



B747

Dispatch Deviations Guide

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Preface

Section List

Section P - Preface

Section 0 - General

Section 1 - EICAS Messages

Section 2 - MEL

Section 3 - CDL

Section 4 - Miscellaneous

Table of Contents

Intentionally
Blank

Preface

Revision Record

Revision Transmittal Letter

To: All holders of The Boeing Company Dispatch Deviations Guide, Boeing Document Number D6U10151-TBC

Subject: Dispatch Deviations Guide (DDG) Revision 29

DDG Revision 29 is a complete revision. DDG Revision 29 incorporates FAA 747-400 MMEL Revision 30 and 747-400 AFM Appendix CDL Revision 12.

Revision Record

No.	Revision Date	Date Filed
22	April 30, 2008	
24	October 14, 2009	
26	March 30, 2012	
28	March 8, 2013	

No.	Revision Date	Date Filed
23	April 10, 2009	
25	July 16, 2010	
27	September 7, 2012	
29	March 18, 2016	

General

The Boeing Company issues Dispatch Deviations Guide revisions to provide new or revised procedures and information.

Revisions include a Transmittal Letter, a new Revision Record, Revision Highlights, and a List of Effective Pages. The Revision Record should be completed by the person incorporating the revision into the 747-400 Dispatch Deviations Guide.

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Filing Instructions

Consult the List of Effective Pages. The List of Effective Pages determines the correct content of the manual. Pages identified with an asterisk (*) are either replacement pages or new (original) issue pages.

Pages may be re-dated without revision bars. This is due to repagination of content. The List of Effectd Pages will reflect the date change, but there will not be a corresponding revision highlight.



BRITISH AIRWAYS
747 Dispatch Deviations Guide

Preface

Highlights

This is the initial issue of the British Airways B747 DDG based on Boeing FAA 747 DDG including MEL Revision 29 and CDL Revision 12.

INTENTIONALLY BLANK



BRITISH AIRWAYS
747 Dispatch Deviations Guide

Preface			List of Effective Pages		
Page	Rev	Date	Page	Rev	Date
P.00-TC-00.1	29	Mar 2016	1.00-02-00.6	29	Mar 2016
P.00-TC-00.2	29	Mar 2016	1.00-02-00.7	29	Mar 2016
P.00-01-00.1	29	Mar 2016	1.00-02-00.8	29	Mar 2016
P.00-01-00.2	29	Mar 2016	1.00-02-00.9	29	Mar 2016
P.00-01-00.3	29	Mar 2016	1.00-02-00.10	29	Mar 2016
P.00-01-00.4	29	Mar 2016	1.00-02-00.11	29	Mar 2016
P.00-02-00.1	29+	Mar 2016	1.00-02-00.12	29	Mar 2016
P.00-02-00.2	29+	Mar 2016	1.00-02-00.13	29	Mar 2016
P.00-02-00.3	29+	Mar 2016	1.00-02-00.14	29	Mar 2016
P.00-02-00.4	29+	Mar 2016	1.00-02-00.15	29	Mar 2016
P.00-02-00.5	29+	Mar 2016	1.00-02-00.16	29	Mar 2016
P.00-02-00.6	29+	Mar 2016	1.00-02-00.17	29	Mar 2016
P.00-02-00.7	29+	Mar 2016	1.00-02-00.18	29	Mar 2016
P.00-02-00.8	29+	Mar 2016	1.00-02-00.19	29	Mar 2016
P.00-02-00.9	29+	Mar 2016	1.00-02-00.20	29	Mar 2016
P.00-02-00.10	29+	Mar 2016	1.00-02-00.21	29	Mar 2016
P.00-02-00.11	29+	Mar 2016	1.00-02-00.22	29	Mar 2016
P.00-02-00.12	29+	Mar 2016	1.00-02-00.23	29	Mar 2016
0.00-TC-00.1	29	Mar 2016	1.00-02-00.24	29	Mar 2016
0.00-TC-00.2	29	Mar 2016	1.00-02-00.25	29	Mar 2016
0.00-01-00.1	29	Mar 2016	1.00-02-00.26	29	Mar 2016
0.00-01-00.2	29	Mar 2016	1.00-02-00.27	29	Mar 2016
0.00-01-00.3	29	Mar 2016	1.00-02-00.28	29	Mar 2016
0.00-01-00.4	29	Mar 2016	1.00-02-00.29	29	Mar 2016
0.00-01-00.5	29	Mar 2016	1.00-02-00.30	29	Mar 2016
0.00-01-00.6	29	Mar 2016	1.00-02-00.31	29	Mar 2016
0.00-01-00.7	29	Mar 2016	1.00-02-00.32	29	Mar 2016
0.00-01-00.8	29	Mar 2016	1.00-02-00.33	29	Mar 2016
1.00-TC-00.1	29	Mar 2016	1.00-02-00.34	29	Mar 2016
1.00-TC-00.2	29	Mar 2016	1.00-02-00.35	29	Mar 2016
1.00-01-00.1	29	Mar 2016	1.00-02-00.36	29	Mar 2016
1.00-01-00.2	29	Mar 2016	1.00-02-00.37	29	Mar 2016
1.00-01-00.3	29	Mar 2016	1.00-02-00.38	29	Mar 2016
1.00-01-00.4	29	Mar 2016	2.00-TC-00.1	29	Mar 2016
1.00-02-00.1	29	Mar 2016	2.00-TC-00.2	29	Mar 2016
1.00-02-00.2	29	Mar 2016	2.00-01-00.1	29	Mar 2016
1.00-02-00.3	29	Mar 2016	2.00-01-00.2	29	Mar 2016
1.00-02-00.4	29	Mar 2016	2.00-01-00.3	29	Mar 2016
1.00-02-00.5	29	Mar 2016	2.00-01-00.4	29	Mar 2016



747 Dispatch Deviations Guide

LEP	Page	Rev	Date	Page	Rev	Date	Preface
2.00-01-00.5	29		Mar 2016	2.00-02-00.36	29		Mar 2016
2.00-01-00.6	29		Mar 2016	2.00-02-00.37	29		Mar 2016
2.00-01-00.7	29		Mar 2016	2.00-02-00.38	29		Mar 2016
2.00-01-00.8	29		Mar 2016	2.05-00-01.1	29		Mar 2016
2.00-01-00.9	29		Mar 2016	2.05-00-01.2	29		Mar 2016
2.00-01-00.10	29		Mar 2016	2.21-25-01.1	29		Mar 2016
2.00-02-00.1	29		Mar 2016	2.21-26-05.1	29		Mar 2016
2.00-02-00.2	29		Mar 2016	2.21-26-05.2	29		Mar 2016
2.00-02-00.3	29		Mar 2016	2.21-26-06.1	29		Mar 2016
2.00-02-00.4	29		Mar 2016	2.21-31-01.1	29		Mar 2016
2.00-02-00.5	29		Mar 2016	2.21-31-01.2	29		Mar 2016
2.00-02-00.6	29		Mar 2016	2.21-31-02.1	29		Mar 2016
2.00-02-00.7	29		Mar 2016	2.21-31-02.2	29		Mar 2016
2.00-02-00.8	29		Mar 2016	2.21-31-03.1	29		Mar 2016
2.00-02-00.9	29		Mar 2016	2.21-31-04.1	29		Mar 2016
2.00-02-00.10	29		Mar 2016	2.21-31-04.2	29		Mar 2016
2.00-02-00.11	29		Mar 2016	2.21-32-01.1	29		Mar 2016
2.00-02-00.12	29		Mar 2016	2.21-32-02.1	29		Mar 2016
2.00-02-00.13	29		Mar 2016	2.21-33-01.1	29		Mar 2016
2.00-02-00.14	29		Mar 2016	2.21-33-02.1	29		Mar 2016
2.00-02-00.15	29		Mar 2016	2.21-33-02.2	29		Mar 2016
2.00-02-00.16	29		Mar 2016	2.21-33-03.1	29		Mar 2016
2.00-02-00.17	29		Mar 2016	2.21-33-04.1	29		Mar 2016
2.00-02-00.18	29		Mar 2016	2.21-33-05.1	29		Mar 2016
2.00-02-00.19	29		Mar 2016	2.21-33-06.1	29		Mar 2016
2.00-02-00.20	29		Mar 2016	2.21-40-02.1	29		Mar 2016
2.00-02-00.21	29		Mar 2016	2.21-41-01.1	29		Mar 2016
2.00-02-00.22	29		Mar 2016	2.21-41-01.2	29		Mar 2016
2.00-02-00.23	29		Mar 2016	2.21-41-02.1	29		Mar 2016
2.00-02-00.24	29		Mar 2016	2.21-41-02.2	29		Mar 2016
2.00-02-00.25	29		Mar 2016	2.21-42-01.1	29		Mar 2016
2.00-02-00.26	29		Mar 2016	2.21-42-02.1	29		Mar 2016
2.00-02-00.27	29		Mar 2016	2.21-43-01.1	29		Mar 2016
2.00-02-00.28	29		Mar 2016	2.21-44-01.1	29		Mar 2016
2.00-02-00.29	29		Mar 2016	2.21-44-01.2	29		Mar 2016
2.00-02-00.30	29		Mar 2016	2.21-44-01.3	29		Mar 2016
2.00-02-00.31	29		Mar 2016	2.21-44-02.1	29		Mar 2016
2.00-02-00.32	29		Mar 2016	2.21-44-03.1	29		Mar 2016
2.00-02-00.33	29		Mar 2016	2.21-44-04.1	29		Mar 2016
2.00-02-00.34	29		Mar 2016	2.21-51-01.1	29		Mar 2016
2.00-02-00.35	29		Mar 2016	2.21-51-01.2	29+		Mar 2016



BRITISH AIRWAYS
747 Dispatch Deviations Guide

Preface

LEP

Page	Rev	Date	Page	Rev	Date
2.21-51-02.1	29	Mar 2016	2.21-62-02.3	29	Mar 2016
2.21-51-02.2	29	Mar 2016	2.21-62-02.4	29	Mar 2016
2.21-51-03.1	29	Mar 2016	2.21-62-02.5	29	Mar 2016
2.21-51-04.1	29	Mar 2016	2.21-65-01.1	29	Mar 2016
2.21-51-05.1	29	Mar 2016	2.21-65-02.1	29	Mar 2016
2.21-51-05.2	29	Mar 2016	2.22-10-01.1	29	Mar 2016
2.21-51-06.1	29	Mar 2016	2.22-10-01.2	29	Mar 2016
2.21-51-07.1	29	Mar 2016	2.22-10-01.3	29	Mar 2016
2.21-51-08.1	29	Mar 2016	2.22-11-01.1	29	Mar 2016
2.21-51-09.1	29	Mar 2016	2.22-11-02.1	29	Mar 2016
2.21-52-01.1	29	Mar 2016	2.22-11-03.1	29	Mar 2016
2.21-58-01.1	29	Mar 2016	2.22-11-04.1	29	Mar 2016
2.21-58-02.1	29	Mar 2016	2.22-11-04.2	29	Mar 2016
2.21-58-02.2	29	Mar 2016	2.22-11-04.3	29	Mar 2016
2.21-58-02.3	29	Mar 2016	2.22-11-05.1	29	Mar 2016
2.21-58-03.1	29	Mar 2016	2.22-13-01.1	29	Mar 2016
2.21-58-04.1	29	Mar 2016	2.22-21-01.1	29	Mar 2016
2.21-58-05.1	29	Mar 2016	2.22-21-02.1	29	Mar 2016
2.21-58-05.2	29	Mar 2016	2.22-31-01.1	29	Mar 2016
2.21-58-06.1	29	Mar 2016	2.22-31-02.1	29	Mar 2016
2.21-58-07.1	29	Mar 2016	2.22-31-03.1	29	Mar 2016
2.21-58-07.2	29	Mar 2016	2.23-11-01.1	29	Mar 2016
2.21-58-07.3	29	Mar 2016	2.23-11-01.2	29	Mar 2016
2.21-58-08.1	29	Mar 2016	2.23-11-01.3	29	Mar 2016
2.21-61-01.1	29	Mar 2016	2.23-12-01.1	29	Mar 2016
2.21-61-01.2	29	Mar 2016	2.23-24-01.1	29	Mar 2016
2.21-61-01.3	29	Mar 2016	2.23-25-01.1	29	Mar 2016
2.21-61-02.1	29	Mar 2016	2.23-25-01.2	29	Mar 2016
2.21-61-03.1	29	Mar 2016	2.23-27-01.1	29	Mar 2016
2.21-61-03.2	29	Mar 2016	2.23-28-01.1	29	Mar 2016
2.21-61-04.1	29	Mar 2016	2.23-31-01.1	29	Mar 2016
2.21-61-04.2	29	Mar 2016	2.23-31-01.2	29	Mar 2016
2.21-61-05.1	29	Mar 2016	2.23-31-01.3	29	Mar 2016
2.21-61-06.1	29	Mar 2016	2.23-31-02.1	29	Mar 2016
2.21-61-07.1	29	Mar 2016	2.23-34-01.1	29	Mar 2016
2.21-61-07.2	29	Mar 2016	2.23-34-01.2	29	Mar 2016
2.21-61-11.1	29	Mar 2016	2.23-41-01.1	29	Mar 2016
2.21-61-12.1	29	Mar 2016	2.23-42-01.1	29	Mar 2016
2.21-62-01.1	29	Mar 2016	2.23-42-01.2	29	Mar 2016
2.21-62-02.1	29	Mar 2016	2.23-42-01.3	29	Mar 2016
2.21-62-02.2	29	Mar 2016	2.23-42-02.1	29	Mar 2016



747 Dispatch Deviations Guide

LEP	Page	Rev	Date	Page	Rev	Date	Preface
	2.23-42-03.1	29	Mar 2016	2.24-56-01.6	29	Mar 2016	
	2.23-42-03.2	29	Mar 2016	2.24-56-02.1	29	Mar 2016	
	2.23-42-03.3	29	Mar 2016	2.24-56-02.2	29	Mar 2016	
	2.23-42-04.1	29	Mar 2016	2.25-11-02.1	29	Mar 2016	
	2.23-42-04.2	29	Mar 2016	2.25-11-02.2	29	Mar 2016	
	2.23-43-01.1	29	Mar 2016	2.25-11-03.1	29	Mar 2016	
	2.23-51-02.1	29	Mar 2016	2.25-20-01.1	29	Mar 2016	
	2.23-51-03.1	29	Mar 2016	2.25-24-01.1	29	Mar 2016	
	2.23-51-04.1	29	Mar 2016	2.25-24-01.2	29	Mar 2016	
	2.23-51-08.1	29	Mar 2016	2.25-25-01.1	29	Mar 2016	
	2.23-51-08.2	29	Mar 2016	2.25-25-01.2	29	Mar 2016	
	2.23-71-01.1	29	Mar 2016	2.25-25-02.1	29	Mar 2016	
	2.23-76-02.1	29	Mar 2016	2.25-25-02.2	29	Mar 2016	
	2.23-76-02.2	29	Mar 2016	2.25-25-02.3	29	Mar 2016	
	2.24-11-01.1	29	Mar 2016	2.25-25-02.4	29	Mar 2016	
	2.24-11-01.2	29	Mar 2016	2.25-25-02.5	29	Mar 2016	
	2.24-11-01.3	29	Mar 2016	2.25-25-02.6	29	Mar 2016	
	2.24-11-01.4	29	Mar 2016	2.25-25-04.1	29	Mar 2016	
	2.24-11-02.1	29	Mar 2016	2.25-28-01.1	29	Mar 2016	
	2.24-21-01.1	29	Mar 2016	2.25-28-01.2	29	Mar 2016	
	2.24-21-02.1	29	Mar 2016	2.25-29-02.1	29	Mar 2016	
	2.24-21-02.2	29	Mar 2016	2.25-29-03.1	29	Mar 2016	
	2.24-21-02.3	29	Mar 2016	2.25-30-01.1	29	Mar 2016	
	2.24-21-02.4	29	Mar 2016	2.25-40-01.1	29	Mar 2016	
	2.24-22-01.1	29	Mar 2016	2.25-40-02.1	29	Mar 2016	
	2.24-22-02.1	29	Mar 2016	2.25-40-04.1	29	Mar 2016	
	2.24-22-02.2	29	Mar 2016	2.25-52-01.1	29	Mar 2016	
	2.24-23-01.1	29	Mar 2016	2.25-53-01.1	29	Mar 2016	
	2.24-23-02.1	29	Mar 2016	2.25-54-01.1	29	Mar 2016	
	2.24-23-03.1	29	Mar 2016	2.25-61-01.1	29	Mar 2016	
	2.24-23-04.1	29	Mar 2016	2.25-62-01.1	29	Mar 2016	
	2.24-23-05.1	29	Mar 2016	2.25-63-01.1	29	Mar 2016	
	2.24-23-06.1	29	Mar 2016	2.25-63-02.1	29	Mar 2016	
	2.24-32-01.1	29	Mar 2016	2.25-63-03.1	29	Mar 2016	
	2.24-32-02.1	29	Mar 2016	2.25-63-04.1	29	Mar 2016	
	2.24-41-01.1	29	Mar 2016	2.25-63-05.1	29	Mar 2016	
	2.24-56-01.1	29	Mar 2016	2.25-63-05.2	29	Mar 2016	
	2.24-56-01.2	29	Mar 2016	2.25-64-01.1	29	Mar 2016	
	2.24-56-01.3	29	Mar 2016	2.25-64-02.1	29	Mar 2016	
	2.24-56-01.4	29	Mar 2016	2.25-64-02.2	29	Mar 2016	
	2.24-56-01.5	29	Mar 2016	2.25-65-01.1	29	Mar 2016	



BRITISH AIRWAYS
747 Dispatch Deviations Guide

Preface

LEP

Page	Rev	Date	Page	Rev	Date
2.26-11-01.1	29	Mar 2016	2.27-41-01.1	29	Mar 2016
2.26-11-04.1	29	Mar 2016	2.27-41-01.2	29	Mar 2016
2.26-12-01.1	29	Mar 2016	2.27-41-01.3	29	Mar 2016
2.26-13-01.1	29	Mar 2016	2.27-41-02.1	29	Mar 2016
2.26-13-02.1	29	Mar 2016	2.27-48-01.1	29	Mar 2016
2.26-14-02.1	29	Mar 2016	2.27-48-02.1	29	Mar 2016
2.26-14-03.1	29	Mar 2016	2.27-51-01.1	29	Mar 2016
2.26-14-03.2	29	Mar 2016	2.27-51-01.2	29	Mar 2016
2.26-15-01.1	29	Mar 2016	2.27-51-02.1	29	Mar 2016
2.26-15-01.2	29	Mar 2016	2.27-62-01.1	29	Mar 2016
2.26-16-01.1	29	Mar 2016	2.27-62-02.1	29	Mar 2016
2.26-16-01.2	29	Mar 2016	2.27-68-01.1	29	Mar 2016
2.26-16-01.3	29	Mar 2016	2.27-81-01.1	29	Mar 2016
2.26-17-01.1	29	Mar 2016	2.27-81-01.2	29	Mar 2016
2.26-17-01.2	29	Mar 2016	2.27-81-02.1	29	Mar 2016
2.26-18-01.1	29	Mar 2016	2.27-81-03.1	29	Mar 2016
2.26-18-02.1	29	Mar 2016	2.27-88-01.1	29	Mar 2016
2.26-18-02.2	29	Mar 2016	2.28-11-01.1	29	Mar 2016
2.26-18-02.3	29	Mar 2016	2.28-11-01.2	29	Mar 2016
2.26-19-01.1	29	Mar 2016	2.28-11-02.1	29	Mar 2016
2.26-20-01.1	29	Mar 2016	2.28-11-02.2	29	Mar 2016
2.26-20-01.2	29	Mar 2016	2.28-11-02.3	29	Mar 2016
2.26-21-01.1	29	Mar 2016	2.28-11-03.1	29	Mar 2016
2.26-21-01.2	29	Mar 2016	2.28-15-01.1	29	Mar 2016
2.26-22-01.1	29	Mar 2016	2.28-15-01.2	29	Mar 2016
2.26-22-01.2	29	Mar 2016	2.28-15-02.1	29	Mar 2016
2.26-23-01.1	29	Mar 2016	2.28-15-02.2	29	Mar 2016
2.26-23-01.2	29	Mar 2016	2.28-15-02.3	29	Mar 2016
2.26-24-02.1	29	Mar 2016	2.28-16-01.1	29	Mar 2016
2.26-26-01.1	29	Mar 2016	2.28-16-01.2	29	Mar 2016
2.27-11-01.1	29	Mar 2016	2.28-17-01.1	29	Mar 2016
2.27-11-02.1	29	Mar 2016	2.28-21-01.1	29	Mar 2016
2.27-11-02.2	29	Mar 2016	2.28-21-01.2	29	Mar 2016
2.27-18-01.1	29	Mar 2016	2.28-21-01.3	29	Mar 2016
2.27-21-01.1	29	Mar 2016	2.28-21-01.4	29	Mar 2016
2.27-23-01.1	29	Mar 2016	2.28-21-03.1	29	Mar 2016
2.27-23-02.1	29	Mar 2016	2.28-21-04.1	29	Mar 2016
2.27-28-01.1	29	Mar 2016	2.28-22-01.1	29	Mar 2016
2.27-28-02.1	29	Mar 2016	2.28-22-01.2	29	Mar 2016
2.27-32-01.1	29	Mar 2016	2.28-22-01.3	29	Mar 2016
2.27-38-01.1	29	Mar 2016	2.28-22-01.4	29	Mar 2016



747 Dispatch Deviations Guide

LEP	Page	Rev	Date	Page	Rev	Date	Preface
2.28-22-01.5	29		Mar 2016	2.28-43-01.1	29		Mar 2016
2.28-22-01.6	29		Mar 2016	2.28-44-01.1	29		Mar 2016
2.28-22-01.7	29		Mar 2016	2.28-44-01.2	29		Mar 2016
2.28-22-01.8	29		Mar 2016	2.29-11-01.1	29		Mar 2016
2.28-22-02.1	29		Mar 2016	2.29-11-01.2	29		Mar 2016
2.28-22-02.2	29		Mar 2016	2.29-11-01.3	29		Mar 2016
2.28-22-03.1	29		Mar 2016	2.29-11-02.1	29		Mar 2016
2.28-22-04.1	29		Mar 2016	2.29-11-02.2	29		Mar 2016
2.28-22-04.2	29		Mar 2016	2.29-11-02.3	29		Mar 2016
2.28-22-04.3	29		Mar 2016	2.29-11-03.1	29		Mar 2016
2.28-22-05.1	29		Mar 2016	2.29-11-03.2	29		Mar 2016
2.28-22-05.2	29		Mar 2016	2.29-18-01.1	29		Mar 2016
2.28-22-05.3	29		Mar 2016	2.29-21-01.1	29		Mar 2016
2.28-25-01.1	29		Mar 2016	2.29-31-01.1	29		Mar 2016
2.28-25-02.1	29		Mar 2016	2.29-32-01.1	29		Mar 2016
2.28-26-01.1	29		Mar 2016	2.29-32-01.2	29		Mar 2016
2.28-31-01.1	29		Mar 2016	2.29-33-01.1	29		Mar 2016
2.28-31-01.2	29		Mar 2016	2.29-33-01.2	29		Mar 2016
2.28-31-01.3	29		Mar 2016	2.29-33-01.3	29		Mar 2016
2.28-31-01.4	29		Mar 2016	2.29-34-01.1	29		Mar 2016
2.28-31-02.1	29		Mar 2016	2.29-34-01.2	29		Mar 2016
2.28-31-02.2	29		Mar 2016	2.29-34-02.1	29		Mar 2016
2.28-31-03.1	29		Mar 2016	2.29-34-02.2	29		Mar 2016
2.28-31-04.1	29		Mar 2016	2.30-00-01.1	29		Mar 2016
2.28-31-04.2	29		Mar 2016	2.30-11-01.1	29		Mar 2016
2.28-41-01.1	29		Mar 2016	2.30-11-02.1	29		Mar 2016
2.28-41-01.2	29		Mar 2016	2.30-21-01.1	29		Mar 2016
2.28-41-01.3	29		Mar 2016	2.30-21-01.2	29		Mar 2016
2.28-41-01.4	29		Mar 2016	2.30-21-02.1	29		Mar 2016
2.28-41-02.1	29		Mar 2016	2.30-21-02.2	29		Mar 2016
2.28-41-02.2	29		Mar 2016	2.30-21-03.1	29		Mar 2016
2.28-41-02.3	29		Mar 2016	2.30-31-01.1	29		Mar 2016
2.28-41-03.1	29		Mar 2016	2.30-31-02.1	29		Mar 2016
2.28-41-04.1	29		Mar 2016	2.30-31-03.1	29		Mar 2016
2.28-41-05.1	29		Mar 2016	2.30-41-01.1	29		Mar 2016
2.28-41-05.2	29		Mar 2016	2.30-41-02.1	29		Mar 2016
2.28-41-06.1	29		Mar 2016	2.30-41-03.1	29		Mar 2016
2.28-41-07.1	29		Mar 2016	2.30-41-03.2	29		Mar 2016
2.28-41-07.2	29		Mar 2016	2.30-42-01.1	29		Mar 2016
2.28-42-01.1	29		Mar 2016	2.30-44-01.1	29		Mar 2016
2.28-42-02.1	29		Mar 2016	2.30-71-01.1	29		Mar 2016



BRITISH AIRWAYS

747 Dispatch Deviations Guide

Preface

LEP

Page	Rev	Date	Page	Rev	Date
2.30-81-01.1	29	Mar 2016	2.32-42-03.1	29	Mar 2016
2.30-81-01.2	29	Mar 2016	2.32-42-03.2	29	Mar 2016
2.31-25-01.1	29	Mar 2016	2.32-42-04.1	29	Mar 2016
2.31-31-01.1	29	Mar 2016	2.32-42-04.2	29	Mar 2016
2.31-31-02.1	29	Mar 2016	2.32-44-02.1	29	Mar 2016
2.31-35-01.1	29	Mar 2016	2.32-45-01.1	29	Mar 2016
2.31-51-01.1	29	Mar 2016	2.32-46-01.1	29	Mar 2016
2.31-51-02.1	29	Mar 2016	2.32-48-01.1	29	Mar 2016
2.31-61-01.1	29	Mar 2016	2.32-48-01.2	29	Mar 2016
2.31-61-02.1	29	Mar 2016	2.32-51-01.1	29	Mar 2016
2.31-61-03.1	29	Mar 2016	2.32-51-01.2	29	Mar 2016
2.31-61-04.1	29	Mar 2016	2.32-53-01.1	29	Mar 2016
2.31-61-05.1	29	Mar 2016	2.32-53-01.2	29	Mar 2016
2.31-61-06.1	29	Mar 2016	2.32-53-01.3	29	Mar 2016
2.31-61-06.2	29	Mar 2016	2.32-53-01.4	29	Mar 2016
2.31-61-06.3	29	Mar 2016	2.32-53-02.1	29	Mar 2016
2.32-10-01.1	29	Mar 2016	2.32-61-01.1	29	Mar 2016
2.32-11-01.1	29	Mar 2016	2.32-61-01.2	29	Mar 2016
2.32-30-01.1	29	Mar 2016	2.32-61-02.1	29	Mar 2016
2.32-31-01.1	29	Mar 2016	2.32-61-03.1	29	Mar 2016
2.32-32-01.1	29	Mar 2016	2.32-61-03.2	29	Mar 2016
2.32-33-01.1	29	Mar 2016	2.33-11-01.1	29	Mar 2016
2.32-41-01.1	29	Mar 2016	2.33-12-01.1	29	Mar 2016
2.32-41-01.2	29	Mar 2016	2.33-18-01.1	29	Mar 2016
2.32-41-01.3	29	Mar 2016	2.33-21-01.1	29	Mar 2016
2.32-41-01.4	29	Mar 2016	2.33-21-01.2	29	Mar 2016
2.32-41-01.5	29	Mar 2016	2.33-21-01.3	29	Mar 2016
2.32-41-02.1	29	Mar 2016	2.33-24-01.1	29	Mar 2016
2.32-41-03.1	29	Mar 2016	2.33-24-01.2	29	Mar 2016
2.32-41-04.1	29	Mar 2016	2.33-31-01.1	29	Mar 2016
2.32-41-05.1	29	Mar 2016	2.33-41-01.1	29	Mar 2016
2.32-42-01.1	29	Mar 2016	2.33-42-02.1	29	Mar 2016
2.32-42-01.2	29	Mar 2016	2.33-42-03.1	29	Mar 2016
2.32-42-01.3	29	Mar 2016	2.33-43-01.1	29	Mar 2016
2.32-42-01.4	29	Mar 2016	2.33-44-01.1	29	Mar 2016
2.32-42-01.5	29	Mar 2016	2.33-44-01.2	29	Mar 2016
2.32-42-01.6	29	Mar 2016	2.33-45-01.1	29	Mar 2016
2.32-42-01.7	29	Mar 2016	2.33-51-01.1	29	Mar 2016
2.32-42-01.8	29	Mar 2016	2.33-51-02.1	29	Mar 2016
2.32-42-02.1	29	Mar 2016	2.33-51-03.1	29	Mar 2016
2.32-42-02.2	29	Mar 2016	2.33-51-03.2	29	Mar 2016



747 Dispatch Deviations Guide

LEP	Page	Rev	Date	Page	Rev	Date	Preface
2.34-00-01.1	29		Mar 2016	2.34-61-02.2	29		Mar 2016
2.34-00-02.1	29		Mar 2016	2.35-11-01.1	29		Mar 2016
2.34-11-01.1	29		Mar 2016	2.35-11-02.1	29		Mar 2016
2.34-11-02.1	29		Mar 2016	2.35-11-03.1	29		Mar 2016
2.34-12-01.1	29		Mar 2016	2.35-21-01.1	29		Mar 2016
2.34-12-02.1	29		Mar 2016	2.35-21-01.2	29		Mar 2016
2.34-13-01.1	29		Mar 2016	2.35-21-01.3	29		Mar 2016
2.34-13-02.1	29		Mar 2016	2.35-21-02.1	29		Mar 2016
2.34-13-03.1	29		Mar 2016	2.35-31-01.1	29		Mar 2016
2.34-13-04.1	29		Mar 2016	2.35-31-02.1	29		Mar 2016
2.34-16-01.1	29		Mar 2016	2.35-31-02.2	29		Mar 2016
2.34-16-01.2	29		Mar 2016	2.36-11-01.1	29		Mar 2016
2.34-21-01.1	29		Mar 2016	2.36-11-01.2	29		Mar 2016
2.34-21-02.1	29		Mar 2016	2.36-11-02.1	29		Mar 2016
2.34-22-01.1	29		Mar 2016	2.36-11-03.1	29		Mar 2016
2.34-22-02.1	29		Mar 2016	2.36-11-03.2	29		Mar 2016
2.34-22-03.1	29		Mar 2016	2.36-11-04.1	29		Mar 2016
2.34-22-04.1	29		Mar 2016	2.36-11-04.2	29		Mar 2016
2.34-31-01.1	29		Mar 2016	2.36-11-04.3	29		Mar 2016
2.34-31-01.2	29		Mar 2016	2.36-11-04.4	29		Mar 2016
2.34-31-02.1	29		Mar 2016	2.36-11-04.5	29		Mar 2016
2.34-32-01.1	29		Mar 2016	2.36-11-04.6	29		Mar 2016
2.34-33-01.1	29		Mar 2016	2.36-11-04.7	29		Mar 2016
2.34-35-01.1	29		Mar 2016	2.36-11-04.8	29		Mar 2016
2.34-43-01.1	29		Mar 2016	2.36-11-04.9	29		Mar 2016
2.34-43-01.2	29		Mar 2016	2.36-11-04.10	29		Mar 2016
2.34-45-01.1	29		Mar 2016	2.36-11-04.11	29		Mar 2016
2.34-45-01.2	29		Mar 2016	2.36-11-04.12	29		Mar 2016
2.34-46-01.1	29		Mar 2016	2.36-11-04.13	29		Mar 2016
2.34-46-01.2	29		Mar 2016	2.36-11-05.1	29		Mar 2016
2.34-51-01.1	29		Mar 2016	2.36-11-06.1	29		Mar 2016
2.34-51-02.1	29		Mar 2016	2.36-11-07.1	29		Mar 2016
2.34-53-01.1	29		Mar 2016	2.36-11-09.1	29		Mar 2016
2.34-53-01.2	29		Mar 2016	2.36-11-09.2	29		Mar 2016
2.34-55-01.1	29		Mar 2016	2.36-11-09.3	29		Mar 2016
2.34-57-01.1	29		Mar 2016	2.36-11-11.1	29		Mar 2016
2.34-58-01.1	29		Mar 2016	2.36-11-12.1	29		Mar 2016
2.34-58-01.2	29		Mar 2016	2.36-12-01.1	29		Mar 2016
2.34-61-01.1	29		Mar 2016	2.36-12-02.1	29		Mar 2016
2.34-61-01.2	29		Mar 2016	2.36-12-02.2	29		Mar 2016
2.34-61-02.1	29		Mar 2016	2.36-16-01.1	29		Mar 2016



BRITISH AIRWAYS
747 Dispatch Deviations Guide

Preface

LEP

Page	Rev	Date	Page	Rev	Date
2.36-16-01.2	29	Mar 2016	2.52-23-01.1	29	Mar 2016
2.36-21-01.1	29	Mar 2016	2.52-23-01.2	29	Mar 2016
2.36-21-02.1	29	Mar 2016	2.52-23-02.1	29	Mar 2016
2.36-21-03.1	29	Mar 2016	2.52-23-03.1	29	Mar 2016
2.36-21-04.1	29	Mar 2016	2.52-23-04.1	29	Mar 2016
2.36-22-01.1	29	Mar 2016	2.52-23-04.2	29	Mar 2016
2.36-22-02.1	29	Mar 2016	2.52-23-05.1	29	Mar 2016
2.36-22-03.1	29	Mar 2016	2.52-23-05.2	29	Mar 2016
2.38-10-01.1	29	Mar 2016	2.52-23-06.1	29	Mar 2016
2.38-30-01.1	29	Mar 2016	2.52-23-06.2	29	Mar 2016
2.44-01-01.1	29	Mar 2016	2.52-23-07.1	29	Mar 2016
2.44-01-01.2	29	Mar 2016	2.52-32-04.1	29	Mar 2016
2.44-01-01.3	29	Mar 2016	2.52-32-05.1	29	Mar 2016
2.44-01-01.4	29	Mar 2016	2.52-34-01.1	29	Mar 2016
2.44-01-01.5	29	Mar 2016	2.52-34-02.1	29	Mar 2016
2.44-01-02.1	29	Mar 2016	2.52-36-01.1	29	Mar 2016
2.44-02-01.1	29	Mar 2016	2.52-36-02.1	29	Mar 2016
2.44-02-01.2	29	Mar 2016	2.52-48-01.1	29	Mar 2016
2.44-02-01.3	29	Mar 2016	2.52-48-01.2	29	Mar 2016
2.44-02-01.4	29	Mar 2016	2.52-51-02.1	29	Mar 2016
2.44-02-01.5	29	Mar 2016	2.52-51-02.2	29	Mar 2016
2.44-03-01.1	29	Mar 2016	2.52-51-02.3	29	Mar 2016
2.45-45-01.1	29	Mar 2016	2.52-51-02.4	29	Mar 2016
2.45-45-02.1	29	Mar 2016	2.52-51-02.5	29	Mar 2016
2.45-45-03.1	29	Mar 2016	2.52-51-03.1	29	Mar 2016
2.45-45-03.2	29	Mar 2016	2.52-51-06.1	29	Mar 2016
2.46-20-01.1	29	Mar 2016	2.52-73-01.1	29	Mar 2016
2.46-20-01.2	29	Mar 2016	2.52-73-01.2	29	Mar 2016
2.49-11-01.1	29	Mar 2016	2.52-73-01.3	29	Mar 2016
2.49-11-01.2	29	Mar 2016	2.52-BA-01.1	29	Mar 2016
2.49-15-01.1	29	Mar 2016	2.52-BA-01.2	29	Mar 2016
2.49-15-01.2	29	Mar 2016	2.53-21-01.1	29	Mar 2016
2.49-61-01.1	29	Mar 2016	2.53-21-02.1	29	Mar 2016
2.49-61-02.1	29	Mar 2016	2.53-30-01.1	29	Mar 2016
2.49-71-01.1	29	Mar 2016	2.53-30-01.2	29	Mar 2016
2.49-94-01.1	29	Mar 2016	2.73-21-01.1	29	Mar 2016
2.52-11-01.1	29	Mar 2016	2.73-21-02.1	29	Mar 2016
2.52-11-01.2	29	Mar 2016	2.73-21-02.2	29	Mar 2016
2.52-11-02.1	29	Mar 2016	2.73-21-03.1	29	Mar 2016
2.52-11-03.1	29	Mar 2016	2.73-31-01.1	29	Mar 2016
2.52-21-01.1	29	Mar 2016	2.73-34-01.1	29	Mar 2016



747 Dispatch Deviations Guide

LEP	Page	Rev	Date	Page	Rev	Date	Preface
2.74-00-01.1	29		Mar 2016	3.21-52-01.1	29		Mar 2016
2.74-00-02.1	29		Mar 2016	3.21-62-01.1	29		Mar 2016
2.74-00-03.1	29		Mar 2016	3.21-62-01.2	29		Mar 2016
2.74-00-03.2	29		Mar 2016	3.23-61-01.1	29		Mar 2016
2.75-33-01.1	29		Mar 2016	3.23-61-01.2	29		Mar 2016
2.75-33-01.2	29		Mar 2016	3.27-11-01.1	29		Mar 2016
2.77-11-01.1	29		Mar 2016	3.27-11-02.1	29		Mar 2016
2.77-12-01.1	29		Mar 2016	3.27-51-01.1	29		Mar 2016
2.77-12-02.1	29		Mar 2016	3.27-51-01.2	29		Mar 2016
2.77-12-03.1	29		Mar 2016	3.27-51-02.1	29		Mar 2016
2.77-22-01.1	29		Mar 2016	3.27-51-03.1	29		Mar 2016
2.77-31-01.1	29		Mar 2016	3.27-51-04.1	29		Mar 2016
2.78-31-01.1	29		Mar 2016	3.27-51-05.1	29		Mar 2016
2.78-31-01.2	29		Mar 2016	3.27-51-06.1	29		Mar 2016
2.78-31-01.3	29		Mar 2016	3.27-81-01.1	29		Mar 2016
2.78-31-01.4	29		Mar 2016	3.27-81-01.2	29		Mar 2016
2.78-31-01.5	29		Mar 2016	3.27-81-01.3	29		Mar 2016
2.78-34-01.1	29		Mar 2016	3.28-22-01.1	29		Mar 2016
2.78-36-01.1	29		Mar 2016	3.28-22-01.2	29		Mar 2016
2.78-36-01.2	29		Mar 2016	3.32-10-01.1	29		Mar 2016
2.78-36-03.1	29		Mar 2016	3.32-12-01.1	29		Mar 2016
2.78-36-03.2	29		Mar 2016	3.32-12-02.1	29		Mar 2016
2.79-21-02.1	29		Mar 2016	3.32-12-03.1	29		Mar 2016
2.79-21-03.1	29		Mar 2016	3.32-14-01.1	29		Mar 2016
2.79-31-01.1	29		Mar 2016	3.32-14-02.1	29		Mar 2016
2.79-31-01.2	29		Mar 2016	3.32-21-01.1	29		Mar 2016
2.80-11-01.1	29		Mar 2016	3.32-21-02.1	29		Mar 2016
2.80-11-01.2	29		Mar 2016	3.33-41-01.1	29		Mar 2016
2.80-11-01.3	29		Mar 2016	3.33-43-01.1	29		Mar 2016
2.80-11-02.1	29		Mar 2016	3.33-44-01.1	29		Mar 2016
2.80-11-03.1	29		Mar 2016	3.33-51-01.1	29		Mar 2016
2.80-11-04.1	29		Mar 2016	3.52-11-01.1	29		Mar 2016
3.00-TC-00.1	29		Mar 2016	3.52-11-02.1	29		Mar 2016
3.00-TC-00.2	29		Mar 2016	3.52-49-01.1	29		Mar 2016
3.00-01-00.1	29		Mar 2016	3.52-49-02.1	29		Mar 2016
3.00-01-00.2	29		Mar 2016	3.52-49-03.1	29		Mar 2016
3.00-02-00.1	29		Mar 2016	3.52-49-04.1	29		Mar 2016
3.00-02-00.2	29		Mar 2016	3.52-49-05.1	29		Mar 2016
3.00-02-00.3	29		Mar 2016	3.52-49-05.2	29		Mar 2016
3.00-02-00.4	29		Mar 2016	3.53-51-01.1	29		Mar 2016
3.21-30-01.1	29		Mar 2016	3.53-51-01.2	29		Mar 2016



BRITISH AIRWAYS
747 Dispatch Deviations Guide

Preface

LEP

Page	Rev	Date	Page	Rev	Date
3.54-32-01.1	29	Mar 2016			
3.54-32-01.2	29	Mar 2016			
3.54-32-01.3	29	Mar 2016			
3.54-32-01.4	29	Mar 2016			
3.55-20-01.1	29	Mar 2016			
3.55-20-02.1	29	Mar 2016			
3.57-23-01.1	29	Mar 2016			
3.57-28-01.1	29	Mar 2016			
3.57-31-01.1	29	Mar 2016			
3.57-54-01.1	29	Mar 2016			
3.57-54-01.2	29	Mar 2016			
3.57-54-02.1	29	Mar 2016			
3.78-31-02.1	29	Mar 2016			
3.78-31-05.1	29	Mar 2016			
4.00-TC-00.1	29	Mar 2016			
4.00-TC-00.2	29	Mar 2016			
4.00-01-00.1	29	Mar 2016			
4.00-01-00.2	29	Mar 2016			

INTENTIONALLY BLANK

Section 0

Table of Contents

General

Introduction

Document Purpose

Document Content and Organization

British Airways' Policies

Table of Contents

Intentionally
Blank

Document Purpose

This document defines the procedures required to operate the airplane in the various nonstandard configurations allowed by the Federal Aviation Administration (FAA) Master Minimum Equipment List (MMEL), European Aviation Safety Agency (EASA) regulations and the Airplane Flight Manual (AFM) Appendix Configuration Deviation List (CDL).

Document Content and Organization

The DDG is divided into five sections as follows:

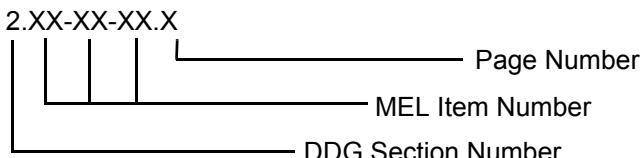
SECTION 0 - GENERAL

SECTION 1 - EICAS MESSAGES

- This section provides a cross reference between EICAS messages and MEL items which may provide dispatch relief. The EICAS message list is in alphabetic order and includes all of the current EICAS messages. The EICAS messages applicable to an operator's airplane and the description of the condition or fault indicated by the messages can be found in the operator's Fault Isolation Manual (FIM).

SECTION 2 - MEL

- This section contains all items from the FAA MMEL. For ease of use, page numbering uses the MEL item number as follows:



For example, MEL item 21-51-01 would be found on page 2.21-51-01.1 in Section 2.

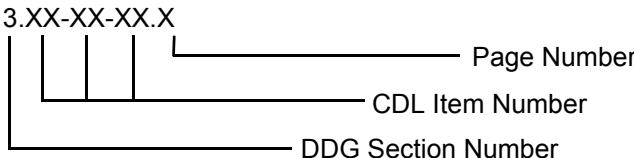
When appropriate, Boeing suggested procedures follow the MEL item. MEL items may not have suggested procedures for the following reasons:

- The procedure is obvious.
- Boeing is not aware of any procedural effects.
- The MMEL does not require that a procedure be established.

The FAA MMEL Definitions and Preamble have been reprinted in this section.

SECTION 3 - CDL

- This section contains all items from the AFM Appendix CDL. For ease of use, page numbering uses the CDL item number as follows:



For example, CDL item 52-11-01 would be found on page 3.52-11-01.1 in Section 3.

When appropriate, illustrations, system effects and performance adjustments follow the CDL item. The CDL General Limitations information has been printed in this section.

SECTION 4 - MISCELLANEOUS

This section is for information that does not fit into the categories covered by Sections 2 and 3.

British Airways' Policies

Defect Evaluation, Rectification and Deferrals

The existence of the B747 Dispatch Deviations Guide does not absolve the Commander and Ground Engineer from ensuring that the aircraft is safe for flight. Consideration will be given to Operational implications, multiple/cumulative defects, items affecting airworthiness or contributing to an increase in crew workload. These considerations may override any clearance to dispatch provided by the DDG. Therefore, it is recognised that the Commander may require a defect otherwise permitted by the MEL or CDL to be rectified. Such action should be discussed with Flight Manager Technical, or his representative as soon as possible if this action could result in operational disruption.

Defects that affect aircraft handling characteristics shall be brought to the attention of the Flight Manager Technical (or his representative) as soon as possible so that a Management Pilot may accomplish timely evaluation of the defect.

When it has been established by both the Commander and the Ground Engineer, that the aircraft cannot reasonably or practicably be immediately repaired, and that it can be dispatched within the terms of the DDG, then the full procedures and constraints as stated in this document must be applied.

The existence of this document does not imply that the rectification of items permitted to be unserviceable should be delayed unnecessarily. Therefore rectification of items dispatched within the terms of the MEL (Section 2) shall be carried out at the first station where time, spares facilities and manpower permit.

Priority must be given to the rectification of:

- All defects that impose a performance penalty on the planned operation.
- All defects that require the use of an alternate/standby system as the primary method of control, or degrade a primary system.
- Defects that have been outstanding for an inappropriate period of time.
- Items that are brought to the attention of the Engineering Manager by the FMT as being critical to the operation.
- Items which, when considered together, have the cumulative effect of unacceptably degrading the operation. The FMT should be notified in such circumstances. It is expected that Commanders and Engineering Personnel will draw his or her attention to cumulative defects that are likely to cause operational problems.
- Defects that affect aircraft handling characteristics.

Non-safety Related Equipment and Passenger Convenience Items

Non-safety Related Equipment

1. Most aircraft are designed and certified with a significant amount of equipment redundancy, such that the airworthiness requirements are satisfied by a substantial margin. In addition, aircraft are generally fitted with equipment that is not required for safe operation under all operating conditions, e.g. instrument lighting in day VMC.
2. All items related to the airworthiness, or required for the safe operation, of the aircraft and not included in the list are automatically required to be operative.
3. BA uses item 05-00-01 to defer non-safety related equipment defects. These items must be raised with a rectification interval of 'D'. If deactivation and/or securing in case of malfunction is required the item must not be deferred using 05-00-01. 05-00-01 contains notes on factors to consider when deciding if an item is non-safety related.

Passenger Convenience Items

1. Equipment, such as entertainment systems or galley equipment, may be installed for passenger convenience. If this equipment does not affect the airworthiness or operation of the aircraft when inoperative, it may be deferred using 25-20-01. The exceptions to this are as follows:
 - A. Where non-safety related equipment serves a second function, such as movie equipment being used for cabin safety briefings, operators should develop and include operational contingency procedures in the MEL in case of an equipment malfunction.
 - B. Where non-safety related equipment is part of another aircraft system, for example the electrical system. If deactivation and/or securing, in case of malfunction is required the item must not be deferred using 25-20-01.

Placarding

British Airways' placarding policy is detailed in the AML User Guide.

Systems Verification

If a system is required to operate normally then the absence of indications or reports to the contrary are sufficient to indicate normal operation. If a system is required to be verified then a specific procedure must be carried out.

Main Maintenance Base and Transit Stations

A Main Maintenance Base is defined as a place where the facilities exist (including time, spares and personnel) for rectification and repair. In practice, British Airways designates certain airfields as Main Maintenance Bases. The expressions 'Main Maintenance Base', 'Main Base' and 'Base' have the same meaning within this document.

LHR is the Main Maintenance Base for the B747. Flight Manager Technical may designate another airfield to become a Main Maintenance Base, and will promulgate such a decision by publishing an Ops Manual Notice amending this paragraph.

At the Main Maintenance Base, once the aircraft has dispatched, restrictions applicable to dispatch from a Main Maintenance Base no longer apply.

After an aircraft dispatches from Main Maintenance Base on the first flight of the day, the Base reverts to Transit Station status for all subsequent transits of that aircraft for the remainder of the day (GMT).

Section 0

Rectification Interval Extension (RIE) Policy

British Airways RIE Policy is detailed in Section 2, MEL, Introduction.

Acceptable Carried Forward (ACF) Procedure

A Commander may accept and carry forward a defect where:

- The Commander determines that the defect complies with the MEL (Section 2),
- The defect requires no (M) maintenance actions or where the defect is considered to affect Non-safety related equipment only, and
- There are no maintenance personnel or spares readily available (i.e. to enable a scheduled departure).

Note: ACF may not be used to dispatch from Main Maintenance Base with a defect that has the restriction 'no dispatch main maintenance base'. ACF may not be used for CDL (Section 3) items.

The following procedure is to be used:

1. Commander will contact Maintrol to advise them of the defect. Maintrol will check the defect against the MEL to consider and advise if the defect can be carried forward. In the case of main Maintenance Base departures, Maintrol will also consider any onward destination and multiple/cumulative defect constraints.
2. Maintrol will record the ACF request and issue a unique number to the Commander. The Commander will indicate his acceptance of the defect by entering the following information in the Action Taken block in the maintenance log:
 - ACF.
 - Unique Number (if provided by Maintrol prior to departure).
 - Reason for ACF (e.g. nil spares, nil manpower, etc.).
 - Signature (Electronic Logbook Print).
3. The defect including the unique number must be re-entered again at each subsequent sector until the defect is deferred or rectified by a suitably authorised engineer, even if the defect is no longer apparent.

Note: Maintrol signal address LHRKEBA. Tel: 044(0)20 8513 0881/3/6/0.

Single Event Authorisation (SEA) Procedure

A Single Event Authorisation may be applied where:

- MEL (Section 2) Maintenance [M] procedure or any other maintenance actions including those associated with the CDL (Section 3) is required and/or inspections are required prior to dispatch, and
- No BA authorised Engineer is available to rectify or defer the defect.

Note: Unlike the MEL, the CDL does not specify Maintenance [M] procedure. Maintrol shall coordinate the requirement for and extent of such maintenance actions.

The following procedure is to be used:

1. A local Engineer must be located via contact with Maintrol. The local Engineer will require a Single Event Authorisation to enable him to certify the completed task(s). The Single Event Authorisation is obtained from Maintrol.
2. The Commander should verify that the Engineer being nominated to accomplish the task is authorised to certify work of a similar nature on aircraft maintained by his/her employing company. Maintrol should be contacted for assistance should this verification prove difficult.
3. This supporting information should be sent to Maintrol, together with a description of the defect and the proposed corrective action required to comply with the DDG.
4. Maintrol will contact the British Airways Quality Assurance Department, to obtain a Single Event Authorisation. If this is issued, Maintrol will provide a Single Event Authorisation number and communicate this to the operating Commander. The nominated Engineer must not carry out any work on the aircraft until this is obtained.
5. The Engineer carrying out the maintenance action must record the details in the of action taken and enter the Single Event Authorisation number in the certification block. In addition, the Single Event Authorisation holder must identify his/her company name and individual staff number within the action block and sign the maintenance log (Electronic Log Print). Commanders should satisfy themselves that the SEA complies fully with the instructions from British Airways Engineering.
6. The Commander must enter the defect details into the Maintenance Log for the next sector. This process must be repeated until the Maintenance Action is re assessed, deferred or Certified by a British Airways Authorised Engineer.

Note: Maintrol signal address LHRKEBA. Tel: 044(0)20 8513 0881/3/6/0.

Engineering Design Instruction (EDI)/Engineering Design Approval (EDA)

Under EASA Part 21 subpart M, British Airways Engineering able to approve deviations from the aircraft manufacturers approved maintenance documentation (e.g. Maintenance Manual, Structural Repair Manual). This approval is granted to designated technical specialists, the Compliance Compilation Engineer (CCE) and the Compliance Verification Engineer (CVE).

This authority is conveyed in an Engineering Design Instruction (EDI) and the Engineering Design Approval (EDA) under procedure EN-SD-21.53. The former document details the accomplishment instructions while the latter documents the substantiation and classification requirements.

There are circumstances where it is not practicable to issue an EDI/EDA and a Temporary Repair Mandate (TRM) may be substituted under procedure EN-SD21.57-WI.3. The EDI/EDA and TRM documents require two separate signatures, one from the CCE and the other from the CVE to be completed prior to flight.

Additionally a document known as a Technical Instruction (TI) may be issued where the authority originates from the original equipment manufacturer (OEM) under procedure EN-WD-2-5-WI.1.

It is normal that a copy of the EDI, TI or TRM is available onboard prior to departure. There may be circumstances where this is not possible and Maintrol will ensure that a copy of the approving documentation is available at the next airfield where the aircraft transits.

Alleviated ETOPS Transit Check

In the event that an aircraft has to depart from an airfield at which there is no BA approved engineer authorized to conduct an ETOPS Transit Check, the Commander may be authorized to conduct an 'Alleviated ETOPS Transit Check' on authority from Maintrol. The schedule is held onboard in the Additional Documents folder. Procedures for recording the check are contained in the Aircraft Maintenance Log User Guide.

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Section 1

Table of Contents EICAS Messages

Introduction

EICAS Messages Cross Reference List

EICAS Messages

Maintenance Level Messages

Considerations for Dispatch with Displayed EICAS and CMCS
Messages

Considerations for Dispatch Using Synoptic Displays

Cross Reference List

Table of Contents

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Section 1

Introduction

EICAS Messages

EICAS Messages Cross Reference List

A Cross Reference List of Engine Indication and Crew Alerting System (EICAS) messages and corresponding MEL items is provided in this section. The Cross Reference List is intended to assist operators in quickly identifying the proper MEL item to consult for possible dispatch relief. All EICAS messages at Status level or higher are listed by message text in alphabetic order. A description of the information provided in each column of the Cross Reference List follows.

Message Text	This column alphabetically lists each message as they would appear on EICAS. (Any associated caret symbol (>) is not included with the message.)
Level	The appropriate EICAS message level is listed: Warning, Caution, Advisory, Memo, or Status.
MEL Item	This column lists the appropriate MEL item(s) to consult for possible dispatch relief with the associated message displayed. EICAS messages that do not have a specific MEL item to allow dispatch are listed with one of the following cross references:
N/A	Not Applicable: There is no MEL item listed because the message does not indicate a system failure.
None	There is no MEL item for the failure condition indicated by this message.

EICAS Messages

EICAS is the primary means of displaying airplane system information to the flight crew. EICAS consolidates engine and subsystem indications and provides a centrally located crew alerting function. EICAS displays System Alerts (Warning, Caution, and Advisory), Communication Alerts, Memo messages, and Status messages as described below. All EICAS messages are displayed on the primary EICAS display, except Status messages which are displayed on the Status page of the selected multifunction display.

Warning	A non-normal operational or system condition displayed in red text accompanied by annunciation of the master warning lights and an aural tone. Immediate crew awareness and corrective action is required.
Caution	A non-normal operational or system condition displayed in amber text accompanied by annunciation of the master caution lights and an aural tone. Immediate crew awareness is required and corrective action may be required.
Advisory	A non-normal operational or system condition displayed in amber text without other visual or aural annunciations. Routine crew awareness is required and corrective action may be required.
Memo	A reminder of a normal condition in white text that indicates the current state of certain manually and automatically configured airplane systems.
Status	A system condition which affects airplane dispatch, displayed in white text on secondary EICAS. Status messages are checked prior to engine start and the condition should be corrected or dispatched per the operator's MEL. There are no inflight crew procedures associated with Status messages.

Maintenance Level Messages

Maintenance Level messages are not included the Cross Reference List, since they do not affect the airworthiness release of the airplane.

Considerations for Dispatch with Displayed EICAS and CMCS Messages

Any monitored faults that affect airplane dispatchability will be displayed on EICAS as a Status or Alert level message with a corresponding maintenance message. System faults displayed at Status level or Alert level should be resolved by MEL compliance or maintenance action prior to engine start. After engine start, EICAS Alert messages are the primary means of alerting the crew to non-normal conditions or improper configuration. Display of any Alert message requires accomplishment of the appropriate non-normal procedure by the crew. Upon completion of the procedure and prior to takeoff, the MEL should be consulted to determine if relief is available for continued operation with system faults displayed at the Alert Level (Warning, Caution, Advisory).

Any system faults that result only in a CMCS maintenance message do not require MEL consideration or maintenance action prior to dispatch. They are addressed within the standard maintenance program.

If the words 'None' are given against the message then, particularly when departing LHR, it would be prudent to ask engineering advice as to whether the flight should continue to the next station, where the necessary engineering support may not be available, or whether action should be taken at the current station before departure. Any performance or other restriction associated with the item need not be applied, as the aircraft has already dispatched. See also QRH CI.2 Non-Normal Checklists Operation.

Boeing analysis is that faults annunciated as status messages do not have an adverse effect on safe continuation of the flight and so do not require checking by crew after the first engine start action (pull of the engine START switch).

Although status messages displayed after engine start do not have to be considered for the current sector, crew are encouraged to review status messages to understand the potential effect on the subsequent sector. Crew should notify Maintrol If these are 'None' (No Dispatch). There are airfields on the BA network which are 'AOG Sensitive' due to the absence of aircraft spares and engineering cover. These are identified by entries on LORETO and in the OM C brief. When operating to these airfields all defects for which the EICAS Message List shows 'None' (No Dispatch) or for which the MEL shows 'Maintenance (M)' actions must be resolved or deferred prior to take-off.

Dispatch capability with an invalid EICAS message depends on the message level. Dispatch with invalid Status level messages is allowed by MEL item 31-61-04, provided that either the associated equipment is verified to operate normally or the dispatch deviations for the associated equipment are observed. However, there is no specific item in the MEL for dispatch with invalid Alert level (Warning, Caution, or Advisory) messages, since they are required for inflight crew awareness or action as described at the beginning of Section 1. Thus, if an Alert message is displayed, dispatch is allowed only if there is MEL relief for the associated equipment fault or failure, and the applicable dispatch deviations are applied. If system deactivation procedures result in an associated Alert message remaining off, dispatch may be acceptable if no inflight alert is needed for the deactivated equipment. In most cases, appropriate placards or flight log entries provide sufficient crew awareness.

Considerations for Dispatch Using Synoptic Displays

Airplane system faults may result in missing information on synoptic displays. Missing data may include any synoptic display element such as flow bars, pump or valve symbols, and digital indications. Display elements may be absent from one, two, or all three multifunction displays. Missing information on a specific synoptic page caused by a communication fault is not indicative of a fault in the system associated with that synoptic page. Decisions regarding dispatch should be based on EICAS Status or Alert level messages and/or other flight deck effects.


BRITISH AIRWAYS
747 Dispatch Deviations Guide
Section 1 Cross Reference List Messages

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
ACARS ALERT	Memo	N/A
ACARS CALL	Memo	N/A
ACARS MESSAGE	Memo	N/A
ACARS MU	Status	23-27-01
ACARS MU L	Status	23-27-01
ACARS MU R	Status	23-27-01
ACARS NO COMM	Memo	N/A
ACARS VOICE	Memo	N/A
ACARS VOICE BUSY	Memo	N/A
ACARS MGT UNIT	Status	23-34-01
ADC CENTER	Advisory	34-12-01
ADC CENTER	Status	34-12-01
ADC LEFT	Advisory	None
ADC LEFT	Status	None
ADC RIGHT	Advisory	34-12-01
ADC RIGHT	Status	34-12-01
ADC SEL CENTER	Advisory	None
ADC SEL CAPT	Advisory	34-00-01
ADC SEL F/O	Advisory	34-00-01
ADF LEFT	Status	34-57-01
ADF RIGHT	Status	34-57-01
AFT CARGO_LP A	Status	26-16-01
AFT CARGO_LP B	Status	26-16-01
A/G DISAGREE	Status	None
AILERON LOCKOUT	Advisory	27-11-02

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
AILERON LOCKOUT	Status	27-11-02
AIRSPEED LOW	Caution	N/A
ALT ALERT SYS	Advisory	34-16-01
AIR/GND SYSTEM	Advisory	None
ALT ALERT SYS	Status	34-16-01
ALT CALLOUT	Advisory	34-46-01
ALT CALLOUTS	Advisory	34-46-01
ALT DISAGREE	Caution	34-11-02 34-12-01
ALTITUDE ALERT	Caution	N/A
ANTI-ICE	Advisory	N/A
ANTI-ICE NAC	Advisory	N/A
ANTI-ICE NAC _	Status	30-21-01 30-21-02
ANTI-ICE WING L	Status	30-11-01
ANTI-ICE WING R	Status	30-11-01
ANTI-ICE WING	Advisory	N/A
ANTISKID	Advisory	32-42-01 32-42-02
ANTISKID	Status	32-42-01 32-42-02
ANTISKID OFF	Advisory	32-42-01
ANTISKID OFF	Status	32-42-01
AOA LEFT	Advisory	None
AOA LEFT	Status	None
AOA RIGHT	Advisory	None
AOA RIGHT	Status	None

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
A/P SINGLE SYS	Status	22-10-01
APU	Advisory	49-11-01
APU	Status	49-11-01
APU DOOR	Advisory	49-15-01
APU DOOR	Status	49-15-01
APU DUCT LEAK	Status	26-19-01 49-11-01
APU FIRE LOOP A	Status	26-15-01
APU FIRE LOOP B	Status	26-15-01
APU FUEL	Advisory	28-25-01 28-25-02
APU FUEL PUMP	Status	28-25-01
APU FUEL VALVE	Status	28-25-02
APU GEN 1	Advisory	24-21-02
APU GEN 1	Status	24-21-02
APU GEN BEARING	Status	24-21-02
APU GEN COOLING	Status	24-21-02
APU RUNNING	Memo	N/A
APU STRT INHIBIT	Status	49-11-01
ATC LEFT	Advisory	34-53-01
ATC LEFT	Status	34-53-01
ATC MESSAGE	Memo	N/A
ATC RIGHT	Advisory	34-53-01
ATC RIGHT	Status	34-53-01
ATTITUDE	Caution	None
AURAL SYNTH CARD	Status	31-51-01
AURAL WARN SPKR	Status	31-51-01

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
AUTOBRAKES	Advisory	32-42-03
AUTOBRAKES	Status	32-42-03
AUTOBRAKES 1	Memo	N/A
AUTOBRAKES 2	Memo	N/A
AUTOBRAKES 3	Memo	N/A
AUTOBRAKES 4	Memo	N/A
AUTOBRAKES MAX	Memo	N/A
AUTOBRAKES RTO	Memo	N/A
AUTO IGNITION _	Status	74-00-03
AUTOPilot	Caution	22-10-01
AUTOPilot DISC	Warning	22-10-01
AUTOSTART OFF	Advisory	N/A
AUTOSTART SYS _	Status	80-11-03
AUTOTHROT DISC	Caution	22-31-01
AUX REFUEL VLV 1	Status	28-21-01
AUX REFUEL VLV 2	Status	28-21-01

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
BARO DISAGREE	Advisory	31-61-02
BAT CHARGER APU	Status	None
BAT CHARGER MAIN	Status	None
BAT DISCH APU	Advisory	None
BAT DISCH MAIN	Advisory	None
BATTERY OFF	Advisory	N/A
BLD _ OVHT/PRV	Advisory	36-11-01 36-11-03 36-12-02

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
BLD DUCT LEAK C	Caution	26-18-02
BLD DUCT LEAK C	Status	26-18-02
BLD DUCT LEAK L	Caution	None
BLD DUCT LEAK L	Status	None
BLD DUCT LEAK R	Caution	None
BLD DUCT LEAK R	Status	None
BLD FWSOV _ OFF	Advisory	36-11-09
BLEED _	Advisory	36-11-03 36-11-09 RR
BLEED _ OFF	Advisory	36-11-01
BLEED _ CLOSED	Status	None
BLEED _ OVHT	Status	36-11-01 36-11-03 36-11-09 RR 36-12-02
BLEED ASCTU A	Status	None
BLEED ASCTU B	Status	None
BLEED FAMV ENG _	Status	36-12-02
BLEED FWSOV _	Status	36-11-09
BLEED HP ENG _	Advisory	36-11-03
BLEED HP ENG _	Status	36-11-03
BLEED ISLN APU	Advisory	36-11-06
BLEED ISLN APU	Status	36-11-06
BLEED ISLN L	Advisory	36-11-04
BLEED ISLN L	Status	36-11-04
BLEED ISLN R	Advisory	36-11-04
BLEED ISLN R	Status	36-11-04

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
BLEED LOSS APU	Status	36-11-05 36-11-06
BLEED OVPRESS _	Status	36-11-03 RR
BODY GEAR STRG	Advisory	32-53-01 32-53-02
BODY GR STRG SYS	Status	32-53-01 32-53-02
BOTTLE LOW APU	Advisory	26-20-01 26-22-01
BOTTLE LOW APU	Status	26-20-01 26-22-01
BRAKE LIMITER	Advisory	None
BRAKE LIMITER	Status	32-42-04
BRAKE SOURCE	Caution	None
BRAKE TEMP	Advisory	32-46-01
BRAKE TEMP SYS	Status	32-46-01
BTL LO L ENG A	Advisory	26-20-01
BTL LO L ENG B	Advisory	26-20-01
BTL LO R ENG A	Advisory	26-20-01
BTL LO R ENG B	Advisory	26-20-01
BTL LOW APU A	Advisory	26-20-01 26-22-01
BTL LOW APU A	Status	26-20-01 26-22-01
BTL LOW APU B	Advisory	26-20-01 26-22-01
BTL LOW APU B	Status	26-20-01 26-22-01

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
BTL LOW CGO A	Advisory	26-20-01 26-23-01
BTL LOW CGO B	Advisory	26-20-01 26-23-01
BTL LOW CGO C	Advisory	26-20-01 26-23-01
BTL LOW CGO D	Advisory	26-20-01 26-23-01
BTL LOW CGO E	Advisory	26-20-01 26-23-01
BTL LOW CGO F	Advisory	26-20-01 26-23-01
BTL LOW CGO G	Advisory	26-20-01 26-23-01
BTL LOW CGO H	Advisory	26-20-01 26-23-01
BTL LOW CGO J	Advisory	26-20-01 26-23-01
BTL LOW CGO K	Advisory	26-20-01 26-23-01
BTL LOW CGO L	Advisory	26-20-01 26-23-01
BTL LOW CGO M	Advisory	26-20-01 26-23-01
BTL LOW CGO N	Advisory	26-20-01 26-23-01
BTL LOW CGO P	Advisory	26-20-01 26-23-01
BTL LOW CARGO A	Status	26-20-01 26-23-01

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
BTL LOW CARGO B	Status	26-20-01 26-23-01
BTL LOW CARGO C	Status	26-20-01 26-23-01
BTL LOW CARGO D	Status	26-20-01 26-23-01
BTL LOW CARGO E	Status	26-20-01 26-23-01
BTL LOW CARGO F	Status	26-20-01 26-23-01
BTL LOW CARGO G	Status	26-20-01 26-23-01
BTL LOW CARGO H	Status	26-20-01 26-23-01
BTL LOW CARGO J	Status	26-20-01 26-23-01
BTL LOW CARGO K	Status	26-20-01 26-23-01
BTL LOW CARGO L	Status	26-20-01 26-23-01
BTL LOW CARGO M	Status	26-20-01 26-23-01
BTL LOW CARGO N	Status	26-20-01 26-23-01
BTL LOW CARGO P	Status	26-20-01 26-23-01
BTL LOW ENG _ A	Advisory	26-20-01
BTL LOW ENG _ A	Status	26-20-01
BTL LOW ENG _ B	Advisory	26-20-01
BTL LOW ENG _ B	Status	26-20-01

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
BTL LOW L ENG A	Status	26-20-01
BTL LOW L ENG B	Status	26-20-01
BTL LOW R ENG A	Status	26-20-01
BTL LOW R ENG B	Status	26-20-01

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
CABIN ALT AUTO	Caution	21-31-02
CABIN ALT AUTO A	Status	21-31-02
CABIN ALT AUTO B	Status	21-31-02
CABIN ALTITUDE	Warning	21-31-02 21-31-03 21-33-01 21-33-05
CABIN INT 1 & CABIN INT 2	Status	23-42-01
CABIN INTERPHONE	Status	23-42-01
CABIN SYSTEM	Status	23-34-01
CACTCS AIR/GND	Status	21-62-01
CAPT XFR BUS	Status	None
CARGO DET AFT 1	Status	26-16-01
CARGO DET AFT 2	Status	26-16-01
CARGO DET AFT 3	Status	26-16-01
CARGO DET AFT 4	Status	26-16-01
CARGO DET AIR	Advisory	26-14-03
CARGO DET AIR	Status	26-14-03
CARGO DET FWD 1	Status	26-16-01
CARGO DET FWD 2	Status	26-16-01
CARGO DET FWD 3	Status	26-16-01

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
CARGO DET FWD 4	Status	26-16-01
CARGO HEAT BULK	Status	21-40-02
CARGO HEAT FWD L	Status	21-43-01
CARGO HEAT FWD R	Status	21-43-01
CARGO ZONE TEMP	Status	21-61-01
CDU CENTER	Status	34-61-02
CDU LEFT	Status	None
CDU MENU	Advisory	N/A
CDU RIGHT	Status	None
CGO BTL DISCH	Advisory	26-20-01 26-23-01
CGO DET AIR LL1	Status	26-14-03
CGO DET AIR LL2	Status	26-14-03
CGO DET AIR LWR	Status	26-14-03
CGO DET AIR MD	Status	26-14-03
CGO DET AIR MD1	Status	26-14-03
CGO DET AIR MD2	Status	26-14-03
CON IGN ENG _	Status	74-00-02
CON IGNITION ON	Memo	N/A
CONFIG FLAPS	Warning	N/A
CONFIG GEAR	Warning	N/A
CONFIG GEAR CTR	Warning	N/A
CONFIG PARK BRK	Warning	N/A
CONFIG SPOILERS	Warning	N/A
CONFIG STAB	Warning	N/A
CONFIG WARN SY	Advisory	None

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
CONFIG WARN SYS	Status	None
CPCS AIR/GND	Status	None
CPCS BACKUP SENS	Status	21-33-06
CREW OXY LOW	Advisory	35-11-02
CREW OXY REFILL	Status	35-11-02
CREW RST OXY ON	Advisory	None
CTR REFUEL VLV	Status	28-21-01

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
DATALINK AVAIL	Advisory	N/A
DATALINK LOST	Advisory	23-25-01 23-27-01
DATALINK SYS	Advisory	23-27-01
DATALINK L	Advisory	23-27-01
DATALINK R	Advisory	23-27-01
DET FIRE APU	Advisory	26-15-01
DET FIRE/OHT _	Advisory	None
DELTA PRESS SW	Status	None
DME LEFT	Status	34-55-01
DME RIGHT	Status	34-55-01
DOOR AFT CARGO	Caution	52-34-01 52-34-02 52-73-01
DOOR AFT CARGO	Status	52-34-01 52-34-02 52-73-01
DOOR BULK CARGO	Advisory	52-73-01
DOOR ELEC CTR	Advisory	52-73-01

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
DOOR ELEC MAIN	Advisory	52-73-01
DOOR ENTRY L _	Advisory	52-73-01
DOOR ENTRY R _	Advisory	52-73-01
DOOR F/D OVHD	Advisory	52-73-01
DOOR FWD CARGO	Caution	52-34-01 52-34-02 52-73-01
DOOR FWD CARGO	Status	52-34-01 52-34-02 52-73-01
DOOR L UPPER DK	Advisory	52-73-01
DOOR R UPPER DK	Advisory	52-73-01
DOOR SIDE CARGO	Caution	52-73-01
DOOR SIDE CARGO	Status	52-73-01
DOOR U/D FLT LK	Caution	52-23-03 52-23-06
DOOR U/D FLT LK	Status	52-23-03 52-23-06
DOORS AUTO	Memo	N/A
DOORS AUTO/MAN	Memo	N/A
DOORS ELEC	Advisory	52-73-01
DOORS ENTRY L	Advisory	52-73-01
DOORS ENTRY R	Advisory	52-73-01
DOORS MANUAL	Memo	N/A
DOORS UPR DECK	Advisory	52-73-01
DRIVE DISC _	Advisory	24-11-01
DRIVE DISC _	Status	24-11-01
DRIVE _ TEMP SNS	Status	24-11-01

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
DUCT LEAK C LP A	Status	26-18-02
DUCT LEAK C LP B	Status	26-18-02
DUCT LEAK L LP A	Status	26-18-01
DUCT LEAK L LP B	Status	26-18-01
DUCT LEAK R LP A	Status	26-18-01
DUCT LEAK R LP B	Status	26-18-01

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
ECS MISC CARD	Status	21-26-05
EE CLNG BYPASS V	Status	21-58-03
E/E CLNG CARD	Advisory	None
EE CLNG CARD	Status	None
EE CLNG E6/E9 V	Status	None
EE CLNG EXH FAN	Status	21-58-04
EE CLNG GND EXH	Status	21-58-07
EE CLNG INBD EXH	Status	21-58-02
EE CLNG OVRD	Status	None
EE CLNG SUP FAN	Status	21-58-06
EE CLNG SUPPLY V	Status	21-58-05
EE LOW FLOW DET	Status	None
EE SMOKE DET	Status	None
EEC _ TEST POWER	Advisory	N/A
EFIS CONTROL L	Advisory	31-61-02
EFIS CONTROL L	Status	31-61-02
EFIS CONTROL R	Advisory	31-61-02
EFIS CONTROL R	Status	31-61-02

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
EFIS/EICAS C/P	Advisory	None
EICAS DSP	Status	31-61-02 31-61-03
EIU CENTER	Status	31-61-06
EIU DISAGREE	Status	31-61-06
EIU LEFT	Advisory	None
EIU LEFT	Status	None
EIU RIGHT	Status	31-61-06
ELEC AC BUS _	Caution	None
ELEC ARINC LINK	Status	None
ELEC BCU 1	Status	None
ELEC BCU 2	Status	None
ELEC BTB _	Status	24-22-01
ELEC BUS ISLN _	Advisory	24-22-01 24-11-01
ELEC DRIVE _	Advisory	24-11-01
ELEC DRIVE _	Status	24-11-01
ELEC GEN OFF _	Advisory	24-11-01
ELEC GEN OFF _	Caution	24-11-01
ELEC GEN SYS _	Status	24-11-01
ELEC IDG _ VALVE	Status	75-33-01
ELEC SSB OPEN	Advisory	None
ELEC SSB OPEN	Status	None
ELEC STBY POWER	Status	None
ELEC TR UNIT _	Status	24-32-01
ELEC UTIL BUS L	Advisory	24-56-01
ELEC UTIL BUS R	Advisory	24-56-01

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
ELEVATOR FEEL	Status	None
ELT ON	Advisory	N/A
EMER LIGHTS	Advisory	N/A
ENG IGNITION	Advisory	74-00-02
ENG _ AUTOSTART	Caution	80-11-03
ENG _ AUTOSTART	Status	80-11-03
ENG _ CH INHIB	Advisory	None
ENG _ CH/A INHIB	Status	None
ENG _ CONTROL	Advisory	None
ENG _ CONTROL	Status	None GE/RR
ENG _ EEC C1	Status	73-21-02
ENG _ EEC MODE	Advisory	73-21-02
ENG _ EEC MODE	Status	73-21-02
ENG _ ESCV	Status	31-61-04
ENG _ FAIL	Caution	None
ENG _ FIRE LP A	Status	26-11-01
ENG _ FIRE LP B	Status	26-11-01
ENG _ FUEL FILT	Advisory	73-34-01
ENG _ FUEL FILT	Status	73-34-01
ENG _ FUEL PRESS	Status	None
ENG _ FUEL VLV	Advisory	None RR
ENG _ FUEL VLV	Status	None RR
ENG _ IGNITOR 1	Status	74-00-01
ENG _ IGNITOR 2	Status	74-00-01
ENG _ LIM PROT	Caution	N/A

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
ENG _ LOW IDLE	Advisory	73-21-01 PW/GE None RR
ENG _ LOW IDLE	Status	73-21-01 PW/GE None RR
ENG _ OIL FILT	Advisory	79-21-02 RR
ENG _ OIL FILT	Status	79-21-02 RR
ENG _ OIL PRESS	Advisory	None
ENG _ OIL PRESS	Caution	None
ENG _ OIL PRESS	Status	None
ENG _ OIL TEMP	Advisory	N/A
ENG _ REV LIMTD	Advisory	78-36-01
ENG _ REV LIMTD	Status	78-36-01
ENG _ REV POS	Status	78-36-01
ENG _ REVERSER	Advisory	78-31-01
ENG _ REVERSER	Status	78-31-01
ENG _ RPM LIM	Advisory	N/A
ENG _ SCAV FILT	Status	79-21-03
ENG _ SHUTDOWN	Caution	N/A
ENG _ SPEED CARD	Status	77-12-02
ENG _ START EGT	Status	None
ENG _ START VLV	Advisory	36-11-01 36-11-02 80-11-01
ENG _ START VLV	Status	36-11-01 36-11-02 80-11-01
ENG _ TURB OVSP	Status	73-21-03
ENG CONTROLS	Advisory	None

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
ENG CONTROLS	Status	None
EQUIP COOLING	Caution	None
EQUIP LOW FLOW	Status	None
EQUIPMENT SMOKE	Status	None
EQUIPMENT TEMP	Status	None

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
F/D LOW FLOW DET	Status	None
F/O XFR BUS	Status	None
FIRE APU	Warning	None
FIRE CARGO AFT	Warning	None
FIRE CARGO FWD	Warning	None
FIRE ENG _	Warning	None
FIRE MAIN DECK	Warning	None
FIRE MN DK FWD	Warning	None
FIRE MN DK MID	Warning	None
FIRE MN DK AFT	Warning	None
FIRE TEST FAIL	Warning	26-11-01 26-15-01 26-16-01 26-17-01 26-18-01 26-18-02
FIRE TEST PASS	Warning	N/A
FIRE WHEEL WELL	Warning	26-17-01
FIRE/OVHT SYS	Status	None
FLAP CONTROL C	Status	27-51-01
FLAP CONTROL L	Status	27-51-01

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
FLAP CONTROL R	Status	27-51-01
FLAP LOAD RELIEF	Status	None
FLAP RELIEF	Advisory	N/A
FLAP SYS MONITOR	Status	27-51-01
FLAPS CONTROL	Caution	None
FLAPS DRIVE	Caution	None
FLAPS PRIMARY	Caution	27-81-01
FLIGHT RCDR SYS	Status	31-31-01
FLT DK LOW FLOW	Status	None
FMC LEFT	Advisory	34-61-01
FMC LEFT	Status	34-61-01
FMC MESSAGE	Advisory	N/A
FMC RIGHT	Advisory	34-61-01
FMC RIGHT	Status	34-61-01
FMC RUNWAY DIS	Caution	N/A
FMC STATUS	Advisory	N/A
FSEIC	Status	None
FSMC A	Status	28-22-02
FSMC B	Status	28-22-02
FUEL AUTO MGMT	Caution	None
FUEL AUX L	Advisory	N/A
FUEL AUX R	Advisory	N/A
FUEL AUX XFR	Advisory	None
FUEL BALANCED	Advisory	N/A
FUEL BALLAST QTY	Caution	34-61-01
FUEL BALLAST SYS	Caution	28-41-04

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
FUEL BALLAST SYS	Status	28-41-04
FUEL CMD OVRD M2	Status	28-22-01
FUEL CMD OVRD M3	Status	28-22-01
FUEL CMD STAB L	Status	28-31-03
FUEL CMD STAB R	Status	28-31-03
FUEL DISAGREE	Advisory	N/A
FUEL IMBALANCE	Advisory	N/A
FUEL IMBAL 1-4	Advisory	N/A
FUEL IMBAL 2-3	Advisory	N/A
FUEL JETT A	Advisory	28-31-01
FUEL JETT A	Status	28-31-01
FUEL JETT B	Advisory	28-31-01
FUEL JETT B	Status	28-31-01
FUEL JETT SYS	Caution	28-31-01
FUEL LOW CTR L	Advisory	N/A
FUEL LOW CTR R	Advisory	N/A
FUEL LO STAB L	Advisory	N/A
FUEL LO STAB R	Advisory	N/A
FUEL OVD CTR L	Advisory	N/A
FUEL OVD CTR R	Advisory	N/A
FUEL OVRD _ AFT	Advisory	28-31-02
FUEL OVRD _ AFT	Status	28-31-02
FUEL OVRD _ FWD	Advisory	28-31-02
FUEL OVRD _ FWD	Status	28-31-02
FUEL PMP STAB L	Advisory	28-22-02 28-31-03

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
FUEL PMP STAB L	Status	28-22-02 28-31-03
FUEL PMP STAB R	Advisory	28-22-02 28-31-03
FUEL PMP STAB R	Status	28-22-02 28-31-03
FUEL PMP STB L	Advisory	N/A
FUEL PMP STB R	Advisory	N/A
FUEL PR SW STB R	Status	28-31-03
FUEL PR SW STB L	Status	28-31-03
FUEL PRES STAB L	Caution	28-22-02 28-31-03
FUEL PRES STAB R	Caution	28-22-02 28-31-03
FUEL PRES STB L	Advisory	28-22-02 28-31-03
FUEL PRES STB R	Advisory	28-22-02 28-31-03
FUEL PRESS ENG _	Caution	28-22-01
FUEL PUMP _ AFT	Advisory	28-22-01
FUEL PUMP _ AFT	Status	28-22-01
FUEL PUMP _ FWD	Advisory	28-22-01
FUEL PUMP _ FWD	Status	28-22-01
FUEL QTY LOW	Caution	N/A
FUEL QTY SYS	Status	28-41-01 28-41-03 28-41-04 28-41-05 28-41-07
FUEL RES XFR 2	Advisory	28-16-01

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
FUEL RES XFR 3	Advisory	28-16-01
FUEL SCAV PUMP	Advisory	28-15-01
FUEL SCAV PUMP	Status	28-15-01
FUEL SPAR VLV _	Status	31-61-04
FUEL STAB XFR	Caution	28-17-01 28-21-01 28-22-02 28-31-03
FUEL TANK/ENG	Advisory	N/A
FUEL TEMP	Status	28-43-01
FUEL TEMP LOW	Advisory	28-43-01 75-33-01
FUEL TEMP SYS	Advisory	28-43-01
FUEL WING ISOL	Advisory	28-21-03
FUEL X-FEED _	Advisory	28-22-05
FUEL X-FEED _	Status	28-22-05
FUEL XFER 1+4	Advisory	N/A
FUEL XFR VLV 1	Status	28-31-01
FUEL XFR VLV 4	Status	28-31-01
FWD CARGO _ LP A	Status	26-16-01
FWD CARGO _ LP B	Status	26-16-01
FWD OVBD VLV	Status	21-31-04

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
GEAR DISAGREE	Caution	32-30-01 32-61-01
GEAR DISAGREE	Status	32-30-01 32-61-01

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
GEAR DOOR	Advisory	None
GEAR DOOR	Status	None
GEAR MONITOR	Status	32-61-01 32-61-02 32-61-03
GEAR TILT	Caution	None
GEAR TILT	Status	None
GND PROX SYS	Advisory	34-46-01
GND PROX SYS	Status	34-46-01
GND TESTS ENABLE	Status	45-45-02
GPS	Advisory	34-58-01
GPS LEFT	Advisory	34-58-01
GPS RIGHT	Advisory	34-58-01
GROUND PROX SYS	Status	34-46-01
G/S ANTENNA C	Status	34-31-02
G/S ANTENNA L	Status	34-31-02
G/S ANTENNA R	Status	34-31-02

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
HEADING	Advisory	None
HEAT L AOA	Advisory	30-31-02
HEAT L AOA	Status	30-31-02
HEAT L TAT	Advisory	30-31-03
HEAT L TAT	Status	30-31-03
HEAT P/S CAPT	Advisory	30-31-01
HEAT P/S CAPT	Status	30-31-01
HEAT P/S F/O	Advisory	30-31-01

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
HEAT P/S F/O	Status	30-31-01
HEAT P/S L AUX	Advisory	30-31-01
HEAT P/S L AUX	Status	30-31-01
HEAT P/S R AUX	Advisory	30-31-01
HEAT P/S R AUX	Status	30-31-01
HEAT R AOA	Advisory	30-31-02
HEAT R AOA	Status	30-31-02
HEAT R TAT	Advisory	30-31-03
HEAT R TAT	Status	30-31-03
HEAT WINDOW L	Advisory	30-41-02
HEAT WINDOW R	Advisory	30-41-02
HF DATA	Advisory	23-11-01 23-27-01
HF DATA	Status	23-11-01 23-27-01
HF DATA L	Status	23-11-01 23-27-01
HF DATA OFF	Memo	None
HF DATA R	Status	23-11-01 23-27-01
HIGH ALT LDG	Status	None
HIGH ALT LDG	Memo	NA
HYD CONTROL 1	Advisory	None
HYD CONTROL 4	Advisory	None
HYD OVHT SYS _	Advisory	29-32-01 29-34-02
HYD OVHT SYS _	Status	29-32-01 29-34-02

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
HYD PRESS DEM _	Advisory	29-11-02 29-11-03
HYD PRESS DEM _	Status	29-11-02 29-11-03
HYD PRESS ENG _	Advisory	29-11-01
HYD PRESS ENG _	Status	29-11-01
HYD PRESS SYS _	Caution	None
HYD QTY HALF _	Advisory	29-33-01
HYD QTY LOW _	Advisory	29-33-01
HYD RSVR PRESS _	Status	29-31-01
HYDIM _	Status	None

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
IAS DISAGREE	Caution	34-11-02 34-12-01
IAS/ALT CTR	Status	34-12-01
IAS/ALT DIFF	Advisory	34-11-02 34-12-01
ICE DETECTOR	Status	30-81-01
ICE DETECTOR L	Status	30-81-01
ICE DETECTOR R	Status	30-81-01
ICE DETECTORS	Advisory	30-81-01
ICING	Advisory	N/A
ICING	Caution	N/A
ICING NAC	Caution	N/A
ICING WING	Advisory	N/A
ICING WING	Caution	N/A
IDLE DISAGREE	Advisory	73-21-01

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
IDLE DISAGREE	Status	73-21-01
IDS DU	Status	31-61-01
IDS ENG DATA MON	Status	None
IDS OPC DISAGREE	Status	None
IDS SOFTWARE	Status	None
IFF MODE 4	Advisory	N/A
IFF SELECTED	Memo	N/A
ILS ANTENNA	Caution	34-31-02
ILS CENTER	Status	34-31-01
ILS LEFT	Status	34-31-01
ILS RIGHT	Status	34-31-01
IRS AC CENTER	Advisory	34-21-01
IRS AC CENTER	Status	34-21-01
IRS AC LEFT	Advisory	None
IRS AC LEFT	Status	None
IRS AC RIGHT	Advisory	34-21-01
IRS AC RIGHT	Status	34-21-01
IRS ALIGN MODE C	Memo	N/A
IRS ALIGN MODE L	Memo	N/A
IRS ALIGN MODE R	Memo	N/A
IRS CENTER	Advisory	34-21-01
IRS CENTER	Status	34-21-01
IRS DC CENTER	Advisory	34-21-01
IRS DC CENTER	Status	34-21-01
IRS DC LEFT	Advisory	None
IRS DC LEFT	Status	None

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
IRS DC RIGHT	Advisory	34-21-01
IRS DC RIGHT	Status	34-21-01
IRS LEFT	Advisory	None
IRS LEFT	Status	None
IRS MOTION	Advisory	N/A
IRS RIGHT	Advisory	34-21-01
IRS RIGHT	Status	34-21-01

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
JETT NOZ ON	Advisory	28-31-01
JETT NOZ ON L	Advisory	28-31-01
JETT NOZ ON R	Advisory	28-31-01
JETT NOZZLE L	Advisory	28-31-01
JETT NOZZLE L	Status	28-31-01
JETT NOZZLE R	Advisory	28-31-01
JETT NOZZLE R	Status	28-31-01
JETT XFR VALVE	Status	28-31-01

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
LANDING ALT	Advisory	N/A
LAV-GALLEY FANS	Status	None
LDG LIGHTS ON	Memo	N/A
LE FLAPS DIS	Advisory	27-88-01
LE MULT DRIVE	Status	None
LE SINGLE DRIVE	Status	27-81-01 27-81-02
LL CGO AFT LP A	Status	26-16-01

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
LL CGO AFT LP B	Status	26-16-01
LL CGO FWD LP A	Status	26-16-01
LL CGO FWD LP B	Status	26-16-01
LOC ANTENNA C	Status	34-31-02
LOC ANTENNA L	Status	34-31-02
LOC ANTENNA R	Status	34-31-02

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
M2/M3 < 3K SIG	Status	28-41-01 28-41-02
M2/M3 < 6K SIG	Status	28-22-02 28-41-01 28-41-02
MACH/SPEED TRIM	Status	None
MAWEA FIRE INPUT	Status	None
MAWEA ID CARD	Status	31-51-02
MAWEA INPUT	Advisory	None
MAWEA MASTER MON	Status	None
MAWEA PWR SUPPLY	Status	None
MAWEA SCID CARD	Status	None

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
NAI DUCT _ LEAK	Status	30-21-01
NAI VALVE _	Advisory	30-21-01 30-21-02
NO AUTOLAND	Advisory	22-13-01
NO AUTOLAND	Caution	22-13-01
NO AUTOLAND	Status	22-13-01

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
NO ICING	Advisory	N/A
NO LAND 3	Advisory	22-13-01
NO LAND 3	Caution	22-13-01
NO LAND 3	Status	22-13-01
NOSE A/G DISAGRE	Status	None
NO SMOKING ON	Memo	N/A

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
OIL PRESS SNS _	Status	None
OVERSPEED	Warning	N/A
OVHT ENG _ COWL	Caution	30-21-03
OVHT ENG _ NAC	Caution	None
OVHT ENG _ STRUT	Caution	None

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
PACK 1 OFF	Memo	N/A
PACK 2 OFF	Memo	N/A
PACK 3 OFF	Memo	N/A
PACK CONTROL	Advisory	None
PACK CONTROL A	Status	21-62-01
PACK CONTROL B	Status	21-62-01

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
PACK _	Advisory	21-51-01 21-51-02 21-51-04 21-51-05 21-51-07 21-51-08 21-51-09 21-62-01 21-62-02
PACK _	Status	21-51-01 21-51-02 21-51-04 21-51-05 21-51-07 21-51-08 21-51-09 21-62-01 21-62-02
PACK _ TMP SNS A	Status	21-51-01
PACK _ TMP SNS B	Status	21-51-01
PACKS 1 + 2 OFF	Memo	N/A
PACKS 1 + 3 OFF	Memo	N/A
PACKS 2 + 3 OFF	Memo	N/A
PACKS HIGH FLOW	Memo	N/A
PACKS OFF	Memo	N/A
PARK BRAKE SET	Memo	N/A
PARK BRK VALVE	Status	None
PASS ADDRESS	Status	23-31-01
PASS ADDRESS 1 & PASS ADDRESS 2	Status	23-31-01
PASS OXY LOW	Advisory	35-21-01 35-21-02

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
PASS OXY REFILL	Status	35-21-01 35-21-02
PASS OXYGEN ON	Advisory	35-21-01
PASS OXYGEN ON	Status	35-21-01
PASS SERVICES	Status	23-34-01 33-21-01 33-24-01
PASS SERVICES 1 & PASS SERVICES 2	Status	33-21-01 33-24-01
PASS SIGNS ON	Memo	N/A
PEDAL STEERING	Status	32-51-01
PILOT RESPONSE	Advisory	N/A
PILOT RESPONSE	Caution	N/A
PILOT RESPONSE	Warning	N/A
PRINTER	Status	23-27-01 45-45-03
PRINTER MESSAGE	Memo	N/A
P/S XFR VLV	Status	34-11-02
PVD BOTH ON	Memo	N/A
PVD CAPT ON	Memo	N/A
PVD F/O ON	Memo	N/A
PVD SYS CAPT	Advisory	34-35-01
PVD SYS F/O	Advisory	34-35-01
PVD SYSTEM CAPT	Status	34-35-01
PVD SYSTEM F/O	Status	34-35-01

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
RADIO ALT CENTER	Status	34-33-01

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
RADIO ALT LEFT	Status	34-33-01
RADIO ALT RIGHT	Status	34-33-01
RADIO TRANSMIT	Advisory	23-11-01 23-12-01 23-51-08
RADIO FAN LWR L	Status	21-25-01
RADIO FAN LWR R	Status	21-25-01
RADIO FAN UPR L	Status	21-25-01
RADIO FAN UPR R	Status	21-25-01
RECIRC FAN LWR L	Status	21-25-01
RECIRC FAN LWR R	Status	21-25-01
RECIRC FAN UPR L	Status	21-25-01
RECIRC FAN UPR R	Status	21-25-01
RES 2A XFR VLV	Status	28-16-01
RES 2B XFR VLV	Status	28-16-01
RES 3A XFR VLV	Status	28-16-01
RES 3B XFR VLV	Status	28-16-01
REV _ INTERLOCK	Status	78-34-01
RUD TRIM CTR	Status	27-21-01
RUDDER RATIO	Advisory	None
RUDDER RATIO	Status	None
RUD RATIO DUAL	Advisory	None
RUD RATIO SNGL	Advisory	None

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
SATCOM	Advisory	23-25-01
SATCOM L	Advisory	23-25-01

Cross Reference List

Message	Level	MEL Item
SATCOM R	Advisory	23-25-01
SATCOM CALL	Memo	N/A
SATCOM DATA	Advisory	23-25-01
SATCOM DATA	Status	23-25-01 23-27-01
SATCOM DATA L	Advisory	23-25-01
SATCOM DATA L	Status	23-25-01 23-27-01
SATCOM DATA R	Advisory	23-25-01
SATCOM DATA R	Status	23-25-01 23-27-01
SATCOM FAN PRIM	Status	23-25-01
SATCOM FAN SEC	Status	23-25-01
SATCOM HI GAIN L	Status	23-25-01
SATCOM HI GAIN R	Status	23-25-01
SATCOM HIGH GAIN	Status	23-25-01
SATCOM LO GAIN L	Status	23-25-01
SATCOM LO GAIN R	Status	23-25-01
SATCOM LOW FLOW	Status	23-25-01
SATCOM LOW GAIN	Status	23-25-01
SATCOM MESSAGE	Memo	N/A
SATCOM SMOKE	Status	23-25-01
SATCOM SYSTEM	Status	23-25-01
SATCOM SYSTEM L	Status	23-25-01
SATCOM SYSTEM R	Status	23-25-01
SATCOM VOICE	Advisory	23-25-01
SATCOM VOICE L	Advisory	23-25-01

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
SATCOM VOICE R	Advisory	23-25-01
SATVOICE AVAIL	Advisory	N/A
SATVOICE LOST	Advisory	N/A
SCAV PUMP ON	Advisory	28-15-01
SEATBELTS OFF	Memo	N/A
SEATBELTS ON	Memo	N/A
SMOKE CREW REST	Caution	26-14-02
SMOKE DR 5 REST	Caution	26-14-02
SMOKE LAVATORY	Advisory	26-13-01
SMOKE LAVATORY	Caution	26-13-01
SMOKE LAV/COMP	Advisory	26-13-01
SMOKE LAV/COMPT	Caution	26-13-01
SMOKE VCC	Advisory	None
SMOKE ZN B REST	Caution	26-14-02
SMOKE ZN F REST	Caution	26-14-02
SMOKE/OVRD VLV	Status	None
SNGL SOURCE ILS	Caution	34-31-01
SNGL SOURCE RA	Advisory	34-33-01
SOURCE SEL ADC	Advisory	N/A
SOURCE SEL EIU	Advisory	N/A
SOURCE SEL F/D	Advisory	N/A
SOURCE SEL IRS	Advisory	N/A
SOURCE SEL NAV	Advisory	N/A
SPEEDBRAKE ARMED	Memo	N/A
SPEEDBRAKE AUTO	Advisory	27-62-01
SPEEDBRAKE AUTO	Status	27-62-01

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
SPEEDBRAKES EXT	Caution	N/A
SPLIT BREAKER	Status	None
STAB AUTO CUTOUT	Status	27-41-01
STAB AUTO TRIM	Status	27-41-01
STAB GREENBAND	Advisory	27-48-02
STAB GREENBAND	Status	27-48-02
STAB SPEED TRIM	Status	None
STAB TRIM	Status	27-41-01
STAB TRIM 2	Advisory	27-41-01
STAB TRIM 3	Advisory	27-41-01
STAB TRIM UNSCHD	Caution	None
STAB TRIM UNSCHD	Status	None
STAB XFR SIG	Status	28-22-04 28-41-02 28-41-04
STAB XFR VLV	Status	28-17-01
STALL WARN SYS	Status	27-32-01
STANDBY INVERTER	Status	None
STARTER CUTOUT _	Caution	80-11-02
STBY BUS APU	Advisory	None
STBY BUS APU	Status	None
STBY BUS MAIN	Advisory	None
STBY BUS MAIN	Status	None
STBY IGNITION ON	Memo	N/A
STBY INV APU	Status	None
STBY INV MAIN	Status	None
STBY POWER OFF	Advisory	None

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
STROBE LIGHT OFF	Memo	N/A
STRUT OVHT _ LPA	Status	26-12-01
STRUT OVHT _ LPB	Status	26-12-01
SUPRNMRY OXY LOW	Advisory	35-21-01
SUPRNMRY OXY ON	Advisory	35-21-01
SUPRNMRY OXY ON	Status	35-21-01

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
TCAS OFF	Advisory	N/A
TCAS RA CAPT	Advisory	34-45-01
TCAS RA F/O	Advisory	34-45-01
TCAS SYS	Status	34-45-01
TCAS SYSTEM	Advisory	34-45-01
TCAS SYSTEM	Status	34-45-01
TE FLAPS	Status	None
TEMP CARGO HEAT	Advisory	21-44-01 21-44-03 21-44-04
TEMP ZONE	Advisory	21-61-01 21-61-03 21-61-04 21-61-07
TERR POS	Advisory	34-58-01 34-46-01
TERR OVRD	Advisory	N/A
TERR SYS	Status	34-46-01
TEST IN PROG	Warning	N/A
TEST PASSED	Warning	N/A

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
THERAP OXYGEN ON	Memo	N/A
TIRE PRESS SYS	Status	32-48-01
TIRE PRESSURE	Advisory	32-48-01
TIRE PRESSURE	Caution	32-48-01
TIRE PRESSURE	Status	32-48-01
TRACK	Advisory	None
TRANSPOUNDER L	Advisory	34-53-01
TRANSPOUNDER R	Advisory	34-53-01
TRIM AIR OFF	Advisory	21-61-01 21-61-03 21-61-04 21-61-07
TURB OVHT _ LP A	Status	77-22-01
TURB OVHT _ LP B	Status	77-22-01
TURB OVSP SYS _	Status	73-21-03

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
UNABLE RNP	Caution	N/A
UNABLE RNP	Advisory	N/A

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
VHF DATA OFF	Memo	N/A
VALVE TEST PASS	Warning	N/A
VALVE TEST IN PROG	Warning	N/A
VMO GEAR DOWN	Memo	N/A
VMO SPARE ENGINE	Memo	N/A
VOR LEFT	Status	34-51-01

Cross Reference List

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
VOR RIGHT	Status	34-51-01

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
WAI VALVE LEFT	Advisory	30-11-01 30-11-02
WAI VALVE RIGHT	Advisory	30-11-01 30-11-02
WINDOW HEAT 1L	Status	30-41-02
WINDOW HEAT 1R	Status	30-41-02
WINDOW HEAT 2L	Status	30-41-02
WINDOW HEAT 2R	Status	30-41-02
WINDSHEAR PRED	Status	34-43-01
WINDSHEAR REAC	Status	34-46-01
WINDSHEAR SYS	Advisory	34-43-01 34-46-01
WNSHR ALERT SYS	Advisory	34-46-01
WNSHR ALERT SYS	Status	34-46-01
WXR SYS	Status	34-43-01

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
X FEED CONFIG	Advisory	N/A

<u>Message</u>	<u>Level</u>	<u>MEL Item</u>
ZONE TEMP	Status	21-61-01 21-61-03 21-61-04 21-61-07 21-61-11 21-61-12

Cross Reference List

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Section 2

Table of Contents

MEL

Introduction

General Notes

MMEL Definitions

MMEL Preamble

British Airways Repair Interval Extension Policy

ATA Contents

Table of Contents

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General Notes

This section contains the MMEL Definitions, the MMEL Preamble and all of the MMEL items from FAA 747-400 MMEL Revision 30.

MEL Items have a table of contents for each ATA. Each section of information in the MEL has been assigned a unique number and when appropriate, is followed by maintenance or operations information.

MMEL Definitions

1. System Definitions. System numbers are based on the Air Transport Association (ATA) Specification and items are numbered sequentially.
 - A. "Interval" (Cell 1) means the Rectification Interval category (A, B, C, and D).
 - B. "Installed" (Cell 2) is the number (quantity) of items normally installed in the aircraft. This number represents the aircraft configuration considered in developing this MMEL. Should the number be a variable (e.g. passenger cabin items), or not applicable, a number is not required; a "-" is then inserted.

Note: Where the MMEL shows a variable number installed, the MEL must reflect the actual number installed.
 - C. "Required" (Cell 3) is the minimum number (quantity) of items required for operation provided the conditions specified are met. Should the number be a variable (e.g. passenger cabin items) or not applicable, a number is not required; a "-" is then inserted.

Note: Where the MMEL shows a variable number required for dispatch, the MEL must reflect the actual number required for dispatch or an alternate means of configuration control approved by the competent authority.
 - D. "Procedure" (Cell 4) indicates a requirement for a specific maintenance or operations procedure.
 - E. Remarks beneath the MMEL boxed area include a statement either prohibiting or allowing operation with a specific number of items inoperative, provisos (conditions and limitations) for such operation, and appropriate notes.

- F. A vertical bar (change bar) in the margin indicates a change, addition or deletion in the adjacent text for the current revision of that page only. The change bar is dropped at the next revision of that page.
2. "-" symbol in Cell 2 (Installed) and/or Cell 3 (Required) indicates a variable number (quantity) of the item installed/required or not applicable.
- Note: Where the MMEL shows a variable number installed/required, the MEL must reflect the actual number installed/required.
3. "****" symbol or "if installed" means that the equipment is either optional or is not required to be installed on all aircraft covered by the MMEL.
4. "Adequate airport" means an airport which the operator considers to be satisfactory, taking account of the applicable performance requirements and runway characteristics; at the expected time of use, the airport will be available and equipped with necessary ancillary services such as ATS, sufficient lighting, communications, weather reporting, navaids and emergency services.
5. "Adequate ETOPS en-route alternate airport" means an adequate airport, which additionally, at the expected time of use, has an ATS facility and at least one instrument approach procedure.
6. "Airplane Flight Manual (AFM)" means the document required for type certification and approved by the Agency. The AFM for the specific aircraft is listed on the applicable Type Certificate Data Sheet.
7. "Alternate procedures are established and used" or similar statement, means that alternate procedures (if applicable), to the affected process, must be drawn up by the operator as part of the MEL approval process, so that they have been established before the MEL document has been approved. Such alternate procedures are normally included in the associated operations (O) procedure.
8. "Any in excess of those required by regulations" means that the listed item of equipment required by applicable legislation (applicable airworthiness codes, Part OPS, Single European Sky Legislation or the applicable airspace requirements) must be operative and only excess equipment may be inoperative. When the equipment is not required, it may be inoperative for the time specified by its rectification interval category.

9. "Appropriate performance adjustments are applied": Where this statement appears please refer to the applicable performance adjustments in the applicable Boeing Dispatch Deviations Guide or Airplane Flight Manual.
10. "As required by applicable regulations" means that the listed item of equipment is subject to certain provisions (restrictive or permissive) expressed in the applicable legislation. When the equipment is not required, it may be inoperative for the time specified by its rectification interval category.
11. "Cabin crewmember" or "flight attendant" means any crewmember, other than a flight crewmember, who performs, in the interests of safety of passengers, duties assigned to him/her by the operator or the commander in the cabin of an airplane.
12. "Calendar Day" means a 24-hour period from midnight to midnight based on either UTC or local time, as selected by the operator. All calendar days are considered to run consecutively.
13. "Combustible Material" means the material which is capable of catching fire and burning. In particular: if an MEL item prohibits loading of combustible (or flammable or inflammable) material, no material may be loaded except the following:
 - A. Cargo handling equipment (unloaded, empty or with ballast);
 - B. Fly away kits (excluding e.g. cans of hydraulic fluid, cleaning solvents, batteries, capacitors, chemical generators, etc.);

Note: If serviceable tires are included, they should only be inflated to a minimum pressure that preserves their serviceability; and

- C. Inflight service material (return catering — only closed catering trolleys/boxes, no newspapers, no alcohol or duty free goods).
14. "Considered Inoperative", as used in the dispatch conditions, means that item must be treated for dispatch, taxiing and flight purposes as though it were inoperative. The item shall not be used or operated until the original deferred item is repaired. Additional actions include: documenting the item on the dispatch release (if applicable), placarding, and complying with all remarks, exceptions, and related MMEL provisions, including any (M) and (O) procedures and observing the rectification interval.
15. "Daylight" means the period between the beginning of morning civil twilight and the end of evening civil twilight relevant to the local aeronautical airspace; or such other period, as may be prescribed by the appropriate authority.

16. "Day of Discovery" means the calendar day that a malfunction was recorded in the aircraft maintenance record/log book.
17. "Deactivated", "secured", and "locked" means that the specified component must be put into an acceptable condition for safe flight. An acceptable method of securing or deactivating will be established by the operator.
18. "Dispatch" or "Commencement of flight" is the point when an aircraft begins to move under its own power for the purpose of preparing for take-off.
19. "Electronic fault alerting system": New generation aircraft display system fault indications to the flight crew by use of computerized display systems.
Boeing airplanes (747-400, 747-8, 757, 767, 777, 787) equipped with Engine Indicating and Crew Alerting Systems (EICAS), provide different priority levels of system messages (Warning, Caution, Advisory, Status and Maintenance). Any message that affects airplane dispatch status will be displayed at a Status message level or higher. The absence of an EICAS Status or higher level (Warning, Caution, Advisory) indicates that the system/component is operating within its approved operating limits or tolerances. System conditions that result only in a maintenance level message, i.e., no correlation with a higher level EICAS message, do not affect dispatch and do not require action other than as addressed within an operators standard maintenance program.
20. "ETOPS" or "ER operations" refers to extended range operations of a two-engine airplane as defined by SPA.ETOPS and AMC 20-6 "Extended Range Operations with Two-Engine Aeroplanes ETOPS Certification and Operation", as amended.
21. "Extended Overwater Flight": Refer to CAT.IDE.A.285(d) for definition.
22. "Flight", for the purposes of this MMEL, means the period of time between the moment when an aircraft begins to move under its own power, for the purpose of preparing for take-off, until the moment the aircraft comes to complete stop on its parking area, after the first landing.
23. "Flight Attendant" means cabin crewmember.
24. "Flight Day" means a 24 hour period (from midnight to midnight) either Universal Coordinated Time (UTC) or local time, as established by the operator, during which at least one flight is initiated for the affected aircraft.

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- 25. "Icing Conditions" means an atmospheric environment that may cause ice to form on the aircraft or in the engine(s) as defined in the AFM.
 - 26. "Inoperative" means the item does not accomplish its intended purpose or is not consistently functioning within its approved operating limits or tolerances.
 - 27. "Inoperative components of an inoperative system": Inoperative items which are components of a system which is inoperative are usually considered components directly associated with and having no other function than to support that system. (Warning/caution systems associated with the inoperative system must be operative unless alleviation is specifically authorized per the MMEL).
 - 28. "Intended Route" corresponds to any point on the route including diversions to reach alternate airports required to be selected by the operational rules.
 - 29. "Is not used" in the provisos, remarks or exceptions for an MMEL item may specify that another item relieved in the MMEL "is not used". In such cases, crewmembers should not activate, actuate, or otherwise utilize that component or system under normal operations. It is not necessary for the operators to accomplish the (M) procedures associated with the item. However, operations-related provisions, (O) procedures and rectification interval must be complied with. An additional placard must be affixed, to the extent practical, adjacent to the control or indicator for the item that is not used to inform crewmembers that a component or system is not to be used under normal operations.
 - 30. "Item" means component, instrument, equipment, system, or function.
 - 31. "(M)" indicates a requirement for a specific maintenance procedure which must be accomplished prior to operation with the listed item inoperative. Normally these procedures are accomplished by maintenance personnel; however, other personnel may be qualified and authorized to perform certain functions. The satisfactory accomplishment of all maintenance procedures, regardless of who performs them, is the responsibility of the operator. Appropriate procedures are required to be published as part of the operator's manual or MEL.

Note: The (M) symbol is required in the operator's MEL unless otherwise authorized by the Authority.

32. "Master Minimum Equipment List" means a document approved by the Agency that establishes the aircraft equipment allowed to be inoperative under conditions specified therein for a specific type of aircraft.
33. "Maximum distance from an adequate airport for two-engine airplanes" is defined in SPA.ETOPS and CAT.OP.AH.140.
34. "Minimum Equipment List" means a document established as specified under 8.a.3. of Annex IV to Regulation (EC) No 216/2008 and approved by the competent authority, in accordance with ORO.MLR.105, that authorizes an operator to dispatch an aircraft with aircraft equipment inoperative as per CAT.IDE.A.105 or NCC.IDE.A.105 under the conditions specified therein.
35. "Notes" provide additional information for flight crew or maintenance consideration. Notes are used to identify applicable material which is intended to assist with compliance, but do not relieve the operator of the responsibility for compliance with all applicable requirements. Notes are not a part of the dispatch conditions.
36. "(O)" indicates a requirement for a specific operations procedure which must be accomplished in planning for and/or operating with the listed item inoperative. Normally these procedures are accomplished by the flight crew; however, other personnel may be qualified and authorized to perform certain functions. The satisfactory accomplishment of all procedures, regardless of who performs them, is the responsibility of the operator. Appropriate procedures are required to be published as a part of the operator's manual or MEL.

Note: The (O) symbol is required in the operator's MEL unless otherwise authorized by the Authority.

37. "Operating minima" means the set of requirements associated to operations requiring a specific approval (refer to Part-SPA).
38. "Pilot in command" means commander.
39. "Placarding": Each inoperative item must be placarded, as applicable to inform and remind the crewmembers and maintenance personnel of the item's condition.

Note: To the extent practical, placards should be located adjacent to the control or indicator for the item affected; however, unless otherwise specified, placard wording and location will be determined by the operator.

40. "Rectification Intervals": Inoperative items or components, deferred in accordance with the MEL, must be rectified at or prior to the rectification intervals established by the following letter designators:
 - A. Category A: No standard interval is specified; however, items in this category shall be rectified in accordance with the conditions stated in the MMEL.
 - 1) Where a time period is specified in days, the interval excludes the day of discovery.
 - 2) Where a time period is specified other than in days, it shall start at the point when the defect is deferred in accordance with the operator's approved MEL.
 - B. Category B: Items in this category shall be rectified within three (3) calendar days, excluding the day of discovery.
 - C. Category C: Items in this category shall be rectified within ten (10) calendar days, excluding the day of discovery.
 - D. Category D: Items in this category shall be rectified within one hundred and twenty (120) calendar days, excluding the day of discovery.
41. "Required Cabin Crew Seat" is a seat in the aircraft cabin which meets the following conditions:
 - A. Where the certification of the cabin requires this seat to be occupied by a qualified cabin crewmember as specified in the Operations Manual;
 - B. This seat is a part of the station to which a qualified cabin crewmember is to be assigned for the flight; and
 - C. The qualified cabin crewmember assigned to the station is a member of the minimum cabin crew designated for the flight.
42. "Suitable airport" means adequate ETOPS en-route alternate airport.
43. "Visible Moisture" means an atmospheric environment containing water in any form that can be seen in natural or artificial light; for example, clouds, fog, rain, sleet, hail, or snow.
44. "Visual Flight Rules (VFR)" is as defined in SERA.5005, as amended. This precludes a pilot from filing an Instrument Flight Rules (IFR) flight plan.
45. "VMC (Visual Meteorological Conditions)" are meteorological conditions expressed in terms of visibility, distance from cloud and ceiling, equal to or better than the minima specified in SERA.5001, as amended. This definition does not include "VFR-on-top" or "over the top".

MMEL Preamble

Introduction

The following is applicable for operators under European air operations regulations (Part-OPS). Paragraph 1.c.2 of Annex I to Article 5 (Essential requirements for airworthiness) of Regulation (EC) No 216/2008 (the 'Basic Regulation') requires that all equipment installed on an aircraft required for type certification or by operating rules shall be operative. However, paragraph 2.a.3 of Annex IV to Article 8 (Essential requirements for air operations) of the Basic Regulation also allows the use of a Minimum Equipment List (MEL) where compliance with certain equipment requirements is not necessary in the interests of safety under all operating conditions. Experience has shown that with the various levels of redundancy designed into aircraft, operation of every system or installed items may not be necessary when the remaining operative equipment can provide an acceptable level of safety.

Purpose and Limitations

This Minimum Equipment List (MEL) is developed by British Airways and approved by the CAA to improve aircraft use and thereby providing more convenient and economic air transportation for the public. This MEL includes those items related to airworthiness, air operations, airspace requirements, and other items the Agency finds may be inoperative and yet maintain an acceptable level of safety by appropriate conditions and limitations; it does not contain obviously required items such as:

- Engines, wings, flaps and rudders,
- Items not required on the particular flight (e.g. P3 Oxygen mask when no P3 is carried),
- Items specifically installed by British Airways, which, when inoperative, do not affect airworthiness. (e.g. carpets, pen holders),
- Systems or components or displays that are partially unserviceable (e.g. a function of the Audio Selector Panel not critical for the particular flight). The Commander must carefully assess such deficiencies, seeking advice from Flight Manager Technical, or his/her representative where appropriate.

In order to maintain an acceptable level of safety, the MEL establishes limitations on the duration of and conditions for operation with inoperative items. Unless specifically allowed by this MEL, an inoperative item may not be removed from the aircraft.

Section 2

Utilization

The MEL takes into consideration the operator's particular aircraft equipment configuration and operational conditions. This MEL is no less restrictive than the MMEL. It allows operation of the aircraft with inoperative items of equipment for a certain period of time until rectification can be accomplished.

The MEL cannot deviate from Airworthiness Directives, Safety Directives, or any other additional mandatory requirements. It is important to remember that all items related to the airworthiness and the operational regulations of the aircraft not listed on the MMEL shall be operative.

Suitable conditions and limitations in the form of placards, maintenance procedures, crew operating procedures and other restrictions as prescribed in this MMEL shall be specified in the MEL to ensure that an acceptable level of safety is maintained. It is important that rectifications be accomplished at the earliest opportunity.

When an item is discovered to be inoperative, it is reported by making an entry in the continuing airworthiness record system or the operator's technical log, as applicable. Following sufficient fault identification, the item is then either rectified or may be deferred following the MEL or other approved means of compliance acceptable to the competent authority and the Agency prior to further operation. MEL conditions and limitations do not relieve the operator from determining that the aircraft is in a condition for safe operation with items inoperative.

Prior to operation with any item inoperative acceptance by the crew is required in accordance with the continuing airworthiness management procedures.

Operators shall establish a controlled and sound rectification program including the parts, personnel, facilities, procedures and schedules to ensure timely rectification.

Operators should include guidance in the MEL to deal with any failures which occur between the commencement of the flight and the start of the take-off.

WHEN DEVELOPING THE MEL, COMPLIANCE WITH THE STATED INTENT OF THE PREAMBLE, DEFINITIONS AND THE CONDITIONS AND LIMITATIONS SPECIFIED IN THIS MMEL IS REQUIRED.

Multiple Inoperative Items

Operators are responsible for exercising the necessary operational control to ensure that an acceptable level of safety is maintained. The exposure to additional failures during continued operation with inoperative items shall also be considered. Wherever possible, account has been taken in this MMEL of multiple inoperative items. However, it is unlikely that all possible combinations of this nature have been accounted for.

Therefore, when operating with multiple inoperative items, the inter-relationships between those items and the effect on aircraft operation and crew workload shall be considered.

Rectification Interval Extension

As the competent authority, the CAA permits British Airways a one time extension of the applicable rectification intervals B or C (but not A or D) for the same duration as that specified in this MEL.

This extension policy, which allows, as a maximum, a one time extension of the interval stipulated in the MMEL, has been taken into account during the development of this document.

British Airways Repair Interval Extension Policy

A Repair Interval Extension (RIE) should only be requested when events beyond British Airways' control have precluded rectification. It may be used for items with a repair interval of B or C only.

Requests for a one off application of the RIE procedure for any MEL item, which must include a plan to rectify the defect at the earliest opportunity, will be passed to the Flight Operations Duty Technical Manager and the appropriate Engineering Maintenance Manager for approval. If approved, the RIE details will be entered into the Aircraft Maintenance Log as a new ADD. Engineering will provide the CAA with details of RIEs used for B or C items within 10 days. The Duty Technical Manager may require additional restrictions, but must retain a record of his justification.

Section 2**ATA Contents****MEL****ATA 05 - Non-Safety Related Equipment****05-00-01 Non-Safety Related Equipment****ATA 21 - Air Conditioning****21-25-01 Recirculation Fans****21-26-05 ECS Misc Card**

21-26-05A *Extended Overwater Flight Allowed*

21-26-05B *Extended Overwater Flight Prohibited*

21-26-06 Chiller Boost Fan**21-31-01 Outflow Valves**

21-31-01A *One Inoperative*

21-31-01B *Two Inoperative*

21-31-02 Automatic Cabin Pressure Controllers (A and B)

21-31-02A *One Inoperative - Manual Mode Operative*

21-31-02B *One Inoperative - Manual Mode Inoperative*

21-31-02C *Both Inoperative - Unpressurized Flight*

21-31-03 Cabin Pressure Control Systems (Manual L and R)

21-31-03A *One Inoperative*

21-31-03B *Both Inoperative*

21-31-04 Forward Overboard Valve (Lower 41 Section)

21-31-04-01 Models Without Auxiliary Fuel Tank Provisions

21-31-04-01A *Valve Closed*

21-31-04-01B *Valve Open*

21-32-01 Positive Pressure Relief Valves

21-32-01B *Both Inoperative*

21-32-02 Landing Altitude (LDG ALT) Switch**21-33-01 Cabin RATE Indication**

21-33-01A *Pressurized Flight*

21-33-01B *Unpressurized Flight*

Table of Contents

- 21-33-02 Cabin Differential Pressure Indication**

21-33-02A *CAB ALT Indication Operative*
21-33-02B *CAB ALT Indication Inoperative*

21-33-03 CAB ALT Indication

21-33-03A *Cabin Differential Pressure Indication Operative*
21-33-03B *Cabin Differential Pressure Indication Inoperative*

21-33-04 OUTFLOW VALVES Position Indicators (Overhead Panel)

21-33-04A *Pressurized Flight*
21-33-04B *Unpressurized Flight*

21-33-05 Cabin Altitude Primary Sensors

21-33-05A *One Inoperative*
21-33-05B *Both Inoperative*

21-33-06 Cabin Altitude Backup Sensor (CPCS BACKUP SENS) System

21-40-02 Bulk Cargo Heating System (Electric)

21-41-01 Door 5 Overhead Crew Rest Environmental Control System

21-41-01-01 Temperature Control
21-41-01-02 Ventilation
21-41-01-03 Temperature Indicator

21-41-02 Zone F Crew Rest Environmental Control System

21-41-02-01 Temperature Control
21-41-02-02 Ventilation
21-41-02-03 Temperature Indicator

21-42-01 Flight Crew Auxiliary Heat System (Foot and Shoulder)

21-42-02 Flight Deck Crew Rest Area Heat Control System

21-42-02-01 Temperature Control Functions (LOW/MED/HIGH)

21-43-01 Forward Cargo Compartment Heating System (Electric)

21-44-01 Aft Cargo Heating System

Table of Contents

- 21-44-01-02 Three Valve Installation
 - 21-44-01-02A Override Valve Closed
 - 21-44-01-02B Bulk and Container Control Valves Closed
- 21-44-02 Aft Cargo TEMP Light
- 21-44-03 Aft Cargo Heat 90 Degree F Overheat Switch(es)
- 21-44-04 Aft Cargo Compartment Heat Temperature Control (Sidewall Switches)
 - 21-44-04-02 Three Valve Installation
 - 21-44-04-02A One Per Compartment Inoperative
 - 21-44-04-02B All Inoperative
- 21-51-01 Packs
 - 21-51-01-01 Passenger/Combi or Freighter without Draw-Through Smoke Detection System
- 21-51-02 Pack Flow Control and Shutoff Valves
 - 21-51-02-01 Normal Flow Mode
 - 21-51-02-02 High Flow Mode
 - 21-51-02-02-01 Models Without Auxiliary Fuel Tank Provisions
 - 21-51-02-02-01A One Inoperative - Two Packs Operative
 - 21-51-02-02-01B All Inoperative - Three Packs Operative
- 21-51-03 Pack HI FLOW Switch
- 21-51-04 Air Cycle Machines (ACM)
 - 21-51-04-01 Passenger/Combi
 - 21-51-04-01A Associated Turbine Bypass Valve Open
 - 21-51-04-01B Associated Pack Off
- 21-51-05 ACM Turbine Bypass Valves
 - 21-51-05-01 Passenger/Combi
 - 21-51-05-01A Valve Open
 - 21-51-05-01B Associated Pack Off
- 21-51-06 Water Separators
 - 21-51-06-01 Passenger/Combi

Table of Contents

- 21-51-07 Pack Overheat Switches**
- 21-51-07A *All Inoperative*
21-51-07B *One Inoperative*
- 21-51-08 Compressor Overheat Switches**
- 21-51-08A *One Inoperative*
21-51-08B *All Inoperative*
- 21-51-09 Compressor Temperature Bulbs**
- 21-51-09A *All Inoperative*
21-51-09B *One Inoperative*
- 21-52-01 Pack SYS FAULT Light**
- 21-58-01 Equipment Cooling Control System**
- 21-58-01-01 NORM Mode
- 21-58-02 Equipment Cooling Inboard Exhaust Valve**
- 21-58-02-01 Passenger/Combi
- 21-58-03 Equipment Cooling Bypass Valve**
- 21-58-03-01 Passenger/Combi
- 21-58-04 Equipment Cooling Exhaust Fan**
- 21-58-05 Equipment Cooling Inboard Supply Valve**
- 21-58-06 Equipment Cooling Supply Fan**
- 21-58-07 Equipment Cooling Ground Exhaust Valve**
- 21-58-07A *Both Fans Operative*
21-58-07B *One Fan Deactivated*
- 21-58-08 Galley/Lavatory Fans**
- 21-61-01 Zone Temperature Control System (Passenger/Combi)**
- 21-61-01A *Trim Air Mod Valve(s) Appropriately Positioned*
21-61-01B *Master Trim Air Valve Closed*
- 21-61-02 Cabin Temperature Selection System**
- 21-61-02-01 Passenger/Combi (In Passenger Cabin)
- 21-61-03 Master Trim Air Valve**

Table of Contents

- 21-61-03-01 Passenger/Combi
21-61-03-01A *With SB 747-21-2337 and 747-21-2338*
21-61-03-03 Pressure Regulating Function

21-61-04 Zone Trim Air Modulation Valves (Passenger/Combi)

21-61-04A *Valve(s) Appropriately Positioned*
21-61-04B *Master Trim Air Valve Closed With SB 747-21-2337 and 747-21-2338*

21-61-05 ALTN Control Mode (Zone A/Upper Deck)

21-61-06 ZONE RST Switch

21-61-06-01 Passenger/Combi

21-61-07 Duct Overheat Protective Systems (Passenger and Crew System) (Passenger/Combi)

21-61-07A *Trim Air Mod Valve(s) Closed*
21-61-07B *Master Trim Air Valve Closed*
21-61-07C *Trim Air Mod Valve(s) Operative*

21-61-11 Zone Duct Temperature Sensors

21-61-12 Zone Temperature Sensors

21-61-12-01 Passenger/Combi Configurations or Freighter with Draw-Through Smoke Detection System

21-62-01 Pack Temperature Control Systems

21-62-02 Pack Coolant (Inlet/Exit Doors) Systems

21-62-02A *Inlet/Exit Doors Open*
21-62-02B *Inlet/Exit Doors Closed*

21-62-02-01 Inlet Doors
21-62-02-02 Exit Doors

21-65-01 Compartment Temperature Indications (EICAS)

21-65-02 Zone SYS FAULT Light

ATA 22 - Auto Flight

22-10-01 Autopilot Systems

22-10-01A *One Inoperative*

Table of Contents

- 22-10-01B *Two Inoperative*
22-10-01C *Three Inoperative*

22-11-01 Control Wheel Autopilot Disengage Switches**22-11-02 Mode Control Panel Windows**

- 22-11-02-01 Airspeed (IAS/MACH)
22-11-02-02 Heading (HDG)
22-11-02-03 Vertical Speed (VERT SPD)
22-11-02-04 Altitude (ALT)

22-11-03 Mode Control Panel Selectors

- 22-11-03-01 VERT SPD Selector (DN & UP)
22-11-03-02 BANK LIMIT Selector (AUTO, 5, 10, 15, 20, 25)
22-11-03-03 Selector Push Functions
 22-11-03-03-01 ALT
 22-11-03-03-02 HDG SEL
 22-11-03-03-03 IAS/MACH

22-11-04 Mode Control Panel Switches

- 22-11-04-01 A/P Engage Switches (L CMD, C CMD, R CMD)
 22-11-04-01A *One or Two Inoperative*
 22-11-04-01B *Three Inoperative*
22-11-04-02 A/T Arm Switch (A/T ARM)
 22-11-04-02A *Inoperative ON*
 22-11-04-02B *Inoperative OFF*
22-11-04-03 A/T Speed Mode Engage Switch (SPD)
22-11-04-04 Flight Director Switches (F/D)
22-11-04-05 IAS/MACH SEL (Reference) Switch
22-11-04-06 APP Switch
22-11-04-07 LOC Engage Switch
22-11-04-08 THR, L NAV, V NAV, FL CH, HDG HOLD, V/S, and ALT HOLD Switches

22-11-05 Mode Control Panel Switch Lights

- 22-11-05-01 Autopilot Engage Switch Lights (CMD)

Table of Contents

- 22-11-05-02 Mode Selector Switch Lights
- 22-13-01 Automatic Landing System (Autoland)**
 - 22-13-01-01 Triple Channel Autoland (LAND 3)
 - 22-13-01-02 Automatic Rollout Control
- 22-21-01 Yaw Dampers**
- 22-21-02 Yaw Damper INOP Lights**
- 22-31-01 Autothrottle System**
- 22-31-02 Autothrottle Disconnect Switches**
 - 22-31-02A *One Inoperative*
 - 22-31-02B *Both Inoperative*
- 22-31-03 Takeoff/Go-Around (TO/GA) Switches**
 - 22-31-03A *One Inoperative*
 - 22-31-03B *Both Inoperative*

ATA 23 - Communications

- [TGL] 23-11-01 High Frequency (HF) Communication System**
 - 23-11-01A *Not Required*
 - 23-11-01B *Two Long Range Communication Systems required and SATCOM Operative*
 - 23-11-01C *Two Long Range Communication Systems required and SATCOM Inoperative*
 - 23-11-01D *Two Long Range Communication Systems required and SATCOM Operative*
- [TGL] 23-12-01 VHF Communications Systems**
- 23-24-01 Radio Communications Panels**
- 23-25-01 Satellite Communication (SATCOM) Systems**
 - 23-25-01A *Alternate Procedures Required*
 - 23-25-01B *Procedures Do Not Require Use*
- 23-25-01-01 SATCOM Voice Systems
 - 23-25-01-01A *Alternate Procedures Required*
 - 23-25-01-01B *Procedures Do Not Require Use*

Table of Contents

23-27-01 ACARS System23-27-01A *Alternate Procedures Required*

23-27-01-01 Dual ACARS Management Units (MUs)

23-27-01-02 Automatic Dependent Surveillance - Contract (ADS-C)

23-28-01 Selective Call (SELCAL) System23-28-01A *Alternate Procedures Required*23-28-01B *Procedures Do Not Require Use*

23-28-01-01 Channels

23-28-01-01A *Alternate Procedures Required*23-28-01-01B *Procedures Do Not Require Use***[TGL] 23-31-01 Passenger Address System**

23-31-01-01 Passenger/Combi

23-31-01-01-01 Passenger Address Controller Circuits

23-31-01-01-02 Lavatory Speakers

23-31-01-01-03 Cabin Speakers

23-31-01-01-04 Direct Access Function

23-31-02 Prerecorded Passenger Announcement System23-31-02A *Alternate Procedures Required***23-34-01 ACESS Central Management Unit (CMU)/Passenger Service Controller (PSC)**23-34-01A *Cabin Interphone Operative*23-34-01B *Passenger Address Operative***23-41-01 Service Interphone System**

23-41-01-01 Nose Gear Jack

23-41-01-01A *Flight Interphone Operative*23-41-01-01B *Flight Interphone Inoperative*

23-41-01-02 Other Than Nose Gear Jack

23-42-01 Crewmember Interphone Systems

23-42-01-01 Passenger/Combi

23-42-01-01-01 Flight Deck to Cabin, Cabin to Flight Deck Functions

23-42-01-01-02 Cabin to Cabin Function

Table of Contents

- 23-42-01-01 Passenger/Combi
- 23-42-01-01-03A *Flight Deck to Ground/Ground to Flight Deck Function*
- 23-42-01-01-03B *Flight Deck to Ground/Ground to Flight Deck Function*
- 23-42-01-01-04 Cabin Interphone Controller Circuits
- 23-42-01-01-05 Flight Deck Intercommunication

23-42-02 Flight Deck Hand Microphones

- 23-42-02A *Boom Microphone Operative*
- 23-42-02B *Procedures Do Not Require Use*

23-42-03 Handset System

- 23-42-03-01 Passenger/Combi
- 23-42-03-01-01 Flight Deck
 - 23-42-03-01-01A *Required By Procedures*
 - 23-42-03-01-01B *Procedures Do Not Require Use*
- 23-42-03-01-02 Main Cabin
- 23-42-03-01-03 Upper Deck Cabin
 - 23-42-03-01-03A *Upper Deck Cabin Occupied*
 - 23-42-03-01-03B *Upper Deck Cabin Unoccupied*
- 23-42-03-01-04 Crew Rest

[TGL] 23-42-04 Cabin Interphone Alerting System

- 23-42-04-01 Passenger/Combi
- 23-42-04-01-01 Flight Deck Call System (Lights and EICAS Messages)
- 23-42-04-01-02 Flight Attendant Call Lights
- 23-42-04-01-03 Flight Attendant Chime

23-43-01 Ground Crew Call System

[TGL] 23-51-02 Headsets/Headphones/Boom Microphones (including ANR headsets)

23-51-03 Flight Deck Speakers

[TGL] 23-51-04 Audio Control Panels

Table of Contents

23-51-08 Captain/First Officer Push-To-Talk (PTT) Switches

23-51-08-01 Control Wheel PTT Switches

23-51-08-02 Flight Crew Audio Control Panel PTT Switches

23-51-08-03 Glareshield PTT Switches

[TGL] 23-71-01 Cockpit Voice Recorder System (CVR)**[TGL] 23-76-02 Cockpit Door Surveillance System (CDSS)****ATA 24 - Electrical Power****24-11-01 Engine Driven Generator Systems (IDG, GCU, GCB)**24-11-01A *All Configurations***24-11-02 Generator DRIVE Lights****24-21-01 Lightning Protectors****24-21-02 APU Driven Generator Systems (Generator, AGCU, APB)**24-21-02A *APBs Remain Open*24-21-02B *APU Generator Deactivated*

24-21-02-01 APU Generator Cooling Airflow Detector

24-22-01 Bus Tie Breakers (BTB)

24-22-01-01 No. 1, 2, and 3

24-22-01-02 No. 4

24-22-02 Split System Breaker (SSB)**24-23-01 APU Generator Power ON Lights****24-23-02 APU Generator Power AVAIL Lights****24-23-03 AC Bus ISLN Lights****24-23-04 Engine and APU Generator FIELD OFF Lights (Overhead Maintenance Panel)****24-23-05 Split System Breaker OPEN Light (Overhead Maintenance Panel)****24-23-06 GEN CONT Lights****24-32-01 Transformer Rectifier Units (TRU)**

24-32-01-01 Main

Table of Contents

24-32-01-03 Ground Handling

24-32-02 DC Bus Isolation Relays

24-32-02-01 No. 1, 2, and 3

24-32-02-02 No. 4

24-41-01 External Power Systems

24-56-01 Electrical Load Control Units (ELCU)

24-56-01-01 Utility Power ELCUs

24-56-01-02 Galley Power ELCUs (Passenger/Combi)

24-56-02 Utility Power OFF Lights

ATA 25 - Equipment/Furnishings

[TGL] 25-11-02 Flight Crew Seats

25-11-02-02 Manual Adjustment System

25-11-02-02-01 Recline Systems

25-11-02-02-02 Armrests

25-11-02-02-03 Lumbar/Thigh Supports

25-11-02-02-04 Headrests

25-11-02-02-05 Vertical Adjustment

[TGL] 25-11-03 Observer's Seat(s)

25-11-03-01 Primary Observer Seat (Including Associated Equipment)

25-11-03-02 Additional Observer's Seat(s) (Including Associated Equipment)

25-20-01 Passenger Convenience Item(s)

25-24-01 Cart Lift System (Between Main and Upper Deck Galleys)

25-24-01-01 Normal Mode

25-24-01-02 Override Mode

25-24-01-03 Actuator Motors

[TGL] 25-25-01 Cabin Crew Seat Assemblies (Single or Dual Position)

25-25-01-01 Required Cabin Crew Seats

25-25-01-02 Non-Required Cabin Crew Seats

Table of Contents

[TGL] 25-25-02 Passenger Seats

25-25-02-01 Recline Mechanism

 25-25-02-01A *Seat Secured Up-Right*

 25-25-02-01B *Immovable Seat Back*

25-25-02-02 Underseat Baggage Restraining Bars

25-25-02-03 Armrests

 25-25-02-03A *Armrests With Recline Mechanism*

 25-25-02-03B *Armrests Without Recline Mechanism*

25-25-02-04 Electrical/ Electronic Systems/ Components

25-25-02-05 Retractable Privacy Screen

25-25-02-06 "Takeoff, Taxi, and Landing" (TTL) Position Light (Lie Flat Seats)

25-25-02-07 In Seat Stowage Drawer

25-25-02-08 Footstool

25-25-04 Upper Deck Emergency Exit Door Escape Path Guides

25-28-01 Overhead Storage Bin(s)/Cabin and Galley Storage Compartments/Closets

 25-28-01A *Door Secured Closed*

 25-28-01B *Door Removed*

25-28-01-01 Multi Latch/Quarter Turn Lug Installations

25-29-02 Cabin Crew Rest Area Door Lock(s)

25-29-03 Flight Crew/Flight Attendant Rest Area(s)

25-30-01 Galley/Cabin Waste Receptacle Access Doors/Covers

25-40-01 Exterior Lavatory Door Ashtrays

25-40-01-01 Airplanes With Multiple Exterior Lavatory Door Ashtrays Installed

 25-40-01-01A *Ashtrays Affected: 50% or Less*

 25-40-01-01B *Ashtrays Affected: More than 50%*

25-40-02 Lavatory Waste Receptacle Access Doors/Covers

25-40-04 Interior Lavatory Ashtrays

25-40-04-01 Associated Lavatory Fire Extinguishing System Operative

Table of Contents

- 25-40-04-02 Lavatory Door Locked Closed
- 25-52-01 Lower Cargo Compartment Lining Panels**
- 25-53-01 Lower Cargo Handling System(s)**
- 25-54-01 Lower Cargo Restraint Systems**
- 25-54-01A *Cargo Compartment Used*
- 25-54-01B *Cargo Compartment(s) Remains Empty*
- 25-61-01 Flight Crew/Supernumerary Escape Devices**
- 25-61-01-01 Inertial Escape Reels
- 25-61-01-01-01 Passenger/Combi or Freighter with Draw-Through Smoke Detection System
- [TGL] **25-62-01 Flotation Equipment (Crew and Passenger)**
- 25-63-01 Emergency Evacuation Signal System**
- 25-63-02 Megaphones**
- 25-63-03 FASTEN SEAT BELT WHILE SEATED Placards**
- 25-63-04 Cabin Emergency Flashlight Holders/Flashlights**
- [TGL] **25-63-05 Emergency Locator Transmitter (ELT)**
- 25-63-05-01 Survival Type ELTs
- 25-63-05-02 Fixed ELTs
- 25-63-05-02A *Required and ELT Deactivated*
- 25-63-05-02C *Not Required and ELT Deactivated*
- 25-63-05-02 Automatic ELT (if fitted)
- 25-64-01 Flexible Smoke Barrier (Passenger/Combi)**
- 25-64-02 Emergency Medical Equipment**
- 25-64-02-01 Automatic External Defibrillators (AED) and/or Associated Equipment
- 25-64-02-02 Emergency BA Medical (M5) Kit (EMK) and/or Associated Equipment
- 25-64-02-02A *Required by FAR*
- 25-64-02-03 Basic First Aid (M2) Kit (FAK) and/or Associated Equipment
- 25-64-02-03A *Required*

Table of Contents25-64-02-03B *Not Required***25-65-01 Passenger Restraint Kit****ATA 26 - Fire Protection****26-11-01 Engine Fire Detector Systems**

26-11-01-01 Detection Loop

26-11-01-02 Flight Deck Test System

26-11-04 Fuel Control Switch Fire Light**26-12-01 Engine Strut Overheat Detection Systems (RR)**

26-12-01-01 Detection Loop

26-13-01 Lavatory Smoke Detection Systems26-13-01A *Lavatory Used Only By Crewmembers***26-13-02 Galley 4 IFE Smoke Detection System****26-14-02 Crew Rest Area Smoke Detection System (Door 5 and Zone F)**

26-14-02-01 Ionization Type Detectors

26-14-02-01-01 Passenger/Combi

26-14-03 CARGO DET AIR Indicating System (Main Deck/Lower Lobe) (Passenger, Combi and Freighter with Draw-Through Smoke Detection System)26-14-03A *Cargo Carried*26-14-03B *Cargo Compartment Empty***26-15-01 APU Fire Detection System**

26-15-01-01 Detection Loop

26-15-01-01A *One Inoperative*26-15-01-01B *Both Inoperative - APU Used On Ground*

26-15-01-02 Flight Deck Test System

26-16-01 Lower Lobe Cargo Compartment Smoke Detection System (Forward, Aft)

26-16-01-01 Flight Deck Test System

26-16-01-01A *Cargo Carried*

Table of Contents

- 26-16-01-01B *Cargo Compartment Empty*
- 26-16-01-02 Detectors
 - 26-16-01-02-01 Passenger, Combi and Freighter with Draw-Through Smoke Detection System
 - 26-16-01-02-01A *Cargo Carried*
 - 26-16-01-02-01B *Cargo Compartment Empty*
 - 26-16-01-03 Draw Through Tube Heaters
- 26-17-01 Wheel Well Fire Detection System**
 - 26-17-01A *BTMS Inoperative*
 - 26-17-01B *BTMS Operative*
- 26-17-01-01 Flight Deck Test System
- 26-18-01 Wing Leading Edge Overheat Detection System**
 - 26-18-01-01 Dual Loop System
 - 26-18-01-01-01 Loops
 - 26-18-01-02 Flight Deck Test System
- 26-18-02 Center Duct Leak Detection Systems**
 - 26-18-02-01 Dual Loop System
 - 26-18-02-01-01 Loops
 - 26-18-02-02 Flight Deck Test System
- 26-19-01 APU Duct Leak Detection System**
- 26-20-01 Fire Bottle Pressure Indication Systems (Engine, Lower Cargo, Main Deck Cargo, APU)**
- 26-21-01 Fire Extinguisher Squib Test (Engine, APU, Lower Cargo, Main Deck)**
 - 26-21-01-01 Lower Cargo and Main Deck Squib Test System
 - 26-21-01-02 APU Squib Test System
- 26-22-01 APU Fire Extinguisher System**
 - 26-22-01-01 APU Auto Discharge
- 26-23-01 Lower Cargo Compartment Fire Extinguisher System**
 - 26-23-01-01 Passenger/Combi and Freighter with Draw-Through Smoke Detection System

Table of Contents

- 26-23-01-03 Four Bottle System, Bottles C & D
 26-23-01-03A One Inoperative
 26-23-01-03B Both Inoperative
- 26-24-02 Lavatory Fire Extinguisher Systems**
 26-24-02A Smoke Detection System Operative
 26-24-02B Smoke Detection System Inoperative
- 26-26-01 Portable Fire Extinguishers**

ATA 27 - Flight Controls

- 27-11-01 Aileron Trim System**
- 27-11-02 Outboard Aileron Lockout System**
- 27-11-02-01 747-400 and 747-400F
 27-11-02-04 Indication System
- 27-18-01 Aileron Position Indicating System**
- 27-21-01 Rudder Trim System**
- 27-21-01-01 Trim Switch Speed Positions
- 27-23-01 Flight Control Shutoff Switch Lights**
- 27-23-02 Hydraulic Flight Control Valves**
- 27-28-01 Rudder Position Indicating System**
- 27-28-02 Rudder Trim Indicator**
- 27-32-01 Stall Warning Systems**
- 27-32-01-01 Stick Shakers
- 27-38-01 Elevator Position Indicating System**
- 27-41-01 Stabilizer Trim/Rudder Ratio Changer Modules (SRM)**
- 27-41-01-01 Stabilizer Trim Control
- 27-41-02 Control Wheel Stabilizer Trim Switches**
- 27-48-01 Stabilizer Trim Indicators**
- 27-48-02 Nose Gear Pressure Switch**
- 27-51-01 Flap Control Units (FCU)**

Table of Contents

- 27-51-02 TE Flap Drive System**
 - 27-51-02-01 No-Coast Drag Brake
- 27-62-01 Auto Spoilers System**
- 27-62-02 Speed Brake Solenoid**
- 27-68-01 Spoiler Position Indicating System**
- 27-81-01 Leading Edge Flaps Drives (Pneumatic)**
- 27-81-02 Leading Edge Flaps Drives (Electric)**
- 27-81-03 Leading Edge Flaps Retraction System (Reverser Actuated)**
- 27-88-01 Leading Edge Flaps System Position Monitor**

ATA 28 - Fuel

- 28-11-01 Fuel Sump Drain Valves**
 - 28-11-01A *No Evidence of Leakage*
 - 28-11-01B *Evidence of Leakage*
- 28-11-02 Horizontal Stabilizer Sump Drain Valves**
 - 28-11-02A *Stabilizer Tank Remains Empty*
 - 28-11-02B *Stabilizer Tank Usable*
 - 28-11-02C *Surge Tank Drain Valve*
- 28-11-02-01 Electric Actuation Feature
- 28-11-03 Horizontal Stabilizer Sump Drain Indicators**
- 28-15-01 Fuel Scavenge Pump (Electric)**
 - 28-15-01A *Center Tank Empty*
 - 28-15-01B *Center Tank Fuel Use Limitation*
- 28-15-02 Hydro-mechanical Fuel Scavenge Systems**
 - 28-15-02A *Center Tank Empty*
 - 28-15-02B *Center Tank Fuel Use Limitation*
- 28-15-02-02 With SB 747-28-2255 Incorporated or Production Equivalent (PRR 85580-R)
 - 28-15-02-02A *Main Fuel Tank Float Valve Operates Normally*

Table of Contents

- 28-15-02-02B *Main Fuel Tank Float Valve Inop Closed*
28-15-02-02C *Main Fuel Tank Float Valve Inop Open*
- 28-16-01 Reserve 2 and 3 Fuel Transfer Valves**
28-16-01A *Reserve Tanks Fueled*
28-16-01B *Reserve Tanks Empty*
- 28-17-01 Horizontal Stabilizer Fuel Isolation Valves**
- 28-21-01 Pressure Fueling System**
28-21-01-01 Refuel Valves
 28-21-01-01A *Valve Inoperative Open*
 28-21-01-01B *Valve Inoperative Closed*
28-21-01-02 Volumetric Top-Off (VTO) Feature
28-21-01-03 Preselect Feature
28-21-01-06 Fueling Power Control Switch (Fueling Panel)
 28-21-01-06A *Fueling Panel is Deactivated*
 28-21-01-06B *Operates in BATT Position*
- 28-21-03 Center Isolation Valve**
- 28-21-04 Fueling Receptacle Caps**
- 28-22-01 Main Tank Boost Pumps**
28-22-01-01 Main Tank 1 and 4 Boost Pumps
 28-22-01-01A *Center Tank Fuel Unrestricted*
 28-22-01-01B *Center Tank Fuel Restricted*
28-22-01-02 Main Tank 2 and 3 Boost Pumps
28-22-01-02-01 Aft Boost Pumps
 28-22-01-02-01A *Aft Override Pump Operates Normally*
 28-22-01-02-01B *Engine Driven Generator Operates Normally*
28-22-01-02-02 Fwd Boost Pumps
- 28-22-02 Fuel Management Systems (FSMC A/FSMC B)**
28-22-02-01 Passenger/Combi
- 28-22-03 Fuel Crossfeed VALVE Lights**

Table of Contents

28-22-04 Horizontal Stabilizer Fuel Transfer Signals

28-22-04-01 In-Air Signals

28-22-04-01A *Reserve Tanks 2 and 3 Fueled*

28-22-04-01B *Reserve Tank 2 and 3 Empty*

28-22-04-02 Flaps-Retracted Signals

28-22-04-03 Stabilizer Pump Switch-Position Signals

28-22-05 Fuel Crossfeed Valves

28-22-05-01 Fuel Crossfeed Valves 1 and 4

28-22-05-02 Fuel Crossfeed Valves 2 and 3

28-25-01 APU Fuel (DC) Pump

28-25-02 APU Fuel Valve

28-26-01 Manually Operated Defuel Valves

28-31-01 Fuel Jettison System

28-31-01-01 Center Wing Tank Jettison/Transfer Valves

28-31-01-01-01 *Passenger/Combi*

28-31-01-02 Main Tanks 2 and 3 Jettison/Transfer Valves

28-31-01-02-01 *Passenger/Combi*

28-31-01-03 Main Tanks 1 and 4 Transfer Valves

28-31-01-04 Fuel Jettison Control Cards

28-31-02 Main Tanks 2 and 3 Override/Jettison Pumps

28-31-02A *All Engine Driven Generators Operate Normally*

28-31-02B *Associated Main Tank Boost Pumps Operate Normally*

28-31-02C *All Main Tank Boost Pumps Operate Normally*

28-31-03 Horizontal Stabilizer Pumps

28-31-04 Center Tank Override Jettison Pumps

28-31-04A *Center Tank Fuel Usable*

28-31-04B *Center Tank Fuel Considered Unusable*

28-41-01 Main Tank Fuel Quantity Indicating Systems (Flight Deck)

Table of Contents

28-41-02 Single Point Sensor Systems

28-41-02-01 Center Tank Sensors

28-41-02-01A *Stabilizer Tank Fuel Usable*

28-41-02-01B *Stabilizer Tank Empty*

28-41-02-02 Main Tanks 2 and 3 Sensors (Reserve Transfer)

28-41-02-02A *One Inoperative*

28-41-02-02B *Both Inoperative*

28-41-02-02-01 Passenger/Combi

28-41-02-03 Main Tanks 2 and 3 Sensors (Main 1 and 4 Jettison Transfer)

28-41-03 Total Fuel Quantity Indication

28-41-04 Center Tank Fuel Quantity Indicating System (Flight Deck)

28-41-05 Reserve Tank Fuel Quantity Indicating Systems (Flight Deck)

28-41-05-01 Passenger/Combi

28-41-06 Wing Fueling Station Quantity Indicating System

28-41-07 Horizontal Stabilizer Tank Fuel Quantity Indicating System (Flight Deck)

28-42-01 Fuel Pump Low PRESS Lights

28-42-02 Stabilizer Fuel Pump Low PRESS Lights

28-43-01 Fuel Temperature Indication (Main Tank #1)

28-43-01A *One Operative*

28-43-01B *All Inoperative*

28-44-01 Measuring Sticks

ATA 29 - Hydraulic Power

29-11-01 Engine Driven Hydraulic Pump Systems

29-11-01A *Associated Pump Operated in Depressurized Mode*

29-11-01B *Associated Pump Deactivated*

Table of Contents

- 29-11-01-01 Pump Depressurization Function
 - 29-11-01-02 Supply Shutoff Valves
 - 29-11-01-02A *Associated Pump Deactivated*
 - 29-11-02 Demand Hydraulic Pumps**
 - 29-11-02-01 No. 1 or No. 4 Demand Pump Systems
 - 29-11-02-02 No. 2 or No. 3 Demand Pump Systems
 - 29-11-03 Demand Pump Selector**
 - 29-11-03-01 AUTO Position
 - 29-11-03-01A *Associated Pump Operative*
 - 29-11-03-01B *Associated Pump Inoperative*
 - 29-11-03-02 ON Position
 - 29-11-03-02A *Associated Pump Operative*
 - 29-11-03-02B *Associated Pump Inoperative*
 - 29-18-01 Reservoir Servicing Gauge**
 - 29-21-01 Auxiliary Pump (AC Motor Pump) System(s)**
 - 29-31-01 HYD RSVR PRESS Message**
 - 29-32-01 Hydraulic System Temperature Indications**
 - 29-32-01A *Verify Associated Hydraulic Quantity Indication*
 - 29-32-01B *Verify Associated Hydraulic SYS FAULT Light*
 - 29-33-01 Hydraulic Quantity Indications**
 - 29-33-01A *Two Hydraulic Quantity Indications Required, Verify Hydraulic Temperature Indication*
 - 29-33-01B *Two Hydraulic Quantity Indications Required, Verify Hydraulic SYS FAULT Light*
 - 29-33-01C *Hydraulic Quantity Indications Not Required, Verify Hydraulic Temperature Indication*
 - 29-33-01D *Hydraulic Quantity Indications Not Required, Verify Hydraulic SYS FAULT Light*

Table of Contents

29-34-01 Pump Low Pressure Indication Systems

- 29-34-01-01 Pump LOW PRESS Lights
- 29-34-01-02 Engine Driven Pump Pressure Switches
- 29-34-01-03 Demand Pump Pressure Switches

29-34-02 Hydraulic SYS FAULT Lights

- 29-34-02A *Associated Hydraulic Quantity Indication Operates Normally*
- 29-34-02B *Associated Temperature Indication Operates Normally*

ATA 30 - Ice and Rain Protection

30-00-01 Windshield Air (Defog) System Controls

30-11-01 Wing Anti-Ice Valves

30-11-02 Wing Anti-Ice VALVE Light or WAI Indications

- 30-11-02A *Associated Valve Verified To Operate Normally*
- 30-11-02B *Associated Valve Inoperative*

30-21-01 Nacelle Anti-Ice Valves

- 30-21-01B *Valve Open*

30-21-02 Nacelle Anti-Ice VALVE Lights or NAI Indications

- 30-21-02A *Associated Valve Verified To Operate Normally*
- 30-21-02B *Associated Valve Inoperative*

30-21-03 Engine Cowl Overheat Indication (RR)

30-31-01 Pitot-Static Probe Heater Systems

30-31-02 Angle of Attack Sensor Heater Systems

30-31-03 Temperature Probe Heater Systems

30-41-01 Window Heat INOP Lights

30-41-02 Flight Deck Window Heater Systems (No. 1 & No. 2)

- 30-41-02-01 Passenger, Combi, and Freighter with Draw-Through Smoke Detection System

Table of Contents

30-41-03 Flight Deck Window Heater Systems (No.3)

30-42-01 Windshield Wipers

30-42-01-01 Low Speed

30-42-01-02 High Speed

 30-42-01-02A *One Inoperative*

 30-42-01-02B *Both Inoperative*

30-44-01 Windshield Washer Systems

30-71-01 Waste Water Drain Heater System(s)

 30-71-01A *Lavatory Water Supply Secured Off*

 30-71-01B *Lavatory Water Supply Not Used*

30-81-01 Ice Detection System

ATA 31 - Indicating/Recording Systems

31-25-01 Clock

[TGL] 31-31-01Flight Data Recorder (FDR)

[TGL] 31-31-02Quick Access Recorder (QAR) System

31-35-01 Aircraft Condition Monitoring System (ACMS)

31-51-01 Master Caution/Warning Systems

31-51-01-01 Master Warning Lights (Pilot's Glare Shield)

31-51-01-02 Master Caution Lights (Pilot's Glare Shield)

31-51-01-03 Aural Warning Speaker Systems

31-51-02 MAWEA ID Card

31-61-01 EICAS Lower Integrated Display Unit (IDU)

31-61-02 EFIS Control Panels

31-61-03 EICAS Display Select Panel

31-61-04 EICAS Status Messages

 31-61-04A *System(s) Used*

 31-61-04B *System(s) Considered Inoperative*

31-61-05 EICAS Synoptic Displays

Table of Contents

31-61-06 EFIS/EICAS Interface Units (EIU)

ATA 32 - Landing Gear

32-10-01 Main Gear Wheel Tiebolts

32-11-01 Landing Gear Strut Pressure Indicators

32-30-01 Landing Gear Retracting System

32-31-01 Landing Gear Latch Solenoid

32-32-01 Wing Gear Uplock Bungee Springs

32-33-01 Body Gear Uplock Bungee Springs

32-41-01 Wheel Brakes

32-41-01A *Install Brake Deactivation Tool*

32-41-01B *Deactivate Brake(s) By Capping Brake Line*

32-41-01C *Remove Inoperative Brake*

32-41-02 Brake Accumulator Pressure Indicator (In Wheel Well)

32-41-03 HYD BRAKE PRESS Indicator (Flight Deck)

32-41-04 Inflight Wheel Braking System

32-41-05 BRAKE SOURCE Light

32-42-01 Antiskid System

32-42-01-01 Control Channels

32-42-01-02 Wheelspeed Transducers

32-42-01-02A *Fore-Aft Wheel Pair Not Involved*

32-42-01-02B *Associated Brake Deactivated*

32-42-02 Alternate Antiskid Valves

32-42-03 Autobrake System

32-42-03A *Autobrake Solenoid Valve Verified Closed*

32-42-03B *Control Module Deactivated*

32-42-04 Torque Limiter System

Table of Contents

- 32-42-04-01 Torque Limiter Control**
 - 32-42-04-01A *Dispatch with Brake Limiter Indication Not Displayed***
 - 32-42-04-01B *Dispatch with Brake Limiter Indication Allowed***
- 32-44-02 Brake Status Lights (On Nose Gear)**
 - 32-44-02A *Alternate Procedures Required***
 - 32-44-02B *Procedures Do Not Require Use***
- 32-45-01 Nose Wheel Snubber Pads**
- 32-46-01 Brake Temperature Monitoring System (BTMS)**
- 32-48-01 Tire Pressure Indication System**
 - 32-48-01A *Alternate Procedures Required***
 - 32-48-01B *Procedures Do Not Require Use***
- 32-48-01-01 Tire Pressure Sensors**
- 32-51-01 Rudder Pedal Nose Wheel Steering System**
- 32-53-01 Body Gear Steering System**
- 32-53-02 Body Gear Steering Indication System**
- 32-61-01 Body and Wing Landing Gear Uplock Position Sensors**
 - 32-61-01A *One Inoperative***
 - 32-61-01B *Two Or More Inoperative***
- 32-61-02 Landing Gear Door Warning Sensors**
- 32-61-03 Wing Landing Gear Downlock Position Sensors**

ATA 33 - Lights

- 33-11-01 Flight Compartment and Instrument Lighting System**
- 33-12-01 Storm Override Switch**
- 33-18-01 Master Dim and Test System**
 - 33-18-01A *Dim Function Inoperative***
 - 33-18-01B *Test Function Inoperative***

Table of Contents

[TGL] 33-21-01 Cabin Interior Illumination System

33-21-01-01 Passenger and Combi Configurations

 33-21-01-01-01 Cabin Lighting - Passengers Carried

 33-21-01-01-02 Cabin Lighting - Passengers Not Carried

 33-21-01-02 First Class Mood Lighting

 33-21-01-02-01 Lights

 33-21-01-02-02 Lighting Control

 33-21-01-03 Cabin Crew Rest Lighting

 33-21-01-04 Flight Crew Bunk Lights

33-24-01 Passenger Lighted Information Signs (No Smoking/Fasten Seat Belt/Return to Seat)

 33-24-01A *PA System Inoperative*

 33-24-01B *PA System Operative*

33-24-01-01 Aural Tone System

33-24-01-02 Flight Deck Automatic Function

33-31-01 Wheel Well, Cargo Compartment, Servicing, Exterior Cargo Loading Area, and Electrical Equipment Center Lights Systems

33-41-01 Wing Illumination Lights

33-42-02 Landing Lights

 33-42-02A *All Operations*

 33-42-02B *Day Operations*

33-42-02-01 Dim Position

33-42-03 Runway Turn-Off Lights

 33-42-03A *All Operations*

 33-42-03B *Day Operations*

33-43-01 Position Lights (Wing Tips and Tail)

 33-43-01A *All Operations*

 33-43-01B *Day Operations*

[TGL] 33-44-01 Anti-Collision Light Systems

Table of Contents

- 33-44-01-01 Red Upper and Lower Fuselage Beacon Lights
 - 33-44-01-01A Tail/Wing Tip Strobes Operative
 - 33-44-01-01B Tail/Wing Tip Strobes Operative
- 33-44-01-02 White Tail and Wing Tip Strobe Lights
 - 33-44-01-02A Upper/Lower Beacons Operative

33-45-01 LOGO Light System

[TGL] 33-51-01Interior Emergency Lighting System

- 33-51-01-01 Overhead Emergency Lighting (Each aisle)
- 33-51-01-02 EXIT Signs
- 33-51-01-03 Exit Area lighting

[TGL] 33-51-02Exterior Emergency Lighting System

- 33-51-02A Escape Slide Lighting / Overwing Escape Route Lighting - Associated Door Inoperative - Night Operations
- 33-51-02C Escape Slide Lighting / Overwing Escape Route Lighting - Day Operations

[TGL] 33-51-03Floor Proximity Emergency Escape Path Marking System

- 33-51-03-01 Passenger and Combi Configurations
 - 33-51-03-01-01 Incandescent Marking System

ATA 34 - Navigation

- 34-00-01 Instrument Source Select Switches (FLT DIR, NAV, EIU, IRS, AIR DATA)**
 - 34-00-01-01 Auto-Select Feature
- 34-00-02 PFD/ND Standby Power Switching**
- 34-11-01 Static Air Temperature (SAT) Indications**
- 34-11-02 Pitot/Static Probe Source Select Valve(s)**
- 34-12-01 Air Data Computer System (ADC)**
- 34-12-02 Total Air Temperature Indication**
 - 34-12-02-01 Total Air Temperature Probes

Table of Contents

- 34-13-01 Mach Indications**
 - 34-13-01A One Inoperative
 - 34-13-01B Both Inoperative
- 34-13-02 Mach/Airspeed Warning Systems**
- 34-13-03 Standby Altimeter Vibrator**
- 34-13-04 True Airspeed Indications**
- 34-16-01 Altitude Alerting System**
 - 34-16-01A All Inoperative
 - 34-16-01-01 Aural Alert
 - 34-16-01-02 Visual Alert
- 34-21-01 Inertial Reference Units (IRUs)**
 - 34-21-01A Center Inoperative
 - 34-21-01B Right Inoperative
- 34-21-02 IRS 'ON BAT' Light**
- 34-22-01 Non-Stabilized Magnetic Compass (Standby)**
 - 34-22-01A Three IRUs Operative
 - 34-22-01B Two IRUs Operative
 - 34-22-01C Flight in Areas of Magnetic Unreliability
- 34-22-02 Standby Radio Magnetic Indicator (RMI)**
- 34-22-03 Flight Director Systems**
 - 34-22-03-01 Flight Director Displays
- 34-22-04 Standby Attitude/ILS Indicator**
 - 34-22-04-01 Attitude
 - 34-22-04-01B Day VMC Operations
 - 34-22-04-02 ILS
 - 34-22-04-02A VMC at Departure/Arrival Airports
 - 34-22-04-02B Standby Power to Captain's PFD/ND Available
- [TGL] 34-31-01 Instrument Landing System (ILS)**
 - 34-31-01A One Inoperative

Table of Contents

- 34-31-01B *More Than One Inoperative*
- 34-31-01-01 Excessive Beam Deviation Feature
- 34-31-01-01A *One Inoperative*
- 34-31-01-01B *Two Inoperative*
- 34-31-02 ILS Antenna Switching**
- 34-31-02-01 Glide Slope
- 34-31-02-01A *One Inoperative*
- 34-31-02-02 Localizer
- 34-31-02-02A *One Inoperative*
- [TGL] 34-32-01 Navigation Systems (Marker Beacon)**
- 34-32-01-01 IFR Operations
- 34-32-01-02 VFR Operations
- 34-33-01 Radio Altimeters (RA)**
- 34-33-01-02 Multi-Source Datalink to GPWS
- 34-35-01 Para Visual Displays**
- [TGL] 34-43-01 Weather Radar Systems**
- 34-43-01A *Two inoperative*
- 34-43-01C *One Operative*
- 34-43-01-01 Auxiliary Side Panel Displays
- 34-43-01-02 Windshear Alert Mode (Predictive)
- 34-43-01-02A *Reactive Windshear Inoperative*
- 34-43-01-02B *Reactive Windshear Operative*
- [TGL] 34-45-01 Traffic Collision and Avoidance System (TCAS)**
- 34-45-01A *Required*
- 34-45-01-01 Combined Traffic Alert (TA) Resolution Advisory (RA)
Dual Display
- 34-45-01-02 Resolution Advisory (RA) Display System(s)
- 34-45-01-02A *One Operative*
- 34-45-01-02B *None Operative*
- 34-45-01-03 Traffic Alert (TA) Display System(s)
- 34-45-01-04 Audio Functions

Table of Contents

[TGL] 34-46-01Ground Proximity Warning System (GPWS)

- 34-46-01-03 Glideslope Deviation(s) (Mode 5)
 - 34-46-01-03A *None Operative*
 - 34-46-01-03B *None Operative - Day VMC*
- 34-46-01-04 Advisory Callouts (Mode 6)
- 34-46-01-05 Windshear Alert Mode (Reactive) (Mode 7)
- 34-46-01-06 Terrain Awareness and Warning System (TAWS)

[TGL] 34-51-01Navigation Systems (VOR)

- 34-51-01-01 Two Operative FMS
- 34-51-01-02 One Operative FMS

34-51-02 VOR Mode Selection Switching

[TGL] 34-53-01ATC Transponders and Automatic Altitude Reporting Systems

- 34-53-01A *None Operative*
- 34-53-01B *One Operative*
- 34-53-01-01 Enhanced Downlink Aircraft Reportable Parameters
- 34-53-01-02 ADS-B Squitter Transmissions
 - 34-53-01-02A *Operations Do Not Require Use*

[TGL] 34-55-01Distance Measuring Equipment (DME)

- 34-55-01-01 Routes Not Dependent On Use
- 34-55-01-02 Operational Procedures Do Not Require Use

[TGL] 34-57-01Navigation Systems (ADF)

- 34-57-01-01 Routes Not Dependent On Use
- 34-57-01-02 Operational Procedures Do Not Require Use

[TGL] 34-58-01Global Positioning System (GPS)

- 34-58-01-01 Alternate Procedures Established
- 34-58-01-02 Procedures or Navigation not Dependent on Use

[TGL] 34-61-01Flight Management Computer Systems (FMCS includes Thrust Management Function)

- 34-61-01-03 Navigation Databases

Table of Contents

34-61-02 Control Display Units (CDU)

34-61-02-01 Center CDU

ATA 35 - Oxygen

35-11-01 Remote Fill Station

35-11-02 Crew Oxygen Pressure Indication System

35-11-03 Oxygen Overboard Discharge Indicator

[TGL] 35-21-01 Passenger/Supernumerary Oxygen System

35-21-01-01 Passenger/Combi

35-21-01-01A *Seats Blocked - No Altitude Restriction*

35-21-01-01B *All Packs Operative - FL 250 Altitude Restriction*

35-21-01-01C *10,000 Feet MSL Altitude Restriction*

35-21-01-03 Automatic Presentation

35-21-02 Passenger/Supernumerary Oxygen Pressure Indication System

35-31-01 Portable Oxygen Dispensing Units (Bottle and Mask)

35-31-02 Protective Breathing Equipment (PBE)

ATA 36 - Pneumatic

36-11-01 Engine Bleed Pressure Regulating and Shutoff Valves (PRSOV)

36-11-02 Engine Bleed PRSOV Start Solenoids

36-11-03 Engine High Pressure Bleed Systems

36-11-04 Wing Isolation Valves (Left and Right)

36-11-05 APU Check Valve

36-11-06 APU Bleed Air Isolation Valve

36-11-07 Left and Right Wing Isolation VALVE Lights

36-11-09 Firewall Shutoff Valves (FWSOV) (RR)

36-11-09A *Valve Closed - Icing Conditions Prohibited*

36-11-09B *Valve Open - Icing Conditions Allowed*

Table of Contents

- 36-11-11 Intermediate Bleed Check Valves**
- 36-11-12 High Stage (HP) Check Valves (RR)**
- 36-12-01 Precoolers**
 - 36-12-01-01 PW, GE & RR
- 36-12-02 Fan Air (Precooler) Control Systems**
 - 36-12-02-02 RR
 - 36-12-02-03 All Engines
- 36-16-01 APU Pneumatic Duct**
- 36-21-01 DUCT PRESS Indication Systems**
 - 36-21-01A One Inoperative
 - 36-21-01B Both Inoperative
- 36-21-02 ENGINE BLEED OFF Lights**
- 36-21-03 Engine Bleed Pressure Sensor**
- 36-21-04 Engine Bleed Over-pressure Switch**
- 36-22-01 Bleed Air SYS FAULT Lights**
- 36-22-02 APU Isolation VALVE Light**
- 36-22-03 Engine Bleed Temperature Sensor**

ATA 38 - Water/Waste

- 38-10-01 Potable Water Systems**
 - 38-10-01A *Inoperative Components Deactivated*
 - 38-10-01B *System Not Used*
- 38-30-01 Lavatory Waste Systems**
 - 38-30-01A *Inoperative Components Deactivated*
 - 38-30-01B *Lavatory Not Used*

ATA 44 - Cabin Systems

- 44-01-01 IFE AVOD/DTES**
 - 44-01-01-01 IFE AVU Fan Failure
 - 44-01-01-02 PAT/CFS

Table of Contents

- 44-01-01-03 Audio/Video Distribution System (RF Quality)
 - 44-01-01-03A
 - 44-01-01-03B
- 44-01-01-04 IFE System Seat Related Components/Functions
- 44-01-01-05 DMS
- 44-01-01-06 ISL
- 44-01-01-07 EHUB
- 44-01-01-08 No IFE

44-01-02 AVOD/DTES VCC COOLING FANS 1 AND 2**44-02-01 IFE Panasonic**

- 44-02-01-01 VCC Cooling Fan
- 44-02-01-02 File Server (FS)
- 44-02-01-03 Aircraft Interface (AI)
- 44-02-01-04 Crew Terminal
- 44-02-01-05 In-Seat IFE Components
- 44-02-01-06 IFE AMCUs
- 44-02-01-07 Complete IFE System INOP

44-03-01 GOGO Connectivity System**ATA 45 - Central Maintenance System****45-45-01 Central Maintenance Computers****45-45-02 Ground Test Enable Switches****45-45-03 Multiple-Input Printer**

- 45-45-03A *Alternate Procedures Used*
- 45-45-03B *Procedures Do Not Require Printer*

ATA 46 - Information Systems**46-20-01 Electronic Flight Bag Systems (EFBs)**

- 46-20-01-01 IPad Mounting Device (FlyPad Tray)
 - 46-20-01-01A *Two Inoperative*
 - 46-20-01-01B *One Inoperative*

Table of Contents

ATA 49 - Airborne Auxiliary Power

49-11-01 Auxiliary Power Unit

49-11-01-01 Pneumatic Function

49-15-01 APU Inlet Door

49-15-01A *Inoperative Closed*

49-15-01B *Inoperative Open*

49-61-01 APU External Control Panel

49-61-01A *Auto Fire Bottle Installed and Operative*

49-61-01B *Auto Fire Bottle Not Installed or Inoperative*

49-61-02 APU RPM Indications (N1, N2)

49-71-01 APU EGT Indication

49-94-01 APU Oil Quantity Indication

ATA 52 - Doors

[TGL] 52-11-01 Main Entry Doors/Slides

52-11-02 Pressure Stop Fitting Assemblies (Main Entry Doors)

52-11-03 Main Entry Door Hold-Open Latch

52-11-03B *Passenger Operations*

52-11-03-01 Latch Release Lever

52-21-01 Crew Compartment Overhead Hatch Latch Pins

52-23-01 Upper Deck Escape Door/Slide

52-23-01-01 Passenger/Combi

52-23-01-01A *One Inoperative - Limited Passengers On Upper Deck*

52-23-01-01B *Both Inoperative - No Passengers On Upper Deck*

52-23-02 Upper Deck Type "A" Emergency Exit Door Actuator(s)

52-23-03 DOOR U/D Flight Lock Actuators

52-23-03-01 Passenger / Combi

52-23-04 DOOR U/D GND MODE Lights (Above Door)

Table of Contents

- 52-23-04-01 Passenger / Combi
 - 52-23-04-01A DOOR U/D FLT LK Message Operative
 - 52-23-04-01B Cabin Attendant Monitors Door Handle
- 52-23-05 Pressure Stop Fitting Assemblies (Upper Deck Door(s))**
 - 52-23-05-01 Passenger / Combi
 - 52-23-05-01A Pressurized Flight With Restrictions
 - 52-23-05-01B Unpressurized Flight
- 52-23-06 Door U/D FLT LK Indication**
 - 52-23-06-01 Passenger / Combi
 - 52-23-06-01A DOOR U/D GND MODE Lights Operative
 - 52-23-06-01B Cabin Attendant Monitors Door Handle
- 52-23-07 Upper Deck Door Battery OK Lights**
- 52-32-04 Cargo Door Lift Systems (Main Lower Lobe Cargo Doors)**
- 52-32-05 Cargo Door Hook Systems (Main Lower Lobe Cargo Doors) (Electrical Function)**
- 52-34-01 Main Lower Lobe Cargo Doors**
- 52-34-02 Main Lower Lobe Cargo Door Latch Systems (Electrical Function)**
- 52-36-01 Bulk Cargo Door Balance Mechanism**
- 52-36-02 Bulk Cargo Door Pressure Stop Fitting Assemblies**
- 52-48-01 Main (Forward) Electronic Bay Access Door Latch Pins**
 - 52-48-01A Door Operates Normally
 - 52-48-01B Door Does Not Operate Normally
- [TGL] 52-51-02 Lockable Flight Deck Door Automatic Locking System**
 - 52-51-02-01 Flight Deck Access Panel System (Keypad, Door Chime)
 - 52-51-02-01-01 LEDs
 - 52-51-02-02 Flight Deck Door LOCK FAIL Light
 - 52-51-02-03 Flight Deck Door AUTO UNLK Light
 - 52-51-02-04 Flight Deck Door Lock Control Selector

Table of Contents

52-51-03 Lockable Flight Deck Door Dead Bolt

52-51-06 Flight Deck Door Viewing Port

 52-51-06B *With Electronic Visual Surveillance System
 Installed*

52-73-01 Door Indication

 52-73-01-01 Auto/Man EICAS Indications

 52-73-01-01A *Required By Procedures*

52-BA-01 MEC (Main Equipment Centre) Hatch Locking Tool

ATA 53 - Fuselage

53-21-01 Floor Vents (Passenger Airplanes)

53-21-02 Sidewall Vents (Passenger Airplanes)

**53-30-01 FUSELAGE ADJACENT TO MAIN STATIC VENTS/ PITOT/
STATIC SYSTEMS**

ATA 73 - Engine Fuel and Control

73-21-01 Minimum Idle/Approach Idle Selection Systems

 73-21-01-01 Ground Minimum Idle Selection Systems

73-21-02 Electronic Engine Control Systems (EEC)

 73-21-02-01 ENG_EEC Mode (PW and RR)

 73-21-02-04 ENG_EEC C1 (RR)

73-21-03 Turbine Overspeed System (RR)

73-31-01 Fuel Flow Indications

73-34-01 Fuel Filter Bypass Warning Systems

ATA 74 - Ignition

74-00-01 Ignition Systems

74-00-02 Continuous Ignition Selection System

 74-00-02-01 Flap Actuated

 74-00-02-02 Nacelle Anti-Ice Actuated

 74-00-02-03 Switch Actuated

Table of Contents

74-00-03 Auto Ignition (RR Autostart)

ATA 75 - Bleed Air

75-33-01 IDG Air/Oil Cooler (AOC) Valves

75-33-01-03 RR

ATA 77 - Engine Indicating

77-11-01 Engine Pressure Ratio Indicating Systems (PW and RR)

77-12-01 N2 Tachometer Systems (RR)

77-12-02 Engine Speed Cards

77-12-03 N3 Tachometer Generator (RR)

77-22-01 Engine Turbine Overheat Detector Loops (RR)

77-31-01 Vibration Indicating Systems

ATA 78 - Engine Exhaust

78-31-01 Thrust Reverser Systems (such as, but not limited to engine reverse hydraulic isolation valves, thrust reverser air system, and REV unlock indications)

78-31-01A One Inoperative

78-31-01B Two Inoperative

78-34-01A Interlock Extended

78-34-01B Interlock Retracted

78-36-01 Reverser Position Sensing System

78-36-01A One Inoperative

78-36-01B Two Inoperative

78-36-03 Full REV Position Indications (Green)

ATA 79 - Engine Oil

79-21-02 Engine High Pressure Oil Filter Warning Indication (Approaching Blockage) (RR)

79-21-03 Engine Fine Scavenge Oil Filter Warning Indication (Impending Bypass) (RR)

Table of Contents**79-31-01 Oil Quantity Indicating Systems****ATA 80 - Starting**

- 80-11-01 Engine Start Valves**
- 80-11-02 Starter Switch Systems**
- 80-11-03 Auto Start Systems**
- 80-11-04 Start Valve Open Lights**

05-00-01 Non-Safety Related Equipment

Interval	Installed	Required	Procedure
D	-	-	

The following reference may be used to defer a condition of minor unserviceability relating to non airworthiness items and/or items not required for safe operation of the aircraft except where:

- a. The item or condition is addressed elsewhere in this document.
- b. The serviceability specification of item or condition is contained in other aircraft Approved Technical Publications e.g. AMM.

NOTE 1:(Reference GM1 ORO.MLR.105(a)). In order for inoperative installed equipment to be considered non-safety related the following criteria should be considered:

- a. the operation of the aircraft is not adversely affected such that standard operating procedures related to ground personnel, and crew members are impeded;
- b. the condition of the aircraft is not adversely affected such that the safety of passengers and/or personnel is jeopardised;
- c. the condition of the aircraft is configured to minimise the probability of a subsequent failure that may cause injury to passengers / personnel and/or cause damage to the aircraft;
- d. the condition does not include the use of required emergency equipment and does not impact emergency procedures such that personnel could not perform them.

NOTE 2: This item must not be used for partial unserviceability of items listed elsewhere in the MEL. See also MEL Definitions - 'Inoperative components of an inoperative system'.

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21-25-01 Recirculation Fans

Interval	Installed	Required	Procedure
C	4	0	(M) (O)

May be inoperative provided:

- a. Fuel burn penalty is observed.
 - b. Associated fan is deactivated.

MAINTENANCE (M)

Deactivate the inoperative recirculation fan.

1. For upper right fan, open and collar P415 panel OVHD RECIRC FAN 1 CONT PWR circuit breaker.
 2. For upper left fan, open and collar P415 panel OVHD RECIRC FAN 2 CONT PWR circuit breaker.
 3. For lower right fan, open and collar P415 panel U/F RECIRC FAN 2 PWR circuit breaker.
 4. For lower left fan, open and collar P415 panel U/F RECIRC FAN 1 PWR circuit breaker.
 - A. For Hamilton Standard humidifier (P/N S214W002-200) installation:
 - 1) Position temperature control panel (P5) HUMID switch to OFF.
 - 2) Close humidifier manual shutoff valve (AMM 21-71-11).

OPERATIONS (O)

1. For one inoperative upper fan, position the upper RECIRC fan switch ON.
 2. For one inoperative lower fan, position the lower RECIRC fan switch ON.
 3. For airplanes without Door 5 Crew Rest installed and both upper or both lower fans inoperative, position associated RECIRC fan switch OFF.
 4. For airplanes with Door 5 Crew Rest installed:
 - A. For both upper fans inoperative, position upper RECIRC fan switch ON.
 - B. For both lower fans inoperative, position lower RECIRC fan switch OFF.
 5. For more than one fan inoperative, increase flight planning fuel by 0.8%.

21-26-05 ECS Misc Card**21-26-05A Extended Overwater Flight Allowed**

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative provided:

- Forward Overboard Valve is deactivated closed.
- Operation is limited to two Air Conditioning Packs.
- Procedures are established and used to verify the aft cargo compartment remains empty or contains only empty cargo handling equipment, ballast (ballast may be loaded in ULDs), or fly away kits.

For Passenger and Combi:

- One Lavatory/Galley fan is verified to operate normally.
- Aft Cargo Heat remains OFF.
- Fwd Cargo Heat (electrical) is deactivated.

NOTE 1: The airplane must also be dispatched using MEL item 21-31-04.

NOTE 2: Operators must also comply with MEL item 21-51-01 operational requirements.

NOTE 3: For Forward Cargo Compartment Heating System (Electric) installed, the airplane must also be dispatched using MEL item 21-43-01.

MAINTENANCE (M)

- Deactivate the Forward Overboard Valve closed using DDG Item 21-31-04 (M) procedure.
- Confirm operation of Lavatory/Galley fans.
 - Gain access the Lavatory/Galley fans in section 46 by entering via the bulk cargo compartment aft bulkhead access panel.
 - Confirm fan operation by feeling for air discharge from either the primary fan or the secondary fan exit ducts.
- If installed, deactivate forward cargo heat (electrical) using DDG Item 21-43-01 (M) procedure.

OPERATIONS (O)

- Aft cargo compartment must remain empty except for ballast, empty cargo containers (ballast may be loaded in ULDs), fly away kits, pallets, and cargo restraint components.
- Forward cargo compartment electric heaters (which supply heat in addition to the equipment cooling exhaust airflow) will be unavailable.
- Status message ECS MISC CARD will remain displayed.

21-26-05 ECS Misc Card**21-26-05B Extended Overwater Flight Prohibited**

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative provided:

- a. Forward Overboard Valve is deactivated open.
- b. Extended overwater flight is prohibited.
- c. Operation is limited to two Air Conditioning Packs.
- d. Procedures are established and used to verify the forward lower lobe cargo compartment remains empty or contains only empty cargo handling equipment, ballast (ballast may be loaded in ULDs), or fly away kits.

For Passenger and Combi:

- e. One Lavatory/Galley fan is verified to operate normally.
- f. Aft Cargo Heat remains OFF.
- g. Fwd Cargo Heat (electrical) is deactivated.

NOTE 1: The airplane must also be dispatched using MEL item 21-31-04.

NOTE 2: Operators must also comply with MEL item 21-51-01 operational requirements.

NOTE 3: For Forward Cargo Compartment Heating System (Electric) installed, the airplane must also be dispatched using MEL item 21-43-01.

MAINTENANCE (M)

1. Deactivate the Forward Overboard Valve open using DDG item 21-31-04 (M) procedure.
2. Confirm operation of Lavatory/Galley fans.
 - A. Gain access the Lavatory/Galley fans in section 46 by entering via the bulk cargo compartment aft bulkhead access panel.
 - B. Confirm fan operation by feeling for air discharge from either the primary fan or the secondary fan exit ducts.
3. If installed, deactivate forward cargo heat (electrical) using DDG Item 21-43-01 (M) procedure.

OPERATIONS (O)

1. Flight must not be conducted over routes that require extended over-water operation.
2. Forward lower lobe cargo compartment must remain empty except for ballast, empty cargo containers (ballast may be loaded in ULDs), fly away kits, pallets, and cargo restraint components.
3. Forward cargo compartment electric heaters will be unavailable.
4. Status message ECS MISC CARD will remain displayed.

21-26-06 Chiller Boost Fan

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative deactivated.

MAINTENANCE (M)

Deactivate chiller boost fan.

1. Open and collar P415 CHILLER BOOST FAN PWR circuit breaker.
2. Raise carry forward action, OPDEF, to notify the local Catering Teams to add dry ice to all of the door 2 galley complex catering carts. The addition of dry ice will aid chiller performance.

21-31-01 Outflow Valves**21-31-01A One Inoperative**

Interval	Installed	Required	Procedure
C	2	1	(M) (O)

One valve may be inoperative provided:

- a. A maximum of two packs are used throughout flight.
- b. Valve is deactivated closed.
- c. Both automatic and manual controls operate normally on the remaining valve.

MAINTENANCE (M)

Deactivate inoperative outflow valve closed.

1. For the left outflow valve, open and collar the P6 panel CABIN PRESS CONT L ICU and P414 panel CABIN PRESS ICU LEFT circuit breakers.
2. For the right outflow valve, open and collar the P6 panel CABIN PRESS CONT R ICU and P414 panel CABIN PRESS ICU RIGHT circuit breakers.
3. For manual control available:
 - A. Position manual control for inoperative outflow valve MAN ON, and drive valve fully closed.
 - B. Position manual control OFF.
4. For manual control not available:
 - A. Remove outflow valve AC motor (AMM 21-31-06/401).
 - B. Close valve by applying torque to actuator output shaft.
 - C. Reinstall AC motor (AMM 21-31-06/405).

OPERATIONS (O)

1. A maximum of two packs may be used throughout flight.
2. For manual control available, maintain manual control OFF.
3. Use MEL item 21-51-01 Operations Note.

21-31-01 Outflow Valves**21-31-01B Two Inoperative**

Interval	Installed	Required	Procedure
C	2	0	(M) (O)

May be inoperative provided:

- a. Flight is conducted in an unpressurized configuration.
- b. Procedures are established and used to verify the lower lobe cargo compartments remain empty or contain only empty cargo handling equipment, ballast (ballast may be loaded in ULDs), or fly away kits.

- c. Extended overwater flight is prohibited.
 - d. Door 5R Crew Rest and Zone F Crew Rest areas are empty, locked closed and placarded INOPERATIVE - DO NOT ENTER.
-

MAINTENANCE (M)

Deactivate outflow valves open.

- 1. Open and collar P6 panel CABIN PRESS CONT L ICU circuit breaker
- 2. Open and collar P6 panel CABIN PRESS CONT R ICU circuit breaker.
- 3. Open and collar P414 panel CABIN PRESS ICU LEFT circuit breaker.
- 4. Open and collar P414 panel CABIN PRESS ICU RIGHT circuit breakers.
- 5. For manual control available:
 - A. Position manual control for inoperative outflow valve MAN ON, and drive valve fully open.
 - B. Position manual control OFF
- 6. For manual control not available:
 - A. Remove outflow valve AC motor (AMM 21-31-06/401)
 - B. Open valve by applying torque to actuator output shaft.
 - C. Reinstall AC motor (AMM 21-31-06/405).
- 7. Door 5R Crew Rest and Zone F Crew rest areas are empty, locked closed and placarded INOPERATIVE - DO NOT ENTER.

OPERATIONS (O)

- 1. Flight will be unpressurized. With passengers/supernumeraries on board, enroute altitude must be limited to 10,000 feet.
- 2. To avoid passenger/supernumerary discomfort after takeoff obstacle clearance has been assured, limit climb and descent to 500 fpm.
- 3. Extended overwater flight is prohibited.
- 4. Flight must remain within 60 minutes of a suitable landing airport.
- 5. Three pack operation is required for unpressurized flight to ensure adequate smoke removal capability.
 - A. Select all three air conditioning packs to NORM mode.
 - B. Select upper recirculation fans ON.
 - C. Select lower recirculation fans OFF.
- 6. The lower lobe cargo compartments must remain empty except for ballast, empty cargo containers (ballast may be loaded in ULDs), fly away kits, pallets, and cargo restraint components.
- 7. The Door 5R Crew Rest and Zone F Crew Rest areas are empty, locked closed and not used for any purpose.

21-31-02 Automatic Cabin Pressure Controllers (A and B)**21-31-02A One Inoperative - Manual Mode Operative**

Interval	Installed	Required	Procedure
C	2	1	

One may be inoperative provided both outflow valves operate normally in manual mode.

21-31-02 Automatic Cabin Pressure Controllers (A and B)**21-31-02B One Inoperative - Manual Mode Inoperative**

Interval	Installed	Required	Procedure
C	2	1	(M)

One may be inoperative provided:

- If one outflow valve is inoperative in the manual mode, it must be deactivated closed, with a maximum of two packs used throughout flight.
 - Cabin altitude backup sensor system (CPCS BACKUP SENS) operates normally.
-

NOTE: Operators must also comply with MEL item 21-51-01 operational requirements.

MAINTENANCE (M)

Deactivate inoperative outflow valve closed.

- Use MEL item 21-31-01A (M) procedure to deactivate the valve closed.

OPERATIONS NOTE

- Do not use more than two packs throughout the flight.
- Use MEL item 21-51-01 Operations Note.

21-31-02 Automatic Cabin Pressure Controllers (A and B)**21-31-02C Both Inoperative - Unpressurized Flight**

Interval	Installed	Required	Procedure
C	2	0	(M) (O)

May be inoperative provided:

- Flight is conducted in an unpressurized configuration.
- Procedures are established and used to verify the lower lobe cargo compartments remain empty or contain only empty cargo handling equipment, ballast (ballast may be loaded in ULDs), or fly away kits.

- c. Extended overwater flight is prohibited.
- d. Door 5R Crew Rest and Zone F Crew Rest areas are empty, locked closed and placarded INOPERATIVE - DO NOT ENTER.

NOTE: The airplane must also be dispatched using MEL item 21-31-01B.

MAINTENANCE (M)

Deactivate both outflow valves open for unpressurized flight.

1. Use MEL item 21-31-01B (M) procedure to deactivate both outflow valves open for unpressurized flight.

OPERATIONS (O)

1. Use MEL item 21-31-01B (O) procedure for unpressurized flight.
2. Lower lobe cargo compartments must remain empty except for ballast, empty cargo containers (ballast may be loaded in ULDs), fly away kits, pallets, and cargo restraint components.

21-31-03 Cabin Pressure Control Systems (Manual L and R)
21-31-03A One Inoperative

Interval	Installed	Required	Procedure
C	2	1	(M) (O)

One may be inoperative provided:

- a. Associated outflow valve is deactivated closed.
- b. A maximum of two packs are used throughout flight.

NOTE: Operators must also comply with MEL item 21-51-01 operational requirements.

MAINTENANCE (M)

Deactivate the associated outflow valve closed.

1. Use MEL item 21-31-01A (M) procedure to deactivate outflow valve closed.

OPERATIONS (O)

1. Do not use more than two packs throughout the flight.

21-31-03 Cabin Pressure Control Systems (Manual L and R)
21-31-03B Both Inoperative

Interval	Installed	Required	Procedure
C	2	0	(M) (O)

May be inoperative provided:

- a. Flight is conducted in an unpressurized configuration.
- b. Procedures are established and used to verify the lower lobe cargo compartments remain empty or contain only empty cargo handling equipment, ballast (ballast may be loaded in ULDs), or fly away kits.
- c. Extended overwater flight is prohibited.
- d. Door 5R Crew Rest and Zone F Crew Rest areas are empty, locked closed and placarded INOPERATIVE - DO NOT ENTER.

NOTE: The airplane must also be dispatched using MEL item 21-31-01B.

MAINTENANCE (M)

Deactivate both outflow valves open for unpressurized flight.

1. Use MEL item 21-31-01B (M) procedure to deactivate both outflow valves open for unpressurized flight.

OPERATIONS (O)

Use MEL item 21-31-01B (O) procedure for unpressurized flight.

21-31-04 Forward Overboard Valve (Lower 41 Section)**21-31-04-01 Models Without Auxiliary Fuel Tank Provisions****21-31-04-01A Valve Closed**

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative deactivated closed provided:

- Procedures are established and used to verify the aft lower lobe cargo compartment remains empty or contains only empty cargo handling equipment, ballast (ballast may be loaded in ULDs), or fly away kits.

MAINTENANCE (M)

Deactivate the forward overboard valve in the closed position.

- Open and collar P6 panel FWD OVBD VLV CONT circuit breaker.
- Open and collar P180 panel FWD OVBD VALVE POWER circuit breaker.
- Gain access to inoperative valve (AMM 21-26-15/401)
- Disconnect, cap and stow electrical connector DV462 from valve.
- Manually position operating lever/position indicator closed.
- Lockwire the lever to the actuator mounting screws.

OPERATIONS (O)

Associated cargo compartments must remain empty except for ballast, empty cargo containers (ballast may be loaded in ULDs), fly away kits, pallets, and cargo restraint components.

21-31-04 Forward Overboard Valve (Lower 41 Section)**21-31-04-01 Models Without Auxiliary Fuel Tank Provisions****21-31-04-01B Valve Open**

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative deactivated open provided:

- Extended overwater flight is prohibited.
- Procedures are established and used to verify the forward lower lobe cargo compartment remains empty or contains only empty cargo handling equipment, ballast (ballast may be loaded in ULDs), or fly away kits.

MAINTENANCE (M)

Deactivate the forward overboard valve in the open position.

1. Open and collar P6 panel FWD OVBD VLV CONT circuit breaker.
2. Open and collar P180 panel FWD OVBD VALVE POWER circuit breaker.
3. Gain access to inoperative valve (AMM 21-26-15/401).
4. Disconnect, cap and stow electrical connector DV462 from valve.
5. Manually position operating lever/position indicator to the open position.
6. Lockwire lever to the actuator mounting screws.

OPERATIONS (O)

Associated cargo compartments must remain empty except for ballast, empty cargo containers (ballast may be loaded in ULDs), fly away kits, pallets, and cargo restraint components.

21-32-01 Positive Pressure Relief Valves**21-32-01B Both Inoperative**

Interval	Installed	Required	Procedure
C	2	0	(M) (O)

May be inoperative provided:

- a. Flight is conducted in an unpressurized configuration.
- b. Procedures are established and used to verify the lower lobe cargo compartments remain empty or contain only empty cargo handling equipment, ballast (ballast may be loaded in ULDs), or fly away kits.
- c. Extended overwater flight is prohibited.
- d. Door 5R Crew Rest and Zone F Crew Rest areas are empty, locked closed and placarded INOPERATIVE - DO NOT ENTER.

NOTE: The airplane must also be dispatched using MEL item 21-31-01B.

MAINTENANCE (M)

Deactivate both outflow valves open for unpressurized flight.

1. Use DDG Item 21-31-01B (M) procedure to deactivate both outflow valves open for unpressurized flight.

OPERATIONS (O)

Use DDG Item 21-31-01B (O) procedure for unpressurized flight.

21-32-02 Landing Altitude (LDG ALT) Switch

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative in automatic mode.

OPERATIONS (O)

1. Do not accomplish LANDING ALT checklist.
2. Set Landing Altitude using manual mode.
3. Touchdown zone indicator (amber crosshatched area) will not be shown on PFD altitude tape.

21-33-01 Cabin RATE Indication**21-33-01A Pressurized Flight**

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided all remaining components and functions of the pressurization system operate normally.

OPERATIONS (O)

Operate the pressurization system using the other available indications.

21-33-01 Cabin RATE Indication**21-33-01B Unpressurized Flight**

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative provided:

- a. Flight is conducted in an unpressurized configuration.
- b. Procedures are established and used to verify the main deck cargo compartments remain empty or contain only empty cargo handling equipment, ballast (ballast may be loaded in ULDs), or fly away kits.
- c. Extended overwater flight is prohibited.
- d. Door 5R Crew Rest and Zone F Crew Rest areas are empty, locked closed and placarded INOPERATIVE - DO NOT ENTER.

NOTE: The airplane must also be dispatched using MEL item 21-31-01B.

MAINTENANCE (M)

Deactivate both outflow valves open for unpressurized flight.

1. Use MEL item 21-31-01B (M) procedure to deactivate both outflow valves open for unpressurized flight.

OPERATIONS (O)

Use MEL item 21-31-01B (O) procedure for unpressurized flight.

21-33-02 Cabin Differential Pressure Indication**21-33-02A CAB ALT Indication Operative**

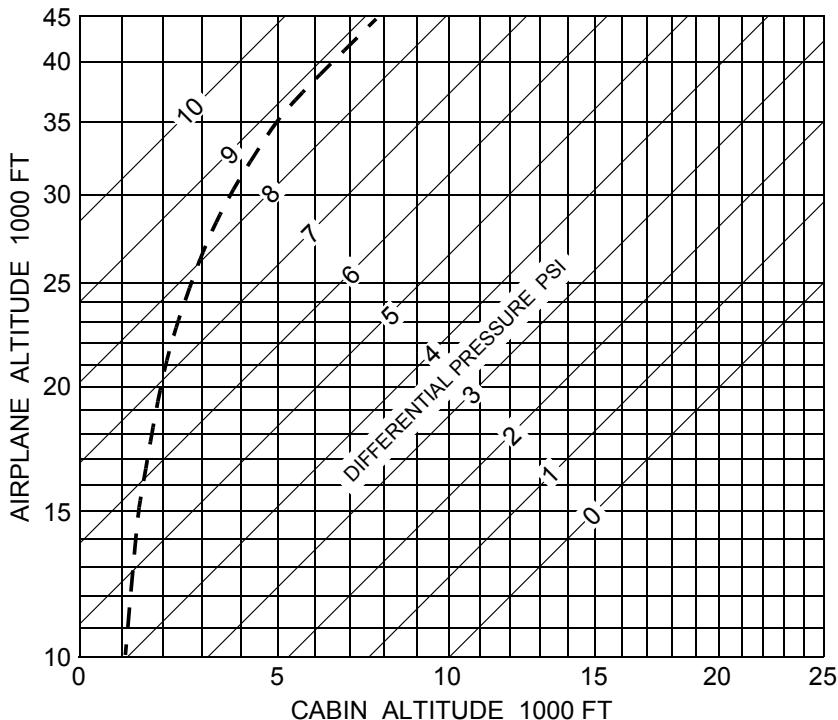
Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided:

- a. Cabin altitude indication operates normally.
- b. A chart is provided for the flight crew to convert cabin altitude to differential pressure.

OPERATIONS (O)

The following chart may be used to determine cabin differential pressure from indicated values of airplane and cabin altitude. Heavy dashed line gives differential pressure for Auto Controller schedule.



21-33-02 Cabin Differential Pressure Indication**21-33-02B CAB ALT Indication Inoperative**

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative provided:

- a. Flight is conducted in an unpressurized configuration.
- b. Procedures are established and used to verify the lower lobe cargo compartments remain empty or contain only empty cargo handling equipment, ballast (ballast may be loaded in ULDs), or fly away kits.
- c. Extended overwater flight is prohibited.
- d. Door 5R Crew Rest and Zone F Crew Rest areas are empty, locked closed and placarded INOPERATIVE - DO NOT ENTER.

NOTE: The airplane must also be dispatched using MEL item 21-31-01B.

MAINTENANCE (M)

Deactivate both outflow valves open for unpressurized flight.

1. Deactivate both outflow valves open using MEL item 21-31-01B (M) procedure.

OPERATIONS (O)

Use MEL item 21-31-01B (O) procedure for unpressurized flight.

Section 2**21-33-03 CAB ALT Indication****21-33-03A Cabin Differential Pressure Indication Operative**

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided:

- a. Cabin differential pressure indication operates normally.
 - b. A chart is provided for the flight crew to convert cabin differential pressure to cabin altitude.
-

OPERATIONS (O)

Use MEL item 21-33-02A (O) procedure to determine cabin altitude for a particular condition.

21-33-03 CAB ALT Indication**21-33-03B Cabin Differential Pressure Indication Inoperative**

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative provided:

- a. Flight is conducted in an unpressurized configuration.
 - b. Procedures are established and used to verify the lower lobe cargo compartments remain empty or contain only empty cargo handling equipment, ballast (ballast may be loaded in ULDs), or fly away kits.
 - c. Extended overwater flight is prohibited.
 - d. Door 5R Crew Rest and Zone F Crew Rest areas are empty, locked closed and placarded INOPERATIVE - DO NOT ENTER.
-

NOTE: The airplane must also be dispatched using MEL item 21-31-01B.

MAINTENANCE (M)

Deactivate both outflow valves open for unpressurized flight.

1. Use MEL item 21-31-01B (M) to deactivate both outflow valves open.

OPERATIONS (O)

Use MEL item 21-31-01B (O) procedure for unpressurized flight.

21-33-04 OUTFLOW VALVES Position Indicators (Overhead Panel)**21-33-04A Pressurized Flight**

Interval	Installed	Required	Procedure
C	2	0	

May be inoperative provided all remaining components and functions of the pressurization system operate normally.

21-33-04 OUTFLOW VALVES Position Indicators (Overhead Panel)**21-33-04B Unpressurized Flight**

Interval	Installed	Required	Procedure
C	2	0	(M) (O)

May be inoperative provided:

- a. Flight is conducted in an unpressurized configuration.
 - b. Procedures are established and used to verify the lower lobe cargo compartments remain empty or contain only empty cargo handling equipment, ballast (ballast may be loaded in ULDs), or fly away kits.
 - c. Extended overwater flight is prohibited.
 - d. Door 5R Crew Rest and Zone F Crew Rest areas are empty, locked closed and placarded INOPERATIVE - DO NOT ENTER.
-

NOTE: The airplane must also be dispatched using [MEL item 21-31-01B](#).

MAINTENANCE (M)

Deactivate both outflow valves open for unpressurized flight.

1. Use [MEL item 21-31-01B \(M\)](#) procedure to deactivate both outflow valves open.

OPERATIONS (O)

Use [MEL item 21-31-01B \(O\)](#) procedure for unpressurized flight.

21-33-05 Cabin Altitude Primary Sensors**21-33-05A One Inoperative**

Interval	Installed	Required	Procedure
C	2	1	

One primary sensor may be inoperative provided the Cabin Altitude Backup Sensor (CPCS BACKUP SENS) system operates normally.

21-33-05 Cabin Altitude Primary Sensors**21-33-05B Both Inoperative**

Interval	Installed	Required	Procedure
C	2	0	(O)

May be inoperative provided flight remains at or below 10,000 feet MSL.

NOTE: The airplane must also be dispatched using [MEL item 21-31-02C](#).

OPERATIONS (O)

Cabin Pressure Controllers A & B will be inoperative. Maintain flight at or below 10,000 feet MSL.

NOTE: Cabin Altitude Warning System is inoperative.

**21-33-06 Cabin Altitude Backup Sensor (CPCS BACKUP SENS)
System**

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided both automatic cabin pressure controllers operate normally.

21-40-02 Bulk Cargo Heating System (Electric)

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative deactivated off.

MAINTENANCE (M)

Deactivate the bulk cargo heating system.

1. For inoperative heater and fan
 - A. Open and collar P415 panel BULK CARGO HEATER circuit breaker.
 - B. Open and collar P415 panel VENT FAN PWR - BULK CGO circuit breaker.
 - C. Position Bulk Compartment Temperature Selector Switch to 4 degrees C / 40 degrees F / LOW.
2. For inoperative heater and operative fan
 - A. Open and collar P415 panel BULK CARGO HEATER circuit breaker.
 - B. Position Bulk Compartment Temperature Selector Switch to 18 degrees C / 65 degrees F / HIGH.

OPERATIONS NOTE

Temperature sensitive cargo should not be carried in the bulk cargo compartment.

21-41-01 Door 5 Overhead Crew Rest Environmental Control System

21-41-01-01 Temperature Control

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided heater is deactivated.

MAINTENANCE (M)

Deactivate the Door 5 Overhead Crew Rest Area heater.

1. Open and collar P85 panel OVDR 5 CREW REST HTR PWR circuit breaker.
2. Open and collar P180 panel CREW REST HTR CONT circuit breaker.

OPERATIONS NOTE

Due to limited ventilation and lack of temperature control, Door 5 Overhead Crew Rest Area may become undesirable for occupancy on flights of long duration.

21-41-01 Door 5 Overhead Crew Rest Environmental Control System

21-41-01-02 Ventilation

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided:

- a. Heater is deactivated.
- b. Supply/boost fan is deactivated.

MAINTENANCE (M)

Deactivate the Door 5 Overhead Crew Rest Area heater and supply/boost fan.

1. Open and collar P85 panel OVDR 5 CREW REST HTR PWR circuit breaker.
2. Open and collar P180 panel CREW REST HTR CONT circuit breaker.
3. Open and collar P85 panel CREW REST FAN PWR circuit breaker.

OPERATIONS NOTE

Due to limited ventilation and lack of temperature control, Door 5 Overhead Crew Rest Area may become undesirable for occupancy on flights of long duration.

21-41-01 Door 5 Overhead Crew Rest Environmental Control System

21-41-01-03 Temperature Indicator

Interval	Installed	Required	Procedure
D	1	0	

OPERATIONS NOTE

Control of temperature and ventilation is unaffected.

21-41-02 Zone F Crew Rest Environmental Control System

21-41-02-01 Temperature Control

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided heater is deactivated.

MAINTENANCE (M)

Deactivate Zone F Crew Rest Area heater.

1. Open and collar P415 panel ZONE F HEATER POWER circuit breaker.
2. Open and collar P180 panel ZONE F FAN/HTR CONT circuit breaker.

OPERATIONS NOTE

Due to limited ventilation and lack of temperature control, Zone F Crew Rest Area may become undesirable for occupancy on flights of long duration.

21-41-02 Zone F Crew Rest Environmental Control System

21-41-02-02 Ventilation

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided:

- a. Heater is deactivated.
- b. Supply/boost fan is deactivated.

MAINTENANCE (M)

Deactivate Zone F Crew Rest Area heater and supply/boost fan.

1. Open and collar P415 panel ZONE F HEATER POWER circuit breaker.
2. Open and collar P180 panel ZONE F FAN/HTR CONT circuit breaker
3. Open and collar P85 panel CREW REST FAN PWR circuit breaker.

OPERATIONS NOTE

Due to limited ventilation and lack of temperature control, Zone F Crew Rest Area may become undesirable for occupancy on flights of long duration.

21-41-02 Zone F Crew Rest Environmental Control System

21-41-02-03 Temperature Indicator

Interval	Installed	Required	Procedure
D	1	0	

OPERATIONS NOTE

Control of temperature and ventilation is unaffected.

21-42-01 Flight Crew Auxiliary Heat System (Foot and Shoulder)

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative OFF.

21-42-02 Flight Deck Crew Rest Area Heat Control System

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative deactivated.

MAINTENANCE (M)

Deactivate flight deck crew rest area heat control system.

1. Open and collar P415 panel CREW REST HTR FT DK circuit breaker.

21-42-02 Flight Deck Crew Rest Area Heat Control System
*****21-42-02-01 Temperature Control Functions (LOW/MED/HIGH)**

Interval	Installed	Required	Procedure
C	-	1	

**21-43-01 Forward Cargo Compartment Heating System
(Electric)**

Interval	Installed	Required	Procedure
D	1	0	(M)

May be inoperative OFF.

MAINTENANCE (M)

Deactivate inoperative heating system off.

1. Open and collar P414 panel CARGO HTR PWR LEFT FWD circuit breaker.
2. Open and collar P415 panel CARGO HTR PWR RIGHT FWD circuit breaker.

21-44-01 Aft Cargo Heating System**21-44-01-02 Three Valve Installation**

21-44-01-02A Override Valve Closed

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided override valve is secured closed.

MAINTENANCE (M)

Secure override valve in the closed position.

1. Position Temperature Control panel (P5) AFT CARGO HT switch OFF.
2. Open and collar P415 panel AFT CARGO HEAT PWR circuit breaker.
3. Open P7 panel CARGO HEAT AFT circuit breaker.
4. Gain access to override valve (AMM 21-44-00).
5. Disconnect, cap, and stow the electrical connector from the aft cargo heat override valve.
6. Manually position override valve closed using manual operating handle.
7. Close the CARGO HEAT AFT circuit breaker.

OPERATIONS NOTE

1. Aft cargo compartment heat is not available. Temperature sensitive cargo should not be carried in the aft cargo compartment.
2. Predicted cargo compartment temperatures. Temperature gradients are to be expected.

NOTE: Actual compartment temperature may be monitored on the ECS Synoptic.

Ground operation - steady state temperatures with A/C Packs ON

Airport OAT °C	AFT (Containerized) Cargo Compartment Temperature °C
-40	0
16	23
39	32

Inflight - steady state temperatures after approx. 2.5 hours cruise at FL350	
TAT °C	AFT (Containerized) Cargo Compartment Temperature °C
-46	-2
-27	6
-1	16

21-44-01 Aft Cargo Heating System

21-44-01-02 Three Valve Installation

21-44-01-02B Bulk and Container Control Valves Closed

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided bulk and container control valves are secured closed.

MAINTENANCE (M)

Secure bulk and container control valves closed.

1. Position Temperature Control panel (P5) AFT CARGO HT switch OFF.
2. Open and collar P415 panel AFT CARGO HEAT PWR circuit breaker.
3. Open P7 panel CARGO HEAT AFT circuit breaker.
4. Gain access to bulk and container control valves (AMM 21-44-00).
5. Disconnect, cap, and stow the electrical connector from the aft cargo heat bulk and container control valves.
6. Deactivate both the bulk and container control valves closed using manual operating handle.
7. Close the CARGO HEAT AFT circuit breaker.

OPERATIONS NOTE

1. Aft cargo compartment heat is not available. Temperature sensitive cargo should not be carried in the aft cargo compartment.
2. Consult table below for predicted cargo compartment temperatures when aft cargo heat is inoperative.

NOTE 1: Temperature gradients are to be expected during these inoperative conditions.

NOTE 2: Actual compartment temperature may be monitored on the ECS Synoptic.

Ground operation - steady state temperatures with A/C Packs ON

Airport OAT °C	AFT (Containerized) Cargo Compartment Temperature °C
-40	0
16	23
39	32

Inflight - steady state temperatures after approx. 2.5 hours cruise at FL350

TAT °C	AFT (Containerized) Cargo Compartment Temperature °C
-46	-2
-27	6
-1	16

21-44-02 Aft Cargo TEMP Light

Interval	Installed	Required	Procedure
C	1	0	

21-44-03 Aft Cargo Heat 90 Degree F Overheat Switch(es)

Interval	Installed	Required	Procedure
C	-	0	

May be inoperative provided AFT CARGO HT remains OFF.

OPERATIONS NOTE

Use DDG Item 21-44-01 Operations Note.

21-44-04 Aft Cargo Compartment Heat Temperature Control (Sidewall Switches)

21-44-04-02 Three Valve Installation

21-44-04-02A One Per Compartment Inoperative

Interval	Installed	Required	Procedure
C	4	2	(M)

One switch per compartment may be inoperative provided operative switches are selected and used.

MAINTENANCE (M)

Position operative switches on the two sidewall switch selectors.

1. For low temperature sidewall switch inoperative, position selector to high temperature position.
2. For high temperature sidewall switch inoperative, position selector to low temperature position.

21-44-04 Aft Cargo Compartment Heat Temperature Control (Sidewall Switches)

21-44-04-02 Three Valve Installation

21-44-04-02B All Inoperative

Interval	Installed	Required	Procedure
C	4	0	

All switches may be inoperative provided AFT CARGO HT remains OFF.

OPERATIONS NOTE

Use DDG Item 21-44-01 Operations Note.

21-51-01 Packs

21-51-01-01 Passenger/Combi or Freighter without Draw-Through Smoke Detection System

Interval	Installed	Required	Procedure
C	3	2	(M)

One may be inoperative provided:

- a. Associated pack is selected OFF.
 - b. Associated Pack Flow Control & Shutoff Valve is secured closed.

MAINTENANCE (M)

NOTE: Prior to applying this item verify the remaining two pack systems are fault free. Every effort must be made to rectify this defect as it will affect passenger comfort.

Secure associated pack flow control and shutoff valve closed.

1. Position associated Bleed Air Control panel (P5) PACK selector OFF.
 2. Gain access to pack flow control and shutoff valves (AMM 21-51-01/401). Inspect valve casting around lock hole. Make sure there is no scoring around hole equal to or deeper than 0.005 inch. If damage found, replace valve before securing closed.
 3. Rotate crank arm on end of butterfly shaft until valve is closed.
 4. Turn screw on end of crank into hole of casting. Make sure screw is fully engaged in casting lock hole. Adjust position of lock nut on screw to get best fit in casting.
 5. For pack flow control and shutoff valve canisters with lockout device installed (Hamilton-Sundstrand SB-21-223 or Boeing equivalent.).
 - A. Remove pack flow control shutoff valve plug, packing, spring and filter (AMM 21-51-13/401).
 - B. Remove perforated plug from lockout device canister.
 - C. Remove cap and spring from inside canister.
 - D. Install the sealing plug and spring into filter cavity (Supply Pressure Test Port, G1) with small end of the sealing plug seated inside diameter of the spring. Ensure the sealing plug is seated at the bottom of the filter cavity.
 - E. Apply anti-seize compound to threads of removed perforated plug.
 - F. Install perforated plug and torque to 60-70 pound-inches (6.78 - 7.90 newton-meters).
 - G. Lockwire perforated plug to hole.
 - H. Secure removed plug, packing and filter inside canister for subsequent restoration.

6. Position the overhead panel (P5) HI FLOW switch to ON.
7. For lower lobe cargo compartment A/C installed, position the Overhead Maintenance panel (P461) or Forward Cargo Compartment panel (P86) CARGO COND AIR FLOW RATE selector OFF.
8. Verify ground service connector check valves in pack systems 1 and 3 are undamaged and are free to operate from open to closed (ref AMM 21-21-03).

OPERATIONS NOTE

1. Position HI FLOW switch ON. HI FLOW must be maintained on operative packs.
2. For passenger/combi with lower lobe airconditioning installed, temperature sensitive cargo may be affected.

NOTE 1: For Pack 2 not used and aft lower lobe airconditioning installed, the aft lower lobe cargo compartment may still be heated by the aft cargo heating system.

NOTE 2: For Pack 3 not used and forward lower lobe airconditioning installed, the forward lower lobe cargo compartment may still be heated to a limited extent by equipment cooling exhaust air.

21-51-02 Pack Flow Control and Shutoff Valves

Interval	Installed	Required	Procedure
C	3	2	(M)

One may be inoperative closed provided:

- a. Associated pack is selected OFF.
- b. Associated Pack Flow Control & Shutoff Valve is secured closed.

NOTE: The airplane must also be dispatched using [MEL item 21-51-01](#).

MAINTENANCE (M)

Secure the affected pack flow w contrand shutoff valve closed.

1. Use DDG item 21-51-01 (M) procedure to secure valves closed.

21-51-02 Pack Flow Control and Shutoff Valves**21-51-02-01 Normal Flow Mode**

Interval	Installed	Required	Procedure
C	3	0	(M)

May be inoperative provided:

- a. Valve(s) is verified to close when the associated pack is selected OFF.

MAINTENANCE (M)

Verify pack flow control and shutoff valves closed when associated pack is positioned OFF.

1. Pressurize the pneumatic manifold.
2. Select ECS synoptic display.
3. Position associated Bleed Air Control panel (P5) PACK selector to NORM and confirm air flow to the pack is indicated on synoptic display.
4. Position associated Bleed Air Control panel (P5) PACK selector OFF and confirm OFF is displayed for the associated pack on synoptic display.

OPERATIONS NOTE

1. With Normal Flow mode inoperative and three packs operating, each affected pack will automatically switch to High Flow mode.
 - A. For 1 of the 3 packs operating in High Flow mode, there is no increase in flight planning fuel.
 - B. For 2 of the 3 packs operating in High Flow mode, increase planning fuel by 0.5%.
 - C. For 3 of the 3 packs operating in High Flow mode, increase planning fuel by 0.8%.

NOTE: For dispatch with one pack inoperative, there is no increase in flight planning fuel.

21-51-02 Pack Flow Control and Shutoff Valves**21-51-02-02 High Flow Mode****21-51-02-02-01 Models Without Auxiliary Fuel Tank Provisions****21-51-02-02-01A One Inoperative - Two Packs Operative**

Interval	Installed	Required	Procedure
C	3	2	

One may be inoperative provided two packs are operating.

21-51-02 Pack Flow Control and Shutoff Valves**21-51-02-02 High Flow Mode****21-51-02-02-01 Models Without Auxiliary Fuel Tank Provisions****21-51-02-02-01B All Inoperative - Three Packs Operative**

Interval	Installed	Required	Procedure
C	3	0	(O)

May be inoperative provided:

- a. Three packs are operating.
 - b. Procedures are established and used to verify the forward and aft cargo compartments remain empty or contain only empty cargo handling equipment, ballast (ballast may be loaded in ULDs), or fly away kits.
-

OPERATIONS (O)

The associated cargo compartments must remain empty except for ballast, empty cargo containers (ballast may be loaded in ULDs), fly away kits, pallets, and cargo restraint components.

21-51-03 Pack HI FLOW Switch

Interval	Installed	Required	Procedure
C	1	0	

OPERATIONS NOTE

For Passenger and Combi:

Packs will automatically switch to HI FLOW mode with LWR RECIRC fans selected OFF, requiring an increase in flight planning fuel by 0.8%.

21-51-04 Air Cycle Machines (ACM)**21-51-04-01 Passenger/Combi****21-51-04-01A Associated Turbine Bypass Valve Open**

Interval	Installed	Required	Procedure
C	3	2	(M) (O)

One may be inoperative provided:

- Associated turbine bypass valve is secured open (full heat).
- Associated pack overheat protective system operates normally.
- PACK RST Switch operates normally.

NOTE: The airplane must also be dispatched using [MEL item 21-51-05-01A](#).

MAINTENANCE (M)

Secure turbine bypass valve open.

- Use [MEL item 21-51-05-01A](#) (M) procedure to secure turbine bypass valve open.

OPERATIONS (O)

Use [MEL item 21-51-05-01A](#) (O) procedure.

21-51-04 Air Cycle Machines (ACM)**21-51-04-01 Passenger/Combi****21-51-04-01B Associated Pack Off**

Interval	Installed	Required	Procedure
C	3	2	(M)

One may be inoperative provided:

- Associated pack is selected OFF.
- Associated Pack Flow Control & Shutoff Valve is secured closed.

NOTE: The airplane must also be dispatched using [MEL item 21-51-01](#).

MAINTENANCE (M)

Secure the associated pack flow control and shutoff valve closed.

- Use [MEL item 21-51-01](#) (M) procedure to secure the associated pack flow control and shutoff valve closed.

21-51-05 ACM Turbine Bypass Valves**21-51-05-01 Passenger/Combi****21-51-05-01A Valve Open**

Interval	Installed	Required	Procedure
C	3	2	(M) (O)

One may be inoperative provided:

- a. Inoperative valve is secured open.
- b. Associated pack overheat protective system operates normally.
- c. PACK RST Switch operates normally.

MAINTENANCE (M)

Secure associated turbine bypass valve open and prior to every flight review CMC messages.

1. Open P6 panel PACK TEMP CONT-A circuit breaker.
2. Open P6 panel PACK TEMP CONT-B circuit breaker.
3. Gain access to inoperative turbine bypass valve (TBV) valve (AMM 21-62-01/401).
4. Remove connector from valve. Install tool p/n 10149050-1 (ref SAP DRG-1014905) on TBV connector to isolate pins. Continue maintenance procedure from item 10. If tool p/n 10149050-1 is not available, continue maintenance procedure from item 5.
5. Remove wire to pin 5 of the TBV connector.
6. Remove wire to pin 7 of the TBV connector.
7. Sleeve pin 5 and wire per Boeing Standard Wiring Practice Manual (SWPM) 20-10-15 using sleeve p/n RT-876 (or equivalent.). Sleeve must extend a minimum of one half inch beyond end of pin.
8. Sleeve pin 7 and wire per Boeing SWPM 20-10-15 using sleeve p/n RT-876 (or equivalent.). Sleeve must extend a minimum of one half inch beyond end of pin.
9. Stow wires to bundle per Boeing SWPM 20-10-11.
10. Rotate allen wrench inserted in manual position shaft to open valve as indicated on valve's position indicator.
11. Reconnect electrical connector to TBV. If tool p/n 10149050-1 installed, verify ship side wiring is not under tension and clear from surrounding structure.
12. Close the opened circuit breakers.
13. For P/N S210U130-41 (or later) pack temperature controller not installed, accomplish pack discharge overheat switch test (AMM 21-51-08/501).

14. For P/N S210U130-41 (or later) pack temperature controller installed, confirm both pack discharge temperature sensors for the associated pack operate normally. Check the following CMC messages are not present:
 - A. Pack 1: 21112, 21172
 - B. Pack 2: 21123, 21173
 - C. Pack 3: 21134, 21174
15. For lower lobe cargo compartment A/C is installed, position the overhead Maintenance panel (P461) or Forward Cargo Compartment panel (P86) CARGO COND AIR FLOW RATE selector OFF.
16. Prior to each flight, review CMC for other faults related to PACK_ status message and dispatch per associated MEL:
 - A. Pack 1: 21113, 21114, 21115, 21117
 - B. Pack 2: 21124, 21125, 21126, 21128
 - C. Pack 3: 21135, 21136, 21137, 21139
17. If tool p/n 10149050-1 installed, ensure carry forward action includes removal of lockout tool (return tool to local maintenance control office).

OPERATIONS (O)

1. Do not operate affected pack until airborne and TAT is +10 degree C or cooler.
2. During descent when TAT is +10 degree C or greater, select affected Pack Control Selector OFF.
3. Temperature sensitive cargo should not be carried in the lower lobe.

21-51-05 ACM Turbine Bypass Valves

21-51-05-01 Passenger/Combi

21-51-05-01B Associated Pack Off

Interval	Installed	Required	Procedure
C	3	2	(M)

One may be inoperative provided:

- a. Associated pack is selected OFF.
- b. Associated Pack Flow Control & Shutoff Valve is secured closed.

NOTE: The airplane must also be dispatched using [MEL item 21-51-01](#).

MAINTENANCE (M)

Secure associated pack flow control and shutoff valve closed.

1. Use [MEL item 21-51-01](#) (M) procedure to secure the associated pack flow control and shutoff valve closed.

21-51-06 Water Separators

21-51-06-01 Passenger/Combi

Interval	Installed	Required	Procedure
C	3	0	(M)

May be operated with coalescer bag removed.

MAINTENANCE (M)

Remove associated water separator coalescer bag (AMM 21-51-05/201).

21-51-07 Pack Overheat Switches**21-51-07A All Inoperative**

Interval	Installed	Required	Procedure
C	3	0	(M)

May be inoperative deactivated provided:

- a. Both Pack Temperature Sensors for associated pack operate normally.
- b. Both Pack Temperature Control channels for associated pack operate normally.

MAINTENANCE (M)

Deactivate affected overheat switch.

1. Position associated Bleed Air Control panel (P5) PACK selector OFF.
2. Gain access to affected pack (AMM 21-51-08/2011).
3. For inoperative pack 1 overheat switch, disconnect, cap and stow affected electrical connector from the Pack Overheat Switch (DS519) installed in the Pack Discharge Duct.
4. For inoperative pack 2 overheat switch, disconnect, cap and stow affected electrical connector from the Pack Overheat Switch (DS518) installed in the Pack Discharge Duct.
5. For inoperative pack 3 overheat switch, disconnect, cap and stow affected electrical connector from the Pack Overheat Switch (DS521) installed in the Pack Discharge Duct.

21-51-07 Pack Overheat Switches**21-51-07B One Inoperative**

Interval	Installed	Required	Procedure
C	3	2	(M)

One may be inoperative provided:

- a. Associated pack is selected OFF.
- b. Associated Pack Flow Control & Shutoff Valve is secured closed.

NOTE: The airplane must also be dispatched using [MEL item 21-51-01](#).

MAINTENANCE (M)

Secure associated pack flow control and shutoff valve closed.

1. Use [MEL item 21-51-01](#) (M) procedure to secure associated pack flow control and shutoff valve closed.

Section 2**21-51-08 Compressor Overheat Switches****21-51-08A One Inoperative**

Interval	Installed	Required	Procedure
C	3	2	

One may be inoperative provided:

- a. Associated pack remains OFF.

NOTE: Also comply with MEL item 21-51-01 operational requirements.

21-51-08 Compressor Overheat Switches**21-51-08B All Inoperative**

Interval	Installed	Required	Procedure
C	3	0	(M)

May be inoperative provided:

- a. Compressor Temperature Bulb for associated pack operates normally.
- b. Pack Coolant (Inlet/Exit doors) system operates normally.
- c. Compressor Overheat Switch(es) is deactivated.

MAINTENANCE (M)

Deactivate inoperative compressor discharge overheat switch.

1. Position associated Bleed Air Control panel (P5) PACK selector OFF.
2. Gain access to affected pack (AMM 21-51-09/205).
3. For inoperative pack 1 overheat switch, disconnect, cap and stow affected electrical connector from Pack Overheat Switch (DS520) installed in Pack Discharge Duct.
4. For inoperative pack 2 overheat switch, disconnect, cap and stow affected electrical connector from Pack Overheat Switch (DS517) installed in Pack Discharge Duct.
5. For inoperative pack 3 overheat switch, disconnect, cap and stow affected electrical connector from Pack Overheat Switch (DS522) installed in Pack Discharge Duct.

21-51-09 Compressor Temperature Bulbs**21-51-09A All Inoperative**

Interval	Installed	Required	Procedure
C	3	0	(M)

May be inoperative provided the compressor overheat discharge switches operate normally.

MAINTENANCE (M)

Confirm compressor discharge overheat switches operate normally.

1. Accomplish compressor discharge overheat switch test (AMM 21-51-09/501).

21-51-09 Compressor Temperature Bulbs**21-51-09B One Inoperative**

Interval	Installed	Required	Procedure
C	3	2	(M)

One may be inoperative provided:

- a. Associated pack is selected OFF.
- b. Associated Pack Flow Control & Shutoff Valve is secured closed.

NOTE: The airplane must also be dispatched using [MEL item 21-51-01](#).

MAINTENANCE (M)

Secure associated pack flow control and shutoff valve closed.

1. Use [MEL item 21-51-01](#) (M) procedure to secure the associated pack flow control and shutoff valve closed.

21-52-01 Pack SYS FAULT Light

Interval	Installed	Required	Procedure
C	1	0	

21-58-01 Equipment Cooling Control System**21-58-01-01 NORM Mode**

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided:

- a. STBY mode is used.
 - b. For ground operation above 41 degrees C OAT, at least one pack is operating.
-

OPERATIONS (O)

1. Position Temperature Control panel (P5) EQUIP COOLING selector to STBY.
2. For ground operation above 41 degrees C OAT, at least one pack is operating.

21-58-02 Equipment Cooling Inboard Exhaust Valve

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative deactivated closed provided:

- a. Equipment cooling system is operated with one fan deactivated.
- b. Remaining fan operates normally.
- c. **For operation on the ground above 29 degrees C OAT at least one pack is operating.**

NOTE: Forward cargo heating will not be available.

MAINTENANCE (M)

Deactivate one fan and inboard exhaust valve closed using either the exhaust fan deactivation procedure (Method 1) or supply fan deactivation procedure (Method 2).

1. Method 1 (for exhaust fan deactivation and inboard exhaust valve closed):
 - A. Open P414 panel EQUIP COOL CONT VLV INBD circuit breaker.
 - B. Fabricate a shorting plug.
 - 1) Obtain a P/N BACC45FN14-15P (or equivalent) connector and two P/N BACC47CN1A or P/N BACC47CN1S pin contacts (or equivalent).
 - 2) Jumper pin 5 and pin 6 using 3 to 4 inches of BMS 13-60 Type1/BMS 13-48 Type 10 wire (or equivalent.).
 - C. Gain access to inboard exhaust valve (AMM 21-58-23/401).
 - D. Disconnect electrical connector from inboard exhaust valve.
 - E. Install fabricated shorting plug on electrical connector and stow.
 - F. Manually position inboard exhaust valve closed if open.
 - G. Close the opened circuit breaker.
 - H. Open and collar P415 panel EQPT COOLING EXHAUST FAN circuit breaker.
2. Method 2 (for supply fan deactivation and inboard exhaust valve closed):
 - A. Open P414 panel EQUIP COOL CONT VLV INBD circuit breaker.
 - B. Gain access to inboard exhaust valve (AMM 21-58-23/401).
 - C. Disconnect, cap and stow electrical connector from Inboard Exhaust Valve.
 - D. Manually position inboard exhaust valve closed if open.
 - E. Close the opened circuit breaker.
 - F. Open and collar P414 panel EQPT COOLING SUPPLY FAN circuit breaker.

OPERATIONS (O)

NOTE 1: For Exhaust Fan deactivated, status message EE CLNG EXH FAN will remain annunciated.

NOTE 2: For Supply Fan deactivated, status message EE CLNG SUP FAN and EE CLNG INBD EXH will remain annunciated.

Forward cargo heat is not available. Temperature sensitive cargo may be effected. Predicted cargo compartment temperatures when forward cargo heat is inoperative:

Ground operation - steady state temperatures with A/C Packs ON	
Airport OAT °C	FWD Cargo Compartment Temperature °C
7	23
15	31
27	37

Inflight - steady state temperatures after approx. 2.5 hours cruise at FL350	
TAT °C	FWD Cargo Compartment Temperature °C
-46	-1
-27	9
-1	23

NOTE: Temperature gradients are to be expected during these inoperative conditions.

21-58-02 Equipment Cooling Inboard Exhaust Valve**21-58-02-01 Passenger/Combi**

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative deactivated open provided:

- Equipment cooling system is operated in the NORMAL or STBY mode.
- Both equipment cooling fans operate normally.
- Procedures are established and used to verify the forward lower lobe cargo compartment remains empty or contains only empty cargo handling equipment, ballast (ballast may be loaded in ULDs), or fly away kits.

MAINTENANCE (M)

Deactivate inboard exhaust valve open.

1. Position Temperature Control panel (P5) EQUIP COOLING selector to STBY.
2. Open P414 panel EQUIP COOL CONT VLV INBD circuit breaker.
3. Gain access to inoperative inboard exhaust valve (AMM 21-58-23/401).
4. Disconnect, cap and stow electrical connector from inboard exhaust valve.
5. Manually position inboard exhaust valve open if closed.
6. Close the opened circuit breaker.

OPERATIONS (O)

The associated cargo compartments must remain empty except for ballast, empty cargo containers (ballast may be loaded in ULDs), fly away kits, pallets, and cargo restraint components.

21-58-03 Equipment Cooling Bypass Valve**21-58-03-01 Passenger/Combi**

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative deactivated closed.

MAINTENANCE (M)

Deactivate bypass valve closed.

1. Open P414 panel EQUIP COOL CONT VLV INBD circuit breaker.
2. Gain access to cooling bypass valve (AMM 21-58-22/401).
3. Disconnect, cap and stow electrical connector from bypass valve.
4. Manually position valve closed if open.
5. Close P414 panel EQUIP COOL CONT VLV INBD circuit breaker.

21-58-04 Equipment Cooling Exhaust Fan

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative deactivated provided:

- a. Supply fan operates normally.
- b. For operation on the ground above 29 degrees C OAT, at least one pack is operating.

NOTE: Forward cargo heating will not be available.

MAINTENANCE (M)

Deactivate cooling exhaust fan.

1. Open and collar P415 panel EQPT COOLING EXHAUST FAN circuit breaker.

OPERATIONS (O)

1. For operation on the ground above 29 degrees C OAT, at least one pack is operating.
2. See [MEL item 21-58-02](#) for predicted cargo compartment temperatures.
3. Forward cargo heat is not available.
4. Temperature sensitive should not be carried in fwd cargo compartment.

21-58-05 Equipment Cooling Inboard Supply Valve

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative deactivated closed provided:

- a. Equipment cooling system is operated with one fan deactivated.
- b. Remaining fan operates normally.
- c. For operation on the ground above 29 degrees C OAT, at least one pack is operating.

NOTE: Forward cargo heating will not be available.

MAINTENANCE (M)

Deactivate one fan and inboard supply valve closed using either exhaust fan or supply fan procedure.

1. For exhaust fan deactivation and inboard supply valve closed.
 - A. Open P414 panel EQUIP COOL CONT VLV INBD circuit breaker.
 - B. Gain access to inoperative inboard supply valve (AMM 21-58-21/401).
 - C. Disconnect, cap and stow valve electrical connector.
 - D. Position inboard supply valve closed if open.
 - E. Close the opened circuit breaker.
 - F. Open and collar P415 panel EQPT COOLING EXHAUST FAN circuit breaker.
2. For supply fan deactivation and inboard supply valve closed.
 - A. Open P414 panel EQUIP COOL CONT VLV INBD circuit breaker.
 - B. Gain access to inoperative inboard supply valve (AMM 21-58-21/401).
 - C. Disconnect, cap and stow inboard supply valve electrical connector.
 - D. Position inboard supply valve closed if open.
 - E. Close the opened circuit breaker.
 - F. Open and collar the P414 panel EQPT COOLING SUPPLY FAN circuit breaker.

OPERATIONS (O)

NOTE 1: For Exhaust Fan deactivated, status message EE CLNG EXH FAN will remain annunciated.

NOTE 2: For Supply Fan deactivated, status message EE CLNG SUP FAN will remain annunciated.

Forward cargo heat is not available. Temperature sensitive cargo may be effected. Predicted cargo compartment temperatures when forward cargo heat is inoperative:

Ground operation - steady state temperatures with A/C Packs ON	
Airport OAT °C	FWD Cargo Compartment Temperature °C
7	23
15	31
27	37

Inflight - steady state temperatures after approx. 2.5 hours cruise at FL350	
TAT °C	FWD Cargo Compartment Temperature °C
-46	-1
-27	9
-1	23

NOTE: Temperature gradients are to be expected during these inoperative conditions.

21-58-06 Equipment Cooling Supply Fan

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative deactivated provided:

- a. Exhaust fan operates normally.
- b. For operation on the ground above 29 degrees C OAT, at least one pack is operating.

NOTE: Forward cargo heating will not be available.

MAINTENANCE (M)

Deactivate the equipment cooling supply fan.

1. Open and collar P414 panel EQPT COOLING SUPPLY FAN PWR circuit breaker.

OPERATIONS (O)

Forward cargo heat is not available. Temperature sensitive cargo may be effected. Predicted cargo compartment temperatures when forward cargo heat is inoperative:

Ground operation - steady state temperatures with A/C Packs ON	
Airport OAT °F / °C	FWD Cargo Compartment Temperature °C
45 / 7	23
59 / 15	31
80 / 27	37

Inflight - steady state temperatures after approx. 2.5 hours cruise at FL350	
TAT °F / °C	FWD Cargo Compartment Temperature °C
-50 / -46	-1
-16 / -27	9
30 / -1	23

NOTE: Temperature gradients are to be expected during these inoperative conditions.

21-58-07 Equipment Cooling Ground Exhaust Valve
21-58-07A Both Fans Operative

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative deactivated closed provided:

- a. Equipment cooling system is operated in the STBY mode.
- b. Both fans operate normally.
- c. For operation on the ground above 41 degrees C OAT, at least one pack is operating.

MAINTENANCE (M)

Deactivate ground exhaust valve closed.

1. Position Temperature Control panel (P5) EQUIP COOLING selector to STBY.
2. Open P414 panel EQUIP COOL CONT VLV GND circuit breaker.
3. Fabricate a shorting plug.
 - A. Obtain a P/N BACC45FN12-12P (or equivalent) connector and two P/N BACC47CN1 or P/N BACC47CN1S pin contacts (or equivalent).
 - B. Jumper pin 1 and pin 2 using 3 to 4 inches of BMS 13-60 Type1/BMS 13-48 Type 10 wire (or equivalent).
4. Gain access to ground exhaust valve (AMM 21-58-12/401).
5. Disconnect electrical connector from ground exhaust valve.
6. Install fabricated shorting plug on electrical connector and stow.
7. Manually position the valve in the closed position:
 - A. Insert 3/8 inch drive 0 - 150 inch pound wrench into the ground exhaust valve manual drive collar located on airplane skin adjacent to valve flapper door.
 - B. Push manual drive collar in approximately 3/8 inch and rotate counter-clockwise to close valve. Torque should be at least 28 inch-pounds, but not exceed 100 inch-pounds to lock door in place.

NOTE: If required torque exceeds 100 inch-pounds, check door and mating seat for obstructions.
- C. Confirm valve closed by visual check of flapper position.
8. Close the opened circuit breaker.
9. Ensure EQUIP COOLING caution message or EE CLNG GND EXH status message is not displayed.

OPERATIONS (O)

1. Set Temperature Control panel EQUIP COOLING selector to STBY.

2. For operation on the ground above 41 degrees C OAT, at least one pack is operating.

21-58-07 Equipment Cooling Ground Exhaust Valve**21-58-07B One Fan Deactivated**

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative deactivated closed provided:

- a. Equipment cooling system is operated with one fan deactivated.
- b. Remaining fan operates normally.
- c. For operation on the ground above 29 degrees C OAT, at least one pack is operating.

NOTE: Forward cargo heating will not be available with one fan deactivated.

MAINTENANCE (M)

Deactivate one fan and ground exhaust valve closed.

1. Position Temperature Control panel (P5) EQUIP COOLING selector to STBY.
2. Open P414 panel EQUIP COOL CONT VLV GND circuit breaker.
3. Fabricate a shorting plug.
 - A. Obtain a P/N BACC45FN12-12P (or equivalent) connector and two P/N BACC47CN1 or P/N BACC47CN1S pin contacts (or equivalent).
 - B. Jumper pin 1 and pin 2 using 3 to 4 inches of BMS 13-60 Type1/BMS 13-48 Type 10 wire (or equivalent).
4. Gain access to ground exhaust valve (AMM 21-58-12/401).
5. Disconnect electrical connector from ground exhaust valve.
6. Install fabricated shorting plug on electrical connector and stow.
7. Manually position the valve in the closed position:
 - A. Insert 3/8 inch drive 0 - 150 inch pound wrench into the ground exhaust valve manual drive collar located on airplane skin adjacent to valve flapper door.
 - B. Push manual drive collar in approximately 3/8 inch and rotate counter-clockwise to close valve. Torque should be at least 28 inch-pounds, but not exceed 100 inch-pounds to lock door in place.

NOTE: If required torque exceeds 100 inch-pounds, check door and mating seat for obstructions.
- C. Confirm valve closed by visual check of flapper position.
8. Close the opened circuit breaker.

9. Deactivate one fan.
 - A. For Supply Fan deactivated, open and collar P414 panel EQPT COOLING SUPPLY FAN circuit breaker.
 - B. For Exhaust Fan deactivated, open and collar P415 panel EQPT COOLING EXHAUST FAN
10. Ensure EQUIP COOLING caution message or EE CLNG GND EXH status message is not displayed.

OPERATIONS (O)

NOTE 1: For Exhaust Fan deactivated, status message EE CLNG EXH FAN will remain annunciated.

NOTE 2: For Supply Fan deactivated, status message EE CLNG SUP FAN and EE CLNG INBD EXH will remain annunciated.

Forward cargo heat is not available. Temperature sensitive cargo may be effected. Predicted cargo compartment temperatures when forward cargo heat is inoperative:

Ground operation - steady state temperatures with A/C Packs ON	
Airport OAT °C	FWD Cargo Compartment Temperature °C
7	23
15	31
27	37

Inflight - steady state temperatures after approx. 2.5 hours cruise at FL350	
TAT °C	FWD Cargo Compartment Temperature °C
-46	-1
-27	9
-1	23

NOTE: Temperature gradients are to be expected during these inoperative conditions.

21-58-08**Galley/Lavatory Fans**

Interval	Installed	Required	Procedure
C	2	1	

Section 2**21-61-01 Zone Temperature Control System
(Passenger/Combi)****21-61-01A Trim Air Mod Valve(s) Appropriately Positioned**

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

Control to individual zones may be inoperative provided associated zone trim air modulation valve(s) is secured in appropriate position unless it is verified that associated zone operation in MAN mode is normal.

MAINTENANCE (M)

Secure inoperative zone trim air modulation valves in appropriate position and prior to each flight review CMC messages.

1. Confirm individual zone operative control status.
 - A. Access the CMC OTHER FUNCTIONS page, and selecting SHOP FAULTS, 21 AIR CONDITIONING, and ZONE TEMP CONTROL. An inoperative Zone Temperature Controller (ZTC) will be reporting one or more of the following shop faults:
 - 1) 00 I/O BOARD A FAIL
 - 2) 00 MOTOR DRIVER BOARD A FAIL
 - 3) 00 I/O BOARD B FAIL
 - 4) 00 MOTOR DRIVER BOARD B FAIL
 - B. For one or both Board A faults are reported, the ZTC has lost control to one or more of zones: A, B, D, E.
 - C. For one or both Board B faults are reported, the ZTC may have lost control to one or more of the zones: C, F/D, U/D, lower Cargo zones.
2. Verify normal MAN mode operation for F/D zone, installed lower Cargo and Combi zones.
 - A. Monitor ECS Maintenance Page and alternately position associated Zone Temperature Selector to MAN W and MAN C. Confirm associated zone trim air modulation valve is operative and responds correctly.
 - B. For operative valves, position the associated TEMP selector to MAN.
 - C. For inoperative F/D, U/D and Cabin/Combi zones, secure valves in appropriate position for affected zone:
 - 1) Open P6 panel ZONE TEMP CONT AC circuit breaker.
 - 2) Open P6 panel ZONE TEMP CONT DC circuit breaker.
 - 3) Gain access to inoperative zone trim air modulation valve (AMM 21-61-10/401).
LH wheel well - Zones A,C,E and F/D.
RH wheel well - Zones B,D and U/D.

- 4) Disconnect, cap and stow electrical connector from affected valves.
- 5) Rotate valve manual position shaft with Allen wrench until valve is in the following appropriate position:

NOTE 1: Only full open and full closed are designated on position indicator and each 1/4 turn of wrench moves valve 10%.

NOTE 2: Range reflects approximate seat occupancy: High occupancy = lower %. Low occupancy = higher %.

Trim Air Mod Valve	Range of Appropriate Valve Positions
ZONE A	15% - 30% Open
ZONE B	20% - 35% Open
ZONE C	15% - 30% Open
ZONE D	5% - 20% Open
ZONE E	0% - 10% Open
ZONE E (COMBI)	0% (Lock Closed)
ZONE F/D	5% - 20% Open
ZONE U/D	20% - 35% Open

- 6) Close the opened circuit breakers.
- 7) Advisory message TEMP ZONE may remain displayed.
- 8) Prior to each flight, review CMC for other faults related to ZONE TEMP status message and dispatch per associated MEL:

21015, 21016, 21017, 21018, 21019, 21020, 21021, 21167.

OPERATIONS (O)

1. Advisory message TEMP ZONE may remain displayed.
2. For taxi, takeoff, climb, approach and landing, set Trim Air switch OFF.
3. For cruise and descent, set Trim Air switch ON.

NOTE: During descent, to avoid high temperatures in affected zones, set Trim Air switch OFF before passing through 15,000 feet MSL.

4. Cabin Temperature Selector (in passenger cabin) will be inoperative for zones with trim mod valves secured.

21-61-01 Zone Temperature Control System (Passenger/Combi)

21-61-01B Master Trim Air Valve Closed

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative provided:

- a. Master Trim Air Valve remains closed.
-

MAINTENANCE (M)

Close Master Trim Air Valve and prior to every flight review CMC messages.

1. Position Temperature Control panel (P5) TRIM AIR switch OFF.
2. Advisory message TEMP ZONE may remain displayed.
3. Prior to each flight, review CMC for other faults related to ZONE TEMP status message and dispatch per associated MEL:

21015, 21016, 21017, 21018, 21019, 21020, 21021, 21167.

OPERATIONS (O)

1. Advisory message TEMP ZONE may remain displayed.
2. Set PASS TEMP selector to AUTO for average cabin temperatures of 18 degrees C to 29 degrees C.

NOTE: Flight crews need to be aware that after several hours of operation with the master trim air valve closed, one or more zones may become warmer or cooler than passengers find comfortable. Permitting passengers to move from the warm zone(s) to the cooler zone(s) will help to moderate temperatures.

21-61-02 Cabin Temperature Selection System
21-61-02-01 Passenger/Combi (In Passenger Cabin)

Interval	Installed	Required	Procedure
C	1	0	

21-61-03 Master Trim Air Valve**21-61-03-01 Passenger/Combi****21-61-03-01A With SB 747-21-2337 and 747-21-2338**

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative closed.

MAINTENANCE (M)

Close Master Trim Air Valve and prior to every flight review CMC messages.

1. Position Temperature Control panel (P5) TRIM AIR switch OFF.
2. Gain access to inoperative Master Trim Air Shutoff Valve (AMM 21-61-08/401).
3. Disconnect, cap and stow valve electrical connector.
4. Pressurize pneumatic system using APU or ground air supply.
5. Select EICAS-ECS-Maintenance page via the CMC.
6. Position the Bleed Air Control panel (P5) PACK 1 selector to NORM.
7. Confirm TRIM AIR PRESS is approximately zero.
 - A. For trim air pressure not zero, manually close Manual Solenoid Override and confirm TRIM AIR PRESS is approximately zero.
8. Remove pneumatic supply if further use not required.
9. Position Bleed Air Control panel (P5) PACK 1 selector OFF when pneumatics no longer required.
10. Prior to each flight, review CMC for other faults related to ZONE TEMP status message and dispatch per associated MEL:
21015, 21016, 21017, 21018, 21019, 21020, 21021, 21041, 21060, 21184, 21185.

OPERATIONS NOTE

1. Set PASS TEMP selector to AUTO for average cabin temperatures of 18 degrees C and 29 degrees C.
2. Flight crews need to be aware that after several hours of operation with the master trim air valve closed, one or more zones may become warmer or cooler than passengers find comfortable. Permitting passengers to move from the warm zone(s) to the cooler zone(s) will help to moderate this situation.

21-61-03 Master Trim Air Valve**21-61-03-03 Pressure Regulating Function**

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative or deactivated provided shutoff feature operates normally.

MAINTENANCE (M)

Deactivate Master Trim Air Valve pressure regulating function and prior to every flight review CMC messages.

1. Gain access to inoperative Master Trim Air Shutoff Valve (AMM 21-61-08/401).

2. Remove downstream (duct) sense line tube from tee fitting.

NOTE: There are two exterior pressure sensing ports in the master trim air valve. The aft port is the downstream (duct) pressure sensing port. The forward port is the cabin pressure sensing port.

3. Plug and secure downstream (duct) sense line tube.

4. Allow tee fitting to remain open. Do not cap or plug opening.

5. Confirm trim air supply valve operation:

- A. Position Temperature Control panel (P5) TRIM AIR switch OFF.

- B. Pressurize pneumatic system using the APU or an external supply of pneumatic air.

- C. Select EICAS-ECS-Maintenance page via the CMC.

- D. Position Bleed Air Control panel (P5) PACK 1 selector to NORM.

- E. Confirm TRIM AIR PRESS is approximately zero.

- F. Position Temperature Control panel (P5) TRIM AIR switch ON.

- G. Confirm TRIM AIR PRESS increases.

- H. Position Temperature Control panel (P5) TRIM AIR switch OFF.

- I. Confirm TRIM AIR PRESS returns to approximately zero.

- J. Position Temperature Control panel (P5) TRIM AIR switch ON.

6. Remove pneumatic supply if further use not required.

7. Position Bleed Air Control panel (P5) PACK 1 selector OFF when pneumatics no longer required.

8. Prior to each flight, review CMC for other faults related to ZONE TEMP status message and dispatch per associated MEL:

21015, 21016, 21017, 21018, 21019, 21020, 21021, 21041, 21060, 21184, 21185.

21-61-04 Zone Trim Air Modulation Valves (Passenger/Combi)
21-61-04A Valve(s) Appropriately Positioned

Interval	Installed	Required	Procedure
C	7	0	(M) (O)

May be inoperative provided:

- a. Associated valve(s) is secured in the appropriate position.
 - b. If affected, **FLT DECK Zone Trim Air Modulation Valve** is secured in the appropriate position unless it can be verified that operation in MAN mode is normal.
-

NOTE: The airplane must also be dispatched using [MEL item 21-61-01A](#).

MAINTENANCE (M)

Secure inoperative zone trim air modulation valves in appropriate position and prior to every flight review CMC messages.

1. Confirm Zone Temperature Controller (ZTC) is operating normally.
 - A. Perform Chapter 21 TRIM SYSTEM Ground Test using CMC.
2. Use [MEL item 21-61-01A](#).

OPERATIONS (O)

1. For taxi, takeoff, climb, approach and landing, select Trim Air switch OFF.
2. For cruise and descent, select Trim Air switch ON.

NOTE: During descent, to avoid high temperatures in affected zone(s), select Trim Air switch OFF before passing through 15,000 feet MSL.

3. Cabin Temperature Selector (in the passenger cabin) will be inoperative for zones with trim air mod valves secured.

21-61-04 Zone Trim Air Modulation Valves (Passenger/Combi)
21-61-04B Master Trim Air Valve Closed With SB 747-21-2337 and 747-21-2338

Interval	Installed	Required	Procedure
C	7	0	(M)

May be inoperative provided:

- a. Master Trim Air Valve remains closed.
-

MAINTENANCE (M)

Close Master Trim Air Valve and prior to every flight review CMC messages.

1. Position Temperature Control panel (P5) TRIM AIR switch OFF.

2. Prior to each flight, review CMC for other faults related to CARGO ZONE TEMP status message and dispatch per associated MEL:
21015, 21016, 21017, 21018, 21019, 21020, 21021, 21041, 21060, 21167, 21184, 21185.

OPERATIONS NOTE

1. Status message ZONE TEMP will remain displayed.
2. Average cabin temperature is controllable (between 18°C and 29°C) by appropriate use of the PASS TEMP selector in AUTO mode.
3. Flight crews need to be aware that after several hours of operation with the master trim air valve closed, one or more zones may become warmer or cooler than passengers find comfortable. Permitting passengers to move from the warm zone(s) to the cooler zone(s) will help to moderate temperatures.

21-61-05 ALTN Control Mode (Zone A/Upper Deck)

Interval	Installed	Required	Procedure
C	-	0	

May be inoperative provided ALTN is not selected.

21-61-06 ZONE RST Switch**21-61-06-01 Passenger/Combi**

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided passenger temperature control system operates normally in AUTO or ALTN.

21-61-07 Duct Overheat Protective Systems (Passenger and Crew System) (Passenger/Combi)

21-61-07A Trim Air Mod Valve(s) Closed

Interval	Installed	Required	Procedure
C	7	0	(M) (O)

May be inoperative provided:

- a. Associated zone duct overheat switch(es) is deactivated.
- b. Associated zone trim air modulation valve is secured closed.

MAINTENANCE (M)

Secure inoperative zone trim air modulation valves closed and deactivate associated zone duct overheat switches and prior to every flight review CMC messages.

NOTE: Duct overheat switches are interchangeable with an operative switch (if available) from zone E.

1. Open P6 panel ZONE TEMP CONT AC circuit breaker.
2. Open P6 panel ZONE TEMP CONT DC circuit breaker.
3. Gain access to inoperative zone trim air modulation (modulating) valves (AMM 21-61-10/401).
LH wheel well - Zones A,C,E and F/D.
RH wheel well - Zones B,D and U/D.
4. Disconnect, cap and stow valve electrical connector.
5. Position associated valve shaft CLOSED using an Allen wrench.
6. Close the opened circuit breakers.
7. Position Temperature Control panel (P5) TRIM AIR switch OFF.
8. Gain access to associated zone duct overheat (overtemperature) switches (AMM 21-61-07/201).
9. Disconnect, cap and stow associated switch electrical connector.
10. Position Temperature Control panel (P5) TRIM AIR switch ON.
11. **Prior to each flight, review CMC for other faults related to ZONE TEMP status message and dispatch per associated MEL:**

21015, 21016, 21017, 21018, 21019, 21020, 21021, 21041, 21060, 21167, 21184, 21185.

OPERATIONS (O)

1. Status message ZONE TEMP will remain displayed.
2. The PASS TEMP selector may be operated in AUTO mode.

21-61-07 Duct Overheat Protective Systems (Passenger and Crew System) (Passenger/Combi)

21-61-07B Master Trim Air Valve Closed

Interval	Installed	Required	Procedure
C	7	0	(M) (O)

May be inoperative provided:

- a. Master trim air valve remains closed.
- b. PASS TEMP is selected to ALTN position.

MAINTENANCE (M)

Position Master Trim Air Valve closed.

1. Position Temperature Control panel (P5) TRIM AIR switch OFF.
2. Position PASS TEMP selector to ALTN position.

OPERATIONS (O)

Set and maintain PASS TEMP selector in ALTN position.

21-61-07 Duct Overheat Protective Systems (Passenger and Crew System) (Passenger/Combi)

21-61-07C Trim Air Mod Valve(s) Operative

Interval	Installed	Required	Procedure
C	7	0	(M)

May be inoperative provided:

- a. Associated zone trim air modulation valve operates normally.
- b. Associated zone duct temperature sensor operates normally.
- c. Associated zone duct overheat switch(es) is deactivated.

MAINTENANCE (M)

Deactivate associated zone duct overheat switches.

1. Position the Temperature Control panel (P5) TRIM AIR switch OFF.
2. Gain access to associated zone duct overheat (overtemperature) switches (AMM 21-61-07/201).
3. Disconnect, cap and stow associated switch electrical connector.
4. Position Temperature Control panel (P5) TRIM AIR switch ON.

21-61-11 Zone Duct Temperature Sensors

Interval	Installed	Required	Procedure
C	7	6	

21-61-12 Zone Temperature Sensors**21-61-12-01 Passenger/Combi Configurations or Freighter with
Draw-Through Smoke Detection System**

Interval	Installed	Required	Procedure
C	-	-	

One may be inoperative.

21-62-01 Pack Temperature Control Systems

Interval	Installed	Required	Procedure
C	2	1	

One pack temperature controller (A or B) may be inoperative for each operating pack.

21-62-02 Pack Coolant (Inlet/Exit Doors) Systems**21-62-02A Inlet/Exit Doors Open**

Interval	Installed	Required	Procedure
C	3	2	(M) (O)

One may be inoperative for an inoperative pack provided associated exit door has greater open area than inlet door.

NOTE: The airplane must also be dispatched using MEL item 21-51-01.

MAINTENANCE (M)

NOTE: Use CDL Item 21-62-01 for missing inlet door.

Confirm exit door has greater open area than inlet door.

1. Position associated Temperature Control panel (P5) PACK selector OFF.
2. Open P6 panel PACK TEMP CONT A circuit breaker.
3. Open P6 panel PACK TEMP CONT B circuit breaker.
4. Gain access to associated Pack Flow Control and Shutoff Valve (FCV) (AMM 21-51-01/401). Inspect valve casting around lock hole. Make sure there is no scoring around hole equal to or deeper than 0.005 inch. If damage found, replace valve before securing closed.
5. Position FCV closed by positioning locking screw (end of crank arm) into hole in casting. Make sure screw is fully engaged in casting lock hole. Adjust position of lock nut on screw to get best fit in casting.
6. Disconnect, cap and stow electrical connectors for inlet/exit doors.
7. Position of the inlet/exit doors.
 - A. For exit door open less than inlet, reposition the inlet and exit doors as necessary, hand turning an Allen wrench in adapter on end of gearbox opposite linear screw if actuators can be manually moved.
8. Close the opened circuit breakers.

OPERATIONS (O)

Use DDG Item 21-51-01 for dispatch with an inoperative pack.

21-62-02 Pack Coolant (Inlet/Exit Doors) Systems**21-62-02B Inlet/Exit Doors Closed**

Interval	Installed	Required	Procedure
C	3	2	(M) (O)

One may be inoperative for an inoperative pack provided associated inlet and exit doors are secured closed.

NOTE: The airplane must also be dispatched using MEL item 21-51-01.

MAINTENANCE (M)

Secure inoperative inlet/exit doors closed.

1. Position associated Temperature Control panel (P5) PACK selector OFF.
 2. Open P6 panel PACK TEMP CONT A circuit breaker.
 3. Open P6 panel PACK TEMP CONT B circuit breaker.
 4. Gain access to associated Pack Flow Control and Shutoff Valve (FCV) (AMM 21-51-01/401). Inspect valve casting around lock hole. Make sure there is no scoring around hole equal to or deeper than 0.005 inch. If damage found, replace valve before securing closed.
 5. Position FCV closed by positioning locking screw (end of crank arm) into hole in casting. Make sure screw is fully engaged in casting lock hole. Adjust position of lock nut on screw to get best fit in casting.
- NOTE: If lock out device fitted to FCV use per MEL item 21-51-01.
6. Disconnect, cap and stow electrical connectors for inlet and exit doors.
 7. Position of the inlet and exit doors closed.
 - A. For inlet/exit doors not closed, reposition the inlet and exit doors as necessary, hand turning an Allen wrench in adapter on end of gearbox opposite linear screw if actuators can be manually moved.
 8. Close the opened circuit breakers.

OPERATIONS (O)

Use DDG Item 21-51-01 for dispatch with an inoperative pack.

21-62-02 Pack Coolant (Inlet/Exit Doors) Systems

21-62-02-01 Inlet Doors

Interval	Installed	Required	Procedure
C	3	2	(M) (O)

One inlet door may be inoperative secured 60% open to full open provided:

- a. Remaining two packs operate normally.
 - b. Associated turbine bypass valve operates normally.
 - c. Associated exit door is secured at least 50% open.
-

MAINTENANCE (M)

NOTE: Use CDL Item 21-62-01 for missing inlet door.

Secure inoperative inlet/exit doors in required positions and prior to every flight review CMC messages.

1. Open P6 panel PACK TEMP CONT A circuit breaker.
2. Open P6 panel PACK TEMP CONT B circuit breaker.
3. Jumper door actuator electrical connector.
 - A. Disconnect electrical connector from actuator.
 - B. Remove wires from positions 6, 7 and 8 of connector.
 - C. Sleeve (RT-876 or equivalent) each wire and contact per Boeing Standard Wiring Practice Manual (BSWPM) section 20-10-15.
 - D. Fabricate a 4 inch jumper wire from type UA (BMS 13-48 TY VIII CL 1 or equivalent) 20 AWG wire and two 20 gauge sockets (P/N BACC47CP1A or equivalent).
 - E. Jumper positions 6 and 8 of connector.
 - F. Stow removed wires and reconnect electrical connector per BSWPM section 20-10-11.
4. Position inoperative inlet door at least 60% open using Allen wrench in adapter on end of gearbox linear screw.

NOTE: 60% open = 9.45 inches (or less) between centerline of actuator support bolt and centerline of ram bolt
5. Position inoperative exit doors at least 50% open using Allen wrench in adapter on end of gearbox linear screw.

NOTE: 100% open recommended for warm ambient conditions.
6. Close the opened circuit breakers.
7. Confirm advisory message PACK _ is not displayed.
8. Prior to each flight, review CMC for other faults related to PACK _ status message and dispatch per associated MEL:
 - A. Exit Door Secured Open:
 - 1) Pack 1: 21113, 21114, 21117, 21118
 - 2) Pack 2: 21124, 21125, 21128, 21129
 - 3) Pack 3: 21135, 21136, 21139, 21140
 - B. Inlet Door Secured Open:
 - 1) Pack 1: 21113, 21117, 21118
 - 2) Pack 2: 21124, 21128, 21129
 - 3) Pack 3: 21135, 21139, 21140

OPERATIONS (O)

Operate packs in NORM mode. Pack output temperature may be low in a cold environment.

21-62-02 Pack Coolant (Inlet/Exit Doors) Systems**21-62-02-02 Exit Doors**

Interval	Installed	Required	Procedure
C	3	0	(M) (O)

Any exit doors may be inoperative secured at least 50% open.

MAINTENANCE (M)

Secure inoperative exit doors at least 50% open and prior to every flight review CMC messages.

1. Open P6 panel PACK TEMP CONT A circuit breaker.
2. Open P6 panel PACK TEMP CONT B circuit breaker.
3. Jumper door actuator electrical connector.
 - A. Disconnect electrical connector from actuator.
 - B. Remove wires from positions 6, 7 and 8 of connector.
 - C. Sleeve (RT-876 or equivalent) each wire and contact per Boeing Standard Wiring Practice Manual (BSWPM) section 20-10-15.
 - D. Fabricate a 4 inch jumper wire from type UA (BMS 13-48 TY VIII CL 1 or equivalent) 20 AWG wire and two 20 gauge sockets (P/N BACC47CP1A or equivalent).
 - E. Jumper positions 6 and 8 of connector.
 - F. Stow removed wires and reconnect electrical connector per BSWPM section 20-10-11.
4. Position inoperative exit doors at least 50% open using Allen wrench in adapter on end of gearbox linear screw.
NOTE: 100% open recommended for warm ambient conditions.
5. Close the opened circuit breakers.
6. Confirm advisory message PACK _ is not displayed.
7. Prior to each flight, review CMC for other faults related to PACK _ status message and dispatch per associated MEL:
 - A. Exit Door Secured Open:
 - 1) Pack 1: 21113, 21114, 21117, 21118
 - 2) Pack 2: 21124, 21125, 21128, 21129
 - 3) Pack 3: 21135, 21136, 21139, 21140
 - B. Inlet Door Secured Open:
 - 1) Pack 1: 21113, 21117, 21118
 - 2) Pack 2: 21124, 21128, 21129
 - 3) Pack 3: 21135, 21139, 21140

OPERATIONS (O)

1. Operate packs in NORM mode.
2. If exit door is not full open, pack output temperature may be high at low altitude and on ground. If a pack overheat condition develops, advisory message PACK _ will be displayed.
3. Status message PACK _ will remain displayed.

21-65-01 Compartment Temperature Indications (EICAS)

Interval	Installed	Required	Procedure
C	-	0	

21-65-02 Zone SYS FAULT Light

Interval	Installed	Required	Procedure
C	1	0	

22-10-01 Autopilot Systems**22-10-01A One Inoperative**

Interval	Installed	Required	Procedure
C	3	2	(M) (O)

One may be inoperative provided:

- a. Associated FCC SERVO circuit breaker is opened and collared.
- b. Autopilot Flight Director System is verified not in a single source configuration before each departure.
- c. Approach minimums do not require its use.

MAINTENANCE (M)

Open the associated FCC SERVO circuit breaker and verify Autopilot Flight Director System status.

1. Open and collar the associated P7 panel FCC servo circuit breaker for the inoperative FCC.
 - A. For left FCC, L FLT CONT CMPTR SERVO
 - B. For center FCC, C FLT CONT CMPTR SERVO
 - C. For right FCC, R FLT CONT CMPTR SERVO
2. Before each departure, verify that A/P SINGLE SYS message is not displayed. If it is displayed, dispatch may be conducted by considering all autopilots inoperative.

OPERATIONS (O)

Dispatch is allowed provided approach minimums do not require its use.

NOTE: For enroute operations requiring altitude hold capability (e.g. RVSM airspace), any one of the following autopilot modes will provide acceptable altitude hold capability:

1. Altitude Hold (ALT HOLD).
2. Vertical Speed (V/S) with 000 selected.
3. Vertical Navigation (V NAV) with FMC flight plan.
4. V NAV with FMC flight plan combined with altitude intervention.

22-10-01 Autopilot Systems**22-10-01B Two Inoperative**

Interval	Installed	Required	Procedure
C	3	1	(M) (O)

Two may be inoperative provided:

- a. At least two FCC power circuit breakers remain closed.

- b. Associated FCC SERVO circuit breakers are opened and collared.
 - c. Autopilot Flight Director System is verified not in a single source configuration before each departure.
 - d. Approach minimums do not require their use.
-

MAINTENANCE (M)

Open the associated FCC SERVO circuit breaker and verify Autopilot Flight Director System status.

1. Open and collar the associated P7 panel FCC servo circuit breaker for the inoperative FCC.
 - A. For left FCC, L FLT CONT CMPTR SERVO
 - B. For center FCC, C FLT CONT CMPTR SERVO
 - C. For right FCC, R FLT CONT CMPTR SERVO
2. Confirm two P7 panel FCC power circuit breakers are closed.
 - A. For left FCC, L FLT CONT CMPTR PWR
 - B. For center FCC, C FLT CONT CMPTR PWR
 - C. For right FCC, R FLT CONT CMPTR PWR
3. Before each departure, confirm that A/P SINGLE SYS message is not displayed. If it is displayed, dispatch may be conducted by considering all autopilots inoperative.

OPERATIONS (O)

Dispatch is allowed provided approach minimums do not require its use.

NOTE: For enroute operations requiring altitude hold capability (e.g. RVSM airspace), any one of the following autopilot modes will provide acceptable altitude hold capability:

1. Altitude Hold (ALT HOLD).
2. Vertical Speed (V/S) with 000 selected.
3. Vertical Navigation (V NAV) with FMC flight plan.
4. V NAV with FMC flight plan combined with altitude intervention.

22-10-01 Autopilot Systems

22-10-01C Three Inoperative

Interval	Installed	Required	Procedure
A	3	0	(M) (O)

All may be inoperative provided:

- a. Repairs or replacements are made within four flights. The aircraft may not depart from the main maintenance base with all autopilots inoperative.
- b. The flight deck door lock and cockpit door surveillance systems are serviceable.

- c. At least one FCC power circuit breaker remains closed.
- d. All three FCC SERVO circuit breakers are opened and collared.
- e. Approach minimums do not require their use.
- f. Enroute operations (e.g. RVSM airspace) do not require their use.
- g. Flight crewmembers are limited to 5 flight hours per scheduled flight day.
- h. With No Autopilot Systems serviceable:
Terminal Area RNAV operations may be flown provided the Flight Director is serviceable.
Where F/Ds are also unserviceable, RNAV operations are not approved and conventional procedures or radar vectors should be used.

MAINTENANCE (M)

Open the associated FCC SERVO circuit breaker and verify Autopilot Flight Director System status.

1. Open and collar all three P7 panel FCC servo circuit breakers.
 - A. For left FCC, L FLT CONT CMPTR SERVO
 - B. For center FCC, C FLT CONT CMPTR SERVO
 - C. For right FCC, R FLT CONT CMPTR SERVO
2. Confirm at least one FCC power circuit breakers (P7 panel) are closed.
 - A. For left FCC, L FLT CONT CMPTR PWR
 - B. For center FCC, C FLT CONT CMPTR PWR
 - C. For right FCC, R FLT CONT CMPTR PWR

OPERATIONS (O)

Dispatch is allowed provided:

1. Approach minimums do not require their use.
2. Flight crews are limited to no more than 5 flight hours per flight day.

22-11-01 Control Wheel Autopilot Disengage Switches

Interval	Installed	Required	Procedure
C	2	1	

One may be inoperative provided:

- a. No autopilot is used below 1,500 feet AGL.
 - b. Approach minimums do not require autopilot use.
-

22-11-02 Mode Control Panel Windows**22-11-02-01 Airspeed (IAS/MACH)**

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided selected airspeed indications on both PFDs operate normally.

22-11-02 Mode Control Panel Windows**22-11-02-02 Heading (HDG)**

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided selected heading indications on both PFDs operate normally.

22-11-02 Mode Control Panel Windows**22-11-02-03 Vertical Speed (VERT SPD)**

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided selected vertical speed indications on both PFDs operate normally.

22-11-02 Mode Control Panel Windows**22-11-02-04 Altitude (ALT)**

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided selected altitude indications on both PFDs operate normally.

22-11-03 Mode Control Panel Selectors**22-11-03-01 VERT SPD Selector (DN & UP)**

Interval	Installed	Required	Procedure
C	1	0	

22-11-03 Mode Control Panel Selectors**22-11-03-02 BANK LIMIT Selector (AUTO, 5, 10, 15, 20, 25)**

Interval	Installed	Required	Procedure
C	1	0	

22-11-03 Mode Control Panel Selectors**22-11-03-03 Selector Push Functions****22-11-03-03-01 ALT**

Interval	Installed	Required	Procedure
C	1	0	

22-11-03 Mode Control Panel Selectors**22-11-03-03 Selector Push Functions****22-11-03-03-02 HDG SEL**

Interval	Installed	Required	Procedure
C	1	0	

22-11-03 Mode Control Panel Selectors**22-11-03-03 Selector Push Functions****22-11-03-03-03 IAS/MACH**

Interval	Installed	Required	Procedure
C	1	0	

22-11-04 Mode Control Panel Switches**22-11-04-01 A/P Engage Switches (L CMD, C CMD, R CMD)****22-11-04-01A One or Two Inoperative**

Interval	Installed	Required	Procedure
C	3	1	(M) (O)

May be inoperative provided associated autopilot system is considered inoperative.

NOTE: The airplane must also be dispatched using [MEL item 22-10-01](#).

MAINTENANCE (M)

Airplane must also be dispatched using [MEL item 22-10-01](#).

OPERATIONS (O)

Airplane must also be dispatched using [MEL item 22-10-01](#).

22-11-04 Mode Control Panel Switches**22-11-04-01 A/P Engage Switches (L CMD, C CMD, R CMD)****22-11-04-01B Three Inoperative**

Interval	Installed	Required	Procedure
B	3	0	(M) (O)

May be inoperative provided all three autopilot systems are considered inoperative.

NOTE: The airplane must also be dispatched using [MEL item 22-10-01](#).

MAINTENANCE (M)

Airplane must also be dispatched using [MEL item 22-10-01](#).

OPERATIONS (O)

Airplane must also be dispatched using [MEL item 22-10-01](#).

22-11-04 Mode Control Panel Switches**22-11-04-02 A/T Arm Switch (A/T ARM)****22-11-04-02A Inoperative ON**

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative ON provided autothrottle disconnect switches operate normally.

22-11-04 Mode Control Panel Switches**22-11-04-02 A/T Arm Switch (A/T ARM)****22-11-04-02B Inoperative OFF**

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative OFF provided autothrottle system is considered inoperative.

NOTE: The airplane must also be dispatched using MEL item 22-31-01.

22-11-04 Mode Control Panel Switches**22-11-04-03 A/T Speed Mode Engage Switch (SPD)**

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided approach minimums do not require autothrottle use.

22-11-04 Mode Control Panel Switches**22-11-04-04 Flight Director Switches (F/D)**

Interval	Installed	Required	Procedure
C	2	0	

May be inoperative OFF provided flight director displays are considered inoperative.

NOTE: The airplane must also be dispatched using MEL item 34-22-03.

22-11-04 Mode Control Panel Switches**22-11-04-05 IAS/MACH SEL (Reference) Switch**

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided IAS is displayed in associated window.

Section 2**MAINTENANCE NOTE**

For dispatch with an inoperative IAS/MACH SEL switch, IAS must be displayed in the associated MCP window. If MACH is displayed, simultaneously cycling P7 panel MCP L and MCP R circuit breakers will cause IAS to be displayed in the window.

22-11-04 Mode Control Panel Switches**22-11-04-06 APP Switch**

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided approach minimums do not require use of autopilot or flight director.

22-11-04 Mode Control Panel Switches**22-11-04-07 LOC Engage Switch**

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided localizer only approach is not used.

22-11-04 Mode Control Panel Switches**22-11-04-08 THR, L NAV, V NAV, FL CH, HDG HOLD, V/S, and ALT HOLD Switches**

Interval	Installed	Required	Procedure
C	7	0	

May be inoperative provided procedures do not require their use.

OPERATIONS NOTE

For RVSM enroute operations, any one of the following autopilot modes will provide acceptable altitude hold capability:

1. Altitude Hold (ALT HOLD).
2. Vertical Speed (V/S) with 000 selected.
3. Vertical Navigation (VNAV) with FMC flight plan.
4. V NAV with FMC flight plan combined with altitude intervention.

22-11-05 Mode Control Panel Switch Lights**22-11-05-01 Autopilot Engage Switch Lights (CMD)**

Interval	Installed	Required	Procedure
C	3	2	

22-11-05 Mode Control Panel Switch Lights**22-11-05-02 Mode Selector Switch Lights**

Interval	Installed	Required	Procedure
C	-	0	

22-13-01 Automatic Landing System (Autoland)

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided approach minimums do not require its use.

22-13-01 Automatic Landing System (Autoland)**22-13-01-01 Triple Channel Autoland (LAND 3)**

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided approach minimums do not require its use.

22-13-01 Automatic Landing System (Autoland)**22-13-01-02 Automatic Rollout Control**

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided approach minimums do not require its use.

22-21-01 Yaw Dampers

Interval	Installed	Required	Procedure
C	2	1	(M)

One may be inoperative provided:

- a. Operation of remaining yaw damper is verified to operate normally.
 - b. Associated yaw damper switch remains OFF.
-

MAINTENANCE (M)

Verify the proper operation of the remaining yaw damper.

1. Establish electrical power (AMM 24-22-00/201) and hydraulic power (AMM 29-11-00/201).
2. Verify that the IRUs are aligned and in NAV mode.
3. Perform CMC YDM ACT ground test for the operational yaw damper (AMM 22-21-00).
4. Restore aircraft to required configuration.

22-21-02 Yaw Damper INOP Lights

Interval	Installed	Required	Procedure
C	2	0	

22-31-01 Autothrottle System

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided approach minimums do not require its use.

OPERATIONS NOTE

The A/T ARM Switch should be placed in the OFF position. If A/T ARM Switch is in the OFF position, the EEC engine trim function will not operate. Small thrust asymmetry may occur even if the throttles appear aligned.

1. Press TO/GA to update the MAP prior to take-off.

22-31-02 Autothrottle Disconnect Switches**22-31-02A One Inoperative**

Interval	Installed	Required	Procedure
C	2	1	

One may be inoperative provided AUTOTHROTTLE ARM switch operates normally.

22-31-02 Autothrottle Disconnect Switches**22-31-02B Both Inoperative**

Interval	Installed	Required	Procedure
C	2	0	

May be inoperative provided:

- a. Autothrottles are not armed.
 - b. Approach minimums do not require use of autothrottles.
-

OPERATIONS NOTE

1. With the autothrottles not armed (A/T ARM switch in OFF position), the EEC engine trim function will not operate. Small thrust asymmetry may occur even if the throttles appear aligned.
2. Press TO/GA to update the MAP prior to take-off.

22-31-03 Takeoff/Go-Around (TO/GA) Switches**22-31-03A One Inoperative**

Interval	Installed	Required	Procedure
C	2	1	

One may be inoperative provided:

- a. No autopilot is used below 1,500 feet AGL.
 - b. Approach minimums do not require autopilot use.
-

22-31-03 Takeoff/Go-Around (TO/GA) Switches**22-31-03B Both Inoperative**

Interval	Installed	Required	Procedure
C	2	0	

May be inoperative provided:

- a. Thrust levers are operated manually for takeoff and go-around.
- b. Autopilot and Flight Director are not used below 500 feet AGL or MDA, whichever is higher.

NOTE 1: Flight Director Go-around and Windshear guidance are not available with both TO/GA switches inoperative.

NOTE 2: Press TO/GA to update the MAP prior to take-off.

[TGL] 23-11-01 High Frequency (HF) Communication System**23-11-01A Not Required**

Interval	Installed	Required	Procedure
D	-	-	

Any in excess of those required for the route to be flown, and not powered by an emergency bus, may be inoperative.

[TGL] 23-11-01 High Frequency (HF) Communication System**23-11-01B Two Long Range Communication Systems required and SATCOM Operative**

Interval	Installed	Required	Procedure
C	-	1	(O) (M)

May be inoperative while conducting operations that require two LRCS provided:

- SATCOM air-ground communications with Air Navigation Service Provider(s) are available for the intended route.
- SATCOM Voice or Data transfer functions are operative.
- Prior to each flight, coordination with the appropriate Air Navigation Service Provider(s) is established where INMARSAT codes, or equivalent, are not available whilst using SATCOM voice function.
- Alternate communication procedures are established and used.

NOTE 1: SATCOM is to be used only as a backup to normal HF communications.

NOTE 2: For intended routes, consider the need for TCAS.

MAINTENANCE (M)

If desired, the inoperative HF radio can be deactivated by opening and collaring the associated circuit breaker.

OPERATIONS (O)

Extended over water operations that require two long range Communication Systems may be conducted with one operative HF-voice system and SATCOM, provided coverage exists for the route of the flight.

See OM A 10.9.2 Additional Dispatch Serviceability Requirements.

[TGL] 23-11-01 High Frequency (HF) Communication System**23-11-01C Two Long Range Communication Systems required and SATCOM Inoperative**

Interval	Installed	Required	Procedure
A	-	1	(M) (O)

Any in excess of one may be inoperative for a maximum of 3 calendar days for flight on a route that requires two Long Range Communication Systems, provided alternate communication procedures are established and used.

NOTE 1: When the route enters airspace for which an In Flight Blind Broadcast Procedure exists, select the appropriate I.F.B.F. VHF frequency and apply the procedure.

NOTE 2: For intended routes, consider the need for TCAS.

MAINTENANCE (M)

If desired, the inoperative HF radio can be deactivated by opening and collaring the associated circuit breaker.

OPERATIONS (O)

1. Extended over water operations that require two long range Communication Systems may be conducted with one operative HF-voice system and SATCOM, provided coverage exists for the route of the flight.

See OM A 10.9.2 Additional Dispatch Serviceability Requirements.

[TGL] 23-11-01 High Frequency (HF) Communication System**23-11-01D Two Long Range Communication Systems required and SATCOM Operative**

Interval	Installed	Required	Procedure
A	-	0	(M) (O)

One or more may be inoperative for a maximum of 3 calendar days for flight on a route that requires two Long Range Communication Systems provided:

- a. SATCOM air-ground communications with Air Navigation Service Provider(s) for the intended route,
- b. SATCOM voice function is operative,
- c. Prior to each flight, coordination with the appropriate Air Navigation Service Provider(s) is established where INMARSAT codes, or equivalent, are not available whilst using SATCOM voice function,
- d. Prior to each flight, permission is obtained from the appropriate Air Navigation Service Provider(s) to communicate via SATCOM only, and
- e. Alternate communication procedures are established and used.

NOTE 1: When operative, use of SATCOM Data transfer function should be part of these procedures.

NOTE 2: When the route enters airspace for which an In Flight Blind Broadcast Procedure exists, select the appropriate I.F.B.F. VHF frequency and apply the procedure.

NOTE 3: For intended routes, consider the need for TCAS.

MAINTENANCE (M)

If desired, the inoperative HF radio can be deactivated by opening and collaring the associated circuit breaker.

OPERATIONS (O)

1. Extended over water operations that require two long range Communication Systems may be conducted with one operative HF-voice system and SATCOM, provided coverage exists for the route of the flight.

See OM A 10.9.2 Additional Dispatch Serviceability Requirements.

[TGL] 23-12-01 VHF Communications Systems

Interval	Installed	Required	Procedure
C	3	2	

Centre or Right system may be inoperative provided it is not powered by the Emergency DC Bus, Battery Bus, Battery Direct Bus, or the Transfer Bus and not required for emergency procedures.

MAINTENANCE NOTE

1. Left VHF radio must operate normally.
2. If centre VHF radio is required for ATC communication and ACARS is installed which use the centre VHF radio, the ACARS system must be disabled.

NOTE: Airplane must also be dispatched using MEL item 23-27-01.

- A. For single ACARS, open and collar:
 - 1) P6 panel ACARS DC circuit breaker.
 - 2) P7 panel ACARS AC circuit breaker.
- B. For single ACARS with dual ACARS provisioning, open and collar:
 - 1) P6 panel ACARS/CMU DC circuit breaker.
 - 2) P7 panel ACARS AC circuit breaker.
 - 3) P7 panel CMU L AC circuit breaker.
 - 4) P7 panel CMU R AC circuit breaker.
- C. For dual ACARS, open and collar:
 - 1) P6 panel ACARS DC circuit breaker.
 - 2) P7 panel ACARS AC-R circuit breaker.
 - 3) P7 panel ACARS AC-L circuit breaker.

OPERATIONS NOTE

1. Left VHF radio must operate normally.
2. See OM A **10.9.2 Additional Dispatch Serviceability Requirements**.

23-24-01 Radio Communications Panels

Interval	Installed	Required	Procedure
C	3	2	

Center or right panel may be inoperative provided associated switch remains OFF.

23-25-01 Satellite Communication (SATCOM) Systems

23-25-01A Alternate Procedures Required

Interval	Installed	Required	Procedure
C	-	0	(O)

May be inoperative provided alternate procedures are established and used.

OPERATIONS (O)

Alternate procedures must be established and used.

See OM A 10.9.2 Additional Dispatch Serviceability Requirements.

23-25-01 Satellite Communication (SATCOM) Systems

23-25-01B Procedures Do Not Require Use

Interval	Installed	Required	Procedure
D	-	0	

May be inoperative provided procedures do not require its use.

23-25-01 Satellite Communication (SATCOM) Systems

23-25-01-01 SATCOM Voice Systems**23-25-01-01A Alternate Procedures Required**

Interval	Installed	Required	Procedure
C	-	0	(O)

May be inoperative provided alternate procedures are established and used.

OPERATIONS (O)

Alternate procedures must be established and used.

See OM A 10.9.2 Additional Dispatch Serviceability Requirements.

23-25-01 Satellite Communication (SATCOM) Systems

23-25-01-01 SATCOM Voice Systems

23-25-01-01B Procedures Do Not Require Use

Interval	Installed	Required	Procedure
D	-	0	

May be inoperative provided procedures do not require its use.

23-27-01 ACARS System

23-27-01A Alternate Procedures Required

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided alternate procedures are established and used.

NOTE: Any mode which functions normally may be used.

OPERATIONS (O)

Alternate procedures must be established and used.

See OM A 10.9.2 Additional Dispatch Serviceability Requirements.

23-27-01 ACARS System

23-27-01-01 Dual ACARS Management Units (MUs)

Interval	Installed	Required	Procedure
D	2	1	

23-27-01 ACARS System

23-27-01-02 Automatic Dependent Surveillance - Contract (ADS-C)

Interval	Installed	Required	Procedure
C	1	0	(O)

OPERATIONS (O)

Alternate procedures must be established and used.

23-28-01 Selective Call (SELCAL) System**23-28-01A Alternate Procedures Required**

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided alternate procedures are established and used.

OPERATIONS (O)

Alternate procedures must be established and used.

Listening watch must be maintained on the appropriate ATC frequency.

23-28-01 Selective Call (SELCAL) System**23-28-01B Procedures Do Not Require Use**

Interval	Installed	Required	Procedure
D	1	0	

May be inoperative provided procedures do not require its use.

Listening watch must be maintained on the appropriate ATC frequency.

23-28-01 Selective Call (SELCAL) System**23-28-01-01 Channels****23-28-01-01A Alternate Procedures Required**

Interval	Installed	Required	Procedure
C	-	0	

May be inoperative provided alternate procedures are established and used.

23-28-01 Selective Call (SELCAL) System**23-28-01-01 Channels****23-28-01-01B Procedures Do Not Require Use**

Interval	Installed	Required	Procedure
D	-	0	

May be inoperative provided procedures do not require its use.

[TGL] 23-31-01 Passenger Address System**23-31-01-01 Passenger/Combi**

Interval	Installed	Required	Procedure
B	1	0	(O)

May be inoperative provided:

- a. Alternate, normal and emergency procedures and/or operating restrictions are established and used.
 - b. Flight Deck/Cabin interphone system (including chime system) is operative.
- NOTE 1: Any station function(s) that operates normally may be used.
- NOTE 2: For individual handsets see MEL item 23-42-03.
-

MAINTENANCE NOTE

PASS ADDRESS status message may be displayed when the passenger address system otherwise operates normally. Airplane may be dispatched using MEL item 31-61-04.

OPERATIONS (O)

Prior to flight, the pilot in command must brief cabin crew members on the emergency procedures which will be used.

Procedures for inoperative PA system are detailed in FAM, Section 4.20.7 Alternate Procedures – PA Unserviceable.

23-31-01 Passenger Address System**23-31-01-01 Passenger/Combi****23-31-01-01-01 Passenger Address Controller Circuits**

Interval	Installed	Required	Procedure
C	2	1	(O)

One circuit may be inoperative provided the operative controller circuit is selected.

OPERATIONS (O)

Depress the PASSENGER ADDRESS switch on the Cabin Configuration Test Module (CCTM) located at Door 2R.

NOTE: The switch will illuminate when the Alternate Controller Circuit is selected.

Section 2**23-31-01 Passenger Address System****23-31-01-01 Passenger/Combi****23-31-01-01-02 Lavatory Speakers**

Interval	Installed	Required	Procedure
C	-	0	(O)

May be inoperative provided:

- a. Return to seat light in associated lavatory operates normally, and
- b. Alternate procedures for notifying lavatory occupants are established and used.

OPERATIONS (O)

Procedures for inoperative PA system are detailed in FAM, Section 4.20.7
Alternate Procedures – PA Unserviceable.

23-31-01 Passenger Address System**23-31-01-01 Passenger/Combi****23-31-01-01-03 Cabin Speakers**

Interval	Installed	Required	Procedure
C	-	-	(M)

No passenger seat, cabin attendant seat or crew rest area bunk may be occupied from which the Passenger Address System is not audible and intelligible or that seat must be blocked and placarded DO NOT OCCUPY.

MAINTENANCE (M)

For seat blocking and placarding procedures, see Item 25-25-2 (M) procedures.

23-31-01 Passenger Address System**23-31-01-01 Passenger/Combi****23-31-01-01-04 Direct Access Function**

Interval	Installed	Required	Procedure
C	-	1	(O)

One may be inoperative provided:

- a. Alternate, normal and emergency procedures and/or operating restrictions are established and used.

- b. Handset 4P function at affected station operates normally.
-

OPERATIONS (O)

Prior to flight, the pilot in command must brief cabin crew members on the emergency procedures which will be used.

Procedures for inoperative PA system are detailed in FAM, Section 4.20.7
Alternate Procedures – PA Unserviceable.

23-31-02 Prerecorded Passenger Announcement System
*****23-31-02A Alternate Procedures Required**

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided alternate procedures are established and used.

OPERATIONS (O)

Implement alternative procedures – e.g. use of public address system. See OMB Section 3.3.2.a PRA Unserviceable.

23-34-01 ACESS Central Management Unit (CMU)/Passenger Service Controller (PSC)

23-34-01A Cabin Interphone Operative

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided:

- a. Cabin lighting is sufficient for cabin attendants to perform their duties.
- b. Passenger sign system operates normally.
- c. One Cabin Interphone Controller Circuit operates normally.

MAINTENANCE (M)

Confirm the passenger sign system and one Cabin Interphone Controller Circuit operates normally.

1. Turn on FASTEN SEATBELT sign from flight deck and check that the passenger signs have illuminated.
2. Call the flight deck on the Cabin Interphone system at door 1 left (or door 2 left).

NOTE: If an alternate controller circuit has been selected, confirm that the associated system operates normally.

23-34-01 ACESS Central Management Unit (CMU)/Passenger Service Controller (PSC)

23-34-01B Passenger Address Operative

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided:

- a. Cabin lighting is sufficient for cabin attendants to perform their duties.
- b. Passenger sign system operates normally.
- c. One Passenger Address Controller Circuit operates normally.

MAINTENANCE (M)

Confirm the passenger sign system and one Passenger Address Controller Circuit operates normally.

1. Turn on FASTEN SEATBELT sign from flight deck and check that the passenger signs have illuminated.
2. Make PA announcement using the direct access button and PTT on the handset.

NOTE: If an alternate controller circuit has been selected, ensure that the associated system operates normally.

23-41-01 Service Interphone System**23-41-01-01 Nose Gear Jack****23-41-01-01A Flight Interphone Operative**

Interval	Installed	Required	Procedure
C	1	0	(O)

Service interphone flight deck to ground/ground to flight deck function may be inoperative provided:

- a. Alternate procedures are established and used.
- b. Nose gear/forward fuselage flight interphone jack operates normally.

OPERATIONS (O)

Use flight interphone for communication with ground crew during ground handling operations.

23-41-01 Service Interphone System**23-41-01-01 Nose Gear Jack****23-41-01-01B Flight Interphone Inoperative**

Interval	Installed	Required	Procedure
B	1	0	(O)

May be inoperative provided alternate procedures are established and used.

OPERATIONS (O)

Alternate procedures must be established and used. These procedures may include hand signals.

23-41-01 Service Interphone System**23-41-01-02 Other Than Nose Gear Jack**

Interval	Installed	Required	Procedure
D	-	0	

May be inoperative provided procedures do not require its use.

23-42-01 Crewmember Interphone Systems**23-42-01-01 Passenger/Combi****23-42-01-01-01 Flight Deck to Cabin, Cabin to Flight Deck Functions**

Interval	Installed	Required	Procedure
B	-	-	(O)

May be inoperative provided:

- a. Flight deck to cabin and cabin to flight deck interphone functions operate normally on at least fifty percent of the cabin handsets.
- b. Flight deck to cabin and cabin to flight deck interphone function operates normally at one door for each pair of exit doors.
- c. Alternate communications procedures between affected flight attendants station(s) and flight deck are established and used.

NOTE: Any station function(s) that operate normally may be used.

MAINTENANCE NOTE

The CABIN INTERPHONE status message may be displayed when the cabin interphone system otherwise operates normally. Airplane may be dispatched using [MEL item 31-61-04](#).

OPERATIONS (O)

Prior to flight, the pilot in command must brief cabin crew members on alternate communications procedures between affected flight attendants stations and flight deck.

Procedures for inoperative PA system are detailed in [FAM 4.20.5 Alternate Procedures – Interphone System Unserviceable](#).

23-42-01 Crewmember Interphone Systems**23-42-01-01 Passenger/Combi****23-42-01-01-02 Cabin to Cabin Function**

Interval	Installed	Required	Procedure
B	-	-	(O)

May be inoperative provided:

- a. Cabin to cabin and interphone functions operate normally on at least fifty percent of the cabin handsets.
- b. Cabin to cabin interphone function operates normally at one door for each pair of exit doors.
- c. Alternate communications procedures between affected flight attendants station(s) are established and used.

NOTE: Any station function(s) that operate normally may be used.

OPERATIONS (O)

Prior to flight, alternate communications procedures between affected flight attendant stations are established and used.

Procedures for inoperative PA system are detailed in FAM 4.20.5 Alternate Procedures – Interphone System Unserviceable.

23-42-01 Crewmember Interphone Systems

23-42-01-01 Passenger/Combi

23-42-01-01-03A Flight Deck to Ground/Ground to Flight Deck Function

Interval	Installed	Required	Procedure
C	1	0	(O)

Flight interphone flight deck to ground/ground to flight deck function may be inoperative provided:

- a. Alternate procedures are established and used.
 - b. Nose gear/forward fuselage service interphone jack operates normally.
-

OPERATIONS (O)

Use alternate procedures. Such procedures may include the use of hand signals.

23-42-01 Crewmember Interphone Systems

23-42-01-01 Passenger/Combi

23-42-01-01-03B Flight Deck to Ground/Ground to Flight Deck Function

Interval	Installed	Required	Procedure
B	1	0	(O)

Flight interphone flight deck to ground/ground to flight deck function may be inoperative provided alternate procedures are established and used.

OPERATIONS (O)

Use alternate procedures. Such procedures may include the use of hand signals.

23-42-01 Crewmember Interphone Systems**23-42-01-01 Passenger/Combi****23-42-01-01-04 Cabin Interphone Controller Circuits**

Interval	Installed	Required	Procedure
C	2	1	(O)

One circuit may be inoperative provided the operative controller circuit is selected.

OPERATIONS (O)

Depress the CABIN INTERPHONE switch on the Cabin Configuration Test Module (CCTM) located at Door 2R.

NOTE: The switch will illuminate when the operative controller circuit is selected.

23-42-01 Crewmember Interphone Systems**23-42-01-01 Passenger/Combi****23-42-01-01-05 Flight Deck Intercommunication**

Interval	Installed	Required	Procedure
D	-	-	(O)

Flight Interphone jacks and transmit switches in excess of those required for flight deck crew members (including official observer in forward observer's seat) may be inoperative.

NOTE: Any interphone function that operates normally may be used.

23-42-02 Flight Deck Hand Microphones

23-42-02A Boom Microphone Operative

Interval	Installed	Required	Procedure
C	-	-	

May be inoperative or missing provided associated boom microphone operates normally.

23-42-02 Flight Deck Hand Microphones

23-42-02B Procedures Do Not Require Use

Interval	Installed	Required	Procedure
D	-	0	

May be inoperative or missing provided procedures do not require their use.

23-42-03 Handset System**23-42-03-01 Passenger/Combi****23-42-03-01-01 Flight Deck****23-42-03-01-01A Required By Procedures**

Interval	Installed	Required	Procedure
C	-	0	(O)

May be inoperative provided:

- a. Flight deck to cabin communication operates normally.
 - b. Alternate procedures are established and used.
-

OPERATIONS (O)

Alternate procedures must be established and used. This can include using headset or hand microphone for required communications.

23-42-03 Handset System**23-42-03-01 Passenger/Combi****23-42-03-01-01 Flight Deck****23-42-03-01-01B Procedures Do Not Require Use**

Interval	Installed	Required	Procedure
D	-	0	

May be inoperative provided procedures do not require its use.

23-42-03 Handset System**23-42-03-01 Passenger/Combi****23-42-03-01-02 Main Cabin**

Interval	Installed	Required	Procedure
B	-	-	(O)

May be inoperative provided:

- a. Fifty percent of cabin handsets operate normally.
- b. One handset must operate normally at each pair of main exit doors.
- c. Alternate communications procedures between the affected flight attendant's station(s) are established and used.

NOTE 1: An operative handset at an inoperative flight attendant seat shall not be counted to satisfy the fifty percent requirement.

NOTE 2: Any handset(s) function(s) that operates normally may be used.

NOTE 3: Direct Access function of cabin crew handsets must be deferred using MEL item [TGL] 23-31-01 and the conditions associated with this item.

OPERATIONS (O)

Alternate communication procedures between the affected flight attendant's stations must be established and used. Advise cabin crew of any limitations affecting the Cabin Interphone system. Prior to flight, alternate communications procedures between affected flight attendant stations are established and used.

See FAM 4.20.5 Alternate Procedures – Interphone System Unserviceable.

23-42-03 Handset System

23-42-03-01 Passenger/Combi

23-42-03-01-03 Upper Deck Cabin

23-42-03-01-03A Upper Deck Cabin Occupied

Interval	Installed	Required	Procedure
B	2	1	

23-42-03 Handset System

23-42-03-01 Passenger/Combi

23-42-03-01-03 Upper Deck Cabin

23-42-03-01-03B Upper Deck Cabin Unoccupied

Interval	Installed	Required	Procedure
B	2	0	

May be inoperative provided passengers are not carried in the Upper Deck Cabin.

23-42-03 Handset System

23-42-03-01 Passenger/Combi

23-42-03-01-04 Crew Rest

Interval	Installed	Required	Procedure
B	-	0	(O)

OPERATIONS (O)

Alternate procedures must be established and used. Advise cabin crew of any limitations affecting the Cabin Interphone system. Prior to flight, alternate communications procedures between affected flight attendant stations are established and used.

See FAM 4.20.5 Alternate Procedures – Interphone System Unserviceable

[TGL] 23-42-04 Cabin Interphone Alerting System**23-42-04-01 Passenger/Combi****23-42-04-01-01 Flight Deck Call System (Lights and EICAS Messages)**

Interval	Installed	Required	Procedure
C	-	0	

NOTE: The flight deck chime must always be operative.

[TGL] 23-42-04 Cabin Interphone Alerting System**23-42-04-01 Passenger/Combi****23-42-04-01-02 Flight Attendant Call Lights**

Interval	Installed	Required	Procedure
C	-	0	(O)

May be inoperative provided:

- PA system operates normally.
- If affected call light is used for lavatory smoke detector alerting, an alternate lavatory smoke detector alert (audio or visual) is installed and operates normally.
- Alternate procedures for contacting flight attendants are established and used.

NOTE 1: Passenger to Attendant Call System is considered Non-Safety Related Equipment.

NOTE 2: Any system function that operates normally may be used.

OPERATIONS (O)

Advise cabin crew of any limitations affecting the Cabin Attendant Alerting system. Consider the positioning of megaphones for use in an emergency.

[TGL] 23-42-04 Cabin Interphone Alerting System**23-42-04-01 Passenger/Combi****23-42-04-01-03 Flight Attendant Chime**

Interval	Installed	Required	Procedure
C	-	0	(O)

May be inoperative provided:

- a. PA system operates normally.
- b. If affected chime is used for Lavatory Smoke Detector Alerting, an alternate lavatory smoke detector alert (audio or visual) is installed and operates normally.
- c. Alternate procedures for contacting flight attendants are established and used.

NOTE 1: Passenger to Attendant Call System is considered Non-Safety Related Equipment.

NOTE 2: Any system function that operates normally may be used.

OPERATIONS (O)

Advise cabin crew of any limitations affecting the Cabin Attendant Alerting system. Consider the positioning of megaphones for use in an emergency.

23-43-01 Ground Crew Call System

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative provided:

- a. EE Cooling System is continuously monitored during ground operations.
 - b. Alternate procedures are established and used.
-

MAINTENANCE (M)

1. Provide communication between Flight Deck and Ground Crew members.
2. Provide continuous monitoring of the Flight Deck (when Flight Crew are not available during ground operation) to ensure appropriate action in the event a fault develops during operation of the EE Cooling System.
3. Ensure the Inertial Reference Units are not operating on DC power.

OPERATIONS (O)

Assist in monitoring the EE Cooling and IRUs.

**[TGL] 23-51-02 Headsets/Headphones/Boom Microphones
(including ANR headsets)**

Interval	Installed	Required	Procedure
D	-	-	

Any in excess of one headset (including boom microphone) for each required crew member on flight deck duty may be inoperative or missing.

NOTE: The headset's Active Noise Reduction (ANR) function may be inoperative and a non ANR headset utilised.

23-51-03 Flight Deck Speakers

Interval	Installed	Required	Procedure
C	2	0	

May be inoperative provided:

- a. Procedures are not dependent upon their use.
 - b. Associated headset earphones or headphones are installed and operate normally.
-

[TGL] 23-51-04 Audio Control Panels

Interval	Installed	Required	Procedure
D	3	-	(O)

Any in excess of one for each required crew member on flight deck duty may be inoperative.

23-51-08 Captain/First Officer Push-To-Talk (PTT) Switches
23-51-08-01 Control Wheel PTT Switches

Interval	Installed	Required	Procedure
C	2	1	(M)

One may be inoperative provided:

- a. Associated audio control panel PTT switch operates normally.
 - b. Affected switch is deactivated open.
-

MAINTENANCE (M)

Deactivate the inoperative control wheel PTT switch open.

1. Open P7 panel INTERPHONE - CAPT circuit breaker.
2. Open P7 panel INTERPHONE - F/O circuit breaker.
3. Remove two mounting screws of inoperative control wheel PTT switch.
4. Remove PTT switch assembly.
5. Disconnect terminal lugs from PTT switch.
6. Cap wires and stow disconnected wires control wheel horn.
7. Reinstall the PTT switch assembly in the control wheel and secure with the two mounting screws.
8. Close the opened circuit breakers.

23-51-08 Captain/First Officer Push-To-Talk (PTT) Switches
23-51-08-02 Flight Crew Audio Control Panel PTT Switches

Interval	Installed	Required	Procedure
C	2	1	(M)

One may be inoperative provided:

- a. Associated control wheel PTT switch operates normally.
 - b. Affected switch is verified inoperative open.
-

MAINTENANCE (M)

Verify the inoperative audio control panel (ACP) PTT switch is open.

1. Push the PA transmitter select switch on the associated ACP and ensure the PA MIC light is illuminated.
2. Without pressing any PTT, speak into the associated microphone and determine if voice transmission can be heard over the PA system. If no voice transmission is heard, the switch is in the open position.

23-51-08 Captain/First Officer Push-To-Talk (PTT) Switches**23-51-08-03 Glareshield PTT Switches**

Interval	Installed	Required	Procedure
C	2	0	(M)

May be inoperative provided the affected switch is deactivated open.

MAINTENANCE (M)

Deactivate the inoperative glareshield PTT switch open.

1. Open P7 panel INTERPHONE - CAPT circuit breaker.
2. Open P7 panel INTERPHONE - F/O circuit breaker.
3. Remove mounting screws from glareshield panel containing inoperative PTT switch.
4. Gain access to PTT wires by removing glareshield panel.
5. Disconnect wires from PTT switch.
6. Cap and stow PTT wires behind the switch panel.
7. Reinstall glareshield panel and secure with removed mounting screws.
8. Close the opened circuit breakers.

[TGL] 23-71-01 Cockpit Voice Recorder System (CVR)

Interval	Installed	Required	Procedure
A	1	0	(M)

May be inoperative provided:

- a. It is not reasonably practicable to repair or replace before commencement of the flight,
 - b. The aircraft does not exceed eight (8) further flights with the CVR unserviceable,
 - c. Not more than 72 hours have elapsed since the CVR was found to be unserviceable, and
 - d. The Flight Data Recorder operates normally.
-

MAINTENANCE (M)

Check FDR operation as per AMM.

[TGL] 23-76-02 Cockpit Door Surveillance System (CDSS)

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided:

- a. Flight Deck to Passenger Cabin viewer is serviceable,
- b. Sufficient lighting exists external to Flight Deck door, and
- c. If available, the functioning parts of CDSS, together with provisions a) and/or b), as appropriate, allows positive identification of person external to flight deck

NOTE: Any function that operates normally may be used.

OPERATIONS (O)

1. If the CDSS is inoperative use the flight deck door viewer to identify people requiring entry to the flight deck.
2. At least two people must be permanently present on the flight deck throughout the entire flight.
3. Advise cabin crew to make an interphone call requesting entry to the flight deck.
4. Establish with cabin crew an alternate procedure for entry to the flight deck (e.g. a particular door knock signal).

INTENTIONALLY BLANK

24-11-01 Engine Driven Generator Systems (IDG, GCU, GCB)
24-11-01A All Configurations

Interval	Installed	Required	Procedure
B	4	3	(M)

One may be inoperative provided:

- a. Generator Control Breaker (GCB), if inoperative, remains open.
- b. IDG is disconnected or removed.

CAUTION: **DO NOT OPERATE THE IDG FOR MORE THAN 50 HOURS IN THE DISCONNECTED MODE WITHOUT RECONNECTION. FAILURE TO COMPLY WILL RESULT IN THE NEED TO REMOVE THE IDG FOR A WORKSHOP INSPECTION.**

MAINTENANCE (M)

Verify the GCB is open and the IDG is disconnected or removed.

1. For disconnecting the IDG:

NOTE: During the authorized repair interval, if the associated engine is operated for more than 50 hours with the IDG disconnected, then the IDG should be removed for shop inspection prior to returning the airplane to service.

- A. Apply APU or external power (AMM 24-22-00/201).
- B. Position overhead panel (P5) BATTERY switch ON.
- C. Position overhead panel (P5) STANDBY POWER switch AUTO.
- D. Position associated overhead panel (P5) GEN CONT switch OFF.
- E. Position all overhead panel (P5) BUS TIE switches AUTO.
- F. Confirm BUS TIE ISLN lights are extinguished.

NOTE: If associated failed GCB's BUS TIE breaker ISLN light is illuminated with all BUS TIE switches set to AUTO position, and both synchronous buses are powered, this indicates a failed closed generator control breaker.

- G. Start associated engine (AMM 71-00-00/201).
 - H. With associated engine operating at idle RPM or above, pull guard on associated IDG DRIVE DISC switch and momentarily depress switch.
 - I. Confirm DRIVE DISC switch DRIVE light is illuminated.
 - J. Confirm associated >DRIVE DISC _ advisory message is displayed.
- NOTE:** If >DRIVE DISC _ advisory message is not displayed, IDG must be removed.

2. For removal of the inoperative IDG:
 - A. Remove the inoperative IDG from gearbox (AMM 24-11-01/401).

For RR:

- B. To install IDG drive pad cover plate and secure for dispatch using deactivation/dispatch kit G24008 (requires removal of the QAD adapter) or G24009:
 - 1) For G24008 kit: remove QAD adapter and bolt drive pad cover plate in its place:
 - a. Remove IDG Quick Attach-Detach (QAD) ring (AMM 24-11-08/401).
 - b. Lubricate seal on cover plate with engine oil.
 - c. Place cover plate over drivebox opening and tighten bolts (12) to 276 - 300 pound-inches (31.2 - 33.9 N-m).
 - d. Connect the 4 generator power cables to dummy terminal studs on IDG drive pad cover plate.
 - e. Cap and stow the 2 electrical connectors.
 - f. Install and tighten protective caps on the oil-in, oil-out and overtemperature case drain lines.
 - 2) For G24009 kit: install IDG drive pad cover plate into QAD ring.
 - a. Lubricate seal on cover plate with engine oil.
 - b. Place cover plate into IDG Quick Attach-Detach (QAD) ring.
 - c. Tighten IDG QAD ring tension bolt to 240 -264 pound-inches (27.1 - 29.8 N-m).
 - d. Using a soft mallet, firmly tap the edge of the QAD ring.
NOTE: Tap ring only from 4 o'clock to 7 o'clock position, viewing from rear with tension bolt on left side.
 - e. Re-tighten IDG QAD ring tension bolt to 240 - 264 pound-inches (27.1 - 29.8 N-m) and lockwire.
 - f. Connect the 4 generator power cables to dummy terminal studs on IDG drive pad cover plate.
 - g. Connect the 2 electrical connectors to dummy receptacles on IDG drive pad cover plate.
 - h. Connect the oil-in, oil-out and overtemperature case drain lines to provisions on the IDG drive pad cover plate.
 - i. Start applicable engine (AMM 71-00-00/201) and check for no oil leakage from the IDG drive pad cover plate.
 - 3) Close the right hinged cowl (AMM 71-11-02/201).

OPERATIONS NOTE

1. For IDG removed, the IDG weight: 57 kg:
 - A. Inboard engine IDG Balance Arm: 1112.2 inches.
 - B. Outboard engine IDG Balance Arm: 1455.0 inches.

2. For an inflight failure of the associated bus, the following messages may be displayed:

BUS #1 INOP	BUS #2 INOP
DOOR U/D FLT LK	DOOR U/D FLT LK
ELEC AC BUS 1	ELEC AC BUS 2
FUEL PUMP 3 FWD	FUEL PUMP 1 AFT
FUEL PUMP 2 AFT	ENG 2 EEC MODE
ENG 1 EEC MODE	ANTISKID
OUTFLOW VLV L	ENG 2 REVERSER
ANTISKID	AILERON LOCKOUT
HEAT P/S L AUX	WAI VALVE RIGHT
HEAT P/S CAPT	WAI VALVE LEFT
ENG 1 REVERSER	HEAT WINDOW R
>BLEED 1 OFF	ELEC UTIL BUS L
>NO LAND 3	>BLEED 2 OFF
>IRS AC CENTER	>NO LAND 3
>YAW DAMPER LWR	>ATC RIGHT
HEAT R TAT (at landing)	>IRS AC RIGHT
>IDLE DISAGREE (at landing)	>YAW DAMPER LWR
	SPEEDBRAKES AUTO (at landing)
	>IDLE DISAGREE (at landing)

BUS #3 INOP	BUS #4 INOP
ELEC AC BUS 3	ELEC AC BUS 4
FUEL PUMP 2 FWD	ENG 4 EEC MODE
FUEL PUMP 3 AFT	ANTISKID
ENG 3 EEC MODE	ELEC UTIL BUS R
ANTISKID	>FUEL JETT B
TEMP ZONE	>BLEED 4 OFF
ELEC UTIL BUS R	>JETT NOZZLE R
SPEEDBRAKE AUTO	BLEED ISLN APU
>ATC L	BLEED ISLN R
>FUEL JETT A	BLEED ISLN L
>BLEED 3 OFF	HEAT R TAT
>NO LAND 3	HEAT WINDOW L
>IRS AC LEFT	HEAT R AOA
>JETT NOZZLE LEFT	HEAT P/S R AUX
	HEAT P/S F/O
	IDLE DISAGREE (at landing)

24-11-02 Generator DRIVE Lights

Interval	Installed	Required	Procedure
C	4	3	

24-21-01 Lightning Protectors

Interval	Installed	Required	Procedure
C	12	9	

One of each phase may be inoperative provided all AC buses are paralleled.

NOTE: For triple channel autoland at least two of the three generators used must have lightning protection on all three phases.

24-21-02 APU Driven Generator Systems (Generator, AGCU, APB)

24-21-02A APBs Remain Open

Interval	Installed	Required	Procedure
C	2	0	(M)

May be inoperative provided associated Auxiliary Power Breaker(s) (APBs) remains open.

NOTE 1: If APU 1 generator system is unserviceable and EXT 1 power is removed from the aircraft, the AUX Hydraulic pumps 1 & 4 will not operate, as they are powered from the Ground Handling Bus. See Operations Procedure 1 to provide hydraulic power for braking, when starting engines during pushback.

NOTE 2: Dispatch with one or both generators removed is not allowed by this MEL item.

MAINTENANCE (M)

Deactivate the associated APU generator.

1. For APU GEN BEARING status message displayed.
 - A. Position overhead panel (P5) BATTERY switch ON.
 - B. Confirm the associated overhead maintenance panel (P461) APU generator FIELD OFF light is illuminated.

NOTE: If the FIELD OFF light is extinguished, momentarily toggle and release the associated overhead maintenance panel (P461) APU generator field switch.
 - C. Limit operation of the APU to ground use only (do not use during takeoff).
 - D. Do not operate the APU in excess of 15 hours total cumulative time following the initial bearing failure.

NOTE: Operation of the APU for more than 15 hours total cumulative time following the initial generator bearing failure may result in severe damage to the APU generator and APU.
 2. For an APU Driven Generator Electrical failure or Auxiliary Generator Control Unit (AGCU) failure:
 - A. Confirm APU GEN BEARING status message is not displayed.
 - B. Position overhead panel (P5) BATTERY switch ON.
 - C. Confirm associated overhead maintenance panel (P461) APU generator FIELD OFF light is illuminated.

NOTE: If the FIELD OFF light is extinguished, momentarily toggle and release the associated overhead maintenance panel (P461) APU generator field switch.

3. For Auxiliary Power Breaker (APB) failure, verify the APB is open.
 - A. Confirm electrical power can be applied through external power receptacle Number 1 or from engine driven generator 1 or 2 (AMM 24-22-00/201).
 - B. Position all overhead panel (P5) BUS TIE switches AUTO.
 - C. Confirm overhead panel (P5) ISLN lights are extinguished.
 - D. Confirm overhead maintenance panel (P461) split system breaker OPEN light is extinguished.

NOTE: If split system breaker light is illuminated, toggle SPLIT SYSTEM BREAKER switch to close breaker.

OPERATIONS NOTE

1. During ground operations, lack of APU generator 1 and external power 1, aux pumps 1 and 4 (if installed) will not be available.

NOTE: During pushback use 1 and 4 demand pumps to supply hydraulic pressure for the body gear steering and braking. Be aware that this will increase the pneumatic bleed from the APU and affect dual engine autostart capability. Consider starting an engine on stand.

2. To facilitate engine starting when one or both APU generator systems are inoperative, it is recommended that, prior to engine start, all fuel pumps and R UTILITY power switch are selected OFF. If engines cannot be started due to insufficient external power, select L UTILITY power switch OFF also. Select fuel pumps as required for each individual engine start. Utility power can be restored and the fuel panel correctly configured after completion of the engine start procedure.

NOTE: Removing power from both utility busses results in loss of cabin lighting except for passenger signs and night lighting. At night, to prepare cabin lighting before removing power from the utility busses, instruct the cabin crew to turn on cabin night lighting.

3. If EE CLNG SUP FAN status message is displayed, it can be cleared by rotating the EQUIP COOLING switch to OVRD, then back to NORM.
4. If any RECIRC FAN UPR or LWR status message is displayed, momentarily depress the PACK RST switch until each has cleared.

24-21-02 APU Driven Generator Systems (Generator, AGCU, APB)**24-21-02B APU Generator Deactivated**

Interval	Installed	Required	Procedure
C	2	0	(M)

May be inoperative and removed provided APU is deactivated.

NOTE 1: If APU 1 generator system is unserviceable and EXT 1 power is removed from the aircraft, the AUX Hydraulic pumps 1 & 4 will not operate, as they are powered from the Ground Handling Bus. See Operations Procedure 1 to provide hydraulic power for braking, when starting engines during pushback.

NOTE 2: Dispatch with one or both generators removed is not allowed by this MEL item.

MAINTENANCE (M)

Deactivate APU.

1. Position P5 panel APU Selector Switch OFF.
2. Deactivate (AMM 49-11-00 / APU System Deactivation).
3. Inoperative APU generator(s) may be removed and associated blanking plate(s) installed. (AMM 24-21-03).

OPERATIONS NOTE

1. During ground operations, lack of APU generator 1 and external power 1, aux pumps 1 and 4 (if installed) will not be available.
NOTE: During pushback use 1 and 4 demand pumps to supply hydraulic pressure for the body gear steering and braking. Be aware that this will increase the pneumatic bleed from the APU and affect dual engine autostart capability. Consider starting an engine on stand.

2. To facilitate engine starting, it is recommended that, prior to engine start, all fuel pumps and R UTILITY power switch are selected OFF. If engines cannot be started due to insufficient external power, select L UTILITY power switch OFF also. Select fuel pumps as required for each individual engine start. Utility power can be restored and the fuel panel correctly configured after completion of the engine start procedure.

NOTE: Removing power from both utility busses results in loss of cabin lighting except for passenger signs and night lighting. At night, to prepare cabin lighting before removing power from the utility busses, instruct the cabin crew to turn on cabin night lighting.

3. If EE CLNG SUP FAN status message is displayed, it can be cleared by rotating the EQUIP COOLING switch to OVRD, then back to NORM.

4. If any RECIRC FAN UPR or LWR status message is displayed, momentarily depress the PACK RST switch until each has cleared.

24-21-02 APU Driven Generator Systems (Generator, AGCU, APB)**24-21-02-01 APU Generator Cooling Airflow Detector**

Interval	Installed	Required	Procedure
D	1	0	(M)

May be inoperative deactivated.

MAINTENANCE (M)

Deactivate APU Generator Cooling Airflow Detector.

1. Deactivate the APU Cooling Airflow Detector (AMM 49-51-03/201).

OPERATIONS NOTE

1. To facilitate engine starting when one or both APU generator systems are inoperative, it is recommended that, prior to engine start, all fuel pumps and R UTILITY power switch are selected OFF. If engines cannot be started due to insufficient external power, select L UTILITY power switch OFF also. Select fuel pumps as required for each individual engine start. Utility power can be restored and the fuel panel correctly configured after completion of the engine start procedure.

NOTE: Removing power from both utility busses results in loss of cabin lighting except for passenger signs and night lighting. At night, to prepare cabin lighting before removing power from the utility busses, instruct the cabin crew to turn on cabin night lighting.

2. If EE CLNG SUP FAN status message is displayed, it can be cleared by rotating the EQUIP COOLING switch to OVRD, then back to NORM.
3. If any RECIRC FAN UPR or LWR status message is displayed, momentarily depress the PACK RST switch until each has cleared.

24-22-01 Bus Tie Breakers (BTB)**24-22-01-01 No. 1, 2, and 3**

Interval	Installed	Required	Procedure
C	3	2	(M)

One may be inoperative closed provided:

- No. 4 operates normally.
- Approach minimums do not require its use.

NOTE: If No. 1, 2 or 3 BTB is inoperative, triple channel autoland will not be available.

MAINTENANCE (M)

Confirm bus tie breaker 4 operates normally.

- Apply APU or external power (AMM 24-22-00/201).
- Position the four P5 panel BUS TIE switches to AUTO and confirm BUS TIE 4 ISLN light is extinguished.

NOTE: If any ISLN lights are illuminated with all BUS TIE switches set to the AUTO position and both sync buses powered, this is an indication of an open bus tie breaker.

OPERATIONS NOTE

Triple channel autoland will not be available.

24-22-01 Bus Tie Breakers (BTB)**24-22-01-02 No. 4**

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative closed provided No. 1, 2, and 3 operate normally.

MAINTENANCE (M)

Verify the bus tie breaker failure condition indicated:

- Apply APU or external power (AMM 24-22-00/201).
- Position the four P5 panel BUS TIE switches to AUTO and confirm BUS TIE 1, 2, and 3 ISLN lights are extinguished.

NOTE: If any ISLN lights are illuminated with all BUS TIE switches set to the AUTO position and both sync buses powered, this is an indication of an open bus tie breaker.

24-22-02 Split System Breaker (SSB)

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative closed provided all BTB's operate normally.

MAINTENANCE (M)

NOTE: No maintenance action is required if SSB is inoperative closed. If SSB is inoperative open, it must be replaced per AMM 24-22-02/401.

Alternatively, the same procedure may be used to replace the SSB (P/N 60B00010-30) with APB, BTB, GCB contactor (P/N 60B00010-25).

Dispatch with the substitute -25 part is limited to 10 days (Category C) until permanent SSB repair is made.

Use the following procedure to verify the split system breaker is failed closed:

1. Apply power from source 1 only, APU GEN 1 or EXT PWR 1.
2. Set the four BUS TIE switches to AUTO.
3. Confirm ON light of selected power source switch is illuminated.
4. Confirm ISLN lights on all BUS TIE switches are extinguished, and status message ELEC BTB __ is not displayed.
5. With selected power source supplying both sides of the synchronous bus confirm the following messages are not displayed.
 ELEC AC BUS 3 (Caution)
 ELEC AC BUS 4 (Caution)
 ELEC SSB OPEN (Advisory)
6. Attempt to apply power from source 2 (APU GEN 2 or EXT PWR 2).
 - A. Verify that the selected power source ON light will not illuminate.
7. Verify that the SSB OPEN light is not illuminated and the advisory message ELEC SSB OPEN is not displayed.
8. Dispatch with SSB OPEN light illuminated with messages ELEC SSB OPEN or ELEC AC BUS 3 or ELEC AC BUS 4 is not permitted.

OPERATIONS (O)

1. To facilitate engine starting when the SSB is inoperative:
 - A. Prior to engine start, select all fuel pumps and R UTILITY power switch OFF. If further electrical load reduction is required, also select L UTILITY power switch OFF. Select fuel pumps as required for each individual engine start. Utility power can be restored and the fuel panel correctly configured after completion of the engine start procedure.

NOTE 1: Removing power from both utility busses results in loss of cabin lighting except for passenger signs and night lighting. At night, to prepare cabin lighting before removing power from the utility busses, instruct the cabin crew to turn on cabin night lighting. Utility and galley power can be restored after completion of the engine start procedure.

NOTE 2: Utility Bus equipment are listed in MEL item 24-56-01.

- B. If EE CLNG SUP FAN status message is displayed, it can be cleared by rotating the EQUIP COOLING switch to OVRD, then back to NORM.
- C. If any RECIRC FAN UPR or LWR status message is displayed, momentarily depress the PACK RST switch until each has cleared.

24-23-01 APU Generator Power ON Lights

Interval	Installed	Required	Procedure
C	2	0	

24-23-02 APU Generator Power AVAIL Lights

Interval	Installed	Required	Procedure
C	2	0	

24-23-03 AC Bus ISLN Lights

Interval	Installed	Required	Procedure
C	4	3	(M)

One indication may be inoperative provided associated BTB is verified to operate normally.

MAINTENANCE (M)

Verify the associated BTB operates normally.

1. Apply APU or external power (AMM 24-22-00/201).
2. Confirm ON light on APU GEN or EXT PWR switches are illuminated.
3. Confirm all BUS TIE switches, located on P5 overhead panel, are set to AUTO, and ISLN lights are extinguished.
4. Access electrical maintenance page (AMM 45-10-00/201) and confirm all AC buses are powered in normal voltage range.

**24-23-04 Engine and APU Generator FIELD OFF Lights
(Overhead Maintenance Panel)**

Interval	Installed	Required	Procedure
C	6	0	

24-23-05 Split System Breaker OPEN Light (Overhead Maintenance Panel)

Interval	Installed	Required	Procedure
C	1	0	

24-23-06 GEN CONT Lights

Interval	Installed	Required	Procedure
C	4	0	

24-32-01 Transformer Rectifier Units (TRU)**24-32-01-01 Main**

Interval	Installed	Required	Procedure
C	4	3	

24-32-01 Transformer Rectifier Units (TRU)**24-32-01-03 Ground Handling**

Interval	Installed	Required	Procedure
C	2	0	

24-32-02 DC Bus Isolation Relays**24-32-02-01 No. 1, 2, and 3**

Interval	Installed	Required	Procedure
C	3	2	

One may be inoperative closed provided:

- a. No. 4 operates normally.
- b. Approach minimums do not require its use.

NOTE: If No. 1, 2 or 3 DC Isolation Relay is inoperative, triple channel autoland will not be available.

24-32-02 DC Bus Isolation Relays**24-32-02-02 No. 4**

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative closed provided No. 1, 2, and 3 operate normally.

24-41-01 External Power Systems

Interval	Installed	Required	Procedure
C	2	0	(M)

May be inoperative provided no damage is found to the area inside the MEC behind the external power receptacle.

MAINTENANCE (M)

In the event that Ground Power cannot successfully be established to the aircraft after turning the external power source on and applying electrical power to the external power cables, carry out the following actions:

1. Inspect External Receptacle for signs of overheat.
2. Inspect area inside MEC directly behind the External Power Receptacle for signs of overheat and damage. Remove Floorboards as required to gain access to carry out inspection. Rectify any damage found before further flight.

24-56-01 Electrical Load Control Units (ELCU)**24-56-01-01 Utility Power ELCUs**

Interval	Installed	Required	Procedure
C	4	3	(M) (O)

One may be inoperative provided:

- a. Dispatch limitations for affected utility bus equipment are observed, and

For Passenger and Combi:

- b. Utility bus #4 ELCU operates normally.

MAINTENANCE (M)

Airplane must also be dispatched using the MEL items for the inoperative utility bus equipment.

For Passenger and Combi:

C/B NO.	EQUIPMENT NOMENCLATURE	ATA
UTILITY BUS # 1		
----	CABIN INT ILLUMINATION	33
809	MAIN FWD 3 FUEL BST PUMP	28
3145	EQUIP COOL SUPPLY FAN	21
3163	CARGO HTR PWR L FWD	21
3173	VENT FAN 1 PWR-FWD CRGO	21
3174	VENT FAN 2 PWR-FWD CRGO	21
10200	CAPT AUX HTR HIGH	21
10201	CAPT AUX HTR LOW	21
10202	F/O AUX HTR HIGH	21
10203	F/O AUX HTR LOW	21
10274	AUDIO ENT TAPE/MUX	23
10275	READING LTS ZN A/B LEFT	23
10276	READING LTS ZN A/B CTR	23
10278	READING LTS ZN C/D LEFT	23
10281	READING LTS ZN E LEFT	23
10284	READING LTS UP DK	23
10383	LAV WTR HTR ZN C CTR	38


BRITISH AIRWAYS
747 Dispatch Deviations Guide
Section 2
ATA 24

C/B NO.	EQUIPMENT NOMENCLATURE	ATA
UTILITY BUS # 2		
449	LAV WTR HT ZN A&B DR 1L	38
450	LAV WTR HT ZN C L	38
833	JTSN PUMP 2 FWD	28
835	OVRD JTSN PUMP CTR-L	28
838	JTSN PUMP 3 FWD	28
878	CAPT POWERED SEAT	25
1923	LAV WTR HT ZN B DR 2L	38
3067	WASTE & WTR LINE HTR-MN	30
3095	DR AREA HTR PWR 1 & 2 L	21
3096	DR AREA HTR PWR 3 & 4 L	21
3175	VENT FAN 3 PWR - FWD CGO	21
8611	LAV WATER HTR UPR DK AFT	38
8617	PASS SEAT ZN A-L FWD	25
8618	PASS SEAT ZN A-L AFT	25
10277	READING LTS ZN A/B R	23
10279	READING LTS ZN C/D CTR	23
10280	READING LTS ZN C/D R	23
10282	READING LTS ZN E CTR	23
10283	READING LTS ZN E R	23
10285	SEAT ELEX UNITS ZN A/B	23
10286	SEAT ELEX UNITS ZN C/D	23
10287	SEAT ELEX UNITS ZN E	23
10288	SEAT ELEX UNITS ZN U/D	23
10372	AFT LWR CARGO A/C VLV	21
10385	LAV WTR HTR ZN D CTR-AFT	38

C/B NO.	EQUIPMENT NOMENCLATURE	ATA
UTILITY BUS # 3		
447	LAV WTR HT ZN A & B DR 1R	38
804	MAIN FWD 2 FUEL BST PUMP	28
816	OVHD RECIRC FAN PWR-1	21
817	OVHD RECIRC FAN PWR-2	21
877	F/O POWERED SEAT	25
3093	DOOR AREA HTR PWR 1 & 2 R	21
3094	DOOR AREA HTR PWR 3 & 4 R	21
3164	CARGO HTR PWR R FWD	21
3176	VENT FAN PWR - AFT CGO	21
3177	VENT FAN PWR - BULK CGO	21
3181	UPR DK DR AREA HTR PWR	21
3185	ZONE F HEATER	21
3209	DOOR AREA HTR PWR 5	21
8609	LAV WTR HT UPR DK 3U	38
8610	LAV WTR HT UPR DK 10U	38
10430	ZONE F TEMP CONTROL	21
10470	PASS SEATS UPR DK-R FWD	25
10471	PASS SEATS UPR DK-R CTR	25
10472	PASS SEATS UPR DK-L FWD	25
10473	PASS SEATS UPR DK-L CTR	25
10474	RCDU	45


BRITISH AIRWAYS
747 Dispatch Deviations Guide

Section 2

ATA 24

C/B NO.	EQUIPMENT NOMENCLATURE	ATA
UTILITY BUS # 4		
448	LAV WTR HTR-FC5 & FC6	38
451	LAV WTR HTR ZN B DR 2R	38
522	ACM MASS FLOW IND	21
634	LAV WTR HTR FC3 & FC4	38
636	LAV WTR HTR FC1 & FC2	38
818	UNDERFLOOR RECIRC FAN 1	21
1520	LAV & GLY VENT FAN-PRIM	21
1563	UNDERFLOOR RECIRC FAN 2	21
1741	LAV WTR HTR ZN C R	38
1950	LAV WTR HTR ZN F VANITY	38
3132	CREW REST RECIRC FAN PWR	21
3133	CREW REST HTR PWR	21
3144	LAV & GLY VENT FAN-SEC	21
3147	LAV WASTE VAC BLWR-L	38
3194	FLT DK CREW REST HTR	21
8619	PASS SEATS ZN A-R FWD	25
8620	PASS SEATS ZN A-R AFT	25
8794	CREW REST SHAVER OUTLET	25
10013	CREW REST TEMP CONT	21
10384	LAV WTR HTR ZN D CTR-FWD	38
10423	LAV WTR HTR EC1 & EC2	38
10424	LAV WTR HTR FC7 & FC8	38
10440	VIDEO - ZONE A-AC	23
10441	VIDEO - ZONE B-AC	23
10442	VIDEO - ZONE C-AC	23
10443	VIDEO - ZONE D-AC	23
10444	VIDEO - ZONE E-AC	23

C/B NO.	EQUIPMENT NOMENCLATURE	ATA
UTILITY BUS # 4		
10445	VIDEO - ZONE U/D-AC	23
10446	VIDEO - CONT CTR-AC	23
10517	PASS SEATS ZN A-CTR	25
10520	CABIN DATA TERMINAL	23
10566	PASS SEATS UPR DK L	25
10567	PASS SEATS UPR DK R	25

OPERATIONS (O)

1. The (M) procedure tables list the equipment which may be inoperative when dispatching with the associated Utility Bus inoperative.
2. Observe dispatch limitations for affected utility bus equipment.
3. The associated ELEC UTIL BUS L or R advisory message will be displayed.

24-56-01 Electrical Load Control Units (ELCU)**24-56-01-02 Galley Power ELCUs (Passenger/Combi)**

Interval	Installed	Required	Procedure
C	4	0	

24-56-02 Utility Power OFF Lights

Interval	Installed	Required	Procedure
C	2	0	

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[TGL] 25-11-02 Flight Crew Seats**25-11-02-02 Manual Adjustment System****25-11-02-02-01 Recline Systems**

Interval	Installed	Required	Procedure
B	2	0	(M)

May be inoperative provided:

- a. Affected seat is secured in an upright position.
- b. Seat is acceptable to affected crewmember.

MAINTENANCE (M)

1. Perform an operational test of the associated crew members seat(s) (Ref AMM 25-11-00) to ensure appropriate function of the manual adjustment system(s).
2. Secure seat in the upright position.

[TGL] 25-11-02 Flight Crew Seats**25-11-02-02 Manual Adjustment System****25-11-02-02-02 Armrests**

Interval	Installed	Required	Procedure
C	4	0	(M)

May be inoperative provided:

- a. Affected armrest is stowed in the retracted position or removed.
- b. Seat is acceptable to affected crewmember.

MAINTENANCE (M)

Remove armrest or stow the armrest in retracted position.

[TGL] 25-11-02 Flight Crew Seats**25-11-02-02 Manual Adjustment System****25-11-02-02-03 Lumbar/Thigh Supports**

Interval	Installed	Required	Procedure
C	4	0	

May be inoperative provided seat is acceptable to the affected crewmember.

[TGL] 25-11-02 Flight Crew Seats**25-11-02-02 Manual Adjustment System****25-11-02-02-04 Headrests**

Interval	Installed	Required	Procedure
C	2	0	

May be inoperative provided seat is acceptable to the affected crewmember.

[TGL] 25-11-02 Flight Crew Seats**25-11-02-02 Manual Adjustment System****25-11-02-02-05 Vertical Adjustment**

Interval	Installed	Required	Procedure
B	2	0	(M)

May be inoperative provided:

- a. Seat is acceptable to affected crewmember.
-

MAINTENANCE (M)

Secure associated seat in a fixed vertical position.

[TGL] 25-11-03 Observer's Seat(s)

25-11-03-01 Primary Observer Seat (Including Associated Equipment)

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided the seat is not required and is correctly stowed.

[TGL] 25-11-03 Observer's Seat(s)

25-11-03-02 Additional Observer's Seat(s) (Including Associated Equipment)

Interval	Installed	Required	Procedure
D	1	0	

May be inoperative provided the seat is not required and is correctly stowed.

NOTE: The pilot in command will determine if the minimum safety equipment is functional for other persons authorized to occupy any observers seat(s).

25-20-01 Passenger Convenience Item(s)

Interval	Installed	Required	Procedure
D	-	-	(M)

Passenger convenience items, are those items related to passenger comfort, convenience, or entertainment such as, but not limited to, galley equipment, movie equipment, ash trays, stereo equipment, overhead reading lamps, etc. Items addressed elsewhere in this document shall not be included.

NOTE: Lavatory door ashtrays (internal and external) are not considered convenience items.

MAINTENANCE (M)

For unserviceable electrical equipment in the galley area:

- Ovens
- Trash compactors
- Wine coolers
- Chillers
- Beverage makers (including expresso maker)
- Warming cupboards
- Hot Cups

It is required that the appropriate power circuit breaker(s) for the defective equipment is pulled, and collared, to prevent use of the defective equipment.

For chillers both the 'Comp' and 'Fan' circuit breakers must be pulled and collared.

For ovens you must ensure both 'power' and 'fan' circuit breakers are pulled and collared.

All circuit breakers are located on the adjacent galley control panels.

Mark the defective equipment and its control 'INOP'.

Section 2

25-24-01 Cart Lift System (Between Main and Upper Deck Galleys)

* * *

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative deactivated.

MAINTENANCE (M)

To deactivate the cart lift system pull and collar the following circuit breakers:

Cart Lift Cont Upper Deck P180-G8

Cart Lift Cont Upper Deck P414-F23

Cart Lift Over-ride P180-G19

Cart Lift - Upper Deck-1 P414-M21

Cart Lift - Upper Deck-2 P414-M24

OPERATIONS NOTE

When operating with the Cart Lift System Inoperative, consideration must be made for the quality of service available for upper deck passengers. Dependent on route, it may be necessary to restrict passenger load and operate with the upper deck empty.

25-24-01 Cart Lift System (Between Main and Upper Deck Galleys)

* * *

25-24-01-01 Normal Mode

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided:

- a. Override Mode operates normally.
 - b. Alternate procedures are established and used.

OPERATIONS (O)

- When operating the Cart Lift System in Override mode, operators must take extra precautions as the lift can move with the Cart Lift doors open since the safety systems are disabled in this mode.
 - Only Engineers and Cabin Crew are authorised to change the operating mode of the Cart Lift from Normal to Override or vice-versa and this must be logged in the AML.

3. When operating the Cart Lift System in Override Mode, advise cabin crew to operate the Cart Lift in accordance with the FAM Food Cart Lift 6.10.10.

25-24-01 Cart Lift System (Between Main and Upper Deck Galleys)*********25-24-01-02 Override Mode**

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided:

- a. Normal Mode operates normally.
 - b. Alternate procedures are established and used.
-

OPERATIONS (O)

Advise Cabin Crew to operate the Cart Lift System in accordance with the FAM Food Cart Lift 6.10.10.

25-24-01 Cart Lift System (Between Main and Upper Deck Galleys)*********25-24-01-03 Actuator Motors**

Interval	Installed	Required	Procedure
C	2	1	(M) (O)

One may be inoperative provided:

- a. Associated motor is deactivated.
 - b. Cart lift operates in Normal Mode.
 - c. Alternate procedures are established and used.
-

MAINTENANCE (M)

Contact Cabin Technical for guidance on deactivation procedure.

OPERATIONS (O)

Advise Cabin Crew to operate the Cart Lift System in accordance with the FAM Food Cart Lift 6.10.10.

[TGL] 25-25-01 Cabin Crew Seat Assemblies (Single or Dual Position)

25-25-01-01 Required Cabin Crew Seats

Interval	Installed	Required	Procedure
B	-	-	(M) (O)

One seat position or assembly (dual position) may be inoperative provided:

- a. Affected seat position or seat assembly is not occupied.
- b. Cabin Crew displaced by inoperative seat(s) occupies either an adjacent cabin crew seat or the passenger seat which is most accessible to the inoperative seat(s), so as to most effectively perform assigned duties.
- c. Alternate procedures are established and used for displaced cabin crew.
- d. Folding type seat stows automatically or is secured in the retracted position.
- e. Passenger seat assigned to cabin crew member is placarded FOR CABIN CREW USE ONLY.

NOTE 1: A fully automatic folding seat that will not stow automatically or remain stowed is considered inoperative and shall be secured in the retracted position or removed. An exception should only be made where cabin layout is such that emergency egress is not in any way compromised by a seat in the deployed position.

NOTE 2: A seat position with an inoperative or missing seat belt or harness is considered inoperative.

NOTE 3: This requirement does not preclude use of passenger seats by Cabin Crew carried in excess of the required complement.

NOTE 4: The Zone F Cabin Crew Rest Area seating is not stressed for take-off and landing and must not be used by the displaced crew member.

MAINTENANCE (M)

Secure folding type seats.

1. Secure or remove (AMM 25-25-04) inoperative flight attendant seat.

NOTE: For cabin crew member occupying passenger seat, placard passenger seat FOR CABIN CREW USE ONLY.

OPERATIONS (O)

The cabin attendant assigned to the affected seat must occupy a passenger seat as close to or closer than the nearest seated passenger to the associated exit. The cabin attendant must be able to reach the assigned emergency exit in essentially the same time as from the normally assigned seat, i.e. a 2 or 3 second time difference is considered "essentially the same time".

[TGL] 25-25-01 Cabin Crew Seat Assemblies (Single or Dual Position)**25-25-01-02 Non-Required Cabin Crew Seats**

Interval	Installed	Required	Procedure
C	-	-	(M) (O)

May be inoperative provided:

- a. Inoperative seat or seat assembly is not occupied,
- b. Alternate procedures are established and used for displaced cabin crew,
- c. Folding type seat is stowed or secured in retracted position, and
- d. Where a passenger seat is assigned to displaced cabin crew it is placarded "For Cabin Crew Use Only".

NOTE 1: A seat with an inoperative or missing seat belt or harness is considered inoperative.

NOTE 2: A fully automatic folding seat that will not stow automatically or remain stowed is considered to be inoperative and shall be secured in the retracted position or removed. An exception should only be made where cabin layout is such that emergency egress is not in any way compromised by a seat in the deployed position

MAINTENANCE (M)

For automatic stowing inoperative, secure seat in stowed position.

OPERATIONS (O)

The cabin attendant assigned to the affected seat must occupy a passenger seat as close to or closer than the nearest seated passenger to the associated exit. The cabin attendant must be able to reach the assigned emergency exit in essentially the same time as from the normally assigned seat, i.e. a 2 or 3 second time difference is considered "essentially the same time".

[TGL] 25-25-02 Passenger Seats

Interval	Installed	Required	Procedure
C	-	-	(M)

May be inoperative provided:

- a. Seat does not block an Emergency Exit.
- b. Seat does not restrict any passenger from access to the main aircraft aisle.
- c. The affected seat(s) is blocked and placarded DO NOT OCCUPY.

NOTE 1: A seat with an inoperative seat belt is considered inoperative.

NOTE 2: Inoperative seats do not affect the required number of Cabin Crew.

NOTE 3: Affected seat(s) may include the seat(s) behind and/or adjacent outboard seats.

NOTE 4: Judgement as to whether a soiled or damaged seat is considered inoperative must be made on the basis of the seat's ability to perform its intended function.

MAINTENANCE (M)**For an Inoperative Seat (Seat Not Occupied)**

1. Placard seat: INOP – DO NOT OCCUPY.
2. Secure seat back in the up-right (TTOL) position if possible, and block off seat such that it cannot be occupied. For electrically operated seats disconnect recline actuator(s).

NOTE: Club World Stretch seat is in the TTOL position when the top of the seat back rest is aligned with the joint between the back shell and upper moulded cap.
3. If the seat back is loose, secure seat in the breakover position with a strap or rope such that it cannot move during flight. Affected seat row must not contain an emergency exit.
 - A. If the affected seat is in a group of seats adjacent to the aeroplane sidewall, seats outboard of the seat must not be occupied.
 - B. If the affected seat is in a group of seats between two aisles, block off the row and placard entire row: DO NOT OCCUPY.
4. If the seat is stuck in the reclined position, access is restricted to the row aft of the affected seat. The seat row aft of the affected seat must not contain an emergency exit.
 - A. If the affected seat is in a group of seats adjacent to the aeroplane sidewall, the seat aft of the affected seat and seats outboard from that seat must not be occupied.
 - B. If the affected seat is in a group of seats between two aisles, block off the row of seats aft of the inoperative seat and placard entire row: DO NOT OCCUPY.

For Electrically Operated Seats Inoperative

Do the following in conjunction with Seat Inoperative above, refer to the applicable Component Maintenance Manual.

1. At the seat remove access panel(s), inspect seat wiring for damage. If wiring damage is found contact Fleet Technical Engineer for required repair authority.
2. For mechanical damage gain access to recline actuator(s), with seat electrical power isolated, disconnect electrical connector securely cap and stow away from moving parts.
3. Refit parts removed for access and restore electrical power.

Seat Inoperative in Other than the Upright Position

1. Placard seat "INOP – DO NOT OCCUPY".
2. Secure seat in the breakover position with a strap or rope such that it can not move during flight.
OR
3. If seat is stuck in the reclined position, block off row of seats aft of inoperative seat and placard entire row "DO NOT OCCUPY".

[TGL] 25-25-02 Passenger Seats**25-25-02-01 Recline Mechanism****25-25-02-01A Seat Secured Up-Right**

Interval	Installed	Required	Procedure
C	-	-	(M)

May be inoperative and seat occupied provided seat back is secured in the full up-right position.

MAINTENANCE (M)

Secure associated seat back in the upright position.

For an inoperative passenger seat recline mechanism secured in the upright position (seat occupied):

1. Placard seat: SEAT WILL NOT RECLINE.
NOTE: Seat may be occupied unless considered inoperative for other reasons.
2. For electrically operated seats disconnect recline actuator(s) in accordance with applicable Component Maintenance Manual.

[TGL] 25-25-02 Passenger Seats**25-25-02-01 Recline Mechanism****25-25-02-01B Immovable Seat Back**

Interval	Installed	Required	Procedure
C	-	-	

May be inoperative and seat occupied provided seat back is immovable in the full up-right position.

For an inoperative passenger seat recline mechanism secured in the upright position (seat occupied):

- a. Placard seat: SEAT WILL NOT RECLINE.

NOTE: Seat may be occupied unless considered inoperative for other reasons.

- b. For electrically operated seats disconnect recline actuator(s) in accordance with applicable Component Maintenance Manual.
-

[TGL] 25-25-02 Passenger Seats**25-25-02-02 Underseat Baggage Restraining Bars**

Interval	Installed	Required	Procedure
C	-	-	(O)

May be inoperative or missing provided:

- a. Baggage is not stowed under seat with inoperative restraining bar.
 - b. Associated seat is placarded DO NOT STOW BAGGAGE UNDER THIS SEAT.
 - c. Procedures are established to alert Cabin Crew of inoperative restraining bar.
-

OPERATIONS (O)

Ensure cabin crew are notified of the inoperative restraining bar and that baggage must not be placed under the associated seat.

MAINTENANCE (M)

1. If broken, remove the under-seat baggage restraining bar.
2. Placard associated seat "DO NOT STOW BAGGAGE UNDER THIS SEAT".

[TGL] 25-25-02 Passenger Seats**25-25-02-03 Armrests****25-25-02-03A Armrests With Recline Mechanism**

Interval	Installed	Required	Procedure
C	-	-	(M)

May be inoperative or missing and seat occupied provided:

- a. Armrest does not block any Emergency Exit.
 - b. Armrest does not restrict any passenger from access to the main aircraft aisle.
 - c. If armrest is missing, seat back is secured in the full upright position.
-

MAINTENANCE (M)

Secure associated seat back in the upright position.

[TGL] 25-25-02 Passenger Seats**25-25-02-03 Armrests****25-25-02-03B Armrests Without Recline Mechanism**

Interval	Installed	Required	Procedure
C	-	-	

May be inoperative or missing and seat occupied provided:

- a. Armrest does not block an Emergency Exit.
 - b. Armrest does not restrict any passenger from access to the main aircraft aisle.
-

[TGL] 25-25-02 Passenger Seats**25-25-02-04 Electrical/ Electronic Systems/ Components**

Interval	Installed	Required	Procedure
C	-	-	(M)

May be inoperative and seat occupied provided associated system(s)/components(s) is deactivated.

MAINTENANCE (M)

For inoperative seat electrical/electronic systems/ PC power/ components, deactivate the inoperative systems/ PC power/ components.

Refer to the applicable Component Maintenance Manual for deactivation procedures; if procedures are not available contact Fleet Technical Engineer for required repair authority.

[TGL] 25-25-02 Passenger Seats**25-25-02-05 Retractable Privacy Screen**

Interval	Installed	Required	Procedure
C	-	-	(M)

May be inoperative provided screen is in the retracted position.

25-25-02 Passenger Seats**25-25-02-06 "Takeoff, Taxi, and Landing" (TTL) Position Light (Lie Flat Seats)**

Interval	Installed	Required	Procedure
C	-	-	

May be inoperative and seat occupied provided Flight Attendant verifies seat(s) is in the full upright position prior to takeoff and landing.

[TGL] 25-25-02 Passenger Seats**25-25-02-07 In Seat Stowage Drawer**

Interval	Installed	Required	Procedure
C	-	-	(M)

May be inoperative provided drawer is latched in stowed position or drawer is removed from the affected seat.

MAINTENANCE (M)

For seats with a stowage drawer which will not latch in the stowed position remove drawer in accordance with the applicable Component Maintenance Manual.

[TGL] 25-25-02 Passenger Seats**25-25-02-08 Footstool**

Interval	Installed	Required	Procedure
C	-	-	(M)

Maybe inoperative provided:

- a. Footstool can be latched in or stowed in the upright position,
 - b. If footstool cannot be latched or stowed in the upright position remove footstool, and
 - c. For front/rear row footstools. If Protective travelator rack mechanism guards are damaged or missing deactivate footstool and stow in the lowest upright position.
-

MAINTENANCE (M)

1. For seats with a footstool which will not latch in the stowed position remove the footstool in accordance with the procedures contained in the applicable Component Maintenance Manual.
2. For seats with a footstool where the protective coves are missing or damaged, deactivate the footstool in accordance with the applicable Component Maintenance Manual.

25-25-04 Upper Deck Emergency Exit Door Escape Path Guides

Interval	Installed	Required	Procedure
C	-	-	(M)

May be inoperative or missing provided:

- a. Any passenger seat footstool which can not be latched in the stowed position is removed,
- b. Any trip hazard which is created by the guide being missing is removed, and
- c. If a mandatory placard is removed along with the guide, the affected seat must be placarded with the same wording as the missing placard.

NOTE: Typical examples of escape path guides are passenger seat footstool screens, floor mounted magazine racks. These are located adjacent to and facing the area between the main aisle and the upper deck emergency escape doors.

MAINTENANCE (M)

1. For a damaged or missing escape path guide:
 - A. If as a result of the guide being missing a passenger footstool can not be latched in the stowed position the footstool should be removed and deferred in accordance with MEL item [TGL] 25-25-02.
 - B. If a trip hazard is created by removal of the guide, contact Fleet Technical Engineer for required repair authority.

25-28-01 Overhead Storage Bin(s)/Cabin and Galley Storage Compartments/Closets**25-28-01A Door Secured Closed**

Interval	Installed	Required	Procedure
C	-	-	(M)

May be inoperative provided:

- Procedures are established to secure compartment/closets CLOSED.
- Any emergency equipment located in affected compartment is considered inoperative.
- Affected compartment is not used for storage of any item(s) except for those permanently affixed.
- Associated bin or compartment is prominently placarded : "DO NOT USE".

NOTE: If no partitions are installed, the entire overhead storage compartment is considered one bin or compartment.

MAINTENANCE (M)

Secure inoperative bins, compartments and closets closed.

- Use operator established procedures to ensure affected bins, compartments and closets are empty (except for permanently affixed items) and secured closed.

25-28-01 Overhead Storage Bin(s)/Cabin and Galley Storage Compartments/Closets**25-28-01B Door Removed**

Interval	Installed	Required	Procedure
C	-	-	(M) (O)

May be inoperative provided:

- Affected door(s) is removed.
- Associated bin or compartment is not used for storage of any items, except those permanently affixed.
- Associated bin or compartment is prominently placarded : "DO NOT USE".
- Procedures are established and used to alert crew members and passengers of inoperative bins or compartment.
- Passengers are briefed that associated bin or compartment is not used.

NOTE 1: If no partitions are installed, the entire overhead storage compartment is considered one bin or compartment.

NOTE 2: Any emergency equipment located in the associated compartment (permanently affixed) is available for use.

MAINTENANCE (M)

Remove door, secure inoperative bins, compartments and closets closed and placard..

1. Remove affected door(s).
2. Use operator established procedures to ensure affected bins, compartments and closets are empty (except for permanently affixed items).
3. Items stored within affected location are confirmed to be permanently affixed.
4. Placard associated bin, compartment, "DO NOT USE" so as to prevent its use.

OPERATIONS (O)

1. Alert crew and passengers of the inoperative bins or compartments.
2. Prior to takeoff, passengers are briefed on the non-use of associated inoperative bin, compartment.

25-28-01 Overhead Storage Bin(s)/Cabin and Galley Storage Compartments/Closets

25-28-01-01 Multi Latch/Quarter Turn Lug Installations

Interval	Installed	Required	Procedure
C	-	-	

One latch/lug per compartment may be inoperative provided:

- a. Remaining latch(es)/lug(s) on affected compartments operate normally.
 - b. If affected compartment is used for a galley cart, the cart remains empty.
-

25-29-02**Cabin Crew Rest Area Door Lock(s)**

Interval	Installed	Required	Procedure
A	-	0	(M)

May be inoperative provided:

- a. Associated rest area door lock is deactivated in the unlocked position.
- b. Associated rest area door opens and closes normally.
- c. Repairs or replacements are made within six flight days.

NOTE: There is no dispatch with the door removed.

MAINTENANCE (M)

Deactivate the rest area door lock in the unlocked position and confirm the associated door opens and closes normally.

1. On the Thumb Turn side of the lock rotate the Thumb Turn 90 degrees away from the red line on the knob.
2. Secure Thumb Turn in this position with a large yellow INOP sticker (BA/MA_X81-V1 or BA/MA_82-V1) placed over the thumb turn and onto the door knob.
3. Place a small INOP sticker (BA/MA_X80-V1) over the key operated side of the door knob.
4. Check door can be opened without a key from both sides.

OPERATIONS NOTE

In the event of the crew rest door lock being u/s, the cabin crew must include the crew rest area (when unoccupied) in their cabin patrols to ensure that the area is not occupied by any authorised persons and the door is closed.

25-29-03 Flight Crew/Flight Attendant Rest Area(s)

Interval	Installed	Required	Procedure
C	-	0	(M)

May be inoperative provided affected flight crew/flight attendant rest area(s) is empty, locked closed and placarded "INOPERATIVE – DO NOT ENTER".

NOTE: This proviso is not intended to prohibit flight crew/flight attendant rest area(s) inspections by crewmembers.

MAINTENANCE (M)

Deactivate the associated crew/attendant rest area closed.

1. Remove all baggage and personal items from the associated crew/attendant rest.

NOTE: Blankets, pillows and other items normally used the crew rest may remain.

2. Close the associated crew/attendant rest entrance door.
3. Placard rest area entrance door with an INOP decal adjacent to the door handle.

OPERATIONS NOTE

1. The crew/attendant rest is not available for inflight use. Remove personal items and do not enter except for inspections by crewmembers.
2. Ensure Cabin Crew are briefed to maintain periodic checks as per OM B GEN 2.15.18.a, on the affected toilet compartment(s).

25-30-01 Galley/Cabin Waste Receptacle Access Doors/Covers

Interval	Installed	Required	Procedure
C	-	-	(M) (O)

May be inoperative provided:

- a. Associated waste container is empty.
 - b. Receptacle access is secured to prevent waste introduction into the receptacle.
 - c. Procedures are established to ensure that sufficient galley/cabin waste receptacles are available to accommodate all waste that may be generated on a flight.
-

MAINTENANCE (M)

Confirm associated waste receptacles are empty and secure inoperative door/cover to prevent waste introduction.

1. Empty associated waste receptacles and secure inoperative door/cover to prevent waste introduction.

OPERATIONS (O)

A procedure shall be established to ensure adequate galley waste storage capacity is maintained during periods of flight when affected containers are secured empty.

25-40-01 Exterior Lavatory Door Ashtrays

**25-40-01-01 Airplanes With Multiple Exterior Lavatory Door
Ashtrays Installed**

25-40-01-01A Ashtrays Affected: 50% or Less

Interval	Installed	Required	Procedure
A	-	-	

Up to and including 50 percent may be missing or inoperative for 10 days.

25-40-01 Exterior Lavatory Door Ashtrays

**25-40-01-01 Airplanes With Multiple Exterior Lavatory Door
Ashtrays Installed**

25-40-01-01B Ashtrays Affected: More than 50%

Interval	Installed	Required	Procedure
A	-	-	

More than 50 percent may be missing or inoperative for 3 days.

NOTE: Crew lavatories are included in the total aircraft exterior lavatory door ashtray count.

25-40-02 Lavatory Waste Receptacle Access Doors/Covers

Interval	Installed	Required	Procedure
C	-	-	(M)

May be inoperative provided:

- a. Associated waste container is empty.
- b. Receptacle access is secured to prevent waste introduction into the receptacle.
- c. Lavatory is used only by crewmembers.
- d. Associated lavatory entrance door is locked closed and placarded, INOPERATIVE - DO NOT ENTER.

NOTE: These provisions are not intended to prohibit lavatory use or inspections by crewmembers.

MAINTENANCE (M)

Confirm associated waste receptacles are empty and secure inoperative door/cover to prevent waste introduction.

1. Empty associated waste receptacles and secure inoperative door/cover to prevent waste introduction.
2. Close and lock the associated lavatory door and placard: INOPERATIVE - DO NOT ENTER.

OPERATIONS NOTE

Ensure that the affected lavatory is kept locked and is not entered except for use or inspections by crew members.

25-40-04 Interior Lavatory Ashtrays**25-40-04-01 Associated Lavatory Fire Extinguishing System
Operative**

Interval	Installed	Required	Procedure
B	-	0	

One or more may be inoperative or missing provided associated lavatory fire extinguishing system, when installed, is operative.

25-40-04 Interior Lavatory Ashtrays**25-40-04-02 Lavatory Door Locked Closed**

Interval	Installed	Required	Procedure
D	-	0	(M)

One or more may be inoperative or missing provided:

- a. Affected lavatory door is locked closed and placarded, INOPERATIVE – DO NOT ENTER, to prevent passenger entrance,
- b. Affected lavatory is only used by crew members.

NOTE: These provisions are not intended to prohibit lavatory use or inspections by crew members.

MAINTENANCE (M)

1. Ensure interior lavatory ashtray is empty.
2. If inoperative, secure the ashtray in a manner that will prevent waste from being deposited into it.
3. Close and lock the lavatory door and placard: INOPERATIVE – DO NOT ENTER.

OPERATIONS NOTE

Ensure that the affected lavatory is kept locked and is not entered except for use or inspections by crew members.

25-52-01 Lower Cargo Compartment Lining Panels

Interval	Installed	Required	Procedure
C	-	0	(O)

May be damaged or missing provided procedures are established and used to verify the associated cargo compartment remains empty or contains only empty cargo handling equipment, ballast (ballast may be loaded in ULDs), or fly away kits.

MAINTENANCE NOTE

Notify Maintrol that the FWD/AFT cargo compartment must remain empty except for ballast, empty cargo containers (ballast may be loaded in ULDs), fly away kits, pallets, and cargo restraint components.

OPERATIONS (O)

Associated cargo compartments must remain empty except for ballast, empty cargo containers (ballast may be loaded in ULDs), fly away kits, pallets, and cargo restraint components.

25-53-01 Lower Cargo Handling System(s)

Interval	Installed	Required	Procedure
D	2	0	

NOTE: Any portion of system(s) that operates normally may be used.

MAINTENANCE NOTE

Notify Maintrol that the FWD and/or AFT cargo loading system(s) are inoperative.

NOTE: Manual operation features are provided to allow continued loading/unloading should the cargo electrical components become inoperative. Information is provided in the Weight and Balance Manual.

25-54-01 Lower Cargo Restraint Systems**25-54-01A Cargo Compartment Used**

Interval	Installed	Required	Procedure
A	2	0	(M)

May be inoperative or missing provided:

- a. Acceptable cargo loading limits from the Load and Balance Manual are observed,
 - b. Repairs are made prior to completion of the next heavy maintenance visit.
-

MAINTENANCE (M)

If the number of inoperative restraint components exceeds the allowance in the Load and Balance Manual, inform Maintrol that the affected cargo compartment cannot be used.

For restraint components which are allowed to be inoperative by the Load and Balance Manual, inform Maintrol of any loading restrictions.

25-54-01 Lower Cargo Restraint Systems**25-54-01B Cargo Compartment(s) Remains Empty**

Interval	Installed	Required	Procedure
C	2	0	(M)

May be inoperative or missing provided associated cargo compartment remains empty.

MAINTENANCE (M)

Notify Maintrol that the associated cargo compartments must remain empty except for ballast, empty cargo containers (ballast may be loaded in ULDs), fly away kits, pallets, and cargo restraint components.

25-61-01 Flight Crew/Supernumerary Escape Devices**25-61-01-01 Inertial Escape Reels****25-61-01-01-01 Passenger/Combi or Freighter with Draw-Through Smoke Detection System**

Interval	Installed	Required	Procedure
C	-	-	(M) (O)

May be inoperative or missing provided:

- a. The number of flight crewmembers plus supernumeraries is limited to the number of operative escape reels installed.
- b. Inoperative escape reels are removed.

MAINTENANCE (M)

Remove inoperative escape reels.

1. Remove inoperative escape reels (AMM 25-61-01/201).

OPERATIONS (O)

1. Prior to takeoff, supernumeraries and flight crewmembers are briefed on available emergency egress equipment.

[TGL] 25-62-01 Flotation Equipment (Crew and Passenger)

Interval	Installed	Required	Procedure
D	-	-	(M)

Any in excess of the minimum required may be inoperative or missing provided:

- a. Inoperative equipment is placarded inoperative, removed from the installed location and placed out of sight so it cannot be mistaken for a functional unit,
 - b. Required distribution of serviceable life jackets is maintained to ensure a minimum of one per person.
-

MAINTENANCE (M)

Remove from the installed location and place out of sight so it cannot be mistaken for a functional unit.

25-63-01 Emergency Evacuation Signal System

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided:

- a. Alternate procedures are established to initiate an emergency evacuation.
 - b. Cabin attendants are advised that the evacuation signal system is inoperative.
-

OPERATIONS (O)

1. Advise cabin attendants of inoperative emergency evacuation signal system.
2. Consideration for the alternate procedures to initiate an emergency evacuation should include the use of the Public Address system and/or Megaphones.

25-63-02 Megaphones

Interval	Installed	Required	Procedure
D	-	3	(M) (O)

Any in excess of those required may be inoperative or missing provided:

- a. Inoperative megaphone is removed from passenger cabin, or placarded inoperative and secured out of sight in an approved location.
 - b. Installed location is placarded inoperative.
 - c. Required distribution of megaphones is maintained.
 - d. Procedures are established and used to alert crew members of inoperative or missing equipment.
-

MAINTENANCE (M)

Configure the inoperative megaphone to prevent use.

1. Remove the inoperative megaphone from the airplane, or placard it INOPERATIVE and secure it out of sight in an approved location where it will not be used by mistake.
2. Placard the installed location INOPERATIVE.

OPERATIONS (O)

Ensure cabin crew members are alerted to inoperative or missing equipment.

25-63-03 FASTEN SEAT BELT WHILE SEATED Placards

Interval	Installed	Required	Procedure
C	-	-	

One or more placards may be illegible or missing provided a legible placard is visible from each occupied passenger seat.

25-63-04**Cabin Emergency Flashlight Holders/Flashlights*********

Interval	Installed	Required	Procedure
C	-	-	

May be inoperative or missing provided each required crewmember has a flashlight of equivalent characteristics readily available.

[TGL] 25-63-05 Emergency Locator Transmitter (ELT)**25-63-05-01 Survival Type ELTs**

Interval	Installed	Required	Procedure
D	2	0	(M)

Any in excess of the minimum required may be inoperative or missing provided the equipment is placarded inoperative, removed from the installed location and placed out of sight so that it cannot be mistaken for a functional unit.

MAINTENANCE (M)

Placard ELT inoperative and remove ELT from installed location and place out of sight.

OPERATIONS NOTE

Enroute operations that require fixed or portable ELTs may not be conducted. If further guidance required contact FTD LHR (x30455).

[TGL] 25-63-05 Emergency Locator Transmitter (ELT)**25-63-05-02 Fixed ELTs**

25-63-05-02A Required and ELT Deactivated

Interval	Installed	Required	Procedure
A	1	0	(M)

May be inoperative provided repairs or replacements are made within 6 further flights or 25 flying hours, whichever occurs first and enroute operations do not require its use.

MAINTENANCE (M)

Deactivate the inoperative ELT

1. Gain access to the inoperative ELT.
2. Disconnect, cap and stow the associated control/indication electrical connector.
3. Position the ELT's integral control switch to OFF.

OPERATIONS NOTE

Enroute operations that require fixed or portable ELTs may not be conducted. If further guidance required contact FTD LHR (x30455).

[TGL] 25-63-05 Emergency Locator Transmitter (ELT)**25-63-05-02 Fixed ELTs**

25-63-05-02C Not Required and ELT Deactivated

Interval	Installed	Required	Procedure
D	1	0	(M)

Any in excess of those required may be inoperative provided system is deactivated.

MAINTENANCE (M)

Deactivate the inoperative ELT

1. Gain access to the inoperative ELT.
2. Disconnect, cap and stow the associated control/indication electrical connector.
3. Position the ELT's integral control switch to OFF.

OPERATIONS NOTE

Enroute operations that require fixed or portable ELTs may not be conducted. If further guidance required contact FTD LHR (x30455).

[TGL] 25-63-05 Emergency Locator Transmitter (ELT)**25-63-05-02 Automatic ELT (if fitted)**

Interval	Installed	Required	Procedure
A	1	0	

Must be operative for dispatch into Russian Federation airspace.

May be inoperative provided repairs or replacements are made within 6 further flights or 25 flying hours, whichever occurs first and enroute operations do not require its use.

OPERATIONS NOTE

Enroute operations that require fixed or portable ELTs may not be conducted. If further guidance required contact FTD LHR (x30455).

25-64-01 Flexible Smoke Barrier (Passenger/Combi)

Interval	Installed	Required	Procedure
-	1	1	

Must be operating normally.

25-64-02 Emergency Medical Equipment**25-64-02-01 Automatic External Defibrillators (AED) and/or Associated Equipment**

Interval	Installed	Required	Procedure
A	1	0	(O)

May be incomplete, missing, or inoperative provided:

- a. AED is resealed in a manner that will identify it as a unit that can not be mistaken for a fully serviceable unit.
- b. Repairs or replacements are made within 3 flight cycles.

OPERATIONS (O)

AED must be re-sealed with 2 red seals once opened.

25-64-02 Emergency Medical Equipment**25-64-02-02 Emergency BA Medical (M5) Kit (EMK) and/or Associated Equipment****25-64-02-02A Required by FAR**

Interval	Installed	Required	Procedure
A	1	1	(O)

The BA medical kit may be incomplete for a flight to a destination where repairs or replacements can be made provided:

- a. EMK is resealed in a manner that will identify it as a unit that can not be mistaken for a fully serviceable unit.
- b. Repairs or replacements are made within 2 calendar days.

MAINTENANCE NOTE

EMK is supplied fitted with 2 yellow seals; once opened kits are re-sealed with 2 red seals.

OPERATIONS (O)

EMK must be re-sealed with 2 red seals once opened.

25-64-02 Emergency Medical Equipment

25-64-02-03 Basic First Aid (M2) Kit (FAK) and/or Associated Equipment

25-64-02-03A Required

Interval	Installed	Required	Procedure
A	4	-	(O)

If more than one is required, only one of the required first aid kits may be incomplete, missing, or inoperative provided:

- a. FAK is resealed in a manner that will identify it as a unit that can not be mistaken for a fully serviceable unit.
 - b. Repairs or replacements are made within 2 calendar days.

OPERATIONS (O)

NOTE: 3 appropriately sealed kits are required on aircraft with up to 300 seats, and 4 kits for 301 - 400 seats.

FAK must be re-sealed with 2 red seals once opened.

25-64-02 Emergency Medical Equipment

25-64-02-03 First Aid Kit (FAK) and/or Associated Equipment

25-64-02-03B Not Required

Interval	Installed	Required	Procedure
D	-	-	

Any in excess of those required may be incomplete, missing, or inoperative.

OPERATIONS NOTE

3 appropriately sealed kits are required on aircraft with up to 300 seats, and 4 kits for 301 - 400 seats.

25-65-01

Passenger Restraint Kit

Interval	Installed	Required	Procedure
D	2	1	

No dispatch Main Maintenance base. One passenger restraint pack may be incomplete or missing.

26-11-01 Engine Fire Detector Systems**26-11-01-01 Detection Loop**

Interval	Installed	Required	Procedure
C	8	4	

One loop per engine may be inoperative.

26-11-01 Engine Fire Detector Systems**26-11-01-02 Flight Deck Test System**

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided an alternate procedure is established to assure system integrity.

MAINTENANCE (M)

Verify integrity using alternate procedure.

1. Perform the AMM Ground Test - Fire System (AMM 26-11-00/501).

26-11-04 Fuel Control Switch Fire Light

Interval	Installed	Required	Procedure
A	4	3	

One may be inoperative provided flight does not exceed three flight days before repairs are made.

26-12-01 Engine Strut Overheat Detection Systems (RR)
26-12-01-01 Detection Loop

Interval	Installed	Required	Procedure
C	8	4	

One loop per engine strut may be inoperative.

26-13-01 Lavatory Smoke Detection Systems**26-13-01A Lavatory Used Only By Crewmembers**

Interval	Installed	Required	Procedure
C	-	-	(M) (O)

For each lavatory, may be inoperative provided:

- a. Lavatory waste receptacle is empty.
- b. Associated lavatory door is locked closed and placarded, INOPERATIVE - DO NOT ENTER.
- c. Lavatory is used only by crewmembers.

NOTE: These provisos are not intended to prohibit lavatory use or inspections by crewmembers.

MAINTENANCE (M)

Deactivate the associated lavatory.

1. Confirm associated lavatory waste receptacle in the waste container is empty.
2. Close and lock the associated lavatory door.
3. Placard associated lavatory door INOPERATIVE-DO NOT ENTER.

OPERATIONS (O)

1. Lavatory door should remain locked closed, except for use or inspections by crewmembers.
2. Ensure Cabin Crew are briefed to maintain periodic checks as per OMB GEN, on the affected toilet compartment(s)

26-13-02 Galley 4 IFE Smoke Detection System

Interval	Installed	Required	Procedure
A	1	0	(M)

May be inoperative provided:

- a. Repairs are made within 3 days or prior to Main Base departure whichever is earlier.
 - b. IFE Power Switch is selected OFF and placarded.
-

MAINTENANCE (M)

Select the IFE Power Switch on the CSD Panel to OFF.

26-14-02 Crew Rest Area Smoke Detection System (Door 5 and Zone F)

26-14-02-01 Ionization Type Detectors**26-14-02-01-01 Passenger/Combi**

Interval	Installed	Required	Procedure
C	-	0	(M) (O)

May be inoperative provided:

- a. Crew rest area is empty.
 - b. Crew rest area door is locked closed and placarded, INOPERATIVE - DO NOT ENTER.
 - c. Crew rest area is not used for any purpose.
-

MAINTENANCE (M)

Associated crew rest area is emptied and locked closed.

1. Remove all baggage and personal items from the associated crew rest.
NOTE: Blankets, pillows and other items normally used in the crew rest may remain.
2. Close, lock and placard the associated crew rest entrance door INOPERATIVE - DO NOT ENTER.
3. Notify Maintrol that associated crew rest area is not available for in-flight use.

OPERATIONS (O)

1. The associated crew rest area is not available for inflight use and personal items are removed.
2. Brief Cabin Crew that crew rest area is not to be entered except to inspect it.

26-14-03 CARGO DET AIR Indicating System (Main Deck/Lower Lobe) (Passenger, Combi and Freighter with Draw-Through Smoke Detection System)

26-14-03A Cargo Carried

Interval	Installed	Required	Procedure
C	-	-	(M)

Indication(s) for associated cargo areas may be inoperative provided associated smoke sampling system integrity is verified before each departure.

MAINTENANCE (M)

Verify the integrity of smoke sampling system prior to each departure.

For Passenger and Combi:

1. Supply pneumatic pressure in the center crossover duct (AMM 36-00-00/2011).
2. For the CGO DET AIR LWR status message, gain access to the forward-most port in fwd lower lobe cargo compartment and aft-most port in aft lower lobe cargo compartment (AMM 26-16-00/Smoke Sampling Port Air Flow Test).
3. Use one of the following methods at the smoke sampling orifices associated with the status message:
 - A. Method 1 - Use a hot wire anemometer and adapter (AMM 26-16-00/Smoke Sampling Port Air Flow Test) and verify at least 150 fpm velocity airflow through the smoke sampling orifices.
 - B. Method 2 - Apply smoke adjacent to the forward and aft detection orifices (one at a time) from an available smoke generating source and verify the flight deck fire warning bell sounds off and the associated warning message displays.

26-14-03 CARGO DET AIR Indicating System (Main Deck/Lower Lobe) (Passenger, Combi and Freighter with Draw-Through Smoke Detection System)

26-14-03B Cargo Compartment Empty

Interval	Installed	Required	Procedure
C	-	-	(O)

Indication(s) for associated cargo areas may be inoperative provided:

- a. Procedures are established and used to verify associated lower lobe cargo compartment remains empty or contains only empty cargo handling equipment, ballast (ballast may be loaded in ULDs), or fly away kits.
-

MAINTENANCE NOTE

Advise Maintrol that the associated cargo compartment must remain empty, except for ballast, empty cargo containers (ballast may be loaded in ULDs), fly away kits, pallets, and cargo restraint components.

OPERATIONS (O)

Associated cargo compartment must remain empty, except for ballast, empty cargo containers (ballast may be loaded in ULDs), fly away kits, pallets, and cargo restraint components.

26-15-01 APU Fire Detection System**26-15-01-01 Detection Loop****26-15-01-01A One Inoperative**

Interval	Installed	Required	Procedure
C	2	1	

26-15-01 APU Fire Detection System**26-15-01-01 Detection Loop****26-15-01-01B Both Inoperative - APU Used On Ground**

Interval	Installed	Required	Procedure
C	2	0	(O)

Both loops may be inoperative provided:

- a. APU is used for ground operations only, and is continuously monitored.
- b. APU external control system operates normally.
- c. APU is shut down before taxi.

OPERATIONS (O)

1. The APU is only used for ground operations prior to taxi and must be continuously visually monitored by an exterior observer.
2. If an APU fire is observed, the APU fire extinguisher must be manually discharged using either the right main wheel well APU Fire Shutdown controls or the flight deck overhead panel (P5) APU Fire Discharge handle.

26-15-01 APU Fire Detection System**26-15-01-02 Flight Deck Test System**

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided an alternate procedure is established to ensure integrity of the system.

MAINTENANCE (M)

Verify the APU fire detection system operates normally.

1. Perform the AMM APU Operational Test Using the CMC (AMM 26-15-00/501).

2. Verify PASS is indicated.

NOTE: The indication FAIL is allowed with one or both APU Fire Detection Loops (APU FIRE LOOP-_ FAIL) inoperative provided airplane is also dispatched using [MEL item 26-15-01-01A](#) or [MEL item 26-15-01-01B](#).

26-16-01 Lower Lobe Cargo Compartment Smoke Detection System (Forward, Aft)**26-16-01-01 Flight Deck Test System****26-16-01-01A Cargo Carried**

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided smoke detector system integrity is verified before each departure.

MAINTENANCE (M)

Verify integrity of lower cargo smoke detection system before each departure.

1. Perform the AMM Cargo Detector Operational Test using the CMC (AMM 26-16-00/501).
2. Verify PASS is indicated.

26-16-01 Lower Lobe Cargo Compartment Smoke Detection System (Forward, Aft)**26-16-01-01 Flight Deck Test System****26-16-01-01B Cargo Compartment Empty**

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided procedures are established and used to verify the associated cargo compartments remain empty or contains only empty cargo handling equipment, ballast (ballast may be loaded in ULDs), or fly away kits.

OPERATIONS (O)

Associated cargo compartment must remain empty, except for ballast, empty cargo containers (ballast may be loaded in ULDs), fly away kits, pallets, and cargo restraint components.

26-16-01 Lower Lobe Cargo Compartment Smoke Detection System (Forward, Aft)

26-16-01-02 Detectors

26-16-01-02-01 Passenger, Combi and Freighter with Draw-Through Smoke Detection System

26-16-01-02-01A Cargo Carried

Interval	Installed	Required	Procedure
C	-	-	(M) (O)

One detector (loop A or B) per smoke zone may be inoperative provided remaining detector is verified to operate normally before each departure.

MAINTENANCE (M)

If desired, deactivate inoperative smoke detector by removing and stowing the electrical connector.

OPERATIONS (O)

Prior to each departure, verify the remaining smoke detector operates normally.

For RR:

1. Push and hold the ENG/APU/CARGO button on the flight deck FIRE/OVHT TEST overhead panel.
2. Verify proper system indications followed by EICAS >FIRE TEST PASS message.
3. Release the ENG/APU/CARGO button.

26-16-01 Lower Lobe Cargo Compartment Smoke Detection System (Forward, Aft)

26-16-01-02 Detectors

26-16-01-02-01 Passenger, Combi and Freighter with Draw-Through Smoke Detection System

26-16-01-02-01B Cargo Compartment Empty

Interval	Installed	Required	Procedure
C	-	0	(O)

Both detectors (loops A and B) per smoke zone may be inoperative provided procedures are established and used to verify the associated cargo compartment remains empty or contains only empty cargo handling equipment, ballast (ballast may be loaded in ULDs), or fly away kits.

OPERATIONS (O)

Associated cargo compartment must remain empty, except for ballast, empty cargo containers (ballast may be loaded in ULDs), fly away kits, pallets, and cargo restraint components.

26-16-01 Lower Lobe Cargo Compartment Smoke Detection System (Forward, Aft)

26-16-01-03 Draw Through Tube Heaters

Interval	Installed	Required	Procedure
D	-	0	

26-17-01 Wheel Well Fire Detection System**26-17-01A BTMS Inoperative**

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative deactivated provided brakes are verified cool to the touch before engine start.

MAINTENANCE (M)

Deactivate the wheel well fire detection system and verify brakes are cool to the touch.

1. Open and collar the P6 panel W/W FIRE DET AC circuit breaker.
2. Before each engine start, confirm the brakes are cool to the touch by carefully touching each wheel brake.

OPERATIONS (O)

1. After takeoff, avoid the possibility of retracting a wheel overheated from dragging brakes by leaving landing gear extended for ten minutes.
2. For engine failure after V1, retract landing gear until takeoff obstacles are cleared, then extend for a ten minute cooling period.
3. Pilots must consider the effects associated with delayed raising of the landing gear during winter operations from contaminated runways.

26-17-01 Wheel Well Fire Detection System**26-17-01B BTMS Operative**

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative deactivated provided brakes are verified cool by monitoring brake temperature indications before engine start.

MAINTENANCE (M)

Deactivate the wheel well fire detection system.

1. Open and collar the P6 panel W/W FIRE DET AC circuit breaker.

OPERATIONS (O)

1. Verify brakes are cool before engine start by monitoring brake temperature indications.
 - A. Select the Gear Synoptic on the Secondary EICAS Display.
 - B. Ensure Brake Temperature Indications for all brakes are at level one (1) or zero (0).

-
2. After takeoff, avoid the possibility of retracting a wheel overheated from dragging brakes by monitoring brake temperature indications before gear retraction.
 3. For engine failure after V1, retract landing gear until takeoff obstacles are cleared, then extend for a ten minute cooling period.
 4. Pilots must consider the effects associated with delayed raising of the landing gear during winter operations from contaminated runways.
-

26-17-01 Wheel Well Fire Detection System**26-17-01-01 Flight Deck Test System**

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided an alternate procedure is established to ensure integrity of the system.

MAINTENANCE (M)

Verify integrity of wheel well fire detection system.

1. Perform the AMM wheel well overheat detection system Operational Test using the CMC (AMM 26-17-00/501).
2. Verify PASS is indicated.

26-18-01 Wing Leading Edge Overheat Detection System**26-18-01-01 Dual Loop System**

26-18-01-01-01 Loops

Interval	Installed	Required	Procedure
C	4	2	

One loop in each wing may be inoperative provided the remaining loop(s) operates normally.

26-18-01 Wing Leading Edge Overheat Detection System**26-18-01-02 Flight Deck Test System**

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided an alternate procedure is established to ensure integrity of the system.

MAINTENANCE (M)

Verify integrity of the wing leading edge overheat detection system.

1. Perform the AMM duct leak detection system Operational Test using the CMC (AMM 26-18-00/501).
2. Verify PASS is indicated.

26-18-02 Center Duct Leak Detection Systems

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided alternate procedures are established and used.

OPERATIONS (O)

NOTE: The associated EICAS caution BLD DUCT LEAK C and status BLD DUCT LEAK C, DUCT LEAK C LP A and DUCT LEAK C LP B messages may remain displayed following engine start.

Use the following modified CABIN ALTITUDE (RAPID DEPRESSURIZATION) Non-Normal Checklist:

CABIN ALTITUDE (RAPID DEPRESSURIZATION)

(Center Duct Leak Detection System Inoperative)

Condition: Cabin altitude exceeds 10,000 feet.

OXYGEN MASKS	ON
CREW COMMUNICATIONS	ESTABLISH
ISOLATION VALVE SWITCHES (Both)	OFF
CABIN ALTITUDE AND RATE	CHECK [Confirms pressurization problem.]
If cabin altitude uncontrollable:	
PASSENGER OXYGEN SWITCH	ON [Backs up automatic activation of the passenger oxygen system.]
DESCENT	ACCOMPLISH Without delay, close thrust levers, extend speedbrakes, and descend at VMO/MMO. Level off at lowest safe altitude or 10,000 feet /14,000 feet (as designated in operator's FCOM), whichever is higher.
If structural integrity is in doubt, limit airspeed and avoid high maneuvering loads.	

If cabin altitude can be controlled and both duct pressures remain normal:

PACK 2 CONTROL SELECTOR

OFF

If cabin altitude can be controlled and one duct pressure remains low:

ENGINE BLEED AIR SWITCHES (Affected side)

OFF

ISOLATION VALVE SWITCH (Unaffected side) ON
 PACK CONTROL SELECTOR (Affected side) OFF
 HYDRAULIC DEMAND PUMP 1 OR 4
 SELECTOR (Affected side) OFF
 Do not use wing anti-ice.

For RR:

Sufficient bleed air may not be available for nacelle anti-ice if N1 less than 60% at or above 10,000 feet or less than 55% below 10,000 feet.

Do not accomplish the following checklists:

BLEED OFF
 HYD PRESS DEM 1 OR 4 (Affected side)

LANDING PREPARATION:

LE flaps operate in secondary mode. Allow time during approach for secondary flap operation

PACK CONTROL SELECTORS SET
 Maximum one pack on.
 [Maintains bleed air extraction within limits.]

FLAPS EXTEND OR RETRACT AS REQUIRED

Do not accomplish the following checklists:

FLAPS PRIMARY

Note: A temporary LE flap asymmetry, accompanied by a mild rolling moment, results when LE flaps are extended or retracted.

26-18-02 Center Duct Leak Detection Systems
*****26-18-02-01 Dual Loop System****26-18-02-01-01 Loops**

Interval	Installed	Required	Procedure
C	2	1	

NOTE: Aircraft NLA to NLM have a single loop detection system. Aircraft NLN and onwards have a dual loop detector system.

26-18-02 Center Duct Leak Detection Systems
*****26-18-02-02 Flight Deck Test System**

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided the Flight Deck Test System integrity is verified serviceable using the CMC test procedure.

MAINTENANCE (M)

Verify integrity of the center duct leak detection system.

1. Perform the AMM duct leak detection system Operational Test using the CMC (AMM 26-18-00/501).
2. Verify PASS is indicated.

26-19-01 APU Duct Leak Detection System

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided APU selector switch remains OFF.

OPERATIONS (O)

1. To facilitate engine starting when the APU generator systems are unavailable, it is recommended to select all fuel pumps and R UTILITY power switch OFF prior to engine start. If engines cannot be started due to insufficient external power, also select L UTILITY power switch OFF. Select fuel pumps as required for each individual engine start. Utility power can be restored and the fuel panel correctly configured after completion of the engine start procedure.

NOTE 1: Removing power from both utility busses results in loss of cabin lighting except for passengers signs and night lighting. At night, to prepare cabin lighting before removing power from the utility busses, instruct the cabin crew to turn on cabin night lighting.

NOTE 2: Utility Bus equipment are listed in MEL item 24-56-01.

2. For EE CLNG SUP FAN status message displayed, it can be cleared by rotating the EQUIP COOLING switch to OVRD, then back to NORM.
3. For any RECIRC FAN UPR or LWR status message displayed, momentarily depress the PACK RST switch until each has cleared.
4. Advisory message APU may be displayed.

26-20-01 Fire Bottle Pressure Indication Systems (Engine, Lower Cargo, Main Deck Cargo, APU)

Interval	Installed	Required	Procedure
C	-	0	(M)

May be inoperative provided:

- a. Squib test is used to verify squib integrity.
- b. Procedure is used to verify that the associated bottle is full.

NOTE: Not required for inoperative APU, main deck cargo or lower cargo fire extinguisher system.

MAINTENANCE (M)

NOTE: This MEL item includes associated lights and messages.

Verify the squib integrity and that associated bottle is full.

1. Verify squib integrity.
 - A. Push and hold SQUIB TEST, TEST 1 button, M7327 squib test module on P461 pilot's overhead maintenance panel.
 - B. Observe that following indicating lights on M7327 illuminate (green):
 - 1) All ENG 1, 2, 3, and 4 squib test lights.
 - 2) All CARGO squib test lights (LOWER CARGO on combi airplanes).
 - 3) The APU squib test light.
 - C. Release the SQUIB TEST, TEST 1 button.
 - D. Observe that all squib test indicating lights extinguish.
 - E. Push and hold SQUIB TEST, TEST 2 button, M7327 squib test module on P461 pilot's overhead maintenance panel.
 - F. Observe the following indicating lights on M7327 illuminate (green):
 - 1) All ENG 1, 2, 3, and 4 squib test lights.
 - 2) All CARGO squib test lights (LOWER CARGO on combi airplanes).
 - 3) The APU squib test light.
 - G. Release the SQUIB TEST, TEST 2 button.
 - H. Observe that all squib test indicating lights extinguish.
 - I. Remove electrical power if no longer required (AMM 24-22-00/201).
2. Verify the associated bottle is full.
 - A. Perform the following tests:
 - 1) ENGINE Pressure Switch Test - System Test (AMM 26-21-00/501).
 - 2) APU Pressure Switch Test - System Test (AMM 26-22-00/501).

- 3) LOWER CARGO Pressure Switch Test - System Test (AMM 26-23-00/501).
- B. If above tests fail, remove and weigh the bottle.
 - 1) ENGINE (AMM 26-21-03/401 and AMM 26-21-03/601).
 - 2) APU (AMM 26-22-01/401 and AMM 26-22-01/601).
 - 3) LOWER CARGO (AMM 26-23-01/401 and AMM 26-23-01/601).
 - 4) Disconnect, cap and stow the associated bottle Pressure Switch connector after serviceable bottle weight is confirmed.

26-21-01 Fire Extinguisher Squib Test (Engine, APU, Lower Cargo, Main Deck)

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided it is verified that the failure is in the light circuit.

MAINTENANCE (M)

Verify the squib discharge circuit operates normally.

1. Perform the Squib Discharge Circuit Test for the following systems:
 - A. Engine Fire Extinguishing System (AMM 26-21-00/501).
 - B. APU Fire Extinguishing System (AMM 26-22-00/501).
 - C. Lower Cargo Compartment Fire Extinguishing System (AMM 26-23-00/501).

26-21-01 Fire Extinguisher Squib Test (Engine, APU, Lower Cargo, Main Deck)**26-21-01-01 Lower Cargo and Main Deck Squib Test System**

Interval	Installed	Required	Procedure
C	2	0	(O)

May be inoperative provided procedures are established and used to verify the associated cargo compartment remains empty or contains only empty cargo handling equipment, ballast (ballast may be loaded in ULDs), or fly away kits.

MAINTENANCE NOTE

Inform Maintrol associated Cargo Compartment must remain empty except for ballast, empty cargo containers (ballast may be loaded in ULDs), fly away kits, pallets, and cargo restraint components.

OPERATIONS (O)

Associated cargo compartment must remain empty, except for ballast, empty cargo containers (ballast may be loaded in ULDs), fly away kits, pallets, and cargo restraint components.

26-21-01 Fire Extinguisher Squib Test (Engine, APU, Lower Cargo, Main Deck)

26-21-01-02 APU Squib Test System

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided APU is not used.

OPERATIONS (O)

1. To facilitate engine starting when the APU generator systems are unavailable, it is recommended that, prior to engine start, all fuel pumps and R UTILITY power switch is selected OFF. If engines cannot be started due to insufficient external power, select L UTILITY power switch OFF also. Select fuel pumps as required for each individual engine start. Utility power can be restored and the fuel panel correctly configured after completion of the engine start procedure.

NOTE 1: Removing power from both utility busses results in loss of cabin lighting except for passenger signs and night lighting. At night, to prepare cabin lighting before removing power from the utility busses, instruct the cabin crew to turn on cabin night lighting.

NOTE 2: Utility Bus equipment are listed in MEL item 24-56-01.

2. If EE CLNG SUP FAN status message is displayed, it can be cleared by rotating the EQUIP COOLING switch to OVRD, then back to NORM.
3. If any RECIRC FAN UPR or LWR status message is displayed, momentarily depress the PACK RST switch until each has cleared.

26-22-01 APU Fire Extinguisher System

Interval	Installed	Required	Procedure
C	-	0	(M) (O)

May be inoperative provided:

- a. APU is not used.
- b. APU fuel valve is secured closed.

MAINTENANCE (M)

Secure the APU fuel valve closed.

1. Position overhead panel (P5) APU master switch OFF.
2. Gain access to the APU fuel valve in left wing gear wheel well, rear wing spar.
3. Manually position APU fuel valve override lever to CLOSED position.

OPERATIONS (O)

1. To facilitate engine starting when the APU generator systems are unavailable, it is recommended to select all fuel pumps and R UTILITY power switch OFF prior to engine start. If engines cannot be started due to insufficient external power, also select L UTILITY power switch OFF. Select fuel pumps as required for each individual engine start. Utility power can be restored and the fuel panel correctly configured after completion of the engine start procedure.

NOTE 1: Removing power from both utility busses results in loss of cabin lighting except for passenger signs and night lighting. At night, to prepare cabin lighting before removing power from the utility busses, instruct the cabin crew to turn on cabin night lighting.

NOTE 2: Utility Bus equipment are listed in MEL item 24-56-01.

2. If EE CLNG SUP FAN status message is displayed, it can be cleared by rotating the EQUIP COOLING switch to OVRD, then back to NORM.
3. If any RECIRC FAN UPR or LWR status message is displayed, momentarily depress the PACK RST switch until each has cleared.

26-22-01 APU Fire Extinguisher System**26-22-01-01 APU Auto Discharge**

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided the APU controls at the wheel well or flight deck are monitored by a qualified operator at all times when the APU is used during ground operations.

MAINTENANCE (M)

Monitor APU use during ground operations.

1. Provide electrical power (AMM 24-22-00/201).
2. For APU controls monitored from Flight Deck, an APU fire is indicated when the APU fire switch handle (M7326) red warning light illuminates.
3. For APU controls monitored from Wheel Well, an APU fire is indicated when the red APU FIRE light on M869 APU shutdown module illuminates.

26-23-01 Lower Cargo Compartment Fire Extinguisher System
**26-23-01-01 Passenger/Combi and Freighter with Draw-Through
Smoke Detection System**

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative provided:

- a. Procedures are established and used to verify the lower cargo compartments remain empty or contain only empty cargo handling equipment, ballast (ballast may be loaded in ULDs), or fly away kits.

MAINTENANCE (M)

1. Deactivate lower cargo smoke detection system by opening and collaring the P7 CAR SMK DET LWR A and CAR SMK DET LWR B circuit breakers.
 2. Inform Maintrol that lower cargo compartments remain empty or contain only empty cargo handling equipment, ballast (ballast may be loaded in ULDs), or fly away kits.

OPERATIONS (O)

1. Lower cargo compartments must remain empty, except for ballast, empty cargo containers (ballast may be loaded in ULDs), fly away kits, pallets, and cargo restraint components.

26-23-01 Lower Cargo Compartment Fire Extinguisher System

26-23-01-03 Four Bottle System, Bottles C & D

26-23-01-03A One Inoperative

Interval	Installed	Required	Procedure
C	2	1	(O)

One bottle and associated indications may be inoperative provided:

- a. Airplane is operated pressurized.
 - b. Flight remains within 90 minutes of landing at a suitable airport.

OPERATIONS (O)

For Passenger and Freighter:

1. Remain within 90 minutes of a suitable landing field.

-
- 26-23-01 Lower Cargo Compartment Fire Extinguisher System**
- 26-23-01-03 Four Bottle System, Bottles C & D**
- 26-23-01-03B Both Inoperative**

Interval	Installed	Required	Procedure
C	2	0	(O)

Both bottles and associated indications may be inoperative provided:

- a. Airplane is operated pressurized.
 - b. Flight remains within 30 minutes of landing at a suitable airport.
-

OPERATIONS (O)

For Passenger and Freighter:

1. Remain within 30 minutes of a suitable landing field.

Section 2

26-24-02 Lavatory Fire Extinguisher Systems
26-24-02A Smoke Detection System Operative

Interval	Installed	Required	Procedure
C	-	-	

For each lavatory, the lavatory fire extinguisher system may be inoperative provided Lavatory Smoke Detection system operates normally.

MAINTENANCE NOTE

Perform lavatory smoke detection system operational test (AMM 26-13-00/501).

26-24-02 Lavatory Fire Extinguisher Systems
26-24-02B Smoke Detection System Inoperative

Interval	Installed	Required	Procedure
C	-	0	(M) (O)

For each lavatory, the lavatory fire extinguisher system may be inoperative provided:

- a. Lavatory waste receptacle is empty.
 - b. Associated lavatory door is locked closed and placarded INOPERATIVE - DO NOT ENTER.
 - c. Lavatory is used only by crewmembers.

NOTE: These provisos are not intended to prohibit lavatory use or inspections by crewmembers.

MAINTENANCE (M)

Deactivate the associated lavatory.

1. Check that associated lavatory waste receptacle is empty.
 2. Close and lock associated lavatory door and placard INOPERATIVE - DO NOT ENTER.

OPERATIONS (O)

1. Lavatory door should remain locked closed, except for use or inspection by crewmembers.
 2. Ensure Cabin Crew are briefed to maintain periodic checks as per OM B GEN, on the affected toilet compartment(s).

26-26-01 Portable Fire Extinguishers

Interval	Installed	Required	Procedure
D	-	-	(M)

May be inoperative provided the inoperative fire extinguisher is tagged inoperative, removed from the installed location, and placed out of sight so it can not be mistaken for a functional unit, and

- a. Flight Deck has 1 serviceable BCF extinguisher,
 - b. Upper Deck has 1 serviceable BCF and 1 serviceable water glycol extinguisher adjacent to the galley area plus 1 serviceable BCF extinguisher at the Upper Deck doors,
 - c. Main Deck has not less than five serviceable extinguishers, at least two of which must be BCF, and
 - d. Crew Rest Area (Door 5) – 1 serviceable BCF extinguisher.
-

MAINTENANCE (M)

1. Stow an unserviceable extinguisher in a place, (possibly in a bag) where it will not be used by mistake, until it can be removed at the next available maintenance base.
2. Ensure required distribution of serviceable extinguishers is maintained throughout the airplane.

OPERATIONS NOTE

Inform cabin crew of locations of inoperative or missing fire extinguishers.

27-11-01 Aileron Trim System

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided aileron trim system is verified to be centered.

NOTE 1: The terminology 'aileron trim system is verified to be centered' is not intended to imply any particular tolerance. The intent is that the system be centered to the extent that it is acceptable to the pilot. A tolerance of +/- 1.0 unit of trim should normally make it acceptable; however determination of this tolerance is left up to operator policy or to the individual pilot.

NOTE 2: Following initial Maintenance Procedure, Flight Crew will verify the aileron trim system is centred during normal pre-flight checks – confirm that control wheels are essentially centred.

MAINTENANCE (M)

Center and deactivate the aileron trim system.

1. For aileron trim centered (control wheels at +/- 1.0 unit of trim), open and collar the P7 panel AILERON TRIM CONTROL circuit breaker.
2. For trim system not centered (control wheels not at +/- 1.0 unit of trim), replace the trim actuator with a dummy link to maintain a centered system.
 - A. Open and collar the P7 panel AILERON TRIM CONTROL circuit breaker.
 - B. Gain access to aileron trim actuator (AMM 27-11-06/201).
 - C. Disconnect, cap and stow electrical connector DM254 from trim actuator.
 - D. Remove trim actuator.
 - E. Install dummy link A27088-18 (Boeing Tool) using bolts, washers, nuts and cotter pins from trim actuator.
 - F. Confirm aileron trim is centered (control wheels at +/- 1.0 unit of trim).

27-11-02 Outboard Aileron Lockout System**27-11-02-01 747-400 and 747-400F**

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative unlocked provided maximum airspeed limit is 225 KIAS or 0.73 Mach, whichever is less.

MAINTENANCE (M)

Confirm the outboard ailerons are unlocked.

1. Display the flight controls synoptic page to view the position of the outboard ailerons.
2. Open and collar the P7 panel OUTBD AIL LOCKOUT circuit breaker.
3. Supply pressure to hydraulic systems 1, 2, 3 and 4.
4. Rotate either control wheel to the left and confirm the outboard ailerons move freely.
5. Rotate either control wheel to the right and confirm the outboard ailerons move freely.

OPERATIONS (O)

1. Observe speed limit of 225 KIAS/0.73 Mach.
2. Maximum takeoff weight is limited to 250,000 kg.
3. Flaps up maneuver speed should be selected at VREF + 80 kt (or 225 KIAS maximum)

27-11-02 Outboard Aileron Lockout System**27-11-02-04 Indication System**

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided the aileron lockout system is verified to operate normally before each departure.

MAINTENANCE (M)

Verify the aileron lockout system function operates normally before each departure.

1. Display the flight controls synoptic page to view the position of the outboard ailerons.

-
2. Perform an Aileron Lockout System Existing Faults Check (AMM 27-11-00/501) including the mechanical operation check (requires hydraulic power).
 - A. Confirm the outboard ailerons return to the neutral position during the lockout portion of the CMC test.
 - B. Following the test, confirm the outboard ailerons move freely.

NOTE: The CMC test will indicate FAIL due to the inoperative indication system. Dispatch with the indication system inoperative is allowed provided the lockout function operated normally during the test.

27-18-01 Aileron Position Indicating System

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided visual confirmation of proper aileron movement is made before each departure.

MAINTENANCE (M)

Before each departure visually confirm proper aileron movement.

NOTE: Full control wheel input will result in inboard aileron deflection approximately 20° up or down and outboard aileron deflection approximately 25° up or 15° down. Measurement is not required.

1. Establish communications between flight deck and ground.
2. Position control wheel full left and confirm with ground that left ailerons are up and right ailerons are down.
3. Position control wheel full right and confirm with ground that left ailerons are down and right ailerons are up.

27-21-01 Rudder Trim System**27-21-01-01 Trim Switch Speed Positions**

Interval	Installed	Required	Procedure
C	2	1	

NOTE: This item provides relief for the high speed trim function of the optional 2-speed rudder trim control system. The low speed function must operate normally.

OPERATIONS NOTE

The high speed trim function may be inoperative, this is the second pressure position of the rudder trim switch. The low speed function must operate normally.

27-23-01 Flight Control Shutoff Switch Lights

Interval	Installed	Required	Procedure
C	8	6	(M)

One per axis may be inoperative provided the associated valve position is verified open before each departure.

MAINTENANCE (M)

Before each departure verify the associated flight control hydraulic valve is open.

NOTE: "One per axis" means only one VALVE CLOSED light for the TAIL (upper row) and one for the WING (lower row) may be inoperative.

1. For wing hydraulic shutoff valve, system 1, confirm the P180 panel SYS 1 LATL CONT VALVE circuit breaker is closed.
2. For wing hydraulic shutoff valve, system 2, confirm the P180 panel SYS 2 LATL CONT VALVE circuit breaker is closed.
3. For wing hydraulic shutoff valve, system 3, confirm the P180 panel SYS 3 LATL CONT VALVE circuit breaker is closed.
4. For wing hydraulic shutoff valve, system 4, confirm the P180 panel SYS 4 LATL CONT VALVE circuit breaker is closed.
5. For rudder and elevator hydraulic shutoff valve, system 1, confirm the P180 panel SYS 1 ELEV/RUD VALVE circuit breaker is closed.
6. For rudder and elevator hydraulic shutoff valve, system 2, confirm the P180 panel SYS 2 ELEV/RUD VALVE circuit breaker is closed.
7. For rudder and elevator hydraulic shutoff valve, system 3, confirm the P180 panel SYS 3 ELEV/RUD VALVE circuit breaker is closed.
8. For rudder and elevator hydraulic shutoff valve, system 4, confirm the P180 panel SYS 4 ELEV/RUD VALVE circuit breaker is closed.
9. Position pilot's overhead maintenance panel (P461) FLT CONTROL HYD POWER switches NORM.
10. Gain access to the associated valve (AMM 27-13-01/401, 27-23-01/401).
11. Confirm the visual indicator lever on the associated shutoff valve motor is in the valve open position (POS 2).

27-23-02 Hydraulic Flight Control Valves

Interval	Installed	Required	Procedure
C	8	0	(M)

May be inoperative open.

MAINTENANCE (M)

Deactivate the associated flight control shutoff valve open.

1. For wing hydraulic shutoff valve, system 1, open and collar the P180 panel SYS 1 LATL CONT VALVE circuit breaker.
2. For wing hydraulic shutoff valve, system 2, open and collar the P180 panel SYS 2 LATL CONT VALVE circuit breaker.
3. For wing hydraulic shutoff valve, system 3, open and collar the P180 panel SYS 3 LATL CONT VALVE circuit breaker.
4. For wing hydraulic shutoff valve, system 4, open and collar the P180 panel SYS 4 LATL CONT VALVE circuit breaker.
5. For rudder and elevator hydraulic shutoff valve, system 1, open and collar the P180 panel SYS 1 ELEV/RUD VALVE circuit breaker.
6. For rudder and elevator hydraulic shutoff valve, system 2, open and collar the P180 panel SYS 2 ELEV/RUD VALVE circuit breaker.
7. For rudder and elevator hydraulic shutoff valve, system 3, open and collar the P180 panel SYS 3 ELEV/RUD VALVE circuit breaker.
8. For rudder and elevator hydraulic shutoff valve, system 4, open and collar the P180 panel SYS 4 ELEV/RUD VALVE circuit breaker.
9. Position pilot's overhead maintenance panel (P461) FLT CONTROL HYD POWER switches NORM.
10. Gain access to the associated valve (AMM 27-13-01/401 or 27-23-01/401).
11. Manually move the inoperative shutoff valve indicator lever to the valve open position (POS 2) and lockwire
12. Confirm the associated VALVE CLOSED indicator light is off on Pilot's Overhead Maintenance Panel (P461).

27-28-01 Rudder Position Indicating System

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided visual confirmation of proper rudder movement is made before each departure.

MAINTENANCE (M)

Before each departure visually confirm proper rudder movement.

NOTE: Full rudder pedal input will result in rudder deflection of 31.5 degrees, left and right. Measurement is not required.

1. Establish communications between flight deck and ground.
2. Position rudder pedal full left and confirm with ground that both upper and lower rudder deflect full left.
3. Position rudder pedal full right and confirm with ground that both upper and lower rudder deflect full right.

27-28-02 Rudder Trim Indicator

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided rudder trim is verified centered before each departure.

MAINTENANCE NOTE

Before each departure verify the rudder trim is centered.

1. Select STAT on the EICAS display select panel to display the flight controls position indications on secondary EICAS.
2. Rotate the aisle stand rudder trim control to NOSE LEFT.
 - A. Confirm on both Captain's and First Officer's sides, left rudder pedals move forward and right rudder pedals move aft.
 - B. Confirm that rudder position indications (upper and lower) on secondary EICAS indicate rudder moving to left.
3. Rotate the aisle stand rudder trim control to NOSE RIGHT.
 - A. Confirm on both Captain's and First Officer's sides, left rudder pedals move aft and right rudder pedals move forward.
 - B. Confirm that rudder position indications (upper and lower) on secondary EICAS indicate rudder moving to right.
4. Return rudder trim to neutral position by rotating the rudder trim control as required until rudder pedals are aligned together and rudder position indication on EICAS shows rudder (upper and lower) centered.

OPERATIONS (O)

Before each departure, confirm rudder trim is centered.

1. Confirm the rudder pedals are evenly aligned.
2. Confirm the rudder position indication shows rudder centered.

27-32-01 Stall Warning Systems

Interval	Installed	Required	Procedure
C	2	1	(M)

One may be inoperative provided remaining system is verified to operate normally before each departure.

MAINTENANCE (M)

Before each departure, use CMC to verify the remaining stall warning system operates normally.

1. Select CONFIDENCE TESTS from the CMC main menu.
2. Press and release the line select key for the operative stall warning system (STALL LEFT or STALL RIGHT).
3. Confirm the stick shakers operate.

27-32-01 Stall Warning Systems**27-32-01-01 Stick Shakers**

Interval	Installed	Required	Procedure
C	2	1	

27-38-01 Elevator Position Indicating System

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided visual confirmation of proper elevator movement is made before each departure.

MAINTENANCE (M)

Before each departure visually confirm proper elevator movement.

NOTE: Full control column input will result in outboard elevator deflection of 23 degrees up, 17 degrees down and inboard elevator deflection of 25 degrees up, 16 degrees down. Measurement is not required.

1. Establish communications between flight deck and ground.
2. Position control column full aft and confirm with ground that all four elevators are up.
3. Position control column full forward and confirm with ground that all four elevators are down.

- 27-41-01 Stabilizer Trim/Rudder Ratio Changer Modules (SRM)**
27-41-01-01 Stabilizer Trim Control

Interval	Installed	Required	Procedure
C	2	1	(M) (O)

Stabilizer trim control in one module may be inoperative provided:

- Horizontal stabilizer is verified to operate normally with the Alternate Stab Trim Switches.
- Rudder ratio control in both modules operates normally.

NOTE: If Stabilizer Trim Control in the other SRM fails, autopilot will not be available.

MAINTENANCE (M)

Verify horizontal stabilizer operates normally using the alternate stabilizer trim switches.

- Pressurize hydraulic systems 2 and 3 (AMM 29-11-00/201).
- Confirm the stabilizer trim cutout switches and cutout valves operate normally.

NOTE: During the following tests, the >STAB TRIM 2 and >STAB TRIM 3 advisory messages and the STAB TRIM status message will display.

- Position the control stand STAB TRIM 2 and 3 switches to CUTOUT.
 - Hold both control stand STAB TRIM ALTN switches APL NOSE UP for at least 3 seconds.
 - Confirm the control stand stabilizer trim indicators show no movement.
 - Release both control stand STAB TRIM ALTN switches.
 - Hold both control stand STAB TRIM ALTN switches APL NOSE DN for at least 3 seconds.
 - Confirm the control stand stabilizer trim indicators show no movement.
 - Release both control stand STAB TRIM ALTN switches.
 - Position the control stand STAB TRIM 2 and 3 switches to AUTO.
- Confirm alternate trim solenoid valves are not failed in the energized position.
 - Position the control stand left STAB TRIM ALTN switch APL NOSE UP and then APL NOSE DN.
 - Confirm the control stand stabilizer trim indicators show no movement.

- C. Position the control stand right STAB TRIM ALTN switch APL NOSE UP and then APL NOSE DN.
- D. Confirm the control stand stabilizer trim indicators show no movement.
4. Confirm stabilizer trim operates normally using each of the two hydraulic systems (one at a time). For STAB TRIM 2 advisory message displayed, confirm stabilizer operates normally using hydraulic system 3 (STAB TRIM 2 switch CUTOUT) and then using hydraulic system 2 (STAB TRIM 3 switch CUTOUT). For STAB TRIM 3 advisory message displayed, confirm stabilizer operates normally using hydraulic system 2 (STAB TRIM 3 switch CUTOUT) and then using hydraulic system 3 (STAB TRIM 2 switch CUTOUT).
 - A. Position the appropriate control stand STAB TRIM switch to CUTOUT.
 - B. Hold both control stand STAB TRIM ALTN switches APL NOSE UP for at least 3 seconds.
 - C. Confirm the stabilizer moves in airplane nose up direction.
 - D. Release both control stand STAB TRIM ALTN switches.
 - E. Hold both control stand STAB TRIM ALTN switches APL NOSE DN for at least 3 seconds.
 - F. Confirm the stabilizer moves in airplane nose down direction.
 - G. Release both control stand STAB TRIM ALTN switches.
 - H. Position appropriate control stand STAB TRIM switch to AUTO.
5. Confirm both >STAB TRIM 2 and >STAB TRIM 3 advisory messages are not displayed.
6. Confirm the RUDDER RATIO status message is not displayed.

OPERATIONS (O)

1. Manual stabilizer trim control is available from either control wheel trim switch at one half drive speed.
2. During single-channel autopilot operation:
 - A. For the left SRM stabilizer trim control inoperative, the left autopilot will not engage.
 - B. For the right SRM stabilizer trim control inoperative, the right autopilot will not engage.
3. After arming APP mode when autoland status displays LAND 2 or LAND 3, all autopilots will engage.
4. For an inflight failure of the remaining SRM or stabilizer trim control in the remaining SRM, autotrim capability will be lost and manual trim from both of the control wheel trim switches may be lost. Stabilizer trim control may only be available using alternate stabilizer trim.
5. The >STAB TRIM 2 or >STAB TRIM 3 advisory message may be displayed (message may clear when the stabilizer is moved with the alternate stabilizer trim and reappear when using the control wheel trim).

6. Speed Stability Trim will operate normally.

27-41-02 Control Wheel Stabilizer Trim Switches

Interval	Installed	Required	Procedure
C	2	1	(O)

One may be inoperative provided Alternate Stab Trim System is verified to operate normally before each departure.

OPERATIONS (O)

Verify the alternate stabilizer trim system operates normally before each departure.

1. Hold both control stand STAB TRIM ALTN switches APL NOSE UP for at least 3 seconds.
2. Confirm the stabilizer moves in airplane nose up direction.
3. Release both control stand STAB TRIM ALTN switches.
4. Hold both control stand STAB TRIM ALTN switches APL NOSE DN for at least 3 seconds.
5. Confirm the stabilizer moves in airplane nose down direction.
6. Release both control stand STAB TRIM ALTN switches.

27-48-01 Stabilizer Trim Indicators

Interval	Installed	Required	Procedure
C	2	1	(M)

One may be inoperative (including multiple greenband indication) provided faulty indicator is not visible.

MAINTENANCE (M)

Obscure the inoperative stabilizer trim indicator and confirm the remaining stabilizer trim indicator operates normally.

1. Cover the inoperative stabilizer trim indicator with tape or other obscuring material.
2. Confirm the remaining stabilizer trim indicator operates normally.

NOTE: The following does not apply if only the greenband indication is inoperative.

- A. Pressurize hydraulic systems 2 and 3 (AMM 29-11-00/201).
- B. Hold both control stand STAB TRIM ALTN switches APL NOSE UP until the stabilizer stops moving.
- C. Confirm the stabilizer trim indicator reads 14.60 to 14.90 units of trim.
- D. Release both control stand STAB TRIM ALTN switches.
- E. Hold both control stand STAB TRIM ALTN switches APL NOSE DN until the stabilizer stops moving.
- F. Confirm the stabilizer trim indicator reads 0.10 to 0.40 units of trim.
- G. Release both control stand STAB TRIM ALTN switches.

27-48-02 Nose Gear Pressure Switch

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided stabilizer trim position is properly set before each flight for the actual airplane weight, center of gravity and takeoff thrust setting.

MAINTENANCE NOTE

The STAB GREENBAND status and advisory messages indicates the nose gear pressure switch disagrees with the selected greenband, or an invalid CG has been entered into the MCDU. Invalid CG values are CG < 8.5 or CG > 33.0. If the message is due to an invalid CG input, the greenband indications on the stabilizer trim indicators will not be illuminated. If the message is due to disagreement between the nose pressure switch and the selected greenband, either the NOSE UP or NOSE DOWN greenband indications will be illuminated.

OPERATIONS (O)

1. Verify the stabilizer trim position is properly set for the gross weight, center of gravity (CG), and takeoff thrust before each departure.
 - A. Confirm that FMC takeoff data (gross weight, CG, takeoff thrust) has been correctly initialized.
 - B. Confirm the stabilizer trim is properly set for the gross weight, CG, and takeoff thrust.
2. The >STAB GREENBAND advisory message and the STAB GREENBAND status message may be displayed.

27-51-01 Flap Control Units (FCU)

Interval	Installed	Required	Procedure
C	3	2	(M) (O)

One may be inoperative or removed provided:

- a. It is verified that flap position RVDT sensors operate normally before each departure.

MAINTENANCE (M)

NOTE 1: The FCUs are interchangeable.

NOTE 2: An inoperative left or right FCU will cause the STAB XFR SIG status message to be displayed. The airplane must also be dispatched using [MEL item 28-22-04-02](#).

NOTE 3: AD 2005-04-03 requires at least one operative FCU be P/N 285U0011-208 in accordance with S/B 747-27A2386.

Verify the flap position RVDT sensors operate normally before each departure.

1. For FLAP CONTROL _ status message displayed, confirm FLAP SYS MONITOR status message is not displayed (flap position RVDT sensors are operating normally).
2. For FLAP SYS MONITOR status message displayed verify the flap position RVDT sensors operate normally.
 - A. Access CMC Existing Faults for >27 FLAP CONTROL.
 - B. Confirm faults LE _ SWITCH FAIL and _ RVDT FAIL are not present.
 - C. For Interface Fail faults _ RVDT - FCU- _ INTERFACE FAIL or FLAP 26 VAC- _ >FCU- _ INTERFACE FAIL present:
 - 1) Open the following P7 panel flight control circuit breakers:
 - a. FLT CONT ELEC 1L AC
 - b. FLT CONT ELEC 1L DC
 - c. FLT CONT ELEC 2L AC
 - d. FLT CONT ELEC 2L DC
 - e. FLT CONT ELEC 1R AC
 - f. FLT CONT ELEC 1R DC
 - g. FLT CONT ELEC 2R AC
 - h. FLT CONT ELEC 2R DC
 - 2) Label each FCU with LEFT, RIGHT and CENTER identification marks so their original location remains known.
 - 3) Remove the FCU with the Interface Fail faults.
 - 4) Close the flight control circuit breakers and confirm FLAP SYS MONITOR status message does not display within 30 seconds.

- 5) Open the flight control circuit breakers and move one of the installed FCUs to the removed FCU slot.
- 6) Close the flight control circuit breakers, wait a minimum of 30 seconds and confirm FLAP SYS MONITOR status message does not display.
 - If FLAP SYS MONITOR message displays, an RVDT sensor fault is confirmed.
 - If FLAP SYS MONITOR message does not display, RVDT sensors are verified to operate normally (the removed FCU is confirmed inoperative, do not install).
- 7) Open the flight control circuit breakers move the FCU back to its original slot.
- 8) Close the flight control circuit breakers and confirm the FLAP CONTROL _ is displayed for the removed FCU.
- 9) Confirm the FLAP SYS MONITOR status message is not displayed.

OPERATIONS (O)

1. The NO LAND 3 status message may be displayed.
2. The FMC scratch pad message PERF/VNAV UNAVAILABLE may be displayed.
3. When the flight director is selected to the FCC associated with the inoperative FCU, the pitch flight director bar will not be displayed at speeds below 60 knots.
4. For an inoperative L or R FCU, the >IDLE DISAGREE advisory message may be displayed in flight when selecting idle thrust with flaps not in landing position and engine anti-ice off.

NOTE: Display of the EICAS advisory message >IDLE DISAGREE on the ground indicates failure of the ground minimum idle selection system and MEL item 73-21-01 should be used.

27-51-02 TE Flap Drive System**27-51-02-01 No-Coast Drag Brake**

Interval	Installed	Required	Procedure
A	1	0	(M)

May be inoperative provided:

- a. Flap Drive Torque Tube and No-Coast Drag Brake support bracket are verified to be undamaged before each departure.
- b. Flap control handle remains in agreement with flap position when hydraulics are unpressurized and Alternate Flaps Arm Switch remains OFF during ground operations in the terminal ramp area.
- c. Repairs are made within three flight days.

MAINTENANCE (M)

Verify the flap drive torque tube and no-coast drag brake support bracket are not damaged before each departure (AMM 27-51-42).

1. Examine the Flap Drive Torque Tube at its connection to the No-Coast Drag Brake and confirm that there is no evidence of damage.
2. Examine the Flap Drive Torque Tube where it passes through the body to wing air seal and confirm that there is no evidence of damage.
3. Examine the No-Coast Drag Brake and confirm that there is no evidence of damage to its support bracket.

OPERATIONS NOTE

When aircraft is in the terminal ramp area, ensure the ALTN FLAPS ARM Switch is selected OFF.

This precludes uncommanded flap extension (due to gravity) when the TE Flap No-Coast Drag Brake is inoperative.

27-62-01 Auto Spoilers System

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative provided:

- a. System is deactivated.
- b. Performance decrements are applied.

MAINTENANCE (M)

Deactivate automatic speed brake system.

1. Open and collar the P7 panel SPEED BRAKE AUTO CONT circuit breaker.
2. Notify Flight Technical Dispatch (Allowable Landing Weight at Destination may be reduced).

OPERATIONS (O)

Extend speedbrakes manually for rejected takeoff or landing.

1. Base take-off and landing performance on manual speedbrakes.
 - A. Request take-off performance from CARD using the Performance Correction Code for 'AUTOSPOILERS INOP' shown in the Performance Manual. If CARD is not available contact FTD.
 - B. Dispatch Landing Weights or obtainable tailwind for Auto-Spoilers unserviceable are shown on the Dispatch Landing pages in the Performance Manual in brackets after the normal Landing Weights or tailwind if different.

NOTE: Inflight Landing Distance correction shown in QRH PI Normal Configuration Landing Distance.

2. For rejected takeoff:
 - A. Simultaneously close thrust levers, disengage autothrottles and apply maximum manual wheel brakes or verify operation of RTO autobrakes.
 - B. Manually raise speed brake lever.
 - C. Apply maximum amount of reverse thrust consistent with conditions.
3. For landing:
 - A. Simultaneously close thrust levers and apply manual wheel brakes or verify operation of autobrakes.
 - B. Manually raise speed brake lever.
 - C. Apply reverse thrust consistent with conditions.

27-62-02 Speed Brake Solenoid

Interval	Installed	Required	Procedure
-	1	1	

Must be operative.

27-68-01 Spoiler Position Indicating System

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided visual confirmation of proper spoiler movement is made before each departure.

MAINTENANCE (M)

Visually confirm proper spoiler movement before each departure.

NOTE: Full control wheel input will result in most inboard spoilers not extending, the second most inboard will extend approximately 20° and the outboard four will extend approximately 45°.

1. Pressurize all four hydraulic systems (AMM 29-11-00/201).
2. Establish communications between flight deck and ground.
3. Position control wheel full left and confirm with ground that left wing spoilers extended correctly.
4. Position control wheel full right and confirm with ground that right wing spoilers extended correctly.

27-81-01 Leading Edge Flaps Drives (Pneumatic)

Interval	Installed	Required	Procedure
C	8	7	(M) (O)

One may be inoperative provided:

- a. All electric drives operate normally.
 - b. Takeoff obstacle clearance is not required upon retraction of flaps from takeoff position.
-

MAINTENANCE (M)

Verify the leading edge flap electric drives operate normally.

1. If all leading edge and trailing edge flaps are not fully retracted, retract them using the flap lever.
2. Inhibit trailing edge motion and leading edge pneumatic motion by opening the following circuit breakers on the P6 panel:
 - A. PRI LE FLAP DR CONT GRP A (AC)
 - B. PRI LE FLAP DR CONT GRP B (AC)
 - C. TE FLAP ELEC CONT INBD
 - D. TE FLAP ELEC CONT OUTBD
 - E. PRI TE FLAP CONT DC

3. Move the flap lever to 5:

The leading edge flaps should remain stationary for approximately 15 seconds, and then extend electrically. Verify that all leading edge flaps extend by observing the EICAS non-normal (expanded) flap display and by observing the flap panels.

NOTE: The Caution message FLAPS DRIVE and the status messages LE MULT DRIVE and TE FLAPS will remain displayed on EICAS following this step.

4. Move the flap lever to UP:
5. Close the opened circuit breakers.
6. Press the ALT FLAPS arm switch. Press the arm switch again and verify the messages FLAPS DRIVE, LE MULT DRIVE, and TE FLAPS are extinguished.

OPERATIONS (O)

1. With one pneumatic drive inoperative, the status message LE SINGLE DRIVE will be displayed. Additionally, the caution message FLAPS PRIMARY will be displayed during flap operation. The FLAPS PRIMARY message indicates a temporary LE Flap disagreement as a result of slower electrical actuation of the affected LE Flap panels. At the completion of flap motion, with all panels in commanded position, FLAPS PRIMARY will extinguish.
2. If, whilst taxiing out, a FLAPS PRIMARY caution message and only a LE SINGLE DRIVE status message are displayed, refer to QRH and check that flaps reach selected position prior to take-off.
3. If subsequent to a LE SINGLE DRIVE status message appearing, a LE MULTIDRIVE status message appears:
 - A. Leave Flaps in selected position.
 - B. Access the CMC (If necessary obtain engineering assistance) and confirm that associated with LE MULT DRIVE status message, that there is only evidence of a single drive failure. If there is only evidence of a single drive failure the LE MULT DRIVE status message can assumed to be false and the aircraft operated in accordance with MEL item 31-61-04.
 - C. Dispatch with FLAPS PRIMARY displayed, or the status message LE MULT DRIVE, is prohibited.
 - D. Check Flaps reach required position prior to take-off.
4. After Take-off: Retract the flaps with the flap lever using normal procedures. The affected leading edge flaps will automatically be retracted electrically at a slower rate than the pneumatic flaps.
5. Flap Extension: Use the flap lever and normal procedures.

NOTE: Time required for the operation of the affected leading edge flap will be much longer due to the slower operation of the electric drive (10 seconds for pneumatic operation vs. 90 seconds for electrical operation).

27-81-02 Leading Edge Flaps Drives (Electric)

Interval	Installed	Required	Procedure
C	8	7	(M)

One may be inoperative provided:

- a. All pneumatic drives operate normally.
 - b. Associated electric drive is deactivated.
-

MAINTENANCE (M)

Deactivate the inoperative leading edge flap electric drive.

1. Extend the leading edge flaps pneumatically (AMM 27-81-00/201).
2. Check the Primary EICAS Display to ensure that all leading edge flaps are extended to the correct position.
3. Remove pneumatic power (AMM 36-00-00/201).
4. Open the following circuit breakers:
 - A. P6 panel PRI LE FLAP CONT GRP A AC
 - B. P6 panel PRI LE FLAP CONT GRP A DC
 - C. P6 panel PRI LE FLAP CONT GRP B AC
 - D. P6 panel PRI LE FLAP CONT GRP B DC
 - E. P6 panel LE FLAP ELEC CONT GRP B DRIVE 1
 - F. P6 panel LE FLAP ELEC CONT GRP A DRIVE 2
 - G. P6 panel LE FLAP ELEC CONT GRP A DRIVE 3
 - H. P6 panel LE FLAP ELEC CONT GRP A DRIVE 4
 - I. P414 panel LE FLAP ELEC DRIVE 1
 - J. P414 panel LE FLAP ELEC DRIVE 4
 - K. P415 panel LE FLAP ELEC DRIVE 2
 - L. P415 panel LE FLAP ELEC DRIVE 3
5. Gain access to the inoperative electric drive motor (AMM 27-81-03/201).
6. Disconnect, cap and stow the alternate motor P203 electrical connector.
7. Close the opened circuit breakers.
8. Retract the leading edge flaps (AMM 27-81-00/201).

OPERATIONS NOTE

No change to operating procedures.

**27-81-03 Leading Edge Flaps Retraction System (Reverser
Actuated)**

Interval	Installed	Required	Procedure
C	1	0	

27-88-01**Leading Edge Flaps System Position Monitor*********

Interval	Installed	Required	Procedure
C	1	0	

28-11-01 Fuel Sump Drain Valves**28-11-01A No Evidence of Leakage**

Interval	Installed	Required	Procedure
A	-	0	(M)

May be inoperative provided:

- a. There is no evidence of leakage.
- b. Refuelling service equipment is checked for moisture accumulation before and after each fuel service, and
- c. The aircraft may continue to fly for a maximum of 25 flight hours prior to completion of repairs.

MAINTENANCE (M)

Confirm there is no evidence of fuel sump drain leakage and prevent water accumulation in associated fuel tank.

1. Visually inspect exterior surface location of the inoperative sump drain valve to verify that there is no evidence of fuel leakage.
2. Use alternate procedures to prevent water accumulation in the associated tank.

28-11-01 Fuel Sump Drain Valves**28-11-01B Evidence of Leakage**

Interval	Installed	Required	Procedure
C	-	0	(M)

May be leaking provided:

- a. Leakage is stopped by installing the correct drain plug tool.
- b. The valve operates in order to carry out regular water drain checks IAW usual procedures.

MAINTENANCE (M)

1. Install drain plug tool (p/n 4BA11868 or 4BA82132) in the drain hole of the leaking sump drain valve:
 - A. On the plug, turn the spring to put the anti-rotation tabs furthest from the seal face.
 - B. Push the plug into the valve and turn 90 degrees to engage the plug in the valve body.
 - C. Lock the plug in position, by turning the spring to put the anti-rotation tabs nearest to the seal face and latch the spring in the groove on the plug body.

2. Turn the plug to make sure the anti-rotation spring tabs stop the plug from coming out.
3. Visually inspect external surfaces of a valve and plug for signs of fuel leakage (none permitted with plug installed).
4. Raise carry forward action to verify the drain plug tool is installed and not leaking before each departure.
5. Until the leaking sump drain valve is repaired or replaced, raise carry forward action to:
 - A. Remove the plug to do regular water checks IAW AMM 12-11-10/301.
 - B. Install the plug after the water check is done.
 - C. Visually inspect external surfaces of valve and plug for signs of fuel leakage after the water check is done (none permitted with plug installed).

28-11-02 Horizontal Stabilizer Sump Drain Valves

28-11-02A Stabilizer Tank Remains Empty

Interval	Installed	Required	Procedure
C	3	0	(O)

May be inoperative provided horizontal stabilizer tank remains empty.

MAINTENANCE NOTE

Advise Flight Technical Dispatch or Maintrol that loading restrictions apply for Take-off Weights in excess of 385,553 kg. Refer to Load & Balance Manual.

OPERATIONS (O)

Loadability is reduced at takeoff weights above 385,553 kg.

28-11-02 Horizontal Stabilizer Sump Drain Valves

28-11-02B Stabilizer Tank Usable

Interval	Installed	Required	Procedure
C	3	0	(M)

May be inoperative provided:

- a. There is no evidence of leakage.
- b. Alternate procedures are used to prevent water accumulation in associated tank.

MAINTENANCE (M)

Confirm there is no evidence of fuel sump drain leakage and prevent water accumulation in associated fuel tank.

1. Visually inspect exterior surface location of the inoperative sump drain valve to verify that there is no evidence of fuel leakage.
2. Use alternate procedures to prevent water accumulation in the associated tank.

NOTE: One alternate procedure is to check the refuel service equipment for moisture accumulation before and after each refuel operation.

28-11-02 Horizontal Stabilizer Sump Drain Valves**28-11-02C Surge Tank Drain Valve**

Interval	Installed	Required	Procedure
C	1	0	(M)

May be leaking provided:

- a. Leakage is stopped by installing the correct drain plug tool.
- b. The valve operates in order to carry out regular water drain checks IAW usual procedures.

MAINTENANCE (M)

1. Install drain plug tool (p/n 4BA11868 or 4BA82132) in the drain hole of the leaking sump drain valve:
 - A. On the plug, turn the spring to put the anti-rotation tabs furthest from the seal face.
 - B. Push the plug into the valve and turn 90 degrees to engage the plug in the valve body.
 - C. Lock the plug in position, by turning the spring to put the anti-rotation tabs nearest to the seal face and latch the spring in the groove on the plug body.
2. Turn the plug to make sure the anti-rotation spring tabs stop the plug from coming out.
3. Visually inspect external surfaces of valve and plug for signs of fuel leakage (none permitted with plug installed).
4. Raise carry forward action to verify the drain plug tool is installed and not leaking before each departure.
5. Until the leaking sump drain valve is repaired or replaced, raise carry forward action to:
 - A. Remove the plug to do regular water checks IAW AMM 12-11-10/301.
 - B. Install the plug after the water check is done.
 - C. Visually inspect external surfaces of valve and plug for signs of fuel leakage after the water check is done (none permitted with plug installed).

28-11-02 Horizontal Stabilizer Sump Drain Valves*********28-11-02-01 Electric Actuation Feature**

Interval	Installed	Required	Procedure
D	2	0	(M)

Section 2 May be inoperative provided:

- a. There is no evidence of leakage.
 - b. Valve(s) is operated manually.
-

MAINTENANCE (M)

NOTE: The two sump drain valves in horizontal stabilizer tank have the electric actuation feature. The sump drain valve in the surge tank does not have the electric actuation feature.

Confirm there is no evidence of fuel sump drain leakage and prevent water accumulation in associated fuel tank.

1. Visually inspect exterior surface location of the inoperative sump drain valve to verify that there is no evidence of fuel leakage.
2. Operate the associated valve using the manual override push button.

28-11-03 Horizontal Stabilizer Sump Drain Indicators

Interval	Installed	Required	Procedure
C	2	0	(M)

May be inoperative provided there is no evidence of leakage from associated valve(s).

MAINTENANCE (M)

Confirm there is no evidence of fuel sump drain valve leakage.

1. Visually inspect exterior surface location of the associated sump drain valve(s) to verify that there is no evidence of fuel leakage.

28-15-01 Fuel Scavenge Pump (Electric)

28-15-01A Center Tank Empty

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative deactivated provided center tank remains empty.

NOTE: This MEL item provides relief only for aircraft equipped with electrical fuel scavenge pump (NLA to NLZ and IVA). Relief for the hydro-mechanical fuel scavenge system (IVB and onwards) is available in MEL item 28-15-02.

MAINTENANCE (M)

Deactivate the fuel scavenge pump.

1. Open and collar the P414 panel SCAVENGE PUMP circuit breaker.

OPERATIONS NOTE

The >SCAV PUMP ON advisory message may be displayed on the ground.

28-15-01 Fuel Scavenge Pump (Electric)

28-15-01B Center Tank Fuel Use Limitation

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative deactivated provided the first 1360 kg of center tank fuel is included as part of Zero Fuel Weight and is considered unusable.

NOTE: This MEL item provides relief only for aircraft equipped with electrical fuel scavenge pump (NLA to NLZ and IVA). Relief for the hydro-mechanical fuel scavenge system (IVB and onwards) is available in MEL item 28-15-02.

MAINTENANCE (M)

Deactivate the fuel scavenge pump.

1. Open and collar the P414 panel SCAVENGE PUMP circuit breaker.
2. Advise Flight Technical Dispatch or Maintrol that 1360 kg of fuel will be unusable.

OPERATIONS NOTE

1. The first 1360 kg of fuel loaded in the centre tank is included as part of Zero Fuel Weight and is considered unusable. Loadsheet will be annotated in free text field to confirm that, with additional centre tank fuel loaded, Max ZFW has not been exceeded. No Service Weight Adjustment will be shown.
2. The FUEL SCAV PUMP status message will be displayed and latched when the fuel scavenge pump is commanded on.
3. The >SCAV PUMP ON advisory message may be displayed on the ground.

28-15-02 Hydro-mechanical Fuel Scavenge Systems

28-15-02A Center Tank Empty

Interval	Installed	Required	Procedure
D	2	0	(M)

May be inoperative provided:

- a. Center tank remains empty.
- b. Center tank quantity indication operates normally.

MAINTENANCE (M)

Defuel the center tank using the pressure defueling procedure and drain the remaining center tank fuel (approximately 125 gallons) through the sump drain (AMM 28-26-00/201).

28-15-02 Hydro-mechanical Fuel Scavenge Systems

28-15-02B Center Tank Fuel Use Limitation

Interval	Installed	Required	Procedure
C	2	0	(M)

May be inoperative provided the first 1360 kg of center tank fuel is included as part of Zero Fuel Weight and is considered unusable.

NOTE: With two float valves inoperative open, it will be necessary to deactivate the associated system(s).

MAINTENANCE (M)

With either float valve inoperative open, it may be necessary to deactivate system to prevent the unwanted fuel transfer from center wing tank to inboard main tanks. If it is necessary to deactivate system, remove the associated fuel strainers (AMM 28-15-00/201).

OPERATIONS NOTE

The first 1360 kg of fuel loaded in the center tank is included as part of Zero Fuel Weight, is considered unusable, and is accounted for during flight planning and for weight and balance calculations.

NOTE: The FUEL OVRD CTR L/R alerting messages are normally displayed with 1360 kg remaining in the centre tank. Since the override/jettison pumps are turned off at this point, the remaining fuel is transferred to the main tanks by the scavenge systems. With both scavenge systems inoperative, the remaining fuel will not be transferred from the centre tank.

28-15-02 Hydro-mechanical Fuel Scavenge Systems

28-15-02-02 With SB 747-28-2255 Incorporated or Production Equivalent (PRR 85580-R)

28-15-02-02A Main Fuel Tank Float Valve Operates Normally

Interval	Installed	Required	Procedure
D	2	1	

One system may be inoperative provided associated main fuel tank float valve operates normally.

28-15-02 Hydro-mechanical Fuel Scavenge Systems

28-15-02-02 With SB 747-28-2255 Incorporated or Production Equivalent (PRR 85580-R)

28-15-02-02B Main Fuel Tank Float Valve Inop Closed

Interval	Installed	Required	Procedure
D	2	1	

One system may be inoperative provided associated main fuel tank float valve is inoperative closed.

MAINTENANCE NOTE

NOTE 1: The hydro-mechanical fuel scavenge system is a dual system feeding both inboard main tanks. Each half of the system includes two jet pumps and two float valves (one of each valve is located in the centre tank and inboard main tank). If the pump is inoperative or either float valve is inoperative closed, that half of the system will not transfer fuel from the centre tank making one half of the system inoperative.

NOTE 2: The float valves in the centre tank have been permanently locked open IAW SB 747-28-2255 (BA mod 28G123) to advance the scavenge start time for more effective system performance. With the inboard main tank float valve(s) inoperative open, it is necessary to deactivate one half of / the whole system to prevent unwanted fuel transfer from the centre wing tank to the inboard main tank(s) or prevent fuel spillage when centre wing tank fuel is carried.

-
- 28-15-02 Hydro-mechanical Fuel Scavenge Systems**
28-15-02-02 With SB 747-28-2255 Incorporated or Production Equivalent (PRR 85580-R)
28-15-02-02C Main Fuel Tank Float Valve Inop Open

Interval	Installed	Required	Procedure
D	2	1	(M)

One main fuel tank float valve may be inoperative open provided associated system is deactivated.

MAINTENANCE (M)

With the float valve located in the associated inboard main tank inoperative open, it will be necessary to deactivate the system to prevent the unwanted fuel transfer from center wing tank to the associated inboard main tank.

To deactivate system, remove the associated fuel strainer (AMM 28-15-00/201).

28-16-01 Reserve 2 and 3 Fuel Transfer Valves**28-16-01A Reserve Tanks Fueled**

Interval	Installed	Required	Procedure
C	4	2	(M) (O)

One per tank may be inoperative deactivated closed (with reserve tanks fueled) provided:

- a. Zero Fuel Weight CG limit is 2% MAC forward of the AFT limit.
 - b. If fuel in reserve tanks 2 or 3 does not transfer, observe 325 KCAS/0.92M speed limitation for remainder of flight.
-

MAINTENANCE (M)

Deactivate and secure the inoperative transfer valve in the closed position.

1. For reserve 2A or 3A transfer valve inoperative, open the P7 panel FUEL XFR VALVE RES 2A & 3A circuit breaker.
2. For reserve 2B or 3B transfer valve inoperative, open the P7 panel FUEL XFR VALVE RES 2B & 3B circuit breaker.
3. Extend and deactivate outboard trailing edge flaps (AMM 27-51-00/201).
4. Gain access to the inoperative transfer valve (AMM 28-16-01/401).
5. Disconnect, cap and stow electrical connector from the inoperative valve.
6. Position manual override lever for the inoperative valve CLOSED and lockwire.
7. Close the opened circuit breakers.
8. Activate and retract outboard trailing edge flaps (AMM 27-51-00/202).

OPERATIONS (O)

An additional valve failure may occur and cause fuel to become trapped in a reserve tank. Operating procedures must therefore include the following:

1. Plan required fuel load considering that fuel may become trapped in affected reserve tank.
2. The airplane must be loaded so that the actual Zero Fuel Weight CG is at least 2% MAC forward of the Aft Limit. This ensures the CG will remain within the certified CG Envelope should fuel become trapped in Reserve Tank 2 or 3.
3. Confirm fuel automatically transfers when either Main Tank #2 or Main Tank #3 quantity is reduced below 18,144 kg.
4. If fuel in either reserve tank does not transfer, limit maximum operating speed to 325 KCAS/0.92 Mach) for the remainder of the flight.

28-16-01 Reserve 2 and 3 Fuel Transfer Valves**28-16-01B Reserve Tanks Empty**

Interval	Installed	Required	Procedure
C	4	0	(O)

May be inoperative provided:

- a. Reserve tanks 2 and 3 remain empty.
 - b. Maximum zero fuel weight is reduced by the weight of the center tank fuel.
 - c. Maximum Take-off Weight is limited to 335,664 kg.
-

OPERATIONS (O)

1. Reserve tanks 2 and 3 must remain empty.
2. For center tank fueled, reduce the maximum zero fuel weight by the weight of the center tank fuel. Center tank fuel may be used.
3. Maximum takeoff weight may not exceed 335,658 kg.
4. Contact Centralised Load Control (CLC) and advise that there is a non-standard fuel distribution. Provide CLC fuel quantities in each of the following tanks:
 - Centre
 - MAIN 1
 - MAIN 2
 - MAIN 3
 - MAIN 4
 - RESERVE 2
 - RESERVE 3

28-17-01 Horizontal Stabilizer Fuel Isolation Valves*******

Interval	Installed	Required	Procedure
C	4	0	(M) (O)

May be inoperative secured closed provided stabilizer tank remains empty.

MAINTENANCE (M)

Deactivate and secure the inoperative valve closed.

NOTE: If one or both Aft Isolation Valves are inoperative, it is acceptable to deactivate and secure both Fwd Isolation Valves closed in lieu of the affected Aft Isolation Valve(s).

1. Gain access to the inoperative valve (AMM 28-17-00/201).
2. Disconnect, cap and stow the electrical connector from valve actuator.
3. Position manual override lever located on valve actuator closed and lockwire.

OPERATIONS (O)

1. Stabilizer tank must remain empty.
2. Loadability is reduced at takeoff weights above 385,553 kg.

28-21-01 Pressure Fueling System

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided alternate refueling procedures are established and used.

NOTE 1: For an inoperative refuel valve indicator light, the associated refuel valve is considered inoperative.

NOTE 2: Any function of the Fueling Control Panel that operates normally may be used.

MAINTENANCE (M)

Alternate refueling procedures are established and used.

1. Alternate refueling procedures are established and used (AMM 12-11-03/301, 12-11-04/301, 12-11-06/301).

NOTE: Refuel valves can be manually operated, opened/closed (use AMM 28-21-00/201).

2. Operative functions of the system may be used.
3. For inoperative refuel valve indicator light, the airplane must also be dispatched using [MEL item 28-21-01-01](#).

28-21-01 Pressure Fueling System**28-21-01-01 Refuel Valves****28-21-01-01A Valve Inoperative Open**

Interval	Installed	Required	Procedure
C	-	0	(M) (O)

May be inoperative open provided:

- a. Alternate refueling procedures are established and used.
- b. Fuel jettison system is considered inoperative.
- c. Stabilizer tank remains empty.

NOTE: The airplane must also be dispatched using [MEL item 28-31-01](#).

MAINTENANCE (M)

Fuel jettison system is considered inoperative, confirm stabilizer is empty and pressure fuel using manual mode.

1. Confirm stabilizer is empty.
2. Pressure fuel airplane using manual mode. Use overwing filling for remainder of fueling (AMM 12-11-01/301).

OPERATIONS (O)**For Passenger or Combi without Aux fuel tanks**

1. Stabilizer tank must remain empty.
2. Fuel jettison system must be considered inoperative.
3. Loadability is reduced at takeoff weights above 385,553 kg.
4. For refuel valve failed open in reserve tanks 2 or 3, maximum takeoff weight may not exceed 335,658 kg.
5. For refuel valve failed open in main tanks 1 or 4, maximum takeoff weight is limited to the maximum zero fuel weight.

28-21-01 Pressure Fueling System**28-21-01-01 Refuel Valves****28-21-01-01B Valve Inoperative Closed**

Interval	Installed	Required	Procedure
C	-	0	(M)

May be inoperative closed provided:

- a. Alternate refueling procedures are established and used.
- b. For any center tank refuel valve inoperative closed, stabilizer tank remains empty.

MAINTENANCE (M)

Alternate refueling procedures are established and used, and confirm stabilizer is empty.

1. Alternate refueling procedures are established and used (AMM 12-11-03/301, 12-11-04/301, 12-11-06/301)

NOTE: Refuel valves can be manually operated, opened/closed (use AMM 28-21-00/201).

2. For main tank refuel valve, fuel through overwing fill port (AMM 12-11-01/301).
3. For any center tank refuel valve inoperative closed, confirm stabilizer is empty.

OPERATIONS NOTE**For Passenger or Combi without Aux fuel tanks:**

1. For center tank refuel valve inoperative closed, stabilizer tank must remain empty.
2. Loadability is reduced at takeoff weights above 385,553 kg.

28-21-01 Pressure Fueling System**28-21-01-02 Volumetric Top-Off (VTO) Feature**

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided alternate refueling procedures are established and used.

MAINTENANCE (M)

Alternate refueling procedures are established and used.

1. Alternate refueling procedures are established and used (AMM 12-11-03/301, 12-11-04/301, 12-11-06/301).

28-21-01 Pressure Fueling System**28-21-01-03 Preselect Feature**

Interval	Installed	Required	Procedure
C	-	0	(M)

May be inoperative provided alternate procedures are established and used for refueling associated fuel tank.

MAINTENANCE (M)

Alternate refueling procedures are established and used.

1. Alternate refueling procedures are established and used (AMM 12-11-03/301, 12-11-04/301, 12-11-06/301).

28-21-01 Pressure Fueling System**28-21-01-06 Fueling Power Control Switch (Fueling Panel)****28-21-01-06A Fueling Panel is Deactivated**

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided fueling panel is deactivated before each departure.

MAINTENANCE (M)

Deactivate the refueling control panel before each departure.

1. Position the refueling control panel power switch to NORM.

2. Open and collar the P414 panel FUELING PWR (or FUELING LTS) circuit breaker.
3. Confirm power has been removed from the refueling control panel.

28-21-01 Pressure Fueling System**28-21-01-06 Fueling Power Control Switch (Fueling Panel)****28-21-01-06B Operates in BATT Position**

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided the fuel control panel indicator test switch operates normally when Refuel POWER Select Switch is used in the BATT position.

MAINTENANCE (M)

Operate fuel control panel in BATT position.

1. Position refuel control panel POWER switch to BATT.

28-21-03 Center Isolation Valve

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative secured open.

MAINTENANCE (M)

Secure the center isolation valve open.

1. Open and collar P180 panel CENTER ISOLATION VALVE circuit breaker.
2. Position the valve actuator manual override lever open and lockwire.

28-21-04**Fueling Receptacle Caps**

Interval	Installed	Required	Procedure
C	4	0	(M)

May be inoperative or missing provided:

- a. Associated refuel adapter valve is verified closed after refueling.
 - b. No leakage can be detected after refuelling is complete.
-

MAINTENANCE (M)

1. Verify the associated refuel adapter valve is closed after refueling.
2. After refuelling nozzle is disconnected, visually check for fuel leakage.

28-22-01 Main Tank Boost Pumps**28-22-01-01 Main Tank 1 and 4 Boost Pumps****28-22-01-01A Center Tank Fuel Unrestricted**

Interval	Installed	Required	Procedure
C	4	3	(M) (O)

One may be inoperative provided:

- a. All main tank 2 and 3 boost pumps operate normally.
- b. Main tanks 1 and 4 transfer valves are verified to operate normally.
- c. Fuel quantity indicating system for the associated tank operates normally.
- d. The following minimum fuel quantities are retained in the associated tank for the flight conditions shown (normal fuel loading, balance and usage requirements still apply):

Takeoff: 11,002 kg

Landing: 2,127 kg

MAINTENANCE (M)

NOTE: Main Tank 1, 2, 3 and 4 boost pumps are interchangeable.

Verify main tank 1 and 4 transfer valves operate normally and deactivate the inoperative fuel pump.

1. Verify main tank 1 and 4 transfer valves operate normally using one of the following methods (A or B):
 - A. Fuel System Synoptic verification method:
 - 1) On the pilots overhead panel, set the FUEL XFER MAIN 1 & 4 switch to ON. On the Fuel System Synoptic display, confirm transfer arrows are displayed between Main Tanks 1 & 2 and Main Tanks 3 & 4.
 - 2) Confirm Main Tanks 1 & 4 quantity indications are decreasing.
 - 3) Set the FUEL XFER MAIN 1 & 4 switch to OFF. On the Fuel System Synoptic display, confirm the transfer arrows are no longer displayed between Main Tanks 1 & 2 and Main Tanks 3 & 4.
 - B. Manual Override Handle visual verification method:
 - 1) Position the FUEL XFER MAIN 1 & 4 switch on and off.
 - 2) Confirm that the Manual Override Handle on both main tank transfer valves cycle to the open and closed positions.
2. Deactivate the inoperative fuel pump.
 - A. For tank 1 forward boost pump inoperative, open and collar P415 panel FUEL BOOST PUMP MAIN FWD 1 circuit breaker.

- B. For tank 1 aft boost pump inoperative, open and collar P414 panel FUEL BOOST PUMP MAIN AFT 1 circuit breaker.
- C. For tank 4 forward boost pump inoperative, open and collar P414 panel FUEL BOOST PUMP MAIN FWD 4 circuit breaker.
- D. For tank 4 aft boost pump inoperative, open and collar P415 panel FUEL BOOST PUMP MAIN AFT 4 circuit breaker.

OPERATIONS (O)

1. For takeoff, minimum amount of fuel in each main tank 1, 2, 3 and 4 is 11,002 kg.
2. For landing, minimum amount of fuel in each main tank 1, 2, 3 and 4 is 2,127 kg.
3. The inoperative fuel pump FUEL PUMP _ FWD or AFT advisory message will remain displayed and the low pressure light will be illuminated.

NOTE 1: Inoperative boost pump operations may require large amounts of fuel to be retained in the main fuel tanks for take-off and landing. Payload and/or range restrictions may result. Extra fuel is required in the tank with the inoperative pump in order to ensure the pumps are covered at all stages of flight. As remaining fuel in the other tanks will always exceed the reserve fuel required and the reserve quantity can be extracted from those tanks within existing balance and usage requirements then the reserve fuel requirement may be considered to be included in the additional fuel loaded for this defect.

NOTE 2: Payload restrictions when operating short range flights with an inoperative boost pump in Main Tank 1 or 4 can be minimised by dispatching in accordance with item 28-22-01-01B. If wing tanks are less than full, at least 7,711 kg fuel is in the Centre Wing Tank for take-off. All Centre Wing Tank fuel must be included as part of Zero Fuel Weight.

28-22-01 Main Tank Boost Pumps

28-22-01-01 Main Tank 1 and 4 Boost Pumps

28-22-01-01B Center Tank Fuel Restricted

Interval	Installed	Required	Procedure
C	4	3	(M) (O)

One may be inoperative provided:

- a. Prior to engine start, a minimum of 7,711 kg fuel is loaded in the center tank and maximum zero fuel weight is reduced by the weight of the center tank fuel.
- b. All main tank 2 and 3 boost pumps operate normally.
- c. Main tanks 1 and 4 transfer valves are verified to operate normally.
- d. Both center wing tank override/jettison pumps operate normally.
- e. Fuel quantity indicating system for the associated tank operates normally.

- f. For takeoff, engines 1 and 4 are manifolded to the center wing tank.
 - g. A minimum fuel quantity of 2,127 kg is retained in the associated tank for takeoff and landing (normal fuel loading, balance and usage requirements still apply).
-

MAINTENANCE (M)

NOTE: Main Tank 1, 2, 3 and 4 boost pumps are interchangeable.

Verify main tank 1 and 4 transfer valves operate normally and deactivate the inoperative fuel pump.

1. Confirm Main Tank 1 and 4 transfer valves operate normally using one of the following methods (A or B):
 - A. Fuel System Synoptic verification method:
 - 1) On the pilots overhead panel, set the FUEL XFER MAIN 1 & 4 switch to ON. On the Fuel System Synoptic display, observe that transfer arrows are displayed between Main Tanks 1 & 2 and Main Tanks 3 & 4.
 - 2) Confirm Main Tanks 1 & 4 quantity indications are decreasing.
 - 3) Set the FUEL XFER MAIN 1 & 4 switch to OFF. On the Fuel System Synoptic display, confirm the transfer arrows are no longer displayed between Main Tanks 1 & 2 and Main Tanks 3 & 4.
 - B. Manual Override Handle visual verification method:
 - 1) Position the FUEL XFER MAIN 1 & 4 switch on and off.
 - 2) Confirm the Manual Override Handle on both main tank transfer valves cycle to the open and closed positions.
 2. Deactivate the inoperative fuel pump.
 - A. For tank 1 forward boost pump inoperative, open and collar P415 panel FUEL BOOST PUMP MAIN FWD 1 circuit breaker.
 - B. For tank 1 aft boost pump inoperative, open and collar P414 panel FUEL BOOST PUMP MAIN AFT 1 circuit breaker.
 - C. For tank 4 forward boost pump inoperative, open and collar P414 panel FUEL BOOST PUMP MAIN FWD 4 circuit breaker.
 - D. For tank 4 aft boost pump inoperative, open and collar P415 panel FUEL BOOST PUMP MAIN AFT 4 circuit breaker.

OPERATIONS (O)

1. Minimum amount of fuel in center tank is 7,711 kg.
2. Reduce the maximum zero fuel weight by the weight of the center tank fuel.
3. For takeoff and landing, minimum amount of fuel in each main tank 1, 2, 3 and 4 is 2,127 kg.
4. For takeoff with main tanks less than full, position crossfeed valves 1 and 4 ON.

NOTE: The >FUEL TANK/ENG advisory message will be displayed. After take-off, use normal fuel procedures.

5. The inoperative fuel pump FUEL PUMP _ FWD or AFT advisory message will remain displayed and the low pressure light will be illuminated.

NOTE: Inoperative boost pump operations may require large amounts of fuel to be retained in the main fuel tanks for take-off and landing. Payload and/or range restrictions may result. Extra fuel is required in the tank with the inoperative pump in order to ensure the pumps are covered at all stages of flight. As remaining fuel in the other tanks will always exceed the reserve fuel required and the reserve quantity can be extracted from those tanks within existing balance and usage requirements then the reserve fuel requirement may be considered to be included in the additional fuel loaded for this defect.

28-22-01 Main Tank Boost Pumps

28-22-01-02 Main Tank 2 and 3 Boost Pumps

Interval	Installed	Required	Procedure
C	4	3	(M) (O)

One may be inoperative provided:

- a. All main tank 1 and 4 boost pumps operate normally.
- b. All main tank fuel quantity indicating systems operate normally.
- c. The associated fuel crossfeed valve is deactivated open.
- d. Remaining fuel crossfeed valves operate normally.
- e. Associated tank override/jettison pumps are selected on for takeoff.
- f. Center tank and auxiliary tank (if installed) remain empty, or maximum zero fuel weight is reduced by the weight of the center tank and auxiliary tank fuel.
- g. Horizontal stabilizer tank remains empty.
- h. The following minimum fuel quantities are retained in the associated tank for the flight conditions shown (normal fuel loading, balance and usage requirements still apply):

LANDING: 3,905 kg.

MAINTENANCE (M)

NOTE: Main Tank 1, 2, 3 and 4 boost pumps are interchangeable.

Deactivate the associated crossfeed valve in the open position and deactivate the inoperative fuel pump.

1. Deactivate the associated crossfeed valve open using DDG item 28-22-05 (M) procedure.

2. Deactivate the inoperative fuel pump.
 - A. For tank 2 forward boost pump inoperative, open and collar P415 panel FUEL BOOST PUMP MAIN FWD 2 circuit breaker.
 - B. For tank 2 aft boost pump inoperative, open and collar P414 panel FUEL BOOST PUMP MAIN AFT 2 circuit breaker.
 - C. For tank 3 forward boost pump inoperative, open and collar P414 panel FUEL BOOST PUMP MAIN FWD 3 circuit breaker.
 - D. For tank 3 aft boost pump inoperative, open and collar P415 panel FUEL BOOST PUMP MAIN AFT 3 circuit breaker.

OPERATIONS (O)

For Passenger or Combi without Aux fuel tanks

1. Loadability is reduced at takeoff weights above 385,553 kg.
2. For landing, minimum amount of fuel in each main tank 1, 2, 3 and 4 is 3,905 kg.
3. Reduce maximum zero fuel weight by the weight of the center tank fuel.
4. For takeoff, set associated main tank override/jettison pumps ON and center tank override pumps OFF.
5. After takeoff and following flap retraction, use normal fuel procedures.
6. The inoperative fuel pump FUEL PUMP _ FWD or AFT advisory message will remain displayed and the low pressure light will be illuminated.
7. The deactivated crossfeed valve FUEL X FEED _ advisory and status messages will be displayed.

NOTE: Fuel synoptic crossfeed valve position display will be blank for all four crossfeed valves.

28-22-01 Main Tank Boost Pumps

28-22-01-02 Main Tank 2 and 3 Boost Pumps

28-22-01-02-01 Aft Boost Pumps

28-22-01-02-01A Aft Override Pump Operates Normally

Interval	Installed	Required	Procedure
C	2	1	(M) (O)

One aft boost pump may be inoperative provided:

- a. All main tank 1 and 4 boost pumps and main tank 2 and 3 fwd boost pumps operate normally.
- b. Aft override/jettison pump in associated tank operates normally.
- c. Fuel quantity indicating system for the associated tank operates normally.
- d. The following minimum fuel quantities are retained in the associated tank for the flight conditions shown (normal fuel loading, balance and usage requirements still apply):

Takeoff: 35,557 kg

Landing: 3,905 kg

MAINTENANCE (M)

NOTE: Main Tank 1, 2, 3 and 4 boost pumps are interchangeable.

Deactivate the inoperative fuel pump.

1. For tank 2 aft boost pump inoperative, open and collar P414 panel FUEL BOOST PUMP MAIN AFT 2 circuit breaker.
2. For tank 3 aft boost pump inoperative, open and collar P415 panel FUEL BOOST PUMP MAIN AFT 3 circuit breaker.

OPERATIONS (O)

1. For takeoff:
 - A. Minimum amount of fuel in main tank 2 is 35,557 kg.
 - B. Minimum amount of fuel in main tank 3 is 35,557 kg.
 - C. Main tanks 1 and 4 are full.
2. For landing, minimum amount of fuel in each main tank 1, 2, 3 and 4 is 3,905 kg.
3. The inoperative fuel pump FUEL PUMP _ AFT advisory message will remain displayed and the low pressure light will be illuminated.

28-22-01 Main Tank Boost Pumps

28-22-01-02 Main Tank 2 and 3 Boost Pumps

28-22-01-02-01 Aft Boost Pumps

28-22-01-02-01B Engine Driven Generator Operates Normally

Interval	Installed	Required	Procedure
C	2	1	(M) (O)

One aft boost pump may be inoperative provided:

- a. All main tank 1and 4 boost pumps and main tank 2 and 3 fwd boost pumps operate normally.
- b. Fuel quantity indicating system for the associated tank operates normally.
- c. All engine driven generator systems operate normally.
- d. The following minimum fuel quantities are retained in the associated tank for the flight conditions shown (normal fuel loading, balance and usage requirements still apply):

Takeoff: 35,557 kg.

Landing: 3,905 kg.

MAINTENANCE (M)

NOTE: Main Tank 1, 2, 3 and 4 boost pumps are interchangeable.

Deactivate the inoperative fuel pump.

1. For tank 2 aft boost pump inoperative, open and collar P414 panel FUEL BOOST PUMP MAIN AFT 2 circuit breaker.
2. For tank 3 aft boost pump inoperative, open and collar P415 panel FUEL BOOST PUMP MAIN AFT 3 circuit breaker.

OPERATIONS (O)

1. For takeoff:
 - A. Minimum amount of fuel in main tank 2 is 35,557 kg.
 - B. Minimum amount of fuel in main tank 3 is 35,557 kg.
 - C. Main tanks 1 and 4 are full.
2. For landing, minimum amount of fuel in each main tank 1, 2, 3 and 4 is 3,905 kg.
3. The inoperative fuel pump FUEL PUMP _ AFT advisory message will remain displayed and the low pressure light will be illuminated.

28-22-01 Main Tank Boost Pumps

28-22-01-02 Main Tank 2 and 3 Boost Pumps

28-22-01-02-02 Fwd Boost Pumps

Interval	Installed	Required	Procedure
C	2	1	(M) (O)

One fwd boost pump may be inoperative provided:

- a. All main tank 1and 4 boost pumps and main tank 2 and 3 aft boost pumps operate normally.
- b. Fuel quantity indicating system for the associated tank operates normally.
- c. The following minimum fuel quantities are retained in the associated tank for the flight conditions shown (normal fuel loading, balance and usage requirements still apply):

Takeoff: 11,002 kg

Landing: 3,905 kg

MAINTENANCE (M)

NOTE: Main Tank 1, 2, 3 and 4 boost pumps are interchangeable.

Deactivate the inoperative fuel pump.

1. For tank 2 forward boost pump inoperative, open and collar P415 panel FUEL BOOST PUMP MAIN FWD 2 circuit breaker.
2. For tank 3 forward boost pump inoperative, open and collar P414 panel FUEL BOOST PUMP MAIN FWD 3 circuit breaker.

OPERATIONS (O)

1. For takeoff, minimum amount of fuel in each main tank 1, 2, 3 and 4 is 11,002 kg.
2. For landing, minimum amount of fuel in each main tank 1, 2, 3 and 4 is 3,905 kg.
3. The inoperative fuel pump FUEL PUMP _ FWD advisory message will remain displayed and the low pressure light will be illuminated.

28-22-02 Fuel Management Systems (FSMC A/FSMC B)

Interval	Installed	Required	Procedure
C	2	1	(M) (O)

One card may be inoperative with reserve tanks 2 and 3 fueled provided:

- a. Stabilizer tank remains empty.
- b. Zero Fuel Weight CG limit is 4% MAC forward of the Aft Limit.
- c. If fuel in reserve tanks 2 or 3 does not transfer, observe 325 KCAS/0.92M speed limitation for remainder of flight.
- d. Main tanks 2 and 3 fuel quantity indicating systems operate normally.

MAINTENANCE (M)

Confirm FSMC operation.

1. Confirm one FSMC operates normally by performing the FSMC operational test (AMM 28-22-13/501).
2. Open and collar the inoperative FSMC circuit breaker, FUEL SYSTEM MGMT CARD A or FUEL SYSTEM MGMT CARD B.

NOTE: For Main Tank 2 Quantity signal failure, Main Tank 3 Quantity signal failure or Single Point Sensor signal failure, use MEL item 28-41-01 or MEL item 28-41-02.

OPERATIONS (O)

For Passenger or Combi without Aux fuel tanks

1. Loadability is reduced at takeoff weights above 385,553 kg.
2. Load the airplane so that the actual Zero Fuel Weight CG is at least 4% MAC forward of the Aft Limit.
3. Plan required fuel load considering that fuel may become trapped in both reserve tanks. If not possible, flight plan to an en-route alternate, reverting to original destination once reserve fuel has transferred. Advise Flight Technical Dispatch.
4. If fuel in reserve tanks does not transfer, limit maximum operating speed to 325 KCAS/0.92 Mach for the remainder of the flight.

NOTE: Reserve tank fuel will automatically transfer when either main tank 2 or 3 quantity is reduced below 18,144 kg.

28-22-02 Fuel Management Systems (FSMC A/FSMC B)
28-22-02-01 Passenger/Combi

Interval	Installed	Required	Procedure
C	2	1	(M) (O)

One card may be inoperative with reserve tanks 2 and 3 empty provided:

- a. Stabilizer tank remains empty.
 - b. Maximum takeoff weight is limited to 335,658 kg.
-

MAINTENANCE (M)

Confirm FSMC operation.

1. Confirm one FSMC operates normally by performing the FSMC operational test (AMM 28-22-13/501).
2. Open and collar the inoperative FSMC circuit breaker, FUEL SYSTEM MGMT CARD A or FUEL SYSTEM MGMT CARD B.

NOTE: For Main Tank 2 Quantity signal failure, Main Tank 3 Quantity signal failure or Single Point Sensor signal failure, use MEL item 28-41-01 or MEL item 28-41-02.

OPERATIONS (O)

For Passenger or Combi without Aux fuel tanks

1. All tanks (except stabilizer tank and reserve tanks 2 and 3) may be fueled to capacity, provided takeoff weight does not exceed 335,658 kg.
2. Reduce Maximum Zero Fuel Weight by the weight of the center tank fuel. Center tank fuel may be used.

28-22-03 Fuel Crossfeed VALVE Lights

Interval	Installed	Required	Procedure
C	4	3	(M)

One may be inoperative provided associated valve operates normally.

MAINTENANCE (M)

Confirm the associated valve position on synoptic page.

28-22-04 Horizontal Stabilizer Fuel Transfer Signals

28-22-04-01 In-Air Signals**28-22-04-01A Reserve Tanks 2 and 3 Fueled**

Interval	Installed	Required	Procedure
C	2	1	(M) (O)

One may be inoperative with reserve tanks 2 and 3 fueled provided:

- a. Main tanks 2 and 3 fuel quantity indicating systems operate normally.
- b. Stabilizer tank remains empty.
- c. Zero Fuel Weight CG limit is 4% MAC forward of the aft limit.
- d. If fuel in reserve tanks 2 or 3 does not transfer, observe 325 KCAS/0.92M speed limitation for remainder of flight.

MAINTENANCE (M)

Confirm an In-Air signal failure caused the STAB XFR SIG status message to be displayed.

NOTE: For Center Wing Tank (CWT) Quantity signal failure or Single Point Sensor signal failure, use MEL item 28-41-02 or MEL item 28-21-04.

OPERATIONS (O)**For Passenger or Combi without Aux fuel tanks**

1. Loadability is reduced at takeoff weights above 385,553 kg.
2. Stabilizer tank must remain empty.
3. Load the airplane so that the actual Zero Fuel Weight CG is at least 4% MAC forward of the Aft Limit.
4. Plan required fuel load considering that fuel may become trapped in both reserve tanks. If not possible, flight plan to an en-route alternate, reverting to original destination once reserve fuel has transferred. Advise Flight Technical Dispatch.
5. If fuel in reserve tanks does not transfer, limit maximum operating speed to 325 KCAS/0.92 Mach for the remainder of the flight.

NOTE 1: Reserve tank fuel will automatically transfer when either main tank 2 or 3 quantity is reduced below 18,114 kg.

NOTE 2: Monitor fuel quantity indication and confirm fuel transfer from the reserve tanks. This is necessary since EICAS annunciation may not occur after subsequent failure enroute.

28-22-04 Horizontal Stabilizer Fuel Transfer Signals
*****28-22-04-01 In-Air Signals****28-22-04-01B Reserve Tank 2 and 3 Empty**

Interval	Installed	Required	Procedure
C	2	1	(M)

One may be inoperative with reserve tanks 2 and 3 empty provided:

- a. Stabilizer tank remains empty.
 - b. Maximum takeoff weight is limited to 335,658 kg.
-

MAINTENANCE (M)

Confirm an In-Air signal failure caused the STAB XFR SIG status message to be displayed.

NOTE: For Center Wing Tank (CWT) Quantity signal failure or Single Point Sensor signal failure, use MEL item 28-41-02 or MEL item 28-21-04.

OPERATIONS NOTE

1. Stabilizer tank must remain empty.
 2. All tanks (except stabilizer tank and reserve tanks 2 and 3) may be fueled to capacity, provided takeoff weight does not exceed 335,664 kg.
 3. Reduce Maximum Zero Fuel Weight by the weight of the center tank fuel. Center tank fuel may be used.
-

28-22-04 Horizontal Stabilizer Fuel Transfer Signals
*****28-22-04-02 Flaps-Retracted Signals**

Interval	Installed	Required	Procedure
C	2	1	(M)

One may be inoperative provided Stabilizer Tank remains empty.

MAINTENANCE (M)

Confirm a Flaps-Retracted signal failure caused the STAB XFR SIG status message to be displayed.

NOTE: For Center Wing Tank (CWT) Quantity signal failure or Single Point Sensor signal failure, use MEL item 28-41-02 or MEL item 28-21-04.

OPERATIONS NOTE

For Passenger or Combi without Aux fuel tanks

1. Loadability is reduced at takeoff weights above 385,553 kg.

-
2. Stabilizer tank must remain empty.
-

28-22-04 Horizontal Stabilizer Fuel Transfer Signals
*****28-22-04-03 Stabilizer Pump Switch-Position Signals**

Interval	Installed	Required	Procedure
C	2	0	(M)

May be inoperative provided Stabilizer Tank remains empty.

MAINTENANCE (M)

Confirm Stabilizer Pump Switch-Position signal failure(s) caused the STAB XFR SIG status message to be displayed.

NOTE: For Center Wing Tank (CWT) Quantity signal failure or Single Point Sensor signal failure, use MEL item 28-41-02 or MEL item 28-21-04.

OPERATIONS NOTE**For Passenger or Combi without Aux fuel tanks**

1. Loadability is reduced at takeoff weights above 385,553 kg.
2. Stabilizer tank must remain empty.

28-22-05 Fuel Crossfeed Valves**28-22-05-01 Fuel Crossfeed Valves 1 and 4**

Interval	Installed	Required	Procedure
C	2	1	(M) (O)

One may be inoperative provided:

- a. Valve is secured open.
- b. All main tank fuel quantity indicating systems operate normally.
- c. Crossfeed Valves 2 and 3 operate normally.

MAINTENANCE (M)

Secure the inoperative crossfeed valve in the open position.

1. Extend and deactivate the leading edge flaps (AMM 27-81-00/201).
2. For crossfeed valve 1, open P6 panel FUEL XFEED VALVE ENG 1 circuit breaker.
3. For crossfeed valve 4, open P6 panel FUEL XFEED VALVE ENG 4 circuit breaker.
4. Gain access to the inoperative crossfeed valve (AMM 28-22-02/401).
5. Disconnect, cap, and stow the crossfeed valve electrical connector.
6. Position manual override lever OPEN and lockwire.
7. Close the opened circuit breakers.
8. Activate and retract the leading edge flaps (AMM 27-81-00/201).

OPERATIONS (O)

NOTE: The FUEL X FEED _ advisory message will be displayed.

1. Use normal fuel procedures until main tanks are equal (>FUEL TANK/ENG advisory message displayed).
2. When >FUEL TANK/ENG advisory message displayed accomplish the following:
 - A. Set main tank 2 and 3 OVRD FWD and AFT pump switches OFF.
NOTE: The >FUEL TANK/ENG advisory message will remain displayed.
 - B. Set X FEED valve switches 2 and 3 to OFF.
NOTE: The >X FEED CONFIG advisory message will remain displayed.
3. For airplanes with hydro-mechanical fuel scavenge systems, expect fuel usage from tanks 1 and 4 to be greater than tanks 2 and 3, and >FUEL IMBALANCE advisory message may be displayed.
 - A. For >FUEL IMBALANCE displayed, set X FEED valve switches 2 and 3 ON and set MAIN PUMP switches 1 and 4 to OFF.

- B. When >FUEL IMBALANCE is no longer displayed, set MAIN PUMP switches 1 and 4 ON and set X FEED valve switches 2 and 3 to OFF.
4. The fuel synoptic crossfeed valve position display will be blank for all four crossfeed valves.

28-22-05 Fuel Crossfeed Valves**28-22-05-02 Fuel Crossfeed Valves 2 and 3**

Interval	Installed	Required	Procedure
C	2	1	(M) (O)

One may be inoperative provided:

- a. Valve is secured open.
- b. All main tank fuel quantity indicating systems operate normally.
- c. Crossfeed Valves 1 and 4 operate normally.
- d. Center tank remains empty, or maximum zero fuel weight is reduced by the weight of the center tank.
- e. Horizontal stabilizer tank remains empty.

MAINTENANCE (M)

Secure the inoperative crossfeed valve in the open position.

1. Extend and deactivate the leading edge flaps (AMM 27-81-00/201).
2. For crossfeed valve 2, open P6 panel FUEL XFEED VALVE ENG 2 circuit breaker.
3. For crossfeed valve 3, open P6 panel FUEL XFEED VALVE ENG 3 circuit breaker.
4. Gain access to the inoperative crossfeed valve (AMM 28-22-02/401).
5. Disconnect, cap, and stow the crossfeed valve electrical connector.
6. Position manual override lever OPEN and lockwire.
7. Close the opened circuit breakers.
8. Activate and retract the leading edge flaps (AMM 27-81-00/201).

OPERATIONS (O)**For Passenger or Combi without Aux fuel tanks**

1. Loadability is reduced at takeoff weights above 385,553 kg.
2. Reduce the Maximum Zero Fuel Weight by the weight of the center tank fuel. Center tank fuel may be used.
3. Takeoff fuel feed must be main tank-to-engine or main tanks 2 and 3 to all engines.

NOTE: If the center tank contains fuel, ensure the center tank override/jettison pumps are selected OFF prior to takeoff.

4. Horizontal stabilizer tank must remain empty

5. The fuel synoptic crossfeed valve position display will be blank for all four crossfeed valves.

28-25-01 APU Fuel (DC) Pump

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative deactivated.

MAINTENANCE (M)

Deactivate the APU DC fuel pump.

1. Open and collar the P6 panel DC FUEL PUMP APU circuit breaker.
2. For APU operation:
 - A. Apply external power to the AC Buses (AMM 24-22-00/201).
 - B. Position main pump 2 aft switch ON.
 - C. Start and run APU using normal procedures (AMM 49-11-00/201).

28-25-02 APU Fuel Valve

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative closed.

MAINTENANCE (M)

NOTE: For towing airplane with an inoperative APU refer to AMM 09-11-00/201.

Deactivate the APU fuel valve in the closed position.

1. Position the Electrical System Control Panel (P5) APU master control switch OFF.
2. Open and collar the P6 panel APU FUEL SHUT OFF circuit breaker.
3. Open and collar P6 panel APU ALTN CONT circuit breaker.
4. Open and collar P83 panel APU PRIMARY CONT circuit breaker.
5. Gain access to the APU fuel valve (AMM 28-25-02/401).
6. Manually position the APU fuel valve closed.

OPERATIONS (O)

1. For insufficient external power, prior to engine start:
 - A. Position all fuel pumps and R UTILITY power switch OFF.
 - B. If needed, position L UTILITY power switch OFF.
2. Select fuel pumps as required for each individual engine start.
3. Restore utility power and ensure the fuel panel is correctly configured after engine start.
4. For EE CLNG SUP FAN status message displayed, it can be cleared by rotating the EQUIP COOLING switch to OVRD, then back to NORM.
5. For RECIRC FAN UPR or LWR status message displayed, momentarily depress the PACK RST switch until each has cleared.

NOTE 1: Removing power from both utility busses results in loss of cabin lighting except for passenger signs and night lighting. At night, to prepare cabin lighting before removing power from the utility busses, instruct the cabin crew to turn on cabin night lighting.

NOTE 2: Utility Bus equipment is listed in MEL item 24-56-01.

28-26-01 Manually Operated Defuel Valves

Interval	Installed	Required	Procedure
C	2	0	(M)

May be inoperative secured closed.

MAINTENANCE (M)

Secure the inoperative defuel valve in the closed position.

1. Gain access to the inoperative defuel valve (AMM 28-26-01/401).
2. Manually rotate valve handle to closed.
3. Secure the valve handle with lockwire to nearby structure.

28-31-01 Fuel Jettison System

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

All components may be inoperative provided:

- a. Airplane performance requirements are satisfied, including Approach Climb and Landing Climb capability.
- b. Jettison nozzle valves are secured closed.
- c. Main tanks 1 and 4 transfer valves are secured closed.
- d. All main tank 1 and 4 boost pumps operate normally.

MAINTENANCE (M)

Secure the jettison nozzle valves closed and secure main tanks 1 and 4 transfer valves closed.

1. Secure the fuel jettison nozzle valves closed.
 - A. Gain access to fuel jettison nozzle valves (AMM 28-31-05/401).
 - B. Disconnect cap and stow the fuel jettison nozzle valves electrical connectors.
 - C. Manually position valves closed.
2. Secure the main tanks 1 and 4 transfer valves closed.
 - A. Gain access to main tanks 1 and 4 transfer valves (AMM 28-16-04/401).
 - B. Disconnect cap and stow the transfer valves electrical connectors (DV55, DV50).
 - C. Position associated valve override lever closed and lockwire.

OPERATIONS (O)

Limit the takeoff weight to the maximum climb limited landing weight at the departure airport plus 7,257 kg.

NOTE: Max climb weight can be found in B747 Performance Manual Section 3.6.

28-31-01 Fuel Jettison System**28-31-01-01 Center Wing Tank Jettison/Transfer Valves**

Interval	Installed	Required	Procedure
C	2	0	(M)

May be inoperative secured closed provided associated inboard main tank jettison/transfer valve(s) operates normally.

MAINTENANCE (M)

Secure the inoperative center wing tank jettison/transfer valve closed.

1. Gain access to the inoperative jettison/transfer valve (AMM 28-31-04/401).
2. Disconnect, cap and stow the valve electrical connector.
3. Manually position valves closed.

28-31-01 Fuel Jettison System**28-31-01-01 Center Wing Tank Jettison/Transfer Valves****28-31-01-01-01 Passenger/Combi**

Interval	Installed	Required	Procedure
C	2	0	(M) (O)

May be inoperative provided:

- a. Valve(s) is secured open.
- b. Both jettison nozzle valves operate normally.
- c. Stabilizer tank remains empty.

MAINTENANCE (M)

Secure the inoperative center wing tank jettison/transfer valve open.

1. Gain access to the inoperative jettison/transfer valve (AMM 28-31-04/401).
2. Disconnect, cap and stow the valve electrical connector.
3. Manually position valves open.

OPERATIONS (O)

For Passenger or Combi without Aux fuel tanks:

1. Loadability is reduced at takeoff weights above 385,553 kg.
2. Stabilizer tank must remain empty.

28-31-01 Fuel Jettison System**28-31-01-02 Main Tanks 2 and 3 Jettison/Transfer Valves**

Interval	Installed	Required	Procedure
C	2	0	(M)

May be inoperative secured closed provided associated center wing tank jettison/transfer valve(s) operates normally.

MAINTENANCE (M)

Secure the inoperative main tanks 2 and 3 jettison/transfer valves closed.

1. Gain access to inoperative jettison/transfer valves (AMM 28-31-04/401).
2. Disconnect, cap and stow the fuel jettison valve electrical connectors.

3. Manually position valves closed.

28-31-01 Fuel Jettison System**28-31-01-02 Main Tanks 2 and 3 Jettison/Transfer Valves****28-31-01-02-01 Passenger/Combi**

Interval	Installed	Required	Procedure
C	2	0	(M) (O)

May be inoperative provided:

- a. Valve(s) is secured open.
 - b. Both jettison nozzle valves operate normally.
 - c. Stabilizer tank remains empty.
-

MAINTENANCE (M)

Secure the inoperative main tanks 2 and 3 jettison/transfer valve open.

1. Gain access to the inoperative jettison/transfer valve (AMM 28-31-04/401).
2. Disconnect, cap and stow the valve electrical connector.
3. Manually position valves open.

OPERATIONS (O)

For Passenger or Combi without Aux fuel tanks:

1. Loadability is reduced at takeoff weights above 385,553 kg.
 2. Stabilizer tank must remain empty.
-

28-31-01 Fuel Jettison System**28-31-01-03 Main Tanks 1 and 4 Transfer Valves**

Interval	Installed	Required	Procedure
C	2	0	(M)

May be inoperative secured closed provided:

- a. Required fuel to be jettisoned does not deplete inboard main tank below the quantity in the outboard main tanks.
 - b. Both boost pumps for associated tank operate normally.
-

MAINTENANCE (M)

Secure the inoperative main tanks 1 and 4 transfer valves closed.

1. Gain access to the inoperative transfer valves (AMM 28-16-04/401).
2. Disconnect, cap and stow valve electrical connector (DV55, DV50).
3. Position associated valve override lever closed and lockwire.

28-31-01 Fuel Jettison System**28-31-01-04 Fuel Jettison Control Cards**

Interval	Installed	Required	Procedure
C	2	1	(M)

FJCC A may be inoperative provided FJCC B is verified to operate normally prior to each departure.

MAINTENANCE (M)

Before each departure, verify FJCC B operates normally.

1. Confirm operation of fuel jettison control card B by performing Fuel Jettison Control Card - Operational Test (AMM 28-31-00/501).

-
- 28-31-02 Main Tanks 2 and 3 Override/Jettison Pumps**
28-31-02A All Engine Driven Generators Operate Normally

Interval	Installed	Required	Procedure
C	4	3	(M)

One forward or aft override/jettison pump may be inoperative deactivated provided, for an aft override/jettison pump, all engine driven generator systems operate normally.

MAINTENANCE (M)

Deactivate the inoperative fuel pump.

1. For tank 2 forward override/jettison pump inoperative, open and collar P414 panel FUEL OVRD/JTSN PUMP FWD 2.
2. For tank 2 aft override/jettison pump inoperative, open and collar P415 panel FUEL OVRD/JTSN PUMP AFT 2.
3. For tank 3 forward override/jettison pump inoperative, open and collar P414 panel FUEL OVRD/JTSN PUMP FWD 3.
4. For tank 3 aft override/jettison pump inoperative, open and collar P415 panel FUEL OVRD/JTSN PUMP AFT 3.

OPERATIONS NOTE

To preclude possibility of fuel imbalance between main tanks 2 and 3, it is recommended that an override/jettison pump in the symmetrical main tank be selected OFF. If an operative pump is selected OFF, it may be selected ON should the crew desire to minimize time required to jettison fuel.

- 28-31-02 Main Tanks 2 and 3 Override/Jettison Pumps**
28-31-02B Associated Main Tank Boost Pumps Operate Normally

Interval	Installed	Required	Procedure
C	4	3	(M)

One forward or aft override/jettison pump may be inoperative deactivated provided, for an aft override/jettison pump, both associated main tank boost pumps operate normally.

MAINTENANCE (M)

Deactivate the inoperative fuel pump.

1. For tank 2 forward override/jettison pump inoperative, open and collar P414 panel FUEL OVRD/JTSN PUMP FWD 2.

2. For tank 2 aft override/jettison pump inoperative, open and collar P415 panel FUEL OVRD/JTSN PUMP AFT 2.
3. For tank 3 forward override/jettison pump inoperative, open and collar P414 panel FUEL OVRD/JTSN PUMP FWD 3.
4. For tank 3 aft override/jettison pump inoperative, open and collar P415 panel FUEL OVRD/JTSN PUMP AFT 3.

OPERATIONS NOTE

To preclude possibility of fuel imbalance between main tanks 2 and 3, it is recommended that an override/jettison pump in the symmetrical main tank be selected OFF. If an operative pump is selected OFF, it may be selected ON should the crew desire to minimize time required to jettison fuel.

28-31-02 Main Tanks 2 and 3 Override/Jettison Pumps

28-31-02C All Main Tank Boost Pumps Operate Normally

Interval	Installed	Required	Procedure
C	4	2	(M)

One forward or aft override/jettison pump per tank may be inoperative deactivated provided:

- a. For an inoperative aft override/jettison pump, all engine driven generator systems operate normally.
- b. All Main Tanks 2 and 3 boost pumps operate normally.

MAINTENANCE (M)

Deactivate the inoperative fuel pumps.

1. For tank 2 forward override/jettison pump inoperative, open and collar P414 panel FUEL OVRD/JTSN PUMP FWD 2.
2. For tank 2 aft override/jettison pump inoperative, open and collar P415 panel FUEL OVRD/JTSN PUMP AFT 2.
3. For tank 3 forward override/jettison pump inoperative, open and collar P414 panel FUEL OVRD/JTSN PUMP FWD 3.
4. For tank 3 aft override/jettison pump inoperative, open and collar P415 panel FUEL OVRD/JTSN PUMP AFT 3.

28-31-03 Horizontal Stabilizer Pumps

Interval	Installed	Required	Procedure
C	2	0	(M) (O)

May be inoperative deactivated provided stabilizer tank remains empty.

MAINTENANCE (M)

NOTE: HST pumps, CWT pumps and Main Tank Override/Jettison pumps are interchangeable. Swapping the inoperative pump with one from another location may provide alternate options (MEL item 28-31-02 or MEL item 28-31-04).

Deactivate the inoperative pump.

1. For the left stabilizer pump, open and collar P85 panel HORIZ STAB XFER/JETT PUMP - LEFT circuit breaker.
2. For the right stabilizer pump, open and collar P85 panel HORIZ STAB XFER/JETT PUMP - RIGHT circuit breaker.

OPERATIONS (O)**For Passenger or Combi without Aux fuel tanks**

1. Loadability is reduced at takeoff weights above 385,553 kg.
2. Stabilizer tank must remain empty.

28-31-04 Center Tank Override Jettison Pumps**28-31-04A Center Tank Fuel Usable**

Interval	Installed	Required	Procedure
C	2	1	(M) (O)

May be inoperative deactivated provided:

- a. Horizontal stabilizer tank remains empty.
- b. With center tank fueled, fuel quantity remaining in main wing tanks is adequate to reach a suitable airport if remaining center tank pump fails at any time.
- c. Maximum zero fuel weight is reduced by the weight of the center tank fuel.
- d. Center tank quantity indication operates normally.

MAINTENANCE (M)

NOTE: HST pumps, CWT pumps and Main Tank Override/Jettison pumps are interchangeable. Swapping the inoperative pump with one from another location may provide alternate options (MEL item 28-31-02 or MEL item 28-31-03).

Deactivate the inoperative center tank override/jettison fuel pump.

1. For the center left override/jettison pump inoperative, open and collar P414 panel FUEL OVRD/JTSN PUMP CTR LEFT circuit breaker.
2. For the center right override/jettison pump inoperative, open and collar P415 panel FUEL OVRD/JTSN PUMP CTR RIGHT circuit breaker.
3. Position associated CWT override/jettison pump switch OFF.

OPERATIONS (O)**For Passenger or Combi without Aux fuel tanks**

1. The horizontal stabilizer tank must remain empty.
2. Loadability is reduced at takeoff weights above 385,553 kg.
3. Reduce the maximum zero fuel weight by the weight of the center tank fuel. Center tank fuel may be used.
4. Position associated CWT override/jettison pump switch OFF.
 - A. The FUEL OVD CTR L or R advisory message for the inoperative pump will be displayed if the center tank contains more than 7,710 kg of fuel when on the ground and prior to engine start and more than 1,814 kg of fuel when in cruise flight.
5. For using fuel in the CWT:
 - A. Flight plan should be such that fuel quantity remaining in main wing tanks is adequate to reach a suitable airport if the remaining center pump fails at any time.

- B. For takeoff, position operative override/jettison pump switch OFF until reaching cruise. After reaching cruise, position operative override/jettison pump switch ON and accomplish the FUEL PRESS CTR advisory message Non-Normal Checklist.

28-31-04 Center Tank Override Jettison Pumps**28-31-04B Center Tank Fuel Considered Unusable**

Interval	Installed	Required	Procedure
C	2	0	(M) (O)

May be inoperative deactivated provided:

- a. Horizontal stabilizer tank remains empty.
 - b. Maximum zero fuel weight is reduced by the weight of the center tank fuel.
 - c. Center tank fuel is considered unusable.
-

MAINTENANCE (M)

Deactivate the center tank override/jettison fuel pumps.

1. For the center left override/jettison pump inoperative, open and collar P414 panel FUEL OVRD/JTSN PUMP CTR LEFT circuit breaker.
2. For the center right override/jettison pump inoperative, open and collar P415 panel FUEL OVRD/JTSN PUMP CTR RIGHT circuit breaker.
3. Position associated CWT override/jettison pump switch OFF.

OPERATIONS (O)**For Passenger or Combi without Aux fuel tanks**

1. The horizontal stabilizer tank must remain empty.
2. Loadability is reduced at takeoff weights above 385,553 kg.
3. Reduce the maximum zero fuel weight by the weight of the center tank fuel.
4. Center tank fuel is considered unusable.
5. Position associated CWT override/jettison pump switch OFF.
 - A. The FUEL OVD CTR L or R advisory message for the inoperative pump will be displayed if the center tank contains more than 7,710 kg of fuel when on the ground and prior to engine start and more than 1,814 kg of fuel when in cruise flight.

28-41-01 Main Tank Fuel Quantity Indicating Systems (Flight Deck)

Interval	Installed	Required	Procedure
C	4	3	(M) (O)

One may be inoperative provided:

- a. FMC is initialized with the known total fuel quantity.
 - b. Engine fuel flow indications operate normally.
 - c. FMC Calculated fuel quantity operates normally.
 - d. Tank is emptied and serviced with a known quantity of fuel, or measuring stick readings are taken to verify fuel quantity in tank with inoperative indicator after each refuelling.
 - e. All boost pumps for the associated tank operate normally.
 - f. If failed indicator is for main tank 2 or 3, management and jettison single point sensor systems for both tanks operate normally.
 - g. Remaining individual tank quantity indications are available.
 - h. Appropriate procedures are used enroute to identify engine fuel leaks if suspected or confirmed.
-

NOTE: The airplane must also be dispatched using MEL item 28-41-03.

MAINTENANCE (M)

Verify the fuel quantity in the tank with the inoperative fuel quantity indication system after each refueling.

1. Confirm fuel quantity using one of the following methods.
 - A. Defuel the associated tank (AMM 28-26-00/201) and service the tank with a known quantity of fuel (AMM 12-11-01/301).
 - B. Determine the fuel quantity using the associated tank's measuring sticks (AMM 28-44-00/001).

OPERATIONS (O)

For Passenger or Freightier:

NOTE: The FUEL IMBALANCE and the associated main tank pair FUEL IMBAL 1-4 or FUEL IMBAL 2-3 advisory messages will be inhibited for a blanked main tank quantity indication. The FUEL DISAGREE advisory message will either be displayed or inoperative.

1. Total fuel quantity must be calculated and manually initialized on the FMC PERF INIT page.
2. FMC Progress Page 1 LAST waypoint FUEL may display 0.0.
3. If it is necessary to jettison fuel enroute:
 - A. Record the FUEL TO REMAIN quantity selected for the jettison operation.

- B. Wait two minutes after fuel jettison is complete and then manually re-initialize the FMC with the total FUEL TO REMAIN quantity recorded above.
- 4. In case of enroute failure of the FMC calculated total fuel quantity, flight crew must keep a fuel log for remainder of flight.

NOTE: The PROGRESS page 1 display of FUEL quantity and actual time of arrival (ATA) at last waypoint prior to failure may be used as a starting point. In some failure modes, PROGRESS page 2 FUEL USED data may be available.

Sample Fuel Logs (all fuel quantities in kgs) based on centre tank quantity indication inoperative

Clock Time hrs	Average FF per Engine (EICAS)	# Engines Operating	Fuel Burn	Total Fuel Remaining	Sum of Operative Gauges	Fuel Remaining in Tank with Inop Gauge
12.00				145,900	-----	-----
12.00 to 13.00	2700	4	10,900	135,000	111,820	23,180
13.00 to 14.00	2600	4	10,400	124,600	111,820	12,780

- 5. To identify an engine affected by an engine fuel leak:
 - A. If CWT contains fuel:
 - 1) Calculate total fuel quantity available in CWT and Stabilizer Tank at the beginning of the flight.
 - 2) Verify the point (in time and place) enroute when 1360 kg of fuel remains in CWT (advisory message FUEL LOW CTR L or FUEL LOW CTR R) and compare with the corresponding flight plan point of predicted CWT fuel depletion. If CWT fuel depletion precedes the predicted point, an engine fuel leak should be suspected.
 - B. If CWT is empty or contains only Ballast Fuel, the crew must be alert for the following conditions as indications that a significant engine fuel leak has occurred:
 - 1) Rapid reduction in a fuel quantity indication if the leak resides with an engine associated with an operating fuel quantity indication.
 - 2) Excessive lateral trim requirement.
 - 3) An engine flame-out.
 - C. If an engine fuel leak is suspected, accomplish Non-Normal Checklist FUEL LEAK ENGINE.

- D. Non-Normal Checklist FUEL LEAK ENGINE requires identifying an engine fuel leak by observing one main tank fuel quantity decreasing faster than other main tank fuel quantities. Modify this requirement as follows:
- 1) For Main Tank 1 FQIS inoperative:
 - a. CROSSFEED VALVE 1, 4 Switches.....ON
 - b. OVERRIDE PUMP 2 AND 3 Switches....OFF
 - c. MAIN PUMP 1 Switches.....OFF

NOTE: Main Tank 4 now supplies fuel to both engines 1 and 4.

 - d. Confirm affected engine fuel leak by observing if Main Tank 4 fuel quantity decreases faster than the combined decrease in both Main Tanks 2 and 3 fuel quantity. A faster decrease of approximately 500 kg in 30 minutes should be considered confirmation that engine 1 has a fuel leak.
 - 2) For Main Tank 2 FQIS inoperative:
 - a. CROSSFEED VALVE 2, 3 Switches.....ON
 - b. OVERRIDE PUMP 2 AND 3 Switches....OFF
 - c. MAIN PUMP 2 Switches.....OFF

NOTE: Main Tank 3 now supplies fuel to both engines 2 and 3.

 - d. Confirm affected engine fuel leak by observing if Main Tank 3 fuel quantity decreases faster than the combined decrease in both Main Tanks 1 and 4 fuel quantity. A faster decrease of approximately 500 kg in 30 minutes should be considered confirmation that engine 2 has a fuel leak.
 - 3) For Main Tank 3 FQIS inoperative:
 - a. CROSSFEED VALVE 2, 3 Switches.....ON
 - b. OVERRIDE PUMP 2 AND 3 Switches....OFF
 - c. MAIN PUMP 3 Switches.....OFF

NOTE: Main Tank 2 now supplies fuel to both engines 2 and 3.

 - d. Confirm affected engine fuel leak by observing if Main Tank 2 fuel quantity decreases faster than the combined decrease in both Main Tanks 1 and 4 fuel quantity. A faster decrease of approximately 500 kg in 30 minutes should be considered confirmation that engine 3 has a fuel leak.
 - 4) For Main Tank 4 FQIS inoperative:
 - a. CROSSFEED VALVE 1, 4 Switches.....ON
 - b. OVERRIDE PUMP 2 AND 3 Switches....OFF

-
- c. MAIN PUMP 4 Switches.....OFF
NOTE: Main Tank 1 now supplies fuel to both engines 1 and 4.
 - d. Confirm affected engine fuel leak by observing if Main Tank 1 fuel quantity decreases faster than the combined decrease in both Main Tanks 2 and 3 fuel quantity. A faster decrease of approximately 500 kg in 30 minutes should be considered confirmation that engine 4 has a fuel leak.

28-41-02 Single Point Sensor Systems**28-41-02-01 Center Tank Sensors**

28-41-02-01A Stabilizer Tank Fuel Usable

Interval	Installed	Required	Procedure
C	2	1	

One may be inoperative provided center tank fuel quantity indicating system operates normally.

MAINTENANCE NOTE

The STAB XFR SIG status message may be displayed. The CMC should be checked prior to each departure to ensure no additional faults have occurred if the stabilizer tank is fueled.

28-41-02 Single Point Sensor Systems**28-41-02-01 Center Tank Sensors**

28-41-02-01B Stabilizer Tank Empty

Interval	Installed	Required	Procedure
C	2	0	(O)

May be inoperative provided stabilizer tank remains empty.

OPERATIONS (O)

1. Stabilizer tank must remain empty.
2. For operations of passenger or combi airplanes, loadability is reduced at takeoff weights above 385,553 kg.
3. The STAB XFR SIG status message may be displayed.

28-41-02 Single Point Sensor Systems**28-41-02-02 Main Tanks 2 and 3 Sensors (Reserve Transfer)****28-41-02-02A One Inoperative**

Interval	Installed	Required	Procedure
C	2	1	

One may be inoperative provided main tanks 2 and 3 fuel quantity indicating systems operate normally.

28-41-02 Single Point Sensor Systems**28-41-02-02 Main Tanks 2 and 3 Sensors (Reserve Transfer)****28-41-02-02B Both Inoperative**

Interval	Installed	Required	Procedure
C	2	0	(O)

May be inoperative with reserve tanks 2 and 3 fueled provided:

- a. Main tanks 2 and 3 fuel quantity indicating systems operate normally.
- b. Zero fuel weight CG limit is 4% MAC forward of the Aft Limit.
- c. If fuel in reserve tanks 2 or 3 does not transfer, observe 325 KCAS/0.92M speed limitation for remainder of flight.

OPERATIONS (O)

1. Plan required fuel load considering fuel may become trapped in reserve tanks.
2. Load the airplane so that the actual Zero Fuel Weight CG is at least 4% MAC forward of the Aft Limit.
3. Reserve tank fuel will automatically transfer when either Main Tank #2 or Main Tank #3 quantity is reduced below 18,144 kg.
NOTE: Confirm fuel quantity indication and fuel transfer from reserve tanks.
4. If fuel in reserve tanks does not transfer, limit maximum operating speed to 325 KCAS/0.92 Mach for the remainder of the flight.

28-41-02 Single Point Sensor Systems**28-41-02-02 Main Tanks 2 and 3 Sensors (Reserve Transfer)****28-41-02-02-01 Passenger/Combi**

Interval	Installed	Required	Procedure
C	2	0	(O)

May be inoperative with reserve tanks 2 and 3 empty provided maximum takeoff weight is limited to 335,658 kg.

OPERATIONS (O)

1. All tanks (except reserve tanks 2 and 3) may be fueled to capacity, provided takeoff weight for passenger or combi airplanes does not exceed 335,658 kg.
2. Empty reserve tanks 2 and 3 requires empty tail tank.

3. Reduce the Maximum Zero Fuel Weight by the weight of the center tank fuel. Center tank fuel may be used.

28-41-02 Single Point Sensor Systems**28-41-02-03 Main Tanks 2 and 3 Sensors (Main 1 and 4 Jettison Transfer)**

Interval	Installed	Required	Procedure
C	2	1	

One may be inoperative provided main tanks 2 and 3 fuel quantity indicating systems operate normally.

28-41-03 Total Fuel Quantity Indication

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative provided:

- a. FMC is initialized with the known total fuel quantity.
 - b. Engine fuel flow indications and FMC Calculated fuel quantity operates normally.
 - c. Both FMCs operate normally.
-

MAINTENANCE (M)

If any individual tank quantities required for dispatch are not available on the fuel synoptic page, MEL restrictions for the associated tank quantity indicating system must be observed.

OPERATIONS (O)

For Passenger or Freighter:

1. Total fuel quantity must be calculated and manually initialized on the FMC PERF INIT page.
2. FMC Progress Page 1 LAST waypoint FUEL may display 0.0.
3. If total fuel quantity is inoperative as a result of an individual tank quantity indication, MEL restrictions for that item must be observed.
4. If it is necessary to jettison fuel enroute:
 - A. Record the FUEL TO REMAIN quantity selected for the jettison operation.
 - B. Wait two minutes after fuel jettison is complete and then manually re-initialize the FMC with the total FUEL TO REMAIN quantity recorded above.
5. The FUEL DISAGREE advisory message will be inoperative.
6. In case of enroute failure of the FMC calculated total fuel quantity, flight crew must keep a fuel log for remainder of flight. See MEL item 28-41-01 for sample fuel logs.

NOTE: The PROGRESS page 1 display of FUEL quantity and ATA at the last waypoint prior to failure may be used as a starting point. In some failure modes, PROGRESS page 2 FUEL USED data may be available.

**28-41-04 Center Tank Fuel Quantity Indicating System
(Flight Deck)**

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided:

- a. Center tank and stabilizer tank remain empty.
 - b. FMC is initialized with the known total fuel quantity.
-

NOTE: The airplane must also be dispatched using MEL item 28-41-03.

OPERATIONS (O)

1. Total fuel quantity must be calculated and manually initialized on the FMC PERF INIT page.
2. FMC Progress Page 1 LAST waypoint FUEL may display 0.0.
3. Center tank override jettison pumps and horizontal stabilizer pumps should remain OFF.
4. If it is necessary to jettison fuel enroute:
 - A. Record the FUEL TO REMAIN quantity selected for the jettison operation.
 - B. Wait two minutes after fuel jettison is complete and then manually re-initialize the FMC with the total FUEL TO REMAIN quantity recorded above.
5. In case of enroute failure of the FMC calculated total fuel quantity, flight crew must keep a fuel log for the remainder of the flight. See MEL item 28-41-01 for sample fuel logs.

NOTE: The PROGRESS page 1 display of FUEL quantity and ATA at the last waypoint prior to failure may be used as a starting point. In some failure modes, PROGRESS page 2 FUEL USED data may be available.

**28-41-05 Reserve Tank Fuel Quantity Indicating Systems
(Flight Deck)**

Interval	Installed	Required	Procedure
C	2	0	(M) (O)

May be inoperative with reserve tanks 2 and 3 fueled provided:

- a. Tank is emptied and serviced with a known quantity of fuel, or measuring stick readings are taken to verify quantity in tank with inoperative indicator after each refueling.
 - b. FMC is initialized with the known total fuel quantity.
 - c. Engine fuel flow indications and FMC Calculated fuel quantity operates normally.
 - d. Remaining individual tank quantity indications are available.
-

NOTE: The airplane must also be dispatched using MEL item 28-41-03.

MAINTENANCE (M)

Verify the fuel quantity in the tank with the inoperative fuel quantity indication system after each refueling.

1. Confirm fuel quantity using one of the following methods.
 - A. Defuel the associated tank (AMM 28-26-00/201) and service the tank with a known quantity of fuel (AMM 12-11-01/301).
 - B. Determine the fuel quantity using the associated tank's measuring sticks (AMM 28-44-00/001).

OPERATIONS (O)

For Passenger or Freighter:

1. Total fuel quantity must be calculated and manually initialized on the FMC PERF INIT page.
2. FMC Progress Page 1 LAST waypoint FUEL may display 0.0.
3. If it is necessary to jettison fuel enroute:
 - A. Record the FUEL TO REMAIN quantity selected for the jettison operation.
 - B. Wait two minutes after fuel jettison is complete and then manually re-initialize the FMC with the total FUEL TO REMAIN quantity recorded.
4. The FUEL DISAGREE advisory message will be inoperative.
5. In case of enroute failure of FMC calculated total fuel quantity, flight crew must keep a fuel log for remainder of flight. (See MEL item 28-41-01 for sample fuel logs).

NOTE: The PROGRESS page 1 display of FUEL quantity and actual time of arrival (ATA) at the last waypoint prior to failure may be used as a starting point. In some failure modes, PROGRESS page 2 FUEL USED data may be available.

28-41-05 Reserve Tank Fuel Quantity Indicating Systems (Flight Deck)**28-41-05-01 Passenger/Combi**

Interval	Installed	Required	Procedure
C	2	0	(O)

May be inoperative with reserve tanks 2 and 3 empty provided:

- a. Takeoff weight is limited to a maximum of 335,658 kg.
 - b. Remaining individual tank quantity indications are available.
-

NOTE: The airplane must also be dispatched using MEL item 28-41-03.

OPERATIONS (O)

1. Total fuel quantity must be calculated and manually initialized on the FMC PERF INIT page.
2. FMC Progress Page 1 LAST waypoint FUEL may display 0.0.
3. All tanks (except reserve tanks 2 and 3) may be fueled to capacity, provided takeoff weight does not exceed 335,658 kg.
4. Reduce Maximum Zero Fuel Weight by the weight of the center tank fuel. Center tank fuel may be used.

28-41-06 Wing Fueling Station Quantity Indicating System

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided preselect refueling is not used.

MAINTENANCE (M)

Use the AMM Manual Pressure Refueling procedure (AMM 12-11-03/301).

Use flight deck fuel synoptic or fuel measuring sticks and aircraft attitude inclinometers to ensure that the correct amount of fuel has been loaded.

NOTE: If the flight deck fuel synoptic is blank for one or more tanks, the automatic fuel shutoff for the related tank(s) will be inoperative.

28-41-07 Horizontal Stabilizer Tank Fuel Quantity Indicating System (Flight Deck)

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative provided:

- a. Stabilizer tank remains empty.
- b. Remaining individual tank quantity indications are available.
- c. FMC is initialized with the known total fuel quantity.
- d. Engine fuel flow indications and FMC Calculated fuel quantity operates normally.
- e. Horizontal stabilizer REU is deactivated (removed).

MAINTENANCE (M)

Deactivate the horizontal stabilizer tank Remote Electronic Unit (REU) and refueling system.

1. Deactivate the horizontal stabilizer tank REU by removing the REU or the REU Individual Fuel Quantity Channel (IFQC) card.
 - A. For removing the REU, use the AMM REU removal procedure (AMM 28-41-14/401).
 - B. For removing the REU IFQC card, use the AMM REU IFQC card removal procedure (AMM 28-41-17/401).

NOTE: If the CMC message FUEL QTY HORIZ STAB REMOTE ELEC UNIT IFQC BOARD FAIL is not displayed prior to removal, the removed REU may be tagged suitable for future re-installation.
2. Deactivate the horizontal stabilizer tank refueling system.
 - A. For horizontal stabilizer tank not empty, transfer fuel from the stabilizer tank to the center wing tank (AMM 28-26-00/201).
 - B. Verify the tank is empty by activating the Left and Right Stabilizer Tank Pumps until each pump's low pressure light illuminates continuously for ten seconds.
 - C. Position P42 fueling control panel horizontal stabilizer fuel isolation valve control switch closed.
 - D. Open and collar P7 panel REFUEL & XFR STAB L and REFUEL & XFR STAB R circuit breakers.

OPERATIONS (O)

For Passenger without Aux fuel tanks

1. Total fuel quantity must be calculated and manually initialized on the FMC PERF INIT page.
2. FMC Progress Page 1 LAST waypoint FUEL may display 0.0.
3. Loadability is reduced at takeoff weights above 385,553 kg.
4. The FUEL QTY SYS and STAB XFR VLV status messages will be displayed.
5. For fuel jettison:
 - A. Record the FUEL TO REMAIN quantity selected for the jettison operation.
 - B. Wait two minutes after fuel jettison is complete and then manually re-initialize the FMC with the total FUEL TO REMAIN quantity recorded.
6. The FUEL DISAGREE advisory message will be inoperative.

28-42-01 Fuel Pump Low PRESS Lights

Interval	Installed	Required	Procedure
C	14	-	

One PRESS light may be inoperative for each tank containing fuel.

NOTE: Not required for empty tanks.

28-42-02 Stabilizer Fuel Pump Low PRESS Lights*******

Interval	Installed	Required	Procedure
C	2	0	

May be inoperative provided associated pump(s) operate normally.

NOTE: No other alleviation for this item is given.

28-43-01 Fuel Temperature Indication (Main Tank #1)**28-43-01A One Operative**

Interval	Installed	Required	Procedure
C	-	1	(M)

MAINTENANCE (M)

Select Fuel Temperature Sensor A or B as required on Overhead Maintenance Panel.

28-43-01 Fuel Temperature Indication (Main Tank #1)**28-43-01B All Inoperative**

Interval	Installed	Required	Procedure
C	-	0	

May be inoperative provided Total Air Temperature (TAT) or Static Air Temperature (SAT) to (TAT) conversion is substituted as an indication of fuel temperature.

28-44-01 Measuring Sticks

Interval	Installed	Required	Procedure
C	-	0	

May be inoperative provided fuel quantity is verified by other means.

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29-11-01 Engine Driven Hydraulic Pump Systems**29-11-01A Associated Pump Operated in Depressurized Mode**

Interval	Installed	Required	Procedure
C	4	3	(M) (O)

One engine pump system, including the pump and/or associated plumbing, may be inoperative provided:

- a. All Demand pumps operate normally.
- b. Demand pump for the associated hydraulic system remains ON.
- c. Associated pump is operated in the depressurized mode with fluid supply and pump case return functioning normally.

MAINTENANCE (M)

NOTE: If the affected EDP shutoff valve is inoperative in the closed position or the fluid supply or the pump case drain lines are not functioning normally, the EDP must be deactivated (AMM 29-11-05/201).

Confirm the inoperative Engine Driven Pump (EDP) shutoff valve is in the open position and fluid supply and pump case return are operating normally.

1. Gain access to the inoperative EDP shutoff valve (AMM 29-11-04).
2. Confirm that the hydraulic shutoff valve position indicator is in the open position.
3. Confirm fluid supply and pump drain case are satisfactory by engine motoring (AMM 71-00-00/201) and ensure pressure, quantity and temperature indications on the hydraulic synoptic page are within correct ranges.
4. Confirm the affected EDP is set to OFF for depressurised operation.

OPERATIONS (O)

1. Position the associated Engine Hydraulic Pump Switch in the off position.
2. After engine start, position the associated hydraulic DEMAND pump selector ON for the entire flight.

29-11-01 Engine Driven Hydraulic Pump Systems**29-11-01B Associated Pump Deactivated**

Interval	Installed	Required	Procedure
C	4	3	(M) (O)

One engine pump system, including the pump and/or associated plumbing, may be inoperative provided:

- a. All Demand pumps operate normally.
- b. Demand pump for the associated hydraulic system remains ON.

- c. Associated pump is deactivated.

MAINTENANCE (M)

Deactivate the inoperative Engine Driven Pump (EDP).

1. Deactivate the inoperative EDP (AMM 29-11-05/201).

OPERATIONS (O)

After engine start, position the associated hydraulic DEMAND pump selector ON for the entire flight.

29-11-01 Engine Driven Hydraulic Pump Systems

29-11-01-01 Pump Depressurization Function

Interval	Installed	Required	Procedure
C	4	3	

One pump depressurization function may be inoperative.

29-11-01 Engine Driven Hydraulic Pump Systems

29-11-01-02 Supply Shutoff Valves

29-11-01-02A Associated Pump Deactivated

Interval	Installed	Required	Procedure
C	4	3	(M) (O)

One supply shutoff valve may be inoperative closed provided:

- a. All Demand pumps operate normally.
- b. Demand pump for the associated hydraulic system remains ON.
- c. Associated pump is deactivated.

MAINTENANCE (M)

Deactivate the associated Engine Driven Pump (EDP) and the inoperative supply shutoff valve closed.

1. Deactivate the inoperative EDP (AMM 29-11-05/201).
2. Deactivate the EDP hydraulic supply shutoff valve closed.
 - A. Gain access to the hydraulic shutoff valve (AMM 29-11-04).
 - B. Open the associated P6 panel engine fire extinguisher circuit breakers.
 - 1) For EDP 1 or 3: FIRE EXT ENG 1 & 3 BTL A and FIRE EXT ENG 1 & 3 BTL B

- 2) For EDP 2 or 4: FIRE EXT ENG 2 & 4 BTL A and FIRE EXT ENG 2 & 4 BTL B
- C. Pull (do not turn) the associated P5 engine fire control panel Engine Fire Switch.

NOTE: To operate the engine fire control switch, push the override switch below the engine fire control switch.
- D. Confirm the associated EDP shutoff valve is in the closed position.
- E. Open and collar the associated P7 panel HYDRAULICS EDP SUPPLY circuit breaker:
- F. Push the associated P5 engine fire control panel Engine Fire Switch back to its normal position.
- G. Close the opened engine fire extinguisher circuit breakers.

OPERATIONS (O)

After engine start, position the associated hydraulic DEMAND pump selector ON for the entire flight.

29-11-02 Demand Hydraulic Pumps

29-11-02-01 No. 1 or No. 4 Demand Pump Systems

Interval	Installed	Required	Procedure
C	2	1	(M) (O)

One may be inoperative deactivated provided:

- VMCG is increased by 5 kts. If V1 is less than the corrected VMCG value, take-off is permitted provided V1 is set equal to the corrected VMCG and the Accelerate Stop Distance Available exceeds 2010 m (6600 ft) for a dry runway or 2390 m (7830 ft) for a wet runway.
- Takeoff performance must be in accordance with the AFM appendix for landing gear extended. Request take-off performance from CARD using the Performance Correction Codes for 'LANDING GEAR EXTENDED' & 'DEMAND HYDRAULIC PUMPS 1 or 4 INOP' shown in the Performance Manual. If CARD is not available contact FTD.
- Demand pumps 2 and 3 operate normally.

CAUTION: WITH DEMAND PUMP 1 OR 4 INOPERATIVE, AN ASSOCIATED ENGINE FAILURE ON TAKE-OFF, WILL CAUSE AN HYDRAULIC SYSTEM LOSS, PREVENTING RETRACTION OF SOME LANDING GEAR, AND WILL REQUIRE ELECTRIC OPERATION OF TRAILING EDGE FLAPS. IT IS PROBABLE THAT THE AIRCRAFT WILL NOT BE CAPABLE OF LONG DISTANCE OPERATIONS, DUE TO THE TAKE OFF PERFORMANCE LIMITED (TOPL) WEIGHT DECREMENTS FOR 'OBSTACLE CLEARANCE AND TAKE-OFF CLIMB' REQUIRED IN OPERATIONS PROCEDURE. DEPENDING ON ALTITUDE AND TEMPERATURE THE TOPL RESTRICTIONS WILL BE IN THE ORDER OF 50 TONNES. CONTACT FLIGHT TECHNICAL DISPATCH OR MAINTROL FOR ADVICE.

MAINTENANCE (M)

Deactivate the inoperative demand pump.

- Position associated HYD PUMPS DEMAND selector OFF.
- Open and collar the associated P7 panel HYDR _ DEMAND circuit breaker.
- Confirm the Air Driven Pump (ADP) air shutoff valve is closed.
 - Pressurize the pneumatic manifold (AMM 36-00-00/201).
 - Confirm no air is being exhausted from the ADP exhaust louvers.

- C. For air being exhausted from the ADP exhaust louvers, secure the speed or shutoff valve closed.
 - 1) Depressurize the pneumatic manifold (AMM 36-00-00/201).
 - 2) Gain access to the air shutoff valve (RH trailing edge fairing door).
 - 3) Confirm the shutoff valve is closed (actuator fully retracted).
 - 4) For both speed and shutoff valves open, secure at least one of the valves closed.
 - a. Disconnect at least one valve actuator from the valve shaft (leaving cranking arm on shaft).
 - b. Move valve shaft to the closed position and lockwire.

OPERATIONS (O)

1. Takeoff:

- A. With Demand Hydraulic Pumps No. 1 or No. 4 inoperative, an engine failure at the same position (1 or 4) on takeoff will cause a hydraulic system loss, preventing retraction of some landing gear, and will require secondary mode (electric) operation of trailing edge flaps. Takeoff performance (including obstacle clearance) is thus based on gear and flaps extended.

Request take-off performance from CARD using the Performance Correction Codes for 'LANDING GEAR EXTENDED' & 'DEMAND HYDRAULIC PUMPS 1 or 4 INOP' shown in the Performance Manual. If CARD is not available contact FTD.

NOTE: At take-off weights greater than 326,600 kg, flaps up manoeuvring speed (VREF+100) may exceed VLO (270 kts). Ensure gear is retracted prior to selecting Flaps Up.

B. After takeoff:

- 1) Retract landing gear with the gear lever using normal procedures.
- 2) Retract flaps with the flap lever using normal procedures.

29-11-02 Demand Hydraulic Pumps

29-11-02-02 No. 2 or No. 3 Demand Pump Systems

Interval	Installed	Required	Procedure
C	2	1	(M)

One may be inoperative deactivated provided demand pumps 1 and 4 operate normally.

MAINTENANCE (M)

Deactivate the inoperative demand pump.

1. Position associated HYD PUMPS DEMAND selector OFF.

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2. Open and collar the associated P7 panel HYDR _ DEMAND circuit breaker.
3. For an inoperative demand Air Driven Pump (ADP), confirm the air shutoff valve is closed.
 - A. Pressurize the pneumatic manifold (AMM 36-00-00/201).
 - B. Confirm no air is being exhausted from the ADP exhaust louvers.
 - C. For air being exhausted from the ADP exhaust louvers, secure the speed or shutoff valve closed.
 - 1) Depressurize the pneumatic manifold (AMM 36-00-00/201).
 - 2) Gain access to the air shutoff valve (RH trailing edge fairing door).
 - 3) Confirm the shutoff valve is closed (actuator fully retracted).
 - 4) For both speed and shutoff valves open, secure at least one of the valves closed.
 - a. Disconnect at least one valve actuator from the valve shaft (leaving cranking arm on shaft).
 - b. Move valve shaft to the closed position and lockwire.

29-11-03 Demand Pump Selector**29-11-03-01 AUTO Position****29-11-03-01A Associated Pump Operative**

Interval	Installed	Required	Procedure
C	4	0	(M) (O)

May be inoperative provided:

- a. If the affected pump is either No. 1 and/or No. 4, it remains ON during takeoff and landing.
- b. Verify OFF and ON positions operate normally.

MAINTENANCE (M)

Verify that OFF and ON positions operate normally for affected selector.

1. After engine start or using an alternate air source for affected pump, confirm the associated system pressure with affected Demand Pump Selector in ON position, and no other pumps running, is 2800-3200 psi.
2. Position selector to OFF and confirm the system pressure decreases.

OPERATIONS (O)

For Demand Pump 1- 4 AUTO position inoperative, position the selector ON for takeoff and landing.

29-11-03 Demand Pump Selector**29-11-03-01 AUTO Position****29-11-03-01B Associated Pump Inoperative**

Interval	Installed	Required	Procedure
C	4	3	

One may be inoperative provided associated demand pump is inoperative.

NOTE: The airplane must also be dispatched using MEL item 29-11-02.**29-11-03 Demand Pump Selector****29-11-03-02 ON Position****29-11-03-02A Associated Pump Operative**

Interval	Installed	Required	Procedure
C	4	2	(M)

Two may be inoperative provided:

- a. Verify AUTO and OFF functions of the associated demand pump operate normally.
 - b. Associated EDP operates normally.
-

MAINTENANCE (M)

Verify the associated demand pump auto and off positions operate normally.

1. Start the associated engine.
2. Position the associated Engine Driven Pump (EDP) OFF.
3. Position the associated Demand Pump AUTO and confirm the system pressure is 2800-3200 psi.
4. Position the associated Demand Pump OFF and confirm the system pressure decreases to less than 500 psi.
5. Position associated Demand Pump AUTO.
6. Position associated EDP ON.
7. For inoperative demand pumps 1 or 4 selector, confirm the auto control of the ADP continuous solenoid functions properly.
 - A. Display the Hydraulic Synoptic page and confirm the associated ADP is not operating.
 - B. Select flaps 5 and confirm the associated ADP starts to operate.

29-11-03 Demand Pump Selector

29-11-03-02 ON Position

29-11-03-02B Associated Pump Inoperative

Interval	Installed	Required	Procedure
C	4	3	

One may be inoperative provided associated demand pump is inoperative.

NOTE: The airplane must also be dispatched using MEL item 29-11-02.

29-18-01 Reservoir Servicing Gauge

Interval	Installed	Required	Procedure
D	1	0	

29-21-01 Auxiliary Pump (AC Motor Pump) System(s)

Interval	Installed	Required	Procedure
C	-	0	(M) (O)

May be inoperative provided Demand Pump Selector is properly positioned.

NOTE: All aircraft are equipped with an Auxiliary Pump on Systems 1 & 4.

MAINTENANCE (M)

1. Position associated Demand Pump Selector OFF or AUTO.
2. When towing airplane, have APU running to provide electrical power and bleed air. Pressurize hydraulic system 4, or 1, or 2 with the applicable system demand pump.

OPERATIONS (O)

1. Before engine start, position the associated Demand Pump Selector AUTO or ON.
2. After engines are started, use normal procedures to position the Demand Pump Selectors.

NOTE: Dual engine autostart is not permitted if both No.1 and No.4 Demand Pump Selectors are selected to AUTO or ON, as the additional pneumatic bleed will cause poor engine starting.

29-31-01 HYD RSVR PRESS Message

Interval	Installed	Required	Procedure
C	4	0	(M)

May be inoperative provided associated reservoir pressurization is verified to operate normally once each flight day.

MAINTENANCE (M)

Verify the associated reservoir pressurization operates normally once each flight day using Method 1 or 2.

NOTE: Status message HYD RSVR PRESS _ may remain displayed.

1. Method 1:
 - A. Pressurize the pneumatic system.
 - B. Depress the reservoir pressurization bleed valve (port "BLD" on the reservoir pressurization module) for two minutes.
 - C. Verify that air can continually be heard flowing through the valve.
 - D. After releasing the pressurization bleed valve, verify that there is no air leakage downstream of the pressurization module and at the reservoir.
2. Method 2:
 - A. Depressurize the associated reservoir.
 - B. Install a pressure gauge at the "GA" port on the reservoir pressurization module.
 - C. Pressurize the pneumatic system and verify that pressure is maintained greater than 21 psia (6 psig).

29-32-01 Hydraulic System Temperature Indications**29-32-01A Verify Associated Hydraulic Quantity Indication**

Interval	Installed	Required	Procedure
C	4	3	(M)

One may be inoperative provided the following indications are verified to operate normally:

- a. Associated system pressure indication.
- b. Associated hydraulic quantity indication.

MAINTENANCE (M)

Verify the associated system pressure and quantity indications operate normally.

1. Pressurize the associated system.
2. Display the Hydraulic Synoptic page.
3. Verify the hydraulic pressure is 2800 - 3200 psi.
4. Verify the hydraulic quantity is 0.75 to 1.15 full (fraction of total capacity).

OPERATIONS NOTE

The associated HYD OVHT SYS _ advisory and status messages may remain displayed following engine start.

29-32-01 Hydraulic System Temperature Indications**29-32-01B Verify Associated Hydraulic SYS FAULT Light**

Interval	Installed	Required	Procedure
C	4	3	(M)

One may be inoperative provided the following indications are verified to operate normally:

- a. Associated system pressure indication.
- b. Associated hydraulic "SYS FAULT" light.

MAINTENANCE (M)

Verify the associated system pressure indication and SYS FAULT light operate normally.

1. Display the Hydraulic Synoptic page.
2. Verify the associated SYS FAULT light is on before the system is pressurized.
3. Pressurize the associated system.
4. Verify the hydraulic pressure is 2800 - 3200 psi.

-
5. Verify the SYS FAULT light extinguishes.

OPERATIONS NOTE

The associated HYD OVHT SYS _ advisory and status messages may remain displayed following engine start.

29-33-01 Hydraulic Quantity Indications**29-33-01A Two Hydraulic Quantity Indications Required, Verify
Hydraulic Temperature Indication**

Interval	Installed	Required	Procedure
C	4	2	(M)

May be inoperative provided:

- a. Associated reservoir level(s) are verified normal before each departure,
- b. Associated system pressure indication is verified to operate normally.
- c. Associated hydraulic temperature indication is verified to operate normally.

MAINTENANCE (M)

Verify the associated reservoir level is normal prior to each departure and verify the associated pressure and temperature indications operate normally.

1. Confirm the associated reservoir level is normal prior to each departure using the fill station indication or the reservoir sight gauge (AMM 12-12-01).
2. Confirm the associated system pressure and temperature indications operate normally.
 - A. Pressurize the associated system.
 - B. Display the Hydraulic Synoptic page.
 - C. Confirm the hydraulic pressure is 2800 - 3200 psi.
 - D. Confirm the hydraulic temperature is less than 80 degrees C.
3. If desired, the inoperative quantity indication may be deactivated by disconnecting, capping and stowing the associated hydraulic quantity transmitter electrical connector (DT401, DT402, DT403 or DT404).

29-33-01 Hydraulic Quantity Indications**29-33-01B Two Hydraulic Quantity Indications Required, Verify
Hydraulic SYS FAULT Light**

Interval	Installed	Required	Procedure
C	4	2	(M)

May be inoperative provided:

- a. Associated reservoir level(s) are verified normal before each departure,
- b. Associated system pressure indication is verified to operate normally.
- c. Associated hydraulic "SYS FAULT" light is verified to operate normally.

Section 2

MAINTENANCE (M)

Verify the associated reservoir level is normal prior to each departure and verify the associated pressure indication and SYS FAULT light operate normally.

1. Confirm the associated reservoir level is normal prior to each departure using the fill station indication or the reservoir sight gauge (AMM 12-12-01).
 2. Confirm the associated system pressure and SYS FAULT light operates normally.
 - A. Display the Hydraulic Synoptic page.
 - B. Verify the associated SYS FAULT light is on before the system is pressurized.
 - C. Pressurize the associated system.
 - D. Confirm the hydraulic pressure is 2800 - 3200 psi.
 - E. Confirm the SYS FAULT light extinguishes.
 3. If desired, the inoperative quantity indication may be deactivated by disconnecting, capping and stowing the associated hydraulic quantity transmitter electrical connector (DT401, DT402, DT403 or DT404).

29-33-01 Hydraulic Quantity Indications

**29-33-01C Hydraulic Quantity Indications Not Required, Verify
Hydraulic Temperature Indication**

Interval	Installed	Required	Procedure
B	4	0	(M)

May be inoperative provided:

- a. Associated reservoir level(s) are verified normal before each departure,
 - b. Associated system pressure indication is verified to operate normally.
 - c. Associated hydraulic temperature indication is verified to operate normally.

MAINTENANCE (M)

Verify the associated reservoir level is normal prior to each departure and verify the associated pressure and temperature indications operate normally.

1. Confirm the associated reservoir level is normal prior to each departure using the fill station indication or the reservoir sight gauge (AMM 12-12-01).
 2. Confirm the associated system pressure and temperature indications operate normally.
 - A. Pressurize the associated system.
 - B. Display the Hydraulic Synoptic page.
 - C. Confirm the hydraulic pressure is 2800 - 3200 psi.
 - D. Confirm the hydraulic temperature is less than 80 degrees C.

3. If desired, the inoperative quantity indication may be deactivated by disconnecting, capping and stowing the associated hydraulic quantity transmitter electrical connector (DT401, DT402, DT403 or DT404).

29-33-01 Hydraulic Quantity Indications**29-33-01D Hydraulic Quantity Indications Not Required, Verify
Hydraulic SYS FAULT Light**

Interval	Installed	Required	Procedure
B	4	0	(M)

May be inoperative provided:

- a. Associated reservoir level(s) are verified normal before each departure,
 - b. Associated system pressure indication is verified to operate normally.
 - c. Associated hydraulic "SYS FAULT" light is verified to operate normally.
-

MAINTENANCE (M)

Verify the associated reservoir level is normal prior to each departure and verify the associated pressure indication and SYS FAULT light operate normally.

1. Confirm the associated reservoir level is normal prior to each departure using the fill station indication or the reservoir sight gauge (AMM 12-12-01).
2. Confirm the associated system pressure and SYS FAULT light operate normally.
 - A. Display the Hydraulic Synoptic page.
 - B. Confirm the associated SYS FAULT light is on before the system is pressurized.
 - C. Pressurize the associated system.
 - D. Confirm the hydraulic pressure is 2800 - 3200 psi.
 - E. Confirm the SYS FAULT light extinguishes.
3. If desired, the inoperative quantity indication may be deactivated by disconnecting, capping and stowing the associated hydraulic quantity transmitter electrical connector (DT401, DT402, DT403 or DT404).

29-34-01 Pump Low Pressure Indication Systems**29-34-01-01 Pump LOW PRESS Lights**

Interval	Installed	Required	Procedure
C	8	4	(M)

One light per hydraulic system may be inoperative provided:

- a. Associated system pressure indication operates normally.
- b. Associated pump operates normally before each departure.

MAINTENANCE (M)

Confirm associated pump operates normally before each departure.

1. For an Air Driven Pump (ADP) or AC Motor-Driven Pump (ACMP) low PRESS light inoperative:

- A. Supply electrical power and pressurize the pneumatic manifold.
- B. Position the associated Demand pump selector AUTO or ON.
- C. Confirm the hydraulic pressure is 2800 - 3200 psi.

2. For an Engine Driven Pump (EDP) low PRESS light inoperative:

NOTE: This check can be performed by the flight crew prior to shutting down engines on previous flight or prior to departure after engine start.

- A. Start the associated engine.
- B. Position the associated engine pump switch ON.
- C. Confirm the hydraulic pressure is 2800 - 3200 psi.

29-34-01 Pump Low Pressure Indication Systems**29-34-01-02 Engine Driven Pump Pressure Switches**

Interval	Installed	Required	Procedure
C	4	3	(M)

One may be inoperative provided:

- a. Associated demand pump AUTO function is considered inoperative.
- b. Associated system pressure indication operates normally.
- c. Associated pump operates normally before each departure.
- d. Associated demand pump indication system operates normally.

MAINTENANCE (M)

Confirm associated pump operates normally before each departure.

NOTE: This check can be performed by the flight crew prior to shutting down engines on previous flight or prior to departure after engine start.

1. Start the associated engine.
2. Position the associated engine pump switch ON.
3. Confirm the hydraulic pressure is 2800 - 3200 psi.
4. Airplane must also be dispatched using MEL item 29-11-03.

29-34-01 Pump Low Pressure Indication Systems**29-34-01-03 Demand Pump Pressure Switches**

Interval	Installed	Required	Procedure
C	4	3	(M)

One may be inoperative provided:

- a. Associated system pressure indication operates normally.
 - b. Associated pump operates normally before each departure.
 - c. Associated engine driven pump indication system operates normally.
-

MAINTENANCE (M)

Confirm associated pump operates normally before each departure.

1. Supply electrical power and pressurize the pneumatic manifold.
2. Position the associated Demand pump selector AUTO or ON.
3. Confirm the hydraulic pressure is 2800 - 3200 psi.

29-34-02 Hydraulic SYS FAULT Lights**29-34-02A Associated Hydraulic Quantity Indication Operates Normally**

Interval	Installed	Required	Procedure
C	4	3	(M)

One may be inoperative provided the following indications are verified to operate normally:

- a. Associated system pressure indication.
- b. Associated hydraulic quantity indication.

MAINTENANCE (M)

Verify the associated system pressure and quantity indications operate normally.

1. Pressurize the associated system.
2. Display the Hydraulic Synoptic page.
3. Verify the hydraulic pressure is 2800 - 3200 psi.
4. Verify the hydraulic quantity is 0.75 to 1.15 full (fraction of total capacity).

OPERATIONS NOTE

The associated HYD OVHT SYS _ advisory and status messages may remain displayed following engine start.

29-34-02 Hydraulic SYS FAULT Lights**29-34-02B Associated Temperature Indication Operates Normally**

Interval	Installed	Required	Procedure
C	4	3	(M)

One may be inoperative provided the following indications are verified to operate normally:

- a. Associated system pressure indication
- b. Associated system temperature indication.

MAINTENANCE (M)

Verify the associated system pressure and temperature indications operate normally.

1. Pressurize the associated system.
2. Display the Hydraulic Synoptic page.
3. Verify the hydraulic pressure is 2800 - 3200 psi.

4. Verify the hydraulic temperature is less than 80 degrees C.

OPERATIONS NOTE

The associated HYD OVHT SYS _ advisory and status messages may remain displayed following engine start.

30-00-01 Windshield Air (Defog) System Controls

Interval	Installed	Required	Procedure
C	2	0	(M)

May be inoperative provided defogging valve(s) is secured ON.

MAINTENANCE (M)

Secure the inoperative windshield air shutoff valve ON.

1. For windshield air shutoff valve inoperative in the closed position:
 - A. Open P180 panel WINDSHIELD AIR circuit breaker.
 - B. Gain access to inoperative air shutoff valve (AMM 21-22-01/401).
 - C. Disconnect, cap, and stow the air shutoff valve electrical connector DV464 (Captain) or DV465 (First Officer).
 - D. For air shutoff valve with a manual override lever installed, move the manual override lever to the open position.
 - E. For air shutoff valve without a manual override lever installed:
 - 1) Loosen two clamps on valve and remove from flexible hose.
 - 2) Fabricate a shutoff valve replacement duct as follows:
AL Alloy Tubing
6.00 length x 2.00 O.D x 0.022 Wall
6061-0 per WW-T-700/6 or 5052-0 per WW-T-700/4
Finish F-17-08
Bead both ends per MS 33660
(Dimensions in inches)
 - 3) Install fabricated replacement duct in place of air shutoff valve.
 - F. Close the opened circuit breakers.
2. For windshield air shutoff valve inoperative in the open position, secure both air shutoff valves ON:
 - A. Position both WSHLD AIR switches ON.
 - B. With one or more packs operating, ensure air is being supplied to both windshields by feeling that air flows freely from the air outlets.
 - C. Open and collar P180 panel WINDSHIELD AIR circuit breaker.

30-11-01 Wing Anti-Ice Valves

Interval	Installed	Required	Procedure
C	2	0	(M)

May be inoperative secured closed provided airplane is not operated in known or forecast icing conditions.

MAINTENANCE (M)

Secure the inoperative wing anti-ice valve closed.

1. Extend and deactivate the leading edge flaps and install safety locks (AMM 27-81-00/201).
2. Open P6 panel WING ANTI-ICE CONT circuit breaker.
3. Open P6 panel WING THERMAL ANTI-ICE VALVE circuit breaker.
4. Gain access to the inoperative anti-ice valve (AMM 30-11-03/401)
5. Disconnect, cap, and stow the electrical connector.
6. Position the valve closed using the manual handle.
7. Activate leading edge flaps (AMM 27-81-00/201).
8. Close the opened circuit breakers.

30-11-02 Wing Anti-Ice VALVE Light or WAI Indications

30-11-02A Associated Valve Verified To Operate Normally

Interval	Installed	Required	Procedure
C	-	0	(M)

May be inoperative provided associated valve is verified to operate normally before departure in known or forecast icing conditions.

MAINTENANCE (M)

Before each departure into known or forecast icing conditions, verify the associated valve operates normally.

1. Perform the Wing Thermal Anti-Ice System Test (AMM 30-11-00/501) excluding the Wing TAI system CMC ground test.

NOTE: Disregard test procedure steps calling for verification of the inoperative indications. Verification is by observing the position indicator on the valve assembly on the wing.

OPERATIONS NOTE

1. For airplanes equipped with VALVE Light and WAI Indications, both may be inoperative.
2. Do not accomplish the WAI VALVE LEFT or RIGHT advisory message Non-Normal Checklist.

30-11-02 Wing Anti-Ice VALVE Light or WAI Indications

30-11-02B Associated Valve Inoperative

Interval	Installed	Required	Procedure
C	-	0	

May be inoperative provided the associated valve is inoperative.

OPERATIONS NOTE

1. For airplanes equipped with VALVE Light and WAI Indications, both may be inoperative.
2. Do not accomplish the WAI VALVE LEFT or RIGHT advisory message Non-Normal Checklist.

30-21-01 Nacelle Anti-Ice Valves**30-21-01B Valve Open**

Interval	Installed	Required	Procedure
C	4	3	(M) (O)

One may be inoperative open provided:

- a. High pressure shutoff valve is secured closed.
- b. Bleed air switch for associated engine remains OFF except for engine start.
- c. Associated engine nacelle anti-ice switch is operated manually.
- d. Bleed systems on the remaining engines operate normally.
- e. Left and right ISLN valves remain open for takeoff and during flaps operation.

For RR:

- f. A minimum of 60% N1 is maintained at or above 10,000 ft. MSL, or 55% N1 is maintained below 10,000 ft. MSL on the associated engine while in icing conditions.

For RR:

- g. Associated FWSOV operates normally.
- h. Appropriate performance adjustments are applied.

MAINTENANCE (M)

Secure associated NAI valve open.

For RR:

1. Open P6 panel applicable NAC ANTI-ICE ENG _ circuit breaker (P6 Panel).
2. Remove engine NAI valve access panel, located on right side of fan cowl (AMM 30-21-03/201).
3. Lock the NAI valve in the open position:
 - A. Push in on the manual override release button and turn the manual override selector counterclockwise to the OVERRIDE position. Release the button.
4. Install engine NAI valve access panel.
5. Close the opened circuit breaker.
6. Secure the associated high stage bleed air valve closed using the appropriate DDG item 36-11-03 (M) procedure.

OPERATIONS (O)**For RR:**

1. Do not accomplish the NAI VALVE __ advisory message Non-Normal Checklist for the associated engine.

2. For the associated engine, select Engine Bleed OFF except for ground engine starting.
NOTE: Starter assisted inflight start is not available for the affected engine.
3. When operating in icing conditions, select Nacelle Anti-Ice ON and:
 - A. Engine's maintain a minimum of 60% N1 at or above 10,000 ft. MSL.
 - B. Maintain a minimum of 55% N1 below 10,000 ft. MSL.
4. APU-TO-PACK TAKEOFF is not permitted since L and R ISLN valves must remain open during takeoff.
5. Advisory and status messages BLEED HP ENG _ will remain displayed.
6. Reduce performance limited weights by the appropriate adjustments:

Takeoff & Landing	Enroute Climb
0 kg	7,983 kg

30-21-02 Nacelle Anti-Ice VALVE Lights or NAI Indications
30-21-02A Associated Valve Verified To Operate Normally

Interval	Installed	Required	Procedure
C	4	3	(M)

One may be inoperative provided associated valve is verified to operate normally before departure in known or forecast icing conditions.

MAINTENANCE (M)

Before departure into known or forecast icing conditions, verify valve associated with inoperative VALVE light or NAI indication operates normally.

For RR:

NOTE: There is no valve position indicator on the RR nacelle anti-ice valve assembly.

1. Supply electrical power (AMM 24-22-00/201).
2. Pressurize the pneumatic system with either a ground air source or with the APU (AMM 36-00-00/201).
3. Manually open the associated engine PRSOV (AMM 36-11-04/201).
4. Station observer at the appropriate cowl inlet to monitor NAI exhaust flow. NAI exhaust air exits into the inlet interior from the exhaust slot around the inlet circumference.
5. Verify that nacelle anti-ice valve opens:
 - A. Position associated Anti-Ice/Rain Removal panel (P5) NACELLE ANTI-ICE switch ON.

CAUTION: **Do not open the engine inlet anti-ice valve for more than 30 seconds. Too much heat (350F) from the airflow can cause damage to the inlet cowl. To prevent personal injury, use an indirect contact method to verify airflow.**

- B. Verify that NAI exhaust air flows from the exhaust slot around the inlet circumference.
6. Verify that nacelle anti-ice valve closes:
 - A. Position associated Anti-Ice/Rain Removal panel (P5) NACELLE ANTI-ICE switch OFF.
 - B. Verify that NAI exhaust air ceases to flow from the exhaust slot around the inlet circumference.
7. Release the pressure in the pneumatic system (AMM 36-00-00/201).
8. Remove electrical power (AMM 24-22-00/201).

OPERATIONS NOTE

1. For airplanes equipped with VALVE Lights and NAI Indications, both may be inoperative for one engine.
2. The ENG _ LOW IDLE advisory message may be displayed.

30-21-02 Nacelle Anti-Ice VALVE Lights or NAI Indications**30-21-02B Associated Valve Inoperative**

Interval	Installed	Required	Procedure
C	4	3	

One may be inoperative provided the associated nacelle anti-ice valve is inoperative.

30-21-03 Engine Cowl Overheat Indication (RR)

Interval	Installed	Required	Procedure
C	4	3	(M) (O)

One may be inoperative provided:

- a. Associated HPSOV is secured in the closed position.
- b. Associated nacelle anti-ice valve operates normally.
- c. A minimum of 60% N1 (55% below 10,000 feet MSL) is maintained on the associated engine in icing conditions.
- d. L and R ISLN valves are open for takeoff, and when flaps are operated.
- e. Remaining engine bleed systems operate normally.
- f. Associated ENG COWL OVHT card is deactivated (removed) from the fire detection card file.

MAINTENANCE (M)

Secure associated HPSOV closed and deactivate associated ENG COWL OVHT card.

1. Secure the associated HPSOV in the closed position using the appropriate DDG item 36-11-03 (M) procedure.
2. Remove the associated ENG COWL OVHT card from the Fire Detection Card file (AMM 26-10-01/401).
 - A. For engine 1, remove card A4.
 - B. For engine 2, remove card A9.
 - C. For engine 3, remove card A14.
 - D. For engine 4, remove card A19.
3. Protect and stow the removed ENG COWL OVHT card.

OPERATIONS (O)

1. For operating in icing conditions, position Nacelle Anti Ice ON and maintain a minimum 60% N1 (55% N1 below 10,000 ft. MSL) on associated engine to ensure adequate air supply to Nacelle TAI manifold.
2. During takeoff and for all flap operations, ensure that the L and R ISLN valve switches are in the open position.
3. With the HPSOV secured closed, it is normal for the Pressure Regulating and Shutoff Valve (PRSOV) to close during engine operation at idle or if engine power settings are unequal. Consequently, the associated Engine Bleed Air OFF light will illuminate whenever the PRSOV is closed. Advancing the throttle off idle to approximately 75% N3 will open the PRSOV and extinguish the Engine Bleed Air OFF light.
4. The BLEED HP ENG _ advisory and status messages will be displayed.

30-31-01 Pitot-Static Probe Heater Systems

Interval	Installed	Required	Procedure
B	4	3	

Heater elements in one probe may be inoperative provided airplane is not operated in visible moisture or in known or forecast icing conditions.

NOTE 1: For probe heat to be considered operative, both heater elements in that probe must operate normally.

NOTE 2: The pitot and static port heater system is required to be operative for RVSM operations.

30-31-02 Angle of Attack Sensor Heater Systems

Interval	Installed	Required	Procedure
C	2	1	

One may be inoperative provided airplane is not operated in known or forecast icing conditions.

30-31-03 Temperature Probe Heater Systems

Interval	Installed	Required	Procedure
C	2	1	

OPERATIONS NOTE

Flight in icing conditions may result in unreliable performance calculations.

30-41-01 Window Heat INOP Lights

Interval	Installed	Required	Procedure
C	2	1	

One may be inoperative provided associated heater operates normally.

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-
- 30-41-02 Flight Deck Window Heater Systems (No. 1 & No. 2)**
30-41-02-01 Passenger, Combi, and Freighter with Draw-Through Smoke Detection System

Interval	Installed	Required	Procedure
C	4	3	

One window heater system (No. 1 or No. 2) may be inoperative provided:

- a. The aircraft is not operated in known or forecast icing conditions, and
 - b. The windshield air system is operative.
-

30-41-03 Flight Deck Window Heater Systems (No.3)

Interval	Installed	Required	Procedure
C	2	0	(M)

May be inoperative provided affected No. 3 window heat circuit is deactivated.

MAINTENANCE (M)

Deactivate the No. 3 window heat circuit using one of the following methods.

1. Method 1 (for control thermostat with electrical connector installed).

Remove the control thermostat (AMM 30-41-06/401) from the affected No. 3 window(s):

 - A. Open the main power distribution panel (P6) WINDOW HEAT PWR 2L & 3R circuit breaker.
 - B. Open the main power distribution panel (P6) WINDOW HEAT PWR 2R & 3L circuit breaker.
 - C. Gain access to the No. 3 window control thermostat (window 3L control thermostat S759 and/or window 3R control thermostat S762) installed below the overheat thermostat on the aft edge of the window.
 - D. Lift the retainer and move the thermostat away from the windowpane.
 - E. Move the thermostat to one side and carefully lower the spring.
 - F. Disconnect, cap and stow the electrical connector from the control thermostat.
 - G. Close the opened circuit breakers.
2. Method 2 (for control thermostat without electrical connector installed).

Remove the overheat thermostat (AMM 30-41-06/403) from the affected No. 3 window(s):

NOTE: Removal of the overheat thermostat will generate the CMC message WINDOW 3_HEAT FAIL.

 - A. Open the main power distribution panel (P6) WINDOW HEAT PWR 2L & 3R circuit breaker.
 - B. Open the main power distribution panel (P6) WINDOW HEAT PWR 2R & 3L circuit breaker.
 - C. Gain access to the No. 3 window overheat thermostat (window 3L overheat thermostat S1026 and/or window 3R overheat thermostat S1029) installed above the control thermostat on the aft edge of the window.
 - D. Lift the retainer spring and remove the thermostat from the rubber ring.
 - E. Lower the spring against the windowpane.

-
- F. Disconnect thermostat wires and insulate each wire to prevent electrical shorting and then stow the wiring for the removed overheat thermostat.
 - G. Close the opened circuit breakers.

30-42-01 Windshield Wipers

Interval	Installed	Required	Procedure
C	2	0	

May be inoperative provided airplane is not operated in known or forecast precipitation within 5 statute miles of the airport of departure or intended landing.

30-42-01 Windshield Wipers**30-42-01-01 Low Speed**

Interval	Installed	Required	Procedure
C	2	0	

May be inoperative provided associated high speed function operates normally.

30-42-01 Windshield Wipers**30-42-01-02 High Speed****30-42-01-02A One Inoperative**

Interval	Installed	Required	Procedure
C	2	1	

One may be inoperative provided associated low speed function operates normally.

30-42-01 Windshield Wipers**30-42-01-02 High Speed****30-42-01-02B Both Inoperative**

Interval	Installed	Required	Procedure
C	2	0	

May be inoperative provided:

- Both low speed functions operate normally.
 - Airplane is not operated in known or forecast precipitation of moderate or greater intensity within 5 statute miles of the airport of departure or intended landing.
-

30-44-01 Windshield Washer Systems

Interval	Installed	Required	Procedure
C	2	0	

30-71-01 Waste Water Drain Heater System(s)**30-71-01A Lavatory Water Supply Secured Off**

Interval	Installed	Required	Procedure
C	-	0	(M)

May be inoperative provided:

- a. Water supply to associated lavatory, galley and service center basin(s) is secured off.
 - b. Associated lavatory, galley and service center basin(s) is not used.
-

MAINTENANCE (M)

Secure the water supplies associated with the inoperative drain mast heater off.

1. Gain access to the water supply shutoff valves for the lavatory sinks, galley sinks, and drinking fountains associated with the inoperative drain mast.
 2. Close the associated water supply shutoff valves.
-

30-71-01 Waste Water Drain Heater System(s)**30-71-01B Lavatory Water Supply Not Used**

Interval	Installed	Required	Procedure
C	-	0	(M)

May be inoperative provided:

- a. Water supply to associated galley and service center basin(s) is secured off.
- b. Associated lavatory, galley and service center basin(s) is not used.
- c. Associated lavatory door is locked closed and placarded, INOPERATIVE - DO NOT ENTER.
- d. Lavatory is used only by crewmembers.

NOTE: These provisos are not intended to prohibit lavatory use or inspections by crewmembers.

MAINTENANCE (M)

Secure the galley and service center basin water supplies associated with the inoperative drain mast heater off and lock the associated lavatory closed.

1. Gain access to the water supply shutoff valves for the galley sinks, and drinking fountains associated with the inoperative drain mast.
2. Close the associated water supply shutoff valves.
3. Lock the associated lavatory closed.

30-81-01 Ice Detection System

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative deactivated provided nacelle and wing anti-ice systems are operated manually and alternate procedures are established and used to illuminate ice accretion on an outside surface visible from the flight deck.

MAINTENANCE (M)

Deactivate the ice detection system.

1. Open and collar the P414 panel L ICE DETECTOR circuit breaker.
2. Open and collar the P415 panel R ICE DETECTOR circuit breaker.
3. Gain access to the ice detector probes (AMM 30-81-01/401).
4. Disconnect, cap and stow the ice detector probe electrical connectors (DM6703 and DM6704).

OPERATIONS (O)

Operate the Nacelle and Wing Anti-Ice systems manually. Refer to FCOM SP16 for manual procedures.

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31-25-01 Clock

Interval	Installed	Required	Procedure
C	2	1	(M)

One may be inoperative at either pilot's or copilot's station.

NOTE: The CAPT clock provides the Time & Date data for the L FMC, L CMC and R CMC. The F/O clock provides Time & Date data for the R FMC. It is preferable that the serviceable clock is fitted in the CAPT position.

MAINTENANCE (M)

If necessary interchange the CAPT and F/O clocks so the serviceable clock is in the LEFT position.

[TGL] 31-31-01 Flight Data Recorder (FDR)

Interval	Installed	Required	Procedure
A	1	0	

May be inoperative provided:

- a. Cockpit Voice Recorder (CVR) operates normally.
 - b. It is not reasonably practicable to repair or replace before commencement of flight,
 - c. The aircraft does not exceed 8 further flights with the FDR unserviceable,
 - d. Not more than 72 hours have elapsed since the FDR was found to be unserviceable
-

[TGL] 31-31-02 Quick Access Recorder (QAR) System

Interval	Installed	Required	Procedure
C	1	0	

31-35-01**Aircraft Condition Monitoring System (ACMS)**

Interval	Installed	Required	Procedure
D	1	0	

31-51-01 Master Caution/Warning Systems**31-51-01-01 Master Warning Lights (Pilot's Glare Shield)**

Interval	Installed	Required	Procedure
C	2	1	

One may be inoperative provided master warning aural systems and all discrete warning lights operate normally.

31-51-01 Master Caution/Warning Systems**31-51-01-02 Master Caution Lights (Pilot's Glare Shield)**

Interval	Installed	Required	Procedure
C	2	1	

One may be inoperative provided master caution aural systems and all discrete caution lights operate normally.

31-51-01 Master Caution/Warning Systems**31-51-01-03 Aural Warning Speaker Systems**

Interval	Installed	Required	Procedure
C	2	1	

One may be inoperative provided Master Warning, Master Caution, and all discrete caution lights operate normally.

31-51-02 MAWEA ID Card

Interval	Installed	Required	Procedure
C	1	0	

NOTE: ACARS will be inoperative.

31-61-01 EICAS Lower Integrated Display Unit (IDU)

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided it is verified that EICAS can be switched to an alternate IDU (in case of enroute failure of the EICAS Upper IDU).

MAINTENANCE (M)

NOTE: IDUs are interchangeable.

Verify EICAS display can be switched to an alternate IDU.

1. Position INBD CRT switch on CAPT or F/O Display Transfer Module to EICAS position.
2. Confirm EICAS is switched to CAPT or F/O inboard IDU.
3. Position switch to NORM.

31-61-02 EFIS Control Panels

Interval	Installed	Required	Procedure
C	2	1	(M) (O)

One may be inoperative deactivated provided left and right CDU EFIS control functions are verified to operate normally.

MAINTENANCE (M)

Deactivate affected EFIS control panel and verify the EFIS control function for both left and right Control Display Units (CDUs) operates normally.

1. Open the P7 panel EFIS CONT L circuit breaker.
2. Open the P7 panel EFIS CONT R circuit breaker.
3. Press MENU key on left and right CDUs and confirm SELECT> prompt is displayed below EFIS CP annunciation on both CDUs.
4. Collar the circuit breaker opened above associated with the inoperative control panel.
5. Close the circuit breaker opened above associated with the operative control panel.

OPERATIONS (O)

Use the associated CDU for EFIS control.

31-61-03 EICAS Display Select Panel

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative provided:

- a. Left and right CDU EICAS control functions are verified to operate normally.
- b. Individual fuel quantity indications required for dispatch operate normally.

NOTE: One EFIS control panel will be deactivated. The airplane must also be dispatched using MEL item 31-61-02.

MAINTENANCE (M)

NOTE: The following procedure satisfies MEL item 31-61-02 (M) procedure.

Verify CDU EICAS control functions operate normally and deactivate one of the EFIS control panels.

1. Verify EICAS control function operates normally from the left and right Control Display Units (CDUs).
 - A. Open the P7 panel EFIS CONT L circuit breaker.
 - B. Open the P7 panel EFIS CONT R circuit breaker.
 - C. Press MENU key on left and right CDUs and verify SELECT> prompt is displayed below EICAS CP annunciation on both CDUs.
2. Deactivate one of the EFIS control panels and use the associated CDU for EFIS control panel and EICAS display select panel functions.
 - A. Collar one of the P7 panel EFIS CONT L or EFIS CONT R circuit breakers and close the other.
NOTE: It is preferable to collar the EFIS CONT R circuit breaker.
 - B. Select EICAS CP function and EFIS CP function using the CDU associated with the deactivated EFIS control panel.

OPERATIONS (O)

Use the associated CDU for EFIS control.

31-61-04 EICAS Status Messages**31-61-04A System(s) Used**

Interval	Installed	Required	Procedure
C	-	0	(M) (O)

May be inoperative provided associated equipment is verified to operate normally.

NOTE: Dispatch with inoperative (nuisance) Status level messages is allowed by the provisions of this MEL item.

MAINTENANCE (M)

Verify the associated equipment operates normally before each departure.

OPERATIONS (O)

Verify the associated equipment operates normally before each departure.

31-61-04 EICAS Status Messages**31-61-04B System(s) Considered Inoperative**

Interval	Installed	Required	Procedure
C	-	0	(M) (O)

May be inoperative provided dispatch deviations for associated equipment are observed.

NOTE: The airplane must also be dispatched using the applicable MEL item(s).

MAINTENANCE (M)

If applicable, accomplish the (M) procedures for dispatch deviations of the associated equipment.

OPERATIONS (O)

If applicable, accomplish the (O) procedures for dispatch deviations of the associated equipment.

31-61-05 EICAS Synoptic Displays

Interval	Installed	Required	Procedure
C	6	0	

May be inoperative provided individual fuel quantity indications required for dispatch operate normally.

31-61-06 EFIS/EICAS Interface Units (EIU)

Interval	Installed	Required	Procedure
B	3	2	(M)

Center or right EIU may be inoperative provided:

- a. EIU Instrument Source Selector is verified to operate normally.
 - b. EICAS EIU Selector is verified to operate normally.
-

MAINTENANCE (M)

Deactivate the inoperative EIU and verify EIU instrument source selector and EIU selector operate normally.

1. For center EIU inoperative, open and collar the P7 panel EIU C circuit breaker.
2. For right EIU inoperative, open and collar the P7 panel EIU R circuit breaker.
3. Position the Capt's EIU source selector to the inoperative EIU (C or R) and confirm the associated EFIS displays are blank.
4. Position the Capt's EIU source selector to L and confirm associated EFIS displays are normal.
5. Position the Capt's EIU source selector to the remaining operative EIU (R or C) and confirm associated EFIS displays are normal.
6. Position the Capt's EIU source selector to AUTO and confirm associated EFIS displays are normal.
7. Position the F/O's EIU source selector to the inoperative EIU (C or R) and confirm associated EFIS displays are blank.
8. Position the F/O's EIU source selector to L and confirm associated EFIS displays are normal.
9. Position the F/O's EIU source selector to remaining operative EIU (R or C) and confirm associated EFIS displays are normal.
10. Position the F/O's EIU selector to AUTO and confirm associated EFIS displays are normal.
11. Confirm SOURCE SEL EIU advisory message is not displayed.
12. With both primary and secondary EICAS displays operating, position the EICAS EIU selector to the inoperative EIU and confirm EICAS displays are blank.
13. Position the EICAS EIU selector to L and confirm EICAS displays are normal.
14. Position the EICAS EIU selector to the remaining operative EIU (C or R) and confirm EICAS displays are normal.
15. Position the EICAS EIU selector to AUTO and confirm EICAS displays are normal.

-
16. Confirm EIU DISAGREE status message is not displayed.

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32-10-01 Main Gear Wheel Tiebolts

Interval	Installed	Required	Procedure
-	288	288	

Must be operative.

32-11-01 Landing Gear Strut Pressure Indicators

Interval	Installed	Required	Procedure
D	4	0	(M)

May be inoperative provided landing gear strut is checked for proper inflation and extension.

MAINTENANCE (M)

Confirm proper inflation and extension of the associated shock strut.

1. Use an external pressure gauge to check the associated shock strut for proper inflation and extension.

32-30-01 Landing Gear Retracting System

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be partially or completely inoperative provided:

- a. Inoperative components are properly secured.
 - b. For gear down ferry information contact Flight Ops Management and Flight Technical Dispatch.
-

MAINTENANCE (M)

Secure the landing gear to remain extended in the down position and position the Gear Down Dispatch Switch in the Gear Down Dispatch position.

1. Configure the landing gear to remain extended for dispatch (AMM 32-00-00/201).
2. For securing all landing gear in down position, open and collar the P7 panel Landing Gear Lever Lock circuit breaker.
3. Place the Electrical and Electronics compartment Gear Down Dispatch Switch in the Gear Down Dispatch position.

OPERATIONS (O)

1. Operate aircraft in accordance with B747-400 Gear Down Ferry Flights document. Observe the landing gear extended placard speed limitation (270KIAS/0.73M). Request take-off performance from CARD using the Performance Correction Code for 'LANDING GEAR EXTENDED' shown in the Performance Manual. If CARD is not available contact FTD.
2. Base flight plan on landing gear extended.
3. The Warning Electronics System (WES) will set VMO/MMO to 270 KIAS/.73 Mach.
4. If all landing gear is not to be left extended, use of the following procedure will keep all the wheel well doors closed:
 - A. Before retraction of operable landing gear, depressurise the hydraulic system associated with the inoperative landing gear:
 - 1) Body and Nose Gear Hydraulic System 1
 - 2) Wing Gear Hydraulic System 4
 - B. After gear retraction, position gear lever OFF.
 - C. Repressurise the hydraulic system associated with the inoperative landing gear.

32-31-01 Landing Gear Latch Solenoid

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative provided:

- a. Solenoid is in the latched position.
 - b. Override mechanism operates normally.
-

MAINTENANCE (M)

Verify the lock solenoid is in the latched position and the override mechanism operates normally.

1. Install all landing gear ground lockpins (AMM 32-00-15/201).
2. Move the landing gear control handle from the DN to the OFF position.
3. Without pushing the landing gear control handle LOCK OVRD button, ensure that the landing gear control handle cannot be moved from the OFF to the UP position.
4. Push the landing gear control handle LOCK OVRD button and ensure that the landing gear control handle moves from the OFF to the UP position and into the detent.
5. Move the landing gear control handle to the DN position.
6. Remove all of the landing gear ground lockpins.

OPERATIONS (O)

For landing gear retraction, use the GEAR LEVER WILL NOT MOVE UP

Non-Normal Checklist.

32-32-01 Wing Gear Uplock Bungee Springs

Interval	Installed	Required	Procedure
B	4	3	(M) (O)

One may be broken or missing provided gear handle remains UP after gear retraction.

MAINTENANCE (M)

Inspect and remove broken pieces of spring.

OPERATIONS (O)

Leave the landing gear lever in the UP position after gear retraction.

32-33-01 Body Gear Uplock Bungee Springs

Interval	Installed	Required	Procedure
B	4	3	(M) (O)

One may be broken or missing provided gear handle remains UP after gear retraction.

MAINTENANCE (M)

Inspect and remove broken pieces of spring (AMM 32-33-08/401).

OPERATIONS (O)

Leave the landing gear lever in the UP position after gear retraction.

32-41-01 Wheel Brakes**32-41-01A Install Brake Deactivation Tool**

Interval	Installed	Required	Procedure
C	16	14	(M) (O)

One or two brakes may be deactivated with a deactivation tool provided performance decrements are applied for two brakes deactivated.

MAINTENANCE (M)

Deactivate the inoperative brakes.

For Brake System Control Unit (BSCU) P/N S283U002-5 / 42-747-3 (or later) installed:

1. Deactivate inoperative brake using brake deactivation tool.
 - A. Inhibit ANTISKID and BRAKE LIMITER advisory messages by rotating the BSCU (E9 Rack) message inhibit knobs on the unit's front face so one knob points to each affected wheel's position number.

NOTE: For further ANTISKID or BRAKE LIMITER advisory message displayed, fault isolation is required.
 - B. Install wing and body gear door locks (AMM 32-00-30/201), and ensure that all wheels are chocked.
 - C. Remove pressure from hydraulic systems 1, 2 and 4 (AMM 29-11-00/201).
 - D. Release the parking brake.
 - E. Release pressure from the hydraulic brake accumulator by operating the brake pedals until the HYD BRAKE PRESS gauge on the P1 panel shows precharge pressure (approximately 750 psi).
 - F. Remove the applicable shuttle valve cap (the valve that supplies the brakes to be deactivated).

NOTE: To identify the shuttle valve that supplies the brakes to be deactivated, refer to FIM 32-42-00/101, Figure 126.
 - G. Install brake deactivation tool (Ref. Drawing A32080 or equivalent CMM part number 2-7461-3) in place of the valve cap and tighten 50 pound inches. Install a lockwire.
 - H. Restore the airplane to its required configuration.
 - I. Test for proper deactivation:
 - 1) Pressurize hydraulic system 4 (AMM 29-11-00/201).
 - 2) Operate the brakes and make sure that the deactivated brake does not apply by observing brake piston movement.

OPERATIONS (O)

1. When brakes are deactivated with the deactivation tool, gear retract braking remains operative. Normal gear retraction procedure is used. Request take-off performance from CARD using the Performance Correction Code for '2 BRAKES INOP - DEACTIVATION TOOL USED' shown in the Performance Manual. If CARD is not available contact FTD.
2. Stopping distances will increase. For dispatch landing performance, refer to Performance Manual, where maximum landing weights are shown on the landing page in brackets after the normal landing weights.

NOTE: Take-off with one or two brakes deactivated is permitted provided: No ice, snow slush or excessive water is present on the runway, such that, contaminated runway performance has to be used.

32-41-01 Wheel Brakes**32-41-01B Deactivate Brake(s) By Capping Brake Line**

Interval	Installed	Required	Procedure
C	16	14	(M) (O)

One or two brakes may be deactivated by capping the brake line provided:

- a. Takeoff and landing performance complies with the Performance Manual, both for Gear Down dispatch and for two brakes deactivated.
- b. After takeoff, gear remains down for two minutes before retraction.

NOTE: With brake lines capped or brakes removed, it is probable that the aircraft will not be capable of long distance operations, due to the Take Off Performance Limited (TOPL) weight decrements for 'Obstacle Clearance and Take-off Climb' required in Operations Procedure. Depending on altitude and temperature the TOPL restrictions will be in excess of 23 tonnes. The preferred option uses deactivation tools which allow gear retract braking to remain operational. Contact Flight Technical Dispatch or Maintrol for advice.

MAINTENANCE (M)

Deactivate the inoperative brakes.

For Brake System Control Unit (BSCU) P/N S283U002-5 / 42-747-3 (or later) installed:

1. Deactivate the inoperative brakes by capping the brake lines.
 - A. Inhibit ANTISKID and BRAKE LIMITER advisory messages by rotating the BSCU (E9 Rack) message inhibit knobs on the unit's front face so one knob points to each affected wheel's position number.
- NOTE: For further ANTISKID or BRAKE LIMITER advisory message displayed, fault isolation is required.

- B. Install wing and body gear door locks (AMM 32-00-30/2011), and confirm all wheels are chocked.
- C. Remove pressure from hydraulic systems 1, 2 and 4 (AMM 29-11-00/2011).
- D. Release the parking brake.
- E. Release pressure from the hydraulic brake accumulator by operating the brake pedals until HYD BRAKE PRESS gauge on the P1 panel shows precharge pressure (approximately 750 psi).
- F. Uncouple the Brake Disconnect - Brake Hose Half and attach the hose to the landing gear truck using tie-wrap, P/N BACS38K3D or equivalent. This will ensure that the hose will not interfere with brake rotation when the gear is retracted.

NOTE 1: The part of the Brake Disconnect that is attached to the hose is called the Brake Disconnect - Brake Hose Half. The part of the Brake Disconnect that is attached to the brake is called the Brake Disconnect - Brake Half.

NOTE 2: The Brake Disconnect incorporates a pressure release function in the Brake Half; there is no need to open the brake bleed fitting for dispatch.

- G. Pressurize hydraulic system 1, 2 or 4.
- H. Apply brake pressure and check for leaks.
- I. Restore airplane to its required configuration.

OPERATIONS (O)

1. Request take-off performance from CARD using the Performance Correction Code for '2 BRAKES INOP - LINE CAPPED/BRAKE REMOVED' shown in the Performance Manual. If CARD is not available contact FTD.
2. Second segment take-off performance will be limited due to the requirement to keep gear extended for 2 minutes. Second segment take-off will be affected the same for one or two brakes deactivated.
3. Landing gear must remain extended for a minimum of 2 minutes after takeoff to permit affected wheels to spin down prior to gear retraction.
4. For dispatch landing performance, refer to Performance Manual, where maximum landing weights are shown on the landing page in brackets after the normal landing weights.

NOTE 1: Take-off with one or two brakes deactivated is permitted provided: No ice, snow slush or excessive water is present on the runway, such that, contaminated runway performance has to be used.

NOTE 2: At takeoff weights greater than 326587 kg, flaps up maneuver speed (VREF + 100 kt) may exceed VLO (270 kt). Therefore, ensure gear is retracted prior to selecting Flaps Up.

32-41-01 Wheel Brakes**32-41-01C Remove Inoperative Brake**

Interval	Installed	Required	Procedure
C	16	14	(M) (O)

One or two brakes may be deactivated by removing the brake(s) and capping the lines provided:

- a. Takeoff and landing performance complies with the Performance Manual, both for Gear Down dispatch and for two brakes deactivated.
- b. After takeoff, gear remains down for two minutes before retraction.
- c. If inoperative brake(s) are on wheels other than No. 1, 2, 13, or 14, one forward and one aft brake on the same side must be removed to maintain a balanced truck, or if inoperative brake(s) are on wheels No. 1, 2, 13, or 14, one brake on each affected truck may be removed.

NOTE: With brake lines capped or brakes removed, it is probable that the aircraft will not be capable of long distance operations, due to the Take Off Performance Limited (TOPL) weight decrements for 'Obstacle Clearance and Take-off Climb' required in Operations Procedure.

Depending on altitude and temperature the TOPL restrictions will be in excess of 23 tonnes. The preferred option uses deactivation tools which allow gear retract braking to remain operational. Contact Flight Technical Dispatch or Maintrol for advice.

MAINTENANCE (M)

Remove inoperative brakes and cap associated brake lines.

For Brake System Control Unit (BSCU) P/N S283U002-5/42-747-3 (or later) installed:

1. Remove brakes and cap brake lines.

NOTE: To ensure that the truck will tilt to the retract position, one forward and one aft brake on the same side must be removed to maintain a balanced truck. It may be necessary to remove or relocate an operative brake in order to balance the truck and ensure proper retraction. However, if the inoperative brake(s) is on wheel No. 1, 2, 13 or 14, one brake on each affected truck may be removed.

- A. Inhibit ANTISKID and BRAKE LIMITER advisory messages by rotating the BSCU (E9 Rack) message inhibit knobs on the unit's front face so one knob points to each affected wheel's position number.

NOTE: For further ANTISKID or BRAKE LIMITER advisory message displayed, fault isolation is required.

- B. Remove the affected brakes (AMM 32-41-15).
- C. Cap and secure the hydraulic lines and electrical wiring for the affected brakes, using (M) procedure 32-41-01B.

-
- D. Remove the associated brake equalizer rods from the truck.
 - E. Install tire and wheel assemblies and restore the airplane to normal (AMM 32-41-15).

OPERATIONS (O)

- 1. Request take-off performance from CARD using the Performance Correction Code for '2 BRAKES INOP - LINE CAPPED/BRAKE REMOVED' shown in the Performance Manual. If CARD is not available contact FTD.
- 2. Second segment take-off performance will be limited due to the requirement to keep gear extended for 2 minutes. Second segment take-off will be affected the same for one or two brakes deactivated.
- 3. Climb performance will be affected since the landing gear must remain extended for a minimum of 2 minutes after takeoff to permit affected wheels to spin down prior to gear retraction.
- 4. For dispatch landing performance, refer to Performance Manual, where maximum landing weights are shown on the landing page in brackets after the normal landing weights.

NOTE 1: Take-off with one or two brakes deactivated is permitted provided: No ice, snow slush or excessive water is present on the runway, such that, contaminated runway performance has to be used.

NOTE 2: At takeoff weights greater than 326587 kg, flaps up maneuver speed (VREF + 100 kt) may exceed VLO (270 kt). Therefore, ensure gear is retracted prior to selecting Flaps Up.

**32-41-02 Brake Accumulator Pressure Indicator
(In Wheel Well)**

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided flight deck indication operates normally.

32-41-03 HYD BRAKE PRESS Indicator (Flight Deck)

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided:

- a. Brake accumulator charge is verified normal once each flight day.
- b. Brake source discrete light operates normally.

MAINTENANCE (M)

Verify the brake accumulator charge is normal once each flight day.

1. Chock the wheels, release the parking brake and depressurize hydraulic systems 1, 2 and 4.
2. Apply and release brakes 8 times.
3. Confirm landing gear ground lockpins are installed on all landing gear (AMM 09-11-00/201).
4. Install wing and body landing gear door locks if not installed.
5. Gain access to the hydraulic brake accumulator direct reading pressure gauge in the right side body landing gear wheel well.
6. Confirm the direct reading pressure gauge adjacent to the hydraulic brake accumulator air charging valve indicates correct precharge (approximately 750 psi).
7. Remove the landing gear door locks and landing gear ground lockpins if not required for other ground operations.

32-41-04 Inflight Wheel Braking System

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided:

- a. Takeoff performance is based on landing gear extended.
- b. After takeoff, landing gear remains extended for a minimum of two minutes before retraction.

NOTE: With gear retract braking inoperative and the requirement to leave the gear extended for 2 minutes after take-off, it is probable that the aircraft will not be capable of long distance operations, due to the Take Off Performance Limited (TOPL) weight decrements for 'Obstacle Clearance and Take-off Climb' required in OPERATIONS Procedure. Depending on altitude and temperature the TOPL restrictions will be in excess of 23 tonnes. Contact Flight Technical Dispatch or Maintrol for advice

OPERATIONS (O)

1. Request take-off performance from CARD using the Performance Correction Code for 'LANDING GEAR EXTENDED' shown in the Performance Manual. If CARD is not available contact FTD.
2. After takeoff, leave the landing gear extended for a minimum of 2 minutes prior to gear retraction.

NOTE: At takeoff weights greater than 326,587 kg, flaps up maneuver speed (VREF + 100 kt) may exceed VLO (270 kt). Therefore, ensure gear is retracted prior to selecting Flaps Up.

32-41-05 BRAKE SOURCE Light

Interval	Installed	Required	Procedure
C	1	0	

32-42-01 Antiskid System

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative provided operations comply with antiskid inoperative procedures and performance data.

NOTE 1: Antiskid faults to 3 or more wheels require the use of this MEL item.

NOTE 2: Use of this item is not permitted with MEL item 32-41-01, Wheel Brakes.

NOTE 3: A fault isolation procedure (Maintenance Procedure paragraph 1 below) is necessary to determine which one of three possible maintenance actions is to be used for dispatch. If only one or two wheels are affected by an antiskid fault, it may be necessary to deactivate the affected wheel's brake for dispatch. If one or two brakes are deactivated, the performance penalty for Two Brakes Deactivated is applied rather than the more severe Antiskid Inoperative performance penalty. If one or two wheelspeed transducers are inoperative and a fore-aft wheel pair is not involved, the affected wheel's brakes may remain active; however, the performance penalty for Two Brakes Deactivated using Deactivation Tool must still be applied. If Brake System Control Unit (BSCU) P/N 42-747-3 (BA Mod 32F087) or later version is installed, Advisory message ANTISKID will be inhibited for one or two brakes deactivated in accordance with the following maintenance procedure. Should an additional enroute antiskid fault(s) occur affecting another wheel, EICAS will again display ANTISKID. Following conclusion of the Maintenance Procedure, if EICAS message ANTISKID or ANTISKID OFF remains displayed, the Fault Isolation procedure must be performed prior to every departure to determine if additional antiskid faults occurred enroute.

MAINTENANCE (M)

Confirm antiskid faults, deactivate the associated wheel antiskid system, confirm operation of the brake system when CMC message NORMAL ANTISKID VALVE X FAIL is identified, and prior to every flight review CMC messages when ANTISKID advisory message is displayed.

1. Conduct a CMC Brake System Ground Test.

NOTE: The ground set-up procedure may be simplified. The IRUs do not need to be in NAV mode. (Ignore any IRS signal fault indications). Hydraulic pressure is not required. Autobrake system does not need to be armed.

- A. Select 32 BRAKE CONTROL from the CMC GROUND TEST menu.
- B. Execute the BRAKE SYSTEM BITE test. Record all antiskid system configuration and input faults annunciated during the test.

- C. Following the conclusion of the CMC Brake System Ground Test, select the line-select key opposite the FAIL prompt on the CMC and record the antiskid system fault. Continue to select the NEXT PAGE key on the CMC as required and record the antiskid system faults.

NOTE: When CMC message PARK BRK VLV NOT OPEN WHEN RELEASED or NO PARK BRKE PWR is displayed, dispatch is not allowed (Brake Torque Limiter is inoperative). This condition causes Status message PARK BRK VALVE as well as ANTISKID OFF and BRAKE LIMITER Advisory messages.

2. Deactivate the associated wheel antiskid system.

NOTE: For any two wing gear wheel circuit breakers opened, body gear steering will be inoperative. The airplane must also be dispatched using [MEL item 32-53-01](#).

- A. For CMC messages ANTISKID TRANSDUCER X FAIL and/or BSCU FAIL; ANTISKID CONTROL CHANNEL X-Y, open and collar the following circuit breakers to the affected wheels.

- 1) For wheels 1,3: P180 panel ANTISKID 1-3.
- 2) For wheels 2,4: P180 panel ANTISKID 2-4.
- 3) For wheels 5,7: P180 panel ANTISKID 5-7
- 4) For wheels 6,8: P180 panel ANTISKID 6-8.
- 5) For wheels 9,11: P180 panel ANTISKID 9-11.
- 6) For wheels 10,12: P180 panel ANTISKID 10-12.
- 7) For wheels 13,15: P180 panel ANTISKID 13-15.
- 8) For wheels 14,16: P180 panel ANTISKID 14-16.

- B. For CMC message NO POWER ON ANTISKID CHANNEL X-Y, the associated antiskid system channel is already unpowered and deactivated.

3. Confirm manual operation of the normal brake system on the affected wheels for CMC message NORMAL ANTISKID VALVE X FAIL.

- A. Provide electrical power to all operative antiskid and torque limiter channels (AMM 24-22-00/201).
- B. Chock wheels.
- C. Pressurize hydraulic system 4 (AMM 29-11-00/201).
- D. Fully depress and release the brake pedals and confirm the brake wear indicator pins and/or brake pistons indicate the affected brakes apply and release.
- E. For manual operation not available:
 - 1) Open the P180 panel ANTISKID X-X circuit breaker for the affected wheels.
 - 2) Disconnect and stow the associated antiskid valve electrical connector.
 - 3) Close the opened circuit breakers.

NOTE: Previous deactivation of the associated wheel antiskid system may require the circuit breaker be collared.

- 4) Fully depress and release the brake pedals and confirm the brake wear indicator pins and/or brake pistons indicate the affected brakes apply and release.
4. For ANTISKID advisory message displayed, before each flight review CMC for additional antiskid faults, repeating MAINTENANCE (M) for these faults.

OPERATIONS (O)

1. Use of assumed temperature reduced thrust procedures are not allowed with antiskid inoperative.
2. Take-off is permitted with the antiskid system inoperative provided:
 - A. No ice, snow slush or excessive water is present on the runway, such that, contaminated runway performance has to be used or a wet V1 applied.
 - B. All thrust reversers are serviceable.
 - C. Reduced Thrust is not used.
 - D. Request take-off performance from CARD using the Performance Correction Code for 'ANTI-SKID INOP' shown in the Performance Manual. If CARD is not available contact FTD.

NOTE: TAKE-OFF FROM A WET RUNWAY IS NOT PERMITTED.

3. For rejected takeoff:
 - A. Autobrakes are not available.
 - B. Immediately place all thrust levers to idle.
 - C. Deploy full speed brakes.
 - D. Apply steady light braking for weights under approximately 226,500 kg or apply steady light-to-moderate manual braking at heavier weights.
4. For landing:
 - A. Autobrakes are not available.
 - B. Deploy full speed brakes immediately after touchdown.
 - C. Apply steady light braking for landing weights under approximately 226,500 kg or apply steady light-to-moderate manual braking at heavier weights. Modulate brakes as necessary to prevent skidding.
 - D. Landing with antiskid inoperative, use the Generalised Landing Charts (Antiskid Inoperative) in B747 Performance Manual Section 3.6 to obtain a Regulated Landing Weight.

32-42-01 Antiskid System**32-42-01-01 Control Channels**

Interval	Installed	Required	Procedure
C	16	14	(M) (O)

Antiskid control channels for one or two brakes may be inoperative provided:

- a. The affected brakes are deactivated.
- b. Performance decrements are applied for the selected procedure.

NOTE 1: Antiskid faults to 3 or more wheels require the use of MEL item 32-42-01.

NOTE 2: Performance penalty for Two Brakes Deactivated is applied rather than the more severe Antiskid Inoperative AFM performance penalty.

NOTE 3: The airplane must also be dispatched using MEL item 32-41-01.

NOTE 4: Also see Note 3 in Antiskid System item above.

MAINTENANCE (M)

Confirm antiskid faults, deactivate the associated brakes, and prior to every flight review CMC messages when ANTISKID advisory message is displayed.

1. Conduct a CMC Brake System Ground Test.

NOTE: The ground set-up procedure may be simplified. The IRUs do not need to be in NAV mode. (Ignore any IRS signal fault indications). Hydraulic pressure is not required. Autobrake system does not need to be armed.

- A. Select 32 BRAKE CONTROL from the CMC GROUND TEST menu.
- B. Execute the BRAKE SYSTEM BITE test. Record all antiskid system configuration and input faults annunciated during the test.
- C. Following the conclusion of the CMC Brake System Ground Test, select the line-select key opposite the FAIL prompt on the CMC and record the antiskid system fault. Continue to select the NEXT PAGE key on the CMC as required and record the antiskid system faults.

NOTE: When CMC message PARK BRK VLV NOT OPEN WHEN RELEASED or NO PARK BRKE PWR is displayed, dispatch is not allowed (Brake Torque Limiter is inoperative). This condition causes Status message PARK BRK VALVE as well as ANTISKID OFF and BRAKE LIMITER Advisory messages.

2. Use MEL item 32-41-01 to deactivate the associated wheel brakes.
3. For ANTISKID advisory message displayed, before each flight review CMC for additional antiskid faults, repeating MAINTENANCE (M) for these faults.

OPERATIONS (O)

1. When brake(s) are deactivated with deactivation tool(s), gear retract braking remains operative. Normal gear retraction procedure may be used. Take-off and landing performance must be in accordance with MEL item 32-41-01A Brakes Deactivated with Deactivation Tools.
2. When brakes are deactivated by capping brake lines or by brake removal, gear retract braking will not be available for the affected wheels. After take-off the landing gear must remain extended for a minimum of 2 minutes to permit the affected wheels to spin down prior to gear retraction. Take-off and landing performance must be in accordance with MEL item 32-41-01B/C brakes deactivated by Capping Brake Lines.
NOTE 1: At take-off weights greater than 326,587 kg, flaps up manoeuvring speed (VREF+100) may exceed VLO (270 kts). Ensure gear is retracted prior to selecting Flaps Up.
NOTE 2: With brake lines capped or brakes removed, it is probable that the aircraft will not be capable of long distance operations, due to the Take-off Performance Limited (TOPL) weight decrements for 'obstacle clearance and take-off climb' required in flight crew procedure O.3. Depending on altitude and temperature the TOPL restrictions will be in excess of 23 tonnes. The preferred option uses deactivation tools which allow gear retract braking to remain operational. If necessary, contact flight technical dispatch for advice.
3. For advisory message ANTISKID remaining displayed, RTO and landing autobrakes are inoperative.

32-42-01 Antiskid System**32-42-01-02 Wheelspeed Transducers****32-42-01-02A Fore-Aft Wheel Pair Not Involved**

Interval	Installed	Required	Procedure
C	16	14	(M) (O)

One transducer in a locked-wheel protection pair (fore & aft wheels) may be inoperative provided performance complies with data for two brakes deactivated.

NOTE 1: Antiskid faults to 3 or more wheels require the use of MEL item 32-42-01.

NOTE 2: Performance penalty for Two Brakes Deactivated is applied rather than the more severe Antiskid Inoperative AFM performance penalty.

NOTE 3: If one or two wheelspeed transducers are inoperative and a fore-aft wheel pair is not involved, the affected wheel's brakes may remain active; however, performance penalty for Two Brakes Deactivated must still be applied.

Section 2

MAINTENANCE (M)

Confirm antiskid faults, and prior to every flight review CMC messages when ANTISKID advisory message is displayed.

1. Conduct a CMC Brake System Ground Test.

NOTE: The ground set-up procedure may be simplified. The IRUs do not need to be in NAV mode. (Ignore any IRS signal fault indications). Hydraulic pressure is not required. Autobrake system does not need to be armed.

- A. Select 32 BRAKE CONTROL from the CMC GROUND TEST menu.
- B. Execute the BRAKE SYSTEM BITE test. Record all antiskid system configuration and input faults annunciated during the test.
- C. Following the conclusion of the CMC Brake System Ground Test, select the line-select key opposite the FAIL prompt on the CMC and record the antiskid system fault. Continue to select the NEXT PAGE key on the CMC as required and record the antiskid system faults.

NOTE: When CMC message PARK BRK VLV NOT OPEN WHEN RELEASED or NO PARK BRKE PWR is displayed, dispatch is not allowed (Brake Torque Limiter is inoperative). This condition causes Status message PARK BRK VALVE as well as ANTISKID OFF and BRAKE LIMITER Advisory messages.

2. For ANTISKID TRANSDUCER X FAIL (fore-aft pair not involved):
 - A. Procedures are established and used to notify dispatch and flight crew that antiskid transducers are inoperative, but affected wheel brakes remain operative.
- NOTE: Do not use BSCU message inhibit knobs.
3. For ANTISKID advisory message displayed, before each flight review CMC for additional antiskid faults, repeating MAINTENANCE (M) for these faults.

OPERATIONS (O)

1. Takeoff and landing performance must be in accordance with MEL item 32-41-01A (O) procedure.

NOTE: If brakes are capped or removed use performance corrections from 32-41-01B/C.

2. For advisory message ANTISKID remaining displayed, RTO and landing autobrakes are inoperative.
3. Locked wheel protection remains available.

32-42-01 Antiskid System**32-42-01-02 Wheelspeed Transducers****32-42-01-02B Associated Brake Deactivated**

Interval	Installed	Required	Procedure
C	16	14	(M) (O)

May be inoperative provided:

- a. The affected brakes are deactivated.
- b. Performance decrements are applied for the selected procedure.

NOTE 1: Antiskid faults to 3 or more wheels require the use of MEL item 32-42-01.

NOTE 2: Performance penalty for Two Brakes Deactivated is applied rather than the more severe Antiskid Inoperative AFM performance penalty.

NOTE 3: The airplane must also be dispatched using MEL item 32-41-01.

MAINTENANCE (M)

Confirm antiskid faults, deactivate the associated brakes, and prior to every flight review CMC messages when ANTISKID advisory message is displayed.

1. Conduct a CMC Brake System Ground Test.

NOTE: The ground set-up procedure may be simplified. The IRUs do not need to be in NAV mode. (Ignore any IRS signal fault indications). Hydraulic pressure is not required. Autobrake system does not need to be armed.

- A. Select 32 BRAKE CONTROL from the CMC GROUND TEST menu.
- B. Execute the BRAKE SYSTEM BITE test. Record all antiskid system configuration and input faults annunciated during the test.
- C. Following the conclusion of the CMC Brake System Ground Test, select the line-select key opposite the FAIL prompt on the CMC and record the antiskid system fault. Continue to select the NEXT PAGE key on the CMC as required and record the antiskid system faults.

NOTE: When CMC message PARK BRK VLV NOT OPEN WHEN RELEASED or NO PARK BRKE PWR is displayed, dispatch is not allowed (Brake Torque Limiter is inoperative). This condition causes Status message PARK BRK VALVE as well as ANTISKID OFF and BRAKE LIMITER Advisory messages.

2. Use MEL item 32-41-01 to deactivate the associated wheel brakes.
3. For ANTISKID advisory message displayed, before each flight review CMC for additional antiskid faults, repeating MAINTENANCE (M) for these faults.

OPERATIONS (O)

1. When brake(s) are deactivated with deactivation tool(s), gear retract braking remains operative. Normal gear retraction procedure may be used. Take-off and landing performance must be in accordance with MEL item 32-41-01A Brakes Deactivated with Deactivation Tools.
2. When brakes are deactivated by capping brake lines or by brake removal, gear retract braking will not be available for the affected wheels. After take-off the landing gear must remain extended for a minimum of 2 minutes to permit the affected wheels to spin down prior to gear retraction. Take-off and landing performance must be in accordance with MEL item 32-41-01B/C brakes deactivated by Capping Brake Lines.

NOTE: At take-off weights greater than 326,587 kg, flaps up manoeuvring speed (VREF+100) may exceed VLO (270 kts). Ensure gear is retracted prior to selecting Flaps Up.

NOTE: With brake lines capped or brakes removed, it is probable that the aircraft will not be capable of long distance operations, due to the Take-off Performance Limited (TOPL) weight decrements for 'obstacle clearance and take-off climb' required in flight crew procedure O.3. Depending on altitude and temperature the TOPL restrictions will be in excess of 23 tonnes. The preferred option uses deactivation tools which allow gear retract braking to remain operational. If necessary, contact flight technical dispatch for advice.

3. For advisory message ANTISKID remaining displayed, RTO and landing autobrakes are inoperative.

32-42-02 Alternate Antiskid Valves

Interval	Installed	Required	Procedure
C	8	7	(M) (O)

One valve (affecting two wheels) may be inoperative provided:

- a. Both of the associated brakes are deactivated by capping the supply pressure hydraulic line.
- b. Performance decrements are applied.

NOTE: It is probable that the aircraft will not be acceptable for long distance operations, due to the Take Off Performance Limited (TOPL) weight decrements for 'Obstacle Clearance and Take-off Climb' required. Depending on altitude and temperature the TOPL restrictions will be in excess of 23 tonnes. Contact Flight Technical Dispatch or Maintrol for advice.

MAINTENANCE (M)

Cap and deactivate the associated brake lines and prior to every flight review CMC messages when ANTISKID advisory message is displayed.

1. Deactivate the associated brakes using DDG Item 32-41-01B.
2. For ANTISKID advisory message displayed, before each flight review CMC for additional antiskid faults.

NOTE: The ground set-up procedure may be simplified. The IRUs do not need to be in NAV mode. (Ignore any IRS signal fault indications). Hydraulic pressure is not required. Autobrake system does not need to be armed.

- A. Select 32 BRAKE CONTROL from the CMC GROUND TEST menu.
- B. Execute the BRAKE SYSTEM BITE test. Record all antiskid system configuration and input faults annunciated during the test.
- C. Following the conclusion of the CMC Brake System Ground Test, select the line-select key opposite the FAIL prompt on the CMC and record the antiskid system fault. Continue to select the NEXT PAGE key on the CMC as required and record the antiskid system faults.

NOTE: When CMC message PARK BRK VLV NOT OPEN WHEN RELEASED or NO PARK BRKE PWR is displayed, dispatch is not allowed (Brake Torque Limiter is inoperative). This condition causes Status message PARK BRK VALVE as well as ANTISKID OFF and BRAKE LIMITER Advisory messages.

- D. For additional faults indicated, use DDG item 32-42-01, 32-42-01-01, or 32-42-01-02 as applicable.

OPERATIONS (O)

1. Take-off and landing performance must be in accordance with MEL item 32-41-01A.
2. Landing gear must remain extended for a minimum of 2 minutes after takeoff to permit affected wheels to spin down prior to gear retraction.
NOTE: At takeoff weights greater than 326,587 kg, flaps up maneuver speed (VREF + 100 kt) may exceed VLO (270 kt). Therefore, ensure gear is retracted prior to selecting Flaps Up.

32-42-03 Autobrake System**32-42-03A Autobrake Solenoid Valve Verified Closed**

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided:

- a. Autobrake selector remains in the OFF position.
- b. Autobrake solenoid valve is verified closed.
- c. Approach minimums do not require its use.

MAINTENANCE (M)

Verify the Autobrake solenoid valve is closed.

1. Install wheel chocks at all wheels.
2. Release the parking brake.
3. Pressurize hydraulic system No. 4 (AMM 29-11-00/201).
4. Position Autobrake Selector switch OFF.
5. For AUTOBRAKES advisory message displayed, open and collar the P180 panel AUTOBRAKES circuit breaker.
6. For AUTOBRAKES advisory message remains displayed:
 - A. Depressurize Hydraulic Systems No. 1, 2 and 4.
 - B. Pump the brake pedals through their full range 10 times.
NOTE: Brake accumulator pressure gauge will reduce no further (approximately 750 psi).
 - C. Confirm AUTOBRAKES advisory message remains displayed.
NOTE: For AUTOBRAKES advisory message not displayed, dispatch using MEL item 32-42-03B.
7. Set the parking brake.

32-42-03 Autobrake System**32-42-03B Control Module Deactivated**

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided:

- a. Autobrake selector remains in the OFF position.
- b. Autobrake pressure control module is deactivated.
- c. Approach minimums do not require its use.

MAINTENANCE (M)

Deactivate the autobrake pressure control module.

1. Install door locks on wing landing gear (AMM 32-00-30/201).
2. Install door locks on body landing gear (AMM 32-00-30/201).
3. Install wheel chocks at all wheels.
4. Release the parking brake.
5. Remove pressure from hydraulic system No. 4 and the reservoir (AMM 29-11-00/201).
6. Release hydraulic fluid from the brake accumulator.
 - A. Pump the brake pedals through their full range 10 times.
 - B. Confirm the Hydraulic Brake Pressure indication (flight deck) did not decrease the last time brake pedals were pumped.

NOTE: Brake accumulator pressure gauge will reduce no further (approximately 750 psi).

7. Open and collar the P180 panel Autobrakes circuit breaker.
8. Gain access to the Autobrake Pressure Control Module (AMM 32-42-11).
9. Deactivate the autobrake pressure control module using one of the following methods:
 - A. Disconnect and cap the System Pressure hydraulic line to the autobrake hydraulic control module (P/N 60B00263-x).
 - B. Remove the autobrake pressure control module (P/N 60B00263-x), cap the System Pressure hydraulic line and interconnect the Brake Pressure and Return hydraulic lines (straight section of -10 tubing 7-1/2 inches long including fittings).
10. Restore pressure to hydraulic system No. 4 and check for leaks.
11. Set the parking brake.

32-42-04 Torque Limiter System**32-42-04-01 Torque Limiter Control****32-42-04-01A Dispatch with Brake Limiter Indication Not Displayed**

Interval	Installed	Required	Procedure
C	16	14	(M) (O)

Torque limiter control for two brakes on one truck may be inoperative provided:

- Associated brakes are considered inoperative.
- Appropriate performance adjustments are applied.
- BRAKE LIMITER indication is not displayed on EICAS.

NOTE: The airplane must also be dispatched using MEL item 32-41-01.

MAINTENANCE (M)

Deactivate the associated brakes and confirm BRAKE LIMITER messages are not displayed.

- Deactivate the two associated brakes using DDG Item 32-41-01.

NOTE: BRAKE LIMITER advisory and status messages will again display if additional brake limiter faults occur affecting other wheel positions.

OPERATIONS (O)

NOTE: If torque limiter control for only one brake per truck is inoperative, refer to Performance Manual for Maximum Quick Turnaround Weight and apply the 4536 kg weight penalty. This penalty is valid up to Maximum Landing Weight. The EICAS status message BRAKE LIMITER will remain displayed.

- Dispatch with takeoff and landing performance based on two brakes deactivated.
- Use the appropriate DDG Item 32-41-01A (O) procedure for the brake deactivation method.
- Confirm BRAKE LIMITER advisory and status messages are not displayed.

32-42-04 Torque Limiter System**32-42-04-01 Torque Limiter Control****32-42-04-01B Dispatch with Brake Limiter Indication Allowed**

Interval	Installed	Required	Procedure
C	16	10	(M) (O)

May be inoperative provided:

- Two torque limiters and associated brakes per truck operate normally.

- b. For two torque limiters inoperative on the same truck, at least one associated brake must be considered inoperative.
 - c. Appropriate performance adjustments are applied.
-

MAINTENANCE (M)

Prior to each flight review CMC faults and deactivate brakes as required.

- 1. For only BRAKE LIMITER status message displayed:
 - A. Prior to each flight review CMC for additional brake limiter faults.
NOTE 1: This allows 1 torque limiter inoperative on each truck and the associated brake is not required to be deactivated.
 - NOTE 2:** For 2 torque limiters inoperative on the same truck, always do Step.2.
- 2. For BRAKE LIMITER advisory message displayed:
 - A. Prior to each flight review CMC for additional brake limiter faults.
 - B. For two torque limiters inoperative on the same truck, deactivate at least one associated brake using DDG item 32-41-01.
NOTE 1: The airplane must also be dispatched using MEL item 32-41-01.
NOTE 2: MEL item 32-41-01 allows only two brakes inoperative.
NOTE 3: This allows 2 torque limiters inoperative on 1 truck, 2 torque limiters inoperative on a 2nd truck (1 brake deactivated on each truck) and 1 torque limiter inoperative on each remaining truck (that does not require brake deactivation).

OPERATIONS (O)

- 1. For only one torque limiter per truck inoperative:
 - A. Reduce the Maximum Quick Turnaround Limit Weight by 4,536 kg.
 - B. Confirm BRAKE LIMITER advisory message is not displayed.
- 2. For only two torque limiters inoperative on the same truck:
 - A. Dispatch with takeoff and landing performance based on two brakes deactivated.
 - B. Use appropriate DDG item 32-41-01 (O) procedure for the brake deactivation method.
 - C. Confirm BRAKE LIMITER advisory message is not displayed.
- 3. For two torque limiters inoperative on the same truck with additional torque limiters inoperative on remaining trucks:
 - A. Reduce the Maximum Quick Turnaround Limit Weight by 4,536 kg.
 - B. Dispatch with takeoff and landing performance based on two brakes deactivated.
 - C. Use appropriate DDG item 32-41-01A (O) procedure for the brake deactivation method.
 - D. Confirm BRAKE LIMITER advisory message is not displayed.

32-44-02 Brake Status Lights (On Nose Gear)

32-44-02A Alternate Procedures Required

Interval	Installed	Required	Procedure
C	-	0	(O)

May be inoperative provided alternate procedures are established and used.

OPERATIONS (O)

Alternate procedures must be established to ensure ground crew knowledge of brake system status.

These procedures may include but not be limited to flight deck indications, use of interphone and hand signals.

32-44-02 Brake Status Lights (On Nose Gear)

32-44-02B Procedures Do Not Require Use

Interval	Installed	Required	Procedure
D	-	0	

May be inoperative provided procedures do not require their use.

32-45-01 Nose Wheel Snubber Pads

Interval	Installed	Required	Procedure
C	2	0	

32-46-01 Brake Temperature Monitoring System (BTMS)

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided Maximum Quick Turnaround weight limitations are observed.

OPERATIONS (O)

Observe Maximum Quick Turnaround Limitation, refer to B747 Performance Manual Section 3.6.

32-48-01 Tire Pressure Indication System

32-48-01A Alternate Procedures Required

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided alternate procedures are established and used.

MAINTENANCE (M)

Measure tire pressure and deactivate tire pressure indications system.

1. Use an alternate means to measure tire pressure (AMM 12-15-06/301).
2. Deactivate tire pressure indication system.
 - A. Open and collar P414 panel TIRE PRESSURE IND SYS circuit breaker.
 - B. Open and collar P180 panel TIRE PRESSURE IND SYSTEM circuit breaker.

32-48-01 Tire Pressure Indication System

32-48-01B Procedures Do Not Require Use

Interval	Installed	Required	Procedure
D	1	0	(M)

May be inoperative provided procedures do not require its use.

MAINTENANCE (M)

Measure tire pressure and if desired, deactivate tire pressure indications system.

1. Use an alternate means to measure tire pressure (AMM 12-15-06/301).
2. If desired, deactivate tire pressure indication system.
 - A. Open and collar the P414 panel TIRE PRESSURE IND SYS circuit breaker.
 - B. Open and collar the P180 panel TIRE PRESSURE IND SYSTEM circuit breaker.

32-48-01 Tire Pressure Indication System

32-48-01-01 Tire Pressure Sensors

Interval	Installed	Required	Procedure
C	18	0	(M)

May be inoperative provided:

- a. Associated sensor(s) is deactivated.
 - b. Alternate procedures are established and used.
-

MAINTENANCE (M)

Deactivate inoperative tire pressure sensors and measure tire pressure.

1. deactivate associated tire pressure sensor:
 - A. Remove inoperative sensors (AMM 32-45-11/401 or AMM 32-45-12/401).
 - B. Install seal cap (P/N 4305910080) to maintain wheel balance and seal pressure port.
2. Use an alternate means to measure tire pressure (AMM 12-15-06/301).

32-51-01 Rudder Pedal Nose Wheel Steering System

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative provided:

- a. Other systems are not impaired.
- b. Landing approach minimums do not require automatic rollout guidance system. CAT 3B No DH and CAT 3B operations prohibited.

MAINTENANCE (M)

Confirm rudder pedals and tiller steering are not impaired, and if desired, deactivate rudder pedal nose wheel steering.

1. Confirm operation of rudder pedals is not impaired.
2. Confirm the tiller steering operates normally.
3. If desired, the rudder pedal nose wheel steering system may be deactivated.
 - A. Remove the second center ceiling panel aft in the LH Forward Passenger Cabin (Zone A) to gain access to the rudder pedal steering interconnect mechanism (AMM 32-51-07/401).
 - B. Prepare safety-sensitive systems for air mode simulation (AMM 32-09-02/201).

NOTE: Putting the airplane in air mode simulation, will cause PW and RR engine probe heaters to turn on with the possibility of overheating and damaging the probes. It may be desirable to open circuit breakers for all four engine probe heaters during this maintenance procedure.
 - C. Place proximity switch slugs (P/N A27092-61) at nose gear squat switch sensors.

NOTE: In lieu of using a proximity switch slug, the Nose Landing Gear Torsion Links Apex Pin may be disconnected and the torsion links carefully lowered. The upper link in the lowered position will provide proximity for the Squat Switch Sensors. To avoid potential for sensor damage, support the Upper Torsion Link until it is carefully lowered into position.
- D. Confirm the rudder pedal interconnect mechanism moves to the disconnected position (i.e. that full travel of the rudder pedal does not move the interconnect mechanism quadrant).
- E. Open and collar the P7 panel NOSE GR STRG PRI circuit breaker.
- F. Open and collar the P7 panel NOSE GR STRG ALT circuit breaker.
- G. Remove and stow the electrical connector from the nose gear steering interconnect actuators.

- H. Remove installed proximity switch slug (or re-connect the Nose Landing Gear Torsion Links Apex Pin if disconnected).
- I. Confirm the nose gear steering system operates normally using the tiller.
- J. Confirm the rudder operates normally.
- K. Install main deck ceiling panel.

OPERATIONS (O)

NOTE: Pilots must use caution when using the nose wheel steering tiller at speeds above 20 knots to avoid over-controlling the nose wheels resulting in possible loss of directional control.

- 1. For takeoff:
 - A. For pilot flying with access to the nose wheel steering tiller:
 - 1) Maintain directional control by steering first with the tiller and then transitioning to control solely with the rudder, as the rudder becomes fully effective.
 - 2) The transition from nose wheel steering to rudder control typically occurs between 60 to 80 knots and is normally completed by 80 knots.
 - 3) The tiller should be guarded until directional control is established with the rudder.
 - 4) Gradually release the pressure on the tiller while establishing the required amount of rudder control.
 - B. For pilot monitoring:
 - 1) Hold a light forward pressure on the control column and use the control wheel to maintain the wings level during the initial phase of the takeoff roll.
 - 2) At approximately 80 knots, when the pilot flying has transitioned from steering by means of the tiller to rudder control and has moved his hand from the tiller to the control wheel, release the control wheel.
- 2. For landing:
 - A. The Pilot flying with access to the nose wheel steering tiller should use the rudder and tiller as required during the landing roll and be prepared to steer the airplane, using the tiller, once the rudder has become ineffective (approximately 80 knots).
 - B. The pilot monitoring should assist the pilot flying by maintaining the wings level during the initial phase of the landing roll and holding a light forward pressure on the control column

32-53-01 Body Gear Steering System

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative provided:

- a. Body gear steering actuators are verified locked.
- b. Body gear steering is deactivated.

NOTE: All attempts are to be made to rectify this defect prior to dispatch from Main Base. If rectification is unsuccessful, or cannot be achieved by scheduled departure time, Maintrol must be advised in order that they can coordinate with Operations and Flight Management in order to minimise operational disruption.

MAINTENANCE (M)

Verify the body gear steering actuators are locked and deactivate the body gear steering.

1. Verify body gear steering actuators are locked.
 - A. Perform a BITE test of the steering system of the body gear using Body Gear Steering Actuator Lock Switch Installation procedure AMM 32-53-16 3.F.(15), steps (a) through (i).
 - B. Confirm at least one lock switch (either primary or alternate) has a bit status of 1 (locked) on each actuator.

NOTE: For both primary and alternate lock switches on an actuator having a bit status of 0 (unlocked), the actuator may be unlocked or the body gear steering indication system (MEL item 32-53-02) may be inoperative.
 - C. If required to prevent false BODY GEAR STRG/SYS EICAS msgs:
 - 1) After verifying the actuator is locked, check for CMC messages 32059, 32060, 32061 or 32062.
 - 2) If the actuator lock switch(es) has a bit status of 0 (unlocked) or has a lock switch disagree history, use MEL item 32-53-02 to disconnect the affected lock switch connector(s).
2. Deactivate Body Gear Steering and if required, deactivate the steering actuators or control modules.
 - A. Deactivate Body Gear Steering
 - 1) Remove nose gear torsion link apex pin and secure upper torsion link so it clears structure when turning.
 - 2) Open and collar the P7 panel BODY GR STRG ARM AC circuit breaker.
 - 3) Open and collar the P7 panel BODY GR STRG ARM DC circuit breaker.

- 4) Using tiller, steer left and right at least 25 degrees. Confirm no body gear steering actuator extension occurs.
 - 5) Reconnect nose gear torsion links.
- B. For deactivating steering actuators (leaks excessively), disconnect the associated steering hydraulic system.
- NOTE:** Use the blanks MS21914-10 (Qty 2), MS21914-8 (Qty 1), MS21913-10 (Qty2) and MS21913-8 (Qty 1) to cap the hoses and fittings on one BLG
- 1) Depressurize hydraulic system No. 1.
 - 2) Disconnect the OUTBD and INBD CYL EXT (extend) hoses and one RET (retract) hose from the associated body gear trunnion swivel fittings. Cap the trunnion swivel fittings.
- NOTE:** It is only necessary to deactivate the hoses to the two steering actuators on the BLG with the hydraulic leak.
- 3) Loosen the B nuts on EXT and RET hoses on the associated steering actuators. Drain the fluid from the hoses and re-tighten the B nuts.
 - 4) Cap and stow the disconnected hoses so they clear the gear retraction swing.
 - 5) Rotate the top disconnected swivel INBD EXT on the right body gear or the OUTBD EXT on the left body gear, toward the nose of the airplane to a horizontal position and secure there with lockwire (prevents possible interference with closing of slaved gear door).
 - 6) Pressure check system.
 - 7) Pressurize hydraulic system No. 1.
- C. For deactivating hydraulic control modules (leak excessively or pressure switch fault), disconnect the associated hydraulic control module (disconnect both control modules for a pressure switch fault).
- 1) Depressurize hydraulic system No. 1.
 - 2) Remove the pressure supply lines (P1) to the control module (from the landing gear down LGD1 lines). Remove the return lines (R1) that connect to the top of the control module. Cap disconnected ports on tee line fittings. Stow tubes aboard airplane.
 - 3) Disconnect EXT and RET hoses at the associated steering actuators and drain lines. Reconnect hoses.
 - 4) Cap the open ports on the control module.
 - 5) Pressure check system.
 - 6) Pressurize hydraulic system No. 1.

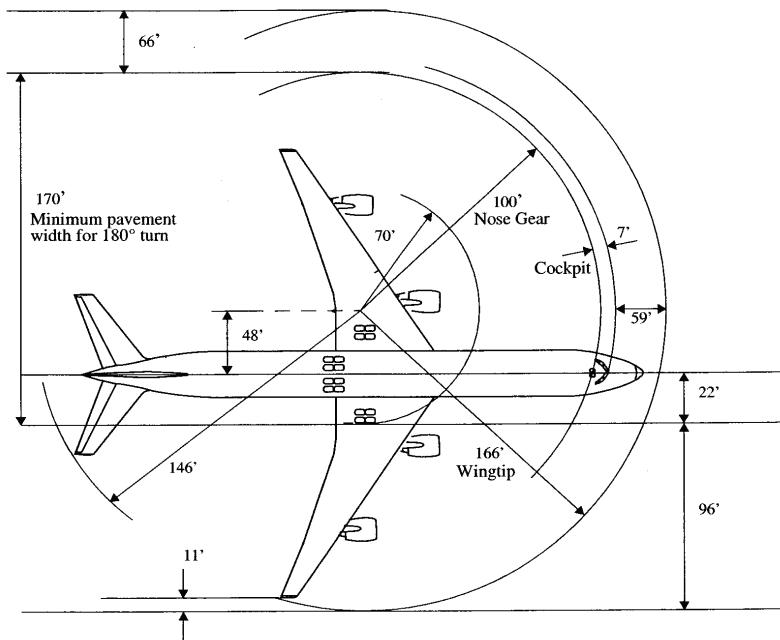
NOTE: The >BODY GEAR STRG advisory message may remain displayed.

OPERATIONS (O)

1. Turning capability will be reduced. See the following illustration depicting approximate minimum turning radii using differential thrust in addition to nose wheel steering. As with all turns, the cockpit must travel outside the centreline of the turn to align the main path. The tip of the winglet describes the largest arc while turning and determines the obstruction clearance path. All other portions of the aircraft structure are within this arc. It should be noted from the TURNING RADIUS illustration that the wingtips are moved outboard about 11 feet, and travel 59 feet in front of the cockpit. Do not attempt to make a turn away from an obstruction within 11 feet of the wing tip or within 59 feet of the flight deck.
2. Avoid sharp turns if possible, due to excessive tyre scrubbing.

CAUTION: **AVOID USE OF EXCESSIVE THRUST IN RAMP AREA
DUE TO POSSIBLE DAMAGE OR INJURY FROM JET
WAKE.**

3. If required, use the GEAR LEVER WILL NOT MOVE UP Non-Normal Checklist.



NOTE: Pilot technique, taxi speed, G.W., C.G., runway/ramp conditions, nose wheel steering, and amount of differential thrust will affect turn radius and location of turn center.

Conditions:
 - Turn initiated at 10 kt
 - 70° Nose Steering
 - Body Gear Steering Deactivated
 - No Braking
 - Differential Thrust.

APPROXIMATE MINIMUM TURNING RADIUS BODY GEAR STEERING DEACTIVATED

32-53-02 Body Gear Steering Indication System

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative provided:

- a. Body gear steering actuators are verified locked.
 - b. Body gear steering is deactivated.
 - c. Body gear steering actuator integrity is verified before each departure.
-

MAINTENANCE (M)

Verify the body gear steering actuators are locked, deactivate the body gear steering and verify the body gear steering actuator integrity before each departure.

NOTE: For a single lock switch failure (primary or alternate) not annunciated on EICAS, does not constitute an inoperative indication system.

1. Verify the body gear steering actuators are locked and deactivate the body gear steering using DDG item 32-53-01 (M) procedure.
2. Disconnect, cap and stow the electrical connector on the affected body gear steering actuator.
3. Before each departure, verify body gear steering integrity.
 - A. Depressurize hydraulic system No. 1.
 - B. Tow airplane (using normal towing procedures) as follows, and confirm no body gear steering actuator extension or separation occurs:
 - 1) Nose wheel left 45 degrees, move 50 feet, stop.
 - 2) Nose wheel right 45 degrees, move 50 feet, stop.
 - C. Repressurize hydraulic system No. 1.

OPERATIONS (O)

Use DDG item 32-53-01 (O) procedure.

32-61-01 Body and Wing Landing Gear Uunlock Position Sensors**32-61-01A One Inoperative**

Interval	Installed	Required	Procedure
B	8	7	(M) (O)

One may be inoperative provided the associated Primary and Alternate Landing Gear Door Warning Sensors are verified to operate normally.

MAINTENANCE (M)

Verify the associated primary and alternate landing gear door warning sensors operate normally.

1. Confirm the following CMC messages are not displayed:
 - A. xx GEAR DOOR yy PROX SWITCH SENSOR FAIL (PSEU)
 - B. xx GEAR DOOR yy PROX SWITCH TARGET FAIL (PSEU)
 - C. xx GEAR DOOR yy PROX SWITCH SENSOR/WIRE FAIL (PSEU)
 Where xx is L BODY, R BODY, L WING, and R WING; and yy is PRIMARY and ALTERNATE.

OPERATIONS (O)

1. Confirm gear has properly retracted. Verify advisory message GEAR DOOR does not display.
 NOTE 1: For the GEAR DOOR advisory message displayed, do GEAR DOOR Non-Normal checklist.
 NOTE 2: For the GEAR DISAGREE caution message displayed, do GEAR DISAGREE Non-Normal checklist.

32-61-01 Body and Wing Landing Gear Uunlock Position Sensors**32-61-01B Two Or More Inoperative**

Interval	Installed	Required	Procedure
B	8	0	(M) (O)

May be inoperative provided:

- a. Associated landing gear and its symmetric pair are secured in the down and locked position.
- b. For gear down ferry information contact Flight Ops Management and Flight Technical Dispatch.



NOTE: Dispatch is permitted if the cause of the Indication System failure is due to either Main Gear Uplock position sensors (DDG item 32-61-01), Landing Gear Door warning sensors (DDG item 32-61-02) or Wing Gear Downlock position sensors (DDG item 32-61-03). Dispatch with faulty Nose Gear Up, Lock, Compressed sensors, Main Gear Tilt sensors or Body Gear Downlock sensors is not permitted, as this will affect essential systems including the Air/Ground System.

MAINTENANCE (M)

Secure the associated landing gear and its symmetric landing gear pair in the down position and position the Gear Down Dispatch Switch in the Gear Down Dispatch position.

1. For partial gear down dispatch, dispatch with symmetric landing gear extended. (AMM 32-00-00/201).
2. For securing all landing gear in down position, use DDG item 32-30-01 (M).

OPERATIONS (O)

NOTE: The GEAR DISAGREE caution message may be displayed.

1. Operate airplane in accordance with Performance Manual Gear Down Operation section. Observe the landing gear extended placard speed limitation (270 KIAS/0.73 M).
2. Base flight plan on landing gear extended.
3. If all landing gear are not to be left extended, use of the following procedure will keep all wheel well doors closed:
 - A. Before retraction of operable landing gear, depressurise the hydraulic system associated with the inoperative landing gear.

Body and nose gear	Hydraulic System 1
Wing gear	Hydraulic System 4

NOTE: If Hydraulic System 1 is depressurised, gear retract braking is unavailable. Wait two (2) minutes after take-off before retracting landing gear to permit wheels to spin down prior to retraction.

- B. After gear retraction, position gear lever OFF.
- C. Repressurise the hydraulic system associated with the inoperative landing gear.

32-61-02 Landing Gear Door Warning Sensors

Interval	Installed	Required	Procedure
C	10	5	(M) (O)

One per door may be inoperative provided the associated operative sensor is verified to function correctly.

MAINTENANCE (M)

Verify at least one landing gear door warning primary or alternate sensor per gear is functioning correctly.

1. Isolate the landing gear door warning sensor fault to the LRU level (AMM 32-09-03/501).
2. Verify the following CMC messages are not displayed for both the primary and alternate sensors on each landing gear door:
 - A. xx GEAR DOOR yy PROX SWITCH SENSOR FAIL (PSEU)
 - B. xx GEAR DOOR yy PROX SWITCH TARGET FAIL (PSEU)
 - C. xx GEAR DOOR yy PROX SWITCH SENSOR/WIRE FAIL (PSEU)Where xx is L BODY, R BODY, L WING, and R WING; and yy is PRIMARY and ALTERNATE.

OPERATIONS (O)

For the GEAR DOOR advisory message displayed, do the GEAR DOOR Non-Normal checklist.

32-61-03 Wing Landing Gear Downlock Position Sensors

Interval	Installed	Required	Procedure
B	4	0	(M) (O)

May be inoperative provided:

- a. Both wing gear are secured in the down and locked position.
- b. For gear down ferry information contact Flight Ops Management and Flight Technical Dispatch.

NOTE: Dispatch is permitted if the cause of the Indication System failure is due to either the Main Gear Uplock position sensors (MEL item 32-61-01), Landing Gear Door warning sensors (MEL item 32-61-02) or the Wing Gear Downlock position sensors (MEL item 32-61-03). Dispatch with faulty Nose Gear Up, Lock, Compressed sensors, Main Gear Tilt sensors, or Body Gear Downlock sensors is not permitted, as this will affect essential systems including the Air/Ground System.

MAINTENANCE (M)

Secure the associated landing gear and its symmetric landing gear pair in the down position and position the Gear Down Dispatch Switch in the Gear Down Dispatch position.

1. For partial gear down dispatch, dispatch with symmetric landing gear extended. (AMM 32-00-00/201).
2. For securing all landing gear in down position, use DDG item 32-30-01 (M).

OPERATIONS (O)

NOTE: The GEAR DISAGREE caution message may be displayed.

1. Request take-off performance from CARD using the Performance Correction Code for 'LANDING GEAR EXTENDED' shown in the Performance Manual. If CARD is not available contact FTD.
2. Base flight plan on landing gear extended.
3. Observe the landing gear extended placard speed limitation (270 KIAS/0.73 M).
4. If all landing gear are not to be left extended, use of the following procedure will keep all wheel well doors closed:
 - A. Before retraction of operable landing gear, depressurise the hydraulic system associated with the inoperative landing gear.

Body and nose gear	Hydraulic System 1
Wing gear	Hydraulic System 4

- NOTE: If Hydraulic System 1 is depressurised, gear retract braking is unavailable. Wait two (2) minutes after take-off before retracting landing gear to permit wheels to spin down prior to retraction.
- B. After gear retraction, position gear lever OFF.
 - C. Repressurise the hydraulic system associated with the inoperative landing gear.

33-11-01 Flight Compartment and Instrument Lighting System

Interval	Installed	Required	Procedure
C	-	-	

Individual lights or light controls may be inoperative provided:

- a. Left and right flight deck dome lights operate normally.
- b. Remaining lighting system lights are sufficient to clearly illuminate all required instruments, controls, and other devices for which they are provided.
- c. Remaining lighting system lights are positioned so that direct rays are shielded from flight crew eyes.
- d. Flight deck emergency light operates normally.
- e. Lighting configuration and intensity is acceptable to the flight crew.

NOTE: Individual buttons/switch lights and/or annunciations/indications are excluded from this relief.

33-12-01 Storm Override Switch

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided associated lights operate normally.

33-18-01 Master Dim and Test System**33-18-01A Dim Function Inoperative**

Interval	Installed	Required	Procedure
B	1	0	

Dim function may be inoperative provided:

- a. Test and Bright functions operate normally.
 - b. Light intensity is acceptable to the flight crew.
-

33-18-01 Master Dim and Test System**33-18-01B Test Function Inoperative**

Interval	Installed	Required	Procedure
B	1	0	

Test function of individual light may be inoperative provided:

- a. Dim or Bright functions operate normally.
 - b. Light intensity is acceptable to the flight crew.
-

[TGL] 33-21-01 Cabin Interior Illumination System**33-21-01-01 Passenger and Combi Configurations****33-21-01-01-01 Cabin Lighting - Passengers Carried**

Interval	Installed	Required	Procedure
C	-	-	

Individual lights may be inoperative provided:

- a. Remaining lighting is sufficient for cabin crew to perform their duties,
- b. Inoperative lights are not part of the cabin emergency lighting.

NOTE: Cabin emergency lighting does not include floor proximity lights. (Refer to MEL item [TGL] 33-51-03).

OPERATIONS NOTE

Check that remaining light is sufficient for cabin crew to perform their duties.

[TGL] 33-21-01 Cabin Interior Illumination System**33-21-01-01 Passenger and Combi Configurations****33-21-01-01-02 Cabin Lighting - Passengers Not Carried**

Interval	Installed	Required	Procedure
D	-	-	

All lighting may be inoperative provided passengers are not carried.

[TGL] 33-21-01 Cabin Interior Illumination System**33-21-01-02 First Class Mood Lighting****33-21-01-02-01 Lights**

Interval	Installed	Required	Procedure
B	-	-	

Individual lights may be inoperative provided:

- a. Remaining lighting is sufficient for cabin crew to perform their duties,
- b. Inoperative lights are not part of the cabin emergency lighting.

OPERATIONS NOTE

Check that remaining light is sufficient for cabin crew to perform their duties.

[TGL] 33-21-01 Cabin Interior Illumination System**33-21-01-02 First Class Mood Lighting****33-21-01-02-02 Lighting Control**

Interval	Installed	Required	Procedure
A	1	0	(O)

Lighting control may be inoperative provided:

- a. Remaining lighting is sufficient for cabin crew to perform their duties,
- b. Inoperative lights are not part of the cabin emergency lighting,
- c. Repairs are made within 3 flight sectors or prior to departure from Main base whichever is earlier.

OPERATIONS (O)

1. When loss of mood lighting control at door 1L, the 1st class Prime lighting control box gui switch at door 1L **MUST** be kept 'ON' at all times in flight. Otherwise there will be a loss of lighting in a decompression condition.
2. Consideration should be given to making passengers aware of the loss of lighting control.

[TGL] 33-21-01 Cabin Interior Illumination System**33-21-01-03 Cabin Crew Rest Lighting**

Interval	Installed	Required	Procedure
B	-	-	

Individual lights may be inoperative provided remaining lighting is sufficient to prevent a hazardous condition.

OPERATIONS NOTE

Check that remaining light is sufficient for cabin crew to perform their duties.

[TGL] 33-21-01 Cabin Interior Illumination System**33-21-01-04 Flight Crew Bunk Lights**

Interval	Installed	Required	Procedure
B	-	-	(M)

May be inoperative.

MAINTENANCE (M)

In the event that crew bunk lights remain "On", trip and collar circuit breaker C10944 (Crew Rest Reading Light) on E8 panel.

33-24-01 Passenger Lighted Information Signs (No Smoking/Fasten Seat Belt/Return to Seat)**33-24-01A PA System Inoperative**

Interval	Installed	Required	Procedure
C	-	-	(M) (O)

May be inoperative provided:

- a. Associated passenger seat, cabin crew seat, lavatory or crew rest area bunk is not occupied from which a passenger lighted information sign is not readily legible.
- b. Associated seat, lavatory, or bunk must be blocked and placarded - DO NOT OCCUPY.

NOTE: These conditions are not intended to prohibit lavatory use or inspections by crewmembers.

MAINTENANCE (M)

Confirm affected passenger notice signs are legible.

NOTE: In tests conducted at Boeing for the FAA, a sign was considered "readily legible" if enough of the sign could be seen to identify it. NO SMOK and FASTEN SEAT B would be considered examples of signs that are readily legible.

1. Tapes or ropes of conspicuous contrasting colors must be installed to block access to unusable seats prior to boarding of passengers.
2. Conspicuous signs or placards shall be placed in appropriate locations which are not to be occupied by passengers or flight attendants.
3. For an associated lavatory, close and lock the lavatory door.

OPERATIONS (O)

If system or multiple signs are inoperative and seats or lavatories are to be used, liaise with cabin crew to establish procedure to be used to alert all cabin crew and notify passengers by use of PA when seat belts should be fastened and smoking is prohibited.

33-24-01 Passenger Lighted Information Signs (No Smoking/Fasten Seat Belt/Return to Seat)**33-24-01B PA System Operative**

Interval	Installed	Required	Procedure
C	-	-	(O)

May be inoperative and associated passenger seat(s), cabin crew member seats(s) cabin crew member seats(s), lavatories or crew rest areas may be occupied provided:

- a. Passenger Address System operates normally.
- b. PA system is used to notify passengers and cabin crew when associated sign(s) are placed on or off.

OPERATIONS (O)

If system or multiple signs are inoperative and seats or lavatories are to be used, liaise with cabin crew to establish procedure to be used to alert all cabin crew and notify passengers by use of PA when seat belts should be fastened and smoking is prohibited.

33-24-01 Passenger Lighted Information Signs (No Smoking/Fasten Seat Belt/Return to Seat)

33-24-01-01 Aural Tone System

Interval	Installed	Required	Procedure
C	1	0	

33-24-01 Passenger Lighted Information Signs (No Smoking/Fasten Seat Belt/Return to Seat)

33-24-01-02 Flight Deck Automatic Function

Interval	Installed	Required	Procedure
C	-	0	(O)

Automatic function may be inoperative provided:

- a. Manual Control function operates normally.
- b. Procedures for its use are established and used.

OPERATIONS (O)

Select sign switch(es) to ON/OFF as appropriate.

**33-31-01 Wheel Well, Cargo Compartment, Servicing, Exterior
Cargo Loading Area, and Electrical Equipment Center
Lights Systems**

Interval	Installed	Required	Procedure
C	-	0	

33-41-01 Wing Illumination Lights

Interval	Installed	Required	Procedure
C	2	0	(O)

May be inoperative provided ground de-icing procedures do not require their use.

OPERATIONS (O)

Ensure de-icing rigs have sufficient lighting for adequate ground de-icing.

Section 2

33-42-02 Landing Lights**33-42-02A All Operations**

Interval	Installed	Required	Procedure
C	4	2	

One light per side may be inoperative.

33-42-02 Landing Lights**33-42-02B Day Operations**

Interval	Installed	Required	Procedure
C	4	0	

May be inoperative for day operations.

33-42-02 Landing Lights**33-42-02-01 Dim Position**

Interval	Installed	Required	Procedure
C	4	0	

33-42-03 Runway Turn-Off Lights**33-42-03A All Operations**

Interval	Installed	Required	Procedure
C	2	0	

May be inoperative provided both landing lights on the same side of airplane as inoperative turn-off light(s) operate normally.

33-42-03 Runway Turn-Off Lights**33-42-03B Day Operations**

Interval	Installed	Required	Procedure
C	2	0	

May be inoperative for day operations.

33-43-01 Position Lights (Wing Tips and Tail)**33-43-01A All Operations**

Interval	Installed	Required	Procedure
C	6	3	

For night operations, all except the following minimum may be inoperative:

- a. One stationary red wing tip bulb.
 - b. One stationary green wing tip bulb.
 - c. One stationary white tail bulb.
-

33-43-01 Position Lights (Wing Tips and Tail)**33-43-01B Day Operations**

Interval	Installed	Required	Procedure
C	6	0	

May be inoperative for day operations.

[TGL] 33-44-01 Anti-Collision Light Systems**33-44-01-01 Red Upper and Lower Fuselage Beacon Lights****33-44-01-01A Tail/Wing Tip Strobes Operative**

Interval	Installed	Required	Procedure
C	2	1	(O)

May be inoperative provided:

- a. The White Tail and Wing Tip Strobe lights operate normally.
 - b. Alternate procedures are established and used.
-

OPERATIONS (O)

With unserviceable lower body anti-collision light (Red Strobe) ensure that ground staff at arrival station are given advance notice, and after establishing communication on the ground ensure that ramp staff and/or service vehicles do not approach the aircraft until the engines are shut down and they have been given clearance to do so.

[TGL] 33-44-01 Anti-Collision Light Systems**33-44-01-01 Red Upper and Lower Fuselage Beacon Lights****33-44-01-01B Tail/Wing Tip Strobes Operative**

Interval	Installed	Required	Procedure
C	2	0	(O)

May be inoperative for day operations provided:

- a. White wing tip strobe lights operate normally.
 - b. Alternate procedures are established and used.
-

OPERATIONS (O)

With unserviceable lower body anti-collision light (Red Strobe) ensure that ground staff at arrival station are given advance notice, and after establishing communication on the ground ensure that ramp staff and/or service vehicles do not approach the aircraft until the engines are shut down and they have been given clearance to do so.

33-44-01 Anti-Collision Light Systems

33-44-01-02 White Tail and Wing Tip Strobe Lights

33-44-01-02A Upper/Lower Beacons Operative

Interval	Installed	Required	Procedure
C	3	0	

May be inoperative provided the Red Upper and Lower Fuselage Beacon lights operate normally.

33-45-01

LOGO Light System

Interval	Installed	Required	Procedure
D	1	0	

[TGL] 33-51-01 Interior Emergency Lighting System**33-51-01-01 Overhead Emergency Lighting (Each aisle)**

Interval	Installed	Required	Procedure
B	-	-	

A Maximum of one in four consecutive overhead emergency lights (or light assemblies) may be inoperative.

[TGL] 33-51-01 Interior Emergency Lighting System**33-51-01-02 EXIT Signs**

Interval	Installed	Required	Procedure
C	-	-	

Up to 50% of the bulbs may be inoperative in one or more signs.

NOTE: Complete sign may be inoperative provided the associated exit is considered inoperative (refer to MEL item [TGL] 52-11-01)

[TGL] 33-51-01 Interior Emergency Lighting System**33-51-01-03 Exit Area lighting**

Interval	Installed	Required	Procedure
B	-	-	

One may be inoperative.

[TGL] 33-51-02 Exterior Emergency Lighting System

**33-51-02A Escape Slide Lighting / Overwing Escape Route
Lighting - Associated Door Inoperative - Night
Operations**

Interval	Installed	Required	Procedure
A	-	-	

One may be inoperative provided:

- a. Associated main entry door/slide is considered inoperative.
 - b. Repairs are made within five flights.
-

NOTE: The airplane must also be dispatched using MEL item [TGL] 52-11-01

[TGL] 33-51-02 Exterior Emergency Lighting System

**33-51-02C Escape Slide Lighting / Overwing Escape Route
Lighting - Day Operations**

Interval	Installed	Required	Procedure
B	-	0	

May be inoperative for day operations.

[TGL] 33-51-03 Floor Proximity Emergency Escape Path Marking System**33-51-03-01 Passenger and Combi Configurations****33-51-03-01-01 Incandescent Marking System**

Interval	Installed	Required	Procedure
B	-	-	

Individual marker lights may be inoperative as detailed in the OPERATIONS NOTE.

OPERATIONS NOTE

1. The following are the dispatch requirements for the BA 747-400 Incandescent Marking System:
 - A. EXIT IDENTIFIERS
 - 1) A maximum of 3 filaments may be inoperative in each exit identifier.
 - B. FLOOR TRACK RED LIGHTS
 - 1) Up to 50% may be inoperative, i.e. 1 lamp in each 2 lamp group, or 2 lamps in each 4 lamp group.
 - C. FLOOR TRACK WHITE LIGHTS AND/OR DIRECTIONAL ARROW LIGHTS.
 - 1) Lights may be inoperative provided:
 - a. All lights marking right angle intersections, including cross aisles and overwing exits, must be operative,
 - b. Along each aisle axis, all lights within one metre of lights marking right angle intersections must be operative,
 - c. Up to 50% of other lights may be inoperative provided every 3rd lamp is operative.
 - D. SEAT END-BAY LIGHTS
 - 1) All seat end-bay lights MUST be operative.

INTENTIONALLY BLANK

Section 2

34-00-01 Instrument Source Select Switches (FLT DIR, NAV, EUU, IRS, AIR DATA)

Interval	Installed	Required	Procedure
C	10	-	(M) (O)

May be inoperative provided:

- a. Associated instruments operate from isolated sources.
 - b. Inoperative switches are not moved in flight.

NOTE: This MEL item does not include the CENTER ADC Selector installed on ADIRU equipped airplanes.

MAINTENANCE (M)

Confirm associated instruments operate from isolated sources.

1. Position Captain's or First Officer's unaffected Source Select Switch(es) so that both pilot's instruments are operating from different sources.
 2. Confirm the following advisory messages are not displayed:
>SOURCE SEL ADC
>SOURCE SEL EIU
>SOURCE SEL F/D
>SOURCE SEL IRS
>SOURCE SEL NAV

OPERATIONS (O)

Do not move inoperative instrument source select switches in flight.

34-00-01 Instrument Source Select Switches (FLT DIR, NAV, EIU, IRS, AIR DATA)

34-00-01-01 Auto-Select Feature

Interval	Installed	Required	Procedure
C	-	0	(M)

May be inoperative provided source is verified.

MAINTENANCE (M)

Verify source for inoperative EIU Auto-Select feature.

1. Position L on Captain's EIU source selector and R or C on First Officer's selector.
 2. Confirm >SOURCE SEL EIU advisory message is not displayed.

34-00-02**PFD/ND Standby Power Switching*********

Interval	Installed	Required	Procedure
C	2	1	

34-11-01 Static Air Temperature (SAT) Indications

Interval	Installed	Required	Procedure
D	-	0	

34-11-02

Pitot/Static Probe Source Select Valve(s)

Interval	Installed	Required	Procedure
C	-	0	(M)

May be inoperative provided left and right ADCs operate normally.

MAINTENANCE (M)

1. Select Centre ADC on the First Officer's Air Data Source Selector (P3 panel):
 - A. If EICAS status message P/S XFR VLV is displayed, placard the First Officer's Air Data Source Selector Centre position – INOP.
2. Subsequently, select Right ADC on the First Officer's Air Data Source Selector (P3 panel):
 - A. If EICAS status message P/S XFR VLV is displayed, placard the Captain's Air Data Source Selector Centre position – INOP.
3. If EICAS status message P/S XFR VLV was displayed in both of the preceding steps, the Centre ADC must be considered inoperative using MEL item 34-12-01.

NOTE: EICAS status message P/S XFR VLV may remain displayed provided the Captain's and First Officer's Air Data Source Selectors are not selected to an inoperative position.

34-12-01 Air Data Computer System (ADC)

Interval	Installed	Required	Procedure
C	3	2	(M) (O)

May be inoperative provided at least the left and one other ADC operate normally.

MAINTENANCE (M)

If EICAS Status Message ADC RIGHT is annunciated, the following procedure for selecting the Centre ADC is recommended:

1. Select Centre ADC on F/O P3 panel.

NOTE: Centre ADC must be selected prior to proceeding to Step 2.

2. Determine if Status Message AOA RIGHT is displayed:

A. If AOA RIGHT is not displayed, dispatch is allowed.

B. If AOA RIGHT is displayed, locate circuit breaker ADC R PWR on panel P7-2 A14:

1) If circuit breaker ADC R PWR is closed, dispatch is not allowed.

2) If circuit breaker ADC R PWR is open, close it one time ONLY and wait 30 seconds:

a. If circuit breaker ADC R PWR re-opens, dispatch is not allowed.

b. If circuit breaker ADC R PWR remains closed, and AOA RIGHT is not displayed, dispatch is allowed.

OPERATIONS (O)

The Non-Normal Checklist ALT DISAGREE should be modified to the following when dispatching with only two operative ADCs:

1. Flight not permitted in RVSM airspace
2. Transponder altitude received by ATC may be unreliable.
3. **Do not use the flight path vector (FPV).**
4. LANDING PREPARATION:
 - Maintain visual conditions if possible.
 - Establish landing configuration early.
 - Radio altitude reference available below 2500 feet.
 - Use electronic and visual glide slope indicators, where available for approach and landing.

34-12-02 Total Air Temperature Indication

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided Static Air Temperature (SAT) indication is available.

34-12-02 Total Air Temperature Indication**34-12-02-01 Total Air Temperature Probes**

Interval	Installed	Required	Procedure
C	2	1	

34-13-01 Mach Indications**34-13-01A One Inoperative**

Interval	Installed	Required	Procedure
C	2	1	

One may be inoperative provided flight descends to FL 290 or below if failure of the second indication occurs in flight.

34-13-01 Mach Indications**34-13-01B Both Inoperative**

Interval	Installed	Required	Procedure
C	2	0	

May be inoperative provided flight remains at or below FL 290.

34-13-02 Mach/Airspeed Warning Systems

Interval	Installed	Required	Procedure
B	2	1	

One (Captain's or F/O's) may be inoperative.

34-13-03 Standby Altimeter Vibrator

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided VMC conditions exist at departure and arrival airports.

34-13-04

True Airspeed Indications

Interval	Installed	Required	Procedure
C	-	0	

34-16-01 Altitude Alerting System**34-16-01A All Inoperative**

Interval	Installed	Required	Procedure
A	-	0	(O)

May be inoperative provided:

- a. Autopilot with altitude hold and altitude capture operates normally.
- b. Enroute operations do not require its use.
- c. Airplane does not depart from a Main Maintenance Base where repair or replacement can be made.
- d. Repairs are made within three flight days.

NOTE: The altitude alerting system is required to be operative for RVSM operations.

OPERATIONS (O)

1. Enroute operations that require altitude alerting (such as RVSM) may not be conducted.
2. Autopilot must have altitude hold capability.

NOTE: Any one of the following autopilot modes will provide acceptable altitude hold capability:

- A. Altitude Hold (ALT HOLD),
- B. Vertical Speed (V/S) with 000 selected,
- C. Vertical Navigation (V NAV) with FMC flight plan, or
- D. V NAV with FMC flight plan combined with altitude intervention.
3. Use the autopilot and altitude hold for all operations for which it is appropriate.
4. Cross-check the altitude displays between the captain's and first officer's PFDs upon reaching and departing an assigned altitude. Periodically cross-check altitude indications when maintaining an assigned altitude.
5. Pilot monitoring should call out approaching and departing assigned altitudes.
6. Flight crew must be aware that the usual alerts for altitude deviations will not occur.

34-16-01 Altitude Alerting System**34-16-01-01 Aural Alert**

Interval	Installed	Required	Procedure
C	-	0	

May be inoperative provided:

- a. Visual alert operates normally.
 - b. Autopilot with altitude hold and altitude capture operates normally.
-

34-16-01 Altitude Alerting System**34-16-01-02 Visual Alert**

Interval	Installed	Required	Procedure
C	-	0	

May be inoperative provided:

- a. Aural alert operates normally.
 - b. Autopilot with altitude hold and altitude capture operates normally.
-

34-21-01 Inertial Reference Units (IRUs)**34-21-01A Center Inoperative**

Interval	Installed	Required	Procedure
C	3	2	

Center IRU may be inoperative provided approach minimums do not require its use.

NOTE 1: Operation with one IRU unserviceable satisfies BRNAV (Basic R Nav) requirements.

NOTE 2: For unrestricted operation in MNPS airspace the aircraft must have two fully serviceable Long Range Navigation Systems (LRNSs). A LRNS may be one of the following:

- One Inertial Reference System (IRS),
- One Flight Management System (FMS) using the inputs from one or more IRS', or
- One Global Positioning System (GPS).

34-21-01 Inertial Reference Units (IRUs)**34-21-01B Right Inoperative**

Interval	Installed	Required	Procedure
C	3	2	

Right IRU may be inoperative provided:

- a. Approach minimums do not require its use.
- b. Standby power to the Captain's ND is installed and available.

NOTE 1: Operation with one IRU unserviceable satisfies BRNAV (Basic R Nav) requirements.

NOTE 2: For unrestricted operation in MNPS airspace the aircraft must have two fully serviceable Long Range Navigation Systems (LRNSs). A LRNS may be one of the following:

- One Inertial Reference System (IRS),
- One Flight Management System (FMS) using the inputs from one or more IRS', or
- One Global Positioning System (GPS).

OPERATIONS NOTE

For airplanes with AUTO IRS source selector option, the C IRS should be manually selected when dispatching with an inoperative R IRU.

34-21-02 IRS 'ON BAT' Light

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided the ground crew call horn is verified to operate normally.

MAINTENANCE (M)

Verify the ground crew horn is operating.

1. Momentarily open the P180 panel IRS ON BATTERY circuit breaker and confirm ground crew horn is operating normally. (AMM 23-43-00/3)
2. Close the opened circuit breaker.

34-22-01 Non-Stabilized Magnetic Compass (Standby)**34-22-01A Three IRUs Operative**

Interval	Installed	Required	Procedure
B	1	0	

May be inoperative provided three IRUs operate normally.

34-22-01 Non-Stabilized Magnetic Compass (Standby)**34-22-01B Two IRUs Operative**

Interval	Installed	Required	Procedure
B	1	0	(O)

May be inoperative provided:

- a. Any combination of two IRUs operate normally.
 - b. Airplane is operated with dual independent navigation capability and under positive radar control by ATC on the enroute portion of the flight.
-

OPERATIONS (O)

Flight crew must ensure that planned routes comply with limitations.

34-22-01 Non-Stabilized Magnetic Compass (Standby)**34-22-01C Flight in Areas of Magnetic Unreliability**

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative for flights that are entirely within areas of magnetic unreliability provided at least two IRUs operate normally.

OPERATIONS (O)

Flight crew must ensure that planned routes comply with limitations.

34-22-02**Standby Radio Magnetic Indicator (RMI)*********

Interval	Installed	Required	Procedure
C	-	0	

May be inoperative provided standby power to Captain's ND is installed and available.

34-22-03 Flight Director Systems

Interval	Installed	Required	Procedure
C	3	0	

May be inoperative provided approach minimums do not require their use.

OPERATIONS NOTE

Terminal Area RNAV operations may be flown provided the Autopilot is serviceable.

34-22-03 Flight Director Systems**34-22-03-01 Flight Director Displays**

Interval	Installed	Required	Procedure
C	2	0	

May be inoperative provided approach minimums do not require their use.

NOTE: Windshear guidance may be unavailable.

OPERATIONS NOTE

Terminal Area RNAV operations may be flown provided the Autopilot is serviceable.

34-22-04 Standby Attitude/ILS Indicator

34-22-04-01 Attitude**34-22-04-01B Day VMC Operations**

Interval	Installed	Required	Procedure
B	1	0	

May be inoperative provided:

- a. Operations are conducted in Day VMC only.
 - b. Operations are not conducted into known or forecast over-the-top conditions.
 - c. Both attitude indicators are operative.
-

34-22-04 Standby Attitude/ILS Indicator

34-22-04-02 ILS

34-22-04-02A VMC at Departure/Arrival Airports

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided VMC conditions exist at departure and arrival airports.

34-22-04 Standby Attitude/ILS Indicator

34-22-04-02 ILS

34-22-04-02B Standby Power to Captain's PFD/ND Available

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided Standby power to Captain's PFD/ND is available.

[TGL] 34-31-01 Instrument Landing System (ILS)
34-31-01A One Inoperative

Interval	Installed	Required	Procedure
B	3	2	(O)

One may be inoperative for IFR operations provided approach minimums do not require their use.

OPERATIONS (O)

1. For the left ILS is inoperative, Ground Proximity Warning System Mode 5 (Glideslope Deviation) will be inoperative, and dispatch must also be in accordance with MEL item 34-46-01-03. Advisory and Status messages GND PROX SYS may be displayed.
2. If a >GPS LEFT or >GPS RIGHT EICAS advisory message displays, the associated ILS receiver may also be failed.
3. To verify ILS receiver operation:
 - A. Enter an ILS frequency on the FMS-CDU NAV RADIO page (if a frequency is not already entered), and
 - B. Verify the frequency is displayed on the appropriate left or right PFD approach reference. If the approach reference is not displayed, the ILS receiver is also failed. Triple channel autoland will not be available.
4. If a left or right MMR fails to provide ILS information, select Centre EIU with the EIU Source Selector for the appropriate PFD.
 - A. Verify that the Centre ILS frequency is displayed on the appropriate left or right PFD approach reference. If the approach reference is not displayed, the Centre ILS receiver is also failed. Autoland will not be available.
5. Delete the manually entered ILS frequency, to allow autotuning for the serviceable ILS/s.
6. Consider the affect of Autoland capability for the operation.

[TGL] 34-31-01 Instrument Landing System (ILS)
34-31-01B More Than One Inoperative

Interval	Installed	Required	Procedure
D	3	0	

One or more may be inoperative for VFR operations.

OPERATIONS NOTE

- For the left ILS is inoperative, Ground Proximity Warning System Mode 5 (Glideslope Deviation) will be inoperative, and dispatch must also be in accordance with MEL item 34-46-01-03. Advisory and Status messages GND PROX SYS may be displayed.

34-31-01 Instrument Landing System (ILS)**34-31-01-01 Excessive Beam Deviation Feature**

34-31-01-01A One Inoperative

Interval	Installed	Required	Procedure
D	3	2	

One may be inoperative provided approach minimums do not require their use.

OPERATIONS NOTE

- For the left ILS is inoperative, Ground Proximity Warning System Mode 5 (Glideslope Deviation) will be inoperative, and dispatch must also be in accordance with MEL item 34-46-01-03. Advisory and Status messages GND PROX SYS may be displayed.

34-31-01 Instrument Landing System (ILS)**34-31-01-01 Excessive Beam Deviation Feature**

34-31-01-01B Two Inoperative

Interval	Installed	Required	Procedure
C	3	1	

May be inoperative provided approach minimums do not require their use.

OPERATIONS NOTE

- For the left ILS is inoperative, Ground Proximity Warning System Mode 5 (Glideslope Deviation) will be inoperative, and dispatch must also be in accordance with MEL item 34-46-01-03. Advisory and Status messages GND PROX SYS may be displayed.

34-31-02 ILS Antenna Switching**34-31-02-01 Glide Slope****34-31-02-01A One Inoperative**

Interval	Installed	Required	Procedure
C	3	2	(O)

One may be inoperative provided approach minimums do not require use of the associated ILS Glide Slope receiver.

NOTE: If Left Glide Slope switching is inoperative, GPWS Mode 5 is considered inoperative.

OPERATIONS (O)

1. Confirm that the associated ILS receiver is not required for planned approach minimums.
2. For left glideslope switch inoperative, GPWS Mode 5 is considered inoperative. Airplane must also be dispatched using MEL item 34-46-01-03.

34-31-02 ILS Antenna Switching**34-31-02-02 Localizer****34-31-02-02A One Inoperative**

Interval	Installed	Required	Procedure
B	3	2	(O)

One may be inoperative provided approach minimums do not require use of the associated ILS Localizer receiver.

OPERATIONS (O)

Confirm that the associated ILS receiver is not required for planned approach minimums.

[TGL] 34-32-01 Navigation Systems (Marker Beacon)**34-32-01-01 IFR Operations**

Interval	Installed	Required	Procedure
B	1	0	

May be inoperative for IFR provided, approach procedures to be used do not require marker fixes.

MAINTENANCE NOTE

1. The left and right VOR/MKR receivers are interchangeable.
2. If the Marker Beacon is inoperative, the left VOR/MKR receiver may be interchanged with an operative Right VOR/MKR Receiver.

34-32-01 Navigation Systems (Marker Beacon)**34-32-01-02 VFR Operations**

Interval	Installed	Required	Procedure
D	1	0	

May be inoperative for VFR operations.

34-33-01 Radio Altimeters (RA)**34-33-01-02 Multi-Source Datalink to GPWS**

Interval	Installed	Required	Procedure
C	3	1	(M) (O)

Two may be inoperative provided:

- a. GPWS/TAWS is supplied with Radio Altitude Data.
 - b. Approach minimums or operating procedures do not require its use.
-

NOTE 1: BA 747-400 aircraft have the 'Multi-Source Data link to GPWS' modification embodied, and the GPWS/RA Source Select Switch (P461 panel) is inoperative or not installed. The GPWS is fully operational with any one radio altimeter operative.

NOTE 2: If the loss of the radio altimeter prohibits normal operation of the TCAS, the dispatch deviation and rectification for an inoperative TCAS must be observed (refer to MEL item [TGL] 34-45-01).

NOTE 3: For proper operation of the Autopilot Flight Director System (AFDS) takeoff and approach modes, an operative RA and FCC on the same side (L/R) is required.

MAINTENANCE (M)

1. Refer to MEL item 22-13-01 for AUTOLAND Status.
2. Verify that the status message GROUND PROX SYS and advisory message GND PROX SYS are not displayed. If displayed, there is a fault in the GPWS system and dispatch must also be in accordance with MEL item [TGL] 34-46-01.

OPERATIONS (O)

1. For one RA inoperative, status message NO LAND 3 will be displayed.
2. For more than one RA inoperative, status message NO AUTOLAND will be displayed.

34-35-01

Para Visual Displays

Interval	Installed	Required	Procedure
D	2	0	

One or both may be inoperative provided, take-off minima are not dependent upon their use.

NOTE: In conditions requiring the use of PVD for take-off, it is only necessary for the Handling Pilot's PVD to be serviceable.

[TGL] 34-43-01 Weather Radar Systems**34-43-01A Two inoperative**

Interval	Installed	Required	Procedure
A	2	0	

Both may be inoperative provided:

- a. The weather reports or forecasts available to the Commander indicate that cumulonimbus clouds or other potentially hazardous weather conditions, which could be detected by the system when in working order, are unlikely to be encountered on the intended route.
- b. Repairs are made within one flight day.

[TGL] 34-43-01 Weather Radar Systems**34-43-01C One Operative**

Interval	Installed	Required	Procedure
D	2	1	

May be inoperative provided one weather radar system operates normally.

34-43-01 Weather Radar Systems**34-43-01-01 Auxiliary Side Panel Displays**

Interval	Installed	Required	Procedure
D	-	0	

34-43-01 Weather Radar Systems**34-43-01-02 Windshear Alert Mode (Predictive)**

34-43-01-02A Reactive Windshear Inoperative

Interval	Installed	Required	Procedure
B	-	0	(O)

May be inoperative provided:

- a. Alternate procedures are established and used.

- b. Take-offs and landings are not conducted in known or forecast windshear conditions.

NOTE: Alternate procedures should include reviewing windshear avoidance and windshear recovery procedures.

OPERATIONS (O)

1. For aircraft incorporating a Predictive Windshear Alert Mode in the weather radar system(s), the EICAS advisory message WINDSHEAR SYS is displayed when either predictive windshear alerting capability in the weather radar system(s) is inoperative or GPWS reactive alert mode is inoperative.
2. Refer to FCOMs and QRH for a review of applicable windshear information.
3. See OM A 10.9.2 Additional Dispatch Serviceability Requirements

34-43-01 Weather Radar Systems

34-43-01-02 Windshear Alert Mode (Predictive)

34-43-01-02B Reactive Windshear Operative

Interval	Installed	Required	Procedure
C	-	0	(O)

May be inoperative provided:

- a. Alternate procedures are established and used.
 - b. GPWS Windshear Alert Mode (Reactive) (Mode 7) operates normally.
-

OPERATIONS (O)

1. For aircraft incorporating a Predictive Windshear Alert Mode in the weather radar system(s), the EICAS advisory message WINDSHEAR SYS is displayed when either predictive windshear alerting capability in the weather radar system(s) is inoperative or GPWS reactive alert mode is inoperative.
2. Refer to FCOMs and QRH for a review of applicable windshear information.
3. See OM A 10.9.2 Additional Dispatch Serviceability Requirements

[TGL] 34-45-01 Traffic Collision and Avoidance System (TCAS)
34-45-01A Required

Interval	Installed	Required	Procedure
A	1	0	(M)

May be inoperative provided:

- a. System is deactivated and secured.
- b. It is not reasonably practical to repair before the commencement of flight,
- c. Repairs/replacements must be carried out within 10 calendar days.

NOTE: From main maintenance base aircraft should not be dispatched to/through areas where the use of IFBP (In-Flight Broadcast Procedures) is required.

MAINTENANCE (M)

Deactivate and secure TCAS.

1. Open and collar the P7 panel TCAS circuit breaker.

OPERATIONS NOTE

See OM A 10.9.2 Additional Dispatch Serviceability Requirements.

34-45-01 Traffic Collision and Avoidance System (TCAS)
**34-45-01-01 Combined Traffic Alert (TA) Resolution Advisory (RA)
Dual Display**

Interval	Installed	Required	Procedure
C	2	1	

One may be inoperative on the non-flying pilot side provided:

- a. TA and RA visual display is operative on the flying pilot side, and
- b. TA and RA audio function is operative on the flying pilot side.

34-45-01 Traffic Collision and Avoidance System (TCAS)
34-45-01-02 Resolution Advisory (RA) Display System(s)
34-45-01-02A One Operative

Interval	Installed	Required	Procedure
C	2	1	

One may be inoperative on the non-flying pilot side.

34-45-01 Traffic Collision and Avoidance System (TCAS)**34-45-01-02 Resolution Advisory (RA) Display System(s)****34-45-01-02B None Operative**

Interval	Installed	Required	Procedure
C	-	0	(O)

May be inoperative provided:

- a. Traffic Alert (TA) visual display and audio functions are operative.
 - b. TA only mode is selected by the crew.
 - c. Enroute or approach procedures do not require its use.
-

OPERATIONS (O)

Select TA mode. Observe operative indications and advisories. Respond as appropriate.

34-45-01 Traffic Collision and Avoidance System (TCAS)**34-45-01-03 Traffic Alert (TA) Display System(s)**

Interval	Installed	Required	Procedure
C	-	0	(O)

May be inoperative provided:

- a. RA visual display and audio functions are operative.
 - b. Enroute or approach procedures do not require its use.
-

OPERATIONS (O)

Observe operative indications and advisories. Respond as appropriate.

34-45-01 Traffic Collision and Avoidance System (TCAS)**34-45-01-04 Audio Functions**

Interval	Installed	Required	Procedure
B	1	0	

May be inoperative provided enroute or approach procedures do not require use of TCAS.

[TGL] 34-46-01 Ground Proximity Warning System (GPWS)**34-46-01-03 Glideslope Deviation(s) (Mode 5)****34-46-01-03A None Operative**

Interval	Installed	Required	Procedure
B	1	0	

[TGL] 34-46-01 Ground Proximity Warning System (GPWS)**34-46-01-03 Glideslope Deviation(s) (Mode 5)****34-46-01-03B None Operative - Day VMC**

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative for day VMC only.

[TGL] 34-46-01 Ground Proximity Warning System (GPWS)**34-46-01-04 Advisory Callouts (Mode 6)**

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided alternate procedures are established and used.

OPERATIONS (O)

1. Maintain awareness of aircraft altitude and flight path. This may include the use of all systems available (autopilot, autoland, ILS, FMCS) and audible approach altitude call outs.
2. Refer to FCOM for operation in WINDSHEAR.

[TGL] 34-46-01 Ground Proximity Warning System (GPWS)**34-46-01-05 Windshear Alert Mode (Reactive) (Mode 7)**

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided alternate procedures are established and used.

NOTE: Alternate procedures should include reviewing windshear avoidance and windshear recovery procedures.

OPERATIONS (O)

1. Maintain awareness of aircraft altitude and flight path. This may include the use of all systems available (autopilot, autoland, ILS, FMCS) and audible approach altitude call outs.
2. Refer to FCOM for operation in WINDSHEAR.

[TGL] 34-46-01 Ground Proximity Warning System (GPWS)

34-46-01-06 Terrain Awareness and Warning System (TAWS)

Interval	Installed	Required	Procedure
A	1	0	

May be inoperative provided:

- a. The GPWS functions are operative,
 - b. Repairs or replacements are carried out within 10 calendar days.
-

[TGL] 34-51-01 Navigation Systems (VOR)**34-51-01-01 Two Operative FMS**

Interval	Installed	Required	Procedure
C	2	0	

One or more may be inoperative where navigational capability can be assured and the approach procedures are not required to be based upon VOR signals.

MAINTENANCE NOTE

NOTE: The VOR/MKR Receiver contains the Marker Beacon System which is pin activated in the left VOR/MKR Receiver position only. If the Marker Beacon is inoperative, see MEL item [TGL] 34-32-01.

[TGL] 34-51-01 Navigation Systems (VOR)**34-51-01-02 One Operative FMS**

Interval	Installed	Required	Procedure
C	2	1	

One may be inoperative provided:

- a. Both ADF (where required) and DME are operative,
 - b. The "Alternative Navigation Equipment" is serviceable. (Minimum of two IRUs and one FMC.)
-

MAINTENANCE NOTE

NOTE: The VOR/MKR Receiver contains the Marker Beacon System which is pin activated in the left VOR/MKR Receiver position only. If the Marker Beacon is inoperative, see MEL item [TGL] 34-32-01.

34-51-02 VOR Mode Selection Switching

Interval	Installed	Required	Procedure
C	2	1	

OPERATIONS NOTE

This MEL item allows dispatch with an inoperative VOR Navigation Display (ND) Mode Selector which are located on the Captain's and First Officer's EFIS Control Panels. MEL item 31-61-02 provides dispatch relief with a completely inoperative EFIS Control Panel.

[TGL] 34-53-01 ATC Transponders and Automatic Altitude Reporting Systems
34-53-01A None Operative

Interval	Installed	Required	Procedure
A	2	0	

May be inoperative provided:

- a. Operations do not require its use.
- b. One or more may be inoperative for one flight, provided permission is obtained from the Air Navigation Service Provider(s) to fly in the airspace when an ATC Mode S Transponder System is required for the intended route.

NOTE 1: A serviceable Mode S transponder is required for TCAS operation. Refer to MEL item [TGL] 34-45-01.

NOTE 2: A serviceable Mode S transponder is required (to provide altitude report) for flight into RVSM airspace.

MAINTENANCE NOTE

For one or both transponders unserviceable contact Flight Technical Dispatch or Maintrol, who will liaise with Flight Manager Technical and clarify any impact on the planned operation and ensure operating crew are briefed appropriately.

OPERATIONS NOTE

If both transponders are unserviceable, liaise with Flight Technical Dispatch to obtain the appropriate clearances. See OM A 10.9.2 Additional Dispatch Serviceability Requirements.

34-53-01 ATC Transponders and Automatic Altitude Reporting Systems
34-53-01B One Operative

Interval	Installed	Required	Procedure
D	2	1	

MAINTENANCE NOTE

For one or both transponders unserviceable contact Flight Technical Dispatch or Maintrol, who will liaise with Flight Manager Technical and clarify any impact on the planned operation and ensure operating crew are briefed appropriately.

34-53-01 ATC Transponders and Automatic Altitude Reporting Systems

34-53-01-01 Enhanced Downlink Aircraft Reportable Parameters

Interval	Installed	Required	Procedure
C	-	0	

One or more Downlinked Aircraft Parameters (DAPs), which provide Enhanced Surveillance, may be unserviceable.

34-53-01 ATC Transponders and Automatic Altitude Reporting Systems

34-53-01-02 ADS-B Squitter Transmissions

34-53-01-02A Operations Do Not Require Use

Interval	Installed	Required	Procedure
D	-	0	

May be inoperative provided operations do not require their use.

[TGL] 34-55-01 Distance Measuring Equipment (DME)

34-55-01-01 Routes Not Dependent On Use

Interval	Installed	Required	Procedure
C	2	0	

One or more may be inoperative provided navigation procedures for the planned routes to be flown are not dependent upon the use of affected DME.

[TGL] 34-55-01 Distance Measuring Equipment (DME)

34-55-01-02 Operational Procedures Do Not Require Use

Interval	Installed	Required	Procedure
B	2	0	

One or more may be inoperative provided:

- a. One ADF, two VORs or “Alternate Navigation Equipment” are operative (Minimum of two IRUs and one FMC).
- b. Operational procedures do not require their use.

NOTE: For aircraft without GPS equipment consideration should be given to the capability of the FMS without DME sensors. RNAV operations are only approved for aircraft with serviceable GPS.

[TGL] 34-57-01 Navigation Systems (ADF)**34-57-01-01 Routes Not Dependent On Use**

Interval	Installed	Required	Procedure
C	2	0	

One or more may be inoperative provided navigation procedures for the planned routes to be flown are not dependent upon the use of affected ADF.

OPERATIONS NOTE

Refer to OM C for further information.

[TGL] 34-57-01 Navigation Systems (ADF)**34-57-01-02 Operational Procedures Do Not Require Use**

Interval	Installed	Required	Procedure
B	2	0	

One or more may be inoperative provided:

- a. One DME, two VORs, or “approved alternate navigation equipment” are operative (minimum of two IRUs and one FMC),
 - b. Operational procedures do not require their use.
-

OPERATIONS NOTE

Refer to OM C for further information.

[TGL] 34-58-01 Global Positioning System (GPS)**34-58-01-01 Alternate Procedures Established**

Interval	Installed	Required	Procedure
C	2	0	

One or more may be inoperative provided alternate procedures are established and used.

NOTE 1: When installed, GPS provides the time base for the aircraft clocks and is the preferred method of providing latitude/longitude information for IRU alignment.

NOTE 2: For unrestricted operation in MNPS airspace the aircraft must have two fully serviceable. Long Range Navigation Systems (LRNS's). A LRNS may be one of the following:

- One Inertial Reference System (IRS),
- One Flight Management System (FMS) using the inputs from one or more IRS', or
- One Global Positioning System (GPS).

[TGL] 34-58-01 Global Positioning System (GPS)**34-58-01-02 Procedures or Navigation not Dependent on Use**

Interval	Installed	Required	Procedure
D	2	1	

May be inoperative provided procedures or navigation is not dependent upon its use.

NOTE 1: When installed, GPS provides the time base for the aircraft clocks and is the preferred method of providing latitude/longitude information for IRU alignment.

NOTE 2: For unrestricted operation in MNPS airspace the aircraft must have two fully serviceable. Long Range Navigation Systems (LRNS's). A LRNS may be one of the following:

- One Inertial Reference System (IRS),
- One Flight Management System (FMS) using the inputs from one or more IRS', or
- One Global Positioning System (GPS).

MAINTENANCE NOTE

NOTE: Aircraft are equipped with Multi-Mode receivers (MMR's) for GPS operation. The MMR combines ILS and GPS functions in a single component. The Centre MMR contains a redundant GPS card. If GPS Left or GPS Right has failed an interchange of MMR Left or MMR Right with MMR Centre may restore system operation. Advisory message >GPS LEFT or >GPS RIGHT are displays for failures in the left or right MMR, which may also indicate a failure of the associated ILS. Cross refer to MEL item [TGL] 34-31-01 for ILS dispatch relief.

OPERATIONS NOTE

The ADS-B Out data may be inoperative.

**[TGL] 34-61-01 Flight Management Computer Systems (FMCS
includes Thrust Management Function)**

Interval	Installed	Required	Procedure
C	2	1	(O)

One may be inoperative provided:

- The remaining FMC is verified to operate normally,
- En route operations do not require its use.

NOTE 1: Any mode which functions normally may be used. The FMC Master Switch and the Navigation Source Selectors should be positioned to the operable FMC.

NOTE 2: One unserviceable FMC satisfies the following requirements:

- PRNAV (RNAV1)
- Basic RNP1
- BRNAV (RNAV5)
- RNP 10 (RNAV10)
- MNPS

NOTE 3: For unrestricted operation in MNPS airspace the aircraft must have two fully serviceable Long Range Navigation Systems (LRNS's). A LRNS may be one of the following:

- One Inertial Reference System (IRS),
- One Flight Management System (FMS) using the inputs from one or more IRS', or
- One Global Positioning System (GPS).

OPERATIONS (O)

For Inoperative Flight Management Computers (FMC)

1. Select serviceable FMC
 - A. For take-off, set speed bugs on standby ASI to: V1, VR, V2 and, VREF 30 + 40 (V2 is equivalent to VREF30)
 - B. In the event of a further FMC failure on take-off retract flaps in accordance with the following minimum manoeuvre speeds and refer to QRH:

Flap 10	VREF30 + 20
Flap 5	VREF30 + 40
Flap 1	VREF30 + 60
Flap 0	VREF30 + 80

-
- C. For landing, refer to QRH FMC LEFT,RIGHT.
-

**[TGL]34-61-01 Flight Management Computer Systems (FMCS
includes Thrust Management Function)**

34-61-01-03 Navigation Databases

Interval	Installed	Required	Procedure
A	2	2	

Must be installed and in date.

34-61-02 Control Display Units (CDU)**34-61-02-01 Center CDU**

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided left and right IRUs operate normally.

MAINTENANCE NOTE

CDUs can be interchanged to put the inoperative CDU in the centre position.

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35-11-01 Remote Fill Station

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided leak-tight integrity of the supply system is not affected.

MAINTENANCE (M)

Verify oxygen supply system does not have leaks.

1. Visually check the high-pressure tubing connections.
2. Monitor the crew and passenger oxygen system pressures on the status page and verify that the pressures do not decrease over a period of 15 minutes.

35-11-02 Crew Oxygen Pressure Indication System

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided an accepted procedure is used to ensure that oxygen supply is above the minimum required for flight.

MAINTENANCE (M)

Verify there is sufficient crew oxygen supply and oxygen shutoff valve(s) open.

1. Gain access to the crew oxygen cylinders.
2. Verify that the crew oxygen pressure shown on the gauge of the crew oxygen cylinder(s) is above the minimum required for dispatch.

NOTE: Crew minimum dispatch pressures are as follows:

No of Crew	Ex LHR	Other Sectors
4	1000 psig	800 psig
3	1000 psig	600 psig
2	1000 psig	400 psig

The pressure displayed on the oxygen servicing panel is to be taken as the master, in case of discrepancy with the EICAS indication. Adjustment of the required pressures may be carried out in the event that the oxygen bottle (not ambient) temperature is significantly different to standard.

3. Verify that the crew oxygen cylinder shutoff valve(s) is open.

35-11-03 Oxygen Overboard Discharge Indicator

Interval	Installed	Required	Procedure
C	1	0	(O) (M)

May be damaged or missing.

MAINTENANCE (M)

WARNING: IF THE OVERBOARD DISCHARGE INDICATOR (GREEN DISK) IS MISSING, ALL PASSENGER AND CREW OXYGEN CYLINDERS MUST BE INSPECTED TO BE SURE THEY MEET THE PRESSURE REQUIREMENTS FOR DISPATCH (AMM 35-41-09/401 REFERS). FAILURE TO DO SO COULD RESULT IN THE LOSS OF PRESSURE OF THE ENTIRE PASSENGER OR CREW OXYGEN SYSTEMS.

1. For missing indicators:
 - A. Inspect all passenger and crew oxygen bottles for over-pressure discharge by doing 'Oxygen System Dispatch Pressure Indication Test' IAW AMM 35-21-00/501 Config.2 (passenger) and AMM 35-11-00/501 (crew).
 - B. Replace any bottle(s) found discharged IAW AMM 12-15-08/301.

OPERATIONS (O)

Before each departure, confirm crew oxygen system operates normally and the crew and passenger indicated pressures are above the minimum required for dispatch

1. Select the status page and note oxygen pressures.
2. Select 100% on the NORMAL/100% switch.
3. Push down and hold the RESET/TEST SLIDE lever.
4. Confirm yellow cross appears momentarily in FLOW indicator.
5. Push and hold the EMERGENCY/TEST selector.
 - A. While holding RESET/TEST SLIDE lever down, push EMERGENCY TEST selector and observe yellow cross appears in FLOW indicator.
 - B. Confirm oxygen pressure did not decrease more than 100 psi during test.
6. Confirm crew and passenger oxygen system pressures on the status page are above the minimum required for dispatch.

[TGL] 35-21-01 Passenger/Supernumerary Oxygen System**35-21-01-01 Passenger/Combi****35-21-01-01A Seats Blocked - No Altitude Restriction**

Interval	Installed	Required	Procedure
B	-	-	(M) (O)

Passenger service units (PSUs) may be inoperative without flight altitude restriction provided:

- Associated seats are blocked and placarded to prevent occupancy.
- Units operate normally for all usable lavatory and flight attendant locations.

Oxygen Minimum Dispatch Pressures

Minimum Pressures for dispatch are as follows:

NOTE: The Number in the cabin must include both the passenger load and the cabin crew. The pressures assume that there is planned carriage of passengers requiring therapeutic oxygen. If carriage of a passenger requiring therapeutic oxygen from the ring main system is not planned., then the listed minimum pressures may be reduced by 150 psig.

B747-400 15 CYLINDERS		
<u>NBR IN CABIN</u>	<u>VIA A368, B215 & B330 (URAMQI)</u>	<u>OTHER SECTORS</u>
409 (Max Config)	1650 psig	1250 psig
371	1600 psig	1200 psig
350	1500 psig	1150 psig
300	1350 psig	1000 psig
200	950 psig	750 psig

The pressure displayed on the oxygen servicing panel is to be taken as the master, in case of discrepancy with the EICAS indication.

MAINTENANCE (M)

- Close the inoperative PSU doors and secure using adhesive tape.
- Placard, rope, tie, tape or otherwise block the seat(s) serviced by the inoperative PSU(s) to prevent seat occupancy.
- Notify Flight Technical dispatch or Maintrol of the defect and restrictions.

OPERATIONS (O)

Ensure blocked seats remain unoccupied.

[TGL] 35-21-01 Passenger/Supernumerary Oxygen System**35-21-01-01 Passenger/Combi****35-21-01-01B All Packs Operative - FL 250 Altitude Restriction**

Interval	Installed	Required	Procedure
B	1	0	(O)

May be inoperative provided:

- a. Flight is not conducted where the minimum altitude enroute is above 13,000 feet MSL.
- b. All air conditioning packs operate normally.
- c. All remaining components of the pressurization system operate normally.
- d. Flight altitude remains at or below FL 250.
- e. Portable Oxygen units are provided for all cabin crew and at least 10% of the passengers.
- f. Passengers are appropriately briefed.

See Oxygen Minimum Dispatch Pressures note above.

MAINTENANCE NOTE

Notify Flight Technical dispatch or Maintrol of the defect and restrictions.

OPERATIONS (O)

1. Do not conduct flight where the minimum altitude enroute is above 13,000 feet MSL.
2. Maintain altitude at or below FL 250.

[TGL] 35-21-01 Passenger/Supernumerary Oxygen System**35-21-01-01 Passenger/Combi****35-21-01-01C 10,000 Feet MSL Altitude Restriction**

Interval	Installed	Required	Procedure
B	1	0	(O)

May be inoperative provided:

- a. Flight remains at or below 10,000 feet MSL,
- b. All air-conditioning packs operate normally,
- c. All other components of the pressurisation system operate normally, and
- d. Passengers are appropriately briefed.

See Oxygen Minimum Dispatch Pressures note above.

MAINTENANCE NOTE

Notify Flight Technical dispatch or Maintrol of the defect and restrictions.

OPERATIONS (O)

Maintain altitude at or below 10,000 feet MSL.

[TGL] 35-21-01 Passenger/Supernumerary Oxygen System**35-21-01-03 Automatic Presentation**

Interval	Installed	Required	Procedure
B	1	0	(M) (O)

Automatic presentation system may be inoperative provided:

- a. Manual deployment system operates normally.
 - b. Flight remains at or below FL 300.
-

MAINTENANCE (M)

1. Confirm the manual deployment system operates normally. (AMM 35-21-00)
2. Notify Flight Technical Dispatch or Maintrol of the defect and restrictions.

OPERATIONS (O)

Maintain altitude at or below FL 300.

35-21-02 Passenger/Supernumerary Oxygen Pressure Indication System

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative provided an accepted procedure is used to ensure that oxygen supply is above minimum required for flight.

MAINTENANCE (M)

Verify there is sufficient passenger/supernumerary oxygen supply and oxygen shutoff valve(s) open.

1. Gain access to the passenger/supernumerary oxygen cylinders.
2. Confirm the passenger/supernumerary oxygen average pressure shown on the gauge of the passenger/supernumerary oxygen cylinder(s) is above the minimum required for dispatch. See item [TGL] 35-21-01 for minimum dispatch pressures.
3. Confirm the passenger/supernumerary oxygen cylinder shutoff valve(s) is open.

OPERATIONS (O)

Confirm the passenger/supernumerary oxygen pressure shown on the gauge of the passenger/supernumerary oxygen cylinder(s) is above the minimum required for dispatch. See item [TGL] 35-21-01 for minimum dispatch pressures.

35-31-01 Portable Oxygen Dispensing Units (Bottle and Mask)

Interval	Installed	Required	Procedure
D	-	-	(M)

May be unserviceable or missing provided:

- a. A portable oxygen unit is available for each cabin crew member and is at least $\frac{3}{4}$ full,
NOTE: Required minimum number of cabin crew is 12, if no upper deck passengers are carried 11.
 - b. Bottles not properly serviced are replaced, serviced, or removed at the next available maintenance facility,
 - c. Location placarding for the associated inoperative bottle to be removed or obscured,
 - d. If it is to be used the cabin crew bunk area must have 8 portable oxygen bottles.
-

MAINTENANCE (M)

Confirm required portable oxygen system distribution, stow inoperative units and remove at next available maintenance facility.

1. Confirm required distribution of serviceable units is maintained throughout the airplane.
2. Inoperative units are obscured and stowed to prevent their use, and removed from the airplane at the next available maintenance facility.

35-31-02 Protective Breathing Equipment (PBE)

Interval	Installed	Required	Procedure
D	-	-	

(M) Any in excess of those required may be inoperative or missing provided:

- a. Required distribution is maintained,
- b. Inoperative PBE and its installed location are placarded inoperative,
- c. Inoperative PBE unit is secured out of sight in an approved stowage, and
- d. Procedures are established and used to alert crew members of inoperative or missing equipment.

NOTE: Inoperative PBE units may be subject to dangerous goods requirements.

MAINTENANCE NOTE

1. Remove or obscure location placarding.
2. Placard inoperative units to prevent use and store them in a location where they will not be used by mistake.

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36-11-01 Engine Bleed Pressure Regulating and Shutoff Valves (PRSOV)

Interval	Installed	Required	Procedure
C	4	3	(M) (O)

One may be inoperative provided:

- Associated PRSOV is secured closed except for engine start.
- L and R ISLN valves are open for takeoff, and when flaps are operated.
- Bleed systems on remaining engines operate normally.
- Start valves on remaining engines operate normally.

NOTE: For engine starting defects when the PRSOV fails to reverse flow refer to MEL item 36-11-02. Do not deactivate PRSOV or lock it closed.

MAINTENANCE (M)

Manually hold open PRSOVs for engine start, coordinate engine start with flight crew, and close PRSOVs. (AMM 36-11-04)

NOTE: Operators should be aware of Engine Inlet and Exhaust Hazard Areas (AMM 71-00-00).

- Establish interphone communication with the flight deck and determine if the applicable wing manifold will be pressurized or unpressurized for associated engine start.
NOTE: The amount of torque necessary to open the PRSOV depends on existing pneumatic pressure. If manifold is unpressurized, the PRSOV will open easily. If manifold is pressurized, the PRSOV may require up to 50 ft-lb of applied torque to open.
- When requested by the flight crew, slowly turn the PRSOV manual override drive 90° clockwise to the open position. Hold it in the open position until the flight crew requests a closed PRSOV.
- When flight crew requests closed PRSOV, turn the PRSOV manual override drive 90° counter-clockwise to the closed position.
NOTE: Request that flight deck select ENGINE BLEED Switch OFF before proceeding to next step.
- After the flight crew switches engine bleed off, lock the PRSOV in the locked closed position by depressing the manual override drive approximately 1/4 inch. Then turn the drive counter-clockwise to the locked closed position (90° past the closed position). Advise flight deck that the PRSOV is locked closed.

OPERATIONS (O)

For RR:

- Start the associated engine with manual override start procedure.

NOTE: The amount of torque necessary to open the PRSOV depends on existing pneumatic pressure. If manifold is unpressurized, the PRSOV will open easily. If manifold is pressurized, the PRSOV may require up to 50 ft-lb of applied torque to open.

- A. If PRSOV is to be opened with wing pneumatic manifold unpressurized:
 - 1) Select the appropriate L(R) ISLN VALVE Switch OFF.
 - 2) If the other engine on the same wing is running, select its ENGINE BLEED Switch OFF.
- B. When ready for engine start, advise ground crew to open the PRSOV.
- C. Ensure the pneumatic manifold is pressurized and pull the appropriate engine start switch.

NOTE: If PRSOV is opened with the wing pneumatic manifold unpressurized, select appropriate L(R) ISLN VALVE Switch ON after PRSOV is confirmed open by ground crew.

- D. At 45-50% N3, request closed PRSOV to ground crew.
 - E. Continue engine start.
 - F. Set ENGINE BLEED Switch OFF when requested by ground crew to enable them to secure the PRSOV closed.
 - G. Select ON for the associated ENGINE BLEED Switch after ground crew has secured the PRSOV locked closed.
 - H. Set ENGINE BLEED switch for other engine on the same wing ON.
2. APU-TO-PACK TAKEOFF procedure is not permitted since L and R ISLN valves must remain open during takeoff.
 3. Starter assisted inflight start is not available for the affected engine.
 4. During takeoff and for all flap operations, ensure that the L and R ISLN valve switches are in the open position.

36-11-02 Engine Bleed PRSOV Start Solenoids

Interval	Installed	Required	Procedure
C	4	3	(M) (O)

One may be inoperative provided:

- a. Bleed valve otherwise functions normally.
 - b. Start valves on remaining engines operate normally.
-

MAINTENANCE (M)

Manually hold open PRSOV for engine start, coordinate engine start with flight crew, and close PRSOV.

1. Use DDG item 36-11-01 (M) procedure, but do not lock the PRSOV in the closed position.

OPERATIONS (O)

1. PRSOV must be manually opened by ground crew for engine start.
Perform DDG item 36-11-01 (O) procedure, but PRSOV will not be locked closed.
2. Starter assisted inflight start is not available for the affected engine.

36-11-03 Engine High Pressure Bleed Systems

Interval	Installed	Required	Procedure
C	4	3	(M) (O)

One may be inoperative provided:

- Associated High Pressure Shutoff Valve (HPSOV) is secured closed.
- Bleed systems on remaining engines operate normally.

For RR:

- A minimum of 60% N1 is maintained at or above 10,000 ft. MSL, or 55% N1 is maintained below 10,000 ft. MSL on the associated engine while in icing conditions.
-

MAINTENANCE (M)**For RR Engines:**

- Deactivate the High Stage Bleed Valve.
 - Deactivate the thrust reverser in the forward thrust position (AMM 78-31-00/201).
 - Release the pressure in the pneumatic system (AMM 36-00-00/201).
 - Install the access platform and the access stools in the cold stream duct.
 - Install the protective pads onto the exhaust mixer duct.
 - Remove the right front pylon fairing access panel (AMM 72-03-00/401).
 - Lock high stage bleed valve closed by rotating manual override hex 90° counter-clockwise to CLOSED-LOCKED position.
 - Install the right front pylon fairing access panel (AMM 72-03-00/401).
 - Remove the access platform and access stools from the cold stream duct.
 - Remove the protective pads from the exhaust mixer duct.
 - Activate the thrust reverser (AMM 78-31-00/201).

OPERATIONS (O)**For RR Engines:**

- For operating in icing conditions:
 - Select Nacelle Anti-Ice ON.
 - Maintain a minimum of 60% N1 at or above 10,000 ft MSL.
 - Maintain a minimum of 55% N1 below 10,000 ft MSL.
- Bleed Air OFF light will illuminate at idle or if engine power settings are unequal.

-
- 3. Bleed Air OFF light will extinguish by advancing throttles to approximately 75% N3.
 - 4. Advisory and status messages BLEED HP ENG_ will remain displayed.

36-11-04

Wing Isolation Valves (Left and Right)

Interval	Installed	Required	Procedure
C	2	1	(M) (O)

One may be inoperative deactivated open provided the pack on the same side as operative valve operates normally.

MAINTENANCE (M)

Deactivate the wing isolation valve open.

1. Position the P5 Overhead Panel wing ISLN switch open. Approximately 10 seconds is required for the valve to open.
2. For inoperative left wing isolation valve, open and collar the P6 panel L ISO VLV AIR SUPPLY PWR circuit breaker.
3. For inoperative right wing isolation valve, open and collar the P6 panel R ISO VLV AIR SUPPLY PWR circuit breaker.
4. Gain access to inoperative wing isolation valve (AMM 36-11-07/201).
5. Examine the position indicator on the actuator housing. If the position indicator is not in the OPEN position, turn the manual drive until the valve is in the OPEN position.
6. Disconnect, cap and stow the electrical connector from the isolation valve.
7. Close the associated access panel to the wing isolation valve.

OPERATIONS (O)

Modify Non-Normal Procedures are necessary for SMOKE, FIRE OR FUMES and BLEED DUCT LEAK L, C, R.

For airplanes without Center Bleed Duct Leak Detection, modify Non-Normal Procedures for WAI VALVE LEFT L, R and CABIN ALTITUDE (RAPID DEPRESSURIZATION).

For Passenger and Combi:

1. Modified SMOKE, FIRE OR FUMES Non-Normal Procedure for L ISLN VALVE deactivated open:
SMOKE FIRE OR FUMES (L ISLN VALVE inop open)
 - A. Condition: Smoke, fire or fumes is identified.
 - B. Diversion may be need.
 - C. Oxygen masks (as needed) - ON, 100%
 - D. Smoke goggles (as needed) - ON
 - E. Crew and Cabin communications - Establish
 - F. Advise the cabin crew to turn off main IFE and PC power switches (as installed).
 - G. Instruct cabin crew to turn on cabin night lighting.
 - H. UTILITY POWER SWITCHES (Both) - OFF

- I. APU SELECTOR - OFF
- J. PASSENGER SIGNS - ON
- K. Anytime the smoke or fumes becomes the greatest threat, do the SMOKE OR FUMES REMOVAL checklist.
- L. If the source of the smoke, fire or fumes is obvious and can be extinguished quickly:
 - 1) Source - Isolate and extinguish
 - 2) If possible remove power from the affected equipment by switch or circuit breaker in the flight deck or cabin.
 - 3) If source is visually confirmed to be extinguished, and the smoke or fumes are decreasing (both true), then
 - a. Continue the flight at the Captain's discretion.
 - b. Restore unpowered items at the Captain's discretion.
 - c. Do the SMOKE OR FUMES REMOVAL checklist if needed.
- M. Initiate a diversion to the nearest suitable airport while continuing the checklist.
- N. Consider an immediate landing if the smoke, fire or fumes situation becomes uncontrollable.
- O. Do not delay landing in an attempt to complete the following steps.
- P. RIGHT ISOLATION VALVE SWITCH - OFF
- Q. PACK 3 CONTROL SELECTOR - OFF
- R. Wait 2 minutes unless the smoke or fumes are increasing [Allows time for the smoke to clear.]
- S. If the smoke or fumes continue or are increasing:
 - 1) PACK 3 CONTROL SELECTOR - NORM
 - 2) PACK 1 CONTROL SELECTOR - OFF
 - 3) Wait 2 minutes unless the smoke or fumes are increasing [Allows time for the smoke or fumes to clear.] then do the following:
- T. If the smoke or fumes continue or are increasing:
 - 1) PACK 1 CONTROL SELECTOR - NORM
 - 2) PACK 2 CONTROL SELECTOR - OFF
 - 3) Wait 2 minutes unless the smoke or fumes are increasing [Allows time for the smoke or fumes to clear.] then do the following:
- U. If the smoke or fumes are increasing:
 - 1) PACK 1 CONTROL SELECTOR - OFF
 - 2) TRIM AIR SWITCH - OFF
 - 3) AFT CARGO HEAT SWITCH - OFF

-
- 4) Wait 2 minutes unless the smoke or fumes are increasing [Allows time for the smoke or fumes to clear.] then do the following:
 - V. If the smoke or fumes continue or are increasing:
 - 1) RIGHT ISOLATION VALVE SWITCH - ON
 - 2) PACK 1 CONTROL SELECTOR - NORM
 - 3) PACK 2 CONTROL SELECTOR - NORM
 - 4) TRIM AIR SWITCH - ON
 - 5) AFT CARGO HEAT SWITCH - ON
 - 6) Consider an immediate landing.
 - W. Do the SMOKE OR FUMES REMOVAL checklist if need.
 - X. Do not accomplish the following checklists:
 - 1) ELEC UTIL BUS L, R
 - 2) FUEL OVRD 2, 3 FWD
 - 3) FUEL PRESS CTR L
 - 4) FUEL PUMP 2, 3 FWD
 - 5) CARGO DET AIR
 - 6) TEMP ZONE
 - 7) TRIM AIR OFF

For Passenger and Combi:

- 2. Modified SMOKE FIRE OR FUMES Non-Normal Procedure for R ISLN VALVE deactivated open:

SMOKE FIRE OR FUMES (R ISLN VALVE inop open)

 - A. Condition: Smoke, fire or fumes is identified.
 - B. Diversion may be need.
 - C. Oxygen masks (as needed) - ON, 100%
 - D. Smoke goggles (as needed) - ON
 - E. Crew and Cabin communications - Establish
 - F. [Option - PRR 85515 and S/B 747-24-2246 not incorporated] - Advise the cabin crew to turn off main IFE and PC power switches (as installed).
 - G. Instruct cabin crew to turn on cabin night lighting.
 - H. UTILITY POWER SWITCHES (Both) - OFF
 - I. APU SELECTOR - OFF
 - J. PASSENGER SIGNS - ON
 - K. Anytime the smoke or fumes becomes the greatest threat, do the SMOKE OR FUMES REMOVAL checklist.
 - L. If the source of the smoke, fire or fumes is obvious and can be extinguished quickly:
 - 1) Source - Isolate and extinguish

- 2) If possible remove power from the affected equipment by switch or circuit breaker in the flight deck or cabin.
 - 3) If source is visually confirmed to be extinguished, and the smoke or fumes are decreasing (both true), then
 - a. Continue the flight at the Captain's discretion.
 - b. Restore unpowered items at Captains discretion.
 - c. Do the SMOKE OR FUMES REMOVAL checklist if needed.
- M. Initiate a diversion to the nearest suitable airport while continuing the checklist.
- N. Consider an immediate landing if the smoke, fire or fumes situation becomes uncontrollable.
- O. Do not delay landing in an attempt to complete the following steps.
- P. LEFT ISOLATION VALVE SWITCH - OFF
- Q. PACK 1 CONTROL SELECTOR - OFF
- R. Wait 2 minutes unless the smoke or fumes are increasing [Allows time for the smoke to clear.]
- S. If the smoke or fumes continue or are increasing:
 - 1) PACK 1 CONTROL SELECTOR - NORM
 - 2) PACK 3 CONTROL SELECTOR - OFF
 - 3) Wait 2 minutes unless the smoke or fumes are increasing [Allows time for the smoke or fumes to clear.] then do the following:
- T. If the smoke or fumes continue or are increasing:
 - 1) PACK 3 CONTROL SELECTOR - NORM
 - 2) PACK 2 CONTROL SELECTOR - OFF
 - 3) Wait 2 minutes unless the smoke or fumes are increasing [Allows time for the smoke or fumes to clear.] then do the following:
- U. If the smoke or fumes are increasing:
 - 1) PACK 3 CONTROL SELECTOR - OFF
 - 2) TRIM AIR SWITCH - OFF
 - 3) AFT CARGO HEAT SWITCH - OFF
 - 4) Wait 2 minutes unless the smoke or fumes are increasing [Allows time for the smoke or fumes to clear.] then do the following:
- V. If the smoke or fumes continue or are increasing:
 - 1) LEFT ISOLATION VALVE SWITCH - ON
 - 2) PACK 2 CONTROL SELECTOR - NORM
 - 3) PACK 3 CONTROL SELECTOR - NORM
 - 4) TRIM AIR SWITCH - ON
 - 5) Consider an immediate landing.

- W. Do the SMOKE OR FUMES REMOVAL checklist if need.
- X. Do not accomplish the following checklists:
 - 1) ELEC UTIL BUS L, R
 - 2) FUEL OVRD 2, 3 FWD
 - 3) FUEL PRESS CTR L
 - 4) FUEL PUMP 2, 3 FWD
 - 5) CARGO DET AIR
 - 6) TEMP ZONE
 - 7) TRIM AIR OFF
- 3. Modified BLEED DUCT LEAK L, C, R Non-Normal procedure for L ISLN VALVE deactivated open:

BLEED DUCT LEAK L, C, R	
(L ISLN VALVE inop open)	
Condition: Bleed air leak or overheat along left, center, or right duct section.	
If BLD DUCT LEAK L or C message displayed:	
R ISOLATION VALVE SWITCH	OFF
ENGINE BLEED AIR 1 & 2 SWITCHES	OFF
PACK 1 & 2 CONTROL SELECTORS	OFF
APU SELECTOR	OFF
AFT CARGO HEAT SWITCH	OFF
TRIM AIR SWITCH	OFF
HYDRAULIC DEMAND PUMP 1 SELECTOR	OFF
WING ANTI-ICE SWITCH	OFF

For Passenger and Combi:

PASSENGER TEMPERATURE SELECTOR	SET
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Do not use wing anti-ice.

For RR:

Sufficient bleed air may not be available for nacelle anti-ice if N1 is less than 60% at or above 10,000 feet or less than 55% below 10,000 feet.

Cargo smoke detection no longer available.

Do not use ground pneumatic air.

BLEED DUCT LEAK L, C, R
(L ISLN VALVE inop open)
Do not accomplish the following checklists:
BLEED OFF
HYD PRESS DEMAND 1, 2
CARGO DET AIR
TEMP ZONE
TRIM AIR OFF
LANDING PREPARATION:
LE flaps operate in secondary mode. Allow additional time during approach for flap extension.
Do not accomplish the following checklist:
FLAPS PRIMARY
Note: A temporary LE flap asymmetry, accompanied by a mild rolling moment results when LE flaps are extended or retracted.
If BLD DUCT R is displayed accomplish the QRH BLEED DUCT LEAK L, C, R Non-Normal checklist.

4. Modified BLEED DUCT LEAK L, C, R Non-Normal procedure for R ISLN VALVE deactivated open:

BLEED DUCT LEAK L, C, R
(R ISLN VALVE inop open)
Condition: Bleed air leak or overheat along left, center, or right duct section.
If BLD DUCT LEAK C or R message displayed:
L ISOLATION VALVE SWITCH.....OFF
ENGINE BLEED AIR 3 & 4 SWITCHESOFF
PACK 2 & 3 CONTROL SELECTORSOFF
APU SELECTOR.....OFF
AFT CARGO HEAT SWITCH
TRIM AIR SWITCH
HYDRAULIC DEMAND PUMP 4 SELECTOR.....OFF
WING ANTI-ICE SWITCH

For Passenger and Combi:

PASSENGER TEMPERATURE SELECTOR	SET
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BLEED DUCT LEAK L, C, R
(R ISLN VALVE inop open)
Do not use wing anti-ice.

For RR:

Sufficient bleed air may not be available for nacelle anti-ice if N1 is less than 60% at or above 10,000 feet or less than 55% below 10,000 feet.

Cargo smoke detection no longer available.
Do not use ground pneumatic air.
Do not accomplish the following checklists: BLEED OFF HYD PRESS DEMAND 3, 4 CARGO DET AIR TEMP ZONE TRIM AIR OFF
LANDING PREPARATION:
LE flaps operate in secondary mode. Allow additional time during approach for flap extension.
Do not accomplish the following checklist: FLAPS PRIMARY
Note: A temporary LE flap asymmetry, accompanied by a mild rolling moment results when LE flaps are extended or retracted.
If BLD DUCT L is displayed accomplish the QRH BLD DUCT LEAK L, C, R Non-Normal checklist.

5. Modified WAI VALVE L, R Non-Normal Procedure for L ISLN VALVE deactivated open for airplanes without Center Bleed Duct Leak Detection:

WAI VALVE L, R
(L ISLN VALVE inop open)
Condition: Wing anti-ice valve not in commanded position.
Light: VALVE
If wing anti-ice switch ON:

WAI VALVE L, R	
(L ISLN VALVE inop open)	
WING ANTI-ICE SWITCH	OFF [Valve failed closed.]
Do not use wing anti-ice.	
If wing anti-ice switch OFF:	
WING ANTI-ICE SWITCH	ON [Valve failed open.]
After landing:	
ENGINE BLEED AIR 1 AND 2 SWITCHES.....	OFF
LEFT ISOLATION VALVE SWITCH	OFF
If BLEED ISLN message displayed:	
RIGHT ISOLATION VALVE SWITCH	OFF
APU Bleed Air Switch	OFF

For Airplanes with #1 hydraulic aux pump:

(Airplanes with #1 hydraulic aux pump)
If WAI VALVE LEFT message displayed when towed into the gate with engines shut down:
HYDRAULIC DEMAND PUMP 1 SELECTOR..... AUX [Provides hydraulic power for body gear steering]
Do not accomplish the following checklists: HYD PRESS DEM PACK

6. Modified WAI VALVE L, R Non-Normal Procedure for R ISLN VALVE deactivated open for airplanes without Center Bleed Duct Leak Detection:

WAI VALVE L, R	
(R ISLN VALVE inop open)	
Condition: Wing anti-ice valve not in commanded position.	
Light: VALVE	
If wing anti-ice switch ON:	
WING ANTI-ICE SWITCH	OFF [Valve failed closed.]

WAI VALVE L, R
(R ISLN VALVE inop open)
Do not use wing anti-ice.
If wing anti-ice switch OFF:
WING ANTI-ICE SWITCH.....ON [Valve failed open.]
After landing:
ENGINE BLEED AIR 3 AND 4 SWITCHES OFF
RIGHT ISOLATION VALVE SWITCH.....OFF
If BLEED ISLN message displayed:
LEFT ISOLATION VALVE SWITCH.....OFF
APU Bleed Air Switch OFF

For Airplanes with #1 hydraulic aux pump:

If WAI VALVE LEFT message displayed when towed into the gate with engines shut down:
HYDRAULIC DEMAND PUMP 1 SELECTORAUX [Provides hydraulic power for body gear steering]
Do not accomplish the following checklists: HYD PRESS DEM PACK

7. Modified CABIN ALTITUDE (RAPID DEPRESSURIZATION) Non-Normal Procedure for L ISLN VALVE deactivated open for airplanes without Center Bleed Duct Leak Detection:

CABIN ALTITUDE (RAPID DEPRESSURIZATION)
(L ISLN VALVE inop open)
Condition: Cabin altitude excessive.
OXYGEN MASKS.....ON
CREW COMMUNICATIONS.....ESTABLISH
ISOLATION VALVE SWITCHES (Both) OFF
CABIN ALTITUDE AND RATE CHECK [Confirms pressurization problem.]
If cabin altitude uncontrollable:

CABIN ALTITUDE (RAPID DEPRESSURIZATION)	
(L ISLN VALVE inop open)	
PASSENGER OXYGEN SWITCH.....	ON [Backs up automatic activation of the passenger oxygen system.]
DESCENT	ACCOMPLISH
Without delay, close thrust levers, extend speedbrakes, and descend at VMO/MMO. Level off at lowest safe altitude or 10,000 feet/14,000 feet (as designated in operator's FCOM), whichever is higher.	
If structural integrity in doubt, limit airspeed and avoid high maneuvering loads.	
If cabin altitude can be controlled and right duct pressure remains low:	
Accomplish the BLEED DUCT LEAK R Non-Normal procedure in the QRH.	
If cabin altitude can be controlled and left duct pressure remains low:	
ENGINE BLEED AIR 1 & 2 SWITCHES	OFF
PACK 1 & 2 CONTROL SELECTORS	OFF
APU SELECTOR.....	OFF
AFT CARGO HEAT SWITCH	OFF
TRIM AIR SWITCH	OFF
HYDRAULIC DEMAND PUMP 1 SELECTOR.....	OFF
WING ANTI-ICE SWITCH	OFF

For Passenger and Combi:

PASSENGER TEMPERATURE SELECTOR	SET
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Do not use wing anti-ice.

For RR:

Sufficient bleed air may not be available for nacelle anti-ice if N1 less than 60% at or above 10,000 feet or less than 55% below 10,000 feet.
--

Cargo smoke detection no longer available.
--

Do not use ground pneumatic air.

CABIN ALTITUDE (RAPID DEPRESSURIZATION)	
(L ISLN VALVE inop open)	
Do not accomplish the following checklists:	
BLEED ISLN L	
BLEED OFF	
CARGO DET AIR	
HYD PRESS DEM 1	
TEMP ZONE	
TRIM AIR OFF	
LANDING PREPARATION:	
LE flaps operate in secondary mode. Allow time during approach for secondary flap operation.	
Do not accomplish the following checklist:	
FLAPS PRIMARY	
Note: A temporary LE flap asymmetry, accompanied by a mild rolling moment, results when LE flaps are extended or retracted.	
If OUTFLOW VALVE L, OUTFLOW VALVE R, and CABIN ALT AUTO messages displayed:	
Do not accomplish the following checklists:	
CABIN ALT AUTO	
OUTFLOW VALVE L, R	

8. Modified (RAPID DEPRESSURIZATION) Non-Normal Procedure for R ISLN VALVE deactivated open for airplanes without Center Bleed Duct Leak Detection:

CABIN ALTITUDE (RAPID DEPRESSURIZATION)	
(R ISLN VALVE inop open)	
Condition: Cabin altitude excessive.	
OXYGEN MASKS	ON
CREW COMMUNICATIONS	ESTABLISH
ISOLATION VALVE SWITCHES (Both)	OFF
CABIN ALTITUDE AND RATE	CHECK [Confirms pressurization problem.]
If cabin altitude uncontrollable:	
PASSENGER OXYGEN SWITCH	ON [Backs up automatic activation of the passenger oxygen system.]

CABIN ALTITUDE (RAPID DEPRESSURIZATION)	
(R ISLN VALVE inop open)	
DESCENT	ACCOMPLISH
Without delay, close thrust levers, extend speedbrakes, and descend at VMO/MMO. Level off at lowest safe altitude or 10,000 feet/14,000 feet (as designated in operator's FCOM), whichever is higher.	
If structural integrity in doubt, limit airspeed and avoid high maneuvering loads.	
If cabin altitude can be controlled and left duct pressure remains low:	
Accomplish the BLEED DUCT LEAK L Non-Normal procedure in the QRH.	
If cabin altitude can be controlled and right duct pressure remains low:	
ENGINE BLEED AIR 3 & 4 SWITCHES	OFF
PACK 2 & 3 CONTROL SELECTORS	OFF
APU SELECTOR	OFF
AFT CARGO HEAT SWITCH	OFF
TRIM AIR SWITCH	OFF
HYDRAULIC DEMAND PUMP 4 SELECTOR	OFF
WING ANTI-ICE SWITCH	OFF

For Passenger and Combi:

PASSENGER TEMPERATURE SELECTOR	SET
Do not use wing anti-ice.	

For RR:

Sufficient bleed air may not be available for nacelle anti-ice if N1 less than 60% at or above 10,000 feet or less than 55% below 10,000 feet.
--

Cargo smoke detection no longer available.
Do not use ground pneumatic air.
Do not accomplish the following checklists: BLEED ISLN R BLEED OFF CARGO DET AIR HYD PRESS DEM 4 TEMP ZONE TRIM AIR OFF

CABIN ALTITUDE (RAPID DEPRESSURIZATION)
(R ISLN VALVE inop open)
LANDING PREPARATION:
LE flaps operate in secondary mode. Allow time during approach for secondary flap operation.
Do not accomplish the following checklist: FLAPS PRIMARY
Note: A temporary LE flap asymmetry, accompanied by a mild rolling moment, results when LE flaps are extended or retracted.
If OUTFLOW VALVE L, OUTFLOW VALVE R, and CABIN ALT AUTO messages displayed:
Do not accomplish the following checklists: CABIN ALT AUTO OUTFLOW VALVE L, R

36-11-05 APU Check Valve

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided the APU Isolation Valve remains closed after first engine starts.

OPERATIONS (O)

1. Close APU Isolation Valve after first engine is started.
2. Use Engine Crossbleed Start Supplementary Procedure for subsequent engine starts.
3. Maintain APU Isolation Valve closed.

36-11-06 APU Bleed Air Isolation Valve

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided valve is deactivated closed after engines are started.

MAINTENANCE (M)

NOTE: The APU bleed air shutoff valve is installed in the upper outboard aft corner of the left body gear wheel well. Access to the valve is available in the body gear wheel well. To deactivate the APU bleed air valve, position the valve in the CLOSED position and disconnect the electrical connector.

Deactivate the APU bleed air valve closed.

1. Install the wing and body gear door locks (AMM 32-00-30/201).
2. Install landing gear ground lock pins (AMM 09-11-00/201).
3. Put the P5 Overhead Panel APU BLEED switch OFF position. Wait approximately 10 seconds for the valve to close.
4. Open and collar the P6 panel APU ISO VLV AIR SUPPLY PWR circuit breaker.
5. Gain access to inoperative APU bleed isolation valve (AMM 36-11-09/201).
6. Manually position the APU bleed isolation valve CLOSED.
7. Disconnect, cap and stow the electrical connector from the APU bleed air valve.
8. Remove the gear door locks and landing gear lock pins.

OPERATIONS NOTE

The amber VALVE light on the overhead panel may remain illuminated. On the ECS synoptic page, the APU Bleed Air Isolation valve may be displayed OPEN in amber. BLEED ISLN APU advisory message may remain displayed.

36-11-07 Left and Right Wing Isolation VALVE Lights

Interval	Installed	Required	Procedure
C	2	1	(O)

One may be inoperative provided associated duct pressure indication is available.

OPERATIONS (O)

Use ECS Synoptic or duct pressure indications to determine isolation valve position.

36-11-09 Firewall Shutoff Valves (FWSOV) (RR)
36-11-09A Valve Closed - Icing Conditions Prohibited

Interval	Installed	Required	Procedure
C	4	3	(M) (O)

One may be inoperative secured closed provided:

- a. Airplane is not operated in known or forecast icing conditions.
- b. L and R ISLN valves are open for takeoff, and when flaps are operated.
- c. Bleed systems on remaining engines operate normally.
- d. Associated ENGINE BLEED switch is selected OFF except for engine start.

MAINTENANCE (M)

Secure the FWSOV closed.

1. For valve that does not have a manual lock feature:
 - A. Refer to DDG Item 36-11-03 (M) procedure to deactivate the High Stage Bleed Valve.
2. For valve that has a manual lock feature:
 - A. Deactivate the thrust reverser in the forward thrust position (AMM 78-31-00/201).
 - B. Isolate the electrical supply to the FWSOV (AMM 24-22-00/201).
 - C. Install the protective pads to the exhaust mixer duct.
 - D. Put the INA access platform and access stools in the cold stream duct.
 - E. Remove the left or right front pylon fairing access panel (AMM 72-03-00/401).
 - F. Disconnect, cap and stow the valve electrical connector.
 - G. Position the manual override until the valve is latched closed.
 - H. Install the left or right front pylon fairing access panel (AMM 72-03-00/401).
 - I. Remove the access stools and the INA access platform from the cold stream duct.
 - J. Remove the protective pads from the exhaust mixer duct.
 - K. Activate the thrust reverser (AMM 78-31-00/201).

OPERATIONS (O)

1. For the associated engine, select Engine Bleed OFF except for ground engine start and when bleed air is required for in-flight start.
2. APU-TO-PACK TAKEOFF procedure is not permitted since L and R ISLN valves must remain open during takeoff.

3. Operations must not be conducted in icing conditions. Do not select associated engine Nacelle Anti-Ice Switch ON.
4. Status message BLEED FWSOV _ will be displayed.
5. If associated engine is not equipped with a FWSOV locking feature, the HPSOV will be deactivated closed.

36-11-09 Firewall Shutoff Valves (FWSOV) (RR)**36-11-09B Valve Open - Icing Conditions Allowed**

Interval	Installed	Required	Procedure
C	4	3	(M) (O)

One may be inoperative open provided:

- a. Associated FWSOV operates pneumatically in the full open position.
- b. Associated HPSOV is secured closed.
- c. Associated ENGINE BLEED switch is selected OFF except for engine start.
- d. L and R ISLN valves are open for takeoff and when flaps are operated.
- e. Bleed systems on remaining engines operate normally.
- f. A minimum of 60% N1 is maintained at or above 10,000 ft. MSL, or 55% N1 is maintained below 10,000 ft. MSL on the associated engine while in icing conditions.

MAINTENANCE (M)

Secure the HPSOV closed and check that FWSOV operates pneumatically in full open position.

1. Deactivate the thrust reverser in the forward thrust position (AMM 78-31-00/201).
2. Release the pressure in the pneumatic system (AMM 36-00-00/201).
3. Install the access platform and the access stools in the cold stream duct.
4. Install the protective pads onto the exhaust mixer duct.
5. Remove the right front pylon fairing access panel (AMM 72-03-00/401).
6. Lock high stage bleed valve closed by rotating manual override hex 90° counter-clockwise to CLOSED.
7. Install the right front pylon fairing access panel (AMM 72-03-00/401).
8. Remove the access platform and access stools from the cold stream duct.
9. Remove the protective pads from the exhaust mixer duct.
10. Access the engine start valve and disconnect the start valve's electrical connector.
11. Pressurize the pneumatic manifold to above 20 psig.
12. Position the associated engine's bleed switch ON.
13. Pull the associated engine's start switch to open the PRSOV.

14. Confirm that the FWSOV opens fully and remains in the full open position by using any one of the following methods:
 - A. Observe the position pointer on the valve, or
 - B. Observe the position indicated on CMC ECS Maintenance page.
15. Confirm the associated engine's start switch is off and connect the start valve's electrical connector.
16. Activate the thrust reverser (AMM 78-31-00/201).

OPERATIONS (O)

1. Set Engine Bleed switch OFF except for ground engine start and when bleed air is required for in-flight start.
2. APU-TO-PACK TAKEOFF procedure is not permitted since L and R ISLN valves must remain open during takeoff and when flaps are operated.
3. When operating in icing conditions, set a minimum of 60% N1 at or above 10,000 ft. MSL (or 55% N1 below 10000 ft. MSL) on associated engine.
4. During engine start the associated advisory message BLEED _ will temporarily display. It will disappear at the conclusion of engine start when the FWSOV is no longer commanded closed. It may reappear when the bleed switch is selected OFF after engine start.

36-11-11 Intermediate Bleed Check Valves

Interval	Installed	Required	Procedure
C	4	3	(M) (O)

One may be inoperative open provided:

For RR:

- a. A minimum of 60% N1 is maintained at or above 10,000 ft. MSL, or 55% N1 is maintained below 10,000 ft. MSL on the associated engine while in icing conditions.
 - b. Associated HPSOV is secured closed.
 - c. Bleed systems on remaining engines operate normally.
-

MAINTENANCE (M)

Secure the HPSOV closed.

1. Use the (M) procedure for DDG Item 36-11-03 to secure the HPSOV closed.

OPERATIONS (O)

For RR:

1. When operating in icing conditions:
 - A. Set Nacelle Anti-Ice ON.
 - B. Maintain a minimum of 60% N1 at or above 10,000 ft MSL.
 - C. Maintain a minimum of 55% N1 below 10,000 ft MSL.
2. Bleed Air OFF light will illuminate at idle or if engine power settings are unequal.
3. Bleed Air OFF light will extinguish by advancing throttles to approximately 72% N2.
4. Advisory and status messages BLEED HP ENG _ will remain displayed.

36-11-12 High Stage (HP) Check Valves (RR)

Interval	Installed	Required	Procedure
C	4	0	

May be inoperative open.

36-12-01 Precoolers
36-12-01-01 PW, GE & RR

Interval	Installed	Required	Procedure
C	4	3	(O)

One may be inoperative provided:

- a. Associated ENGINE BLEED switch is selected OFF except for engine start.
- b. Airplane is not operated in known or forecast icing conditions.
- c. L and R ISLN valves are open for takeoff, and when flaps are operated.
- d. Bleed systems on remaining engines operate normally.
- e. Associated Engine Anti-Ice switch must remain OFF.

NOTE: Aircraft may be dispatched with damage to the precooler (including core damage) provided engine start is not precluded.

OPERATIONS (O)

1. For the associated engine, select Engine Bleed OFF except for ground engine start and when bleed air is required for in-flight start.
2. Operations must not be conducted in icing conditions.
3. APU-TO-PACK TAKEOFF procedure is not permitted.
4. L and R ISLN valves must remain open during takeoff and when flaps are operated.

36-12-02 Fan Air (Precooler) Control Systems**36-12-02-02 RR**

Interval	Installed	Required	Procedure
C	4	3	(M) (O)

One control system may be inoperative provided:

- a. Associated Fan Air Valve is secured full open.
 - b. Associated ENGINE BLEED switch is selected OFF when wing anti-ice is ON.
 - c. Bleed systems on remaining engines operate normally.
 - d. Start Valves on all remaining engines operate normally.
-

MAINTENANCE (M)

Secure the Fan Air Valve(s) full open.

1. Release the pressure in the pneumatic system (AMM 36-00-00/201).
2. Gain access to associated fan air temperature sensor (AMM 36-12-02/401).
3. Disconnect the signal pressure tube from the fan air temperature sensor.
4. Install a cap (P/N MS21914-6 or equivalent) on the fan air temperature sensor and a plug (P/N BACP20AU6 or equivalent) on the open signal pressure tube fitting.
5. Lockwire the installed cap to the installed plug using procedure defined in BAC5018 - Double Twist Safety Wire Application.

OPERATIONS (O)

1. Increase flight planning fuel by 0.5%.
2. When operating in icing conditions:
 - A. Set a minimum of 60% N1 at or above 10,000 ft. MSL (or 55% N1 below 10000 ft. MSL) on the affected engine to ensure adequate air supply to the Nacelle TAI manifold.
 - B. Select Engine Bleed OFF for the affected engine when wing anti-ice is selected ON.
3. Status message BLEED FAMV ENG _ will remain displayed for the affected engine.

36-12-02 Fan Air (Precooler) Control Systems**36-12-02-03 All Engines**

Interval	Installed	Required	Procedure
C	4	0	(M) (O)

May be inoperative provided:

- a. Associated Fan Air valve(s) is secured full open.
 - b. Airplane is not operated in known or forecast icing conditions.
 - c. For each inoperative system, the appropriate performance penalties are applied.
-

MAINTENANCE (M)

Secure associated fan air valve(s) in the full open position.

For RR:

1. Release the pressure in the pneumatic system (AMM 36-00-00/201).
2. Gain access to associated fan air temperature sensor (AMM 36-12-02/401).
3. Disconnect the signal pressure tube from the fan air temperature sensor.
4. Install a cap (P/N MS21914-6 or equivalent) on the fan air temperature sensor and a plug (P/N BACP20AU6 or equivalent) on the open signal pressure tube fitting.
5. Lockwire the installed cap to the installed plug using procedure defined in BAC5018 - Double Twist Safety Wire Application.

OPERATIONS (O)

Status message BLEED FAMV ENG _ will remain displayed for the affected engine(s).

For RR:

1. Do not operate airplane in known or forecast icing conditions.
2. Increase flight planning fuel by 0.5% for each valve affected.

36-16-01 APU Pneumatic Duct

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative (leaking) provided:

- a. APU check valve operates normally.
 - b. If APU is used for electrical power, the APU Bleed Air Valve is deactivated closed.
-

MAINTENANCE (M)

Confirm the operation of the forward APU check valve and configure the valve for dispatch, if necessary.

1. Check that landing gear ground locks are installed and open wing and body gear doors.
2. Install wing and body gear door locks.
3. If the APU check valve has a valve bypass line installed, remove the bypass line from the pneumatic duct. On the downstream side of the APU check valve only, seal the connection on the pneumatic duct with a suitable cap.
4. Using an external air source, pressurize the pneumatic manifold.
5. Check the APU check valve for internal leaks by listening near the valve.
6. Remove external air source.
7. If leak is between the APU and the APU bleed air valve, do not use APU.

CAUTION: **THERE IS NOT A CHECK VALVE IN THE PNEUMATIC SYSTEM BETWEEN THE APU AND THE APU BLEED AIR (ISOLATION) VALVE. IF THE DUCT ASSEMBLY IS PUNCTURED/SEPARATED BETWEEN THESE TWO LOCATIONS INSIDE THE PRESSURE HULL, THE DAMAGE MUST BE REPAIRED BEFORE FLIGHT TO PREVENT A LOSS OF CABIN PRESSURE AND ALTITUDE CONTROL.**

8. If leak is between the APU check valve and the APU bleed air valve, and the APU is to be used as a source of electrical power, secure the APU bleed air valve closed.
 - A. With the APU shut down and the APU bleed air valve closed, check the valve position indicator in the closed position.
 - B. Disconnect the electrical connector from the APU bleed air valve and stow.
9. Remove the wing and body gear door locks and close the doors, if appropriate.

OPERATIONS (O)

If APU is to be used for electrical power, use normal procedures except leave the APU bleed switch OFF. APU bleed air will not be available.

36-21-01 DUCT PRESS Indication Systems**36-21-01A One Inoperative**

Interval	Installed	Required	Procedure
C	2	1	(M)

One may be inoperative provided L and R ISLN valves are verified to operate normally.

MAINTENANCE (M)

Verify the L and R ISLN valves operate normally.

1. Push the ECS switch on the EICAS Display Select Panel.
2. Position the P5 panel L and R ISLN valve switches closed.
3. Confirm both left and right isolation valves go closed within ten seconds.
4. Position the L ISLN valve switch open.
5. Confirm the left isolation valve opens within ten seconds.
6. Position the R ISLN valve switch open.
7. Confirm the right isolation valve opens within ten seconds.

36-21-01 DUCT PRESS Indication Systems**36-21-01B Both Inoperative**

Interval	Installed	Required	Procedure
C	2	0	(M)

May be inoperative provided:

- a. Crossover duct leak detection is installed and operates normally.
- b. L and R ISLN valves are verified to operate normally.

MAINTENANCE (M)

Verify the L and R ISLN valves operate normally.

1. Push the ECS switch on the EICAS Display Select Panel.
2. Position the P5 panel L and R ISLN valve switches closed.
3. Confirm the both left and right isolation valves go closed within ten seconds.
4. Position the L ISLN valve switch open.
5. Confirm the left isolation valve opens within ten seconds.
6. Position the R ISLN valve switch open.
7. Confirm the right isolation valve opens within ten seconds.

36-21-02 ENGINE BLEED OFF Lights

Interval	Installed	Required	Procedure
C	4	0	

36-21-03 Engine Bleed Pressure Sensor

Interval	Installed	Required	Procedure
C	4	0	

36-21-04 Engine Bleed Over-pressure Switch

Interval	Installed	Required	Procedure
C	4	3	(M) (O)

One may be inoperative deactivated provided:

- a. Associated HPSOV is secured closed.
- b. Associated Bleed switch remains OFF for takeoff.

For RR:

- c. A minimum of 60% N1 is maintained at or above 10,000 ft. MSL, or 55% N1 is maintained below 10,000 ft. MSL on the associated engine while in icing conditions.
 - d. Bleed systems on remaining engines operate normally.
-

MAINTENANCE (M)**For RR Engines:**

Deactivate the associated Bleed switch and secure associated HPSOV closed.

1. Gain access to the associated engine bleed air overpressure switch (AMM 36-21-03/401).
2. Fabricate a 3 to 4 inch jumper wire from type 6A (BMS 13-60 Type 1 or BMS 13-48 Type 10 or equivalents) wire. Terminate wire with P/N BACC47CN1A 20 AWG (or equivalent) pins on each end, per the Standard Wiring Practices Manual.
3. Disconnect the electrical connector from the switch.
4. Jumper connector locations 4 and 6 with the fabricated jumper wire.
5. Use DDG Item 36-11-03 (M) procedure to secure associated HPSOV closed.

OPERATIONS (O)

1. Set the associated Bleed switch OFF for takeoff and may be selected ON after flaps are UP.
2. Accomplish DDG Item 36-11-03 (O) procedure.

36-22-01 Bleed Air SYS FAULT Lights

Interval	Installed	Required	Procedure
C	4	0	

36-22-02 APU Isolation VALVE Light

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided associated EICAS message is not displayed.

36-22-03 Engine Bleed Temperature Sensor

Interval	Installed	Required	Procedure
C	4	0	

Section 2

38-10-01 Potable Water Systems

38-10-01A Inoperative Components Deactivated

Interval	Installed	Required	Procedure
C	-	-	(M)

Individual components may be inoperative provided:

- a. Associated components are deactivated or isolated.
 - b. Associated system components are verified not to have leaks.

NOTE: Any portion of system which operates normally may be used.

MAINTENANCE (M)

Deactivate applicable potable water system components and check for leaks.

1. Deactivate or isolate inoperative components.
 2. Verify associated system components do not have leaks.

38-10-01 Potable Water Systems

38-10-01B System Not Used

Interval	Installed	Required	Procedure
C	-	-	(M)

May be inoperative provided:

- a. System is drained.
 - b. Procedures are established to ensure that system is not serviced.

MAINTENANCE (M)

Drain potable water system.

1. Drain potable water system (AMM 12-14-01/301).
 2. Establish procedures to ensure that system is not serviced.

OPERATIONS NOTE

Under EU regulations, British Airways aircraft are considered to be food premises and therefore have to have an adequate supply of hot and/or cold water available on-board whenever the aircraft is operating. This can be achieved by the provision of bottled water.

38-30-01 Lavatory Waste Systems**38-30-01A Inoperative Components Deactivated**

Interval	Installed	Required	Procedure
C	-	0	(M)

Individual components may be inoperative provided:

- Associated components are deactivated or isolated.
- Associated system components are verified not to have leaks.

NOTE: Any portion of system which operates normally may be used.

MAINTENANCE (M)

Deactivate or isolate inoperative components and verify associated system components do not have leaks (AMM 38-00-00).

38-30-01 Lavatory Waste Systems**38-30-01B Lavatory Not Used**

Interval	Installed	Required	Procedure
C	-	0	(M)

Associated lavatory may be inoperative provided:

- Associated components are deactivated or isolated to prevent leaks.
- Associated lavatory door is secured closed and placarded INOPERATIVE - DO NOT ENTER.

NOTE 1: These provisions are not intended to prohibit inspections by crewmembers.

NOTE 2: For the upper deck lavatory inoperative, the Captain will determine if flight duration is acceptable,

NOTE 3: With the left hand vacuum blower Inop, toilets A and B will not operate on the ground and below 16,000 ft.

MAINTENANCE (M)

Deactivate or isolate the associated lavatory components and secure the lavatory door closed..

1. Deactivate or isolate inoperative components (AMM 38-00-00)
2. If possible, drain the associated waste tank (AMM 12-17-01/301).
3. Secure closed and appropriately placard the associated lavatory door.

44-01-01 IFE AVOD/DTES**44-01-01-01 IFE AVU Fan Failure**

Interval	Installed	Required	Procedure
B	-	-	(M)

May be inoperative provided flight legs reported on Faults/Failures BIT/BITE screen at PAT does not exceed 7 sectors.

MAINTENANCE (M)

NOTE: Check the Cabin Log divider card X7137 for Defects of Significant Operational Impact (OPDEF) and take the appropriate action.

44-01-01 IFE AVOD/DTES**44-01-01-02 PAT/CFS**

Interval	Installed	Required	Procedure
A	1	0	(M) (O)

May be inoperative provided repairs are made within 3 days.

MAINTENANCE (M)

NOTE: Check the Cabin Log divider card X7137 for Defects of Significant Operational Impact (OPDEF) and take the appropriate action.

1. Pull and collar the PAT and CFS circuit breaker at the VCC panel. This allows the DMSs to go into autonomous mode after 30 min, providing broadcast mode only to the passenger.

OPERATIONS (O)

1. Prior to flight, brief the SCCM that a Manual Safety Demonstrations will have to be accomplished through out the aircraft.

44-01-01 IFE AVOD/DTES**44-01-01-03 Audio/Video Distribution System (RF Quality)****44-01-01-03A**

Interval	Installed	Required	Procedure
C	-	-	(M) (O)

May be inoperative provided that the condition only affects individual seat places or a single column on an ADB.

MAINTENANCE (M)

NOTE 1: Check the Cabin Log divider card X7137 for Defects of Significant Operational Impact (OPDEF) and take the appropriate action.

NOTE 2: RF Quality refers to white noise (static) at the passenger headset and/or severely degraded picture quality at the passenger(s) video screen.

1. Any zone(s) affected by audio static should be deactivated by tripping the applicable ADB circuit breaker(s) in the MEC on panels P414/P415.

OPERATIONS (O)

1. Where audio/video channels are affected by white noise (static), the noise levels generated can be severe, therefore the affected zones are deactivated to prevent passengers being exposed to this condition.
2. Prior to flight, brief the SCCM that the reading lights and call light functions will not be available in the zones deactivated and Manual Safety Demonstrations will have to be accomplished in these zones.

44-01-01 IFE AVOD/DTES**44-01-01-03 Audio/Video Distribution System (RF Quality)****44-01-01-03B**

Interval	Installed	Required	Procedure
A	-	-	(M) (O)

Audio/film static and/or a severely degraded video picture is acceptable provided repairs are made:

- a. Within 3 flight sectors, or
- b. Prior to Main Base departure, whichever is earlier.

MAINTENANCE (M)

NOTE 1: Check the Cabin Log divider card X7137 for Defects of Significant Operational Impact (OPDEF) and take the appropriate action.

NOTE 2: RF Quality refers to white noise (static) at the passenger headset and/or severely degraded picture quality at the passenger(s) video screen.

1. Any zone(s) affected by audio static should be deactivated by tripping the applicable ADB circuit breaker(s) in the MEC on panels P414/P415.

OPERATIONS (O)

1. Where audio/video channels are affected by white noise (static), the noise levels generated can be severe, therefore the affected zones are deactivated to prevent passengers being exposed to this condition.
2. Prior to flight, brief the SCCM that the reading lights and call light functions will not be available in the zones deactivated and Manual Safety Demonstrations will have to be accomplished in these zones.

44-01-01 IFE AVOD/DTES**44-01-01-04 IFE System Seat Related Components/Functions**

Interval	Installed	Required	Procedure
C	-	-	(M)

IFE in-seat functions may be inoperative at individual seat locations provided:

- a. AVU fan failures are deferred IAW MEL item 44-01-01-01,
- b. Any in-seat wiring damage is electrically isolated from the seat box,
- c. PC and seat power defects are deferred IAW MEL item [TGL] 25-25-02.

MAINTENANCE (M)

NOTE: Check the Cabin Log divider card X7137 for Defects of Significant Operational Impact (OPDEF) and take the appropriate action.

1. Damaged wiring (e.g. severed wired, conductors exposed) must be electrically isolated. Refer to Rockwell Collins AMM 44-00-98 (MC 10163170) for deactivation procedures.

44-01-01 IFE AVOD/DTES**44-01-01-05 DMS**

Interval	Installed	Required	Procedure
A	-	0	(M) (O)

May be inoperative provided repairs are made within 3 days.

MAINTENANCE (M)

NOTE: Check the Cabin Log divider card X7137 for Defects of Significant Operational Impact (OPDEF) and take the appropriate action.

1. Pull and collar the applicable circuit breaker at the VCC.
2. Boot system to ensure premium passenger have AVOD priority.

OPERATIONS (O)

1. If Safety Video is not available a manual safety demo must be given. See 747-400 FAM.

NOTE: Passengers in premium classes will have AVOD as priority, some passengers in WT will have AVOD and remainder will have broadcast (provided the system has been rebooted).

44-01-01 IFE AVOD/DTES**44-01-01-06 ISL**

Interval	Installed	Required	Procedure
A	1	0	(M)

May be inoperative provided repairs are made within 5 days.

MAINTENANCE (M)

NOTE: Check the Cabin Log divider card X7137 for Defects of Significant Operational Impact (OPDEF) and take the appropriate action.

44-01-01 IFE AVOD/DTES**44-01-01-07 EHUB**

Interval	Installed	Required	Procedure
A	1	0	(M)

May be inoperative provided repairs are made within 3 days.

MAINTENANCE (M)

NOTE: Check the Cabin Log divider card X7137 for Defects of Significant Operational Impact (OPDEF) and take the appropriate action.

44-01-01 IFE AVOD/DTES**44-01-01-08 No IFE**

Interval	Installed	Required	Procedure
A			(M) (O)

May be inoperative provided repairs are made:

- a. Within 3 flight sectors, or
- b. Prior to Main Base departure, whichever is earlier.

MAINTENANCE (M)

NOTE: Check the Cabin Log divider card X7137 for Defects of Significant Operational Impact (OPDEF) and take the appropriate action.

1. Pull and collar the Main IFE Power 50A CIRCUIT BREAKER (C9133) on P415 panel in the EE bay.
2. Pull and collar the Main IFE Power 50A CIRCUIT BREAKER (C9152) on P414 panel in the EE bay.
3. Make Cabin log entry 'No SEP Demo, No Reading lights or Crew Call'.

Section 2

OPERATIONS (O)

1. Prior to flight, brief the SCCM that reading lights and call light functions will not be available in the zones deactivated and Manual Safety Demonstrations will have to be accomplished.

44-01-02 AVOD/DTES VCC COOLING FANS 1 AND 2

Interval	Installed	Required	Procedure
A	2	0	(M) (O)

Both may be inoperative provided:

- a. Backup cooling fan (fan 3) is operative,
- b. Repairs are made:
 - 1) Within 3 flight sectors, or
 - 2) Prior to Main Base departure, whichever is earlier.

MAINTENANCE (M)

1. To achieve a Main Base dispatch configuration, both main VCC cooling fans must be operative.
2. Press to test on control panel, ensure all lamps illuminate and backup fan (fan 3 is located behind upper DMSs) can be heard.
3. Notify Maintrol that a VCC cooling fan(s) is/are inoperative.

OPERATIONS (O)

1. Prior to flight, brief the SCCM that the VCC Control Panel Overtemp Light is to be monitored throughout flight. In the event of an overtemp condition displayed the IFE system is to be switched off.

NOTE 1: When the main VCC fan(s) have failed the VCC fan(s) light(s) will illuminate on the control panel.

NOTE 2: When fan 3 is running, fan 3 light on the control panel is illuminated.

44-02-01 IFE Panasonic**44-02-01-01 VCC Cooling Fan**

Interval	Installed	Required	Procedure
A	2	1	(M) (O)

Individual VCC cooling fan may be inoperative provided repairs are made:

- Within 3 flights, or
- Prior to Main Base departure whichever is earlier.

MAINTENANCE (M)

NOTE: Check the Cabin Log divider card X7137 for Defects of Significant Operational Impact (OPDEF) and take the appropriate action.

- Notify Maintrol that one cooling fan is inoperative.

OPERATIONS (O)

- Prior to flight, brief the SCCM that the VCC Cooling Fan Warning lights need to be monitored throughout the flight. If the second cooling fan warning light illuminates, the IFE must be turned off immediately.

44-02-01 IFE Panasonic**44-02-01-02 File Server (FS)**

Interval	Installed	Required	Procedure
C	3	-	(M) (O)

MAINTENANCE (M)

NOTE: Check the Cabin Log divider card X7137 for Defects of Significant Operational Impact (OPDEF) and take the appropriate action.

- One File Server Failed:
 - The inoperative File Server must be moved into Position 3.
 - Trip and collar the following circuit breaker located on the VCC Switch Panel:
 - FS3
- Two File Servers Failed:
 - The inoperative File Servers must be moved into Position 2 & 3.
 - Trip and collar the following circuit breaker located on the VCC Switch Panel:
 - FS2
 - FS3

3. All File Servers Failed:

- A. Trip and collar the following circuit breaker located on the VCC Switch Panel:
- 1) FS1
 - 2) FS2
 - 3) FS3

OPERATIONS (O)

If ALL File Servers are inoperative, prior to flight brief the SCCM that the IFE content will be limited to a small selection of Audio and Video. The following services will not be available: Passenger Reading Lights (except for Club World), Attendant Call Lights, Pre-Recorded Announcements (PRAM), Safety Video, Boarding Music, and Moving Map Flight Data.

44-02-01 IFE Panasonic**44-02-01-03 Aircraft Interface (AI)**

Interval	Installed	Required	Procedure
A	1	-	(M) (O)

May be inoperative provided repairs are made:

- a. Within 3 flights, or
- b. Prior to Main Base departure whichever is earlier.

MAINTENANCE (M)

NOTE: Check the Cabin Log divider card X7137 for Defects of Significant Operational Impact (OPDEF) and take the appropriate action.

1. Deactivate the Aircraft Interface:

- A. Trip and collar the following circuit breaker located on the VCC Switch Panel:
- 1) AI

OPERATIONS (O)

1. Prior to flight brief the SCCM that the following services will not be available: Passenger Reading Lights (except for Club World), Attendant Call Lights, Pre-Recorded Announcements (PRAM), Safety Video, Boarding Music, and Moving Map Flight Data.
2. Manual Safety demonstrations will have to be accomplished at all locations.

44-02-01 IFE Panasonic
44-02-01-04 Crew Terminal

Interval	Installed	Required	Procedure
A	1	-	(M) (O)

May be inoperative provided repairs are made:

- Within 3 flights, or
- Prior to Main Base departure whichever is earlier.

MAINTENANCE (M)

NOTE: Check the Cabin Log divider card X7137 for Defects of Significant Operational Impact (OPDEF) and take the appropriate action.

- Deactivate the Aircraft Interface:
 - Trip and collar the following circuit breaker located on the VCC Switch Panel:
 - CT
 - SPM:
- Enable the IFE service by:
 - Turning on the IFE at the VCC.
 - After 10 minutes, toggle the Flight Deck No Smoking Selector to OFF.
 - After 15 seconds, toggle the Flight Deck No Smoking Selector to ON.

OPERATIONS (O)

- Prior to flight brief the SCCM that the IFE will be operational for passengers, but there will be no crew controls available. The following services will not be available: Parental Lock, Pre- Recorded Announcements (PRAM), Video Safety Video, and Boarding Music.
- Manual Safety demonstrations will have to be accomplished at all locations.

44-02-01 IFE Panasonic
44-02-01-05 In-Seat IFE Components

Interval	Installed	Required	Procedure
C	-	-	(M)

Individual components may be inoperative provided:

- PC Power and Seat Power defects are deferred IAW MEL 25-25-02 Item d).
- Any in seat wiring damage is electrically isolated from the power source.

NOTE: Any portion of the system that operates normally may be used.

MAINTENANCE (M)

NOTE: Check the Cabin Log divider card X7137 for Defects of Significant Operational Impact (OPDEF) and take the appropriate action.

1. When deferring any item the Operational Significant Cabin Defects Sheet (QU_X940) should be checked and the appropriate action taken.
2. In-seat wiring that has been damaged (e.g. severed wires, exposed conductors) should be electrically isolated to prevent occurrence of a hazardous condition. Design Authority must be gained to allow the aircraft to dispatch in a safe condition.

44-02-01 IFE Panasonic

44-02-01-06 IFE AMCUs

Interval	Installed	Required	Procedure
C	6	-	(M) (O)

MAINTENANCE (M)

NOTE: Check the Cabin Log divider card X7137 for Defects of Significant Operational Impact (OPDEF) and take the appropriate action.

1. The failed AMCU should be isolated using the relevant AMCU Isolation Switch on the VCC Switch Panel.

OPERATIONS (O)

1. Prior to flight brief the SCCM that there will be no IFE or in-seat power for the Zone(s) affected. This will also prevent the Seat Electronics (recline, in-seat lights, etc) from operating in the Club World and First Class.
2. Manual Safety demonstrations will have to be accomplished in the affected zone(s).

44-02-01 IFE Panasonic

44-02-01-07 Complete IFE System INOP

Interval	Installed	Required	Procedure
A	-	-	(M) (O)

May be inoperative provided repairs are made:

- a. Within 3 flights, or
- b. Prior to Main Base departure whichever is earlier.

MAINTENANCE (M)

NOTE: Check the Cabin Log divider card X7137 for Defects of Significant Operational Impact (OPDEF) and take the appropriate action.

1. Deactivate the IFE System:

- A. Trip and collar the following circuit breakers:

PANEL	POSN	CB	NAME
P414	G13	CZ9001	AMCU 1
P414	K13	CZ9002	AMCU 2
P414	J10	CZ9004	AMCU 4
P414	J13	CZ9005	AMCU 5
P414	P30	CZ9008	IFE 115 VAC

P415	N18	CZ9003	AMCU 3
P415	N21	CZ9006	AMCU 6
P415	N24	CZ9007	VCC
P415	E39	C10446	VIDEO CONT CTR-AC

P180	E25	C9136	IFE SEAT PWR CTRL
P180	E24	C10447	VIDEO CONT CTR-DC

OPERATIONS (O)

1. Prior to flight brief the SCCM that there will be no IFE or in-seat power for the whole aircraft. This will also prevent the Seat Electronics (recline, in-seat lights, etc) from operating in the Club World and First Class. There will be no Safety Demo, Boarding Music, or PRAMs.
2. Manual Safety demonstrations will have to be accomplished.

44-03-01 GOGO Connectivity System

Interval	Installed	Required	Procedure
D	1	-	(M) (O)

System may be inoperative provided:

- a. For reported WiFi / TPED interference with aircraft systems the GOGO system is deactivated.
- b. For any damaged wiring the system is deactivated.

NOTE 1: Many aircraft components have been tested for immunity from WiFi emissions during certification of the GOGO system. If any component is fitted that does not comply with the list in document ITI-10222421 the system MUST be deactivated using the (M) procedure below.

NOTE 2: Except as above, system should be left activated to allow remote BITE monitoring.

MAINTENANCE (M)

For reported interference, non-compatible component installation or damaged wiring:

1. Trip and collar the following CBs:
 - A. P6 Power Distribution Panel.
 - WIFI DC
 - B. P415 Power Distribution Panel
 - WIFI AC
 - KANDU
 - KRFU
2. Raise a separate ADD IAW this MEL item for EACH component fitted.

OPERATIONS (O)

Nil.

45-45-01 Central Maintenance Computers

Interval	Installed	Required	Procedure
C	2	1	

45-45-02 Ground Test Enable Switches

Interval	Installed	Required	Procedure
C	2	0	(M)

May be inoperative provided switch(es) are deactivated.

MAINTENANCE (M)

Deactivate the ground test enable switches.

1. Open and collar the P180 panel CMC ENABLE SWITCH circuit breaker.

45-45-03 Multiple-Input Printer

45-45-03A Alternate Procedures Used

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided alternate procedures are established and used.

OPERATIONS (O)

Alternate procedures must be established and used.

45-45-03 Multiple-Input Printer

45-45-03B Procedures Do Not Require Printer

Interval	Installed	Required	Procedure
D	1	0	

May be inoperative provided procedures do not require its use.

INTENTIONALLY BLANK

46-20-01 Electronic Flight Bag Systems (EFBs)**46-20-01-01 iPad Mounting Device (FlyPad Tray)**

46-20-01-01A Two Inoperative

Interval	Installed	Required	Procedure
A	2	0	(O)

Except for dispatch from LHR, two may be inoperative.

MAINTENANCE NOTE

Material Number – FPTRAY747400BA.

OPERATIONS (O)

Stow the inoperative mounting device in an appropriate stowage on the flight deck, until it can be removed from the aircraft at LHR. Use alternate procedures for access to information required in flight.

46-20-01 Electronic Flight Bag Systems (EFBs)**46-20-01-01 iPad Mounting Device (FlyPad Tray)**

46-20-01-01B One Inoperative

Interval	Installed	Required	Procedure
A	2	1	(O)

May be inoperative provided:

- a. Replacement is made within 3 days.
 - b. Procedures do not require its use.
-

MAINTENANCE NOTE

Material Number – FPTRAY747400BA.

OPERATIONS (O)

Stow the inoperative mounting device in an appropriate stowage on the flight deck, until it can be removed from the aircraft at LHR. Use alternate procedures for access to information required in flight.

INTENTIONALLY BLANK

49-11-01 Auxiliary Power Unit

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided procedures do not require its use.

MAINTENANCE NOTE

See Boeing Maintenance Manual for towing airplane with an inoperative APU or if APU removal is desired.

The APU Battery is used to supply power to flight critical loads if the primary DC power source is lost in flight.

Due to unavailability of a spare APU, it may be desirable to operate with the APU removed while repairs are made. Instructions for removal of the APU, including capping pipes, securing loose hardware, tool requirements, etc. are included in Boeing Maintenance Manual 49-11-01 Removal/Installation procedure. Account must be made for the change in Operating Empty Weight (including centre of gravity effect) due to APU removal.

OPERATIONS NOTE

1. Where possible, start two engines on stand using the GROUND PNEUMATIC START PROCEDURE. Start the remaining engines using the CROSSBLEED START PROCEDURE.
2. External power sources may trip off line when the demand load is high. To minimize this possibility, it is recommended that, prior to engine start, select R UTILITY power switch and all fuel pumps OFF. If further electrical load reduction is required, also select L UTILITY power switch OFF. Select fuel pumps as required for each individual engine start. Utility power can be restored and the fuel panel correctly configured after completion of the engine start procedure.

NOTE 1: Removing power from both utility busses results in loss of cabin lighting except for passenger signs and night lighting. At night, to prepare cabin lighting before removing power from the utility busses, instruct the cabin crew to turn on cabin night lighting.

NOTE 2: Utility Bus equipment is listed in MEL item 24-56-01.

NOTE 3: When the APU is unserviceable and EXT 1 power is removed from the aircraft, the AUX Hydraulic pumps 1 & 4 will not operate, as they are powered from the Ground Handling Bus. During pushback use 1 & 4 demand pumps to supply hydraulic pressure for the body gear steering and braking. Be aware that this will increase the pneumatic bleed requirement and may affect dual engine autostart capability.

3. For EE CLNG SUP FAN status message displayed, it can be cleared by rotating the EQUIP COOLING switch to OVRD, then back to NORM.

4. For any RECIRC FAN UPR or LWR status message displayed, momentarily depress the PACK RST switch until each has cleared.
5. Account for the change in Operating Empty Weight (including center of gravity effect) due to APU removal.

NOTE: Due to CBs pulled as part of the Maintenance action APU & APU FUEL EICAS messages may remain displayed.

49-11-01 Auxiliary Power Unit**49-11-01-01 Pneumatic Function**

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided procedures do not require its use.

OPERATIONS NOTE

1. When using APU for electrical power, close APU Bleed Air on P5 panel.

49-15-01 APU Inlet Door**49-15-01A Inoperative Closed**

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative secured closed provided APU is not used.

MAINTENANCE (M)

1. Secure APU inlet door closed (AMM 49-15-00/201).
2. If manual drive is not installed or door cannot be operated manually:
 - A. Remove actuator and install fixed link (Boeing Tool MIT65B98813) to secure door closed (AMM 49-15-00/201).

OPERATIONS NOTE

1. Where possible, start two engines on stand using the GROUND PNEUMATIC START PROCEDURE. Start the remaining engines using the CROSSBLEED START PROCEDURE.
2. External power sources may trip off line when the demand load is high. To minimize this possibility, it is recommended that, prior to engine start, select R UTILITY power switch and all fuel pumps OFF. If further electrical load reduction is required, also select L UTILITY power switch OFF. Select fuel pumps as required for each individual engine start. Utility power can be restored and the fuel panel correctly configured after completion of the engine start procedure.

NOTE 1: Removing power from both utility busses results in loss of cabin lighting except for passenger signs and night lighting. At night, to prepare cabin lighting before removing power from the utility busses, instruct the cabin crew to turn on cabin night lighting.

NOTE 2: Utility Bus equipment is listed in MEL item 24-56-01.

NOTE 3: When the APU is unserviceable and EXT 1 power is removed from the aircraft, the AUX Hydraulic pumps 1 & 4 will not operate, as they are powered from the Ground Handling Bus. During pushback use 1 & 4 demand pumps to supply hydraulic pressure for the body gear steering and braking. Be aware that this will increase the pneumatic bleed requirement and may affect dual engine autostart capability.

3. For any RECIRC FAN UPR or LWR status message displayed, momentarily depress the PACK RST switch until each has cleared.
4. For EE CLNG SUP FAN status message displayed, it can be cleared by rotating the EQUIP COOLING switch to OVRD, then back to NORM.

49-15-01 APU Inlet Door**49-15-01B Inoperative Open**

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative open or partially open provided appropriate performance adjustments are applied.

NOTE: With door in open position, APU may be used on the ground.

MAINTENANCE NOTE

Prior to operating APU, visually check APU door is at least 15 degrees open.

OPERATIONS (O)

1. Reduce performance limited weights by the appropriate adjustments:

Takeoff & Landing	Enroute Climb
1,452 kg	4,400 kg

2. Increase flight planning fuel by 2.0%.

NOTE: APU DOOR advisory message may be displayed when the APU is not running.

49-61-01 APU External Control Panel**49-61-01A Auto Fire Bottle Installed and Operative**

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided APU automatic fire bottle discharge system operates normally.

OPERATIONS NOTE

APU operation permitted with the following functions inoperative at the APU Remote Control Module.

1. Fire warning light.
2. Fire warning horn.
3. Stop switch.
4. Bottle discharge switch.
5. Fire shutdown handle (switch).

49-61-01 APU External Control Panel**49-61-01B Auto Fire Bottle Not Installed or Inoperative**

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative (and APU used) provided a qualified operator remains in the vicinity of the APU controls on the flight deck.

OPERATIONS NOTE

APU operation permitted with the following functions inoperative at the APU Remote Control Module.

1. Fire warning light.
2. Fire warning horn.
3. Stop switch.
4. Bottle discharge switch.
5. Fire shutdown handle (switch).

49-61-02**APU RPM Indications (N1, N2)**

Interval	Installed	Required	Procedure
C	2	0	

49-71-01 APU EGT Indication

Interval	Installed	Required	Procedure
C	1	0	

49-94-01**APU Oil Quantity Indication**

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative (and APU used) provided:

- a. APU oil quantity is filled to capacity.
 - b. After five flight days, APU oil quantity is again filled to capacity.
 - c. There is no evidence of above normal oil consumption or leakage.
-

MAINTENANCE (M)

Fill APU oil and verify no evidence of above normal oil consumption or leakage.

1. Fill APU oil to capacity prior to first flight and after five flight days.
2. Verify there is no history of abnormal APU oil consumption and visually inspect the aft fuselage around the APU area for evidence of oil leakage.

[TGL] 52-11-01 Main Entry Doors/Slides

Interval	Installed	Required	Procedure
A	10	9	(M) (O)

One may be inoperative for a maximum of 5 flights provided:

- a. The passenger number reduction and distribution policy, and cabin safety procedures are established and used,
- b. The affected emergency exit is closed and locked,
- c. A conspicuous barrier, strap or rope and a placard stating "DO NOT USE" are placed across the affected emergency exit prior to passenger boarding,
- d. The affected emergency exit is not used for passenger boarding, nor for any purpose whilst passengers are on board.

NOTE: If the affected emergency exit is operative mechanically, it may still be used for evacuation in the case of emergency.

- e. Visual indications (illuminated and non-illuminated) directing passengers to the affected emergency exit are obscured,
- f. All crew members are briefed on the location and condition of the affected emergency exit, passenger distribution and modified cabin safety procedures,
- g. The affected door and blocked seating layout are checked before each flight by the appropriate cabin crew member,
- h. The escape path to the affected emergency exit is checked by the appropriate cabin crew member to be unobstructed before each take-off and landing.

NOTE: A positioning flight with flight crew and cabin crew is permitted with more than one door slide unserviceable.

MAINTENANCE (M)

Configure the door, exit signs and seats as appropriate.

1. Each emergency exit sign or light identifying an unusable evacuation route (including floor proximity escape path marking system arrows) should be covered or otherwise blocked so that it is not visible.
2. Block the inoperative door with a conspicuous barrier strap or rope and placard INOPERATIVE.
3. Block unusable passenger seats with conspicuous tape or ropes and placard DO NOT OCCUPY.
4. If a slide/raft is removed from a door it must not be carried in the passenger cabin. Carriage in the cargo hold is permitted provided it is per Dangerous Goods Regulations (UN No.2990).

OPERATIONS (O)

1. Before operating with any door or slide inoperative, the Captain is to liaise with the SCCM and station staff to ensure that the following conditions are applied:
 - A. During taxi, take-off and landing, a cabin attendant is to be so positioned as to be able to direct passengers away from the inoperative door/slide as appropriate in an emergency.
 - B. Appropriate PA announcements are to be made prior to take-off and landing.
2. Refer to B747-400 Load & Balance Manual Section 1.4 for passenger load restrictions. Notify Flight Technical Dispatch (passenger load may be restricted).

52-11-02 Pressure Stop Fitting Assemblies (Main Entry Doors)

Interval	Installed	Required	Procedure
C	-	-	(M) (O)

One forward fitting assembly and/or one aft fitting assembly per door (with a total of 10 fittings per airplane) may be missing or inoperative provided:

- a. There are no visible defects on other fitting assemblies for the associated door(s).
 - b. Cabin altitude auto controller operates normally.
 - c. Maximum cabin differential pressure is limited to 5.2 psi.
-

MAINTENANCE (M)

NOTE: Each Main Entry Door Pressure Stop Fitting Assembly consists of a mating door-frame-mounted fitting (including an associated bearing plate) plus a door-mounted stop pin fitting (including an associated stop pin and a stop pin retainer).

Visually inspect remaining fitting assemblies on affected door(s) and door frames to ensure there are no defects.

OPERATIONS (O)

Airplane altitude is limited to 11,000 feet MSL.

52-11-03 Main Entry Door Hold-Open Latch**52-11-03B Passenger Operations**

Interval	Installed	Required	Procedure
B	-	0	

May be inoperative provided the associated door is considered inoperative.

MAINTENANCE NOTE

Refer to MEL item [TGL] 52-11-01 for Maintenance Procedures.

OPERATIONS NOTE

Refer to MEL item [TGL] 52-11-01 and B747-400 Load & Balance Manual Section 1.4.

52-11-03 Main Entry Door Hold-Open Latch**52-11-03-01 Latch Release Lever**

Interval	Installed	Required	Procedure
C	-	0	

52-21-01 Crew Compartment Overhead Hatch Latch Pins

Interval	Installed	Required	Procedure
C	4	4	

All must be installed.

52-23-01 Upper Deck Escape Door/Slide**52-23-01-01 Passenger/Combi****52-23-01-01A One Inoperative - Limited Passengers On Upper Deck**

Interval	Installed	Required	Procedure
C	2	1	(M) (O)

One may be inoperative, or a slide missing provided upper deck occupancy is limited to 24 passengers, with airplane capacity limited to 550 passengers total.

MAINTENANCE (M)

Cover associated exit signs and block associated doors.

1. Cover or block each exit sign identifying an unusable evacuation route (including floor proximity escape path marking system) so that it is not visible.
2. Block the inoperative door with a conspicuous barrier strap or rope and placard INOPERATIVE.
3. Block unusable passenger seats with conspicuous tape or ropes and placard DO NOT OCCUPY.
4. If a slide is removed from a door it must not be carried in the passenger cabin. Carriage in the cargo hold is permitted provided it is per Dangerous Goods Regulations (UN No.2990).

OPERATIONS (O)

1. Upper deck occupancy is limited to 24 passengers. (Refer to B747 Load & Balance Manual Section 1.4 for detail)
2. Before operating with any door or slide inoperative, the Captain is to liaise with the SCCM and station staff to ensure that the following conditions are applied:
 - A. During taxi, take-off and landing, a cabin attendant is to be so positioned as to be able to direct passengers away from the inoperative door/slide as appropriate in an emergency.
 - B. Appropriate PA announcements are to be made prior to take-off and landing.

52-23-01 Upper Deck Escape Door/Slide**52-23-01-01 Passenger/Combi****52-23-01-01B Both Inoperative - No Passengers On Upper Deck**

Interval	Installed	Required	Procedure
C	2	0	(M) (O)

May be inoperative or slide missing provided:

- a. Upper deck occupancy is limited to those flight crewmembers essential to the flight (including official observer in observer seats) during takeoff or landing.
 - b. Inertial escape reels are installed and operate normally for upper deck occupants.
-

MAINTENANCE (M)

Cover associated exit signs, block associated doors and passenger access to upper deck.

1. Cover or block each exit sign identifying an unusable evacuation route (including floor proximity escape path marking system) so that it is not visible.
2. Block inoperative door/slide using a conspicuous barrier strap or rope and placard INOPERATIVE.
3. Block passenger access to upper deck with conspicuous barrier strap or rope and placard NO PASSENGER ACCESS.
4. If a slide is removed from a door it must not be carried in the passenger cabin. Carriage in the cargo hold is permitted provided it is per Dangerous Goods Regulations (UN No.2990).

OPERATIONS (O)

Before operating with any door or slide inoperative, the Captain is to liaise with the SCCM and station staff to ensure that the following conditions are applied:

1. During taxi, take-off and landing, a cabin attendant is to be so positioned as to be able to direct passengers away from the inoperative door/slide as appropriate in an emergency.
2. Appropriate PA announcements are to be made prior to take-off and landing.

**52-23-02 Upper Deck Type "A" Emergency Exit Door
Actuator(s)**

Interval	Installed	Required	Procedure
C	2	0	

Electrical operation feature of doors may be inoperative.

52-23-03 DOOR U/D Flight Lock Actuators

52-23-03-01 Passenger / Combi

Interval	Installed	Required	Procedure
C	2	0	(M) (O)

May be inoperative or missing provided:

- a. Each upper deck Type "A" door is verified to be capable of being unlatched before each departure, and
- b. Cabin attendant(s) monitors the door handle(s) when cabin differential pressure is less than 3.0 psi.

MAINTENANCE (M)

Verify the upper deck type A door is capable of being unlatched.

1. If desired, remove the affected flight lock actuator.
 - A. For RH door, open and collar the P180 panel RH UPR DK DR FLT LOCK circuit breaker.
 - B. For LH door, open and collar the P180 panel LH UPR DK DR FLT LOCK circuit breaker.
 - C. Disconnect, cap and stow flight lock electrical connector.
 - D. Remove the flight lock actuator (AMM 52-23-08/401)
2. Position door mode selector lever to Manual.
3. Rotate inside handle open. Door will translate upward approximately 2 inches.
4. Rotate inside handle to latched position.

OPERATIONS (O)

1. Designate one cabin attendant to monitor each door handle when the cabin differential pressure is below 3.0 psi.
2. Inform the designated cabin attendant when the differential pressure is below 3.0 psi.
3. The Ground Mode light may remain illuminated and EICAS DOOR U/D FLT LOCK caution and status messages may remain displayed.

52-23-04 DOOR U/D GND MODE Lights (Above Door)

52-23-04-01 Passenger / Combi**52-23-04-01A DOOR U/D FLT LK Message Operative**

Interval	Installed	Required	Procedure
C	2	0	(M)

May be inoperative provided:

- Each upper deck Type "A" door is verified to be capable of being unlatched before each departure.
- DOOR U/D FLT LK message operates normally.

MAINTENANCE (M)

Verify the upper deck type A door is capable of being unlatched and ensure the DOOR U/D FLT LK message operates normally.

- Verify the upper deck type A door is capable of being unlatched.
 - Place the Mode Selector Lever in the MANUAL position.

CAUTION: DO NOT RAISE INSIDE DOOR HANDLE WHEN DOOR IS IN AUTOMATIC MODE. DOOR WILL OPEN RAPIDLY AND SLIDE WILL DEPLOY.

- Rotate the inside handle to the open position. Door should translate upward approximately 2 inches.
 - Rotate the inside handle downward to the latched position.
- Ensure the DOOR U/D FLT LK caution message operates normally.
 - Energize all 28 V DC Buses.
 - Remove the flight lock actuator access panel (10-inch square access panels located in the door upper lining, left of the inside handle)
 - Rotate the flight lock lever arm until it comes in contact with the inside handle shaft and verify the message DOOR U/D FLT LK appears on EICAS.
 - Release the flight lock lever arm and verify that the EICAS message DOOR U/D FLT LK is not displayed.
 - Put the air/ground relay system in the air mode (AMM 32-09-02/201).
 - Open LH UPR DK DR FLT LK circuit breaker on the P180 DC Power Distribution Panel.
 - Confirm the message DOOR U/D FLT LK appears on EICAS.
 - Close P180 Panel LH UPR DK DR FLT LK circuit breaker.
 - Confirm the EICAS message DOOR U/D FLT LK is extinguished.
 - Open P180 Panel RH UPR DK DR FLT LK circuit breaker.
 - Confirm the EICAS message DOOR U/D FLT LK appears on EICAS.

- L. Close P180 Panel RH UPR DK DR FLT LK circuit breaker.
 - M. Confirm the EICAS message DOOR U/D FLT LK is extinguished.
 - N. Put the air/ground relay system back to the ground mode (AMM 32-09-02/2011).
 - O. Restore the flight lock actuator access panel.

52-23-04 DOOR U/D GND MODE Lights (Above Door)

52-23-04-01 Passenger / Combi

52-23-04-01B Cabin Attendant Monitors Door Handle

Interval	Installed	Required	Procedure
C	2	0	(M) (O)

May be inoperative provided:

- a. Each upper deck Type "A" door is verified to be capable of being unlatched before each departure.
 - b. Cabin attendant(s) monitors the door handle(s) when cabin differential pressure is less than 3.0 psi.

MAINTENANCE (M)

Verify the upper deck type A door is capable of being unlatched.

1. Place the Mode Selector Lever in the MANUAL position.

CAUTION: DO NOT RAISE INSIDE DOOR HANDLE WHEN DOOR IS IN AUTOMATIC MODE. DOOR WILL OPEN RAPIDLY AND SLIDE WILL DEPLOY.

2. Rotate the inside handle to the open position. Door should translate upward approximately 2 inches.
 3. Rotate the inside handle downward to the latched position.

OPERATIONS (O)

1. Designate one cabin attendant to monitor the handle for each affected door when the cabin differential pressure is below 3.0 psi.
 2. The Flight Deck Crew must inform the designated cabin attendant(s) when the differential pressure is below 3.0 psi.

52-23-05 Pressure Stop Fitting Assemblies (Upper Deck Door(s))

52-23-05-01 Passenger / Combi

52-23-05-01A Pressurized Flight With Restrictions

Interval	Installed	Required	Procedure
C	-	-	(M) (O)

One forward fitting assembly and/or one aft fitting assembly per door may be missing or inoperative provided:

- a. There are no visible defects on remaining fitting assemblies for associated door(s).
- b. Cabin altitude auto controller operates normally.
- c. Maximum cabin pressure differential is limited to 3.0 psi.

MAINTENANCE (M)

NOTE: Each Upper Deck Door Pressure Stop Fitting Assembly consists of a mating door-frame-mounted fitting (including an associated bearing plate) plus a door-mounted stop pin fitting (including an associated stop pin and a stop pin retainer).

Visually inspect remaining fitting assemblies on affected doors and door frames to ensure there are no defects.

OPERATIONS (O)

In Automatic Cabin Altitude control, limit aircraft altitude to 7,000 feet MSL.

52-23-05 Pressure Stop Fitting Assemblies (Upper Deck Door(s))

52-23-05-01 Passenger / Combi

52-23-05-01B Unpressurized Flight

Interval	Installed	Required	Procedure
C	-	-	(M) (O)

One forward fitting assembly and/or one aft fitting assembly per door may be missing or inoperative in unpressurized configuration.

MAINTENANCE (M)

Configure the airplane for unpressurized flight. .

1. Use DDG item 21-31-01B (M).

OPERATIONS (O)

Conduct the flight unpressurized using DDG Item 21-31-01B (O) procedure.

52-23-06 Door U/D FLT LK Indication

52-23-06-01 Passenger / Combi**52-23-06-01A DOOR U/D GND MODE Lights Operative**

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided:

- a. Each upper deck Type "A" door is verified to be capable of being unlatched before each departure.
- b. DOOR U/D GND MODE lights above each upper deck type "A" door operates normally.

MAINTENANCE (M)

Verify both upper deck type A doors are capable of being unlatched and confirm both DOOR U/D GND MODE lights operate normally.

1. Verify both upper deck type A doors are capable of being unlatched.
 - A. Position door mode selector lever to MANUAL.

**CAUTION: DO NOT RAISE INSIDE DOOR HANDLE WHEN
DOOR IS IN AUTOMATIC MODE. DOOR WILL
OPEN RAPIDLY AND SLIDE WILL DEPLOY.**

- B. Rotate the inside handle open. Door should translate upward approximately 2 inches.
 - C. Rotate the inside handle downward to latched position.
2. Ensure both DOOR U/D GND MODE lights operate normally.
 - A. Energize all 28 V DC Buses.
 - B. Remove the flight lock actuator access panel (10-inch square access panel located in the door upper lining, left of the inside handle).
 - C. Rotate the flight lock lever arm until it comes in contact with the inside handle shaft and verify the DOOR U/D GND MODE light is extinguished.
 - D. Release the flight lock lever arm and confirm the DOOR U/D GND MODE light is illuminated.
 - E. Put the air/ground relay system in the air mode (AMM 32-09-02/201).
 - F. Open P180 Panel LH UPR DK DR FLT LOCK circuit breaker.
 - G. Confirm the DOOR U/D GND MODE light above the left hand door is illuminated.
 - H. Close the P180 Panel LH UPR DK DR FLT lock circuit breaker.
 - I. Confirm the DOOR U/D GND MODE light above the left hand door is extinguished.

- J. Open the P180 Panel RH UPR DK DR FLT LK circuit breaker.
- K. Confirm the DOOR U/D GND MODE light above the right hand door is illuminated.
- L. Close the P180 Panel RH UPR DK DR FLT LK circuit breaker.
- M. Confirm the DOOR U/D GND MODE light above the right hand door is extinguished.
- N. Put the air/ground relay system back to the ground mode (AMM 32-09-02/2011).
- O. Restore the flight lock actuator access panel.

52-23-06 Door U/D FLT LK Indication*********52-23-06-01 Passenger / Combi****52-23-06-01B Cabin Attendant Monitors Door Handle**

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative provided:

- a. Each upper deck Type "A" door is verified to be capable of being unlatched before each departure.
 - b. Cabin attendant(s) monitors the door handle(s) when cabin differential pressure is less than 3.0 psi.
-

MAINTENANCE (M)

Verify both upper deck type A doors are capable of being unlatched.

- 1. Position the mode selector lever to MANUAL.

CAUTION: **DO NOT RAISE INSIDE DOOR HANDLE WHEN DOOR IS IN AUTOMATIC MODE. DOOR WILL OPEN RAPIDLY AND SLIDE WILL DEPLOY.**

- 2. Rotate the inside handle open. Door should translate upward approximately 2 inches.
- 3. Rotate the inside handle downward to latched position.

OPERATIONS (O)

- 1. Designate one cabin attendant to monitor each affected door handle when the cabin differential pressure is below 3.0 psi.
- 2. Inform the designated cabin attendants when the differential pressure is below 3.0 psi.

52-23-07 Upper Deck Door Battery OK Lights

Interval	Installed	Required	Procedure
C	2	1	(M)

One press-to-test system may be inoperative provided associated system is verified to be adequately charged once each flight day.

MAINTENANCE (M)

Verify associated system is adequately charged once each flight day.

1. Depress and hold operational BATTERY OK lighted switch on door annunciation module above door. Confirm the light illuminates after a delay of approximately 2 seconds and extinguishes when switch is released.
2. Gain access to the batteries.
3. Remove batteries from M7037 and M7038 receptacles (AMM 52-23-14).
4. Install M7037 battery in M7038 receptacle and M7038 battery in M7037 receptacle.
5. Depress and hold operational BATTERY OK lighted switch on door annunciation module above door. Confirm the light illuminates after a delay of approximately 2 seconds and extinguishes when switch is released.
6. Close the opened access panels.

52-32-04 Cargo Door Lift Systems (Main Lower Lobe Cargo Doors)

Interval	Installed	Required	Procedure
B	-	0	(M)

May be inoperative provided:

- a. There is no damage to the latch mechanism.
 - b. There is no damage to the master latch lock mechanism.
 - c. Associated door is opened, closed and locked using an accepted maintenance manual procedure.
 - d. All latch cams are visually confirmed to be in the closed position.
-

MAINTENANCE (M)

Confirm there is no damage to the latch or the master latch lock mechanisms and use the AMM procedure to open, close and lock the door.

1. Visually check the associated cargo door to ensure that there is no damage to the latch or the master latch lock mechanisms.
2. The door must be locked and unlocked using the exterior master latch lock handle.
3. The door must be locked and latched for dispatch.
4. For access to affected cargo compartment, open, close, latch and lock the associated lower lobe cargo door using AMM procedure (AMM 52-34-00).

52-32-05 Cargo Door Hook Systems (Main Lower Lobe Cargo Doors) (Electrical Function)

Interval	Installed	Required	Procedure
C	-	0	(M)

May be inoperative provided:

- a. Manual function operates normally.
 - b. There is no damage to the hook mechanism.
 - c. Doors are closed and locked using an accepted maintenance manual procedure.
 - d. All latch cams are visually confirmed to be in the closed position.
-

MAINTENANCE (M)

Confirm there is no damage to the hook mechanism and use the appropriate AMM procedure to close and lock the door.

1. Visually check the associated cargo door to ensure that there is no damage to the hook mechanism.
2. For Lower Lobe Cargo Door, close, latch and lock the door using the appropriate AMM procedure (AMM 52-34-00).

52-34-01 Main Lower Lobe Cargo Doors

Interval	Installed	Required	Procedure
C	2	2	

Must be operative.

NOTE: Relief only permissible under MEL item 52-32-04, 52-32-05 and
52-34-02.

**52-34-02 Main Lower Lobe Cargo Door Latch Systems
(Electrical Function)**

Interval	Installed	Required	Procedure
C	2	0	(M)

May be inoperative provided:

- a. Manual function operates normally.
 - b. There is no damage to the latch mechanism.
 - c. There is no damage to the master latch lock mechanism.
 - d. Doors are closed and locked using an accepted maintenance manual procedure.
 - e. All latch cams on lower sill are confirmed to be in the closed position.
-

MAINTENANCE (M)

Inspect latch mechanism and master latch lock mechanism for damage and use the appropriate AMM procedure to close and lock the door.

1. Visually inspect latch mechanism and master latch mechanism. Confirm no damage exists
2. Close, latch and lock the door using the appropriate AMM procedure (AMM 52-34-00).

52-36-01 Bulk Cargo Door Balance Mechanism

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided a safety hold open device is used when door is in OPEN position.

MAINTENANCE (M)

Ensure the door latch support clip at the door's lower edge engages a latch in the compartment ceiling when the door is in the open position.

52-36-02 Bulk Cargo Door Pressure Stop Fitting Assemblies

Interval	Installed	Required	Procedure
C	-	-	(M) (O)

One forward fitting assembly or one aft fitting assembly may be missing or inoperative provided:

- a. There are no visible defects on remaining fitting assemblies for associated door.
 - b. Cabin altitude auto controller operates normally.
 - c. Maximum cabin pressure differential is limited to 5.2 psi.
-

MAINTENANCE (M)

NOTE: Each Bulk Cargo Door Pressure Stop Fitting Assembly consists of a mating door-frame-mounted fitting (including an associated bearing plate) plus a door-mounted stop pin fitting (including an associated stop pin and a stop pin retainer).

Visually inspect remaining fitting assemblies on affected door(s) and door frames to ensure there are no defects.

OPERATIONS (O)

Airplane altitude is limited to 11,000 feet MSL.

52-48-01 Main (Forward) Electronic Bay Access Door Latch Pins**52-48-01A Door Operates Normally**

Interval	Installed	Required	Procedure
C	4	3	(M)

One may be damaged or removed provided door operates normally.

MAINTENANCE (M)

NOTE: With a missing latch pin with the extend stop collar, be careful not to over-rotate the door handle when securing the door closed. When closing the door, do not rotate the outside handle past the hatch skin cutout or the interior handle past the closed guide markings.

If required, remove the damaged latch pin.

1. Remove the door (AMM 52-48-03/401).
2. Remove the damaged latch pin assembly using the appropriate steps in 747 Overhaul Manual, Electronics Access Door Assembly, 52-48-21.
3. Replace the latch pin assembly with washers the same diameter as the adjacent washers and the same total thickness as the rack gear on the latch pin assembly.
4. Reassemble door mechanism using the appropriate steps in 747 Overhaul Manual, Electronics Access Door Assembly, 52-48-21.
5. Reinstall the door (AMM 52-48-03/403).

52-48-01 Main (Forward) Electronic Bay Access Door Latch Pins**52-48-01B Door Does Not Operate Normally**

Interval	Installed	Required	Procedure
C	4	3	(M)

One may be inoperative provided:

- a. Integrity of remaining pins is verified.
 - b. Remaining pins are verified to be fully engaged.
 - c. Verification procedures are repeated each time the door is opened and closed.
-

MAINTENANCE (M)

Verify the remaining latch pins have no damage and are fully engaged each time door is opened and closed.

1. Confirm integrity of the access door remaining latch pins from inside the airplane Main Electronic Bay.
 - A. Remove the internal handle and door liner.
 - B. Visually confirm the integrity of the three remaining latch pins.
 - C. Replace the door liner and internal handle.
 - D. Confirm that the door handle is in the latched position.
 - E. Visually confirm the three remaining latch pins are fully engaged with their respective keeper fittings.
2. Each time the access door is opened and then closed, confirm the remaining latch pins are fully engaged.
 - A. Confirm the exterior operating handle is stowed flush with the door and is secured in the latched position by the handle latch.
 - B. Confirm the door is flush with the fuselage skin.
 - C. Confirm the door is latched by pushing inward on the door and confirm it does not move.

[TGL] 52-51-02 Lockable Flight Deck Door Automatic Locking System

Interval	Installed	Required	Procedure
A	1	0	(M) (O)

May be inoperative provided:

- a. Automatic locking system is deactivated.
- b. Door dead bolt operates normally and is used to lock the door.
- c. Alternate procedures are established and used for locking and unlocking the door using the dead bolt.
- d. Repairs are made within two flight days.

MAINTENANCE (M)

Deactivate the automatic locking system.

1. Position Flight Deck Access System switch OFF (guard extended)

NOTE: LOCK FAIL light will remain illuminated when the Flight Deck Access System switch is in the OFF position (guard extended).

OPERATIONS (O)

Use the door internal dead bolt. The 'Ground Use Only' placard may be disregarded.

[TGL] 52-51-02 Lockable Flight Deck Door Automatic Locking System

52-51-02-01 Flight Deck Access Panel System (Keypad, Door Chime)

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative provided:

- a. Keypad is deactivated.
- b. The automatic lock controls are verified to operate normally.
- c. Alternate procedures are established and used.

MAINTENANCE (M)

1. Deactivate the keypad.
 - A. Open the circuit breaker for the flight deck door lock.
 - B. Remove the keypad.

- C. Disconnect the electrical connector from the keypad.
- D. Install the keypad.
- E. Close the circuit breaker for the flight deck door lock.

NOTE: Ensure the Flight Deck Access System switch is in the OFF position (guard extended) when flight deck door is closed and the flight deck not occupied.

2. Verify Automatic Lock Controls are Operating Normally
 - A. With the flight deck door open, supply electrical power on the aircraft (AMM 24-22-00/201).
 - B. Position Chime Module switch NORM (guard closed).
 - C. Position the Door Lock Control Selector AUTO.
 - D. Verify the electric strike is in the locked position (solenoid pin in the electric strike will be extended up, such that the strike can not be rotated).
 - E. Enter keypad access code and verify the door chime sounds.
 - F. Position the Door Lock Control Selector DENY.
 - G. Before the DENY time delay has expired, enter the keypad access code and verify the door chime does not sound.
 - H. Position and hold Door Lock Control Selector UNLKD.
 - I. Verify the electric strike is in the unlocked position (solenoid pin in the electric strike will retract down, such that the strike can be rotated).
 - J. Position the Door Lock Control Selector to AUTO.
 - K. Verify the electric strike is in the locked position (solenoid pin in the electric strike will be extended up, such that the strike can not be rotated).

OPERATIONS (O)

Establish with cabin crew an alternate procedure for entry to the flight deck (e.g. a particular door knock signal).

NOTE: Ensure the Flight Deck Access System switch is in the OFF position (guard extended) when flight deck door is closed and the flight deck not occupied.

[TGL] 52-51-02 Lockable Flight Deck Door Automatic Locking System

52-51-02-01 Flight Deck Access Panel System (Keypad, Door Chime)

52-51-02-01-01 LEDs

Interval	Installed	Required	Procedure
C	-	0	(O)

May be inoperative provided alternate procedures are established and used.

OPERATIONS (O)

Establish with cabin crew an alternate procedure for entry to the flight deck.

[TGL] 52-51-02 Lockable Flight Deck Door Automatic Locking System

52-51-02-02 Flight Deck Door LOCK FAIL Light

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided automatic lock controls are verified to operate normally.

MAINTENANCE (M)

Verify the automatic lock controls operate normally.

1. With the flight deck door open, supply electrical power on the airplane (AMM 24-22-00/201).
2. Position Flight Deck Access System switch NORM (guard closed).
3. Position the Flight Deck Door Lock selector AUTO.
4. Verify the electric strike is in the locked position (solenoid pin in the electric strike will be extended up such that you can not rotate the strike).
5. Enter keypad access code and verify the door chime sounds.
6. Position the Flight Deck Door Lock selector DENY.
7. Before the DENY time delay has expired, enter the keypad access code and verify the door chime does not sound.
8. Position and hold Flight Deck Door Lock selector UNLKD.
9. Verify the electric strike is in the unlocked position (solenoid pin in the electric strike will retract down such that you can rotate the strike).
10. Position the Flight Deck Door Lock selector AUTO.
11. Verify the electric strike is in the locked position (solenoid pin in the electric strike will be extended up such that you can not rotate the strike).

[TGL] 52-51-02 Lockable Flight Deck Door Automatic Locking System

52-51-02-03 Flight Deck Door AUTO UNLK Light

Interval	Installed	Required	Procedure
C	1	0	(M)

May be inoperative provided:

- a. Automatic lock controls are verified to operate normally.
 - b. Door chime operates normally.
-

MAINTENANCE (M)

Verify the automatic lock controls operate normally.

1. With the flight deck door open, supply electrical power on the airplane (AMM 24-22-00/201).
2. Position Flight Deck Access System switch NORM (guard closed).
3. Position the Flight Deck Door Lock selector AUTO.
4. Verify the electric strike is in the locked position (solenoid pin in the electric strike will be extended up such that you can not rotate the strike).
5. Enter keypad access code and verify the door chime sounds.
6. Position the Flight Deck Door Lock selector DENY.
7. Before the DENY time delay has expired, enter the keypad access code and verify the door chime does not sound.
8. Position and hold Flight Deck Door Lock selector UNLKD.
9. Verify the electric strike is in the unlocked position (solenoid pin in the electric strike will retract down such that you can rotate the strike).
10. Position the Flight Deck Door Lock selector AUTO.
11. Verify the electric strike is in the locked position (solenoid pin in the electric strike will be extended up such that you can not rotate the strike).

[TGL] 52-51-02 Lockable Flight Deck Door Automatic Locking System

52-51-02-04 Flight Deck Door Lock Control Selector

Interval	Installed	Required	Procedure
B	1	0	(M) (O)

May be inoperative provided:

- a. Keypad is deactivated.
 - b. Automatic lock is verified to operate normally.
 - c. Alternate procedures are established and used.
-

MAINTENANCE (M)

Deactivate the keypad and verify the automatic lock operates normally.

1. Deactivate the keypad.
 - A. Open the circuit breaker for the flight deck door lock.
 - B. Remove the keypad.

- C. Disconnect the electrical connector from the keypad.
- D. Install the keypad.
- E. Close the circuit breaker for the flight deck door lock.

NOTE: Ensure the Flight Deck Access System switch is in the OFF position (guard extended) when flight deck door is closed and the flight deck not occupied.
- 2. Verify the automatic lock operates normally.
 - A. With the flight deck door open, supply electrical power on the airplane (AMM 24-22-00/201).
 - B. Position Flight Deck Access System switch NORM (guard closed).
 - C. Verify the electric strike is in the locked position (solenoid pin in the electric strike will be extended up such that you can not rotate the strike).
 - D. Position Flight Deck Access System switch OFF (guard extended).
 - E. Verify the electric strike is in the unlocked position (solenoid pin in the electric strike will retract down such that you can rotate the strike).
 - F. Position Flight Deck Access System switch NORM (guard closed).
 - G. Verify the electric strike is in the locked position (solenoid pin in the electric strike will be extended up such that you can not rotate the strike).

OPERATIONS (O)

Establish with cabin crew an alternate procedure for entry to the flight deck (e.g. a particular door knock signal).

NOTE: Ensure the Flight Deck Access System switch is in the OFF position (guard extended) when flight deck door is closed and the flight deck not occupied.

52-51-03**Lockable Flight Deck Door Dead Bolt**

Interval	Installed	Required	Procedure
C	1	0	

May be inoperative provided automatic lock controls operate normally.

52-51-06 Flight Deck Door Viewing Port

52-51-06B With Electronic Visual Surveillance System Installed

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided:

- a. A flight deck door visual surveillance system is installed and operates normally.
- b. Alternate procedures are established and used.

OPERATIONS (O)

Alternate procedures are established and used for ensuring the security of the area outside the flight crew compartment door. Flight Crew to decide alternate procedures for the flight with the Cabin Crew. This may include identifiable knock or similar.

52-73-01 Door Indication

Interval	Installed	Required	Procedure
C	1	0	(M) (O)

May be inoperative provided door(s) is verified closed and locked by an alternate procedure.

MAINTENANCE (M)

NOTE: Maintenance procedures are to be performed as the final closing of an affected door(s) prior to takeoff. The status of the affected door(s) should be communicated to the flight crew as appropriate.

Verify the affected door is closed and locked.

1. Main Entry and Upper Deck Doors:
 - A. Check that the door is flush with the fuselage skin.
 - B. Check that the exterior operating handle is stowed flush with the door.
 - C. Check that the interior operating handle is rotated to the fully latched (closed) position.
2. Crew Compartment Overhead Door (Hatch):
 - A. Open the door and check that the exterior handle is stowed flush with the door and is secured in the latched position by the handle latch.
 - B. Close and latch the door.
 - C. Ensure that the latch pins properly engage the keeper fittings on the body and that the arrow on the interior handle is aligned with the LOCKED arrow on the door lining.
3. Bulk Cargo Door:
 - A. Ensure the interior and exterior operating handles are working in phase by pulling the exterior handle from its recess in the door until it is fully extended. Restow the handle.
 - B. Check that the exterior operating handle is stowed flush with the door.
 - C. Check that the door is flush with the fuselage skin.
 - D. Check that the door is latched by pushing inward on the door and verify that it does not move.
4. Main/Center Electronics Equipment Access Door:
 - A. Ensure the interior and exterior operating handles are working in phase by pulling the exterior handle from its recess in the door until it is fully extended. Restow the handle.
 - B. Check that the exterior operating handle is stowed flush with the door and is secured in the latched position by the handle latch.
 - C. Check that the door is flush with the fuselage skin.



- D. Check that the door is latched by pushing inward on the door and verify that it does not move.
 5. Forward and Aft Lower Lobe Cargo Doors:
 - A. Close and latch door per normal procedure.
 - B. Check that the door is fully latched by observing, through the door's viewports, that the stripe on each rotary latch cam is aligned with the arrow on the adjacent latch pin fitting.
 - C. Observe that the pressure relief doors are open prior to closing the master latch lock handle. Observe the pressure relief doors closing while moving the master latch lock handle to the closed position.

NOTE: Do not force master latch lock handle closed - resistance or interference indicates latch cams may not be in fully latched position.
 - D. Check that the master latch lock handle and its trigger are stowed flush with the door and that the pressure relief doors are closed. The top of a fully closed pressure relief door is approximately one half inch inboard of the cargo door skin when the airplane is unpressurized.

OPERATIONS (O)

NOTE: Associated door indication may remain displayed.

52-73-01 **Door Indication**

52-73-01-01 Auto/Man EICAS Indications

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52-73-01-01A Required By Procedures

Interval	Installed	Required	Procedure
C	-	0	(O)

May be inoperative provided door(s) is verified in Auto or Man as appropriate by an alternate procedure.

OPERATIONS (O)

Verify that the door(s) is in Auto or Man as appropriate by checking the position of the door mode selector lever (main entry doors) or the door arm/disarm lever (upper deck doors).

NOTE: Associated door indication may remain displayed

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52-BA-01 MEC (Main Equipment Centre) Hatch Locking Tool

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative / missing provided that the MEC locking plate is verified as unlocked before each departure

OPERATIONS (O)

Ensure the MEC locking plate is unlocked before each departure.

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53-21-01 Floor Vents (Passenger Airplanes)

Interval	Installed	Required	Procedure
C	-	-	

Two in each zone may be open or missing.

53-21-02**Sidewall Vents (Passenger Airplanes)**

Interval	Installed	Required	Procedure
C	-	-	(M)

Two sidewall vents on each side of each zone may be open or missing provided the adjacent passenger seat is blocked from occupancy.

MAINTENANCE (M)

Block the passenger seat adjacent to the inoperative sidewall vent.

Apply tape or attach ropes of conspicuous, contrasting colors to affected seat(s).

**53-30-01 FUSELAGE ADJACENT TO MAIN STATIC VENTS/
PITOT/STATIC SYSTEMS**

Interval	Installed	Required	Procedure
-	-	-	(M) (O)

Damage to the fuselage in the area defined by B747-400 S.R.M. 51-10-03 must be assessed to ensure compliance with the restrictions for operation in RVSM airspace.

MAINTENANCE (M)

1. Assess the damage in accordance with B747-400 S.R.M. 51-10-03.
2. Inform Flight Technical Dispatch or Maintrol that the aircraft is unable to operate in RVSM airspace.

OPERATIONS (O)

Do not operate the aircraft in RVSM airspace. Liaise with Flight Technical Dispatch.

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73-21-01 Minimum Idle/Approach Idle Selection Systems
73-21-01-01 Ground Minimum Idle Selection Systems

Interval	Installed	Required	Procedure
C	4	0	(O)

May be inoperative provided:

- a. Antiskid operates normally.
 - b. Appropriate performance adjustments are applied.
-

OPERATIONS (O)

Reduce performance limited weights by the appropriate adjustments for each affected engine.

Request take-off performance from CARD using the Performance Correction Code for 'MIN IDLE SEL SYS INOP' shown in the Performance Manual. If CARD is not available contact FTD.

Takeoff	Landing
2,268 kg	6,803 kg

73-21-02 Electronic Engine Control Systems (EEC)**73-21-02-01 ENG_EEC Mode (PW and RR)**

Interval	Installed	Required	Procedure
C	4	3	(O)

One may be inoperative provided:

- a. All engines are operated in the alternate (ALTN) mode.
- b. Appropriate procedures, limitations and performance decrements are applied.

OPERATIONS (O)

1. Set all EEC Mode Switches to ALTN (even if switch has ALTN illuminated).
2. Anti-skid must be operative.
3. No ice, snow, slush or excessive water is present on the runway, such that, contaminated runway performance has to be used.
4. Press TO/GA to update the MAP prior to take-off. Thrust must be set manually as Auto Thrust is not available.
5. Use of Reduced Thrust by the Assumed Temperature method is prohibited. The FMC will calculate and display the correct EPR after engine start with any EEC in alternate (ALTN) mode.
6. Reduce the Maximum Rated Go-around EPR (TOGA) indicated on the FMC by 0.04.
7. Request take-off performance from CARD using Performance Correction Code shown in the Performance Manual using 'EEC system inop' correction (This correction reduces the TOPL and amends V speeds).

NOTE: Autothrottle is not available in ATLN mode refer to
MEL item 21-31-01.

8. For the destination, reduce the Climb Limited Landing Weight by 35,000 kg – see Performance Manual Landing section, for Generalised Landing Weight Graphs.

NOTE 1: Thrust setting at take-off is accomplished by manually setting thrust on the three engines with operative EPR indicators and matching the N1 values for the engine with the inoperative EPR to the resulting N1 from the serviceable engines.

NOTE 2: With inop EECs the following may be seen.

1. FMC V speeds will clear on engine start
2. No derated power settings are available for takeoff or climb
3. Magenta EPR indications will not function as normal

73-21-02 Electronic Engine Control Systems (EEC)**73-21-02-04 ENG_EEC C1 (RR)**

Interval	Installed	Required	Procedure
A	4	2	

Two may be inoperative with C1 faults provided repairs are made within maximum operating time interval of 150 hours (as per RR engine Type Data Sheet number E30NE note 17).

MAINTENANCE NOTE

NOTE 1: Engine Type Certificate Data Sheets specifically prohibit operation of any engine with control faults annunciated by the EICAS message >ENG _ CONTROL.

NOTE 2: ENG_EEC CAT 2 faults are annunciated for maintenance purposes only and are displayed only on the CMCs. Operation with EEC_CAT 2 faults is allowed by the Engine Type Certificate. MEL dispatch is not necessary with EEC_CAT 2 faults. For ENG_EEC CAT 2 faults found during routine Daily and Monthly Checks refer to the Check Instruction Sheet for dispatch and deferment criteria.

73-21-03 **Turbine Overspeed System (RR)**

Interval	Installed	Required	Procedure
C	4	0	

73-31-01 Fuel Flow Indications

Interval	Installed	Required	Procedure
B	4	3	

One may be inoperative provided:

- a. Fuel quantity indicating systems for tanks containing fuel operate normally.

For RR:

- b. Associated N1, N2, N3 and EPR indications operate normally.
-

OPERATIONS NOTE

1. The associated engine's Fuel Used indication, FMC Calculated Fuel Quantity, and Total Fuel Used indication on Progress Page 2/3 will be inoperative.
2. The Total Fuel indication on the primary EICAS and the FMC Totalizer Fuel Quantity on Progress Page 2/3 are not affected.
3. The estimated fuel remaining at waypoint or destination on Progress Page 1/3 and the FMC Gross Weight indication will be available and predicated on totalizer fuel quantity.
4. The FUEL DISAGREE advisory message will be inoperative.

73-34-01 Fuel Filter Bypass Warning Systems

Interval	Installed	Required	Procedure
C	4	3	(M)

One may be inoperative provided:

- a. It is verified that the malfunction is in the fuel filter bypass warning system.
 - b. Associated fuel filter is checked for the presence of contaminants before each departure.
-

MAINTENANCE (M)

Verify that the malfunction is in the alerting system and before each departure check the associated fuel filter for contamination.

1. Verify that the malfunction is in the associated fuel filter bypass warning system.
 - A. Remove and replace the fuel filter (AMM 73-11-02/401).
 - B. If status message ENG _ FUEL FILT remains displayed after system is restored to normal configuration and 70 seconds time has elapsed, the fuel filter bypass warning system is faulty.
2. Prior to each departure check the associated fuel filter for contaminants.

For RR:

- A. Confirm fuel drained from the filter plug is free of contaminants (AMM 73-11-02).

OPERATIONS NOTE

Associated advisory and status messages ENG _ FUEL FILT will remain displayed.

74-00-01 Ignition Systems

Interval	Installed	Required	Procedure
C	8	4	(O)

One per engine may be inoperative provided:

- a. Nacelle anti-ice system on the associated engine operates normally.
- b. Ignition Selector is positioned to ensure ignition to all engines.

For RR:

- c. No. 1 ignition system is verified to operate on at least two engines prior to each flight.
-

OPERATIONS (O)

For RR:

1. Position Autostart switch OFF.
2. Position Auto Ignition selector 1 for starting at least two engines.
3. After engine start, verify Standby Ignition selector NORM.
4. For Autostart installed, position Auto Ignition selector NORM.

For RR:

NOTE 1: If the Autostart system attempts a start using an inoperative Ignition system, the start attempt will automatically shutdown after 20 seconds. The ENG _ IGNITOR _ status message will display and the next Autostart attempt will automatically utilize both Ignition systems.

NOTE 2: On engines where No. 1 ignition system is not operating be aware that selecting Standby Ignition selector to NORM will mean no standby ignition to that engine. If standby ignition is required, it may be necessary to manually select standby ignition from NORM to the number 2 position.

74-00-02 Continuous Ignition Selection System**74-00-02-01 Flap Actuated**

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided continuous ignition is manually selected ON when required.

OPERATIONS (O)

Set Continuous Ignition switch ON when flaps are extended from the FLAPS UP position.

74-00-02 Continuous Ignition Selection System**74-00-02-02 Nacelle Anti-Ice Actuated**

Interval	Installed	Required	Procedure
C	4	0	(O)

May be inoperative provided continuous ignition is manually selected ON when required.

OPERATIONS (O)

Set Continuous Ignition switch ON prior to entering icing conditions.

74-00-02 Continuous Ignition Selection System**74-00-02-03 Switch Actuated**

Interval	Installed	Required	Procedure
C	1	0	(O)

May be inoperative provided standby ignition system is used to provide continuous ignition when required.

OPERATIONS (O)

For RR:

1. Position Standby Ignition switch 1 or 2 during operation in flight conditions specified in FCOM.

74-00-03 Auto Ignition (RR Autostart)

Interval	Installed	Required	Procedure
C	4	0	(O)

May be inoperative provided:

- a. Ignition Select Switch NORM position is placarded INOP and that position is not used.
- b. Continuous Ignition is ON when required.

MAINTENANCE NOTE

Placard ignition select switch NORM position INOP.

NOTE: With the Ignition Select Switch in the NORM position both ignitors automatically energise if an excessive rate of change of N3 deceleration is detected or N3 drops below commanded idle. (monitored and controlled individually by each engine's EEC). If the EICAS Status Message AUTO IGNITION _ is displayed, the associated engine's Autoignition system is inoperative.

OPERATIONS (O)

1. Set and maintain AUTO IGNITION Selector to 1, 2 or BOTH.
2. Set Continuous Ignition ON for take-off and landing, operation in heavy rain, severe turbulence or volcanic dust, upon entering icing conditions or when standing water or slush exists on the runway.

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75-33-01 IDG Air/Oil Cooler (AOC) Valves**75-33-01-03 RR**

Interval	Installed	Required	Procedure
C	4	0	(M)

May be inoperative provided:

- a. Valves are inoperative open.
 - b. Appropriate performance adjustments are applied.
-

MAINTENANCE (M)

Deactivate the IDG Air/Oil Cooler Valve Open as follows:

1. Open the associated P180 panel 180J6 ENG 1 & 2 IDG VALVE or 180F6 ENG 3 & 4 IDG VALVE circuit breaker.
2. Open the right hinged cowl (AMM 71-11-02/201).
3. Verify the IDG Oil Cooler valve is in the open position by viewing vanes and shaft through the outlet duct (use flashlight if required) (AMM 24-11-07/401, Figure 401).
 - A. If the valve is closed, dispatch is not allowed.
 - B. If the shaft has failed, ensure that the lower section of the shaft complete with vane is still well supported in two locations. If this is not the case, dispatch is not allowed.
4. Deactivate the actuator solenoid.
 - A. Disconnect the IDG Oil Temp Switch by removing connector tag D14449D from the receptacle in tube (P/N UL26001).
 - B. Cap and stow the wiring harness, the open ends of connector and the receptacle.
5. Close the right hinged cowl (AMM 71-11-02/201).
6. Close the opened P180 panel circuit breaker.

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77-11-01 Engine Pressure Ratio Indicating Systems (PW and RR)

Interval	Installed	Required	Procedure
C	4	3	(O)

One may be inoperative provided:

- a. All EECs are switched to ALTN mode.
- b. Appropriate procedures, limitations, and performance decrements are applied.

For RR:

- c. N1, N2, N3 and Fuel Flow indication on associated engine operate normally.
-

OPERATIONS (O)

Use DDG item 73-21-02-01 (O) procedure.

77-12-01 N2 Tachometer Systems (RR)

Interval	Installed	Required	Procedure
B	4	3	

One may be inoperative provided remaining engine indicating systems operate normally.

77-12-02 Engine Speed Cards

Interval	Installed	Required	Procedure
C	4	3	(O)

One card may be inoperative provided:

- a. Associated engine is started last.

For RR:

- b. Associated start switch is manually canceled when N3 reaches 50%.
 - c. CMC BITE tests for ATA 21 systems are not initiated after engine start.
-

OPERATIONS (O)

1. The EEC ALTN Mode switch light for the associated engine may not operate normally.
2. The associated engine must be started last.

For RR:

3. Start the associated engine using the Manual Start Supplementary Procedure and the following:
 - A. If required, hold the START switch in the start position until N3 reaches 50%.
 - B. When N3 reaches 50%, set START switch to the off position.

77-12-03 N3 Tachometer Generator (RR)

Interval	Installed	Required	Procedure
C	4	3	(O)

One may be inoperative provided:

- a. Associated Vibration Indicating System is considered inoperative.
 - b. Associated Engine Speed Card is considered inoperative.
-

NOTE: The airplane must also be dispatched using MEL item 77-12-02 and 77-31-01.

OPERATIONS (O)

Associated N3 indication will not display until engine reaches approximately 8%.

77-22-01 Engine Turbine Overheat Detector Loops (RR)

Interval	Installed	Required	Procedure
C	8	4	

One loop per engine may be inoperative.

77-31-01 Vibration Indicating Systems

Interval	Installed	Required	Procedure
C	4	3	

May be inoperative unless required by a maintenance program.

78-31-01 **Thrust Reverser Systems (such as, but not limited to engine reverse hydraulic isolation valves, thrust reverser air system, and REV unlock indications)**

78-31-01A **One Inoperative**

Interval	Installed	Required	Procedure
C	4	3	(M) (O)

One may be inoperative provided:

- a. Associated reverser is deactivated and secured in the forward thrust position,
- b. On associated engine, both T/R Control and T/R Indication circuit breakers are opened and collared,
- c. Operating procedures appropriate to the various configurations of inoperative reverser(s) are devised,
- d. Appropriate performance decrements are applied.

MAINTENANCE (M)

Deactivate and secure associated reverser in the forward thrust position.

WARNING: **DEACTIVATION OF THE THRUST REVERSER SYSTEM WILL BE PROPERLY ACCOMPLISHED WHEN ALL STEPS SHOWN IN THESE PROCEDURES ARE FOLLOWED. DEVIATIONS TO THESE PROCEDURES, OR CHANGING THE SYSTEM CONFIGURATION, MAY RESULT IN IMPROPER DEACTIVATION AND UNCOMMENDED DEPLOYMENT OF THE REVERSER.**

1. Open these circuit breakers and install safety locks for the applicable engine:

Main Power Distribution Panel, P6

Row	Col	Number	Name
C	12	C00404	T/R IND ENG 4
C	13	C01441	T/R CONT ENG 4
D	12	C00403	T/R IND ENG 3
D	13	C01442	T/R CONT ENG 3
E	12	C00402	T/R IND ENG 2
E	13	C01704	T/R CONT ENG 2
F	12	C00405	T/R IND ENG 1
F	13	C01703	T/R CONT ENG 1
G	14	C10448	ENG 1 START/IGN CONT

Row	Col	Number	Name
G	15	C10449	ENG 2 START/IGN CONT
G	16	C10450	ENG 3 START/IGN CONT
G	17	C10451	ENG 4 START/IGN CONT

2. Open the right hinged cowl for access (Ref AMM 71-11-02/201).
3. Remove the in-flight lock bars from the stowage bracket near the IDG cooler.
4. Close the right hinged cowl (Ref AMM 71-11-02/201).
5. Install the in-flight lock bars through the translating cowl and into the manual cycle and lockout shaft in the lower left gearbox (position No. 3) and the lower right gearbox (position No. 2). Install the bolts at each position.
6. Install the INA access platform (RR tool CP30784) in cold stream duct, the access stools (RR tool CP30785) on the access platform, and the protection pads (RR tool CP30769) to the exhaust mixer duct.
7. Open the air motor pressure relief access panel (Ref AMM 72-03-00/401).
8. Pull the air motor brake release handle forward and then turn 90 degrees to keep the handle in its position.
9. Move the manual override to the CLOSED position. This is done by turning the manual override switch 90 degrees clockwise. At the correct position you will feel a latch (detent) engage, the switch lever you turn will go into a recess in the switch body.
10. Loosen the bolts and remove the lock bars from the lower left gearbox (position No. 3) and the lower right gearbox (position No. 2).
11. Try to manually move the translating cowl forward (Ref. AMM 78-30-00/501). Make sure the translating cowl is against the forward hard stop.
12. Verify that the thrust reverser position feedback sensors are properly installed and rigged. Perform a physical check of the TRCP position indication on the EICAS EPSC page to be certain it is within limits (AMM 78-30-00/501).
13. Manually lock the number two and number three gearboxes and ensure the unlock indication probes are not protruded (Ref. AMM Figure 201/78-30-01-990-801-D00).
14. Install the in-flight lock bars through the translating cowl and into the manual cycle and lockout shaft in the lower left gearbox (position No. 3) and the lower right gearbox (position No. 2). Install the bolts at each position.
15. Turn the manual brake release handle 90 degrees and release the handle to apply the air motor brake.
16. Close the air motor pressure relief panel (Ref AMM 72-03-00/401).

17. Remove the INA access platform, access stools, and protection pads from the exhaust mixer duct.
18. For the applicable engine; close these circuit breakers and remove the DO-NOT-CLOSE tags:

Main Power Distribution Panel, P6

Row	Col	Number	Name
G	14	C10448	ENG 1 START/IGN CONT
G	15	C10449	ENG 2 START/IGN CONT
G	16	C10450	ENG 3 START/IGN CONT
G	17	C10451	ENG 4 START/IGN CONT

The following circuit breakers for the applicable engine will remain open and collared:

Main Power Distribution Panel, P6

Row	Col	Number	Name
C	12	C00404	T/R IND ENG 4
C	13	C01441	T/R CONT ENG 4
D	12	C00403	T/R IND ENG 3
D	13	C01442	T/R CONT ENG 3
E	12	C00402	T/R IND ENG 2
E	13	C01704	T/R CONT ENG 2
F	12	C00405	T/R IND ENG 1
F	13	C01703	T/R CONT ENG 1

19. Install an INOP tag on the applicable reverse thrust lever.
20. Put a placard on the primary EICAS display – “ENG_REV INOP”.

OPERATIONS (O)

1. The REV amber indication and ENG _ REVERSER message may be displayed for the deactivated reverser.
2. Use symmetrical reverse as required. (If reverse idle only used then all thrust levers may be brought to reverse idle position.)

Performance Information

1. Take-off with two thrust reversers inop is permitted provided: – No ice, snow, slush or excessive water is present on the runway, such that contaminated runway performance has to be used.
2. Take-off from a dry runway:
 - A. Normal performance criteria apply.
 - B. Reduced thrust may be used.

3. Take-off from a wet runway:

- A. The antiskid and wheel brake system must be fully serviceable (excludes Torque Limiter and Autobrake).
- B. Reduced thrust may be used.
- C. Request take-off performance from CARD using Performance Correction Code for 'Thrust Reverser Inoperative' shown in the Performance Manual.

NOTE: If the resulting V1 is less than VMCG take-off is permitted provided V1 is set equal to VMCG and the ASDA exceeds 2440 m.

4. Landing:

- A. When landing with Thrust Reverser inoperative no further corrections to the Obtainable Landing Weight or Tailwind Landing Data Summaries are required.
- B. When using Generalised Landing Charts, Performance Manual Pt. 1, Section 1.1, to obtain a Regulated Landing Weight, use the correction shown on chart if operating with one reverser inoperative.

78-31-01 Thrust Reverser Systems (such as, but not limited to engine reverse hydraulic isolation valves, thrust reverser air system, and REV unlock indications)

78-31-01B Two Inoperative

Interval	Installed	Required	Procedure
A	4	2	(M) (O)

Two may be inoperative provided:

- a. Inoperative thrust reversers are on symmetrical engines only,
- b. Associated reversers are deactivated and secured in the forward thrust position,
- c. On associated engine, both T/R Control and T/R Indication circuit breakers are opened and collared,
- d. Anti-skid and auto spoiler systems operate normally,
- e. Operating procedures appropriate to various configurations of inoperative reverser(s) are devised,
- f. Repairs are made within three flight days.

MAINTENANCE (M)

NOTE: Dispatch with 2 brakes deactivated or with 2 anti-skid channels inop is allowed. However, with two inoperative thrust reversers, dispatch with the entire antiskid system inoperative is not allowed.

Deactivate the inoperative reversers using the appropriate DDG item 78-31-01A (M) procedure.

OPERATIONS (O)

NOTE: Dispatch with 2 brakes deactivated or with 2 anti-skid channels inop is allowed. However, with two inoperative thrust reversers, dispatch with the entire antiskid system inoperative is not allowed.

1. The REV amber indication and ENG _ REVERSER message may be displayed for the deactivated reversers.

Performance Information

1. Take-off with two thrust reversers inop is permitted provided: – No ice, snow, slush or excessive water is present on the runway, such that contaminated runway performance has to be used.

2. Take-off from a dry runway:

- A. Normal performance criteria apply.
- B. Reduced thrust may be used.

3. Take-off from a wet runway:

- A. The antiskid and wheel brake system must be fully serviceable (excludes Torque Limiter and Autobrake).
- B. Reduced thrust may be used.
- C. Request take-off performance from CARD using Performance Correction Code for 'Thrust Reverser Inoperative' shown in the Performance Manual.

NOTE: If the resulting V1 is less than VMCG take-off is permitted provided V1 is set equal to VMCG and the ASDA exceeds 2440 m.

4. Landing:

- A. When landing with Thrust Reverser inoperative no further corrections to the Obtainable Landing Weight or Tailwind Landing Data Summaries are required.
- B. When using Generalised Landing Charts, Performance Manual Pt. 1, Section 1.1, to obtain a Regulated Landing Weight, use the correction shown on chart if operating with one reverser inoperative.

78-34-01 Engine Reverse Lever Interlock**78-34-01A Interlock Extended**

Interval	Installed	Required	Procedure
C	4	3	(O)

One may be inoperative extended.

OPERATIONS (O)

For interlock inoperative extended (released), there will be no physical stop for that reverse thrust lever when it is pulled up to the interlock position. The EEC will not allow the engine reverse thrust to increase above idle until the thrust reverser sleeves are sufficiently deployed.

When using reverse thrust, pull all reverse levers up to the normal interlock position and apply reverse thrust as required when the operative interlocks release.

78-34-01 Engine Reverse Lever Interlock**78-34-01B Interlock Retracted**

Interval	Installed	Required	Procedure
C	4	3	(O)

One may be inoperative retracted provided:

- a. Performance decrements for inoperative reversers are applied,
- b. Operating procedures appropriate to the various configurations of inoperative reverser(s) are devised.

NOTE: Associated reverse thrust is limited to idle when the reverser interlock is inoperative retracted.

OPERATIONS (O)

1. For interlock inoperative retracted, it will not be possible to move the reverse thrust lever beyond reverse idle, even when the reverser sleeves are fully deployed. When using reverse thrust, pull all reverse levers up to the interlock position. When the reverse interlocks release, apply symmetrical reverse thrust as needed for stopping requirements.
2. Refer to MEL item 78-31-01 Operations (O) procedures for Performance Information.

78-36-01 Reverser Position Sensing System**78-36-01A One Inoperative**

Interval	Installed	Required	Procedure
C	4	3	(M) (O)

One may be inoperative provided:

- a. Associated reverser is considered inoperative, refer to MEL item 78-31-01.
- b. Associated reverser is secured in the forward thrust position.
- c. On associated engine, both T/R Control and T/R Indication circuit breakers are opened and collared.

MAINTENANCE (M)

Deactivate and secure the associated reverser in the forward position.

1. Use DDG item 78-31-01A (M) procedure to deactivate and secure the associated reverser in the forward position.

For RR:

2. Confirm the two Thrust Reverser Cowl Position (TRCP) indications for the associated engine are out of range.
 - A. Position Overhead Maintenance Panel EEC MAINT POWER switch TEST.
 - B. Display Maintenance page 71 EPCS.
 - 1) For RR SB78-9344 installed (BA mod 78F079), verify Channel A and Channel B TRCPs > 108.0% or < -8.0%.
 - C. Review the CMC ATA 71 Existing Faults for maintenance messages.
 - 1) Confirm maintenance message 7_723 is displayed.
 - 2) Confirm maintenance message 7_750 is not displayed.
 - D. Position Overhead Maintenance Panel (P461) EEC MAINT POWER switch NORM.

OPERATIONS (O)

NOTE: The REV amber indication and ENG _ REVERSER message may be displayed for the deactivated reverser.

1. Use symmetrical reverse as required.

For RR:

2. Before each departure verify ENG _ REV LIMTD advisory message is displayed approximately one minute after engine start and before the associated thrust lever is moved from the idle stop.
3. Refer to MEL item 78-31-01 for Performance Information.

78-36-01 Reverser Position Sensing System**78-36-01B Two Inoperative**

Interval	Installed	Required	Procedure
A	4	2	(M) (O)

Two may be inoperative provided:

- a. Associated reverser is considered inoperative, refer to MEL item 78-31-01.
 - b. Inoperative thrust reversers are on symmetrical engines only.
 - c. Associated reversers are secured in the forward thrust position.
 - d. On associated engine, both T/R Control and T/R Indication circuit breakers are opened and collared.
 - e. Anti-skid and auto spoiler systems operate normally.
 - f. Repairs are made within three flight days.
-

MAINTENANCE (M)

Deactivate and secure the associated reverser in the forward position.

1. Use DDG item 78-36-01A (M) procedure.

OPERATIONS (O)

Use DDG item 78-36-01A (O) procedure.

78-36-03 Full REV Position Indications (Green)

Interval	Installed	Required	Procedure
C	4	3	

One may be inoperative provided associated REV unlock indication (Amber) operates normally.

NOTE: Not required for an inoperative thrust reverser.

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**79-21-02 Engine High Pressure Oil Filter Warning Indication
(Approaching Blockage) (RR)**

Interval	Installed	Required	Procedure
C	4	2	(M)

Two may be inoperative provided:

- a. It is verified that the malfunction is in the alerting system.
 - b. The Master Chip Detector is checked for contaminants before each departure.
-

MAINTENANCE (M)

Verify that malfunction is in the alerting system and before each departure, check Master Chip Detector for contaminants.

1. Check the pressure filter for evidence of blockage (AMM 79-00-00/601).
2. Before each departure, check Master Chip Detector for contamination (AMM 79-21-03/401).

**79-21-03 Engine Fine Scavenge Oil Filter Warning Indication
(Impending Bypass) (RR)**

Interval	Installed	Required	Procedure
C	4	2	(M)

Two may be inoperative provided:

- a. It is verified that the malfunction is in the alerting system.
 - b. The Master Chip Detector is checked for contaminants before each departure.
-

MAINTENANCE (M)

Verify that malfunction is in the alerting system and before each departure, check Master Chip Detector for contaminants.

1. Check the fine scavenge oil filter for evidence of blockage (AMM 79-00-00/601).
2. Before each departure, check Master Chip Detector for contamination (AMM 79-21-03/401).

79-31-01 Oil Quantity Indicating Systems

Interval	Installed	Required	Procedure
B	4	3	(M)

One may be inoperative provided:

- a. It is verified before each departure that the oil tank is filled to the recommended capacity.
 - b. There is no evidence of above normal oil consumption or leakage.
 - c. Associated oil temperature and pressure indications operate normally.
-

MAINTENANCE (M)

Inspect for oil consumption and leakage and before each departure, verify oil quantity in associated oil tank is filled to recommended capacity.

1. Before each departure, confirm oil quantity in the associated tank is at the recommended capacity and fill if required (AMM 12-13-03/301).
2. Review engine records to confirm oil usage is within engine manufacturer's limits, oil consumption guidelines (AMM 71-00-00/201), or operator's approved limits (if more restrictive).

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80-11-01 Engine Start Valves

Interval	Installed	Required	Procedure
C	4	3	(M) (O)

One may be inoperative closed provided:

- a. Alternate starting procedures are established and used.
 - b. Associated Start Valve Open Light operates normally.
-

MAINTENANCE (M)

For RR:

WARNING: **DO NOT USE ENGINE NACELLE SERVICE INTERPHONE JACK ON ENGINE WHICH IS TO BE STARTED OR IS IN OPERATION. PERSONNEL COULD ENTER HAZARD AREA RESULTING IN SERIOUS INJURY OR LOSS OF LIFE (REFER TO AMM 71-00-00/201 FOR OPERATING ENGINE HAZARD ZONES AND SAFE ACCESS CORRIDORS).**

WARNING: **WARNING: WHEN MANUALLY OPERATING START VALVE, HAND AND ARM COVERS MUST BE WORN. HEAT AND AIR BLASTS FROM STARTER COULD RESULT IN INJURY TO PERSONNEL.**

CAUTION: **MANUAL OPENING OF THE START VALVE WITHOUT AIR PRESSURE IN START DUCT MAY DAMAGE VALVE.**

NOTE: There are two procedures to start the engine if the start valve does not operate due to electrical failure. The second procedure is recommended if the first procedure does not start the engine.

1. Manually open and close the affected start valve as directed by the flight crew using the manual-override-start-button procedure (AMM 71-00-00/201).
 - A. Establish interphone communication between flight deck and ground crew who will operate the manual override start button.
 - B. Open the manual start access door and locate the button between the valve and the fan case.
 - C. Upon command from the flight deck, press and hold the manual start button to open the start valve.

NOTE: There will be a 5 to 10 second delay from the time the manual start button is first pushed and the time the starter begins to operate.

- D. After engine has started and upon command from the flight deck, close start valve by releasing the manual start button or by manually using the drive extension.

- E. Close the manual start access door.
2. Manually open and close the affected start valve as directed by the flight crew using the Start Valve Butterfly Shaft Override procedure (AMM 71-00-00/201).
- A. Establish interphone communication between the flight deck and the ground crew person who will operate the manual Start Valve Butterfly Shaft Override.
 - B. Open the right hinged cowl (AMM 71-11-02/201).
 - C. Open the starter valve access door and locate the hex nut on the valve butterfly shaft.
 - D. Place a 18-24 inch long, 1/2 inch drive extension, with a 1/2 inch socket on the butterfly valve shaft hex nut. Turn the valve and hold it in the open position and then advise the flight crew that the start valve is open ready to start the engine.
 - E. After the engine has started and upon flight deck command to close the start valve, turn the butterfly valve to the CLOSED.
 - F. Remove the 1/2 inch drive extension and socket from the butterfly valve shaft hex nut and close the right hinged cowl.
 - G. Close the right hinged cowl (AMM 71-11-02/201) and manual start access door.

OPERATIONS (O)

For RR:

1. For ground start of the associated engine, amend engine start procedures to direct the ground crew to manually open and close the associated start valve.
 - A. Establish communications with the ground crew.
 - B. For Autostart installed, position AUTOSTART switch(es) off.
 - C. Perform one of the following Override procedures.
 - 1) Manual Override Start Button procedure:
 - a. Pull and hold the Start switch.
 - b. Direct ground crew to open the start valve.
 - c. When N3 indicates 45-50%, direct ground crew to close the start valve.
 - d. After Start Valve Open light extinguishes, release the Start switch.
 - 2) Butterfly Shaft Override procedure:
 - a. After ground crew has opened the start valve, pull the Start switch.
 - b. When N3 indicates 45-50%, direct ground crew to close the start valve.
 - D. For Autostart installed, set AUTOSTART switch(es) ON.

-
2. For inflight start of associated engine, ensure that airspeed is sufficient for a windmilling start.

80-11-02 Starter Switch Systems

Interval	Installed	Required	Procedure
C	4	0	(O)

May be inoperative provided alternate start procedures are used.

OPERATIONS (O)**For RR:**

Perform Manual Engine Start procedure with the following exceptions:

1. Manually pull and, if necessary, hold the START switch in the start position until N3 reaches 50%.
2. When N3 reaches 50%, manually push the engine START switch into the off position.

80-11-03 Auto Start Systems

Interval	Installed	Required	Procedure
C	4	0	(O)

May be inoperative provided Manual Start System operates normally.

MAINTENANCE NOTE

Autoignition System (Auto Relight) is a function of the Autostart System controlled by the EEC of each engine. It is not affected by the position of the Autostart Switch. Failure of an Autoignition System is indicated by Status Message AUTO IGNITION X. Check EICAS for the presence of Status Message AUTO IGNITION X. If displayed refer to MEL item 74-00-03 for relief.

OPERATIONS (O)

For RR:

1. For ground start, use manual start procedures for the associated engines.
2. After all engines are started, select the Autostart switch to OFF.
3. Auto-relight is independent of autostart.

80-11-04 Start Valve Open Lights

Interval	Installed	Required	Procedure
C	4	3	(O)

One may be inoperative provided it is verified after engine start that the associated start valve is closed.

OPERATIONS (O)**For RR:**

1. Verify STARTER CUTOUT caution message is not displayed after engine speed reaches 52% N3.

Section 3

Table of Contents

CDL

Introduction

General Notes

Limitations

Weight Reductions

Enroute Diversion Speed Effects

Enroute Fuel Mileage Effects

ATA Contents

Table of Contents

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Section 3

Introduction

CDL

General Notes

This section contains locations, illustrations and performance information for all of the CDL items from the 747-400 Airplane Flight Manual (AFM) D6U10001 Appendix Configuration Deviation List (CDL) revision 14, D6U10002 Appendix Configuration Deviation List (CDL) revision 13 and D6U10003 Appendix Configuration Deviation List (CDL) revision 12.

Limitations

The associated limitations must be listed on a placard affixed in the cockpit in clear view of the pilot-in-command and other appropriate crew members.

Operation with those missing parts requiring a reduction of VMO/MMO is permitted only when the airplane has the maximum airspeed limit indication and the Mach airspeed warning system programmed for the altitude/speed schedule specified for the applicable missing part.

The pilot in command will be notified of each operation with a missing parts by listing the missing parts in the flight or dispatch release.

The operator will list in the aircraft logbook an appropriate notation covering the missing parts on each flight.

If an additional part is lost in flight the airplane may not depart the airport at which it landed following this event until it again complies with CDL limitations. This, does not preclude the issuance of a ferry permit to allow the airplane to be flown to a point where the necessary repairs or replacements can be made.

No more than one part for any one sub-system may be missing unless specifically designated combinations are indicated herein. Unless otherwise specified herein, parts from different sub-systems may be missing.

Weight Reductions

The performance penalties are cumulative unless specifically designated penalties for combination of missing parts are indicated. Where performance penalties are listed as negligible, no more than three negligible items may be missing without taking further penalty. For each missing item more than three, reduce the takeoff, landing and enroute climb limits by 45 kilograms. Where performance penalties are listed as no penalty, any accumulative number of items listed as no penalty may be missing without further penalty.

Enroute Diversion Speed Effects

The enroute climb weight penalties listed are based on operating speeds that approximate the maximum lift-to-drag ratio speed. To account for the difference in level off altitude when operating at other speeds, multiply the enroute climb weight penalty listed by the following appropriate factor:

Diversion Speed	Factor
LRC	1.6
280 KIAS	2.1
300 KIAS	2.6
320 KIAS	3.6
340 KIAS	4.1

Enroute Fuel Mileage Effects

The drag effects of many 747-400 CDL items are so small that the changes in flight planning fuel are negligible. For items that have enroute climb weight penalties listed, an increase in flight planning fuel of 0.25% per 454 kg of enroute climb weight penalty (non-factored penalty) may be used to account for the drag increase.

Section 3

ATA Contents

CDL

ATA 21 - Air Conditioning

- 21-30-01 Cabin Pressure Relief Valve Flapper Doors**
- 21-52-01 A/C Ram Air Outlet Assemblies**
- 21-62-01 A/C Ram Air Inlet Doors**

ATA 23 - Communications

- 23-61-01 Static Dischargers (Trailing and Tip Type)**

ATA 27 - Flight Controls

- 27-11-01 Outboard Aileron End Seals**
- 27-11-02 Inboard Aileron End Seals**
- 27-51-01 Trailing Edge Flap to Fuselage Seals**
- 27-51-02 Flap Track (Canoe) Fairing**
- 27-51-03 Flap Track Fairing Tailcones**
- 27-51-04 Inboard Trailing Edge Flap Outboard Deflection Control Roller**
- 27-51-05 Inboard Trailing Edge Flap End Seals (Outboard End)**
- 27-51-06 Outboard Trailing Edge Flap End Seals**
- 27-81-01 Folding Nose Assembly**

ATA 28 - Fuel

- 28-22-01 Boost Pump Access Doors (Main Tanks 1 and 4)**

ATA 32 - Landing Gear

- 32-10-01 Main Landing Gear Door Seals**
- 32-12-01 Wing Gear Shock Strut Outboard Door, Inboard Door and Inboard Door Fairing**
- 32-12-02 Wing Gear Shock Strut Inboard Door and Inboard Door Fairing**
- 32-12-03 Wing Gear Shock Strut Inboard Door Fairing**

Table of Contents

- 32-14-01 Body Gear Shock Strut Inboard Door**
- 32-14-02 Body Gear Shock Strut Outboard Door**
- 32-21-01 P37 Control Panel Cover (On Nose Gear)**
- 32-21-02 Nose Gear Bullnose Air Deflector**

ATA 33 - Lights

- 33-41-01 Wing Illumination Light Covers**
- 33-43-01 Wing-Tip Navigation Light Lens**
- 33-44-01 Upper and Lower Body Anti-Collision Light Lenses**
- 33-51-01 Overwing Emergency Light Covers**

ATA 52 - Doors

- 52-11-01 Main Entry Door Mid and Aft Hinge Fairings**
- 52-11-02 Main Entry Door Forward Hinge Fairings**
- 52-49-01 External Power Receptacle Door**
- 52-49-02 Pneumatic Ground Service Door**
- 52-49-03 Toilet Service Door**
- 52-49-04 Cargo Door Switch Access Panels**
- 52-49-05 CWT Sump Drain Access Panels**

ATA 53 - Fuselage

- 53-51-01 Wing-to-Body Fillet Fairing**

ATA 54 - Nacelles & Pylons

- 54-32-01 Nacelle Strut Access Doors (Includes Pylon Valve Access Doors)**

ATA 55 - Stabilizer

- 55-20-01 Elevator Inboard Bulb Seals**
- 55-20-02 Elevator Outboard Bulb Seals**

Table of Contents**ATA 57 - Wings**

- 57-23-01 Winglet Fairings**
- 57-28-01 Winglets**
- 57-31-01 Fueling Panel Doors**
- 57-54-01 Leading Edge Flap - Inboard Strut Seal**
- 57-54-02 Leading Edge Flap Folding Nose - Inboard Strut Seal**

ATA 78 - Engine Exhaust

- 78-31-02 Fan Thrust Reverser Blocker Doors**
- 78-31-05 Fan Thrust Reverser Cascade Boxes**

Table of Contents

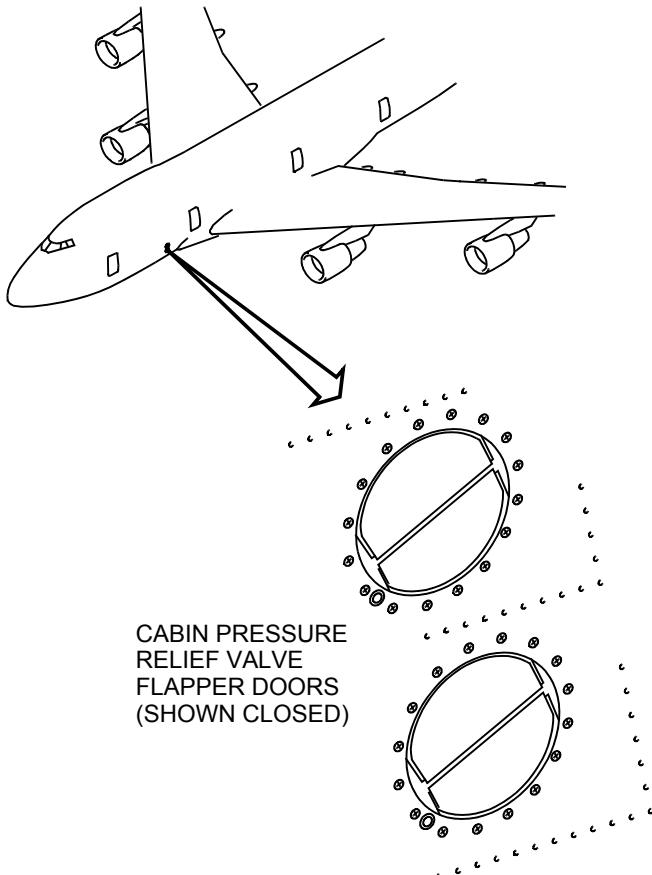
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21-30-01 Cabin Pressure Relief Valve Flapper Doors

Any number may be missing.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
2	Negligible penalty	Negligible penalty

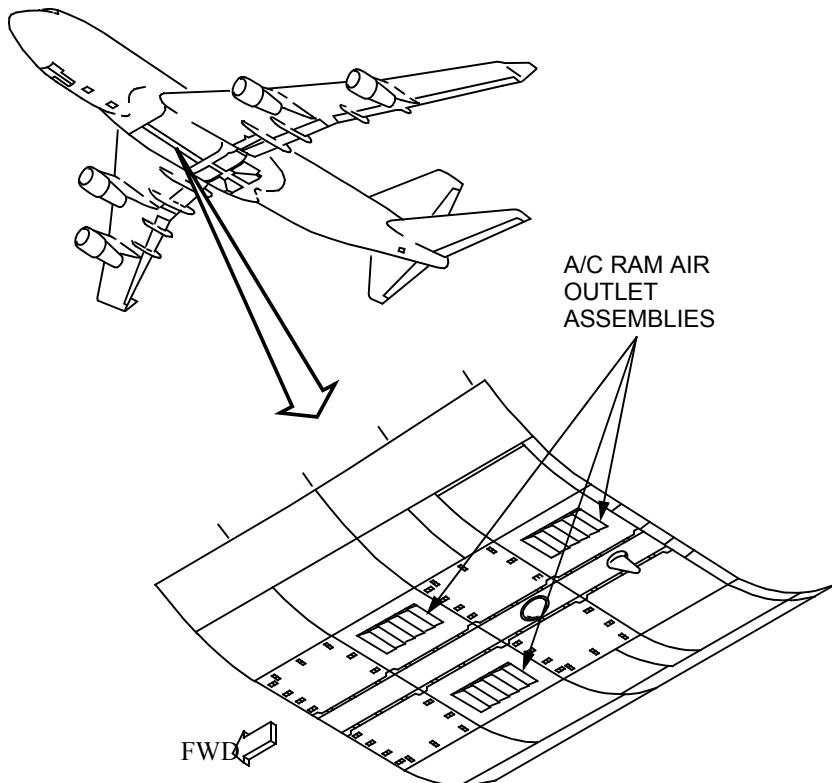


21-52-01 A/C Ram Air Outlet Assemblies

Any number of louvers may be missing from the three assemblies in any combination.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
3	1339 kg	4083 kg



21-62-01 A/C Ram Air Inlet Doors

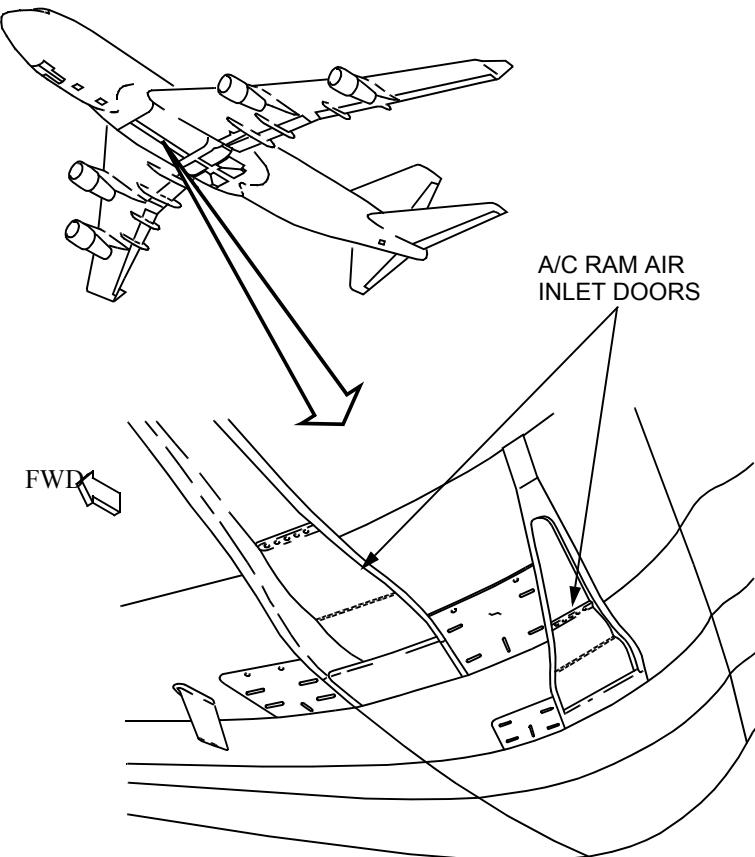
One may be missing.

NOTE 1: The exit louvers for the pack with the missing door must be in the full open position.

NOTE 2: Dispatch using MEL item 21-62-02.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
3	363 kg	1089 kg



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23-61-01 Static Dischargers (Trailing and Tip Type)

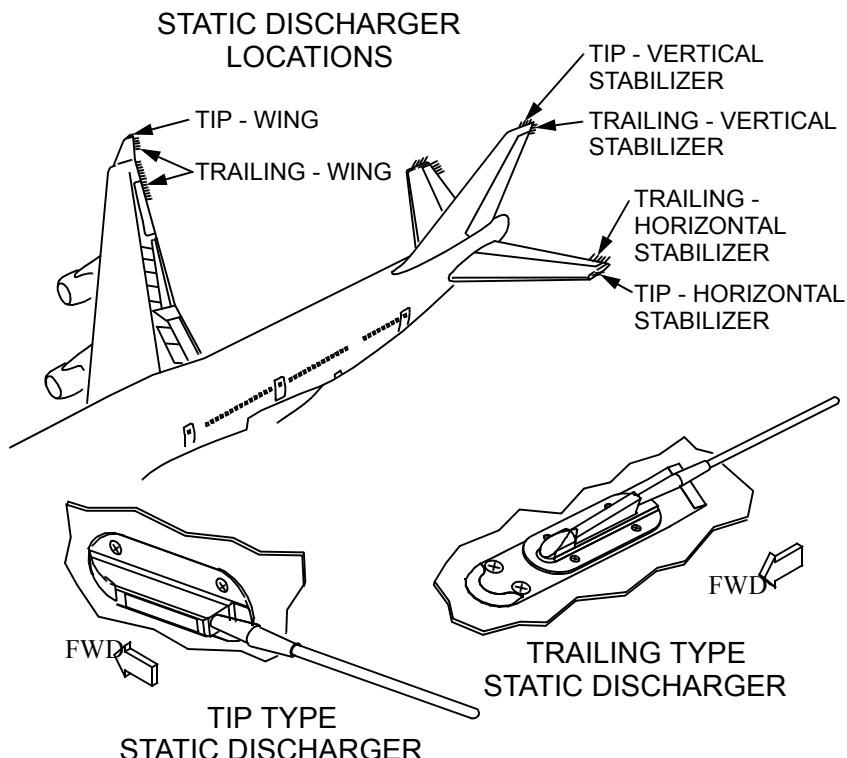
A minimum of 23 are required provided they are distributed as follows.

1. A minimum of 15 trailing type dischargers with 3 at any of the 6 outboard locations on each wing, 3 at any of the 5 outboard locations on each horizontal stabilizer and 3 at any of the 4 upper locations on the vertical stabilizer.

For All:

2. A minimum of 8 tip type dischargers with 1 on each winglet tip, 2 on each horizontal stabilizer tip and 2 on the vertical stabilizer tip.

Number Installed	Takeoff & Landing	Enroute Climb
68	No penalty	No penalty



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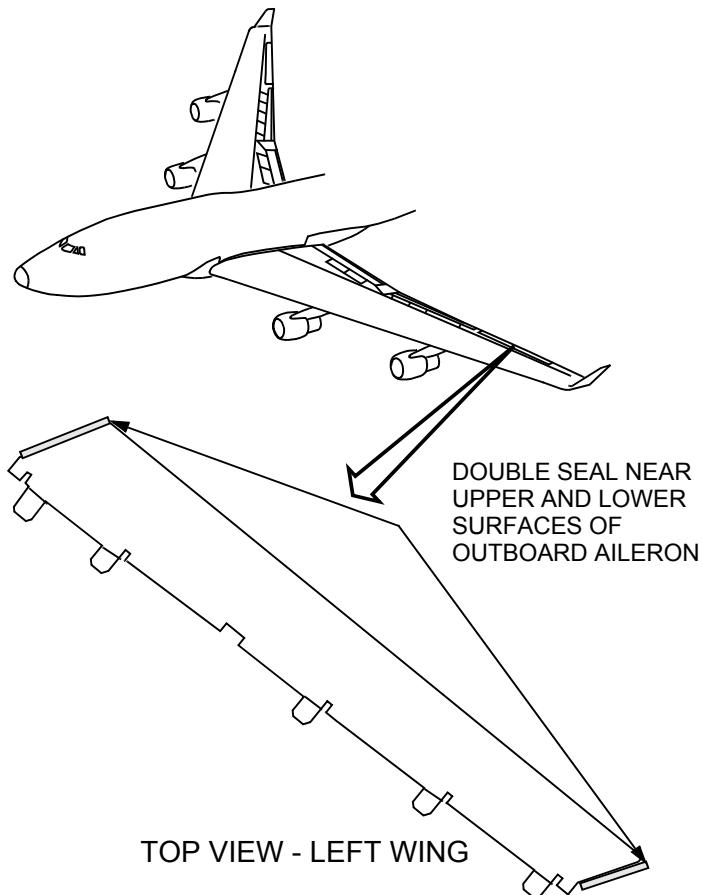
27-11-01 Outboard Aileron End Seals

Any one seal from a pair may be missing. The performance decrement is negligible.

Any number of pairs may be missing.

Performance limited weights are reduced by the following for each missing pair:

Number Installed	Takeoff & Landing	Enroute Climb
4 Pairs	127 kg	395 kg



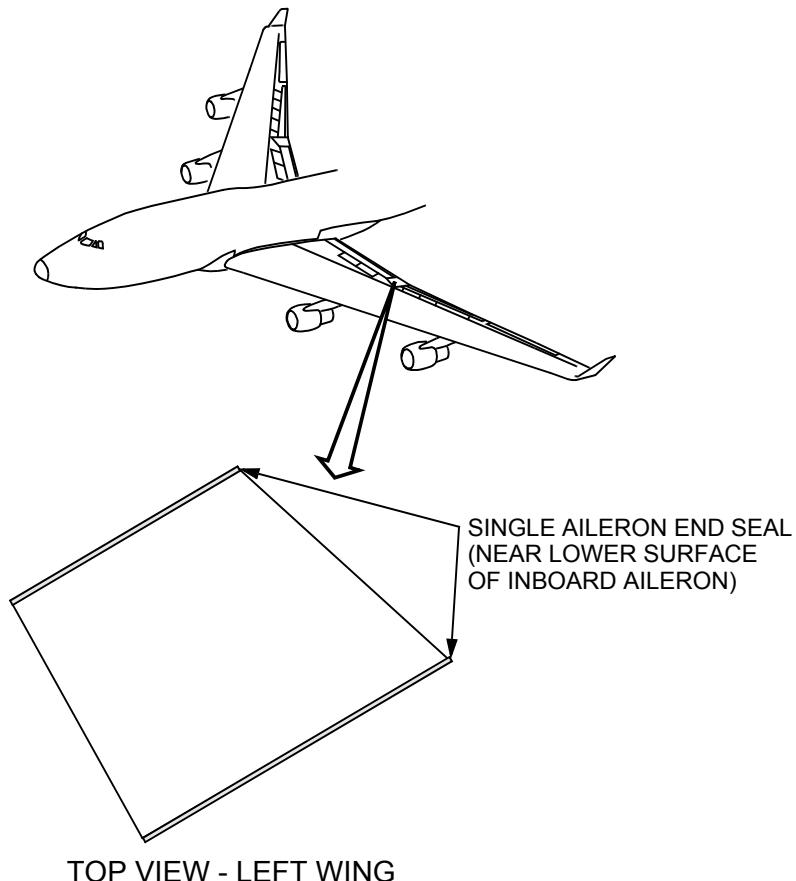
27-11-02 Inboard Aileron End Seals

Any number may be missing.

Performance limited weights are reduced by the following for each missing seal:

NOTE: A seal consists of multiple segments at any of the four installed locations.

Number Installed	Takeoff & Landing	Enroute Climb
4	No penalty	531 kg



Section 3
27-51-01 Trailing Edge Flap to Fuselage Seals

Any number may be missing or damaged.

NOTE 1: A missing seal is defined as the absence of an entire seal, or a seal that has sustained damage to both the upper and lower surfaces and allows leakage through the surfaces.

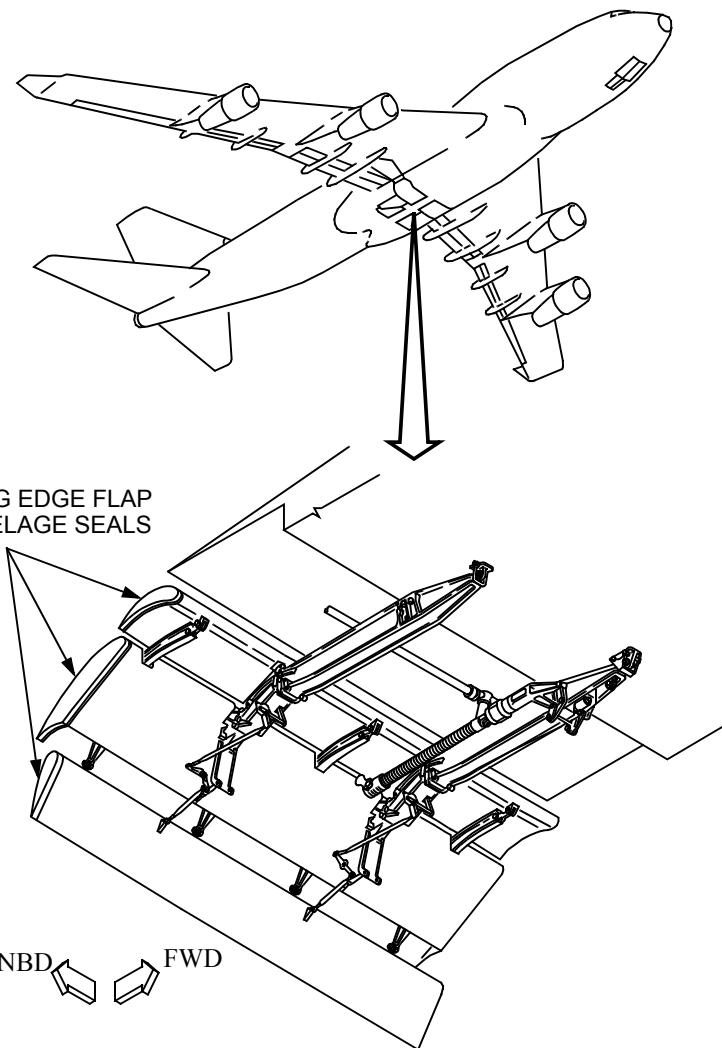
NOTE 2: A damaged seal is defined as one which sustained damage to either the upper or lower surface, but does not allow airflow through both surfaces.

NOTE 3: Takeoff Climb decrements are for Second Segment Climb limits.

NOTE 4: * With a missing Fore-Flap seal, no additional Takeoff Climb Flaps 10 decrement is required for missing or damaged associated Mid-Flap and Aft-Flap seals.

Performance limited weights are reduced by the following performance decrements for each missing or damaged item:

Number Installed	Takeoff		Enroute Climb	Landing		
	Flaps 10	Flaps 20		Flaps 25	Flaps 30	
Missing Seal						
6	Fore-Flap					
	*1996 kg	998 kg	None	1157 kg	2064 kg	
	Mid-Flap					
	817 kg	726 kg	2631 kg	862 kg	862 kg	
	Aft-Flap					
Damaged Seal						
6	Fore-Flap					
	363 kg	363 kg	None	431 kg	431 kg	
	Mid-Flap					
	726 kg	726 kg	2631 kg	862 kg	862 kg	
	Aft-Flap					



27-51-02 Flap Track (Canoe) Fairing

This item is for the following part numbers:

1. Flap track 1 & 8: Part Number 65B15510
2. Flap track 2 & 7: Part Number 65B15520
3. Flap track 3 & 6: Part Number 65B15530
4. Flap track 4 & 5: Part Number 65B15540

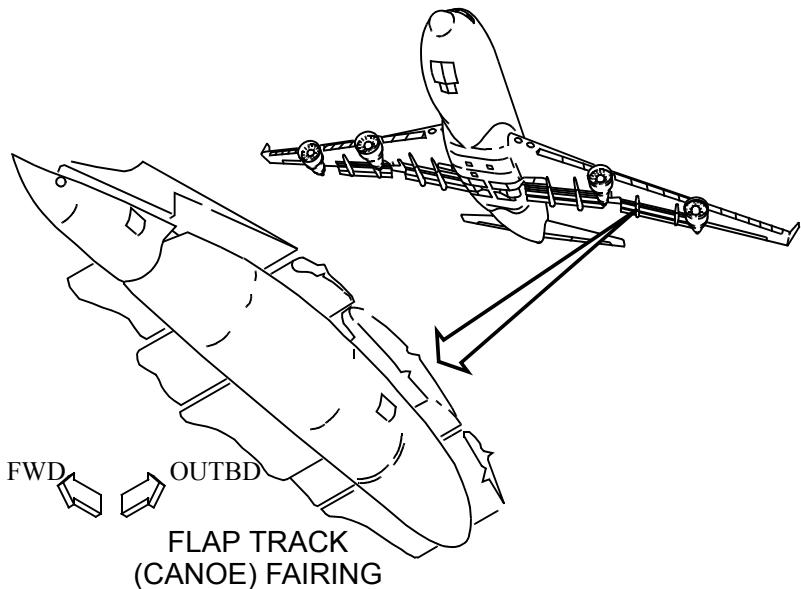
The moveable portion or the entire fairing may be missing from one flap track.

Performance limited weights are reduced by the following:

NOTE 1: Penalty to be added to aircraft instantaneous weight when calculating all engines and engine out ceilings, drift down height/distance etc. Only add to FMC ZFW when climb/drift down performance information is required. Use correct ZFW for fuel/time predictions.

NOTE 2: If only the movable door in fairing number 1 or 8 is missing, the corresponding tailcone must be removed to prevent structural damage. Use item 27-51-03 in lieu of item 27-51-02 in this case.

Number Installed	Takeoff & Landing	Enroute Climb
8	1316 kg	4015 kg



27-51-03 Flap Track Fairing Tailcones

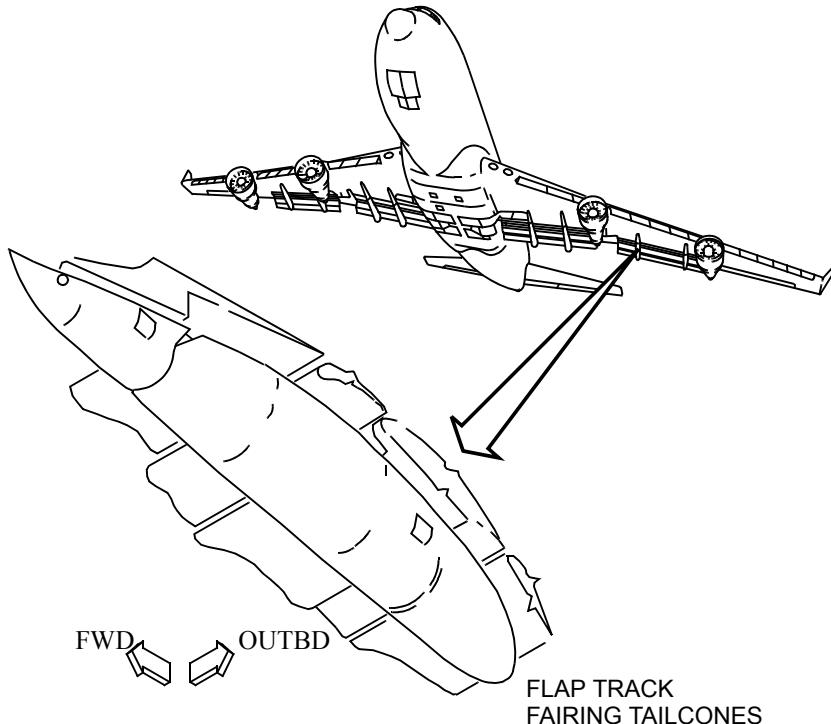
NOTE 1: Penalty to be added to aircraft instantaneous weight when calculating all engines and engine out ceilings, drift down height/distance etc. Only add to FMC ZFW when climb/drift down performance information is required. Use correct ZFW for fuel/time predictions.

NOTE 2: If the movable door in fairing number 1 or 8 is missing, the corresponding tailcone must be removed to prevent structural damage. The tailcone performance decrements are then applied.

One or two may be missing.

Performance limited weights are reduced by the following for each missing item:

Number Installed	Takeoff & Landing	Enroute Climb
8	476 kg	1451 kg



27-51-04 Inboard Trailing Edge Flap Outboard Deflection Control Roller

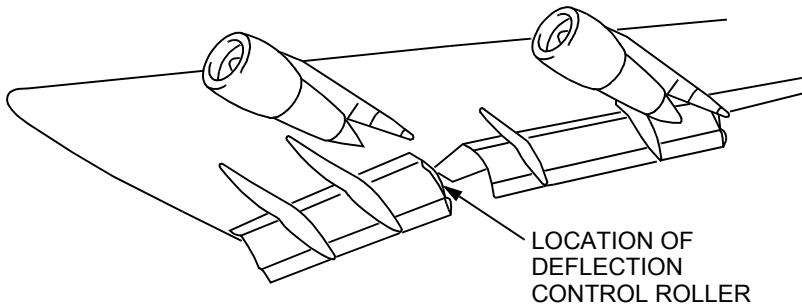
One or both may be missing.

Performance limited weights are reduced by the following for each missing roller:

NOTE 1: Penalty to be added to aircraft instantaneous weight when calculating all engines and engine out ceilings, drift down height/distance etc. Only add to FMC ZFW when climb/drift down performance information is required. Use correct ZFW for fuel/time predictions.

NOTE 2: Due to the possibility of additional wear on the mid flap bullnose created by contact with the seal retainer, operation beyond the next C check is not recommended.

Number Installed	Takeoff	Enroute Climb
2	Negligible penalty	118 kg



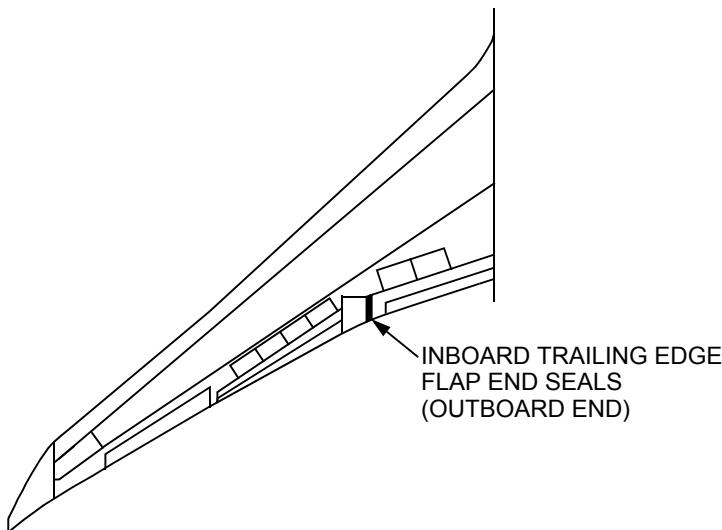
27-51-05 Inboard Trailing Edge Flap End Seals (Outboard End)

Any number may be missing.

Performance limited weights are reduced by the following for each missing seal.

NOTE: A seal consists of multiple segments at any of the two installed locations.

Number Installed	Takeoff	Enroute Climb
2	No penalty	272 kg



Section 3

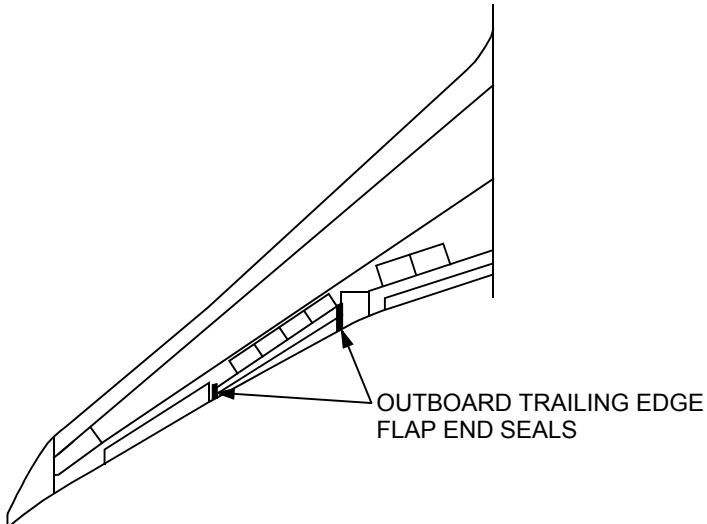
27-51-06 Outboard Trailing Edge Flap End Seals

Any number may be missing.

Performance limited weights are reduced by the following for each missing seal.

NOTE: A seal consists of multiple segments at any of the four installed locations.

Number Installed	Takeoff	Enroute Climb
4	No penalty	431 kg



27-81-01 Folding Nose Assembly

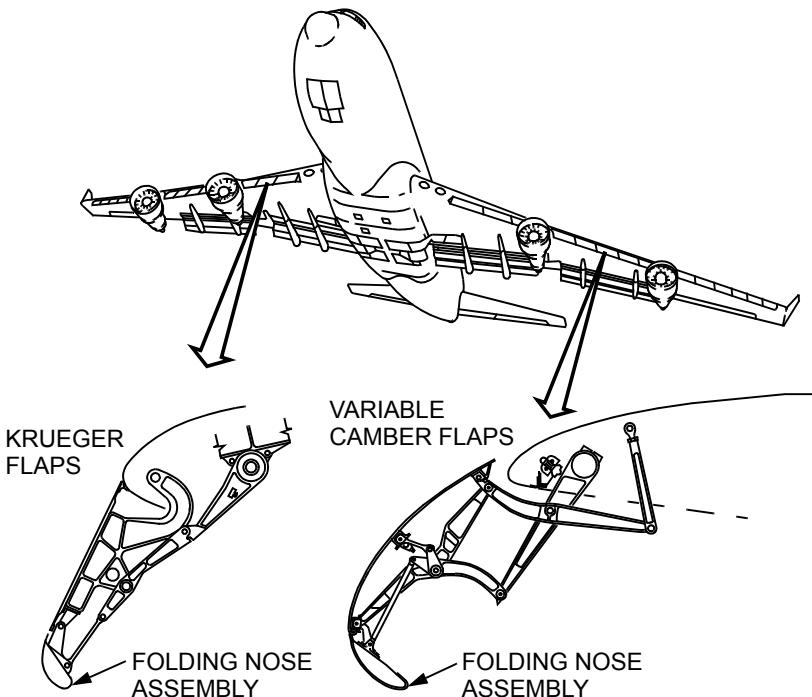
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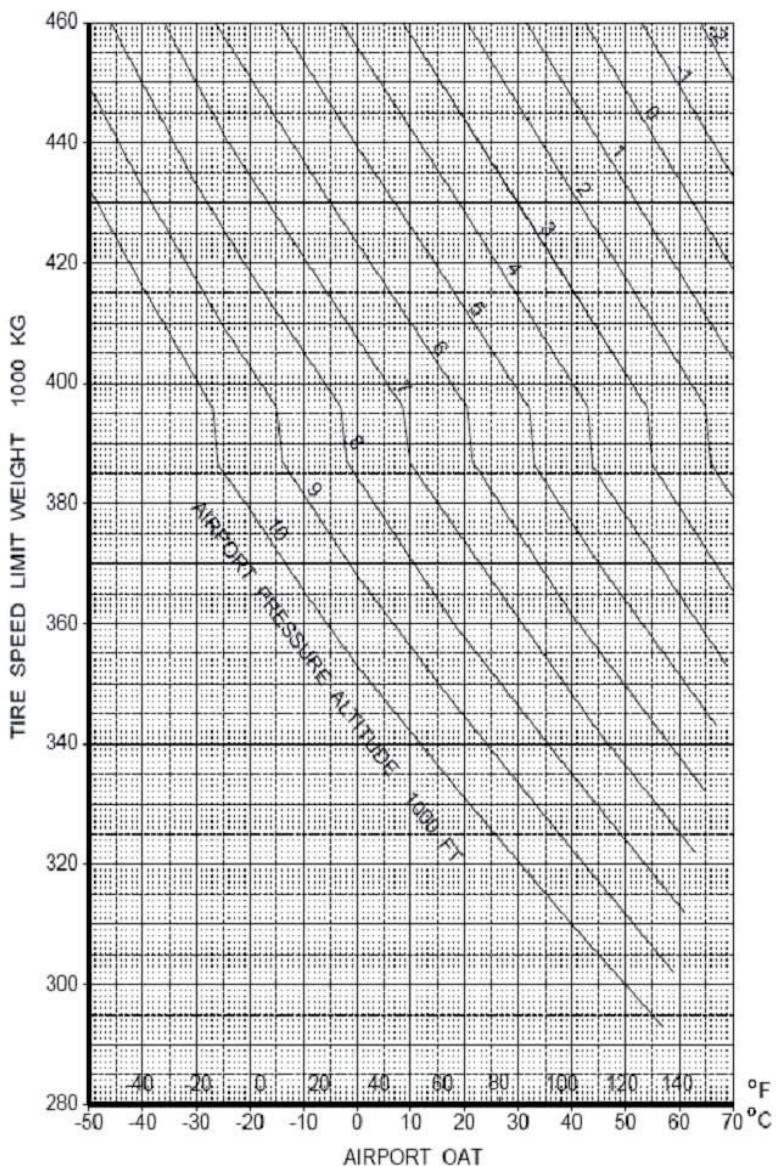
One may be missing.

Performance adjustments are applied as follows:

1. Take-off performance (use Flaps 20 only)
 - A. Use CARD with correction code 81 to obtain the performance figures.
 - B. For airfield pressure altitudes above 4000 ft, additionally extract the tyre speed limit from the chart below and reduce this value by 25,900 kg. Use the lower value of the adjusted tyre speed limit and the TOPL calculated in step 1. If the aircraft is tyre speed limited then perform the take-off using full power. In both cases if new TOPL is still too restrictive consider contacting FTSS (Flight Operations Engineers) via Flight Technical Dispatch to obtain possible improved data.
2. Landing performance:
 - A. Reduce landing field length limit weight by 20,412 kg.
 - B. Increase landing approach speed VREF by 6 knots.

NOTE: Buffet onset will occur earlier than normal during maneuvering flight with flaps extended.





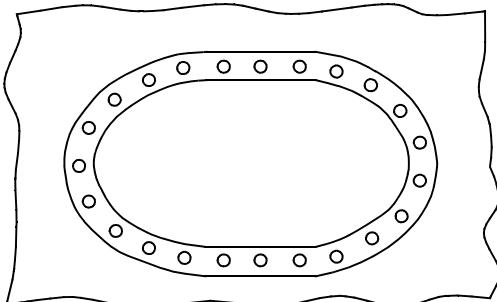
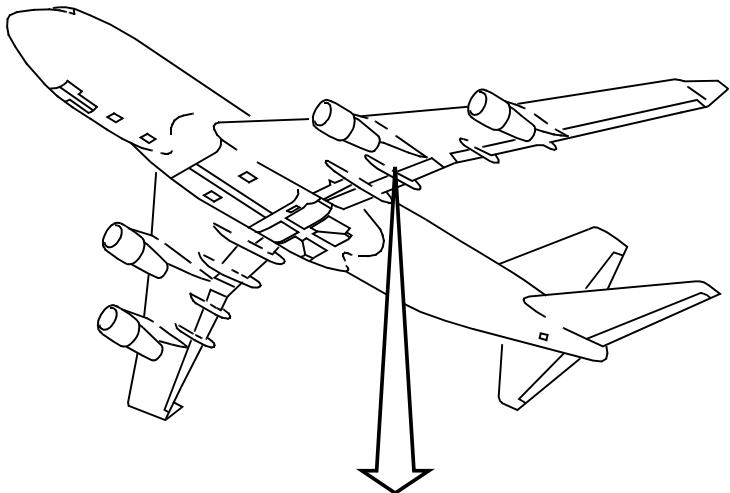
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28-22-01 Boost Pump Access Doors (Main Tanks 1 and 4)

Two maximum may be missing.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
4	Negligible penalty	Negligible penalty



**BOOST PUMP ACCESS DOORS
(2 ON EACH WING)**

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32-10-01 Main Landing Gear Door Seals

One may be missing.

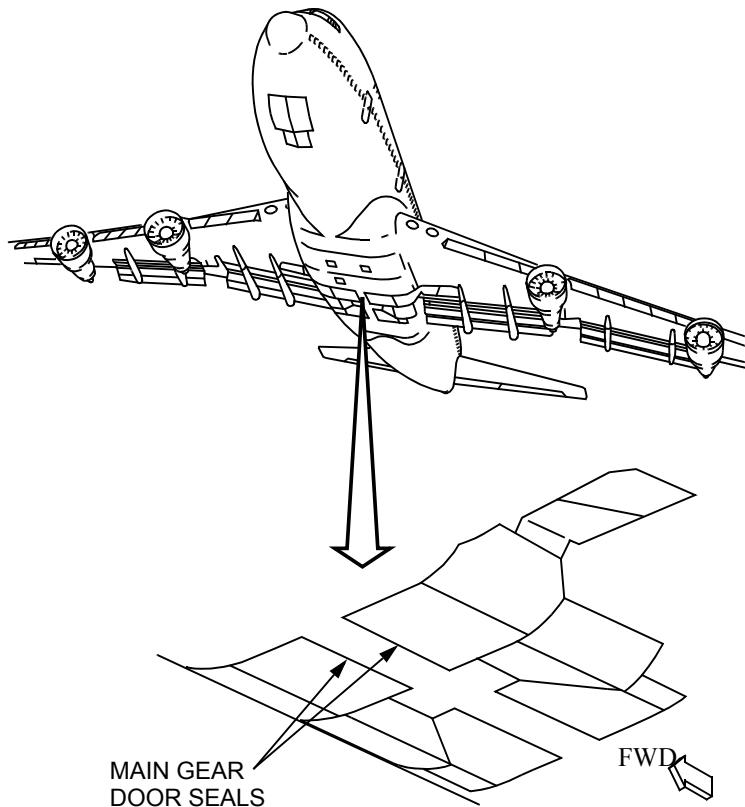
The maximum airspeed limits (VMO/MMO) are 270 KCAS/0.73 Mach.

NOTE 1: Place the Gear Down Dispatch switch in the Main Equipment Center to GEAR DOWN DISPATCH position.

NOTE 2: Maximum takeoff weight limited to 326,586 kg. [AFM Gear-Down (Landing Gear Extended) Appendix]

Performance limited weights are reduced by the following.

Number Installed	Takeoff and Landing	Enroute Climb
96	154 kg	463 kg



32-12-01 Wing Gear Shock Strut Outboard Door, Inboard Door and Inboard Door Fairing

One may be missing.

The maximum airspeed limits (VMO/MMO) are 270 KCAS/0.73 Mach.

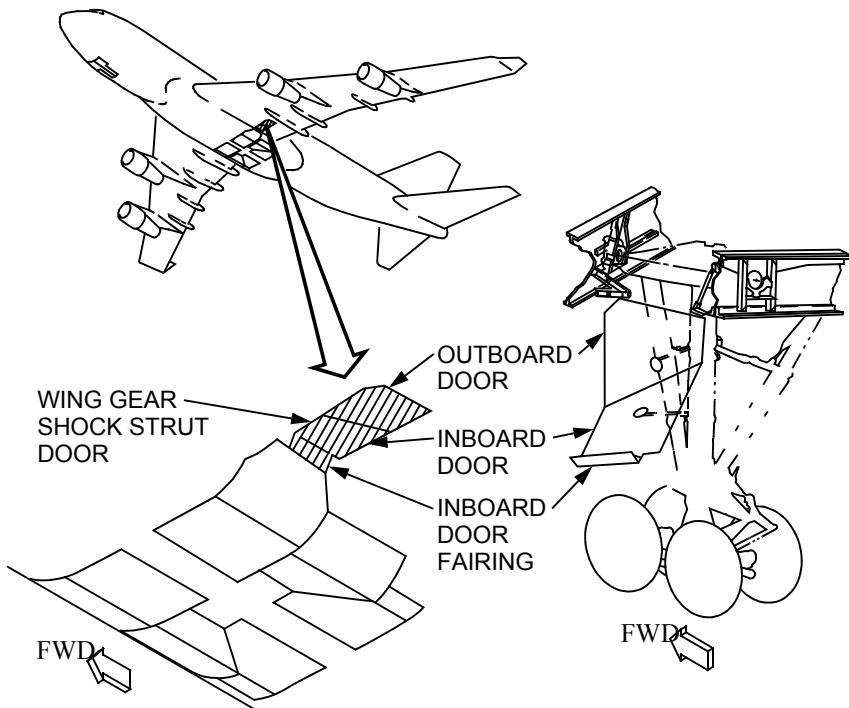
NOTE 1: Place the Gear Down Dispatch switch in the Main Equipment Center to GEAR DOWN DISPATCH position.

NOTE 2: Maximum takeoff weight limited to 326,586 kg. [AFM Gear-Down (Landing Gear Extended) Appendix]

NOTE 3: Penalty to be added to aircraft instantaneous weight when calculating all engines and engine out ceilings, drift down height/distance etc. Only add to FMC ZFW when climb/drift down performance information is required. Use correct ZFW for fuel/time predictions.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
2	313 kg	962 kg



Section 3

32-12-02 Wing Gear Shock Strut Inboard Door and Inboard Door Fairing

One may be missing.

The maximum airspeed limits (VMO/MMO) are 270 KCAS/0.73 Mach.

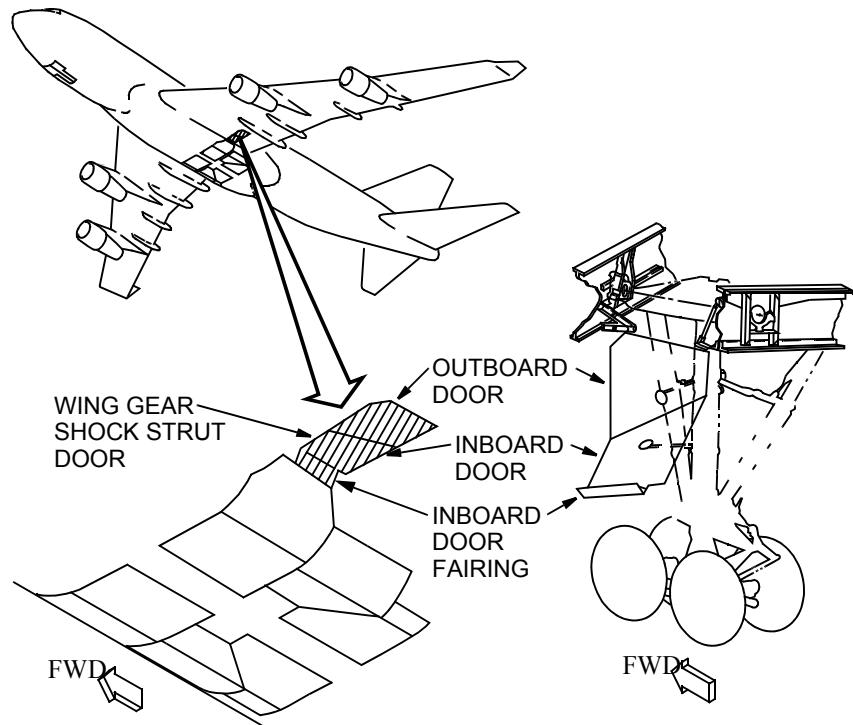
NOTE 1: Place the Gear Down Dispatch switch in the Main Equipment Center to GEAR DOWN DISPATCH position.

NOTE 2: Maximum takeoff weight limited to 326,586 kg. [AFM Gear-Down (Landing Gear Extended) Appendix]

NOTE 3: Penalty to be added to aircraft instantaneous weight when calculating all engines and engine out ceilings, drift down height/distance etc. Only add to FMC ZFW when climb/drift down performance information is required. Use correct ZFW for fuel/time predictions.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
2	163 kg	499 kg



32-12-03 Wing Gear Shock Strut Inboard Door Fairing

One may be missing.

The maximum airspeed limits (VMO/MMO) are 270 KCAS/0.73 Mach.

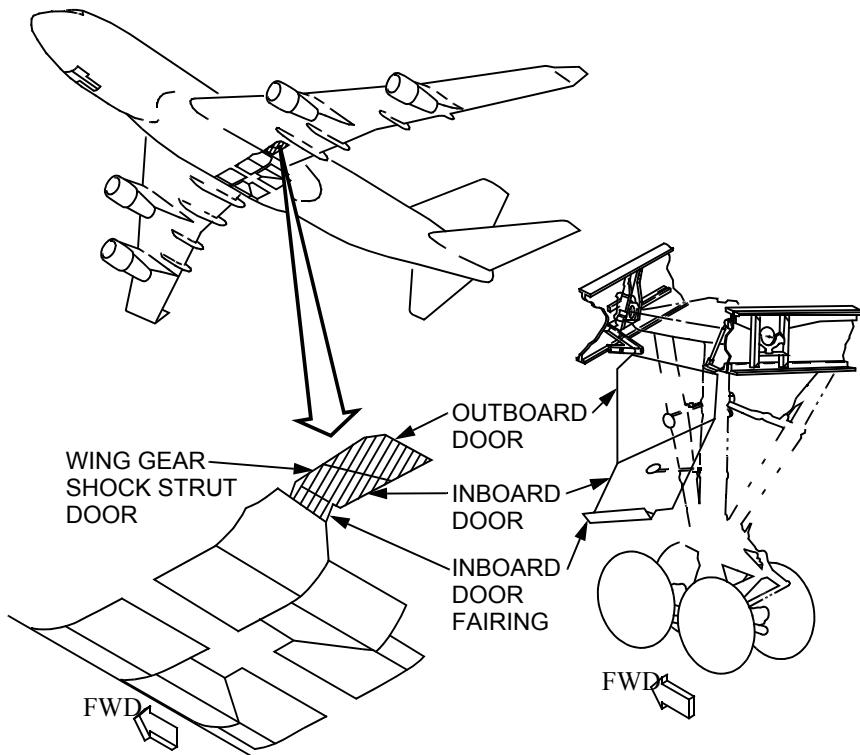
NOTE 1: Place the Gear Down Dispatch switch in the Main Equipment Center to GEAR DOWN DISPATCH position.

NOTE 2: Maximum takeoff weight limited to 326,586 kg. [AFM Gear-Down (Landing Gear Extended) Appendix]

NOTE 3: Penalty to be added to aircraft instantaneous weight when calculating all engines and engine out ceilings, drift down height/distance etc. Only add to FMC ZFW when climb/drift down performance information is required. Use correct ZFW for fuel/time predictions.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
2	Negligible penalty	45 kg



32-14-01 Body Gear Shock Strut Inboard Door

One may be missing.

The maximum airspeed limits (VMO/MMO) are 270 KCAS/0.73 Mach.

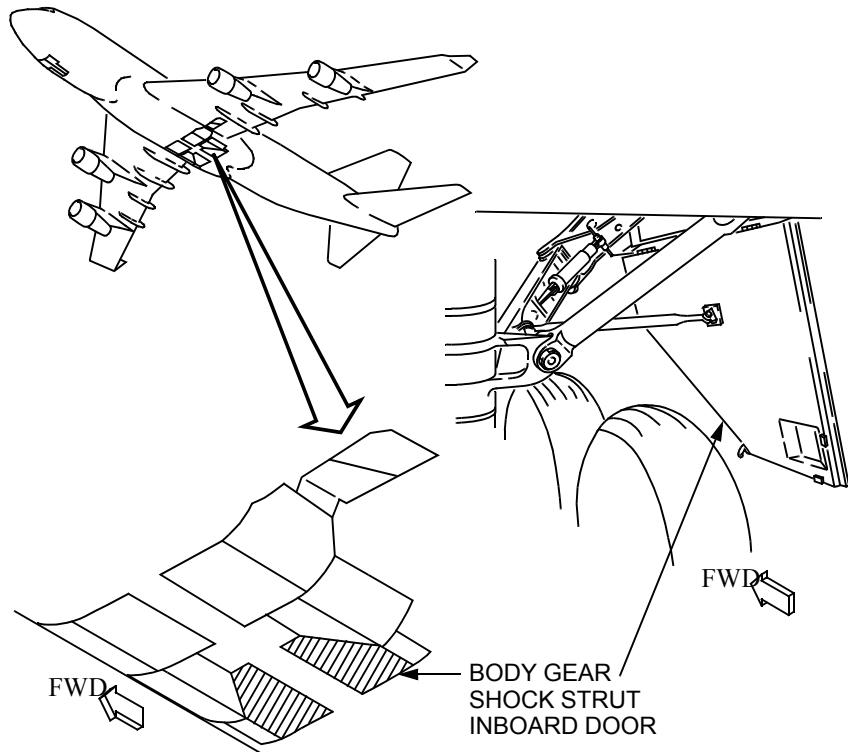
NOTE 1: Place the Gear Down Dispatch switch in the Main Equipment Center to GEAR DOWN DISPATCH position.

NOTE 2: Maximum takeoff weight limited to 326,586 kg. [AFM Gear-Down (Landing Gear Extended) Appendix]

NOTE 3: Penalty to be added to aircraft instantaneous weight when calculating all engines and engine out ceilings, drift down height/distance etc. Only add to FMC ZFW when climb/drift down performance information is required. Use correct ZFW for fuel/time predictions.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
2	254 kg	780 kg



32-14-02 Body Gear Shock Strut Outboard Door

One may be missing.

The maximum airspeed limits (VMO/MMO) are 270 KCAS/0.73 Mach.

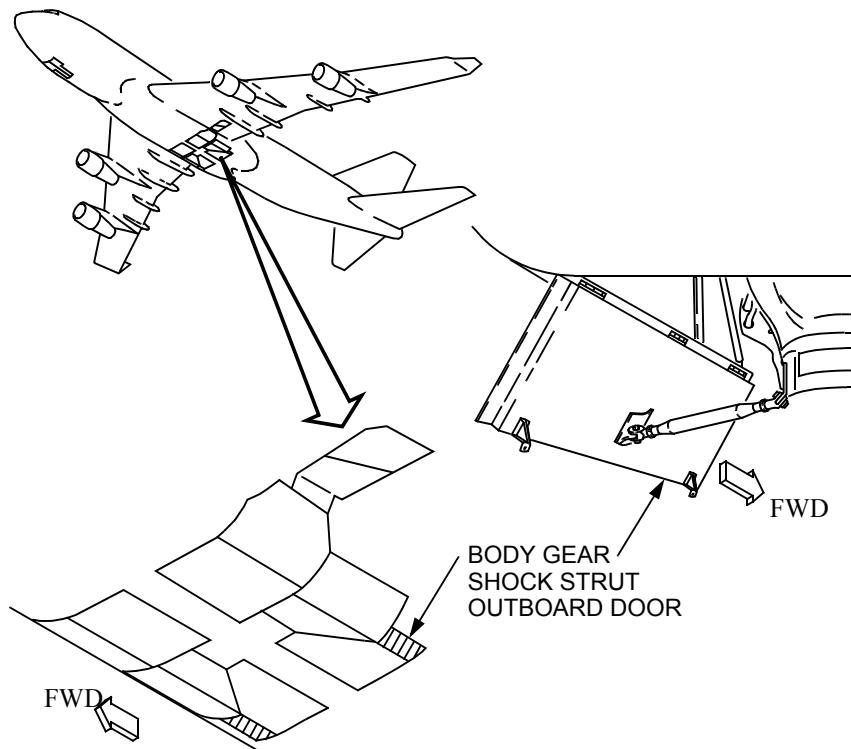
NOTE 1: Place the Gear Down Dispatch switch in the Main Equipment Center to GEAR DOWN DISPATCH position.

NOTE 2: Maximum takeoff weight limited to 326,586 kg. [AFM Gear-Down (Landing Gear Extended) Appendix]

NOTE 3: Penalty to be added to aircraft instantaneous weight when calculating all engines and engine out ceilings, drift down height/distance etc. Only add to FMC ZFW when climb/drift down performance information is required. Use correct ZFW for fuel/time predictions.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
2	50 kg	145 kg



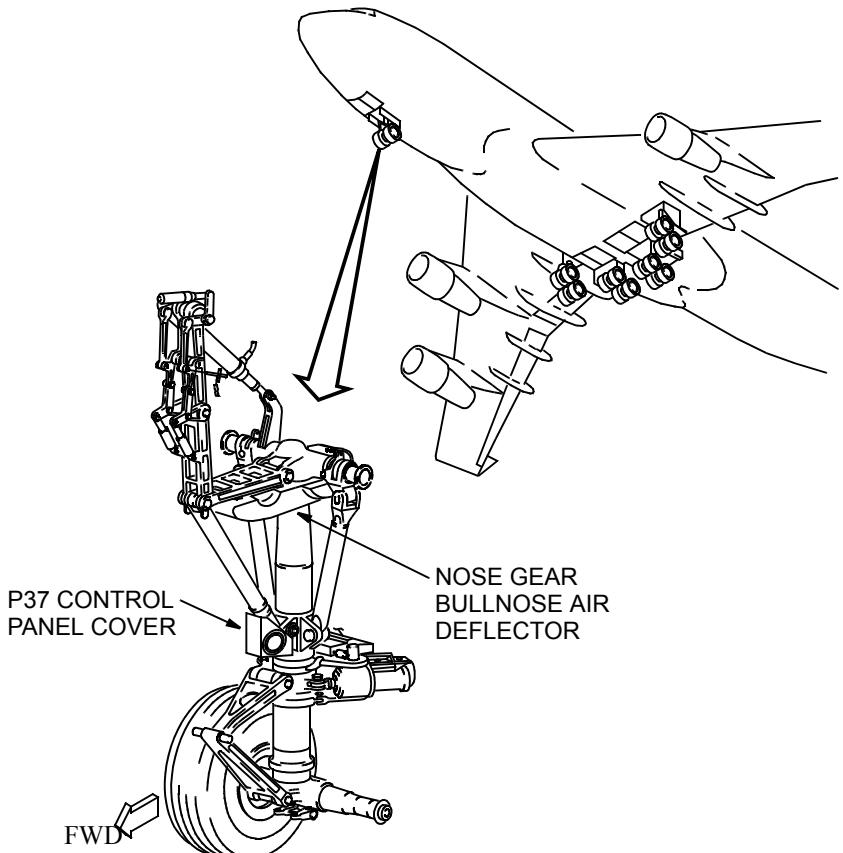
32-21-01 P37 Control Panel Cover (On Nose Gear)

May be missing.

NOTE: May be missing in combination with Item 32-21-2.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
1	No penalty	No penalty



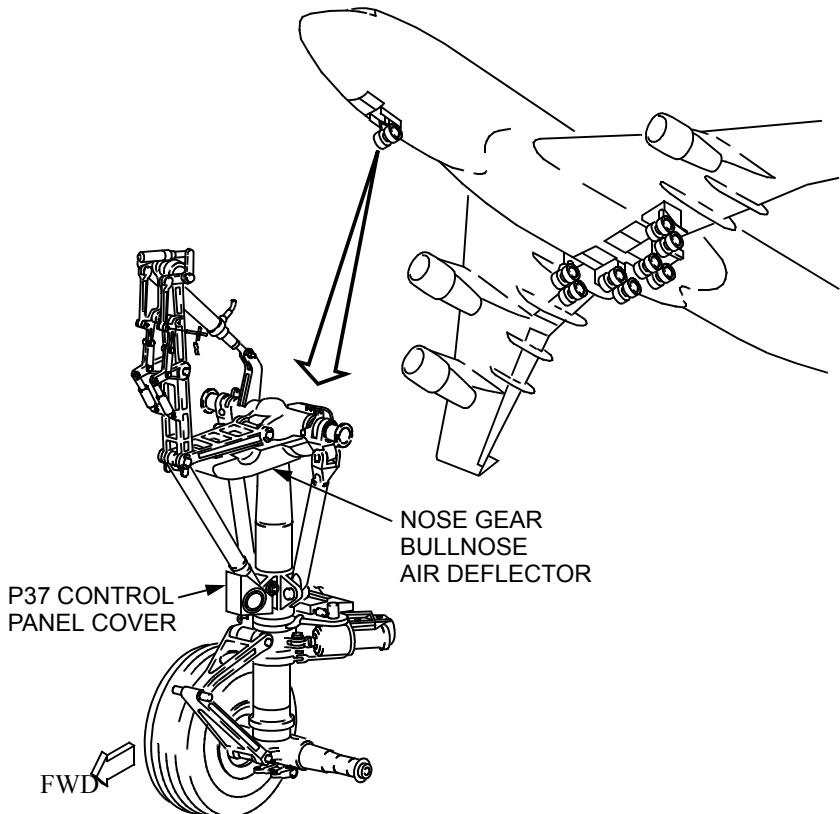
32-21-02 Nose Gear Bullnose Air Deflector

May be missing.

NOTE: May be missing in combination with Item 32-21-1.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
1	No penalty	No penalty

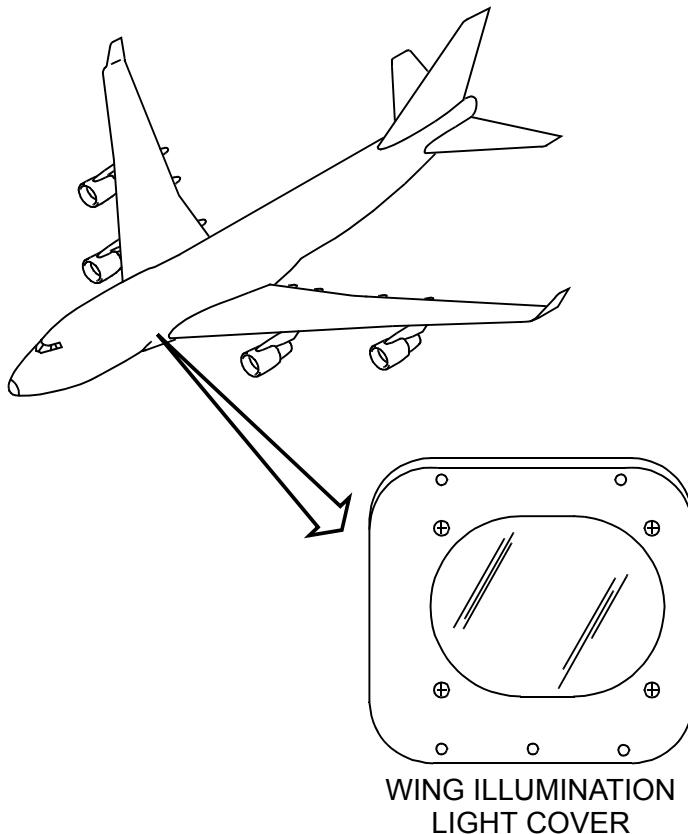


33-41-01 Wing Illumination Light Covers

One or both may be missing.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
2	Negligible penalty	Negligible penalty



33-43-01 Wing-Tip Navigation Light Lens

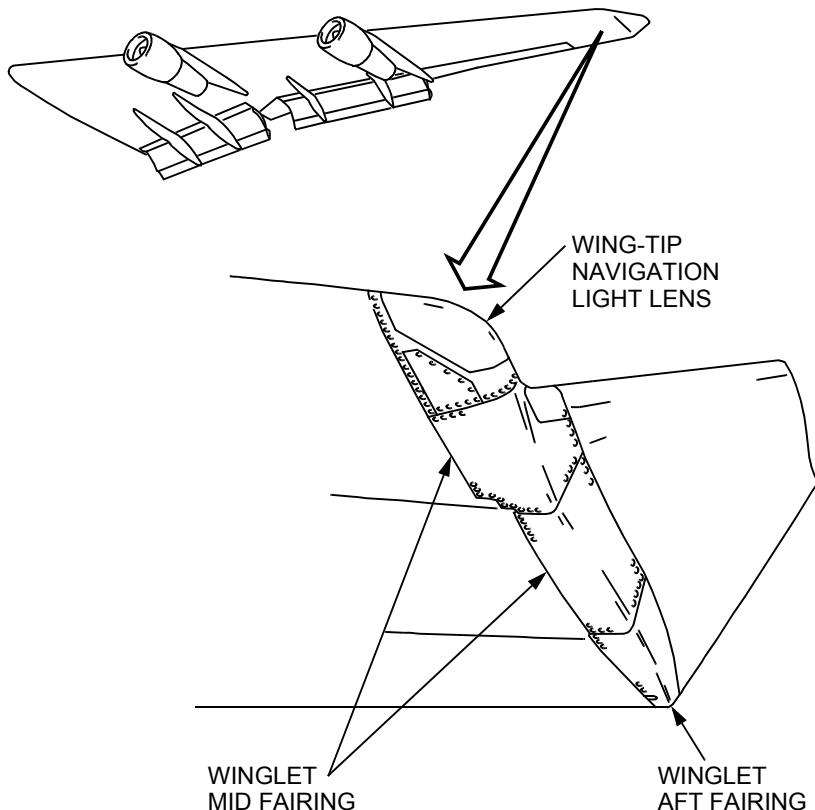
One may be missing provided the affected winglet and all of its fairings are removed.

For a missing lens, disconnect electrical power and remove light bulbs, reflector, lens cover and lens cover support. Cover the light assembly opening with speed tape.

NOTE: For wing-tip navigation lights, dispatch using MEL item 33-43-01.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
2	9571 kg	4945 kg



Section 3

747 Dispatch Deviations Guide

33-44-01 Upper and Lower Body Anti-Collision Light Lenses

One or both lenses may be missing.

NOTE 1: The bulb must be removed, and the opening must be covered with speed tape to prevent moisture or debris from entering into light assembly.

NOTE 2: The airplane must also be dispatched using MEL item 33-44-01.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
2	No penalty	No penalty

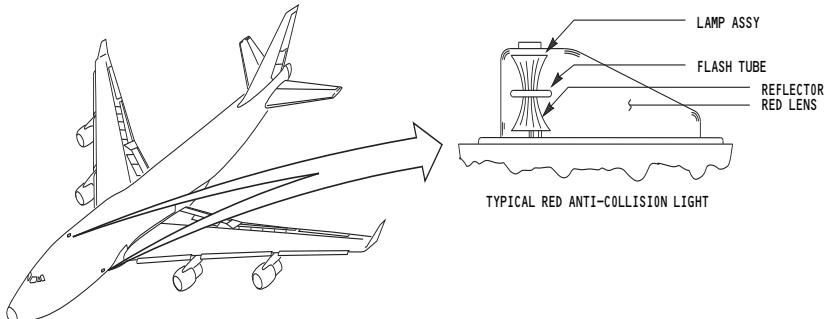
MAINTENANCE

1. Set the overhead panel (P5) BEACON switch OFF.
 2. Open the P6 panel RED ANTI-COLLISION LTS circuit breaker.
 3. Gain access to the associated beacon light.
 4. Disconnect, cap and stow power input connector to associated anti-collision light power supply (AMM 33-44-09/401) (SSM 33-44-01).

For Strobe Beacon Lights (anti-collision lights with flash tube)

5. For strobe beacon light(s), remove the associated flash tube.
 6. With rest of light assembly intact, cover the opening with speed tape.
 7. Close the opened circuit breaker.
 8. For upper beacon light inoperative, set the overhead panel (P5) BEACON switch to LWR.
 9. For lower beacon light inoperative or both beacon lights inoperative, set the overhead panel (P5) BEACON switch OFF.

Strobe Beacon Lights

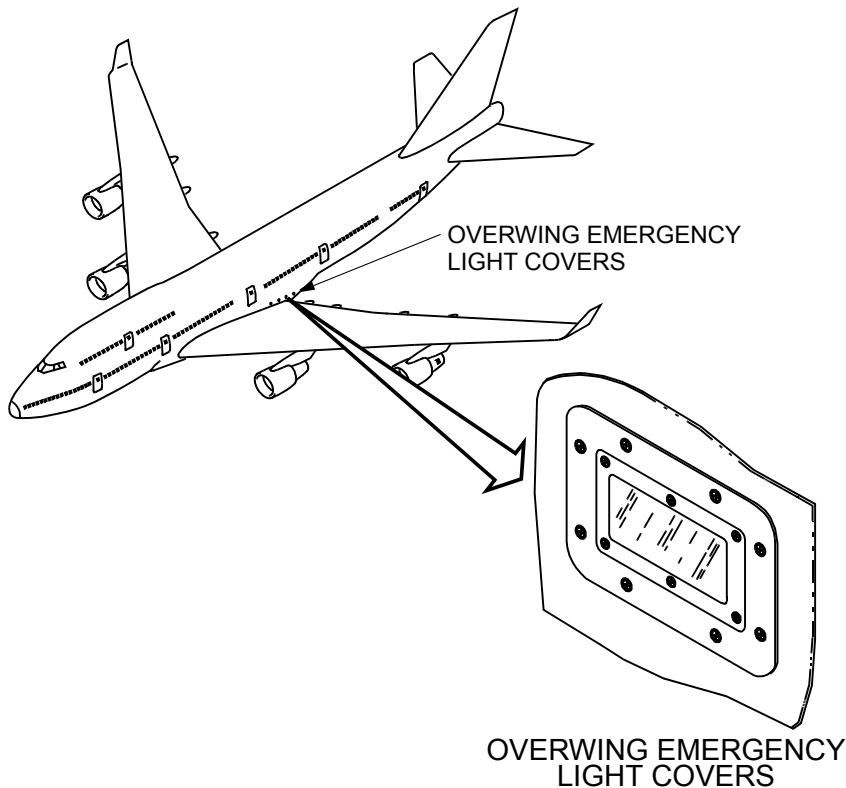


33-51-01 Overwing Emergency Light Covers

Any number may be missing.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
8	Negligible penalty	Negligible penalty



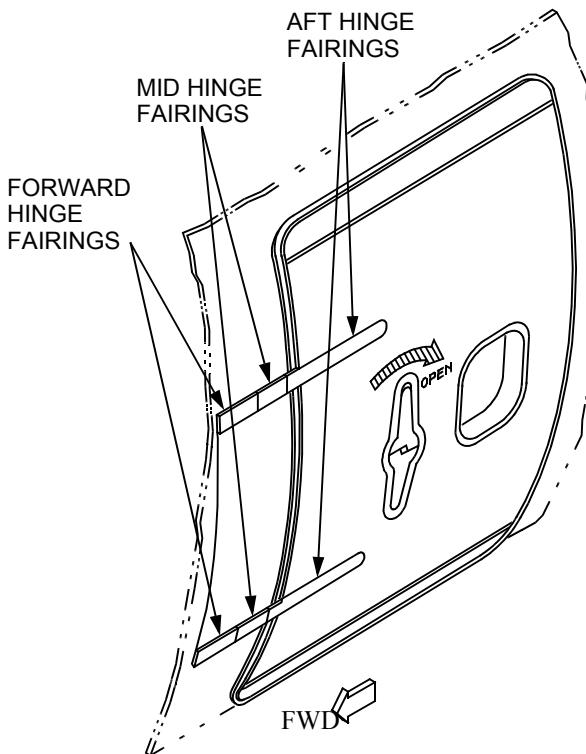
52-11-01 Main Entry Door Mid and Aft Hinge Fairings

This item is for the small mid and aft fairings installed over hinge attachment points (2 at upper hinge attachment and 2 at lower hinge attachment).

Any number may be missing from two main entry doors (maximum of eight).

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
40	Negligible penalty	Negligible penalty



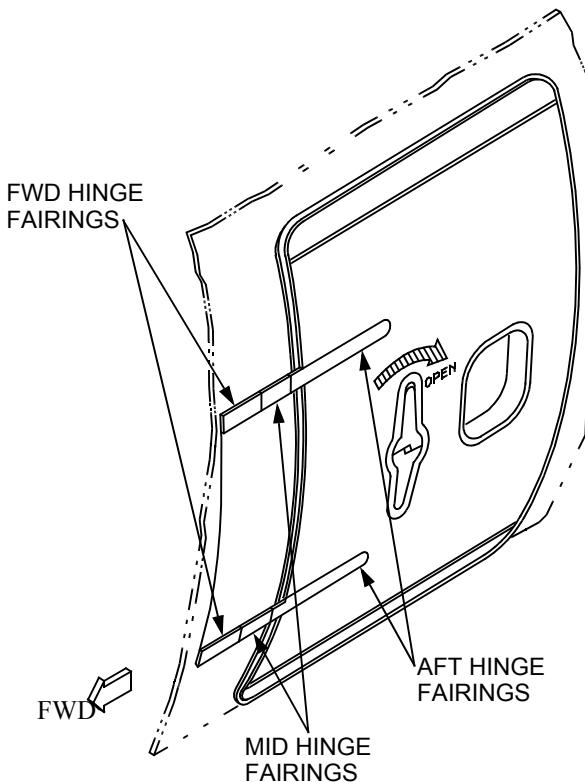
52-11-02 Main Entry Door Forward Hinge Fairings

This item is for the small forward fairings installed over hinge attachment points (1 at upper hinge attachment and 1 at lower hinge attachment).

Performance limited weights are reduced by the following:

1. Maximum of eight may be missing.

Number Installed	Takeoff & Landing	Enroute Climb
20	No penalty	No penalty



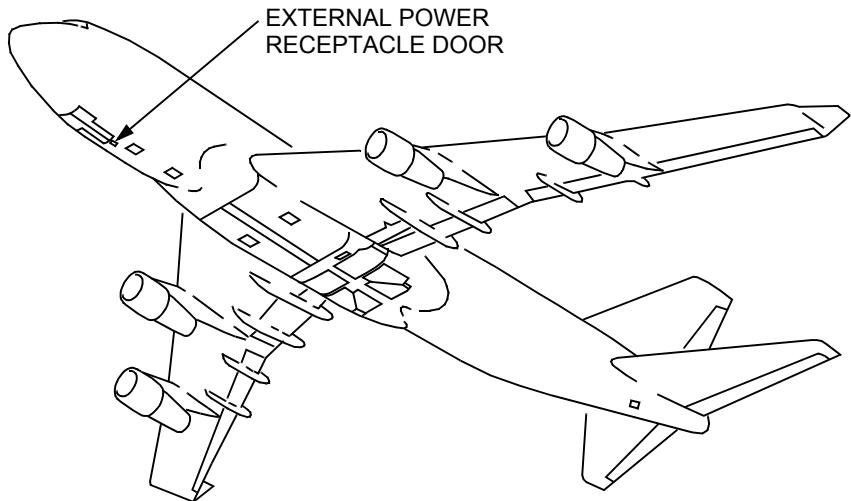
Section 3

52-49-01 External Power Receptacle Door

May be missing.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
1	Negligible penalty	Negligible penalty



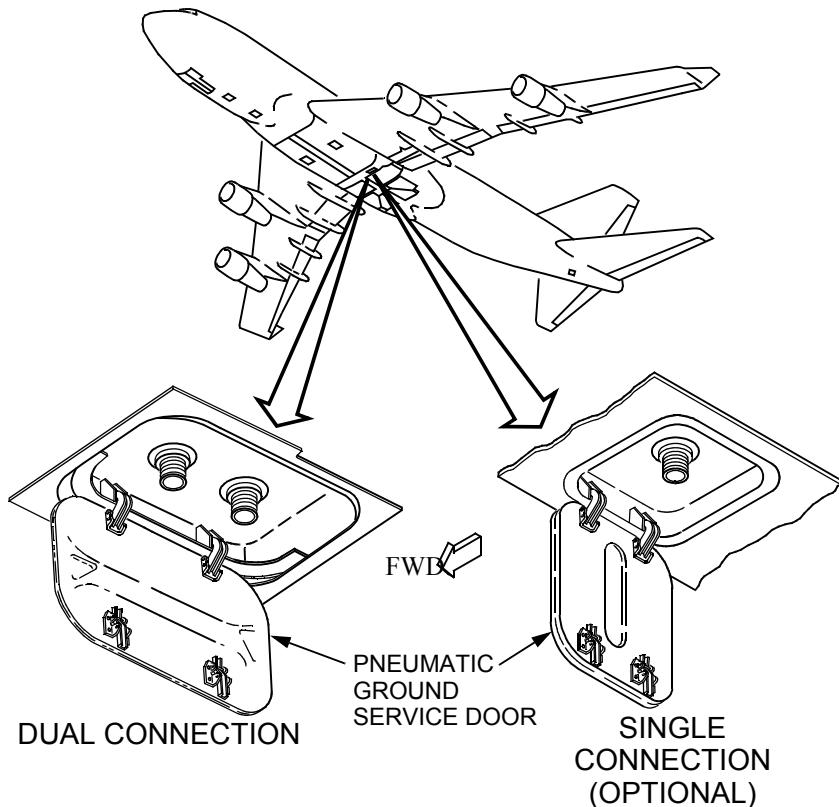
52-49-02 Pneumatic Ground Service Door

This item is for either dual or single pneumatic ground service connection door installations.

May be missing.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
1	Negligible penalty	69 kg



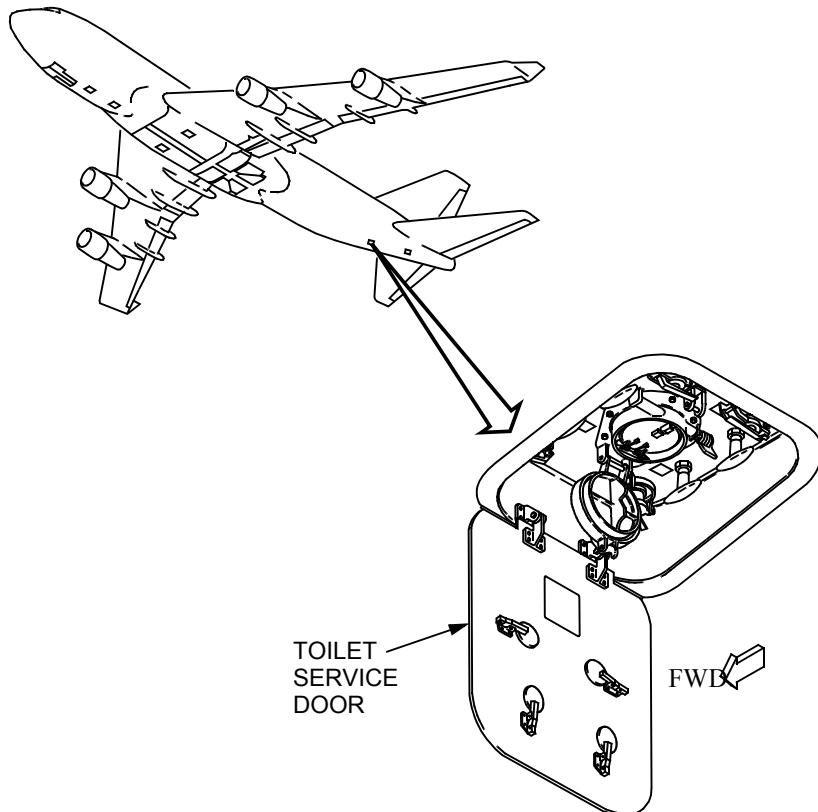
52-49-03 Toilet Service Door

May be missing

NOTE: Penalty to be added to aircraft instantaneous weight when calculating all engines and engine out ceilings, drift down height/distance etc. Only add to FMC ZFW when climb/drift down performance information is required. Use correct ZFW for fuel/time predictions.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
1	Negligible penalty	69 kg

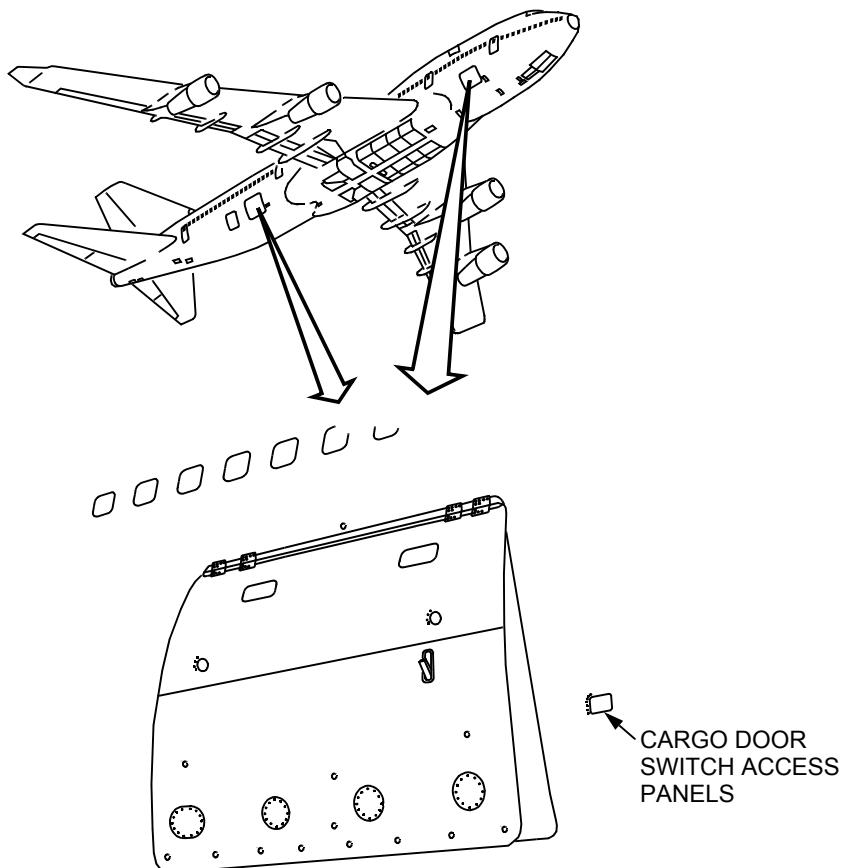


52-49-04 Cargo Door Switch Access Panels

Any number may be missing.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
2	Negligible penalty	Negligible penalty

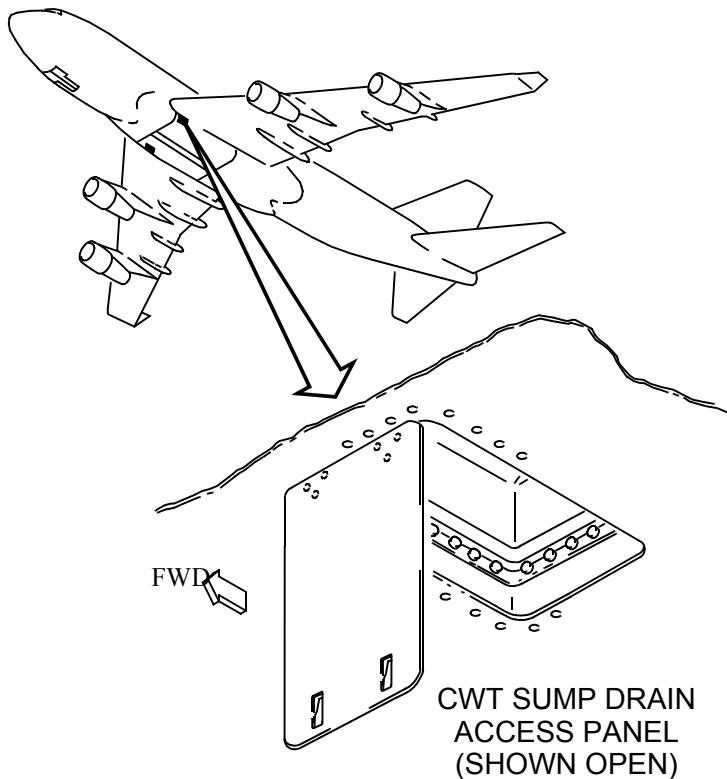


52-49-05 CWT Sump Drain Access Panels

Any number may be missing.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
2	Negligible penalty	Negligible penalty



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53-51-01 Wing-to-Body Fillet Fairing

This item is for the fairing adjacent the fixed wing trailing edge upper panel.

Any number may be missing.

Removal of the wing-to body fillet fairing exposes a longeron splice fitting on the side of the body. This longeron splice fitting must be thoroughly speed taped.

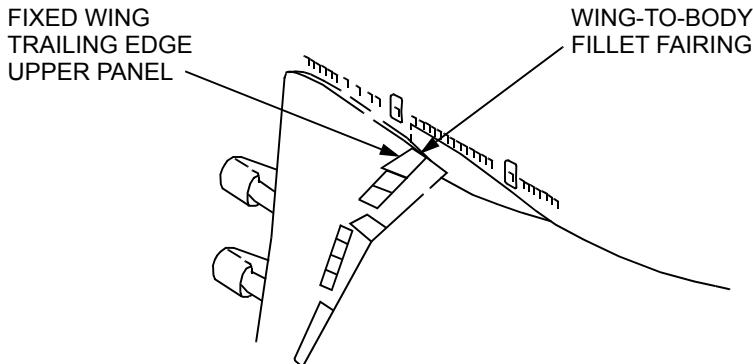
The maximum airspeed limits (VMO/MMO) are 270 KCAS/0.73 Mach.

NOTE 1: Place the Gear Down Dispatch switch in the Main Equipment Center to GEAR DOWN DISPATCH position.

NOTE 2: Maximum takeoff weight limited to 326,586 kg. [AFM Gear-Down (Landing Gear Extended) Appendix]

Performance limited weights are reduced by the following for each missing fairing.

Number Installed	Takeoff and Landing	Enroute Climb
2	Negligible penalty	82 kg



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54-32-01 Nacelle Strut Access Doors (Includes Pylon Valve Access Doors)
For RR:

Any number of the specified doors may be missing.

NOTE: Enroute climb penalty to be added to aircraft instantaneous weight when calculating all engines and engine out ceilings, drift down height/distance etc. Only add to FMC ZFW when climb/drift down performance information is required. Use correct ZFW for fuel/time predictions.

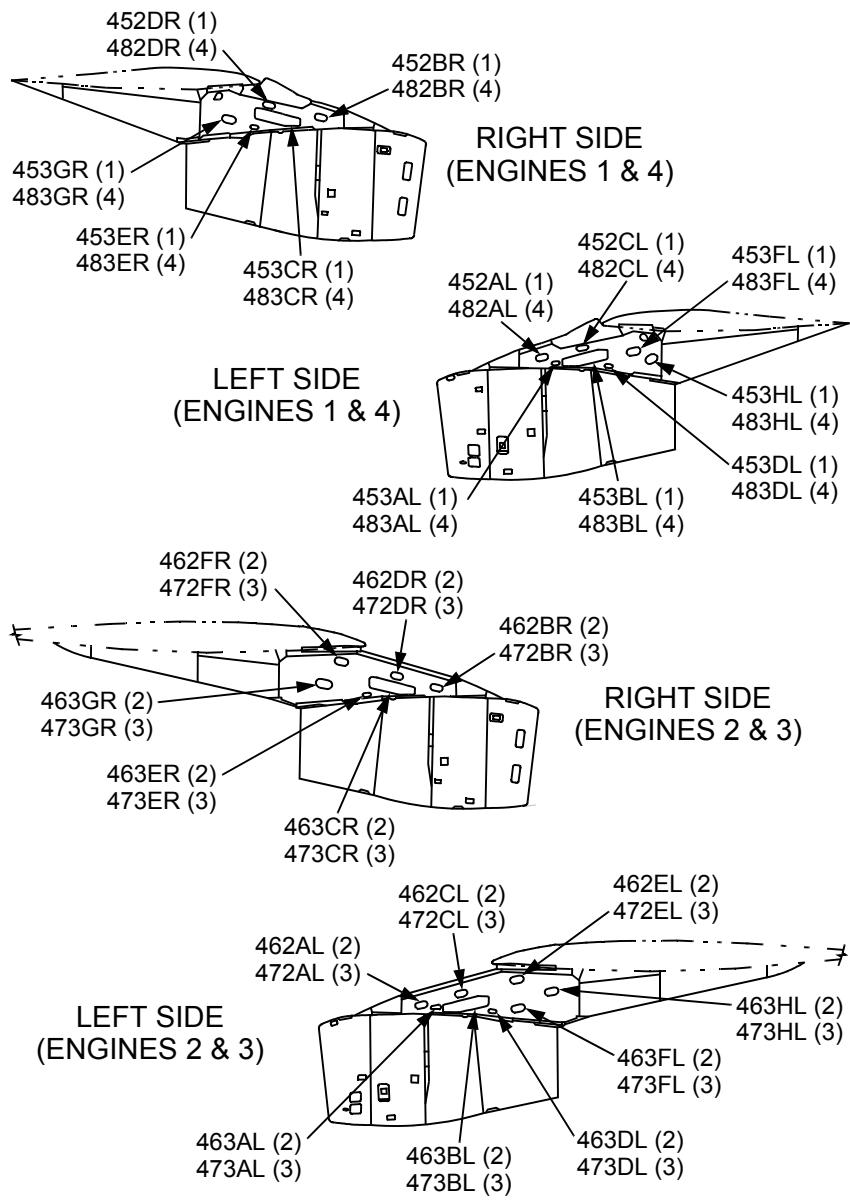
The performance limited weights are reduced by the following for each affected strut:

For RR:

Number Installed	Location	Number of Doors Missing (Per Strut)	Performance Decrement (Per Affected Strut)	
			Takoff & Landing	Enroute Climb
40	Inboard Strut: Group I (total of 4 per strut)	One	7 kg	21 kg
		More than One	363 kg	1112 kg
40	Inboard Strut: Group II (total of 2 per strut)	One	7 kg	21 kg
		Both	205 kg	613 kg
40	Inboard Strut: Group III (total of 3 per strut)	One	7 kg	21 kg
		More than One	295 kg	930 kg
40	Inboard Strut: Group IV (total of 3 per strut)	One or More	227 kg	681 kg
40	Inboard Strut: Group V (total of 2 per strut)	One	7 kg	21 kg
		Both	14 kg	41 kg
40	Outboard Strut: Group I (total of 4 per strut)	One	7 kg	21 kg
		More than One	363 kg	1112 kg

Number Installed	Location	Number of Doors Missing (Per Strut)	Performance Decrement (Per Affected Strut)	
			Takoff & Landing	Enroute Climb
40	Outboard Strut: Group III (total of 3 per strut)	One	7 kg	21 kg
		More than One	318 kg	1021 kg
40	Outboard Strut: Group IV (total of 3 per strut)	One or More	227 kg	681 kg
40	Outboard Strut: Group V (total of 2 per strut)	One	7 kg	21 kg
		Both	14 kg	41 kg
Group	Inboard Strut Doors	Outboard Strut Doors		
I	462 AL, BR, CL, DR 472 AL, BR, CL, DR	452 AL, BR, CL, DR 482 AL, BR, CL, DR		
II	462 EL, FR 472 EL, FR			
III	463 FL, GR, HL 473 FL, GR, HL	453 FL, GR, HL 483 FL, GR, HL		
IV	463 AL, BL, CR 473 AL, BL, CR	453 AL, BL, CR 483 AL, BL, CR		
V	463 DL, ER 473 DL, ER	453 DL, ER 483 DL, ER		

For RR:



ACCESS DOORS

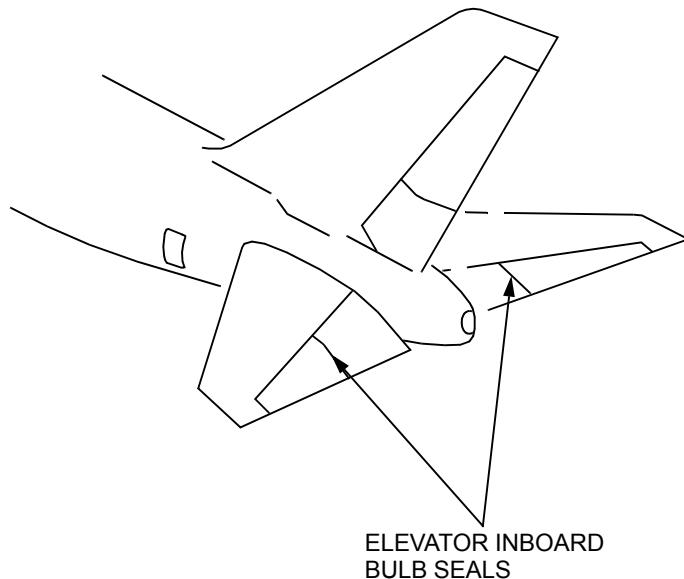
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Section 3**55-20-01 Elevator Inboard Bulb Seals**

Any number may be missing.

Performance limited weights are reduced by the following for each missing seal.

Number Installed	Takeoff and Landing	Enroute Climb
2	Negligible penalty	91 kg

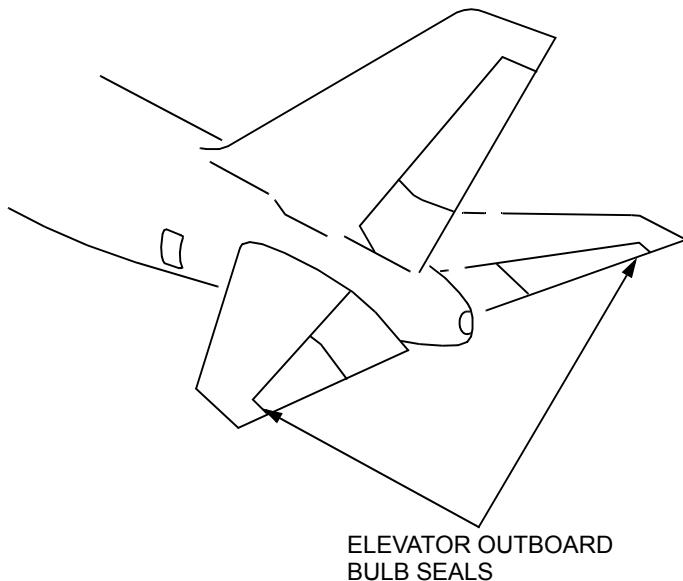


55-20-02 Elevator Outboard Bulb Seals

Any number may be missing.

Performance limited weights are reduced by the following.

Number Installed	Takeoff and Landing	Enroute Climb
2	Negligible penalty	Negligible penalty



Section 3

57-23-01 Winglet Fairings

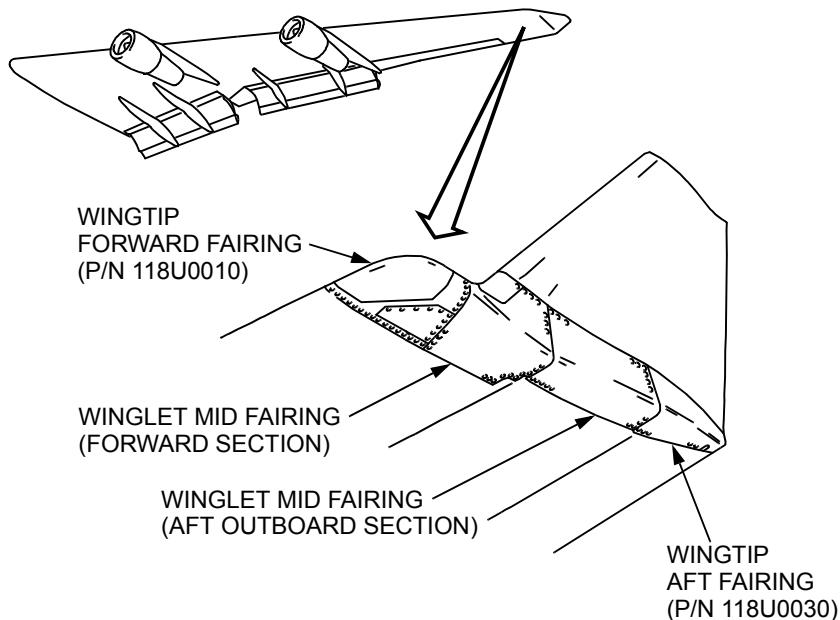
One set may be missing.

NOTE 1: If any winglet fairing is damaged or missing, the affected winglet and all its fairings except the leading edge wingtip fairing Part Number 118U0010 and the trailing edge wingtip fairing Part Number 118U0030 must be removed. The forward facing opening in the trailing edge wingtip fairing must be covered (e.g. speed tape).

NOTE 2: Penalty to be added to aircraft instantaneous weight when calculating all engines and engine out ceilings, drift down height/distance etc. Only add to FMC ZFW when climb/drift down performance information is required. Use correct ZFW for fuel/time predictions.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
10	9435 kg	4536 kg



57-28-01 Winglets

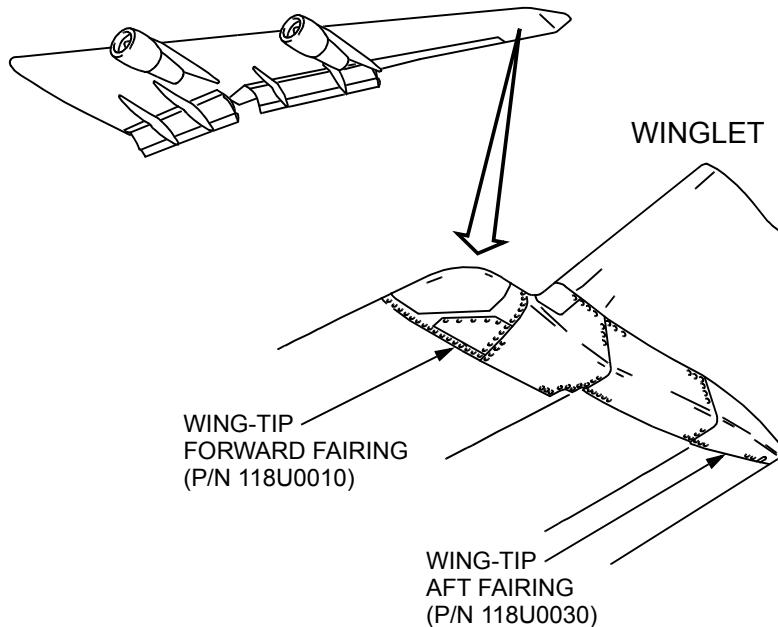
One may be missing.

NOTE 1: If a winglet is removed, the affected winglet fairings except the leading edge wingtip fairing Part Number 118U0010 and the trailing edge wingtip fairing Part Number 118U0030 must be removed. The forward facing opening in the trailing edge wingtip fairing must be covered (e.g. speed tape).

NOTE 2: Penalty to be added to aircraft instantaneous weight when calculating all engines and engine out ceilings, drift down height/distance etc. Only add to FMC ZFW when climb/drift down performance information is required. Use correct ZFW for fuel/time predictions.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
2	9435 kg	4536 kg

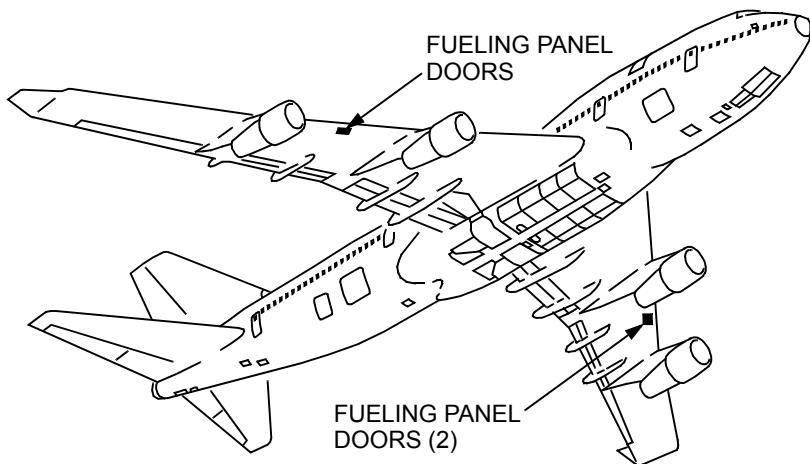


57-31-01 Fueling Panel Doors

Any number may be missing.

Performance limited weights are reduced by the following for each missing item:

Number Installed	Takeoff & Landing	Enroute Climb
3	Negligible penalty	Negligible penalty



57-54-01 Leading Edge Flap - Inboard Strut Seal

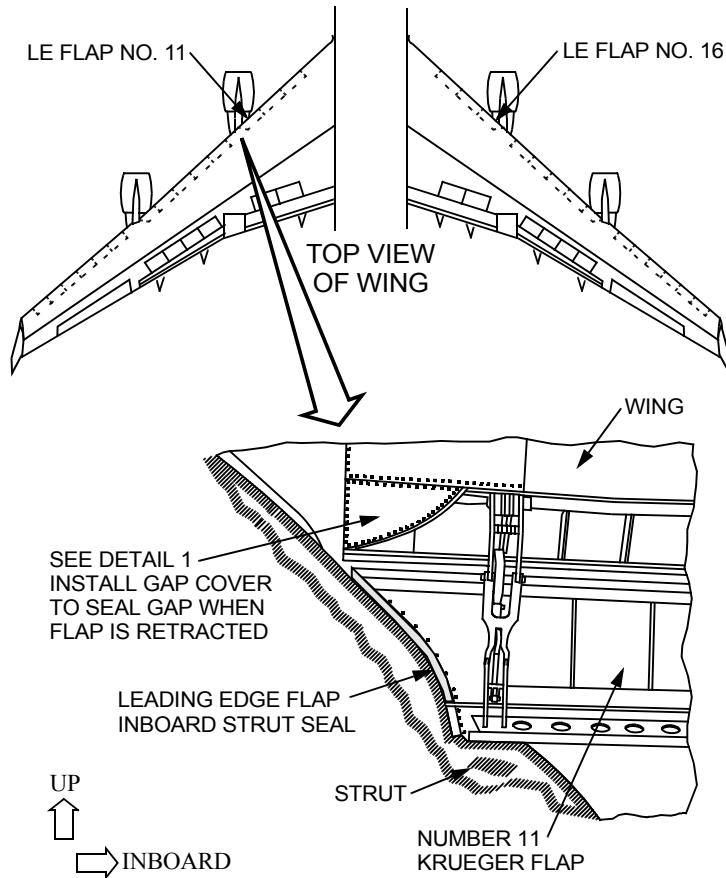
Any number may be missing.

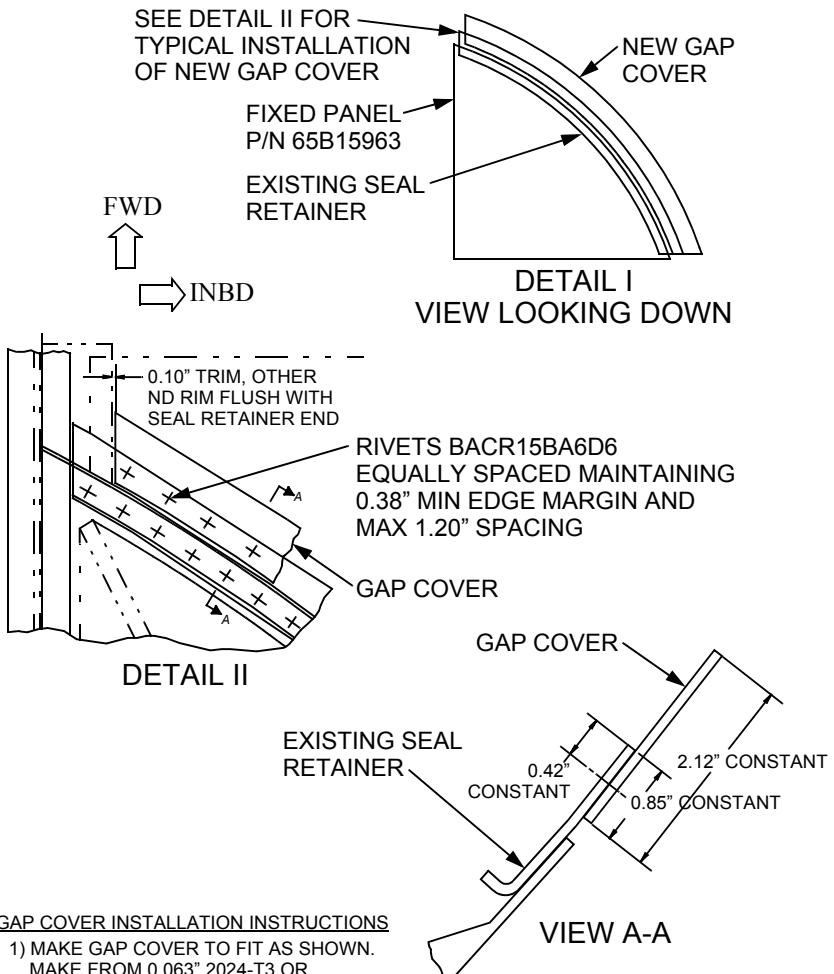
The aft center of gravity limit is reduced from 33% MAC to 29% MAC.

Performance limited weights are reduced by the following:

NOTE: A flat plate seal must be placed on the fixed lower surface structure to ensure that the leading edge cavity is sealed when flaps are retracted.

Number Installed	Takeoff	Landing
2	2286 kg	2948 kg




GAP COVER INSTALLATION INSTRUCTIONS

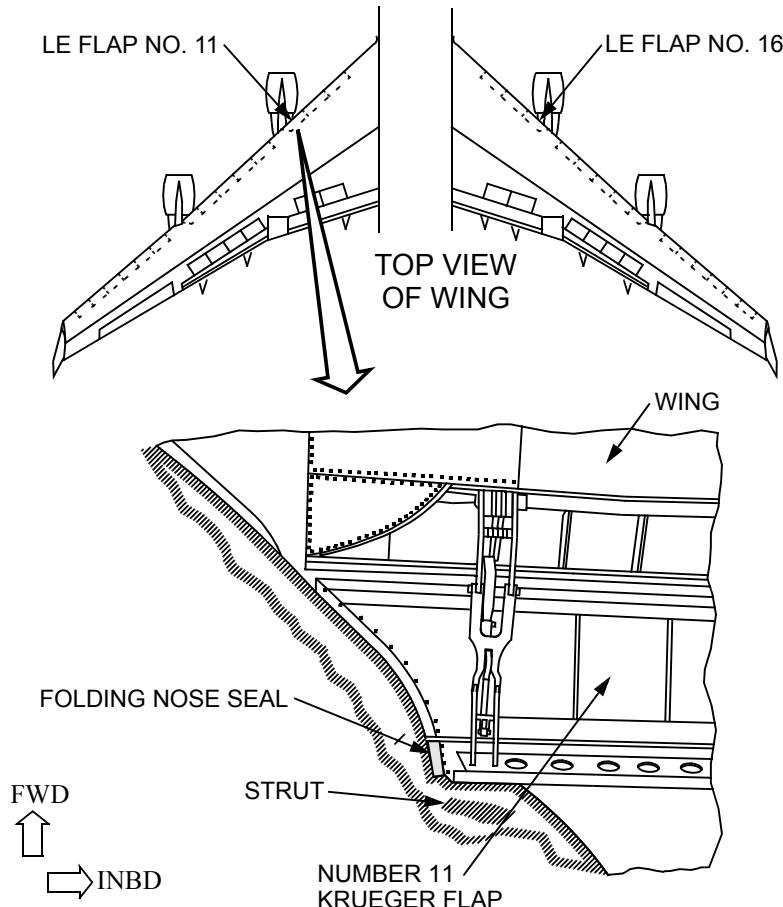
- 1) MAKE GAP COVER TO FIT AS SHOWN.
MAKE FROM 0.063" 2024-T3 OR 7075-T6 ALUMINUM.
- 2) FINISH GAP COVER WITH ALODINE AND BMS 10-11 TYPE 1 PRIMER.
- 3) INSTALL GAP COVER ONTO EXISTING SEAL RETAINER AS SHOWN. USE BACR15BA606 RIVETS, FLUSH ON LOWER SURFACE OF GAP COVER.

57-54-02 Leading Edge Flap Folding Nose - Inboard Strut Seal

Any number may be missing.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
2	No penalty	No penalty



78-31-02 Fan Thrust Reverser Blocker Doors

For RR:

1. One per cowl half on two symetrical engines (maximum of four total) may be missing. Symetrical engines are 1 & 4, 2 & 3 or all 4 engines.

NOTE 1: Thrust reverser should be locked out with missing blocker door using MEL item 78-31-01.

NOTE 2: Operating links for missing blocker doors must be removed.

NOTE 3: Reverse thrust must not be used or selected on an engine with missing blocker doors. Thrust reverser should be locked out with missing blocker doors. Use landing performance data for number of serviceable thrust reversers only.

NOTE 4: Penalty to be added to aircraft instantaneous weight when calculating all engines and engine out ceilings, drift down height/distance etc. Only add to FMC ZFW when climb/drift down performance information is required. Use correct ZFW for fuel/time predictions.

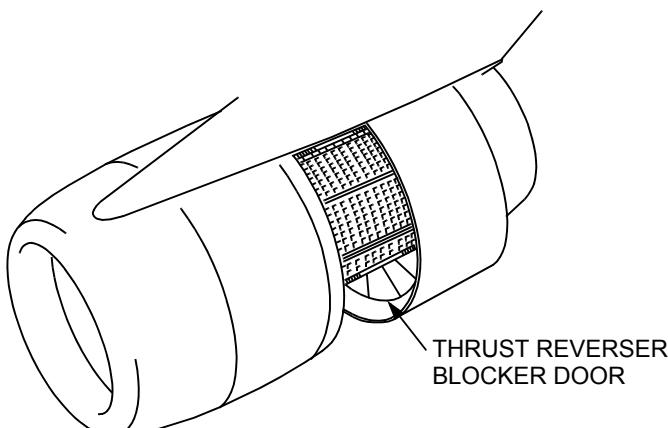
For each affected engine, performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
48 (6 per cowl half)	477 kg	772 kg

For RR:

48 (6 per cowl half)	477 kg	772 kg
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For RR:



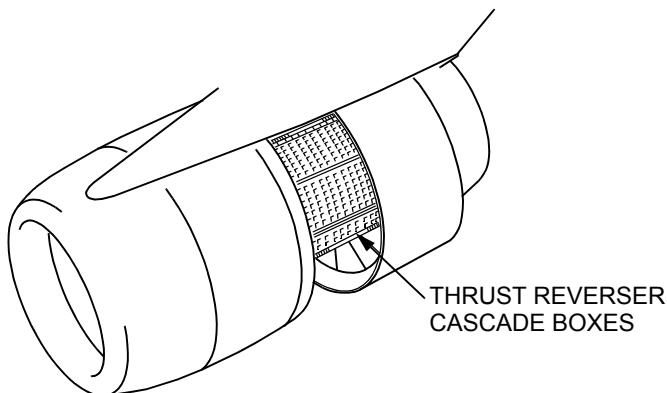
78-31-05 Fan Thrust Reverser Cascade Boxes**For RR Engines:**

1. One may be damaged or missing from one engine.
2. Associated thrust reverser is deactivated.

NOTE: Dispatch using MEL item 78-31-01.

Performance limited weights are reduced by the following:

Number Installed	Takeoff & Landing	Enroute Climb
48	No penalty	No penalty



Section 4

Table of Contents

Miscellaneous

General

Airplane Model Information

Table of Contents

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Airplane Model Information

Where applicable, airplane model information (annotation) is included above affected text to identify configuration-specific information. The annotation applies only to text aligned immediately below it and any associated indented text. Where possible, British Airways removes stages not applicable to its configuration. The following example illustrates the model applicability for a Maintenance procedure:

MAINTENANCE (M)

Verify that the associated engine fuel shutoff valve is operating normally once each flight day (AMM 73-00-00/901).

1. Start the associated engine and allow engine to stabilize at ground idle (AMM 71-00-00/201).
2. Open the P11 panel FUEL SPAR VALVE circuit breaker for the associated engine.
3. After minimum engine operating time, position the associated engine FUEL CONTROL switch to CUTOFF and confirm engine shutdown.
4. For engine not shutdown, the fuel shutoff valve is not operating normally.
 - A. Monitor EGT and be prepared to motor the engine.
 - B. Close the P11 panel FUEL SPAR VALVE circuit breaker.

For PW or RR:

- C. The engine may continue to operate for one minute.
5. Confirm the associated FUEL SPAR VALVE L or R status message is displayed.
6. Erase the latched FUEL SPAR VALVE L or R status message (AMM 31-61-00/201).
7. After engine has stopped rotating, close the P11 panel FUEL SPAR VALVE circuit breaker.

When airplane model information (annotation) is left justified, aligned with the bolded heading or title and not aligned with an individual paragraph, step, or note, it indicates all the information following that annotation is applicable to the end of the listed steps, or until another airplane model is noted. For this format, all the steps that follow multiple annotations are re-numbered beginning from step 1 for each annotation.

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