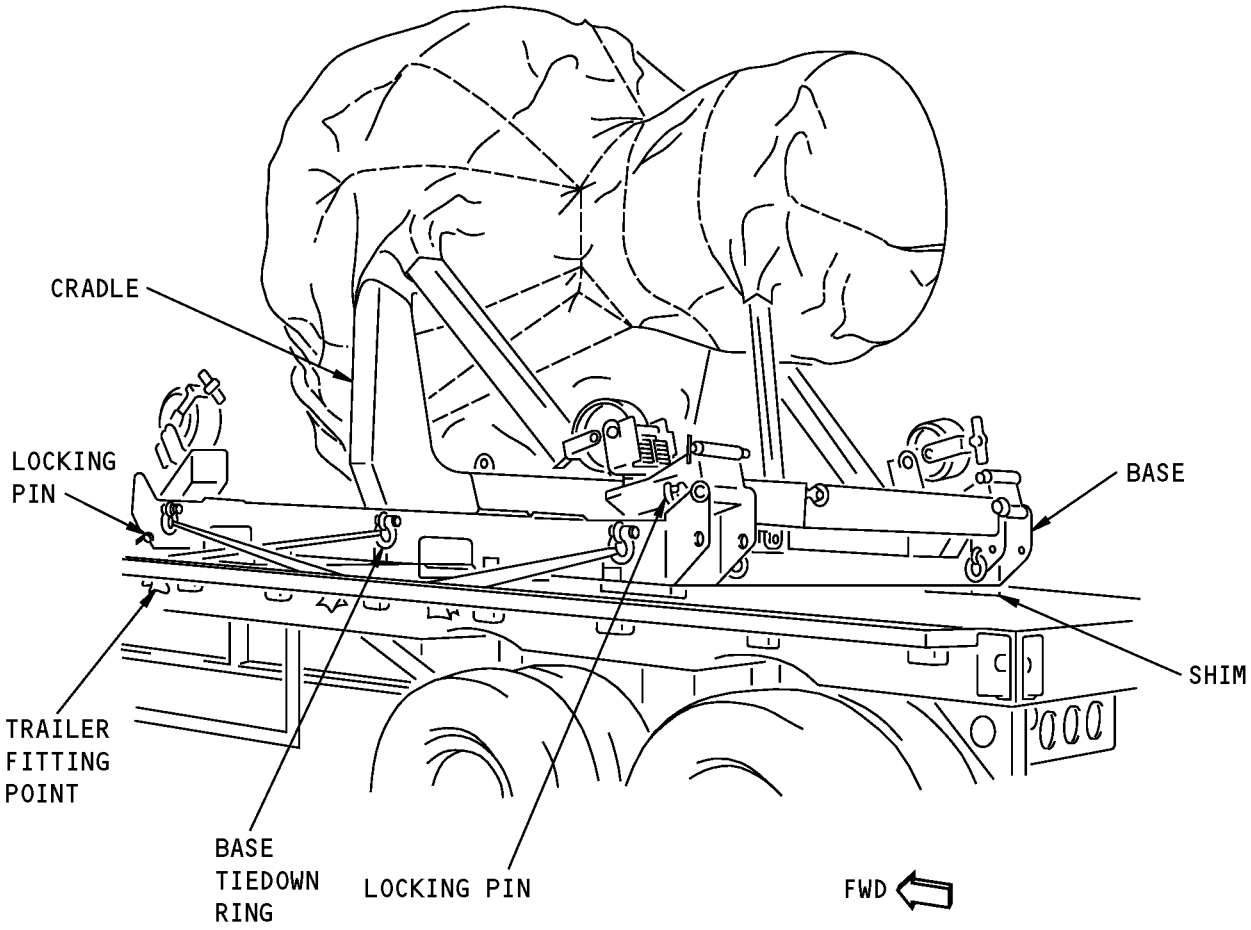
(Continued)

Aircraft Accessibility	Bare Engine	Partial QEC	QEC
B747F	X	X	X
B747			
B757			
B767			
A300			
A300C			
A310			
A320			
A340C			
TRANSALL	X	X	X
L1011 TRISTAR	X	X	X
L100 HERCULES	X	X	X
CL 44	X	X	X
GUPPY S	X	X	X
ANTONOV 12	X	X	X

END OF TASK

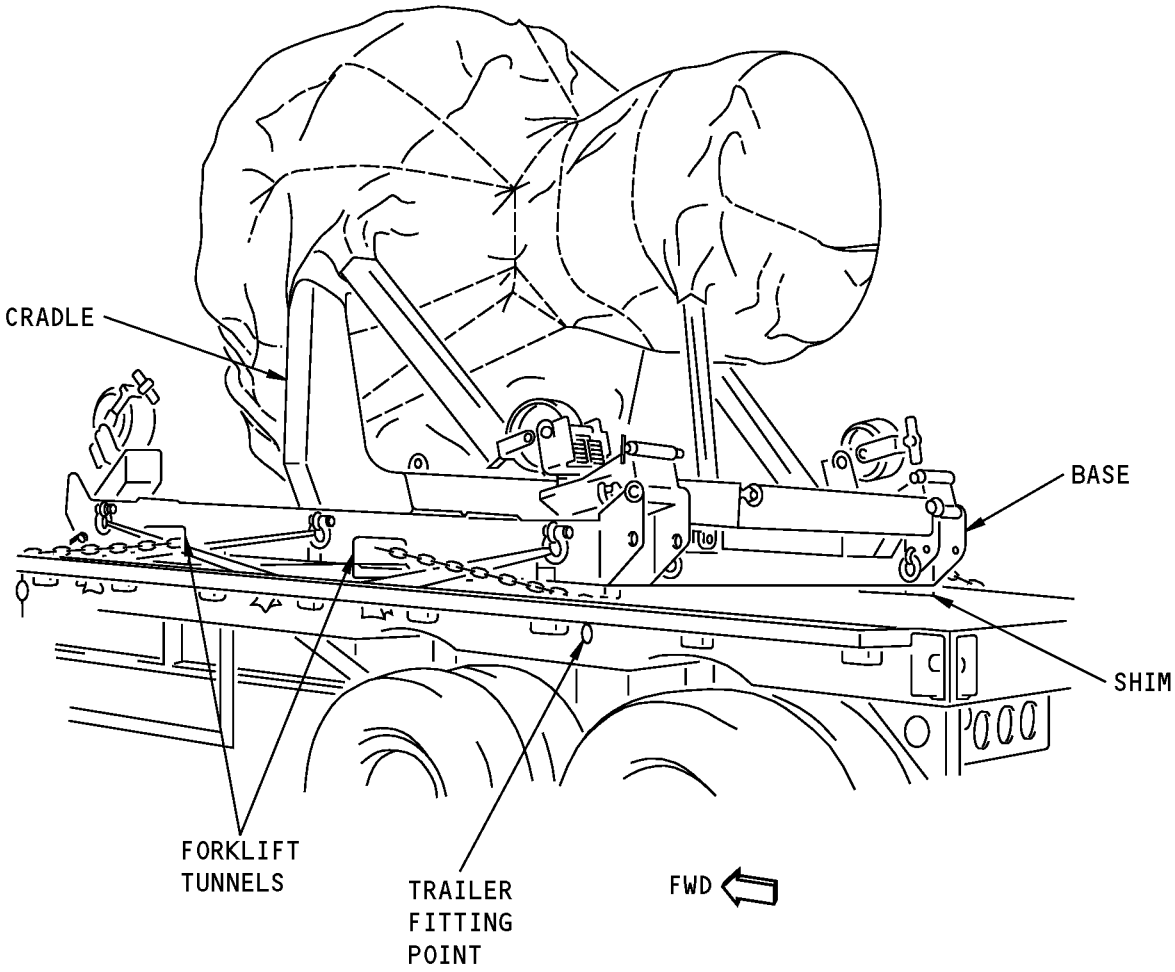


Engine Transportation Cradle and Base
Figure 201/71-00-04-990-801-F00



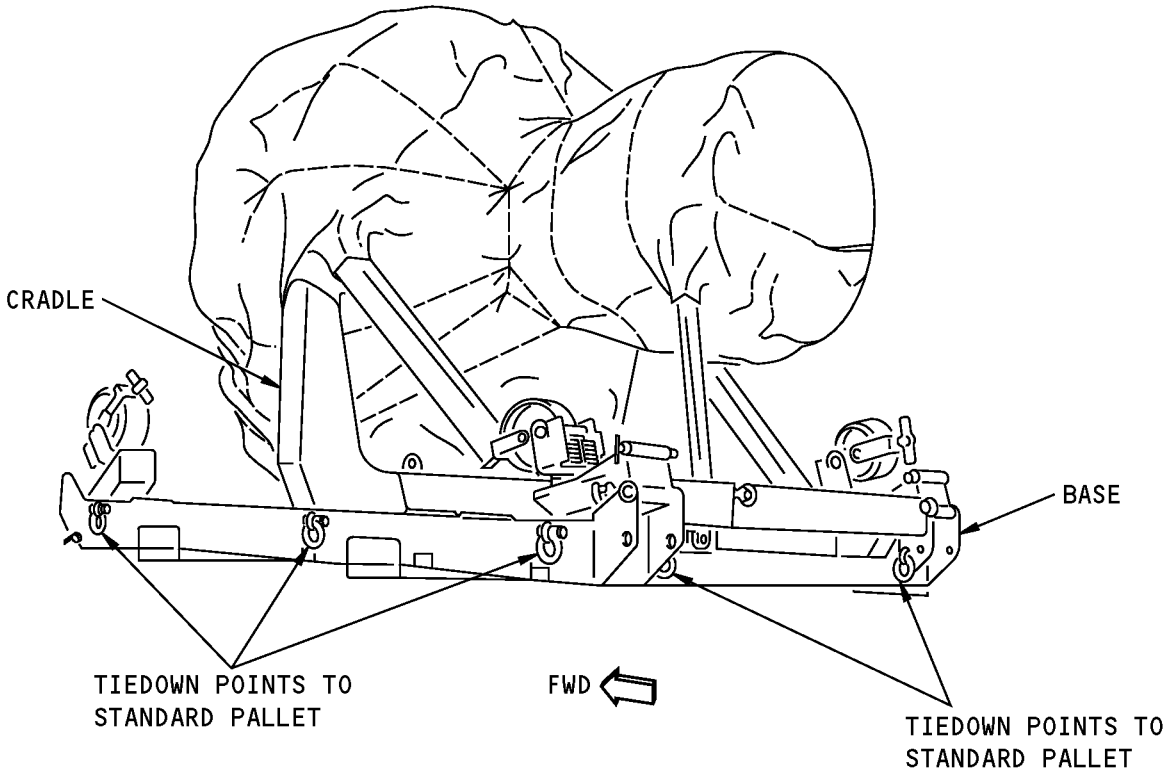
S-M56-MM-03816-00-B

Correct Tiedown Procedure with Shims Below Stand Base
Figure 202/71-00-04-990-802-F00



S-M56-MM-03817-00-B

Alternate Tiedown Procedure Through the Stand Forklift Tunnels
Figure 203/71-00-04-990-803-F00



S-M56-MM-03818-00-B

Location of Tiedown for Base Attachment to Standard Pallet
Figure 204/71-00-04-990-804-F00

POWER PLANT (ENGINE INTERMIX) - MAINTENANCE PRACTICES

1. General

A. This procedure has these tasks:

(1) A task to change the engine model to a different thrust rating with the engine identification plug.

(2) A task to do an intermix of Technology Insertion Engines and Non-Technology Insertion Engines.

B. To change the airplane engine thrust rating for the Flight Management Computer System (FMCS), refer to these steps:

(1) A Boeing service bulletin is necessary for each airplane to do this task.

(2) Use the instructions in the service bulletin to do the applicable task.

(3) Contact your Boeing Customer Engineering representative for specific information on the service bulletin applicability to your fleet.

C. To do an intermix or substitution of SAC and DAC engines , refer to these steps:

(1) A Boeing service bulletin is necessary for each airplane to do this task.

(2) Use the instructions in the service bulletin to do the applicable task.

(3) Contact your Boeing Customer Engineering representative for specific information on the service bulletin applicability to your fleet.

TASK 71-00-07-800-801-F00

2. Change the Engine Model

A. General

(1) This task changes the engine model to a different thrust rating with the applicable CFMI Service Bulletin.

(2) The task includes these steps:

(a) Remove and install the applicable identification plug on the Electronic Engine Control (EEC)

(b) Do a change to the engine nameplate to agree with the identification plug.

B. References

Reference	Title
73-21-61-000-801-F00	Identification Plug Removal (P/B 401)
73-21-61-400-801-F00	Identification Plug Installation (P/B 401)

C. Location Zones

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

D. Procedure

SUBTASK 71-00-07-800-001-F00

(1) Find the applicable CFMI service bulletin for the applicable engine model.

HAP ALL; AIRPLANES WITH SINGLE ANNULAR COMBUSTOR (SAC) ENGINES

(a) Refer to these service bulletins:

1) CFM56-7B18 - CFMI SB 72-006,

2) CFM56-7B20 - CFMI SB 72-007,

3) CFM56-7B22 - CFMI SB 72-008,
4) CFM56-7B24 - CFMI SB 72-009,
5) CFM56-7B26 - CFMI SB 72-010,
6) CFM56-7B26/B1 - CFMI SB 72-166,
7) CFM56-7B27 - CFMI SB 72-011,
8) CFM56-7B27/B1 - CFMI SB 72-167.
9) CFM56-7B27/B3 - CFMI SB 72-168.

HAP ALL

SUBTASK 71-00-07-800-002-F00

(2) To change the engine model, do the steps in the applicable CFMI service bulletin.
(a) To remove the identification plug, (TASK 73-21-61-000-801-F00).
(b) To install the correct identification plug, (TASK 73-21-61-400-801-F00).
(c) Make sure that you do the change to the engine nameplate to agree with the necessary engine model.

——————— END OF TASK ———————

TASK 71-00-07-860-801-F00

3. Intermix of Technology Insertion Engines and Non-Technology Insertion Engines

A. General
(1) This task is to do an intermix of Technology Insertion (TI) Engines and Non-Technology Insertion Engines.
(a) A Technology Insertion Engine has a ''/3'' after the thrust rating on the engine data plate. An example of a SAC Engine with TI is CFM56-7B22/3. An example of a SAC Engine is CFM56-7B22.

B. Procedure

SUBTASK 71-00-07-860-003-F00

(1) Do an intermix of a Technology Insertion Engine and Non-Technology Insertion Engine.
(a) Refer to the applicable airplane service bulletin for the intermix of the engines. The airplane must be on the effectivity list of the applicable service bulletin.
1) 71-1551, Airplanes with SAC Engines as base engines
a) and with revised thrust reversers.
2) 71-1582, Airplanes with Technology Insertion Engines (SAC/3) as base engines.
3) 71-1588, Airplanes with SAC Engines as base engines
a) and with earlier thrust reversers.
4) 71-1585, Airplanes with DAC Engines as base engines
a) and with earlier thrust reversers.

——————— END OF TASK ———————

INLET COWL - REMOVAL/INSTALLATION

1. General

A. This procedure contains scheduled maintenance task data.

B. This procedure contains these four tasks:

(1) The removal of the inlet cowl with a sling and an overhead hoist

(2) The installation of the inlet cowl with a sling and an overhead hoist

(3) The removal of the inlet cowl with a nose cowl dolly or boom hoist

(4) The installation of the inlet cowl with a nose cowl dolly or boom hoist.

C. Inlet cowls are interchangeable between engine positions 1 and 2.

TASK 71-11-01-000-801-F00

2. Remove the Inlet Cowl

A. General

(1) The purpose of this task is to permit mechanics to select the applicable method to remove the inlet cowl.

(2) The procedure can be used for the left inlet cowl or right inlet cowl.

B. Location Zones

Zone	Area
412	Engine 1 - Nose Inlet Cowl
422	Engine 2 - Nose Inlet Cowl

C. Procedure

SUBTASK 71-11-01-240-001-F00

(1) Do one of these tasks to remove the inlet cowl:

(a) Do this task: Remove the Inlet Cowl (Sling and Overhead Hoist), TASK 71-11-01-000-802-F00.

(b) Do this task: Remove the Inlet Cowl (Nose Cowl Dolly or Boom Hoist), TASK 71-11-01-000-803-F00.

——————— END OF TASK ———————

TASK 71-11-01-400-801-F00

3. Install the Inlet Cowl

A. General

(1) The purpose of this task is to permit mechanics to select the applicable method to install the inlet cowl.

(2) The procedure can be used for the left inlet cowl or right inlet cowl.

B. Location Zones

Zone	Area
412	Engine 1 - Nose Inlet Cowl
422	Engine 2 - Nose Inlet Cowl

C. Procedure

SUBTASK 71-11-01-400-001-F00

(1) Do one of these tasks to install the inlet cowl:

(a) Do this task: Install the Inlet Cowl (Sling and Overhead Hoist), TASK 71-11-01-400-802-F00.

(b) Do this task: Install the Inlet Cowl (Nose Cowl Dolly or Boom Hoist), TASK 71-11-01-400-803-F00.

——————— END OF TASK ———————

TASK 71-11-01-000-802-F00

4. Remove the Inlet Cowl (Sling and Overhead Hoist)

A. General

(1) The removal and installation of the inlet cowl is done with a sling and an overhead hoist.

(2) The sling attaches to the four ground handling points on the inlet cowl.

(3) An overhead hoist is used with the sling to move the inlet cowl.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
73-21-05-000-801-F00	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 #: B71040-39, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Opt Part #: B71040-38, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

D. Location Zones

Zone	Area
412	Engine 1 - Nose Inlet Cowl
422	Engine 2 - Nose Inlet Cowl

E. Access Panels

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

F. Prepare for the Removal of the Inlet Cowl

SUBTASK 71-11-01-860-001-F00

(1) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

G. Inlet Cowl Removal

SUBTASK 71-11-01-020-001-F00

(1) Do these steps to disconnect the T12 electrical harnesses from the inlet cowl (Figure 401):

(a) Do this step;

Open the applicable T12 access doors:

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

(b) Disconnect the T12 sensor connector (Ch A) [9] and the T12 sensor connector (Ch B) [8] from the forward side of the inlet cowl bulkhead.

(c) Do these steps to remove the electrical connectors, DJ0804 [7] and DJ0704 [5] from the aft side of the inlet cowl bulkhead:

1) Remove the four bolts [10] and washers [11] that attach the electrical connectors, DJ0704 [5] and DJ0804 [7] to the inlet cowl bulkhead.

2) Pull the harnesses [5] and [7] away from the inlet cowl.

NOTE: Temporarily attach these harnesses to the engine fan case.

SUBTASK 71-11-01-020-002-F00

(2) Remove the nut [12] and the washer [13] that attach the bonding jumper [6] to the aft side and forward side of the inlet cowl bulkhead.

SUBTASK 71-11-01-020-003-F00

(3) If a T12 sensor is not installed on the replacement inlet cowl, do this task: T12 Sensor Removal, TASK 73-21-05-000-801-F00.

SUBTASK 71-11-01-410-002-F00

(4) Close the T12 access door.

SUBTASK 71-11-01-020-004-F00

(5) Do these steps to disconnect the EEC cooling hose [4]:

(a) Disconnect the EEC cooling hose clamp [5] on the EEC cooling hose [4].

(b) Disconnect the EEC cooling hose [4] from the duct on the inlet cowl bulkhead.

SUBTASK 71-11-01-020-005-F00

(6) Remove the coupling [2] that attaches the inlet cowl TAI duct [1] to the aft side of the inlet cowl bulkhead.

SUBTASK 71-11-01-080-001-F00

(7) Do these steps to install the removal equipment for the inlet cowl [31] (Figure 402):

(a) Connect a hoist to the inlet cowl sling, SPL-2062.

(b) Use four hoist pins [33] to attach the four sling straps [32] to the inlet cowl [31].

(c) Attach the lever hoists [34] and the forward straps [32] to the crossbeam.

CAUTION: ADJUST THE SLING TO HOLD ONLY THE WEIGHT OF THE INLET COWL. MORE FORCE CAN CAUSE DAMAGE TO THE INLET COWL.

(d) Adjust the lever hoists [34] to remove the slack from the straps [32].

SUBTASK 71-11-01-020-006-F00

(8) Do these steps to remove the inlet cowl [31] (Figure 403):

WARNING: BE CAREFUL WHEN YOU MOVE THE INLET COWL. BECAUSE THE INLET COWL WEIGHS 310 POUNDS (141 KG), INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Remove the bolts [55], spacers [54], washers [53], and nuts [52] that attach the inlet attach flange to the engine attach flange.

NOTE: You can unclip wire harnesses to get access, specially for the right side.

CAUTION: USE PRECAUTION TO PREVENT DAMAGE TO THE INTEGRATED DRIVE GENERATOR (IDG), IDG OIL COOLING TUBING, AND HYDRAULIC HOSES.

(b) Pull the inlet cowl [31] forward until it is clear of the shear pins [51] on the engine attach flange.

NOTE: The shear pins are attached to the engine attach flange at the 3:00 and 9:00 o'clock positions.

(c) Move the inlet cowl [31] forward and away from the engine attach flange.

(d) Loosen the lever hoists [34] and turn the inlet cowl [31] until the inlet attach flange faces down and the inlet lip skin faces upward.

(e) Install the inlet cowl [31] on a pallet or other suitable surface.

SUBTASK 71-11-01-900-001-F00

(9) Remove the seal [3] from the forward flange of the inlet cowl TAI duct [1].

(a) Make sure the seal is serviceable.

(b) If the seal is not serviceable, replace it.

(c) Install the seal.

NOTE: The seal is slightly "oval" and will snap into its position.

SUBTASK 71-11-01-020-007-F00

(10) Install protective caps on the EEC cooling hose [4], the inlet cowl TAI duct [1] and the openings on the inlet cowl bulkhead.

SUBTASK 71-11-01-080-002-F00

(11) Remove the sling and overhead hoist as follows:

(a) Release the tension from the straps and the lever hoists.

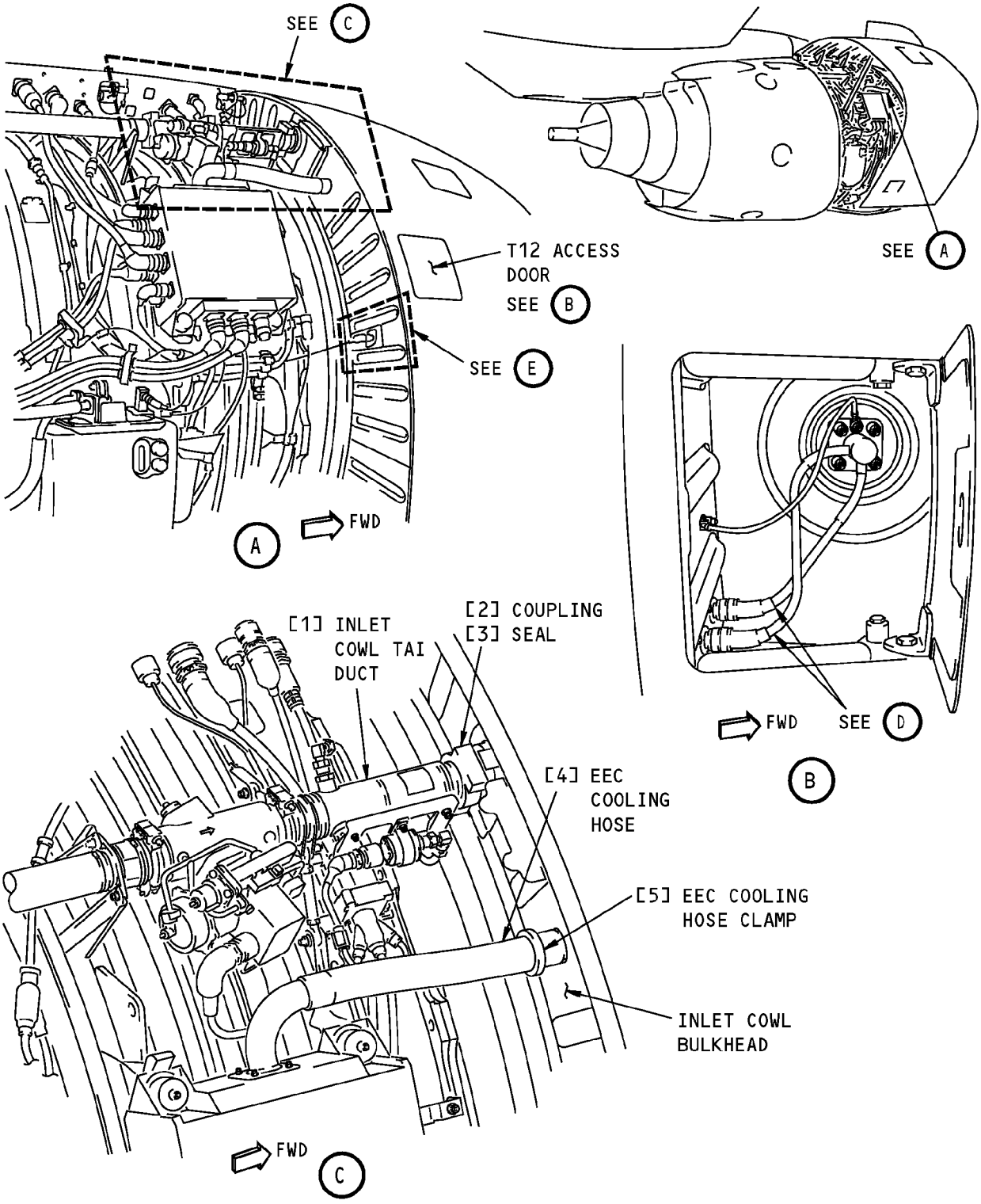
(b) Remove the four hoist pins [33] that attach the straps [32] to the inlet cowl [31].

(c) Remove the sling from the inlet cowl [31].

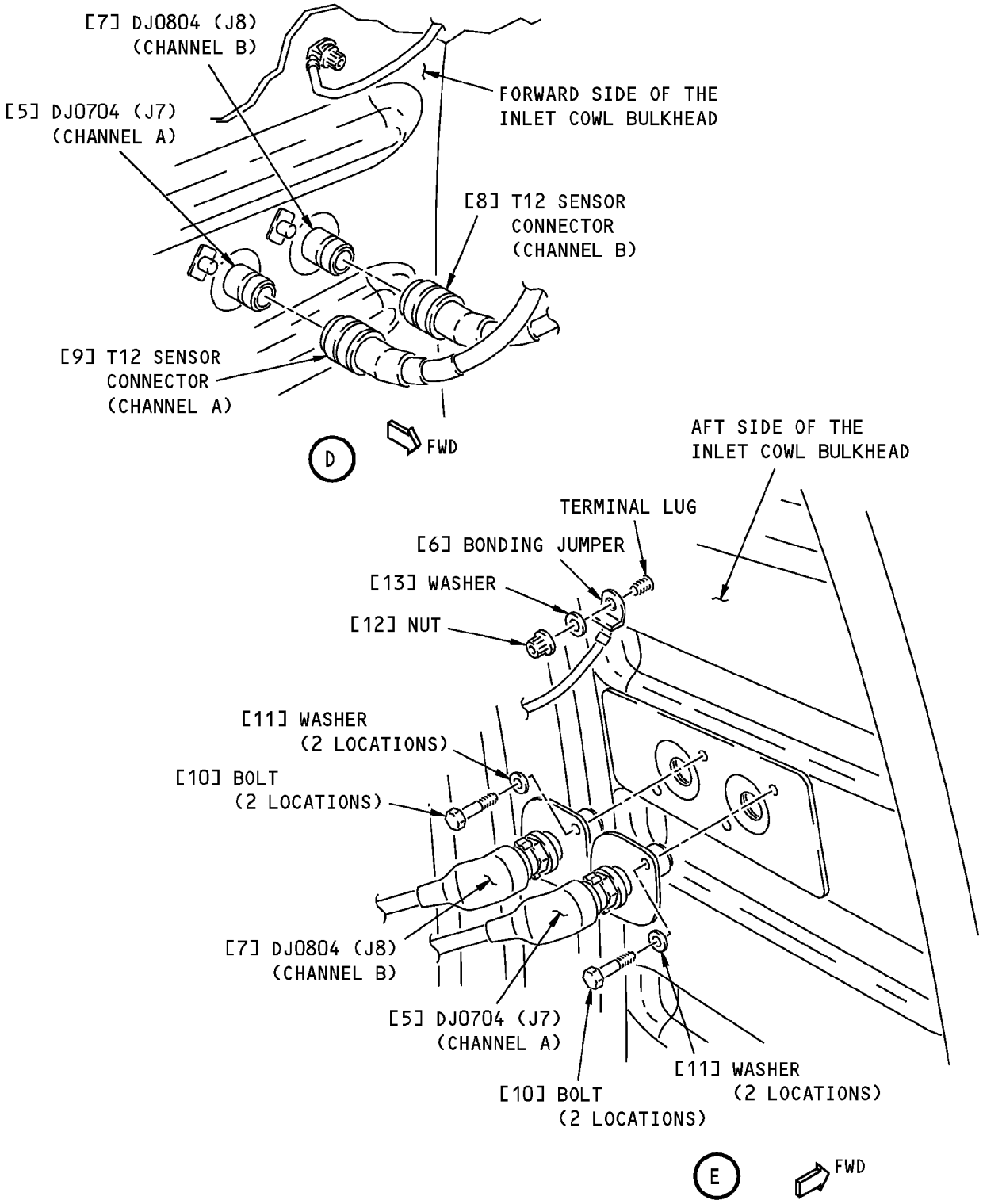
SUBTASK 71-11-01-980-001-F00

(12) Remove the inlet cowl [31] from the work area.

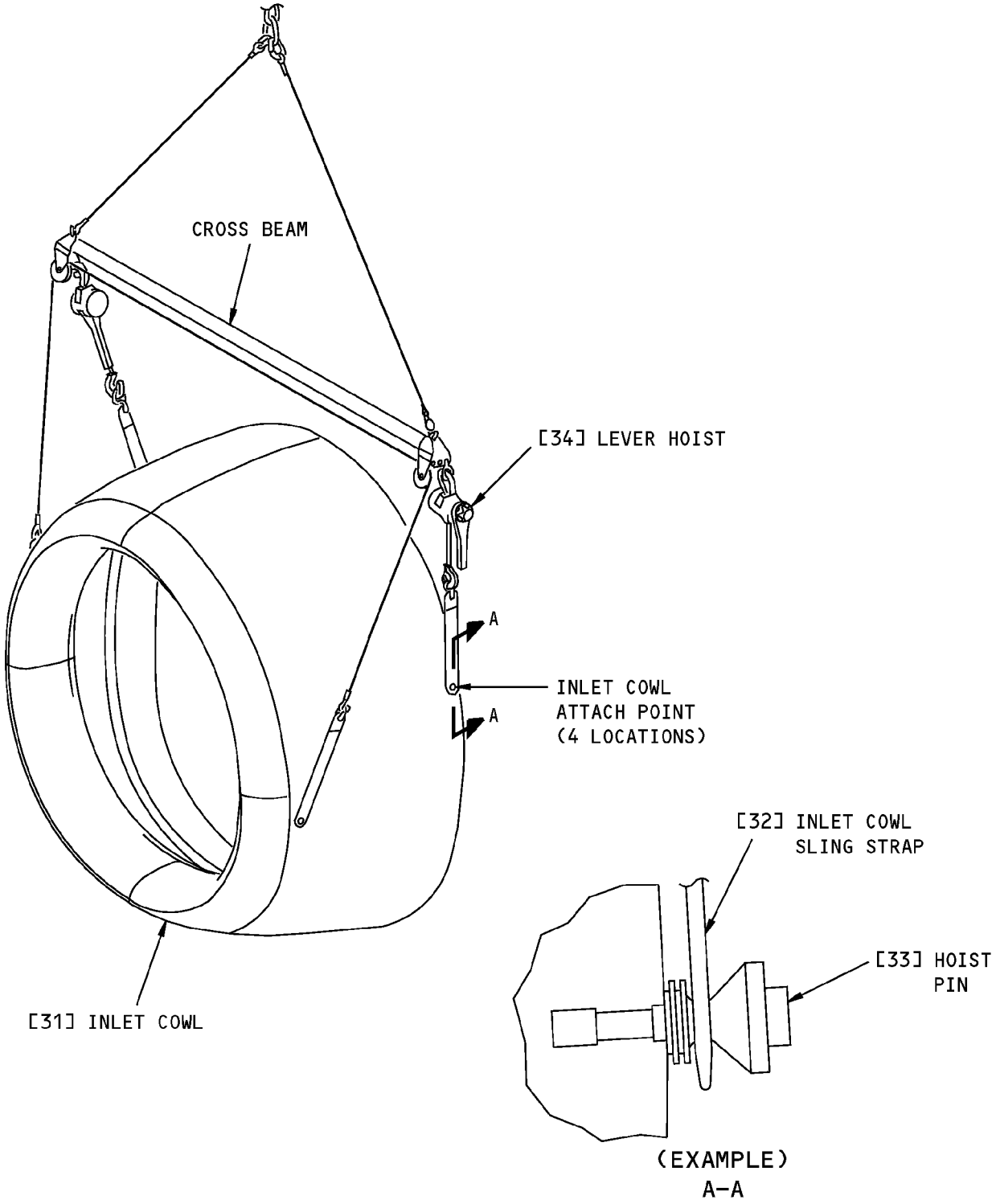
END OF TASK



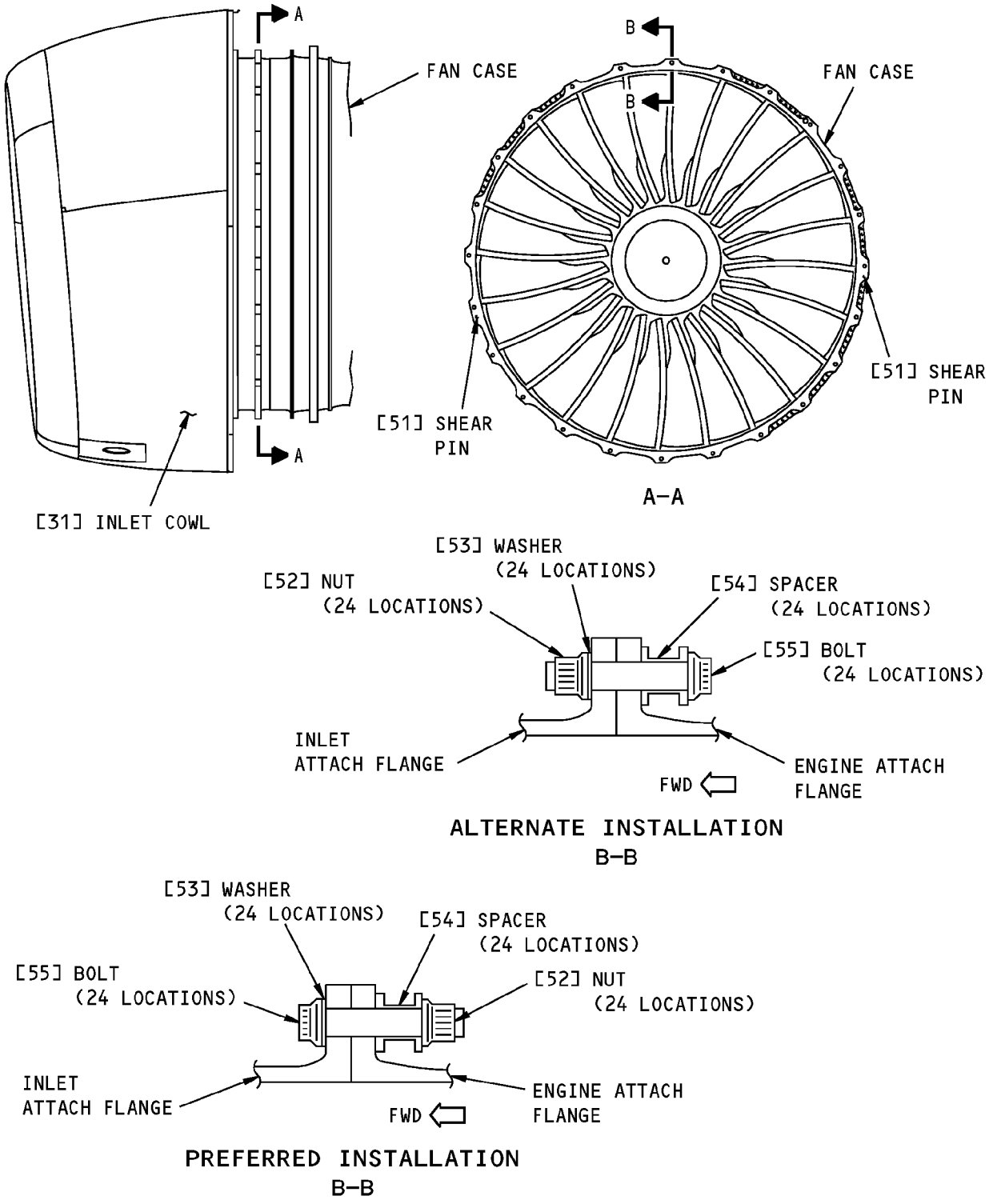
Inlet Cowl Installation
Figure 401 (Sheet 1 of 2)/71-11-01-990-802-F00



Inlet Cowl Installation
Figure 401 (Sheet 2 of 2)/71-11-01-990-802-F00



Inlet Cowl Equipment
Figure 402/71-11-01-990-803-F00



Inlet Cowl Installation
Figure 403/71-11-01-990-804-F00

TASK 71-11-01-400-802-F00

5. Install the Inlet Cowl (Sling and Overhead Hoist)

A. References

Reference	Title
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
73-21-05-400-801-F00	T12 Sensor Installation (P/B 401)

B. Tools/Equipment

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

Reference	Description
SPL-2062	Sling - Inlet Cowl (Part #: B71040-39, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Opt Part #: B71040-38, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
STD-3906	Mallet - Rubber

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	Seal	30-21-11-01-125	HAP 001-007
		30-21-11-01A-125	HAP 008-013, 015-026, 028-054, 101-999
31	Inlet cowl	71-11-01-01-025	HAP 001-007
		71-11-02-02-005	HAP ALL
		71-11-02-02-010	HAP ALL
		71-11-02-02-035	HAP ALL
		71-11-02-02-040	HAP ALL

D. Location Zones

Zone	Area
412	Engine 1 - Nose Inlet Cowl
422	Engine 2 - Nose Inlet Cowl

E. Access Panels

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

F. Inlet Cowl Installation

SUBTASK 71-11-01-400-002-F00

(1) If not already done, prepare the inlet cowl sling, SPL-2062 for the installation (Figure 402).

SUBTASK 71-11-01-480-001-F00

(2) Do these steps to attach the sling to the inlet cowl [31]:

(a) Connect the hoist to the inlet cowl sling, SPL-2062.

(b) Attach the straps [32] to the inlet cowl [31] with the four hoist pins [33] (Figure 402).

(c) Attach the forward sling straps [32] to the lever hoists [34].

(d) Make sure the sling straps [32] are vertical.

SUBTASK 71-11-01-820-001-F00

(3) Make sure the shear pins [51] at the 3:00 and 9:00 o'clock positions on the engine flange are correctly installed (Figure 403).

SUBTASK 71-11-01-020-008-F00

(4) Remove the protective caps on the EEC cooling hose [4], the inlet cowl TAI duct [1] and the openings on the inlet cowl bulkhead.

SUBTASK 71-11-01-420-001-F00

(5) Make sure that the seal [3] is installed in the forward flange of the inlet cowl TAI duct.

(a) If the seal [3] is not installed, install a seal [3].

NOTE: The seal is slightly "oval" and will snap into its position.

SUBTASK 71-11-01-420-002-F00

(6) Do these steps to install the inlet cowl [31]:

WARNING: BE CAREFUL WHEN YOU MOVE THE INLET COWL. BECAUSE THE INLET COWL WEIGHS 310 POUNDS (141 KG), INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Lift the inlet cowl [31] off the pallet or other surface.

(b) Use the lever hoists [34] to turn the inlet cowl [31] until the inlet attach flange is vertical.

NOTE: To turn the inlet, decrease the length of the lever hoist chains.

CAUTION: USE PRECAUTION TO NOT DAMAGE THE CTAI OR EEC COOLING DUCT FLANGES WHEN YOU ENGAGE THE INLET ATTACH FLANGE TO THE ENGINE ATTACH FLANGE.

CAUTION: BE CAREFUL WHEN YOU ADJUST THE INLET COWL ON THE ENGINE. THE INLET COWL CAN HIT THE INTEGRATED DRIVE GENERATOR (IDG), IDG OIL COOLING TUBING AND HYDRAULIC HOSES.

(c) Adjust the inlet cowl [31] until the holes in the inlet attach flange are aligned with the shear pins [51] on the engine attach flange.

(d) Make sure that the inlet attach flange touches the engine attach flange in all locations.

SUBTASK 71-11-01-820-002-F00

(7) Make sure the forward duct of the inlet cowl TAI valve [1] and the EEC cooling hose [4] are aligned and correctly seated.

SUBTASK 71-11-01-420-003-F00

(8) Do these steps to attach the inlet cowl [31] to the engine (Figure 403):

(a) Install the 24 bolts [55], the 24 spacers [54], the 24 washers [53] and the 24 nuts [52] (24 locations each) as you obey these steps:

1) Install the bolts [55] with the bolthead on the forward side of the flange.

NOTE: As an alternate procedure, you can install the bolts with the boltheads aft.

2) Install the spacers [54] on the aft side of the flange.

3) Install the washers [53] on the forward side of the flange.

(b) Cross-tighten the bolts [55] to 585-715 pound-inches (66-81 Newton meters).

NOTE: If you used the alternate procedure to install the bolts, tighten the nuts [52] to 500-650 pound-inches (56-73 Newton meters).

NOTE: As a guide, tighten the fastener that is on the forward side of the flange and near the washer [53].

SUBTASK 71-11-01-080-003-F00

(9) Do these steps to remove the inlet cowl installation equipment:

(a) Release the load from the straps [32].

(b) To disconnect the straps [32] from the inlet cowl [31], remove the four hoist pins [33].

(c) Remove the sling, cross beam, lever hoists [34] and the overhead hoist.

SUBTASK 71-11-01-420-004-F00

(10) Do these steps to connect the inlet cowl TAI duct [1] (Figure 401):

(a) Adjust the coupling [2] to give the maximum clearances to the coupling bolt.

(b) Tighten the coupling [2] to the torque given on the part.

(c) Lightly tap the outer edge of the coupling [2] with a rubber mallet, STD-3906.

(d) Tighten the coupling [2] again to the torque given on the part.

SUBTASK 71-11-01-420-005-F00

(11) Do these steps to install the EEC cooling hose [4] (Figure 401):

(a) Install the EEC cooling hose [4] on the aft side of the inlet cowl bulkhead.

(b) Install the hose clamp [5] on the EEC cooling hose [4].

(c) Tighten the hose clamp [5] to 20-30 pound-inches (2-4 Newton meters).

SUBTASK 71-11-01-410-003-F00

(12) If a T12 sensor is not installed on the replacement inlet cowl [31], do this task: T12 Sensor Installation, TASK 73-21-05-400-801-F00.

SUBTASK 71-11-01-420-006-F00

(13) Do these steps to install the T12 electrical harnesses to the inlet cowl (Figure 401):

(a) Install the four bolts [10] and washers [11] that attach the electrical connectors, DJ0804 [7] and DJ0704 [5] to the aft side of the inlet cowl bulkhead [31].

NOTE: The electrical connector DJ0804 (on the J8 wiring harness) is inboard, and the electrical connector DJ0704 (on the J7 wiring harness) is outboard.

1) Tighten the bolts [10] to 72-88 pound-inches (8.0-9.9 Newton meters).

(b) Do this step;

Open the T12 access doors:

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

(c) Connect these electrical connectors:

1) Connect the T12 sensor connector (Ch B) [8] to the electrical connector, DJ0804 [7].

2) Connect the T12 sensor connector (Ch A) [9] to the electrical connector, DJ0704 [5].

SUBTASK 71-11-01-420-007-F00

(14) Do these steps to install the bonding jumper [6] to the aft side of the inlet cowl bulkhead:

(a) Connect the bonding jumper [6] to the terminal lug with the nut [12] and washer [13].

(b) Tighten the nut [12] to 65-70 pound-inches (7.3-7.9 Newton meters).

SUBTASK 71-11-01-410-004-F00

(15) Do this step;

Close the T12 access doors:

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

SUBTASK 71-11-01-860-002-F00

(16) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

——————— END OF TASK ———————

TASK 71-11-01-000-803-F00

6. Remove the Inlet Cowl (Nose Cowl Dolly or Boom Hoist)

A. General

(1) The removal and installation of the inlet cowl is done with a nose cowl dolly or a boom hoist.

(a) An overhead hoist is not necessary for this procedure.

(b) The dolly, COM-2060 operates as follows:

1) The dolly is a fixture which has a structural base mounted on three casters.

2) The three casters let the dolly move in the longitudinal direction.

3) Three hand jacks let the dolly move in the vertical direction.

4) For this procedure the nose cowl dolly will be referred to as the dolly.

(c) The boom hoist, SPL-2430 is a boom hoist and uses a installation/removal frame equipment, SPL-2165 frame assembly to attach to the inlet cowl.

1) The boom hoist is also used for removal of the thrust reverser and aft fairing.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
73-21-05-000-801-F00	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
COM-2060	Dolly - Nose Cowl, Removal/Installation, CFM56-3 and -7 Engine (Part #: AM-1940-400, Supplier: 9M323, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -ALL, -BBJ)
SPL-2165	Installation/Removal Frame Equipment - Inlet Cowl, CFM56-7 Engine (Part #: C71027-1, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
SPL-2430	Hoist - Boom, Ground Based (Part #: C78026-156, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

D. Location Zones

Zone	Area
412	Engine 1 - Nose Inlet Cowl
422	Engine 2 - Nose Inlet Cowl

E. Access Panels

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

F. Prepare for the Removal of the Inlet Cowl.

SUBTASK 71-11-01-010-002-F00

(1) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

G. Inlet Cowl Removal

SUBTASK 71-11-01-020-009-F00

(1) Do these steps to remove the T12 electrical harnesses from the inlet cowl (Figure 401):

(a) Do this step;

Open the T12 access doors:

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

(b) Disconnect the T12 sensor connector (Ch A) [9] and the T12 sensor connector (Ch B) [8] from the forward side of the inlet cowl bulkhead.

(c) Do these steps to remove the electrical connectors, DJ0804 [7] and DJ0704 [5] from the aft side of the inlet cowl bulkhead:

1) Remove the four bolts [10] and washers [11] that attach the electrical connectors, DJ0704 [5] and DJ0804 [7] to the inlet cowl bulkhead.

2) Pull the harnesses [5] and [7] away from the inlet cowl.

NOTE: Temporarily attach these harnesses to the engine fan case.

SUBTASK 71-11-01-020-010-F00

(2) Remove the nut [12] and the washer [13] that attach the bonding jumper [6] to the aft side and forward side of the inlet cowl bulkhead.

SUBTASK 71-11-01-020-011-F00

(3) If a T12 sensor is not installed on the replacement inlet cowl, do this task: T12 Sensor Removal, TASK 73-21-05-000-801-F00.

SUBTASK 71-11-01-410-005-F00

(4) Close the T12 access door.

SUBTASK 71-11-01-020-012-F00

(5) Do these steps to disconnect the EEC cooling hose [4]:

(a) Disconnect the EEC cooling hose clamp [5] on the EEC cooling hose [4].

(b) Remove the EEC cooling hose [4] from the duct on the inlet cowl bulkhead.

SUBTASK 71-11-01-020-013-F00

(6) Remove the coupling [2] that attaches the inlet cowl TAI duct [1] to the aft side of the inlet cowl bulkhead.

SUBTASK 71-11-01-020-014-F00

(7) To install the support equipment for the inlet cowl removal, do the applicable steps that follow:

(a) To use the dolly, do these steps (Figure 404):

1) Put the dolly below the inlet cowl [31].

2) Use the hand jacks on the dolly to lift the dolly until it touches the inlet cowl [31].

3) Adjust the hand jacks so that all three of the rubber supports on the dolly touch the inlet cowl [31].

4) Attach the engine cowling strap around the inlet cowl [31] and to the two connections on the dolly.

CAUTION: APPLY ONLY THE FORCE WHICH IS NECESSARY TO HOLD THE INLET COWL IN THE DOLLY. MORE FORCE CAN CAUSE DAMAGE TO THE INLET COWL.

5) Tighten the engine cowling strap to hold the inlet cowl [31] to the dolly.

(b) To use the boom hoist, do these steps (Figure 405):

1) Install the frame assembly on the inlet cowl [31] with the pins at the four GSE attach points.

NOTE: You can assemble the frame on the inlet cowl. Install the two side parts on the inlet cowl. Use the pins to install the parts of the forward assembly.

2) Adjust the boom hoist and align the holes in the frame assembly with the adapter on the hoist.

a) Make sure you know the hydraulic operation of the boom, mast and pitch controls.

3) Attach the boom hoist to the frame assembly with the two lockpins.

SUBTASK 71-11-01-020-015-F00

(8) Do these steps to remove the inlet cowl [31] (Figure 403).

WARNING: BE CAREFUL WHEN YOU MOVE THE INLET COWL. BECAUSE THE INLET COWL WEIGHS 310 POUNDS (141 KG), INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Remove the bolts [55], spacers [54], washers [53], and nuts [52] that attach the inlet attach flange to the engine attach flange.

NOTE: You can unclip wire harnesses to get access, specially for the right side.

CAUTION: USE PRECAUTION TO PREVENT DAMAGE TO THE INTEGRATED DRIVE GENERATOR (IDG), IDG OIL COOLING TUBING AND HYDRAULIC HOSES.

(b) Pull the inlet cowl [31] forward until it is clear of the shear pins [51] on the engine attach flange.

NOTE: The shear pins are attached to the engine attach flange at the 3:00 and 9:00 o'clock positions.

(c) Move the inlet cowl [31] forward and away from the engine attach flange to a suitable location.

SUBTASK 71-11-01-900-002-F00

(9) Remove the seal [3] from the forward flange of the inlet cowl TAI duct [1].

(a) Make sure the seal is serviceable.

(b) If the seal is not serviceable, replace it.

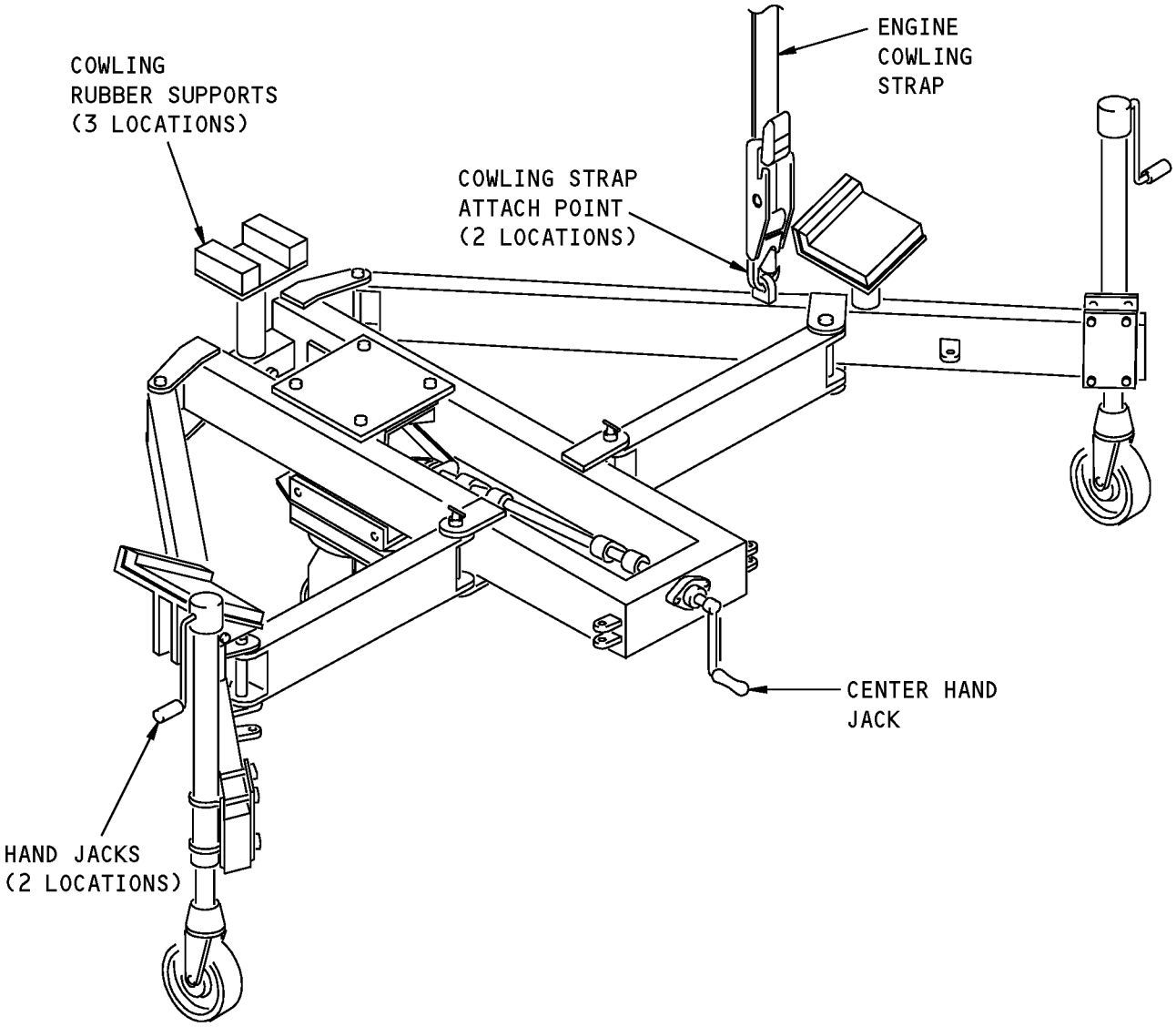
(c) Install the seal.

NOTE: The seal is slightly "oval" and will snap into its position.

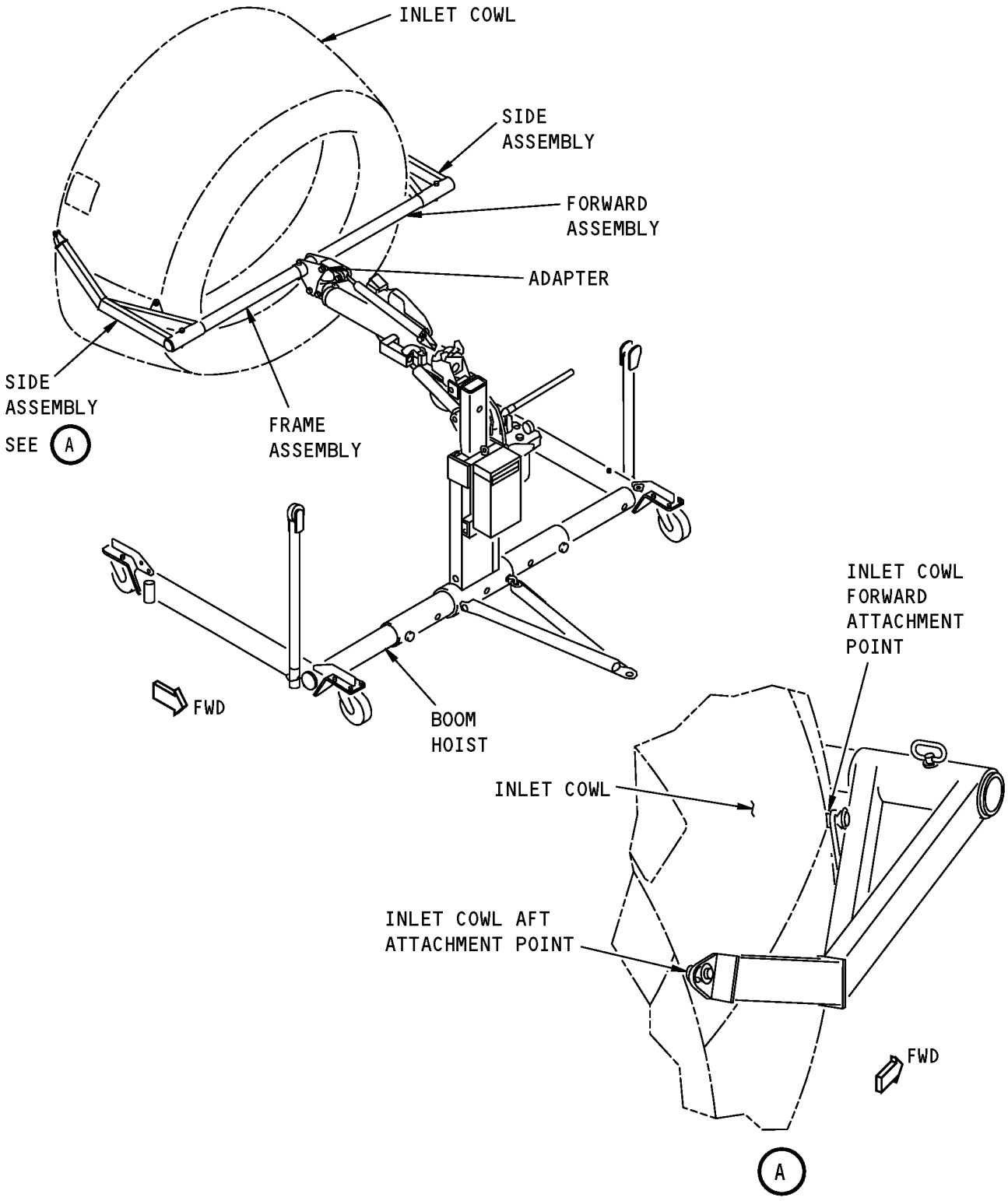
SUBTASK 71-11-01-020-016-F00

(10) Install protective caps on the EEC cooling hose [4], the inlet cowl TAI duct [1] and the openings on the inlet cowl bulkhead.

END OF TASK



Inlet Cowl Equipment - Nose Cowl Dolly
Figure 404/71-11-01-990-805-F00



Inlet Cowl Equipment - Boom Hoist
Figure 405/71-11-01-990-806-F00

TASK 71-11-01-400-803-F00

7. Install the Inlet Cowl (Nose Cowl Dolly or Boom Hoist)

A. References

Reference	Title
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
73-21-05-400-801-F00	T12 Sensor Installation (P/B 401)

B. Tools/Equipment

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

Reference	Description
COM-2060	Dolly - Nose Cowl, Removal/Installation, CFM56-3 and -7 Engine (Part #: AM-1940-400, Supplier: 9M323, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -ALL, -BBJ)
SPL-2165	Installation/Removal Frame Equipment - Inlet Cowl, CFM56-7 Engine (Part #: C71027-1, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
SPL-2430	Hoist - Boom, Ground Based (Part #: C78026-156, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)
STD-3906	Mallet - Rubber

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	Seal	30-21-11-01-125	HAP 001-007
		30-21-11-01A-125	HAP 008-013, 015-026, 028-054, 101-999
31	Inlet cowl	71-11-01-01-025	HAP 001-007
		71-11-02-02-005	HAP ALL
		71-11-02-02-010	HAP ALL
		71-11-02-02-035	HAP ALL
		71-11-02-02-040	HAP ALL

D. Location Zones

Zone	Area
412	Engine 1 - Nose Inlet Cowl
422	Engine 2 - Nose Inlet Cowl

E. Access Panels

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

F. Inlet Cowl Installation

SUBTASK 71-11-01-480-002-F00

(1) To make sure the support equipment is correct for the inlet cowl installation, do the applicable steps that follow:

(a) To use the dolly, COM-2060, do this step (Figure 404):

CAUTION: APPLY ONLY THE FORCE WHICH IS NECESSARY TO HOLD THE INLET COWL IN THE DOLLY. MORE FORCE CAN CAUSE DAMAGE TO THE INLET COWL.

1) Make sure the engine cowling strap is tightened around the inlet cowl to hold the inlet cowl to the dolly.

(b) To use the boom hoist, make sure the installation/removal frame equipment, SPL-2165 frame and boom hoist, SPL-2430 are installed correctly (Figure 405).

1) If it is necessary, do the steps in the Removal Task to install the support equipment.

SUBTASK 71-11-01-820-003-F00

(2) Make sure the shear pins [51] at the 3:00 and 9:00 o'clock positions on the engine flange are correctly installed (Figure 403).

SUBTASK 71-11-01-020-017-F00

(3) Remove the protective caps on the EEC cooling hose [4], the inlet cowl TAI duct [1] and the openings on the inlet cowl bulkhead.

SUBTASK 71-11-01-420-008-F00

(4) Make sure that the seal [3] is installed in the forward flange of the inlet cowl TAI duct.

(a) If the seal [3] is not installed, install the seal [3].

NOTE: The seal is slightly "oval" and will snap into its position.

SUBTASK 71-11-01-420-009-F00

(5) Do these steps to install the inlet cowl [31]:

WARNING: BE CAREFUL WHEN YOU MOVE THE INLET COWL. BECAUSE THE INLET COWL WEIGHS 310 POUNDS (141 KG), INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(a) Move the support equipment with the inlet cowl [31] to the engine attach flange.

(b) Use the controls of the support equipment to lift the inlet cowl [31] to the height of the engine attach flange.

CAUTION: USE PRECAUTION TO NOT DAMAGE THE CTAI OR EEC COOLING DUCT FLANGES WHEN YOU ENGAGE THE INLET ATTACH FLANGE TO THE ENGINE ATTACH FLANGE.

CAUTION: BE CAREFUL WHEN YOU ADJUST THE INLET COWL ON THE ENGINE. THE INLET COWL CAN HIT THE INTEGRATED DRIVE GENERATOR (IDG), IDG OIL COOLING TUBING AND HYDRAULIC HOSES.

(c) Adjust the inlet cowl [31 until the holes in the inlet attach flange are aligned with the shear pins [51] on the engine attach flange.

(d) Make sure that the inlet attach flange touches the engine attach flange in all locations.

SUBTASK 71-11-01-820-004-F00

(6) Make sure the forward duct of the inlet cowl TAI valve [1] and the EEC cooling hose [4] are aligned and correctly seated.

SUBTASK 71-11-01-420-010-F00

(7) Do these steps to attach the inlet cowl [31] to the engine (Figure 403):

(a) Install the 24 bolts [55], the 24 spacers [54], the 24 washers [53] and the 24 nuts [52] (24 locations each) as you obey these steps:

1) Install the bolts [55] with the bolthead on the forward side of the flange.

NOTE: As an alternate procedure, you can install the bolts with the boltheads aft.

2) Install the spacers [54] on the aft side of the flange.

3) Install the washers [53] on the forward side of the flange.

(b) Cross-tighten the bolts [55] to 585-715 pound-inches (66-81 Newton meters).

NOTE: If you used the alternate procedure to install the bolts, tighten the nuts [52] to 500-650 pound-inches (56-73 Newton meters).

NOTE: As a guide, tighten the fastener that is on the forward side of the flange and near the washer [53].

SUBTASK 71-11-01-020-018-F00

(8) To remove the support equipment, do the applicable steps that follow:

(a) To remove the dolly, do these steps:

1) Remove the engine cowling strap.

2) Lower the dolly and remove the dolly from below the inlet cowl.

(b) To remove the boom hoist, do these steps:

1) Disconnect the frame assembly from the inlet cowl at the four GSE attach points.

2) Move the boom hoist and frame assembly away from the inlet cowl.

3) Remove the frame assembly from the boom hoist.

SUBTASK 71-11-01-420-011-F00

(9) Do these steps to connect the inlet cowl TAI duct [1] (Figure 401):

(a) Adjust the coupling [2] to give the maximum clearances to the coupling bolt.

(b) Tighten the coupling [2] to the torque given on the part.

(c) Lightly tap the outer edge of the coupling with a rubber mallet, STD-3906.

(d) Tighten the coupling [2] again to the torque given on the part.

SUBTASK 71-11-01-420-012-F00

(10) Do these steps to install the EEC cooling hose [4] (Figure 401):

(a) Install the EEC cooling hose [4] on the aft side of the inlet cowl bulkhead.

(b) Install the hose clamp [5] on the EEC cooling hose [4].

(c) Tighten the hose clamp [5] to 20-30 pound-inches (2-4 Newton meters).

SUBTASK 71-11-01-410-006-F00

(11) If a T12 sensor is not installed on the replacement inlet cowl [31], do this task: T12 Sensor Installation, TASK 73-21-05-400-801-F00.

SUBTASK 71-11-01-420-013-F00

(12) Do these steps to install the T12 electrical harnesses to the inlet cowl (Figure 401):

(a) Install the four bolts [10] and washers [11] that attach the electrical connector, DJ0804 [7] and DJ0704 [5] to the aft side of the inlet cowl bulkhead [31].

NOTE: The electrical connector DJ0804 (on the J8 wiring harness) is inboard, and the electrical connector DJ0704 (on the J7 wiring harness) is outboard.

(b) Tighten the bolts [10] to 72-88 pound-inches (8.0-9.9 Newton meters).

(c) Do this step;

Open the T12 access doors:

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

(d) Connect these electrical connectors:

1) Connect the T12 sensor connector (Ch B) [8] to the electrical connector, DJ0804 [7].

2) Connect the T12 sensor connector (Ch A) [9] to the electrical connector, DJ0704 [5].

SUBTASK 71-11-01-420-014-F00

(13) Do these steps to install the bonding jumper [6] to the aft side of the inlet cowl bulkhead:

(a) Connect the bonding jumper [6] to the terminal lug with the nut [12] and washer [13].

(b) Tighten the nut [12] to 65-70 pound-inches (7.3-7.9 Newton meters).

SUBTASK 71-11-01-410-007-F00

(14) Do this step;

Close the T12 access doors:

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

SUBTASK 71-11-01-860-003-F00

(15) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

END OF TASK

INLET COWL - INSPECTION/CHECK

1. General

A. This procedure contains scheduled maintenance task data.

B. This procedure has two tasks:

(1) The task to examine the inlet cowl skin for damage

(2) The task to examine the bolts that attach the inlet cowl to the engine.

TASK 71-11-01-200-801-F00

2. Inlet Cowl Inspection

(Figure 601)

A. General

(1) This task examines the skin of the inlet cowl for damage.

B. References

Reference	Title
71-11-01-300-801-F01	Replace the Thermal Anti-Ice (TAI) Exhaust Duct (P/B 801)
CMM 71-11-22	Inlet Cowl AY
SRM 54-10-01	Structural Repair Manual

C. Location Zones

Zone	Area
412	Engine 1 - Nose Inlet Cowl
422	Engine 2 - Nose Inlet Cowl

D. Procedure

SUBTASK 71-11-01-210-001-F00

(1) Examine the internal skin, the external skin and the lip skin of the inlet cowl for the damage that follows:

(a) Cracks

(b) Nicks, gouges, scratches and corrosion

(c) Dents

(d) Holes

(e) Erosion (on the lip skin)

(f) Missing sealant between the lip skin segments (3 locations)

1) Missing sealant is permitted between the segments. It is not necessary to re-apply the sealant.

SUBTASK 71-11-01-220-001-F00

(2) If you find damage, refer to this reference (SRM 54-10-01) for the permitted limits.

SUBTASK 71-11-01-210-003-F00

(3) Visually examine the cowl thermal anti-ice (TAI) duct louver for signs of cracks or missing louvers.

NOTE: The TAI duct louver is found at the 6 o'clock position of the inlet cowl.

NOTE: To repair the TAI exhaust duct, remove the duct from the inlet cowl. Do this task: Replace the Thermal Anti-Ice (TAI) Exhaust Duct, TASK 71-11-01-300-801-F01. It is not necessary to remove the inlet cowl to do this repair.

(a) If one or more missing louvers are found with no cracks in the slotted areas, it is permitted to return the airplane to service.

(b) If cracks are found in the slotted areas but do not exceed 1.0 inch (25.40 mm) in length, do these steps for a temporary repair:

1) Do a stop drill repair with a #30 drill (0.1285 inch dia.) at the end of the cracks.

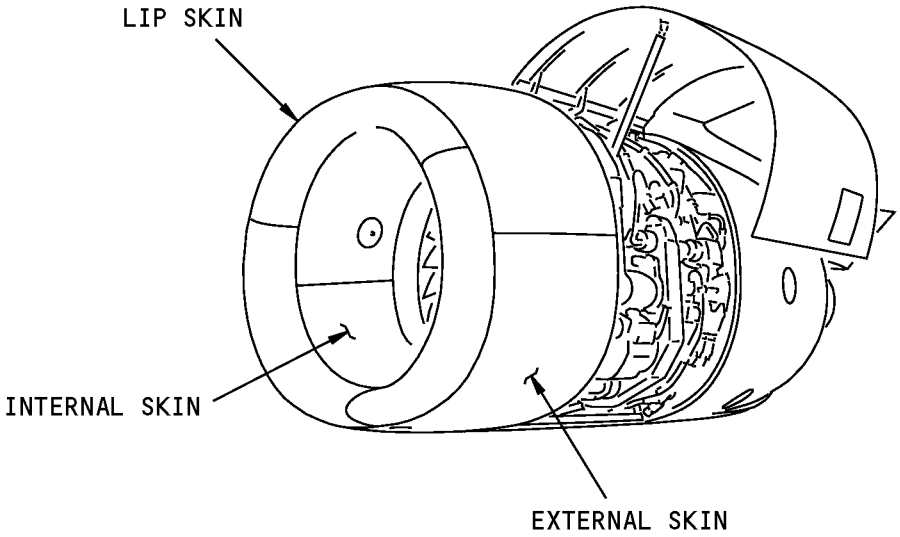
2) Return the airplane to service.

(c) All missing louvers and cracks should be repaired in 800 hrs after you note the missing louvers or after you do the temporary repair.

1) Refer to CMM 71-11-22 for the applicable repair.

(d) If the crack danage is more than 1.0 inch (25.40 mm) in length in any slot area, the duct should be replaced or contact the vendor (Goodrich) for disposition.

END OF TASK



Inlet Cowl Inspection
Figure 601/71-11-01-990-801-F00

TASK 71-11-01-200-802-F00

3. Inlet Cowl Bolt Inspection

A. General

(1) This procedure is a scheduled maintenance task.

(2) This task is a visual check of the bolts (24 locations) that attach the inlet cowl to the engine.

B. References

Reference	Title
71-11-01-400-801-F00	Install the Inlet Cowl (P/B 401)
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)

C. Location Zones

Zone	Area
412	Engine 1 - Nose Inlet Cowl
422	Engine 2 - Nose Inlet Cowl

D. Procedure

SUBTASK 71-11-01-010-001-F00

(1) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 71-11-01-210-002-F00

(2) Do a visual check of the bolts (24 locations) which attach the inlet cowl to the engine (flange A1) for the correct installation.

(a) Look for bolts which are loose or missing.

1) Missing or loose bolts are not permitted.

2) Refer to the task to install the inlet cowl to install and tighten the bolts (TASK 71-11-01-400-801-F00).

SUBTASK 71-11-01-410-001-F00

(3) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

——————— END OF TASK ———————

INLET COWL - REPAIR

1. General

A. This repair is to replace the thermal anti-ice (TAI) exhaust duct in the inlet cowl.

TASK 71-11-01-300-801-F01

2. Replace the Thermal Anti-Ice (TAI) Exhaust Duct

A. General

(1) This task is to replace the TAI exhaust duct in the inlet cowl.

(2) Use this procedure for the left of right inlet cowl.

(3) The TAI exhaust duct is found at the 6 o'clock position on the inlet cowl.

B. Location Zones

Zone	Area
412	Engine 1 - Nose Inlet Cowl
422	Engine 2 - Nose Inlet Cowl

C. Procedure

SUBTASK 71-11-01-010-003-F01

(1) Do these steps to remove the access panel:

(a) Remove the bolts that attach the access panel to the outer barrel of the inlet cowl.

(b) Remove the access panel

SUBTASK 71-11-01-020-019-F01

(2) Do these steps to remove the TAI exhaust duct [1]:

(a) Remove the bolts and washers from the flange of the TAI exhaust duct.

(b) Remove the TAI exhaust duct:

(c) Apply tape to cover the TAI duct area on the ''D'' duct bulkhead of the inlet cowl.

SUBTASK 71-11-01-420-015-F01

(3) Do these steps to install the TAI exhaust duct [1]:

(a) Remove the tape from the TAI duct area.

(b) Put the TAI exhaust duct in the correct position in the inlet cowl.

1) Align the holes in the duct flange with the holes in the inner barrel.

(c) Install the bolts and washers.

1) Tighten the bolts to 30-35 inch-pounds (3.39-3.95 Newton-meters.

SUBTASK 71-11-01-410-008-F01

(4) Do these steps to install the access panel:

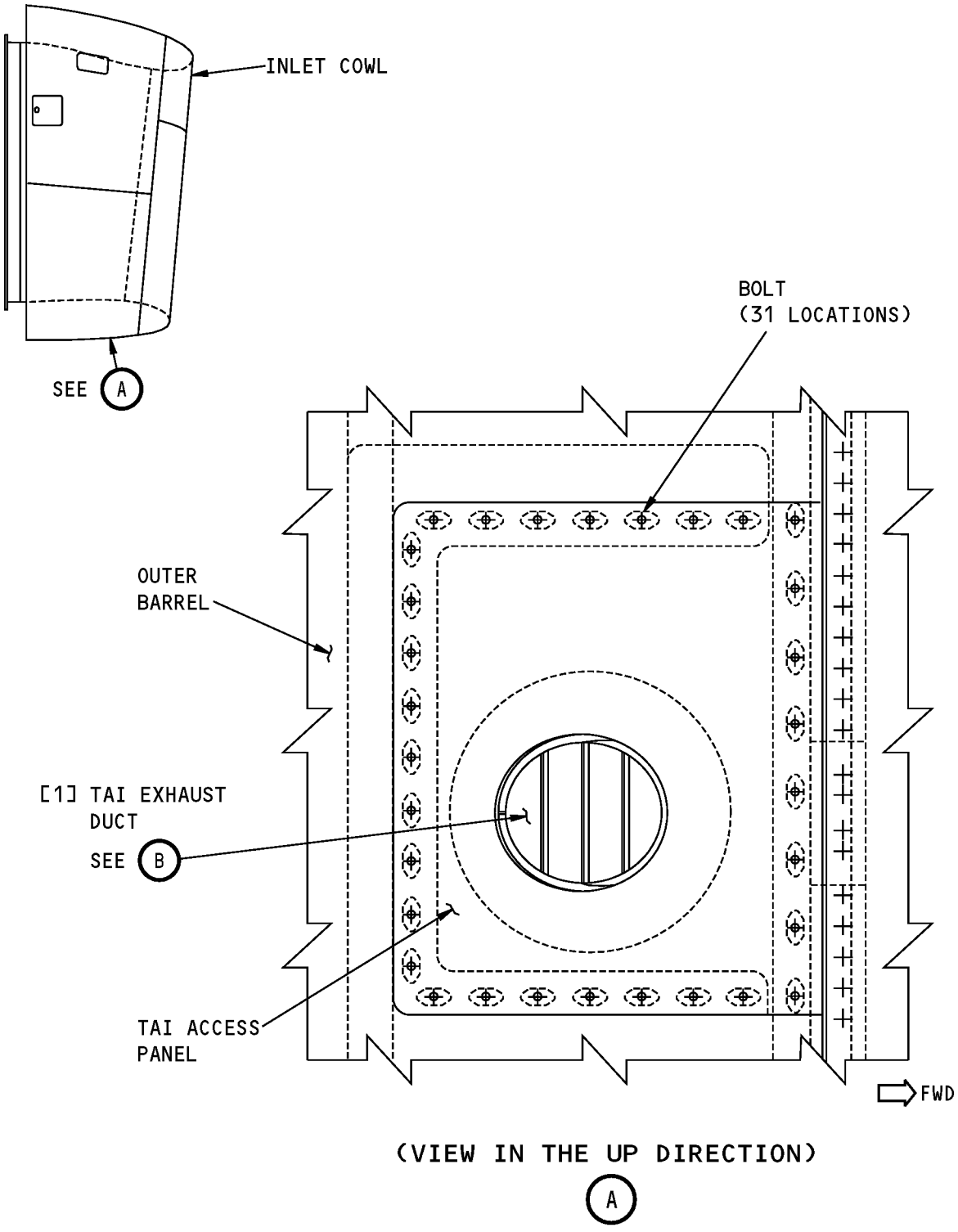
NOTE: Make sure you do not damage the bulb seal when you install the access panel. Carefully guide the exhaust duct stand-off over the TAI duct mounting flange.

(a) Install the access panel with the bulb seal in contact with the flange of the TAI exhaust duct..

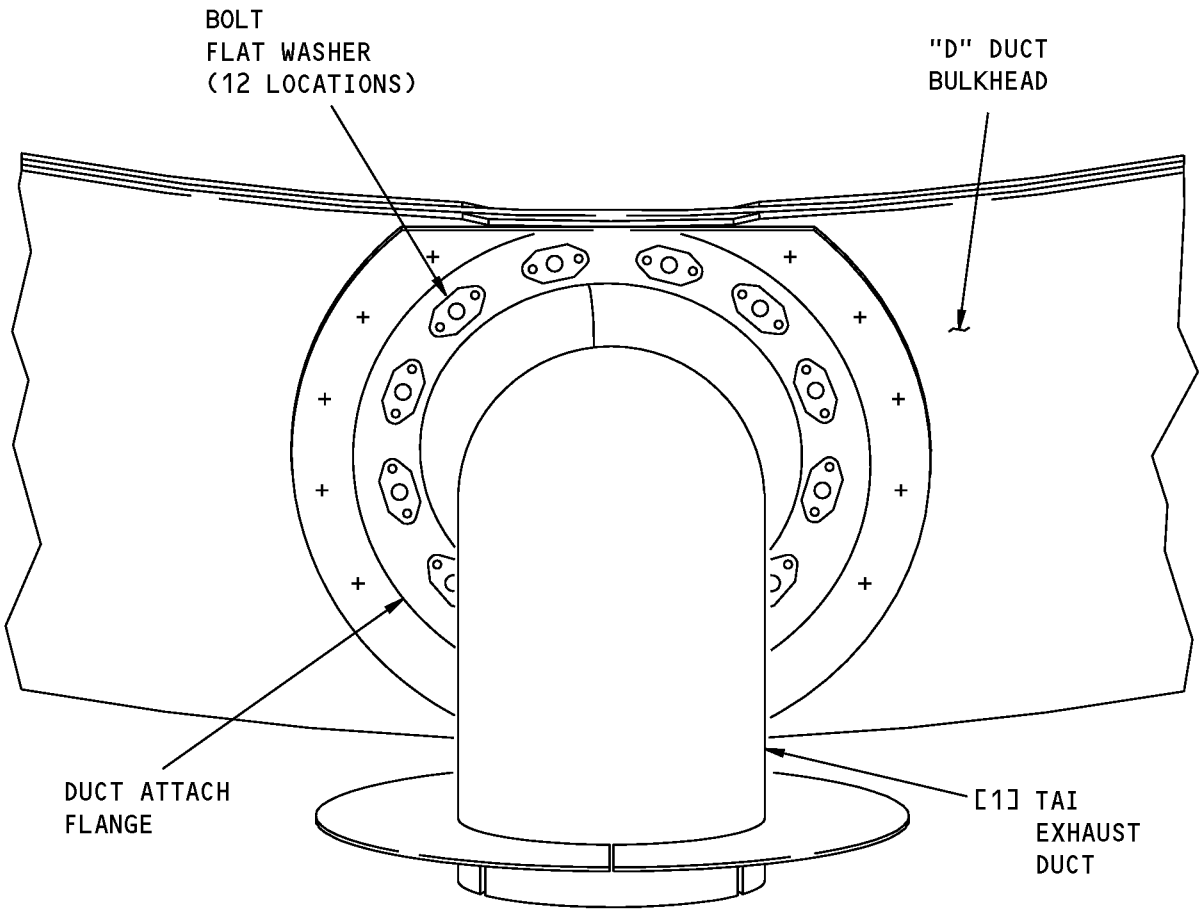
(b) Install the bolts.

1) Tighten the bolts in an alternate pattern to 24-27 inch-pounds (2.71-3.05 Newtin-meters).

END OF TASK



TAI Exhaust Duct
Figure 801 (Sheet 1 of 2)/71-11-01-990-807-F01



TAI Exhaust Duct
Figure 801 (Sheet 2 of 2)/71-11-01-990-807-F01

FAN COWL PANELS - MAINTENANCE PRACTICES

1. General

A. This procedure contains these two tasks:

(1) The first task is to open the fan cowl panels

(2) The second task is to close the fan cowl panels.

TASK 71-11-02-010-801-F00

2. Open the Fan Cowl Panels

(Figure 201)

A. General

(1) Each fan cowl panel is held open with two hold-open rods.

(2) The hold-open rod is spring-loaded in the stowed position and has a double action lock.

(a) You must pull back the end sleeve and compress the rod from the end to release the hold-open rod from the stow receiver.

(3) Two clear movements of the lock are necessary to release the hold-open rod from the locked position.

(a) You must turn and pull the release sleeve in the direction of the arrow.

(b) The hold-open rod is free to extend or compress.

B. References

Reference	Title
27-81-00-040-801	Deactivate the Leading Edge Flaps and Slats (P/B 201)

C. 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

D. Procedure

SUBTASK 71-11-02-860-001-F00

WARNING: DO NOT UNLATCH THE FAN COWL PANELS DURING AN ENGINE OPERATION BECAUSE 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 WHICH COULD CAUSE SERIOUS INJURY OR DEATH.

WARNING: DO NOT OPEN THE FAN COWL PANELS IN HIGH WINDS OR GUST CONDITIONS MORE THAN 40 KNOTS. INJURY TO PERSONS AND DAMAGE TO EQUIPMENT COULD OCCUR.

CAUTION: DO NOT OPEN THE INBOARD FAN COWL PANEL UNLESS THE LEADING EDGE FLAPS ARE DEACTIVATED IN THE RETRACTED POSITION. THERE IS NOT SUFFICIENT CLEARANCE. DAMAGE TO EQUIPMENT COULD OCCUR.

(1) When you open the inboard fan cowl panel, retract and do the deactivation procedure for the leading edge flaps (TASK 27-81-00-040-801) .

SUBTASK 71-11-02-010-002-F00

(2) Release the three latches along the mating line of the fan cowl panels:

(a) Push the trigger to release the safety catch and pull the handle to release the latch.

1) Use a screwdriver in the slot if it is necessary.

(b) Do the steps again for the other two latches.

SUBTASK 71-11-02-010-003-F00

(3) Do these steps to open the fan cowl panels:

NOTE: It is recommended that you open the two fan cowl panels and install the hold-open rods, and not let a fan cowl panel hang loose.

WARNING: HOLD THE FAN COWL PANEL WHILE YOU EXTEND OR UNLOCK THE HOLD-OPEN RODS. IF THE FAN COWL PANEL FALLS, INJURY TO PERSONS AND DAMAGE TO THE ENGINE COMPONENTS CAN OCCUR.

(a) Manually hold the fan cowl panel and move it away from the engine until you can get access to the hold-open rods.

(b) Do these steps to engage the forward hold-open rod on the engine:

1) Retract the sleeve at the receiver end of the hold-open rod and compress it to disengage the rod from the receiver.

2) The rod will extend and snap into the first position to hold the fan cowl panel in the 28-degree open position.

3) Engage the hold-open rod on the engine mounted receiver.

NOTE: For the left side of the fan case, the forward receiver is on the engine flange B1 at the 10:00 o'clock position. The aft receiver is near the fuel nozzle filter. For the right side of the fan case, the forward receiver is on the engine flange A1 at the 2:00 o'clock position. The aft receiver is on the flange B6, aft of the EEC.

(c) Do the steps again, to engage the aft hold-open rod on the engine.

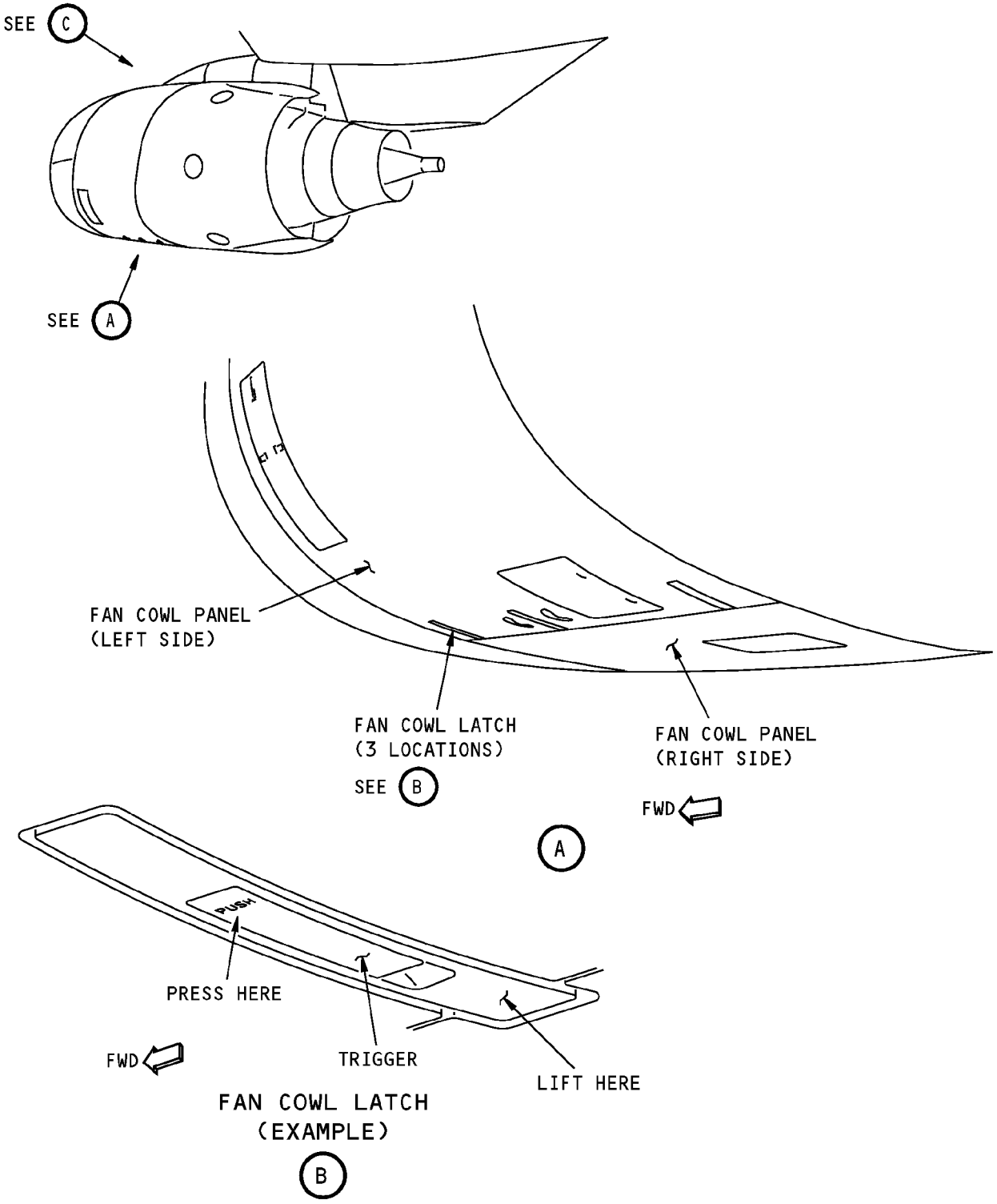
(d) Do these steps to fully open the fan cowl panel to the 55-degree position:

1) Hold the fan cowl panel.

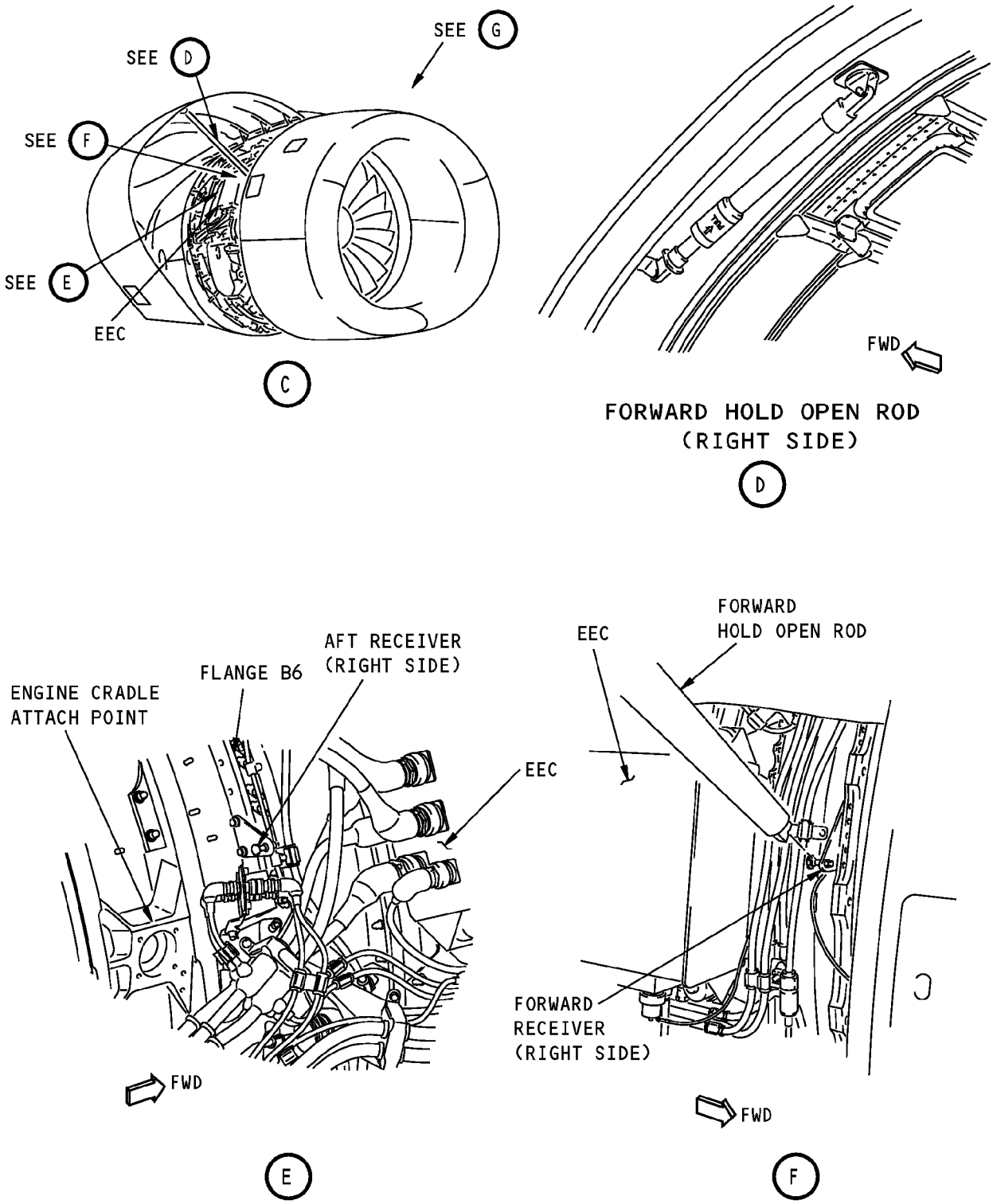
2) Move the TURN/PULL sleeve in the direction of the arrow to unlock each hold-open rod.

3) Move the fan cowl panel away from the engine until the hold-open rods extend and snap into the fully open position.

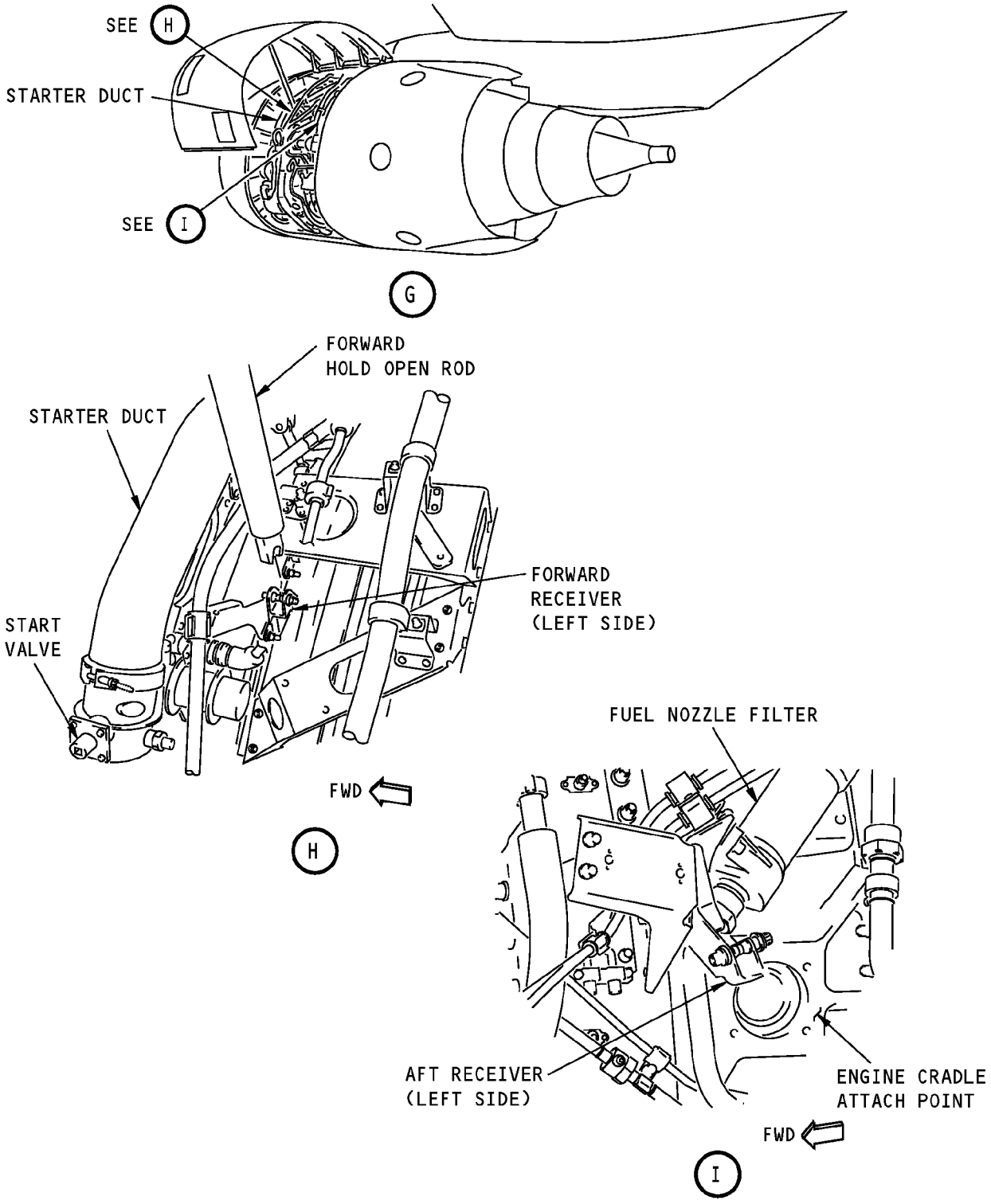
——————— END OF TASK ———————



Fan Cowl Panel Opening and Closing
Figure 201 (Sheet 1 of 3)/71-11-02-990-802-F00



Fan Cowl Panel Opening and Closing
Figure 201 (Sheet 2 of 3)/71-11-02-990-802-F00



Fan Cowl Panel Opening and Closing
Figure 201 (Sheet 3 of 3)/71-11-02-990-802-F00

TASK 71-11-02-410-801-F00

3. Close the Fan Cowl Panels

(Figure 201)

A. References

Reference	Title
27-81-00-440-801	Reactivate the Leading Edge Flaps and Slats (P/B 201)
71-11-03-700-801-F00	Fan Cowl Panel Latch Adjustment (P/B 501)

B. Procedure

SUBTASK 71-11-02-410-002-F00

WARNING: DO NOT CLOSE THE FAN COWL PANEL DURING AN ENGINE OPERATION BECAUSE 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 WHICH COULD CAUSE SERIOUS INJURY OR DEATH.

WARNING: BE CAREFUL WHEN YOU CLOSE THE FAN COWL PANEL IN HIGH WINDS OR GUST CONDITIONS. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO THE EQUIPMENT.

WARNING: DO NOT TRY TO CLOSE THE FAN COWL IN WINDS MORE THAN 40 KNOTS. THE FAN COWL PANELS CAN STAY OPEN IN WINDS TO 65 KNOTS. IN WINDS MORE THAN 65 KNOTS, THE HOLD-OPEN ROD CAN FAIL AND CAUSE INJURY TO PERSONS AND DAMAGE TO THE EQUIPMENT.

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.

(1) Do these steps to engage the hold-open rod on the fan cowl panel:

(a) Hold the fan cowl panel.

(b) Move the TURN/PULL sleeve in the direction of the arrow to unlock each hold-open rod.

(c) Manually move the fan cowl panel toward the engine until the hold-open rods lock at the first click (28-degree position).

(d) Do these steps to engage the forward hold-open rod on the fan cowl panel:

1) Retract the sleeve at the receiver end of the hold-open rod and compress it to disengage the rod from the receiver.

2) Engage the hold-open rod on the receiver on the fan cowl panel.

(e) Do the steps again to engage the aft hold-open rod on the fan cowl panel.

SUBTASK 71-11-02-410-003-F00

CAUTION: DO NOT LET THE FAN COWL PANEL CLOSE QUICKLY. DAMAGE TO THE FAN COWL PANEL AND ENGINE COMPONENTS CAN OCCUR.

(2) Slowly lower the fan cowl panel.

SUBTASK 71-11-02-410-004-F00

CAUTION: DO NOT USE MORE THAN 60 POUNDS (270 NEWTONS) OF FORCE TO PUSH THE LATCH HANDLE CLOSED. TOO MUCH FORCE CAN CAUSE DAMAGE TO THE LATCH.

(3) Close the three latches along the mating line of the fan cowl panels:

(a) Engage the latch hook to latch the keeper, and push the latch handles closed.

(b) Do the step again for the other two latches.

(c) If a latch adjustment is necessary, do this task: Fan Cowl Panel Latch Adjustment, TASK 71-11-03-700-801-F00.

SUBTASK 71-11-02-860-002-F00

(4) To put the airplane back to its usual condition, do this task: Reactivate the Leading Edge Flaps and Slats, TASK 27-81-00-440-801.

END OF TASK

FAN COWL PANEL - REMOVAL/INSTALLATION

1. General

A. This procedure has these tasks to remove and install the fan cowl panels:

(1) To remove the fan cowl panels (Selection)

(2) To install the fan cowl panels (Selection)

(3) To remove the fan cowl panels (Manual Procedure)

(4) To install the fan cowl panels (Manual Procedure)

(5) To remove the fan cowl panels (Sling Procedure)

(6) To install the fan cowl panels (Sling Procedure).

TASK 71-11-02-000-801-F00

2. Remove the Fan Cowl Panel (Selection)

A. General

(1) The purpose of this task is to permit mechanics to select the applicable procedure to remove a fan cowl panel. The manual procedure uses four persons to remove the fan cowl panel. The sling procedure uses a sling and hoist.

(2) The procedures can be used for the left or the right fan cowl panels.

B. Procedure

SUBTASK 71-11-02-020-001-F00

(1) Do one of these tasks to remove the applicable fan cowl panel:

(a) Do this task: Remove the Fan Cowl Panel (Manual Procedure), TASK 71-11-02-000-802-F00.

(b) Do this task: Remove the Fan Cowl Panel (Sling Procedure), TASK 71-11-02-000-803-F00.

——————— END OF TASK ———————

TASK 71-11-02-400-801-F00

3. Install the Fan Cowl Panel (Selection)

A. General

(1) The purpose of this task is to permit mechanics to select the applicable procedure to install a fan cowl panel. The manual procedure uses four persons to install the fan cowl panel. The sling procedure uses a sling and hoist.

(2) The procedures can be used for the left or the right fan cowl panels.

B. Procedure

SUBTASK 71-11-02-420-001-F00

(1) Do one of these tasks to install the applicable fan cowl panel:

(a) Do this task: Install the Fan Cowl Panel (Manual Procedure), TASK 71-11-02-400-802-F00.

(b) Do this task: Install the Fan Cowl Panel (Sling Procedure), TASK 71-11-02-400-803-F00.

——————— END OF TASK ———————

TASK 71-11-02-000-802-F00

4. Remove the Fan Cowl Panel (Manual Procedure)

(Figure 401)

A. References

Reference	Title
27-81-00-040-801	Deactivate the Leading Edge Flaps and Slats (P/B 201)

B. 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

C. Prepare to Remove the Fan Cowl Panel

SUBTASK 71-11-02-840-001-F00

WARNING: DO NOT TRY TO REMOVE THE FAN COWL PANELS DURING AN ENGINE OPERATION BECAUSE THE FORWARD LATCHES ARE IN THE ENGINE INLET HAZARD ZONE. IF YOU GO INTO THE HAZARD AREA, YOU CAN BE PULLED INTO THE ENGINE. SERIOUS OR FATAL INJURIES CAN OCCUR.

WARNING: BE CAREFUL WHEN YOU REMOVE THE FAN COWL PANEL IN HIGH WINDS OR GUSTY WIND CONDITIONS. DO NOT TRY TO REMOVE THE FAN COWL PANELS IF THE WINDS ARE ABOVE 40 KNOTS. THE WINDS CAN CAUSE THE FAN COWL PANELS TO MOVE SUDDENLY. INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Make sure you obey these precautions when you remove the fan cowl panel:

(a) The engine is not operational

(b) The maximum wind velocity is not more than 40 knots.

SUBTASK 71-11-02-860-003-F00

(2) If you remove the inboard fan cowl panel, you must retract and do the deactivation procedure for the leading edge flaps, (TASK 27-81-00-040-801) .

SUBTASK 71-11-02-860-004-F00

(3) Install a DO-NOT-OPERATE tag on the start lever for the applicable engine.

NOTE: This step will make sure the applicable engine will not operate.

D. Remove the Fan Cowl Panel

SUBTASK 71-11-02-020-002-F00

(1) Release the three latches along the mating line of the fan cowl panels:

(a) Push the trigger to release the safety catch and pull the handle to release the latch.

1) Use a screwdriver in the slot if more leverage is necessary.

(b) Do the above steps again for the other two latches.

SUBTASK 71-11-02-020-003-F00

CAUTION: MAKE SURE YOU USE A MINIMUM OF FOUR PERSONS TO REMOVE THE FAN COWL PANEL. USE THREE PERSONS TO HOLD THE PANEL AND ONE TO DISENGAGE THE FAN COWL CLEVIS FROM THE STRUT LUGS. THE LEFT FAN COWL PANEL WEIGHS APPROXIMATELY 80 POUNDS (36 KG), AND THE RIGHT FAN COWL PANEL WEIGHS APPROXIMATELY 96 POUNDS (44 KG). IF YOU DO NOT USE THE MINIMUM NUMBER OF PERSONS, DAMAGE TO THE FAN COWL PANEL, STRUT, INLET AND THRUST REVERSER CAN OCCUR.

(2) Do these steps to remove the fan cowl panel [1]:

CAUTION: BE CAREFUL WHEN YOU OPEN THE FAN COWL PANELS. OPEN THE FAN COWL PANEL JUST UNTIL ONE PERSON CAN GO UNDER THE FAN COWL AND DISENGAGE THE PINS. IF YOU OPEN THEM TOO MUCH, DAMAGE TO THE STRUT CAN OCCUR.

(a) Use three persons to hold the fan cowl panel [1] open.

(b) Use the fourth person to disengage each quick-release pin as follows:

NOTE: There is a quick-release pin for each of the three attach points. Each quick-release pin is permanently attached to the strut.

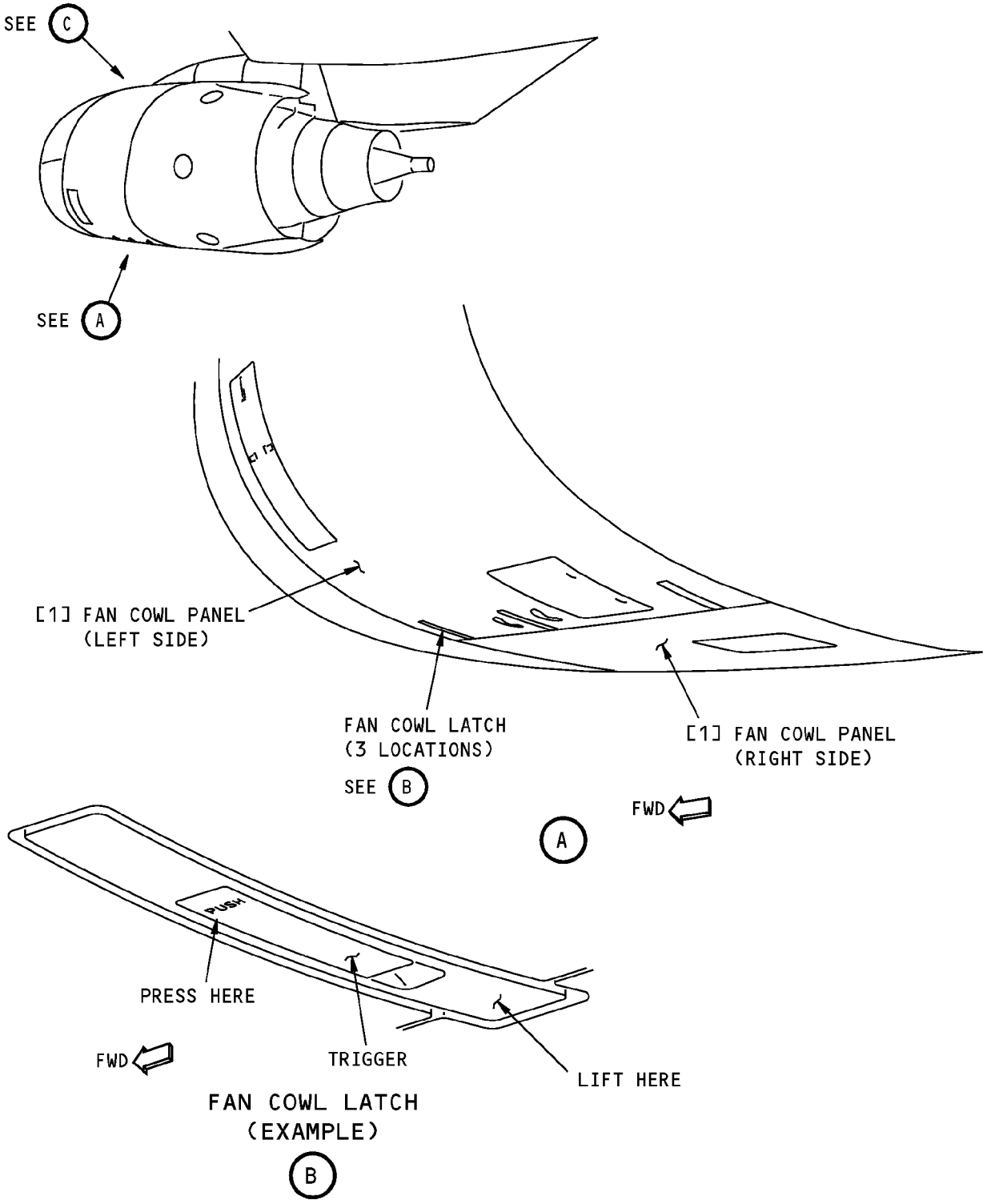
1) Remove the safety pin from the end of the quick-release pin.
2) Release the quick release pin with the button on the end.
3) Do the above steps again for the other two quick release pins.

(c) Move the fan cowl panel [1] away from the engine.

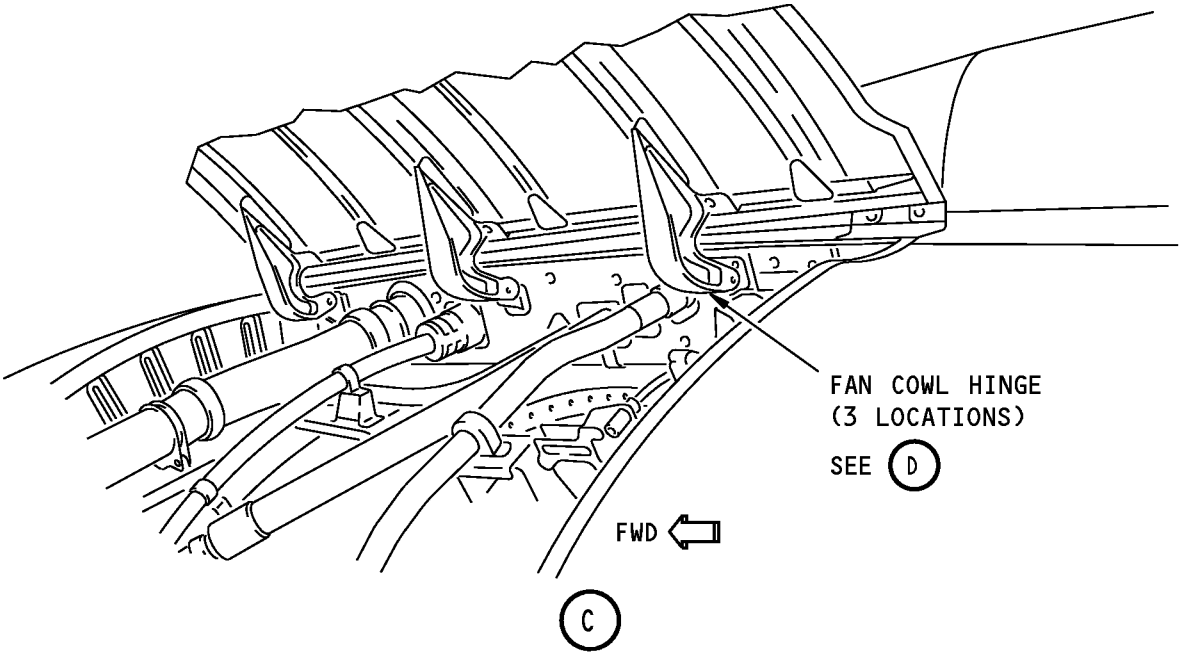
(d) Put the fan cowl panel [1] on a pallet or other suitable surface.

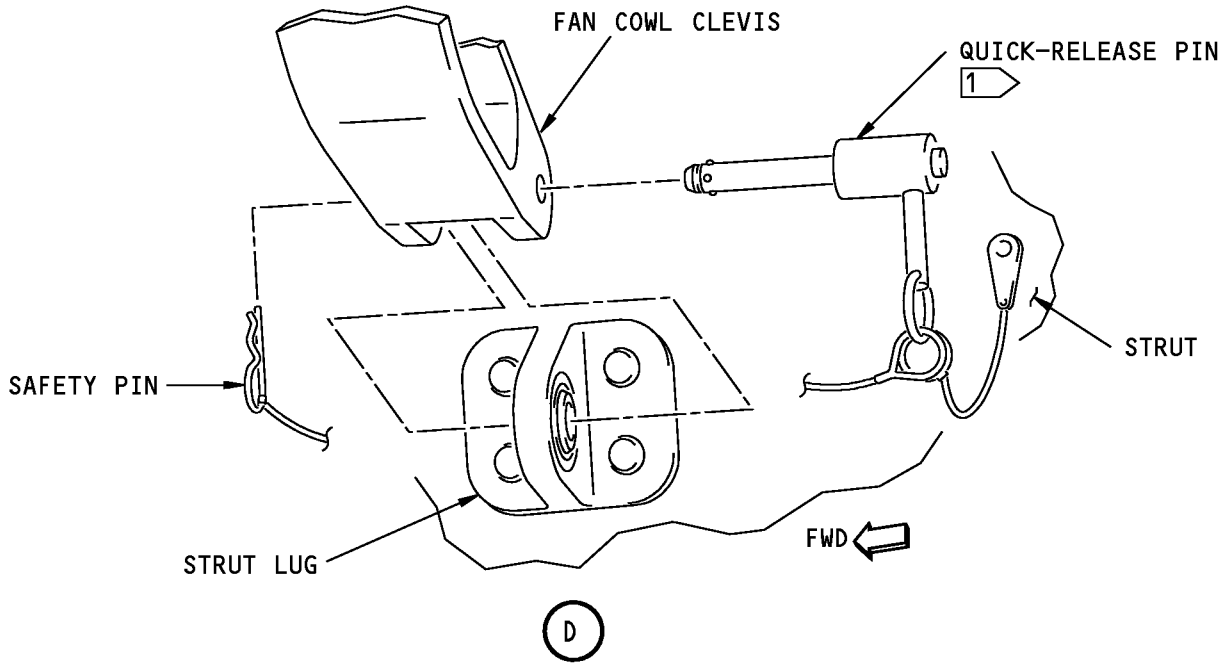
NOTE: Put the fan cowl panel with its top and bottom edges on the pallet or surface.

———————— END OF TASK ————————



Fan Cowl Panel Installation
Figure 401 (Sheet 1 of 2)/71-11-02-990-803-F00





NOTE: LEFT FAN COWL SHOWN,
RIGHT FAN COWL EQUIVALENT.

1 OUTER HINGE SHOWN. THE QUICK-RELEASE PIN IS INSTALLED FROM THE FORWARD SIDE ON THE MIDDLE HINGE.

Fan Cowl Panel Installation
Figure 401 (Sheet 2 of 2)/71-11-02-990-803-F00

TASK 71-11-02-400-802-F00

5. Install the Fan Cowl Panel (Manual Procedure)

(Figure 401)

A. References

Reference	Title
27-81-00-440-801	Reactivate the Leading Edge Flaps and Slats (P/B 201)
71-11-03-700-801-F00	Fan Cowl Panel Latch Adjustment (P/B 501)
71-11-08-000-801-F00	Vortex Control Device Removal (P/B 401)
71-11-08-400-801-F00	Vortex Control Device Installation (P/B 401)

B. 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

C. Prepare for the Installation of the Fan Cowl Panel

SUBTASK 71-11-02-840-002-F00

WARNING: DO NOT TRY TO INSTALL THE FAN COWL PANELS DURING AN ENGINE OPERATION BECAUSE THE FORWARD LATCHES ARE IN THE ENGINE INLET HAZARD ZONE. IF YOU GO INTO THE HAZARD AREA, YOU CAN BE PULLED INTO THE ENGINE. SERIOUS OR FATAL INJURIES CAN OCCUR.

WARNING: BE CAREFUL WHEN YOU INSTALL THE FAN COWL PANEL IN HIGH WINDS OR GUSTY WIND CONDITIONS. DO NOT INSTALL THE FAN COWL PANELS IF THE WINDS ARE ABOVE 40 KNOTS. THE WINDS CAN CAUSE THE FAN COWL PANELS TO MOVE SUDDENLY. INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Make sure you obey these precautions when you install the fan cowl panel [1]:

(a) The engine is not operational.

(b) The maximum wind velocity is not more than 40 knots.

SUBTASK 71-11-02-900-001-F00

CAUTION: MAKE SURE THAT THE FAN COWL PANEL AT THE INBOARD POSITION ON THE ENGINE HAS A VORTEX CONTROL DEVICE (VCD). IF THE VCD IS NOT INSTALLED, AIRPLANE OPERATION WILL BE AFFECTED.

(2) For an inboard fan cowl panel, make sure that the replacement fan cowl panel [1] has a vortex control device (VCD).

(a) If it is necessary to install a VCD on the replacment fan cowl panel [1], do these steps to remove the VCD from the removed fan cowl panel [1] and install it to the new fan cowl panel [1]:

1) Do this task: Vortex Control Device Removal, TASK 71-11-08-000-801-F00.

2) Do this task: Vortex Control Device Installation, TASK 71-11-08-400-801-F00.

SUBTASK 71-11-02-900-002-F00

(3) For an outboard fan cowl panel, make sure that the replacment fan cowl panel does not have a VCD.

(a) If the fan cowl panel has a VCD, do this task: Vortex Control Device Removal, TASK 71-11-08-000-801-F00

D. Install the Fan Cowl Panel

SUBTASK 71-11-02-420-002-F00

WARNING: BE CAREFUL WHEN YOU MOVE THE FAN COWL PANEL. BECAUSE THE LEFT FAN COWL PANEL WEIGHS 80 POUNDS (36 KG) AND THE RIGHT FAN COWL PANEL WEIGHS 96 POUNDS (44 KG), INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION: BE CAREFUL WHEN YOU PUT THE FAN COWL PANEL ON THE HINGES. DAMAGE TO THE HINGES, STRUT AND FAN COWL PANEL CAN OCCUR.

CAUTION: MAKE SURE YOU USE A MINIMUM OF FOUR PERSONS TO INSTALL THE FAN COWL PANEL. IF YOU DO NOT USE THE MINIMUM NUMBER OF PERSONS, DAMAGE TO THE FAN COWL PANEL, STRUT, INLET AND THRUST REVERSER CAN OCCUR.

(1) Do these steps to install the fan cowl panel [1]:

(a) Use three persons to lift the fan cowl panel [1] to the engine and align the fan cowl clevises with the strut lugs.

(b) Use the fourth person to install the quick-release pins.

(c) At two of the three locations, install the quick-release pins to attach the strut lugs to the fan cowl clevises.

NOTE: For the forward and aft attach points, the quick-release pins are installed from the aft side. For the center attach point, the quick-release pin is installed from the forward side.

NOTE: The quick-release pins and the safety pins are permanently attached to the strut.

1) Install the safety pin through the hole in the end of each quick-release pin.

(d) At the remaining location, install the quick-release pin.

NOTE: You can apply a maximum force of 30 pounds (133 Newtons) to the fan cowl at the hinge locations to align the hinges.

1) Install the safety pin through the hole in the end of the quick-release pin.

(e) Slowly close, but do not latch, the fan cowl panel [1].

SUBTASK 71-11-02-420-003-F00

(2) If you replaced the fan cowl panel, do this task: Fan Cowl Panel Latch Adjustment, TASK 71-11-03-700-801-F00.

SUBTASK 71-11-02-010-004-F00

CAUTION: DO NOT USE MORE THAN 60 POUNDS (270 NEWTONS) OF FORCE TO PUSH THE LATCH HANDLE CLOSED. TOO MUCH FORCE CAN CAUSE DAMAGE TO THE LATCH.

(3) Close the three latches along the mating line of the fan cowl panels:

(a) Engage the latch hook to latch the keeper, and push the latch handle closed.

(b) Do the above step again for the other two latches.

SUBTASK 71-11-02-860-005-F00

(4) If you installed the inboard fan cowl panel, do this task: Reactivate the Leading Edge Flaps and Slats, TASK 27-81-00-440-801.

END OF TASK

TASK 71-11-02-000-803-F00

6. Remove the Fan Cowl Panel (Sling Procedure)

(Figure 402)

A. References

Reference	Title
27-81-00-040-801	Deactivate the Leading Edge Flaps and Slats (P/B 201)

B. Tools/Equipment

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

Reference	Description
SPL-2108	Sling - Fan Cowl, CFM56-7 Engine (Part #: C71026-1, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

C. 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

D. Prepare to Remove the Fan Cowl Panel

SUBTASK 71-11-02-840-003-F00

WARNING: DO NOT TRY TO REMOVE THE FAN COWL PANELS DURING AN ENGINE OPERATION BECAUSE THE FORWARD LATCHES ARE IN THE ENGINE INLET HAZARD ZONE. IF YOU GO INTO THE HAZARD AREA, YOU CAN BE PULLED INTO THE ENGINE. SERIOUS OR FATAL INJURIES CAN OCCUR.

WARNING: BE CAREFUL WHEN YOU REMOVE THE FAN COWL PANEL IN HIGH WINDS OR GUSTY WIND CONDITIONS. DO NOT TRY TO REMOVE THE FAN COWL PANELS IF THE WINDS ARE ABOVE 40 KNOTS. THE WINDS CAN CAUSE THE FAN COWL PANELS TO MOVE SUDDENLY. INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Make sure you obey these precautions when you remove the fan cowl panel:

(a) The engine is not operational

(b) The maximum wind velocity is not more than 40 knots.

SUBTASK 71-11-02-860-006-F00

(2) If you remove the inboard fan cowl panel, you must retract and do the deactivation procedure for the leading edge flaps, (TASK 27-81-00-040-801) .

SUBTASK 71-11-02-860-007-F00

(3) Install a DO-NOT-OPERATE tag on the start lever for the applicable engine.

NOTE: This step will make sure the applicable engine will not operate.

E. Remove the Fan Cowl Panel

SUBTASK 71-11-02-480-001-F00

(1) Install the fan cowl sling, SPL-2108 at the GSE attach point on the fan cowl panel.

(a) Do not tighten the hoist ring bolt more than the torque shown on the sling.

SUBTASK 71-11-02-010-005-F00

(2) Release the three latches along the mating line of the fan cowl panels:

(a) Push the trigger to release the safety catch and pull the handle to release the latch.

1) Use a screwdriver in the slot if more leverage is necessary.

(b) Do the above steps again for the other two latches.

SUBTASK 71-11-02-020-005-F00

CAUTION: BE CAREFUL WHEN YOU MOVE THE FAN COWL PANEL. BECAUSE THE LEFT FAN COWL PANEL WEIGHS APPROXIMATELY 80 POUNDS (36 KG), AND THE RIGHT FAN COWL PANEL WEIGHS APPROXIMATELY 96 POUNDS (44 KG), DAMAGE TO THE FAN COWL PANEL, STRUT, INLET AND THRUST REVERSER CAN OCCUR.

(3) Do these steps to remove the fan cowl panel [1]:

CAUTION: BE CAREFUL WHEN YOU OPEN THE FAN COWL PANELS. OPEN THE FAN COWL PANEL JUST UNTIL ONE PERSON CAN GO UNDER THE FAN COWL AND DISENGAGE THE PINS. IF YOU OPEN THEM TOO MUCH, DAMAGE TO THE STRUT CAN OCCUR.

(a) Use the hoist and sling to hold the fan cowl panel [1] open.

(b) Disengage the quick-release pin at an outer hinge as follows:

NOTE: There is a quick-release pin for each of the three attach points. Each quick-release pin is permanently attached to the strut.

1) Remove the safety pin from the end of the quick-release pin.

2) Release the quick-release pin with the button on the end and remove the pin.

3) Install the drift pin from the sling kit at the outer hinge.

4) Do the above steps again at the remaining outer hinge.

(c) Disengage and remove the quick-release pin at the center hinge.

(d) Adjust the position of the fan cowl panel, until you can easily remove the drift pins.

(e) Remove the drift pin at each outer hinge.

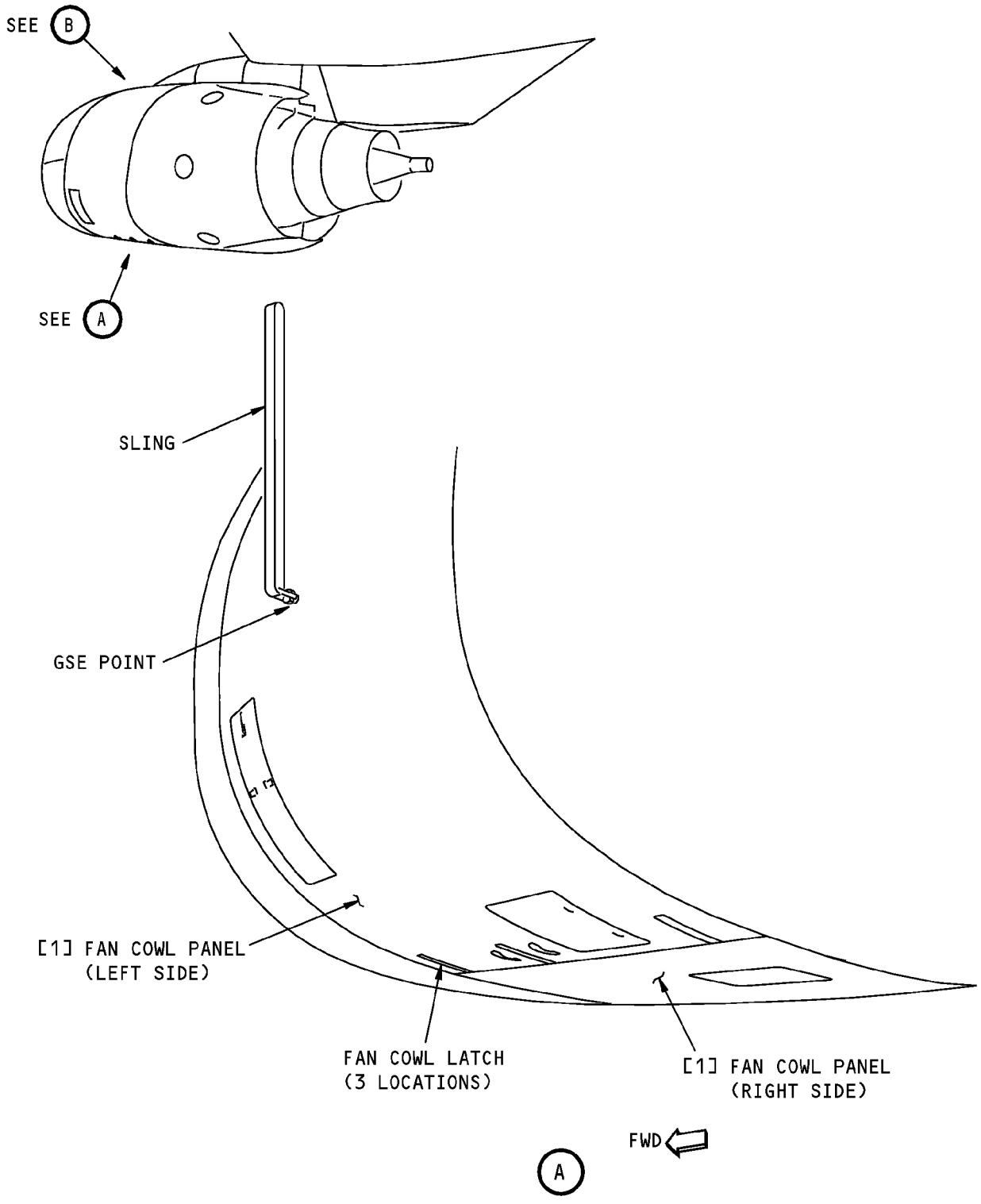
(f) Move the fan cowl panel [1] away from the engine.

(g) Put the fan cowl panel [1] on a pallet or other suitable surface.

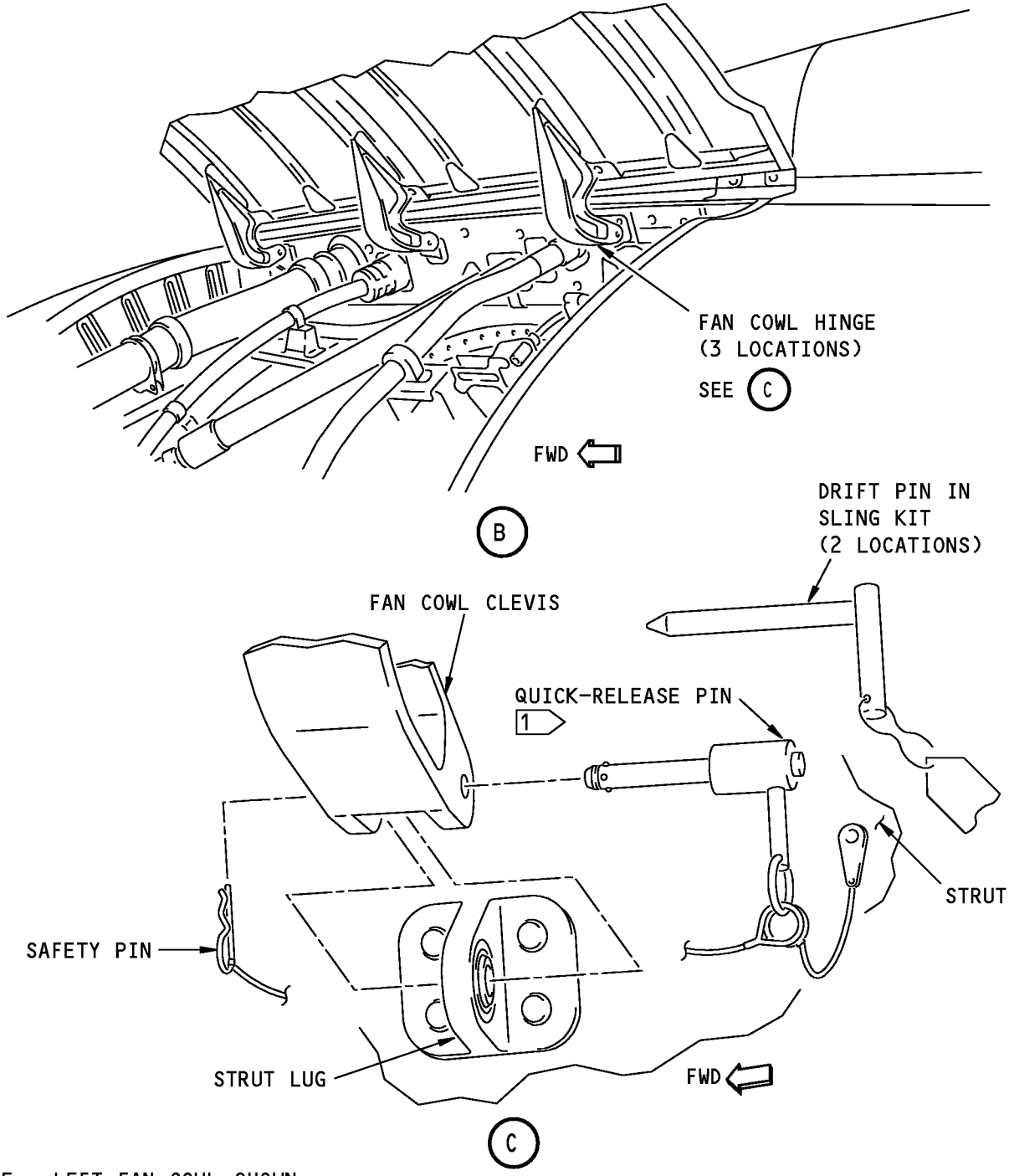
NOTE: Put the fan cowl panel with its top and bottom edges on the pallet or surface.

(h) If it is necessary, remove the sling from the fan cowl panel.

——————— END OF TASK ———————



Fan Cowl Panel Installation (Sling Procedure)
Figure 402 (Sheet 1 of 2)/71-11-02-990-804-F00



NOTE: LEFT FAN COWL SHOWN,
RIGHT FAN COWL EQUIVALENT.

1 OUTER HINGE SHOWN. THE QUICK-RELEASE PIN IS INSTALLED FROM THE FORWARD SIDE ON THE MIDDLE HINGE.

Fan Cowl Panel Installation (Sling Procedure)
Figure 402 (Sheet 2 of 2)/71-11-02-990-804-F00

TASK 71-11-02-400-803-F00

7. Install the Fan Cowl Panel (Sling Procedure)

(Figure 402)

A. References

Reference	Title
27-81-00-440-801	Reactivate the Leading Edge Flaps and Slats (P/B 201)
71-11-03-700-801-F00	Fan Cowl Panel Latch Adjustment (P/B 501)
71-11-08-000-801-F00	Vortex Control Device Removal (P/B 401)
71-11-08-400-801-F00	Vortex Control Device Installation (P/B 401)

B. Tools/Equipment

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

Reference	Description
SPL-2108	Sling - Fan Cowl, CFM56-7 Engine (Part #: C71026-1, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

C. 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

D. Prepare to Install the Fan Cowl Panel

SUBTASK 71-11-02-840-004-F00

WARNING: DO NOT TRY TO INSTALL THE FAN COWL PANELS DURING AN ENGINE OPERATION BECAUSE THE FORWARD LATCHES ARE IN THE ENGINE INLET HAZARD ZONE. IF YOU GO INTO THE HAZARD AREA, YOU CAN BE PULLED INTO THE ENGINE. SERIOUS OR FATAL INJURIES CAN OCCUR.

WARNING: BE CAREFUL WHEN YOU INSTALL THE FAN COWL PANEL IN HIGH WINDS OR GUSTY WIND CONDITIONS. DO NOT TRY TO INSTALL THE FAN COWL PANELS IF THE WINDS ARE ABOVE 40 KNOTS. THE WINDS CAN CAUSE THE FAN COWL PANELS TO MOVE SUDDENLY. INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(1) Make sure you obey these precautions when you install the fan cowl panel:

(a) The engine is not operational.

(b) The maximum wind velocity is not more than 40 knots.

SUBTASK 71-11-02-900-003-F00

CAUTION: MAKE SURE THAT THE FAN COWL PANEL AT THE INBOARD POSITION ON THE ENGINE HAS A VORTEX CONTROL DEVICE (VCD). IF THE VCD IS NOT INSTALLED, AIRPLANE OPERATION WILL BE AFFECTED.

(2) For an inboard fan cowl panel, make sure that the replacement fan cowl panel [1] has a vortex control device (VCD).

(a) If it is necessary to install a VCD on the replacment fan cowl panel [1], do these steps to remove the VCD from the removed fan cowl panel [1] and install it to the new fan cowl panel [1]:

1) Do this task: Vortex Control Device Removal, TASK 71-11-08-000-801-F00.

2) Do this task: Vortex Control Device Installation, TASK 71-11-08-400-801-F00.

SUBTASK 71-11-02-900-004-F00

(3) For an outboard fan cowl panel, make sure that the replacment fan cowl panel does not have a VCD.

(a) If the fan cowl panel has a VCD, do this task: Vortex Control Device Removal, TASK 71-11-08-000-801-F00.

E. Install the Fan Cowl Panel

SUBTASK 71-11-02-420-005-F00

WARNING: BE CAREFUL WHEN YOU MOVE THE FAN COWL PANEL. BECAUSE THE LEFT FAN COWL PANEL WEIGHS 80 POUNDS (36 KG) AND THE RIGHT FAN COWL PANEL WEIGHS 96 POUNDS (44 KG), INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

CAUTION: BE CAREFUL WHEN YOU PUT THE FAN COWL PANEL ON THE HINGES. DAMAGE TO THE HINGES, STRUT AND FAN COWL PANEL CAN OCCUR.

(1) Do these steps to install the fan cowl panel [1]:

(a) Use the hoist and fan cowl sling, SPL-2108 to lift the fan cowl panel [1] to the engine and align the fan cowl clevises with the strut lugs.

(b) Install the drift pins from the sling kit at the two outer hinges.

(c) At the center hinge, install the quick-release pin from the forward side to attach the strut lug to the fan cowl clevis.

NOTE: For the center attach point, the quick-release pin is installed from the forward side. For the forward and aft attach points, the quick-release pins are installed from the aft side.

NOTE: The quick-release pins and the safety pins are permanently attached to the strut.

1) Install the safety pin through the hole in the end of the quick-release pin.

(d) At one of the outer hinges, do these steps install the quick-release pin from the aft side:

1) Remove the drift pin.

2) Install the quick-release pin.

NOTE: You can apply a maximum force of 30 pounds (133 Newtons) to the fan cowl at the hinge locations to align the hinges.

a) Install the safety pin through the hole in the end of the quick-release pin.

3) Do the above steps again to install the quick-release pin at the remaining outer hinge.

SUBTASK 71-11-02-080-001-F00

(2) To remove the sling, do these steps:

(a) Slowly lower and close, but do not latch, the fan cowl panel [1].

(b) Remove the hoist ring bolt to remove the sling.

SUBTASK 71-11-02-420-006-F00

(3) If you replaced the fan cowl panel, do this task: Fan Cowl Panel Latch Adjustment, TASK 71-11-03-700-801-F00.

SUBTASK 71-11-02-010-006-F00

CAUTION: DO NOT USE MORE THAN 60 POUNDS (270 NEWTONS) OF FORCE TO PUSH THE LATCH HANDLE CLOSED. TOO MUCH FORCE CAN CAUSE DAMAGE TO THE LATCH.

(4) Close the three latches along the mating line of the fan cowl panels:

(a) Engage the latch hook to latch the keeper, and push the latch handle closed.

(b) Do the above step again for the other two latches.

SUBTASK 71-11-02-860-008-F00

(5) If you installed the inboard fan cowl panel, do this task: Reactivate the Leading Edge Flaps and Slats, TASK 27-81-00-440-801.

——————— END OF TASK ———————

FAN COWL PANELS - INSPECTION/CHECK

1. General

A. This procedure contains scheduled maintenance task data.

B. This procedure has two tasks:

(1) To examine the fan cowl panels

(2) To examine only the outer surface of the fan cowl panels.

TASK 71-11-02-200-801-F00

2. Fan Cowl Panels Inspection

(Figure 601)

A. General

(1) This task examines the condition of the fan cowl panels.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
SRM 54-20-01	Structural Repair Manual
SRM 54-20-90	Structural Repair Manual

C. 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

D. Procedure

SUBTASK 71-11-02-210-001-F00

(1) Examine the outer surfaces of each fan cowl for damage.

(a) If there is damage, refer to this reference for the limits and the repair tasks (SRM 54-20-01).

SUBTASK 71-11-02-010-001-F00

(2) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 71-11-02-210-002-F00

(3) Examine the inner surfaces of each fan cowl for damage.

(a) If there is damage, refer to this reference for the limits and the repair tasks (SRM 54-20-01).

SUBTASK 71-11-02-210-003-F00

(4) Examine the hinges of each fan cowl for damage and worn areas.

(a) If there is damage or worn areas, refer to this reference for the limits and the repair tasks (SRM 54-20-90).

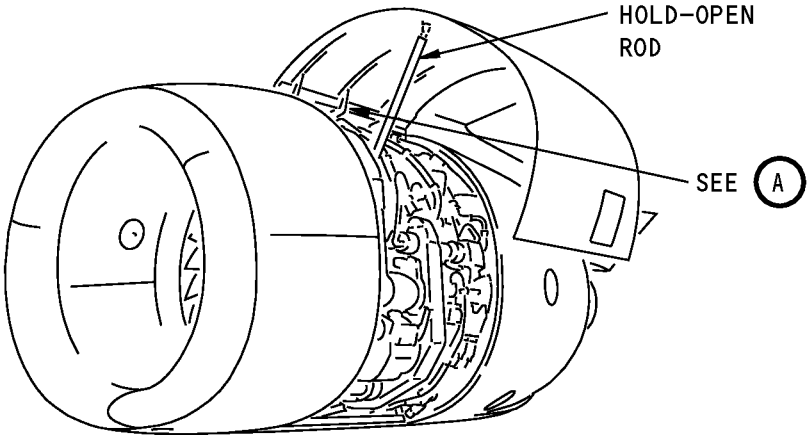
SUBTASK 71-11-02-210-004-F00

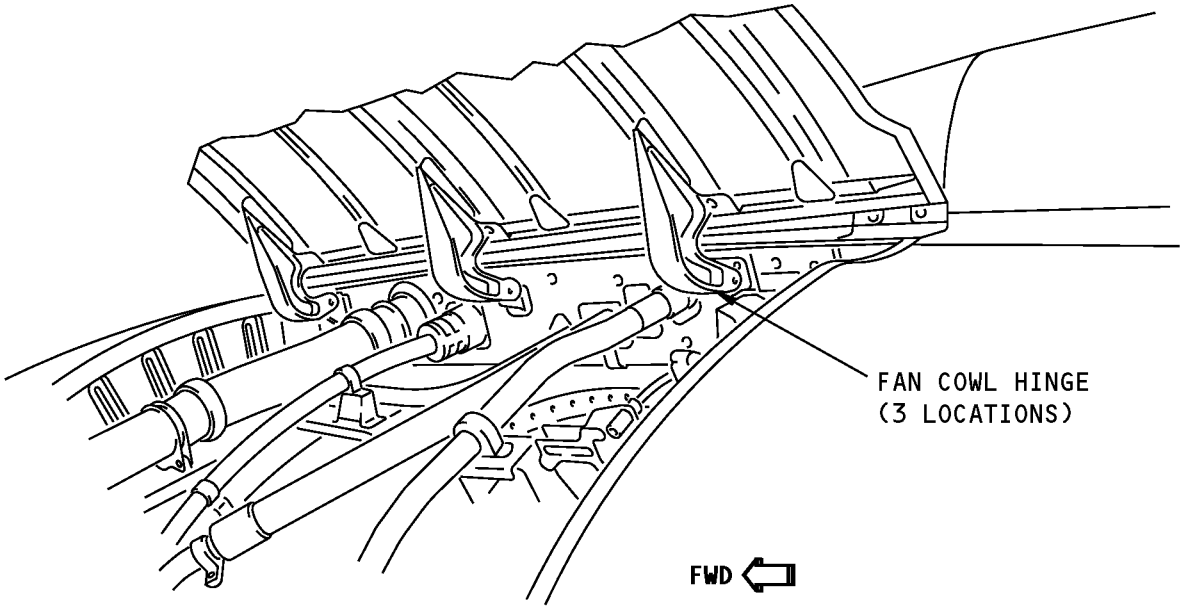
(5) Examine each hold-open rod for damage and worn areas.

SUBTASK 71-11-02-410-001-F00

(6) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

END OF TASK





A

Fan Cowl Panel Inspection
Figure 601/71-11-02-990-801-F00

TASK 71-11-02-200-802-F00

3. Fan Cowl Panels (Outer Surface) Inspection

A. General

(1) This procedure is a scheduled maintenance task.

(2) This task examines the outer surface of the fan cowl panels.

B. References

Reference	Title
SRM 54-20-01	Structural Repair Manual

C. 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

D. Procedure

SUBTASK 71-11-02-210-005-F00

(1) Examine the outer surfaces of each fan cowl for damage.

(a) If there is damage, refer to this reference for the limits and repair tasks (SRM 54-20-01).

——————— END OF TASK ———————

FAN COWL PANEL LATCH - REMOVAL/INSTALLATION

1. General

A. This procedure has these two tasks:

(1) The first task is to remove and install the latches on the fan cowl panel.

(2) The second task is to remove and install the latch keepers on the fan cowl panel.

TASK 71-11-03-900-801-F00

2. Fan Cowl Panel Latch Removal/Installation

(Figure 401)

A. General

(1) The fan cowl panel latches are found on the bottom of the left fan cowl panel.

(2) For this procedure, the fan cowl panel latch will be referred to as the latch.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-03-700-801-F00	Fan Cowl Panel Latch Adjustment (P/B 501)

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Hook latch assembly	71-11-02-10-195	HAP 001-013, 015-026, 028-038
		71-11-02-10-200	HAP 001-013, 015-026, 028-038
		71-11-02-10-205	HAP 001-013, 015-026, 028-038
		71-11-02-10-208	HAP ALL
		71-11-02-10-212	HAP ALL

D. Location Zones

Zone	Area
413	Engine 1 - Fan Cowl, Left
423	Engine 2 - Fan Cowl, Left

E. Latch Removal

SUBTASK 71-11-03-910-001-F00

(1) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 71-11-03-910-002-F00

(2) Do these steps to remove each latch:

(a) Remove the cotter pin [5] from the nut [4].

(b) Remove the nut [4], the two washers [2], and the bolt [3].

(c) Remove the hook latch assembly [1].

F. Latch Installation

SUBTASK 71-11-03-910-003-F00

(1) Do these steps to install each latch:

(a) Put the hook latch assembly [1] in the latch housing and align the holes.

(b) Install the bolt [3] and washer [2] with the bolt head on the forward side of the latch.

(c) Install the washer [2] and the nut [4].

CAUTION: DO NOT USE MORE THAN 20 POUND-INCHES (2.26 NEWTON-METERS) TORQUE ON THE NUT. TOO MUCH TORQUE CAN CAUSE DAMAGE TO THE EQUIPMENT.

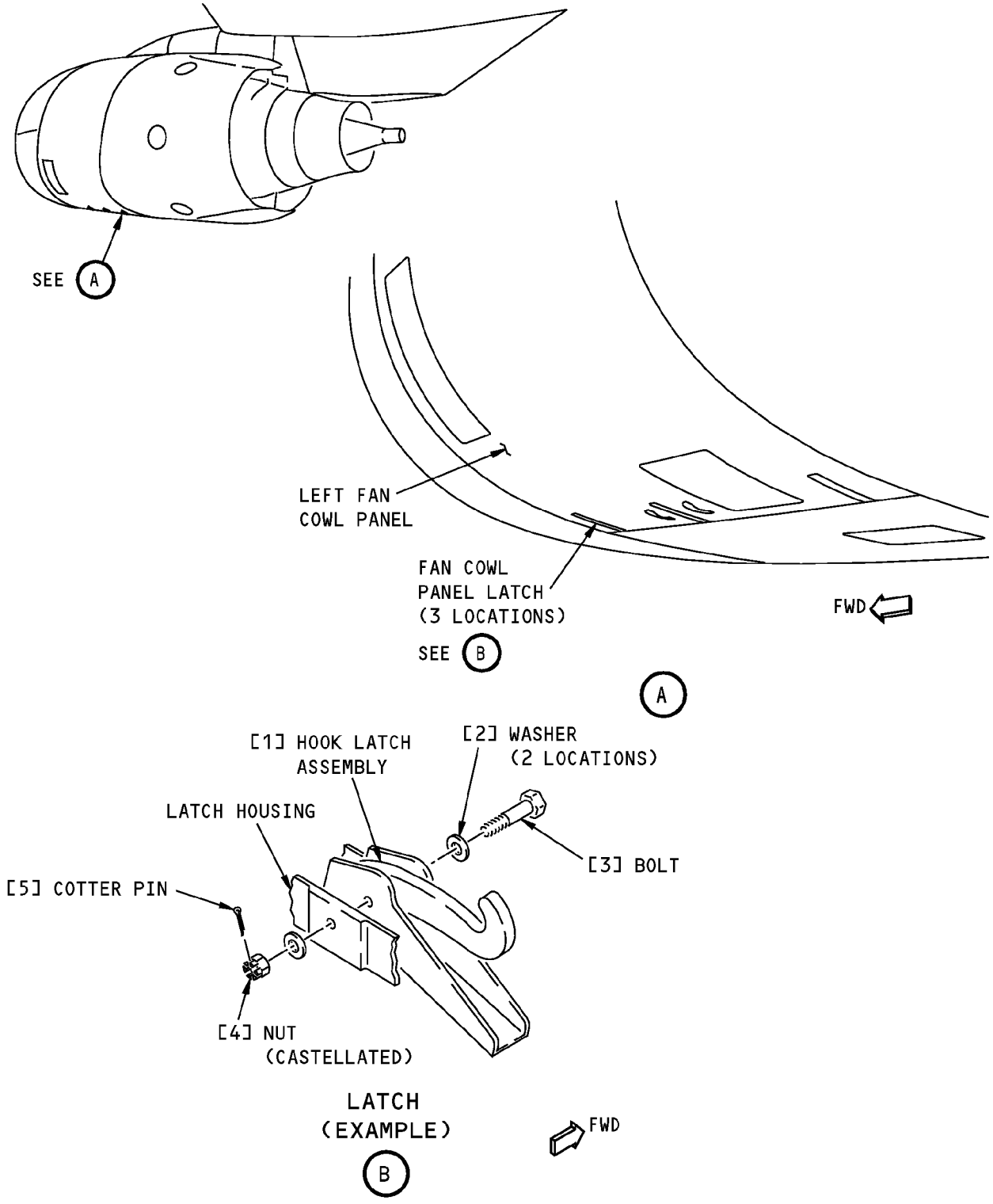
1) Tighten the nut with your hand until you can align the holes for the cotter pin.

(d) Install the cotter pin [5].

SUBTASK 71-11-03-910-004-F00

(2) Do this task: Fan Cowl Panel Latch Adjustment, TASK 71-11-03-700-801-F00.

——————— END OF TASK ———————



Fan Cowl Panel Latch Installation
Figure 401/71-11-03-990-801-F00

TASK 71-11-03-900-802-F00

3. Fan Cowl Panel Latch Keeper Removal/Installation

(Figure 402)

A. General

(1) The fan cowl panel latch keepers are found on the bottom of the right fan cowl panel.

(2) For this procedure, the fan cowl panel latch keeper will be referred to as the latch keeper.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-03-700-801-F00	Fan Cowl Panel Latch Adjustment (P/B 501)

C. Location Zones

Zone	Area
414	Engine 1 - Fan Cowl, Right
424	Engine 2 - Fan Cowl, Right

D. Latch Keeper Removal

SUBTASK 71-11-03-910-005-F00

(1) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 71-11-03-910-006-F00

(2) Do these steps to remove each latch keeper [21]:

(a) Remove the four nuts [24], the eight washers [22] and the four bolts [23] that attach the latch keeper to the latch keeper housing.

(b) Remove the latch keeper [21].

E. Latch Keeper Installation

SUBTASK 71-11-03-910-007-F00

(1) Do these steps to install each latch keeper [21]:

(a) Put the latch keeper [21] in the latch keeper housing and align the bolt holes.

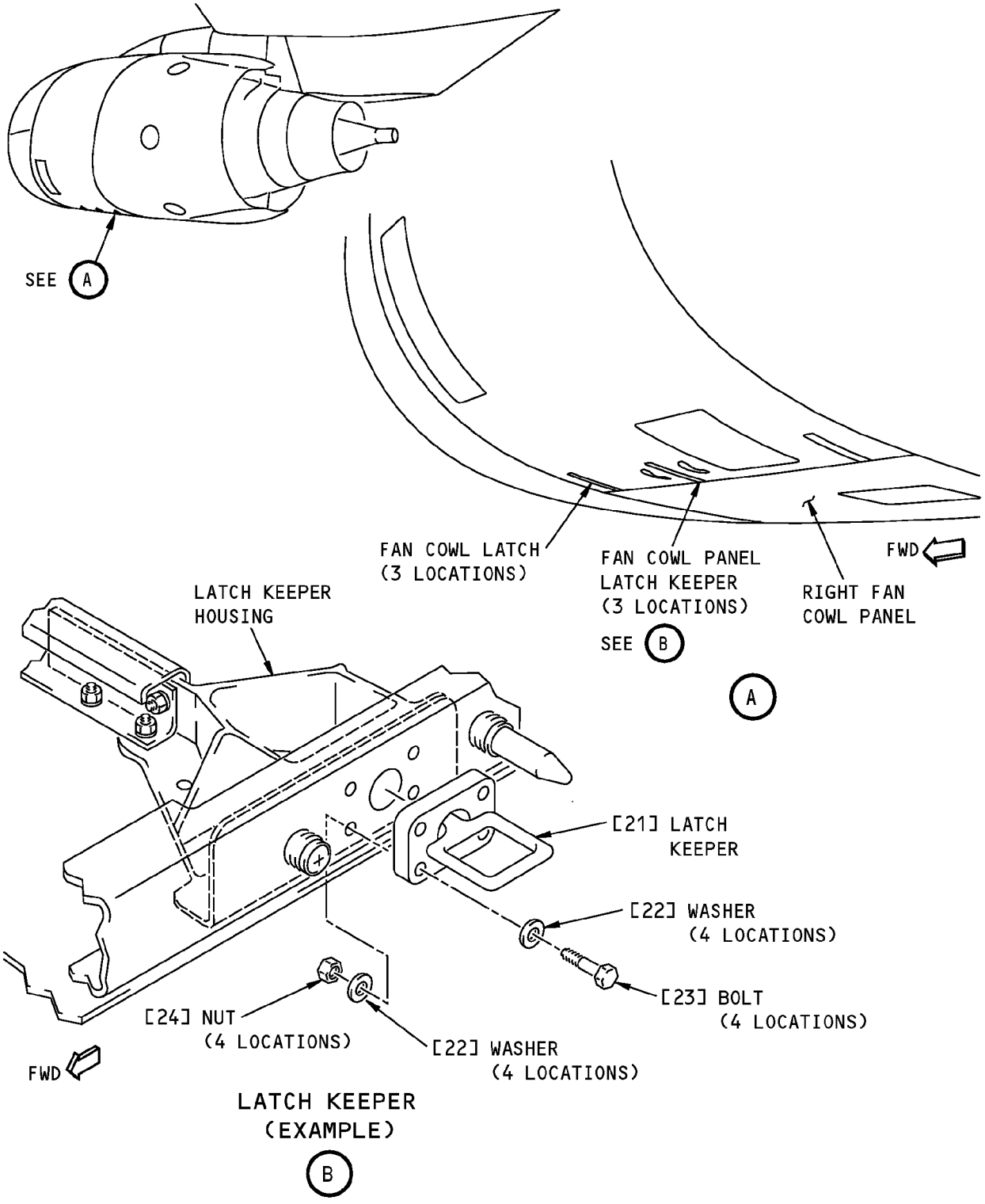
(b) Install the four bolts [23], the eight washers [22], and the four nuts [24].

(c) Tighten the nuts [24] to 50-70 pound-inches (5.65-7.91 Newton meters).

SUBTASK 71-11-03-910-008-F00

(2) Do this task: Fan Cowl Panel Latch Adjustment, TASK 71-11-03-700-801-F00.

——————— END OF TASK ———————



Fan Cowl Panel Latch Keeper Installation
Figure 402/71-11-03-990-802-F00

FAN COWL PANEL LATCH - ADJUSTMENT/TEST

1. General

A. This procedure has one task to adjust latches on the fan cowl panel.

TASK 71-11-03-700-801-F00

2. Fan Cowl Panel Latch Adjustment

(Figure 501)

A. General

(1) Latch adjustments are necessary to get the correct clearance at the mating line of the fan cowl panels and to get the correct latch tension.

(a) The clearance adjustment uses laminated washers at each latch position.

(b) The latch tension adjustment gives the correct force to close the latch handle.

(2) Do the latch adjustments in the sequence given.

(3) Do the latch adjustments after the removal or the replacement of these components:

(a) The fan cowl panels

(b) The latches or the latch keepers on the fan cowl panels

(c) The inlet cowl, the thrust reverser or the engine.

(4) The latch adjustments for the fan cowl panels are written with the inlet cowl installed and the thrust reverser closed, latched and correctly adjusted.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)

C. Tools/Equipment

Reference	Description
STD-1099	Gauge - Push/Pull, Dial, 0-150 Lb Capacity

D. Consumable Materials

Reference	Description	Specification
G02020	Clay, Modeling	

E. 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

F. Clearance Adjustment

SUBTASK 71-11-03-820-001-F00

(1) Do these steps for an initial clearance check:

(a) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

(b) Apply clay, G02020 to the striker plate and alignment pin flange on each latch keeper housing on the right fan cowl panel (View D-D).

(c) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

1) Engage but do not close the latches.

CAUTION: DO NOT USE MORE THAN 60 POUNDS (267 N) OF FORCE TO PUSH THE LATCH HANDLE CLOSED. TOO MUCH FORCE CAN CAUSE DAMAGE TO THE EQUIPMENT.

(d) Put a push/pull gauge (0-150 lbs), STD-1099 approximately 1.0 inch (25.4 mm) from the end of the latch handle and close the latch with a force of 15-25 pounds (67-111 N).

(e) If the force is not 15-25 pounds (67-111 N), do these steps to adjust the latch keepers (Views A-A and B-B):

1) Keep the latch handle open in the free travel position of approximately 15 degrees.

2) Put a 5/32 inch (4 mm) hexagonal wrench into the slots of the latch keeper.

3) Turn the wrench in the aft direction to increase the latch tension or the forward direction to decrease the tension.

(f) Measure the clearance at the mating line between the fan cowl panels at each latch.

1) Make sure that the clearance is 0.120 ±0.090 inch (3.048 ±2.286 mm) (VIEW A).

(g) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

(h) Measure the clay at the striker plate and the alignment pin flange at each latch.

1) There must be no measureable clearance between the striker plate and the latch housing or the alignment pin flange and the latch housing.

(i) If there is no clearance, remove the clay from the latch with a clean cotton cloth.

1) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

2) Do this procedure: Latch Tension Adjustment.

(j) If there is a clearance, continue to the subsequent step.

SUBTASK 71-11-03-820-002-F00

(2) Do these steps to remove the laminated washers [7] from the striker plate [6] at each latch (View D-D):

(a) Remove the nut [9], washer [8] and bolt [5] that attach the striker plate [6] to the latch keeper housing.

(b) Remove the striker plate [6] and laminated washers [7] and keep the laminated washers for the subsequent installation.

(c) Install the striker plate [6], bolt [5], washer [8] and nut [9].

1) Tighten the nut [9] to 18-25 pound-inches (2.03-2.82 Newton-meters).

SUBTASK 71-11-03-820-003-F00

(3) Do these steps to remove the laminated washers [1] from the alignment pin [2] at each latch (View A):

(a) Remove the nut [4] and washer [3] that attach the alignment pin [2] to the keeper housing.

(b) Remove the alignment pin [2], and laminated washers [1] and keep the laminated washers for the subsequent installation.

(c) Install the alignment pin [2], washer [3], and nut [4].

1) Tighten the nut [4] to 270-350 pound-inches (30.50-39.54 Newton-meters).

SUBTASK 71-11-03-820-004-F00

(4) Do these steps to find the correct thickness of washers [1] and [7] to install at each latch.

(a) Apply clay, G02020 to the striker plate and the alignment pin flange.

(b) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

1) Engage the forward and aft latch hooks in the latch keepers.

(c) Adjust the forward and aft latch keepers to get these conditions:

1) A force of 15-25 pounds (67-111 N) to close the latch

2) A clearance of 0.120 ±0.090 inch (3.048 ±2.286 mm) at the mating line between the fan cowl panels.

NOTE: A tapered clearance between the fan cowl panels from the forward end to the aft end is permitted.

3) Do these steps for the adjustment:

a) Keep the latch handle open in the free travel position of approximately 15 degrees.

b) Put a 5/32 inch (4 mm) hexagonal wrench into the slots of the keeper.

c) Turn the wrench in the aft direction to increase the latch tension or the forward direction to decrease the tension.

(d) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

(e) Measure the thickness of the clay at the striker plate and alignment pin flange at each latch.

1) This is the correct thickness of laminated washers [1] and [7] to install.

SUBTASK 71-11-03-820-005-F00

(5) Do these steps to install the correct thickness of laminated washers [1] and [7] at the striker plate [6] and alignment pin [2] at each latch (View D-D):

(a) Remove the clay from the striker plate, alignment pin flange, and latch keeper housing with a clean cotton cloth.

(b) Remove the nut [9], washer [8], bolt [5], and striker plate [6].

(c) Adjust the quantity of the laminated washers [1] and [7] to agree with the correct thickness that you found.

(d) Install the striker plate [6], laminated washers [7], and bolt [5] with the laminated washers between the striker plate and the keeper housing.

(e) Install the washer [8] and nut [9].

NOTE: Put laminated washers or equivalent washers between the keeper housing and the nut to keep the correct fastener grip length.

1) Tighten the nut [9] to 18-25 pound-inches (2.03-2.82 Newton-meters).

(f) Remove the nut [4], washer [3], and alignment pin [2].

(g) Install the necessary laminated washers [1] and alignment pin [2] with the laminated washers between the pin flange and the keeper housing.

(h) Install the washer [3] and nut [4].

NOTE: Put laminated washers or equivalent washers between the keeper housing and the nut to keep the correct fastener grip length.

1) Tighten the nut [4] to 270-350 pound-inches (30.50-39.54 Newton-meters).

SUBTASK 71-11-03-410-001-F00

(6) Do these steps for a clearance check of the washer installation:

(a) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

1) Engage the latch hooks in the keepers in this sequence:

a) Engage the center latch hook.

b) Engage the forward latch hook.

c) Engage the aft latch hook.

(b) Make sure that the striker plate and the alignment pin flange touch fully with the latch housings at each latch.

1) If there is a clearance at one or more positions, do these steps again:

a) Remove the laminated washers.

b) Find the correct thickness of washers with clay.

c) Install the laminated washers.

d) Do the clearance check of the washer installation.

2) If there are no clearances, do this procedure: Latch Tension Adjustment.

G. Latch Tension Adjustment

SUBTASK 71-11-03-820-006-F00

CAUTION: DO NOT USE MORE THAN 60 POUNDS (267 N) OF FORCE TO PUSH THE LATCH HANDLE CLOSED. TOO MUCH FORCE CAN CAUSE DAMAGE TO THE EQUIPMENT.

(1) Do these steps to adjust the latch tension:

(a) Disengage one of the three latches.

(b) Put a push/pull gauge (0-150 lbs), STD-1099 approximately 1.0 inch (25.4 mm) from the end of the latch handle and close the latch with a force of 40-60 pounds (178-267 N).

1) If it is necessary, adjust the latch keeper to get the correct force on the latch handle.

a) Keep the latch handle open in the free travel position of approximately 15 degrees.

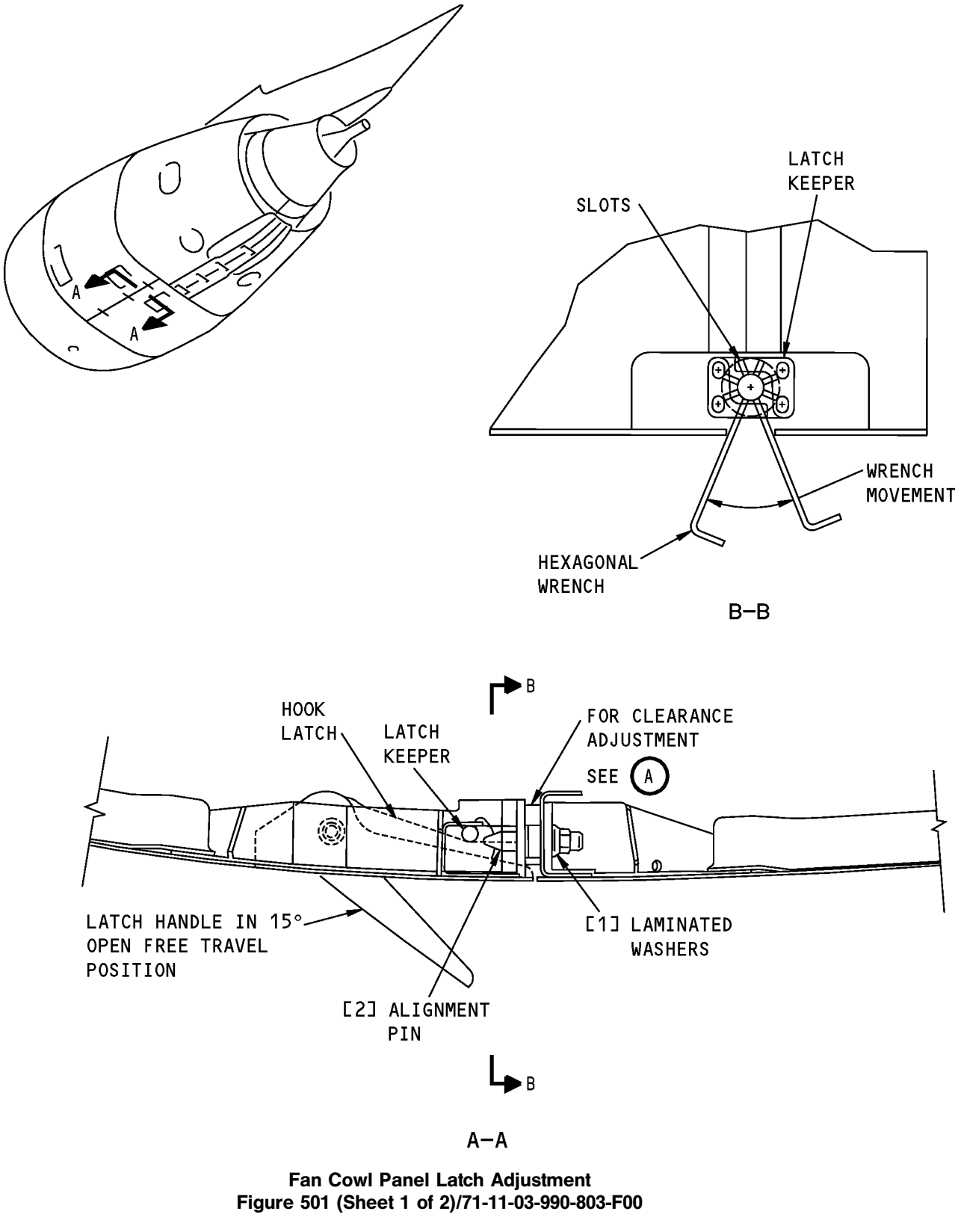
b) Put a 5/32 inch (4 mm) hexagonal wrench into the slots of the keeper.

c) Turn the wrench in the aft direction to increase the latch tension or the forward direction to decrease the tension.

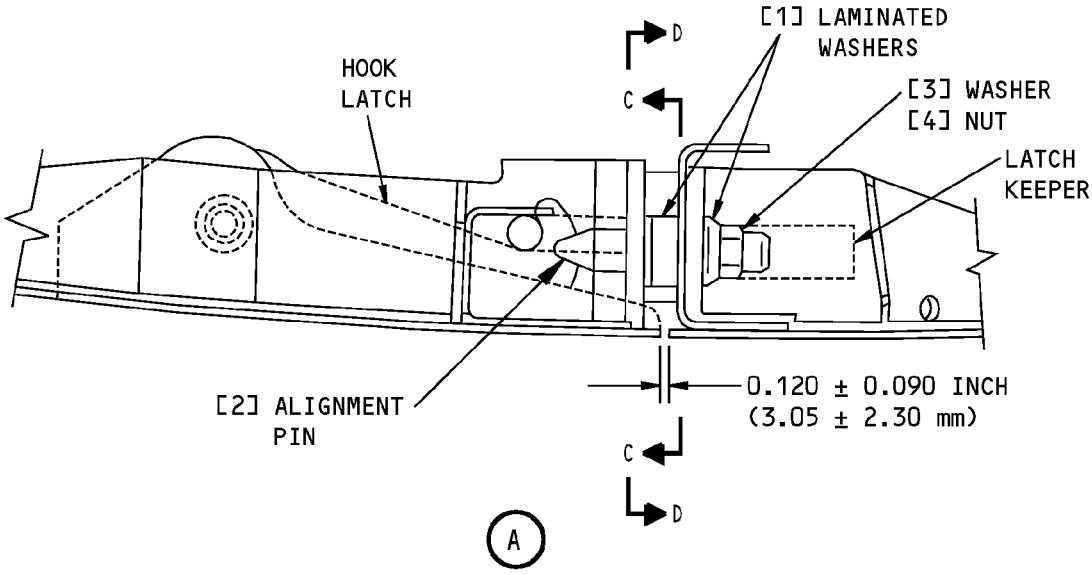
2) Adjust the latch tension for the remaining latches.

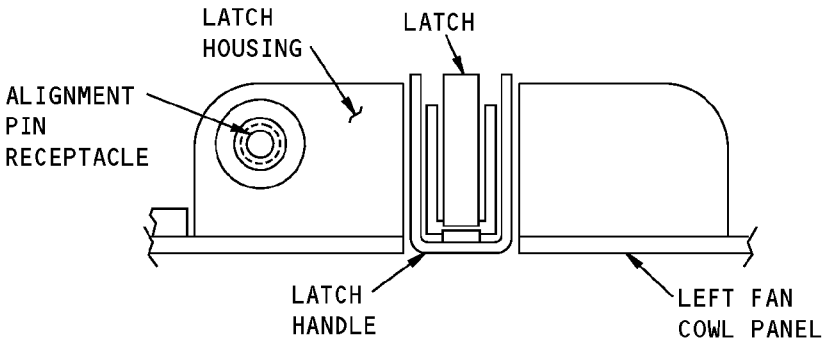
NOTE: Make sure the trigger lock of the latch handle engages to hold the handle in the closed position.

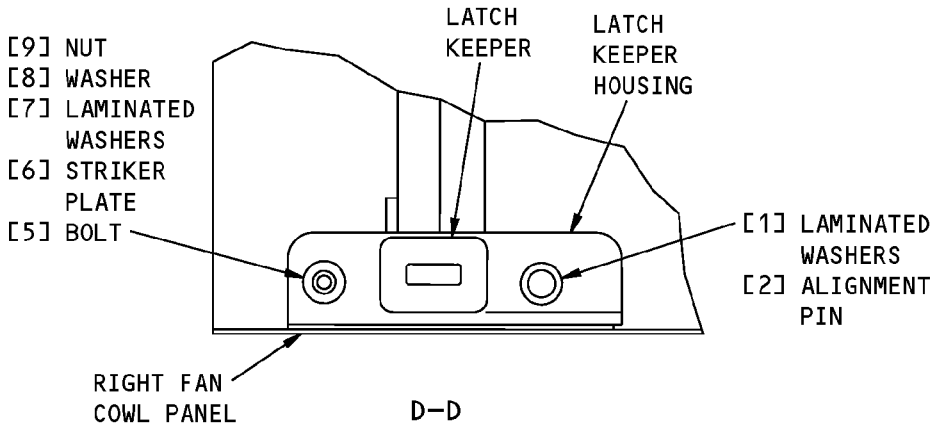
——————— END OF TASK ———————



Fan Cowl Panel Latch Adjustment
Figure 501 (Sheet 1 of 2)/71-11-03-990-803-F00







Fan Cowl Panel Latch Adjustment
Figure 501 (Sheet 2 of 2)/71-11-03-990-803-F00

IDG ACCESS DOOR - MAINTENANCE PRACTICES

1. General

A. This procedure has the task for the removal and the installation of the latches on the IDG access door.

TASK 71-11-04-900-801-F00

2. IDG Access Door Latch Removal/Installation

(Figure 201)

A. General

(1) This procedure removes and installs the IDG access door latch (referred to as the latch).

(2) The IDG access door (referred to as the door) is on the left fan cowl panel.

B. References

Reference	Title
71-11-04-820-802-F00	IDG Access Door Free Play Adjustment (P/B 501)

C. Tools/Equipment

Reference	Description
STD-442	Gun - Heat, 180° F (82° C) Maximum Output Temperature

D. Consumable Materials

Reference	Description	Specification
A00247	Sealant - Pressure And Environmental - Chromate Type	BMS 5-95
A00900	Sealant - Silicone, RTV - Dow Corning 93-006-1	
C00259	Primer - Chemical And Solvent Resistant Finish, Epoxy Resin	BMS10-11, Type I

E. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	Latch	71-11-02-10-135	HAP ALL

F. Location Zones

Zone	Area
413	Engine 1 - Fan Cowl, Left
423	Engine 2 - Fan Cowl, Left

G. Access Panels

Number	Name/Location
413AL	IDG Access Door, Engine 1
423AL	IDG Access Door, Engine 2

H. Latch Removal

SUBTASK 71-11-04-010-001-F00

(1) Do this step;

Open the applicable door:

Number	Name/Location
413AL	IDG Access Door, Engine 1

or open this access panel:

Number	Name/Location
423AL	IDG Access Door, Engine 2

(a) Push the larger end of the latches into the door to open the latches.

(b) Pull the door down to the fully open position.

SUBTASK 71-11-04-020-001-F00

(2) Do these steps to remove each latch [3]:

(a) Remove the four nuts [1], washers [2], and pins [4] that attach the latch to the door.

(b) Remove the latch [3].

I. Latch Installation

SUBTASK 71-11-04-400-001-F00

(1) Apply two layers of primer, C00259 to the mating surfaces of the latch [3].

(a) Dry the primer for five minutes with the 180° F (82° C) maximum output temperature heat gun, STD-442.

SUBTASK 71-11-04-420-001-F00

(2) Put the latch [3] in the door and align the bolt holes.

SUBTASK 71-11-04-390-001-F00

(3) Apply a layer of sealant, A00247 to the bottom side of the heads of the four pins [4].

SUBTASK 71-11-04-420-002-F00

(4) Install the four pins [4], washers [2], and nuts [1].

(a) Tighten the nuts [1].

(b) Clean all unwanted sealant from the head of the pins and the outer surface of the door.

SUBTASK 71-11-04-390-002-F00

(5) Apply a Dow Corning 93-006-1 sealant, A00900 to the four nuts [1].

SUBTASK 71-11-04-220-004-F00

(6) Make sure that the latch is smooth with the outer surface of the door in 0.0 ±0.030 inch (±0.762 mm).

(a) If the latch is not in the limits, replace the latch.

SUBTASK 71-11-04-220-005-F00

(7) Measure the distance between the latch and the latch cut-out in the door (View A-A).

(a) If the distance is not correct, do these steps to adjust the latch:

1) Loosen the four nuts.

2) Set the latch for the correct distance.

3) Tighten the four nuts.

SUBTASK 71-11-04-410-003-F00

(8) Do this step;

Close the applicable door:

Number	Name/Location
413AL	IDG Access Door, Engine 1

or close this access panel:

Number	Name/Location
423AL	IDG Access Door, Engine 2

(a) Make sure that the latches are in the fully open position.

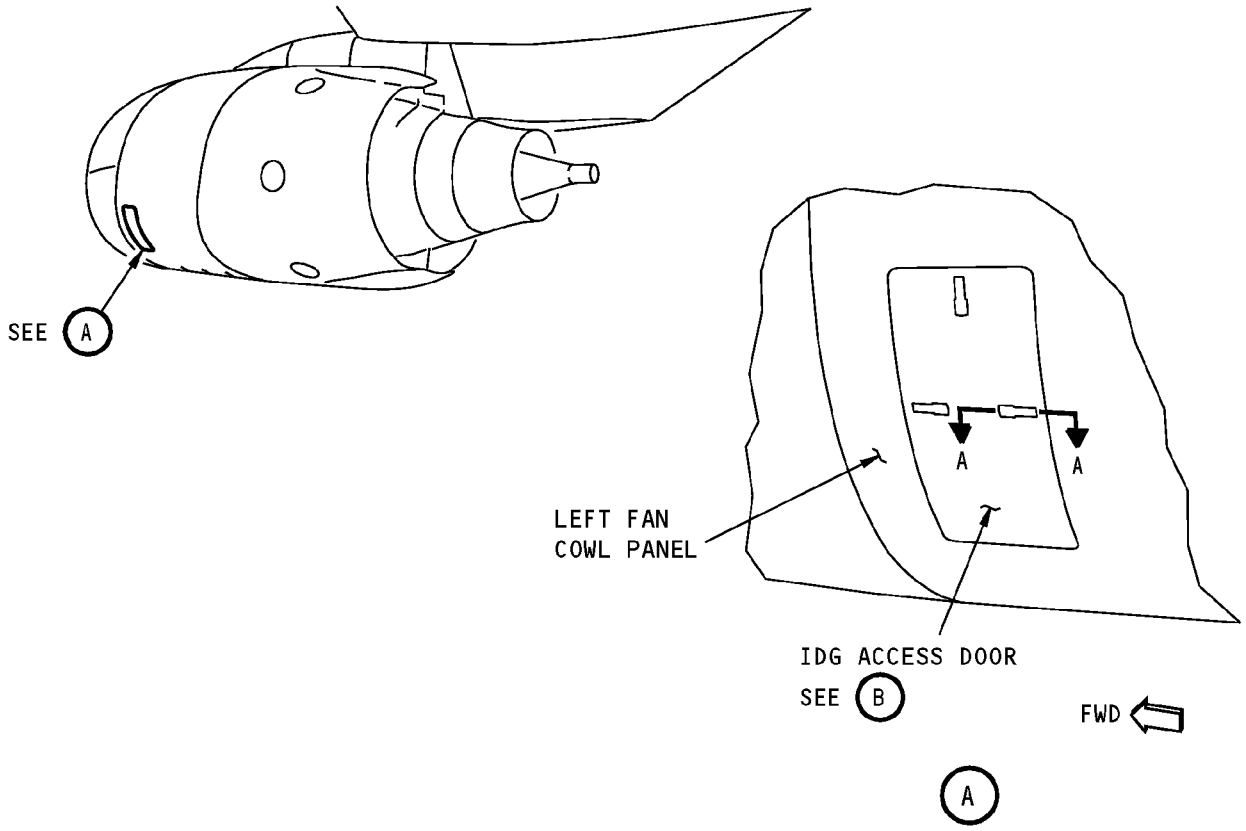
(b) Close the door.

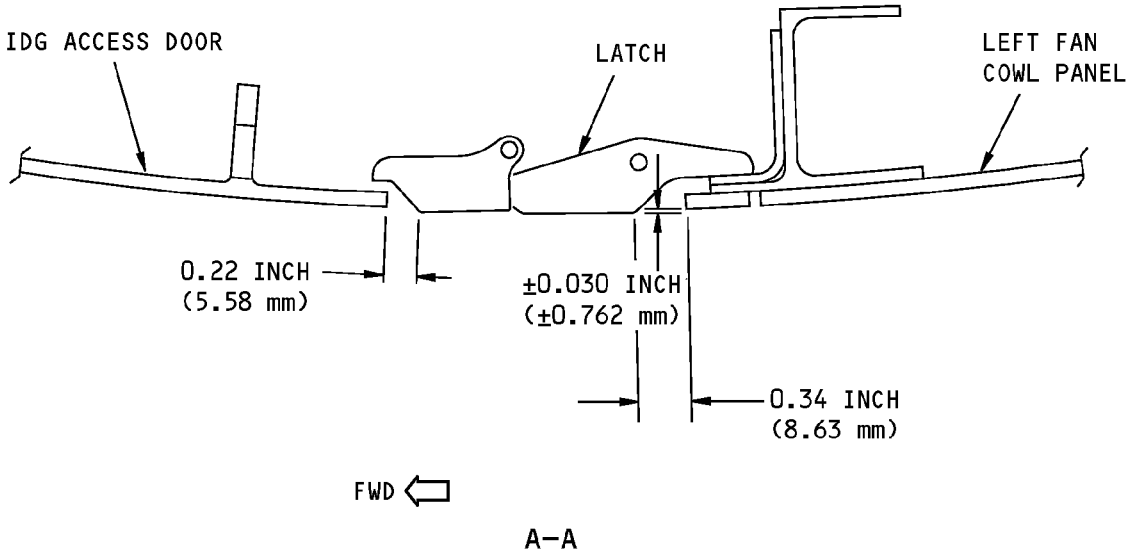
(c) Push the middle of each latch into the door to close the latch.

SUBTASK 71-11-04-820-002-F00

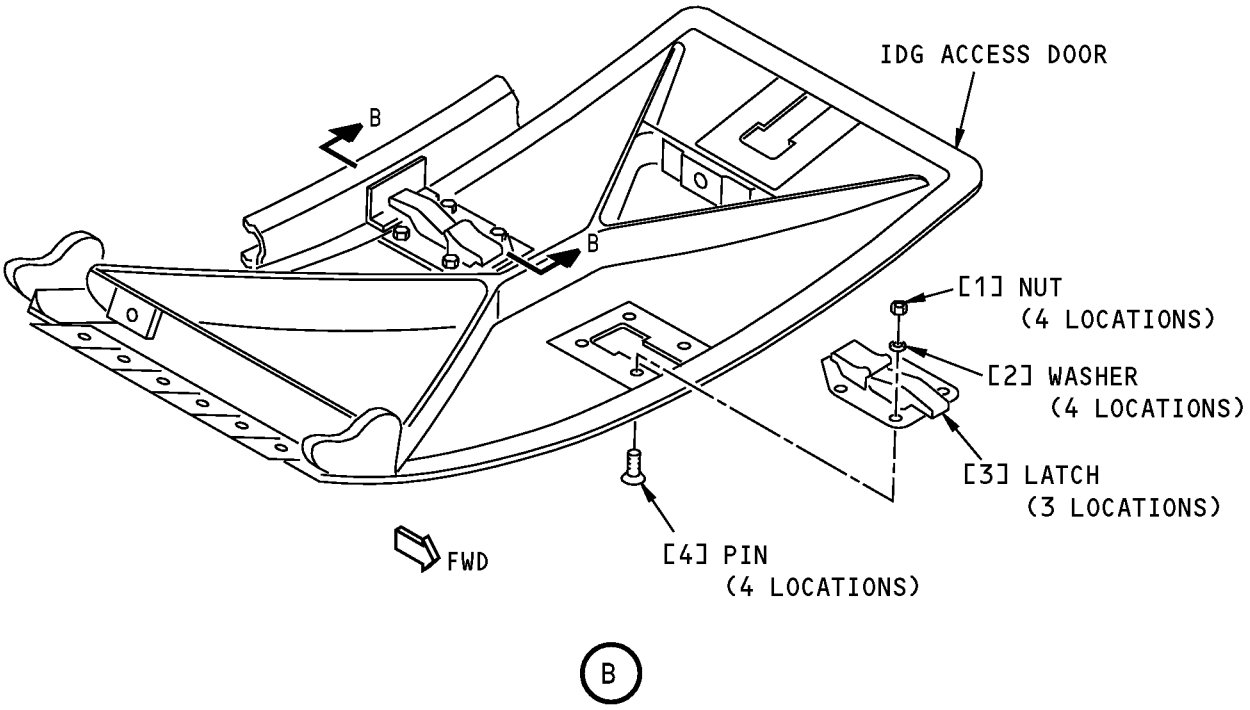
(9) Do this task: IDG Access Door Free Play Adjustment, TASK 71-11-04-820-802-F00.

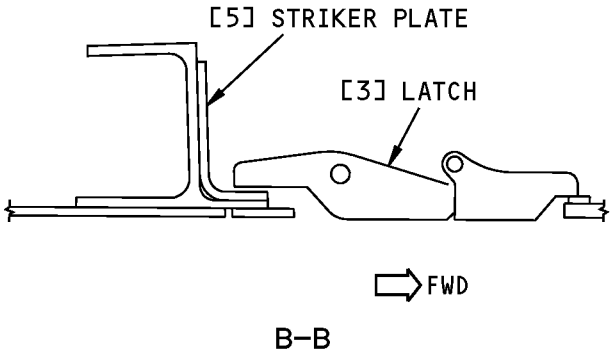
END OF TASK





IDG Access Door Latch Installation
Figure 201 (Sheet 1 of 2)/71-11-04-990-802-F00





IDG Access Door Latch Installation
Figure 201 (Sheet 2 of 2)/71-11-04-990-802-F00

IDG ACCESS DOOR - REMOVAL/INSTALLATION

1. General

A. This procedure contains these two tasks:

(1) The removal of the IDG (Integrated Drive Generator) access door

(2) The installation of the IDG access door.

TASK 71-11-04-000-801-F00

2. IDG Access Door Removal

(Figure 401)

A. General

(1) This task removes the IDG access door (referred to as the door) from the left fan cowl panel.

(2) The applicable door is identified below in the Access Panels list.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)

C. Location Zones

Zone	Area
413	Engine 1 - Fan Cowl, Left
423	Engine 2 - Fan Cowl, Left

D. Access Panels

Number	Name/Location
413AL	IDG Access Door, Engine 1
423AL	IDG Access Door, Engine 2

E. Procedure

SUBTASK 71-11-04-010-002-F00

(1) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 71-11-04-010-003-F00

(2) Do this step;

Open the applicable door:

Number	Name/Location
413AL	IDG Access Door, Engine 1

or open this access panel:

Number	Name/Location
423AL	IDG Access Door, Engine 2

(a) Push the larger end of each latch into the door to open the latches.

(b) Pull the door down to the fully open position.

SUBTASK 71-11-04-020-002-F00

(3) Do these steps to remove the door [3]:

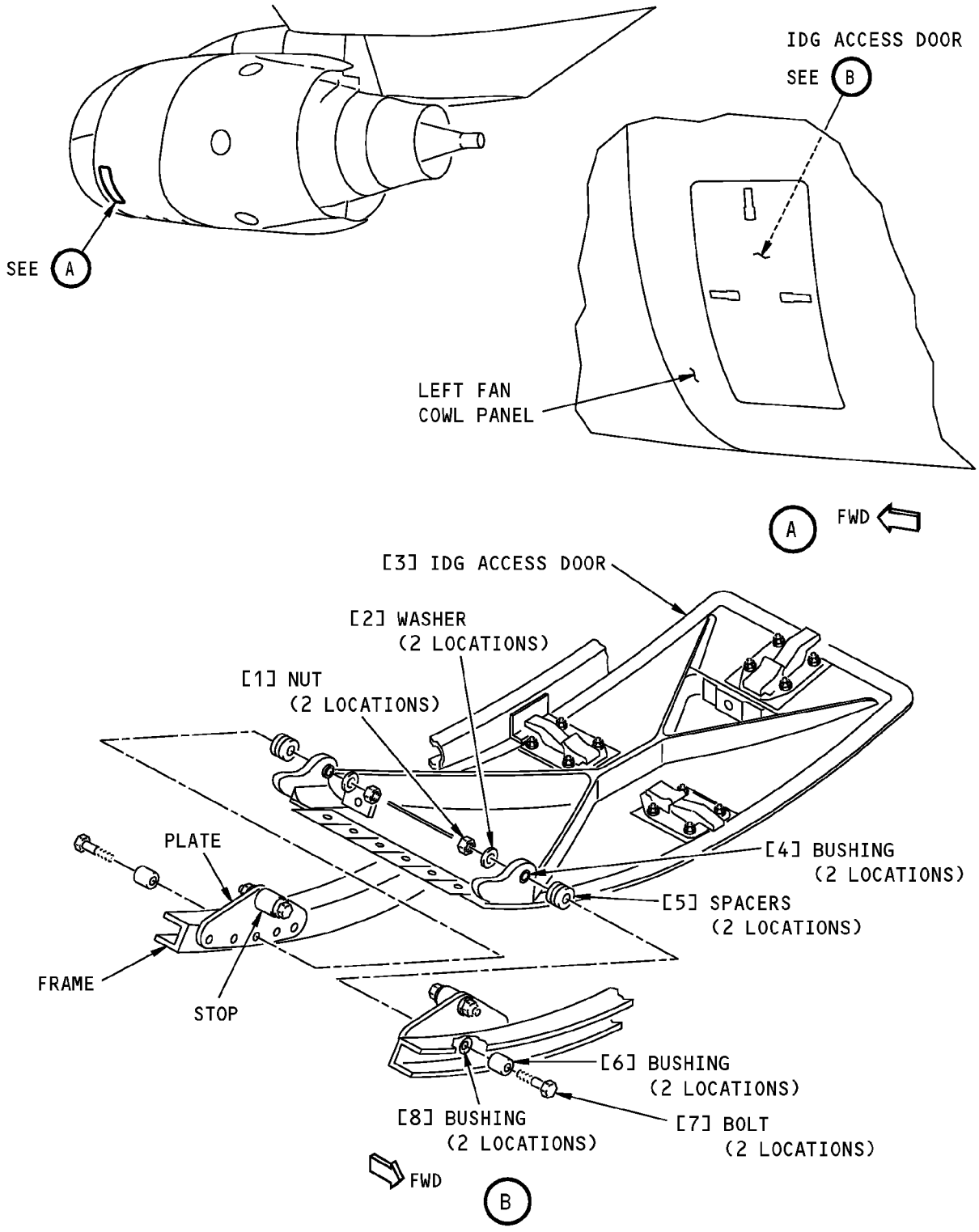
NOTE: You can find more than one spacer [5] with the bolts and nuts at the hinge. These spacers are necessary to align the door in the middle of its opening. Make sure to keep the spacers, because you will use the spacers in the correct quantity to install the door.

(a) Remove the nut [1], washer [2], spacers [5], bushings [4], [6] and [8], and bolt [7] at each door hinge.

1) If you will re-install the same door, record the number and the location of the spacers [5] that you remove.

(b) Remove the door [3].

——————— END OF TASK ———————



IDG Access Door Installation
Figure 401/71-11-04-990-803-F00

TASK 71-11-04-400-801-F00

3. IDG Access Door Installation

(Figure 401)

A. References

Reference	Title
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
71-11-04-820-801-F00	IDG Access Door Adjustment (P/B 501)
71-11-04-820-802-F00	IDG Access Door Free Play Adjustment (P/B 501)

B. Consumable Materials

Reference	Description	Specification
D00015	Grease - Aircraft Bearing (Use BMS 3-24 until existing stocks are depleted, BMS 3-33 supersedes BMS 3-24)	BMS3-24 (Superseded by BMS 3-33)

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	Door	71-11-02-10-133	HAP ALL

D. Location Zones

Zone	Area
413	Engine 1 - Fan Cowl, Left
423	Engine 2 - Fan Cowl, Left

E. Access Panels

Number	Name/Location
413AL	IDG Access Door, Engine 1
423AL	IDG Access Door, Engine 2

F. Procedure

SUBTASK 71-11-04-210-001-F00

(1) Examine the stops for worn areas or deterioration.

(a) Replace the stops if damage is found.

SUBTASK 71-11-04-210-002-F00

(2) Examine the bushings [4], [6], and [8] for worn areas.

(a) Replace the bushings if worn areas are found.

SUBTASK 71-11-04-640-001-F00

(3) Lubricate the bolts [7] with grease, D00015.

SUBTASK 71-11-04-700-001-F00

(4) Do these steps to install the door [3].

(a) Put the door [3] in the opening of the fan cowl panel and align the bolt holes at the hinges.

(b) Install the bolt [7], bushings [4], [6] and [8], spacers [5], washer [2], and nut [1] at each hinge.

NOTE: If you re-install the same door, install the same number of spacers [5] in the same location that you recorded in the removal task.

1) Tighten the nuts [1] with your hand.

CAUTION: DO NOT USE MORE THAN 40 POUND-INCHES (4.52 NEWTON METERS) TORQUE ON THE NUT TO PREVENT DAMAGE TO THE EQUIPMENT.

(c) Tighten the nuts [1] to the correct torque.

SUBTASK 71-11-04-410-004-F00

(5) Do this task;

Close the applicable access door:

Number	Name/Location
413AL	IDG Access Door, Engine 1

or close this access panel:

Number	Name/Location
423AL	IDG Access Door, Engine 2

(a) Make sure that the latches are in the fully open position and close the door.

(b) Push the middle of the latches into the door, to close the latches.

SUBTASK 71-11-04-700-002-F00

(6) Do this task: IDG Access Door Adjustment, TASK 71-11-04-820-801-F00.

SUBTASK 71-11-04-700-003-F00

(7) Do this task: IDG Access Door Free Play Adjustment, TASK 71-11-04-820-802-F00.

SUBTASK 71-11-04-410-005-F00

(8) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

——————— END OF TASK ———————

IDG ACCESS DOOR - ADJUSTMENT/TEST

1. General

A. This procedure has these two tasks:

(1) To adjust the clearance and aerosmoothness of the IDG access door

(2) To adjust the free play of the IDG access door.

TASK 71-11-04-820-801-F00

2. IDG Access Door Adjustment

(Figure 501)

A. General

(1) This procedure adjusts the IDG access door (referred to as the door) with its opening in the left fan cowl panel.

(a) The adjustments are for the correct edge clearances and the aerosmoothness of the door.

(2) This procedure is necessary after the removal or the replacement of the door.

B. References

Reference	Title
71-11-04-000-801-F00	IDG Access Door Removal (P/B 401)
71-11-04-400-801-F00	IDG Access Door Installation (P/B 401)

C. Tools/Equipment

Reference	Description
STD-1107	Gauge - Feeler, 0.0 - 0.5 Inch, Readable to 1/1000th

D. Location Zones

Zone	Area
413	Engine 1 - Fan Cowl, Left
423	Engine 2 - Fan Cowl, Left

E. Access Panels

Number	Name/Location
413AL	IDG Access Door, Engine 1
423AL	IDG Access Door, Engine 2

F. Procedure

SUBTASK 71-11-04-410-001-F00

(1) Do this step;

Close the applicable access door:

Number	Name/Location
413AL	IDG Access Door, Engine 1

or close this access panel:

Number	Name/Location
423AL	IDG Access Door, Engine 2

(a) Make sure that the latches are in the fully open position and close the door.

(b) Push the middle of the latches into the door, to close the latches.

SUBTASK 71-11-04-220-001-F00

(2) Measure the clearance between the door and the fan cowl panel at the forward and aft edges with a 0.0 - 0.5 Inch feeler gauge, STD-1107 (View B).

(a) Make sure that the clearance is 0.060 ±0.030 inch (1.524 ±0.762 mm).

(b) If the clearance is not correct, do these steps to adjust the clearance:

1) Do this task: IDG Access Door Removal, TASK 71-11-04-000-801-F00.

2) Record the number and the location of the spacers that you remove from between the bushings.

3) Add or remove the spacers between the bushings to get the clearances equal and in the limits.

4) Do this task: IDG Access Door Installation, TASK 71-11-04-400-801-F00.

SUBTASK 71-11-04-220-002-F00

(3) Measure the clearance between the door and the fan cowl panel at the top and bottom edges with the gage.

(a) Make sure that the clearance is 0.060 ±0.030 inch (1.524 ±0.762 mm).

SUBTASK 71-11-04-220-003-F00

(4) Make sure that the edges of the door are smooth with the outer surface of the fan cowl panel at 0.00 ±0.030 inch (0.762 mm).

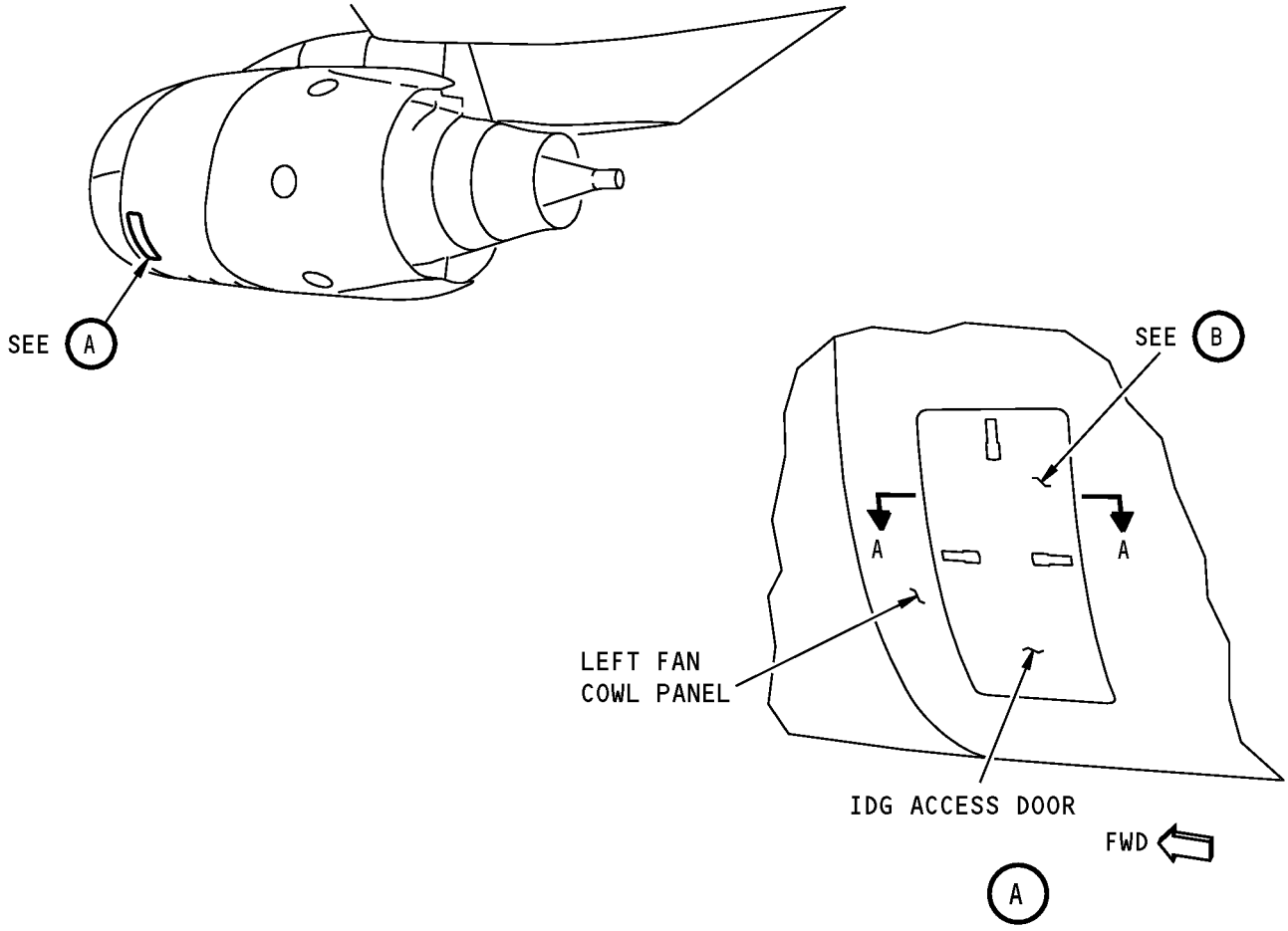
(a) If the door is not in the limits, replace the door.

These are the tasks:

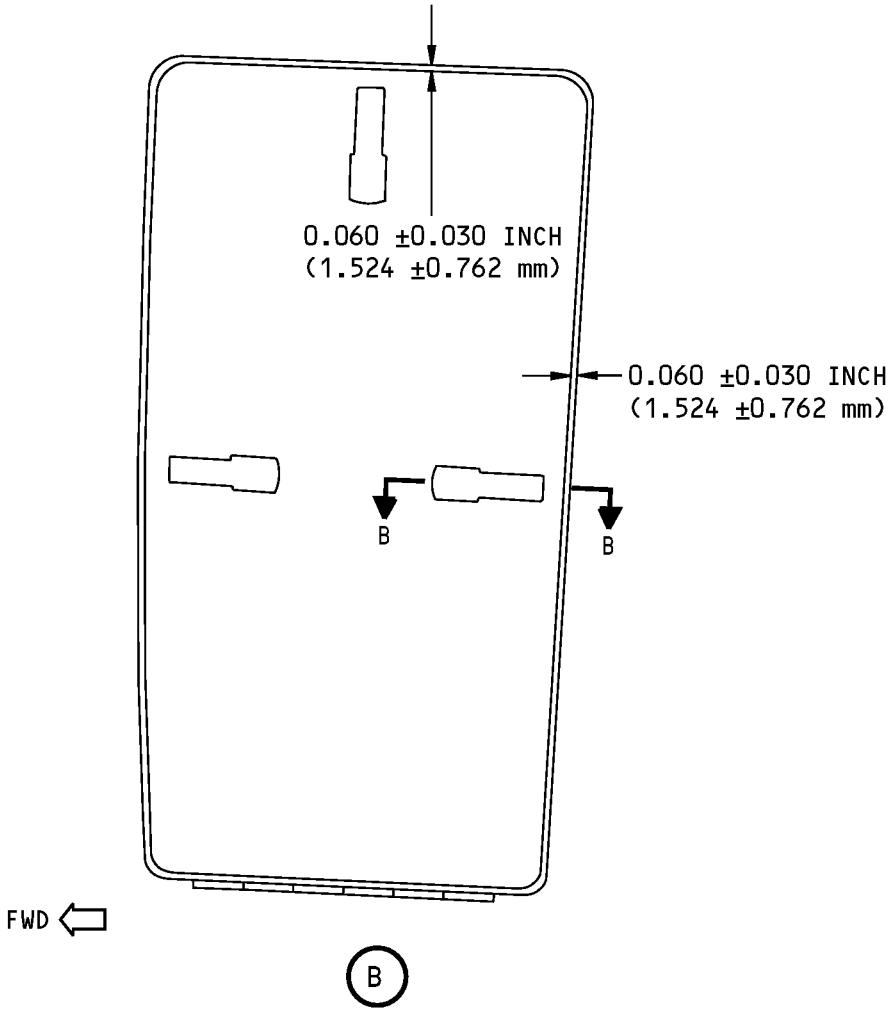
IDG Access Door Removal, TASK 71-11-04-000-801-F00,

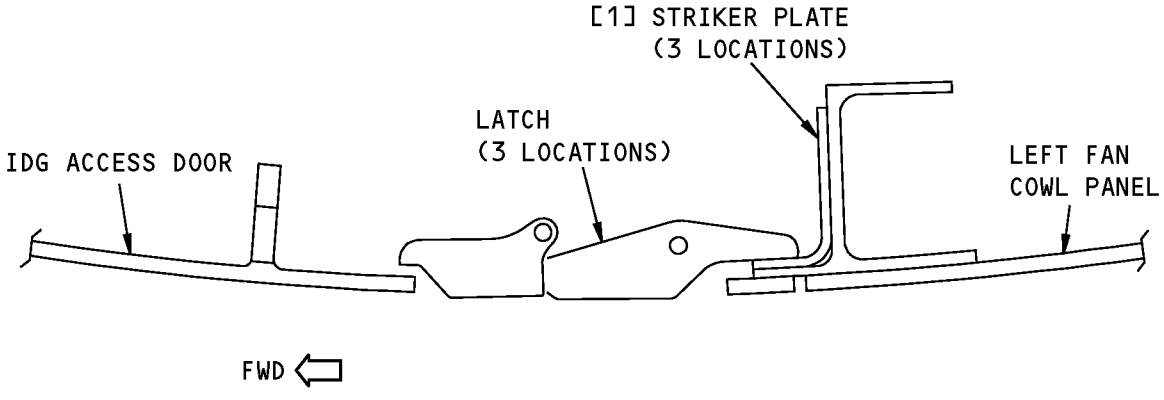
IDG Access Door Installation, TASK 71-11-04-400-801-F00.

———————— END OF TASK ————————



IDG Access Door Adjustment
Figure 501 (Sheet 1 of 2)/71-11-04-990-801-F00





B–B

IDG Access Door Adjustment
Figure 501 (Sheet 2 of 2)/71-11-04-990-801-F00

TASK 71-11-04-820-802-F00

3. IDG Access Door Free Play Adjustment

(Figure 501)

A. General

(1) This procedure adjusts the IDG access door (referred to as the door) with its opening in the left fan cowl panel.

(a) The adjustments are for a tight fit with the latches locked.

(2) This procedure is necessary after the removal or the replacement of the door or the latches.

B. Location Zones

Zone	Area
413	Engine 1 - Fan Cowl, Left
423	Engine 2 - Fan Cowl, Left

C. Access Panels

Number	Name/Location
413AL	IDG Access Door, Engine 1
423AL	IDG Access Door, Engine 2

D. Procedure

SUBTASK 71-11-04-410-002-F00

(1) Do this step;

Close the applicable access door:

Number	Name/Location
413AL	IDG Access Door, Engine 1

or close this access panel:

Number	Name/Location
423AL	IDG Access Door, Engine 2

(a) Make sure that the latches are in the fully open position and close the door.

(b) Push the middle of the latches into the door, to close the latches.

SUBTASK 71-11-04-820-001-F00

(2) Examine the door for a tight fit, make sure that there is no free play with the latches fully locked.

(a) If there is play, do these steps to adjust the latches:

1) Open the door.

2) Do these steps to remove the three striker plates [1]:

a) Center punch the four rivets on the striker plate.

b) Drill out the rivets with a 5/32-inch bit.

c) Remove the striker plate [1].

3) Install the new striker plates [1] with new rivets.

(b) Close the applicable door.

(c) Make sure that the edges of the door are smooth with the outer surface of the fan cowl panel.

1) The limits are 0.00 ±0.030 inch (0.762 mm).

—————— END OF TASK ——————

OIL TANK ACCESS DOOR - MAINTENANCE PRACTICES

1. General

A. This procedure has the task for the removal and installation of the latches on the oil tank access door.

TASK 71-11-05-900-801-F00

2. Oil Tank Access Door Latch Removal/Installation

(Figure 201)

A. General

(1) This procedure removes and installs the oil tank access door latch (referred to as the latch).

(2) The oil tank access door (referred to as the door) is on the right fan cowl panel.

B. References

Reference	Title
71-11-05-820-802-F00	Oil Tank Access Door Free Play Adjustment (P/B 501)

C. Location Zones

Zone	Area
414	Engine 1 - Fan Cowl, Right
424	Engine 2 - Fan Cowl, Right

D. Access Panels

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

E. Latch Removal

SUBTASK 71-11-05-010-003-F00

(1) Do this step;

Open the applicable door:

Number	Name/Location
414AR	Oil Tank Access Door, Engine 1

or open this door:

Number	Name/Location
424AR	Oil Tank Access Door, Engine 2

(a) Push the larger end of the latches into the door to open the latches.

(b) Pull the door out to the fully open position.

SUBTASK 71-11-05-020-002-F00

(2) Do these steps to remove each latch [1]:

(a) Remove the four nuts [2] and pins [3] that attach the latch to the door.

(b) Remove the latch [1].

F. Latch Installation

SUBTASK 71-11-05-020-003-F00

(1) Do these steps to install each latch [1]:

(a) Put the latch [1] in the door and align the bolt holes.

(b) Install the four pins [3] and nuts [2].

SUBTASK 71-11-05-010-004-F00

(2) Make sure that the latch is smooth with the outer surface of the door in 0 ±0.030 inch (0.762 mm).

(a) If the latch [1] is not in the limits, replace the latch.

SUBTASK 71-11-05-400-001-F00

(3) Measure the distance between the latch and the latch cut-out in the door (View A-A).

(a) If the distance is not correct, do these steps to adjust the latch:

1) Loosen the four nuts.

2) Set the latch for the correct distance.

3) Tighten the four nuts.

SUBTASK 71-11-05-410-003-F00

(4) Do this step;

Close the applicable door:

Number	Name/Location
414AR	Oil Tank Access Door, Engine 1

or close this door:

Number	Name/Location
424AR	Oil Tank Access Door, Engine 2

(a) Make sure that the latches are in the fully open position.

(b) Close the door.

(c) Push the middle of each latch into the door to close the latch.

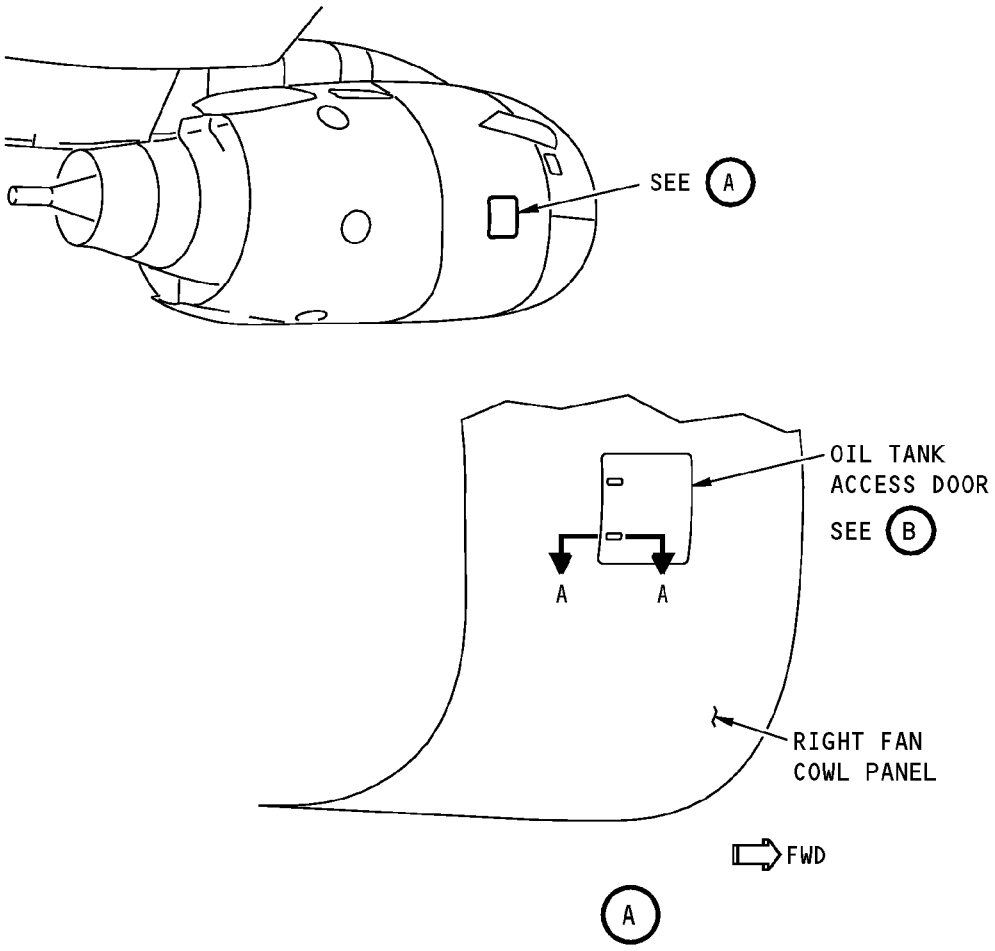
SUBTASK 71-11-05-820-003-F00

(5) Examine the door for a tight fit.

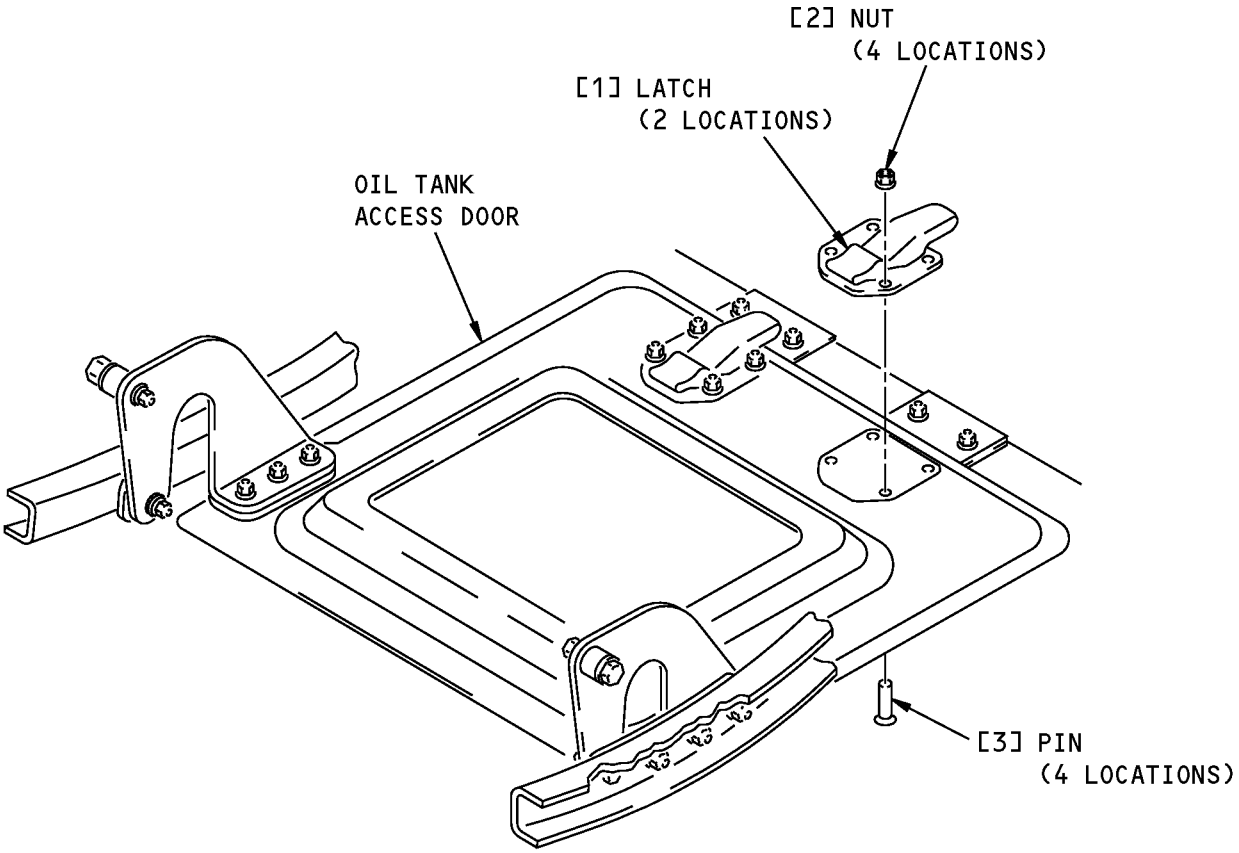
(a) Make sure that there is no free play with the latches fully locked.

(b) If there is free play, do this task: Oil Tank Access Door Free Play Adjustment, TASK 71-11-05-820-802-F00.

——————— END OF TASK ———————



Oil Tank Access Door Latch Installation
Figure 201 (Sheet 1 of 2)/71-11-05-990-802-F00



Oil Tank Access Door Latch Installation
Figure 201 (Sheet 2 of 2)/71-11-05-990-802-F00

OIL TANK ACCESS DOOR - REMOVAL/INSTALLATION

1. General

A. This procedure has these two tasks:

(1) The removal of the oil tank access door

(2) The installation of the oil tank access door.

TASK 71-11-05-000-801-F00

2. Oil Tank Access Door Removal

(Figure 401)

A. General

(1) This task removes the oil tank access door (referred to as the door) from the right fan cowl panel.

(2) The applicable door is identified in the Access Panels list.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)

C. Location Zones

Zone	Area
414	Engine 1 - Fan Cowl, Right
424	Engine 2 - Fan Cowl, Right

D. Access Panels

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

E. Procedure

SUBTASK 71-11-05-010-001-F00

(1) Do this step;

Open the applicable doors:

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

(a) Push the larger end of each latch into the door to open the latches.

(b) Pull the door to the fully open position.

SUBTASK 71-11-05-010-002-F00

(2) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 71-11-05-020-001-F00

(3) Do these steps to remove the door [1]:

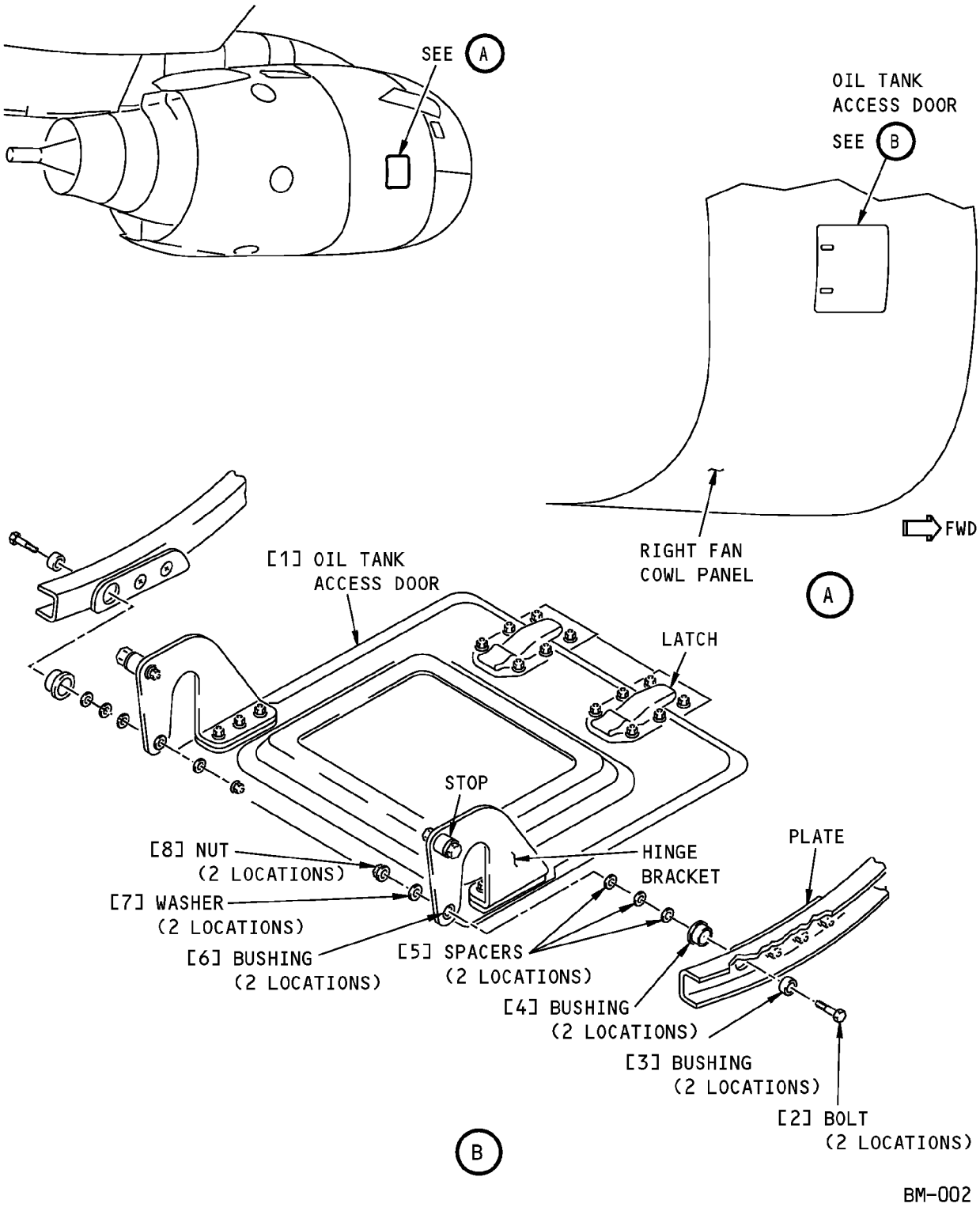
NOTE: You can find more than one spacer [5] with the bolts and nuts at the hinge. These spacers are necessary to align the door in the middle of its opening. Make sure to keep the spacers, because you will use the spacers in the correct quantity to install the door.

(a) Remove the nut [8], washer [7], bushings [3], [4] and [6], spacers [5], and the bolt [2] at each door hinge.

1) If you will re-install the same door, record the number and location of the spacers [5] that you remove.

(b) Remove the door [1].

——————— END OF TASK ———————



Oil Tank Access Door Installation
Figure 401/71-11-05-990-801-F00

TASK 71-11-05-400-801-F00

3. Oil Tank Access Door Installation

(Figure 401)

A. References

Reference	Title
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
71-11-05-820-801-F00	Oil Tank Access Door Adjustment (P/B 501)
71-11-05-820-802-F00	Oil Tank Access Door Free Play Adjustment (P/B 501)

B. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Door	71-11-02-10A-365	HAP 001-013, 015-026, 028-031
		71-11-02-10A-369	HAP ALL

C. Location Zones

Zone	Area
414	Engine 1 - Fan Cowl, Right
424	Engine 2 - Fan Cowl, Right

D. Access Panels

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

E. Procedure

SUBTASK 71-11-05-210-001-F00

(1) Examine the stops for worn areas or deterioration.

(a) Replace the stops, if there is damage.

SUBTASK 71-11-05-210-002-F00

(2) Examine the bushings [3], [4], and [6] for worn areas.

(a) Replace the bushings, if there are worn areas.

SUBTASK 71-11-05-700-001-F00

(3) Do these steps to install the door [1].

(a) Put the door [1] in the opening of the fan cowl panel and align the bolt holes at the hinges.

(b) Install the bolt [2], bushings [3], [4] and [6], spacers [5], washers [7], and nut [8] at each hinge.

NOTE: If you re-install the same door, install the same number of spacers [5] in the same location that you recorded in the removal task.

1) Tighten the nuts [8] with your hand.

CAUTION: DO NOT USE MORE THAN 40 POUND-INCHES (4.52 NEWTON METERS) TORQUE ON THE NUT TO PREVENT DAMAGE TO THE EQUIPMENT.

(c) Tighten the nuts [8] to the correct torque.

SUBTASK 71-11-05-410-001-F00

(4) Do this step;

Close the applicable access door:

Number	Name/Location
414AR	Oil Tank Access Door, Engine 1

or close this access door:

Number	Name/Location
424AR	Oil Tank Access Door, Engine 2

(a) Make sure that the latches are in the fully open position and close the door.

(b) Push the middle of the latches into the door, to close the latches.

SUBTASK 71-11-05-820-001-F00

(5) Do this task: Oil Tank Access Door Adjustment, TASK 71-11-05-820-801-F00.

SUBTASK 71-11-05-820-002-F00

(6) Do this task: Oil Tank Access Door Free Play Adjustment, TASK 71-11-05-820-802-F00.

SUBTASK 71-11-05-410-002-F00

(7) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

——————— END OF TASK ———————

OIL TANK ACCESS DOOR - ADJUSTMENT/TEST

1. General

A. This procedure has these two tasks:

(1) To adjust the clearance and aerosmoothness of the oil tank access door

(2) To adjust the free play of the oil tank access door.

TASK 71-11-05-820-801-F00

2. Oil Tank Access Door Adjustment

(Figure 501)

A. General

(1) This procedure adjusts the oil tank access door (referred to as the door) with its opening in the right fan cowl panel.

(a) The adjustments are for the correct edge clearances and the aerosmoothness of the door.

(2) This procedure is necessary after the removal or the replacement of the door.

B. References

Reference	Title
71-11-05-000-801-F00	Oil Tank Access Door Removal (P/B 401)
71-11-05-400-801-F00	Oil Tank Access Door Installation (P/B 401)

C. Tools/Equipment

Reference	Description
STD-1107	Gauge - Feeler, 0.0 - 0.5 Inch, Readable to 1/1000th

D. Location Zones

Zone	Area
414	Engine 1 - Fan Cowl, Right
424	Engine 2 - Fan Cowl, Right

E. Access Panels

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

F. Procedure

SUBTASK 71-11-05-410-004-F00

(1) Do this step;

Close the applicable access door:

Number	Name/Location
414AR	Oil Tank Access Door, Engine 1

or close this access door:

Number	Name/Location
424AR	Oil Tank Access Door, Engine 2

(a) Make sure that the latches are in the fully open position and close the door.

(b) Push the middle of the latches into the door, to close the latches.

SUBTASK 71-11-05-220-001-F00

(2) Measure the clearance between the door and the fan cowl panel at the top and bottom edges with a 0.0 - 0.5 Inch feeler gauge, STD-1107.

(a) Make sure that the clearance is 0.060 -0.050/+0.030 inch (1.524 -1.270/+0.762 mm).

(b) If the clearance is not correct, do these steps to adjust the clearance:

1) Do this task: Oil Tank Access Door Removal, TASK 71-11-05-000-801-F00.

2) Record the number and the location of the spacers that you remove from between the hinges and the bushings.

3) Add or remove the spacers between the hinge brackets and the bushings to get the clearances to be equal and in the limits.

4) Do this task: Oil Tank Access Door Installation, TASK 71-11-05-400-801-F00.

SUBTASK 71-11-05-220-002-F00

(3) Measure the clearance between the door and the fan cowl panel at the forward and aft edges with the gage.

(a) Make sure that the clearance is 0.120 ±0.030 inch (3.048 ±0.762 mm) for the forward edge.

(b) Make sure that the clearance is 0.060 -0.050/+0.030 inch (1.524 -1.270/+0.762 mm) for the aft edge.

(c) If the clearances are not correct, replace the door.

These are the tasks:

Oil Tank Access Door Removal, TASK 71-11-05-000-801-F00,

Oil Tank Access Door Installation, TASK 71-11-05-400-801-F00.

SUBTASK 71-11-05-220-003-F00

(4) Make sure that the edges of the door are smooth with the outer surface of the fan cowl panel at 0.00 ±0.030 inch (0.762 mm).

(a) If the door is out of limits, do these steps to adjust the door:

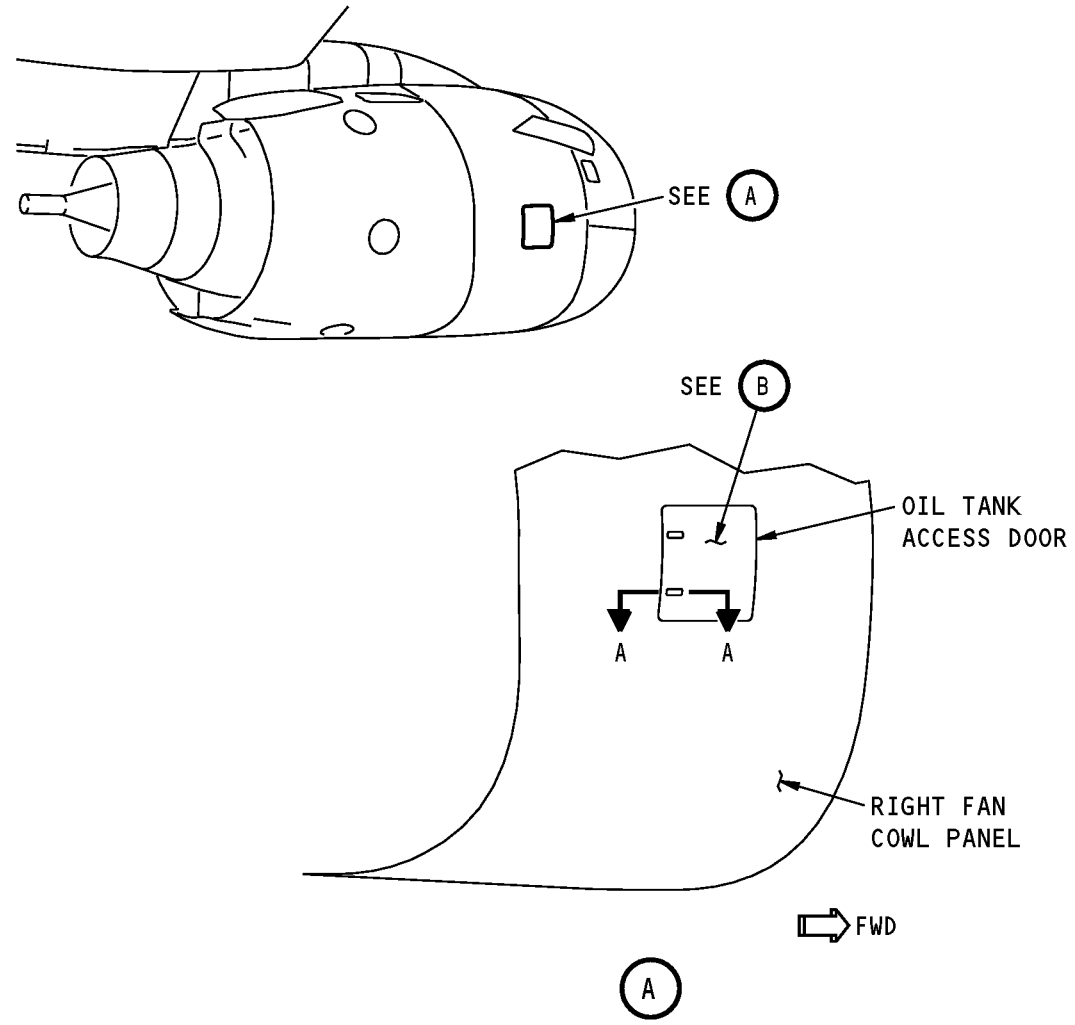
1) Open the door.

2) Add or remove the shims [6] below the hinge brackets [5].

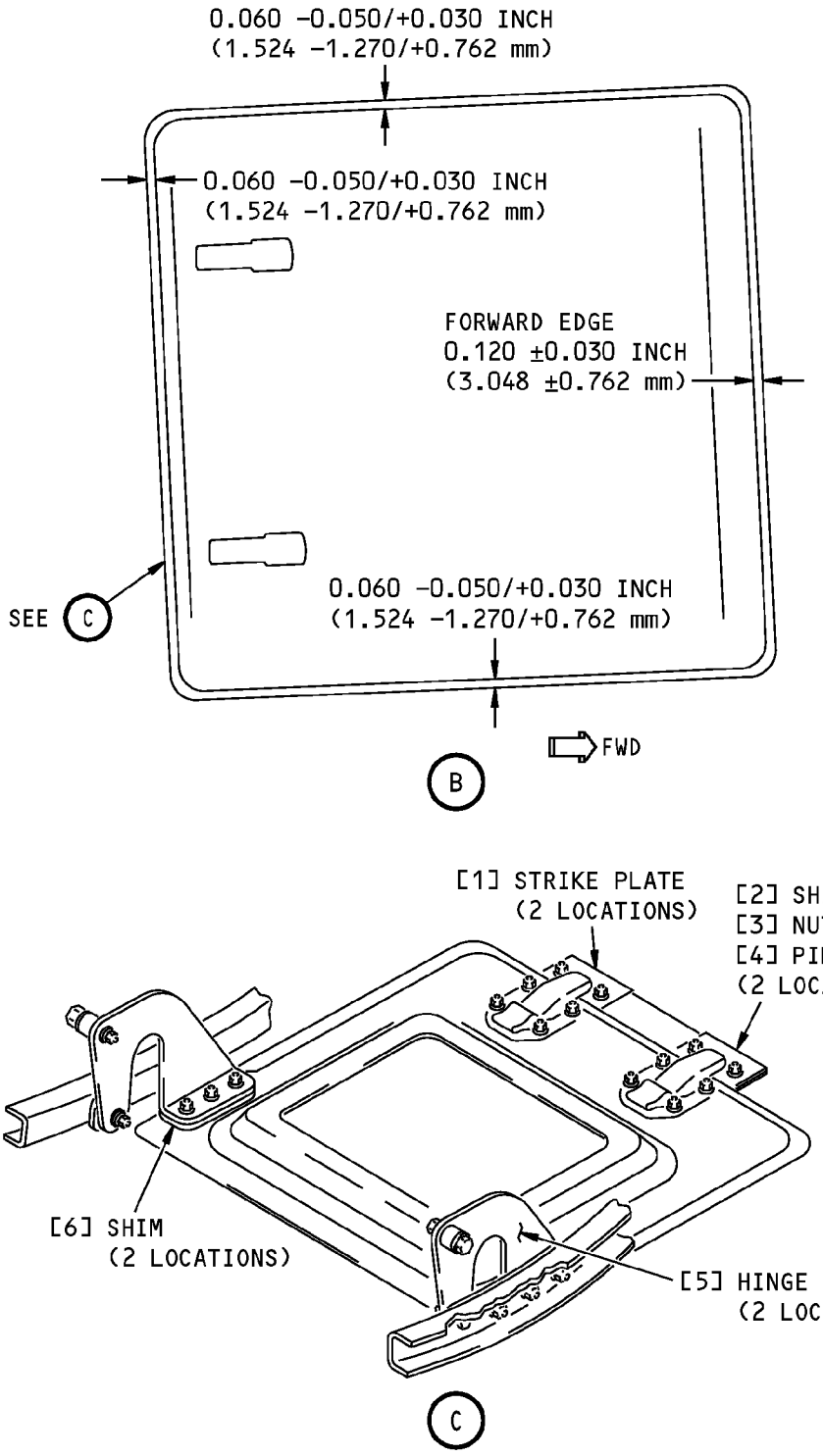
3) Add or remove the shims [2] below the striker plates [1].

4) Close the door.

END OF TASK



Oil Tank Access Door Adjustment
Figure 501 (Sheet 1 of 2)/71-11-05-990-803-F00



Oil Tank Access Door Adjustment
Figure 501 (Sheet 2 of 2)/71-11-05-990-803-F00

TASK 71-11-05-820-802-F00

3. Oil Tank Access Door Free Play Adjustment

(Figure 501)

A. General

(1) This procedure adjusts the oil tank access door (referred to as the door) with its opening in the right fan cowl panel.

(a) The adjustments are for a tight fit with locked latches.

(2) This procedure is necessary after the removal or the replacement of the door or the latches.

B. Location Zones

Zone	Area
414	Engine 1 - Fan Cowl, Right
424	Engine 2 - Fan Cowl, Right

C. Access Panels

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

D. Procedure

SUBTASK 71-11-05-410-005-F00

(1) Do this step;

Close the applicable access door:

Number	Name/Location
414AR	Oil Tank Access Door, Engine 1

or close this access door:

Number	Name/Location
424AR	Oil Tank Access Door, Engine 2

(a) Make sure that the latches are in the fully open position and close the door.

(b) Push the middle of the latches into the door, to close the latches.

SUBTASK 71-11-05-820-004-F00

(2) Examine the door for a tight fit, make sure that there is no free play with the latches fully locked.

(a) If there is play, do these steps to adjust the latches:

1) Open the door.

2) Do these steps to remove the two striker plates [1]:

a) Remove the two nuts [3] and pins [4] that attach the striker plate to the door.

b) Remove the striker plate [1].

c) Remove the shim [2].

3) Adjust the thickness of the shim [2] to remove the free play.

4) Do these steps to install the two striker plates [1]:

a) Install the two pins [4], the shims [2], the striker plate [1] and the two nuts [3].

b) Tighten the nuts [3].

(b) Close the door.

(c) Make sure that the edges of the door are smooth with the outer surface of the fan cowl panel.

1) The limits are 0.00 ±0.030 inch (0.762 mm).

—————— END OF TASK ——————

T12 ACCESS/PRESSURE RELIEF DOOR - MAINTENANCE PRACTICES

1. General

A. This procedure has the task to remove and install the latch on the T12 access/pressure relief door.

TASK 71-11-06-900-801-F00

2. T12 Access/Pressure Relief Door Latch Removal/Installation

(Figure 201)

A. General

(1) This task removes and installs the T12 access/pressure relief door latch (referred to as the latch).

(2) The T12 access/pressure relief door (referred to as the door) is on the right side of the inlet cowl.

B. References

Reference	Title
71-11-06-820-802-F00	T12 Access/Pressure Relief Door Free Play Adjustment (P/B 501)
71-11-06-820-803-F00	T12 Access/Pressure Relief Door Latch Release Test (P/B 501)

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	Latch	71-11-01-02-115	HAP ALL

D. Location Zones

Zone	Area
412	Engine 1 - Nose Inlet Cowl
422	Engine 2 - Nose Inlet Cowl

E. Access Panels

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

F. Latch Removal

SUBTASK 71-11-06-010-002-F00

(1) Open the applicable doors:

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

(a) Put a screwdriver blade into the latch button slot.

(b) Move the latch button up to release the latch.

(c) Open the door.

SUBTASK 71-11-06-020-002-F00

(2) Do these steps to remove the latch [3]:

(a) Remove the four nuts [1], washers [2], and bolts [4] that attach the latch to the door.

(b) Remove the latch [3].

G. Latch Installation

SUBTASK 71-11-06-420-002-F00

(1) Do these steps to install the latch [3]:

(a) Put the latch [3] on the door and align the bolt holes.

(b) Install the four bolts [4], washers [2], and nuts [1].

(c) Tighten the nuts [1].

SUBTASK 71-11-06-410-002-F00

(2) Close the applicable doors:

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

(a) Make sure that the latch is in the fully open position and close the door.

(b) Push the latch button into the door until the latch button is smooth with the door.

SUBTASK 71-11-06-420-003-F00

(3) Make sure that the latch button is smooth with the outer surface of the door at 0.0 ±0.030 inch (±0.762 mm).

(a) If the latch is not in the limits, replace the latch.

SUBTASK 71-11-06-400-001-F00

(4) Make sure that the clearance between the latch button and the door is constant (View A-A).

(a) If the latch is not in the limits, do these steps:

1) Loosen the nuts [1].

2) Adjust the latch position for the correct clearance.

3) Tighten the nuts 15].

SUBTASK 71-11-06-820-004-F00

(5) Examine the door for a tight fit.

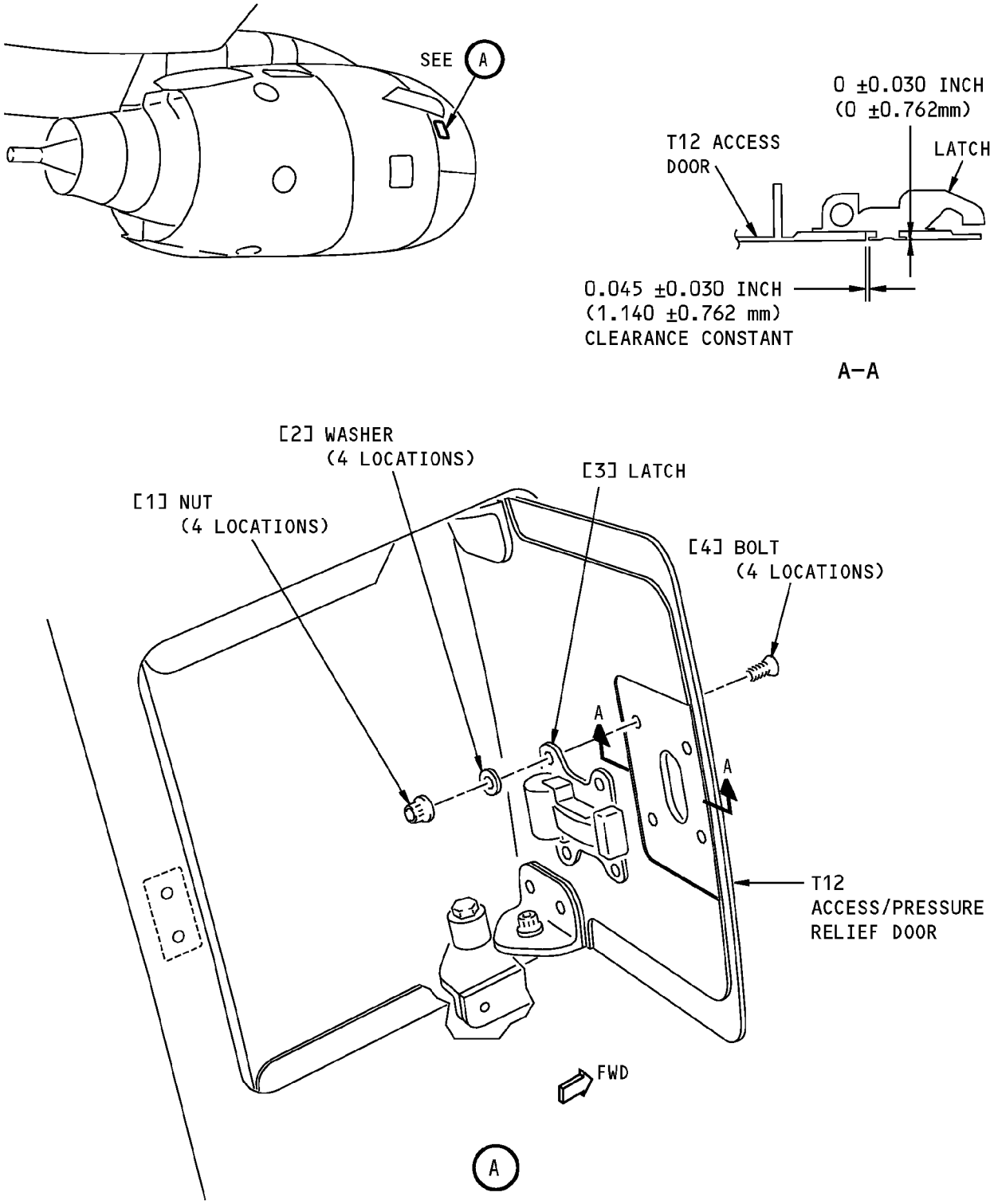
(a) Make sure that there is no free play with the latch fully locked.

(b) If there is free play, do this task: T12 Access/Pressure Relief Door Free Play Adjustment, TASK 71-11-06-820-802-F00.

SUBTASK 71-11-06-820-005-F00

(6) Do this task: T12 Access/Pressure Relief Door Latch Release Test, TASK 71-11-06-820-803-F00.

———————— END OF TASK ————————



T12 Access/Pressure Relief Door Latch Installation
Figure 201/71-11-06-990-802-F00

T12 ACCESS/PRESSURE RELIEF DOOR - REMOVAL/INSTALLATION

1. General

A. This procedure has these two tasks:

(1) The removal of the T12 access and pressure-relief door

(2) The installation of the T12 access and pressure-relief door.

TASK 71-11-06-000-801-F00

2. T12 Access/Pressure Relief Door Removal

(Figure 401)

A. General

(1) This task removes the T12 access/pressure-relief door (referred to as the door) from the right side of the inlet cowl.

(2) The applicable door is identified in the Access Panels list.

B. Location Zones

Zone	Area
412	Engine 1 - Nose Inlet Cowl
422	Engine 2 - Nose Inlet Cowl

C. Access Panels

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

D. Procedure

SUBTASK 71-11-06-010-001-F00

(1) Do this step;

Open the applicable door:

Number	Name/Location
412AR	T12 Access Door, Engine 1

or open this access door:

Number	Name/Location
422AR	T12 Access Door, Engine 2

(a) Put a screwdriver blade into the latch button slot.

(b) Move the latch button up to release the latch.

(c) Open the door.

SUBTASK 71-11-06-020-001-F00

(2) Do these steps to remove the door [6]:

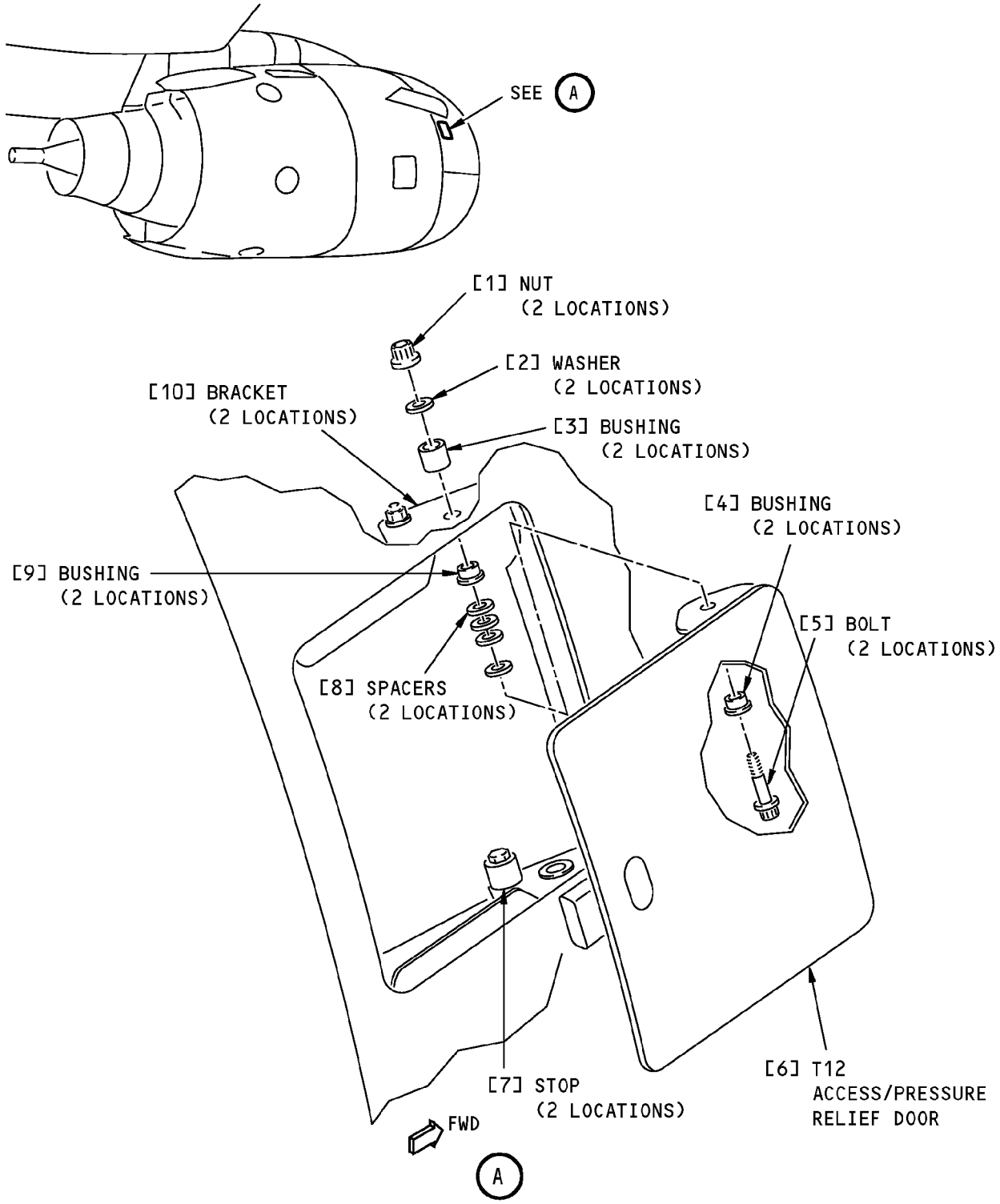
NOTE: You can find more than one spacer [8] with the bolts and nuts at the hinge. These spacers are necessary to align the door in the middle of its opening. Make sure to keep the spacers, because you will use the spacers in the correct quantity to install the door.

(a) Remove the nut [1], washers [2], spacers [8], bushing [3], [4] and [9], and the bolt [5] at each door hinge.

1) If you will re-install the same door, record the number and location of the spacers [8] that you remove.

(b) Remove the door [6].

END OF TASK



T12 Access/Pressure Relief Door Installation
Figure 401/71-11-06-990-801-F00

TASK 71-11-06-400-801-F00

3. T12 Access/Pressure Relief Door Installation

(Figure 401)

A. References

Reference	Title
71-11-06-820-801-F00	T12 Access/Pressure Relief Door Adjustment (P/B 501)
71-11-06-820-802-F00	T12 Access/Pressure Relief Door Free Play Adjustment (P/B 501)
71-11-06-820-803-F00	T12 Access/Pressure Relief Door Latch Release Test (P/B 501)

B. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
6	Door	71-11-01-02-110	HAP ALL

C. Location Zones

Zone	Area
412	Engine 1 - Nose Inlet Cowl
422	Engine 2 - Nose Inlet Cowl

D. Access Panels

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

E. Procedure

SUBTASK 71-11-06-210-001-F00

(1) Examine the stops [7] for worn areas or deterioration.

(a) Replace the stops, if there is damage.

SUBTASK 71-11-06-210-002-F00

(2) Examine the bushings [3], [4] and [9] for worn areas.

(a) Replace the bushings, if there are worn areas.

SUBTASK 71-11-06-420-001-F00

(3) Do these steps to install the door [6]:

(a) Put the door [6] in the opening on the inlet cowl and align the bolt holes at the hinges.

(b) Install the bolt [5], bushings [3], [4], and [9], spacers [8], washers [2], and nut [1] at each hinge.

NOTE: If you re-install the same door, install the number of spacers [8] in the same location as you recorded in the removal task.

1) Tighten the nuts [1] with your hand.

2) Tighten the nuts [1] to the correct torque.

SUBTASK 71-11-06-410-001-F00

(4) Do this step;

Close the applicable door:

Number	Name/Location
412AR	T12 Access Door, Engine 1

or close this access door:

Number	Name/Location
422AR	T12 Access Door, Engine 2

(a) Make sure that the latch is in the fully open position and close the door.

(b) Push the latch button into the door until the latch button is smooth with the door.

SUBTASK 71-11-06-820-001-F00

(5) Do this task: T12 Access/Pressure Relief Door Adjustment, TASK 71-11-06-820-801-F00.

SUBTASK 71-11-06-820-002-F00

(6) Do this task: T12 Access/Pressure Relief Door Free Play Adjustment, TASK 71-11-06-820-802-F00.

SUBTASK 71-11-06-820-003-F00

(7) Do this task: T12 Access/Pressure Relief Door Latch Release Test, TASK 71-11-06-820-803-F00.

——————— END OF TASK ———————

T12 ACCESS/PRESSURE RELIEF DOOR - ADJUSTMENT/TEST

1. General

A. This procedure has these three tasks:

(1) To adjust the clearance and aerosmoothness of the T12 access and pressure-relief door

(2) To adjust the free play of the T12 access and pressure-relief door

(3) The latch release test of the T12 access and pressure-relief door.

TASK 71-11-06-820-801-F00

2. T12 Access/Pressure Relief Door Adjustment

(Figure 501)

A. General

(1) This procedure adjusts the T12 access/pressure-relief door (referred to as the door) with its opening in the right side of the inlet cowl.

(a) The adjustments are for the correct edge clearances and the aerosmoothness of the door.

(2) This procedure is necessary after the removal or the replacement of the door.

B. References

Reference	Title
71-11-06-000-801-F00	T12 Access/Pressure Relief Door Removal (P/B 401)
71-11-06-400-801-F00	T12 Access/Pressure Relief Door Installation (P/B 401)

C. Tools/Equipment

Reference	Description
STD-1107	Gauge - Feeler, 0.0 - 0.5 Inch, Readable to 1/1000th

D. Location Zones

Zone	Area
412	Engine 1 - Nose Inlet Cowl
422	Engine 2 - Nose Inlet Cowl

E. Access Panels

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

F. Procedure

SUBTASK 71-11-06-410-003-F00

(1) Do this step;

Close the applicable access door:

Number	Name/Location
412AR	T12 Access Door, Engine 1

or close this access door:

Number	Name/Location
422AR	T12 Access Door, Engine 2

(a) Make sure that the latch is in the fully open position and close the door.

(b) Push the latch button into the door until the latch button is smooth with the door.

SUBTASK 71-11-06-220-001-F00

(2) Measure the clearance between the door and the inlet cowl at the top and bottom edges with a 0.0 - 0.5 Inch feeler gauge, STD-1107.

(a) Make sure that the clearance is 0.060 ±0.030 inch (1.524 ±0.762 mm).

(b) If the clearance is not correct, do these steps to adjust the clearance:

1) Do this task: T12 Access/Pressure Relief Door Removal, TASK 71-11-06-000-801-F00.

a) Record the number and the location of the spacers installed between the bushings.

2) Add or remove the spacers between the bushings to keep the clearances equal and in the limits.

3) Do this task: T12 Access/Pressure Relief Door Installation, TASK 71-11-06-400-801-F00.

SUBTASK 71-11-06-220-002-F00

(3) Measure the clearance between the door and the inlet cowl at the forward and aft edges with the gage.

(a) Make sure that the clearance is 0.060 ±0.030 inch (1.524 ±0.762 mm).

1) If the clearance is not correct, replace the door.

These are the tasks:

T12 Access/Pressure Relief Door Removal, TASK 71-11-06-000-801-F00,

T12 Access/Pressure Relief Door Installation, TASK 71-11-06-400-801-F00.

SUBTASK 71-11-06-220-003-F00

(4) Make sure that the edges of the door are smooth with the outer surface of the inlet cowl at 0.00 ±0.030 inch (±0.762 mm).

(a) If the door is out of limits, do these steps to adjust the door:

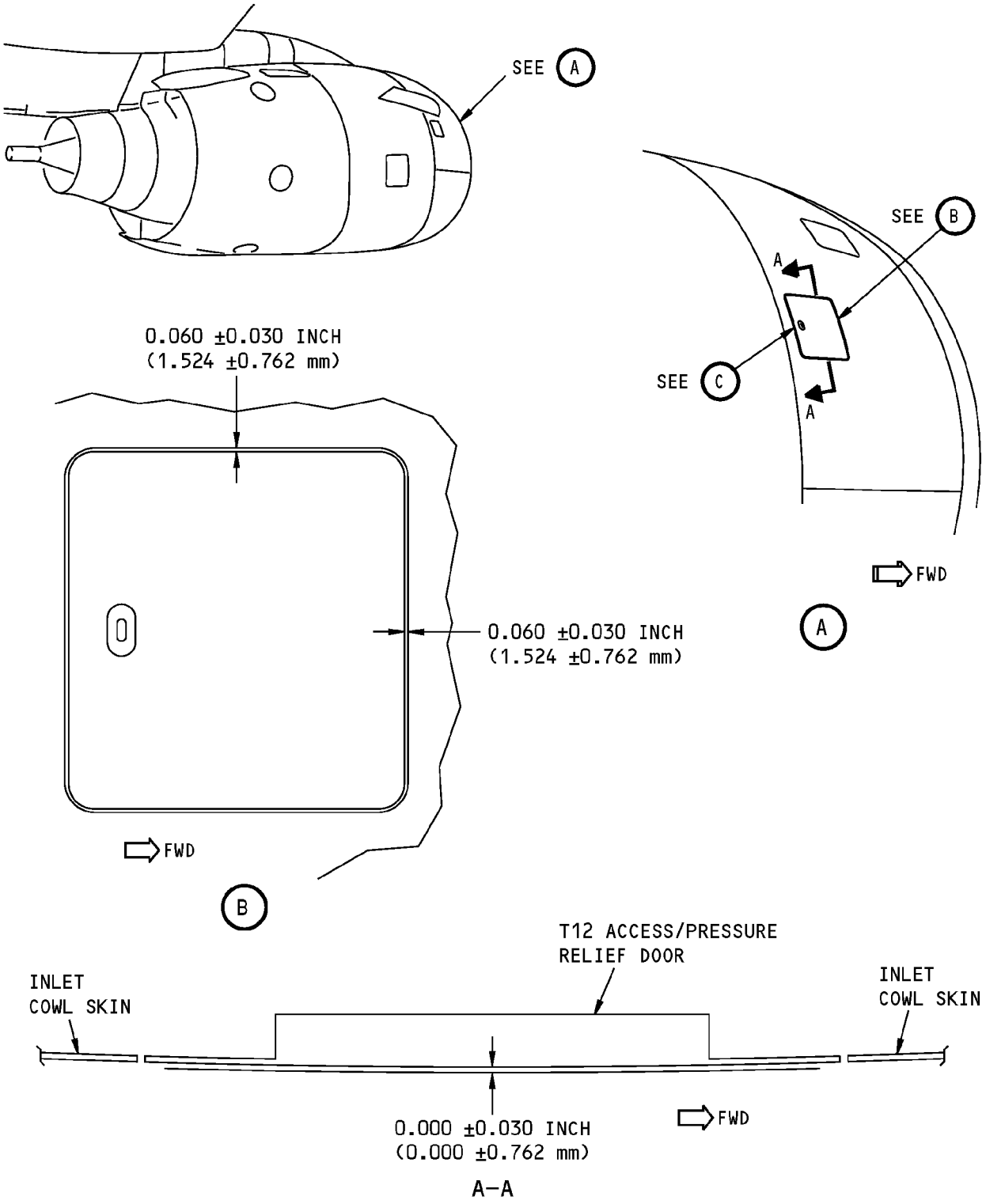
1) Open the door.

2) Add or remove the shims [4] and [6] below the plates [5] and [7].

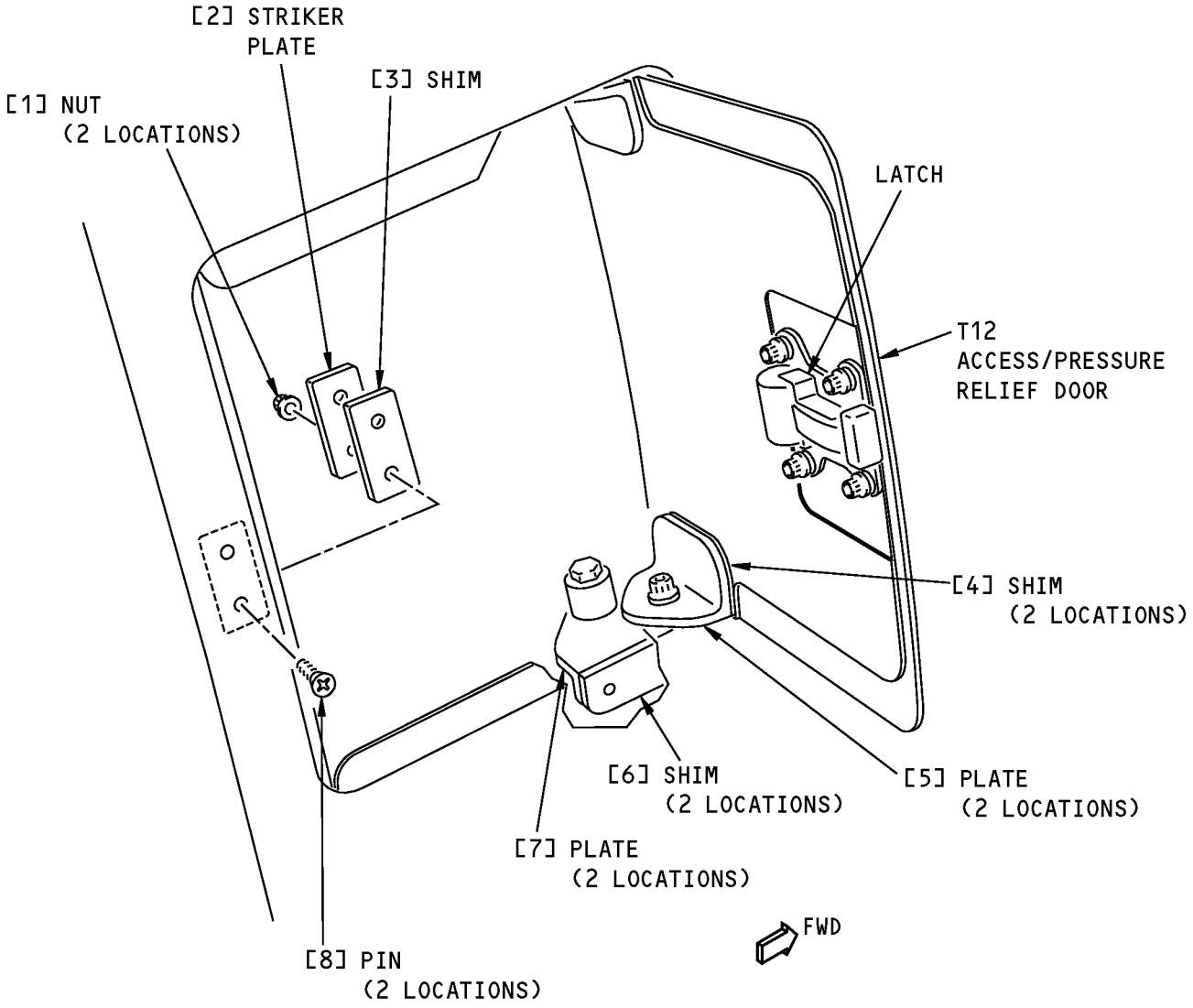
3) Add or remove the shims [3] below the striker plate [2].

4) Close the door.

END OF TASK



T12 Access/Pressure Relief Door Adjustment
Figure 501 (Sheet 1 of 2)/71-11-06-990-803-F00



T12 Access/Pressure Relief Door Adjustment
Figure 501 (Sheet 2 of 2)/71-11-06-990-803-F00

TASK 71-11-06-820-802-F00

3. T12 Access/Pressure Relief Door Free Play Adjustment

(Figure 501)

A. General

(1) This procedure adjusts the T12 access and pressure-relief door (referred to as the door) with its opening on the right side of the inlet cowl.

(a) The adjustments are for a tight fit with the latch locked.

(2) This procedure is necessary after the removal or the replacement of the door or the latches.

B. Location Zones

Zone	Area
412	Engine 1 - Nose Inlet Cowl
422	Engine 2 - Nose Inlet Cowl

C. Access Panels

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

D. Procedure

SUBTASK 71-11-06-410-004-F00

(1) Do this step;

Close the applicable access door:

Number	Name/Location
412AR	T12 Access Door, Engine 1

or close this access door:

Number	Name/Location
422AR	T12 Access Door, Engine 2

(a) Make sure that the latch is in the fully open position and close the door.

(b) Push the latch button into the door until the latch button is smooth with the door.

SUBTASK 71-11-06-220-004-F00

(2) Make sure the edges of the door are smooth with the outer surface of the cowl at 0.00 ±0.030 inch (±0.762 mm).

SUBTASK 71-11-06-820-006-F00

(3) Examine the door for a tight fit, make sure that there is no free play with the latch fully locked.

(a) If there is play, do these steps to adjust the latch:

1) Open the door.

2) Do these steps to install a new striker plate [2]:

a) Remove the two nuts [1] and pins [8], the striker plate [2] and the shim [3].

b) Install the two pins [8], shim [3], the new striker plate [2], and the two nuts [1].

c) Tighten the two nuts [1].

3) Close the door.

(b) Make sure that the edges of the door are smooth with the outer surface of the inlet cowl.

1) The limits are 0.00 ±0.030 inch (±0.762 mm).

——————— END OF TASK ———————

TASK 71-11-06-820-803-F00

4. T12 Access/Pressure Relief Door Latch Release Test

(Figure 502)

A. General

(1) This task makes sure that the T12 access and pressure-relief door latch (referred to as the latch) opens at the correct load.

(2) The T12 access and pressure-relief door (referred to as the door) is found on the right side of the inlet cowl.

B. References

Reference	Title
71-11-06-900-801-F00	T12 Access/Pressure Relief Door Latch Removal/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-5	Adapter - Load Test, Pressure Relief Door Latch (Part #: B71044-28, Supplier: 81205, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Opt Part #: B71044-10, Supplier: 81205, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

D. Location Zones

Zone	Area
412	Engine 1 - Nose Inlet Cowl
422	Engine 2 - Nose Inlet Cowl

E. Access Panels

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

F. Procedure

SUBTASK 71-11-06-410-005-F00

(1) Make sure that the applicable access doors are closed:

Number	Name/Location
412AR	T12 Access Door, Engine 1
422AR	T12 Access Door, Engine 2

SUBTASK 71-11-06-970-001-F00

(2) Calculate the minimum and the maximum torque for the length of the wrench that you use with the formula (Table 501).

Table 501/71-11-06-993-805-F00

LATCH RELEASE TEST - TORQUE CALCULATION
TORQUE pound-inch = 0.53(P)(L)/(L + 1.5 inch) Where P = Latch open load in pounds L = Wrench effective length in inches Figure 502 For METRIC, N.m = 0.13442(P)(L)/(L + 38.1 mm) P in Newtons, L in mm
Pmin-Pmax must be 50-65 pounds (222.4-289.1 Newtons)
EXAMPLE CALCULATION (use Pmin-Pmax, L = 12 inch) TORQUE minimum = 0.53(50)(12)/(12 + 1.5) = 23.6 pound-inches TORQUE maximum (use Pmax = 65) = 30.6 pound-inches For METRIC, let L = 304.8 mm TORQUE min = 0.13442(222.4)(304.8)/(304.8 + 38.1) = 2.66 N.m TORQUE maximum (use Pmax = 289.1) = 3.46 N.m

(a) The correct load (Pmin-Pmax) to open the latch is 50-65 pounds (222.4-289.1 Newtons).

(b) Find the effective length of the torque wrench (VIEW A-A).

(c) For a 12-inch (304.8 mm) wrench, the correct torque is 23.6-30.6 pound-inches (2.66-3.46 Newton-meters).

SUBTASK 71-11-06-820-007-F00

(3) Do these steps to do the latch test:

(a) Put the torque adapater on the torque wrench.

1) The torque adapter is part of the pressure relief door latch load test adapter, SPL-5.

(b) Put the thinner end of the adapter tightly into the slot on the latch.

(c) Apply a right-angle force on the torque wrench in the aft direction until the latch opens.

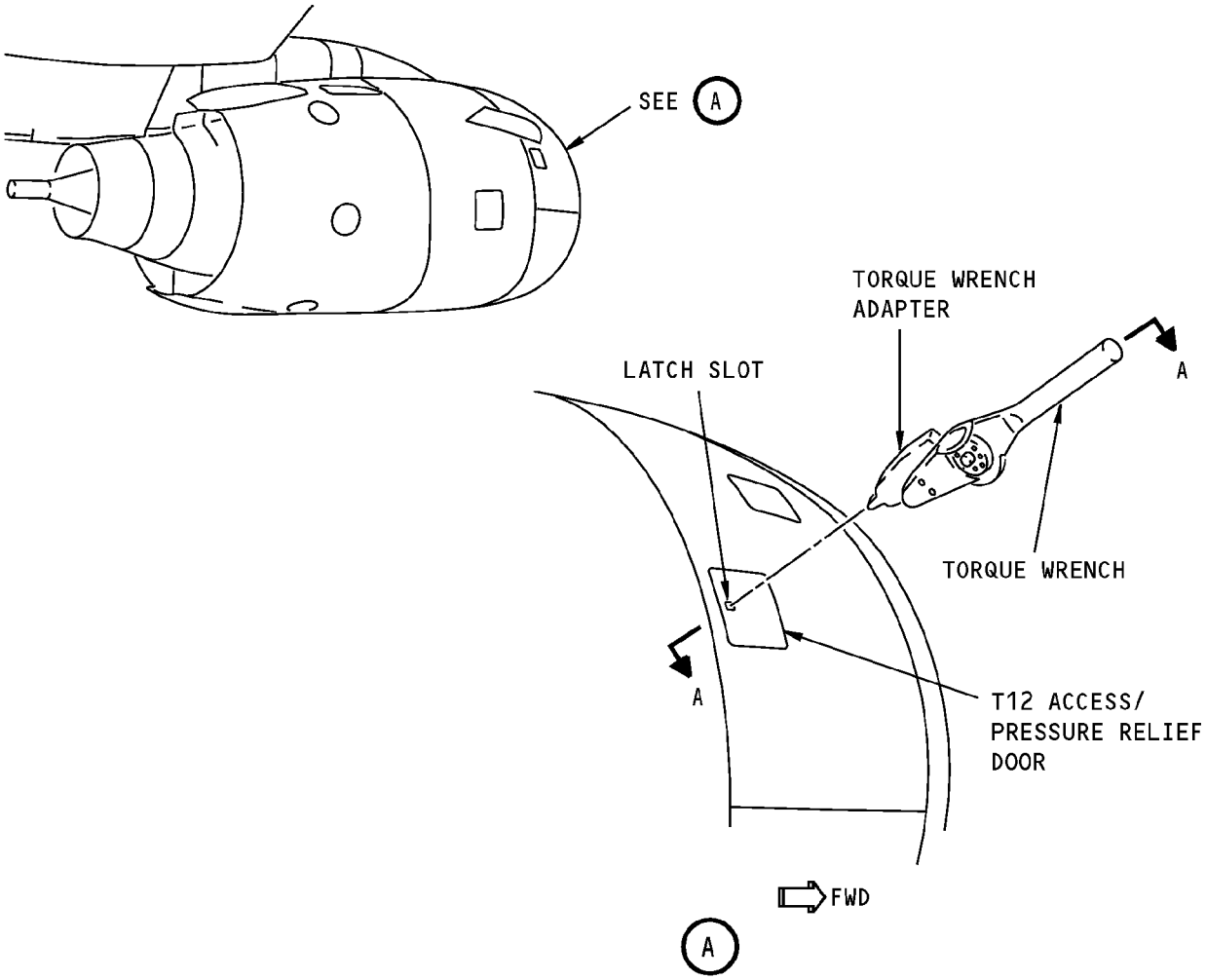
(d) Record the torque value when the latch opens.

(e) If the torque value is not in the calculated limits, replace the latch.

1) Do this task: T12 Access/Pressure Relief Door Latch Removal/Installation, TASK 71-11-06-900-801-F00.

(f) Close the door.

END OF TASK



T12 Access/Pressure Relief Door Load Test
Figure 502/71-11-06-990-804-F00

CHIP DETECTOR ACCESS/PRESSURE RELIEF DOOR - MAINTENANCE PRACTICES

1. General

A. This procedure has the task to remove and install the chip detector access and pressure-relief door latches.

TASK 71-11-07-900-801-F00

2. Chip Detector Access/Pressure Relief Door Latch Removal/Installation

(Figure 201)

A. General

(1) This task removes and installs the chip detector access/pressure relief door latch (referred to as the latch).

(2) The chip detector access/pressure relief door (referred to as the door) has two latches and is found on the left fan cowl panel.

B. References

Reference	Title
71-11-07-820-802-F00	Chip Detector Access/Pressure Relief Door Free Play Adjustment (P/B 501)
71-11-07-820-803-F00	Chip Detector Access/Pressure Relief Door Latch Release Test (P/B 501)

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
3	Latch	71-11-02-10-150	HAP ALL

D. Location Zones

Zone	Area
413	Engine 1 - Fan Cowl, Left
423	Engine 2 - Fan Cowl, Left

E. Access Panels

Number	Name/Location
413BL	Chip Detector/Pressure Relief Door, Engine 1
423BL	Chip Detector/Pressure Relief Door, Engine 2

F. Latch Removal

SUBTASK 71-11-07-010-001-F00

(1) Open the applicable doors:

Number	Name/Location
413BL	Chip Detector/Pressure Relief Door, Engine 1
423BL	Chip Detector/Pressure Relief Door, Engine 2

(a) Put a screwdriver blade into each latch button slot.

(b) Move the latch button up to release the latch.

(c) Open the door.

SUBTASK 71-11-07-020-001-F00

(2) Do these steps to remove each latch [3]:

(a) Remove the four nuts [1], washers [2], and bolts [4] that attach the latch to the door.

(b) Remove the latch [3].

G. Latch Installation

SUBTASK 71-11-07-420-001-F00

(1) Do these steps to install each latch [3]:

(a) Put the latch [3] on the door and align the bolt holes.

(b) Install the four bolts [4], washers [2], and nuts [1].

(c) Tighten the nuts [1].

SUBTASK 71-11-07-410-001-F00

(2) Close the applicable doors:

Number	Name/Location
413BL	Chip Detector/Pressure Relief Door, Engine 1
423BL	Chip Detector/Pressure Relief Door, Engine 2

(a) Make sure that the latches are in the fully open position and close the door.

(b) Push the latch buttons into the door until the latch buttons are smooth with the door.

SUBTASK 71-11-07-400-001-F00

(3) Make sure that the latch buttons are smooth with the outer surface of the door at 0.0 ±0.030 inch (±0.762 mm).

(a) If the latch is not in the limits, replace the latch.

SUBTASK 71-11-07-400-002-F00

(4) Make sure that the clearance between the latch button and the door is constant (View A-A).

(a) If the latch is not in the limits, do these steps:

1) Loosen the nuts [1].

2) Adjust the latch position for the correct clearance.

3) Tighten the nuts [1].

SUBTASK 71-11-07-820-001-F00

(5) Examine the door for a tight fit.

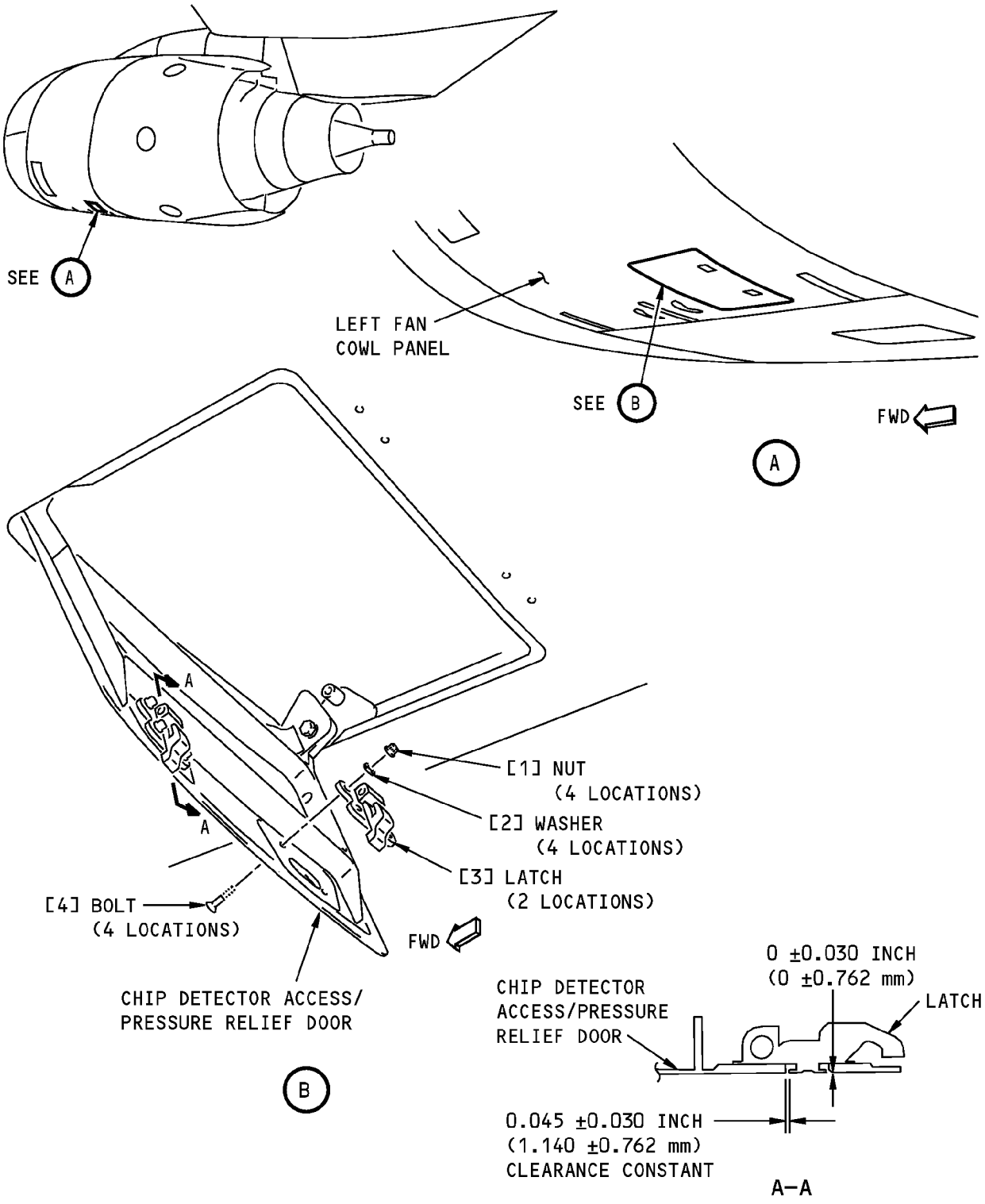
(a) Make sure there is no free play with the latches fully locked.

(b) If there is free play, do this task: Chip Detector Access/Pressure Relief Door Free Play Adjustment, TASK 71-11-07-820-802-F00.

SUBTASK 71-11-07-820-002-F00

(6) Do this task: Chip Detector Access/Pressure Relief Door Latch Release Test, TASK 71-11-07-820-803-F00.

———————— END OF TASK ————————



Chip Detector Access/Pressure Relief Door Latch Installation
Figure 201/71-11-07-990-801-F00

CHIP DETECTOR ACCESS/PRESSURE RELIEF DOOR - REMOVAL/INSTALLATION

1. General

A. This procedure has these two tasks:

(1) The removal of the chip detector access and pressure-relief door

(2) The installation of the chip detector access and pressure-relief door.

TASK 71-11-07-000-801-F00

2. Chip Detector Access/Pressure Relief Door Removal

(Figure 401)

A. General

(1) This task removes the chip detector access and pressure-relief door (referred to as the door) from the left fan cowl panel.

(2) The applicable door is identified in the Access Panels list.

B. Location Zones

Zone	Area
413	Engine 1 - Fan Cowl, Left
423	Engine 2 - Fan Cowl, Left

C. Access Panels

Number	Name/Location
413BL	Chip Detector/Pressure Relief Door, Engine 1
423BL	Chip Detector/Pressure Relief Door, Engine 2

D. Procedure

SUBTASK 71-11-07-010-002-F00

(1) Open the applicable doors:

Number	Name/Location
413BL	Chip Detector/Pressure Relief Door, Engine 1
423BL	Chip Detector/Pressure Relief Door, Engine 2

(a) Put a screwdriver blade into the latch button slots.

(b) Move the latch buttons up to release the latches.

(c) Open the door.

SUBTASK 71-11-07-020-002-F00

(2) Do these steps to remove the door [10]:

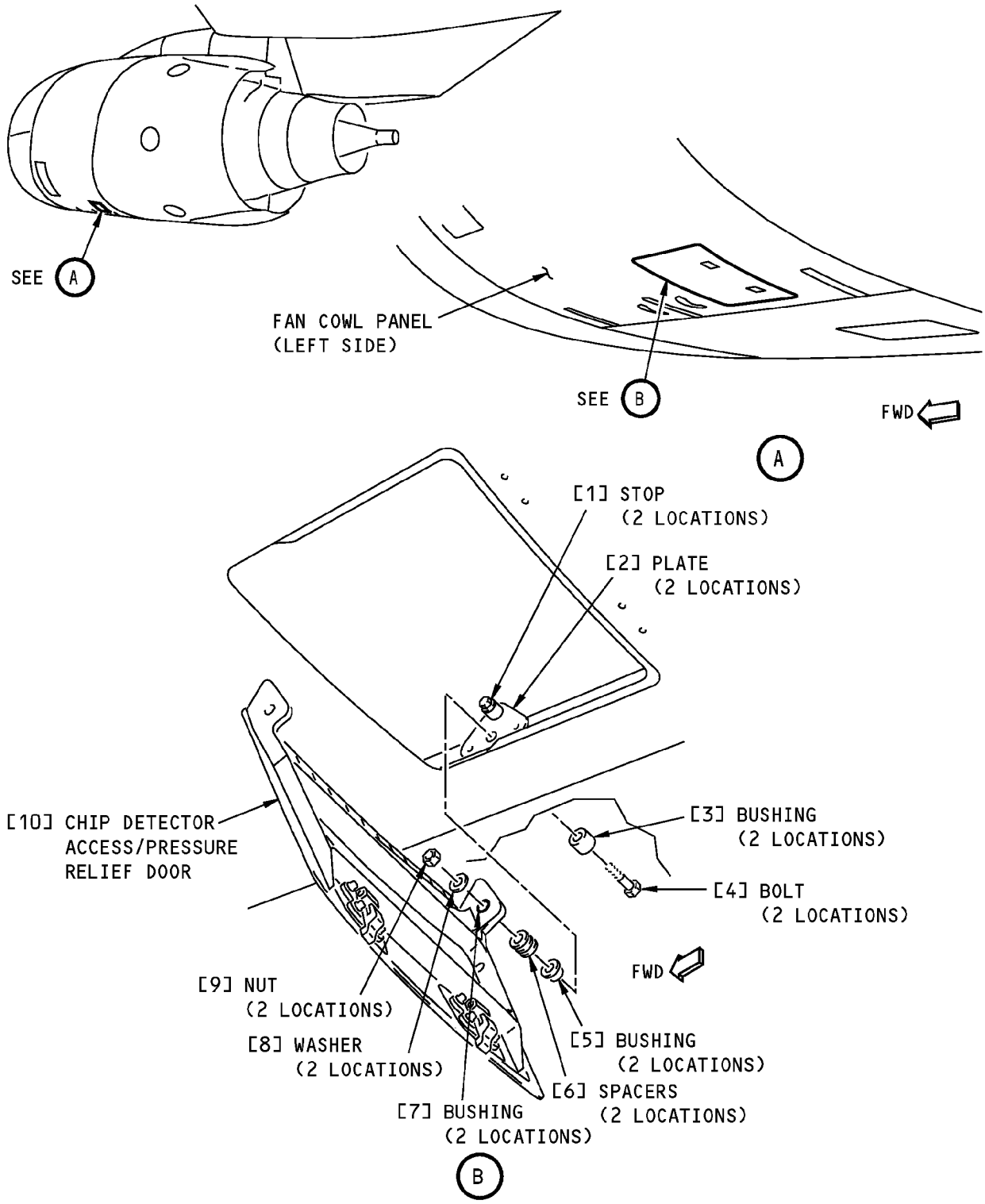
NOTE: You can find more than one spacer [6] with the bolts and nuts at the hinge. These spacers are necessary to align the door in the middle of its opening. Make sure to keep the spacers, because you will use the spacers in the correct quantity to install the door.

(a) Remove the nut [9], washers [8], spacers [6], bushings [3], [5] and [7] and the bolt [4] at each hinge.

1) If you will re-install the same door, record the number and location of the spacers [6] you remove.

(b) Remove the door [10].

END OF TASK



Chip Detector Access/Pressure Relief Door Installation
Figure 401/71-11-07-990-802-F00

TASK 71-11-07-400-801-F00

3. Chip Detector Access/Pressure Relief Door Installation

(Figure 401)

A. References

Reference	Title
71-11-07-820-801-F00	Chip Detector Access/Pressure Relief Door Adjustment (P/B 501)
71-11-07-820-802-F00	Chip Detector Access/Pressure Relief Door Free Play Adjustment (P/B 501)
71-11-07-820-803-F00	Chip Detector Access/Pressure Relief Door Latch Release Test (P/B 501)

B. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
10	Door	71-11-02-10-145	HAP ALL

C. Location Zones

Zone	Area
413	Engine 1 - Fan Cowl, Left
423	Engine 2 - Fan Cowl, Left

D. Access Panels

Number	Name/Location
413BL	Chip Detector/Pressure Relief Door, Engine 1
423BL	Chip Detector/Pressure Relief Door, Engine 2

E. Procedure

SUBTASK 71-11-07-210-001-F00

(1) Examine the stops [1] for worn areas or deterioration.

(a) Replace the stops if there is damage.

SUBTASK 71-11-07-210-002-F00

(2) Examine the bushings [3], [5] and [7] for worn areas.

(a) Replace the bushings if there are worn areas.

SUBTASK 71-11-07-420-002-F00

(3) Do these steps to install the door [10].

(a) Put the door [10] in the opening on the fan cowl panel and align the bolt holes at each hinge.

(b) Install the bolt [4], bushings [3], [5] and [7], spacers [6], washers [8], and nut [9] at each hinge.

NOTE: If you re-install the same door, install the same number of spacers [6] in the same location as you recorded in the removal task.

1) Tighten the nuts [9] with your hand.

2) Tighten the nuts [9] to the correct torque.

SUBTASK 71-11-07-410-002-F00

(4) Close the applicable doors:

Number	Name/Location
413BL	Chip Detector/Pressure Relief Door, Engine 1
423BL	Chip Detector/Pressure Relief Door, Engine 2

(a) Make sure that the latches are in the fully open position and close the door.

(b) Push the latch buttons into the door until the latch buttons are smooth with the door.

SUBTASK 71-11-07-820-003-F00

(5) Do this task: Chip Detector Access/Pressure Relief Door Adjustment, TASK 71-11-07-820-801-F00.

SUBTASK 71-11-07-820-004-F00

(6) Do this task: Chip Detector Access/Pressure Relief Door Free Play Adjustment, TASK 71-11-07-820-802-F00.

SUBTASK 71-11-07-820-005-F00

(7) Do this task: Chip Detector Access/Pressure Relief Door Latch Release Test, TASK 71-11-07-820-803-F00.

END OF TASK

CHIP DETECTOR ACCESS/PRESSURE RELIEF DOOR - ADJUSTMENT/TEST

1. General

A. This procedure has these three tasks:

(1) To adjust the clearance and aerosmoothness of the chip detector access and pressure-relief door

(2) To adjust the free play of the chip detector access and pressure-relief door

(3) The latch release test of the chip detector access and pressure-relief door.

TASK 71-11-07-820-801-F00

2. Chip Detector Access/Pressure Relief Door Adjustment

(Figure 501)

A. General

(1) This procedure adjusts the chip detector access/pressure relief door (referred to as the door) with its opening in the left fan cowl panel.

(a) The adjustments are for the correct edge clearances and aerosmoothness of the door.

(2) This procedure is necessary after the removal or the replacement of the door.

B. References

Reference	Title
71-11-07-000-801-F00	Chip Detector Access/Pressure Relief Door Removal (P/B 401)
71-11-07-400-801-F00	Chip Detector Access/Pressure Relief Door Installation (P/B 401)

C. Location Zones

Zone	Area
413	Engine 1 - Fan Cowl, Left
423	Engine 2 - Fan Cowl, Left

D. Access Panels

Number	Name/Location
413BL	Chip Detector/Pressure Relief Door, Engine 1
423BL	Chip Detector/Pressure Relief Door, Engine 2

E. Procedure

SUBTASK 71-11-07-410-003-F00

(1) Close the applicable access doors:

Number	Name/Location
413BL	Chip Detector/Pressure Relief Door, Engine 1
423BL	Chip Detector/Pressure Relief Door, Engine 2

(a) Make sure that the latches are in the fully open position and close the door.

(b) Push the latch buttons into the door until the latch buttons are smooth with the door.

SUBTASK 71-11-07-220-001-F00

(2) Measure the clearance between the door and the fan cowl at the top and bottom edges with the gage.

(a) Make sure that the clearance is 0.060 ±0.030 inch (1.524 ±0.762 mm).

(b) If the clearance is not correct, do these steps adjust the clearance:

1) Do this task: Chip Detector Access/Pressure Relief Door Removal, TASK 71-11-07-000-801-F00.
   a) Record the number and the location of the spacers that you removed from between the bushings.
2) Add or remove the spacers between the bushings to keep the clearances equal and in the limits.
3) Do this task: Chip Detector Access/Pressure Relief Door Installation, TASK 71-11-07-400-801-F00.

SUBTASK 71-11-07-220-002-F00

(3) Measure the clearance between the door and the fan cowl at the forward and aft edges with the gage.
   (a) Make sure that the clearance is 0.090 ±0.030 inch (2.286 ±0.762 mm) for the forward edge.
   (b) Make sure that the clearance is 0.060 ±0.030 inch (1.524 ±0.762 mm) for the aft edge.
   (c) If the clearances are not correct, replace the door.

   These are the tasks:

   Chip Detector Access/Pressure Relief Door Removal, TASK 71-11-07-000-801-F00,

   Chip Detector Access/Pressure Relief Door Installation, TASK 71-11-07-400-801-F00.

SUBTASK 71-11-07-220-003-F00

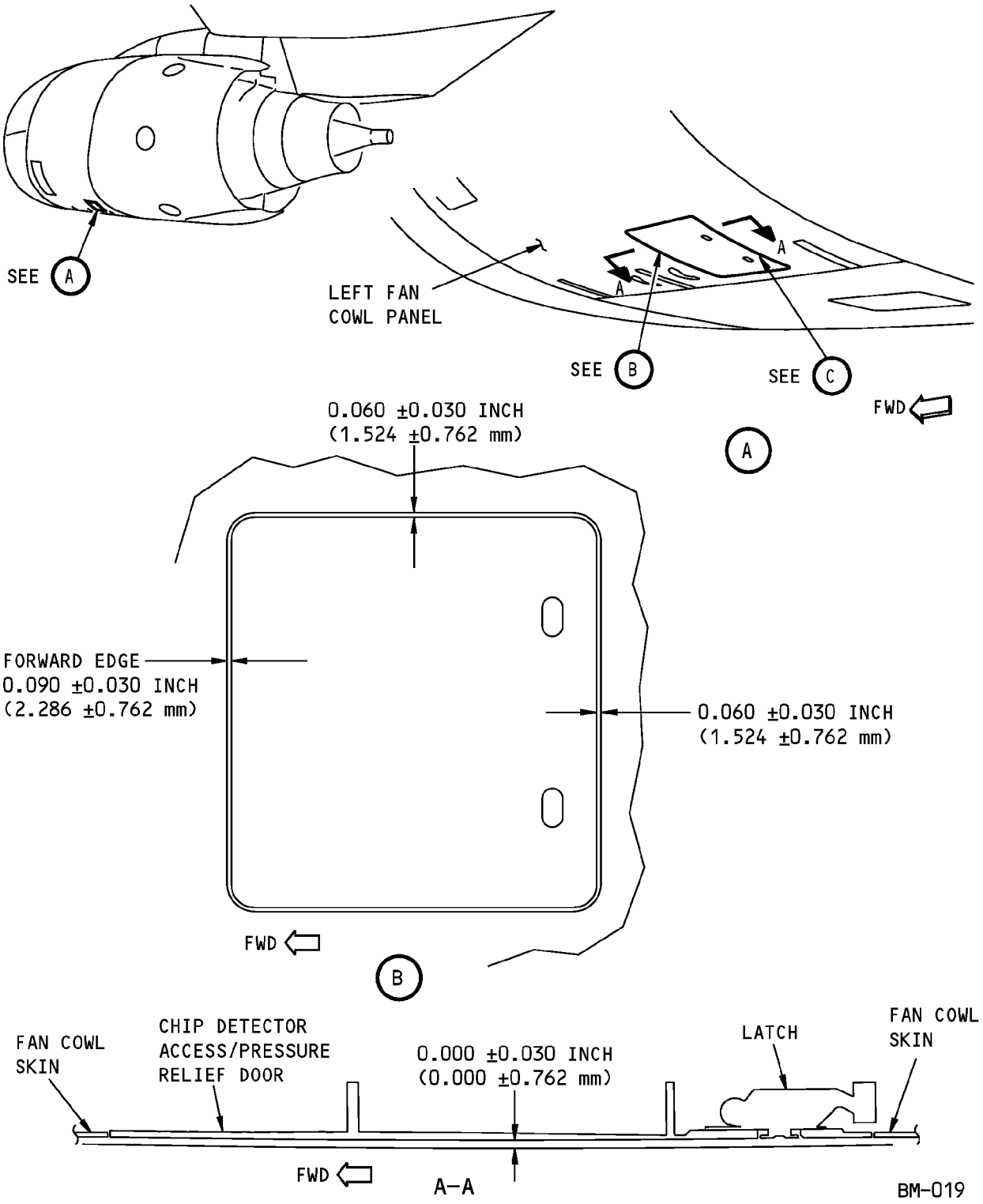
(4) Make sure that the edges of the door are smooth with the outer surface of the fan cowl at 0.00 ±0.030 inch (±0.762 mm).
   (a) If the door is out of limits, replace the door.

   These are the tasks:

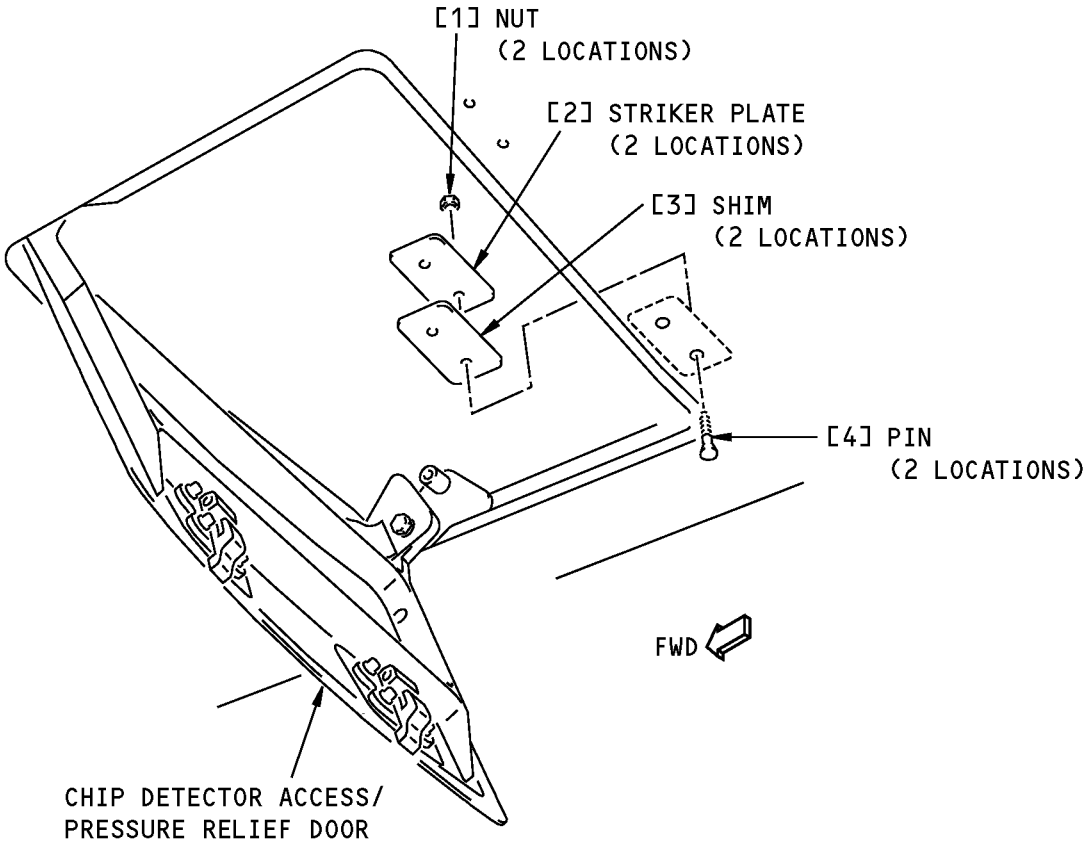
   Chip Detector Access/Pressure Relief Door Removal, TASK 71-11-07-000-801-F00,

   Chip Detector Access/Pressure Relief Door Installation, TASK 71-11-07-400-801-F00.

——————— END OF TASK ———————



Chip Detector Access/Pressure Relief Door Adjustment
Figure 501 (Sheet 1 of 2)/71-11-07-990-803-F00



Chip Detector Access/Pressure Relief Door Adjustment
Figure 501 (Sheet 2 of 2)/71-11-07-990-803-F00

TASK 71-11-07-820-802-F00

3. Chip Detector Access/Pressure Relief Door Free Play Adjustment

(Figure 501)

A. General

(1) The procedure adjusts the chip detector access/pressure relief door (referred to as the door) with its opening on the left fan cowl panel.

(a) The adjustments are for a tight fit with the latches locked.

(2) This procedure is necessary after the removal or the replacement of the door or the latches.

B. Location Zones

Zone	Area
413	Engine 1 - Fan Cowl, Left
423	Engine 2 - Fan Cowl, Left

C. Access Panels

Number	Name/Location
413BL	Chip Detector/Pressure Relief Door, Engine 1
423BL	Chip Detector/Pressure Relief Door, Engine 2

D. Procedure

SUBTASK 71-11-07-410-004-F00

(1) Close the applicable access doors:

Number	Name/Location
413BL	Chip Detector/Pressure Relief Door, Engine 1
423BL	Chip Detector/Pressure Relief Door, Engine 2

(a) Make sure that the latches are in the fully open position and close the door.

(b) Push the latch buttons into the door until the latch buttons are smooth with the door.

SUBTASK 71-11-07-820-006-F00

(2) Examine the door for a tight fit, make sure that there is no free play with the latches fully locked.

(a) If there is play, do these steps to adjust the latch:

1) Open the door.

2) Do these steps to install new striker plates [2]:

a) Remove the two pins [4], the two nuts [1], the striker plate [2] and the shim [3].

b) Install the two pins [4], the shim [3], the new striker plate [2], and the two nuts [1].

c) Tighten the two nuts [1].

3) Close the door.

(b) Make sure the edges of the door are smooth with the outer surface of the cowl

1) The limits are 0.00 ±0.030 inch (±0.762 mm).

——————— END OF TASK ———————

TASK 71-11-07-820-803-F00

4. Chip Detector Access/Pressure Relief Door Latch Release Test

(Figure 502)

A. General

(1) This test makes sure that the chip detector access/pressure relief door latches (referred to as the latch) open at the correct load.

(2) The chip detector access/pressure relief door (referred to as the door) is found on the left fan cowl panel.

B. References

Reference	Title
71-11-07-900-801-F00	Chip Detector Access/Pressure Relief Door Latch Removal/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-5	Adapter - Load Test, Pressure Relief Door Latch (Part #: B71044-28, Supplier: 81205, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ) (Opt Part #: B71044-10, Supplier: 81205, A/P Effectivity: 737-300, -400, -500, -600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

D. Location Zones

Zone	Area
413	Engine 1 - Fan Cowl, Left
423	Engine 2 - Fan Cowl, Left

E. Access Panels

Number	Name/Location
413BL	Chip Detector/Pressure Relief Door, Engine 1
423BL	Chip Detector/Pressure Relief Door, Engine 2

F. Procedure

SUBTASK 71-11-07-410-005-F00

(1) Make sure that the applicable access doors are closed:

Number	Name/Location
413BL	Chip Detector/Pressure Relief Door, Engine 1
423BL	Chip Detector/Pressure Relief Door, Engine 2

SUBTASK 71-11-07-970-001-F00

(2) Calculate the minimum and maximum torque for the length of the wrench that you use with the formula (Table 501).

Table 501/71-11-07-993-805-F00

LATCH RELEASE TEST - TORQUE CALCULATION
TORQUE pound-inch = 0.53(P)(L)/(L + 1.5 inch) Where P = Latch open load in pounds L = Wrench effective length in inches Figure 502 For METRIC, N.m = 0.13442(P)(L)/(L + 38.1 mm) P in Newtons, L in mm
Pmin-Pmax must be 63-77 pounds (280.2-342.5 Newtons)
EXAMPLE CALCULATION (use Pmin-Pmax, L = 12 inch) TORQUE minimum = 0.53(63)(12)/(12 + 1.5) = 29.7 pound-inches TORQUE maximum (use Pmax = 77) = 36.3 pound-inches For METRIC, let L = 304.8 mm TORQUE min = 0.13442(280.2)(304.8)/(304.8 + 38.1) = 3.35 N.m TORQUE maximum (use Pmax = 342.5) = 4.10 N.m

(a) The correct load (Pmin-Pmax) to open the door is 63-77 pounds (280.2-342.5 Newtons).

(b) Find the effective length of the torque wrench (View A-A).

(c) For a 12 inch (304.8 mm) wrench, the correct torque is 29.7-36.3 pound-inches (3.35-4.10 Newton-meters).

SUBTASK 71-11-07-820-007-F00

(3) Do these steps to do the load test:

(a) Make sure that each latch is locked.

(b) Put the torque adapter on the torque wrench.

1) The torque adapter is part of the pressure relief door latch load test adapter, SPL-5.

(c) Put the thinner end of the adapter tightly into the slot on the latch.

(d) Apply a right-angle force on the torque wrench in the aft direction until the latch opens.

(e) Record the torque value when the latch opens.

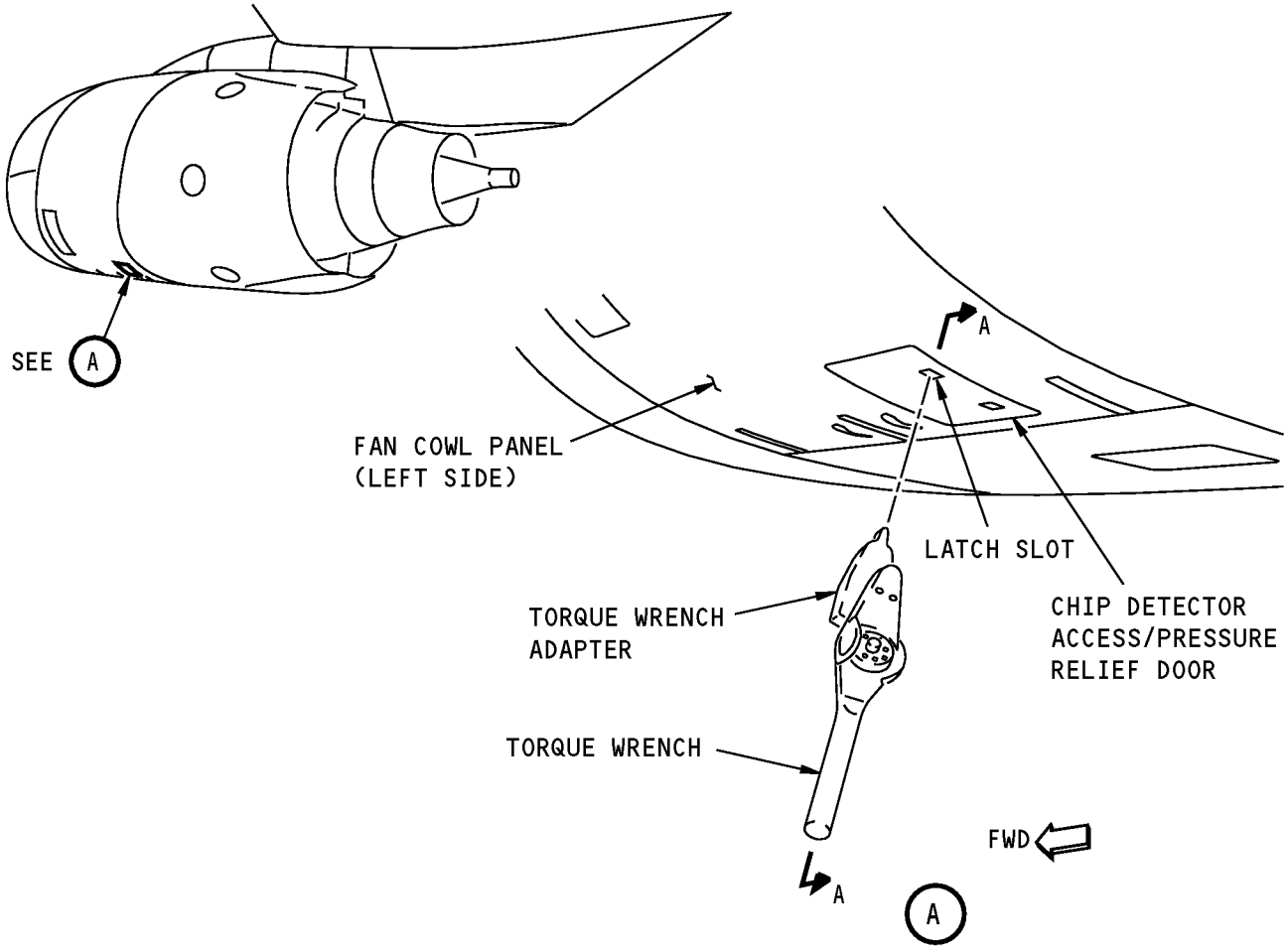
(f) Close the latch and do the load test again on the other latch.

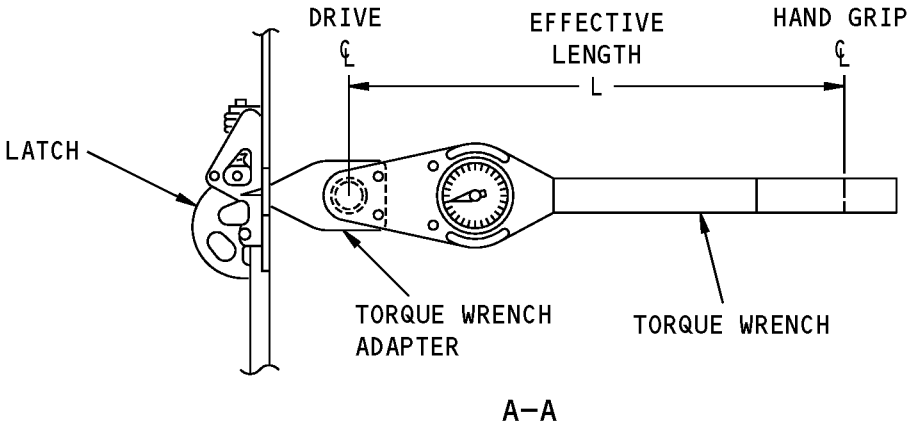
(g) If the torque value is not in the calculated limits, replace the latch.

1) Do this task: Chip Detector Access/Pressure Relief Door Latch Removal/Installation, TASK 71-11-07-900-801-F00.

(h) Close the door.

END OF TASK





Chip Detector Access/Pressure Relief Door Load Test
Figure 502/71-11-07-990-804-F00

VORTEX CONTROL DEVICE - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) The first task is the removal of the vortex control device (VCD)

(2) The second task is the installation of the VCD.

TASK 71-11-08-000-801-F00

2. Vortex Control Device Removal

(Figure 401)

A. General

(1) The vortex control device (VCD) is found on the inboard fan cowl panel of the engine.

(2) It is possible to install the VCD on left or right fan cowl panel, so make sure that the VCD is installed only on the inboard fan cowl panel.

(3) On the fan cowl panels without a VCD, setscrews are installed in the mounting holes.

B. Consumable Materials

Reference	Description	Specification
A00372	Compound - Corrosion Inhibitive Sealing	MIL-S-81733

C. Location Zones

Zone	Area
414	Engine 1 - Fan Cowl, Right
423	Engine 2 - Fan Cowl, Left

D. Procedure

SUBTASK 71-11-08-020-001-F00

(1) Remove the 12 bolts [2] that attach the VCD [1] to the inboard fan cowl panel.

SUBTASK 71-11-08-020-002-F00

(2) Remove the VCD [1].

SUBTASK 71-11-08-420-001-F00

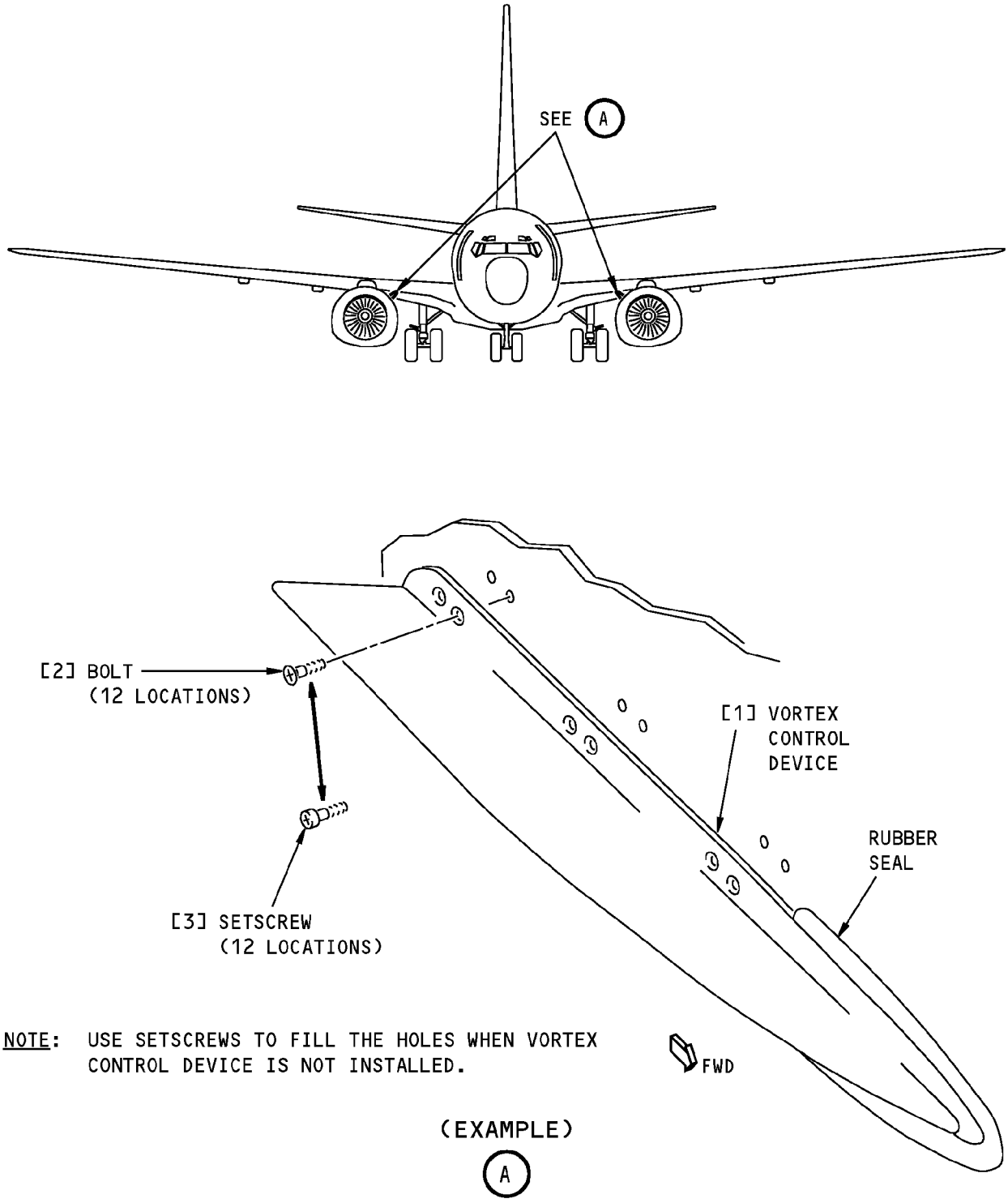
(3) If the VCD [1] is not to be replaced on this fan cowl panel, do these steps to install the 12 setscrews [3] in the mounting holes.

(a) Install the screws [3] and adjust the screws [3] to 0.06 inch below the external surface on the fan cowl panel.

(b) Apply the compound, A00372 to seal the screws [3] to the fan cowl panel and fill the holes.

(c) Make sure that the compound is smooth with the external surface of the fan cowl panel.

——————— END OF TASK ———————



Vortex Control Device Installation
Figure 401/71-11-08-990-801-F00

TASK 71-11-08-400-801-F00

3. Vortex Control Device Installation

(Figure 401)

A. Consumable Materials

Reference	Description	Specification
A00372	Compound - Corrosion Inhibitive Sealing	MIL-S-81733
D00015	Grease - Aircraft Bearing (Use BMS 3-24 until existing stocks are depleted, BMS 3-33 supersedes BMS 3-24)	BMS3-24 (Superseded by BMS 3-33)

B. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	VCD	71-11-30-01-015	HAP ALL
		71-11-30-01-020	HAP ALL

C. Location Zones

Zone	Area
414	Engine 1 - Fan Cowl, Right
423	Engine 2 - Fan Cowl, Left

D. Procedure

SUBTASK 71-11-08-420-002-F00

CAUTION: INSTALL THE VCD ONLY ON THE INBOARD FAN COWL PANEL. THE INCORRECT INSTALLATION OF THE VCD AND FAN COWL PANEL CAN CAUSE INCORRECT AIRPLANE PERFORMANCE.

(1) Put the VCD [1] on the inboard fan cowl and align the bolt holes.

SUBTASK 71-11-08-420-003-F00

(2) Do these steps to install the 12 bolts [2]:

(a) Apply the grease, D00015, to the threads of the bolts [1].

(b) Install the bolts [2].

NOTE: Do not apply the compound, A00372, to the countersunk holes.

1) Tighten the bolts [2] to 30-45 pound-inches (03.39-05.08 Nm).

SUBTASK 71-11-08-390-001-F00

(3) Apply the compound, A00372 to seal the heads of the bolts [1].

(a) Make sure that the compound is smooth with the surface of the VCD [2].

SUBTASK 71-11-08-390-002-F00

(4) Apply the compound, A00372, to seal the edge of the VCD [1] where it touches the fan cowl skin.

(a) Do not apply the compound to the rubber seal at the forward end of the VCD [1].

SUBTASK 71-11-08-210-001-F00

(5) Make sure that the VCD [1] is installed only on the inboard fan cowl panel on each engine.

END OF TASK

VORTEX CONTROL DEVICE - REPAIRS

1. General

A. This procedure has the task to repair the seal on the vortex control device (VCD).

TASK 71-11-08-300-801-F01

2. VCD Seal Repair

A. General

(1) This task is a repair of the vortex control device (VCD) seal.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
71-11-09-000-801-F01	Vortex Control Device Seal Removal (P/B 401)
71-11-09-420-801-F01	Vortex Control Device Seal Installation (P/B 401)

C. Consumable Materials

Reference	Description	Specification
B00130	Alcohol - Isopropyl	TT-I-735
G01043	Cloth - Lint-free	

D. Location Zones

Zone	Area
414	Engine 1 - Fan Cowl, Right
423	Engine 2 - Fan Cowl, Left

E. Procedure

SUBTASK 71-11-08-210-002-F01

(1) Examine the outer surface of the VCD seal for erosion damage:

(a) A VCD seal with erosion damage can continue in service with these conditions:

1) No part of the seal is missing below the VCD to the outer barrel interface (inlet cowl).

2) No gap below the seal and the outer barrel external skin surface (in the static position) because of a missing part of the seal.

3) No tears from the leading edge of the seal extends aft below the VCD.

(b) If you find any of the above conditions, replace the VCD seal.

1) Do these tasks, Vortex Control Device Seal Removal, TASK 71-11-09-000-801-F01 and Vortex Control Device Seal Installation, TASK 71-11-09-420-801-F01.

(c) If the VCD seal is serviceable, you can do the repair to prevent more damage.

SUBTASK 71-11-08-350-001-F01

(2) Do these steps to repair (trim) the VCD seal:

(a) Make a trim template for the VCD seal:

1) Determine how far aft the leading edge of the VCD seal can be trimmed without creating a gap between the underside of the seal and the external surface of the outer barrel skin.

2) Make a mark (horse shoe shaped) on the eroded part/area of the seal to be removed.

3) Make a trim template with 6.0 inch by 6.0 inch by 0.050 inch thick, A286 CRES to align with the shape of the seal material to be removed.

4) Make the template with 0.50 inch radius corners. Contour the template to align the external surface of the outer barrel with light finger pressure.

5) De-burr and remove all sharp edges from the template. Apply Teflon tape around the edges of the template to prevent damage to the outer barrel external surface during installation.

(b) Install the template:

1) Open the fan cowl panel and safety it in the open position to get access to the inlet cowl.

a) Do this task, Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

2) Carefully put the template on the outer barrel external surface where the VCD seal will touch when the fan cowl panel is closed. Make a mark around the edges of the installed position for the template.

NOTE: Be careful to prevent damage to the top coat (paint) on the inlet cowl when you apply the teflon tape or install the trim plate.

3) Apply Teflon tape or equivalent to the entire area where the template is installed. Apply the tape approximately 2.0 inch beyond the edge of the template on all sides for added protection.

4) Attach the trim plate in position with Teflon tape or equivalent.

5) Close the fan cowl panel and make sure that the VCD seal is centered on the template.

a) Do this task, Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00 Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

(c) Trim the VCD seal:

1) Using the template, carefully place the template over the horse shoe shaped mark on the top of the VCD seal and trim the eroded part of the seal using a sharp knife.

NOTE: Make sure that there is sufficient seal material below the VCD after the repair. The seal material prevents damage to the inlet cowl and VCD during flight conditions.

2) Make sure that there are no tears or frayed edges after the repair that no gap is apparent.

3) Carefully remove the seal trimmings and the template.

4) Open the fan cowl panel and carefully remove the teflon tape and all traces of glue or / dhesive on the external surface of the Outer Barrel skin.

WARNING: DO NOT GET ISOPROPYL ALCOHOL IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THE ISOPROPYL ALCOHOL. KEEP THE ISOPROPYL ALCOHOL AWAY FROM SPARKS, FLAME, AND HEAT. ISOPROPYL ALCOHOL IS POISONOUS AND FLAMMABLE, WHICH CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

5) Clean the area with a lint-free cloth, G01043 made moist with alcohol, B00130.

a) Remove all unwanted material and wipe dry with lint-free cloth, G01043.

(d) Examine the VCD seal.

1) Close the fan cowl panel and visually examine the VCD seal to outer barrel external skin interface. Make sure there is no gap.

2) If a gap is found, replace the VCD Seal at the next convenient opportunity.

3) If you do not find a gap, continue the airplane in service.

——————— END OF TASK ———————

SEAL - VORTEX CONTROL DEVICE - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) The first task is the removal of the vortex control device seal.

(2) The second task is the installation of the vortex control device seal.

TASK 71-11-09-000-801-F01

2. Vortex Control Device Seal Removal

(Figure 71-11-08-990-801-F00)

A. General

(1) The vortex control device (VCD) is found on the inboard fan cowl panel of the engine.

(2) It is possible to install the VCD on left or right fan cowl panel, so make sure that the VCD is installed only on the inboard fan cowl panel.

(3) On the fan cowl panels without a VCD, setscrews are installed in the mounting holes.

B. References

Reference	Title
71-11-08 P/B 401	VORTEX CONTROL DEVICE - REMOVAL/INSTALLATION
71-11-08-990-801-F00	Figure: Vortex Control Device Installation (P/B 401)

C. Consumable Materials

Reference	Description	Specification
B01054	Solvent - Methyl Ethyl Ketone and sec-Butyl Alcohol Blend - (MEK:secButyl Alcohol - 42:58 Percent)	BAC 5750, ASTM D740 / ASTM D1007
G00834	Cloth - Lint-free Cotton	

D. Location Zones

Zone	Area
414	Engine 1 - Fan Cowl, Right
423	Engine 2 - Fan Cowl, Left

E. Procedure

SUBTASK 71-11-09-020-001-F01

(1) Remove the VCD [1] from the inboard fan cowl panelVORTEX CONTROL DEVICE - REMOVAL/INSTALLATION, PAGEBLOCK 71-11-08/401.

SUBTASK 71-11-09-020-002-F01

(2) Remove the rubber seal from the VCD.

(a) If necessary use a metal scraper.

(b) Discard the seal.

SUBTASK 71-11-09-110-001-F01

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH, YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE DANGEROUS MATERIALS. SOLVENTS CAN BE FLAMMABLE OR CAUSE DAMAGE TO THE ENVIRONMENT. REFER TO THE MATERIAL SAFETY DATA SHEETS (MSDS) AND THE LOCAL SAFETY PRECAUTIONS.

(WARNING PRECEDES)

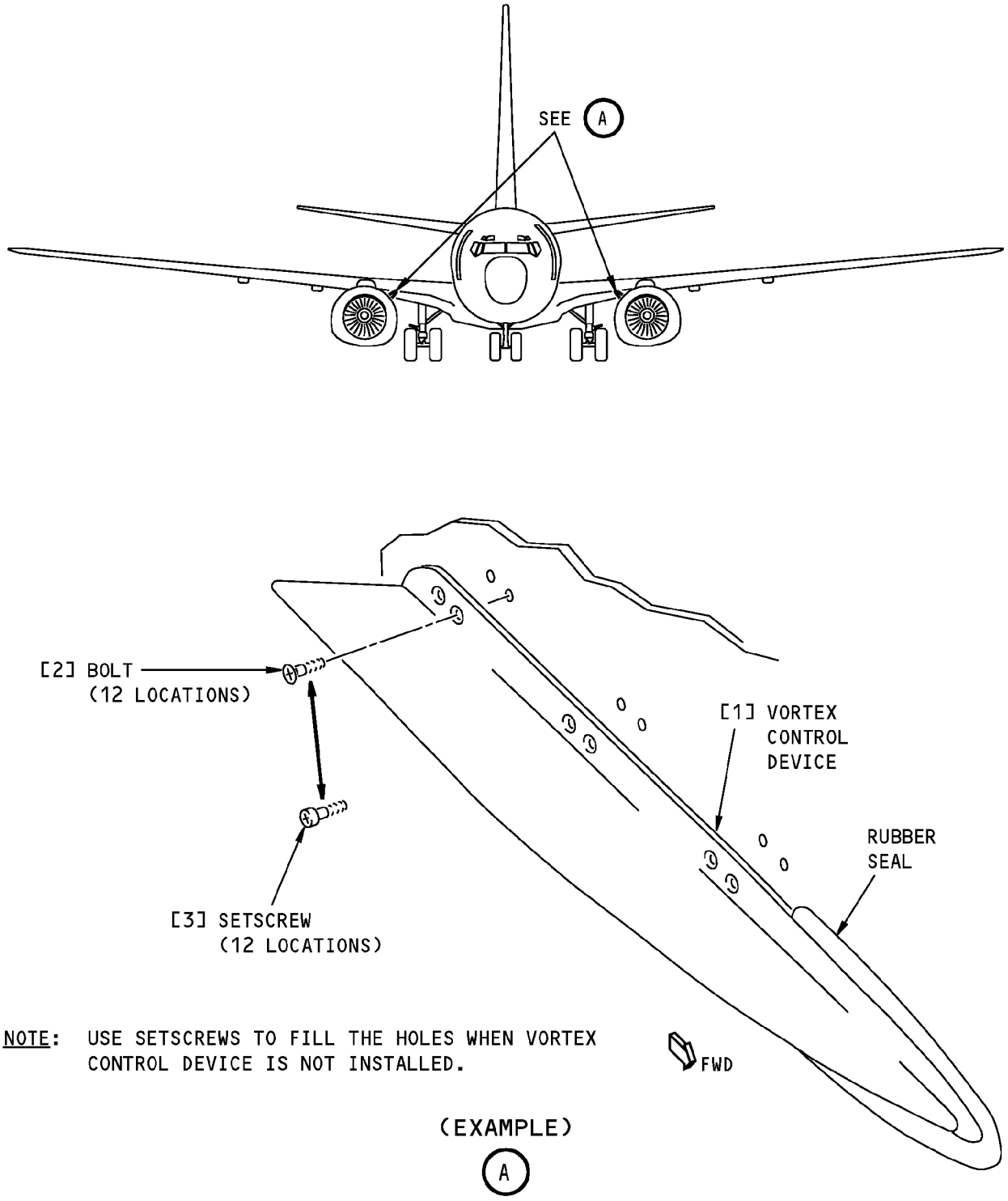
(3) Clean the VCD [1].

(a) Remove all unwanted material with solvent, B01054and a lint-free cloth, G00834.

(b) Dry the VCD with a clean cotton cloth before evaporation of solvent.

NOTE: Be sure to wear gloves when handling the cleaned surface.

——————— END OF TASK ———————



Vortex Control Device Installation
Figure 401/71-11-09-990-801-F00

TASK 71-11-09-420-801-F01

3. Vortex Control Device Seal Installation

(Figure 71-11-08-990-801-F00)

A. References

Reference	Title
71-11-08 P/B 401	VORTEX CONTROL DEVICE - REMOVAL/INSTALLATION
71-11-08-990-801-F00	Figure: Vortex Control Device Installation (P/B 401)

B. Consumable Materials

Reference	Description	Specification
A00066	Sealant - RTV - Dow Corning 90-006	
B01054	Solvent - Methyl Ethyl Ketone and sec-Butyl Alcohol Blend - (MEK:secButyl Alcohol - 42:58 Percent)	BAC 5750, ASTM D740 / ASTM D1007
C00580	Primer - Adhesive Bonding, RTV - DC 1200	
G00834	Cloth - Lint-free Cotton	
G50078	Abrasive - Aluminum Oxide Paper, 320 grit or finer	

C. Location Zones

Zone	Area
414	Engine 1 - Fan Cowl, Right
423	Engine 2 - Fan Cowl, Left

D. Procedure

SUBTASK 71-11-09-120-001-F01

(1) Prepare the faying surfaces of the VCD and the new rubber seal.

(a) Abrade the faying surfaces of the VCD and rubber seal with 320 grit or finer abrasive paper, G50078.

(b) Clean the VCD and the rubber seal using a clean lint-free cloth, G00834and solvent, B01054 or equivalent.

(c) Dry the VCD and the rubber seal with a clean lint-free cloth, G00834.

NOTE: Wear gloves when handling the cleaned surfaces.

WARNING: DO NOT GET PRIMER AND SEALANT IN YOUR MOUTH, EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM PRIMER AND SEALANT. PUT ON GOGGLES, AND GLOVES WHEN YOU USE PRIMER AND SEALANT. KEEP PRIMER AND SEALANT AWAY FROM SPARKS, FLAME, AND HEAT. PRIMER AND SEALANT IS POISONOUS AND FLAMMABLE, AND CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(d) Apply a thin coat of DC 1200 primer, C00580 to the faying surfaces of the VCD and the rubber seal.

NOTE: Use clean gloves when handling primed surfaces.

(e) Air dry the primer for 30 minutes at room temperature with a relative humidity of 50 percent or higher.

NOTE: If the relative humidity is less than 50 percent, dry the primer for 3 hours at room temperature.

SUBTASK 71-11-09-390-001-F01

(2) Apply the adhesive Dow Corning 90-006 sealant, A00066.

WARNING: DO NOT GET THE ADHESIVE IN YOUR EYES OR ON YOUR SKIN. WEAR SAFETY GLASSES TO PROTECT YOUR EYES. WEAR POLYETHYLENE GLOVES TO PROTECT YOUR HANDS. INJURIES TO PERSONNEL COULD OCCUR.

(a) Mix the two parts in accordance with the manufacturer's instructions.

(b) Apply a layer of Dow Corning 90-006 sealant, A00066 10-12 MIL thick, to the faying surfaces of the VCD and the rubber seal.

NOTE: Apply the adhesive within 4 hours after primer application.

NOTE: Install the rubber seal onto the VCD within 5-10 minutes after adhesive has been applied.

(c) Place the rubber seal onto the VCD.

1) Make sure the rubber seal is properly aligned on the VCD.

NOTE: It is acceptable to squeeze out sealant after assembly, but not necessary.

(d) Seal the gap at the aft edge of the rubber seal to VCD interface.

(e) Clamp the seal to the VCD.

1) Use only enough pressure to keep the seal in place.

(f) Cure the adhesive for 24 hours at room temperature.

(g) As an alternate cure method, cure adhesive for 2 hours at room temperature, and then at 200 degrees Fahrenheit (93.33 degrees Celsius) for 2 hours.

SUBTASK 71-11-09-420-001-F01

(3) Install the VCD VORTEX CONTROL DEVICE - REMOVAL/INSTALLATION, PAGEBLOCK 71-11-08/401

END OF TASK

ENGINE MOUNTS - INSPECTION/CHECK

1. General

A. This procedure contains scheduled maintenance task data.

B. This procedure has these tasks:

(1) The inspection of the forward engine mount bolts with the engine installed

(2) Forward engine mount visual inspection with the engine installed

(3) Forward engine mount visual inspection

(4) Forward engine mount detailed inspection

(5) Aft engine mount visual inspection

(6) Aft engine mount detailed inspection.

TASK 71-21-00-200-801-F00

2. Forward Engine Mount Bolts Inspection (Engine Installed)

(Figure 601)

A. General

(1) This procedure is a scheduled maintenance task.

(2) This task is a visual check of the bolts which attach the forward engine mount to the engine.

(3) The forward engine mount is found at the 12:00 o'clock position on the outer case of the fan frame.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
71-21-01-400-801-F00	Forward Engine Mount Installation (P/B 401)

C. Location Zones

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

D. Procedure

SUBTASK 71-21-00-010-001-F00

(1) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 71-21-00-210-001-F00

(2) Do a visual check of the bolts which attach the forward engine mount to the fan frame for the correct installation and damage.

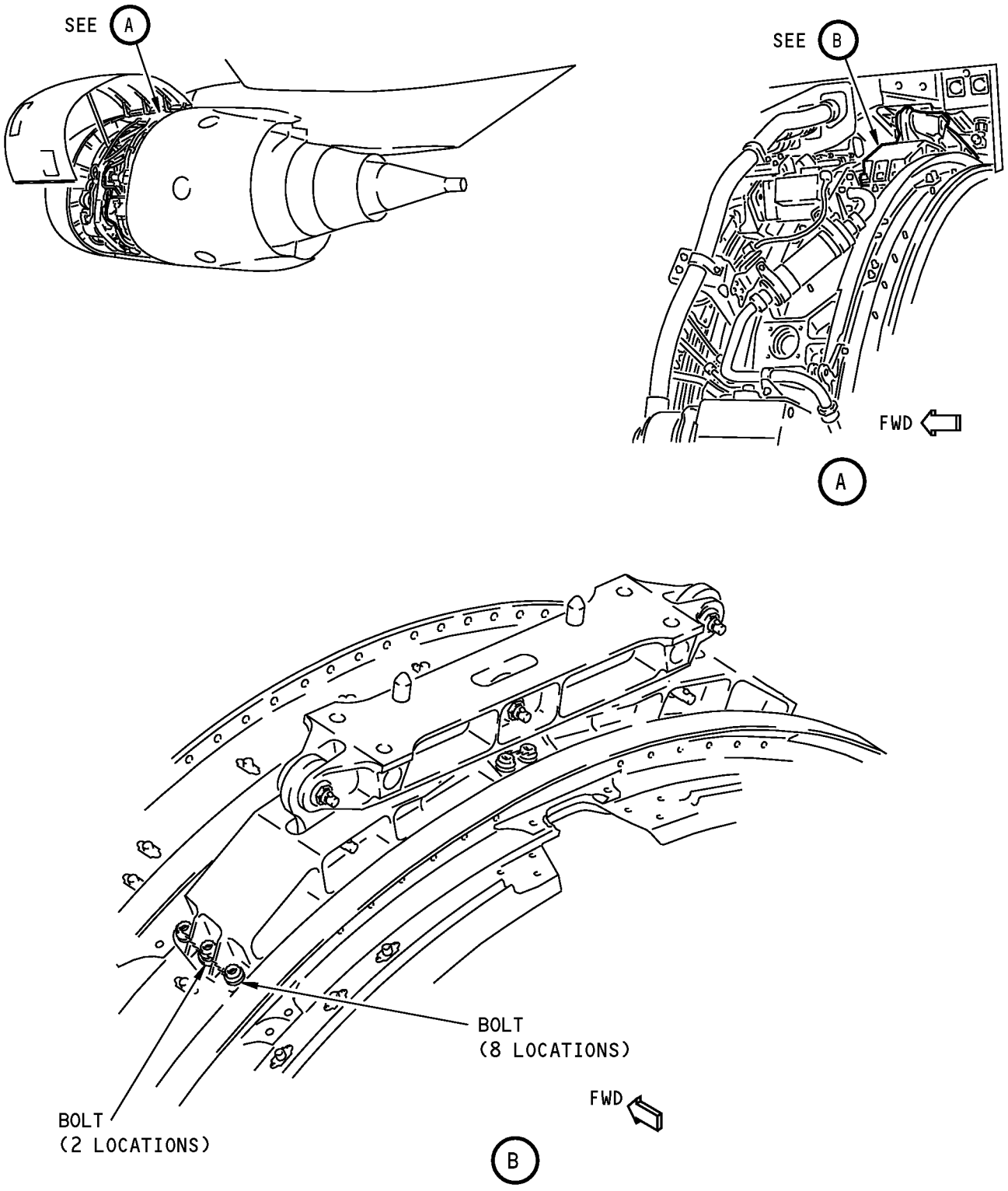
(a) Incorrect installation or damage is not permitted.

1) Replace the bolt. Refer to the task to install the forward mount for instructions (TASK 71-21-01-400-801-F00).

SUBTASK 71-21-00-410-001-F00

(3) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

END OF TASK



Forward Engine Mount Bolts - Inspection
Figure 601/71-21-00-990-801-F00

TASK 71-21-00-210-801-F00

3. Forward Engine Mount Inspection (Engine Installed)

A. General

(1) The forward engine mount is found at the 12:00 o'clock position on the outer case of the fan frame.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)

C. Location Zones

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

D. Procedure

SUBTASK 71-21-00-010-003-F00

(1) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 71-21-00-210-018-F00

(2) Do a visual check of the forward engine mount.

(a) Examine the bushings in the hangar fitting and fan case fitting.

1) Look for bushing migration.

2) If you find bushing migration, do these steps:

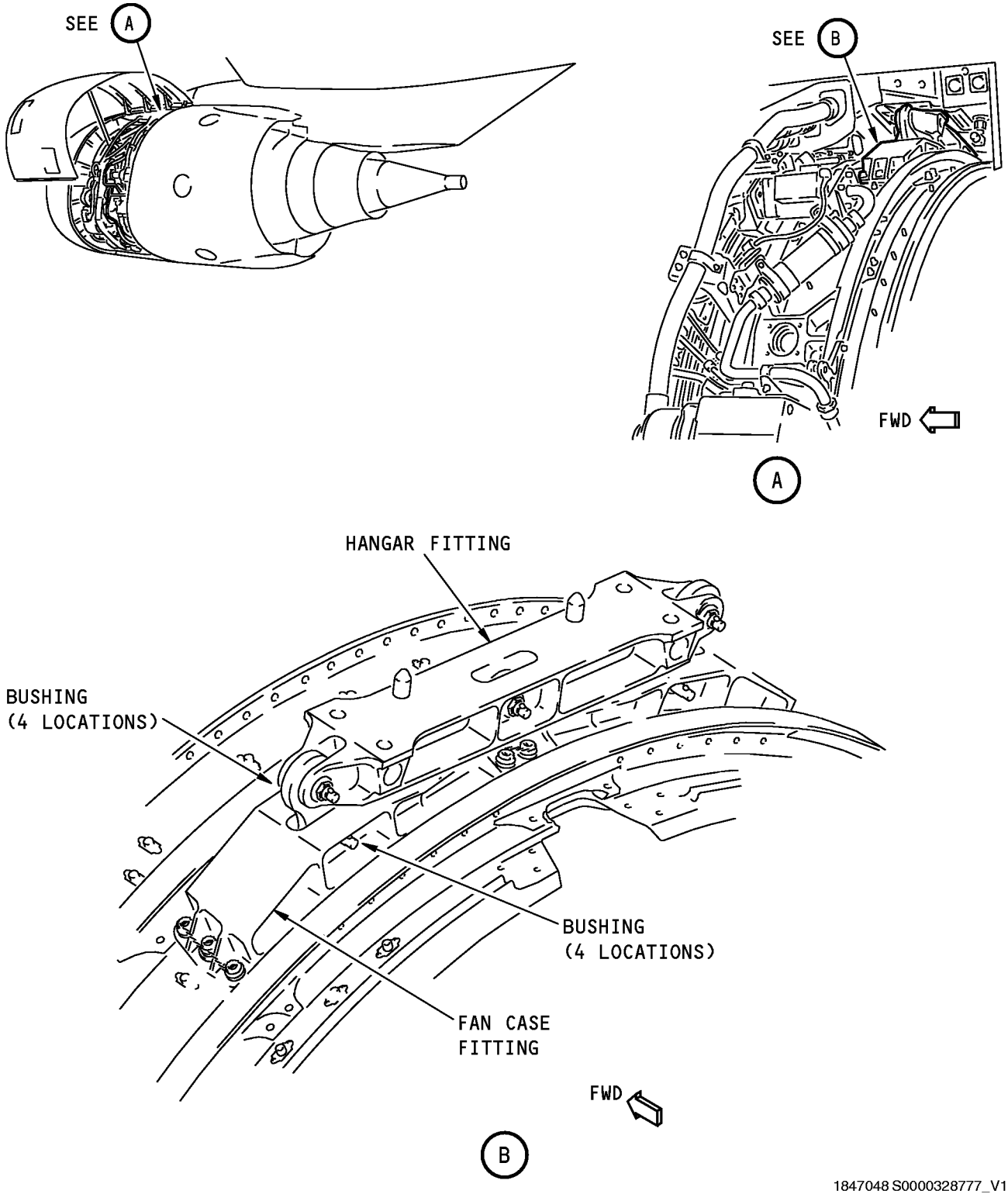
a) Do a visual check for cracks.

b) Do the check for bushing migration again every 24 months or 6,000 flight cycles (whichever comes first) until the condition is corrected per the component manual.

SUBTASK 71-21-00-410-003-F00

(3) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

——————— END OF TASK ———————



Forward Engine Mount Inspection (Engine Installed)
Figure 602/71-21-00-990-808-F00

TASK 71-21-00-200-803-F00

4. Forward Engine Mount Visual Inspection

(Figure 603)

A. General

(1) This task provides instructions to do the visual inspection of the forward engine mount.

(2) This task is used when the engine is off-wing.

(3) The forward engine mount is found at the 12:00 o'clock position on the outer case of the fan frame.

B. Location Zones

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

C. Procedure

SUBTASK 71-21-00-210-005-F00

(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 vertical 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.

1) Cracks to the bearing (race) are not permitted.

2) Cracks to the bearing ball are not permitted.

3) Seized bearing is not permitted.

4) Cracks in bearing are not permitted.

5) Bearing movement is not permitted.

6) All other types of damage to the bearing are not permitted.

(k) Fretting is not permitted.

NOTE: Fretting is caused when two adjacent pieces of metal rub one another.

(l) Pickup is not permitted.

NOTE: Pickup occurs when material is moved from one surface to a surface which it touches.

(m) High metal is not permitted.

NOTE: High metal is metal which is pushed above the surface adjacent to scratches or other damage.

SUBTASK 71-21-00-210-006-F00

(2) If damage is found on the forward engine mount, please contact Boeing.

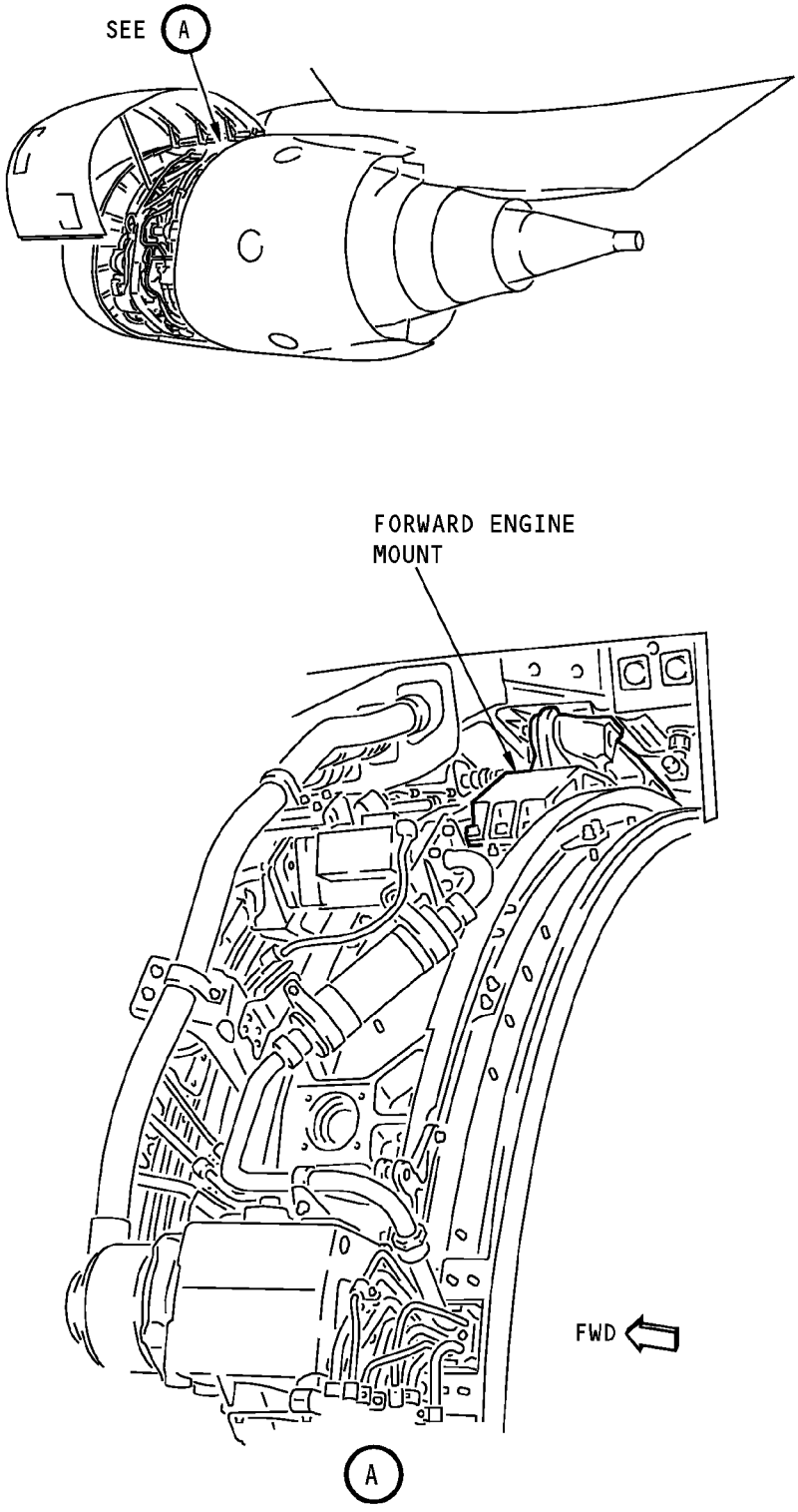
SUBTASK 71-21-00-210-008-F00

(3) Examine the forward engine mount for worn areas.

(a) If you find signs of wear on the forward engine mount.

1) Do this task: Forward Engine Mount Detailed Inspection, TASK 71-21-00-200-804-F00.

END OF TASK



Forward Engine Mount Inspection
Figure 603/71-21-00-990-803-F00

TASK 71-21-00-200-804-F00

5. Forward Engine Mount Detailed Inspection

(Figure 604)

A. General

(1) This task gives the detailed inspection instructions for the forward engine mount.

(2) This task is used when the engine is off-wing.

B. References

Reference	Title
71-21-01-000-801-F00	Forward Engine Mount Removal (P/B 401)
71-21-01-400-801-F00	Forward Engine Mount Installation (P/B 401)

C. Location Zones

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

D. Procedure

SUBTASK 71-21-00-210-009-F00

(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 71-21-37 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-pawl 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 linkage and flange brackets for the forward engine mount.

1) Make sure that they are free of damage and attached correctly.

(e) Examine the areas where the forward lower engine mount attaches to the engine fan case.

1) All types of damage are not permitted.

SUBTASK 71-21-00-210-013-F00

(2) If you find the component attach points are more than the wear limits (Table 601), do these steps that follow.

(a) Replace the forward engine mount component, if it is necessary.

1) Do this task: Forward Engine Mount Removal, TASK 71-21-01-000-801-F00.

2) Do this task: Forward Engine Mount Installation, TASK 71-21-01-400-801-F00.

Table 601/71-21-00-993-801-F00 Forward Engine Mount Wear Limits

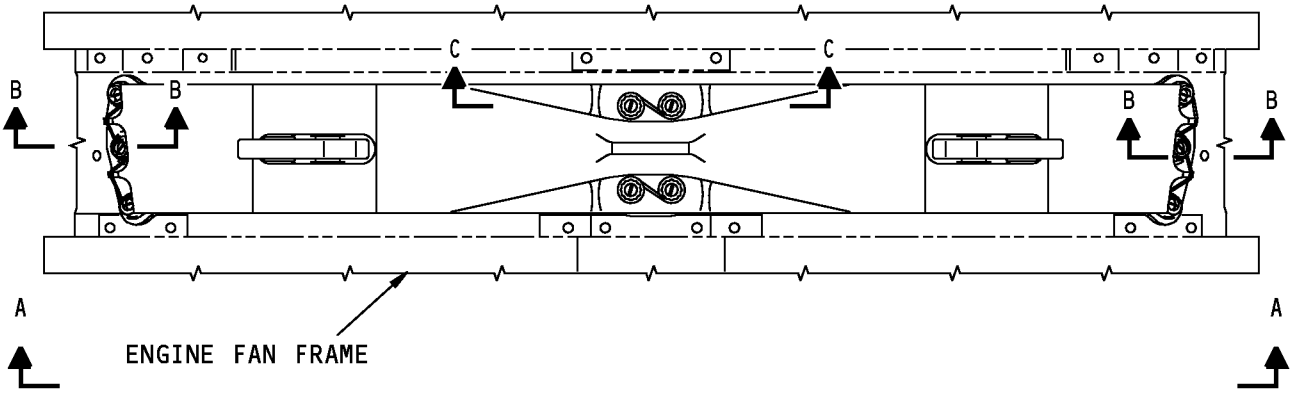
			DIMENSION		WEAR LIMITS (INCHES)
INDEX NO.	PART NAME	DIM.	MIN	MAX	MAXIMUM CLEARANCE
1	BUSHING-SHEAR	ID	-	0.5575	0.0585
	BOLT-SPECIAL	OD	0.4985	-	

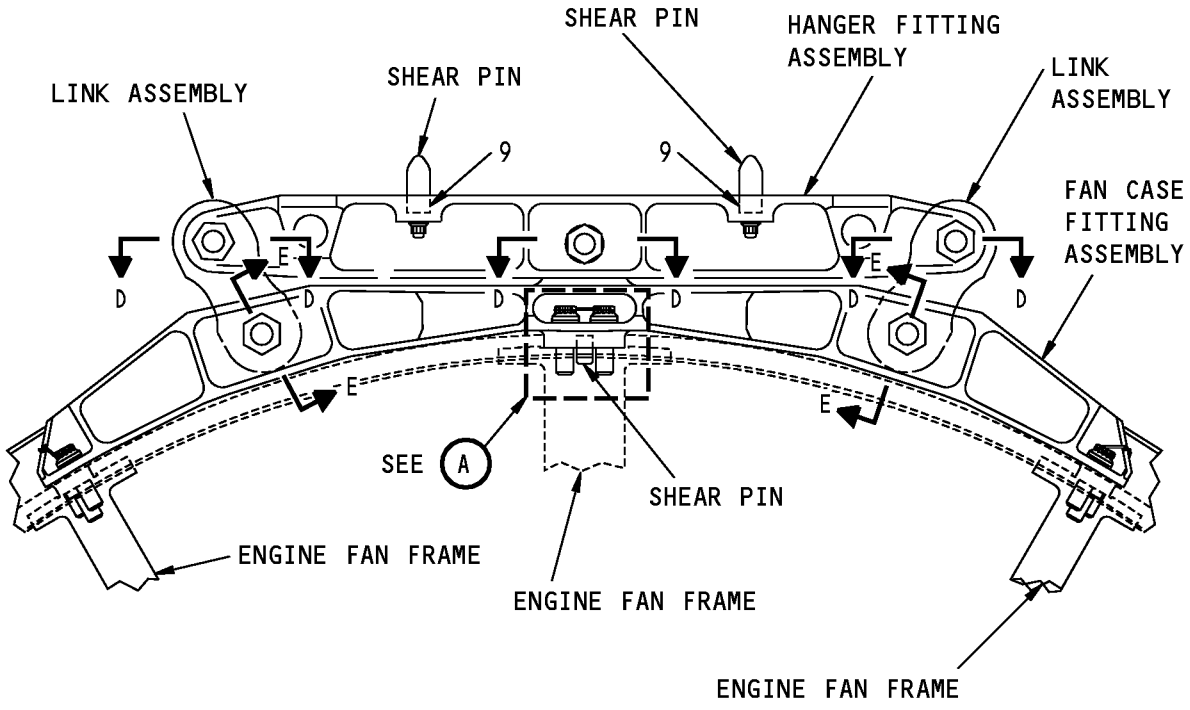
(Continued)

			DIMENSION		WEAR LIMITS (INCHES)
INDEX NO.	PART NAME	DIM.	MIN	MAX	MAXIMUM CLEARANCE
2	FITTING	ID	-	0.8905	0.0270
	BUSHING-SHEAR	OD	0.8600	-	
3	FITTING	ID	-	0.5620	0.0630
	BOLT-SPECIAL	OD	0.4985	-	
4	FITTING	ID		-	-
	PIN-SHEAR	OD	-		
5	*[1]	ID	-	0.5057	0.0092
	PIN-SHEAR	OD	0.4919	-	
6	BEARING (RACE)	ID	-	1.1905	0.0040
	BEARING (BALL)	OD	1.1845	-	
7	BEARING	ID	-	0.7515	0.0030
	PIN-PAWL	OD	0.7470	-	
8	BUSHING	ID	-	0.7521	0.0036
	PIN-PAWL	OD	0.7467	-	
9	FITTING-HANGAR	ID	-	0.7115	0.0070
	PIN-SHEAR	OD	0.7010	-	

*[1] Engine Fan Frame

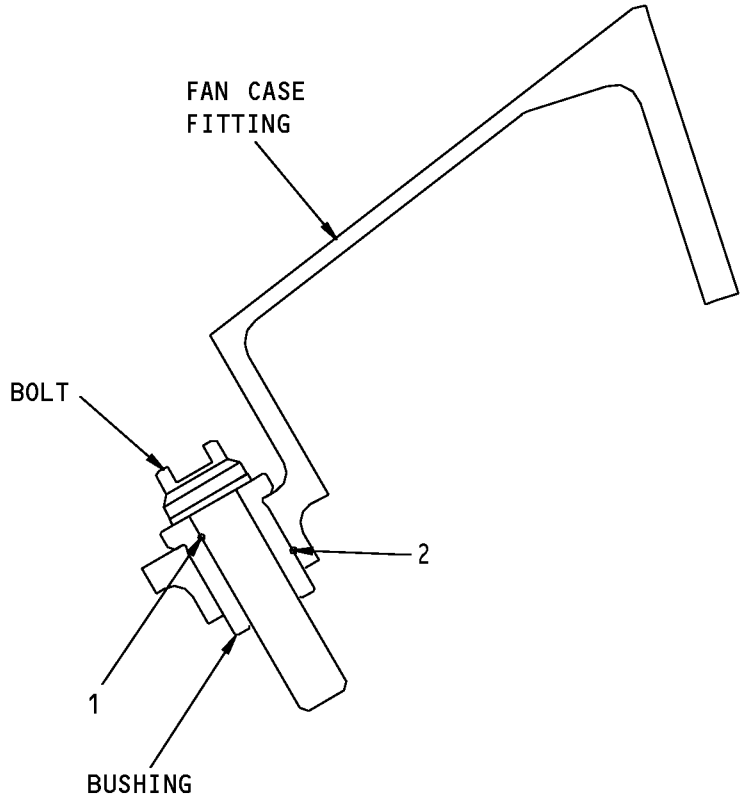
END OF TASK



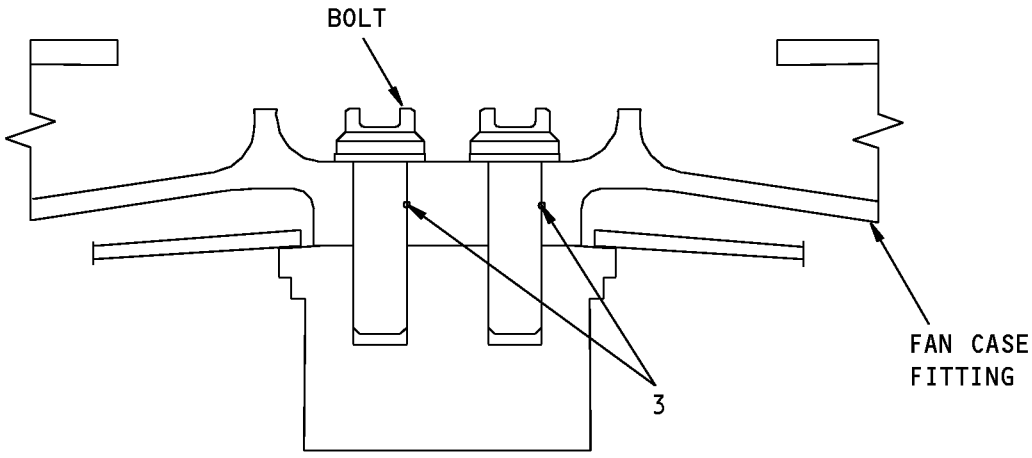


A–A

Forward Engine Mount Inspection
Figure 604 (Sheet 1 of 3)/71-21-00-990-806-F00

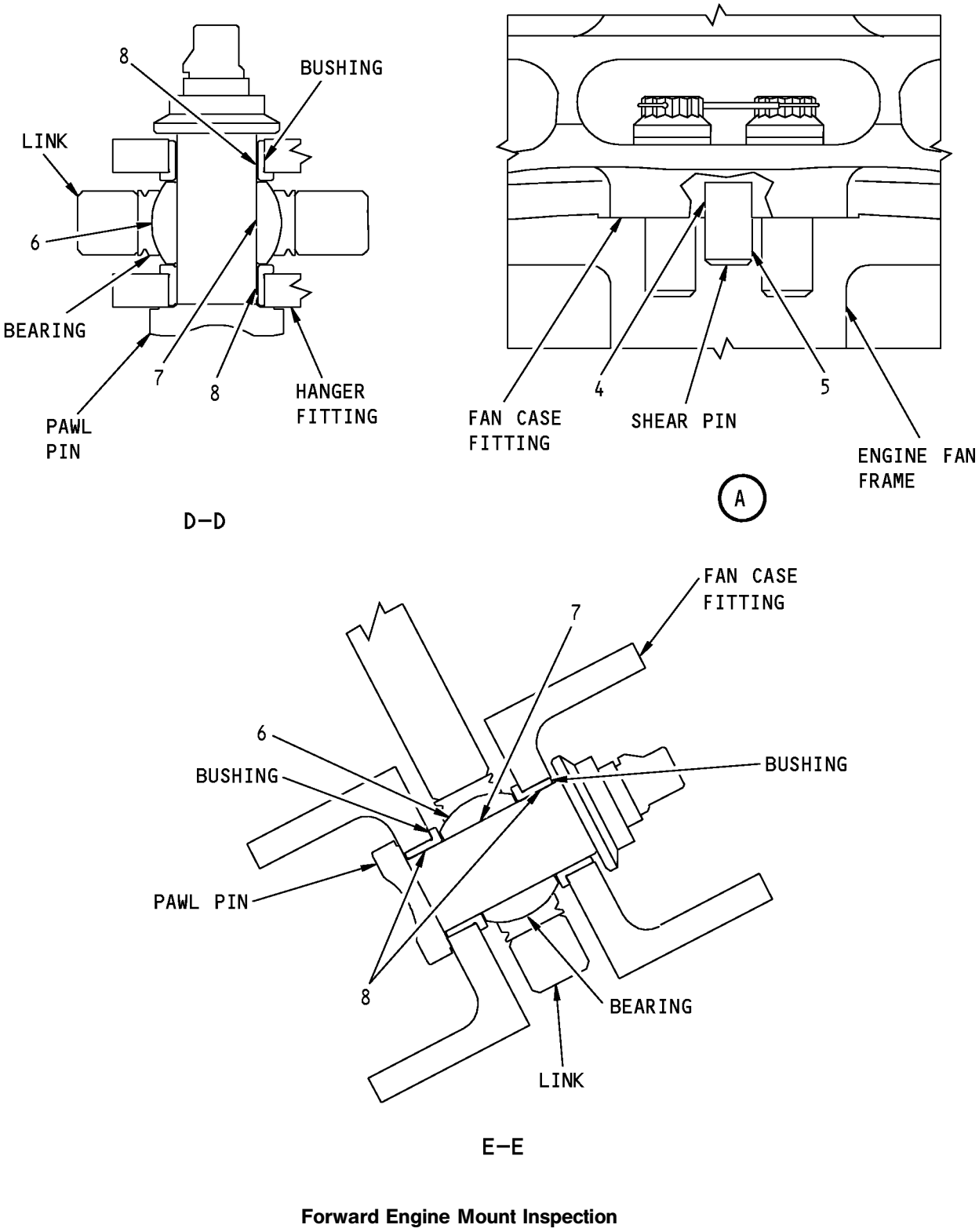


B–B



C–C

Forward Engine Mount Inspection
Figure 604 (Sheet 2 of 3)/71-21-00-990-806-F00



Forward Engine Mount Inspection
Figure 604 (Sheet 3 of 3)/71-21-00-990-806-F00

TASK 71-21-00-200-805-F00

6. Aft Engine Mount Visual Inspection

A. General

(1) This task provides instructions to do the visual inspection of the aft engine mount.

(2) This task is used when the engine is off-wing.

(3) The aft engine mount is found at the 12:00 o'clock position on the turbine rear frame.

B. Location Zones

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

C. Procedure

SUBTASK 71-21-00-210-010-F00

(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 vertical 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.

1) Cracks to the bearing (race) are not permitted.

2) Cracks to the bearing ball are not permitted.

3) Seized bearing is not permitted.

4) Cracks in bearing are not permitted.

5) Bearing movement is not permitted.

6) All other types of damage to the bearing are not permitted.

(k) Fretting is not permitted.

NOTE: Fretting is caused when two adjacent pieces of metal rub one another.

(l) Pickup is not permitted.

NOTE: Pickup occurs when material is moved from one surface to a surface which it touches.

(m) High metal is not permitted.

NOTE: High metal is metal which is pushed above the surface adjacent to scratches or other damage.

SUBTASK 71-21-00-210-011-F00

(2) If damage is found on the aft engine mount, please contact Boeing.

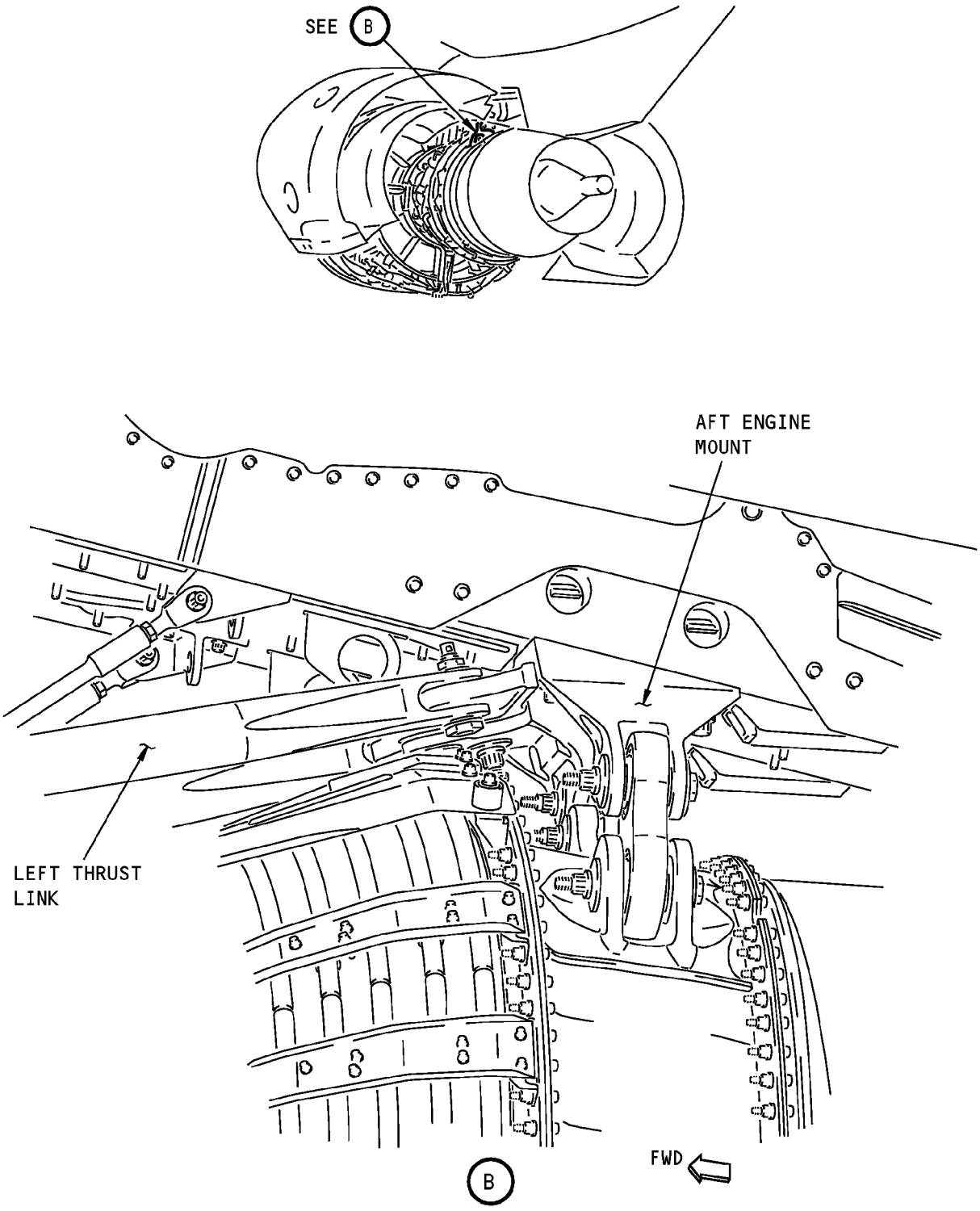
SUBTASK 71-21-00-210-017-F00

(3) Examine the aft engine mount for worn areas.

(a) If you find signs of wear on the aft engine mount.

1) Do this task: Aft Engine Mount Detailed Inspection, TASK 71-21-00-200-806-F00.

——————— END OF TASK ———————



Aft Engine Mounts Inspection
Figure 605/71-21-00-990-807-F00

TASK 71-21-00-200-806-F00

7. Aft Engine Mount Detailed Inspection

(Figure 606 or Figure 607)

A. General

(1) This task gives the detailed inspection instructions for the aft engine mount.

(2) This task is used when the engine is off-wing.

B. References

Reference	Title
71-21-03-000-801-F00	Aft Engine Mount Removal (P/B 401)
71-21-03-400-801-F00	Aft Engine Mount Installation (P/B 401)

C. Location Zones

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

D. Procedure

SUBTASK 71-21-00-210-014-F00

(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 71-21-37 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-pawl in the aft engine mount to make sure that they are free of damage.

(c) Examine the bearings are free of damage.

(d) Examine the bushings are free of damage.

(e) Examine the even bars are free of damage.

(f) Examine the linkage and flange brackets for the aft engine mount are free of damage.

(g) Examine the Worn areas on the clip [left side link].

1) If the wear on the dimples of the clip do not go through the clip [no hole], no action is necessary.

2) If the wear on the dimples of the clip goes through the clip [hole at dimple], it is permitted to continue to operate the engine for up to 12 months prior to repair/ replacement of the clip or left side link.

(h) Examine the areas where the aft engine mount attaches to the engine exhaust outer case.

1) All types of damage are not permitted.

HAP 001-013, 015-026, 028-030 PRE SB 737-71A1462

SUBTASK 71-21-00-210-015-F00

(2) If you find the component attach points on the aft engine mount center link are more than the wear limits (Table 602), do these steps that follow.

(a) Replace the aft engine mount center link component, if it is necessary.

1) Do this task: Aft Engine Mount Removal, TASK 71-21-03-000-801-F00.

2) Do this task: Aft Engine Mount Installation, TASK 71-21-03-400-801-F00.

Table 602/71-21-00-993-802-F00 Aft Engine Mount Wear Limits

			DIMENSION		WEAR LIMITS (INCHES)
INDEX NO.	PART NAME	DIM.	MIN	MAX	MAXIMUM CLEARANCE
1	BUSHING	ID	-	1.2530	0.0050
	PIN-PAWL	OD	1.2455	-	
2	BUSHING	ID	-	1.2530	0.0050
	PIN-PAWL	OD	1.2455	-	
3	BUSHING	ID	-	1.2530	0.0050
	PIN-PAWL	OD	1.2455	-	
4	BEARING (RACE)	ID	-	2.0642	0.0056
	BEARING (BALL)	OD	2.0540	-	
5	BEARING	ID	-	1.2530	0.0050
	PIN-PAWL	OD	1.2455	-	
6	BEARING (RACE)	ID	-	2.0642	0.0056
	BEARING (BALL)	OD	2.0540	-	
7	BEARING	ID	-	1.2530	0.0050
	PIN-PAWL	OD	1.2455	-	
8	BUSHING	ID	-	1.0026	0.0046
	PIN-PAWL	OD	0.9957	-	
9	BUSHING	ID	-	1.0026	0.0046
	PIN-PAWL	OD	0.9957	-	
10	BEARING (RACE)	ID	-	1.6752	0.0068
	BEARING (BALL)	OD	1.6650	-	
11	BEARING	ID	-	1.0030	0.0050
	PIN-PAWL	OD	0.9955	-	
12	FITTING	ID		-	-
	BUSHING	OD	-		
13	BUSHING	ID	-	1.0026	0.0046
	PIN-PAWL	OD	0.9957	-	

HAP 001-013, 015-026, 028-030 PRE SB 737-71A1462 (Continued)

(Continued)

			DIMENSION		WEAR LIMITS (INCHES)
INDEX NO.	PART NAME	DIM.	MIN	MAX	MAXIMUM CLEARANCE
14	BAR	ID		-	-
	BUSHING-FLANGED	OD	-		
15	BUSHING-FLANGED	ID	-	1.0026	0.0046
	PIN-PAWL	OD	0.9957	-	
16	BEARING (RACE)	ID	-	1.6736	0.0052
	BEARING (BALL)	OD	1.6658	-	
17	BEARING	ID	-	1.0030	0.0050
	PIN-PAWL	OD	0.9955	-	
18	BUSHING	ID	-	1.2530	0.0050
	PIN-PAWL	OD	1.2455	-	
19	BUSHING	ID	-	1.2530	0.0050
	PIN-PAWL	OD	1.2455	-	
20	BEARING (RACE)	ID	-	2.0644	0.0076
	BEARING (BALL)	OD	2.0530	-	
21	BEARING	ID	-	1.2530	0.0050
	PIN-PAWL	OD	1.2455	-	
22	BEARING (RACE)	ID	-	1.1905	0.0040
	BEARING (BALL)	OD	1.1845	-	
23	BEARING	ID	-	0.7515	0.0030
	PIN-PAWL	OD	0.7470	-	

HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-71A1462

SUBTASK 71-21-00-210-016-F00

(3) If you find the component on the aft engine mount center link attach points are more than the wear limits (Table 603), do these steps that follow.

(a) Replace the aft engine mount center link component, if it is necessary.

1) Do this task: Aft Engine Mount Removal, TASK 71-21-03-000-801-F00.
2) Do this task: Aft Engine Mount Installation, TASK 71-21-03-400-801-F00.

Table 603/71-21-00-993-803-F00 Aft Engine Mount Wear Limits

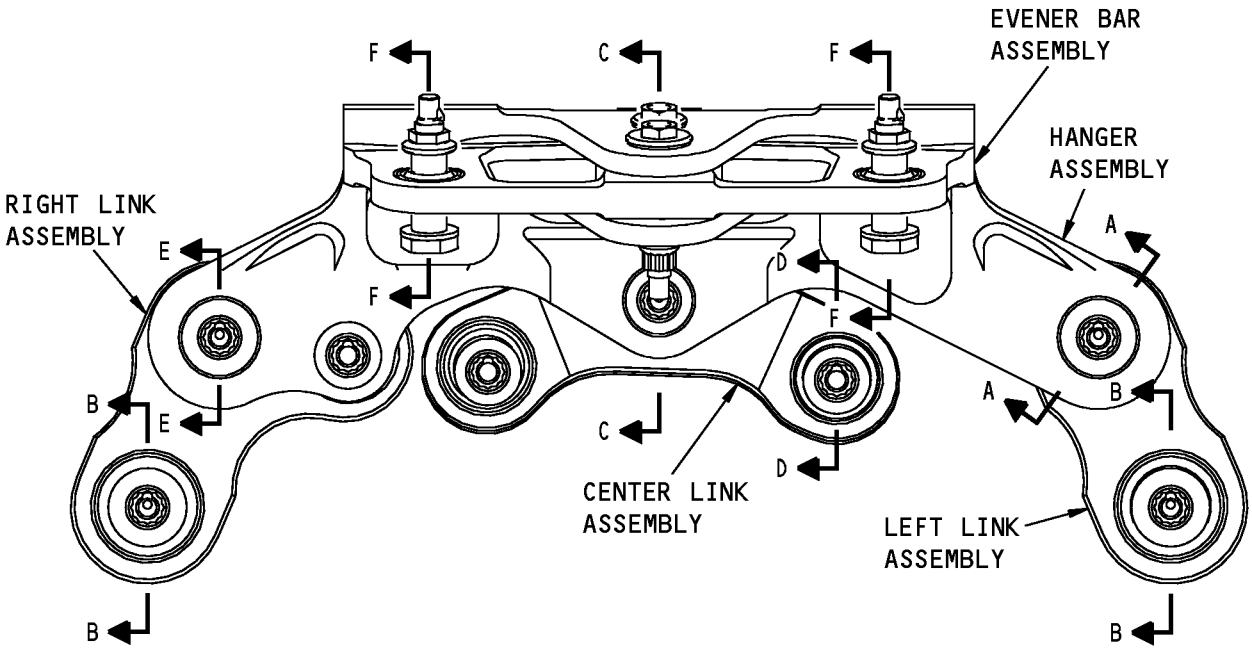
			DIMENSION		WEAR LIMITS (INCHES)
INDEX NO.	PART NAME	DIM.	MIN	MAX	MAXIMUM CLEARANCE
1	BUSHING-FLANGED	ID	-	1.0026	0.0046
	PIN-PAWL	OD	0.9957	-	
2	BUSHING	ID	-	1.0026	0.0046
	PIN-PAWL	OD	0.9957	-	
3	BEARING	ID	-	1.0030	0.0050
	PIN-PAWL	OD	0.9955	-	
4	BEARING (RACE)	ID	-	1.6752	0.0068
	BEARING (BALL)	OD	1.6650	-	
5	BUSHING	ID	-	1.0026	0.0046
	PIN-PAWL	OD	0.9957	-	
6	BUSHING	ID	-	1.0026	0.0046
	PIN-PAWL	OD	0.9957	-	
7	BUSHING	ID	-	1.2530	0.0050
	PIN-PAWL	OD	1.2455	-	
8	BUSHING	ID	-	1.2530	0.0050
	PIN-PAWL	OD	1.2455	-	
9	BEARING (RACE)	ID	-	2.0642	0.0056
	BEARING (BALL)	OD	2.0540	-	
10	BEARING	ID	-	1.2530	0.0050
	PIN-PAWL	OD	1.2455	-	
11	BEARING (RACE)	ID	-	2.0642	0.0056
	BEARING (BALL)	OD	2.0540	-	

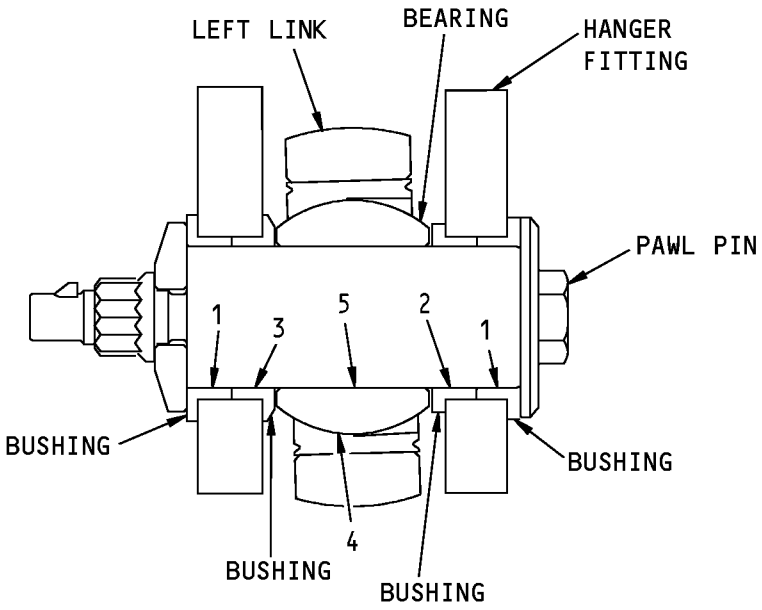
HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-71A1462 (Continued)

(Continued)

			DIMENSION		WEAR LIMITS (INCHES)
INDEX NO.	**PART NAME**	**DIM.**	**MIN**	**MAX**	**MAXIMUM CLEARANCE**
12	BEARING	ID	-	1.2530	0.0050
	PIN-PAWL	OD	1.2455	-	
13	BUSHING	ID	-	1.2530	0.0050
	PIN-PAWL	OD	1.2455	-	
14	BUSHING	ID	-	1.2530	0.0050
	PIN-PAWL	OD	1.2455	-	
15	BEARING (BALL)	ID	-	1.1905	0.0040
	BEARING (RACE)	OD	1.1845	-	
16	BEARING	ID	-	0.7515	0.0030
	PIN-PAWL	OD	0.7470	-	

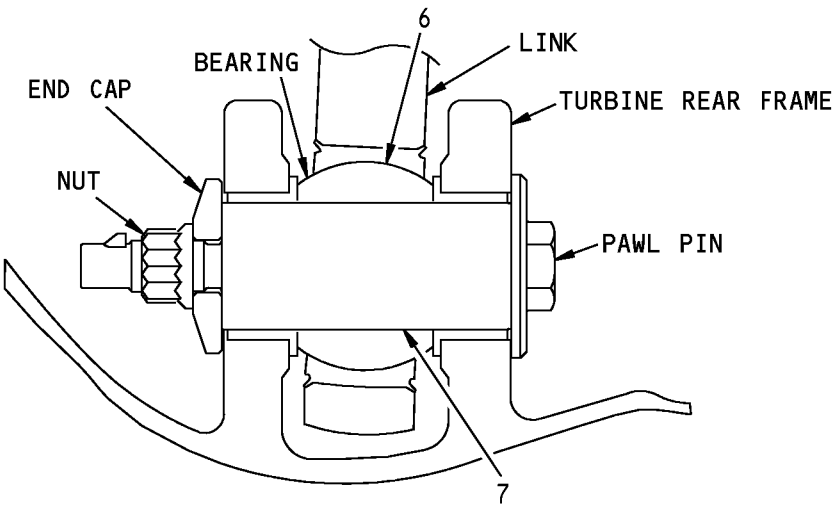
END OF TASK



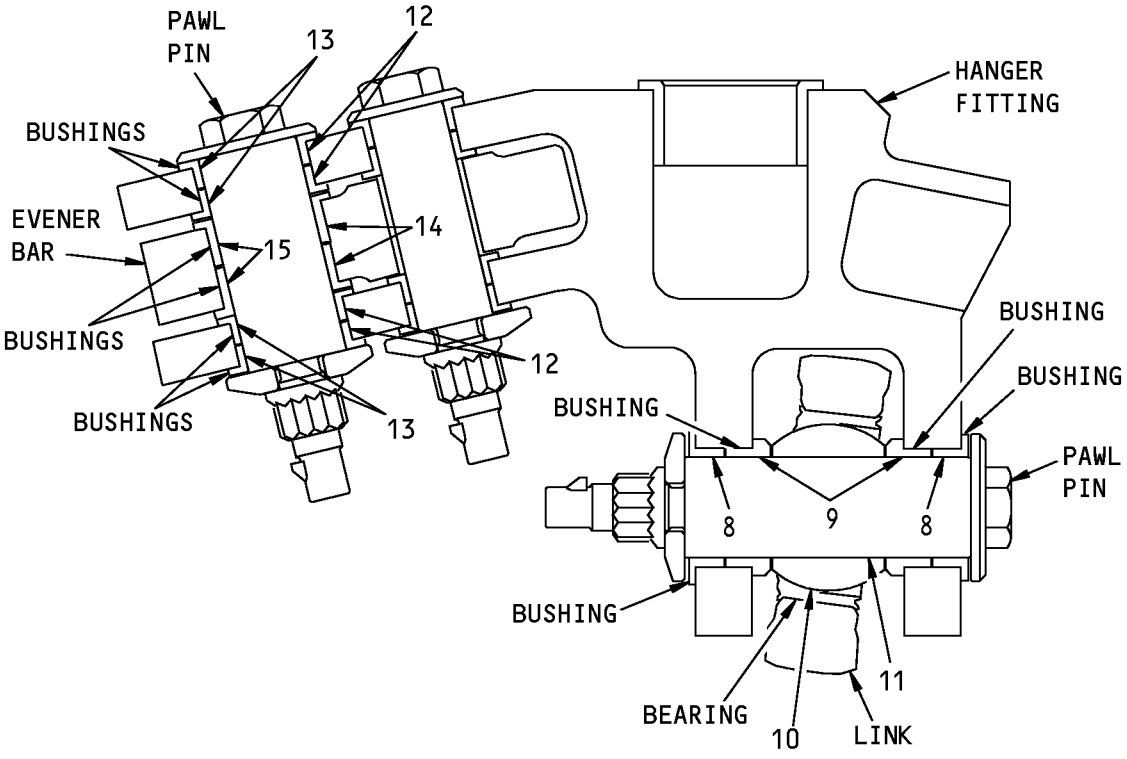


A–A

Aft Engine Mount Inspection
Figure 606 (Sheet 1 of 3)/71-21-00-990-804-F00

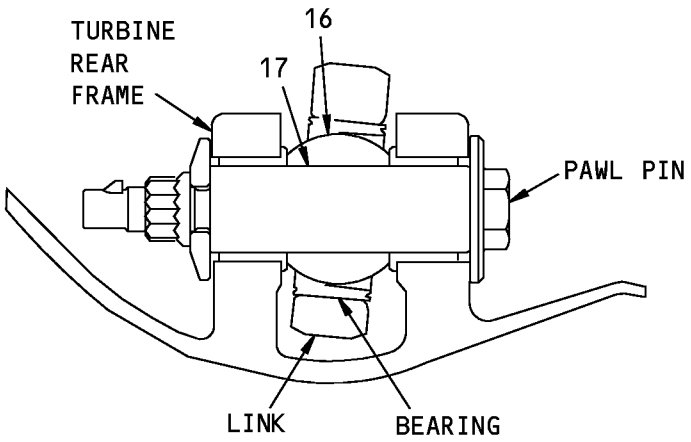


B–B

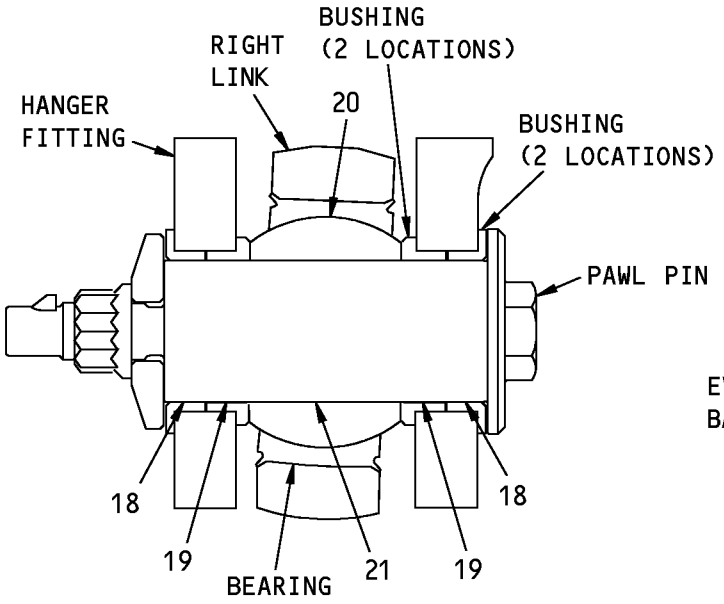


C–C

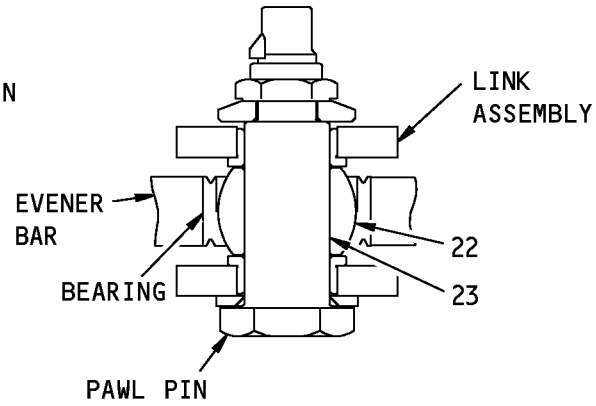
Aft Engine Mount Inspection
Figure 606 (Sheet 2 of 3)/71-21-00-990-804-F00



D–D

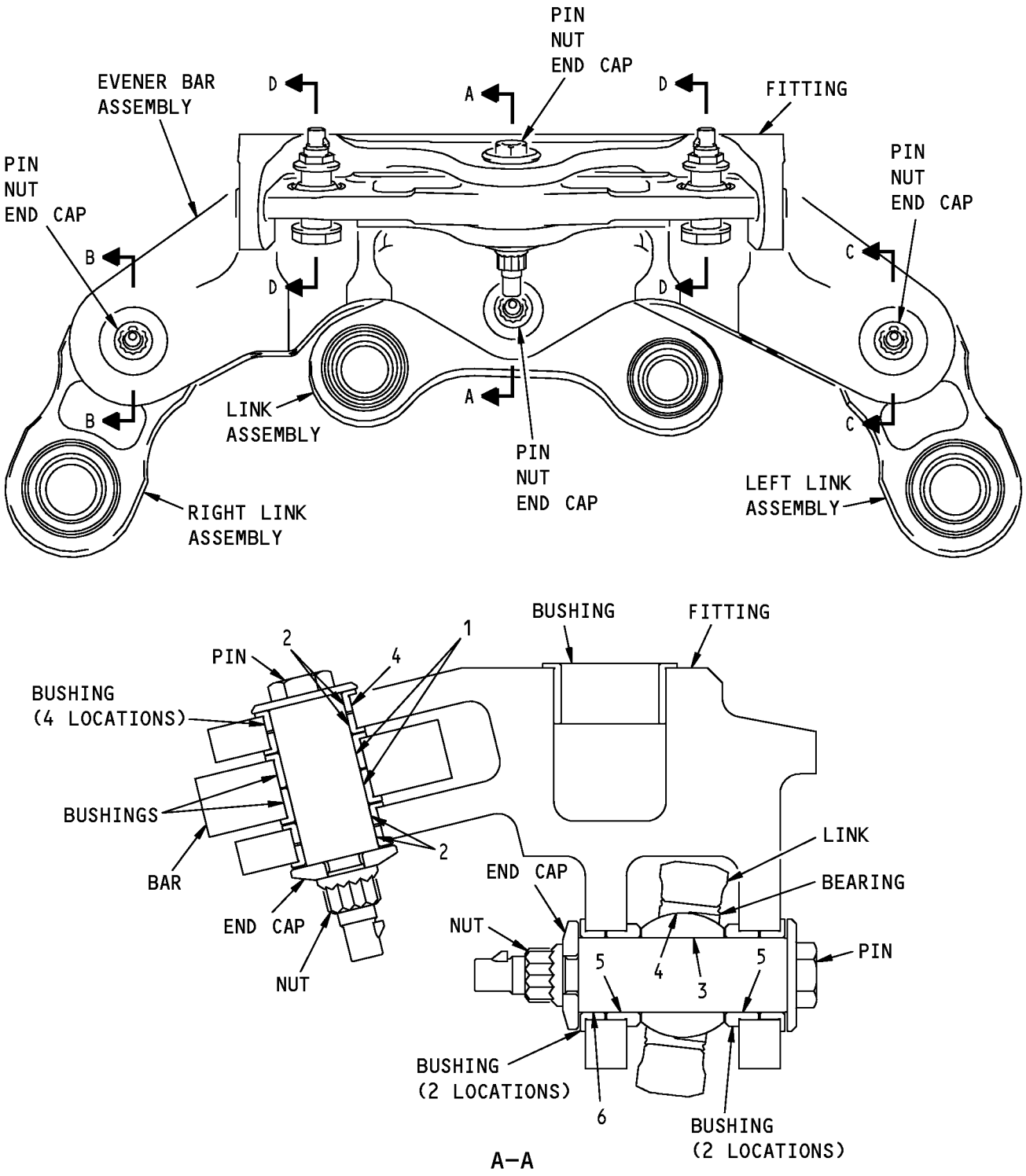


E–E

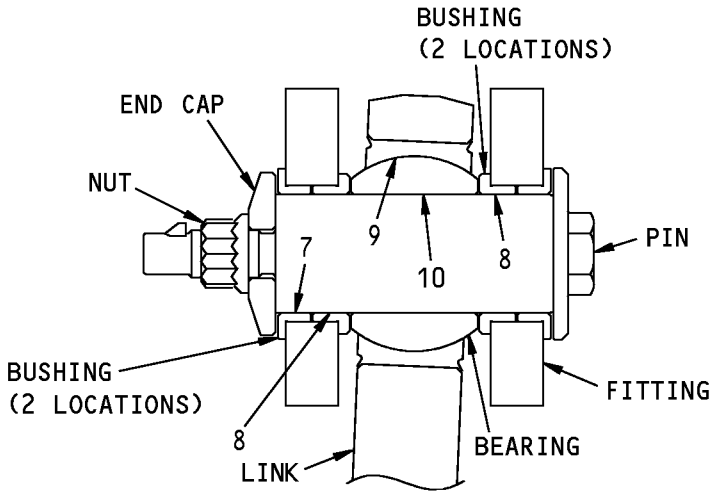


F–F

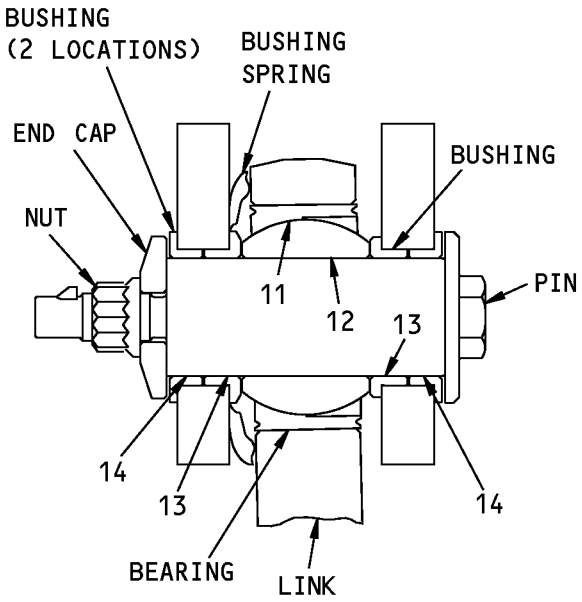
Aft Engine Mount Inspection
Figure 606 (Sheet 3 of 3)/71-21-00-990-804-F00



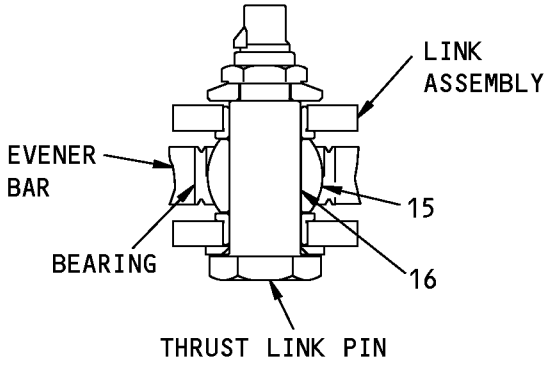
Aft Engine Mount Inspection
Figure 607 (Sheet 1 of 2)/71-21-00-990-805-F00



B–B



C–C



D–D

Aft Engine Mount Inspection
Figure 607 (Sheet 2 of 2)/71-21-00-990-805-F00

FORWARD ENGINE MOUNT - REMOVAL/INSTALLATION

1. General

A. This procedure contains these two tasks:

(1) The first task is the removal of the forward engine mount

(2) The second task is the installation of the forward engine mount.

TASK 71-21-01-000-801-F00

2. Forward Engine Mount Removal

(Figure 401)

A. General

(1) The forward engine mount is found at the 12:00 o'clock position on the outer case of the fan frame.

(2) You must remove the engine from the strut before you can remove the forward engine mount.

B. References

Reference	Title
71-00-02-000-801-F00	Power Plant Removal (P/B 401)

C. Location Zones

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

D. Prepare to Remove the Forward Engine Mount

SUBTASK 71-21-01-010-001-F00

(1) Do this task: Power Plant Removal, TASK 71-00-02-000-801-F00.

E. Remove the Forward Engine Mount

SUBTASK 71-21-01-020-001-F00

(1) Do these steps to remove the hangar fitting [1]:

(a) Remove the three nuts [4] and end caps [3] from the pawl pins [2] in the hangar fitting [1].

1) PAWL PINS WITH A SPRING LOADED PAWL;

Hold the spring-loaded pawl in while you remove the nuts [4].

NOTE: You can use a metal or hard plastic tube or another nut to hold the pawl in.

2) PAWL PINS WITH A COTTER PIN;

Remove the cotter pin before you remove the nuts [4].

(b) Remove the three pawl pins [2] and the two washers [11].

(c) Remove the hangar fitting assembly [1].

SUBTASK 71-21-01-020-002-F00

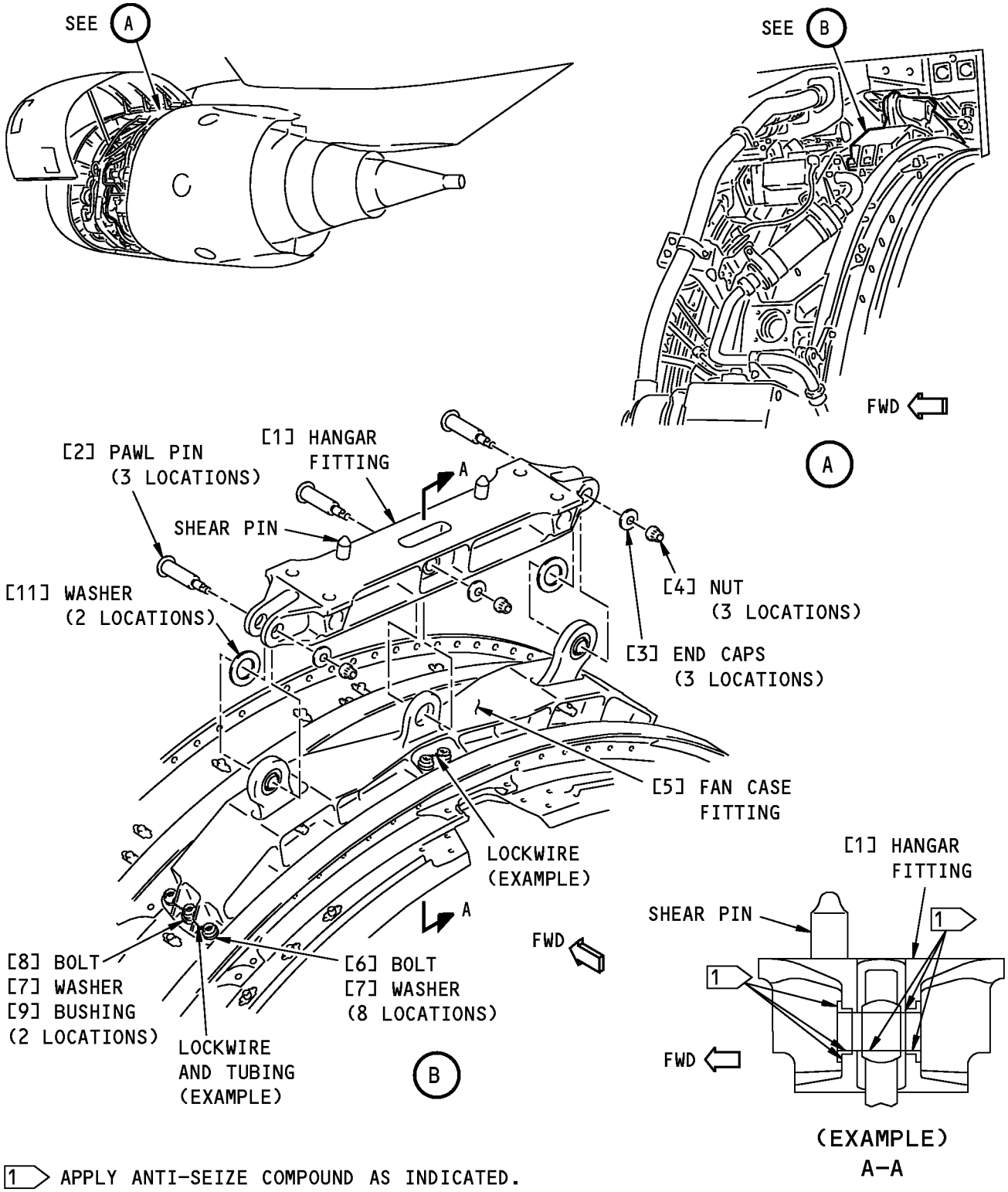
(2) Do these steps to remove the fan case fitting [5]:

(a) Remove the four bolts [6] and washers [7] at the center of the fitting.

(b) Remove the six bolts [6] and [8], six washers [7], and two bushings [9] at the outer positions.

(c) Remove the fan case fitting [5].

END OF TASK



1 APPLY ANTI-SEIZE COMPOUND AS INDICATED.

Forward Engine Mount Installation
Figure 401/71-21-01-990-801-F00

TASK 71-21-01-400-801-F00

3. Forward Engine Mount Installation

(Figure 401)

A. References

Reference	Title
71-00-02-400-801-F00	Power Plant Installation (P/B 401)

B. Consumable Materials

Reference	Description	Specification
D00006	Compound - Antiseize Pure Nickel Special - Never-Seez NSBT-8N	MIL-PRF-907F
G01912	Lockwire - Monel (0.032 In. Dia.)	NASM20995N˜ C32 (QQ-N-281)

C. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Fitting assembly	71-21-01-01-025	HAP 001-007
		71-21-01-02-020	HAP 008-013, 015-026, 028-054, 101-999
5	Fan case fitting	71-21-01-01-065	HAP 001-007
		71-21-01-02-055	HAP 008-013, 015-026, 028-054, 101-999

D. Location Zones

Zone	Area
410	Subzone - Engine 1
420	Subzone - Engine 2

E. Install the Forward Mount

SUBTASK 71-21-01-640-001-F00

(1) Apply the Never-Seez NSBT-8N compound, D00006 to the bolt threads and under the bolt heads [6] and [8].

SUBTASK 71-21-01-020-003-F00

(2) Do these steps to install the fan case fitting [5]:

(a) Put the fan case fitting [5] on the fan case and align the holes.

(b) Install the two longer bolts [8], washers [7] and bushings [9] at the outer positions.

NOTE: Make sure the washers [7] are installed under the bolt heads [8] with the countersunk side up.

(c) Install the four bolts [6] and washers [7] at the outer positions.

(d) Install the four bolts [6] and washers [7] at the center of the fitting.

(e) Tighten the ten bolts [6] and [8] for the fan case fitting to 585-715 pound-inches (66-81 Newton meters).

NOTE: Make sure that the bolts [6] and [8] are tightened equally.

(f) Install the lockwire, G01912 to the four bolts [6] at the center of the fitting.

1) Attach a lockwire to the two forward bolts.

2) Attach a lockwire to the two aft bolts.

(g) Install the lockwire, G01912 on the three bolts [6] and [8] at the outer positions.

1) Install heat shrink tubing on the lockwire where it rubs against the fan case fitting.

SUBTASK 71-21-01-020-004-F00

(3) Apply Never-Seez NSBT-8N compound, D00006 to the pawl pin threads and shanks; and, to the bushings, bearings, and bores.

SUBTASK 71-21-01-020-005-F00

(4) Do these steps to install the hangar fitting [1]:

(a) Put the hangar fitting assembly [1] on the fan case fitting [5] and align the holes for the pawl pins.

1) Make sure to install the hangar fitting with the shear pins on the forward edge.

(b) Install the three pawl pins [2] with the head on the forward side of the mount.

1) The fit for the middle pawl pawl is looser. There is more clearance between the pawl pin and the bushing in the fan case fitting.

(c) Install the washer [11] at each outer pin location.

1) The washer can be installed on the forward or aft side of the bearing.

2) Make sure that the chamfer side of the washer is against the bearing.

(d) Install the three end caps [3] and nuts [4].

1) Make sure that the flat side of the end cap is against the pin shoulder.

2) Tighten the three nuts to 290-510 pound-inches (33-58 Newton meters).

a) You can apply the torque to the nut or the head of the pin.

3) PAWL PINS WITH A SPRING LOADED PAWL;

Make sure the spring-loaded pawl on the pins are in the extended position after the nuts are tight.

4) PAWL PINS WITH A COTTER PIN;

Install the cotter pin.

F. Put the Airplane Back to its Usual Condition

SUBTASK 71-21-01-410-001-F00

(1) Do this task: Power Plant Installation, TASK 71-00-02-400-801-F00.

——————— END OF TASK ———————

THRUST LINK ASSEMBLY - REMOVAL/INSTALLATION

1. General

A. This procedure has these two tasks:

(1) The removal of the thrust link

(2) The installation of the thrust link.

TASK 71-21-02-000-801-F00

2. Thrust Link Assembly Removal

(Figure 401)

A. General

(1) The thrust links are installed between the fan frame and the aft engine mount.

(2) You can only remove and install one thrust link at a time with the power plant installed on the strut because of the load.

B. References

Reference	Title
78-31-00-010-801-F00	Open 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-2438	Equipment - Hold-Open, 65-Degree, T/R Cowl, CFM56-7 Engine (Part #: C78021-1, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

D. Location Zones

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

E. Procedure

SUBTASK 71-21-02-010-001-F00

WARNING: DO THESE SPECIFIED TASKS IN THE CORRECT SEQUENCE BEFORE YOU OPEN THE THRUST REVERSER: RETRACT THE LEADING EDGE, DO THE DEACTIVATION OF 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.

(1) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

SUBTASK 71-21-02-020-001-F00

CAUTION: DO NOT REMOVE THE TWO THRUST LINKS AT THE SAME TIME. THE ENGINE CAN MOVE REARWARD AND DAMAGE ENGINE FAIRINGS. THE MOVEMENT WILL ALSO MAKE IT VERY DIFFICULT TO RE-INSTALL THE PAWL PINS.

(2) Do these steps to remove the left or right thrust link [1]:

(a) For the left thrust link, remove the LPT cooling air tube.

(b) For the right thrust link, disconnect the T3 sensor from the T3 sensor bracket and the T3 sensor bracket from the engine.

(c) Remove the nut [3] and end cap [2] at each end of the thrust link [1].

1) PAWL PINS WITH A SPRING LOADED PAWL;

Hold the spring-loaded pawl in while you remove the nut [3].

NOTE: You can use the thread protector, a metal or hard plastic tube, or another nut to hold the pawl in.

2) PAWL PINS WITH A COTTER PIN;

Remove the cotter pin before you remove the nut [3].

(d) Install a thread protector from equipment, SPL-2438 on the pawl pin [5] at each end of the thrust link.

(e) Remove the pawl pin [5] and washer [4] from the aft end of the thrust link.

(f) Remove the pawl pin [5] and washer [4] from the forward end of thrust link.

HAP 023-026, 028-054, 101-999; HAP 001-013, 015-022 POST SL 737-76-021

1) Remove the washer [6].

HAP 001-013, 015-022 PRE SL 737-76-021

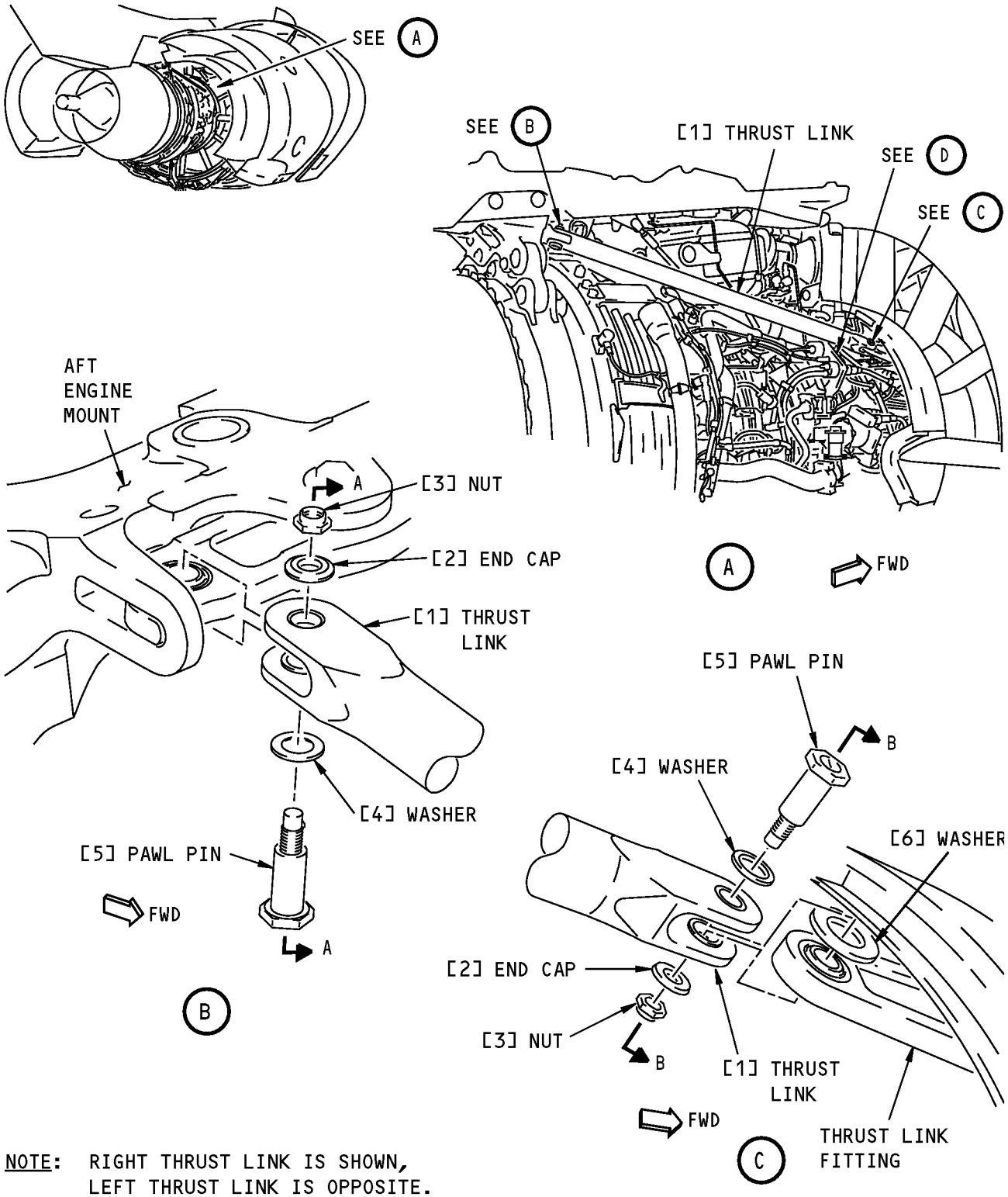
2) Remove the washer [6] if it is installed.

a) The washer [6] is the recommended installation.

HAP ALL

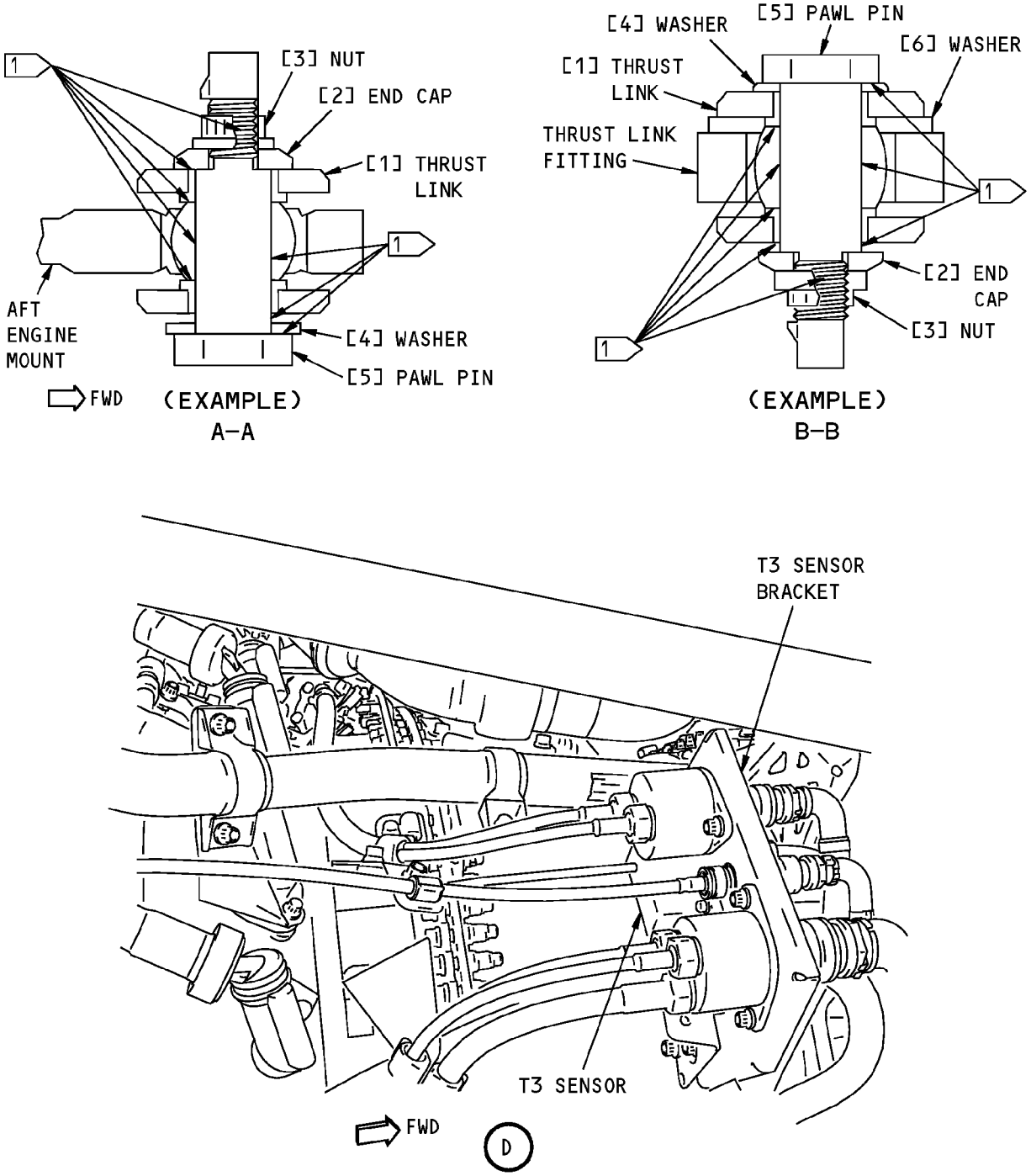
(g) Remove the thrust link assembly [1] in the down direction.

———————— END OF TASK ————————



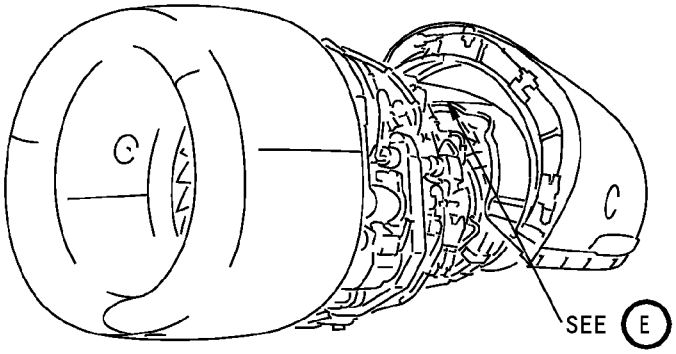
NOTE: RIGHT THRUST LINK IS SHOWN, LEFT THRUST LINK IS OPPOSITE.

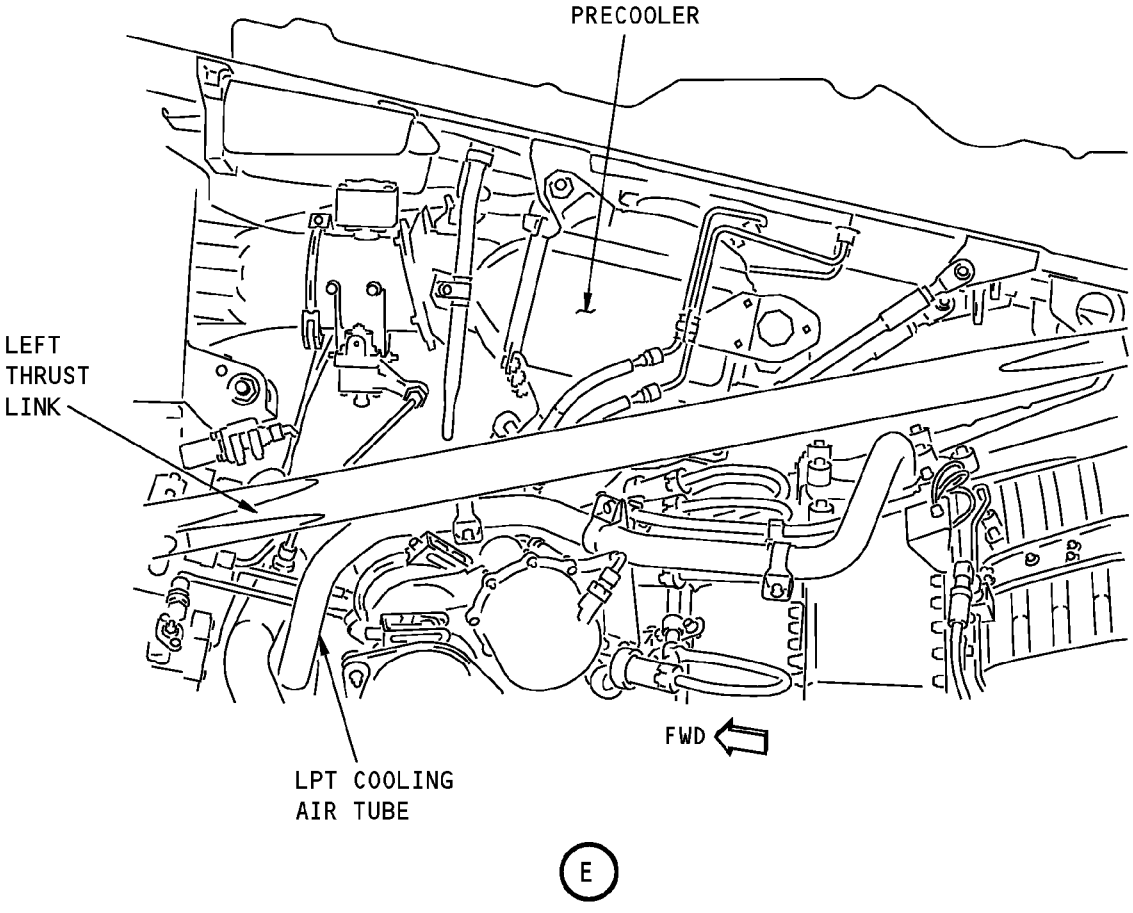
Thrust Link Installation
Figure 401 (Sheet 1 of 3)/71-21-02-990-801-F00



1 > APPLY ANTI-SEIZE COMPOUND AS INDICATED.

Thrust Link Installation
Figure 401 (Sheet 2 of 3)/71-21-02-990-801-F00





Thrust Link Installation
Figure 401 (Sheet 3 of 3)/71-21-02-990-801-F00

TASK 71-21-02-400-801-F00

3. Thrust Link Assembly Installation

(Figure 401)

A. References

Reference	Title
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

B. Tools/Equipment

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

Reference	Description
SPL-2438	Equipment - Hold-Open, 65-Degree, T/R Cowl, CFM56-7 Engine (Part #: C78021-1, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

C. Consumable Materials

Reference	Description	Specification
D00006	Compound - Antiseize Pure Nickel Special - Never-Seez NSBT-8N	MIL-PRF-907F

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Link assembly	71-21-02-01-030	HAP 001-007
		71-21-02-01-035	HAP 001-007
		71-21-02-02-025	HAP 008-013, 015-026, 028-054, 101-999
		71-21-02-02-030	HAP 008-013, 015-026, 028-054, 101-999

E. Location Zones

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

F. Procedure

SUBTASK 71-21-02-640-001-F00

(1) Apply the Never-Seez NSBT-8N compound, D00006 to the threads, shank and below the head of the pawl pins [5] and to the bushings and bores (Views A-A and B-B).

SUBTASK 71-21-02-480-001-F00

(2) Install the thread protector from equipment, SPL-2438 on the pawl pin [5] for the forward end of the thrust link.

SUBTASK 71-21-02-420-001-F00

(3) Do these steps to install the left or right thrust link [1]:

(a) Put the thrust link assembly [1] on the engine.

1) Align the aft end of the thrust link with the aft engine mount and align the forward end with the thrust link fitting.

(b) Install the pawl pin [5] and washer [4] at the aft end of the thrust link.

(c) Install the end cap [2] and nut [3].

1) Make sure the flat side of the end cap [2] is against the shoulder of the pin.

2) PAWL PINS WITH A SPRING LOADED PAWL;

Make sure the spring-loaded pawl is in the extended position after you install the nut [3].

(d) Install the pawl pin [5], washer [4] and washer [6] at the forward end of the thrust link.

1) The chamfered side of the washer [6] faces the spherical bearing

HAP 001-013, 015-022 PRE SL 737-76-021

2) The washer [6] is the recommended installation.

HAP ALL

(e) Remove the thread protector from the pawl pin [5] and install the end cap [2] and nut [3].

1) Make sure the flat side of the end cap [2] is against the shoulder of the pin.

2) PAWL PINS WITH A SPRING LOADED PAWL;

Make sure the spring-loaded pawl is in the extended position after you install the nut [3].

(f) Tighten the two nuts [3] or the head of the pins to 290-510 pound-inches (32.8-57.6 Newton meters).

NOTE: You can apply the torque to the nut or the head of the pin.

(g) PAWL PINS WITH A COTTER PIN;

Install the cotter pin.

(h) For the left thrust link, install the LPT cooling air tube.

(i) For the right thrust link, re-connect the T3 sensor bracket to the engine and the T3 sensor to the T3 sensor bracket.

SUBTASK 71-21-02-010-002-F00

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 this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

END OF TASK

THRUST LINK ASSEMBLY - INSPECTION/CHECK

1. General

A. This procedure has two tasks.

(1) Thrust links visual inspection

(2) Thrust links detailed inspection.

TASK 71-21-02-210-802-F00

2. Thrust Links Visual Inspection

A. General

(1) This task gives the visual inspection instructions for the thrust link.

(2) The thrust links are installed between the inner fan frame and the aft engine mount.

B. References

Reference	Title
71-21-02-000-801-F00	Thrust Link Assembly Removal (P/B 401)
71-21-02-400-801-F00	Thrust Link Assembly Installation (P/B 401)

C. Location Zones

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

D. Procedure

SUBTASK 71-21-02-210-003-F00

(1) Examine the thrust links for damage:

(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.

SUBTASK 71-21-02-210-004-F00

(2) If damage is found on the thrust links, refer to the Structural Repair Manual for the allowable damage limits (SRM 54-70-90).

(a) Replace the thrust links component, if it is more than the allowable damage limits.

1) Do this task: Thrust Link Assembly Removal, TASK 71-21-02-000-801-F00.

2) Do this task: Thrust Link Assembly Installation, TASK 71-21-02-400-801-F00.

SUBTASK 71-21-02-210-005-F00

(3) Examine the thrust link for worn areas.

NOTE: The thrust links can be damaged from contact with the thrust reverser insulation blanket . Refer to the service letter on the insulation blanket.

(a) If you find signs of wear on the thrust links.

1) Do this task: Thrust Links Detailed Inspection, TASK 71-21-02-210-803-F00.

END OF TASK

TASK 71-21-02-210-803-F00

3. Thrust Links Detailed Inspection

(Figure 601)

A. General

(1) This task gives the detailed inspection instructions for the thrust link.

(2) This task is used when the thrust link is removed.

B. Location Zones

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

C. Procedure

SUBTASK 71-21-02-210-006-F00

(1) Do these steps to examine the thrust link for worn areas.

(a) Examine the areas where the thrust links attach points to the aft engine mount and the engine compressor case.

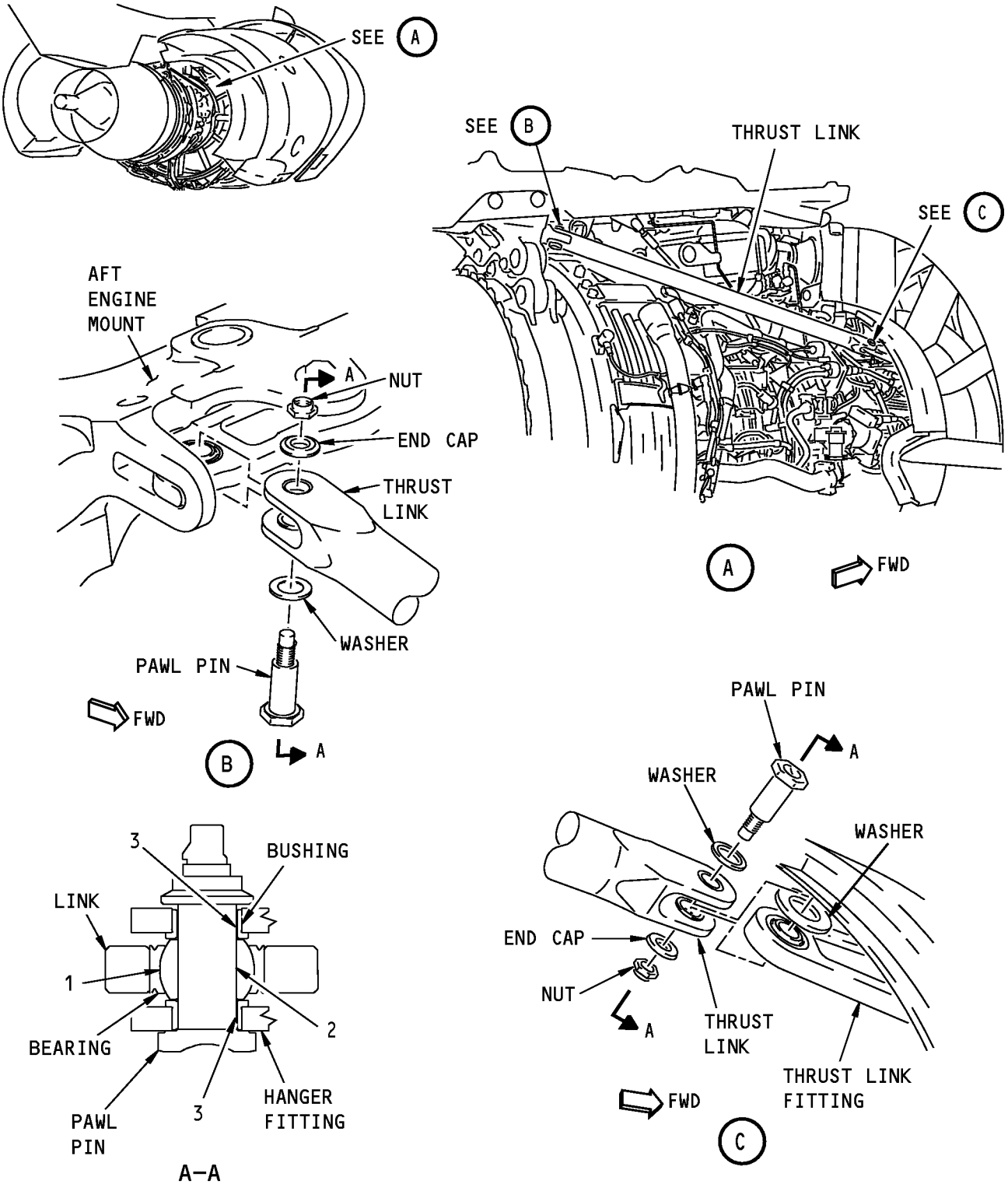
(b) If you find the component attach points are more than the wear limits (Table 601).

1) Replace the worn component of the thrust links, if it is necessary.

Table 601/71-21-02-993-801-F00 Thrust Links Wear Limits

			DIMENSION		WEAR LIMITS (INCHES)
INDEX NO.	PART NAME	DIM.	MIN	MAX	MAXIMUM CLEARANCE
1	BEARING (RACE)	ID	-	1.1905	0.0040
	BEARING (BALL)	OD	1.1845	-	
2	BEARING	ID	-	0.7515	0.0030
	PIN-PAWL	OD	0.7470	-	
3	BUSHING	ID	-	0.7521	0.0036
	PIN-PAWL	OD	0.7467	-	

END OF TASK



Thrust Links Inspection
Figure 601/71-21-02-990-802-F00

AFT ENGINE MOUNT - REMOVAL/INSTALLATION

1. General

A. This procedure contains these two tasks:

(1) The first task is the removal of the aft engine mount

(2) The second task is the installation of the aft engine mount.

TASK 71-21-03-000-801-F00

2. Aft Engine Mount Removal

(Figure 401)

A. General

(1) The aft engine mount is attached to the turbine rear frame at the 12:00 o'clock position.

(2) You must remove the engine from the strut before you can remove the aft engine mount.

B. References

Reference	Title
71-00-02-000-801-F00	Power Plant 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, CFM56-7 Engine Aft Mount (Part #: C71024-1, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

D. Location Zones

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

E. Prepare to Remove the Aft Engine Mount

SUBTASK 71-21-03-840-001-F00

(1) Do this task: Power Plant Removal, TASK 71-00-02-000-801-F00.

F. Remove the Aft Engine Mount

SUBTASK 71-21-03-020-001-F00

(1) Disconnect the two thrust links [2] from the aft engine mount [1].

(a) Remove the nut [11], end cap [12], washer [13] and pawl pin [14] at each thrust link [2].

1) PAWL PINS WITH A SPRING LOADED PAWL;

Hold the spring-loaded pawl in while you remove the nut [11].

NOTE: You can use a metal or hard plastic tube or another nut to hold the pawl in.

2) PAWL PINS WITH A COTTER PIN;

Remove the cotter pin before you remove the nut [11].

SUBTASK 71-21-03-480-001-F00

(2) If you use the optional sling, do these steps to install the fixture, SPL-2107.

(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.

SUBTASK 71-21-03-020-002-F00

WARNING: BE CAREFUL WHEN YOU MOVE THE AFT ENGINE MOUNT. BECAUSE THE AFT ENGINE MOUNT WEIGHS APPROXIMATELY 60 POUNDS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(3) Do these steps to remove the aft engine mount [1]:

(a) Remove the two nuts [4] and end caps [3] and the pawl pins [10] and [15] from the aft engine mount [1] at the two inner locations.

1) PAWL PINS WITH A SPRING LOADED PAWL;

Hold the spring-loaded pawl in while you remove the nut [4].

NOTE: You can use a metal or hard plastic tube or another nut to hold the pawl in.

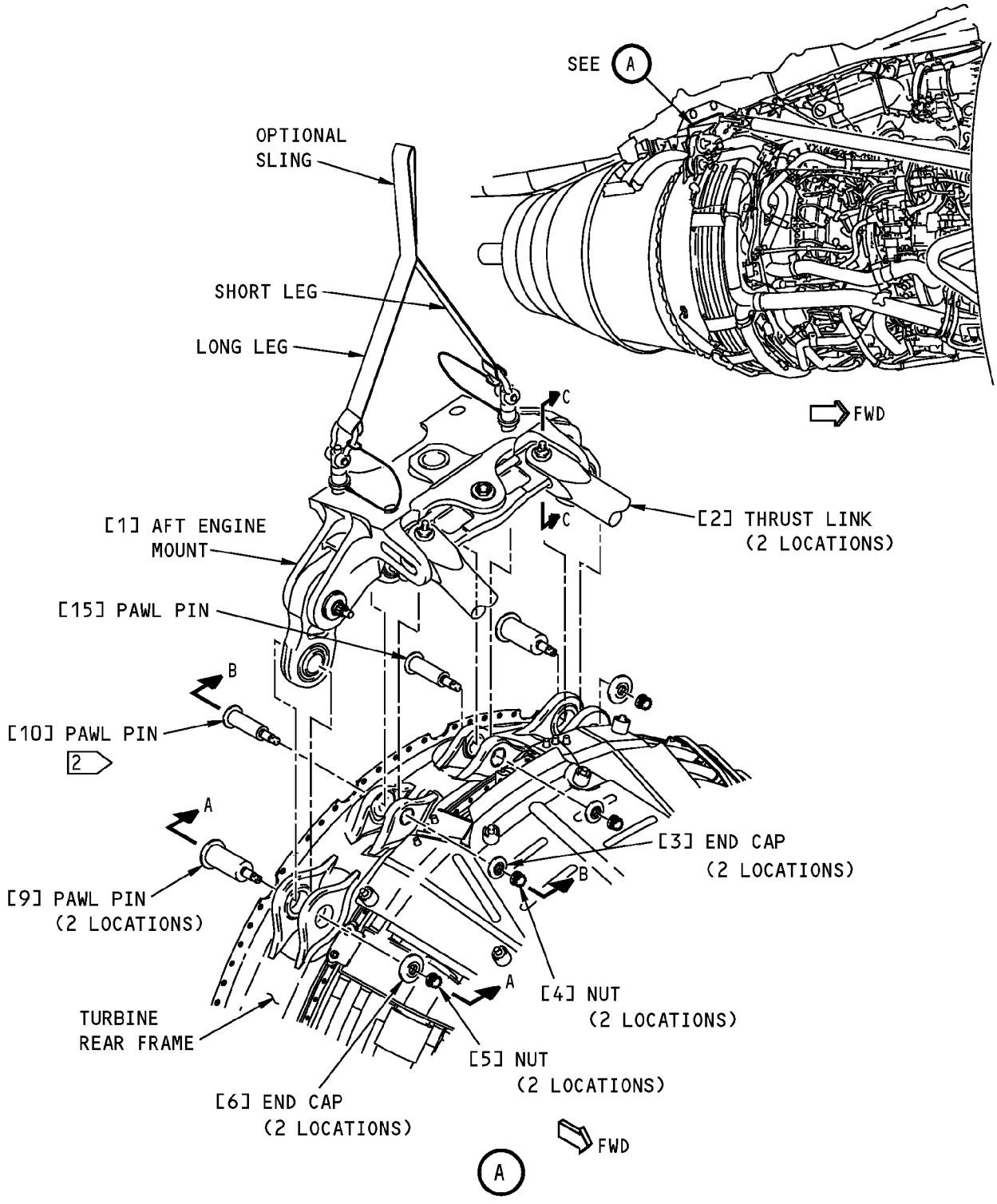
2) PAWL PINS WITH A COTTER PIN;

Remove the cotter pin before you remove the nut [4].

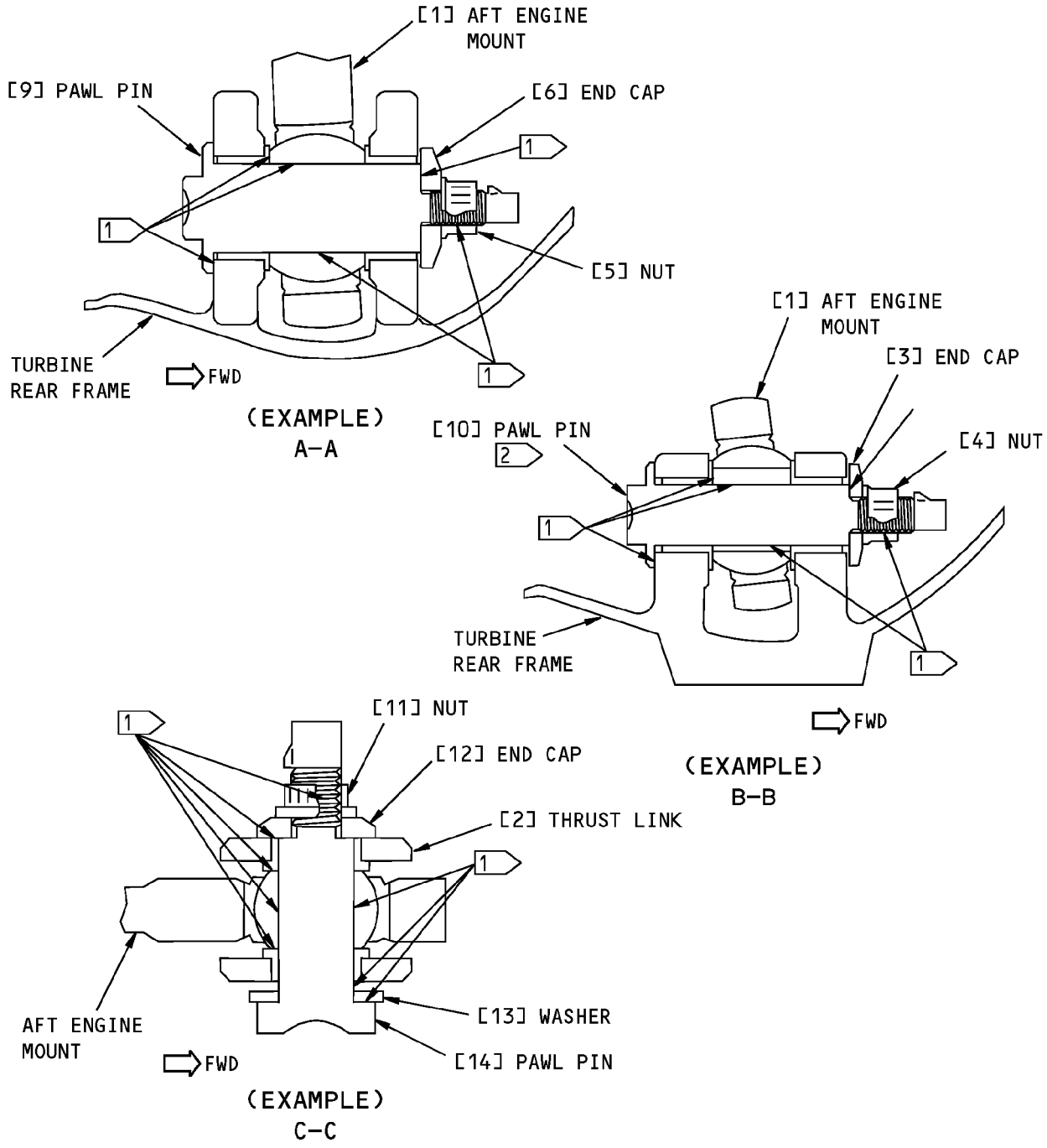
(b) Remove the two nuts [5], end caps [6] and pawl pins [9] from the aft engine mount [1] at the two outer locations.

(c) Remove the aft engine mount [1].

END OF TASK



Aft Engine Mount Installation
Figure 401 (Sheet 1 of 2)/71-21-03-990-801-F00



1 APPLY ANTI-SEIZE COMPOUND AS INDICATED.

2 PAWL PIN CAN TURN WITH HAND PRESSURE AFTER INSTALLATION.

Aft Engine Mount Installation
Figure 401 (Sheet 2 of 2)/71-21-03-990-801-F00

TASK 71-21-03-400-801-F00

3. Aft Engine Mount Installation

(Figure 401)

A. References

Reference	Title
71-00-02-400-801-F00	Power Plant Installation (P/B 401)

B. Tools/Equipment

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

Reference	Description
SPL-2107	Fixture - Lift, CFM56-7 Engine Aft Mount (Part #: C71024-1, Supplier: 81205, A/P Effectivity: 737-600, -700, -700C, -700ER, -700QC, -800, -900, -900ER, -BBJ)

C. Consumable Materials

Reference	Description	Specification
D00006	Compound - Antiseize Pure Nickel Special - Never-Seez NSBT-8N	MIL-PRF-907F

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Mount	71-21-03-01-040	HAP 001, 006, 007
		71-21-03-01-042	HAP 002-005
		71-21-03-02-035	HAP 008-011
		71-21-03-04-035	HAP 012, 013, 015-026, 028-054, 101-999

E. Location Zones

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

F. Install the Aft Engine Mount

SUBTASK 71-21-03-480-002-F00

(1) If you use the optional sling, install the fixture, SPL-2107.

(a) Refer to the Removal Task for the steps to install the sling.

SUBTASK 71-21-03-212-001-F01

(2) Do a check of the assembled aft engine mount for the correct installation of the center link:

(a) Look at the aft face of the center link.

HAP 001-013, 015-026, 028-030 PRE SB 737-71A1462

(b) UNMARKED CENTER LINK WITHOUT POCKETS;

Look at the center bearing for loader relief slot.

1) The loader relief slots of the center bearing should be on the aft face of the center link.

2) The loader relief slots are located 180 degrees apart and are used to install the spherical bearing in the bearing race.

(c) UNMARKED CENTER LINK WITH POCKETS;

Look at the pockets between the center bearing and the outer bearings. The larger pocket should be on the left side on the aft face of the center link.

1) The loader relief slots of the center bearing should be on the aft face of the center link.

HAP 031-054, 101-999; HAP 001-013, 015-026, 028-030 POST SB 737-71A1462

(d) MARKED CENTER LINK;

Look for the AFT mark on the left side of the center link.

1) Look for the L mark on the left side and look for the R mark on the right side.

HAP ALL

(e) If the center link installation is not correct, remove and re-install the center link.

SUBTASK 71-21-03-640-001-F00

(3) Apply Never-Seez NSBT-8N compound, D00006 to the threads, shanks, and below the heads of the pins and to bushings, bearings, and bores (Views A-A, B-B, and C-C).

SUBTASK 71-21-03-420-001-F00

WARNING: BE CAREFUL WHEN YOU MOVE THE AFT ENGINE MOUNT. BECAUSE THE AFT ENGINE MOUNT WEIGHS APPROXIMATELY 60 POUNDS, INJURY TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR

(4) Do these steps to install the aft engine mount [1]:

NOTE: When you install the end caps [6], make sure the flat side of the end cap is against the pin shoulder. You can apply the torque to the nut [5] or the head of the pin [9].

(a) Put the aft engine mount [1] on the turbine rear frame.

(b) Install the two pawl pins [9], end caps [6], and nuts [5] at the outer locations.

NOTE: Make sure that no preload is applied when the pawl pins [9] are installed.

1) Tighten the the nuts [5] to 440-650 pound-inches (50-70 Newton meters).

2) PAWL PINS WITH A SPRING LOADED PAWL;

Make sure the spring loaded pawl is in the extended position after you tighten the nut [5].

3) PAWL PINS WITH A COTTER PIN;

Install the cotter pin.

(c) Install the pawl pins [10] and [15] and the two end caps [3] and nuts [4] at the inner locations.

NOTE: The fit for pawl pin [10] is looser than the fit for pawl pin [15]. The pawl pan [10] is smaller than pawl pin [15] in diameter. Make sure that no preload is applied when the pawl pins are installed.

1) If a preload is necessary, make sure to do the above check of the aft mount for the correct installation of the center link.

2) Tighten the the nuts [4] to 440-650 pound-inches (50-70 Newton meters).

3) PAWL PINS WITH A SPRING LOADED PAWL;

Make sure the spring loaded pawl is in the extended position after you tighten the nut [4].

4) PAWL PINS WITH A COTTER PIN;

Install the cotter pin.

SUBTASK 71-21-03-080-001-F00

(5) If you use the optional sling, remove the sling.

SUBTASK 71-21-03-420-002-F00

(6) Do these steps to connect the two thrust links [2] to the aft engine mount [1]:

(a) Put the thrust links [2] on the aft engine mount [1].

(b) Install the pawl pins [14], washers [13], end caps [12] and nuts [11].

1) Tighten the the nuts [11] to 290-510 pound-inches (32.8-57.6 Newton meters).

2) PAWL PINS WITH A SPRING LOADED PAWL;

Make sure the spring-loaded pawl is in the extended position after you tighten the nut [11].

3) PAWL PINS WITH A COTTER PIN;

Install the cotter pin.

G. Put the Airplane Back To Its Usual Condition

SUBTASK 71-21-03-840-002-F00

(1) Do this task: Power Plant Installation, TASK 71-00-02-400-801-F00.

——————— END OF TASK ———————

NACELLE WIRING HARNESSES - INSPECTION/CHECK

1. General

A. This procedure has two tasks:

(1) The check for corrosion of the Electronic Engine Control (EEC) connectors at the strut seal rib (inboard).

(2) The check for corrosion of the EEC connectors at the wing-body and the strut seal rib (outboard).

B. Use this procedure if either of these service bulletins are not done:

(1) 737-800 AIRPLANES PRE-SB 73-1015

TASK 71-51-00-210-801-F00

2. EEC Connector Check at the Strut Seal Rib (Inboard)

(Figure 601, Figure 602)

A. General

(1) This task is a check for corrosion of these Electronic Engine Control (EEC) connectors at the strut seal rib (inboard):

(a) For Engine 1;

D30040 and D30082.

(b) For Engine 2;

D30140 and D30182.

(c) Refer to the references for the connectors (WDM 73-21-11) and bracket locations (WDM 91-04-13).

B. References

Reference	Title
27-81-00-080-801	Leading Edge Flap and Slat Locks Removal (P/B 201)
27-81-00-480-801	Leading Edge Flap and Slat Locks Installation (P/B 201)
27-81-00-860-803	Leading Edge Flaps and Slats Extension (P/B 201)
27-81-00-860-804	Leading Edge Flaps and Slats Retraction (P/B 201)
SWPM Ch 20	Standard Wiring Practices Manual
WDM 73-21-11	Wiring Diagram Manual
WDM 91-04-13	Wiring Diagram Manual

C. Consumable Materials

Reference	Description	Specification
G00009	Compound - Organic Corrosion Inhibiting	BMS3-23

D. Location Zones

Zone	Area
430	Subzone - Engine 1, Nacelle Strut
440	Subzone - Engine 2, Nacelle Strut

E. Access Panels

Number	Name/Location
511AB	Inboard Leading Edge, Lower Removable Panel
611AB	Inboard Leading Edge, Lower Removable Access Panel

F. Procedure

SUBTASK 71-51-00-010-001-F00

(1) To get access to the electrical connectors, do these steps:

(a) Do this task: Leading Edge Flaps and Slats Extension, TASK 27-81-00-860-803.

(b) Do this task: Leading Edge Flap and Slat Locks Installation, TASK 27-81-00-480-801.

(c) For Engine 1, do this task:

Open the applicable access panel:

Number	Name/Location
511AB	Inboard Leading Edge, Lower Removable Panel

(d) For Engine 2, do this task:

Open the applicable access panel:

Number	Name/Location
611AB	Inboard Leading Edge, Lower Removable Access Panel

SUBTASK 71-51-00-210-001-F00

(2) Find these EEC connectors on the strut seal rib (inboard):

(a) For Engine 1;

D30040 and D30082.

(b) For Engine 2;

D30140 and D30182.

SUBTASK 71-51-00-210-002-F00

(3) Visually examine the connectors for corrosion.

(a) Use a mirror to see behind the connector and backshell.

(b) Look for these signs of corrosion:

1) White to grayish powder (corrosion product)

2) Pits on the connector backshell

3) Blisters or lifted areas of the plating.

(c) Corrosion on the backshell shoulder is permitted if the backshell support for the saddle clamp is not weak.

(d) Corrosion in the termination area is not acceptable for these conditions:

1) The shield pigtails are loose below the band.

2) The pits go through the backshell body.

3) The blisters of the plating show base metal attack.

4) The corrosion covers one or more pigtails where they enter the band.

a) Make sure the pigtail touches the backshell (preferred) or touches the band (sufficient).

5) The full circumference of the termination area shows corrosion.

(e) If the corrosion found is more than the limits, do these steps:

1) Replace the backshell or the wire bundle in no more than 10 cycles (SWPM Ch 20).

2) Do this task: EEC Connector Check at the Wing-Body and Strut Seal Rib (Outboard), TASK 71-51-00-210-802-F00.

(f) If the corrosion is less than the limits or not found, do these steps:

1) If there is corrosion, remove what you can with a brush.

2) Apply corrosion inhibiting compound, G00009 to the shields, band and backshell.

3) Apply compound to all backshells that you examined.

SUBTASK 71-51-00-860-001-F00

(4) To put the airplane back to its usual condition, do these steps:

(a) For engine1, do this task;

Close the applicable access panel:

Number	Name/Location
511AB	Inboard Leading Edge, Lower Removable Panel

(b) For engine2, do this task;

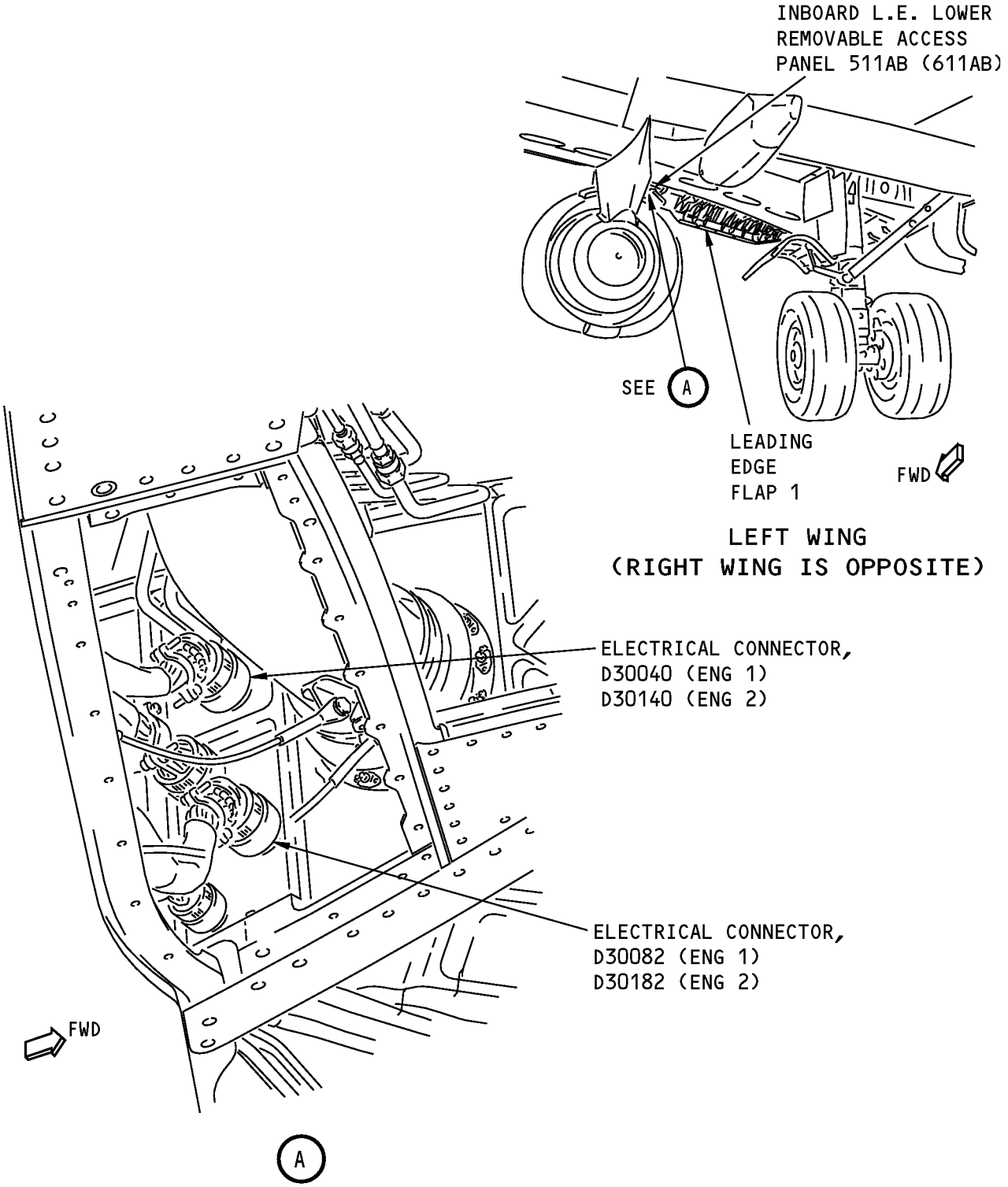
or close this access panel:

Number	Name/Location
611AB	Inboard Leading Edge, Lower Removable Access Panel

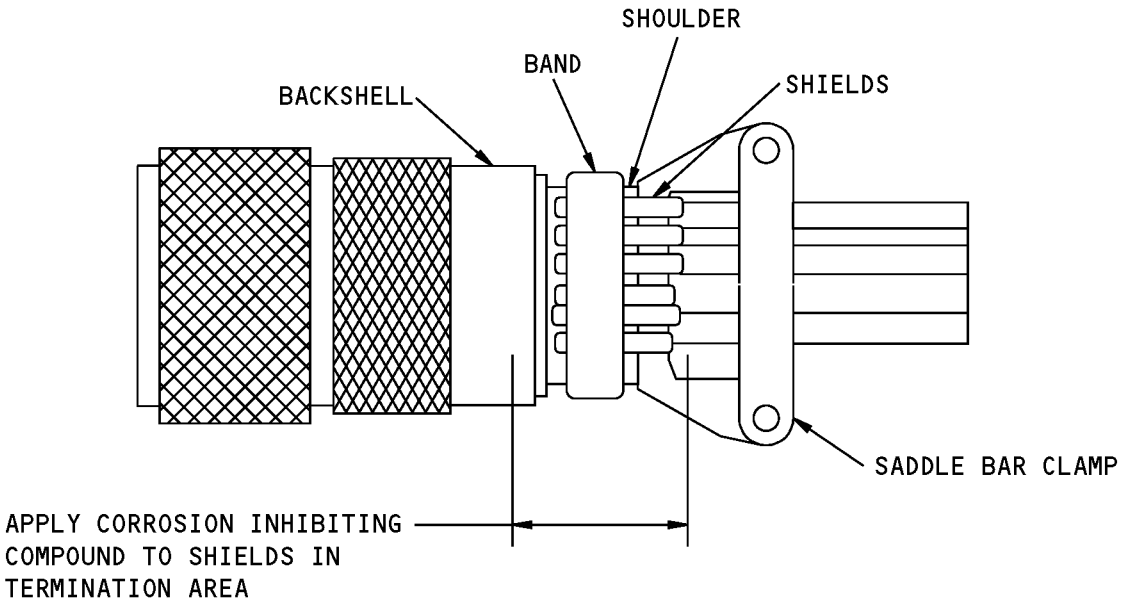
(c) Do this task: Leading Edge Flap and Slat Locks Removal, TASK 27-81-00-080-801.

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

———————— END OF TASK ————————

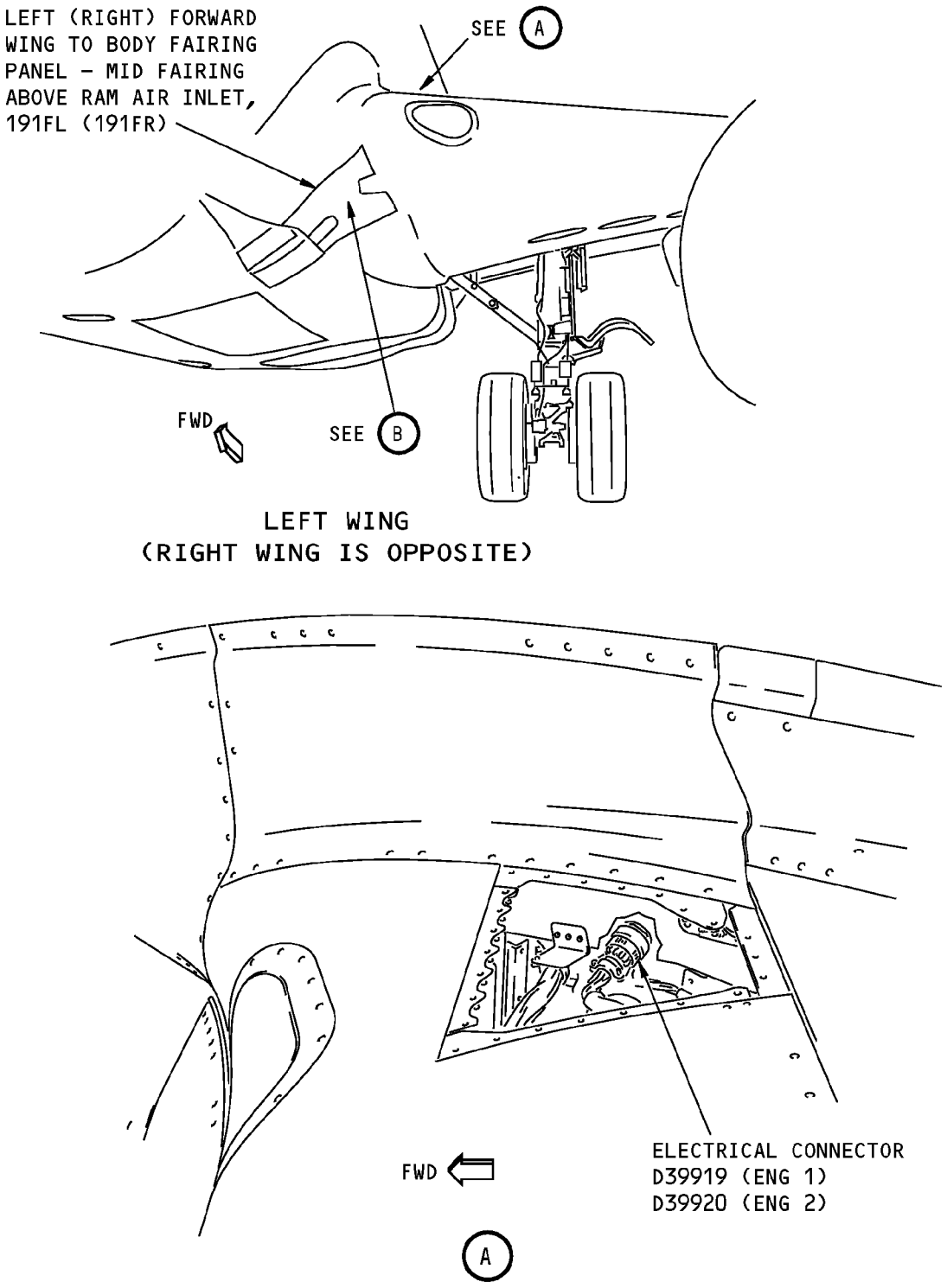


EEC Connector Strut Seal Rib Inboard - Location
Figure 601/71-51-00-990-801-F00

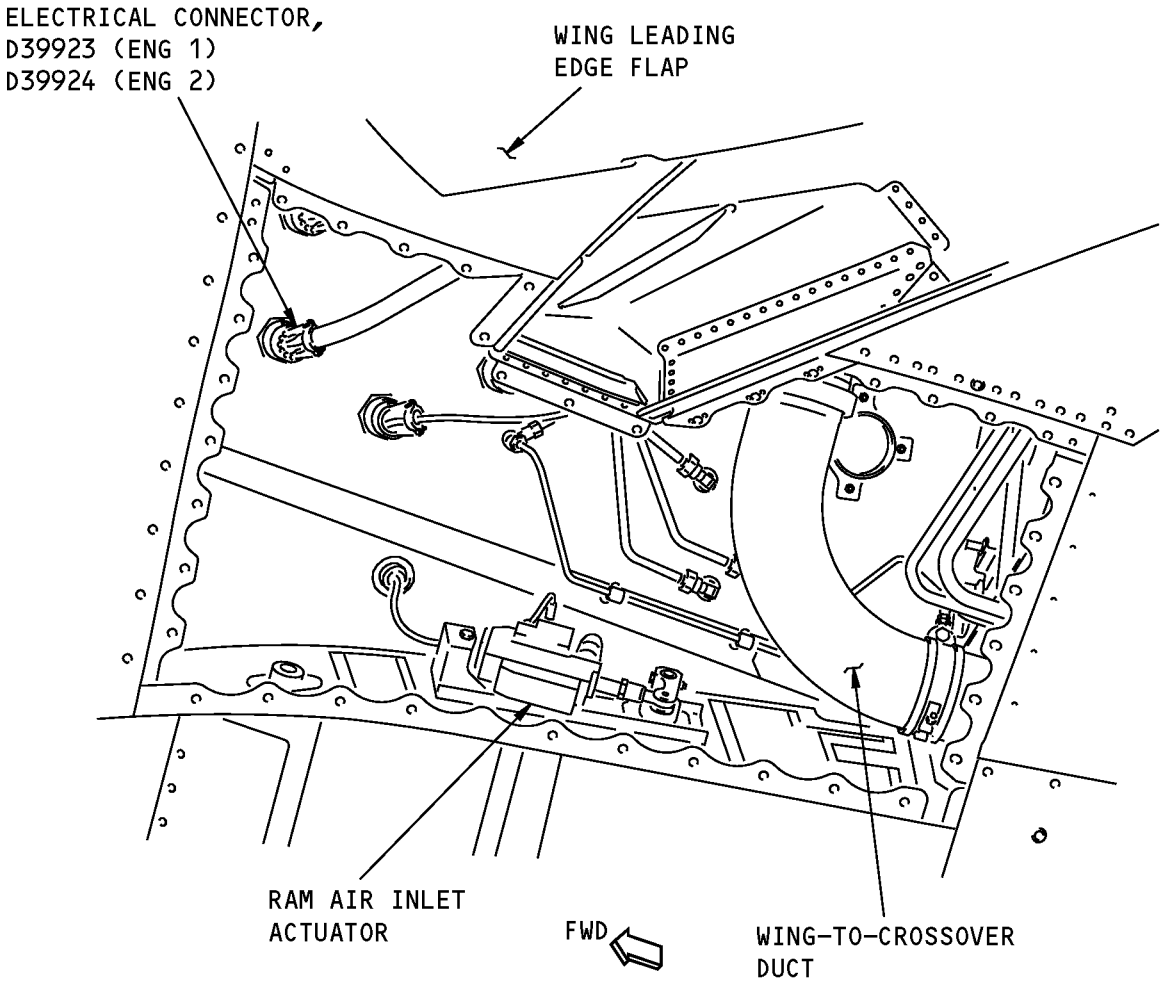


NOTE: STRAIGHT BACKSHELL CONNECTOR SHOWN.
SAME BAND AND SHIELDS INSTALLED ON
45° BACKSHELL CONNECTOR.

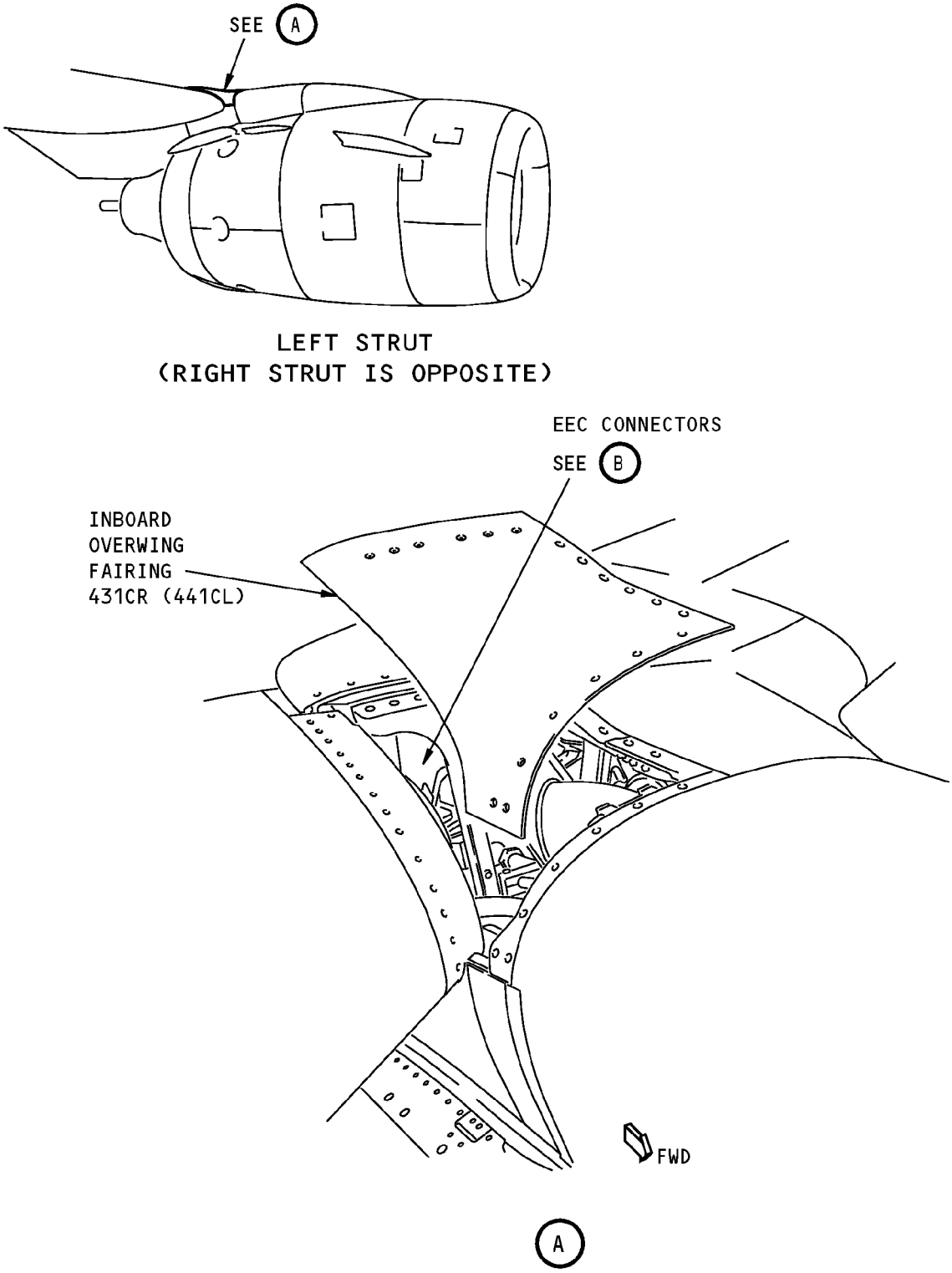
Backshell Connector Corrosion - Inspection
Figure 602/71-51-00-990-802-F00



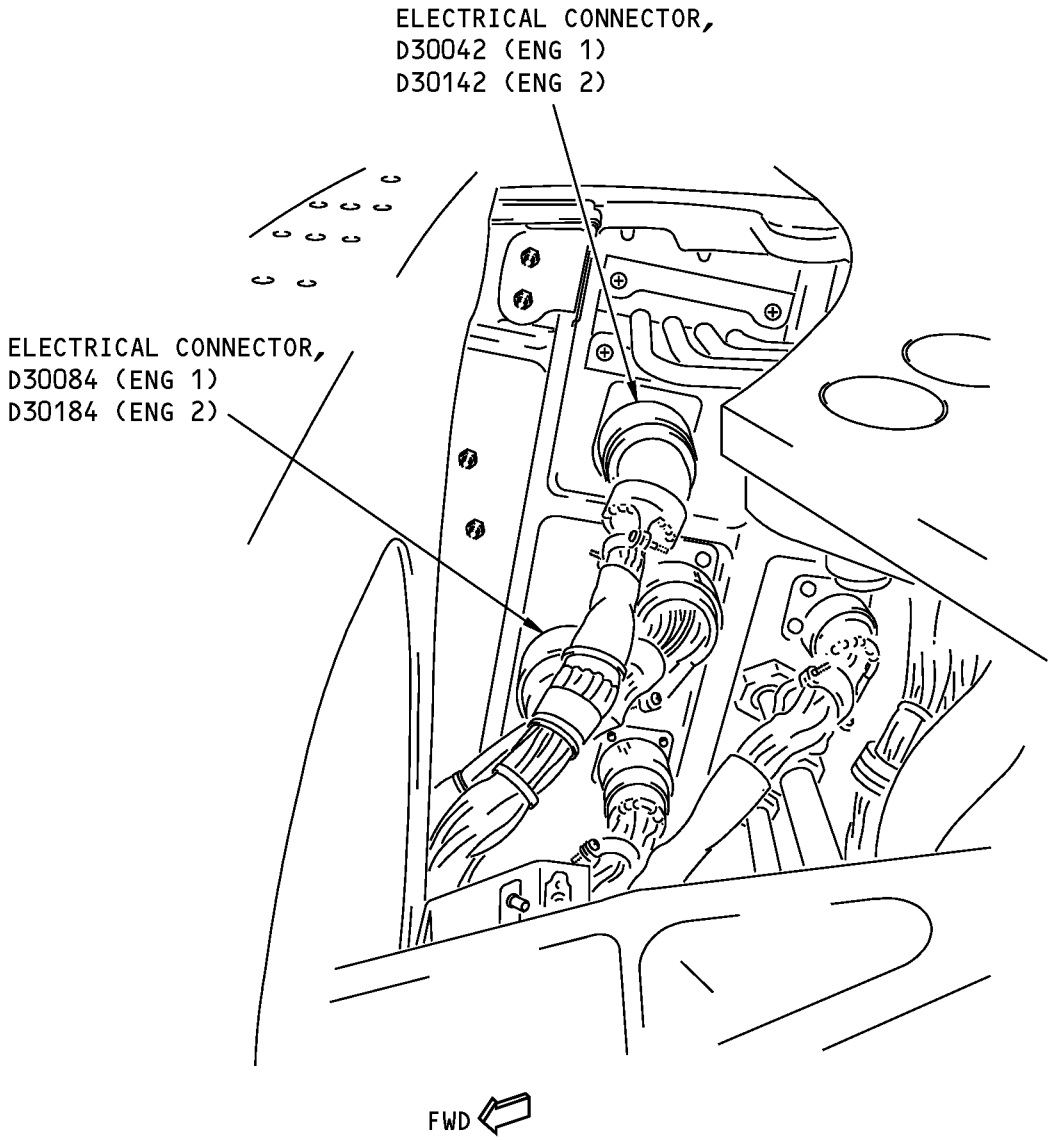
EEC Connectors Wing Body - Location
Figure 603 (Sheet 1 of 2)/71-51-00-990-803-F00



EEC Connectors Wing Body - Location
Figure 603 (Sheet 2 of 2)/71-51-00-990-803-F00



EEC Connectors Strut Seal Rib (Outboard) - Location
Figure 604 (Sheet 1 of 2)/71-51-00-990-804-F00



EEC Connectors Strut Seal Rib (Outboard) - Location
Figure 604 (Sheet 2 of 2)/71-51-00-990-804-F00

TASK 71-51-00-210-802-F00

3. EEC Connector Check at the Wing-Body and Strut Seal Rib (Outboard)

(Figure 602, Figure 603, Figure 604)

A. General

(1) This task is a check for corrosion of these Engine Electronic Control (EEC) connectors at the wing-body and strut seal rib (outboard):

(a) For Engine 1;

wing-body D39919, D39923 and strut D30042, D30084.

(b) For Engine 2;

wing-body D39920, D39924 and strut D30142, D30184.

(c) Refer to the references for the connectors (WDM 73-21-11) and bracket locations (WDM 91-04-13).

B. References

Reference	Title
54-52-03-010-801	Wing Junction Fairing Removal (P/B 401)
54-52-03-410-801	Wing Junction Fairing Installation (P/B 401)
SWPM Ch 20	Standard Wiring Practices Manual
WDM 73-21-11	Wiring Diagram Manual
WDM 91-04-13	Wiring Diagram Manual

C. Consumable Materials

Reference	Description	Specification
G00009	Compound - Organic Corrosion Inhibiting	BMS3-23

D. Location Zones

Zone	Area
191	Lower Wing-To-Body Fairing - Forward of Wing Box
430	Subzone - Engine 1, Nacelle Strut
440	Subzone - Engine 2, Nacelle Strut

E. Access Panels

Number	Name/Location
191FL	Forward Wing To Body Fairing Panel - Mid Fairing, Above Ram Air Inlet
191FR	Forward Wing To Body Fairing Panel - Mid Fairing, Above Ram Air Inlet
431CR	Forward Strut Fairing, Right Overwing Fairing, Strut 1
441CL	Forward Strut Fairing, Left Overwing Fairing, Strut 2
511AT	Inboard Leading Edge, Strakelet Upper Panel
611AT	Inboard Leading Edge, Strakelet Upper Access Panel

F. Procedure

SUBTASK 71-51-00-010-002-F00

(1) Find these EEC connectors at the wing-body:

(a) For engine 1, do these steps:

1) Open these access panels:

Number	Name/Location
191FL	Forward Wing To Body Fairing Panel - Mid Fairing, Above Ram Air Inlet
511AT	Inboard Leading Edge, Strakelet Upper Panel

and .

2) Find the EEC connectors D39919 and D39923.

(b) For engine 2, do these steps:

1) Open these access panels:

Number	Name/Location
191FR	Forward Wing To Body Fairing Panel - Mid Fairing, Above Ram Air Inlet
611AT	Inboard Leading Edge, Strakelet Upper Access Panel

and .

2) Find the EEC connectors D39920 and D39924.

SUBTASK 71-51-00-010-003-F00

(2) Find these EEC connectors at the strut seal rib (outboard):

(a) For engine 1, do these steps:

1) Open this access panel:

Number	Name/Location
431CR	Forward Strut Fairing, Right Overwing Fairing, Strut 1

a) Do this task: Wing Junction Fairing Removal, TASK 54-52-03-010-801.

2) Find the EEC connectors D30042 and D30084.

(b) For engine 2, do these steps:

1) Open this access panel:

Number	Name/Location
441CL	Forward Strut Fairing, Left Overwing Fairing, Strut 2

a) Do this task: Wing Junction Fairing Removal, TASK 54-52-03-010-801.

2) Find the EEC connectors D30142 and D30184.

SUBTASK 71-51-00-210-003-F00

(3) Visually examine the connectors for corrosion.

(a) Use a mirror to see behind the connector and backshell.

(b) Look for these signs of corrosion:

1) White to grayish powder (corrosion product)

2) Pits on the connector backshell

3) Blisters or lifted areas of the plating.

(c) Corrosion on the backshell shoulder is permitted if the backshell support for the saddle clamp is not weak.

(d) Corrosion in the termination area is not acceptable for these conditions:

1) The shield pigtails are loose below the band.
2) The pits go through the backshell body.
3) The blisters of the plating show base metal attack.
4) The corrosion covers one or more pigtails where they enter the band.
   a) Make sure the pigtail touches the backshell (preferred) or touches the band (sufficient).
5) The full circumference of the termination area shows corrosion.

(e) If the corrosion found is more than the limits, replace the backshell or the wire bundle in no more than 10 cycles (SWPM Ch 20).

(f) If the corrosion is less than the limits or not found, do these steps:
1) If there is corrosion, remove what you can with a brush.
2) Apply corrosion inhibiting compound, G00009 to the shields, band and backshell.
3) Apply compound to all backshells that you examined.

SUBTASK 71-51-00-410-001-F00

(4) For engine 1, do this task:

Close the applicable access panel:

Number	Name/Location
431CR	Forward Strut Fairing, Right Overwing Fairing, Strut 1

(a) Do this task: Wing Junction Fairing Installation, TASK 54-52-03-410-801.

(5) For engine 2, do this task:

Close the applicable access panel:

Number	Name/Location
441CL	Forward Strut Fairing, Left Overwing Fairing, Strut 2

(a) Do this task: Wing Junction Fairing Installation, TASK 54-52-03-410-801.

SUBTASK 71-51-00-410-002-F00

(6) For engine 1, do this task:

Close the applicable access panel:

Number	Name/Location
511AT	Inboard Leading Edge, Strakelet Upper Panel

(7) For engine 2, do this task:

Close the applicable access panel:

Number	Name/Location
611AT	Inboard Leading Edge, Strakelet Upper Access Panel

SUBTASK 71-51-00-410-003-F00

(8) For engine 1, do this task:

Close the applicable access panel:

Number	Name/Location
191FL	Forward Wing To Body Fairing Panel - Mid Fairing, Above Ram Air Inlet

(9) For engine 2, do this task:

Close the applicable access panel:

Number	Name/Location
191FR	Forward Wing To Body Fairing Panel - Mid Fairing, Above Ram Air Inlet

END OF TASK

NACELLE WIRING HARNESSES - REMOVAL/INSTALLATION

1. General

A. This procedure has two tasks:

(1) The removal of the nacelle wiring harnesses (MW0301, MW0302, MW0303, MW0304, MW0312 and MW0313 harnesses).

(2) The installation of the nacelle wiring harnesses (MW0301, MW0302, MW0303, MW0304, MW0312 and MW0313 harnesses).

TASK 71-51-03-000-801-F00

2. Nacelle Wiring Harnesses Removal

A. General

(1) The nacelle wiring harnesses are the MW0301, MW0302, MW0303, MW0304, MW0311, MW0312 and MW0313 harnesses.

(a) To remove the MW0311 harness, do this task: 3 O'clock Strut Harness Removal, TASK 73-21-06-000-802-F00

(2) Make sure you install protective covers on all electrical connectors and receptacles.

(3) For this procedure, a nacelle wiring harness will be referred to as a harness.

(4) You can remove one or more harnesses at a time. The removal procedure for each harness is equivalent.

B. References

Reference	Title
24-22-00-860-812	Remove Electrical Power (P/B 201)
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
73-21-06-000-802-F00	3 O'clock Strut Harness Removal (P/B 401)

C. Location Zones

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

D. Prepare for Removal

SUBTASK 71-51-03-010-001-F00

(1) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 71-51-03-860-001-F00

(2) Do this task: Remove Electrical Power, TASK 24-22-00-860-812.

E. Remove the Nacelle Wiring Harness

SUBTASK 71-51-03-020-001-F00

(1) To remove the MW0301 harness [1], do these steps (Figure 401):

(a) Find the MW0301 harness [1] on the engine.

(b) Disconnect the harness from these components:

1) The service disconnect panel on the right side of the fan cowl support beam D30212 (D30412), DP0112.

2) The J1 receptacle on the aft side of the EEC, DP0101

3) Ignition Box 1, DP0102

4) The A/C receptacle on the N1 Speed Sensor, DP0103.

SUBTASK 71-51-03-020-002-F00

(2) To remove the MW0302 harness [11], do these steps (Figure 402):

(a) Find the harness [11] on the engine.

(b) Disconnect the harness from these components:

1) The service disconnect panel on the right side of the fan cowl support beam D30256 (D30456), DP0256

2) The J2 receptacle on the aft side of the EEC, DP0202

3) Ignition Box 2, DP0201.

SUBTASK 71-51-03-020-003-F00

(3) To remove the MW0303 harness [21], do these steps (Figure 403):

(a) Find the MW0303 harness [21]on the engine.

(b) Disconnect the harness from these components:

1) The service disconnect panel on the right side of the fan cowl support beam D30224 (D30424), DP0324

2) The J3 receptacle on the aft side of the EEC, DP0303.

SUBTASK 71-51-03-020-004-F00

(4) To remove the MW0304 harness [31], do these steps (Figure 404):

(a) Find the MW0304 harness [31] on the engine.

(b) Disconnect the harness from these components:

1) The service disconnect panel on the right side of the fan cowl support beam D30260 (D30460), DP0460

2) The J4 receptacle on the aft side of the EEC, DP0404.

SUBTASK 71-51-03-020-012-F00

(5) To remove the MW0312 harness [41], do these steps (Figure 405):

(a) Find the MW0312 harness [41] on the engine.

(b) Disconnect the harness from these components:

1) The service disconnect panel on the left side of the fan cowl support beam D30234 (D30434), DP1234

2) The Start Valve, DP1202

3) The N2 Speed Sensor, DP1201

4) The IDG, DP1205 and DP1206

5) The EDP, DP1204

6) The HMU, DP1203 and DP1207.

SUBTASK 71-51-03-020-013-F00

(6) To remove the MW0313 harness [51], do these steps (Figure 406):

(a) Find the MW0313 harness [51] on the engine.

(b) Disconnect the harness from these components:

1) The service disconnect panel on the right side of the fan cowl support beam D30228 (D30428), DP1328

2) The inlet cowl TAI valve, DP1302 and DP1303

3) The oil quantity transmitter, DP1301

4) The Number 1 Bearing Vibration Sensor, found aft of the oil tank and above the engine nameplate, DP1304.

SUBTASK 71-51-03-010-002-F00

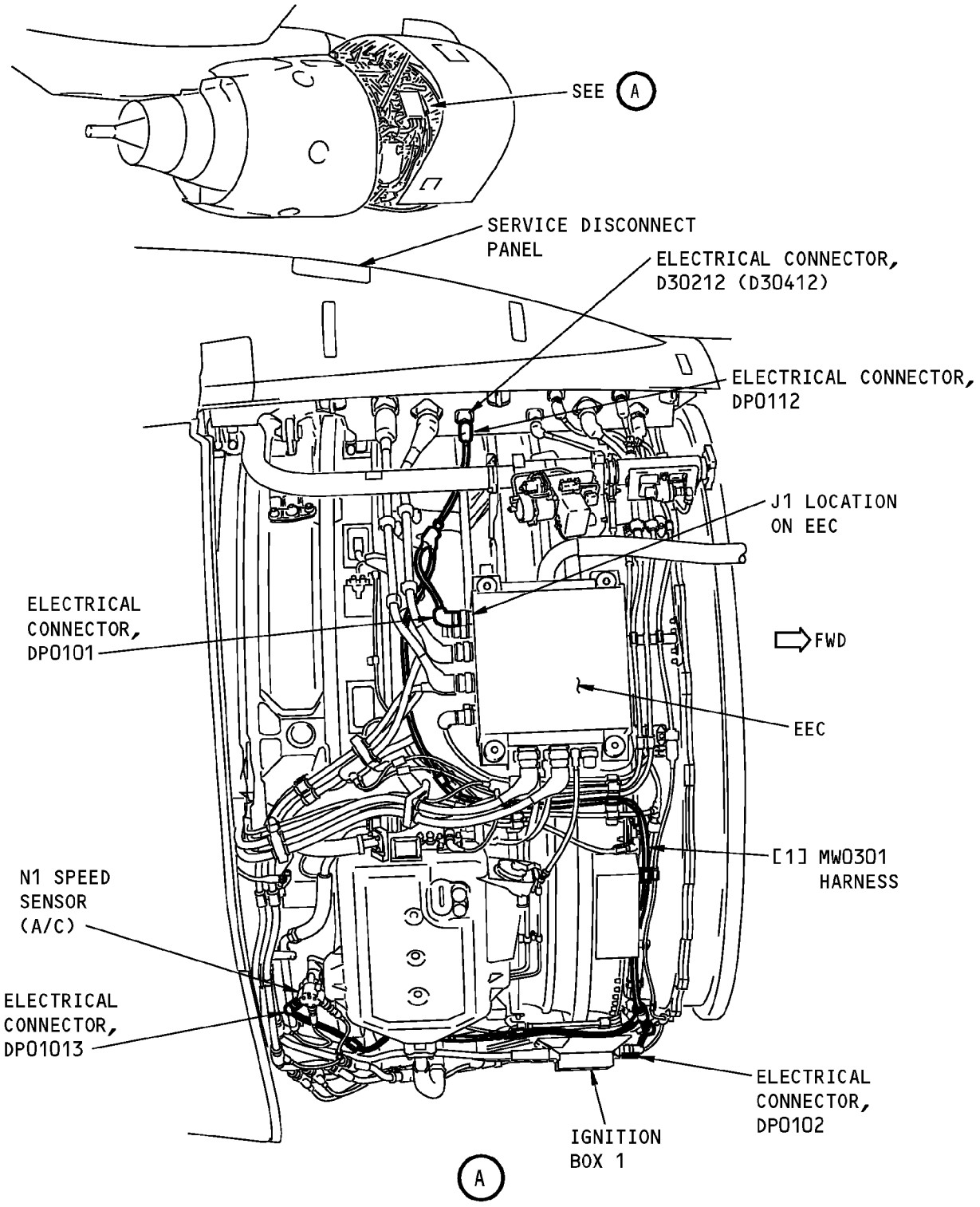
(7) Disengage the harness you want to remove from its attach points.

NOTE: The attach points can be quarter-turn clamps, clips, clamp blocks, "P-clamps" or a combination of the three.

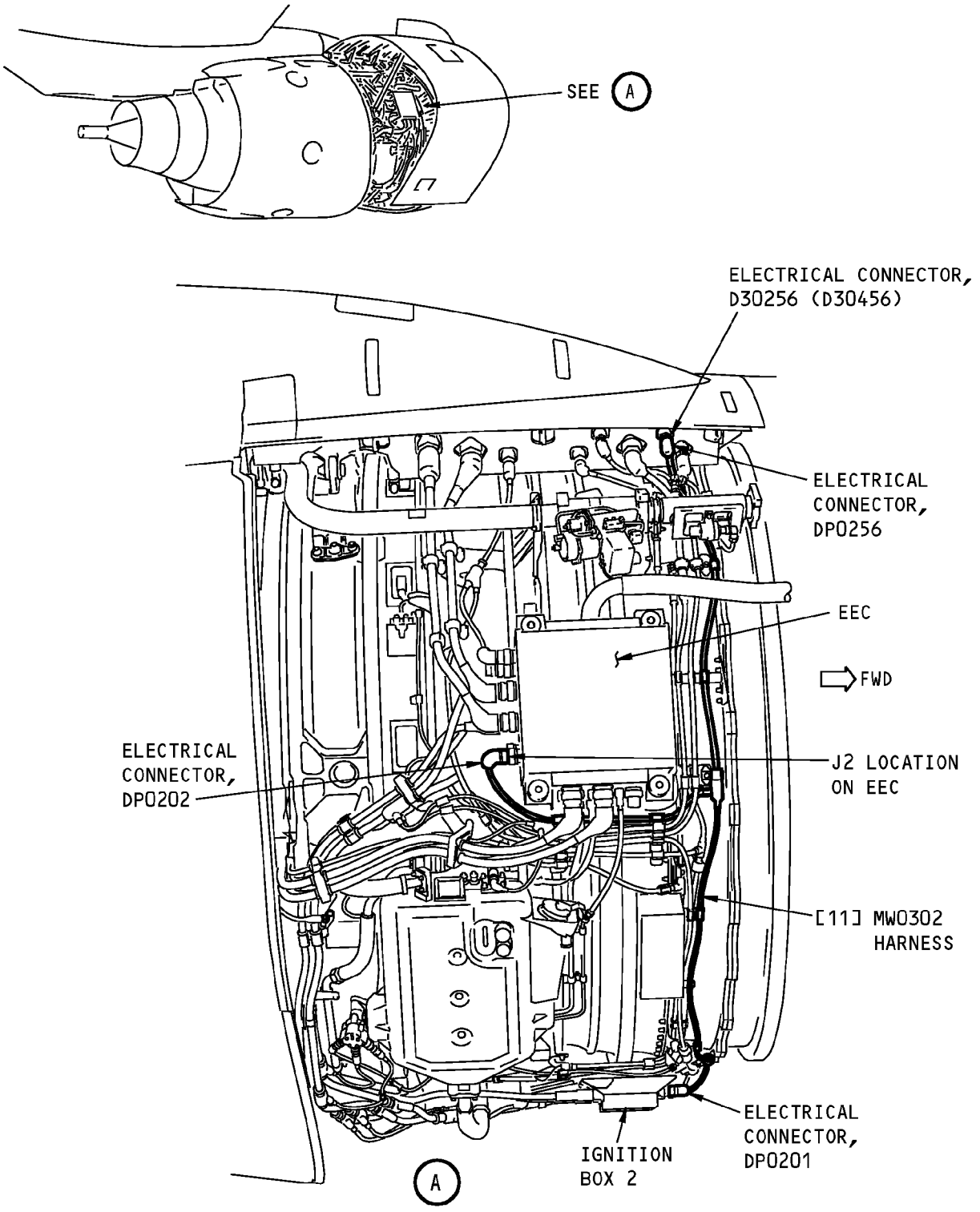
SUBTASK 71-51-03-010-003-F00

(8) Remove the harness from the engine.

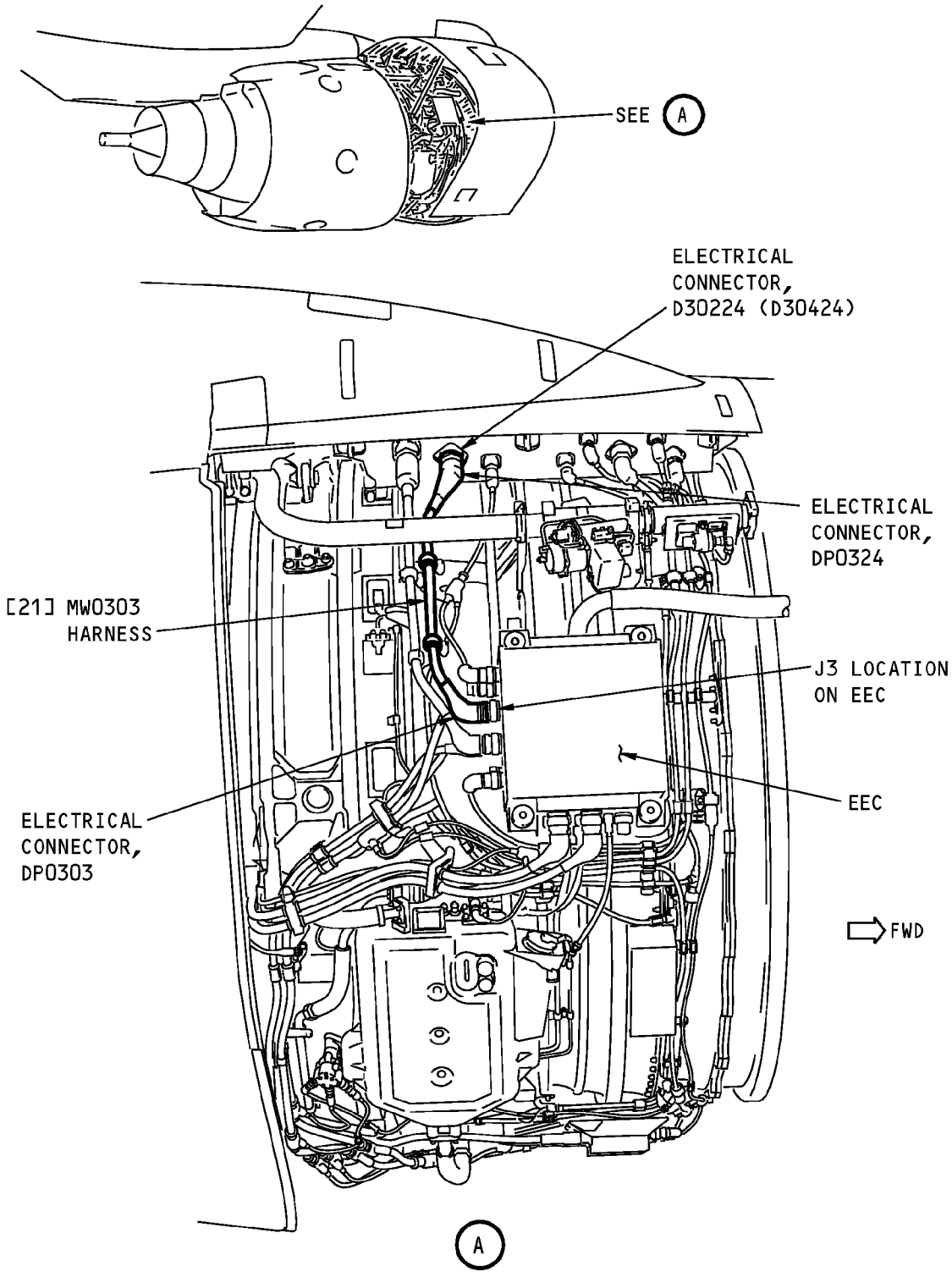
END OF TASK



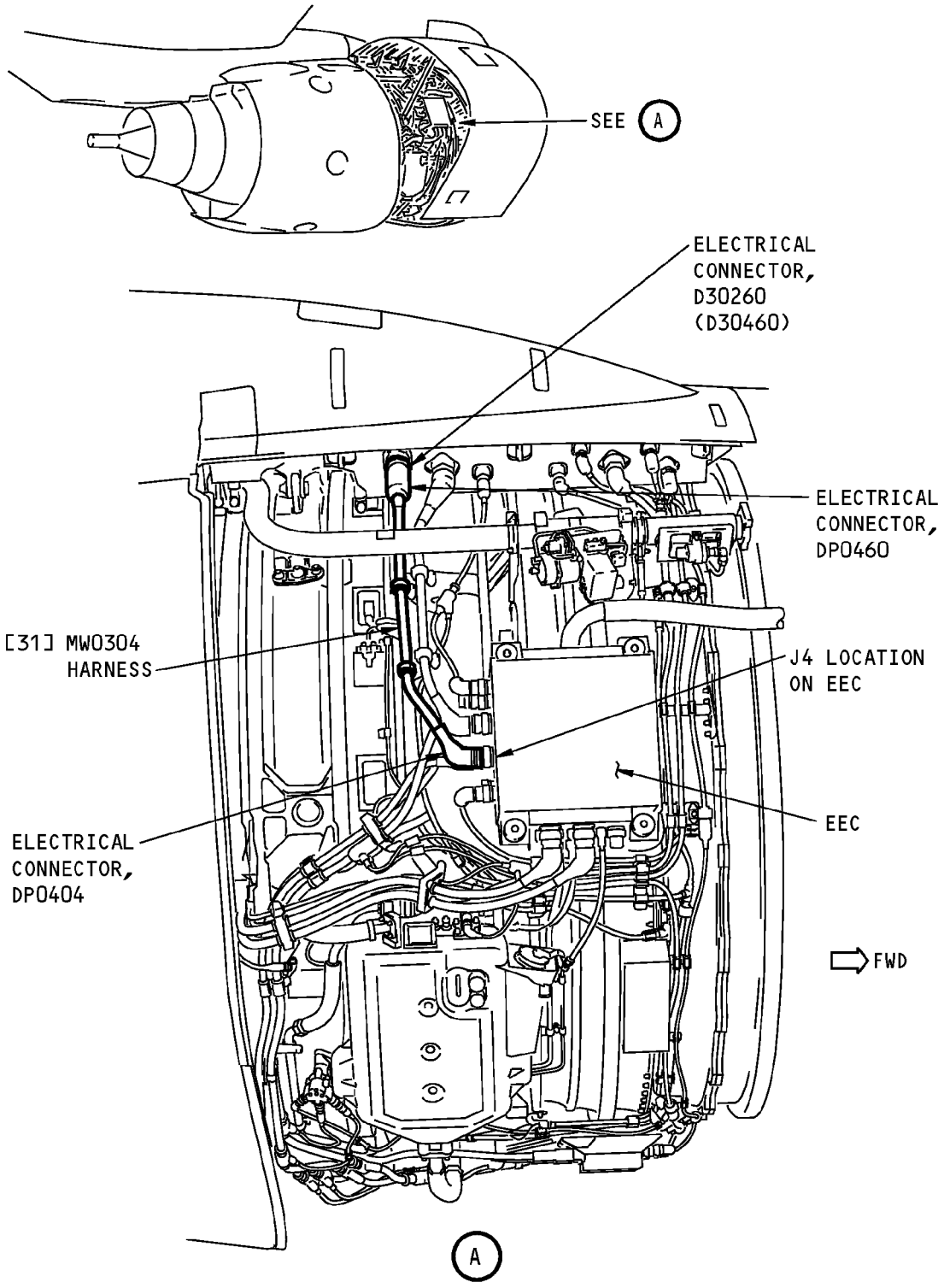
MW0301 Nacelle Wiring Harness Installation
Figure 401/71-51-03-990-801-F00



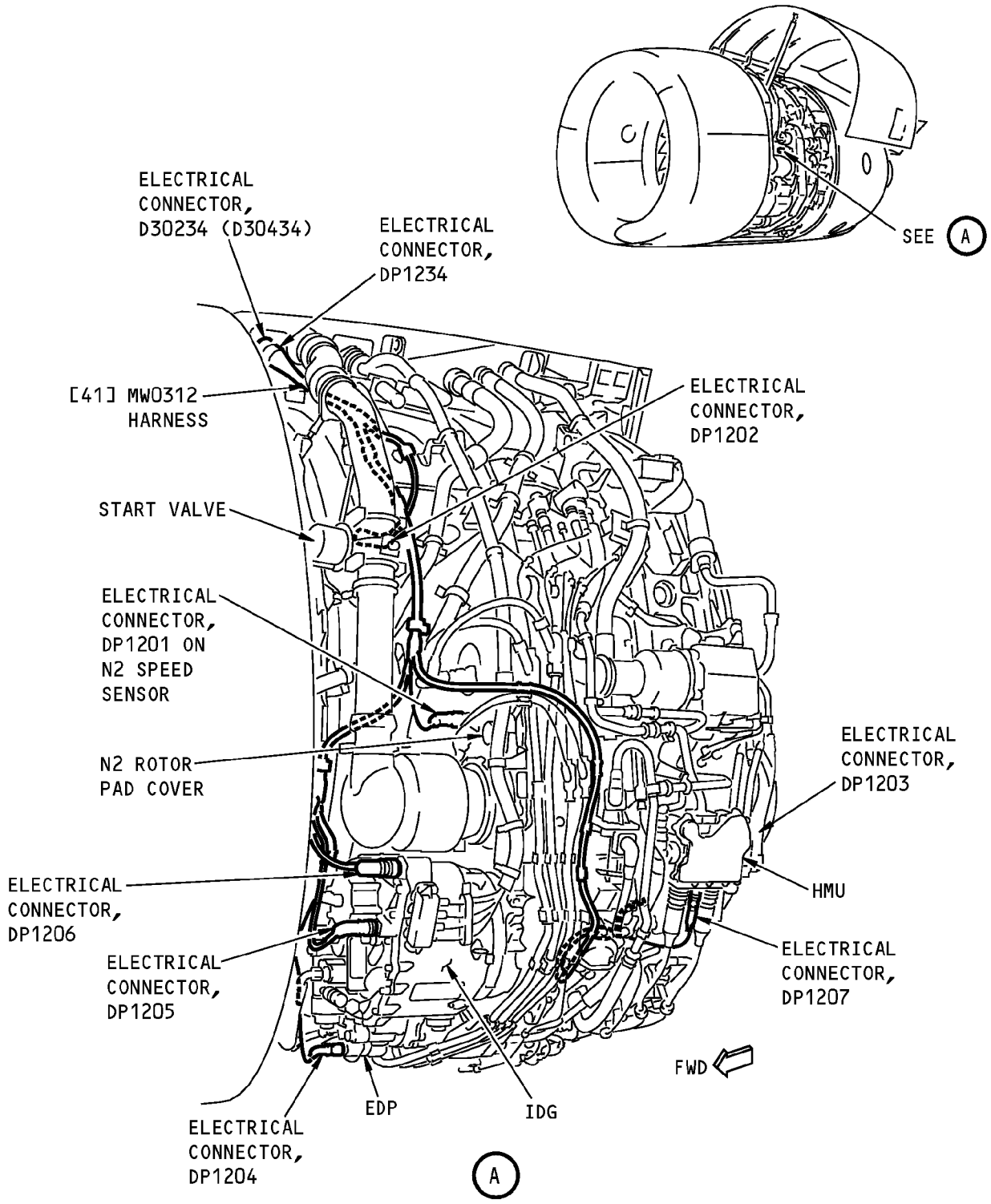
MW0302 Nacelle Wiring Harness Installation
Figure 402/71-51-03-990-802-F00



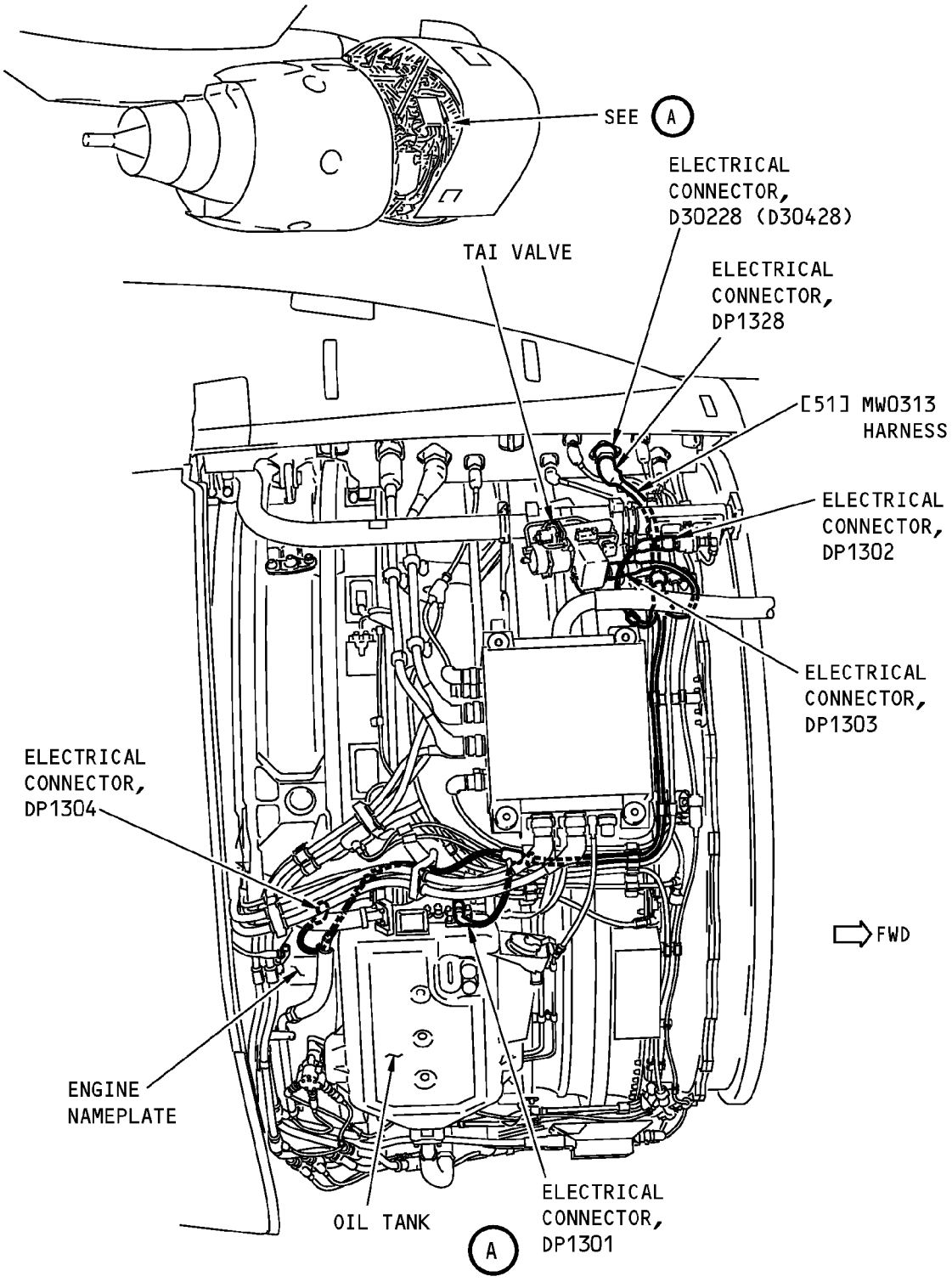
MW0303 Nacelle Wiring Harness Installation
Figure 403/71-51-03-990-803-F00



MW0304 Nacelle Wiring Harness Installation
Figure 404/71-51-03-990-804-F00



MW0312 Nacelle Wiring Harness
Figure 405/71-51-03-990-805-F00



MW0313 Nacelle Wiring Harness Installation
Figure 406/71-51-03-990-806-F00

TASK 71-51-03-400-801-F00

3. Nacelle Wiring Harnesses Installation

A. General

(1) The nacelle wiring harnesses are the MW0301, MW0302, MW0303, MW0304, MW0311, MW0312 and MW0313 harnesses.

(a) To install the MW0311 harness, do this task: 3 O'clock Strut Harness Installation, TASK 73-21-06-400-802-F00

(2) For this procedure, a nacelle wiring harness will be referred to as a harness.

(3) You can install one or more harnesses at a time. The installation procedure for each harness is equivalent.

(4) Make sure you correctly connect, clean, and remove protective covers from all electrical connectors and receptacles.

B. References

Reference	Title
24-22-00-860-811	Supply Electrical Power (P/B 201)
71-00-00-800-811-F00	Power Plant Test Reference Table (P/B 501)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
73-21-06-400-802-F00	3 O'clock Strut Harness Installation (P/B 401)

C. Consumable Materials

Reference	Description	Specification
D00601 [CP2101]	Grease - Graphite, High Temperature	SAE AMS 2518

D. Expendables/Parts

AMM Item	Description	AIPC Reference	AIPC Effectivity
1	Harness	71-51-03-01-070	HAP ALL
11	Harness	71-51-03-01-060	HAP ALL
21	Harness	71-51-03-01-075	HAP ALL
31	Harness	71-51-03-01-080	HAP ALL
41	Harness	71-51-03-01-014	HAP ALL
51	Harness	71-51-03-01-065	HAP ALL

E. Location Zones

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

F. Prepare for the Installation

SUBTASK 71-51-03-020-007-F00

(1) Do these steps to prepare the attach hardware for the harness installation:

(a) Examine all clamps to make sure they are not damaged.

1) Replace all damaged clamps.

(b) If it is necessary, lubricate the threads of the bolts and nuts with grease, D00601 [CP2101] before their installation.

G. Install the Nacelle Wiring Harnesses

SUBTASK 71-51-03-420-001-F00

(1) To install the MW0301 harness [1], do these steps (Figure 401):

(a) Put the MW0301 harness [1] on the engine.

(b) Connect the harness to these components:

1) The service disconnect panel on the right side of the fan cowl support beam D30212 (D30412), DP0112

2) The J1 receptacle on the aft side of the EEC, DP0101

3) Ignition Box 1, DP0102

4) The A/C receptacle on the N1 Speed Sensor, DP0103.

SUBTASK 71-51-03-420-002-F00

(2) To install the MW0302 harness [11], do these steps (Figure 402):

(a) Put the MW0302 harness [11] on the engine.

(b) Connect the harness to these components:

1) The service disconnect panel on the right side of the fan cowl support beam D30256 (D30456), DP0256

2) The J2 receptacle on the aft side of the EEC, DP0202

3) Ignition Box 2, DP0201.

SUBTASK 71-51-03-420-003-F00

(3) To install the MW0303 harness [21], do these steps (Figure 403):

(a) Put the MW0303 harness [21] on the engine.

(b) Connect the harness to these components:

1) The service disconnect panel on the right side of the fan cowl support beam D30224 (D30424), DP0324

2) The J3 receptacle on the aft side of the EEC, DP0303.

SUBTASK 71-51-03-420-004-F00

(4) To install the MW0304 harness [31], do these steps (Figure 404):

(a) Put the MW0304 harness [31] on the engine.

(b) Connect the harness to these components:

1) The service disconnect panel on the right side of the fan cowl support beam D30260 (D30460), DP0460

2) The J4 receptacle on the aft side of the EEC, DP0404.

SUBTASK 71-51-03-420-005-F00

(5) To install the MW0312 harness [41], do these steps (Figure 405):

(a) Put the MW0312 harness [41] on the engine.

(b) Connect the harness to these components:

1) The service disconnect panel on the left side of the fan cowl support beam D30234 (D30434), DP1234

2) The Start Valve, DP1202

3) The N2 Speed Sensor, DP1201

4) The IDG, DP1205 and DP1206

5) The EDP, DP1204

6) The HMU, DP1203 and DP1207.

SUBTASK 71-51-03-420-006-F00

(6) To install the MW0313 harness [51], do these steps (Figure 406):

(a) Put the MW0313 harness [51] on the engine.

(b) Connect the harness to these components:

(c) The service disconnect panel on the right side of the fan cowl support beam D30228 (D30428), DP1328

(d) The inlet cowl TAI valve, DP1302 and DP1303

(e) The oil quantity transmitter, DP1301.

(f) The Number 1 Bearing Vibration Sensor, found aft of the oil tank and above the engine nameplate, DP1304.

SUBTASK 71-51-03-020-009-F00

(7) Make sure that the connectors are fully engaged and do not move.

SUBTASK 71-51-03-020-010-F00

(8) Make sure the force on the harness is applied equally and the harness is not stressed or torn.

SUBTASK 71-51-03-020-011-F00

(9) Engage the harness in its attach points on the engine.

NOTE: The attach points can be quarter-turn clamps, clips, clamp blocks, "P-clamps" or a combination of the three.

SUBTASK 71-51-03-860-002-F00

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

H. Nacelle Wiring Harness Installation Test

SUBTASK 71-51-03-800-001-F00

(1) Do the tests that are listed in the Power Plant Test Reference Table (TASK 71-00-00-800-811-F00).

I. Put the Airplane Back to Its Usual Condition

SUBTASK 71-51-03-400-001-F00

(1) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

——————— END OF TASK ———————

ENGINE VENTS AND DRAINS - INSPECTION/CHECK

1. General

A. This procedure contains scheduled maintenance task data.

B. This procedure examines the engine vents and drains for leakage.

TASK 71-71-00-200-801-F00

2. Engine Vents and Drains Inspection

A. General

(1) This task estimates the condition of the line replaceable units (LRU) by the rate of fluid leakage at the drains.

(2) Leaks from the drain can occur on an engine that does not operate or during an engine start. These leaks are not unusual, and may stop after the engine operates at minimum idle for five (5) minutes.

(3) This procedures examines the engine and strut drains in these areas:

(a) Below the engine fan case for accessory gearbox (AGB)-mounted and engine core component drains, the forward sump and the service disconnect (strut) drain

(b) Inside the primary plug assembly for the aft sump drain.

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)
28-22-15-710-801	Engine Fuel Feed Manifold - Leak Test (P/B 601)
29-00-00-790-801	Hydraulic System External Leakage Check (P/B 601)
71-00-00-700-801-F00	Test 3A - Idle-Power Leak Check (P/B 501)
71-00-00-700-807-F00	Test 12 - Actuators Test (P/B 501)
71-00-00-700-823-F00	Test 3B - Part-Power Leak Check (P/B 501)
71-00-02-000-801-F00	Power Plant Removal (P/B 401)
71-00-02-400-801-F00	Power Plant Installation (P/B 401)
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
72-60-00-000-801-F00	Magnetic Seal Removal (P/B 201)
72-60-00-000-802-F00	Sealol Seal Removal (P/B 201)
72-60-00-400-801-F00	Magnetic Seal Installation (P/B 201)
72-60-00-400-802-F00	Sealol Seal Installation (P/B 201)
73-11-01-000-801-F00	Fuel Pump Package Removal (P/B 401)
73-11-01-400-801-F00	Fuel Pump Package Installation (P/B 401)
73-11-08-000-801-F00	Burner Staging Valve Removal (P/B 401)
73-11-08-400-801-F00	Burner Staging Valve Installation (P/B 401)
73-21-10-000-801-F00	HMU Removal (P/B 401)
73-21-10-400-801-F00	HMU Installation (P/B 401)
75-21-01-000-801-F00	HPTACC Valve Removal (P/B 401)
75-21-01-400-801-F00	HPTACC Valve Installation (P/B 401)
75-22-04-000-802-F00	LPTACC Valve Removal (P/B 401)
75-22-04-400-802-F00	LPTACC Valve Installation (P/B 401)
75-23-01-000-801-F00	Transient Bleed Valve Removal (P/B 401)

(Continued)

Reference	Title
75-23-01-400-801-F00	Transient Bleed Valve Installation (P/B 401)
75-31-01-000-801-F00	Left VSV Actuator Removal (P/B 401)
75-31-01-000-802-F00	Right VSV Actuator Removal (P/B 401)
75-31-01-400-801-F00	Left VSV Actuator Installation (P/B 401)
75-31-01-400-802-F00	Right VSV Actuator Installation (P/B 401)
75-32-02-000-801-F00	Left VBV Actuator Removal (P/B 401)
75-32-02-000-802-F00	Right VBV Actuator Removal (P/B 401)
75-32-02-400-801-F00	Left VBV Actuator Installation (P/B 401)
75-32-02-400-802-F00	Right VBV Actuator Installation (P/B 401)
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)
79-00-00-200-804-F00	Chip Detectors and Scavenge Screens Inspection (P/B 601)
79-11-01-300-801-F00	Replacement of the Filler Cap Packing or Filler Cap (P/B 801)
79-21-02-000-801-F00	Main Oil/Fuel Heat Exchanger Removal (P/B 401)
79-21-02-400-801-F00	Main Oil/Fuel Heat Exchanger Installation (P/B 401)

C. Tools/Equipment

Reference	Description
STD-203	Container - Oil Resistant, 1 U.S.-Gal (3.8 l)
STD-3941	Container - Calibrated, 1 quart (1 l), oil resistant

D. Location Zones

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

E. Examine the Engine Vents and Drains

SUBTASK 71-71-00-010-001-F00

(1) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 71-71-00-790-001-F00

(2) Do a visual check of the drains for signs of leakage (Figure 601, Figure 602).

NOTE: Leaks from the drain can occur on an engine that does not operate or during an engine start. These leaks are not abnormal, and may stop after the engine operates at idle power for 5 minutes.

SUBTASK 71-71-00-790-002-F00

(3) If there are no signs of leakage, the engine is serviceable.

SUBTASK 71-71-00-790-011-F00

(4) These leakage limits are given in threshold limits and serviceable limits:

(a) For fuel leaks:

1) If the total leakage rate from the drains is less than the threshold limit, you can continue to operate the engine. Maintenance action is not necessary.

2) 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.

3) If the total leakage rate from the drains is more than the serviceable limit, you must do the corrective action.

(b) For oil leaks:

1) 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.

2) If the leakage rate is more than the serviceable limit, maintenance must be done before you operate the engine again.

(c) For hydraulic leaks:

1) If the total leakage rate from the strut drain is more than the serviceable limit, you must do the corrective action.

SUBTASK 71-71-00-790-003-F00

WARNING: DO NOT ENTER THE HAZARD AREAS AROUND THE INLET AND THE EXHAUST DURING ENGINE OPERATION. REFER TO 71-00-00/201 FOR THE DEFINITION OF THE HAZARD AREAS. IF PERSONNEL ENTER THESE AREAS DURING ENGINE OPERATION, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT COULD OCCUR.

(5) If you see signs of leakage, do these steps to identify the source of the leakage and the leakage rate:

(a) Put a 1 U.S.-gal (3.81 l) oil resistant container, STD-203 below the drain you think has leakage.

1) You can install plastic tubes and bottles on the drain.

a) Use a minimum tube length and make sure the connections are sealed.

(b) To identify hydraulic leakage, do this task: Test 3A - Idle-Power Leak Check, TASK 71-00-00-700-801-F00.

1) Record the start time and the stop time.

(c) To identify fuel leakage from a specific fuel component, do one of the tasks that follows: Test 3A - Idle-Power Leak Check, TASK 71-00-00-700-801-F00 or Test 12 - Actuators Test, TASK 71-00-00-700-807-F00.

1) Record the start time and the stop time.

(d) To identify oil leakage, do this task: Test 3B - Part-Power Leak Check, TASK 71-00-00-700-823-F00.

1) Record the start time and the stop time.

(e) Monitor the drains for drops of fluid.

1) If you see leakage, identify the drain location and record the number of drops.

(f) Calculate the total engine operation time.

(g) Calculate the number of drops per minute.

(h) Change the number of drops per minute to cc's per hour.

NOTE: 20 drops are approximately one cc.

(i) Compare the leakage rate with the threshold and serviceable limits for that fluid system drain.

NOTE: Leakage from the drain of the main oil/fuel heat exchanger can be fuel or oil.

NOTE: Leakage from the hydraulic pump AGB pad can be hydraulic fluid or oil.

SUBTASK 71-71-00-790-004-F00

WARNING: DO NOT ENTER THE HAZARD AREAS AROUND THE INLET AND THE EXHAUST DURING ENGINE OPERATION. REFER TO 71-00-00/201 FOR THE DEFINITION OF THE HAZARD AREAS. IF PERSONNEL ENTER THESE AREAS DURING ENGINE OPERATION, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT COULD OCCUR.

(6) If the leakage is more than the threshold or serviceable limit, do these steps again to make sure that the corrective action is necessary:

(a) Put a 1 U.S.-gal (3.81 l) oil resistant container, STD-203 below the drain you think has leakage.

1) You can install plastic tubes and bottles on the drain.

a) Use a minimum tube length and make sure the connections are sealed.

(b) To identify fuel or hydraulic leakage, do this task: Test 3A - Idle-Power Leak Check, TASK 71-00-00-700-801-F00.

1) Record the start time and the stop time.

(c) To identify oil leakage from the oil drains (static), do this task: Test 3A - Idle-Power Leak Check, TASK 71-00-00-700-801-F00.

1) Record the start time and the stop time.

(d) To identify oil leakage from the AGB pad drain (AGB rotating seal), do this task: Test 3B - Part-Power Leak Check, TASK 71-00-00-700-823-F00.

1) Record the start time and the stop time.

(e) Monitor the drain for drops of fluid.

(f) Calculate the total engine operation time.

(g) Calculate the number of drops per minute.

(h) Change the number of drops per minute to cc's per hour.

NOTE: 20 drops are approximately one cc.

(i) Compare the leakage rate with the threshold and serviceable limits for that fluid system drain.

NOTE: Leakage from the drain of the main oil/fuel heat exchanger can be fuel or oil.

NOTE: Leakage from the hydraulic pump AGB pad can be hydraulic fluid or oil.

(j) If the leakage rate is still more than the threshold or serviceable limit, do the corrective action for the applicable drain as given below in this paragraph: Engine Vents and Drains Leakage Limits and Corrective Action.

SUBTASK 71-71-00-790-005-F00

(7) If you find oil leakage from the IDG pad drain, find if the leakage is from the IDG or the AGB:

(a) Do this task: IDG Oil System Static Leak Check, TASK 24-11-00-700-801.

(b) If there is a static leak, then the leakage is from the IDG input shaft seal.

(c) If there is no static leak, then the leakage is from the AGB pad seal.

HAP ALL PRE SB CFM56-7B 73-44

SUBTASK 71-71-00-790-006-F00

(8) If you find leakage from the Burner Staging Valve (BSV)/LPTACC valve drain, do these steps (Figure 603):

NOTE: The BSV and the LPTACC valve have a common drain line. Before you can do the corrective action, you must find which of the two components has the leak. CFMI SB 73-044 deletes BSV and the common drain.

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 REVERSERS (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.

(a) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

(b) Do these steps to isolate the leakage:

1) Remove the nut [2] and bolt [1] from the loop clamp [3] and remove the loop clamp [3].
2) Disconnect the LPTACC drain tube from the BSV drain tube.
3) Put a protective cap on the end of the BSV drain tube.
4) Put a plastic bag on the tube nut of the LPTACC drain tube and tighten it with a plastic tie.

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSER. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(c) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

(d) Do this task: Test 3A - Idle-Power Leak Check, TASK 71-00-00-700-801-F00.

1) Record the start time and the stop time.
2) Run the engine at idle power for ten minutes.

(e) Monitor the drain for drops of fuel.

(f) Calculate the total engine operation time.

(g) Record the number of drops from the BSV drain tube.

(h) Change the number of drops per minute to cc's per hour.

NOTE: 20 drops are approximately one cc.

(i) Do these steps to find the leakage rate from the LPTACC valve:

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 REVERSERS (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.

1) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.
2) Remove the plastic bag from the LPTACC valve drain tube.

3) Put the fuel from the inside of the bag in a 1 quart (1 l) oil resistant calibrated container, STD-3941.

4) Calculate the leakage rate for the LPTACC valve.

(j) Compare the leakage rate with the limits for the LPTACC valve and the BSV.

(k) Do these steps to connect the LPTACC drain tube to the BSV drain tube:

1) Remove the cap from the BSV drain tube.

2) Connect the LPTACC drain tube to the BSV drain tube.

a) Tighten the tube nut to 135-150 inch-pounds (15-16 newton-meters).

3) Install the loop clamp [3] on the LPTACC drain tube with the bolt [1] and nut [2].

a) Tighten the nut [2] to 62-68 inch-pounds (7-8 newton-meters).

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSER. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(l) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

HAP ALL

SUBTASK 71-71-00-410-001-F00

(9) If the fan cowl panels are to be closed, do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

F. Engine Vents and Drains Leakage Limits and Corrective Action

SUBTASK 71-71-00-790-007-F00

(1) Fuel drain system

(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 VSV actuator, these are the tasks:

Left VSV Actuator Removal, TASK 75-31-01-000-801-F00,

Left VSV Actuator Installation, TASK 75-31-01-400-801-F00.

2) For the right VSV actuator, these are the tasks:

Right VSV Actuator Removal, TASK 75-31-01-000-802-F00,

Right VSV Actuator Installation, TASK 75-31-01-400-802-F00.

3) For the left VBV actuator, these are the tasks:

Left VBV Actuator Removal, TASK 75-32-02-000-801-F00,

Left VBV Actuator Installation, TASK 75-32-02-400-801-F00.

4) For the right VBV actuator, these are the tasks:

Right VBV Actuator Removal, TASK 75-32-02-000-802-F00,

Right VBV Actuator Installation, TASK 75-32-02-400-802-F00.

5) For the TBV, these are the tasks:

Transient Bleed Valve Removal, TASK 75-23-01-000-801-F00,

Transient Bleed Valve Installation, TASK 75-23-01-400-801-F00.

HAP ALL PRE SB CFM56-7B 73-44

6) These are the tasks:

Burner Staging Valve Removal, TASK 73-11-08-000-801-F00,

Burner Staging Valve Installation, TASK 73-11-08-400-801-F00.

HAP ALL

7) For the HPTACC valve, these are the tasks:

HPTACC Valve Removal, TASK 75-21-01-000-801-F00,

HPTACC Valve Installation, TASK 75-21-01-400-801-F00.

8) For the LPTACC valve, these are the tasks:

LPTACC Valve Removal, TASK 75-22-04-000-802-F00,

LPTACC Valve Installation, TASK 75-22-04-400-802-F00.

9) For the gasket or the HMU, these are the tasks:

HMU Removal, TASK 73-21-10-000-801-F00,

HMU Installation, TASK 73-21-10-400-801-F00.

10) For the main oil/fuel heat exchanger, these are the tasks:

Main Oil/Fuel Heat Exchanger Removal, TASK 79-21-02-000-801-F00,

Main Oil/Fuel Heat Exchanger Installation, TASK 79-21-02-400-801-F00.

11) For the main fuel pump, these are the tasks:

Fuel Pump Package Removal, TASK 73-11-01-000-801-F00,

Fuel Pump Package Installation, TASK 73-11-01-400-801-F00.

SUBTASK 71-71-00-010-002-F00

(2) Engine oil drain system (not the IDG and its cooling system)

(a) Fluid: Oil

(b) Threshold limit: 7 cc/hr (2 drops per minute)

1) You can continue the engine in service until the maintenance can be done. At that time, replace the applicable component below.

(c) Serviceable limit: 20 cc/hr (7 drops per minute)

(d) Replace the applicable component:

1) For the main oil/fuel heat exchanger, these are the tasks:

Main Oil/Fuel Heat Exchanger Removal, TASK 79-21-02-000-801-F00,

Main Oil/Fuel Heat Exchanger Installation, TASK 79-21-02-400-801-F00.

2) Replace the AGB rotating seal of the applicable pad for the fuel pump, hydraulic pump or IDG as follows:

a) For a magnetic seal, these are the tasks:

Magnetic Seal Removal, TASK 72-60-00-000-801-F00,

Magnetic Seal Installation, TASK 72-60-00-400-801-F00.

b) For a Sealol seal, these are the tasks:
Sealol Seal Removal, TASK 72-60-00-000-802-F00,
Sealol Seal Installation, TASK 72-60-00-400-802-F00.

SUBTASK 71-71-00-010-003-F00

(3) Hydraulic drain system

(a) Fluid: Hydraulic fluid

(b) For the limits of the hydraulic engine-driven pump (TASK 29-00-00-790-801)

SUBTASK 71-71-00-790-008-F00

(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.
These are the tasks:
Integrated Drive Generator (IDG) Removal, TASK 24-11-11-000-801,
Integrated Drive Generator (IDG) Installation, TASK 24-11-11-400-801.

(d) For the IDG cooling system, repair or replace the components as it is necessary.

SUBTASK 71-71-00-010-004-F00

(5) Forward Sump

(a) Fluid: Oil

(b) Threshold Limit: 15 cc/hr (5 drops/minute)

(c) Serviceable Limit: 60 cc/hr (20 drops/minute)

(d) Corrective action:

1) Replace the engine.
These are the tasks:
Power Plant Removal, TASK 71-00-02-000-801-F00,
Power Plant Installation, TASK 71-00-02-400-801-F00.

SUBTASK 71-71-00-010-005-F00

(6) Oil Tank Scupper

(a) Fluid: Oil

(b) Serviceable limit: Oil that flows from the oil tank servicing only.

(c) Corrective action:

1) Make sure the oil tank cap is installed correctly.

2) Make sure there is no oil leakage when you service the oil tank.

3) Make sure the oil tank cap O-ring is not damaged. If the O-ring is damaged, do this task: Replacement of the Filler Cap Packing or Filler Cap, TASK 79-11-01-300-801-F00.

SUBTASK 71-71-00-010-006-F00

(7) Aft Sump (Overboard Drain)

NOTE: Oil traces at the bottom of exhaust plug, the exhaust sleeve and the turbine rear frame (TRF) is usual. Oil coking at the flame arrestor and on the rear cover is usual.

NOTE: An oil puddle in the exhaust plug is usual. After engine dry or wet motoring, a large oil puddle in the exhaust plug is usual. Oil leaks are possible at the TRF and primary exhaust plug flange. It is permitted to see oil drops at the TRF drain port at the 6 o'clock location.

(a) Fluid: Oil

(b) Serviceable limit:

1) After an engine shutdown only, there is not more than 60 cc/hr (20 drops per minute).

(c) Corrective action:

1) Do the scavenge screen inspection for the aft sump only and look for obstruction. To examine scavenge screen, do this task: Chip Detectors and Scavenge Screens Inspection, TASK 79-00-00-200-804-F00.

a) If you find obstruction, clean the screen and do the corrective action for the type of material you find.

b) If you do not find obstruction in the scavenge screen, examine the aft sump oil scavenge line or obstruction.

c) If no problem is found, replace the engine.

These are the tasks:

Power Plant Removal, TASK 71-00-02-000-801-F00,

Power Plant Installation, TASK 71-00-02-400-801-F00.

SUBTASK 71-71-00-010-007-F00

(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: 180 cc/hr (60 drops per minute)

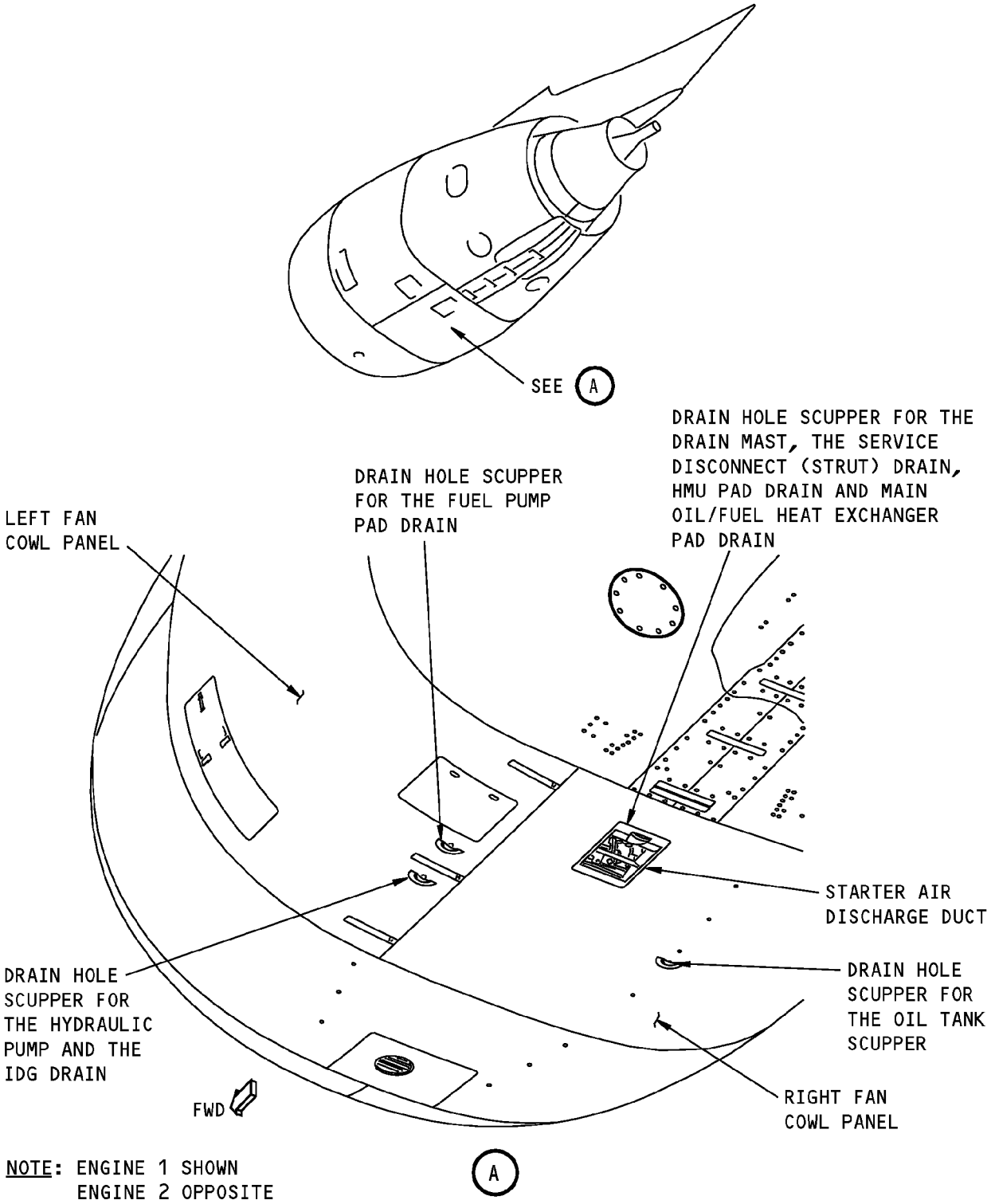
a) You can continue the engine in service for not more than 25 flight cycles before you replace the applicable component.

2) Serviceable limit: 270 cc/hr (90 drops per minute)

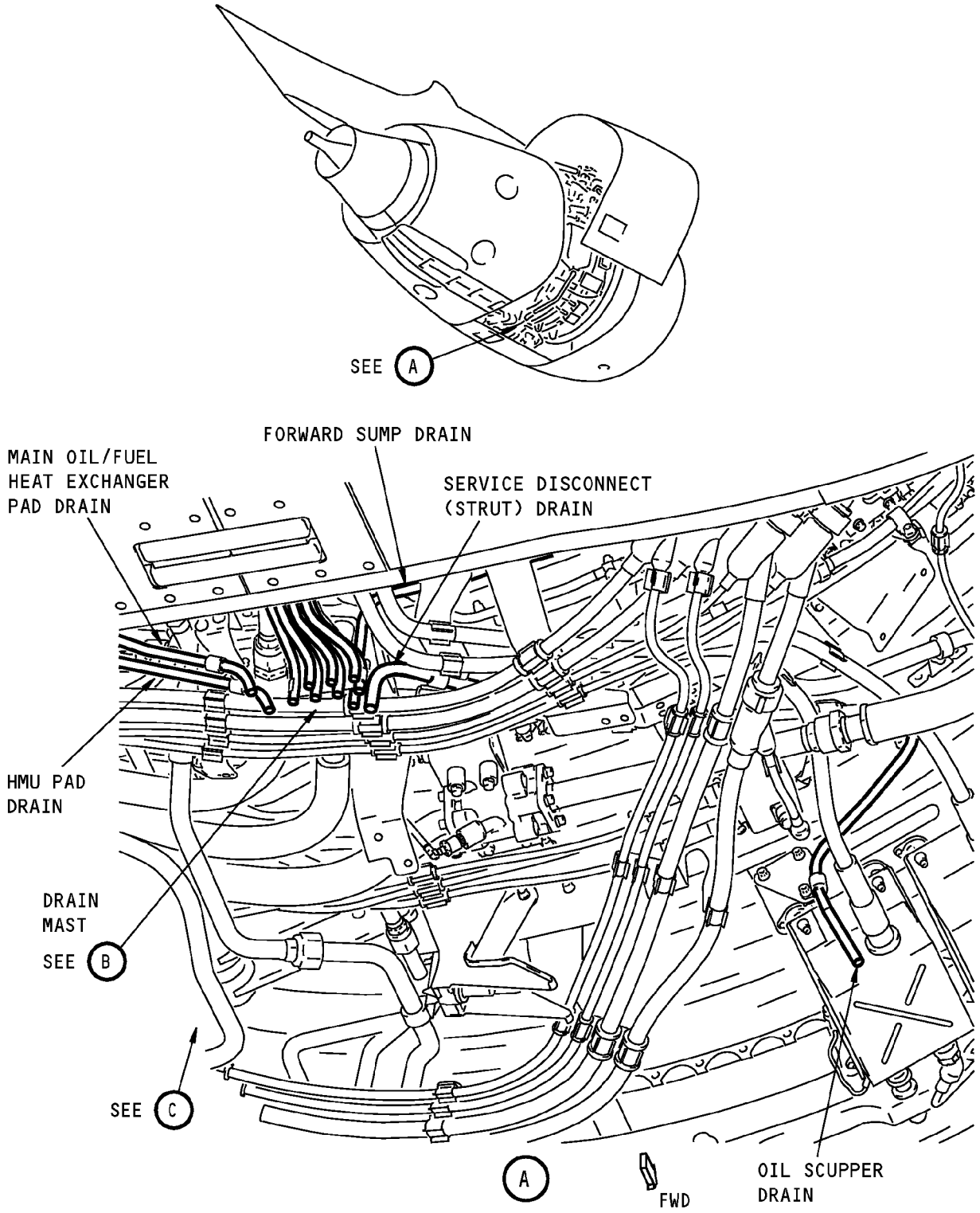
3) Corrective action:

a) Find and correct the fuel leak, do this task: Engine Fuel Feed Manifold - Leak Test, TASK 28-22-15-710-801.

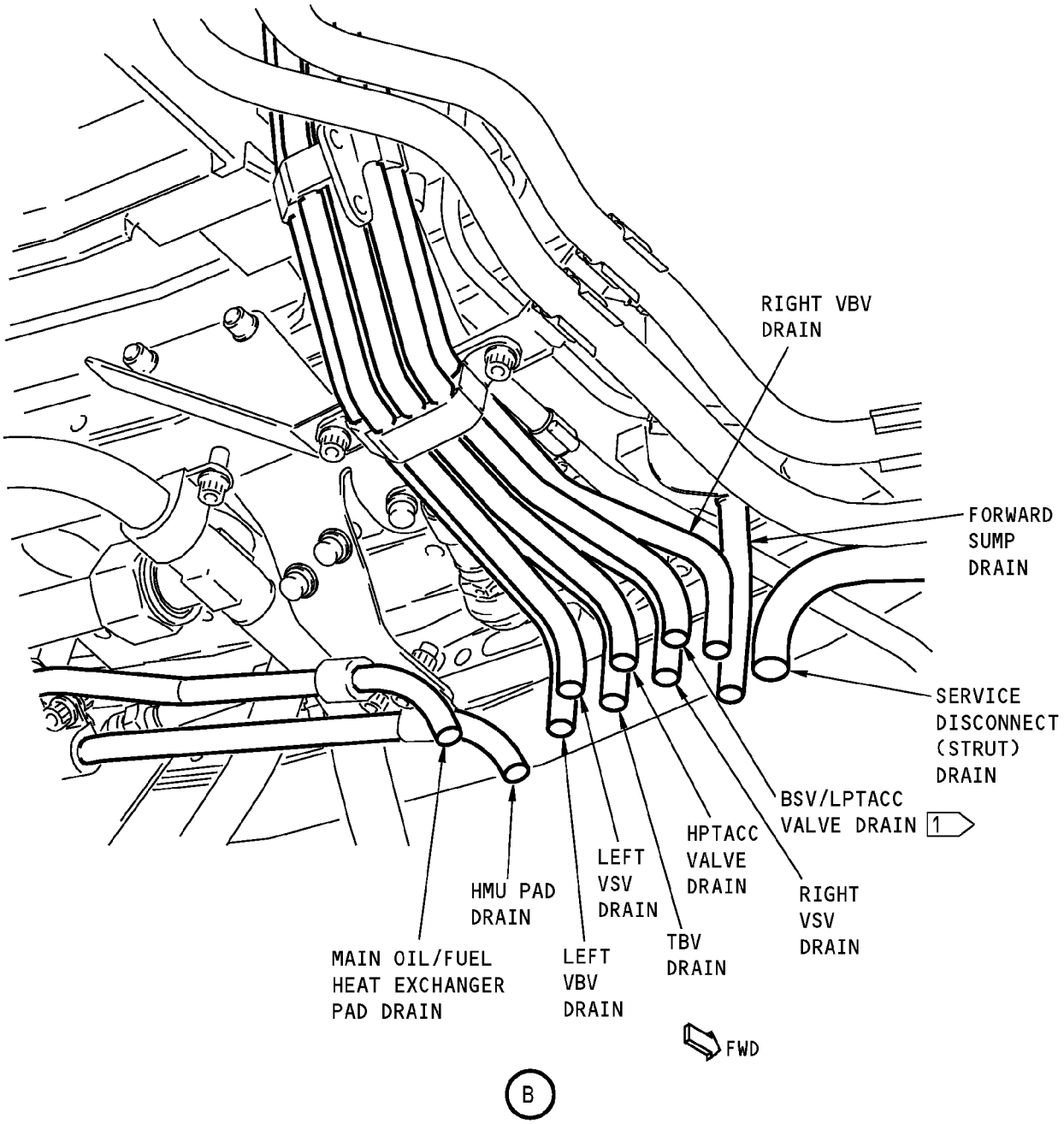
END OF TASK



Fan Cowl Panel Inspection Areas
Figure 601/71-71-00-990-801-F00

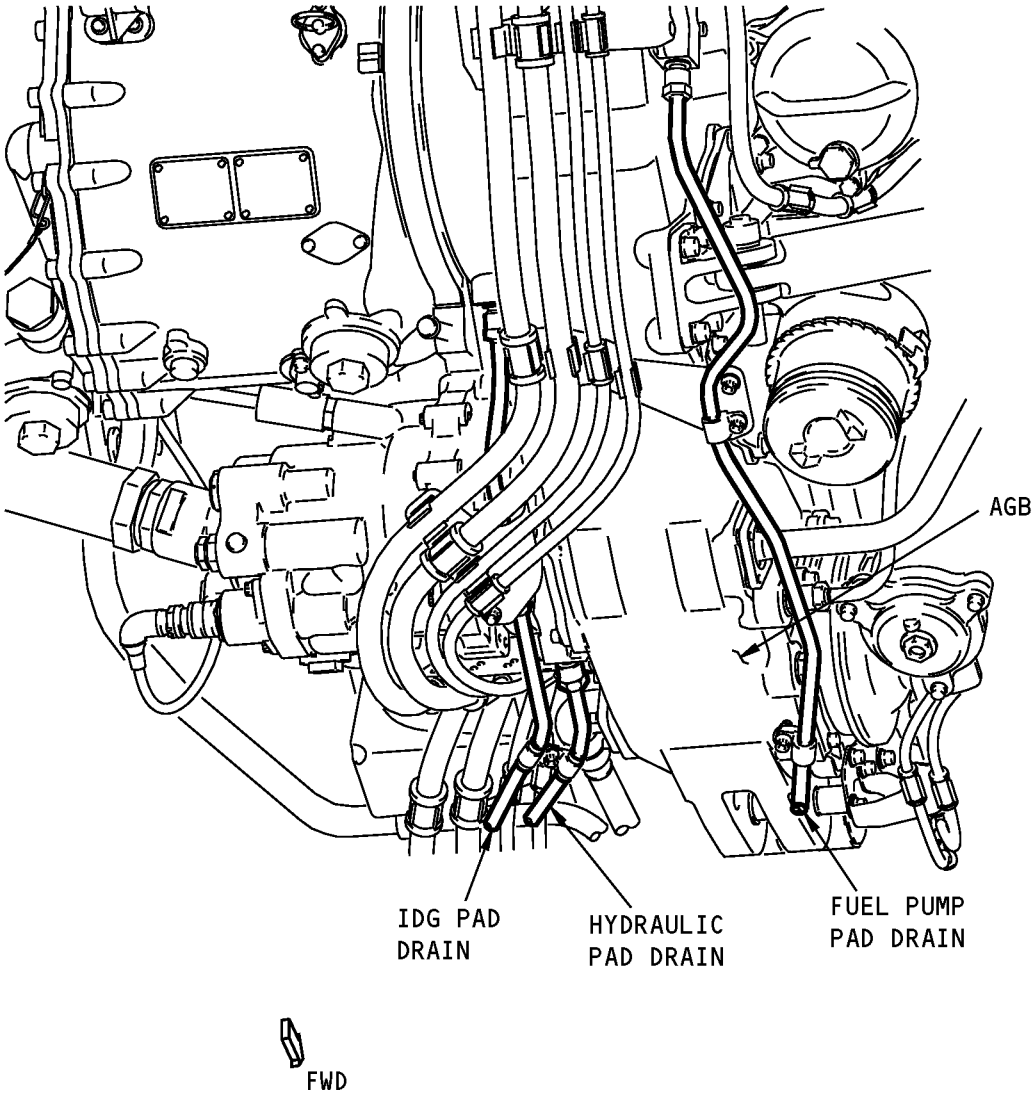


Engine Vents and Drains Inspection
Figure 602 (Sheet 1 of 4)/71-71-00-990-802-F00

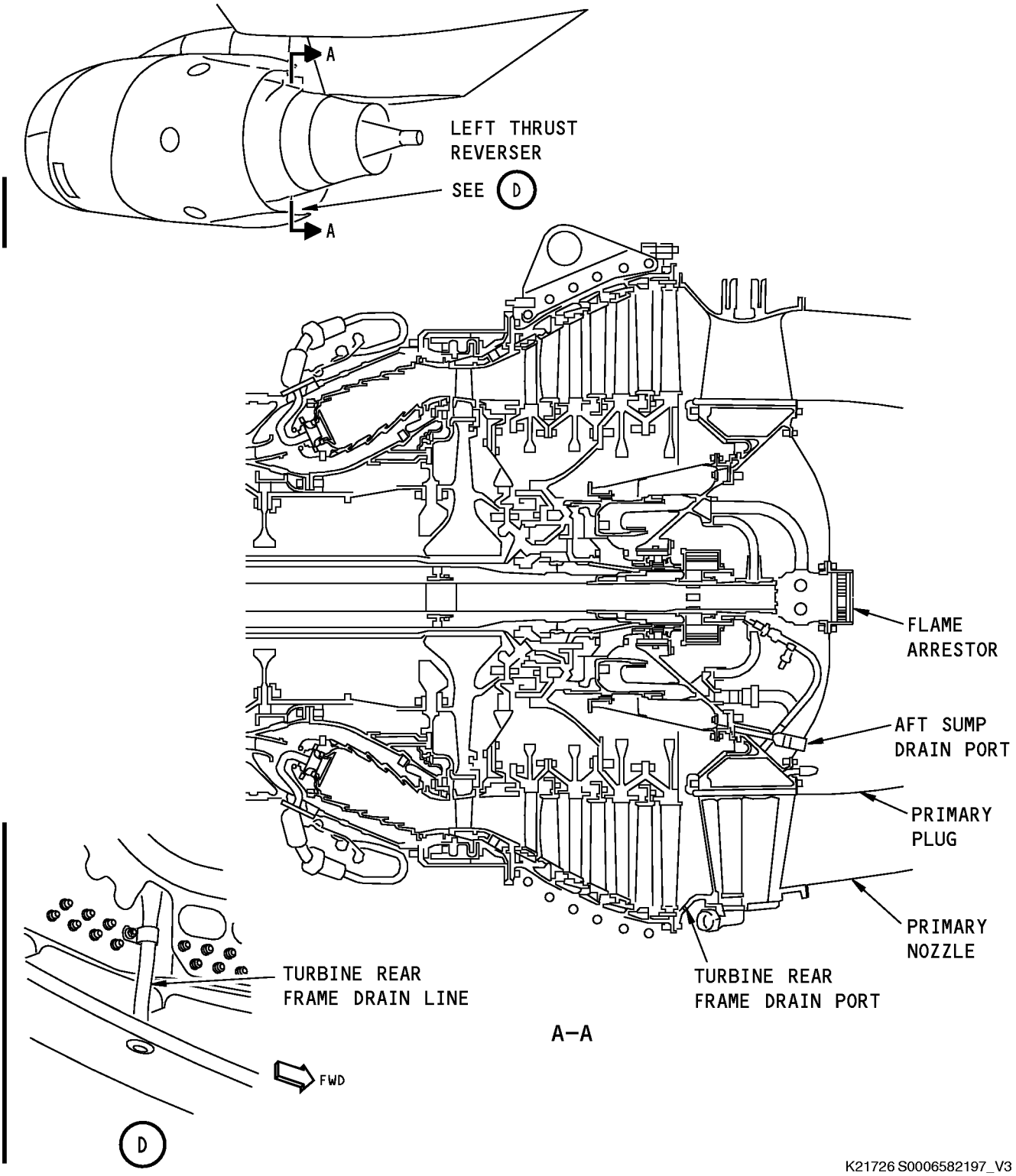


1 ENGINES POST-CFMI-SB 73-044; LPTACC VALVE DRAIN ONLY

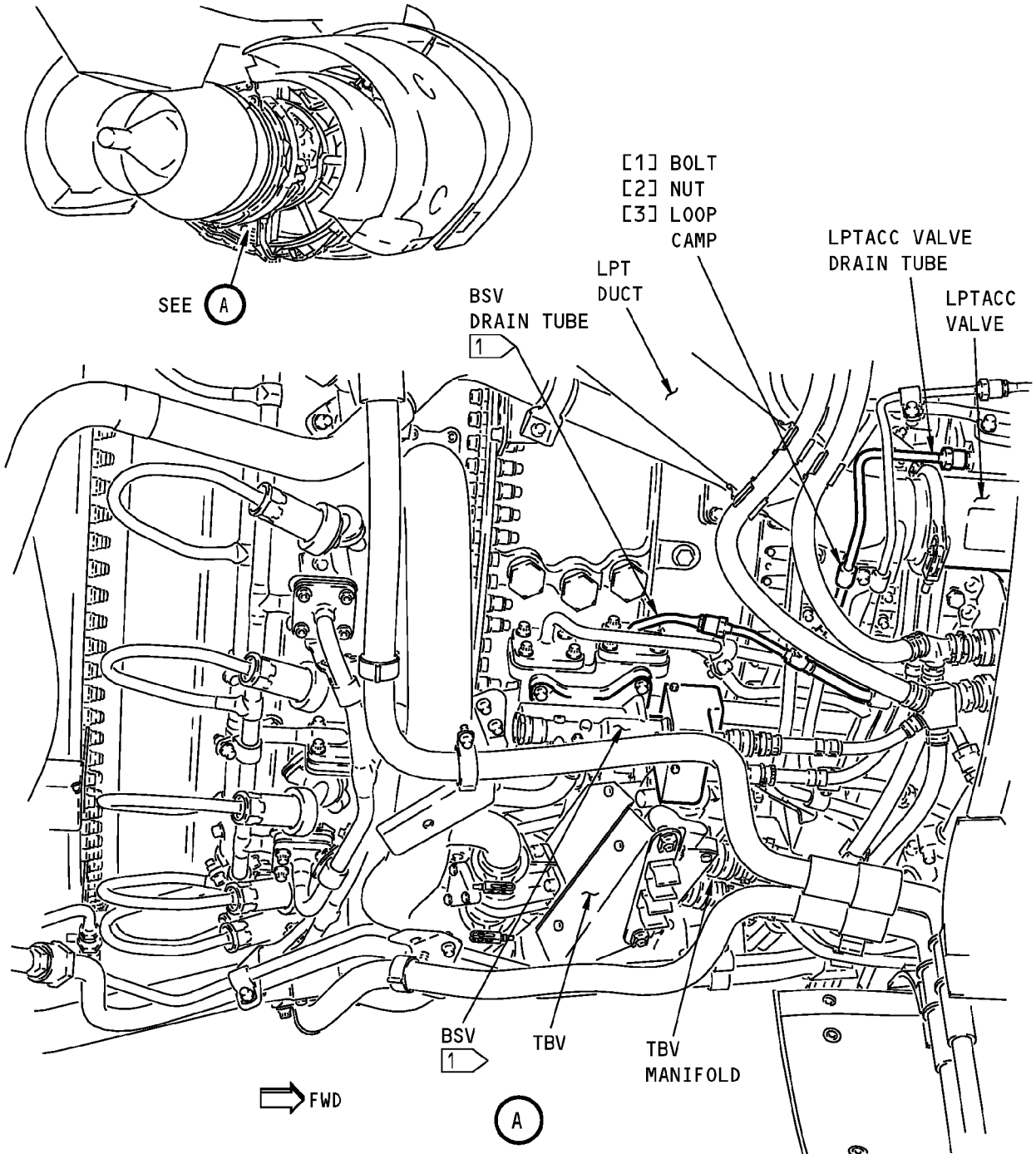
Engine Vents and Drains Inspection
Figure 602 (Sheet 2 of 4)/71-71-00-990-802-F00



Engine Vents and Drains Inspection
Figure 602 (Sheet 3 of 4)/71-71-00-990-802-F00



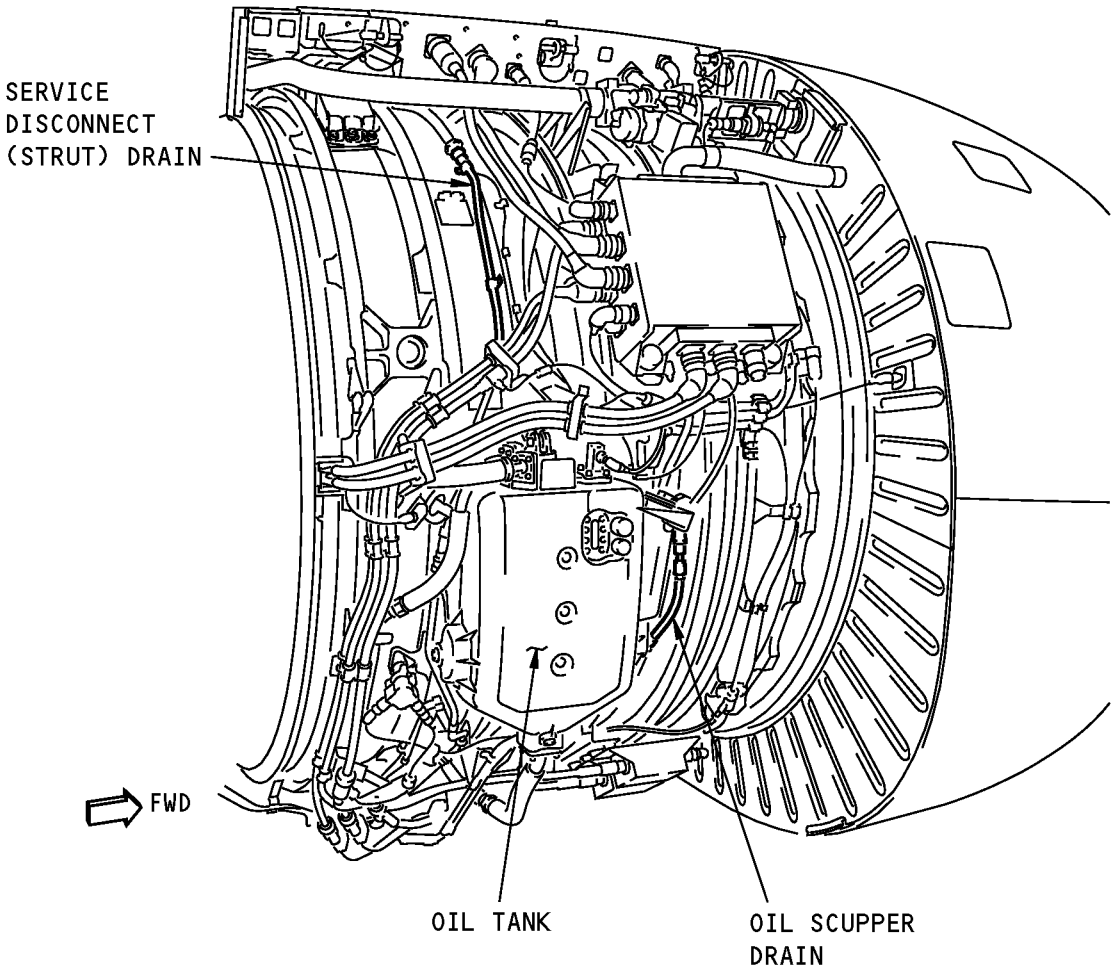
Engine Vents and Drains Inspection
Figure 602 (Sheet 4 of 4)/71-71-00-990-802-F00



NOTE: EXTENSION RING SEGMENT NOT SHOWN.

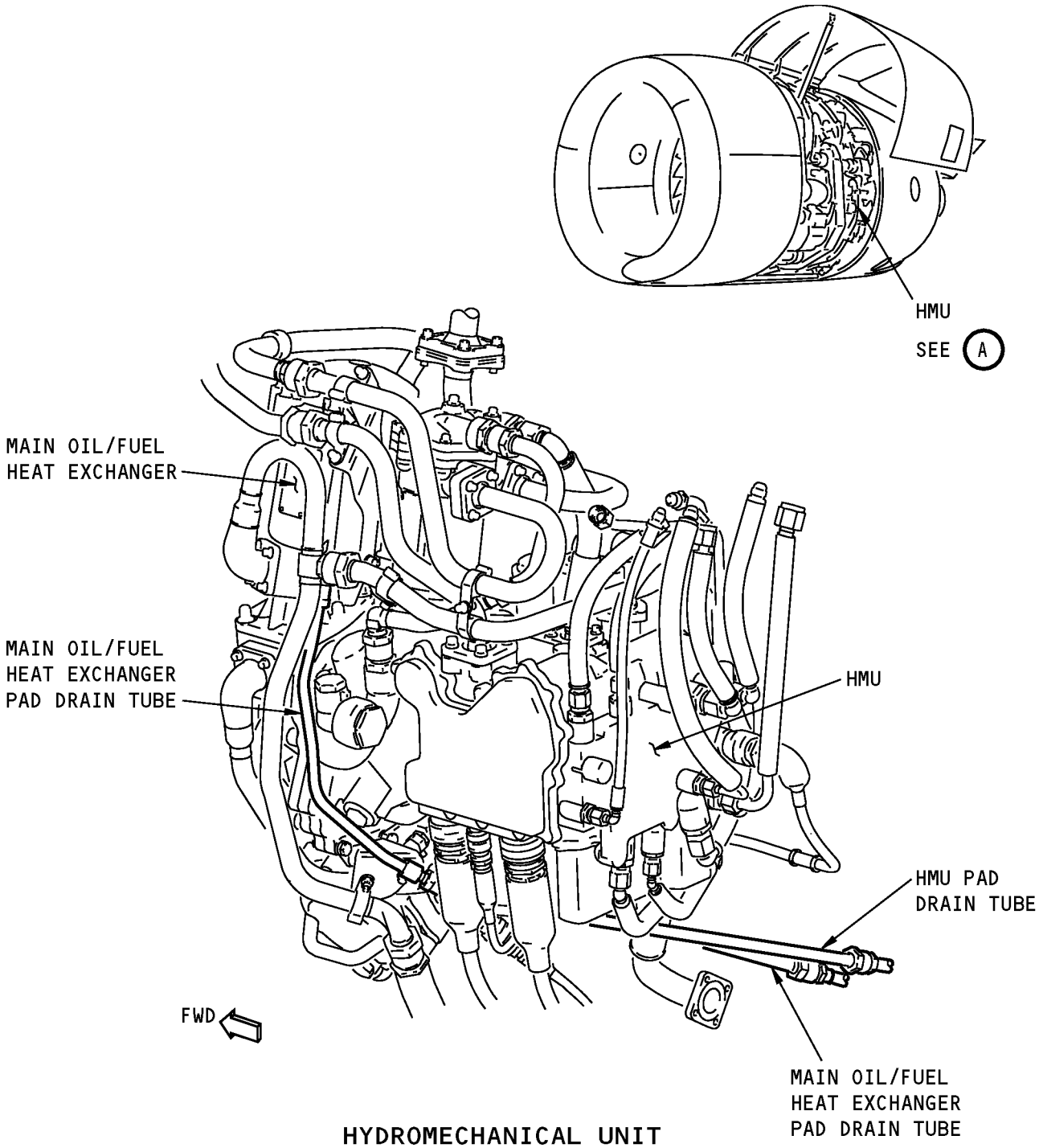
1 > ENGINES PRE-CFMI-SB 73-044

LPTACC Valve Drain Tube Disconnection
Figure 603/71-71-00-990-803-F00



FAN CASE
(RIGHT SIDE)

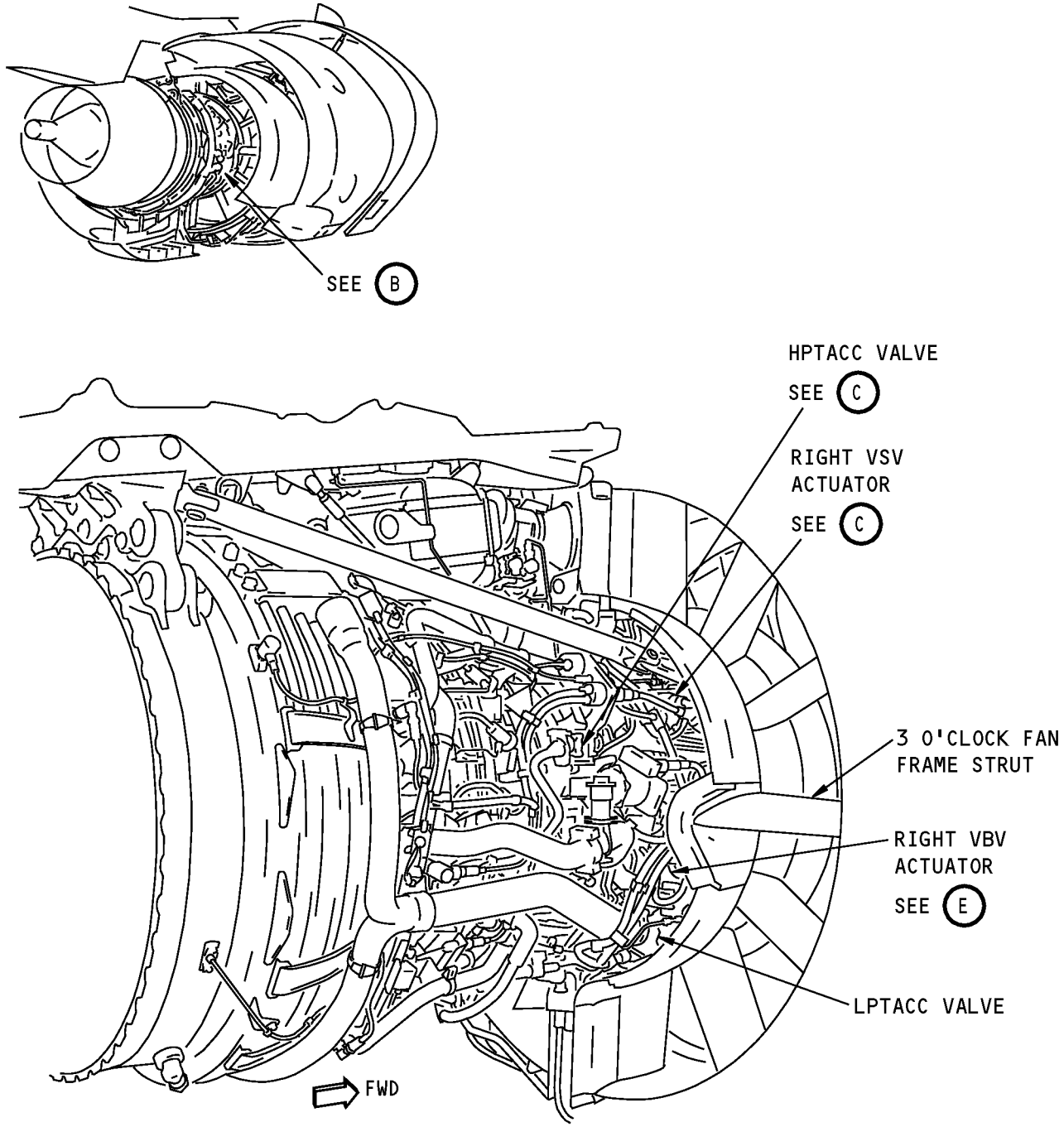
Drain Lines - Operational Check
Figure 604 (Sheet 1 of 6)/71-71-00-990-804-F00



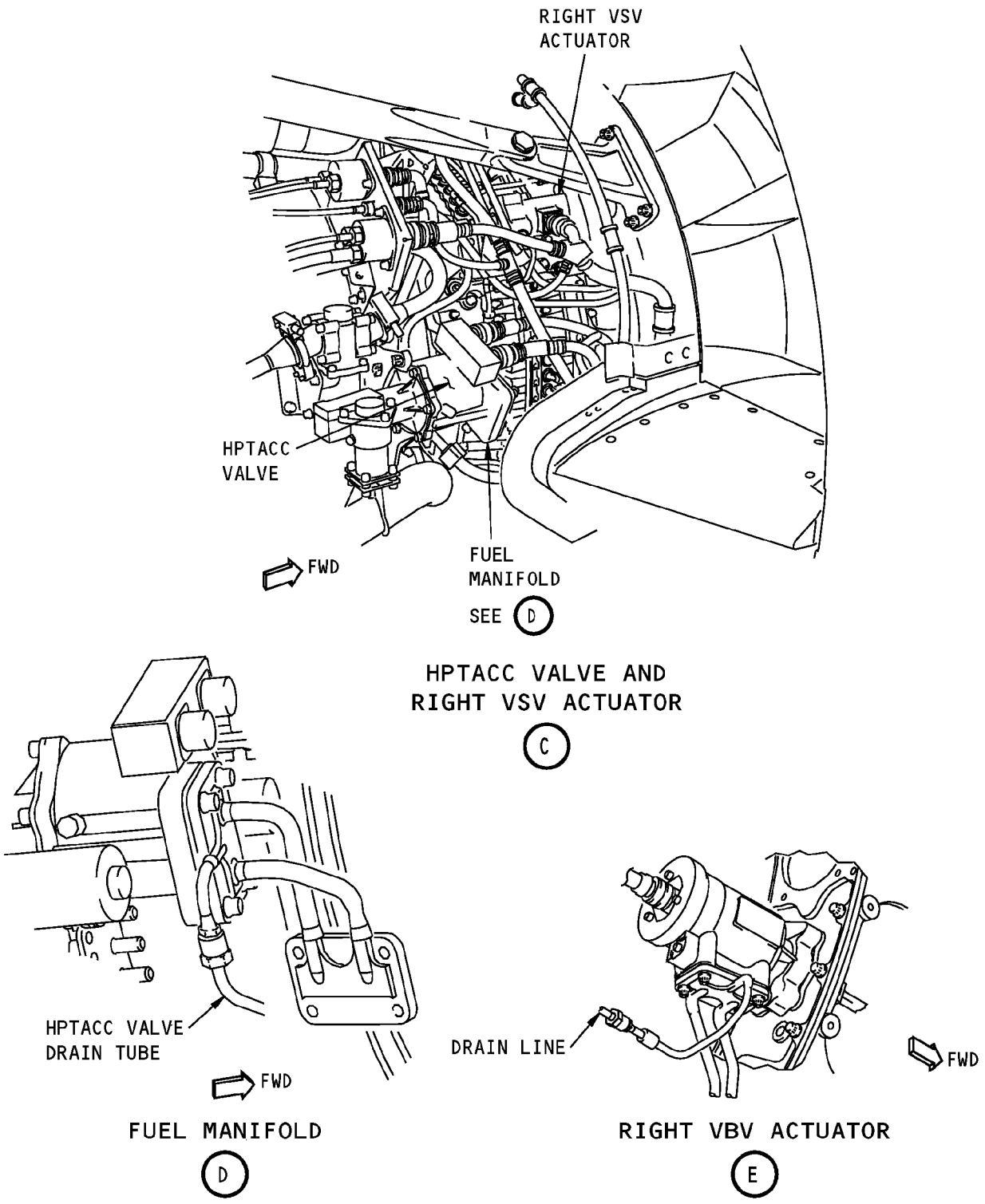
HYDROMECHANICAL UNIT
(HMU)

A

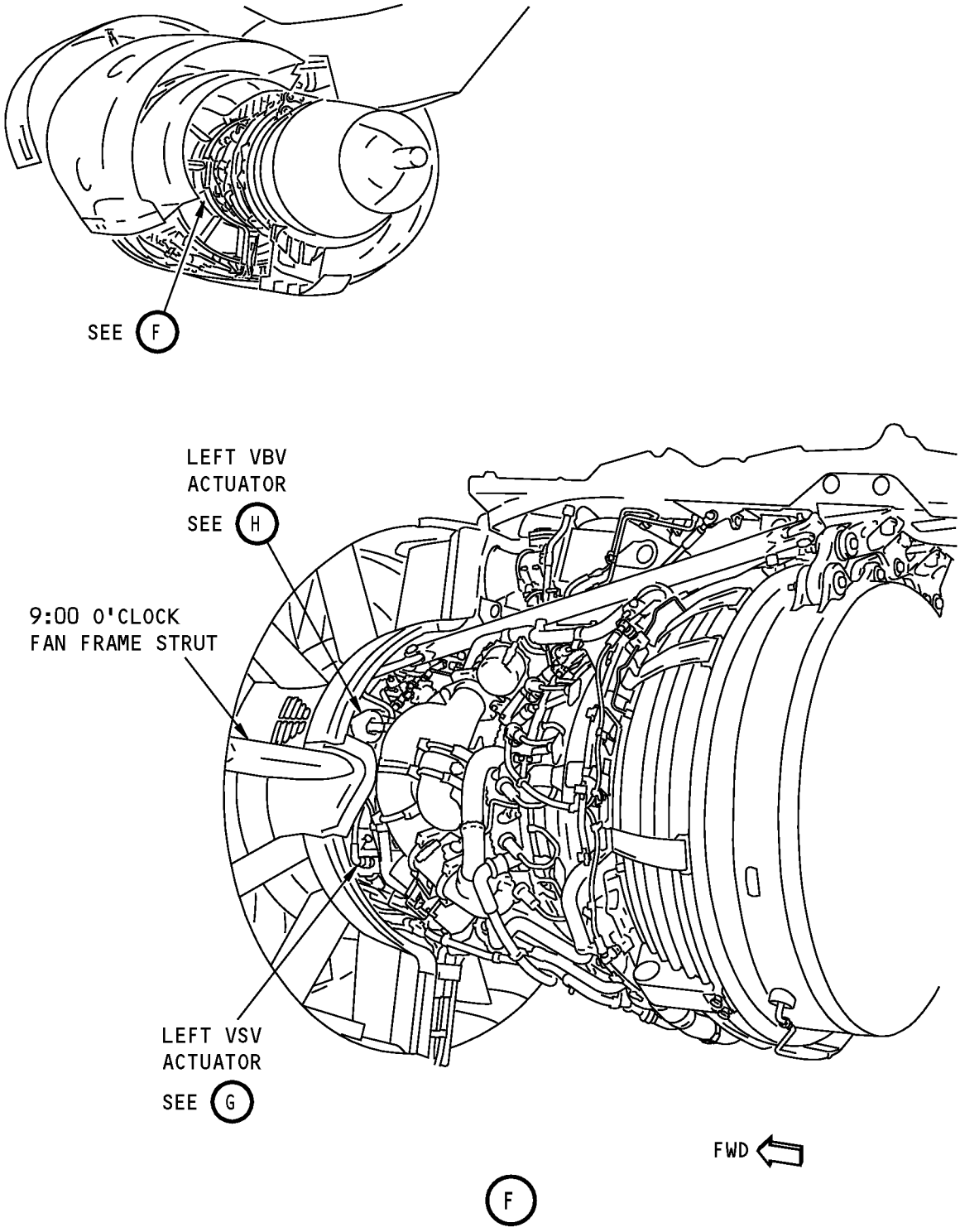
Drain Lines - Operational Check
Figure 604 (Sheet 2 of 6)/71-71-00-990-804-F00



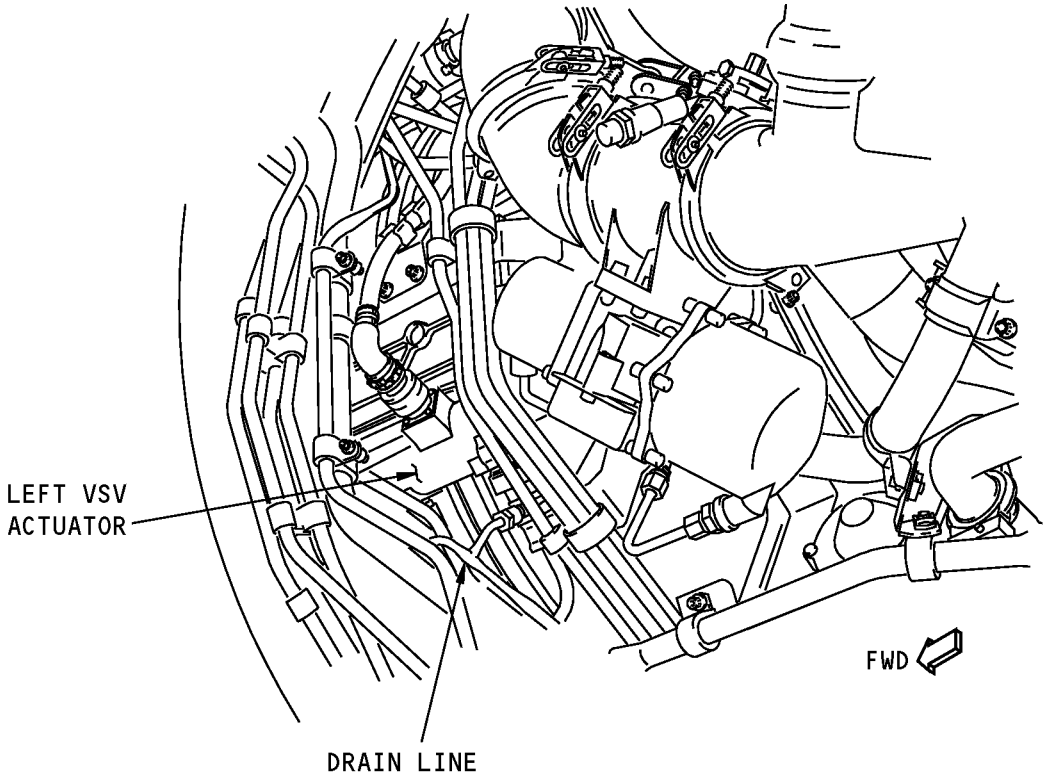
Drain Lines - Operational Check
Figure 604 (Sheet 3 of 6)/71-71-00-990-804-F00



Drain Lines - Operational Check
Figure 604 (Sheet 4 of 6)/71-71-00-990-804-F00

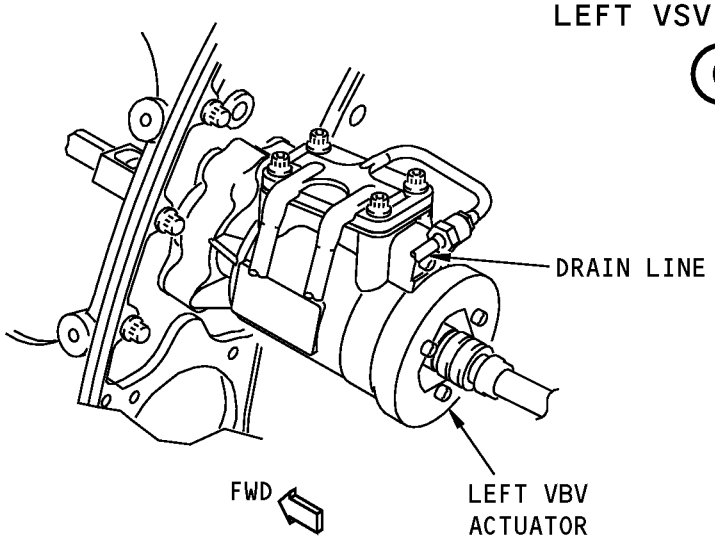


Drain Lines - Operational Check
Figure 604 (Sheet 5 of 6)/71-71-00-990-804-F00



LEFT VSV ACTUATOR

G



LEFT VBV ACTUATOR

H

Drain Lines - Operational Check
Figure 604 (Sheet 6 of 6)/71-71-00-990-804-F00

TASK 71-71-00-700-801-F00

3. Drain Lines Inspection (Operational Check)

(Figure 602, Figure 603, Figure 604)

A. General

(1) This is a scheduled maintenance task which does an operational check of the engine drain lines.

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

C. Tools/Equipment

Reference	Description
STD-1280	Source - Air, Regulated, Dry Filtered, 0-30 PSIG

D. Location Zones

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

E. Do the Operational Check of the Drain Lines

SUBTASK 71-71-00-010-009-F00

(1) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 71-71-00-010-010-F00

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 REVERSERS (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.

(2) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

SUBTASK 71-71-00-210-004-F00

(3) Do these steps to prepare for the procedure:

(a) Find the drain lines for the check (Figure 602):

(b) Find the applicable drain line connections at the engine component to disconnect (Figure 603, Figure 604). Some connections are found at a different location than the engine component:

1) The forward sump drain is on the fan case (rear) at the 5:00 o'clock position.

2) The TBV drain is on the TBV fuel manifold.

3) The VSV drain is on the rod-end and head-end of the actuators.

SUBTASK 71-71-00-700-001-F00

(4) Do the operational check below for each drain line:

(a) It is not necessary to do a check of the aft sump drain or the strut drain.

(b) Disconnect the applicable drain line from the engine component and push the line away from the component.

1) It is not necessary to disconnect the oil tank scupper drain.

2) It can be necessary to disconnect the clamps on some of the drain lines.

3) ENGINES PRE-CFMI-SB 73-044;

For the BSV/LPTACC valve drain line, disconnect the drain lines from the two components and alternately install a cap on the drain lines to do the check of each drain.

HAP ALL POST SB CFM56-7B 73-44

a) ENGINES POST-CFMI-SB 73-044;

The BSV is not installed.

HAP ALL

(c) Connect an 0-30 psig dry filtered regulated air source, STD-1280 to the bottom of the applicable drain line.

(d) Make sure that the air flows freely through the line.

(e) If you find blockage, remove the blockage or replace the drain line.

(f) Re-connect the applicable drain line at the engine component.

(g) Connect the clamps that you loosened to move the drain line.

(h) Remove the 0-30 psig dry filtered regulated air source, STD-1280 from the bottom of the applicable drain line.

SUBTASK 71-71-00-410-003-F00

WARNING: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO CLOSE THE THRUST REVERSER. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(5) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

SUBTASK 71-71-00-410-004-F00

(6) If the fan cowl panels are to be closed, do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

——————— END OF TASK ———————

TASK 71-71-00-200-802-F00

4. Drain Lines Inspection (General Visual)

(Figure 602, Figure 603)

A. General

(1) This procedure is a scheduled maintenance task.

(2) This task examines the drain lines for physical damage (as an example, dents and cracks).

B. References

Reference	Title
71-11-02-010-801-F00	Open the Fan Cowl Panels (P/B 201)
71-11-02-410-801-F00	Close the Fan Cowl Panels (P/B 201)
78-31-00-010-801-F00	Open the Thrust Reverser (Selection) (P/B 201)
78-31-00-010-804-F00	Close the Thrust Reverser (Selection) (P/B 201)

C. Location Zones

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

D. Procedure

SUBTASK 71-71-00-010-008-F00

(1) Do this task: Open the Fan Cowl Panels, TASK 71-11-02-010-801-F00.

SUBTASK 71-71-00-010-011-F00

WARNING: OBEY THE INSTRUCTIONS IN THIS PROCEDURE WHEN YOU OPEN THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Do this task: Open the Thrust Reverser (Selection), TASK 78-31-00-010-801-F00.

SUBTASK 71-71-00-210-002-F00

(3) Visually examine the drain lines for the correct installation.

(a) Make sure there are no loose connections and loose clamps.

SUBTASK 71-71-00-210-003-F00

(4) Visually examine the drain lines for obvious signs of damage.

(a) Look for dents, cracks, wear, and kinks.

(b) If you find damage, replace or repair the drain line.

SUBTASK 71-71-00-410-005-F00

WARNING: OBEY THE INSTRUCTIONS IN THIS PROCEDURE WHEN YOU CLOSE THE THRUST REVERSERS. IF YOU DO NOT OBEY THE INSTRUCTIONS, INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT CAN OCCUR.

(5) Do this task: Close the Thrust Reverser (Selection), TASK 78-31-00-010-804-F00.

SUBTASK 71-71-00-410-002-F00

(6) Do this task: Close the Fan Cowl Panels, TASK 71-11-02-410-801-F00.

END OF TASK