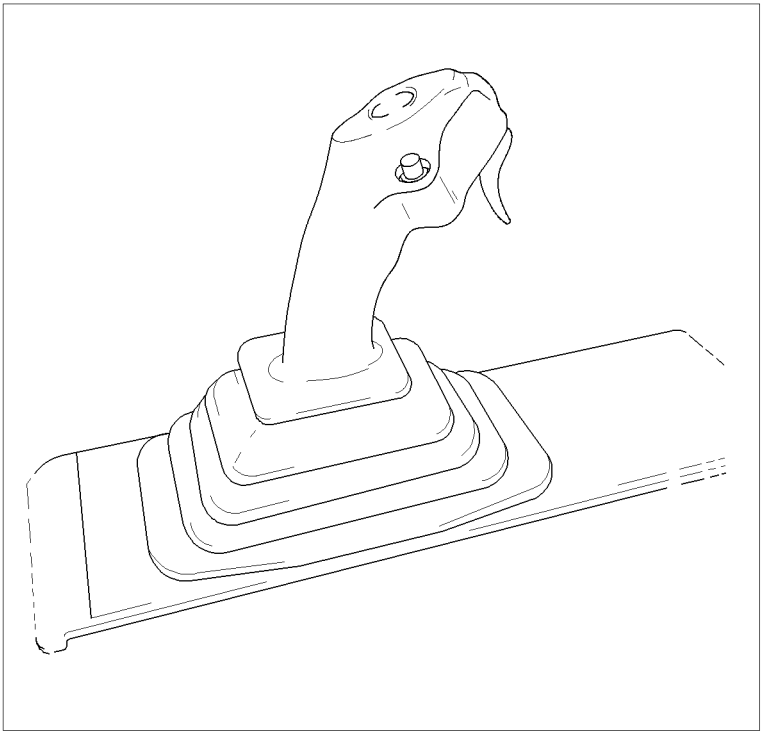
A318/A319/A320/A321

FLIGHT CREW OPERATING MANUAL



FLIGHT OPERATIONS 3

AIRBUS®

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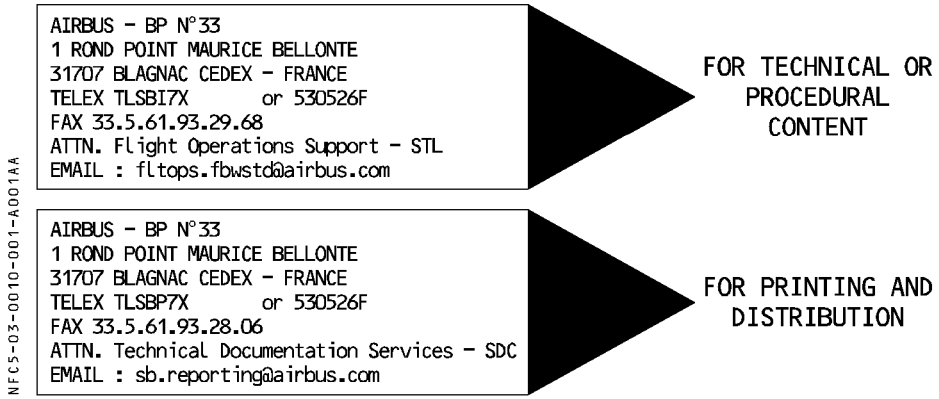
FOREWORD

This manual complements the approved Flight Manual. Airbus has attempted to ensure that the data contained in this manual agrees with the data in the Flight Manual. If there is any disagreement, the Flight Manual is the final authority.

COMMENTS - QUESTIONS - SUGGESTIONS

All manual holders and users are encouraged to submit any Flight Crew Operating Manual questions and suggestions to :

R



CONTENT

R The Flight Crew Operating Manual (FCOM), and the associated Quick Reference Handbook
R (QRH), are developed specifically for flight crews, in order to provide them with all of the
R necessary information about the operational, technical, procedural, and performance
R characteristics that are required for the safe and efficient aircraft operation. These manuals
R take into account all of the operational procedures to be applied during normal and
R abnormal/emergency situations that may occur on ground or in flight.
R The manuals are not designed to provide basic airmanship skills or piloting techniques.
R They are intended for flight crews that have already been trained to fly this type of aircraft,
R and are familiar with the aircraft's handling characteristics.
R In addition, the purpose of the FCOM is to :
R — Be used as a comprehensive reference guide during initial and refresher flight crew
R training. Practical and training-related information is addressed in the Flight Crew
R Training Manual (FCTM).
R — Provide Airbus operators with a basis for their development of a customized airline
R operations manual, in accordance with applicable requirements.

The content is divided into four volumes :
Vol 1 = Systems' description (description of the aircraft systems).
Vol 2 = Flight preparation (performance information, plus loading data).
Vol 3 = Flight operations (operating procedures, techniques, and performance information).
Vol 4 = FMGS pilot's guide (procedures for FMGS use).

USE

As a comprehensive set of references, the FCOM :
- can be used by an operator's flight operations department to supplement its own crew manual
- can be issued directly to crew members for training and subsequently for line operations.

WARNINGS, CAUTIONS AND NOTES

WARNING : an operating procedure, technique, etc, which may result in personel injury or loss of life if not carefully followed.
CAUTION : an operating procedure, technique, etc, which may result in damage to equipment if not carefully followed.
NOTE : an operating procedure, technique, etc, considered essential to emphasize.

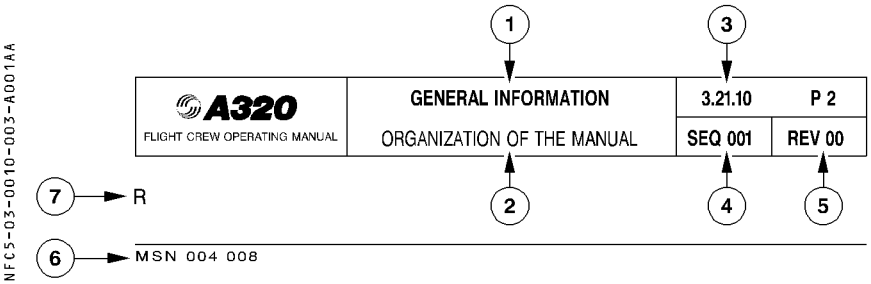
COMPLEMENTARY INFORMATION

The manual includes technical information required for training as well as complementary information.
- Where a paragraph or schematic is preceded by the heading **FOR INFO** the details given are considered to be "nice to know". Knowledge of these items is not required for the type rating qualification.
- ECAM warnings and cautions are summarized in a table at the end of each chapter of volume 1. Numeric values are given for information only.

OPTIONAL EQUIPMENT

The legend "◁" indicates that a paragraph or a shematic is applicable only if the related equipment is installed.

PAGINATION



(1) Chapter title

(2) Subchapter title

(3) FCOM volume number, Chapter number, Section number, Page number

(4) Sequence number is used for Airbus Industrie management of different aircraft configurations and allows to enter into list of effective pages

(5) Revision number of the manual at which the page has been revised

(6) Aircraft MSN
- 004 008 means that the page is applicable to aircraft MSN 004 and MSN 008
- 010-014 means that the page is applicable to aircraft MSN 010 to MSN 014
- ALL means that the page is applicable to all aircraft covered by the manual.

Correspondance between MSN and registration may be found in the cross reference table

(7) An "R" in front of a line indicates that the line has been revised.

REVISIONS

NORMAL REVISIONS

There are issued periodically to cover non-urgent corrections and changes, and to add new data.
They are accompanied by filing instructions and an updated List of Effective Pages that includes customized pages.
A normal revision record sheet is at the front of each volume.
In addition, each volume has a "List of MOD/MP affecting the manual", that gives a simple explanation of the technical content of each MOD/MP incorporated and its validity per aircraft.

TEMPORARY REVISIONS

Printed on yellow paper these are, issued to cover urgent matters arising between normal revisions. They are accompanied by filing instructions and an updated customized list of effective TR.
A yellow temporary revision record sheet is at the front of each volume.

INCORPORATION OF SERVICE BULLETINS IN THE MANUAL

When a Service Bulletin (SB) has been accomplished on one or more aircraft of the operator fleet, and notified to Airbus Industrie, all affected manuals will reflect the new aircraft configuration at next following revision. If judged necessary by Airbus Industrie, or requested by the operator, a "Temporary Revision" is issued between formal revisions.

OPERATIONS ENGINEERING BULLETINS

These are issued as the need arises to give operators revised or new, but significant, technical and procedural information.
OEBs come with an OEB record sheet. This record sheet is re-issued with each normal revision to update the bulletin embodiment status.
They are accompanied by filling instructions and an updated customized list of effective OEB.

HOW TO INSERT A REVISION

FILING INSTRUCTIONS

Use the filing instructions as follows :

- REMOVE : The page must be removed. It may be replaced by a new page if associated with an "INSERT" instruction. If not, the page is cancelled.
- INSERT : The page must be inserted. If not associated with a "REMOVE" instruction, the page is new for the operator fleet and does not replace an existing one.

The column "NOTE" indicates the reason for change. It states "EFFECTIVITY CHANGE ONLY" if the page is only revised due to effectivity change and not due to technical content.

LIST OF EFFECTIVE PAGES (LEP)

The manual after revision must comply with the LEP, which lists all the pages that are in the manual. The new pages are indicated by "N" and the revised pages by "R".

BEST WAY TO GET UPDATED DOCUMENTATION

The best way to ensure timely receipt of getting correct updated documentation is to advise :
AIRBUS INDUSTRIE
BP 33
31707 BLAGNAC CEDEX
FRANCE
Telex : TLSBP7X.. or 530526F
FAX 33.61.93.28.06
ATTN : Customer Service Directorate – Technical Documentation Services (AI/SE – D)
as soon as any change has been completed on any airplane.

To simplify automatic LEP processing some modifications have been grouped under a common code.

CODE	DESIGNATION
0001	CFM 56-5-B3 = (Mod 31707 + CFM 56-5-B1) = (Mod 34818 + CFM 56-5-B1)
0002	Mod : (21678+26377) = (21678+26999) = (21678+26377+26999)
0003	Mod : (20268+24917+56-5-B3) = (20268+24917+31701+56-5-B1) = (20268+24917+34818+56-5-B1)
0004	Mod : 33909 = 33910 = (33910+31896) = (33910+32475) = (31897+33909) = (32929+33909)
0005	Mod : 20268 = (20268+26999+28495)
0006	Mod : (24105+30020) = (24105+25800+30020)
0007	STD = Mod : (31283+34861) = (31283+34862) = (31283+34864)
0009	STD = Mod : 20057 = 20059 = 30020 = 32236 = (20057+20059)
0010	Mod :(36290+CFM 56-5-A4=A5=B5=B6=V2522A5=V2524A5) = (20802+28053+36290+V2524A5)
0011	Mod : (21054+22013+25199) = (21054+22013+25200)
0012	Mod : (22461+23426) = (22461+23943) = (23408+23426) = (23408+23943)
0013	STD = IAE V2500 = Mod : 25404 = 26017
0015	STD = Mod : (30660+34861) = (30660+34864)
0016	Mod : 28479 = 28702 = 28916 = (28479+34861) = (28479+34862)
0017	Mod : (23108+30748)+V2500 = (23109+30748)+V2500 = (23408+30748)+V2500
0018	Mod : 30363 = (28479+30363+34864)
0019	Mod : (28479+30363) = (28702+30363) = (28916+30363) = (28479+30363+34861) = (28479+30363+34862)
0020	Mod : 24105 = (24105+30660+34861) = (24105+30660+34864)
0021	Mod : (24105+30660) = (24105+30660+34862)
0022	Mod : 35311 = 36331 = 36854 = 36849 = 36932
0023	Mod : 22013 = (22013+31283+34861) = (22013+31283+34862) = (22013+31283+34864)
0025	Mod : STD = (33100+34856) = (33100+34898) = (33100+34997) = (32650+32651) = (33100+34856+32650+32651) = (33100+34898+32650+32651) = (33100+34997+32650+32651)
0026	Mod : 20268 = (20268+25800)
0027	Mod : 25720 = 26609 = (25720+26609)
0028	Mod : (26999+31283+35220) = (27646+31283+35220) = (30361+31283+35220) = (26999+27646+31283+35220)
0029	Mod : (20024+22013+24613+26017) = (20024+22013+24613+26017+25410)
0030	Mod : (22013+26999+31283+35220) = (22013+27646+31283+35220) = (22013+26999+27646+31283+35220)
0031	Mod : (22013+26999+30626+31283+35220+33100) = (22013+26999+27646+30626+31283+35220+33100)
0033	Mod : (26999+30626+31283+33300+35220) = (26999+30626+31283+33100+35220) = (26999+27646+30626+31283+33100+35220) = (26999+27646+30626+31283+33300+35220)
0034	Mod : (26999+31283+33100+35220) = (27646+31283+33100+35220) = (26999+27646+31283+33100+35220)
0035	Mod : (21678+24105) = (21678+26335+28160) = (21678+24105+32207+35100) = (21678+26335+28160+32207+35100)
0036	Mod : 21988 = (21988+22013) = (21988+24105)

CODE	DESIGNATION
0038	STD = (32619+28307) = (27725+32239)
0039	Mod : (20047+20063+20151+26723) = (20047+20063+20151+30277) = (20047+20063+20151+27763) = (20047+20063+26723+31112) = (20047+20063+20151+26723+27763)
0040	Mod : 25871 = 25887 = 25893 = 26149 = 26338 = 26608
0041	Mod : (20031+26723) = (20063+27639) = (20063+26723) = (20047+20063+27639) = (20047+20063+27410) = (20047+20063+26723) = (20047+20063+30277)
0042	Mod : (25871+30660) = (25887+30660) = (25893+30660) = (26149+30660) = (26338+30660) = (26608+30660)
0043	Mod : 26608 = (25357+26608) = (26149+26608) = (25357+25596+26608) = (25357+26149+26608) = (25596+26149+26608) = (25357+25596+26149+26608+IAE V2522 = V2524 = V2527 = V2527E = V2530 = V2533) = (25357+25596+26149+26608+27088+IAE V2522 = V2527 = V2527E = V2530 = V2533)
0044	Mod : 26149 = 26608 = (26149+26608)+IAE V2522 = V2524 = V2527 = V2527E = V2530 = V2533
0045	Mod : (33239+30660) = (32619+30660) = (34156+30660)
0046	Mod : 23661 = 24783 = (23661+24783)
0047	Mod : (20024+22013+26017) = (20024+22013+25410+26017)
0048	Mod : (23222+32929) = (26398+31896) = (26398+31897) = (26398+32475) = (26398+32929) = (26398+32402) = (26057+31896) = (23222+32475) = (23222+31896) = (23222+31897) = (26398+31896+32332+32475) = (26398+31897+32333+32929) = (23222+26398+31896) = (23222+26057+31897) = (23222+26398+31897) = (23222+26398+32475) = (23222+26398+32929) = (26057+26398+31897) = (23222+31897+32333+32929) = (23222+26057+26398+31897) = (23222+31896+32332+32475)
0049	(20057+20059) = (20057+20059+20082+20084+36856)
0052	Mod : (26497+32929) = (26497+32475) = (26497+31896+32402) = (26497+31897+32401) = (26497+31897+32929) = (26497+31897+32333+32929) = (26497+31896+32332+32475)
0053	Mod : 28479 = 28702 = 28916 = (28479+34861) = (28479+34862)
0054	Mod : 24349 = 24785 = 24852 = (23779+24349) = (23779+24785) = (23779+24852) = (23779+24349+24785) = (23779+24785+24852)
0056	Mod : (24511+28479) = (24511+28702) = (24511+28916) = (24511+28479+34861) = (24511+28479+34862)
0057	Mod : (20268+36297) = (20268+24946+26965+36297) = (20268+24946+27773+36297) = (20268+25951+26965+36297) = (20268+25951+27773+36297) = (20268+26760+26965+36297) = (20268+26760+27773+36297) = (20268+26965+32150+36297) = (20268+26965+32238+36297) = (20268+26965+32239+36297) = (20268+26965+32311+36297) = (20268+27773+32150+36297) = (20268+27773+32238+36297) = (20268+27773+32239+36297) = (20268+27773+32311+36297) = (20268+26965+35040+36297) = (20268+27773+35040+36297)
0058	Mod : (24511+26401) = (24511+26401+28479+34864)
0059	Mod : 35426 = (20141+20802+27112+35426)
0061	Mod : (23108+27276) = (23109+27276) = (23408+27276) = (23871+27276+CFM 56-5-A1 = A3) = (23109+23408+27276) = (23108+23109+23408+27276)
0062	Mod : (24511+26401+28479) = (24511+26401+28916) = (24511+26401+28479+34861) = (24511+26401=28479+34862)
0063	Mod : 22536 = 23227 = 23529 = (22536+23529)
0064	Mod : (21615+27942) = (20141+20802+21615+22269+23264+23900+27942)
0065	Mod : (23108+20139+27276) = (23109+20139+27276) = (23408+20139+27276)+V2500A1
0066	STD = Mod : (31283+34861) = (31283+34862) = (31283+34864)

CODE	DESIGNATION
0067	STD = Mod : (20024+22013) = (20024+22013+31283+34861) = (20024+22013+31283+34862) = (20024+22013+31283+34864)
0068	Mod : 20024 = (20024+31283+34861) = (20024+31283+34862) = (20024+31283+34864)
0069	Mod : (25800+36311) = (25800+36297) = (25800+36885)
0070	Mod : (20024+22013) = (20024+22013+31283+34861) = (20024+22013+31283+34862) = (20024+22013+31283+34864)
0071	Mod : (20268+36311) = (20268+36297) = (20268+36885)= (20268+25800+36311) = (20268+25800+36297) = (20268+25800+36885) = (20268+25530+26505+36311) = (20268+25530+26505+36297) = (20268+25530+26505+36885) = (20268+25800+25530+26505+36297) = (20268+25800+25530+26505+36885) = (20268+25800+25530+26505+36311)
0072	Mod : 36311 = 36885 = 36297 = (36311+31896) = (36885+31896) = (36297+31896) = (36311+32475) = (36885+32475) = (36297+32475) = (36311+31896+32332+32475) = (36885+31896+32332+32475) = (36297+31896+32332+32475)
0073	Mod : 22562 = 35864 = (22562+35864) = (22562+25888+27609)
0074	Mod : 22013 = (22013+31283+34861) = (22013+31283+34862) = (22013+31283+34864)
0075	CFM 56-5-B4 = IAE V2527 = V2527M = (23108 = 23109 = 23871+CFM 56-5-B4 = IAE V2527 = V2527E)
0076	Mod : (20139+23108) = (20139+23109) = (20139+23408)+V2500
0077	Mod : (25800+36311) = (25800+36297) = (25800+36885)
0078	Mod : (20024+22013) = (20024+22013+31283) = (20024+22013+31283+34861) = (20024+22013+31283+34862) = (20024+22013+31283+34864)
0079	Mod : 25590 = (25590+31283+34861) = (25590+31283+34862) = (25590+31283+34864)
0080	Mod : 24645 = (24645+28479+34864)
0081	Mod : (24645+28479) = (24645+28702) = (24645+28916) = (24645+28479+34861) = (24645+28479+34862)
0082	Mod : (20268+36311) = (20268+36297) = (20268+36885)= (20268+25800+36311) = (20268+25800+36297) = (20268+25800+36885) = (20268+25530+26505+36311) = (20268+25530+26505+36297) = (20268+25530+26505+36885) = (20268+25800+25530+26505+36297) = (20268+25800+25530+26505+36885) = (20268+25800+25530+26505+36311)

	CODE	DESIGNATION
	0083	Mod : (20268+36311) = (20268+24946+26965+36311) = (20268+24946+27773+36311) = (20268+25951+26965+36311) = (20268+25951+27773+36311) = (20268+26760+26965+36311) = (20268+26760+27773+36311) = (20268+26965+32150+36311) = (20268+26965+32238+36311) = (20268+26965+32239+36311) = (20268+26965+32311+36311) = (20268+27773+32150+36311) = (20268+27773+32238+36311) = (20268+27773+32239+36311) = (20268+27773+32311+36311) = (20268+26965+35040+36311) = (20268+27773+35040+36311) (20268+36297) = (20268+24946+26965+36297) = (20268+24946+27773+36297) = (20268+25951+26965+36297) = (20268+25951+27773+36297) = (20268+26760+26965+36297) = (20268+26760+27773+36297) = (20268+26965+32150+36297) = (20268+26965+32238+36297) = (20268+26965+32239+36297) = (20268+26965+32311+36297) = (20268+27773+32150+36297) = (20268+27773+32238+36297) = (20268+27773+32239+36297) = (20268+27773+32311+36297) = (20268+26965+35040+36297) = (20268+27773+35040+36297)" (20268+36885) = (20268+24946+26965+36885) = (20268+24946+27773+36885) = (20268+25951+26965+36885) = (20268+25951+27773+36885) = (20268+26760+26965+36885) = (20268+26760+27773+36885) = (20268+26965+32150+36885) = (20268+26965+32238+36885) = (20268+26965+32239+36885) = (20268+26965+32311+36885) = (20268+27773+32150+36885) = (20268+27773+32238+36885) = (20268+27773+32239+36885) = (20268+27773+32311+36885) = (20268+26965+35040+36885) = (20268+27773+35040+36885)
	0084	Mod: (24645+26925+28479) = (24645+28702+26925) = (24645+28916+26925) = (24645+26925+28479+34861) = (24645+26925+28479+34862)
R	0085	Mod : (36310+20268) = (36310+20268+25800)
R	0086	Mod : 22013=24105=28160=24701=(24701+28160+28917)
	0087	Mod : 27777 = (26608+27777) = (25357+26608+27777) = (26149+26608+27777) = (25357+25596+26149+27777) = (25357+25596+26608+27777) = (25357+26149+26608+27777) = (25596+26149+26608+27777) = (25357+25596+26149+26608+27777) = (25357+25596+26149+26608+27088+27777)+IAE V2522 = V2524 = V2527 = V2527E = V2527M = V2530 = V2533 = (25357+25596+26149+27088+27777)+IAE V2533
R	0088	Mod : (25800+36311) = (25800+36297) = (25800+36885)
	0089	Mod : 25888 = (22562+25888) = (25888+35864) = (22562+25072+25888)
	0090	Mod : 30660 = (28479+30660) = (30660+34862) = (28479+30660+34862)
	0091	Mod : 28479 = 28916 = (28479+34861)
	0092	Mod : (22013+28479) = (22013+28916) = (25951+28479) = (25951+28916) = (22013+28479+34861) = (22013+28479+34862) = (25951+28479+34861) = (25951+28479+34862)
	0093	STD = Mod : 25072 = (22562+25072) = (25888+27609)
	0094	Mod : 28479 = 28916 = (26017+28916) = (28160+28479+28917) = (28160+28916+28917) = (25410+26017+28916)+CFM
R R	0095	Mod : (20268+24917+56-5-B4) = (20268+24917+36311+56-5-B6) = (20268+24917+36885+56-5-B6) = (20268+24917+36297+56-5-B5)
	0096	STD = Mod : (22013+24044) = (25951+32239) = (31283+34864) = (22013+24044+31283+34864) = (25954+32239+31283+34864)
	0097	Mod : 22013 = 25951 = (22013+31283+34864) = (25951+31283+34864)
	0098	Mod : 28479 = 28702 = 28916 = 30660 = (31283+34861) = (31283+34862) = (28479+25951+32239) = (28702+25951+32239) = (28916+25951+32239) = (30660+25951+32239) = (28479+22013+24044) = (28702+22013+24044) = (28916+22013+24044) = (30660+22013+24044) = (25951+32239+31283+34861) = (25951+32239+31283+34862) = (22013+24044+31283+34861) = (22013+24044+31283+34862)

	CODE	DESIGNATION
R	0099	Mod: (20268+36311) = (20268+36297) = (20268+36885) =
R		(20268+24946+26965+36311) = (20268+24946+27773+36311) =
R		(20268+25951+26965+36311) = (20268+25951+27773+36311) =
R		(20268+26760+26965+36311) = (20268+26760+27773+36311) =
R		(20268+26965+32150+36311) = (20268+26965+32238+36311) =
R		(20268+26965+32239+36311) = (20268+26965+32311+36311) =
R		(20268+27773+32150+36311) = (20268+27773+32238+36311) =
R		(20268+27773+32239+36311) = (20268+27773+32311+36311) =
R		(20268+26965+35040+36311) = (20268+27773+35040+36311) =
R		(20268+24946+26965+36297) = (20268+24946+27773+36297) =
R		(20268+25951+26965+36297) = (20268+25951+27773+36297) =
R		(20268+26760+26965+36297) = (20268+26760+27773+36297) =
R		(20268+26965+32150+36297) = (20268+26965+32238+36297) =
R		(20268+26965+32239+36297) = (20268+26965+32311+36297) =
R		(20268+27773+32150+36297) = (20268+27773+32238+36297) =
R		(20268+27773+32239+36297) = (20268+27773+32311+36297) =
R		(20268+26965+35040+36297) = (20268+27773+35040+36297) =
R		(20268+24946+26965+36885) = (20268+24946+27773+36885) =
R		(20268+25951+26965+36885) = (20268+25951+27773+36885) =
R		(20268+26760+26965+36885) = (20268+26760+27773+36885) =
R		(20268+26965+32150+36885) = (20268+26965+32238+36885) =
R		(20268+26965+32239+36885) = (20268+26965+32311+36885) =
R		(20268+27773+32150+36885) = (20268+27773+32238+36885) =
R		(20268+27773+32239+36885) = (20268+27773+32311+36885) =
R		(20268+26965+35040+36885) = (20268+27773+35040+36885)
R	0100	Mod : (20268+36311) = (20268+36885) = (20268+36297) = (20268+25800+36311)
R		= (20268+25800+36297) = (20268+25800+36885) = (20268+25530+26505+36311)
R		= (20268+25800+25530+26505+36311) = (20268+25530+26505+36297) =
R		(20268+25800+25530+26505+36297) = (20268+25530+26505+36885) =
R		(20268+25800+25530+26505+36885)
	0101	Mod : 24511 = (24511+28479+34864)
R	0102	Mod : (36310+20268) = (36310+20268+25800)
R	0103	Mod : (22013+36310) = (22013+36310+25800)
R	0104	Mod : (20057+20059+20067+20069+20071+21708+35220)
	0105	Mod : 24871 = (24871+25410) = (24871+26017) = (24871+25410+26017)+IAE
	0106	Mod : 25410 = 26017 = (25410+26017)+CFM
	0107	STD = Mod : (22562+25072)+IAE V2522 = V2524 = V2527M
R	0109	Mod : (31896+36481/56-5-B4) = (32475+36481/56-5-B4) = (31896+33910/56-5-B5) =
R		(32475+33910/56-5-B5) = (31896+36481/56-5-B6) = (32475+36481/56-5-B6) =
R		(31896+36481/56-5-B7) = (32475+36481/56-5-B7) = (31896+36481/56-5-B9) =
R		(32475+36481/56-5-B9) = (31896+32332+32475+36481/56-5-B4) =
R		(31896+32332+32475+33910/56-5-B5) = (31896+32332+32475+36481/56-5-B6) =
R		(31896+32332+32475+36481/56-5-B7) = (31896+32332+32475+36481/56-5-B9)
R	0110	Mod : (31896+36481) = (32475+36481) = (31896+32332+32475+36481)
	0111	Mod : (21678+21858) = (20117+21678+21858)
	0112	Mod : 22562 = 35864 = (22562+35864)
	0113	Mod : 26149 = 26608 = (26149+26608) = IAE V2522 = V2524 = V2527 = V2527E = V2527M = V2530 = V2533
	0114	Mod : (20024+24613+25410) = (20024+24105+24613+25410)
	0115	IAE V2500 = V2522 = V2524 = V2527 = V2527E = V2527M = (V2500 = V2522 = V2524 = V2527 = V2527E = V2527M+US) = (26346+IAE V2500 = V2524 = V2527 = V2527M)
	0117	STD = IAE = Mod : 26017 = (26017+IAE)
	0119	Mod : 33100 = 33300 = (33100+32650+32651) = (33300+32650+32651)
R	0120	Mod : (33909/V2522) = (35932/V2524) = (35932/V2527) = (35932/V2527E)
	0121	Mod : 25419 = 27992 = (27992+28377) = (25419+26963+27992)

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	0122	Mod : (22249+24215+24588+25529) = (22249+24215+24588+26117) = (22249+24215+24588+26270) = (22249+24215+24588+26117+26270)
	0123	Mod : 25888 = (25888+35864) = (22562+25072+25888)
R	0124	Mod : (26284+30206) = (26285+30206) = (26284+36136) = (26285+36136)
	0125	Mod : (22562+24105) = (24105+35864) = (24105+22562+35864)
	0126	Mod : 30660 = (25888+30660) = (25888+30660+34862) = (25888+30660+35864)
	0127	Mod : 30660 = (22562+30660) = (25888+30660) = (30660+35864) = (22562+30660+34862) = (25888+30660+34862) = (25888+30660+35864)
	0128	Mod : 22013 = (22013+27846) = (22013+28960) = (22013+28479) = (22013+28916) = (22013+28479+28960) = (22013+27846+28916)
	0130	Mod : (28160+30660) = (25888+28160+30660) = (25888+28160+30660+35864)
	0131	Mod : (22562+30660) = (30660+35864) = (22562+30660+34862) = (22562+30660+35864)
	0132	Mod : (25888+30660) = (25888+34862+30660) = (25888+30660+35864)
R	0133	Mod : 25404 = (25404+30660+34861) = (25404+30660+34864)
R	0134	Mod : 30660 = (30660+27725+33239) = (30660+28307+32619)
R	0135	Mod : (28307+30660) = (27725+30660)
R	0136	Mod : (28307+32619) = (27725+33239)
	0137	Mod : 20063 = (20031+20047) = (20047+20063)
R	0138	Mod : (23672+26284+30206) = (23672+26285+30206) = (23672+26284+36136)
R	0139	Mod : 22013+27276+30748+33323+34540
	0140	Mod : 22562 = (22562+31495+35270) = (20063+22562+31495+35270) = (20063+22562) = (20151+22562) = (20063+20151+22562) = (20063+31495+35270+35864) = (20063+20151+31495+35270+35864) = (20063+22562+31495+35270+35864)
	0141	Mod : (20063+22562+31495) = (20063+31495+35864) = (20063+22562+31495+35864)
	0142	Mod : (22562+31112+31495) = (20151+22562+31495) = (22562+31495+23092) = (20063+20151+22562+31495) = (20063+22562+31112+31495) = (20063+20151+31495+35864) = (20063+31115+31495+35864) = (20063+20151+22562+31495+35864) = (20063+22562+31112+31495+35864)
	0143	Mod : 21054 = (21054+25199) = (21054+25200)
R	0144	Mod : 22013+27276+30748+34540
R	0145	Mod : 22013+27276+33323+34540
R R	0146	Mod : 34637 = (26526+34637) = (26526+27046+31375+34637) = (26526+31375+34637+36720)
R R R	0148	STD = Mod : 25072 = 27609 = (22562+25072) = (25888+27609) = (22562+25072+28897)
R R	0149	Mod : 25615 = (25615+25888+27609) = (22562+25072+25615+28897)
R	0150	Mod : 35864 = (22562+28897) = (30784+35864) = (22562+25888+27609+28897)
R R	0151	Mod : 25888 = (22562+25888) = (25072+25888) = (25888+30784) = (25888+35864) = (22562+25072+25888) = (25888+30784+35864) = (25615+25888+35864)
	0152	Mod : STD = (20056+33129) = (20056+34664)
	0153	Mod : STD = 22190 = 34664 = (20056+22190) = (20056+33129) = (30626+35110) = (20056+34664)
	0154	Mod : 30626 = (20056+30626+33129) = (20056+30626+34664)
	0156	Mod : 25863 = (25863+28551+34195)
	0157	Mod : (25863+ACA) = (25863+28551+34195+ACA)
	0158	Mod : 25863 = (25863+ACA) = (25863+28551+34195) = (25863+28551+34195+ACA)
	0161	Mod : (31106+32238) = (31106+32311) = (24946+27773) = (31106+32238+32311) = (23871+31106+32311)

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R	0164	Mod : (25615+35864) = (22562+25615+28897) =
R		(22562+25615+25888+27609+28897)
	0165	Mod : (24105+27276) = (24105+31395) = (26334+27276) = (26334+31395) = (26335+27276) = (26335+31395) = (24105+27276+31395) = (26334+27276+31395) = (26335+27276+31395) = (24105+27276+30977+31395+32207+35100) = (26335+27276+30977+31395+32207+35100)
	0166	STD = Mod : (22013+33879) = (22013+30977) = (24105+33879) = (24105+30977) = (30977+35100)
	0167	Mod : 30020 = 30977 = 33879 = (24105+30020+30977)
R	0169	Mod : (20059+20067+20069+20071+30020+30354+31283+35220+36847)
	0170	STD = Mod : 24588 = 35216 = 36368 = (24215+24588) = (26925+35216) = (26925+36368) = (24215+24588+26925+36368) = (24215+24588+26925+35216)
	0171	Mod : 32088 = 32090 = (24588+32088) = (24588+32090) = (32088+32090) = (32088+35216) = (32090+35216) = (32088+36368) = (32090+36368) = (24215+24588+32088) = (24215+24588+32090) = (24588+32088+32090) = (26925+32090+36368) = (32088+26925+35216) = (26925+32090+35216) = (26925+32088+36368) = (24215+24588+32088+32090) = (24215+24588+26925+32088+32090+35216) = (24215+24588+26925+32088+32090+36368)
	0172	Mod : 28258 = 30470 = 26438 = 27624 = 23888 = 25829 = 32015 = 34330 = 34331 = 34332 = 34333 = 34334 = 35436 = (34330+34332) = (27624+28258) = (27624+30470)
R	0173	STD = (22013+23219+23672) = (23672+24105+25294) =
R		(23672+24105+25294+27620+33497)
R	0174	Mod : 27620 = (22013+23219+23672+27620) = (23672+24105+25294+27620)
	0175	Mod : (20406+24035) = (20406+24211) = (20406+24035+33253) = (20406+24035+34660)
R	0176	Mod : (27620+34637) = (22013+23219+23672+27620+34367) =
R		(23672+24105+25294+27620+34637)
R	0177	Mod : 34637 = (22013+23219+23672+34637) = (23672+24105+25294+34637)
	0179	Mod : (30020+26925) = (24105+26925+30020)
R	0180	Mod : 25108 = 35793 = (22013+23672) = (23672+24105) = (24581+36529) =
R		(24785+36529) = (25108+30020) = (22013+23219+36529) =(24105+25294+36529)
R		= (24105+25108+30020) = (24581+30020+36529) = (24785+30020+36529) =
R		(23672+24105+27620+33497) = (22013+23219+23672+35793) =
R		(22013+23219+23672+36529) = (23672+24105+25294+35793) =
R		(23672+24105+25294+36529)
R	0181	Mod : (25108+27620) = (35793+27620) = (22013+23672+27620) =
R		(23672+24105+27620) = (24581+36529+27620) = (24785+36529+27620) =
R		(25108+30020+27620) = (22013+23219+36529+27620) =
R		(24105+25294+36529+27620) = (24105+25108+30020+27620) =
R		(24581+30020+36529+27620) = (24785+30020+36529+27620) =
R		(22013+23219+23672+35793+27620) = (22013+23219+23672+36529+27620) =
R		(23672+24105+25294+35793+27620) = (23672+24105+25294+36529+27620)
	0182	Mod : 35220 = (28479+31283+35220)
	0183	Mod : 24105 = (24105+27846) = (24105+27846+28916) = (24105+27846+28479) = (24105+27846+28702)
R	0184	Mod : (25108+34637) = (35793+34637) = (22013+23672+34637) =
R		(23672+24105+34637) = (24581+36529+34637) = (24785+36529+34637) =
R		(25108+30020+34637) = (22013+23219+36529+34637) =
R		(24105+25294+36529+34637) = (24105+25108+30020+34637) =
R		(24581+30020+36529+34637) = (24785+30020+36529+34637) =
R		(22013+23219+23672+35793+34637) = (22013+23219+23672+36529+34637) =
R		(23672+24105+25294+35793+34637) = (23672+24105+25294+36529+34637)

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R	0185	Mod : (25108+34637+27620) = (35793+34637+27620) = (22013+23672+34637+27620) = (23672+24105+34637+27620) = (24581+36529+34637+27620) = (24785+36529+34637+27620) = (25108+30020+34637+27620) = (22013+23219+36529+34637+27620) = (24105+25294+36529+34637+27620) = (24105+25108+30020+34637+27620) = (24581+30020+36529+34637+27620) = (24785+30020+36529+34637+27620) = (22013+23219+23672+35793+34637+27620) = (22013+23219+23672+36529+34637+27620) = (23672+24105+25294+35793+34637+27620) = (23672+24105+25294+36529+34637+27620)
R	0186	Mod : (26526+35220+35485) = (34637+35220+35485)
R	0187	Mod : (26526+30020+35220+35485) = (30020+34637+35220+35485)
	0188	STD = Mod : 20062+22188
	0189	Mod : 24035 = 24160 = 24211 = (24035+24211)
R	0190	Mod : (30368+32205+33125+35220) = (32205+33125+35220+35485)
R	0191	Mod : (32205+33125+35220+35485) = (30368+32205+33125+35220)
	0192	Mod : (25205+35871) = (23885+35871) = (26999+35871) = (28382+35871) = (30241+35871) = (26485+35871) = (30631+35871) = (26999+28382+28495+35871) = (25205+28495+26999+35871) = (25205+20268+35871) = (23885+20268+35871) = (26999+20268+35871) = (28382+20268+35871) = (28382+20268+35871) = (30241+20268+35871) = (26485+20268+35871) = (30631+20268+35871) = (26999+28382+28495+20268+35871) = (25205+26999+28495+20268+35871) = (20268+31701+25205+35871) = (20268+31701+23885+35871) = (20268+31701+26999+35871) = (20268+31701+28382+35871) = (20268+31701+30241+35871) = (20268+31701+30631+35871) = (20268+31701+26999+28382+28495+35871) = (20268+31701+25205+26999+28495+35871) = (20268+34818+25205+35871) = (20268+34818+23885+35871) = (20268+34818+26999+35871) = (20268+34818+28382+35871) = (20268+34818+30241+35871) = (20268+34818+26485+35871) = (20268+34818+30631+35871) = (20268+34818+26999+28382+28495+35871) = (20268+34818+25205+26999+28495+35871)
	0193	Mod : 26851 = (25529+26185) = (25529+26208) = (25529+26345) = (25529+26851)
R	0194	Mod : (32205+33125+35220+35485+35871) = (30368+32205+33125+35220+35871)
R	0195	Mod : (24105+31283+36847) = (30020+31283+36847)
	0196	Mod : (25205+35871) = (23885+35871) = (26999+35871) = (28382+35871) = (30241+35871) = (26485+35871) = (30631+35871) = (26999+28382+28495+35871) = (25205+26999+28495+35871)
	0197	Mod : 35871 = (20268+35871) = (20268+31701+35871) = (20268+34818+35871)
R	0198	Mod : (22249+25529+30020+36847+31283) = (22249+26270+36847+30020+31283)
	0199	Mod : 22013 = 24105 = 28160 = 24701 = (24701+28160+28917)
	0200	Mod : (21678+26485+27620+26925) = (21678+26999+27620+26925) = (21678+27620+27646+26925) = (21678+27620+30631+26925) = (21678+27620+30635+26925)
R	0201	Mod : (22249+25529+31283+24105+36847) = (22249+26270+31283+24105+36847) = (22249+25529+26117+31283+24105+36847) = (22249+26117+26270+31283+24105+36847) = (22249+25529+31283+24105+36847)
	0202	Mod : (21678+26485+26925) = (21678+26999+26925) = (21678+27646+26925) = (21678+30631+26925) = (21678+30635+26925) = (21678+26999+33497+26925) = (21678+26999+27620+33497+26925) = (21678+26999+27646+33497+26925)
	0203	Mod : 20268/B4 = (20268+36611/B6) = (20268+26999+28495/B4) = (20268+26999+28495+36311/B6)
	0204	Mod : (26526+35871) = (26526+31283+35871) = (26526+30660+31283+35871)
	0205	Mod : 26876 = 26877 = 27698 = 27740 = 27753 = 28739 = 30163 = 28738 = 31001 = 31699

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R	0206	Mod : (22249+24105+26117+26728+31283+34041+36847) = (22249+30020+26117+26728+31283+34041+36847) = (22249+24105+26270+31283+34041+36847) = (22249+30020+26270+31283+34041+36847)
R	0207	Mod : 36609 = 36772 = 36562 = (22013+30096+34313+36562) = (22013+30096+34809+36772) = (24105+30096+34313+36562) = (24105+30096+34809+36772)
R	0208	Mod : 34313 = 34809 = (24105+30096+34313) = (24105+30096+34809) = (22013+30096+34313) = (22013+30096+34809)
	0209	Mod : 35871 = (35871+31105+35220) = (35871+31070+35220) = (35871+31105+34041+35220) = (35871+31070+34041+35220) = (30020+35871+31105+35220) = (35871+30020+31070+35220)
	0210	Mod : (23219+30206) = (23672+30206) = (24579+30206) = (24581+30206) = (23219+23672+30206) = (23219+23672+24579+30206)
	0211	Mod : (25205+20268/B4) = (23885+20268/B4) = (26999+20268/B4) = (28382+20268/B4) = (30241+20268/B4) = (26485+20268/B4) = (30631+20268/B4) = (25205+20268+36311/B6) = (23885+20268+36311/B6) = (26999+20268+36311/B6) = (28382+20268+36311/B6) = (30241+20268+36311/B6) = (26485+20268+36311/B6) = (30631+20268+36311/B6) = (26999+28382+28495+20268/B4) = (25205+26999+28495+20268/B4) = (26999+28382+28495+20268+36311/B6) = (25505+26999+28495+20268+36311/B6)
	0213	Mod : 23219 = 23672 = 24579 = 24581 = (23219+23672) = (23219+23672+24579)
	0214	Mod : (20268/B4) = (20268+36311/B6)
	0215	"Mod : (20268+36311) = (20268+24946+26965+36311) = (20268+24946+27773+36311) = (20268+25951+26965+36311) = (20268+25951+27773+36311) = (20268+26760+26965+36311) = (20268+26760+27773+36311) = (20268+26965+32150+36311) = (20268+26965+32238+36311) = (20268+26965+32239+36311) = (20268+26965+32311+36311) = (20268+27773+32150+36311) = (20268+27773+32238+36311) = (20268+27773+32239+36311) = (20268+27773+32311+36311) = (20268+26965+35040+36311) = (20268+27773+35040+36311) "
	0216	Mod : (20268+36311) = (20268+25800+36311) = (20268+25530+26505+36311) = (20268+25800+25530+26505+36311)
	0219	Mod : (25615+27276) = (23108+25615+27276)
	0220	Mod : (27276+30748) = ((23108+27276+30748)+2527ea5)
	0221	Mod : (23672+26284) = (23672+26285) = (23219+23672+24579+26285)
	0222	STD = Mod : 20067+20069+20071+28474+28478
	0225	Mod : (20268/B4) = (20268+36311/B6)
R	0226	Mod : (30020+31283) = (30020+33374+37127) = (26728+28479+30020+31283+33374+37127)
R	0228	Mod : 28479 = (26728+28479) = (33374+37127) = (26728+28479+31283+33374+37127)
	0229	Mod : (25615+27276+30748) = (23108+25615+27276+30748)
	0230	STD = Mod : (22553+22889+25081+CFM 56-5-A1 = A3) = (22553+22889+25138+CFM 56-5-A1 = A3) = (22553+22889+25411+CFM 56-5-A1 = A3) = (22553+22889+26577+CFM)
R	0231	Mod : (33374+37128) = (26728+28479+31283+33374+37128)
	0232	STD = Mod : 25410 = 26017 = (25410+26017)
R	0233	Mod : 24498 = 24642 = 25568 = 25888 = 28651
	0234	Mod : (20067+20069) = (20067+20069+31283+34861) = (20067+20069+31283+34862) = (20067+20069+31283+33100+34856) = (20067+20069+31283+33100+34898) = (20067+20069+31283+33100+34997)
	0235	Mod : (21678+21858) = (20117+21678+21858)

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	0236	Mod : 28479 = 28916 = (26017+28479) = (26017+28916)
	0238	STD = Mod : (28160+28413) = (28160+28917) = (28160+28413+28917)
R R	0239	Mod : (24498+30051) = (24642+30051) = (25568+30051) = (25888+30051) = (28651+30051)
R R	0240	Mod : (36847/56-5-B5) = (26017+36847/56-5-A4/A5/B5/B7/B8) = (24105+36847/56-5-B6/IAE) = (24105+26017+36847/56-5-B6/IEA)
R	0241	Mod : (36847/56-5-B4/B6/IAE) = (26017+36847/56-5-A1/A3/B4/B6/IAE)
	0242	Mod : (24105+25615+27276+28162) = (24105+25615+27276+28162+30748)
R	0243	Mod : (34041+36847) = (20268+34041+36847)
	0244	Mod : (22013+28479+28721+30439) = (22013+28479+28960+30439) = (22013+28479+30439+32011) = (22013+28479+30439+32456) = (22013+27846+28721+28916+30439) = (22013+27846+28479+28960+30439) = (22013+28479+28721+30439+32011) = (22013+27846+28479+28721+30439+32011)
	0245	Mod : (24105+27276+30748+34540)
	0247	Mod : (20059+20084) = (30020+30066) = (20057+20059+20084)
	0248	Mod : 24035 = 24160 = 24189 = (24035+24612) = (24160+24612) = (24189+24612)
	0251	Mod : 24064 = 24065 = 24066 = 24067 = (24064+26346+US) = (24065+26346+US) = (24066+26346+US) = (24067+26346+US)
R	0255	Mod : 36847 = (28160+28917+36847)
	0256	Mod : (20067+20069+35220) = (20067+20069+31283+35220)
	0258	STD = Mod : (22013+25199) = (22013+25200)
	0259	Mod : (20059+20067+20069+35220) = (20059+20067+20069+31283+35220)
	0260	STD = Mod : 25072 = (22562+25072) = (25888+27609)+IAE V2522 = V2524 = V2527 = V2527E = V2527M = V2530 = V2533
	0261	Mod : (21533+23222) = (21533+26057) = (21533+23222+26057)
	0262	Mod : (20057+20067+35220+20069) = (20057+20067+20069+31283+35220)
	0263	Mod : (20067+20069+33100+35220) = (20067+20069+31283+33100+35220)
	0264	Mod : 27698 = 27740 = 27753 = 28739 = 30163 = 28738 = 31001 = 26877 = 26876 = 31699 = (22536+27698) = (22536+27740) = (22536+30163) = (23227+27740) = (23227+28738) = (23227+28739) = (23529+26877) = (23529+27698) = (23529+27740) = (23529+27753) = (23529+31699) = (23227+27698+30163) = (23529+26877+31699)
R	0267	Mod : (28160+36847) = (22562+25072+28160+36847)
	0268	Mod : (20059+20067+20069+35220+33100) = (20069+20067+20059+31283+35220+33100)
R R	0269	Mod : 36847+(V2522 = V2524 = V2527M = 56-5-A1 = 56-5-A3 = 56-5-A4 = 56-5-A5 = 56-5-B4 = 56-5-B5 = 56-5-B6 = 56-5-B7)
R R R	0270	Mod : ((20343+36847) = (31276+36847) = (20343+27498+36847) = (27498+31276+36847)) + (V2522 = V2524 = V2527M = 56-5-A1 = 56-5-A3 = 56-5-A4 = 56-5-A5 = 56-5-B4 = 56-5-B5 = 56-5-B6 = 56-5-B7)
R R	0271	Mod : (20343+36847) = (31276+36847) = (20343+27498+36847) = (27498+31276+36847)
R	0272	Mod : (22013+36847) + (V2530 = V2533 = 56-5-B1 = 56-5-B2 = 56-5-B3)
	0273	Mod : 25357 = 25596 = (25357+25596)+IAE V2522 = V2524 = V2527 = V2527E = V2530 = V2533
	0274	Mod : 26149 = (25357+26149) = (25596+26149) = (25357+25596+26149)+IAE V2522 = V2524 = V2527 = V2527E = V2530 = V2533
R R	0275	Mod : (27498+36847) + (V2522 = V2524 = V2527M = 56-5-A1 = 56-5-A3 = 56-5-A4 = 56-5-A5 = 56-5-B4 = 56-5-B5 = 56-5-B6 = 56-5-B7)
	0276	STD = Mod : 28479 = 28916 =27846 = (27846+28479) = (27846+28916)
R	0277	Mod : (27498+36847) + (V2500 = V2527 = V2527E)

	CODE	DESIGNATION
R	0278	Mod : ((20343+22013+36847) = (22013+31276+36847) = (20343+22013+27498+36847) = (22013+27498+31276+36847)) + (V2530 = V2533 = 56-5-B1 = 56-5-B2 = 56-5-B3)
R	0279	Mod : (22013+27498+36847) + (V2530 = V2533 = 56-5-B1 = 56-5-B2 = 56-5-B3)
R	0280	Mod : ((24035 = 24160 = 24211 = (24035+24211)) + CFM) = (24035+PW)
	0281	Mod : (20067+20069+20071+35220) = (20067+20069+20071+33100+34997+35220) = (20067+20069+20071+31283+34861+35220) = (20067+20069+20071+31283+34862+35220)
	0282	Mod : (20059+20067+20069+20071+35220) = (20067+20069+20071+35236+35220) = (20059+20067+20069+20816+27063+35220) = (20059+20067+20069+20071+32146+35220) = (20059+20067+20069+20071+33100+34856+35220) = (20059+20067+20069+20071+33100+34898+35220) = (20059+20067+20069+20071+31283+34862+35220)
	0283	Mod : (20067+20069+20071+21708+35220) = (20067+20069+20816+21708+27063+35220) = (20067+20069+20071+21708+33100+34856+35220) = (20067+20069+20071+21708+31283+34861+35220) = (20067+20069+20071+21708+31283+34862+35220)
	0284	Mod : (20057+20067+20069+20071+35220) = (20057+20067+20069+20816+27063+35220)
R	0285	Mod : (22013+36847/56-5-B1/B2/B3/IAE) = (22013+26017+36847/56-5-B1/B2//B3/IAE)
	0286	Mod : (20057+20059+20067+20069+20071+35220) = (20057+20059+20067+20069+20071+32146+35220) = (20057+20059+20067+20069+20816+27063+35220) = (20057+20059+20067+20069+20071+31283+34864+35220) = (20057+20059+20067+20069+20071+31283+34862+35220)
R	0287	Mod : (36847/56-5-B1/B2/B3/B4/B5/B6/B7/B8) =
R		(36847+28160/56-5-B1/B2/B3/B4/B5/B6/B7/B8) =
R		(36487+30660/56-5-B1/B2/B3/B4/B5/B6/B7/B8) =
R		(36847+25888/56-5-B1/B2/B3/B4/B5/B6/B7/B8) =
R		(36847+28160+30660/56-5-B1/B2/B3/B4/B5/B6/B7/B8) =
R		(36847+22562+28160/56-5-B1/B2/B3/B4/B5/B6/B7/B8) =
R		(36847+25888+28160/56-5-B1/B2/B3/B4/B5/B6/B7/B8) =
R		(36847+25888+30660/56-5-B1/B2/B3/B4/B5/B6/B7/B8) =
R		(36847+28160+28917/56-5-B1/B2/B3/B4/B5/B6/B7/B8) =
R		(36847+22562+30660/56-5-B1/B2/B3/B4/B5/B6/B7/B8) =
R		(36847+30660+35864/56-5-B1/B2/B3/B4/B5/B6/B7/B8) =
R		(36847+25888+28160+28917/56-5-B1/B2/B3/B4/B5/B6/B7/B8) =
R		(36847+25888+30660+34862/56-5-B1/B2/B3/B4/B5/B6/B7/B8) =
R		(36847+25888+30660+35864/56-5-B1/B2/B3/B4/B5/B6/B7/B8) =
R		(36847+22562+30660+34862/56-5-B1/B2/B3/B4/B5/B6/B7/B8) =
R		(36847+25888+28160+30660/56-5-B1/B2/B3/B4/B5/B6/B7/B8) =
R		(36847+25888+30660+34861/56-5-B1/B2/B3/B4/B5/B6/B7/B8) =
R		(36847+25888+30660+34864/56-5-B1/B2/B3/B4/B5/B6/B7/B8) =
R		(36847+22562+28160+30660+34861/56-5-B1/B2/B3/B4/B5/B6/B7/B8) =
R		(36847+22562+28160+30660+34864/56-5-B1/B2/B3/B4/B5/B6/B7/B8) =
R		(36847+25888+28160+30660+35864/56-5-B1/B2/B3/B4/B5/B6/B7/B8)
	0288	Mod : (20059+20067+20069+20071+21708+35220) = (20059+20067+20069+20816+21708+27063+35220) = (20059+20067+20069+20071+21708+33100+34856+35220) = (20059+20067+20069+20071+21708+31283+33100+34856+34862+35220)
	0289	Mod : (20059+20067+20069+20071+30020+35220) = (20269+20067+20069+20071+30354+31283+35220) = (20059+20067+20069+20071+33100+31283+35220)

	CODE	DESIGNATION
R	0290	Mod : (36847/56-5-A1/A3/A4/A5/IAE) = (36847+25072/56-5-A1/A3/A4/A5/IAE) = (36847+30660/56-5-A1/A3/A4/A5/IAE) = (36847+28160/56-5-A1/A3/A4/A5/IAE) = (36847+22562/56-5-A1/A3/A4/A5/IAE) = (36847+25888/56-5-A1/A3/A4/A5/IAE) = (36847+35864/56-5-A1/A3/A4/A5/IAE) = (36847+25888+30660/56-5-A1/A3/A4/A5/IAE) = (36847+22562+28160/56-5-A1/A3/A4/A5/IAE) = (36847+28160+30660/56-5-A1/A3/A4/A5/IAE) = (36847+25888+28160/56-5-A1/A3/A4/A5/IAE) = (36847+28160+28917/56-5-A1/A3/A4/A5/IAE) = (36847+30660+34862/56-5-A1/A3/A4/A5/IAE) = (36847+22562+30660/56-5-A1/A3/A4/A5/IAE) = (36847+30660+35864/56-5-A1/A3/A4/A5/IAE) = (36847+22562+25072/56-5-A1/A3/A4/A5/IAE) = (36847+22562+35864/56-5-A1/A3/A4/A5/IAE) = (36847+28160+28917+30660/56-5-A1/A3/A4/A5/IAE) = (36847+25888+28160+28917/56-5-A1/A3/A4/A5/IAE) = (36847+25888+30660+34862/56-5-A1/A3/A4/A5/IAE) = (36847+25888+30660+35864/56-5-A1/A3/A4/A5/IAE) = (36847+22562+25072+28160/56-5-A1/A3/A4/A5/IAE) = (36847+28160+30660+34861/56-5-A1/A3/A4/A5/IAE) = (36847+28160+30660+34864/56-5-A1/A3/A4/A5/IAE) = (36847+25888+28160+30660/56-5-A1/A3/A4/A5/IAE) = (36847+22562+30660+34862/56-5-A1/A3/A4/A5/IAE) = (36847+22562+30660+35864/56-5-A1/A3/A4/A5/IAE) = (36847+22562+30660+34861/56-5-A1/A3/A4/A5/IAE) = (36847+25888+30660+34861/56-5-A1/A3/A4/A5/IAE) = (36847+25888+30660+34864/56-5-A1/A3/A4/A5/IAE) = (36847+22562+30660+34864/56-5-A1/A3/A4/A5/IAE) = (36847+22562+25072+28160/56-5-A1/A3/A4/A5/IAE) = (36847+28160+30660+34862/56-5-A1/A3/A4/A5/IAE) = (36847+22562+28160+30660/56-5-A1/A3/A4/A5/IAE) = (36847+22562+28160+28917/56-5-A1/A3/A4/A5/IAE) = (36847+25888+28160+30660/56-5-A1/A3/A4/A5/IAE) = (36847+25072+28160+28917/56-5-A1/A3/A4/A5/IAE) = (36847+25888+28160+28917/56-5-A1/A3/A4/A5/IAE)= (36847+22562+25072+28160+30660/56-5-A1/A3/A4/A5/IAE) = (36847+22562+28160+30660+34861/56-5-A1/A3/A4/A5/IAE) = (36847+22562+28160+30660+34864/56-5-A1/A3/A4/A5/IAE) = (36847+22562+28160+28917+30660/56-5-A1/A3/A4/A5/IAE) = (36847+25888+28160+28917+30660/56-5-A1/A3/A4/A5/IAE) = (36847+28160+28917+30660+34862/56-5-A1/A3/A4/A5/IAE) = (36847+25888+28160+30660+35864/56-5-A1/A3/A4/A5/IAE) = (36847+25888+28160+30660+34861/56-5-A1/A3/A4/A5/IAE) = (36847+25888+28160+30660+34864/56-5-A1/A3/A4/A5/IAE) = (36847+22562+25072+28160+28917/56-5-A1/A3/A4/A5/IAE) = (36847+25888+28160+30660+34862/56-5-A1/A3/A4/A5/IAE) = (36847+22562+25072+28160+28917/56-5-A1/A3/A4/A5/IAE)
R	0291	Mod : 36847 = (V2522 = V2524 = V2527MA5 = 56-5-A4 = 56-5-A5 = 56-5-B5 = 56-5-B6 = 56-5-B7)
	0293	Mod : 30470 = 35436 = (27624+28258) = (27624+30470)
	0294	STD = Mod : 23450 = 24588 = (20406+23450) = (23450+24588) = (20406+23450+24588) = (20406+23450+24588+28916)
R	0296	Mod : (36847+56-5-A1/A3/B4) = (36847+36311+56-5-B6)
	0297	Mod : (22706+30365+P8232+33907+31283) = (22706+30365+P8175+P8232+33907+31283)
	0298	Mod : 20057 = 20059 = (31276+32013+20057) = (31276+32013+20059)
	0299	Mod : 27140 = (27140+33100+34997) = (27140+32650+32651) = (27140+32650+32651+34898) = (27140+32650+32651+34856) = (27140+32650+32651+33100+34856) = (27140+32650+32651+33100+34898)

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	0301	Mod : (27140+32650) = (27140+32650+34898) = (27140+32650+34856) = (27140+32650+33100+34856) = (27140+32650+33100+34898)
R	0302	Mod : (22013+36847) = (V2530=V2533 = 56-5-B1 = 56-5-B2 = 56-5-B3)
	0303	Mod : (20047+20151) = (20047+23092) = (20063+20151) = (20047+20063+20151) = (20047+20063+23092) = (20047+20063+31112) = (20063+31112)
	0304	Mod : (24105+27276+30748+33323) = (22013+27276+30748+33323) = (22013+27276+30748+33323+56-5-B3) = (22013+27276+30748+33323+IAEEng:V2533)
R	0305	Mod : (28160+36847+25888) = (22562+25072+25888+28160+36847)
R	0306	Mod : 36847 = (36847+22562+25072)
R	0307	Mod : (20343+22013+36847) = (31276+22013+36847)
R	0308	Mod : 36847 = (20246+20510+36847) = (20246+20510+35220+36847)
	0310	Mod : (22249+26270+31283+34041) = (22249+26117+26728+31283+34041)
R	0312	Mod : (21678+36847) = (21678+28160+28917+36847)
R	0313	Mod : 36847 = (28160+28917+36847)
R	0314	Mod : 21678 = (21678+28160+28917)
	0315	Mod : 22013 = 24105 = 34041 = (23893+25225+34041) = AUA
R	0316	Mod : (24105+30020) = (21678+24105+30020) = (24105+30020+36847)
	0317	Mod : 25241 = 25242 = (25241+25242)
R	0318	Mod : 22013 = 24105 = 28160 = (21678+22013) = (21678+24105) = (21678+28160)
R		= (21678+28160+36847)
	0319	STD = Mod : 25072 = 27609 = (22562+25072) = (25888+27609)
	0321	Mod : (26149+27777) = (26149+26608+27777)
	0322	Mod : 30660 = (26728+28479+30660) = (26728+28479+30660+31283)
	0323	Mod : (30020+32088) = (30020+32090) = (24105+30020+32088+32090)
R	0326	Mod : (32619+36847) = (33239+36847) = (34156+36847)
	0327	Mod : (20024+24613+26017) = (20024+24613+25410+26017)
R	0329	Mod : 36847 = (27725+32239+36847) = (28307+32619+36847)
	0333	STD = Mod : (20024+22013) = (20024+22013+US)
R	0334	Mod : (31283+34861) = (31283+34862) = (31283+34864)
	0335	Mod : (24511+28479+31283+34041) = (24511+28916+31283+34041) = (24511+28479+31283+34041+34861) = (24511+28479+31283+34041+34862)
R	0340	Mod : 36847 = (31283+35220+36847)
	0348	Mod : (20268+22461) = (20268+23408) = (20268+22461+23408)
	0349	Mod : 23108 = 23109 = 23408 = (23109+23408) = (23108+23109+23408)
	0350	Mod : (21678+25410) = (21678+26017) = (21678+25410+26017)
	0360	Mod : (22013+23698) = (22013+23698+23699)
	0362	Mod : (23222+CFM 56-5-B4 = IAE V2527) = (22013+26057) = (23222+23871) = (23222+24105) = (24105+26057) = (22013+23222+26057) = (23222+24105+32207+V2527MA5) = (22013+26057+32207) = (23108+23222+32207) = (23222+24105+32207) = (23222+24105+56-5-a5) = (23222+23871+56-5-a1) = (23222+23871+56-5-a3) = (23222+32207+(56-5-b4=V2527A5)) = (23108+23222)
	0363	Mod : (23222+24105+25615+V2527MA5) = (23222+24105+25615+CFM56-5-B7) = (23108+23222+24105+25615+32207+56-5-B7)
	0364	Mod : (20268+24917+56-5-B4) = (20268+24917+36311+56-5-B6)
	0365	Mod : (20268+24404) = (20268+24404+25800) = (20268+25800+27727) = (20268+24404+25800+27727)
	0366	Mod : 20268 = (20268+25800) = (20268+24404+25502) = (20268+24404+25502+25800)

	CODE	DESIGNATION
R R R R R R R R R	0367	Mod : (20268+36297) = (20268+24946+26965+36297) = (20268+24946+27773+36297) = (20268+25951+26965+36297) = (20268+25951+27773+36297) = (20268+26760+26965+36297) = (20268+26760+27773+36297) = (20268+26965+32150+36297) = (20268+26965+32238+36297) = (20268+26965+32239+36297) = (20268+26965+32311+36297) = (20268+27773+32150+36297) = (20268+27773+32238+36297) = (20268+27773+32239+36297) = (20268+27773+32311+36297) = (20268+26965+35040+36297) = (20268+27773+35040+36297)
	0370	Mod : 20268 = (20268+25800) = (20268+24405+25501) = (20268+24405+25501+25800)
	0376	Mod : 22562 = 35864 = (22562+35864) = (22562+25888+27609)
	0377	Mod : 25888 = (22562+25888) = (25888+35864) = (25888+22562+25072)
	0378	Mod : 20268 = (20268+25800)
	0379	Mod : (20268+24405) = (20268+24405+25800) = (20268+25800+27727) = (20268+24405+25800+27727)
	0380	Mod : (20268+25530) = (20268+25530+25800) = (20268+25800+27727) = (20268+25530+25800+27727)
R R R	0381	Mod : 22562 = 25888 = 35864 = (22562+35864) = (22562+28160+28917) = (25888+28160+28917) = (22562+30660+34861) = (22562+30660+34864) = (25888+30660+34861) = (25888+30660+34864) = (22562+25072+25888)
	0382	Mod : 30660 = (28160+28917+30660) = (28160+28917+30660+34862) = (25888+28160+28917+30660) = (22562+28160+28917+30660)
	0383	Mod : 28160 = (22562+28160) = (25888+28160) = (22562+28160+30660+34861) = (22562+28160+30660+34864)
	0384	Mod : (28160+30660) = (28160+30660+34862) = (22562+25072+28160+30660)
	0385	Mod : (22562+30660) = (30660+35864) = (22562+34862+30660) = (22562+30660+35864)
R R	0386	Mod : 36847 = (V2522 = V2524 = V2527 = V2527E = V2527MA5 = V2500 = 56-5-A1 = 56-5-A3
	0387	STD = Mod : (28160+28917) = (25888+28160+28917)
	0388	Mod : 24404 = 24405 = 25416 = 25530 = (24404+25416) + (24405+25416)
	0389	Mod : (23119+31283) = (22013+24044+31283) = (23119+30660+31283)
R R R	0390	Mod : (36847+56-5-A1/A3/B4) = (36311+36847+56-5-B6) = (28160+28917+36847+56-5-A1/A3/B4) = (36311+28160+28917+36847+56-5-B6) = (22562+36847+V2500A1) = (22562+28160+28917+36847+V2500A1)
	0391	Mod : (25240+28238) = (25274+28238) = (28238+28711)
	0392	Mod : 23108 = 23109 = 23408 = 23871 = 24105 = (P0164+27522+28360+31371)
	0393	Mod : (21678+22013) = (21678+24105) = (21678+28160) =(21678+30020)
	0394	Mod : (21678+22013) = (21678+24105) = (21678+28160)
	0395	Mod : 31897 = 32929 = (31897+32333+32929)
	0396	Mod : (23742+24064) = (23742+24065) = (23742+24066) = (23742+24067) = (23742+24064+26346+US) = (23742+24065+26346+US) = (23742+24066+26346+US) = (23742+24067+26346+US)
	0397	Mod : (20268+28238) = (20268+25800+25238)
	0399	Mod : (27957+V2500A1) = (32656+V2522A5/V2524A5/V2527A5/V2530A5/V2533A5/2527EA5/2527MA5)
	0401	STD = Mod : 25072 = (22562+25072) = (28160+28917) = (25072+28160+28917) = (22562+25072+28160+28917)
	0402	Mod :(20057+20059+20067+20069+20071+21708+30020) = (20059+20067+20069+20071+21708+31283+33100) = (20057+20059+20067+20069+20071+21708+31283+33100)

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	0403	Mod : 27650 = (24588+27650) = (24215+24588+27650)
	0404	Mod :(20067+20069+20071+21708+30020) = (20067+20069+20071+21708+31283+33100)
	0405	Mod :(20067+20069+20071+21708+30020+35220) = (20067+20069+20071+21708+31283+33100+35220)
	0406	Mod : (20067+20069+20071) = (20067+20069+20071+33100+34997) = (20067+20069+20071+31283+34861) = (20067+20069+20071+31283+34862) = (20067+20069+20071+31283+33100+34856) = (20067+20069+20071+31283+33100+34898) = (20067+20069+20071+31283+33100+34997)
	0407	Mod : (20059+20067+20069+20071) = (20067+20069+20071+35236) = (20059+20067+20069+20816+27063) = (20059+20067+20069+20071+32146) = (20059+20067+20069+20071+33100+34856) = (20059+20067+20069+20071+33100+34898) = (20059+20067+20069+20071+31283+34862) = (20059+20067+20069+20071+31283+33100+34862) = (20059+20067+20069+20071+31283+33100+34898)
	0408	Mod : (20059+20067+20069+20071+30020) = (20059+20067+20069+20071+30354+31283) = (20059+20067+20069+20071+33100+31283) = (20059+20067+20069+20071+30020+30354) = (20057+20067+20069+20071+31283+33100)
	0409	Mod : (20067+20069+20071+30020+35220) = (20067+20069+20071+33100+31283+35220) = (20067+20069+20071+300020+30354+35220)
	0410	Mod : (30660+31371) = (26728+27522+28479+30660+31371)
R R	0411	Mod : (36847+56-5-A4/A5/B1/B2/B3/B5/B6/B7/B8/B9) = (28160+36847+56-5-A3/B4) = (36311+28160+36847+56-5-B6) = (22562+28160+36847+V2500A1)
R R R	0412	Mod : STD = (28160+28917+36847) = (22562+25072+36847) = (25888+27609+36847) = (22562+25072+28160+28917+36847) = (25888+27609+28160+28917+36847)
	0413	Mod : (26999+28244+33253) = (26999+28244+33505) = (26999+28244+34660) = (25205+26999+28244+28382+33253) = (26999+28244+28382+28495+33253) = (26999+28244+28382+28495+34660)
	0414	Mod : 25205 = 26111 = 26485 = 26999 = 28382 = 30241 = 30631 = 34825 = (23885+26111) = (28244+34825) = (25205+26999+28495) = (26999+28382+28495) = (26999+28244+30170) = (28244+28382+30170) = (26999+28244+34825) = (26999+28244+34637+35350) = (26999+28244+28382+28495+34825) = (26999+28244+28382+28495+30170) = (26999+28244+28382+28495+34637+35350)
	0415	Mod : (20024+24105+24613+26017) = (20024+24105+24613+25410+26017)
	0416	Mod : 20406 = (20406+24588) = (20406+24588+28916)
	0417	Mod : 28244 = (23885+28244) = (26999+28244+28495) = (26999+27917+28244)
	0419	Mod : (28244+28382) = (26999+28244) = (25205+28244) = (28244+30631) = (28244+30241) = (26485+28244) = (26111+26999+28244) = (26111+28244+28382) = (26999+28244+30241) = (23885+26111+28244) = (26999+28244+28495+28382) = (23885+26111+26999+28244) = (25205+26999+28244+28495)
	0422	Mod : 28479 = 28702 = 28916 = (28479+31283+34861) = (26728+28479)
R R R R R	0423	Mod : (36847+V2522/2524/2527M/2530/2533) = (22562+25072+36847+V2522/2524/2527M/2530/2533) = (25888+27609+36847+V2522/2524/2527M/2530/2533) = (28160+36847+V2527/2527E) = (22562+25072+28160+36847+V2527/2527E) = (25888+27609+28160+36847+V2527/2527E)
	0424	Mod : (23672+24105+27620+33328) = (27620+33328)

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	0425	Mod : (26999+34637+34660) = (26999+34637+33505) = (26999+34637+33253) = (26999+28244+28382+28495+34660+34637) = (26999+28244+28382+25495+34660+34637+34825)
	0426	Mod : (26999+34637+34660+35350) = (26999+28244+34660+34825) = (26999+28244+33253+34825) = (26999+28244+33505+34825) = (26999+28244+34660+34637+35350) = (26999+28244+33253+34637+35350) = (26999+28244+33505+34637+35350) = (26999+28244+34660+34637+34825+35350) = (26999+28244+28382+28495+34660+34825) = (26999+28244+28382+28495+33253+34825) = (26999+28244+28382+28495+34660+34637+35350) = (26999+28244+28382+28495+34660+34637+34825+35350)
	0427	Mod : (26999+28244+34660+34825) = (26999+28244+33253+34825) = (26999+28244+33505+34825) = (26999+28244+34660+34637+34825+35350) = (26999+28244+34660+34637+35350) = (26999+28244+34660+34637+35350) = (26999+28244+28382+28495+34660+34637+34825) = (26999+28244+28382+28495+34660+34637+34825+35350) = (26999+28244+28382+28495+34660+34637+35350) = (26999+28244+28382+28495+34660+34825) = (26999+28244+28382+28495+33253+34825)
	0428	Mod : (22013+24588) = (22013+23450+24588) = (20406+22013+23450+24588) = (20406+22013+23450+24588+28916)
	0429	MSN : 0002 = 0003 = 0004 = 0005 = 0006 = 0007 = 0008 = 0010 = 0011 = 0012 = 0013 = 0014 = 0016 = 0017 = 0018 = 0019 = 0020 = 0021
R R	0430	Mod : (28160+36847) = (22562+25072+28160+36847) = (25888+27609+28160+36847)
	0431	Mod : (23779+24349+34637+35220) = (23779+24852+26526+34637+35220) = (23779+24349+24785+26526+34637+35220) = (23779+24852+34637+35220)
	0432	Mod : (21678+22013+26377) = (21678+22013+26999) = (21678+22013+26379+26999)
R R	0433	Mod : (25888+36847) = (22562+25072+25888+36847) = (25888+28160+28917+36847) = (22562+25072+25888+28160+28917+36847)
R R R R	0434	Mod : 25888+36847+V2522/2524/2527M/2530/2533) = (22562+25072+25888+36847+V2522/2524/2527M/2530/2533) = (25888+28160+36847+V2527/2527E) = (22562+25072+25888+28160+36847+V2527/2527E)
	0435	Mod : (21946+26169+30308) = (21946+26169+30299+30308)
	0436	Mod : (21678+22536+27522+33100) = (21678+22536+27522+33300) = (21678+23529+27522+33100) = (21678+23529+27522+33300) = (21678+23227+27522+33100) = (21678+23227+27522+33300)
	0437	Mod : (34637+35220) = (26526+34637+35220)
R R	0438	Mod : (22562+36847) = (22562+25088+27609+36847) = (22562+28160+28917+36847) = (22562+27609+25888+28160+28917+36847)
R R R R	0439	Mod : 22562+36847+V2522/2524/2527M/2530/2533) = (22562+27609+25888+36847+V2522/2524/2527M/2530/2533) = (22562+28160+36847+V2527/2527E) = (22562+27609+25888+28160+36847+V2527/2527E)
	0440	Mod : (26526+30660+34637) = (30660+34637)
	0441	Mod : (26526+31283+34041) = (26526+30660+31283+34041)
	0444	Mod : (26117+31896) = (26117+31897) = (26270+31896) = (26270+31897) = (27866+31896) = (27866+31897) = (25529+27866+31896) = (25529+27866+31897) = (25529+27866+32475) = (25529+27866+32929) = (26851+27866+31896) = (25529+26185+27866+31897) = (25529+27866+31896+32402) = (27866+32929) = (26270+32475) = (26270+32929) = (27866+31897+32333+32929) = (26270+31896+32332+32475) = (27866+31897+32929) = (26270+31896+32402+32475) = (26117+31896+32402) = (26270+31896+32402) = (27866+31896+32402)

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	0445	Mod : (26485+28916+34637) = (26526+26999+28382+28479+28495+34637) = (26526+26999+28479+34637)
	0447	Mod : (25205+26526+28916) = (26111+26526+28916) = (26526+26999+28479) = (26526+26999+28702) = (26526+26999+28916) = (26526+28382+28916) = (26526+28916+30631) = (23885+26111+26526+28916) = (24075+25205+26526+28916) = (25205+26526+26999+28495+28916) = (26526+26999+28382+28479+28495) = (26526+26999+28382+28495+28702) = (26526+26999+28382+28495+28916) = (24075+25205+26526+26999+28382+28479) = (24075+25205+26526+26999+28495+28916) = (26526+26999+28916+30241) = (23885+26526+26999+28916)
	0448	Mod : 34637 = (26526+34637) = (26526+28244+34637) = (26526+28244+34637+34825)
	0449	Mod : (34637+35350) = (26526+34637+35350) = (26526+28244+34637+35350)
	0450	Mod : STD = 25404 = (30660+34861) = (30660+34864)
	0451	Mod : 30660 = (25404+30660)
R	0452	Mod : STD = 32619 = 33239 = 36462 = (32619+33239) = (32619+36462) = (33239+36462) = (32619+33239+36462)
R	0453	Mod : (36462+36481) = (36462+36750) = (36462+32619+36481) = (36462+32619+36750) = (36462+33239+36481) = (36462+33239+36750) = (36462+32619+33239+36481) = (36462+33239+32619+36750)
R	0455	Mod : 25888 = (25888+28160+28917) = (25888+30660+34861) = (25888+30660+34864) = (22562+25072+25888)
	0456	Mod : (21678+25404) = (21678+25404+31283+34862) = (21678+25404+30626+31283+34862+35110)
	0457	Mod : (21678+21858+25404) = (21678+21858+25404+30626+35110) = (21678+21858+25404+31283+34864) = (21678+21858+25404+31283+34861) = (21678+21858+25404+31283+34862) = (21678+21858+25404+31283+34864+30626+35110) = (21678+21858+25404+31283+34862+30626+35110)
	0458	Mod : (20586+24105) = (20586+24105+28238)
	0459	Mod : 26377 = 26999 = (26377+26999) = (26377+26999+31283+34861) = (26377+26999+30626+31283+34862+35110)
	0460	Mod : (21678+25404+26377) = (21678+25404+26999) = (21678+25404+26377+26999) = (21678+25404+26377+31283+34861) = (21678+25404+26377+31283+34862) = (21678+25404+26377+31283+34864) = (21678+25404+26377+26999+31283+34862) = (21678+25404+26377+30626+31283+34862+35110) = (21678+25404+26377+26999+30626+31283+34862+35110)
	0461	STD = Mod : (28238+31897) = (28238+31896)
	0462	Mod : (21678+22013+25404+26377+31283) = (21678+22013+25404+26999+31283) = (21678+22013+25404+26377+26999+31283) = (21678+22013+25404+26999+30626+31283+35110) = (21678+22013+25404+26377+26999+30626+31283+35110)
	0463	Mod : (26999+27646+33100) = (26999+30626+31283+33100+34862+35110) = (26999+27646+30626+31283+33100+34862+35110)
R	0464	Mod : 25888 = (22562+25888) = (25072+25888) = (25888+30784) = (25888+35864) = (22562+25072+25888) = (25888+30784+35864) = (25615+25888+35864) = (22562+25888+28897) = (22562+25616+25888+28897) = (22562+25888+28897+30784)
R	0465	Mod : 30784 = (22562+25072+28897+30784)
	0466	Mod : (23108+24105+25615+27276+28162+30748+33323) = (24105+25615+27276+28162+33323)
	0467	Mod : (21678+22013+30660) = (21678+24105+30660) = (21678+28160+30660) = (21678+24105+30020+30660)

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	0468	Mod : 22013 = (22013+25410) = (22013+25409+25410)
	0469	Mod : (24105+27276+28162+30748+34540) = (24105+27276+28162+34540)
	0470	Mod : (24105+25615+30748+34024) = (24105+30478+34024)
R R	0471	Mod : (30020+27140) = (33300+27140) = (27140+32650+32651+33100) = (27140+32650+32651+33300)
	0472	Mod : (25404+28479) = (25404+28916) = (25404+28160+28479+28917) = (25404+28160+28916+28917)
	0477	Mod : (24105+25615+27276+34024) = (24105+27276+34024)
	0478	Mod : (24105+25615+27276+28162+34024) = (24105+27276+28162+34024)
R R	0479	Mod : 32619 = 33239 = 36462 = (32619+33239) = (32619+36462) = (33239+36462) = (32619+33239+36462)
	0480	Mod : (23108+25820+30748) = (23109+25820+30748) = (23408+25820+30748)+IAE V2500
R	0481	Mod : 36462 = (32619+36462) = (33239+36462) = (32619+33239+36462)
R	0482	Mod (23222+26398+34540) = (23222+26398+32207+34540)
	0483	Mod : (23108+25820) = (23109+25820) = (23408+25820)+V2500
R R	0484	Mod : 25888 = (25888+30660+34861) = (25888+30660+34864) = (22562+25072+25888)
R R	0485	Mod : (25888+28160) = (22562+25888+28160) = (25888+28160+30660+34861) = (25888+28160+30660+34864) = (22562+25072+25888+28160)
R	0486	Mod : (22562+28160+30660) = (28160+30660+35864)
R	0487	Mod : STD = (25888+27609) = (22562+25072)
R	0488	Mod : 22562 = 35864 = (22562+25888+27609)
	0489	Mod : 25871 = 25887 = 25893 = 26149 = 26338 = 27725 = 28307 = (25871+30660+34861) = (25871+30660+34864) = (25887+30660+34861) = (25887+30660+34864) = (26149+30660+34861) = (26149+30660+34864)
	0490	Mod : 34156 = 32619 = 32656 =33239 = (26338+34156) = (25893+32619) = (25871+33239) = (25893+33239) = (26149+32656) = (25887+34156) = (26338+34156) = (34156+30660+34861) = (34156+30660+34864) = (32656+30660+34861) = (32656+30660+34864) = (33239+30660+34861) = (33239+30660+34864)
R R	0492	Mod : 20024 = (20024+32651) = (20024+32650+32651) = (20024+32650+32651+34035)
	0493	Mod : (34156+30660) = (32619+30660) = (33239+30660) = (32656+30660) = (25871+30660+33239) = (25893+30660+32619) = (26149+30660+32656) = (25887+30660+34156) = (26338+30660+34156) = (25893+30660+33239) = (28307+30660+33239)
R	0494	Mod : (20024+32650+34313) = (20024+32650+34809) = (20024+34035+34809)
	0495	Mod : 34156 = 32619 = 33239 = (26338+34156) = (25893+32619) = (25871+33239) = (25893+33239) = (25887+34156) = (26338+34156) = (28307+33239)
R R	0496	Mod : 31283 = (28479+31283) = (28916+31283) = (22013+24044+31283) = (25951+31283+32239) = (22013+24044+28479+31283)
	0497	Mod : 32656 = (26149+32656)
	0498	Mod : 31897 = 31896 = (26999+28495+31896) = (26999+28495+31897) = (31897+32401+35651) = (26999+28495+31897+32401+35651)
	0500	Mod : (25241+28138) = (25242+28138) = (25241+25242+28138)
	0501	Mod : (25241+26963) = (25242+26963) = (25241+25242+26963)
	0502	Mod : (25241+26963+28138) = (25242+26963+28138) = (25241+25242+26963+28138)
	0503	STD = Mod (31897+32401+35651)
	0504	STD = Mod : (22013+24044) = (25951+32239)
	0506	Mod : 31896 = 31897 = (31897+32401+35651)

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	0507	Mod : 26497 = (26497+31896) = (26497+32475) = (26497+31896+32332) = (26497+31897+32333) = (26497+31897+32401+35651)
	0508	Mod : (20268+24946+26965) = (20268+24946+27773) = (20268+26760+26965) = (20268+26760+27773) = (20268+26965+32150) = (20268+26965+32238) = (20268+26965+32239) = (20268+26965+32311) = (20268+27773+32150) = (20268+27773+32238) = (20268+27773+32239) = (20268+27773+32311) = (20268+25951+26965) = (20268+25951+27773) = (20268+26965+35040) = (20268+27773+35040)
R	0509	Mod : STD = (34864+28916) = (34864+28479)
R	0510	Mod : 22013 = (22013+34864+28916) = (22013+28479+34864)
R R	0511	Mod : (24105+26925+28479) = (24105+26925+28916) = (22013+26925+28479) = (26925+28479+35220)
R R	0512	Mod : 36562 = 36772 = 36609 = (31896+32402+34313+36562) = (31897+32401+34809+36772) = (31897+32401+34809+36609)
	0513	STD = Mod : 31896+32332
	0514	Mod : 27455 = (27455+31896+32332)
	0515	Mod : 25800 = (25800+31896+32332)
	0516	STD = Mod : (31897+32333)
	0517	STD = Mod : 31896+32332+CFM 56-5-A1 = A3 = A4 = A5 = B4 = B5 = B6
R R R R R R R R R	0518	Mod : (25205+26526) = (26111+26526) = (26526+26999) = (26526+28382) = (26526+30241) = (26526+30631) = (26526+30635) = (26485+26526) = (26526+26999+28495) = (26526+26999+30241) = (23885+26111+26526) = (23885+26526+26999) = (24075+25205+26526) = (24075+26526+28382) = (26111+26526+26999) = (26526+26999+28382+28495) = (26526+26999+28495+28916) = (23885+26111+26526+26999) = (26111+26526+28382+30635) = (26526+26999+34864) = (24075+25205+26526+26999+28495)
	0519	Mod : 31896 = 32475 = (31896+32332+32475)
	0520	Mod : (25800+31896) = (25800+32475) = (25800+31896+32332+32475)
	0521	Mod : 31896 = 32475 = (31896+32332+32475)
R	0522	Mod : 22562 = 35864 = (22562+35864) = (22562+25888+27609)
R R	0523	Mod : (22562+24105) = (24105+35864) = (24105+22562+35864) = (22562+24105+25888+27609+35864)
	0524	Mod : (20057+20067+20069+20071) = (20057+20067+20062+20816+27063)
R R R	0525	Mod : (30660+32494) = (26728+27522+28479+31371+32494) = (26728+27522+28479+30660+31371+32494) = (26728+27522+28479+30660+31283+31371+32494)
R R	0526	Mod : (30660+32494+32496) = (26728+27522+28479+30660+31371+32494+32496) = (26728+27522+28479+30660+31283+31371+32494+32496)
R R	0527	Mod : (30660+32494+35227) = (26728+27522+28479+30660+31283+31371+32494+35227)
R R	0528	Mod : (30660+32494+32496+35865) = (26728+27522+28479+30660+31283+31371+32494+32496+35865)
	0529	Mod : (20057+20067) = (20057+20069) = (20057+20067+20069)
R	0530	Mod : (27650+28382) = (26999+27650+28244+28382+28495+34825)
R R R R	0531	Mod : (25205+34637) = (26111+34637) = (26485+34637) = (26999+34637) = (28382+34637) = (30241+34637) = (30631+34637) = (23885+26111+34637) = (26999+28244+34637) + (26999+28244+28382+28495+34637)
R R R R R	0532	Mod : (26999+31896) = (26999+31897) = (28382+31897) = (30241+31896) = (30631+31896) = (26999+28382+28495+31896) = (26999+28382+28495+31897) = (26999+31897+32401+35651) = (28382+31897+32401+35651) = (30241+31897+32401+35651) = (26999+28382+28495+31897+32401+35651)

	CODE	DESIGNATION
R	0533	Mod : (22013+31070+26999) = (26002+28218+28382+31070) = (22013+26002+26111+31070) = (24105+26002+26111+31070) = (26002+26999+28218+31070) = (26002+26111+28218+31070) = (25204+26002+26999+28218+31070) = (22013+26002+26999+28218+31070) = (24105+26002+26999+28218+31070) = (25204+26999+28382+28495+31070) = (22013+26002+28218+30241+31070) = (25204+26002+26999+28218+28382+28495+31070) = (22013+26002+26999+28218+28382+28495+31070) = (24105+26002+26999+28218+28382+28495+31070)
	0534	STD = Mod : 23885 = (26999+28495) = (26999+27917)
	0535	Mod : 25205 = 26111 = 26485 = 26999 = 28382 = 30241 = 30631 = (23885+26111) = (25205+26999+28495) = (26999+28382+28495) = (26999+31896+32332) = (26999+31897+32333) = (26999+28382+28495+31897+32333)
R	0537	Mod : 25205 = 26111 = 26485 = 26999 = 28382 = 30241 = 30631 = 34825 = (23885+26111) = (28244+34825) = (28244+30241) = (25205+26999+28495) = (26999+28382+28495) = (26999+28244+30170) = (28244+28382+30170) = (26999+28244+34825) = (26999+28244+30241+34825) = (26999+28244+28382+28495+30170) = (26999+28244+28382+28495+34825) = (26999+28244+34647+35350) = (26999+28244+28382+28495+34637+35350)
R	0538	Mod : 31283 = (28916+31283) = (28479+31283) = (28702+31283)
R	0539	Mod : (32619+35220) = (33239+35220) = (34156+35220) = (35220+35944) = (25893+32619+35220) = (26149+30660+32656+35220+35944) = (25893+28307+30660+32619+32239+35220)
R	0541	Mod : (25205+28244) = (26999+28244) = (28244+28382) = (28244+30631) = (26485+28244) = (25205+34637) = (26111+34637) = (26485+34637) = (26999+34637) = (28382+34637) = (30241+34637) = (30631+34637) = (23885+26111+28244) = (26111+26999+28244) = (26111+28244+28382) = (26999+28244+30241) = (26999+28244+28382+28495) = (25205+26999+28244+28495)
R	0542	Mod : (27650+28382) = (26999+27650+28244+28382+28495+34825)
R	0543	Mod : (26999+27650+28244) = (27650+28244+28382) = (27650+28244+28382) = (26999+27650+28244+28382+28495)
	0544	STD = Mod : (31896+32332) = (31897+32333)
R	0545	Mod : (26999+28244+33253) = (26999+28244+34660) = (26999+28244+33505) = (25205+26999+28244+28382+33253) = (26999+28244+28382+28495+33253) = (26999+28244+28382+28495+34660) = (26999+28244+28382+28495+34660+34637) = (26999+28244+28382+28495+34660+34637+34825)
R	0546	(56-5-A3 = V2527) = (23408+V2500) = (21615+56-5-A3) = (23264+26058+26059+56-5-A3)
R	0547	(56-5-B1 = 56-5-B2 = V2530) = (31810+56-5-B2)
R	0548	Mod : (25404+28160+28479+34041) = (25404+28160+28916+31283+34041)
R	0549	Mod : (21678+22013+25404+26017+26377) = (21678+22013+25404+26017+26999) = (21678+22013+25404+26017+26377+26999) = (21678+22013+25404+26017+26377+26999+28479) = (21678+22013+25404+26017+26377+26999+28479) = (21678+22013+25404+26017+26377+26999+28479+31283+34861) = (21678+22013+25404+26017+26377+26999+26728+31283+34864) = (21678+22013+25404+26017+26999+33100+34997) = (21678+22013+25404+26017+26999+30626+31283+33100+34864+34997+35110)
R	0550	Mod : (21678+25404+26017+26999+33100) = (21678+25404+26017+26999+30626+33100+35110+31283+34862) = (21678+25404+26017+26377+26728+26999+28479+30660+33100) = (21678+25404+26017+26377+26728+26999+28479+30660+33100+34862+35100)

	CODE	DESIGNATION
R	0551	Mod : (21678+25404+26017+26999+31283+33100) = (21678+25404+26017+26999+30626+31283+33100+35110) = (21678+25404+26017+26377+26728+26999+28479+30660+31283+33100) = (21678+25404+26017+26377+26728+26999+28479+30660+31283+33100+35110)
R	0552	Mod : (21678+25404+26377+26999+31283) = (21678+25404+26377+26999+30626+31283+35110) = (21678+25404+26017+26999+31283+33100+34856) = (21678+25404+26017+26999+31283+33100+34898) = (21678+25404+26017+26999+30626+31283+33100+34856+35110) = (21678+25404+26017+26999+30626+31283+33100+34898+35110) (21678+25404+26017+26377+26728+26999+28479+30660+31283) = (21678+25404+26017+26377+26728+26999+28479+30660+31283+34856+ 35110) = (21678+25404+26017+26377+26728+26999+28479+30660+31283+34898+35110)
R	0553	Mod : (21678+25404+26017+26999+30626+31283) = (21678+25404+26017+26999+30626+31283+33100+34898) = (21678+25404+26017+26377+26728+26999+28479+30626+30660+31283+33100+34856) = (21678+25404+26017+26377+26728+26999+28479+30626+30660+ 31283+34898)
	0554	Mod : (21678+26999) = (21678+21858+26377) = (21678+21858+26999) = (21678+26377+26999)
R	0555	Mod : (21678+22013+25404+26017+26999+33100) = (21678+22013+25404+26017+26377+26728+26999+28479+30660+33100)
R	0556	Mod : (21678+22013+25404+26017+26999+33100) = (21678+22013+25404+26017+26999+31283+33100) = (21678+22013+25404+26017+26999+30626+31283+33100+35110) = (21678+22013+25404+26017+26377+26728+26999+28479+30626+30660+31283+33100+35110)
R	0557	Mod : (21678+22013+25404+26377+26999+31283) = (21678+22013+25404+26999+31283+33100+34997) = (21678+22013+25404+26999+31283+33100+34997+35110) = (21678+22013+25404+26017+26377+26728+26999+28479+30626+30660+31283+33100+34997+35110) = (21678+22013+25404+26017+26377+26728+26999+28479+30660+31283) = (21678+22013+25404+26017+26377+26728+26999+28479+30660+31283+34997+35110)
R	0558	Mod : (26999+31283) = (27646+31283) = (30631+31283) = (2699+27646+31283) = (26999+31283+33100+34856) = (26999+31283+33100+34898) = (26999+30626+31283+33100+34856+35110) = (26999+30626+31283+33100+34898+35110) = (26999+27646+30626+31283+33100+34898+35110)
R	0559	Mod : (26999+31283) = (27646+31283) = (30631+31283) = (2699+27646+31283) = (26999+30626+31283) = (26999+30626+31283+33100+34898) = (26999+27646+30626+31283+33100+34856) = (26999+30626+31283+33100+34856)
R	0560	Mod : (26999+31283+33100) = (27646+31283+33100) = (26999+27646+31283+33100) = (26999+27646+30626+31283+33100+35110) = (26999+30626+31283+33100+35110)
R	0561	Mod : (22013+26999+30626+31283+33100+35110+35220) = (22013+26999+31283+33100+35220) = (22013+26999+27646+30626+31283+33100+35110+35220)
R	0562	Mod : (22013+26999+31283) = (22013+27646+31283) = (22013+26999+27646+31283) = (22013+26999+31283+33100) = (22013+26999+30626+31283+33100+35110) = (22013+26999+27646+30626+31283+33100+35110) = (22013+26999+27646+31283+33100+35110)
R	0563	Mod : 33713 = (25328+33713)
R	0564	Mod : 36331 = (23900+30479+36331)
	0565	STD = Mod : (26526+28956) = (26526+27046+28956)

	CODE	DESIGNATION
R	0566	Mod : 28547 = (23264+23900+28547)
R	0567	Mod : 35311 = (23900+30479+35311)
R	0568	Mod : (23900/56-5-B4/B5/B6/V2527E) = (23264+23900+26058+26059/56-5-B4)
R	0569	Mod : 28547 = (23264+23900+28547)
R	0570	Mod : (30479+56-5-A3/V2527) = (23900+30479+56-5-A3/V2527) = (23264+23900+30479/V2527) = (20802+23264+23900+26059+30479/V2527)
R	0571	Mod : 35735 = (23900+30307+35753)
	0572	Mod : (22013+24385+CFM) = (22013+24385+IAE) = (22013+24385+AUA)
R	0573	Mod : (23264/V2500A1) = (21615+23264/56-5-A1) = (21615+22269+23264+26059/56-5-A1)
R	0575	Mod : (23900/V2500A1) = (23900+21615/56-5-A1)
R	0576	Mod : (31132/56-5-A3) = (31132/V2527-A5) = (23408+31132/V2500A1) = (23900+31132/56-5-A3) = (23900+31132/V2527A5)
R	0577	Mod : (31132/56-5-B4=V2527E) = (23900+31132/56-5-B4=V2527E) = (23264+23900+26058+26059+31132/56-5-B4)
R	0578	Mod : (21601/V2500) = (20802+21601/V2500) = (21601+21615/56-5-A1) = (20141+20802+21601+21615/56-5-A1)
	0579	Mod : (26999+27650 28244) = (27650+28244+28382) = (26999+27650+28244+28382+28495)
	0580	Mod : (31133+CFM 56-5-A3) = (31133+IAE V2527) = (23408+31133+IAE V2500)
R	0581	Mod : (23264+23900/V2500) = (22269+23264+23900/V2500) = (21615+23264+23900/56-5-A1) = (21615+22269+23264+23900/56-5-A1) = (21615+22269+23264+23900+26059/56-5-A1)
R	0582	Mod : (21601/56-5-B4=V2527E) = (21601+23900+25733/56-5-B4)
R	0583	Mod : 34047 = (23900+34047) = (23264+23900+26058+26059+34047)
	0584	Mod : 28479 = 28916 = (26017+28479) = (26017+28916)
	0585	Mod : 28238 = (28238+28479) = (28238+28702) = (28238+28916)
R	0586	Mod : 27942 = (23264+23900+27942)
R	0587	Mod : 31133 = (22269+23900+31133) =(23264+23900+31133) = (23900+26058+31133)
R	0588	Mod : (35198/56-5-A4/A5/B5/B6/V2522/V2524) = (35197+35198/56-5-A4/A5/B5/B6/V2522/V2524)
R	0589	Mod : (35198) = (35197+35198)
	0590	Mod : (22249+25529+26401) = (22249+26117+26401) = (22249+26270+26401)
R	0591	Mod : (35197/56-5-A4/A5/B5/B6/V2522/V2524) = (27112+35197/56-5-B5)
R	0592	Mod : (30479/56-5-B4/V2527E) = (23900+30479/56-5-B4/V2527E) = (23264+23900+30479/56-5-B4/V2527E) = (23900+26058+26059+30479/56-5-B4) = (23264+23900+26058+26059+30479/56-5-B4)
	0593	Mod : (25241+32088) = (25241+32090) = (25242+32088) = (25242+32090) = (25241+25242+32088) = (25241+25242+32090)
	0594	Mod : (25241+28138+32088) = (25241+28138+32090) = (25242+28138+32088) = (25242+28138+32090) = (25241+25242+28138+32088) = (25241+25242+28138+32090)
	0595	Mod : (25241+26963+32088) = (25241+26963+32090) = (25242+26963+32088) = (25242+26963+32090) = (25241+25242+26963+32088) = (25241+25242+26963+32090)
	0596	Mod : (21678+21706+28479) = (21678+21706+28916)
	0597	Mod : (21678+21706+21766+28479) = (21678+21706+21766+28916)
	0598	Mod : (21678+21706+21768+28479) = (21678+21706+21768+28916)
	0599	Mod : (25241+26963+28138+32088) = (25241+26963+28138+32090) = (25242+26963+28138+32088) = (25242+26963+28138+32090) = (25241+25242+26963+28138+32088) = (25241+25242+26963+28138+32090)

	CODE	DESIGNATION
	0600	Mod : 28238 = (27846+28238) = (28238+28479) = (27846+28238+28479) = (27846+28238+26916) = (27846+28238+28702)
R	0601	Mod : 35325 = (23264+23900+35235)
R	0602	Mod : (23264+23900/56-5-A3/V2527) = (22269+23264+23900/56-5-A3/V2527) = (23264+23408+23900/V2500) = (21615+23264+23900/56-5-A3) = (22269+23264+23408+23900/V2500) = (22269+23264+23900+26059/V2527) = (22269+23264+23900+26059/56-5-A3) = (21615+22269+23264+23900/56-5-A3) = (22269+23264+23408+23900+26059/V2500A1) = (21615+22269+23264+23900+26059/56-5-A3)
R	0603	Mod : (22269+23408+23900) = (22269+23264+23408+23900+26058) = (22269+23264+23408+23900+26058+26059)
R	0604	Mod : 35325 = (27112+35426)
R	0605	Mod : (27112+27770/56-5-A4/A5/B5/B6/V2522/V2524)
R	0606	Mod : (22269+23900) = (23264+23900+26058) = (22269+23264+23900+26058+26059)
R	0607	Mod : (22269+23900) = (22269+23264+23900+26058+26059)
R	0608	Mod : 36962 = (26457+36932)
	0609	Mod : (20268+24917+V2533) = (20268+24917+31607+V2530)
	0610	Mod : (20268+24946+26965) = (20268+24946+27773) = (20268+25951+26965) = (20268+25951+27773) = (20268+26760+26965) = (20268+26760+27773) = (20268+26965+32150) = (20268+26965+32238) = (20268+26965+32239) = (20268+26965+32311) = (20268+27773+32150) = (20268+27773+32238) = (20268+27773+32239) = (20268+27773+32311) = (20268+26965+35040) = (20268+27773+35040)
	0611	Mod : 27522 = (27522+31371+31728) = (27522+30660+P0164+31371+31728)
R	0612	Mod : 34251 = (26457+34251)
R	0613	Mod : (22269+23900/56-5-B4/V2527E) = (22269+23900+26058/56-5-B4) = (23264+23900+26058/56-5-B4)
	0614	Mod : 25205 = 26111 = 26485 = 26999 = 28382 = 30241 = 30631 = 30635 = (23885+26111) = (26999+28382+28495) = (24075+25205+26999+28495)
R	0615	Mod : (23264+23900/56-5-B4/V2527E) = (22269+23264+23900/56-5-B4/V2527E) = (23264+23900+26059/56-5-B4)
R	0616	Mod : (21615+27942) = (21615+22269+23264+23900+27942)
R	0617	Mod : (20067+20069+33100+35220) = (20067+20069+31283+33100+35220) = (20067+20069+31283+33300+35220)
R	0618	Mod : (27112+28238+28951/56-5-B7/V2524/27M) = (27112+28238+28951+32635/56-5-B7/V2524/27M)
R	0619	Mod : (20059+20067) = (20059+20069) = (20059+20067+20069) = (35236+20067+20069) = (20059+20067+20069+31283+34861) = (20059+20067+20069+31283+34862) = (20059+20067+20069+31283+33100+34856) = (20059+20067+20069+31283+33100) = (20059+20067+20069+31283+33100+34997)
R	0620	Mod : (28479+P6146) = (28916+P6146) = (28479+31283+P6146) = (28916+31283+P6146) = (28479+34862+P6146) = (28479+31283+34862+P6146)
R	0621	Mod : (28479+P6146) = (28479+31283+P6146)
R	0622	Mod : (30020+31283+P6146) = (28479+30020+31283+P6146)
R	0623	Mod : (30020+31283) = (28479+30020+31283)
R	0624	Mod : 28479 = 28702 = 28916 = (31283+34861) = (31283+34862) = (28479+31283) = (28702+28916) = (28916+31283) = (26728+28479+31283+34862) =
R	0625	Mod : 21678 = (21678+22013) = (21678+24105) = (21678+28160) = (21678+30020) = (21678+28160+36847) = (21678+24105+30020+36847)

	CODE	DESIGNATION
R	0626	Mod : (20067+20069) = (20067+20069+20071+28478) = (20067+20069+20071+21708+28478)
R	0627	Mod : (20067+20069+20071+21708) = (20067+20069+20816+21708+27063) = (20067+20069+20071+21708+33100+34856) = (20067+20069+20071+21708+31283+34861) = (20067+20069+20071+21708+31283+34862) = (20067+20069+20071+21708+31283+33100+34856)
R	0628	Mod : (21615+22269+23900) = (21615+22269+23264+23900+26058+26059)
	0629	Mod : (21678+25404+26017+26999+30020+31283) = (21678+25404+26017+26999+30626+31283+33100) = (21678+25404+26017+26999+30626+31283+33300)
R	0630	Mod : (21711/V2500) = (21615+21711/56-5-A1) = (21615+21711+25733/56-5-A1) = (21615+21711+23900+25733/56-5-A1)
	0631	Mod : (25404+31283) = (25404+26017+28479+31283) = (25404+26017+28916+31283)
R	0632	Mod : (20059+20067+20069+20071+21708+30020+35220) = (20059+20067+20069+20071+21708+31283+33100+35220) = (20059+20067+20069+20071+21708+30354+31283+35220)
R	0633	Mod : (34094+(56-5-B4/B5/B6 = V2527e)) = ((23900+34094)+(56-5-B4/B5/B6 = V2527e)) = (23900+26058+26059+27942+34094+56-5-B4)
R	0634	Mod : 23264+(56-5-A3 = V2527) = ((21615+23264) = (22269+23264))+(56-5-A3 = V2527) = (23264+23408)+V2500 = ((22269+23264+26059)+(56-5-A3 = V2527)) = (21615+22269+23264+26059+56-5-A3)
R	0635	Mod : 22269+(56-5-A3 = V2527) = (22269+23408)+V2500 = ((22269+26058) = (23264+26058) = (21615+22269))+56-5-A3
R	0636	Mod : 23900+(56-5-A3 = V2527) = (23408+23900)+V2500
	0637	Mod : (22249+25529+30020+31283) = (22249+26270+30020+31283)
R	0638	Mod : 25328 = 35306 = (25328+26457)
	0639	Mod : (26526+30020+30660) = (26526+26925+30020+30660+31283)
R	0640	Mod : (24064+26526+35220) = (24065+26526+35220) = (24066+26526+35220) = (24067+26526+35220) = (24067+34637+35220) = (24065+24067+26526+35220) = (24066+24067+26526+35220) = (24067+26526+34637+35220) = (24024+26526+34637+35220) = (24066+26526+34637+35220) = (24065+26526+34637+35220)
R	0641	Mod : (24064+26526) = (24065+26526) = (24066+26526) = (24067+26526) = (24065+34637) = (24065+24067+26526) = (24066+24067+26526) = (24064+24065+26526) = (24064+26526+34637) = (24066+26526+34637)
R	0642	Mod : (20268+24946+27773) = (20268+27773+32311) = (20268+26965+32311) = (20268+27773+32238) = (20268+23871+24946+27773)
R	0643	Mod : (20268+24946+27773) = (20268+25951+27773) = (20268+26760+27773) = (20268+27773+32311) = (20268+26965+32311) = (20268+27773+32238) = (20268+24946+26965+27773) = (20268+24946+25615+27773)
R	0644	Mod : (20268+24946+27773+36311) = (20268+24946+26925+36311)
R	0645	Mod : (20057+20067+20069+20071+30020+35220) = (20057+20067+20069+20071+30354+31283+35220) = (20057+20067+20069+20071+33100+35220+31283)
R	0646	Mod : (22013+22562+23092+31495) = (22013+22562+31112+31495) = (20151+22013+22562+31495) = (20063+20151+22013+22562+31495) = (20063+20151+22013+31495+35864) = (20063+22013+31112+31495+35864) = (20063+20151+22013+22562+31495+35864) = (20063+20151+22013+31112+31495+35864)
R	0647	Mod : (34637+27620) = (28244+34637+27620)
R	0648	Mod : 25590 = (25590+31283+34861) = (25590+31283+34862)
R	0649	Mod : 28916 = 28479 = 28702 = (28479+31283+34862) = (28479+31283+34861)

	CODE	DESIGNATION
	0650	Mod : 31897 = 32929 = (31897+32333+32929)
R	0651	Mod : P0164 = 28360 = 31371 = (P0164+28360) = (P0164+31371) = (28360+31371)
R		= (31371+31728) = (31283+34864) = (31283+34861) = (P0164+30660+31371) =
R		(P0164+28360+31371) = (P0164+31371+31728) = (28360+30660+31371) =
R		(30660+31371+31728) = (P0164+30660+31371+31728) =
R	0652	Mod : (24035+25404) = (24160+25404) = (24189+25404) =
R		(24035+25404+28479+31283+34861) = (24035+25404+28479+31283+34862)
R	0653	Mod : 35220 = (24035+25404+28479+31283+35220)
R	0654	Mod : (24035+25404+35220) = (24160+25404+35220) = (24189+25404+35220) =
R		(24035+25404+28479+31283+35220)
R	0655	Mod : (26999+31896) = (26999+31897) = (28382+31897) = (28382+31896) =
R		(30241+31896) = (30631+31896) = (26999+28382+28495+31896) =
R		(26999+28382+28495+31897) = (26999+31897+32401+35651) =
R		(28382+31897+32401+35651) = (30241+31897+32401+35651) =
R		(26999+28382+28495+31897+32401+35651)
R	0656	Mod : (CFM+33323) = (CFM+25225+28399+33323) = (IAE+33323)
	0657	Mod : (21678+26485+27620) = (21678+26999+27620) = (21678+27620+27646) =
		(21678+27620+30631) = (21678+27620+30635)
R	0658	STD = Mod: 31896 = 31897 = 32401 = 32402 = 32929 = 32475 = 34313 = 34809 =
R		(31896+32332+32475) = (31897+32333+32929) = (28378+31896) = (31896+32332)
R		= (31896+32402) = (31897+32333) = (31897+32401) = (31897+32929) =
R		(32401+32929) = (32333+32929) = (31896+32402+32475) = (31897+32401+32929)
R	0659	Mod : 28378 = (28378+31897) = (28378+31897+32401+34809)
R	0660	Mod : 35220 = (22013+28479) = (22013+28916) = (24105+28479) = (24105+28702)
R		= (24105+28916) = (28479+35220) = (22013+28702)
	0665	Mod : 26925 = (26925+27979) = (24266+26925+32310)
	0667	Mod :20268 = (20268+25800) = (20268+25530+26505) =
		(20268+25800+25530+26505)
	0670	Mod : (21678+26485) = (21678+26999) = (21678+27646) = (21678+30631) =
		(21678+30635) = (21678+26999+33497) = (21678+26999+27620+33497) =
		(21678+26999+27646+33497)
	0671	Mod : 20268 = (20268+25800)
R	0672	Mod : (24105=28439=30020=30203=30920)
	0678	Mod : (20966+CFM 56-5-A3) = (20966+23408+IAE V2500)
	0685	Mod : K0860 = K4355 = (26169+30308+K0860) = (26169+30308+K4355)
	0686	Mod : (21946+K0860) = (21946+K4355) = (21946+26169+30308+K0860) =
		(21946+26169+30308+K4355) = (21946+26169+30299+30308+31285+K0860) =
		(21946+26169+30299+30308+31285+K4355)
	0688	Mod : (26169+30299+K0860) = (26169+30299+K4355)
	0690	Mod : (21532+CFM 56-5-A3) = (21532+23408+IAE V2500)
R	0694	Mod : (26600+31810)=(30310+31810)
	0704	Mod : (21601+CFM 56-5-A3 = IAE V2527) = (21601+23408+IAE V2500)
	0715	Mod : (21711+CFM 56-5-A3) = (21711+23408+IAE V2500)
R	0725	Mod : (28721=28960=32011=32456)
R	0729	Mod : (22013+26401+28479)=(22013+26401+28916)
	0730	Mod : (20268+V2533) = (20268+31607+V2530)
	0732	Mod : 32475 = 32929 = (31896+32402) = (31897+32401) = (26999+28495+32475)
		= (26999+28495+32929) = (31896+32332+32475) = (26999+28495+31896+32402)
	0734	Mod : 32401 = 32402 = 32475 = 32929 = (31896+32402) = (31897+32401) =
		(31896+32332+32475) = (31897+32333+32929)
	0735	Mod : (22013+27276) = (22013+31395) = (22013+27276+31395)

	CODE	DESIGNATION
	0739	Mod : (20268+22461+24946+26965) = (20268+22461+24946+27773) = (20268+22461+25951+26965) = (20268+22461+25951+27773) = (20268+22461+26760+26965) = (20268+22461+26760+27773) = (20268+22461+26965+32150) = (20268+22461+26965+32238) = (20268+22461+26965+32239) = (20268+22461+26965+32311) = (20268+22461+27773+32150) = (20268+22461+27773+32238) = (20268+22461+27773+32239) = (20268+22461+27773+32311) = (20268+22461+26965+35040) = (20268+22461+27773+35040) = (20268+23408+24946+26965) = (20268+23408+24946+27773) = (20268+23408+25951+26965) = (20268+23408+25951+27773) = (20268+23408+26760+26965) = (20268+23408+26760+27773) = (20268+23408+26965+32150) = (20268+23408+26965+32238) = (20268+23408+26965+32239) = (20268+23408+26965+32311) = (20268+23408+27773+32150) = (20268+23408+27773+32238) = (20268+23408+27773+32239) = (20268+23408+27773+32311) = (20268+23408+26965+35040) = (20268+23408+27773+35040) = (20268+22461+23408+24946+26965) = (20268+22461+23408+24946+27773) = (20268+22461+23408+25951+26965) = (20268+22461+23408+25951+27773) = (20268+22461+23408+26760+26965) = (20268+22461+23408+26760+27773) = (20268+22461+23408+26965+32150) = (20268+22461+23408+26965+32238) = (20268+22461+23408+26965+32239) = (20268+22461+23408+26965+32311) = (20268+22461+23408+27773+32150) = (20268+22461+23408+27773+32238) = (20268+22461+23408+27773+32239) = (20268+22461+23408+27773+32311) = (20268+22461+23408+26965+35040) = (20268+22461+23408+27773+35040)
R	0740	Mod : (21678+21858+25404+30626+31283)
	0743	Mod : (21678+25404+26377+26999+31283) = (21678+25404+26377+26999+30626+31283+35110)
R	0744	Mod : (21678+25404+26377+26999+30626+31283)
R	0749	Mod :(21678+24105+26017+33100)=(21678+24105+26017+33300)
R	0751	Mod :(21678+22013)=(21678+24105)=(21678+28160)
	0754	STD = Mod : (22013+24044) = (25951+32239)
R	0756	Mod :(22013+31283+P6911)=(25951+31283+P6911)
R	0758	Mod :(21678+22536)=(21678+23227)=(21678+23529)
	0762	Mod : (23222+24105) = (24105+26057) = (23222+24105+26057)
	0766	Mod : 30020 = (24105+26925+30020) = (24105+26925+28479+30020)
R	0771	Mod : 26485=26999=27646=30631=30635
R	0772	Mod : (21678+21706+21766+21768+28479)=(21678+21706+21766+21768+28916)
	0773	Mod : (22013+27846+28479+28721) = (22013+27846+28479+28960) = (22013+27846+28721+28916) = (22013+27846+28916+28960) = (22013+27846+28479+32011) = (22013+28479+30439+32011) = (22013+28479+30439+32456) = (22013+28479+28721+30439) = (22013+28479+28960+30439)
	0774	Mod : (21678+21706+21768) = (21678+21706+21768+21858+26347)
	0775	Mod: (20268+24946+26965+33323) = (20268+24946+27773+33323) = (20268+25951+26965+33323) = (20268+25951+27773+33323) = (20268+26760+26965+33323) = (20268+26760+27773+33323) = (20268+26965+32150+33323) = (20268+26965+32238+33323) = (20268+26965+32239+33323) = (20268+26965+32311+33323) = (20268+27773+32150+33323) = (20268+27773+32238+33323) = (20268+27773+32239+33323) = (20268+27773+32311+33323) = (20268+26965+33323+35040) = (20268+27773+33323+35040)
	0776	Mod : (26018+26398) = (23222+26018) = (26018+26057) = (23222+26018+26057) = (23222+26018+26398) = (26018+26057+26398) = (23222+26018+26057+26398)
	0778	Mod : 26398 = 23222 = 26057 = (23222+26398) = (26057+26398) = (26398+31896+32332) = (26398+31897+32333) = (23222+26057+26398) = (23222+31896+32332) = (23222+31897+32333)

	CODE	DESIGNATION
	0779	Mod: 26398 = 23222 = 26057 = (23222+26057) = (23222+26398) = (26057+26398) = (23222+26057+26398)
	0780	Mod: 32619 = 33239 = (32619+33239)
	0781	Mod : (22013+27846+28479+28721) = (22013+27846+28479+28960) = (22013+27846+28479+32011) = (22013+27846+28721+28916) = (22013+27846+28916+28960) = (22013+27846+28916+32011) = (22013+28479+30439+32011) = (22013+28479+30439+32456) = (22013+28479+28721+30439) = (22013+28479+28960+30439)
	0783	Mod: 32619 = 33239 = (32619+33239) = (26577+33239)
	0784	STD = Mod: 31896 = 31897 = 32401 = 32402 = 32929 = 32475 = (31896+32332+32475) = (31897+32333+32929) = (20586+22013+30422)
	0801	Mod: 32619 = 33239 = (32619+33239) = (22013+24044+33239) = (22013+24044+32619) = (25951+32239+32619) = (22013+24044+32619+33239)
	0802	Mod : (28378+28479) = (28378+28916) = (33973+28479) = (22013+28479+30422) = (22013+28916+30422) = (22013+25453+28479+30422) = (22013+25453+28916+30422)
R	0806	Mod : (21678+21766+28479)=(21678+21766+28916)
R	0808	Mod : (21678+21766+21767+28479)=(21678+21766+21767+28916)
R	0810	Mod : (21678+21706+21766+21767+21768+28479)=(21678+21706+21766+
R		21767+21768+28916)
	0816	Mod : (26497+32475+32997) = (26497+31896+32402+32997)
	0822	Mod : (23119+31283) = (23013+24044+31283)
	0827	Mod : (20268+24917+V2533) = (20268+24917+31607+V2530)
	0829	STD or Mod : (31395+32207) = (27276+31395+32207)
R	0842	Mod : (24035+31283)=(24160+31283)=(24189+31283)
R	0845	Mod : (28136+28951)=(28136+32635)
	0846	Mod : (21678+26335) = (21678+26334) = (21678+26335+28160+28917)
	0848	Mod : (28479+34456) = (28378+28479) = (28378+28916) = (33973+28479) = (22013+28479+30422) = (22013+28916+30422) = (22013+25453+28479+30422) = (22013+25453+28916+30422)
	0853	(56-5-B4 = V2527E) = (Mod : 20141/56-5-B4)
	0855	(56-5-B8 = 56-5-B9 = PW6122 = PW6124) = (Mod : 20802/PW Eng)
	0857	(56-5-B7 = V2527M) = (Mod : (20141+20802)/56-5-B7)
	0858	Mod : 33713 = (20141+20802+25328+33713)/56-5-B6
	0862	Mod : 23900/(56-5-A3=V2527) = (23408+23900)/V2500 = (20802+23900)/V2527
	0864	Mod : 26457/(56-5-A4 = 56-5-A5 = 56-5-B5 = 56-5-B6 = V2522 = V2524) = (20802+26457)/V2524 = (20141+20802+26457)/(56-5-B5 = 56-5-B6) = (20141+20802+25328+26457+32979)/56-5-B6
	0868	Mod : 25649/(56-5-B1 = 56-5-B2 = V2530) = (24178+25649)/(56-5-B1 = 56-5-B2 = V2530) = (20141+20802+24178+25649)/56-5-B1
	0870	Mod : 24899/(56-5-B1 = 56-5-B2 = V2530) = (20802+24899)/V2530
	0871	(Mod : 24178+(56-5-B1 = 56-5-B2 = V2530)) = (Mod : (20802+24178)+V2530)
	0873	Mod : (30310 = (24899+26600))/(56-5-B1 = 56-5-B2 = V2530) = (20802+30310)/V2530 = (20802+24899+26600)/V2530
	0874	Mod : 27553/(56-5-B3=V2533) = (31607+31615) = (31615+31701) = (31615+31702) = (20141+20802+27553)/56-5-B3
	0875	Mod : 28960/(56-5-B3 = V2533) = (20802+28960)/V2533 = (20141+20802+28960)/56-5-B3
	0877	Mod : 31839/(56-5-B3 = V2533) = (20802+28960+31839)/V2533
	0879	Mod : 23264/(56-5-B4 = V2527E) = (20802+23264)/V2527E
	0882	Mod : 31385/(56-5-B4 = V2527E) = (20141+20802+23900+31385)/56-5-B4
	0885	Mod : (25626 = (20966+25626) = (20802+25626) = (20802+20966+25626))/V2500
	0889	Mod : (21601 = (20802+21601))/V2500 = (20141+20802+21601+21615)/56-5-A1

CODE	DESIGNATION
0890	(Mod : 31672+(56-5-B8 = 56-5-B9 = PW6122 = PW6124) = (Mod : (20141+20802+31672)+56-5-B8)
0891	Mod : 31675/(56-5-B8 = 56-5-B9 = PW6122 = PW6124) = (20141+20802+31675)/56-5-B8
0892	Mod : 33280/(56-5-B8 = 56-5-B9) = (20141+20802+33128+33280)/56-5-B8
0895	(Mod : 28136+(56-5-B7 = V2527M) = (Mod : (20802+28136)+V2527M) = (Mod : (20141+20802+28136)+56-5-B7)
0899	Mod : (27112+27770)/(CFM 56-5-A4 = A5 = B5 = B6 = IAE V2522 = V2524) = (20802+27112+27770)/V2524
0900	Mod : (31321+31607) = (31321+31701) = (31321+31702) = (20802+31321+31607)
0903	(Mod : ((22269+23900) = (26058+23900))+(56-5-B4 = V2527E)) = (Mod : (20141+20802+22269+23900)+56-5-B4) = (Mod : (20802+23264+23900+26058)+V2527) = (Mod : (20141+20802+22269+23900+26058)+56-5-B4)
0904	(Mod : ((23264+23900) = (22269+23264+23900))+(56-5-B4 = V2527E)) = (Mod : (20802+23264+23900)+V2527E) = (Mod : (20141+20802+23264+23900)+56-5-B4) = (Mod : (20141+20802+22269+23264+23900)+56-5-B4)
0905	(Mod : ((25328+27820) = (20141+20802+25328+27820))+56-5-B6)
0907	Mod : (21615+21711+IAE V2500) = (20141+20802+21711+CFM 56-5-A1)= (20141+20802+21615+21711+CFM 56-5-A1) = (20141+20802+21615+21711+25733+CFM 56-5-A1) = (20141+20802+21615+21711+23900+25733+CFM 56-5-A1)
0909	Mod : ((23264+23900+27920) = (20141+20802+23264+23900+27920))+56-5-A3
0910	Mod : ((23264+23900+26891) = (20141+20802+23264+23900+26891))+56-5-A3
0911	(Mod : (23264+23900+27920)+(56-5-B4 = V2527E)) = (Mod : (20141+20802+23264+23900+27920)+56-5-B4)
0913	(Mod : ((23264+23900+27942) = (20802+23264+23900+27942))+V2527)
0915	Mod : (20141+20802+21615+22269+23900) = (20141+20802+21615+26058+23900) = (20141+20802+21615+22269+23264+23900+26058)
0919	Mod : STD = (22013+24044) = (25951+32239) / CFM ALL
0920	Mod : (22249+24215) = (22249+24588) = (22249+25534) = (22249+24588+25534) = (22249+24215+24588+25534) = (22249+24215+24588+26270+34514)
0931	Mod : 21678 = (21678+28160+28917) = (21678+28160+28917+30660)
0953	STD = Mod : 20067+20069+28474+28478
0962	Mod : (21678+24105+32207) = (21678+26335+28160+32207)
0964	Mod : 20343 = 31276 = (20343+27498) = (31276+27498)
0965	Mod : 25240 = 25274 = 28283 = 28711 = (25240+28283) = (25240+28238+28719) = (25274+28238+28719)
0966	Mod : (24785+27620) = (23672+24105+27620) = (24105+24785+27620) = (22013+23672+24785+27620)
0967	Mod : (26526+31283) = (26526+30660+32283)
0968	Mod : (32494+32496) = (P0164+32494+32496)
0970	Mod : (20067+20069+20071+30020) = (20067+20069+20071+30534+31283) = (20067+20069+20071+30534+31283
0976	Mod : 32929 = 32475= (31897+32401) = (31896+32402) = (31897+32333+32929) = (31896+32332+32475)
0977	Mod : 25205 = 26111 = 26485 = 26999 = 28382 = 30241 = 30631 = (23885+26111) = (23885+26999) = (25205+26999+28495) = (26999+28382+28495)
0980	STD = (24105+31364) = (24105+31365) = (24105+31897) = (24105+31896) = (20105+32475) = (24105+32929) = (24105+31380) = (24105+31379) = (24105+31365+31896+31905) = (24105+31364+31897+31906) = (24105+31365+31905+32475) = (24105+31364+31906+32929) = (24105+31365+31905+31380) = (24105+31364+31906+31379)
0981	Mod : 24105 = (24105+31364+31906) = (24105+31365+31905)

	CODE	DESIGNATION
	0984	Mod : 25205 = 26111 = 26485 = 26999 = 28382 = 30241 = 30631 = (23885+26111) = (23885+26999) = (25205+26999+28495) = (26999+28382+28495)
	0986	STD = Mod : (25204+26999+27917) = (26999+28495) = (26999+28218+28495) = (25204+26999+28495) = (24105+25294+26999+28495) = (24105+25294+26002+26999+28218+28495) = (24105+26002+26999+28218+28495+31070) = (25204+26002+26999+28218+28495+31070)
	0992	Mod : (28238+32635) = (28238+28951+32635)
	0993	Mod : (22013+27276+33323) = (24105+27276+33323)
R	0998	Mod :(24035+25404+31283)=(24160+25404+31283)=(24189+25404+31283)
	1000	Mod : ((23108+27276) + (V2527A5+V2527EA5)) = (23109+27276) = (23871+27276)
	1004	Mod : (24105+27276+28162) = (24105+27276+28162+30748)
	1006	Mod : (24105+25615+27276+28162) = (24105+25615+27276+28162+30748) = (23108+24105+25615+27276+28162+30748)
	1007	Mod : (24105+25615+27276+30748+34024) = (24105+27276+30748+34024)
	1016	Mod : 28721 = 28960 = 32011= 32456 = (22013+28721) = (22013+28960) = (22013+32011) = (22013+32456)
	1017	Mod : ((28721 = 28960 = (22013+28960))+US)
	1018	Mod : (20586+30020) = (20586+24105+30020)
	1019	Mod : (STD = 24105 = (30096+32304) = (24105+30096+32304)
	1022	Mod : (23222+24105+30020) = (23222+24105+30020+32207+CFM 56-5-B8)
	1023	Mod : (24105+30020) = (24105+30020+32207+CFM 56-5-B8) = (24105+30020+32207)
	1025	(Mod : 27112+(56-5-A4 = 56-5-A5 = 56-5-B5 = 56-5-B6 = V2522 = V2524)) = (Mod : (20802+27112)+(V2522 = V2524)) = (Mod : (20141+20802+27112)+56-5-B6)
	1026	Mod : (56-5-A4 = 56-5-A5 = 56-5-B5 = 56-5-B6 = V2522 = V2524) = Mod : 32217 = (Mod : 20802+(V2522=V2524)) = ((Mod : 20141+20802)+(56-5-A4 = 56-5-B5 = 56-5-B6 = 56-5-A5)) = (CFM56-5-A5/20141+20802+32979)
	1027	Mod : (20139+21533+27276) = (23109+23408+27276+34540) = (20139+23109+23408+27276+34540) = (20139+21533+23109+23408+27276)
	1028	Mod : (CFM 56-5-B4+23222) = (23222+24105) = (22013+26057+32207)
	1029	Mod : 24785 = (23672+24105) = (22013+23672+24785)
R	1030	Mod : (20024+22013+24613+25410+26017)
R	1034	Mod : (20024+24105+24613+25410+26017)
	1045	Mod : 20343 = 31276 = (20343+27498) = (31276+27498)
	1048	STD = Mod : 26346 = (26346+CFM 56-5-A1 = CFM 56-5-A3 = IAE V2500A1 = V2527A5) = (26346+N:US) = (V2500A1+26346+N:US)
R	1057	Mod : (23108=23109=23408=23871=24105)
	1062	Mod : (23222+26398) = (26057+26398) = (23222+26057+26398)
	1065	Mod : (23222+24105+30020+26398) = (23222+24105+30020+32207+26398+CFM56-5-B8)
	1069	Mod : STD = 26728 = (26728+31283+34864)
	1087	Mod : 24064 = 24065 = 24066 = 24067 = (24064+24065)
	1088	Mod : (24064+26526) = (24065+26526) = (24066+26526) = (24067+26526) = (24065+24067+26526) = (24066+24067+26526) = (24064+24065+26526)
	1089	STD = Mod : 23885 = (26999+28495) = (26999+28495+32929) = (26999+28495+32475) = (26999+28495+31896+32402) = (26999+28495+31897+32401)
	1090	STD = Mod : 23885 = (26999+28495)
	1116	Mod : 28916 = 28479 = 26728 = (26728+31283+34864) = (28479+31283+34861)
	1119	Mod : 26728 = 28479 = (26728+31283+34864) = (28479+31283+34861)
	1129	Mod : (26526+30660) = (26526+26925+30660+31283) = (26526+30660+31283+34862)

	CODE	DESIGNATION
	1136	Mod : (25404+26017) = (25404+26017+26728) = (25404+26017+26728+31283+34864)
	1155	Mod : 23119 = (22013+24044) = (23119+25951+32239) = (23119+28479) = (23119+30660) = (22013+24044+28479) = (23119+28479+31283+34861) = (23119+30660+31283+34862) = (22013+24044+28479+31283+34861)
	1156	Mod : 23119 = (22013+24044) = (23119+25951+32239) = (23119+26728) = (23119+30660) = (23119+26728+31283+34861) = (23119+30660+31283+34862)
	1158	Mod : (25404+28479) = (25404+28916) = (25404+26017+28479) = (25404+26017+28916) = (25404+28702) = (25404+26017+28702) = (25404+26017+26728+28479) = (25404+26017+28479+31283+34861)
	1160	Mod : (24946+26965) = (24946+27773) = (25951+26965) = (25951+27773) = (26760+26965) = (26760+27773) = (26965+32150) = (26965+32238) = (26965+32239) = (26965+32311) = (27773+32150) = (27773+32238) = (27773+32239) = (27773+32311) = (26965+35040) = (27773+35040)
	1162	Mod : 30020 = (24105+30020) = (30020+US) = (24105+30020+US)
	1166	Mod : (27276+30020+30748) = (24105+27276+30020+30748)
	1167	Mod : (V2530 / V2533 / 56-5-B1 / 56-5-B2 / 56-5-B3) = (V2530 / V2533 / 56-5-B1 / 56-5-B2 / 56-5-B3) + LLLLL = 24105 = (24105 + LLLLL) = (V2530 / V2533 / 56-5-B1 / 56-5-B2 / 56-5-B3) + 20268 = (V2530 / V2533 / 56-5-B1 / 56-5-B2 / 56-5-B3) + 20268 + LLLLL = (24105 + 20268) = (24105 + 20268 + LLLLL)
	1168	Mod : 20117 = 21678 = (20117+21678)
R	1169	Mod : (21678+26377)=(20117+2637)
	1172	Mod : (22013+26999+30626+31283+33100) = (22013+26999+27646+30626+31283+33100)
	1173	Mod : (26999+30626+31283+33300) = (26999+30626+31283+33100) = (26999+27646+30626+31283+3310) = (26999+2764630626+31283+33300)
	1174	Mod : Std = 26017 = (26017+26377)
	1175	Mod : 21678 = (21678+26017)
	1176	Mod : (21678+26377) = (21678+26999) = (21678+26377+26999) = (21678+26017+26377)
	1177	Mod : (21678+22013) = (21678+22013+26017)
	1178	Mod : (21678+22013+26377) = (21678+22013+26999) = (21678+22013+26379+26999) = (21678+22013+26017+26377) = (21678+22013+26017+26377+26999)
R	1179	Mod : (21678+22013+25404+26017+26377+26999+30626+31283+33100)
	1180	Mod : (24105+30020) = (24105+30626+31283) = (22013+30626+31283) = (28160+30626+31283) = (24105+30020+30626+31283)
	1182	Mod : 22013 = (22013+31283) = (20024+22013) = (20024+22013+31283)
	1183	Mod : 23699 = 24281 = (23698+23699) = (23698+24281) = (23699+24281) = (23698+23699+24281)
	1186	Mod : (28238+32635) = (28238+28479+32635) = (28238+28702+32635)
	1187	Mod : 22013 = 24105 = 30020 = (24105+30020)
	1188	Mod : STD = 25398 = (22875+25398)
	1190	Mod : (22013+31283) = (25951+31283) = (22013+28479+31283)
	1191	Mod : (31283+P6911) = (P6911+28479+31283) = (22013+24044+31283+P6911) = (25951+31283+32239+P6911)
	1192	Mod : 20075 = 21776 = 24266 = 24267 = (20075+24267) = (24266+24267)
	1193	Mod : 25529 = 26117 = 26270 = 27866 = (26851+27866) = (25529+27866) = (26117+26270) = (25529+26185+27866) = (25529+26208+27866) = (25529+26345+27866) = (26270+31896+32332) = (26270+31897+32333)+(27866+31897+32333) = (25529+27866+31896+32332) = (25529+26185+27866+31897+32333)

CODE	DESIGNATION
1194	Mod : 31896 = 31897 = 32475 = 32929 = (31896+32332+32475) = (31897+32333+32929) = (26270+31897+34514) = (26851+31896) = (31896+32402) = (26270+31897+32333+32929)
1198	Mod : STD = (31495+35270) = (20063+20151+31495+35270) = 20063 = 20151 = (20063+20151) = (20063+31112) = (20063+23092)
1200	Mod : 22013 = (22013+31495+35270) = (20063+20151+22013+31495+35270) = (22013+20063) = (22013+23092) = (20063+20151+22013) = (20063+22013+23092)
1201	Mod : (22013+22562) = (22013+22562+31495+35270) = (20063+22013+22562+31495+35270) = (20063+22013+22562) = (20151+22013+22562) = (20063+20151+22013+22562)
1202	Mod : (20151+31495) = (31112+31495) = (31495+23092) = (20063+20151+31495) = (20063+31112+31495)
1204	Mod : (20151+22013+31495) = (22013+31112+31495) = (22013+23092+31495) = (20063+20151+22013+31495) = (20063+22013+31112+31495)
1206	Mod : 25529 = 25819 = 26117 = 26270 = (25529+25819) = (26117+26270)
1207	Mod : 20233 = 24365 = 25902 = (20233+24365)
1208	Mod : 23698 = 23699 = 24281 = (23698+23699) = (23698+24281) = (23699+24281) = (23698+23699+24281)
1209	Mod : 35220 = (20139+22129+35220)
1212	Mod : 22373 = (22373+25072+28897) = (22373+25072)
1214	Mod : 22199 = 24105 = (22199+24105)
1215	Mod : (21946+24624) = (21946+26169) = (21946+26169) = (21946+26169+30299) = (21946+26169+30299+31285) = (21946+26169+30299+30308) = (21946+26169+30308+31285) = (21946+24624+30299)
1217	Mod : 22013 = 24105 = 24785 = 25108 = (22013+23672) = (23672+24105) = (24785+25108)
1218	Mod : (21946+24624+K0860) = (21946+24624+K4355) = (21946+26169+K0860) = (21946+26169+K4355) = (21946+26169+30299+K0860) = (21946+26169+30299+K4355) = (21946+26169+30299+31285+K0860) = (21946+26169+30299+31285+K4355) = (21946+26169+30299+30308+K0860) = (21946+26169+30299+30308+K4355) = (21946+26169+30308+31285+K0860) = (21946+26169+30308+31285+K4355) = (K0860+21946+24624+30299)
1219	Mod : 26526 = 34637 = (26526+34637)
1223	Mod : (30660+31283+34637) = (26526+30660+31283+34637)
R 1225	Mod : (23885+26111+26526+34637)
1229	Mod : STD = (20046+23450) = 23450
1230	Mod : STD = 24215 = 24215+24588 = 24588
1232	Mod : (24215+32088) = (24215+32090) = (24215+32088+32090)
1233	Mod : (24215+24588+26925+32088) = (24215+24588+26925+32090) = (24215+24588+26925+32088+32090)
1234	Mod : (25205+28916) = (26111+28916) = (26485+28916) = (26999+28479) = (26999+28702) = (26999+28916) = (28382+28916) = (28916+30241) = (28916+30631) = (28916+30635) = (24075+25205+28916) = (25205+26999+28495+28916) = (26999+28382+28479+28495) = (26999+28382+28495+28702) = (26999+28382+28495+28916)
1238	Mod : (22013+26111) = (24105+26111) = (26002+26111) = (28218+26999) = (28218+28382) = (28218+30241) = (26002+28382) = (28218+30635) = (26999+28218+28382) = (26999+28218+28382+28495) = (25204+26999+27917+28218) = (24105+26999+28382+28495) = (25204+26002+26999+28218) = (25204+26002+26999+28218+28382+28495)

	CODE	DESIGNATION
	1242	IAE V2527A5 = CFM 56-5-B4 = Mod : 22013 = 23108 = 23109 = 23408 = 23871 = 24105 = (23108+V2527a5) = (23871+56-5-B4) = (32207+56-5-B4) = (23108+23109) = (23109+23408) = (24105+32207) = (24105+32207+CFM 56-5-B7) =(24105+32207+ IAE V2527M) = (23108+23109+23408) = (22013+32207) = (V2527A5+32207) = (56-5-A1+23871) = (56-5-A3+23871) = (56-5-A4+24105) = (56-5-A5+24105)
	1244	Mod : 23222 = 26057 = (23222+26057) = (23222+56-5-A1) = (56-5-A3+23222)
	1247	Mod : 24105 = 26334= 26335 = (26335+31395+32207) = (26335+27276+32207) = (24105+27276+31395+32207) = (26334+27276+31395+32207) = (26335+27276+31395+32207) = (24105+27276+30977+31395+32207) = (26335+27276+30977+31395+32207)
	1248	Mod : 22013 = (22013+27276+32207) = (22013+31395+32207) = (22013+27276+31395+32207) = (22013+27276+30977+31395) = (22013+27276+30977+31395+32207)
	1249	Mod : (27276+30020+31395) = (24105+27276+30020+31395) = (27276+30020+30977+31395+32207) = (24105+27276+30020+30977+31395+32207)
	1250	Mod : (23222+25615+26398) = (23222+24105+25615+26398) = (23108+23222+25615+26398) = (23108+23222+25615+26398+V2527A5) = (22013+25615+26057+26398) = (22013+25615+26057+26398+32207) = (23222+24105+25615+26398+32207) = (23108+23222+25615+26398+32207+V2527A5)
	1251	Mod : 26925 = (24105+26925)
	1252	Mod : STD = 27979 = (24266+32310) = (20075+27979) = (24266+27979) = (24266+27979+32310)
	1253	Mod : (23222+32207+34024) = (23222+24105+32207+34024)
	1254	Mod : (32207+34024) = (24105+32207+34024)
	1256	Mod : 24404 = 24405 = 25530 = 27640 = (24405+27640)
	1258	Mod : (26526+20343) = (26526+31276) = (26526+31276+27498) = (26526+20343+27498) = (26526+27498+31276+34637)
	1259	Mod : (20343+26526) = (26526+31276) = (26526+27498+31276+34637)
	1260	Mod : (20268+24946+27773)=(20268+27773+32238)=(20268+27773+32311)
	1262	Mod : (22561+30626) = (20082+22561+30626)
	1265	Mod : (20268+24946+27773) = (20268+27773+32311) = (20268+26965+27773+32311)
R	1266	Mod : (22013+22561+30626) = (20082+22013+22561+30626)
	1267	Mod : (20268+27773+32311) = (20268+24946+27773+32150) = (20268+26965+27773+32311)
	1269	Mod : (32087+32088) = (32087+32090) = (32087+32088+32090)
	1271	STD = Mod : 23885 = (26999+28495) = (26999+27917) = (34637+35350)
	1272	Mod : 28244 = 34637 = (23885+28244) = (26999+28244+28495) = (23885+26111+26999+28244)
R	1275	"Mod : (24064+35220)=(24065+35220)=(24066+35220)=(24067+35220) "
	1277	Mod : (26526+35220) = (23779+26526+35220)
	1278	Mod : 24349+35220 = 24785+35220 = 24852+35220 = (23779+24349+35220) = (23779+24785+35220) = (23779+24852+35220) = (23779+24349+24785+35220) = (23779+24785+24852+35220)
	1279	Mod : (24349+26526+35220) = (23779+24349+26526+35220) = (23779+24785+26526+35220) = (23779+24852+26526+35220) = (23779+24349+24785+26526+35220) = (23779+24785+24852+26526+35220)
	1285	Mod : (21678+22536+27522+35227) = (21678+23227+27522+35227) = (21678+23529+27522+35227) = (21678+22536+27522+35865) = (21678+23227+27522+35865) = (21678+23529+27522+35865)

	CODE	DESIGNATION
	1286	Mod : (21678+22536+27522+33100+35227) = (21678+22536+27522+33300+35227) = (21678+23529+27522+33100+35227) = (21678+23529+27522+33300+35227) = (21678+23227+27522+33100+35227) = (21678+23227+27522+33300+35227) = (21678+22536+27522+33100+35865) = (21678+22536+27522+33300+35865) = (21678+23529+27522+33100+35865) = (21678+23529+27522+33300+35865) = (21678+23227+27522+33100+35865) = (21678+23227+27522+33300+35865)
	1287	Mod : 34041 = (20268+34041)
	1288	Mod : 34041 = (23893+25225+34041)
R	1289	Mod : 26645+30439+31040+31283+34041
R	1290	Mod : 26335+27276+30977+31395+32207+34041
R	1291	Mod : 26526+26925+30660+31283+34041
R	1292	Mod : 21678+26335+28160+32207+34041
	1296	Mod : 34313 = 34809 = (32651+34313) = (32651+34809) = (32650+32651+34313) = (32650+32651+34809)
	1297	
	1298	Mod : (20024+32650) = (20024+34035) = (20024+32650+34035)
	1299	Mod : (20024+34313) = (20024+34809) = (20024+32651+34313) = (20024+32651+34809) = (20024+32650+32651+34313) = (20024+32650+32651+34809)
	1300	Mod : (22013+34313) = (22013+34809) = (20024+22013+34313) = (20024+22013+34809)
	1301	Mod : STD = (31283+34861) = (31283+34862) = (31283+34864)
	1302	Mod : 20024 = (20024+31283+34861) = (20024+31283+34862) = (20024+31283+34864)
	1303	Mod : 22013 = (20024+22013) = (20024+22013+31283+34861) = (20024+22013+31283+34862) = (20024+22013+31283+34864)
	1304	Mod : (22013+31283) = (20024+22013+31283)
R	1309	Mod : (32619+35220)=(33239+35220)=(34156+35220)
	1311	Mod : (22013+31283+35220) = (25951+31283+35220) = (22013+28479+31283+35220)
R	1312	Mod : (22013+31283+35220+P6911)=(25951+31283+35220+P6911)
	1313	Mod : 35220 = (35220+33909)
	1314	Mod : 35220 = (35220+33910)
	1317	Mod : (31283+35220) = (28479+31283+35220) = (22013+24044+31283+35220) = (25951+31283+32239+35220)
	1318	Mod : (31283+35220+P6911) = (28479+31283+35220+P6911) = (22013+24044+31283+35220+P6911) = (25951+31283+32239+35220+P6911)
	1319	Mod : (26965+35220) = (22013+26925+35220)
	1320	Mod : (26925+35220) = (24105+26925+35220) = (22013+26925+35220)
	1321	Mod : (25205+20268) = (23885+20268) = (26999+20268) = (28382+20268) = (30241+20268) = (26485+20268) = (30631+20268) = (26999+28382+28495+20268) = (25205+26999+28495+20268)
	1322	Mod : 25205 = 23885 = 26999 = 28382 = 30241 = 26485 = 30631 = (26999+28382+28495) = (25205+26999+28495)

CODE	DESIGNATION
1323	"Mod : (CFM Eng. 56-5-B1+20268+31701+25205)= (CFM Eng. 56-5-B1+20268+31701+23885) = (CFM Eng. 56-5-B1+20268+31701+26999)= (CFM Eng. 56-5-B1+20268+31701+28382) = (CFM Eng. 56-5-B1+20268+31701+30241)= (CFM Eng. 56-5-B1+20268+31701+26485) = (CFM Eng. 56-5-B1+20268+31701+30631)= (CFM Eng. 56-5-B1+20268+31701+26999+28382+28495) = (CFM Eng. 56-5-B1+20268+31701+25205+26999+28495) = (CFM Eng. 56-5-B1+20268+34818+25205)= (CFM Eng. 56-5-B1+20268+34818+23885) = (CFM Eng. 56-5-B1+20268+34818+26999)= (CFM Eng. 56-5-B1+20268+34818+28382) = (CFM Eng. 56-5-B1+20268+34818+30241)= (CFM Eng. 56-5-B1+20268+34818+26485) = (CFM Eng. 56-5-B1+20268+34818+30631)= (CFM Eng. 56-5-B1+20268+34818+26999+28382+28495) = (CFM Eng. 56-5-B1+20268+34818+25205+26999+28495) = (CFM Eng. 56-5-B3+20268+25205)= (CFM Eng. 56-5-B3+20268+23885) = (CFM Eng. 56-5-B3+20268+26999)= (CFM Eng. 56-5-B3+20268+28382) = (CFM Eng. 56-5-B3+20268+30241)= (CFM Eng. 56-5-B3+20268+26485) = (CFM Eng. 56-5-B3+20268+30631)= (CFM Eng. 56-5-B3+20268+26999+28382+28495) = (CFM Eng. 56-5-B3+20268+25205+26999+28495)"
1324	(CFM Eng. 56-5-B3+20268) = (CFM Eng. 56-5-B1+20268+31701) = (CFM Eng. 56-5-B1+20268+34818) = (CFM Eng. 56-5-B3+20268+26999+28495) = (CFM Eng. 56-5-B1+20268+31701+26999+28495) = (CFM Eng. 56-5-B1+20268+34818+26999+28495)
1325	
1326	Mod : (23779+24349+34637) = (23779+24852+26526+34637) = (23779+24349+24785+26526+34637) = (23779+24852+34637)
1333	Mod : 26526 = 34825 = 30170 = (28244+34825) = (28244+30170) = (26526+28244+30170) = (26526+28244+34825)
1334	Mod : (26999+32475) = (26999+32929) = (28382+32475) = (30631+32475) = (25205+32929) = (26999+31896+32402) = (26999+31897+32401) = (30241+31896+32402) = (26999+28382+28495+32475) = (26999+28382+28495+32929) = (26999+31896+32332+32475) = (26999+31897+32333+32929) = (26999+28382+28495+31896+32402) = (26999+28382+28495+31897+32401) = (26999+28382+28495+31896+32332+32475) = (26999+28382+28495+31897+32333+32929)
1335	Mod : (24349+26526) = (24785+26526) = (23779+24349+26526) = (23779+24785+26526) = (23779+24852+26526) = (23779+24349+24785+26526) = (23779+24785+24852+26526)
1340	Mod : 24035 = 24160 = 24211 = (24035+24211) = (23450+24035) = (23450+24211) = (23450+24035) = (23450+24211) = (20406+23450+24035) = (20406+23450+24211) = (23450+24035+24211) = (23450+24035+24211)
1344	Mod : 31896 = 32475 = (31896+32475) = (31896+32332+32475)
1348	Mod : STD = 25800 = (31896+32332) = (25800+31896+32332)
1349	Mod : 31896 = 32475 = (31896+32475) = (25800+31896) = (25800+32475) = (31896+32332+32475) = 25800+31896+32475) = (25800+31896+32332+32475)
1350	Mod : (25800+31896) = (25800+32475) = (25800+31896+32475) = (27455+25800+31896) = (27455+25800+32475) = (25800+31896+32332+32475) = (27455+25800+31896+32475) = (27455+25800+31896+32332+32475)
1351	Mod : 32619 = 33239 = (32619+33239)
1352	Mod : STD = 25800 = 31896 = 32475 = (31896+32475) = (25800+31896) = (25800+32475) = (31896+32332+32475) = (25800+31896+32475) = (25800+31896+32332+32475)
1353	Mod : 31897= 32929 = (31897+32929) = (31897+32333+32929)
1354	Mod : STD = 31896 = 32475 = (31896+32475) = (31896+32332+32475)
1355	Mod : 31896 = 32475 = (31896+32475) = (27455+31896) = (27455+32475) = (31896+32332+32475) = (27455+31896+32475) = (27455+31896+32332+32475)

CODE	DESIGNATION
1356	Mod : 31896 = 32475 = (31896+32475) = (31896+32332+32475)
1357	Mod : STD = 32656 = 34221 = (32656+34221)
1358	Mod : 34221 = (32656+34221)
1359	Mod : 32619 = (28238+32619)
1360	Mod : 28238 = (28238+32656)
1361	Mod : 34221 = (28238+34221) = (32656+34221) = (28238+32656+34221)
1362	Mod : 32656 = 34221 = (32656+34221)
1364	Mod : (21678+22013+25404+26377) = (21678+22013+25404+26999) = (21678+22013+25404+26377+26999) = (21678+22013+25404+26377+31283+34864) = (21678+22013+25404+26377+31283+34861) = (21678+22013+25404+26377+26999+31283+34861) = (21678+22013+25404+26377+26999+30626+35110)
1365	Mod : (26925+30660+31283+34637) = (26526+26925+30660+31283+34637) = (26526+30660+31283+34637+34862)
1366	STD = Mod : 28916 = 26526 = (26999+27917) = (28916+34637) = (26526+28916) = (26999+28495) = (26999+28479+28495) = (26526+26999+27917) = (26526+26999+28479+28495) = (26526+26999+28382+28495+28916+30635)
1373	Mod : (25205+32929) = (26999+32475) = (26999+32929) = (30631+32475) = (28382+32475) = (26999+31896+32402) = (26999+31897+32401) = (30241+31896+32402) = (26999+28382+28495+32475) = (26999+28382+28495+32929) = (26999+31896+32332+32475) = (26999+31897+32333+32929) = (26999+28382+28495+31896+32402) = (26999+28382+28495+31897+32401) = (26999+28382+28495+31897+32929) = (26999+28382+28495+31897+32333+32929) = (26999+28382+28495+31896+32332+32475)
1377	Mod : (21678+26017) = (21678+26017+33100+34856) = (21678+26017+33100+34997)
1378	Mod : (21678+24105+26017) = (21678+24105+26017+33100+34898)
1382	Mod : (20059+20067+20069+20071+21708) = (20059+20067+20069+20816+21708+27063) = (20059+20067+20069+20071+21708+33100+34856) = (20059+20067+20069+20071+21708+31283+33100+34856+34862)
1383	Mod : 24771 = (24771+33100+34856) = (24771+33100+34898)
1385	Mod : (21678+22536+27522) = (21678+23227+27522) = (21678+23529+27522) = (21678+23227+27522+33100+34997) = (21678+22536+27522+33100+34997) = (21678+23529+27522+33100+34898) = (21678+23529+27522+33100+34856) = (21678+23227+27522+33100+34898) = (21678+22536+27522+33100+34856) = (21678+22536+27522+33100+34898) = (21678+23227+27522+33100+34856)
1388	STD = Mod : 26963 = 28377 = 28667 = (25419+26963) = (25419+28667) = (28377+28667) = (27992+28377+28667) = (25419+26963+27992+28667) = (25419+26963+27992+28377) = (26963+28377+28667) = (25419+26963+28377) = (25419+26963+28667) = (25419+26963+28377+28667) = (25419+26963+27992+28377+28667)
1389	STD = Mod: 31896 = 31897 = 32401 = 32402 = 32929 = 32475 = (31896+32332+32475) = (31897+32333+32929) = (28378+31896) = (31896+32332) = (31896+32402) = (31897+32333) = (31897+32401) = (31897+32929) = (32401+32929) = (32333+32929) = (31896+32402+32475) = (31897+32401+32929)
1390	Mod : 32088 = 32090 = (32088+32090)
1391	Mod : (26925+32088) = (26925+32090) = (26925+32088+32090)
1392	Mod : (22013/56-5-B3) = (22013+31607) = (22013+31701) = (22013+31702) = (22013+34818) = (20268+22013)
1393	Mod : (56-5-B3+20268) = (56-5-B1+20268+31701) = (56-5-B1+20268+34818)

	CODE	DESIGNATION
R	1394	Mod : 20268=(20268+31701)=(20268+34818)
	1403	Mod : (20406+22013+28479+28960) = (20406+22013+28721+28916) = (20406+22013+28916+28960) = (20406+22013+24588+28479+28960)
	1404	Mod : STD = (31283+34861) = (31283+34862) = (31283+34864)
	1407	Mod : 21055 = (21055+25199) = (21055+25200)
	1408	Mod : 30626 = (26363+26792+28488+30626)
	1409	Mod : (21899+30363) = (21899+30363+31283+34864) = (21899+30363+31283+34861) = (21899+30363+31283+34862)
	1421	Mod : 31674/(56-5-B8=56-5-B9=6122=6124) = (20141+20802+31674)/56-5-B8
	1427	(26363+26792+28488) = (26363+26792+28488+30626+35110)
	1428	22561 = (22561+30626+35110)
	1429	(22013+22561) = (22013+22561+30626+35110)
	1430	(20082+22013+22561) = (20082+22013+22561+30626+35110)
	1434	Mod : (21678+25404+31283) = (21678+25404+31283+30626+35110)
	1435	Mod : (21678+21858+25404+31283) = (21678+21858+25404+31283+30626+35110)
	1436	Mod : 26377 = 26999 = (26377+26999) = (26377+26999+31283+34864) = (26377+26999+31283+34862) = (26377+26999+31283+34862+30626+35110) = (26377+26999+30626+31283+34864+35110)
	1441	STD = 28685 = 28686 = (28685+34506) = (28686+34506) = (31528+28685) = (31528+28686)
	1442	Mod : 31039 = 31528 = (31528+28685+34506) = (31528+28686+34506)
	1443	Mod : (26377+26999+31283) = (26377+26999+30626+31283+35110)
	1444	Mod : (26377+26999+31283) = (26377+26999+30626+31283+35110)
R R	1446	Mod : (21678+22013+25404+26377+30626+31283)=(21678+22013+25404+26999+30626+31283)
	1447	Mod : 26485 = 26999 = 27646 = 30631 = (26999+27646) = (26999+33100+34856) = (26999+33100+34898) = (26999+31283+34864) = (26999+31283+34861) = (26999+31283+34862) = (26999+27646+31283+34862) = (26999+27646+31283+34861) = (26999+30626+31283+33100+34862+34898+35110) = (26999+30626+31283+33100+34856+34862+35110)
	1448	Mod : (22013+26485) = (22013+26999) = (22013+27646) = (22013+30631) = (22013+26999+27646) = (22013+26999+33100+34997) = (22013+26999+31283+34864) = (22013+26999+27646+31283+34861) = (22013+26999+30626+31283+33100+34864+34887+35110)
	1451	Mod : (22013+26999+31283) = (22013+27646+31283) = (22013+26999+27646+31283) = (22013+26999+31283+33100+34997) = (22013+26999+30626+31283+33100+34997+35110)
	1455	Mod : (21678+22013+25404+26377) = (21678+22013+25404+26999) = (21678+22013+25404+26377+28479) = (21678+22013+25404+26377+28479+31283+34861) = (21678+22013+25404+26377+26728) = (21678+22013+25404+26377+26728+31283+34864) = (21678+25404+26017+26999+33100+34856) = (21678+25404+26017+26999+33100+34898) = (21678+25404+26017+26999+30626+31283+33100+34856+34862+35110) = (21678+25404+26017+26999+30626+31283+33100+34862+34898+35110)
	1461	Mod : 21533 = 34540 = (32207+34540+V2527A5) = (24105+32207+34540)
	1462	Mod : 25615 = (25615+CFM56-5-B4) =(23108+25615) = (24105+25615) = (24105+25615+32207+CFM56-5-B7) = (23108+24105+25615+32207+V2527MA5)
	1463	Mod : (23222+26398) = (23222+26398+V2527A5) = (23222+26398+CFM56-5-B4) = (23222+26057+26398) = (22013+23222+26398) = (22013+26057+26398) = (23222+23408+26398) = (23222+26398+26057+V2527A5) = (23222+26057+26398+CFM56-5-B4) = (23222+24105+26398+32207) = (22013+26057+26398+32207)

	CODE	DESIGNATION
	1464	Mod : 26256 = (26256+31283+34864) = (26256+31283+34861)
	1466	Mod : STD = (31283+24862) = (31283+34861) = (31283+34861) = (31283+34864)
	1467	Mod : (20057+20059+20067+20069+20071) = (20057+20059+20067+20069+20071+32146) = (20057+20059+20067+20069+20816+27063) = (20057+20059+20067+20069+20071+31283+34864) = (20057+20059+20067+20069+20071+31283+34862)
	1470	Mod : (20057+20059+20067+20069) = (20057+20059+20067+20069+26728) = (20057+20059+20067+20069+31283+34864)
	1471	Mod : (56-5-B1 = 56-5-B2 = 56-5-B3) = (25888+ (56-5-B1 = 56-5-B2 = 56-5-B3)) = (25888+30660+34864 + (56-5-B1 = 56-5-B2 = 56-5-B3)) = (25888+30660+34861 + (56-5-B1 = 56-5-B2 = 56-5-B3))
	1475	Mod : 22562 = (22562+30660+34861) = (22562+30660+34864)
	1476	Mod : 25888 = (25888+30660+34861) = (25888+30660+34864)
	1477	Mod : (24105+27276+30020) = (24105+27276+30020+30748+33323)
R	1478	Mod : (22013+27276+30748+25615+33323)
R	1480	Mod : (24105+27276+28162+30748+33323)
R	1481	Mod : (24105+27276+30748+33323+25615)
R	1482	mod : (24105+27276+30748+33323+34540)
	1485	Mod : (21678+22013) = (21678+24105) = (21678+28160) =(21678+30020) = (21678+22013+31283+34861) = (21678+22013+31283+34864) = (21678+28160+31283+34861) = (21678+24105+31283+34861)
	1486	Mod : 25404 = (25404+28160+28917) = (25404+28160+28917+31283+34864)
	1487	Mod : (22013+25404) = (22013+25404+28479+31283+34864)
	1488	Mod : (21678+21706+21766+21767+21768) = (21678+21706+21766+21767+21768+31283+34864)
	1489	Mod : 24105 = 28160 = (24105+30626+35110) = (28160+30626+35110)
	1490	Mod : STD = (28160+28917) = (28160+28917+31283+34864)
	1491	Mod : 22013 = 24015 = 28160 = (22013+31283+34864) = (24105+31283+34861) = (22013+31283+34861) = (24105+31283+34862) = (28160+31283+34861) = (28160+31283+34862) = (22013+30626+31283+34864+35110) = (24105+30626+31283+34862+35110) = (28160+30626+31283+34862+35110)
	1492	Mod : (22013+31283) = (24105+31283) = (28160+31283) = (22013+30626+31283+35110) = (24105+30626+31283+35110) = (28160+30626+31283+35110)
	1493	Mod : STD = (31283+34864)
	1494	Mod : STD = (30626+35110)
R	1495	Mod : (28238+32635+34035)=(28238+32635+32650)
	1496	Mod : 28378 = 33973 = 34456 = (28238+32651) = (33973+32651) = (34456+32651) = (28378+32650+32651) = (33973+32650+32651) = (34456+32650+32651)
R R	1497	Mod :(28378+34035) = (33973+34035) = (34456+34035) = (28378+32650) = (33973+32650) = (34456+32650)
	1498	Mod : STD = 32651 = (32650+32651)
	1499	Mod : STD = (28160+28917)
	1500	Mod : 32088 = 32090 = (32088+28160+28917) = (32090+28160+28917)
R R	1501	Mod : (22013+32088) = (22013+32090) = (24105+32088) = (24105+32090) = (28160+32088) = (28160+32090)
	1502	Mod : STD = (31283+34864) = (31283+34861) = (31283+34862)
	1508	Mod : STD = (31283+34864) = (31283+34862)
	1509	Mod : 22562 = (22562+28160+28917) = (22562+30660+34861) = (22562+30660+34864)
	1511	Mod : 22562 = (22562+30660+34861) = (22562+30660+34864)

CODE	DESIGNATION
1515	Mod : (25888+30660) = (25888+34862+30660)
1523	Mod : STD = 32401 = 32402 = 32475 = 32929 = (31896+32332) = (31897+32333) = (31897+32929) = (31896+32402) = (31897+32401)
1526	Mod : 28160 = (22562+25072+28160) = (28160+30660+34861) = (28160+30660+34864)
1527	Mod : (22562+28160) = (22562+28160+30660+34861) = (22562+28160+30660+34864)
1529	Mod : (22562+28160) = (25888+28160) = (22562+28160+30660+34861) = (22562+28160+30660+34864) = (25888+28160+30660+30660+34861) = (25888+28160+30660+34864)
1532	Mod : ALL CFM = (31283+34861+ALL CFM) = (31283+34862+ALL CFM) = (31283+34864+ALL CFM)
1533	Mod : ALL IAE = (31283+34861+ALL IAE) = (31283+34862+ALL IAE) = (31283+34864+ALL IAE)
1535	Mod : 24035 = 24160 = 24189 = (24035+31283+34861) = (24035+31283+34862) = (24035+31283+34864) = (24160+31283+34861) = (24160+31283+34862) = (24160+31283+34864) = (24189+31283+34861) = (24189+31283+34862) = (24189+31283+34864)
1538	Mod : (26925+28479+34041) = (26925+28479+34041+34861) = (26925+28479+34041+34862)
1539	Mod : (30660+34041) = (30660+34041+34862)
1540	Mod : 20268 = (20268+25800) = (20268+24404+35404) = (20268+27727+35404) = (20268+24404+27727+35404) = (20268+24404+25800+35404) = (20268+25800+27727+35404) = (20268+24404+25800+27727+35404)
1541	STD = Mod : (26645+31040) = (27846+31040) = (28703+31040) = (30439+31040) = (31283+34864) = (26645+31283+34861+31040) = (26645+31283+34862+31040) = (26645+31283+34864+31040) = (26645+30439+31040+31283+34862)
1542	Mod : 26645 = 27846 = 28703 = 30439 = (26645+31283+34861) = (26645+31283+34862) = (26645+31283+34864)
1543	Mod : (22249+25529) = (22249+26117) = (22249+26270) = (22249+25529+31283+34864) = (22249+25529+31283+34862) = (22249+25529+31283+34861) = (22249+26270+31283+34864) = (22249+26270+31283+34862) = (22249+26270+31283+34861)
1544	Mod : (26645+31283) = (26645+30439+31283)
1545	Mod : (26645+31040+31283) = (26645+30439+31040+31283) = (26645+27846+30439+31040+31283)
1546	Mod : (26645+30020+31040+31283) = (26645+27846+30020+30439+31040+31283)
1547	Mod : 22249 = (22249+26270+34514) = (22249+31283+34861) = (22249+31283+34862) = (22249+31283+34864) = (22249+26270+26728+34514)
1548	Mod : (22249+25529+31283) = (22249+26270+31283) = (22249+26117+31283) = (22249+25529+31283) = (22249+25529+26117+31283) = (22249+26117+26270+31283) = (22249+25529+31283)
1549	STD = Mod : 23885 = (26999+28495) =(34637+35350)
1552	Mod : (25204+26999+30823+31105) = (25204+26999+31105+31706) = (25204+26999+28382+28495+31105) = (24105+25204+26999+28382+28495+31105) = (24105+25294+26002+26999+28218+30823+31105) = (24105+25294+26002+26999+28218+31070+31105+31706) = (22013+26002+26999+28218+28382+28495+31105+31706) = (22013+26002+26999+28218+30823+31105+31706) = (22013+26002+26999+31070+31105+31706) = (24105+26002+26999+28218+31070+31105+31706) = (25204+25205+26999+28382+31105) = (25204+26002+26999+28218+30823+31105)

CODE	DESIGNATION
1553	Mod : 25205 = 26485 = 26999 = 28382 = 30241 = 30631 = 30635 = (22013+25204+26999) = (22013+25204+28382) = (24105+25294+26999) = (24105+25294+28382) = (26999+28382+28495) = (24105+25204+28382) = (22013+25204+26999+28382+28495) = (24105+25294+26999+28382+28495) = (24105+25294+26002+26999+28218) = (22013+25204+26002+26999+28218+28382+28495) = (25204+26999) = (25204+26999+28382+28495) = (25204+25205+26999+28495) = (24105+25204+25205+25294+26002) = (24105+25294+26002+26999+28218+28382+28495) = (24105+25294+26002+26999+28218+28382+28495+30635) = (24105+26002+26999+28218+31070+31105) = (22013+25204+26002+26999+28218) = (22013+25204+26002+26999+28218+28382+28495)
1554	Mod : 36847 = (22562+25072+36847) = (25888+27609+36847) = (28160+28917+36847) = (22562+25072+28160+28917+36847) = (25888+27609+28160+28917+36847)

N°	ISSUE DATE	
00	JAN 1987	
01	FEB 1987	
02	SEP 1987	
03	JAN 1988	
04	MAR 1988	
05	MAY 1988	
06	JUL 1988	
07	AUG 1988	
08	OCT 1988	
09	JAN 1989	
10	JAN 1989	
11	APR 1989	
12	JAN 1989	
13	JAN 1990	
14	SEP 1990	
15	FEB 1991	
16	JUL 1991	
17	MAR 1992	
18	DEC 1992	
19	APR 1993	
20	JUL 1993	
21	NOV 1993	
22	JUL 1994	
23	JUL 1995	
24	MAR 1997	
25	JAN 1998	
26	JUL 1998	
27	JAN 1999	

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N°	ISSUE DATE	
28	APR 1999	
29	SEP 1999	
30	MAR 2000	
31	JUL 2000	
32	DEC 2000	
33	JUL 2001	
34	DEC 2001	
35	JUN 2002	
36	MAR 2003	
37	JAN 2004	
38	SEP 2004	
39	SEP 2005	
40	JUL 2006	
41	FEB 2007	

N°	TITLE	STATUS	LOCATION
To be filled by the operator, if needed.			

THIS TABLE GIVES, FOR EACH AIRCRAFT INCLUDED IN THE MANUAL, THE CROSS REFERENCE BETWEEN :

- THE MANUFACTURING SERIAL NUMBER (MSN) WHICH APPEARS IN THE LIST OF EFFECTIVE PAGES

- THE REGISTRATION NUMBER OF THE AIRCRAFT AS KNOWN BY AIRBUS INDUSTRIE.

MSN	REGISTRATION
0990	CC-CZB
1304	CC-COC
1332	CC-COD
1351	CC-COE
1355	CC-COF
1491	CC-COG
1512	CC-COH
1526	CC-COI
1548	CC-COK
1568	CC-COL
1626	CC-COM
1854	LV-BET
1858	LV-BFY
1877	LV-BFO
1903	CC-COT
2089	CC-COU
2096	CC-COX
2295	CC-COY
2304	CC-COZ
2321	CC-CPE
2572	CC-CPF
2585	CC-CPI
2845	CC-CPJ
2858	CC-CPL
2864	CC-CPM
2872	CC-CPO
2886	CC-CPQ
2887	CC-CPX
2892	CC-CQK
2894	CC-CQL
3001	CC-CVA
3030	CC-CVB
3062	CC-CVF
3214	
3216	
3220	
3225	

V CH SEC ---PAGE-- SEQ-	--REV-- ----VALIDATION CRITERIA----- ----------REASONS OF CHANGE----------
3 01 00 001 110	REV040 CODE 0022
	- INCORPORATION OF MOD 36854
3 01 00 002 101	REV041 27620
	- INCORPORATION OF MOD 27620 - TECHNICAL AMENDMENT 1)The table of content has been updated to reflect FCOM revision. Reference to the ISIS has been added.
3 01 00 002 242	REV041 28244+27620/IAE ALL
	- INCORPORATION OF MOD 27620 - VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE - TECHNICAL AMENDMENT 1)The table of content has been updated to reflect FCOM revision. Reference to the ISIS has been added.
3 01 20 001 119	REV032 CODE 1410
	- DELETION OF MOD 20802 - VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
3 01 20 001 174	REV037 31673/56-5-B8/B9/6122/6124
	- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
3 01 20 002 350	REV039 CODE 1477
	- INCORPORATION OF MOD 33323
3 01 22 001 109	REV041 CODE 0208
	- INCORPORATION OF MOD 34809 - TECHNICAL AMENDMENT 1)Page created to provide information related to the introduction of the Thales/Smiths Rev2 FMS.
3 01 32 001 030	REV041 STD=(25951+32239)IAE ENG
	- TECHNICAL AMENDMENT 1)Page revised to incorporate Temporary Revision No 64-1 that provides the applicable Nosewheel Steering angle limitation.
3 01 34 001 001	REV040 CODE 0173
	- INCORPORATION OF MOD 25294
3 01 34 001 200	REV040 CODE 0181
	- INCORPORATION OF MOD 25294 - INCORPORATION OF MOD 35793 - INCORPORATION OF MOD 36529
3 01 49 002 225	REV040 CODE 0164
	- INCORPORATION OF MOD 27609

V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA-----
----------REASONS OF CHANGE----------

3 02 00 002 102 REV041 CODE 0322

- TECHNICAL AMENDMENT
  1)Page revised to reflect that the "REAC W/S DET FAULT" alert is optional and only applicable for aircraft that have the reactive windshear detection function installed.

3 02 00 004 100 REV041 28479=28702=28916

- TECHNICAL AMENDMENT
  1)The Table of Contents has been updated to reflect FCOM revisions and take into account various pagination changes.

3 02 00 004 202 REV041 28479+P6146=28916+P6146

- INCORPORATION OF MOD 28916
- INCORPORATION OF MP P6146
- TECHNICAL AMENDMENT
  1)The Table of Contents has been created to reflect FCOM revisions and take into account various pagination changes.

3 02 00 006 301 REV041 25590+31283+35220

- TECHNICAL AMENDMENT
  1)No technical change.
  The sequence number was changed to ensure correct page validation for all customers.

3 02 00 007 100 REV039 CODE 0649

- INCORPORATION OF MOD 28916

3 02 00 011 001 REV041 STD=26270+34514

- TECHNICAL AMENDMENT
  1)The table of contents has been updated to reflect FCOM revision. Reference to the "ON GROUND EMER/EVACUATION" has been changed to "EMERGENCY EVACUATION".

3 02 00 011 100 REV041 25529=25819=26117=26270

- TECHNICAL AMENDMENT
  1)The table of contents has been updated to reflect FCOM revision. Reference to the "ON GROUND EMER/EVACUATION" has been changed to "EMERGENCY EVACUATION".

3 02 01 003 001 REV041

- TECHNICAL AMENDMENT
  1)Page modified to clarify the meaning of the red and amber LAND ASAP alerts. When a red LAND ASAP is displayed, the flight crew must land as soon as possible at the nearest suitable

V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA-----
----------REASONS OF CHANGE----------

airport at which a safe approach and landing can be made. When an amber LAND ASAP is displayed, the flight crew should consider landing at the nearest suitable airport.

3 02 10 002 001 REV041

- TECHNICAL AMENDMENT
  1)Page revised in order to reintroduced ENG OIL LO PR warning in the list of warnings/cautions which may lead to reject takeoff, when above 100knots. This alert' is reintroduced due to operators' feedback, in order to facilitate decision making at high speed.
  2)The sequence number was changed to ensure correct page validation for all
- ADDITIONAL INFORMATION
  customers.

3 02 10 003 001 REV041

- TECHNICAL AMENDMENT
  1)Page revised to clarify the chronological order for performing the actions of the Rejected Takeoff (RTO) procedure : The flight crew should inform the ATC after the aircraft is stopped, in order to reduce the workload of the F/O during the RTO.

3 02 10 003 030 REV041 IAE V2522/24/27/27M/27E/30

- TECHNICAL AMENDMENT
  1)Page revised to clarify the chronological order for performing the actions of the Rejected Takeoff (RTO) procedure : The flight crew should inform the ATC after the aircraft is stopped, in order to reduce the workload of the F/O during the RTO.

3 02 10 008 001 REV033 CODE 0276

- INCORPORATION OF MOD 28916

3 02 22 003 300 REV041 CODE 0195

- INCORPORATION OF MOD 24105
- INCORPORATION OF MOD 30020
- INCORPORATION OF MOD 36847
- TECHNICAL AMENDMENT
  1)Introduction of FWC "H2F4" standard for A318 and A319 aircraft. For those aircraft types, the crew is requested to use the rudder with care above 140 kt, not 160 kt, for better handling qualities.

3 02 22 004 404 REV041 24105+22249+31283+36847

- INCORPORATION OF MOD 24105
- INCORPORATION OF MOD 36847
- TECHNICAL AMENDMENT

V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA-----
----------REASONS OF CHANGE----------

1)Introduction of FWC "H2F4" standard
for A319 Aircraft. For those aircraft
types, the crew is requested to use
the rudder with care above 140 kt, not
160 kt, for better handling qualities.

3 02 22 005 100 REV041 CODE 1219

- TECHNICAL AMENDMENT
Page revised :
1)to recommend that the MDA (MDH) value
not be entered on the PERF APPR page,
in the case of FCU 1 + 2 FAULT, due to
the fact that this can trigger false
"HUNDRED ABOVE" and "MINIMUM" auto
callouts in final approach, because
the PFD altitude is referenced to STD.
2)for pagination purposes : the "AUTO
FLT FCU 1 (2) FAULT" procedure has
- ADDITIONAL INFORMATION
been moved from 3.02.22 page 5 to
3.02.22 page 6.

3 02 22 006 100 REV041 CODE 0248

- TECHNICAL AMENDMENT
1)Page revised for pagination purposes :
the "AUTO FLT FCU 1 (2) FAULT"
procedure has been moved from 3.02.22
page 5 to 3.02.22 page 6.

3 02 23 001 001 REV036 CODE 1069

- DELETION OF MOD 26728

3 02 23 001 100 REV036 M:28479 OR 28702 OR 28916

- INCORPORATION OF MOD 28479
- INCORPORATION OF MOD 28916

3 02 23 002 100 REV034 30660

- INCORPORATION OF MOD 30660

3 02 24 002 100 REV031 CODE 0233

- INCORPORATION OF MOD 28651
- DELETION OF MOD 22562
- DELETION OF MOD 35864

3 02 24 010 001 REV041

- TECHNICAL AMENDMENT
1)Page revised to delete the VENT BLOWER
FAULT message because it does not
appear in the case of an ELEC DC ESS
BUS FAULT.

3 02 24 011 001 REV041

- TECHNICAL AMENDMENT
1)Page created to remove L TK PUMP 1 and
R TK PUMP 1 from the INOP SYS list :
The DC ESS BUS only controls these
pumps in the case of a DC BUS 1 FAULT.
The INOP SYS list of the DC ESS BUS

V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA-----
----------REASONS OF CHANGE----------

FAULT procedure should only display
the inoperative systems that are
directly impacted by the DC ESS BUS
FAULT.
Therefore, L TK PUMP 1 and R TK PUMP 1
- ADDITIONAL INFORMATION
should not be included.

3 02 24 011 100 REV041 27620=28658=27620+28658

- TECHNICAL AMENDMENT
1)Page created to remove L TK PUMP 1 and
R TK PUMP 1 from the INOP SYS list :
The DC ESS BUS only controls these
pumps in the case of a DC BUS 1 FAULT.
The INOP SYS list of the DC ESS BUS
FAULT procedure should only display
the inoperative systems that are
directly impacted by the DC ESS BUS
FAULT.
Therefore, L TK PUMP 1 and R TK PUMP 1
- ADDITIONAL INFORMATION
should not be included.

3 02 24 012 240 REV041 CODE 1377

- TECHNICAL AMENDMENT
1)Page revised to remove the "AVNCS
VALVE" message from the INOP SYS list
in order to reflect the correct
aircraft configuration.

3 02 24 012 370 REV041 CODE 1378

- TECHNICAL AMENDMENT
1)Page revised to remove the "AVNCS
VALVE" message from the INOP SYS list
in order to reflect the correct
aircraft configuration.

3 02 24 012 400 REV041 CODE 0749

- TECHNICAL AMENDMENT
1)Page revised to remove the "AVNCS
VALVE" message from the INOP SYS list
in order to reflect the correct
aircraft configuration.

3 02 24 014 510 REV037 CODE 0552

- INCORPORATION OF MOD 30660

3 02 24 014 604 REV039 CODE 0553

- INCORPORATION OF MOD 30660
- INCORPORATION OF MOD 34898

3 02 24 014 615 REV038 CODE 0551

- INCORPORATION OF MOD 30660

3 02 24 018 340 REV040 CODE 0207

- INCORPORATION OF MOD 28916

V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA-----
----------REASONS OF CHANGE----------

3 02 24 024 303 REV038 CODE 0596

- INCORPORATION OF MOD 28916

3 02 25 001 100 REV036 MOD 32088 OR 32090

- DELETION OF MOD 32088

3 02 25 001 100 REV041 M:32090

- TECHNICAL AMENDMENT
  1)The sequence number has been changed to ensure a good page validation for all customers.
  The reset procedure to recover the CDLS, if two or more electrical latches are faulty, is the same for all aircraft whatever the CDLS latches standard.

3 02 26 002 105 REV041 CODE 0308

- INCORPORATION OF MOD 36847
- TECHNICAL AMENDMENT
  Page created to introduce the FWC F4 Standard. With this standard, the ENG 1(2) FIRE (on ground) procedure has been modified, in order to :
  1)Provide reference to the new EMERGENCY EVACUATION procedure before engine shutdown, to take into account the total loss of electrical power after shutdown.
  2)Move the steps related to flight crew
- ADDITIONAL INFORMATION
  communication with the ATC and the cabin crew toward the beginning of the procedure.

3 02 26 004 200 REV041 M:27498+36847=31891+36847

- INCORPORATION OF MOD 36847
- TECHNICAL AMENDMENT
  Page created for aircraft with the FWC H2F4 standard :
  1)The SMOKE/FUMES/AVNCS SMOKE guidelines have been updated to highlight that the flight crew must also apply the SMOKE/FUMES/AVNCS SMOKE paper procedure, when requested by the AVIONICS SMOKE ECAM procedure, but no longer needs to refer to the 5-minute countdown. Therefore, this countdown
- ADDITIONAL INFORMATION
  procedure line is deleted.
  2)The new "SMOKE/FUMES PROC ... APPLY" procedure line now appears after the immediate actions to be performed.

3 02 26 005 001 REV041

- TECHNICAL AMENDMENT
  1)Page revised to reflect that it is now possible to apply the SMOKE/FUMES REMOVAL procedure, in the case of an

V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA-----
----------REASONS OF CHANGE----------

electrical emergency configuration, because the procedure has been enhanced.

3 02 26 006B 100 REV040 CODE 0625

- INCORPORATION OF MOD 21678
- INCORPORATION OF MOD 24105
- INCORPORATION OF MOD 28160
- INCORPORATION OF MOD 30020
- INCORPORATION OF MOD 36847
- DELETION OF MOD 20170
- DELETION OF MOD 20172
- DELETION OF MOD 21858

3 02 26 007 121 REV041 CODE 0318/IAE

- TECHNICAL AMENDMENT
  1)No technical change. The sequence number has been changed to ensure correct page validation for all customers.

3 02 26 007 128 REV041 CODE 0314/IAE

- TECHNICAL AMENDMENT
  1)Page revised for FCOM customization purposes. The ECAM displays the "EPR MODE FAULT N1 DEGRADED MODE" warning on IAE engine powered aircraft. Therefore the "as installed" symbol below the MAX SPEED ... 320 KT procedure line is deleted for IAE powered aircraft.

3 02 26 007 230 REV041 CODE 0316/CFM/PW

- INCORPORATION OF MOD 36847
- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
- TECHNICAL AMENDMENT
  1)No technical change. The sequence number has been changed to ensure correct page validation for all customers.

3 02 26 010 001 REV041

- TECHNICAL AMENDMENT
  1)Page revised to reflect that it is now possible to apply the SMOKE/FUMES REMOVAL procedure, in the case of an electrical emergency configuration. Additional information has been added to the procedure to reflect this change.

3 02 26 011 831 REV041 CODE 0169

- INCORPORATION OF MOD 30020
- INCORPORATION OF MOD 36847
- TECHNICAL AMENDMENT
  1)Page created for aircraft that have the FWC H2F4 Standard to indicate that, when the SMOKE FWD (AFT) CRG SMOKE warning is triggered, the flight crew must set the cabin fans to OFF

V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA-----
----------REASONS OF CHANGE----------

to prevent the recirculation of
Halon-polluted air, or smoke in
the cabin.

3 02 26 012 409 REV040 CODE 0617

- INCORPORATION OF MOD 33300

3 02 27 001 200 REV041 24612+26017

- TECHNICAL AMENDMENT
1)Page revised to update the
crossreference : "See page 3" is
replaced by "Refer to the QRH Part 2,
or to the FCOM 3.02.80" after landing
distance coefficients are removed from
FCOM 3.02.27 p3.

3 02 27 008 200 REV037 CODE 0056

- INCORPORATION OF MOD 28916

3 02 27 019 203 REV041 CODE 0623

- TECHNICAL AMENDMENT
1)Page created to reflect that the
"FLAP LEVER NOT ZERO" warning is
deactivated. As a result, this
warning has been deleted from this
page.

3 02 27 019 205 REV041 CODE 0620

- INCORPORATION OF MOD 28916
- INCORPORATION OF MP P6146
- TECHNICAL AMENDMENT
1)No technical change.
The sequence number was changed to
ensure the correct page validation for
all customers.

3 02 28 006 110 REV041 CODE 1208 IAE ALL

- TECHNICAL AMENDMENT
1)Page revised to indicate that the
FUEL HI TEMP caution may spuriously
trigger due to a communication
interference. Therefore, the flight
crew should wait two minutes to
confirm that the caution is not
spurious, before applying the
procedure.

3 02 29 008 105 REV041 28479-28916

- INCORPORATION OF MOD 28916
- TECHNICAL AMENDMENT
1)Page revised to reflect correct INOP
SYS display : with the FWC H2E3
standard, the "N.W. STEER" INOP SYS
is replaced by a "N/W STRG" INOP SYS.

3 02 29 008 110 REV041 CODE 0660

- TECHNICAL AMENDMENT
1)Page revised to reflect correct INOP

V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA-----
----------REASONS OF CHANGE----------

SYS display : with the FWC H2E3 standard, the "N.W. STEER" INOP SYS is replaced by a "N/W STRG" INOP SYS.

3 02 29 008 120 REV041 CODE 0766

- INCORPORATION OF MOD 30020
- TECHNICAL AMENDMENT
  1)Page revised to line up the "WHEN SPD 200 KT" condition under the "IF HYD NOT RECOVERED" condition in order to reflect that "WHEN SPD 200 KT : -L/G ... GRVTY EXTN" only appears if no hydraulic system can be recovered.

3 02 29 008 304 REV041 CODE 0511

- TECHNICAL AMENDMENT
  1)The sequence number was changed to ensure correct page validation for all customers.
  2)Page revised to line up the "WHEN SPD 200 KT" condition under the "IF HYD NOT RECOVERED" condition in order to reflect that "WHEN SPD 200 KT : -L/G GRVTY EXTN" only appears if no hydraulic system can be recovered.

3 02 32 003 110 REV036 CODE 0080

- TECHNICAL AMENDMENT
  1)Page revised to clarify the L/G GRAVITY EXTENSION procedure, and particularly, to indicate that the flight crew must set the L/G to DOWN, if the L/G is confirmed downlocked. Therefore, the "WHEN L/G DOWNLOCKED" condition is added above the "L/G lever...DOWN" action line.

3 02 32 003 200 REV036 CODE 0081

- INCORPORATION OF MOD 28916
- TECHNICAL AMENDMENT
  1)Page revised to clarify the L/G GRAVITY EXTENSION procedure, and particularly, to indicate that the flight crew must set the L/G to DOWN, if the L/G is confirmed downlocked. Therefore, the "WHEN L/G DOWNLOCKED" condition is added above the "L/G lever...DOWN" action line.

3 02 32 003 300 REV037 CODE 0084

- TECHNICAL AMENDMENT
  1)Page revised to clarify the L/G GRAVITY EXTENSION procedure, and particularly, to indicate that the flight crew must set the L/G to DOWN, if the L/G is confirmed downlocked. Therefore, the "WHEN L/G DOWNLOCKED" condition is added above the "L/G lever...DOWN" action line.

V CH SEC	---PAGE--	SEQ-	--REV--	----VALIDATION CRITERIA----- ----------REASONS OF CHANGE----------
3 02 32	010	103	REV037	CODE 0496 - INCORPORATION OF MOD 28916
3 02 34	007	200	REV041	CODE 0641 - TECHNICAL AMENDMENT 1)Page revised to reflect that in the case of an IR 1 fault, the INOP SYS list of the status page includes GPWS TERR. As a result, the note regarding the GPWS TERR amber FAULT light is no longer necessary and is deleted.
3 02 34	007	210	REV041	M:26526+35220 - TECHNICAL AMENDMENT 1)Page revised to reflect that in the case of an IR 1 fault, the INOP SYS list of the status page includes GPWS TERR. As a result, the note regarding the GPWS TERR amber FAULT light is no longer necessary and is deleted.
3 02 34	008	200	REV041	30020+35220 - TECHNICAL AMENDMENT 1)Page created to reflect that in the case of an IR 1 FAULT, the INOP SYS list of the STATUS page includes GPWS TERR. As a result, the note regarding the GPWS TERR amber FAULT light is no longer necessary and is deleted.
3 02 34	009	101	REV041	M:26526=34637 - INCORPORATION OF MOD 26526 - TECHNICAL AMENDMENT 1)Page created to reflect that on aircraft with the EGPWS or the T2CAS, in the case of an IR 1 FAULT, GPWS TERR appears on the INOP SYS status page.
3 02 34	009	400	REV041	CODE 0187 - INCORPORATION OF MOD 26526 - TECHNICAL AMENDMENT 1)Page created to reflect that on aircraft with the EGPWS or the T2CAS, in the case of an IR 1 FAULT, GPWS TERR appears on the INOP SYS status page.
3 02 34	013	300	REV039	CODE 0447 - INCORPORATION OF MOD 28916
3 02 34	015	100	REV041	26526=26526+31375+36720 - TECHNICAL AMENDMENT 1)Page revised to : -Change the action line from "BANK...WINGS LEVEL TO INITIATE PULL UP THEN ADJUST AS REQUIRED" to

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V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA-----
                        ----------------------REASONS OF CHANGE--------------------
--------------------------------------------------------------------------------
                             "BANK...WINGS LEVEL or ADJUST", in
                             order to clarify that the flight crew
                             can initiate the pull-up maneuver,
                             even if the wings are not level. In
                             addition, the related note has been
                             changed to emphasize that the best
                          - ADDITIONAL INFORMATION
                             climb performance is obtained when
                             close to wings level.
                            -Delete the reference to the GPWS from
                             the applicable line in the procedure,
                             for improved technical understanding
                             and standardization.

3 02 34  015       200  REV041  26526+31375

                          - TECHNICAL AMENDMENT
                            1)Page revised to :
                              -Change the action line from
                               "BANK...WINGS LEVEL TO INITIATE PULL
                               UP THEN ADJUST AS REQUIRED" to
                               "BANK...WINGS LEVEL or ADJUST", in
                               order to clarify that the flight crew
                               can initiate the pull-up maneuver,
                               even if the wings are not level. In
                               addition, the related note has been
                               changed to emphasize that the best
                          - ADDITIONAL INFORMATION
                               climb performance is obtained when
                               close to wings level.
                              -Delete the reference to the GPWS from
                               the applicable line in the procedure,
                               for improved technical understanding
                               and standardization.

3 02 36  003       001  REV039  STD:25888+27609

                          - INCORPORATION OF MOD 25888
                          - INCORPORATION OF MOD 27609

3 02 36  004       100  REV039  CODE 0522

                          - INCORPORATION OF MOD 25888
                          - INCORPORATION OF MOD 27609

3 02 70  001       035  REV041  IAE ALL

                          - TECHNICAL AMENDMENT
                            1)The ENG 1(2) REV SWITCH FAULT
                              procedure was moved from FCOM 3.02.70
                              page 1 to FCOM 3.02.70 page 6.

3 02 70  001       130  REV041  M:30660/IAE

                          - INCORPORATION OF MOD 30660
                          - TECHNICAL AMENDMENT
                            1)Page created to reflect that for
                              A320 aircraft, equipped with FWC
                              post-H2E4, "LAND ASAP" appears on the
                              ECAM in the case of an "ENG 1(2)
                              REVERSE FAULT" caution.
                            2)The ENG 1(2) REV SWITCH FAULT
                              procedure was moved from FCOM 3.02.70
                              page 1 to FCOM 3.02.70 page 6.
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V CH SEC ---PAGE--	SEQ-	--REV--	----VALIDATION CRITERIA----- ----------REASONS OF CHANGE----------
3 02 70 004	155	REV040	CODE 0454/IAE ENG ALL - DELETION OF MOD 31283
3 02 70 004	255	REV041	25404+30660 IAE ALL - TECHNICAL AMENDMENT 1)Page revised to reflect that, for A320 aircraft equipped with FWC post-H2E4, "LAND ASAP" appears on the ECAM, in the case of an ENG 1 (2) REVERSE UNLOCKED" caution.
3 02 70 006	030	REV041	IAE ALL - TECHNICAL AMENDMENT 1)The ENG 1(2) REV SWITCH FAULT procedure was moved from FCOM 3.02.70 page 1 to FCOM 3.02.70 page 6.
3 02 70 012	205	REV040	CODE 0631 - INCORPORATION OF MOD 28916
3 02 70 017	001	REV026	CODE 0118 - DELETION OF MOD 25410 - DELETION OF MOD 26017
3 02 70 017	105	REV041	CODE 0040 - TECHNICAL AMENDMENT 1)No technical change. The sequence number was change to ensure correct page validation for all customers.
3 02 70 017	205	REV041	CODE 0042 - INCORPORATION OF MOD 30660 - TECHNICAL AMENDMENT 1)Page created in order to highlight the fact that an AMBER LAND ASAP is displayed on top of the procedure. This was introduced with the FWC H2E4, in order to reduce the probability of a failure in the other engine.
3 02 70 020	001	REV041	CODE 0117 - TECHNICAL AMENDMENT 1)Page revised to clarify that if at least one engine recovers, the flight crew should no longer apply the ENG DUAL FAILURE paper procedure, but refer to the ECAM procedure and status.
3 02 70 021	222	REV039	CODE 0485/V2527/V2527EA5 - INCORPORATION OF MOD 25888
3 02 70 022A	021	REV041	CODE 0334/IAE - VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE - TECHNICAL AMENDMENT

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V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA-----
                        ----------------------REASONS OF CHANGE--------------------
--------------------------------------------------------------------------------
                         1)Page created for pagination purposes:
                           Information was moved from FCOM
                           3.02.70 Page 23 to FCOM 3.02.70 Page
                           22A.

3 02 70  022A      121  REV041  M:31283/IAE

                      - INCORPORATION OF MOD 31283
                      - VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
                      - TECHNICAL AMENDMENT
                         1)Page created for pagination purposes:
                           Information was moved from FCOM
                           3.02.70 Page 23 to FCOM 3.02.70 Page
                           22A.

3 02 70  023       055  REV041  CODE 0334/IAE

                      - TECHNICAL AMENDMENT
                         1)Page revised for pagination purposes:
                           Information was moved from FCOM
                           3.02.70 P 23 to FCOM 3.02.70 Page
                           22A.

3 02 70  023       135  REV041  MOD:31283/IAE

                      - INCORPORATION OF MOD 31283
                      - TECHNICAL AMENDMENT
                         1)Page revised for pagination purposes:
                           Information was moved from FCOM
                           3.02.70 P 23 to FCOM 3.02.70 Page
                           22A.

3 02 70  024       130  REV024  CODE 1535 IAE ALL

                      - DELETION OF MOD 28479
                      - DELETION OF MOD 30660

3 02 70  024       200  REV041  CODE 0842/IAE

                      - INCORPORATION OF MOD 31283
                      - TECHNICAL AMENDMENT
                         1)Page revised to reflect the layout of
                           the ECAM procedure, in the case of an
                           ENG 1(2)FUEL CTL FAULT caution :
                           The THR LEVER(affected) ....IDLE
                           action line has been deleted from the
                           "On ground" section, because :
                           -this action line is valid for both in
                            flight and on ground
                           -it is already reflected in the FCOM
                            before the "In flight" Subsection.

3 02 70  033       100  REV041  36847

                      - INCORPORATION OF MOD 36847
                      - TECHNICAL AMENDMENT
                         1)Introduction of the new ENG DUAL
                           FAILURE - FUEL REMAINING. This
                           procedure is to be applied when
                           required by the new ENG DUAL FAILURE
                           ECAM procedure introduced by the new
                           FWC H2F4 standard.

3 02 70  036       204  REV041  27498+36847

                      - INCORPORATION OF MOD 27498
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V CH SEC	---PAGE--	SEQ-	--REV--	----VALIDATION CRITERIA----- / REASONS OF CHANGE
3 02 70	036	204	REV041	27498+36847
				- INCORPORATION OF MOD 36847 - TECHNICAL AMENDMENT 1)Introduction of the new ENG DUAL FAILURE - NO FUEL REMAINING paper procedure. This procedure is to be applied when required by the new ENG DUAL FAILURE ECAM procedure introduced by the new FWC H2F4 standard.
3 02 80	018	001	REV041	STD=(20139+22129)
				- TECHNICAL AMENDMENT 1)Page revised to introduce landing distance coefficients for dry, wet and contaminated runways, when applying the Unreliable Speed Indication/ADR CHECK procedure.
3 02 80	018	115	REV041	24105
				- TECHNICAL AMENDMENT 1)Page revised to introduce landing distance coefficients for dry, wet and contaminated runways, when applying the Unreliable speed Indication/ADR CHECK procedure.
3 02 80	018	210	REV041	CODE 0179
				- TECHNICAL AMENDMENT 1)Page revised to introduce landing distance coefficients for dry, wet and contaminated runways, when applying Unreliable Speed Indication/ ADR CHECK procedure.
3 02 80	018	220	REV041	24105+26925
				- TECHNICAL AMENDMENT 1)Page revised to introduce landing distance coefficients for dry, wet and contaminated runways, when applying the Unreliable Speed Indication/ADR CHECK procedure.
3 03 04	007	100	REV038	CODE 0086/IAE
				- INCORPORATION OF MOD 24701
3 03 06	013A	100	REV039	CODE 0171
				- INCORPORATION OF MOD 36368
3 03 09	001	030	REV024	IAE/PW
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
3 03 10	004	001	REV041	STD
				- TECHNICAL AMENDMENT 1)Page revised to clarify that during the taxi phase, the flight crew must check that both FDs are set to ON.

V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA-----
----------REASONS OF CHANGE----------

3 03 12 002 120 REV041 CODE 0280/CFM ALL

- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
- TECHNICAL AMENDMENT
  Page revised to indicate that :
  1)During the takeoff phase, the flight crew no longer has to check that both FDs are engaged on the FMA, because the FD check is performed during the taxi phase.
  2)The flight crew calls out "THRUST SET" instead of "POWER SET", to be in accordance with the new list of callouts defined in FCOM 3.03.90.

3 03 12 002 130 REV041 M:24035-24160-24211 IAE ALL

- TECHNICAL AMENDMENT
  Page revised to indicate that :
  1)During the takeoff phase, the flight crew no longer has to check that both FDs are engaged on the FMA, because the FD check is performed during the taxi phase.
  2)The flight crew calls out "THRUST SET" instead of "POWER SET", to be in accordance with the new list of callouts defined in FCOM 3.03.90.

3 03 14 002 100 REV041 24035-24160-24211

- TECHNICAL AMENDMENT
  1)Page revised to clarify that the landing lights must be retracted. When the landing lights are set to OFF, they go off but remain extended. Therefore, the "LAND LIGHTS ... OFF" line is changed to "LAND LIGHTS ... RETRACT", as applicable.

3 03 17 004 001 REV041 STD OR M:(26358+30980)

- TECHNICAL AMENDMENT
  1)Page revised to recommend that the flight crew select CSTR on both the PF and PNF sides during descent, when the aircraft is at 10 000 ft. This is because CSTR is the EFIS option that provides the most useful information for both pilots during the descent and approach phases.

3 03 17 004 103 REV041 M:26358

- TECHNICAL AMENDMENT
  1)Page revised to recommend that the flight crew select CSTR on both the PF and PNF sides during descent, when the aircraft is at 10 000 ft. This is because CSTR is the EFIS option which provides the most useful information for both pilots during the descent and approach phases.

V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA-----
----------REASONS OF CHANGE----------

3 03 18 004 103 REV041 26497

- TECHNICAL AMENDMENT
  1)Page revised to clarify that it is possible to use the speedbrakes during an ILS approach, if the aircraft speed is significantly higher than S on the glideslope, or if the aircraft does not decelerate on the glideslope. However, the flight crew should be aware that the use of speedbrakes causes an increase in VLS.

3 03 18 008 001 REV041

- TECHNICAL AMENDMENT
  Page revised to :
  1)Indicate that when the aircraft is at 50 ft RA, one dot below the glidescope corresponds to 7 ft.
  2)Indicate that at Decision Height (DH), Minimum Descent Altitude (MDA) or Minimum Descent Height (MDH), the PF should call out "CONTINUE" instead of "LANDING". This change was made to ensure that the flight crew is aware
- ADDITIONAL INFORMATION
  that a go-around is still possible. This information is also indicated in SOP 3.03.90.
  3)Change the excessive LOC or GLIDE deviation, regardless of the aircraft altitude to be in accordance with the FCTM : the values are now 1/4 dot LOC ; 1 dot GS, instead of 1 dot LOC/ GS at 500 ft AGL, and 1/2 dot LOC ; 1 dot GS at 300 ft.

3 03 19 002 001 REV041 CODE 0503

- TECHNICAL AMENDMENT
  1)Page revised to clarify that the requirement of two operative FMS and two operative GPS for a RNAV approach is only applicable to RNAV (GPS) approaches.

3 03 19 002 100 REV041 CODE:0734

- TECHNICAL AMENDMENT
  1)Page revised to clarify that the requirement of two operative FMS and two operative GPS for a RNAV approach is only applicable to RNAV (GPS) approaches.

3 03 19 010 001 REV041

- TECHNICAL AMENDMENT
  1)FCOM page revised to indicate that the PNF calls out "COURSE" when the course deviation is greater than 2.5 degrees, in the case of a VOR needle used for a VOR approach.

V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA-----
----------REASONS OF CHANGE----------

3 03 19 011 001 REV041

- TECHNICAL AMENDMENT
  1)Page revised to indicate that if ground references are visible, the PF should call out "CONTINUE" instead of "LANDING". This change was made to ensure that the flight crew is aware that a go-around is still possible. This information is also indicated in SOP 3.03.90.

3 03 19 011 100 REV041 24064=24065=24066=24067

- TECHNICAL AMENDMENT
  1)Page revised to indicate that if ground references are visible, the PF should call out "CONTINUE" instead of "LANDING". This change was made to ensure that the flight crew is aware that a go-around is still possible. This information is also indicated in SOP 3.03.90.

3 03 20 002 001 REV041

- TECHNICAL AMENDMENT
  1)Page revised to correctly indicate that, during the go-around phase, the flight crew should "RETRACT FLAPS ONE STEP (not "RETRACT FLAPS ON STEP").

3 03 22 004 001 REV041

- TECHNICAL AMENDMENT
  1)Page revised to remove the following training-related recommendation "start a gentle progressive flare, and allow the aircraft to touch down without prolonged float". Landing techniques are training related, and have therefore been removed from the SOP. This information is now included in the Flight Crew Training Manual (FCTM).

3 03 22 004 105 REV041 M:24105

- TECHNICAL AMENDMENT
  1)Page revised to remove the following training-related recommendation "start a gentle progressive flare, and allow the aircraft to touch down without prolonged float". Landing techniques are training related, and have therefore been removed from the SOP. This information is now included in the Flight Crew Training Manual (FCTM).

3 03 22 004 110 REV041 M:30020

- TECHNICAL AMENDMENT
  1)Page revised to remove the following training-related recommendation

V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA-----
----------REASONS OF CHANGE----------

"start a gentle progressive flare, and allow the aircraft to touch down without prolonged float". Landing techniques are training related, and have therefore been removed from the SOP. This information is now included in the Flight Crew Training Manual (FCTM).

3 03 90 003 001 REV041

- TECHNICAL AMENDMENT
  1)Page revised to :
  -Indicate that the PNF calls out "COURSE" when the course deviation is greater than 2.5 degrees, in the case of a VOR needle used for a VOR approach.
  -Modify the value of the excessive LOC and GLIDE deviation to be in accordance with the FCTM : "1 dot LOC/GS at 500 ft AGL and 0.5 dot LOC,
- ADDITIONAL INFORMATION
  1 dot GS at 300 ft AGL" has been replaced by "1/4 dot LOC ; 1 dot GS" regardless of the aircraft altitude.

3 04 00 001 315 REV041 CODE 0595

- TECHNICAL AMENDMENT
  1)The Table of Contents has been updated to reflect FCOM revision.

3 04 24 005 205 REV040 CODE 0471

- INCORPORATION OF MOD 33300

3 04 25 001 100 REV041 32088=32090=(32088+32090)

- TECHNICAL AMENDMENT
  1)Page revised to introduce a general description of the opening/closing cockpit door procedure.
  The descriptive information below the action lines has been removed to avoid information duplication.
  2)Part of the AFTER ENGINE START cockpit door operation has been moved to 3.04.25 P2 for pagination purposes.

3 04 25 002 100 REV041 32088=32090

- TECHNICAL AMENDMENT
  1)The description of the opening/closing cockpit door procedure has been introduced in the GENERAL section at the beginning of this COCKPIT DOOR chapter. So the descriptive information below the action lines has been removed to avoid information duplication.
  2)Part of the AFTER ENGINE START cockpit door operation has been moved from
- ADDITIONAL INFORMATION
  3.02.25 P1 for pagination purposes.

V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA----- ----------REASONS OF CHANGE----------
3 04 25 003 100 REV036 32088=32090
- DELETION OF MOD 32088
3 04 25 003 100 REV041 M:32090
- TECHNICAL AMENDMENT 1)The description of the opening/closing cockpit door procedure has been introduced in the GENERAL section at the beginning of this COCKPIT DOOR chapter. So the descriptive information below the action lines have been removed to avoid information duplication.
3 04 32 001 001 REV041
- TECHNICAL AMENDMENT Page revised to : 1)Clarify the BSCU reset procedure. 2)Indicate that, after the flight crew has reset the BSCU, the failure must be investigated before the next flight. However, fixing the failure before the next flight is not necessary because the failure cases listed in the BSCU RESET paper procedure are not "NO GO" MMEL items.
3 04 32 002 001 REV041 STD=25951+32239
- TECHNICAL AMENDMENT 1)Page revised to clarify that maintenance action is required, if the difference between the average temperature of the left gear brakes and the average temperature of the right gear brakes is 200 deg. C or more.
3 04 70 004 050 REV041 PW ALL
- TECHNICAL AMENDMENT 1)Page revised to indicate that the MANUAL ENGINE START procedure has been amended, in order to clarify that the flight crew must set the engine master switch to ON, when N2 gets above 15 percent.
3 04 90 001 030 REV040 IAE/PW
- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
3 04 90 001 130 REV040 26925/IAE/PW
- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
3 04 90 002 030 REV040 IAE/PW
- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE

V CH SEC PAGE	SEQ	REV	VALIDATION CRITERIA / REASONS OF CHANGE
3 04 90 003	001	REV041	- TECHNICAL AMENDMENT 1)Page revised to indicate that flight crew must first shut down engine 2, and then turn on the Y electric pump. This is because if the flight crew turns on the Y electric pump before engine 2 shutdown, an electric transient may turn off the Y electric pump at engine 2 shutdown.
3 04 92 003	001	REV041	- TECHNICAL AMENDMENT 1)Page revised to indicate that the PNF must compare the Green Dot speed value computed by the FMGS with the Green Dot speed value computed by the LPC. If the two values are different, this indicates that the FMGC and the LPC are not using the same takeoff weight (TOW).
3 05 06 001	055	REV041 PW 6122A	- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE - TECHNICAL AMENDMENT 1)Introduction of A318-121 performance data.
3 05 06 002	055	REV041 PW 6122A	- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE - TECHNICAL AMENDMENT 1)Introduction of A318-121 performance data.
3 05 10 004	130	REV041 M:20268/PW6122A	- TECHNICAL AMENDMENT 1)To provide A318-121 performance. 2)Incorporation of TR No. 072-1.
3 05 10 005	130	REV041 M:20268/PW6122A	- TECHNICAL AMENDMENT 1)To provide A318-121 performance. 2)Incorporation of TR No. 072-1.
3 05 10 006	130	REV041 M:20268/PW6122A	- TECHNICAL AMENDMENT 1)To provide A318-121 performance. 2)Incorporation of TR No. 072-1.
3 05 10 007	130	REV041 M:20268/PW6122A	- TECHNICAL AMENDMENT 1)To provide A318-121 performance. 2)Incorporation of TR No. 072-1.
3 05 10 008	130	REV041 M:20268/PW6122A	- TECHNICAL AMENDMENT

V CH SEC ---PAGE-- SEQ- --REV-- ----VALIDATION CRITERIA-----
----------REASONS OF CHANGE----------

1)To provide A318-121 performance.
2)Incorporation of TR No. 072-1.

3 05 10 009 130 REV041 20268 ENG PW 6122A

- TECHNICAL AMENDMENT
1)To provide A318-121 performance.
2)Incorporation of TR No. 072-1.

3 05 15 001 064 REV041 PW:6122A

- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
- TECHNICAL AMENDMENT
1)Introduction of A318-121 performance data.

3 05 15 002 064 REV041 PW:6122A

- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
- TECHNICAL AMENDMENT
1)Introduction of A318-121 performance data.

3 05 15 003 064 REV041 PW:6122A

- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
- TECHNICAL AMENDMENT
1)Introduction of A318-121 performance data.

3 05 15 004 064 REV041 PW:6122A

- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
- TECHNICAL AMENDMENT
1)Introduction of A318-121 performance data.

3 05 15 008 225 REV041 24105+30020/6122/6124

- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
- TECHNICAL AMENDMENT
1)Introduction of A318-121 and A318-122 data.

3 05 15 014 125 REV041 20268/PW6122

- TECHNICAL AMENDMENT
1)Update of A318-121 performance data.

3 05 15 015 125 REV041 20268/PW6122

- TECHNICAL AMENDMENT
1)Update of A318-121 performance data.

3 05 15 016 125 REV041 20268/PW6122

- TECHNICAL AMENDMENT
1)Update of A318-121 performance data.

3 05 15 017 125 REV041 20268/PW6122

- TECHNICAL AMENDMENT
1)Update of A318-121 performance data.

V CH SEC	PAGE	SEQ	REV	VALIDATION CRITERIA / REASONS OF CHANGE
3 05 15	018	125	REV041	20268/PW6122
				- TECHNICAL AMENDMENT 1)Update of A318-121 performance data.
3 05 15	019	125	REV041	20268/PW6122
				- TECHNICAL AMENDMENT 1)Update of A318-121 performance data.
3 05 20	002	118	REV041	20268/PW6122A/6124A
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE - TECHNICAL AMENDMENT 1)Introduction of A318-121/122 performance data.
3 05 20	003	117	REV041	20268/6122/6124
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE - TECHNICAL AMENDMENT 1)Introduction of A318-121/122 performance data.
3 05 20	004	117	REV041	20268/6122/6124
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE - TECHNICAL AMENDMENT 1)Introduction of A318-121/122 performance data.
3 05 20	005	117	REV041	20268/6122/6124
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE - TECHNICAL AMENDMENT 1)Introduction of A318-121/122 performance data.
3 05 20	006	117	REV041	20268/6122/6124
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE - TECHNICAL AMENDMENT 1)Introduction of A318-121/122 performance data.
3 05 20	007	117	REV041	20268/6122/6124
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE - TECHNICAL AMENDMENT 1)Introduction of A318-121/122 performance data.
3 05 20	008	117	REV041	20268/6122A/6124A
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
3 05 20	009	117	REV041	20268/6122A/6124A
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
3 05 20	010	117	REV041	20268/6122A/6124A
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE

V CH SEC	---PAGE--	SEQ-	--REV--	----VALIDATION CRITERIA----- ----------REASONS OF CHANGE----------
3 05 20	011	117	REV041	20268/6122A/6124A
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
3 05 20	012	117	REV041	20268/6122A/6124A
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
3 05 20	013	117	REV041	20268/6122A/6124A
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
3 05 20	014	117	REV041	20268/6122A/6124A
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
3 05 20	015	117	REV041	20268/6122A/6124A
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
3 05 20	016	117	REV041	20268/6122A/6124A
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
3 05 20	017	117	REV041	20268/6122A/6124A
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
3 05 25	002	190	REV040	20268/6122/6124
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
3 05 25	003	190	REV040	20268/6122/6124
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
3 05 25	004	190	REV040	20268/6122/6124
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
3 05 25	005	190	REV040	20268/6122/6124
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
3 05 30	002	125	REV040	M:20268/6122/6124
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
3 05 30	003	125	REV040	M:20268/6122/6124
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
3 05 35	001	220	REV041	24105+30020/6122A/6124A
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
3 05 40	002	115	REV041	20268/PW 6122A
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE - TECHNICAL AMENDMENT 1)To provide A318-121 performance data.
3 05 40	003	115	REV041	20268/PW 6122A
				- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE

V CH SEC ---PAGE--	SEQ-	--REV--	----VALIDATION CRITERIA----- REASONS OF CHANGE----------
3 05 40 003	115	REV041	20268/PW 6122A
			- TECHNICAL AMENDMENT 1)To provide A318-121 performance data.
3 06 20 001	126	REV041	20268/PW6122A
			- TECHNICAL AMENDMENT 1)Update of ice correction on gross ceiling.
3 06 30 002	117	REV041	20268/6122
			- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE - TECHNICAL AMENDMENT 1)Introduction of A318-121 performance data.
3 06 30 009	135	REV041	20268/PW6122
			- TECHNICAL AMENDMENT 1)To provide A318-121 performance data in metric units.
3 06 30 011	135	REV041	20268/PW6122
			- TECHNICAL AMENDMENT 1)To provide A318-121 performance data in metric units.
3 06 30 013	158	REV041	20268/6122A
			- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE - TECHNICAL AMENDMENT 1)To provide A318-121 performance data.
3 06 40 002	117	REV041	20268/6122
			- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE - TECHNICAL AMENDMENT 1)Introduction of A318-121 performance data.
3 06 50 002	117	REV041	20268/6122
			- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE - TECHNICAL AMENDMENT 1)Introduction of A318-121 performance data.
3 06 50 014	120	REV041	20268/6122
			- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE - TECHNICAL AMENDMENT 1)Introduction of A318-121 performance data.
3 06 50 015	120	REV041	20268/6122
			- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE - TECHNICAL AMENDMENT 1)Introduction of A318-121 performance data.

V CH SEC ---PAGE-- SEQ-	--REV-- ----VALIDATION CRITERIA----- ----------REASONS OF CHANGE----------
3 06 55 001 135	REV040 M:20268/6122/6124
	- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE
3 06 60 001 135	REV040 M:20268/6122/6124
	- VERSION AND/OR ENGINE INCORPORATION, DELETION OR CHANGE

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M	V	CH	SEC	---PAGE--	SEQ-	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
	3	00	00	001-2	001	REV024	CONTENT	ALL
	3	00	10	001	001	REV040	ORGANIZATION OF THE MANUAL	ALL
	3	00	10	002	001	REV035	ORGANIZATION OF THE MANUAL	
	3	00	10	003	001	REV024	ORGANIZATION OF THE MANUAL	ALL
	3	00	10	004	001	REV024	ORGANIZATION OF THE MANUAL	
	3	00	10	005	001	REV024	ORGANIZATION OF THE MANUAL	ALL
R	3	00	20	001	001	REV041	LIST OF CODES	ALL
R	3	00	20	002	001	REV041	LIST OF CODES	
R	3	00	20	003	001	REV041	LIST OF CODES	ALL
R	3	00	20	004	001	REV041	LIST OF CODES	
R	3	00	20	005	001	REV041	LIST OF CODES	ALL
R	3	00	20	006	001	REV041	LIST OF CODES	
R	3	00	20	007	001	REV041	LIST OF CODES	ALL
R	3	00	20	008	001	REV041	LIST OF CODES	
R	3	00	20	009	001	REV041	LIST OF CODES	ALL
R	3	00	20	010	001	REV041	LIST OF CODES	
R	3	00	20	011	001	REV041	LIST OF CODES	ALL
R	3	00	20	012	001	REV041	LIST OF CODES	
R	3	00	20	013	001	REV041	LIST OF CODES	ALL
R	3	00	20	014	001	REV041	LIST OF CODES	
R	3	00	20	015	001	REV041	LIST OF CODES	ALL
R	3	00	20	016	001	REV041	LIST OF CODES	
R	3	00	20	017	001	REV041	LIST OF CODES	ALL
R	3	00	20	018	001	REV041	LIST OF CODES	
R	3	00	20	019	001	REV041	LIST OF CODES	ALL
R	3	00	20	020	001	REV041	LIST OF CODES	
R	3	00	20	021	001	REV041	LIST OF CODES	ALL
R	3	00	20	022	001	REV041	LIST OF CODES	
R	3	00	20	023	001	REV041	LIST OF CODES	ALL
R	3	00	20	024	001	REV041	LIST OF CODES	
R	3	00	20	025	001	REV041	LIST OF CODES	ALL
R	3	00	20	026	001	REV041	LIST OF CODES	
R	3	00	20	027	001	REV041	LIST OF CODES	ALL
R	3	00	20	028	001	REV041	LIST OF CODES	
R	3	00	20	029	001	REV041	LIST OF CODES	ALL
R	3	00	20	030	001	REV041	LIST OF CODES	
R	3	00	20	031	001	REV041	LIST OF CODES	ALL
R	3	00	20	032	001	REV041	LIST OF CODES	

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M	V	CH	SEC	---PAGE--	SEQ-	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
N	3	00	20	033	001	REV041	LIST OF CODES	ALL
N	3	00	20	034	001	REV041	LIST OF CODES	
N	3	00	20	035	001	REV041	LIST OF CODES	ALL
N	3	00	20	036	001	REV041	LIST OF CODES	
N	3	00	20	037	001	REV041	LIST OF CODES	ALL
N	3	00	20	038	001	REV041	LIST OF CODES	
N	3	00	20	039	001	REV041	LIST OF CODES	ALL
R	3	00	30	001	001	REV027	LIST OF NORMAL REVISION	ALL
R	3	00	30	002	001	REV041	LIST OF NORMAL REVISION	
	3	00	35	001	001	REV025	RECORD OF TEMPORARY REVISION	ALL
R	3	00	36	001	001	REV041	LETR	ALL
R	3	00	70	001	001	REV041	CROSS REFERENCE TABLE	ALL
R	3	00	75	001	001	REV041	HIGHLIGHTS	ALL
R	3	00	80	001	001	REV041	LIST OF EFFECTIVE PAGES	ALL
R	3	00	85	001	001	REV041	LIST OF MODIFICATIONS	ALL
	3	01	00	001	001	REV032	STD=28680+37199	0990-2321
	3	01	00	002	140	REV035	28244/IAE ALL	
N	3	01	00	001	001	REV032	STD=28680+37199	2572-2894
N	3	01	00	002	242	REV041	28244+27620/IAE ALL	
N	3	01	00	001	110	REV040	CODE 0022	3001-3225
N	3	01	00	002	101	REV041	27620	
	3	01	10	001	001	REV024		0990-1903
	3	01	10	001	105	REV024	M:24105 OR (24105 US)	2089-2894
	3	01	10	001	200	REV036	24105+30020=24105US+30020US	3001-3225
	3	01	20	001	119	REV032	28136=(28053+28136)/ENG	2089-2894
	3	01	20	002	424	REV040	CODE 0241/2522/24/27M	
	3	01	20	001	139B	REV040	CODE 0569/2527EA5/56-5-B4	1491
	3	01	20	002	235	REV040	CODE 0219/V2527A5/27EA5	
	3	01	20	001	139B	REV040	CODE 0569/2527EA5/56-5-B4	1512-1903
	3	01	20	002	335	REV040	CODE 0229/V2527A5/EA5	
N	3	01	20	001	174	REV037	31673/56-5-B8/B9/6122/6124	3001-3225
N	3	01	20	002	350	REV039	CODE 1477	
	3	01	20	001	242	REV032	CODE 0615	1304-1355
	3	01	20	002	235	REV040	CODE 0219/V2527A5/27EA5	
	3	01	20	001	272	REV032	22269+23900/V2527	0990
	3	01	20	002	135	REV028	M:27276/56-5-B4/V2527	

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M	V	CH	SEC	---PAGE--	SEQ-	--REV--	----VALIDATION CRITERIA-----	-----EFFECTIVITY-----
	3	01	20	003	050	REV039	CODE 1242	0990
	3	01	20	004	001	REV026		
	3	01	20	003	215	REV039	CODE 1023	3001-3225
	3	01	20	004	001	REV026		
	3	01	20	003	315	REV039	CODE 1250	1304-2894
	3	01	20	004	001	REV026		
	3	01	20	004A	035	REV038	IAE V2500/V2527A5/2527EA5	0990-1903
	3	01	20	004A	115	REV038	24105	2089-2894
	3	01	20	004A	200	REV038	24105+30020=24105+30020+US	3001-3225
	3	01	20	005	001	REV027		0990
	3	01	20	006	040	REV035	IAE V2527	
	3	01	20	005	001	REV027		1304-1903
	3	01	20	006	266	REV034	23108+25615/IAE V2527EA5	
	3	01	20	005	105	REV027	MOD:24105	2089-2894
	3	01	20	006	125	REV035	25615/IAE V2524	
	3	01	20	005	110	REV037	M:30020=(24105+30020)	3001-3225
	3	01	20	007	001	REV031		0990-1903
	3	01	20	008	001	REV024		
	3	01	20	007	100	REV031	M:24105=30020=(24105+30020)	3001-3225
	3	01	20	008	105	REV026	MOD:24105	
	3	01	20	007	100	REV031	M:24105=30020=(24105+30020)	2089-2894
	3	01	20	008	150	REV026	M:24105 IAE V2522/V2524	
	3	01	20	009	020	REV025	CODE 1167	2089-3225
	3	01	20	010	105	REV025	M:22013 = 24105	
	3	01	20	009	130	REV026	M:20268 V2500/V2527/V2527E	0990-1903
	3	01	20	010	130	REV026	M:20268 V2500/V2527/V2527E	
	3	01	21	001	001	REV034		0990-1491
	3	01	21	002	001	REV024	CODE 0152	
	3	01	21	001	110	REV038		1512-3225
	3	01	21	002	001	REV024	CODE 0152	
	3	01	22	001	002	REV036	CODE 1019	0990
	3	01	22	002	105	REV039	CODE 0535	
	3	01	22	001	002	REV036	CODE 1019	1304-1491 2089-2894
	3	01	22	002	200	REV039	CODE 0655	
	3	01	22	001	104	REV036	MOD 30096=(24105+30096)	1512-1903
	3	01	22	002	200	REV039	CODE 0655	
N	3	01	22	001	109	REV041	CODE 0208	3001-3225
N	3	01	22	002	206	REV039	CODE 1373	

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	3	01	22	004	001	REV040	STD=25225+28399	
	3	01	22	003	050	REV040	IAE	1304-1903
	3	01	22	004	250	REV040	23893+25225/IAE	
	3	01	22	003	108	REV040	24105=(24105/US)/CFM/IAE	2089-2894
	3	01	22	004	150	REV039	24105/IAE	
	3	01	22	004	105	REV039	M:30020=(24105+30020)	3001-3225
	3	01	22	004A	100	REV040	CODE 0315	2089-3225
	3	01	24	001	001	REV024	STD=28568+35815	0990-1626 2089-2585
	3	01	24	002	001	REV024		
	3	01	24	001	100	REV028	MOD : 27230	1854-1903
	3	01	24	002	001	REV024		
	3	01	24	001	105	REV036	M:28568	2845-3225
	3	01	24	002	001	REV024		
	3	01	27	001	001	REV024		ALL
	3	01	27	002	001	REV024		
	3	01	28	001	001	REV039		0990-2894
	3	01	28	002	100	REV024	MOD:20024	
	3	01	28	001	060	REV040	PW ALL	3001-3225
	3	01	28	002	060	REV040	PW ALL = (20024)/PW ALL	
	3	01	29	001	001	REV024		ALL
	3	01	29	002	001	REV024		
R	3	01	32	001	030	REV041	STD=(25951+32239)IAE ENG	0990-2894
N	3	01	34	001	001	REV040	CODE 0173	1304-2321
	3	01	34	001	100	REV040	CODE 0180	0990
	3	01	34	001	200	REV040	CODE 0181	2572-3225
	3	01	35	001	105	REV039	CODE 0137	0990
	3	01	35	001	400	REV039	CODE 0039	1304-3225
	3	01	49	001	110	REV039	CODE 0073	0990
	3	01	49	002	100	REV040	CODE 0150	
	3	01	49	001	110	REV039	CODE 0073	1304-3225
	3	01	49	002	225	REV040	CODE 0164	
	3	01	49	003	135	REV028	CODE 0376	0990-2894
	3	01	70	001	040	REV024	CODE 0115	0990-1903
	3	01	70	002	045	REV037	IAE V2527/V2527E	

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	3	01	70	001	065	REV034	PW ALL	3001-3225
	3	01	70	002	065	REV037	PW ALL	
	3	01	70	003	030	REV024	IAE ALL	0990-2894
	3	02	00	001	001	REV039	CODE 1494	0990
	3	02	00	002	001	REV040	CODE 1069	
	3	02	00	001	001	REV039	CODE 1494	1304-1626
	3	02	00	002	100	REV040	CODE 0422	
R	3	02	00	001	001	REV039	CODE 1494	1854-2321
R	3	02	00	002	102	REV041	CODE 0322	
R	3	02	00	001	100	REV039	M:30626	2572-2894
R	3	02	00	002	102	REV041	CODE 0322	
R	3	02	00	001	210	REV039	M:30626+35220	3001-3225
R	3	02	00	002	102	REV041	CODE 0322	
	3	02	00	003	100	REV039	CODE 1500	0990
	3	02	00	004	001	REV037	CODE 1493	
R	3	02	00	003	200	REV039	CODE 0323	3001-3225
R	3	02	00	004	100	REV041	28479-28702-28916	
N	3	02	00	003	205	REV039	CODE 1501	1304-2894
N	3	02	00	004	202	REV041	28479+P6146-28916+P6146	
	3	02	00	005	001	REV026	CODE 1498	0990
	3	02	00	006	001	REV039	CODE 1493	
	3	02	00	005	001	REV026	CODE 1498	1304-1626 2089-2321
	3	02	00	006	103	REV039	CODE 0648	
	3	02	00	005	001	REV026	CODE 1498	1854-1903 2572-2585
	3	02	00	006	203	REV039	25590+31283	
N	3	02	00	005	001	REV026	CODE 1498	3001-3225
N	3	02	00	006	301	REV041	25590+31283+35220	
	3	02	00	005	105	REV037	M:32650-34035	2845-2894
	3	02	00	006	203	REV039	25590+31283	
	3	02	00	007	001	REV039	CODE 1493	0990
	3	02	00	008	001	REV040	CODE 1502	
	3	02	00	007	100	REV039	CODE 0649	1304-1626 2089-2321
	3	02	00	008	001	REV040	CODE 1502	
	3	02	00	007	100	REV039	CODE 0649	1854-1903
	3	02	00	008	105	REV040	M:31283	
	3	02	00	007	200	REV040	M:(26925+31283)	2572-2894
	3	02	00	008	105	REV040	M:31283	

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	3	02	00	008	105	REV040	M:31283	
	3	02	00	009	001	REV037	CODE 0651	0990-1626
	3	02	00	010	250	REV039	CODE 0652/IAE ALL	
	3	02	00	009	001	REV037	CODE 0651	1854-1903
	3	02	00	010	350	REV040	CODE 0998/ALL IAE	
	3	02	00	009	203	REV037	M:30660+31371	2089-2321
	3	02	00	010	250	REV039	CODE 0652/IAE ALL	
	3	02	00	009	203	REV037	M:30660+31371	2572-2894
	3	02	00	010	350	REV040	CODE 0998/ALL IAE	
	3	02	00	009	301	REV040	M:(31371+35220+35550)	3001-3225
R	3	02	00	011	001	REV041	STD=26270+34514	0990
R	3	02	00	011	100	REV041	25529=25819=26117=26270	1304-3225
	3	02	01	001	001	REV040		ALL
	3	02	01	002	001	REV040		
	3	02	01	002A	001	REV040		ALL
R	3	02	01	003	001	REV041		ALL
R	3	02	01	004	001	REV032		
	3	02	01	005	001	REV037		ALL
	3	02	01	006	001	REV037		
	3	02	01	007	001	REV037		ALL
N	3	02	10	001	001	REV039		ALL
N	3	02	10	002	001	REV041		
R	3	02	10	003	001	REV041		3001-3225
R	3	02	10	004	001	REV030	CODE 1048	
R	3	02	10	003	030	REV041	IAE V2522/24/27/27M/27E/30	0990-2894
R	3	02	10	004	001	REV030	CODE 1048	
	3	02	10	005	115	REV040	23742=((23742+26346)/US)	3001-3225
	3	02	10	006	100	REV030	M:23742	
	3	02	10	005	200	REV036	CODE 0396	0990-2894
	3	02	10	006	100	REV030	M:23742	
	3	02	10	006A	160	REV037	M:20268/IAE V2522/V2524	2089-2894
	3	02	10	006A	170	REV037	M:20268/IAE V2527/V2527E	0990-1903
	3	02	10	007	001	REV033	CODE 0461	ALL
	3	02	10	008	001	REV033	CODE 0276	
	3	02	21	001	001	REV028	STD=30626+35110	0990-2321
	3	02	21	002	001	REV039	STD=30626+35110	

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3 02 21	002	103	REV039	30626	
3 02 21	002A	115	REV039	CODE 1408	2572-3225
3 02 21	002A	315	REV039	CODE 1427	0990-2321
3 02 21	003	001	REV024	CODE 0009	ALL
3 02 21	004	001	REV036		
3 02 21	005	001	REV024		0990
3 02 21	006	110	REV036	CODE 1428	
3 02 21	005	100	REV024	M:20059=30067=35236	1304-2321
3 02 21	006	110	REV036	CODE 1428	
3 02 21	005	100	REV024	M:20059=30067=35236	2572-2894
3 02 21	006	203	REV037	CODE 1262	
3 02 21	005	100	REV024	M:20059=30067=35236	3001-3225
3 02 21	006	310	REV039	22561+30626+35220	
3 02 21	007	100	REV024	MOD:24794	0990-1626 2089-2321
3 02 21	008	001	REV025	CODE 1404	
3 02 21	007	100	REV024	MOD:24794	1854-1903 2572-3225
3 02 21	008	100	REV040	M:31283	
3 02 21	009	001	REV024		0990-2894
3 02 21	010	001	REV024		
3 02 21	009	100	REV039	35220	3001-3225
3 02 21	010	001	REV024		
3 02 21	011	001	REV024	CODE 1404	0990-1626 2089-2321
3 02 21	012	001	REV024		
3 02 21	011	100	REV037	M:31283	1854-1903 2572-2894
3 02 21	012	001	REV024		
3 02 21	011	110	REV039	35220	3001-3225
3 02 21	012	110	REV039	35220	
3 02 21	013	200	REV032	CODE 1409	0990-1626 2089-2321
3 02 21	014	001	REV025	CODE 0153	
3 02 21	013	300	REV037	M:21899+30363+31283	1854-1903
3 02 21	014	001	REV025	CODE 0153	
3 02 21	013	300	REV037	M:21899+30363+31283	2572-3225
3 02 21	014	120	REV037	CODE 0154	
3 02 22	001	100	REV037	CODE 1542	0990-1626 2089-2321
3 02 22	002	001	REV039	CODE 1502	
3 02 22	001	200	REV037	CODE 1544	1854-1903
3 02 22	002	100	REV039	31283=(27728+31283)	

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	3	02	22	002	100	REV039	31283=(27728+31283)	
	3	02	22	003	001	REV039	CODE 1502	0990
	3	02	22	004	120	REV038	CODE 1547	
	3	02	22	003	001	REV039	CODE 1502	1304-1626 2089-2321
	3	02	22	004	240	REV038	CODE 1543	
	3	02	22	003	100	REV039	31283=26728+31283	1854-1903 2572-2894
	3	02	22	004	300	REV038	CODE 1548	
N	3	02	22	003	300	REV041	CODE 0195	3001-3225
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R	3	02	22	005	100	REV041	CODE 1219	ALL
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	3	02	22	007	210	REV025	CODE:0920	0990
	3	02	22	008	001	REV038	STD=32401+35651	
	3	02	22	007	400	REV037	CODE:0122	1304-2894
	3	02	22	008	001	REV038	STD=32401+35651	
	3	02	22	007	400	REV037	CODE:0122	3001-3225
	3	02	22	008	100	REV038	M:32401=32402=32475=32929	
	3	02	23	001	001	REV036	STD=31283+34864	0990
N	3	02	23	001	100	REV036	M:28479 OR 28702 OR 28916	1304-1626
N	3	02	23	001	100	REV036	M:28479 OR 28702 OR 28916	1854-3225
N	3	02	23	002	100	REV034	30660	
	3	02	24	001	002	REV034	STD	ALL
	3	02	24	002	100	REV031	CODE 0233	
	3	02	24	003	001	REV040		3001-3225
	3	02	24	004	500	REV037	CODE 0740	
	3	02	24	003	050	REV040	IAE ALL	0990-1626 2089-2321
	3	02	24	004	300	REV037	CODE 0457	
	3	02	24	003	050	REV040	IAE ALL	1854-1903
	3	02	24	004	400	REV037	CODE 1435	
	3	02	24	003	050	REV040	IAE ALL	2572-2894
	3	02	24	004	500	REV037	CODE 0740	
	3	02	24	005	150	REV037	CODE 0459/IAE	0990-1626 2089-2321
	3	02	24	006	215	REV039	CODE 0554	
	3	02	24	005	350	REV038	CODE 1444/IAE	1854-1903
	3	02	24	006	215	REV039	CODE 0554	

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	3	02	24	006	215	REV039	CODE 0554	
	3	02	24	006	215	REV039	CODE 0554	3001-3225
	3	02	24	007	200	REV027	CODE 0111	0990-1626 2089-2321
	3	02	24	008	300	REV037	CODE 0460	
	3	02	24	007	200	REV027	CODE 0111	1854-1903
	3	02	24	008	500	REV039	CODE 0743	
	3	02	24	007	200	REV027	CODE 0111	2572-3225
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R	3	02	24	009	105	REV037	CODE 1447	0990-1626 2089-2321
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R	3	02	24	010	001	REV041		
R	3	02	24	009	304	REV039	CODE 0559	2572-2585
R	3	02	24	010	001	REV041		
R	3	02	24	009	400	REV037	CODE 1173	2845-2894
R	3	02	24	010	001	REV041		
R	3	02	24	009	525	REV039	CODE 0033	3001-3225
R	3	02	24	010	001	REV041		
R	3	02	24	011	001	REV041		0990-1903
R	3	02	24	012	240	REV041	CODE 1377	
R	3	02	24	011	001	REV041		2089-2321
R	3	02	24	012	370	REV041	CODE 1378	
R	3	02	24	011	100	REV041	27620=28658=27620+28658	2572-2585
R	3	02	24	012	370	REV041	CODE 1378	
R	3	02	24	011	100	REV041	27620=28658=27620+28658	2845-3225
R	3	02	24	012	400	REV041	CODE 0749	
	3	02	24	013	200	REV037	M:20024+21678	0990-1626 2089-2321
	3	02	24	014	400	REV036	CODE 1455	
N	3	02	24	013	200	REV037	M:20024+21678	1854-1903 3001-3225
N	3	02	24	014	510	REV037	CODE 0552	
N	3	02	24	013	200	REV037	M:20024+21678	2572-2585
N	3	02	24	014	604	REV039	CODE 0553	
N	3	02	24	013	200	REV037	M:20024+21678	2845-2894
N	3	02	24	014	615	REV038	CODE 0551	
	3	02	24	015	160	REV026	M:21678=(21678+28160+28917)	0990
	3	02	24	016	125	REV026	CODE 0931	
	3	02	24	015	200	REV026	CODE 0393	1304-1626
	3	02	24	016	220	REV035	CODE 1485	

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	3	02	24	018	105	REV037	CODE 1486	
	3	02	24	017	250	REV033	CODE:0350	1304-3225
	3	02	24	018	340	REV040	CODE 0207	
	3	02	24	019	001	REV036	CODE 0238	0990
	3	02	24	020	200	REV035	21678+21858	
	3	02	24	019	100	REV036	M:22013=24105=28160	1304-3225
	3	02	24	020	310	REV035	21678+21706+21858	
	3	02	24	021	100	REV035	21678	0990-2321
	3	02	24	022	230	REV027	CODE:0670	
	3	02	24	021	100	REV035	21678	2572-3225
	3	02	24	022	400	REV040	CODE 0200	
	3	02	24	023	350	REV030	M:21285+21678+25404/IAE ALL	0990
	3	02	24	024	100	REV038	M:21678	
	3	02	24	023	350	REV030	M:21285+21678+25404/IAE ALL	1304-2894
	3	02	24	024	303	REV038	CODE 0596	
	3	02	24	024	303	REV038	CODE 0596	3001-3225
	3	02	24	025	100	REV037	M:21678=(21678+28160+28917)	0990
	3	02	24	026	001	REV029	STD=M:28160+28917	
	3	02	24	025	200	REV037	CODE 0751	1304-2321
	3	02	24	026	110	REV030	CODE 1489	
	3	02	24	025	200	REV037	CODE 0751	2572-3225
	3	02	24	026	200	REV037	M:24105+30626=28160+30626	
	3	02	24	027	001	REV030	CODE 1490	0990
	3	02	24	028	001	REV040		
	3	02	24	027	100	REV030	CODE 1491	1304-1626 2089-2321
	3	02	24	028	001	REV040		
	3	02	24	027	200	REV037	CODE 1180	2572-3225
	3	02	24	028	001	REV040		
	3	02	24	027	205	REV037	CODE 1492	1854-1903
	3	02	24	028	001	REV040		
R	3	02	25	001	100	REV041	M:32090	ALL
	3	02	26	001	001	REV032		0990-2894
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N	3	02	26	002	105	REV041	CODE 0308	

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	3	02	26	004	100	REV040	27498=31891	
	3	02	26	003	100	REV037	M: 31283	1854-1903 2572-2894
	3	02	26	004	100	REV040	27498=31891	
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R	3	02	26	006	105	REV040	CODE 0298	
R	3	02	26	005	001	REV041		1854-3225
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	3	02	26	006A	001	REV040		ALL
	3	02	26	006B	100	REV040	CODE 0625	ALL
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N	3	02	26	008	001	REV038		
N	3	02	26	007	230	REV041	CODE 0316/CFM/PW	3001-3225
N	3	02	26	008	105	REV038	M:30020	
R	3	02	26	009	001	REV040		0990-2894
R	3	02	26	010	001	REV041		
N	3	02	26	009	103	REV040	30020	3001-3225
N	3	02	26	010	001	REV041		
	3	02	26	011	300	REV040	CODE 0406	0990
	3	02	26	012	200	REV040	CODE 0234	
	3	02	26	011	400	REV040	CODE 0407	1304-2585
	3	02	26	012	210	REV040	CODE 0619	
	3	02	26	011	507	REV040	CODE 0408	2845-2894
	3	02	26	012	503	REV040	CODE 0243	
N	3	02	26	011	831	REV041	CODE 0169	3001-3225
N	3	02	26	012	409	REV040	CODE 0617	
R	3	02	27	001	200	REV041	24612+26017	0990-1903
R	3	02	27	002	350	REV039	CODE 0327	
R	3	02	27	001	200	REV041	24612+26017	2089-3225
R	3	02	27	002	405	REV039	CODE 0415	

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3 02 27 003	110	REV039	CODE 0183	2089-2894
3 02 27 004	100	REV040	M:20024	
3 02 27 003	407	REV039	M:24105+28479+30020+31283	3001-3225
3 02 27 004	110	REV040	M:30020=(20024+30020)	
3 02 27 005	001	REV037	STD	0990
3 02 27 006	001	REV033		
3 02 27 005	001	REV037	STD	1304-2894
3 02 27 006	100	REV033	M:26910	
3 02 27 005	001	REV037	STD	3001-3225
3 02 27 006	200	REV037	M: 30020+26910	
3 02 27 007	001	REV037		0990
3 02 27 008	110	REV037	CODE 0101	
3 02 27 007	001	REV037		1304-2894
3 02 27 008	200	REV037	CODE 0056	
3 02 27 007	100	REV037	M:30020	3001-3225
3 02 27 008	405	REV038	M:24105+24511+30020+31283	
3 02 27 009	001	REV037		0990-2894
3 02 27 010	105	REV037	M:25335=27276	
3 02 27 009	110	REV037	M:30020	3001-3225
3 02 27 010	205	REV037	M:27276+30020	
3 02 27 011	110	REV031	25410	0990-2894
3 02 27 012	001	REV037		
3 02 27 011	110	REV031	25410	3001-3225
3 02 27 012	105	REV037	M:30020	
3 02 27 013	001	REV037		0990-1903
3 02 27 013	100	REV037	M:24105	2089-2894
3 02 27 013	205	REV037	M:24105+30020	3001-3225
3 02 27 013A	100	REV037	M:22013=24105=26334=26335	ALL
3 02 27 014	001	REV037		ALL
3 02 27 015	100	REV037	M:22013=24105=26334=26335	ALL
3 02 27 016	240	REV033	M:21964+22087	
3 02 27 017	001	REV037		0990-2894
3 02 27 018	001	REV024		
3 02 27 017	100	REV037	M:30020	3001-3225
3 02 27 018	001	REV024		

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	3	02	27	020	100	REV040	M:22013=24105=26334=26335	
N	3	02	27	019	203	REV041	CODE 0623	3001-3225
N	3	02	27	020	100	REV040	M:22013=24105=26334=26335	
N	3	02	27	019	205	REV041	CODE 0620	1304-2894
N	3	02	27	020	100	REV040	M:22013=24105=26334=26335	
	3	02	27	021	001	REV024		ALL
	3	02	27	022	001	REV024		
	3	02	28	001	100	REV033	CODE 0068	0990-1626 2089-2321
	3	02	28	002	002	REV033	STD=20024	
	3	02	28	001	200	REV037	M:20024+31283	1854-1903 2572-3225
	3	02	28	002	200	REV037	M:20024+31283	
	3	02	28	003	100	REV028	CODE 0068	0990-1626 2089-2321
	3	02	28	004	001	REV024		
	3	02	28	003	205	REV037	M:20024+31283	1854-1903 2572-3225
	3	02	28	004	001	REV024		
	3	02	28	005	001	REV026	31283=STD	3001-3225
R	3	02	28	005	001	REV026	31283=STD	0990-2894
R	3	02	28	006	110	REV041	CODE 1208 IAE ALL	
	3	02	28	007	100	REV024	CODE 0068	0990-1626 2089-2321
	3	02	28	008	100	REV039	CODE 0492	
	3	02	28	007	205	REV037	M:20024+31283	1854-1903 2572-2585
	3	02	28	008	100	REV039	CODE 0492	
	3	02	28	007	205	REV037	M:20024+31283	2845-2894
	3	02	28	008	215	REV039	CODE 1298	
	3	02	28	007	205	REV037	M:20024+31283	3001-3225
	3	02	28	008	220	REV039	CODE 1299	
	3	02	28	008A	110	REV039	CODE 1302	0990-1626 2089-2321
	3	02	28	008A	200	REV039	20024+31283	1854-1903 2572-3225
	3	02	28	009	110	REV039	20024	ALL
	3	02	28	010	100	REV039	20024	
	3	02	29	001	001	REV037		0990-1903
	3	02	29	002	001	REV024		
	3	02	29	001	105	REV037	CODE 1187	2089-3225
	3	02	29	002	001	REV024		
	3	02	29	003	001	REV037		0990
	3	02	29	004	001	REV024		
	3	02	29	003	001	REV037		1304-1626
	3	02	29	004	100	REV037	CODE 1116	

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	3	02	29	003	120	REV037	M:26925	2572-2894
	3	02	29	004	102	REV037	30660=28479+30660	
	3	02	29	003	201	REV039	CODE 1319	3001-3225
	3	02	29	004	102	REV037	30660=28479+30660	
	3	02	29	005	001	REV037		0990-2321
	3	02	29	006	001	REV025		
	3	02	29	005	120	REV037	M:26925	2572-2894
	3	02	29	006	001	REV025		
	3	02	29	005	200	REV039	M:26925+35220	3001-3225
	3	02	29	006	100	REV037	M:30020	
	3	02	29	007	002	REV024		0990
	3	02	29	008	001	REV038	CODE 0509	
R	3	02	29	007	002	REV024		1304-1903
R	3	02	29	008	105	REV041	28479:28916	
N	3	02	29	007	002	REV024		2089-2321
N	3	02	29	008	110	REV041	CODE 0660	
N	3	02	29	007	002	REV024		2572-2894
N	3	02	29	008	304	REV041	CODE 0511	
N	3	02	29	007	200	REV039	M:30020+35220	3001-3225
N	3	02	29	008	120	REV041	CODE 0766	
	3	02	29	009	001	REV024		0990-2894
	3	02	29	010	001	REV024		
	3	02	29	009	100	REV037	M:30020	3001-3225
	3	02	29	010	200	REV039	M:30020+35220	
	3	02	29	011	100	REV037	CODE 1247	2572-2894
	3	02	29	012	001	REV024		
	3	02	29	011	203	REV037	CODE 0165	0990-2321
	3	02	29	012	001	REV024		
	3	02	29	011	304	REV038	CODE 1249	3001-3225
	3	02	29	012	001	REV024		
	3	02	29	013	001	REV037		0990-1626
	3	02	29	014	001	REV037	CODE 1119	
	3	02	29	013	001	REV037		1854-1903
	3	02	29	014	102	REV037	30660	
	3	02	29	013	100	REV037	M:24105	2089-2321
	3	02	29	014	102	REV037	30660	
	3	02	29	013	120	REV037	CODE 1251	2572-2894
	3	02	29	014	120	REV037	M:26925:(26925+30660)	

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3 02 29 014	120	REV037	M:26925=(26925+30660)	
3 02 29 015	001	REV037		0990-2321
3 02 29 016	001	REV037		
3 02 29 015	120	REV037	M:26925	2572-3225
3 02 29 016	001	REV037		
3 02 30 001	001	REV037		0990-2894
3 02 30 002	001	REV024		
3 02 30 001	001	REV037		3001-3225
3 02 30 002	105	REV039	M:35220	
3 02 30 003	001	REV027	CODE 0066	0990-1626 2089-2321
3 02 30 004	001	REV024		
3 02 30 003	100	REV040	M:31283	1854-1903 2572-2894
3 02 30 004	001	REV024		
3 02 30 003	110	REV040	M:35220=(31283+35220)EQ 210	3001-3225
3 02 30 004	105	REV039	M:35220	
3 02 30 005	001	REV024	CODE 1188	ALL
3 02 30 006	001	REV027		
3 02 30 007	001	REV024		0990-1903
3 02 30 008	130	REV039	26017	
3 02 30 007	001	REV024		2089-3225
3 02 30 008	205	REV039	24105+26017	
3 02 30 009	100	REV040	M:31283	1854-1903 2572-2894
3 02 30 010	100	REV040	M:31283	
3 02 30 009	110	REV040	M:35220=(31283+35220) EQ 210	3001-3225
3 02 30 010	110	REV040	M:35220=(31283+35220) EQ 210	
3 02 30 011	100	REV040	M:31283	1854-1903 2572-2894
3 02 30 012	100	REV040	M:31283	
3 02 30 011	110	REV040	M:35220=(31283+35220) EQ 210	3001-3225
3 02 30 012	110	REV040	M:35220=(31283+35220) EQ 210	
3 02 30 013	100	REV037	M:31283	1854-1903 2572-2894
3 02 30 013	110	REV039	M:35220=(31283+35220) EQ 210	3001-3225
3 02 31 001	001	REV024	CODE 0066	0990
3 02 31 002	001	REV040		
3 02 31 001	100	REV024	CODE 0079	1304-1626 2089-2321
3 02 31 002	001	REV040		
3 02 31 001	200	REV037	M:25590+31283	1854-1903 2572-3225
3 02 31 002	001	REV040		

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3 02 31 004	001	REV038	STD=30368+35270	
3 02 31 003	001	REV040		2572-2894
3 02 31 004	100	REV040	30368	
3 02 31 003	110	REV040	M:35220	3001-3225
3 02 31 004	100	REV040	30368	
3 02 31 005	001	REV038		ALL
3 02 32 001	001	REV030		0990-2321
3 02 32 002	001	REV034		
3 02 32 001	001	REV030		2572-3225
3 02 32 002	103	REV037	M:26925	
3 02 32 003	110	REV036	CODE 0080	0990
3 02 32 004	002	REV039	STD=(20139+22129)	
3 02 32 003	200	REV036	CODE 0081	1304-2321
3 02 32 004	002	REV039	STD=(20139+22129)	
3 02 32 003	300	REV037	CODE 0084	2572-2894
3 02 32 004	002	REV039	STD=(20139+22129)	
3 02 32 003	300	REV037	CODE 0084	3001-3225
3 02 32 004	103	REV039	CODE 1209	
3 02 32 004A	002	REV039		ALL
3 02 32 005	001	REV024		0990-2321
3 02 32 006	001	REV039		
3 02 32 005	100	REV037	M:26925	2572-3225
3 02 32 006	001	REV039		
3 02 32 007	001	REV031		ALL
3 02 32 008	001	REV035		
3 02 32 009	001	REV040	STD = MOD(28479+34864)	0990
3 02 32 010	001	REV037	CODE 0096	
3 02 32 009	100	REV040	CODE 0091	1304-1626
3 02 32 010	105	REV037	CODE 0098	
3 02 32 009	120	REV040	CODE 0090	1854-1903
3 02 32 010	103	REV037	CODE 0496	
3 02 32 009	120	REV040	CODE 0090	2089-2321
3 02 32 010	105	REV037	CODE 0098	
3 02 32 009	120	REV040	CODE 0090	3001-3225
3 02 32 010	204	REV039	CODE 1317	
3 02 32 009	120	REV040	CODE 0090	2572-2894
3 02 32 010	225	REV037	CODE 1191	

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	3	02	32	011	103	REV037	CODE 0665	2572-2894
	3	02	32	012	001	REV039		
	3	02	32	011	103	REV037	CODE 0665	3001-3225
	3	02	32	012	100	REV039	35220	
	3	02	32	013	105	REV037	M:26925=(26925+P6911)	2572-3225
	3	02	32	014	100	REV037	M:26925	
	3	02	34	001	001	REV024	CODE:0294	0990-2894
	3	02	34	002	223	REV030	CODE 1335	
	3	02	34	001	001	REV024	CODE:0294	3001-3225
	3	02	34	002	330	REV039	CODE 1279 EQUI 430 530	
	3	02	34	003	100	REV033	26526	0990-1626
	3	02	34	004	105	REV039	CODE 1464	
	3	02	34	003	100	REV033	26526	2089-2894
	3	02	34	004	205	REV039	CODE:1129	
	3	02	34	003	100	REV033	26526	1854-1903
	3	02	34	004	210	REV039	CODE 0967	
	3	02	34	003	215	REV039	M:30020+35220	3001-3225
	3	02	34	004	300	REV039	CODE:0639	
	3	02	34	005	001	REV038		0990-2894
	3	02	34	006	001	REV040		
	3	02	34	005	301	REV040	CODE 0208	3001-3225
	3	02	34	006	001	REV040		
N	3	02	34	007	200	REV041	CODE 0641	0990-2894
N	3	02	34	008	001	REV038		
N	3	02	34	007	210	REV041	M:26526+35220	3001-3225
N	3	02	34	008	200	REV041	30020+35220	
N	3	02	34	009	101	REV041	M:26526=34637	0990
N	3	02	34	010	001	REV036	STD=31897+32333	
N	3	02	34	009	101	REV041	M:26526=34637	1304-2894
N	3	02	34	010	208	REV036	CODE 0444	
N	3	02	34	009	400	REV041	CODE 0187	3001-3225
N	3	02	34	010	208	REV036	CODE 0444	
	3	02	34	011	001	REV037	CODE 1404	0990-1626 2089-2321
	3	02	34	012	001	REV036		
	3	02	34	011	105	REV037	M:31283	1854-1903 2572-2894
	3	02	34	012	001	REV036		
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	3	02	34	012	001	REV036		

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	3	02	34	014	105	REV038	22769	
	3	02	34	013	300	REV039	CODE 0447	3001-3225
	3	02	34	014	110	REV039	M:35220	
R	3	02	34	015	100	REV041	26526=26526+31375+36720	0990-2864
R	3	02	34	016	100	REV025	M:26526	
R	3	02	34	015	200	REV041	26526+31375	2872-3225
R	3	02	34	016	100	REV025	M:26526	
	3	02	34	017	105	REV040	CODE:0205	0990-1626 2089-2321
	3	02	34	018	001	REV037	CODE 1404	
	3	02	34	017	105	REV040	CODE:0205	1854-1903 2572-2894
	3	02	34	018	105	REV037	M:31283	
	3	02	34	017	105	REV040	CODE:0205	3001-3225
	3	02	34	018	200	REV037	M:30020+31283	
	3	02	34	019	001	REV040		0990-2321
	3	02	34	020	001	REV040		
	3	02	34	019	500	REV040	CODE 0297	2572-3225
	3	02	34	020	001	REV040		
	3	02	34	021	258	REV040	CODE 1321/V2522/2524/2527M	2089-2894
	3	02	34	022	110	REV040	CODE 1322	
	3	02	34	021	260	REV040	CODE 1321/V2527/2527E	0990-1903
	3	02	34	022	110	REV040	CODE 1322	
	3	02	34	022	110	REV040	CODE 1322	3001-3225
	3	02	34	023	110	REV040	CODE 1322	3001-3225
	3	02	34	023	110	REV040	CODE 1322	2089-2894
	3	02	34	024	155	REV040	20268/V2522/2524/2527M	
	3	02	34	023	110	REV040	CODE 1322	0990-1903
	3	02	34	024	160	REV040	20268/V2527/2527E	
	3	02	34	025	155	REV040	20268/2522/2524/2527M	2089-2894
	3	02	34	025	160	REV040	20268/V2527/2527E	0990-1903
	3	02	36	001	001	REV024	STD=20084	ALL
	3	02	36	002	001	REV034	STD=20084	
	3	02	36	003	001	REV039	STD=25888+27609	0990-1903
	3	02	36	004	100	REV039	CODE 0522	
	3	02	36	003	001	REV039	STD=25888+27609	2089-3225
	3	02	36	004	200	REV039	CODE 0523	

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	3	02	36	006	001	REV024		
	3	02	36	005	200	REV036	CODE 0125	3001-3225
	3	02	36	006	200	REV040	M:35220+35550	
	3	02	36	007	001	REV037		0990-1903
	3	02	36	007	100	REV037	M:24105	2089-3225
	3	02	46	001	215	REV039	MOD 30660+31371	2089-3225
	3	02	49	001	001	REV024		ALL
	3	02	52	001	001	REV024	CODE 0188	ALL
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R	3	02	70	002	030	REV038	IAE ALL	
N	3	02	70	001	130	REV041	M:30660/IAE	1854-2894
N	3	02	70	002	030	REV038	IAE ALL	
	3	02	70	003	045	REV025	CODE 0007	0990-1626
	3	02	70	004	155	REV040	CODE 0133/IAE ALL	
R	3	02	70	003	045	REV025	CODE 0007	2089-2321
R	3	02	70	004	255	REV041	25404+30660 IAE ALL	
N	3	02	70	003	115	REV038	31283/V2500/22/24/27/27E/27M	1854-1903 2572-2894
N	3	02	70	004	255	REV041	25404+30660 IAE ALL	
R	3	02	70	005	030	REV024	IAE ALL	0990-2894
R	3	02	70	006	030	REV041	IAE ALL	
	3	02	70	007	025	REV030	IAE ALL	0990-1626 2089-2321
	3	02	70	008	025	REV040	IAE ALL=31283+34862	
	3	02	70	007	025	REV030	IAE ALL	1854-1903 2572-2894
	3	02	70	008	150	REV040	M:31283 IAE ALL	
	3	02	70	009	040	REV040	IAE	0990-2894
	3	02	70	010	035	REV037	CODE 0099	
	3	02	70	011	040	REV040	CODE 0007 IAE ALL	0990
	3	02	70	012	200	REV040	CODE 1136	
	3	02	70	011	040	REV040	CODE 0007 IAE ALL	1304-1626 2089-2321
	3	02	70	012	210	REV040	CODE:1158	
	3	02	70	011	140	REV040	M:31283/IAE	1854-1903 2572-2894
	3	02	70	012	205	REV040	CODE 0631	
	3	02	70	012	205	REV040	CODE 0631	3001-3225
	3	02	70	013	110	REV039	CODE 0018	0990
	3	02	70	014	001	REV037	CODE 0015	

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	3	02	70	013	205	REV036	CODE 0019	2089-2321
	3	02	70	014	200	REV037	CODE 0021	
	3	02	70	013	210	REV037	MOD 30363+31283	1854-1903
	3	02	70	014	103	REV037	M:30660 = (30660+34862)	
	3	02	70	013	210	REV037	MOD 30363+31283	2572-3225
	3	02	70	014	200	REV037	CODE 0021	
	3	02	70	015	020	REV037	CODE 0007 IAE ALL	0990-1626
	3	02	70	016	102	REV040	CODE 0490	
	3	02	70	015	020	REV037	CODE 0007 IAE ALL	2089-2321
	3	02	70	016	207	REV040	CODE 0493	
	3	02	70	015	151	REV037	M:31283/IAE	1854-1903 2572-2894
	3	02	70	016	207	REV040	CODE 0493	
	3	02	70	016	001	REV040	STD	3001-3225
	3	02	70	016A	125	REV040	CODE 0497/IAE	0990-2894
	3	02	70	017	001	REV026		3001-3225
N	3	02	70	017	105	REV041	CODE 0040	0990-1626
N	3	02	70	018	040	REV039	CODE 0007 IAE ENG:ALL	
N	3	02	70	017	205	REV041	CODE 0042	2089-2321
N	3	02	70	018	040	REV039	CODE 0007 IAE ENG:ALL	
N	3	02	70	017	205	REV041	CODE 0042	1854-1903 2572-2894
N	3	02	70	018	145	REV038	MOD 31283 IAE ENG: ALL	
R	3	02	70	019	035	REV026	CODE 0007 IAE ALL	0990-1626 2089-2321
R	3	02	70	020	001	REV041	CODE 0117	
R	3	02	70	019	120	REV038	MOD 31283 IAE ENG:ALL	1854-1903 2572-2894
R	3	02	70	020	001	REV041	CODE 0117	
R	3	02	70	020	001	REV041	CODE 0117	3001-3225
	3	02	70	021	170	REV038	CODE 1509/V2527/V2527E	0990
	3	02	70	022	250	REV038	CODE 0846	
N	3	02	70	021	222	REV039	CODE 0485/V2527/V2527EA5	1304-1626
N	3	02	70	022	260	REV038	CODE 0035	
	3	02	70	021	244	REV038	CODE 0131/V2522/V2524/V2527M	2089-2321
	3	02	70	022	260	REV038	CODE 0035	
	3	02	70	021	244	REV038	CODE 0131/V2522/V2524/V2527M	2572-2894
	3	02	70	022	310	REV038	CODE 0962	
	3	02	70	021	342	REV040	CODE 0486/V2527/2527E	1854-1903
	3	02	70	022	260	REV038	CODE 0035	

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N	3	02	70	022A	021	REV041	CODE 0334/IAE	0990-1626 2089-2321
N	3	02	70	022A	121	REV041	M:31283/IAE	1854-1903 2572-2894
N	3	02	70	023	055	REV041	CODE 0334/IAE	0990-1626 2089-2321
N	3	02	70	024	130	REV024	CODE 1535 IAE ALL	
N	3	02	70	023	135	REV041	MOD:31283/IAE	1854-1903 2572-2894
N	3	02	70	024	200	REV041	CODE 0842/IAE	
	3	02	70	025	030	REV037	IAE ALL	0990-2894
	3	02	70	026	030	REV029	CODE 0099	
	3	02	70	027	160	REV039	CODE 0105	0990-2894
	3	02	70	028	100	REV039	35220	3001-3225
N	3	02	70	033	100	REV041	36847	3001-3225
N	3	02	70	036	204	REV041	27498+36847	3001-3225
	3	02	80	001	001	REV040		0990
	3	02	80	002	100	REV039	26526=34637=26526+34637	
	3	02	80	001	001	REV040		1304-1626
	3	02	80	002	200	REV039	M:27498+26526	
	3	02	80	001	001	REV040		1854-3225
	3	02	80	002	205	REV039	CODE 1258	
	3	02	80	003	001	REV038		0990
	3	02	80	004	001	REV039		
	3	02	80	003	001	REV038		1304-2894
	3	02	80	004	100	REV039	CODE 0172	
	3	02	80	003	100	REV038	30020	3001-3225
	3	02	80	004	100	REV039	CODE 0172	
	3	02	80	005	100	REV038	M:26526=34637=(26526+34637)	0990
	3	02	80	006	001	REV038		
	3	02	80	005	200	REV039	CODE 1259	1854-3225
	3	02	80	006	100	REV038	CODE 0172	
	3	02	80	005	205	REV039	M:27498+26526	1304-1626
	3	02	80	006	100	REV038	CODE 0172	
	3	02	80	007	001	REV034		2089-2894
	3	02	80	008	100	REV039	24105	
	3	02	80	007	001	REV034		3001-3225
	3	02	80	008	105	REV039	30020=24105+30020	
	3	02	80	007	001	REV034		0990
	3	02	80	008	348	REV038	CODE 0508/IAE V2527	

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	3	02	80	008A	076	REV038	IAE V2524	2089-2894
	3	02	80	009	001	REV025		ALL
	3	02	80	010	001	REV034		
	3	02	80	010A	001	REV031		ALL
	3	02	80	011	001	REV040	STD	ALL
	3	02	80	012	001	REV040	STD	
	3	02	80	012A	001	REV040	STD	ALL
	3	02	80	012B	001	REV040	STD	ALL
	3	02	80	012C	001	REV040	STD	ALL
	3	02	80	013	001	REV040		0990-2894
	3	02	80	014	001	REV039		
	3	02	80	013	105	REV040	M:30020	3001-3225
	3	02	80	014	001	REV039		
	3	02	80	015	100	REV032	CODE 0140	0990-2321
	3	02	80	016	030	REV039	IAE ALL	
	3	02	80	015	305	REV037	CODE 0142	3001-3225
	3	02	80	015	305	REV037	CODE 0142	2572-2894
	3	02	80	016	030	REV039	IAE ALL	
R	3	02	80	017	001	REV040	STD=(20139+22129)	0990-1903
R	3	02	80	018	001	REV041	STD=(20139+22129)	
R	3	02	80	017	110	REV040	M:24105	2089-2321
R	3	02	80	018	115	REV041	24105	
R	3	02	80	017	110	REV040	M:24105	2572-2894
R	3	02	80	018	220	REV041	24105+26925	
R	3	02	80	017	113	REV039	30020=(24105+30020)	3001-3225
R	3	02	80	018	210	REV041	CODE 0179	
	3	02	80	018A	001	REV040	STD=(20139+22129)	0990-1903
	3	02	80	018A	115	REV040	24105	2089-2894
	3	02	80	018A	200	REV040	24105+30020	3001-3225
	3	02	80	019	100	REV040	22249	0990
	3	02	80	020	001	REV035	M:STD=(26270+34514)	
	3	02	80	019	100	REV040	22249	1304-3225
	3	02	80	020	100	REV035	CODE 1206	
	3	02	80	021	001	REV039	STD	ALL

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3 02 90 002	001	REV037	STD=M:32208+24105	
3 02 90 001	001	REV028		2089-3225
3 02 90 002	110	REV037	CODE 0672	
3 02 90 003	001	REV039		ALL
3 02 90 004	001	REV037		
3 02 90 005	001	REV037		ALL
3 02 90 006	001	REV037		
3 02 90 007	001	REV037	STD	0990 1491-3225
3 02 90 008	001	REV037	STD	
3 02 90 007	100	REV037	CODE 1207	1304-1355
3 02 90 008	100	REV037	CODE 1207	
3 03 00 001-2	001	REV027		ALL
3 03 01 001	001	REV039		ALL
3 03 02 001	001	REV034		ALL
3 03 02 002	001	REV025		
3 03 03 001	001	REV024		ALL
3 03 04 001	001	REV024		ALL
3 03 04 002	001	REV025		
3 03 04 003	100	REV028	CODE 1212	2845-3225
3 03 04 004	100	REV037	M:26925	
3 03 04 003	200	REV036	22373+28897	0990-2321
3 03 04 004	001	REV033		
3 03 04 003	200	REV036	22373+28897	2572-2585
3 03 04 004	100	REV037	M:26925	
3 03 04 005	001	REV036		ALL
3 03 04 006	100	REV025	CODE 0199	
3 03 04 007	100	REV038	CODE 0086/IAE	0990-2894
3 03 04 008	001	REV024	CODE 1388	
3 03 04 008	001	REV024	CODE 1388	3001-3225
3 03 05 001	001	REV024		ALL
3 03 05 002	001	REV024		
3 03 05 003	105	REV036	CODE 1214	ALL
3 03 05 004	001	REV024		
3 03 05 005	001	REV033		ALL
3 03 05 006	001	REV032		
3 03 06 001	001	REV024		ALL
3 03 06 002	100	REV037	CODE 0435	

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	3	03	06	004	105	REV032	M:24373	
	3	03	06	003	102	REV040	MOD 26284=26285	3001-3225
	3	03	06	004	200	REV037	M: 24373+30020	
	3	03	06	005	001	REV031		0990-2585
	3	03	06	006	100	REV038	M:21125	
	3	03	06	005	001	REV031		2845-3225
	3	03	06	006	205	REV038	M:21125+33240	
	3	03	06	007	001	REV039	CODE 1523	0990 3001-3225
	3	03	06	008	001	REV040	CODE 0658	
	3	03	06	007	110	REV039	CODE 0506	1304-2894
	3	03	06	008	001	REV040	CODE 0658	
	3	03	06	009	001	REV024	STD	0990
	3	03	06	010	001	REV024	CODE 1229	
	3	03	06	009	001	REV024	STD	1304-3225
	3	03	06	010	100	REV037	M:26358	
	3	03	06	011	001	REV035		0990-2321
	3	03	06	012	100	REV034	M:21946=(21946+27620+33497)	
	3	03	06	011	001	REV035		2572-3225
	3	03	06	012	200	REV036	21946+27620	
	3	03	06	013	001	REV039	CODE 1230	ALL
	3	03	06	013A	100	REV039	CODE 0171	ALL
	3	03	06	014	001	REV039		ALL
	3	03	06	015	001	REV039		ALL
	3	03	06	016	001	REV040		
	3	03	07	001	001	REV038		0990-2321
	3	03	07	002	100	REV036	CODE 1390	
	3	03	07	001	001	REV038		2572-3225
	3	03	07	002	200	REV037	CODE 1391	
	3	03	07	003	001	REV033		ALL
	3	03	08	001	175	REV039	CODE:0087	0990-2894
	3	03	08	002	180	REV038	M:26149=26608=27088	
	3	03	08	003	035	REV039	CODE 0099	0990-2894
N	3	03	09	001	030	REV024	IAE/PW	3001-3225
	3	03	09	001	030	REV024	IAE/PW	0990-2894
	3	03	09	002	037	REV035	2522/24/27/30/33/27EA5/27MA5	
	3	03	10	001	001	REV034		0990-2321
	3	03	10	002	001	REV039		

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	3	03	10	002	100	REV039	M:26925	
R	3	03	10	003	200	REV024	MOD:21964+22087	ALL
R	3	03	10	004	001	REV041	STD	
	3	03	10	005	001	REV040	STD	ALL
	3	03	10	005A	001	REV039	STD	ALL
	3	03	10	006	001	REV034	STD = (20139+22129)	0990-1903
	3	03	10	006	105	REV036	24105	2089-2894
	3	03	10	006	110	REV037	M:30020 = 24105+30020	3001-3225
	3	03	11	001	025	REV036	CODE:0504/IAE	0990-2894
	3	03	11	002	100	REV039	20081	
	3	03	11	002	100	REV039	20081	3001-3225
N	3	03	12	001	001	REV040		3001-3225
N	3	03	12	002	120	REV041	CODE 0280/CFM ALL	
R	3	03	12	001	155	REV040	CODE 0399	0990-2894
R	3	03	12	002	130	REV041	M:24035=24160=24211 IAE ALL	
	3	03	12	003	001	REV036		ALL
	3	03	12	004	100	REV038	CODE 0189	
	3	03	12	005	001	REV033	STD	ALL
	3	03	12	006	001	REV037		
	3	03	13	001	001	REV036		ALL
R	3	03	14	001	100	REV027	CODE 0189	ALL
R	3	03	14	002	100	REV041	24035=24160=24211	
	3	03	15	001	001	REV035	CODE 0784	ALL
	3	03	15	002	001	REV040		
	3	03	16	001	001	REV024	STD OR M:28238+28719	3001-3225
	3	03	16	002	001	REV040		
	3	03	16	001	100	REV025	CODE:0965	0990-2894
	3	03	16	002	001	REV040		
	3	03	16	003	001	REV040	CODE 0230	ALL
	3	03	17	001	100	REV039	CODE 0036	ALL
	3	03	17	002	100	REV039	STD	
R	3	03	17	003	100	REV040	CODE:1340	0990
R	3	03	17	004	001	REV041	STD OR M:(26358+30980)	
R	3	03	17	003	100	REV040	CODE:1340	1304-3225
R	3	03	17	004	103	REV041	M:26358	

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	3	03	18	001	100	REV027	M: 26018	0990
	3	03	18	002	210	REV040	CODE 0419	
	3	03	18	001	200	REV027	CODE 0776	2872-2894
	3	03	18	002	105	REV040	CODE 0414	
	3	03	18	001	200	REV027	CODE 0776	1304-2864
	3	03	18	002	210	REV040	CODE 0419	
R	3	03	18	003	001	REV039	CODE 0980	ALL
R	3	03	18	004	103	REV041	26497	
	3	03	18	005	001	REV030		ALL
	3	03	18	006	001	REV039		
R	3	03	18	007	001	REV040	STD	0990-2321
R	3	03	18	008	001	REV041		
R	3	03	18	007	105	REV040	M: 30020 OR(30020+26925)	3001-3225
R	3	03	18	008	001	REV041		
R	3	03	18	007	110	REV040	MOD 26925	2572-2894
R	3	03	18	008	001	REV041		
	3	03	18	009	001	REV036		ALL
R	3	03	19	001	105	REV040	CODE 0535	0990
R	3	03	19	002	001	REV041	CODE 0503	
R	3	03	19	001	200	REV040	CODE 0532	1304-2894
R	3	03	19	002	001	REV041	CODE 0503	
R	3	03	19	001	210	REV040	CODE:1334	3001-3225
R	3	03	19	002	100	REV041	CODE:0734	
	3	03	19	002A	001	REV040		0990-2894
	3	03	19	002A	100	REV040	CODE:0734	3001-3225
	3	03	19	003	120	REV039	CODE 1553	1304-2585
	3	03	19	004	200	REV037	CODE 0048	
	3	03	19	003	315	REV039	CODE 0533	0990
	3	03	19	004	001	REV036	CODE 0544	
	3	03	19	003	400	REV039	CODE 1552	3001-3225
	3	03	19	004	100	REV037	CODE 0468	
	3	03	19	003	400	REV039	CODE 1552	2845-2894
	3	03	19	004	200	REV037	CODE 0048	
	3	03	19	005	001	REV036		2872-3225
	3	03	19	006	100	REV040	CODE 0537	
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	3	03	19	006	200	REV040	CODE 0541	

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	3	03	19	008	200	REV039	M(26925+26965)=(26925+33376)	
R	3	03	19	009	001	REV040	STD=M:24105	0990-2894
R	3	03	19	010	001	REV041		
R	3	03	19	009	105	REV040	M:30020	3001-3225
R	3	03	19	010	001	REV041		
R	3	03	19	011	001	REV041		3001-3225
R	3	03	19	012	100	REV039	M:23742	
R	3	03	19	011	100	REV041	24064=24065=24066=24067	0990-2894
R	3	03	19	012	100	REV039	M:23742	
	3	03	19	013	001	REV039		ALL
R	3	03	20	001	001	REV035		0990 3001-3225
R	3	03	20	002	001	REV041		
R	3	03	20	001	100	REV035	CODE 0779	1304-2894
R	3	03	20	002	001	REV041		
	3	03	21	001	001	REV024		ALL
	3	03	22	001	040	REV032	CODE 0120	0990-1903
	3	03	22	002	040	REV032	CODE 0120	
	3	03	22	001	060	REV032	V2522/V2524/V2527M	2089-2894
	3	03	22	002	060	REV032	V2522/V2524/V2527M	
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R	3	03	22	004	105	REV041	M:24105	
R	3	03	22	003	110	REV037	M:30020	3001-3225
R	3	03	22	004	110	REV041	M:30020	
	3	03	22	005	001	REV039		ALL
	3	03	22	006	001	REV027		
	3	03	23	001	001	REV036	STD=25863+28551	0990
	3	03	23	002	102	REV038	CODE 0507	
	3	03	23	001	110	REV036	CODE 0156	1304-2894
	3	03	23	002	102	REV038	CODE 0507	
	3	03	23	001	110	REV036	CODE 0156	3001-3225
	3	03	23	002	201	REV038	CODE 0052	
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	3	03	23	004	001	REV036	STD OR M:(25863+28551)	

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	3	03	24	001	100	REV039	20081	3001-3225
	3	03	24	002	001	REV034	CODE 0754	
	3	03	24	001	150	REV039	20081/IAE	0990-2894
	3	03	24	002	001	REV034	CODE 0754	
	3	03	25	001	050	REV038	CODE 0919 / IAE ALL	0990-2894
	3	03	25	002	001	REV039		
	3	03	25	002	001	REV039		3001-3225
	3	03	25	003	140	REV038	CODE 1155IAE ALL	0990-1626 2089-2321
	3	03	25	003	255	REV038	CODE 0822 IAE ALL	1854-1903 2572-2894
	3	03	26	001	102	REV040	MOD. 26284 + 26285	0990-1903 3001-3225
	3	03	26	001	205	REV040	CODE 0221	2089-2894
	3	03	90	001	001	REV040		ALL
	3	03	90	002	001	REV040		
R	3	03	90	003	001	REV041		ALL
R	3	03	90	004	001	REV040		
	3	03	90	005	001	REV040		ALL
	3	03	90	006	001	REV040		
	3	03	90	007	001	REV040		ALL
	3	03	90	008	001	REV040	STD	
	3	03	90	009	001	REV040	STD	ALL
R	3	04	00	001	315	REV041	CODE 0595	2089-3225
R	3	04	00	002	001	REV038		
R	3	04	00	001	315	REV041	CODE 0595	0990-1903
R	3	04	00	002	020	REV038	V2522/2527/2527E/2530/2533	
	3	04	00	003	001	REV040		ALL
	3	04	10	001	001	REV024		0990-1903
	3	04	10	002	035	REV039	IAE ALL	
	3	04	10	001	001	REV024		2089-2321
	3	04	10	002	115	REV028	M:24105/CFM ALL=IAE ALL	
	3	04	10	001	100	REV037	M:31040	2572-2894
	3	04	10	002	220	REV037	24105+31040 CFM ALL=IAE ALL	
	3	04	10	001	100	REV037	M:31040	3001-3225
	3	04	10	002	310	REV037	M:24105+30020+31040/CFM=PW	
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	3	04	10	004	100	REV024	MOD:22013 OR 24105	
	3	04	10	003	001	REV040		1304-1903
	3	04	10	004	110	REV024	MOD:25225	
	3	04	21	001	001	REV032		ALL
	3	04	21	002	001	REV024		
	3	04	23	001	001	REV036		ALL
	3	04	23	001A	001	REV036		ALL
	3	04	23	002	001	REV024	STD=(28360+30239)	0990
	3	04	23	002	201	REV033	20137+30239	1304-3225
	3	04	23	003	100	REV024	CODE 0317	ALL
	3	04	24	001	001	REV040		ALL
	3	04	24	002	001	REV033		
	3	04	24	003	001	REV040	STD=26792+28488	ALL
	3	04	24	003A	001	REV040		ALL
	3	04	24	004	001	REV039		0990-1903
	3	04	24	004	103	REV039	CODE 1383	2089-2585
	3	04	24	004	211	REV040	MOD 24771+33300	3001-3225
	3	04	24	004	212	REV040	MOD 24771+33100	2845-2894
	3	04	24	005	001	REV040	CODE 0025	0990
	3	04	24	006	200	REV037	CODE 0758	
	3	04	24	005	001	REV040	CODE 0025	1304-2321
	3	04	24	006	300	REV039	CODE 1385	
	3	04	24	005	105	REV040	CODE 0299	2572-2585
	3	04	24	006	300	REV039	CODE 1385	
N	3	04	24	005	205	REV040	CODE 0471	3001-3225
N	3	04	24	006	410	REV040	CODE 0436	
	3	04	24	005	303	REV040	CODE 0302	2845-2894
	3	04	24	006	410	REV040	CODE 0436	
R	3	04	25	001	100	REV041	32088=32090=(32088+32090)	ALL
R	3	04	25	002	100	REV041	32088=32090	
R	3	04	25	003	100	REV041	M:32090	ALL
	3	04	27	001	001	REV028		ALL
	3	04	27	002	001	REV036		
	3	04	27	003	001	REV036		ALL
	3	04	27	004	001	REV036		

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	3	04	27	005A	001	REV040		ALL
	3	04	27	006	001	REV040		0990-2894
	3	04	27	006	100	REV040	30020	3001-3225
	3	04	27	007	001	REV036		ALL
	3	04	27	008	001	REV036		
	3	04	27	009	001	REV039	CODE 0166	0990-2894
	3	04	27	010	001	REV039		
	3	04	27	009	100	REV039	CODE 0167	3001-3225
	3	04	27	010	001	REV039		
	3	04	27	011	001	REV039		ALL
	3	04	27	012	001	REV036		
	3	04	28	001	100	REV024	MOD:20024	ALL
	3	04	30	001	001	REV039		0990-2894
	3	04	30	002	001	REV039		
	3	04	30	001	105	REV039	30020	3001-3225
	3	04	30	002	001	REV039		
	3	04	31	001	001	REV039	STD = MOD (28925+34282)	ALL
	3	04	31	002	001	REV039	STD = (MOD 28925+34282)	
R	3	04	32	001	001	REV041		ALL
R	3	04	32	002	001	REV041	STD=25951+32239	
	3	04	32	003	001	REV038		0990-1903
	3	04	32	004	001	REV037	STD	
	3	04	32	003	001	REV038		2089-2894
	3	04	32	004	110	REV037	M:24105	
	3	04	32	003	001	REV038		3001-3225
	3	04	32	004	205	REV037	M:30020+24105	
	3	04	34	001	001	REV030		ALL
	3	04	34	002	100	REV032	CODE:0317	
	3	04	34	003	001	REV031		ALL
	3	04	34	004	001	REV040		
	3	04	34	005	001	REV026		0990-1355
	3	04	34	006	001	REV032	CODE 1441	
	3	04	34	005	001	REV026		1491-2321
	3	04	34	006	100	REV035	CODE 1442	
	3	04	34	005	001	REV026		2572-3225
	3	04	34	006	210	REV038	31039+27620=31528+27620	

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	3	04	34	007	001	REV038	STD	0990-2585
	3	04	34	008	001	REV038		
	3	04	34	007	001	REV038	STD	2845-3225
	3	04	34	008	100	REV038	M:33240	
	3	04	34	009	001	REV038	STD	0990-2585
	3	04	34	010	001	REV038		
	3	04	34	009	110	REV038	M:33240	2845-3225
	3	04	34	010	001	REV038		
	3	04	34	011	100	REV037	CODE:0063	ALL
	3	04	34	012	120	REV024	CODE 0063	
	3	04	34	013	105	REV029	CODE 0264	ALL
	3	04	34	014	105	REV040	CODE 0264	
	3	04	34	015	120	REV024	CODE 0063	ALL
	3	04	34	016	100	REV039	28244	
	3	04	34	017	001	REV039		ALL
	3	04	34	018	001	REV026		
	3	04	34	019	001	REV028	CODE 0258	ALL
	3	04	34	020	001	REV028		
	3	04	34	021	100	REV031	28244=26526+28244	0990-2864
	3	04	34	021	110	REV039	CODE 1333	2872-3225
	3	04	46	001	100	REV029	CODE:0611	1304-1568
	3	04	46	002	100	REV037	M:27522=(27522+31371+31728)	
	3	04	46	001	105	REV039	CODE 0392	1626
	3	04	46	002	105	REV039	31371=(27522+28360+31371)	
	3	04	46	001	205	REV039	CODE 0410	1854-3225
	3	04	46	002	105	REV039	31371=(27522+28360+31371)	
	3	04	46	003	100	REV039	31371	1626-3225
	3	04	70	001	001	REV024		ALL
	3	04	70	002	001	REV037		
R	3	04	70	003	020	REV039	CFM=PW	3001-3225
R	3	04	70	004	050	REV041	PW ALL	
	3	04	70	003	030	REV039	IAE	0990-2894
	3	04	70	004	250	REV038	CODE 0321/IAE	
	3	04	70	005	050	REV034	PW ALL	3001-3225
	3	04	70	005	110	REV039	CODE:0113	0990-2894
	3	04	70	006	030	REV040	STD=30439+31040/IAE	
	3	04	70	007	001	REV024		3001-3225

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	3	04	70	008	050	REV030	IAE ALL	
	3	04	70	009	900	REV034	IAC ALK LAN BKP	2089-3225
	3	04	70	010	001	REV030		
	3	04	70	009	900	REV034	IAC ALK LAN BKP	0990-1903
	3	04	70	010	015	REV038	V2522/2527/2527E/2530/2533	
	3	04	80	001	001	REV037		0990-2321
	3	04	80	002	100	REV037	M:32088=32090	
	3	04	80	001	100	REV037	M:26925	2572-3225
	3	04	80	002	200	REV037	M(26925+32088)=(26925+32090)	
	3	04	80	003	001	REV032		ALL
	3	04	90	001	030	REV040	IAE/PW	0990-2321
	3	04	90	002	030	REV040	IAE/PW	
	3	04	90	001	130	REV040	26925/IAE/PW	2572-3225
	3	04	90	002	030	REV040	IAE/PW	
R	3	04	90	003	001	REV041		ALL
	3	04	91	001	001	REV040		ALL
	3	04	91	001A	100	REV040	20268	0990-1903
	3	04	91	001A	110	REV040	24105=(20268+24105)	2089-2894
	3	04	91	001A	300	REV040	M: 20268+24105+30020	3001-3225
	3	04	91	002	236	REV038	20268+24917/V2522/V2524	2089-2894
	3	04	91	002	240	REV040	20268+24917 IAE V2527A5/EA5	0990-1903
	3	04	91	003	100	REV025	M:24917	ALL
	3	04	91	004	001	REV040	STD	
	3	04	91	005	001	REV040		ALL
	3	04	91	006	001	REV026		
	3	04	91	007	001	REV040	STD	ALL
	3	04	91	008	001	REV036	CODE 0152	
	3	04	91	008A	001	REV033		ALL
	3	04	91	009	001	REV037		ALL
	3	04	91	010	001	REV028		
	3	04	91	011	001	REV028		ALL
	3	04	91	012	001	REV028		
	3	04	91	013	100	REV028	M:21729	ALL
	3	04	91	014	001	REV040		
	3	04	91	015	001	REV028		ALL

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	3	04	92	002	001	REV036		
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R	3	04	92	004	001	REV040		
	3	04	92	005	001	REV036		ALL
	3	04	92	006	001	REV040		
	3	05	00	001	001	REV025		ALL
	3	05	00	002	001	REV024		
	3	05	05	001	001	REV024		ALL
	3	05	05	002	001	REV025		
	3	05	05	003	001	REV024		ALL
	3	05	05	004	001	REV024		
	3	05	05	005	001	REV032		ALL
	3	05	05	006	001	REV039		
	3	05	06	001	030	REV024	CODE 0103	0990-2894
	3	05	06	002	030	REV024	IAE ALL	
N	3	05	06	001	055	REV041	PW 6122A	3001-3225
N	3	05	06	002	055	REV041	PW 6122A	
	3	05	06	003	015	REV025	STD=34221/IAE V2524	2089-2894
	3	05	06	004	025	REV025	STD=34221/V2524A5	
	3	05	06	003	040	REV025	STD=34221/V2527	0990
	3	05	06	004	040	REV039	STD=34221/V2527A5	
	3	05	06	003	055	REV025	IAE V2527E	1858 1903
	3	05	06	004	030	REV039	V2527EA5	
	3	05	06	003	063	REV040	PW6122A	3001-3225
	3	05	06	004	063	REV040	PW6122A	
	3	05	06	003	158	REV038	34221+IAE V2527EA5	1304-1854 1877
	3	05	06	004	180	REV038	34221+IEAV2527EA5	
	3	05	06	005	040	REV027	IAE V2527	0990
	3	05	06	006	010	REV027	IAE V2527	
	3	05	06	005	063	REV040	PW6122A	3001-3225
	3	05	06	006	063	REV040	PW6122A	
	3	05	06	005	080	REV027	IAE V2527E	1304-1903
	3	05	06	006	080	REV027	IAE V2527E	
	3	05	06	005	085	REV025	IAE V2524	2089-2894
	3	05	06	006	030	REV025	IAE V2524	
	3	05	06	007	035	REV025	CODE 1357/V2522/V2524	2089-2894
	3	05	06	008	035	REV025	IAE V2522/V2524	
	3	05	06	007	063	REV040	PW6122A	3001-3225
	3	05	06	008	063	REV040	PW6122A	

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3 05 06 008	040	REV025	IAE V2527/V2527E	
3 05 06 007	185	REV037	M:32656IAE V2527/V2527E	1858 1903
3 05 06 008	040	REV025	IAE V2527/V2527E	
3 05 06 009	035	REV025	IAE V2522/V2524	2089-2894
3 05 06 010	045	REV038	IAE V2522/V2524	
3 05 06 009	040	REV025	IAE V2527/V2527E	0990-1903
3 05 06 010	055	REV024	IAE V2527/V2527E	
3 05 06 009	063	REV040	PW6122A	3001-3225
3 05 06 011	020	REV028	IAE V2524	2089-2894
3 05 06 012	050	REV028	IAE V2524	
3 05 06 011	040	REV038	IAE V2527	0990
3 05 06 012	070	REV038	IAE V2527	
3 05 06 011	080	REV038	IAE V2527E	1304-1903
3 05 06 012	075	REV038	IAE V2527E	
3 05 06 013	040	REV039	IAE V2527	0990
3 05 06 014	070	REV037	IAE V2527	
3 05 06 013	070	REV028	IAE V2524	2089-2894
3 05 06 014	050	REV028	IAE V2524	
3 05 06 013	080	REV039	IAE V2527E	1304-1903
3 05 06 014	075	REV037	IAE V2527E	
3 05 06 015	060	REV037	CODE 1357/2522/2524	2089-2894
3 05 06 016	035	REV025	IAE V2522/V2524	
3 05 06 015	145	REV038	CODE 1358/2527/2527E	0990-1854 1877
3 05 06 016	040	REV037	IAE V2527/V2527E	
3 05 06 015	185	REV037	M:32656 IAE V2527/V2527E	1858 1903
3 05 06 016	040	REV037	IAE V2527/V2527E	
3 05 06 017	035	REV025	IAE V2522/V2524	2089-2894
3 05 06 017	040	REV037	IAE V2527/V2527E	0990-1903
3 05 10 001	001	REV024		3001-3225
3 05 10 002	130	REV040	M:20268/PW6122A	
3 05 10 001	001	REV024		2089-2894
3 05 10 002	135	REV025	MOD 20268 IAE V2522/V2524	
3 05 10 001	001	REV024		0990-1903
3 05 10 002	140	REV026	MOD 20268 IAE V2527/V2527E	
R 3 05 10 003	130	REV040	M:20268/PW6122A	3001-3225
R 3 05 10 004	130	REV041	M:20268/PW6122A	
3 05 10 003	135	REV025	MOD 20268 IAE V2522/V2524	2089-2894
3 05 10 004	135	REV025	MOD 20268 IAE V2522/V2524	

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	3	05	10	004	140	REV026	MOD 20268 IAE V2527/V2527E	
R	3	05	10	005	130	REV041	M:20268/PW6122A	3001-3225
R	3	05	10	006	130	REV041	M:20268/PW6122A	
	3	05	10	005	135	REV025	MOD 20268 IAE V2522/V2524	2089-2894
	3	05	10	006	135	REV025	MOD 20268 IAE V2522/V2524	
	3	05	10	005	140	REV026	MOD 20268 IAE V2527/V2527E	0990-1903
	3	05	10	006	140	REV026	MOD 20268 IAE V2527/V2527E	
R	3	05	10	007	130	REV041	M:20268/PW6122A	3001-3225
R	3	05	10	008	130	REV041	M:20268/PW6122A	
	3	05	10	007	135	REV025	MOD 20268 IAE V2522/V2524	2089-2894
	3	05	10	008	135	REV025	MOD 20268 IAE V2522/V2524	
	3	05	10	007	140	REV026	MOD 20268 IAE V2527/V2527E	0990-1903
	3	05	10	008	140	REV026	MOD 20268 IAE V2527/V2527E	
R	3	05	10	009	130	REV041	20268 ENG PW 6122A	3001-3225
	3	05	10	009	135	REV025	MOD 20268 IAE V2522/V2524	2089-2894
	3	05	10	009	140	REV026	MOD 20268 IAE V2527/V2527E	0990-1903
	3	05	15	001	030	REV024	CODE 0516/V2500/V2527/V2527E	0990
	3	05	15	002	030	REV024	CODE 0516/V2500/V2527/V2527E	
N	3	05	15	001	064	REV041	PW:6122A	3001-3225
N	3	05	15	002	064	REV041	PW:6122A	
	3	05	15	001	110	REV037	CODE 0650 IAE V2500/V2527/V2	1304-1903
	3	05	15	002	110	REV037	CODE 1353 V2500/27/27E	
	3	05	15	001	170	REV036	CODE 1353/IAE V2522/V2524	2089-2894
	3	05	15	002	170	REV036	CODE 1353 V2522/24	
	3	05	15	003	030	REV024	CODE 0516/V2500/V2527/V2527E	0990
	3	05	15	004	030	REV024	CODE 0516/V2500/V2527/V2527E	
N	3	05	15	003	064	REV041	PW:6122A	3001-3225
N	3	05	15	004	064	REV041	PW:6122A	
	3	05	15	003	110	REV037	CODE 1353 V2500/27/27E	1304-1903
	3	05	15	004	110	REV037	CODE 1353 V2500/27/27E	
	3	05	15	003	170	REV036	CODE 1353 V2522/24	2089-2894
	3	05	15	004	170	REV036	CODE 1353 V2522/24	
N	3	05	15	005	113	REV041	20268/6122A	3001-3225
N	3	05	15	006	113	REV041	20268/6122A	
	3	05	15	005	130	REV035	MOD 20268 IAE V2522/V2524	2089-2894
	3	05	15	006	130	REV035	20268 IAE V2522/V2524/T=L	
	3	05	15	005	140	REV035	M:20268 IAE V2527/V2527E	0990-1903
	3	05	15	006	140	REV035	20268 IAE V2527/V2527E/T=L	

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N	3	05	15	008	225	REV041	24105+30020/6122/6124	
	3	05	15	007	125	REV031	MOD 20268 IAE V2522/V2524	2089-2894
	3	05	15	008	110	REV025	MOD:24105	
	3	05	15	007	140	REV026	MOD 20268 IAE V2527/V2527E	0990-1903
	3	05	15	008	001	REV025		
	3	05	15	009	125	REV025	MOD 20268 IAE V2522/V2524	2089-2894
	3	05	15	010	125	REV025	MOD 20268 IAE V2522/V2524	
	3	05	15	009	135	REV040	M:20268/PW6122	3001-3225
	3	05	15	010	135	REV040	M:20268/PW6122	
	3	05	15	009	140	REV026	MOD 20268 IAE V2527/V2527E	0990-1903
	3	05	15	010	140	REV026	MOD 20268 IAE V2527/V2527E	
	3	05	15	011	125	REV040	M:20268/PW6122	3001-3225
	3	05	15	012	125	REV040	M:20268/PW6122	
	3	05	15	011	135	REV025	MOD 20268 IAE V2522/V2524	2089-2894
	3	05	15	012	135	REV025	MOD 20268 IAE V2522/V2524	
	3	05	15	011	140	REV026	MOD 20268 IAE V2527/V2527E	0990-1903
	3	05	15	012	140	REV026	MOD 20268 IAE V2527/V2527E	
R	3	05	15	013	125	REV040	M:20268/PW6122	3001-3225
R	3	05	15	014	125	REV041	20268/PW6122	
	3	05	15	013	135	REV025	MOD 20268 IAE V2522/V2524	2089-2894
	3	05	15	014	135	REV025	MOD 20268 IAE V2522/V2524	
	3	05	15	013	140	REV026	MOD 20268 IAE V2527/V2527E	0990-1903
	3	05	15	014	140	REV026	MOD 20268 IAE V2527/V2527E	
R	3	05	15	015	125	REV041	20268/PW6122	3001-3225
R	3	05	15	016	125	REV041	20268/PW6122	
	3	05	15	015	135	REV025	MOD 20268 IAE V2522/V2524	2089-2894
	3	05	15	016	135	REV025	MOD 20268 IAE V2522/V2524	
	3	05	15	015	140	REV026	MOD 20268 IAE V2527/V2527E	0990-1903
	3	05	15	016	140	REV026	MOD 20268 IAE V2527/V2527E	
R	3	05	15	017	125	REV041	20268/PW6122	3001-3225
R	3	05	15	018	125	REV041	20268/PW6122	
	3	05	15	017	135	REV025	MOD 20268 IAE V2522/V2524	2089-2894
	3	05	15	018	135	REV025	MOD 20268 IAE V2522/V2524	
	3	05	15	017	140	REV026	MOD 20268 IAE V2527/V2527E	0990-1903
	3	05	15	018	140	REV026	MOD 20268 IAE V2527/V2527E	
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	3	07	00	001-2	001	REV024		ALL
	3	07	10	001-2	001	REV024		ALL
	3	07	20	001-LEBBU	001	REV037	LIST OF OEB & FCOM BULLETINS	ALL
	3	07	30	001	001	REV025		ALL
	3	07	30	002	001	REV025		

M V T	REV	MOD SB	MP	TITLE / VALIDITY		
.	040B	....				
		28-1152		CC-CZB	CC-COC	CC-COD
		28-1153		CC-COE	CC-COF	CC-COG
				CC-COH	CC-COI	CC-COK
				CC-COL	CC-COM	LV-BET
				LV-BFY	LV-BFO	CC-COT
				CC-COU	CC-COX	CC-COY
				CC-COZ	CC-CPE	CC-CPF
				CC-CPI		
.	040B	....				
		.....		CC-CZB	CC-COC	CC-COD
				CC-COE	CC-COF	CC-COG
				CC-COH	CC-COI	CC-COK
				CC-COL	CC-COM	LV-BET
				LV-BFY	LV-BFO	CC-COT
				CC-COU	CC-COX	CC-COY
				CC-COZ	CC-CPE	CC-CPF
				CC-CPI		
.	036	.....	P0164	COMMUNICATIONS - DATA LINK SYSTEM - DEFINE PIN PROGRAMMING		
		.....		CC-CZB	CC-COC	CC-COD
				CC-COE	CC-COF	CC-COG
				CC-COH	CC-COI	CC-COK
				CC-COL	CC-COM	LV-BET
				LV-BFY	LV-BFO	CC-COT
N	041	.....	P6146	INDICATING/RECORDING SYSTEM - FWC - INTRODUCE "F/CTL FLAP LVR NOT ZERO" RED WARNING		
		.....		CC-COC	CC-COD	CC-COE
				CC-COF	CC-COG	CC-COH
				CC-COI	CC-COK	CC-COL
				CC-COM	LV-BET	LV-BFY
				LV-BFO	CC-COT	CC-COU
				CC-COX	CC-COY	CC-COZ
				CC-CPE	CC-CPF	CC-CPI
				CC-CPJ	CC-CPL	CC-CPM
				CC-CPO	CC-CPQ	CC-CPX
				CC-CQK	CC-CQL	

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	039A	.....	P6911	INDICATING/RECORDING SYSTEM : FROM FWC-F1 PIN-PROGRAMMING FOR IMPROVING THE MONITORING ABOUT THE NORMAL BRAKING SYSTEM CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL
.	039A	.....	P8175	INDICATING/RECORDING SYSTEMS - SDAC - ACTIVATE IAS DISCREPANCY MONITORING BY PIN PROGRAMMING CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL
.	038A	.....	P8232	INDICATING/RECORDING SYSTEMS - FWC - INTRODUCE IAS DISCREPANCY AND DUAL PITOT MONITORING ON FWC H2F1 CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	038A	20011	.....	ELECTRICS- GENERATION- DISTRIBUTION- V.U.'S AND AVIONICS- DEFINE SYSTEMS OF THE BASIC AIRCRAFT- ALL
.	030A	20024	.....	FUEL- INSTALL A CENTRE TANK SYSTEM- ALL
.	030A	20047	.....	EQUIPMENT/FURNISHINGS - FLIGHT COMPARTMENT - INSTALL A 4TH OCCUPANT SEAT - ALL

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	034A	20059	.....	AIR CONDITIONING - CARGO COMPARTMENT -
		21-1047 05		VENTILATION - INSTALL SYSTEM IN AFT COMPARTMENT -
				CC-COC CC-COD CC-COE
				CC-COF CC-COG CC-COH
				CC-COI CC-COK CC-COL
				CC-COM LV-BET LV-BFY
				LV-BFO CC-COT CC-COU
				CC-COX CC-COY CC-COZ
				CC-CPE CC-CPF CC-CPI
				CC-CPJ CC-CPL CC-CPM
				CC-CPO CC-CPQ CC-CPX
				CC-CQK CC-CQL CC-CVA
				CC-CVB CC-CVF MSN 3214
				MSN 3216 MSN 3220 MSN 3225
.	030A	20063	.....	OXYGEN - FLIGHT CREW SYSTEM - INSTALL
		.....		A 77.1 CU/FT BOTTLE IN COMPOSITE MATERIAL -
				ALL
.	030A	20067	.....	FIRE PROTECTION - FWD CARGO COMPARTMENT -
		26-1021 19		INSTALL SMOKE DETECTION SYSTEM -
				ALL
.	030A	20069	.....	FIRE PROTECTION - AFT CARGO COMPARTMENT -
		26-1021 19		INSTALL SMOKE DETECTION SYSTEM -
				ALL
.	030A	20071	.....	FIRE PROTECTION - CARGO COMPARTMENT
		26-1020 18		FIRE EXTINGUISHING - INSTALL A SINGLE SHOT SYSTEM -
				ALL
.	035	20081	.....	LIGHTS - EXTERIOR LIGHTS - INSTALL
		.....		SYNCHRONIZED STROBE LIGHTS
				ALL

M V T	REV	MOD SB	MP	TITLE	VALIDITY
.	030A	20137	.....	COMMUNICATIONS - RADIO MANAGEMENT - INSTALL A 3RD RMP -	
	.....			CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225	
.	030A	20151	.....	OXYGEN - FLIGHT CREW OXYGEN - INSTALL A 115 CU/FT STEEL OXYGEN CYLINDER -	
	.....			CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225	
.	030A	20233	.....	EQUIPMENT/FURNISHINGS-PAX COMPARTMENT- INSTALL SLIDE RAFTS (AIRCRUISER).	
	.....			CC-COC CC-COD CC-COE CC-COF	
.	030A	20268	.....	WINGS-WING TIP FENCES-INTRODUCE WING TIPS INCLUDING FENCES-	
	.....			ALL	
.	037	20802	.....	GENERAL - REINFORCE STRUCTURE FOR MTOW 73,5 T / MLW 64,5 T AND MZFW 60,5 T -	
	.....			ALL	

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	034	20856	.....	LANDING GEAR - INSTALL CARBON BRAKES AND ASSOCIATED WHEELS BF-GOODRICH - CC-CZB CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI
.	037	21125	.....	NAVIGATION - ATC MODE "S" - ACTIVATE SELECTIVE INTERROGATION FUNCTION - ALL
.	040B	21206	.....	NAVIGATION - ADIRU - PROVIDE COMMUNITY FOR CFM AND IAE ENGINES - ALL
.	030A	21285	.....	ENGINE CONTROLS-MODIFY POWER SUPPLY FOR HP FUEL SOLENOID ALL
.	030A	21678	.....	ELECTRICAL POWER-AC/DC ESSENTIAL POWER DISTRIBUTION-PROVIDE PROVISIONS FOR ETOPS- ALL
.	034A	21706	.....	AIR CONDITIONING - VENTILATION CONT.
		21-1047 05		ISOLATION VALVES - CHANGE POWER SUPPLY FOR ETOPS - CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225

M V T	REV	MOD SB	MP	TITLE	VALIDITY
.	030A	21729	.....	AIR CONDITIONING -AVIONICS VENTILATION- IMPROVE ACCURANCY OF SKIN TEMPERATURE READING	ALL
.	030A	21858	.....	COMMUNICATIONS - INSTALL HF1 FOR EROPS	ALL
.	030A	21899	.....	AIR CONDITIONING-AVIONICS VENTILATION- INSTALL A NRV AT AIR INLET	ALL
.	030A	21946	.....	OXYGENE - COCKPIT - INSTALL MODIFIED LP OXYGEN SUPPLY SOLENOID VALVE	ALL
.	030A	21964	.....	FLIGHT CONTROLS - ELAC/EFCS SYSTEM - INTRODUCE SOFTWARE L62	ALL
.	030A	21988	.....	FUEL - IMPROVE LOW LEVEL WARNING	ALL
.	030A	21992	.....	INDICATING/RECORDING SYSTEMS - INTRODUCE CFDIU BATCH 2	ALL
.	030A	22087	.....	FLIGHT CONTROLS - FCDC - INSTALL SOFTWARE L45	ALL
.	036	22199	.....	WINGS - REMOVE LEADING EDGE VENTILATION SYSTEM	ALL
.	030A	22249	.....	AUTO FLIGHT - ACTIVATE WINDSHEAR FUNCTION	ALL
.	039B	22269	.....	GENERAL - INCREASE DESIGN WEIGHT TO 75,5T MTOW	CC-CZB
.	030A	22373	.....	ELECTRICAL POWER - DC GENERATION - INTRODUCE IMPROVED BCL	ALL

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	039B	22536	.....	NAVIGATION - INSTALL A BENDIX TCAS II COLLISION AVOIDANCE SYSTEM CC-CZB
.	030A	22561	.....	FIRE PROTECTION - LAVATORY SMOKE DETECTION - INTRODUCE AMBIENT SYSTEM ALL
.	035	22562	.....	AIRBORNE AUXILIARY POWER UNIT - INTRODUCE APIC APS-3200 49-1029 27 CC-CZB CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI
.	038	22706	.....	INDICATING/RECORDING SYSTEMS - CENTRAL WARNING SYSTEM - INSTALL SDAC A320/321 STANDARD ALL
.	030A	22769	.....	NAVIGATION - GPWS - INSTALL GPWC MARK V WITH INTERFACE WITH CFDS ALL
.	039B	23008	.....	POWER PLANT - IAE - INSTALL DERATED V2500-A5 ON A320 A/C CC-CZB
.	030A	23108	.....	ENGINES - EXTEND FLIGHT ENVELOPPE (9200 FT) FOR IAE V2500 ENGINES (WITHOUT THRUST BUMP) CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT
.	030A	23119	.....	HYDRAULIC POWER-BLUE MAIN HYDRAULIC POWER-IMPROVE MAINTENANCE STATUS OF BLUE HYDRAULIC RESERVOIR ALL

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	030A	23208	.....	LANDING GEAR - WHEELS AND BRAKES - INTRODUCE BSCU STD 6
	.....			ALL
.	030A	23222	.....	CERTIFICATION DOCUMENTS - GENERAL - CERTIFICATION FOR TAKE-OFF WITH 15 KNOT TAILWIND
	.....			CC-COC CC-COD CC-COE
				CC-COF CC-COG CC-COH
				CC-COI CC-COK CC-COL
				CC-COM LV-BET LV-BFY
				LV-BFO CC-COT CC-COU
				CC-COX CC-COY CC-COZ
				CC-CPE CC-CPF CC-CPI
				CC-CPJ CC-CPL CC-CPM
				CC-CPO CC-CPQ CC-CPX
				CC-CQK CC-CQL
.	030A	23227	.....	NAVIGATION - INSTALL A TCAS II COLLISION AVOIDANCE SYSTEM (HONEYWELL)
	.....			CC-COC CC-COD CC-COE
				CC-COF CC-COG CC-COH
				CC-COI CC-COK CC-COL
				CC-COM LV-BET LV-BFY
				LV-BFO CC-COT CC-COU
				CC-COX CC-COY CC-COZ
				CC-CPE CC-CPF CC-CPI
.	030A	23264	.....	GENERAL - INCREASE DESIGN WEIGHT TO 77T MTOW
	.....			CC-COC CC-COD CC-COE
				CC-COF CC-COG CC-COH
				CC-COI CC-COK CC-COL
				CC-COM LV-BET LV-BFY
				LV-BFO CC-COT
.	038	23315	.....	NAVIGATION - ILS - INSTALL NEW BENDIX RIA 35A ILS RECEIVERS (P/N 204.1230.3521)
	.....			ALL

M V T	REV	MOD SB / MP	TITLE / VALIDITY
.	039C	23529	NAVIGATION - INSTALL A TCAS II COLLINS SYSTEM CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	036A	23672	NAVIGATION - ADIRS - INSTALL LITTON 4MCU ON A321 A/C CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL
.	030A	23698	AUXILIARY POWER UNIT - CONTROL AND MONITORING - INTRODUCE A NEW ECB ALL
.	030A	23699	AUXILIARY POWER UNIT - CONTROL AND MONITORING - MODIFY WIRE HARNESSES FOR NEW ECB 817-1 ALL
.	030A	23742	AUTO FLIGHT - FCU - INTRODUCE FCU STANDARD M10 ALL
.	030A	23779	MINOR IMPROVEMENTS INTRODUCED FROM A/C 508 (ST2) TO A/C 521 (ST2) ALL
.	030A	23893	AUTO FLIGHT - LAND CAT III CAPABILITY TEST - EXTEND CAT III CAPABILITY FOR IAE ENGINE CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT

M V T	REV	MOD SB	MP	TITLE	VALIDITY
.	030A	23900	.....	GENERAL - INCREASE DESIGN WEIGHT TO 61T MZFW	CC-CZB CC-C0C CC-C0D CC-C0E CC-C0F CC-C0G CC-C0H CC-C0I CC-C0K CC-C0L CC-C0M LV-BET LV-BFY LV-BF0 CC-C0T
.	030A	23901	.....	LANDING GEAR - WHEELS AND BRAKES - INTRODUCE MODIFIED ALTERNATE BRAKE DISTRIBUTION DUAL VALVE	ALL
.	030A	24035	.....	INDICATING/RECORDING SYSTEMS - GENERAL- DEFINE CPIP3	ALL
.	030A	24066	.....	AUTO FLIGHT - FMS - INTRODUCE FMGC A320/321 B1 STD WITH OPTIONS AND 400 KILOWORDS FOR IAE V2500 VERSIONS	CC-CZB CC-C0C CC-C0D CC-C0E CC-C0F CC-C0G CC-C0H CC-C0I CC-C0K CC-C0L CC-C0M LV-BET LV-BFY LV-BF0 CC-C0T CC-C0U CC-C0X CC-C0Y CC-C0Z CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CP0 CC-CPQ CC-CPX CC-CQK CC-CQL
.	036A	24105	.....	FUSELAGE - REAR FUSELAGE - ADAPT SECTION 17/19 STRUCTURE TO A319 DEFINITION	CC-C0U CC-C0X CC-C0Y CC-C0Z CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CP0 CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	030A	24215	.....	AUTO FLIGHT - FAC - INSTALL TWO FACS P/N BAM 0509	ALL

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	030A	24349	.....	NAVIGATION - ADIRS - INTRODUCE STD P/N AC06 CC-CZB CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	030A	24373	.....	FUEL - TANK LEVEL SENSING - INTRODUCE MODIFIED LOW FUEL PRESSURE WARNING CONTROL ALL
.	030A	24440	.....	LANDING GEAR-NOSE LANDING GEAR- SHOCK ABSORBER-INTRODUCE MODIFIED THROTTLING ROD GUIDE ALL
.	030A	24449	.....	LANDING GEAR - A320/A321 TWIN WHEELS - INTRODUCE BSCU STANDARD 7 (70B VERSION) ALL
.	031	24498	.....	APU - STORAGE AND DISTRIBUTION - MODIFY APU COMMON LUBRICATION SYSTEM ALL
.	030A	24511	.....	FLIGHT CONTROLS -S.E.C. SYSTEM INTRODUCE A320/A321 S.E.C STANDARD P/N BAM0508 ALL
.	039B	24531	.....	NAVIGATION-VOR/MARKER-INTRODUCE BENDIX VOR RVA 36A RECEIVERS WITH FM IMMUNITY CC-CZB
.	030A	24588	.....	AUTO FLIGHT-FAC-INTRODUCE FAC P/N BAM 510 ALL
.	030A	24612	.....	INDICATING/RECORDING SYSTEMS - FWC - INTRODUCE FWC D2 STD ALL

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	030A	24613	.....	FLIGHT CONTROLS - ELAC - INTRODUCE ELAC STD P/N L69
	.....			ALL
.	031	24642	.....	ELECTRICAL POWER - AC AUXILIARY GENERATION (APU GENERATOR) - INTRODUCE MODIFIED GENERATOR
	.....			ALL
.	030A	24645	.....	LANDING GEAR-MLG-LGCIU-INTRODUCTION OF STANDARD UNIT P/N A4C
	.....			ALL
.	040	24701	.....	HYDRAULIC POWER-AUXILIARY HYDRAULIC POWER-RAT-INTRODUCE MODIFIED RAT (NEW BEARING)
	.....			CC-CZB CC-C0C CC-C0D CC-C0E CC-C0F CC-C0G CC-C0H CC-C0I CC-C0K CC-C0L CC-C0M LV-BET LV-BFY LV-BFO CC-C0T
.	036A	24771	.....	COMMUNICATIONS-CIDS-INTRODUCE MODIFIED DIRECTOR POWER SUPPLY PRINCIPLE
	.....			CC-C0U CC-C0X CC-C0Y CC-C0Z CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	030A	24785	.....	NAVIGATION-ADIRS-INTRODUCE 4MCU ADIRU HONEYWELL P/N C06
	.....			CC-C0C CC-C0D CC-C0E CC-C0F CC-C0G CC-C0H CC-C0I CC-C0K CC-C0L CC-C0M LV-BET LV-BFY LV-BFO CC-C0T CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	030A	24794	.....	AIR CONDITIONING-COCKPIT AND CABIN
	.....			TEMPERATURE CTRL-INTRODUCE MODIFIED
				TEMPERATURE SENSOR P/N-02.ON MIXER UNIT
				ALL
.	036A	24852	.....	NAVIGATION-ADIRU-INTRODUCE ADIRU
	.....			P/N -307
				CC-COU CC-COX CC-COY
				CC-COZ CC-CPE CC-CPF
				CC-CPI CC-CPJ CC-CPL
				CC-CPM CC-CPO CC-CPQ
				CC-CPX CC-CQK CC-CQL
.	030A	24871	.....	ENGINE FUEL AND CTRL-FUNCTIONAL
	.....			INTERFACES-INTRODUCE EIU VERSION 5
				ON IAE V2500 ENGINES
				CC-CZB CC-COC CC-COD
				CC-COE CC-COF CC-COG
				CC-COH CC-COI CC-COK
				CC-COL CC-COM LV-BET
				LV-BFY LV-BFO CC-COT
				CC-COU CC-COX CC-COY
				CC-COZ CC-CPE CC-CPF
				CC-CPI CC-CPJ CC-CPL
				CC-CPM CC-CPO CC-CPQ
				CC-CPX CC-CQK CC-CQL
.	030A	24917	.....	FLIGHT CONTROLS-INTRODUCE ELAC STD
	.....			L69J
				ALL
.	039C	24946	.....	LANDING GEAR - MLG - MESSIER -
	.....			INTRODUCE BRAKES P/N C202253
				CC-CPJ CC-CPL CC-CPM
				CC-CPO CC-CPQ CC-CPX
				CC-CQK CC-CQL CC-CVA
				CC-CVB CC-CVF MSN 3214
				MSN 3216 MSN 3220 MSN 3225

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	030A	25068	.....	POWER PLANT - INSTALL IAE V2527E A5 ENGINES (INCREASED TAKE-OFF THRUST AT HIGH ALTITUDES)
				CC-COC CC-COD CC-COE
				CC-COF CC-COG CC-COH
				CC-COI CC-COK CC-COL
				CC-COM LV-BET LV-BFY
				LV-BFO CC-COT
.	039B	25108	.....	NAVIGATION - ADIRS - INSTALL ADIRS LITTON 4MCU ON A320
				CC-CZB
.	030A	25200	.....	FLIGHT MANAGEMENT AND GUIDANCE SYSTEM-INTRODUCE FMGC (IAE ENGINES)
				CC-CZB CC-COC CC-COD
				CC-COE CC-COF CC-COG
				CC-COH CC-COI CC-COK
				CC-COL CC-COM LV-BET
				LV-BFY LV-BFO CC-COT
				CC-COU CC-COX CC-COY
				CC-COZ CC-CPE CC-CPF
				CC-CPI CC-CPJ CC-CPL
				CC-CPM CC-CPO CC-CPQ
				CC-CPX CC-CQK CC-CQL
.	036	25204	.....	NAVIGATION-ADIRS-INSTALL HONEYWELL ADIRS WITH GPS PRIMARY NAVIGATION CAPABILITY
				CC-COC CC-COD CC-COE
				CC-COF CC-COG CC-COH
				CC-COI CC-COK CC-COL
				CC-COM LV-BET LV-BFY
				LV-BFO CC-COT CC-CVA
				CC-CVB CC-CVF MSN 3214
				MSN 3216 MSN 3220 MSN 3225
.	030A	25225	.....	AUTO FLIGHT-FMGC-REDUCE VAPP FOR A320 CFM/IAE
				CC-COC CC-COD CC-COE
				CC-COF CC-COG CC-COH
				CC-COI CC-COK CC-COL
				CC-COM LV-BET LV-BFY
				LV-BFO CC-COT

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	030A	25241	.....	COMMUNICATIONS - RADIO MANAGEMENT - INSTALL A NEW STD RMP1 AND RMP2 WITH VHS SPACING 8, 33KHZ
	.....	.....		ALL
.	030A	25242	.....	COMMUNICATIONS - RADIO MANAGEMENT - INSTALL A NEW STD RMP3 (3°) WITH VHF SPACING 8, 33KHZ
	.....	.....		CC-COC CC-COD CC-COE
				CC-COF CC-COG CC-COH
				CC-COI CC-COK CC-COL
				CC-COM LV-BET LV-BFY
				LV-BFO CC-COT CC-COU
				CC-COX CC-COY CC-COZ
				CC-CPE CC-CPF CC-CPI
				CC-CPJ CC-CPL CC-CPM
				CC-CPO CC-CPQ CC-CPX
				CC-CQK CC-CQL CC-CVA
				CC-CVB CC-CVF MSN 3214
				MSN 3216 MSN 3220 MSN 3225
.	030A	25274	.....	AUTO FLIGHT - FMGC - IAE VERSION - INTRODUCE FMGC CAPABLE OF ACARS AND PRINTER
	.....	.....		CC-CZB CC-COC CC-COD
				CC-COE CC-COF CC-COG
				CC-COH CC-COI CC-COK
				CC-COL CC-COM LV-BET
				LV-BFY LV-BFO CC-COT
				CC-COU CC-COX CC-COY
				CC-COZ CC-CPE CC-CPF
				CC-CPI CC-CPJ CC-CPL
				CC-CPM CC-CPO CC-CPQ
				CC-CPX CC-CQK CC-CQL
.	036A	25294	.....	NAVIGATION - ADIRS - INSTALL HONEYWELL ADIRS CAPABLE OF A319 A/C
	.....	.....		CC-COU CC-COX CC-COY
				CC-COZ CC-CPE CC-CPF
				CC-CPI CC-CPJ CC-CPL
				CC-CPM CC-CPO CC-CPQ
				CC-CPX CC-CQK CC-CQL

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	036A	25335	.....	FLIGHT CONTROLS-ELAC-INTRODUCE A319 EIS L77 SOFTWARE STD-
	.....			CC-COU CC-COX CC-COY
				CC-COZ CC-CPE CC-CPF
				CC-CPI CC-CPJ CC-CPL
				CC-CPM CC-CPO CC-CPQ
				CC-CPX CC-CQK CC-CQL
				CC-CVA CC-CVB CC-CVF
				MSN 3214 MSN 3216 MSN 3220
				MSN 3225
.	040B	25336	.....	NAVIGATION-ADIRS-INTRODUCE AIRU
	.....			LITTON P/N -308
				CC-CZB CC-COU CC-COX
				CC-COY CC-COZ CC-CPE
				CC-CPF CC-CPI CC-CPJ
				CC-CPL CC-CPM CC-CPO
				CC-CPQ CC-CPX CC-CQK
				CC-CQL
.	030A	25357	.....	ENGINE FUEL AND CONTROL-CONTROLLING-
	.....			INTRODUCE E.E.C. SOFTWARE SCN 10A
				ON IAE V2500-A5
				CC-CZB CC-COC CC-COD
				CC-COE CC-COF CC-COG
				CC-COH CC-COI CC-COK
				CC-COL CC-COM LV-BET
				LV-BFY LV-BFO CC-COT
				CC-COU CC-COX CC-COY
				CC-COZ CC-CPE CC-CPF
				CC-CPI CC-CPJ CC-CPL
				CC-CPM CC-CPO CC-CPQ
				CC-CPX CC-CQK CC-CQL
.	030A	25404	.....	EXHAUST-THRUST REVERSER CONTROL AND
	.....			INDICATING-ACTIVATE ADDITIONAL THRUST
				REVERSER LOCK CONTROL
				ALL
.	030A	25410	.....	INDICATING RECORDING SYSTEM-FWC-
	.....			INTRODUCE F.W.C. E1 STANDARD
				ALL

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	030A	25419	.....	ICE AND RAIN PROTECTION-WINDSHIELD RAIN PROTECTION-DESACTIVATION OF RAIN REPELLENT SYSTEM ALL
.	038A	25440	.....	NAVIGATION - GENERAL - CHANGE EQUIPMENTS TO COMPLY WITH MARCH 95 SPECS. CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	030A	25590	.....	INDICATING/RECORDING SYSTEMS - FWC - DEFINE OEB REMINDER WITHIN FWC STD -E1 AND SUBSEQUENT CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	030A	25596	.....	ENGINE FUEL AND CONTROL-CONTROLLING ..... INTRODUCE EEC SOFTWARE SCN 10B 0N IAE V2500-A5 ENGINES CC-CZB CC-C0C CC-C0D CC-C0E CC-C0F CC-C0G CC-C0H CC-C0I CC-C0K CC-C0L CC-C0M LV-BET LV-BFY LV-BFO CC-C0T CC-C0U CC-C0X CC-C0Y CC-C0Z CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL
.	030A	25615	.....	CERTIFICATION - GENERAL - CERTIFICATION ..... FOR HIGH ALTITUDE AIRPORT OPERATION CC-C0C CC-C0D CC-C0E CC-C0F CC-C0G CC-C0H CC-C0I CC-C0K CC-C0L CC-C0M LV-BET LV-BFY LV-BFO CC-C0T CC-C0U CC-C0X CC-C0Y CC-C0Z CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	034	25810	.....	LANDING GEAR - WHEELS AND BRAKES - ..... INSTALL BF GOODRICH CARBON BRAKES (SEPCARB III) P/N 2-1600 CC-C0C CC-C0D CC-C0E CC-C0F CC-C0G CC-C0H CC-C0I CC-C0K CC-C0L CC-C0M LV-BET LV-BFY LV-BFO CC-C0T CC-C0U CC-C0X CC-C0Y CC-C0Z CC-CPE CC-CPF CC-CPI
.	040A	25819	.....	NAVIGATION - WEATHER RADAR SYSTEM - ..... ACTIVATE DUAL PREDICTIVE WINDSHEAR FUNCTION CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225

M V T	REV	MOD SB	MP	TITLE	VALIDITY
.	039B	25830 34-1140 07	.....	NAVIGATION-VOR MARKER-INSTALL AN ALLIED SIGNAL VOR RECEIVER WITH "FM IMMUNITY" P/N 204-1231-3622	CC-CZB
.	030A	25863	.....	AUTO FLIGHT - FCU - DEFINE FLIGHT DIRECTOR ENGAGEMENT IN CROSSED BARS AT GO AROUND	CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	030A	25888	.....	A.P.U.-POWER PLANT-INTRODUCE ALLIED SIGNAL APU 131-9(A)	CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM
.	039B	25951	.....	LANDING GEAR - INSTALL ABS A321 WHEELS AND BRAKES ON A320	CC-CZB
.	040B	26001	.....	NAVIGATION-ADIRS-INTRODUCE HONEYWELL 4 MCU P/N AC09	CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	036A	26002	.....	NAVIGATION-ADIRS-INTRODUCE LITTON ADIRU 4 MCU STD WITH P/N-309 (AIME FUNCTION)
	.....			CC-CZB CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL
.	030A	26017	.....	INDICATING/RECORDING SYSTEMS-FLIGHT WARNING COMPUTER (FWC)-INTRODUCE FWC ST2 E2
	.....			ALL
.	030A	26018	.....	INDICATING/RECORDING SYSTEMS-DISPLAY MANAGEMENT COMPUTER (DMC)-INTRODCUE DMC V32 STD
	.....			ALL
.	039C	26117	.....	NAVIGATION - WEATHER RADAR SYSTEM - ACTIVATE COLLINS DUAL PREDICTIVE WINDSHEAR SYSTEM
	.....			CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	030A	26149	.....	ENGINE FUEL AND CONTROL -CONTROLLING- FADEC SYSTEM-INTRODUCE EEC SOFTWARE SCN-11 (IEAE V2500-A5)
	.....			CC-CZB CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	033	26169	.....	COM-CVR-INSTALL A SOLID STATE COCKPIT VOICE RECORDER (SSCVR) LORAL FAIRCHILD P/N 200-0012-00 (SFE)
		.....		CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	036A	26229	.....	AIR CONDITIONING - PRESSURE CONTROL - INTRODUCE MODIFIED CABIN PRESSURE CONTROLLER P/N 20791
		.....		CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	036A	26243	.....	AUTOFLIGHT -FLIGHT MANAGEMENT SYSTEM- INTRODUCE FMGC (P/N B546 CC M0102) CAPABLE OF GPS/ACARS FUNCTIONS
		.....		CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	030A	26270	.....	NAVIGATION - SINGLE PWS - COLLINS SINGLE PWS ACTIVATION
	.....			CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI
.	040	26284	.....	LIGHTS-INTRODUCE EPSU P/N 54-10 ON A319/A320 A/C
	.....			ALL
.	036A	26298	.....	POWER PLANT-GENERAL-INTRODUCE IAE V2524-A5 ON A319-132 A/C
	.....			CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL
.	030A	26335	.....	FLIGHT CONTROLS-GENERAL- DELETION OF L.A.F. FEATURE FROM A320 A/C (SERIAL SOLUTION)
	.....			CC-CZB CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT
.	037	26358	.....	AUTOFLIGHT-FLIGHT CONTROL UNIT- (FCU) INTRODUCE SEXTANT MODULAR FCU
	.....			CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	035	26363	.....	AIR CONDITIONING-AIR COOLING SYSTEM- INTRODUCE MODIFIED RAM AIR OUTLET ALL
.	030A	26377	.....	NAVIGATION - ILS - INSTALL ADDITIONAL WIRING PROVISIONS FOR MMR INSTALLATION ALL
.	030A	26398	.....	ADDITIONAL CERTIFICATION ITEMS - LANDING WITH A 15 KNOT TAILWIND CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL
.	030A	26443	.....	NAVIGATION - VOR/MARKER - INSTALL TWO VOR/MARKER RECEIVERS 900 COLLINS P/N 822-0297-020 CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	037	26497	.....	AUTO FLIGHT-GENERAL-ACTIVATE GLOBAL SPEED PROTECTION AND F/D DISENGAGEMENT UPON SPEED CONSTRAINTS ALL
.	030A	26526	.....	NAVIGATION - GPWS - ACTIVATE ENHANCED FUNCTIONS OF THE EGPWS ALL

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	030A	26608	.....	ENGINE -FUEL AND CONTROL-CONTROLLING FADEC SYSTEM-IAE V2500-A5-INTRODUCE EEC SOFTWARE SCN 11/P
		.....		CC-CZB CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL
.	035	26645	.....	AUTO-FLIGHT-FAC INTRODUCE FAC STD BAM 0513
		.....		ALL
.	030A	26717	.....	AUTO-FLIGHT-FMGC-INTRODUCE CCM0103 FOR A319 IAE AUTOLAND AND GPS/ACARS FUNCTION.
		.....		CC-CZB CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL
.	030A	26726	.....	INDICATING/RECORDING SYSTEM-SDAC- INTRODUCE SDAC (NEW TECHNOLOGY)
		.....		CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	034A	26728	.....	INDICATING/RECORDING SYSTEM - FWC - INTRODUCE FWC STANDARD H2E2
	.....			CC-COC CC-COD CC-COE
				CC-COF CC-COG CC-COH
				CC-COI CC-COK CC-COL
				CC-COM LV-BET LV-BFY
				LV-BFO CC-COT CC-COU
				CC-COX CC-COY CC-COZ
				CC-CPE CC-CPF CC-CPI
				CC-CPJ CC-CPL CC-CPM
				CC-CPO CC-CPQ CC-CPX
				CC-CQK CC-CQL CC-CVA
				CC-CVB CC-CVF MSN 3214
				MSN 3216 MSN 3220 MSN 3225
.	030A	26785	.....	PNEUMATIC-ENG BLEED AIR SYS-INTRODUCE A TEMP THERMOSTAT WITH MODIFIED LIMITATION SETTINGS (P/N 341E020000)
	.....			ALL
.	030A	26792	.....	AIR CONDITIONING-PACK TEMPERATURE CTRL-INTRODUCE MODIFIED PACK TEMPERATURE CONTROLLER
	.....			ALL
.	031	26910	.....	FLIGHT CONTROL -ELAC SYSTEM- INTRODUCE E.L.A.C. WITH ENHANCED RELAYS
	.....			CC-COC CC-COD CC-COE
				CC-COF CC-COG CC-COH
				CC-COI CC-COK CC-COL
				CC-COM LV-BET LV-BFY
				LV-BFO CC-COT CC-COU
				CC-COX CC-COY CC-COZ
				CC-CPE CC-CPF CC-CPI
				CC-CPJ CC-CPL CC-CPM
				CC-CPO CC-CPQ CC-CPX
				CC-CQK CC-CQL CC-CVA
				CC-CVB CC-CVF MSN 3214
				MSN 3216 MSN 3220 MSN 3225

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	039	26925	.....	LANDING GEAR-ALTERNATE BRAKING- INTRODUCE MODIFIED ALTERNATE BRAKING SYSTEM
	.....			CC-CPF CC-CPI CC-CPJ
				CC-CPL CC-CPM CC-CPO
				CC-CPQ CC-CPX CC-CQK
				CC-CQL CC-CVA CC-CVB
				CC-CVF MSN 3214 MSN 3216
				MSN 3220 MSN 3225
.	033	26963	.....	ICE AND RAIN PROTECTION-WINSHIELD RAIN PROTECTION-ACTIVATION OF RAIN REPELLENT SYS.(FLUID COMPATIBLE WITH OZONE RULES)
	.....			ALL
.	036A	26965	.....	LANDING GEAR-WHEELS AND BRAKES- INTRODUCE BSCU COMMON STD
	.....			CC-COU CC-COX CC-COY
				CC-COZ CC-CPE CC-CPF
				CC-CPI CC-CPJ CC-CPL
				CC-CPM CC-CPO CC-CPQ
				CC-CPX CC-CQK CC-CQL
				CC-CVA CC-CVB CC-CVF
				MSN 3214 MSN 3216 MSN 3220
				MSN 3225
.	030A	26999	.....	NAVIGATION - MMR - INSTALL COLLINS MMR PROVIDING ILS AND GPS FUNCTION
	.....			CC-COC CC-COD CC-COE
				CC-COF CC-COG CC-COH
				CC-COI CC-COK CC-COL
				CC-COM LV-BET LV-BFY
				LV-BFO CC-COT CC-COU
				CC-COX CC-COY CC-COZ
				CC-CPE CC-CPF CC-CPI
				CC-CPJ CC-CPL CC-CPM
				CC-CPO CC-CPQ CC-CPX
				CC-CQK CC-CQL CC-CVA
				CC-CVB CC-CVF MSN 3214
				MSN 3216 MSN 3220 MSN 3225

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	030A	27088	.....	ENGINE FUEL AND CONTROL-CONTROLLING- FADEC SYSTEM-IAE V2500-A5-INTRODUCE EEC SOFT. SCN12 CC-CZB CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL
.	040	27140	.....	ELECTRICAL POWER-GENERAL-DEFINE NEW ELECTRICAL GENERATION CONCEPT FOR SINGLE AISLE A/C CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	035A	27230	.....	EQUIPMENT/FURNISHINGS - ELECTRICAL SERVICE SUPPLY - INSTALL A 15 VDC KID PC POWER SYSTEM IN ENTIRE CABIN LV-BET LV-BFY LV-BFO CC-COT
.	030A	27276	.....	FLIGHT CONTROLS-ELAC SYSTEM-INTRODUCE ELAC SOFTWARE "L80" ALL

M V T	REV	MOD SB	MP	TITLE	VALIDITY
.	030A	27498	.....	ELECTRICAL POWER - GENERAL - AC-DC MAIN DISTRIBUTION - INSTALL AC-DC SHEDDABLE BUSBARS	CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	030A	27522	.....	INFORMATION SYSTEM - AIR TRAFFIC AND INFORMATION SYSTEM (ATIMS) - INSTALL ATSU COMPUTER FOR ACARS	CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	030A	27572	.....	OXYGEN-PASSENGER OXYGEN-INTRODUCE MODIFIED CHEMICAL OXYGEN CONTAINER -15 MIN- PURITAN	ALL
.	038A	27609	.....	AUXILIARY POWER UNIT - POWER PLANT - INSTALL GARRETT APU GTCP36-300 INSTEAD OF GARRETT APU 131-9 (A)	CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	039	27620	.....	NAVIGATION-STANDBY DATA : ALTITUDE AND HEADING - INSTALL INTEGRATED STANDBY INSTRUMENT SYSTEM (ISIS)
	.....			CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	034	27624	.....	EQUIPMENT/FURNISHINGS-MISCELLANEOUS EMERGENCY EQUIPMENT-INSTALL ELT CEIS AO6V2 WITH CONTROL PANEL IN COCKPIT
	.....			CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE
.	039B	27646	.....	NAVIGATION - MMR - INSTALL SEXTANT MMR PROVIDING ILS (FM IMMUNE)
	.....			CC-CZB
.	039B	27698	.....	NAVIGATION - TCAS - INSTALL ALLIED
		34-1177 16		SIGNAL TCAS COMPUTER P/N 066-50000-2220 (WITH CHANGE 7.0)
				CC-CZB
.	039C	27753	.....	NAVIGATION - TCAS - INSTALL COLLINS TCAS TTR921 WITH COLLINS ATC TPR901
	.....			CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	033	27773	.....	LANDING GEAR-NORMAL BRAKING-
		32-1232 01		INTRODUCE STD 8 BSCU (TWIN VERSION)
				ALL

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	030A	27777	.....	ENGINE FUEL AND CONTROL- GENERAL IAE V2500-A5-INTR. ENGINE WITH DATA ENTRY PLUG CONFIG.30 SEC. DRY CRANK SELECTION
		.....		CC-CZB CC-C0C CC-C0D
				CC-C0E CC-C0F CC-C0G
				CC-C0H CC-C0I CC-C0K
				CC-C0L CC-C0M LV-BET
				LV-BFY LV-BF0 CC-C0T
				CC-C0U CC-C0X CC-C0Y
				CC-C0Z CC-CPE CC-CPF
				CC-CPI CC-CPJ CC-CPL
				CC-CPM CC-CP0 CC-CPQ
				CC-CPX CC-CQK CC-CQL
.	030A	27831	.....	AUTO-FLIGHT-FMGC-IAE ENGINES-INTRODUCE FMGC B546CCM0104 (FA 817 STD) CAPABLE OF GPS/ACARS FUNCTION
		.....		CC-CZB CC-C0C CC-C0D
				CC-C0E CC-C0F CC-C0G
				CC-C0H CC-C0I CC-C0K
				CC-C0L CC-C0M LV-BET
				LV-BFY LV-BF0 CC-C0T
				CC-C0U CC-C0X CC-C0Y
				CC-C0Z CC-CPE CC-CPF
				CC-CPI CC-CPJ CC-CPL
				CC-CPM CC-CP0 CC-CPQ
				CC-CPX CC-CQK CC-CQL
.	033	27845	.....	FLIGHT CONTROLS-ELAC-INTRODUCE ELAC WITH ADVANCED ELAC POWER SUPPLY BOARD
		.....		CC-C0C CC-C0D CC-C0E
				CC-C0F CC-C0G CC-C0H
				CC-C0I CC-C0K CC-C0L
				CC-C0M LV-BET LV-BFY
				LV-BF0 CC-C0T CC-C0U
				CC-C0X CC-C0Y CC-C0Z
				CC-CPE CC-CPF CC-CPI
				CC-CPJ CC-CPL CC-CPM
				CC-CP0 CC-CPQ CC-CPX
				CC-CQK CC-CQL CC-CVA
				CC-CVB CC-CVF MSN 3214
				MSN 3216 MSN 3220 MSN 3225

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	040A	27846	.....	AUTOFLIGHT-FAC-INTRODUCE FAC STD P/N BAM0514
	.....			CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	040A	27866	.....	NAVIGATION - WEATHER RADAR SYSTEM - INSTALL ALLIED SIGNAL WEATHER RADAR TRANSCEIVER P/N 066-50008-0405
	.....			CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	030A	27952	.....	PNEUMATIC-ENGINE BLEED AIR SYSTEM- INTRODUCE TLT P/N 341E030000
	.....			ALL
.	039B	27992	.....	ICE AND RAIN PROTECTION-WINDSHIELD RAIN PROTECTION-DESACTIVATION OF NEW RAIN REPELLENT
	.....			CC-CZB
.	030A	28009	.....	AIR CONDITIONING-PRESSURE CONTROL AND
		21-1116 04		MONITORING-INTRODUCE PRESSURE CONTROLLER P/N 9022-15702-10
				CC-CZB CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL
.	036A	28136	.....	GENERAL - INCREASE DESIGN WEIGHT TO : 70,0T MTOW, 62,5T MLW, 58,5T MZFW (WV005)
	.....			CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	030A	28160	.....	ELEC PWR-AC EMERGENCY GENERATION- ACTIVATE A319/A321 ELECTRICAL EMERGENCY CONFIGURATION ON A320 A/C CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT
.	039C	28164	.....	LANDING GEAR - WHEELS AND BRAKES - INSTALL CARBON BRAKES TYPE SEPCARB III PLUS - MESSIER BUGATTI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	036A	28218	.....	NAVIGATION-ADIRS-INTRODUCE LITTON ADIRU 4 MCU STD-312 34-1181 04 CC-CZB CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL
.	030A	28244	.....	NAVIGATION-GPWS-INTRODUCE EGPWS P/N 206-206 AND INHIBIT AUTOMATIC DEACTIVATION ENHANCED FUNCTIONS 34-1193 36 ALL
.	040B	28284	.....	NAVIGATION-ILS-INSTALL SEXTANT MMR PROVIDING ILS (FM IMMUNE) P/N TLS 755.01.0101B CC-CZB
.	034	28377	.....	ICE AND RAIN PROTECTION-WINSHIELD- RAIN PROTECTION-INTRODUCE MODIFIED GAGE ASSY -P/N 4020W35-2 ALL
.	039B	28382	.....	NAVIGATION - MMR - ACTIVATE GPS PRIMARY FUNCTION (HYBRID) IN SEXTANT MMR (WITH HONEYWELL OR LITTON ADIRU) 34-1186 04 CC-CZB

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	030A	28479	.....	INDICATING RECORDING SYSTEM-FWC-
	.....			INTRODUCE FWC STANDARD H2/E3P
				CC-COC CC-COD CC-COE
				CC-COF CC-COG CC-COH
				CC-COI CC-COK CC-COL
				CC-COM LV-BET LV-BFY
				LV-BFO CC-COT CC-COU
				CC-COX CC-COY CC-COZ
				CC-CPE CC-CPF CC-CPI
				CC-CPJ CC-CPL CC-CPM
				CC-CPO CC-CPQ CC-CPX
				CC-CQK CC-CQL CC-CVA
				CC-CVB CC-CVF MSN 3214
				MSN 3216 MSN 3220 MSN 3225
.	030A	28488	.....	AIR CONDITIONING-PACK TEMP.CTRL
	21-1118			INTRODUCE MODIFIED PACK TEMP.
				CTRL P/N 759D0000-02
				ALL
.	032	28547	.....	GENERAL - DESIGN WEIGHT - OPERATE A320
	.....			WITH DUAL WEIGHT VARIANTS (002 OR 010)
				CC-COG CC-COH CC-COI
				CC-COK CC-COL CC-COM
				LV-BET LV-BFY LV-BFO
				CC-COT
.	039C	28568	.....	ELECTRICAL POWER - AC GENERATION -
	.....			INSTALL ELECTRICAL OUTLETS IN COCKPIT
				CC-CPJ CC-CPL CC-CPM
				CC-CPO CC-CPQ CC-CPX
				CC-CQK CC-CQL CC-CVA
				CC-CVB CC-CVF MSN 3214
				MSN 3216 MSN 3220 MSN 3225

M V T	REV	MOD SB	MP	TITLE / VALIDITY
N	041	28651	.....	APU-CONTROL AND MONITORING-INTRODUCE OF VERSATILE ECB ON GTCP 36-300
	.....			CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	040	28658	.....	NAV-STANDBY DATA: ATT AND HDG-INTRODUCE COMPLETE PROV FOR INTEGRATED STANDBY INSTRUMENT SYSTEM ELECTRICAL SUPPLY
	.....			CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	034	28667	.....	ICE AND RAIN PROTECTION-WINDSHIELD RAIN
		30-1037 02		PROTECTION-INTRODUCE MODIFIED GAGE ASSY WITH INPUT VALUE FUNCTION SUPPRESSED ALL
.	030A	28739	.....	NAVIGATION - TCAS - INSTALL HONEYWELL
	.....			TCAS 2000 COMPUTER (WITH CHANGE 7.0) WITH COLLINS ATC TPR720 OR TPR900
				CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	035	28897	.....	APU-CONTROL AND MONITORING-INTRODUCE APIC ECB SOFWARE VERSION 5
	49-1029 27			
	49-1061 03			CC-CZB CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI
N	041	28916	.....	INDICATING RECORDING SYSTEM-FWS INTRODUCE FWC STANDARD H1PE3P
	31-1257			LV-BET LV-BFY
.	040A	30020	.....	FUSELAGE - CENTER FUSELAGE - ADAPT INTERFACES AND ASSEMBLING OF SECTION 15/21 TO 17/19 TO A318 DEFINITION
	.....			CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	040A	30034	.....	ENGINE - GENERAL - INSTALL PW 6100 ENGINE RATED AT 22.100 IBF ON A318
	.....			CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	040A	30067	.....	AIR CONDITIONING-CRG COMPT VENTILATION- INSTALL AN ADAPTED VENTILATION SYSTEM (A319 TO A318) IN AFT CARGO COMPARTMENT
	.....			CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	035	30075	.....	LANDING GEAR - WHEELS AND BRAKES - REDUCE LENGTH OF WEAR INDICATOR ON BF GOODRICH BRAKES
	.....			CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	032	30096	.....	AUTO-FLIGHT-DEFINE "GUIDED RADAR APPROACH WITH AUTOPILOT ENGAGED" PROCEDURE (MUH 250 FT)
		.....		CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT
.	031	30239	.....	INFORMATION SYSTEM - ATIMS - MODIFY ATSU AIRCRAFT INTERFACE SOFTWARE ACCORDING TO SERVICE PROVIDERS LIST
		.....		CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	031	30277	.....	OXYGEN - PASSENGER OXYGEN - INTRODUCE MODIFIED OPTIONAL CHEMICAL OXYGEN CONTAINER SERIES 22 MIN (DRAEGER)
		.....		CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	036A	30299	.....	COMMUNICATIONS - COCKPIT VOICE RECORDER - INSTALL A SSCVR L3-C P/N 2100-1020-02 (SFE)
	.....			CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	034	30308	.....	COMMUNICATIONS - COCKPIT VOICE RECORDER - REINTRODUCE SSCVR ALLIED SIGNAL P/N 980-6022-001
	.....			CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	040A	30354	.....	COMMUNICATIONS - CIDS - DEFINE AND INSTALL A MODIFIED CABIN INTERCOMMUNICATION DATA SYSTEM ON A318
	.....			CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	032	30363	.....	INDICATING/RECORDING SYSTEMS - FWC - ACTIVATE SPECIFIC FWC PROCEDURE
		31-1153		ALL

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	031	30365 31-1144 02	.....	INDICATING RECORDING SYSTEM-SDAC- INTRODUCE STANDARD SDAC P/N 350E5500202 CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	038A	30368	.....	INDICATING RECORDING SYSTEMS- EIS-INSTALL DMC, DU AND DISKETTES FOR EIS2 CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	038A	30439	.....	AUTO-FLIGHT-FLIGHT AUGMENTATION COMPUTER-INTRODUCE FAC SOFTWARE STANDARD P/N B397BAM0515 CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	038A	30626	.....	AIR CONDITIONING-AIR COOLING- INSTALL A NEW ECS CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	036A	30660	.....	INDICATING/RECORDING SYSTEMS - FWC -
		31-1197		INSTALL FWC STANDARD H2E4
		31-1257		LV-BET LV-BFY LV-BFO
				CC-COT CC-COU CC-COX
				CC-COY CC-COZ CC-CPE
				CC-CPF CC-CPI CC-CPJ
				CC-CPL CC-CPM CC-CPO
				CC-CPQ CC-CPX CC-CQK
				CC-CQL CC-CVA CC-CVB
				CC-CVF MSN 3214 MSN 3216
				MSN 3220 MSN 3225
.	033	30748	.....	GENERAL-FLIGHT ENVIRONMENTAL ENVELOPE-
		.....		EXTENSION TO 12100 M (39800 FT)
				CC-COH CC-COI CC-COK
				CC-COL CC-COM LV-BET
				LV-BFY LV-BFO CC-COT
				CC-COU CC-COX CC-COY
				CC-COZ CC-CPE CC-CPF
				CC-CPI CC-CPJ CC-CPL
				CC-CPM CC-CPO CC-CPQ
				CC-CPX CC-CQK CC-CQL
				CC-CVA CC-CVB CC-CVF
				MSN 3214 MSN 3216 MSN 3220
				MSN 3225
.	033	30784	.....	AIRBORNE AUXILIARY POWER (APU) -
		.....		GENERAL - INCREASE OPERATION ENVELOPE
				TO 39800 FT FOR GTCP 36-300
				CC-COM LV-BET LV-BFY
				LV-BFO CC-COT CC-COU
				CC-COX CC-COY CC-COZ
				CC-CPE CC-CPF CC-CPI
				CC-CPJ CC-CPL CC-CPM
				CC-CPO CC-CPQ CC-CPX
				CC-CQK CC-CQL CC-CVA
				CC-CVB CC-CVF MSN 3214
				MSN 3216 MSN 3220 MSN 3225
N	041	30797	.....	INDICATING/RECORDING SYSTEM-FWC-
		31-1257		INTRODUCE NEW FWC STANDARD H1PE3Q
				LV-BET LV-BFY

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	036	30884	.....	PNEUMATIC-ENGINE BLEED AIR SUPPLY- INTRODUCE MODIFIED TEMPERATURE CONTROL THERMOSTAT (TCT)
				CC-COT CC-COU CC-COX
				CC-COY CC-COZ CC-CPE
				CC-CPF CC-CPI CC-CPJ
				CC-CPL CC-CPM CC-CPO
				CC-CPQ CC-CPX CC-CQK
				CC-CQL CC-CVA CC-CVB
				CC-CVF MSN 3214 MSN 3216
				MSN 3220 MSN 3225
.	036	30941	.....	NAVIGATION-ADIRU-INSTALL HONEYWELL ADIR U 4 MCU AD11 (NEW HARD)
				CC-COG CC-COH CC-COI
				CC-COK CC-COL CC-COM
				LV-BET LV-BFY LV-BFO
				CC-COT CC-COU CC-COX
				CC-COY CC-COZ CC-CPE
				CC-CPF CC-CPI CC-CPJ
				CC-CPL CC-CPM CC-CPO
				CC-CPQ CC-CPX CC-CQK
				CC-CQL CC-CVA CC-CVB
				CC-CVF MSN 3214 MSN 3216
				MSN 3220 MSN 3225
.	038A	30977	.....	FLIGHT CONTROLS - ELAC SYSTEM - INTRODUCE ELAC SOFTWARE "L90"
				CC-CPF CC-CPI CC-CPJ
				CC-CPL CC-CPM CC-CPO
				CC-CPQ CC-CPX CC-CQK
				CC-CQL CC-CVA CC-CVB
				CC-CVF MSN 3214 MSN 3216
				MSN 3220 MSN 3225
.	038A	31040	.....	AUTO-FLIGHT - FLIGHT AUGMENTATION COMPUTER (FAC) - INTRODUCE FAC SOFTWARE "BAM0616"
				CC-CPF CC-CPI CC-CPJ
				CC-CPL CC-CPM CC-CPO
				CC-CPQ CC-CPX CC-CQK
				CC-CQL CC-CVA CC-CVB
				CC-CVF MSN 3214 MSN 3216
				MSN 3220 MSN 3225

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	039	31070 34-1245 02	.....	NAVIGATION-ADIRS-INSTALL LITTON ADIRU 4 MCU STANDARD 0314 (A318 COEFF CFM ADDED) CC-CZB CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL
.	039C	31105	.....	NAVIGATION - ADIRS - INSTALL HONEYWELL ADIRU 4MCU P/N HG2030AE21 (A318 COEFF CFM ADDED) CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	033	31106 32-1232 01	.....	LANDING GEAR - NORMAL BRAKING - INTRODUCE STD 9 BSCU (TWIN VERSION) ALL
.	034	31146 32-1228 04	.....	LANDING GEAR - WHEELS AND BRAKES - INTRODUCE OXIDATION RESISTANT BFG CARBON BRAKE CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI
.	039C	31152	.....	LANDING GEAR-STEERING-SUPPLY NOSE WHEEL STEERING WITH YELLOW HYDRAULIC POWER IN PLACE OF GREEN HYDRAULIC POWER CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225

M V T	REV	MOD SB	MP	TITLE	VALIDITY
.	035	31276	.....	ELECTRICAL POWER - GENERAL - INSTALL A COMMERCIAL SHEDDING PUSH-BUTTON SWITCH IN COCKPIT	LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	038A	31283	.....	INDICATING RECORDING SYSTEM-FWC- INTRODUCE FWC STANDARD H2 F1	LV-BET LV-BFY LV-BFO CC-COT CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
		31-1197			
		31-1257			
.	036A	31285	.....	COMMUNICATIONS-COCKPIT VOICE RECORDER-REINTRODUCE SSCVR L3C P/N S200-0012-00	CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	033	31364	.....	AUTO-FLIGHT-FMGC-INSTALL FMGC P/N B546CCM0105 (IAE/GPS/ACARS)	CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	035	31371	.....	INFORMATION SYSTEMS-ATIMS-DEFINE AND INSTALL MODIFIED SOTFWARE ATSU A/C INTERFACE UPGRADED
	.....			CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	039C	31375	.....	NAVIGATION - EGPWS - ACTIVATE OBSTACLE OPTION ON THE EGPWS
	.....			CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	033	31395	.....	FLIGHT CONTROLS - ELAC SYSTEM - INTRODUCE ELAC STD L81
		27-1135 02		ALL
.	038A	31495	.....	INDICATING/RECORDING SYSTEM-EIS2- INSTALL MODIFIED EIS2 SOFTWARE
	.....			CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	035	31528 34-1252	.....	NAVIGATION-ADIRU-RESTORE RVSM 3 CIRCUIT CAPABILITIES (SERIAL SOLUTION) CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	040A	31673	.....	GENERAL-DESIGN WEIGHT-INTRODUCE A318 WV 002-MTOW 63.0T-MLW 57.5T-MZFW 54.5T- CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	039C	31706	.....	NAVIGATION-ADIRS-INTRODUCE HONEYWELL ADIRU 4 MCU P/N HG2030AE22 CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	034	31803 32-1238 06	.....	LANDING GEAR-WHEELS AND BRAKES-INTRODUCE GOODRICH CARBON BRAKE (SEPCARB III) P/N 2-1600-3 WITH ANTI-OXIDANT "M1" CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFY LV-BFO CC-COT CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	035	31891	.....	ELECTRICAL POWER-GENERAL-CHANGE IFE POWER SUPPLY BUSBARS INTO SHEDDABLE BUSBARS 220XP AND 212PP
		.....		LV-BET LV-BFY LV-BFO
				CC-COT CC-COU CC-COX
				CC-COY CC-COZ CC-CPE
				CC-CPF CC-CPI CC-CPJ
				CC-CPL CC-CPM CC-CPO
				CC-CPQ CC-CPX CC-CQK
				CC-CQL CC-CVA CC-CVB
				CC-CVF MSN 3214 MSN 3216
				MSN 3220 MSN 3225
.	034A	31897	.....	AUTOFLIGHT-FMGC-INSTALL FMGC IAE
		22-1090 11		C13042BA01 (EQUIPPED WITH FMS2 HONEYWELL)
				CC-COC CC-COD CC-COE
				CC-COF CC-COG CC-COH
				CC-COI CC-COK CC-COL
				CC-COM LV-BET LV-BFY
				LV-BFO CC-COT CC-COU
				CC-COX CC-COY CC-COZ
				CC-CPE CC-CPF CC-CPI
				CC-CPJ CC-CPL CC-CPM
				CC-CPO CC-CPQ CC-CPX
				CC-CQK CC-CQL CC-CVA
				CC-CVB CC-CVF MSN 3214
				MSN 3216 MSN 3220 MSN 3225
.	036A	32088	.....	EQUIPMENT FURNISHINGS-CURTAINS AND PARTITIONS-MODIFIED INTRUSION AND PENETRATION RESISTANT COCKPIT DOOR
		25-1305 06		ALL
.	036A	32090	.....	DOORS-PASSENGER COMPARTMENT FIXED INTERIOR DOORS-INSTALL ELECTRICAL COCKPIT DOOR RELEASE SYSTEM
		25-1305 06		ALL

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	039	32205	.....	INDICATING RECORDING SYSTEM-SDAC
	.....			INSTALL WIRING PROVISIONS FOR SDAC
				H2-E1 PIN PROGRAMMING
				LV-BFY LV-BFO CC-COT
				CC-COU CC-COX CC-COY
				CC-COZ CC-CPE CC-CPF
				CC-CPI CC-CPJ CC-CPL
				CC-CPM CC-CPO CC-CPQ
				CC-CPX CC-CQK CC-CQL
				CC-CVA CC-CVB CC-CVF
				MSN 3214 MSN 3216 MSN 3220
				MSN 3225
.	038A	32207	.....	FLIGHT CONTROLS - ELAC SYSTEM -
	.....			INTRODUCE ELAC SOFTWARE L82
				CC-CPF CC-CPI CC-CPJ
				CC-CPL CC-CPM CC-CPO
				CC-CPQ CC-CPX CC-CQK
				CC-CQL CC-CVA CC-CVB
				CC-CVF MSN 3214 MSN 3216
				MSN 3220 MSN 3225
.	039D	32238	.....	LANDING GEAR-WHEELS AND BRAKES- INSTALL
		32-1244	25	MESSIER WHEELS&SEPCARB III PLUS BRAKES
				IN PLACE OF GOODRICH WHEELS AND BRAKES
				CC-COC CC-COD CC-COE
				CC-COF CC-COG CC-COH
				CC-COI CC-COK CC-COL
				CC-COM LV-BET LV-BFY
				LV-BFO CC-COT CC-COU
				CC-COX CC-COY CC-COZ
				CC-CPE CC-CPF CC-CPI
.	039B	32239	.....	LANDING GEAR-WHEELS AND BRAKES- INSTALL
		32-1242	04	MESSIER WHEELS &SUBCARB III PLUS BRAKES
				IN PLACE OF ABS(A321TYPE) WHEELS&BRAKES
				CC-CZB
.	037	32311	.....	LANDING GEAR-WHEELS AND BRAKES-CANCEL
		32-1247	02	MIXABILITY BETWEEN GOODRICH BRAKES
				2-1600-2 AND -3 AUTHOR. WITH MOD 31803
				CC-COC CC-COD CC-COE
				CC-COF CC-COG CC-COH
				CC-COI CC-COK CC-COU
				CC-COX CC-COY CC-COZ
				CC-CPE CC-CPF CC-CPI

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	040A	32401	.....	AUTOFLIGHT - FMGC
	.....			DEFINE AND INSTALL FMGC IAE C13043BA01
				THALES(EQUIPPED WITH FMS2 THALES/SMITH)
				CC-CVA CC-CVB CC-CVF
				MSN 3214 MSN 3216 MSN 3220
				MSN 3225
.	037	32500	.....	LANDING GEAR - NORMAL BRAKING -
		32-1254		INSTALL BSCU 9.1
				CC-CZB CC-COC CC-COD
				CC-COE CC-COF CC-COG
				CC-COH CC-COI CC-COK
				CC-COL CC-COM LV-BET
				LV-BFY LV-BFO CC-COT
.	038A	32650	.....	FUEL - QUANTITY INDICATION -
	.....			INTRODUCE FUEL LEAK DETECTION
				CC-CPF CC-CPI CC-CPJ
				CC-CPL CC-CPM CC-CPO
				CC-CPQ CC-CPX CC-CQK
				CC-CQL CC-CVA CC-CVB
				CC-CVF MSN 3214 MSN 3216
				MSN 3220 MSN 3225
.	040B	32651	.....	FUEL-QUANTITY INDICATION-REMOVE FUEL
		28-1150		LEAK DETECTION FUNCTION ASSOCIATED WITH
				FQIC 13-9 (ANTI-MOD FOR MOD 32650)
				CC-CPF CC-CPI CC-CVA
				CC-CVB CC-CVF MSN 3214
				MSN 3216 MSN 3220 MSN 3225
.	036A	32656	.....	ENGINE FUEL AND CONTROL - CONTROLLING -
		73-1075 01		INTRODUCE EEC SOFTWARE STANDARD "SCN17"
				ON V2500-A5 ENGINES
				CC-CZB CC-COC CC-COD
				CC-COE CC-COF CC-COG
				CC-COH CC-COI CC-COK
				CC-COL CC-COM LV-BET
				LV-BFY LV-BFO CC-COT
				CC-COU CC-COX CC-COY
				CC-COZ CC-CPE CC-CPF
				CC-CPI CC-CPJ CC-CPL
				CC-CPM CC-CPO CC-CPQ
				CC-CPX CC-CQK CC-CQL

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	040A	32731	.....	LANDING GEAR - NORMAL BRAKING - INSTALL NEW BSCU STD 4.3 CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	039C	33100	.....	COMMUNICATIONS-CIDS-INTRODUCE ENHANCED CIDS (A318 VERSION) AND RELATED SYSTEMS ON SINGLE AISLE FAMILY CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL
.	039C	33240	.....	NAVIGATION - ADIRS ACTIVATE ALIGNMENT IMPROVEMENT FUNCTION ON ADIRU CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	040A	33300	.....	COMMUNICATION -CABIN INTERCOMMUNICATION DATA SYSTEM (CIDS) - IMPROVE THE A318 CIDS EQUIPMENT CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
N	041	33323	.....	CERTIFICATION DOCUMENTS - GENERAL - EXTEND OPERATING FLIGHT ENVELOPE TO MINUS 2000FT PRESSURE ALTITUDE CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	039D	33328	.....	NAVIGATION - GENERAL - INSTALL PROVISIONS FOR POLAR NAVIGATION FUNCTION ON A320 FAMILY CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	038	33376	.....	LANDING GEAR - NORMAL BRAKING - INSTALL BSCU STD L4.5
	.....			CC-COU CC-COX CC-COY
				CC-COZ CC-CPE CC-CPF
				CC-CPI CC-CPJ CC-CPL
				CC-CPM CC-CPO CC-CPQ
				CC-CPX CC-CQK CC-CQL
				CC-CVA CC-CVB CC-CVF
				MSN 3214 MSN 3216 MSN 3220
				MSN 3225
.	038A	33907	.....	INDICATING/RECORDING SYSTEMS - FWC - INTRODUCE IAS DISCREPANCY AND DUAL PITOT MONITORING ON FWC H2F1
	.....			CC-CPF CC-CPI CC-CPJ
				CC-CPL CC-CPM CC-CPO
				CC-CPQ CC-CPX CC-CQK
				CC-CQL CC-CVA CC-CVB
				CC-CVF MSN 3214 MSN 3216
				MSN 3220 MSN 3225
.	038A	33969	.....	INDICATING RECORDING SYSTEM-ELECTRONIC INSTR. SYS. (EIS)-INSTALL DMC SOFTWARE S4-1 (TEMPORARY LOSS OF DU'S CORRECTION
	.....			CC-CPF CC-CPI CC-CPJ
				CC-CPL CC-CPM CC-CPO
				CC-CPQ CC-CPX CC-CQK
				CC-CQL CC-CVA CC-CVB
				CC-CVF MSN 3214 MSN 3216
				MSN 3220 MSN 3225
.	038A	34043	.....	FLIGHT CONTROLS - ELAC SYSTEM - INSTALL ELAC L91 SOFTWARE
	.....			CC-CPF CC-CPI CC-CPJ
				CC-CPL CC-CPM CC-CPO
				CC-CPQ CC-CPX CC-CQK
				CC-CQL CC-CVA CC-CVB
				CC-CVF MSN 3214 MSN 3216
				MSN 3220 MSN 3225
.	040A	34076	.....	AUTO-FLIGHT - FMGC - INSTALL FMGC IAE C13043BA02 (STD S2I9) THALES(EQUIPPED WITH FMS2 THALES/SMITH)
	.....			CC-CVA CC-CVB CC-CVF
				MSN 3214 MSN 3216 MSN 3220
				MSN 3225

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	038	34221 73-1082 01	.....	ENGINE FUEL AND CONTROL - CONTROLLING - INSTALL EEC SOFTWARE "SCN18" ON IAE V2500-A5 ENGINES CC-CZB CC-COC CC-COD CC-COE CC-COF CC-COG CC-COH CC-COI CC-COK CC-COL CC-COM LV-BET LV-BFO CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL
.	040	34330	.....	EQUIPMENT/FURNISHINGS-MISCELLANEOUS EMERGENCY EQUIPMENT-INSTALL ELT WITH RCP IN COCKPIT ON ENH. PROV. - ELTA CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL
.	040B	34334	.....	EQUIPMENT/FURNISHINGS-MISC. EMERGENCY EQUIPMENT-INSTALL ELT (406AF) WITH RCP IN COCKPIT ON ENH. PROV. - ELTA CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	038A	34428	.....	AIR CONDITIONING - PACK TEMPERATURE CONTROL - INSTALL IMPROVED AIR COND. SYSTEM CONTROLLER PN 1803B0000-01 CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	038A	34571	.....	INDICATING/RECORDING SYSTEMS-ELECTRONIC INSTRUMENT SYSTEM(EIS)- INSTALL DISPLAY MANAGEMENT COMPUTER SOFTWARE EIS2 S4-2 CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	040A	34809	.....	AUTO-FLIGHT - FLIGHT MANAGEMENT AND GUIDANCE COMPUTER - INSTALL FMS2 THALES "S3" ASSOCIATED TO FG "I9": IAE ENGINES CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	039C	34825	.....	NAVIGATION- GPWS - USE LATERAL GPS POSITION WITH AUTOMATIC DESELECTION CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	039	34898	.....	COMMUNICATIONS - CIDS - REINTRODUCE PREVIOUS CIDS ON A319 A/C CC-CPF CC-CPI
.	039B	35040	.....	LANDING GEAR - WHEELS AND BRAKES INTRODUCE GOODRICH DURACARB CARBON BRAKES WITH ANTI - OXYDAN "M1" CC-CPF CC-CPI
.	039C	35216	.....	LANDING GEAR - NORMAL BRAKING - INSTALL BSCU STD L4.8 (EM2) CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	039B	35218	.....	EQUIPMENT/FURNISHINGS - CURTAINS AND PARTITIONS - INSTALL PPTC FOR COCKPIT DOOR STRIKE PROTECTION- BY SB ONLY CC-CZB
		25-1444 02		

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	039	35219	.....	EQUIPMENT/FURNISHINGS - CURTAINS AND PARTITIONS - INSTALL IMPROVED STRIKES FOR COCKPIT DOOR CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	040A	35220	.....	INDICATING/RECORDING SYSTEMS - FLIGHT WARNING COMPUTER (FWC) - INSTALL FWC STANDARD H2F3 CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	039	35249	.....	LANDING GEAR - STEERING - INSTALL NWS ELECTRICAL BOX WITH NEW MICRO-SWITCH AND IMPROVED SEALING CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	040A	35485	.....	INDICATING/RECORDING SYSTEM-ELECTRONIC INSTRUMENT SYSTEM (EIS)-INSTALL DISPLAY MANAGEMENT COMPUTER SOFTWARE EIS2 S6-1 CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	040B	35517	.....	NAVIGATION - ADIRU - INSTALL NORTHROP GRUMMAN ADIRU P/N 465020-0303-0316 CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL

M V T	REV	MOD SB	MP	TITLE / VALIDITY
.	040B	35526	.....	AUTOFLIGHT - FMGC - INSTALL FMGC IAE/PW STD P1I10 (WITH FMS2 HONEYWELL) ON A/C FITTED WITH IAE OR PW POWERPLANTS CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	040A	35550	.....	PNEUMATIC - ENGINE BLEED AIR SUPPLY SYSTEM - INSTALL BMC STD 9 CAPABLE OF A318 PW CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
N	041	35793	.....	NAVIGATION - ADIRU - INSTALL HONEYWELL ADIRU P/N HG2030-AE23 CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	040	35863	.....	AIR CONDITIONING - PACK TEMPERATURE CONTROL - INSTALL AIR CONDITIONING CONTROLLER P/N 1803B0000-02 CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	039C	35864	.....	AIRBORNE AUXILIARY POWER - GENERAL - INSTALL APIC APS3200 APU AS STANDARD (REPLACES HONEYWELL GTCP36-300) CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225

M V T	REV	MOD SB	MP	TITLE / VALIDITY
N	041	36368	.....	LANDING GEAR - NORMAL BRAKING - INSTALL BSCU STD L4.8 (EM2) - BY SB ONLY CC-COU CC-COX CC-COY CC-COZ CC-CPE CC-CPF CC-CPI
N	041	36529	.....	NAVIGATION - ADIRS - ACTIVATE EXTENDED MAGNETIC VARIATIONS TABLE ON HONEYWELL ADIRS CC-CPF CC-CPI CC-CPJ CC-CPL CC-CPM CC-CPO CC-CPQ CC-CPX CC-CQK CC-CQL
.	040B	36725	.....	INDICATING/RECORDING SYSTEMS-ELECTRONIC INSTRUMENT SYSTEM(EIS)-INSTALL DISPLAY MANAGEMENT COMPUTER SOFTWARE EIS2 S7 CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
.	040	36734	.....	FUEL - MAIN FUEL PUMP SYSTEM - APPLY CORRECT TORQUE SETTING + SCREW LOCKING ON GAS RETURN OUTLET FIXING BOLTS 28-1152 01 28-1153 01 ALL
N	041	36847	.....	INDICATING RECORDING SYSTEM - FLIGHT WARNING COMPUTER (FWC)- INSTALL FWC STANDARD H2-F4 CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225
N	041	36854	.....	EQUIPMENT/FURNISHINGS PAX COMPARTMENT- PASSENGER COMPARTMENT SEATS - INSTALL SPSS PROVISIONS IN ENTIRE CABIN ON A318 CC-CVA CC-CVB CC-CVF MSN 3214 MSN 3216 MSN 3220 MSN 3225

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01.27 FLIGHT CONTROL

01.28 FUEL
- GENERAL 1

01.29 HYDRAULIC

01.32 LANDING GEAR
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GENERAL

This section includes the limitations required by the regulations and contained in the Flight Manual.
All references to airspeed, Mach and altitude relate to indicated airspeed, indicated Mach and pressure altitude, unless otherwise noted.

KIND OF OPERATIONS

This airplane is certified in the public transport category (passengers and freight) for day and night operations, in the following conditions when the appropriate equipment and instruments required by the airworthiness and operating regulations are approved, installed and in an operable condition :

- VFR and IFR
- Extended overwater flight
- Flight in icing conditions
- Maximum number of passenger seats : 180

GENERAL

This section includes the limitations required by the regulations and contained in the Flight Manual.
All references to airspeed, Mach and altitude relate to indicated airspeed, indicated Mach and pressure altitude, unless otherwise noted.

KIND OF OPERATIONS

This airplane is certified in the public transport category (passengers and freight) for day and night operations, in the following conditions when the appropriate equipment and instruments required by the airworthiness and operating regulations are approved, installed and in an operable condition :

- VFR and IFR
- Extended overwater flight
- Flight in icing conditions
- Maximum number of passenger seats : 145.

GENERAL

This section includes the limitations required by the regulations and contained in the Flight Manual.
All references to airspeed, Mach and altitude relate to indicated airspeed, indicated Mach and pressure altitude, unless otherwise noted.

KIND OF OPERATIONS

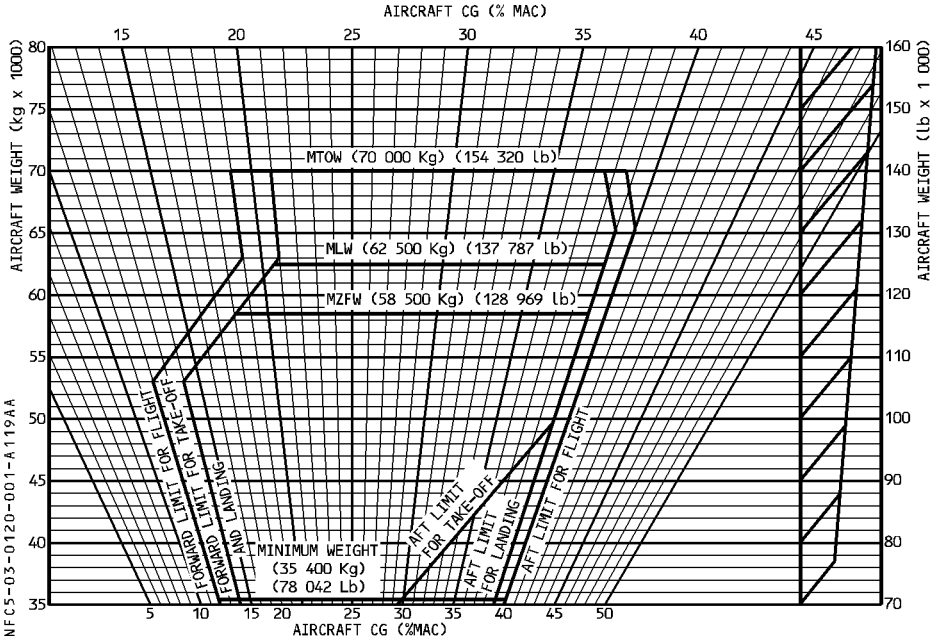
This airplane is certified in the public transport category (passengers and freight) for day and night operations, in the following conditions when the appropriate equipment and instruments required by the airworthiness and operating regulations are approved, installed, and in an operable condition :

- VFR and IFR
- Extended overwater flight
- Flight in icing conditions
- Maximum number of passenger seats : 136.

MINIMUM FLIGHT CREW

The minimum flight crew consists of 2 pilots.

CENTER OF GRAVITY LIMITS



- CG limits are given in percentage of the reference chord length aft of the leading edge.
- The reference chord length is 4.193 m (13.76 ft). It is 14.71 m (48.26 ft) aft of the aircraft nose.
- The CG must always be within these limits, regardless of fuel load.

WEIGHT LIMITATIONS

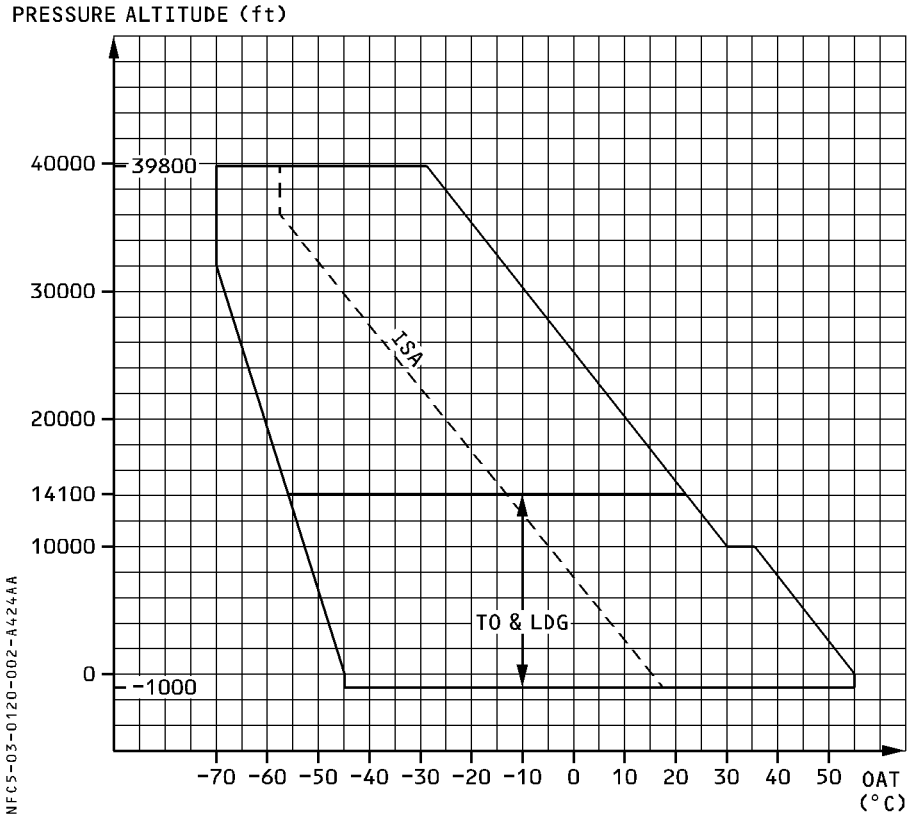
Maximum taxi weight . . . . . 70 400 kg (155 200 lb)
Maximum takeoff weight (brake release) . . . . . 70 000 kg (154 320 lb)
Maximum landing weight . . . . . 62 500 kg (137 787 lb)
Maximum zero fuel weight . . . . . 58 500 kg (128 969 lb)
Minimum weight . . . . . 35 400 kg (78 042 lb)

In exceptional cases (in flight turn back or diversion), an immediate landing at weight above maximum landing weight is permitted, provided the pilot follows the overweight landing procedure.

FLIGHT MANEUVERING LOAD ACCELERATION LIMITS

Clean configuration . . . . . – 1 g to + 2.5 g
Slats and flaps extended . . . . . 0 g to + 2 g
Slats extended and flaps retracted . . . . . 0 g to + 2 g

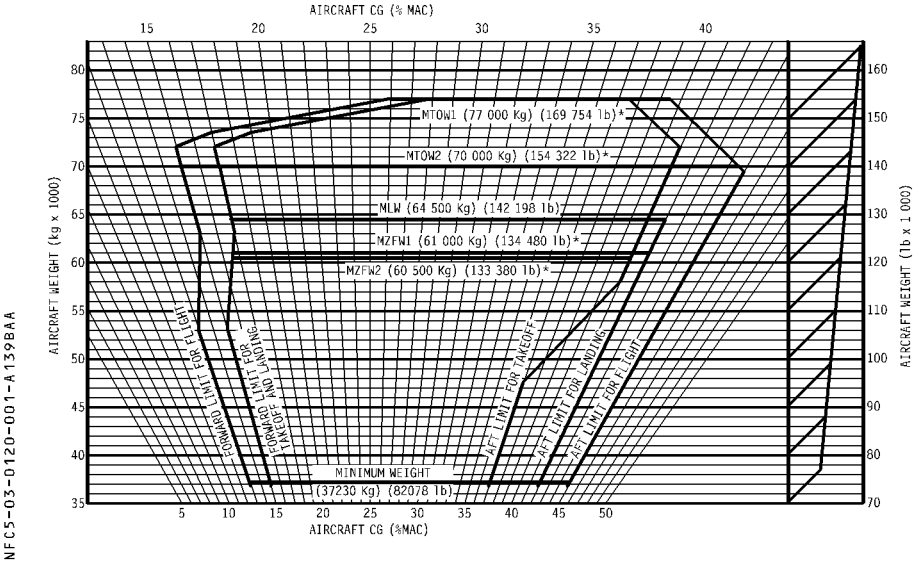
ENVIRONMENTAL ENVELOPE



MINIMUM FLIGHT CREW

The minimum flight crew consists of 2 pilots.

CENTER OF GRAVITY LIMITS



NFC5-03-0120-001-A139BAA

- CG limits are given in percentage of the reference chord length aft of the leading edge.
- The reference chord length is 4.193 m (13.76 ft). It is 16.31 m (53.51 ft) aft of the aircraft nose.
- The CG must always be within these limits, regardless of fuel load.

WEIGHT LIMITATIONS

Maximum taxi weight 1 . . . . . 77 400 kg (170 636 lb)
Maximum takeoff weight 1 (brake release)* . . . . . 77 000 kg (169 754 lb)
Maximum taxi weight 2 . . . . . 70 400 kg (155 203 lb)
Maximum takeoff weight 2 (brake release)* . . . . . 70 000 kg (154 322 lb)
Maximum landing weight . . . . . 64 500 kg (142 198 lb)
Maximum zero fuel weight (for MTOW 1)* . . . . . 61 000 kg (134 480 lb)
Maximum zero fuel weight (for MTOW 2)* . . . . . 60 500 kg (133 380 lb)
Minimum weight . . . . . 37 230 kg (82 078 lb)

In exceptional cases (in flight turn back or diversion), an immediate landing at weight above maximum landing weight is permitted, provided the pilot follows the overweight landing procedure.

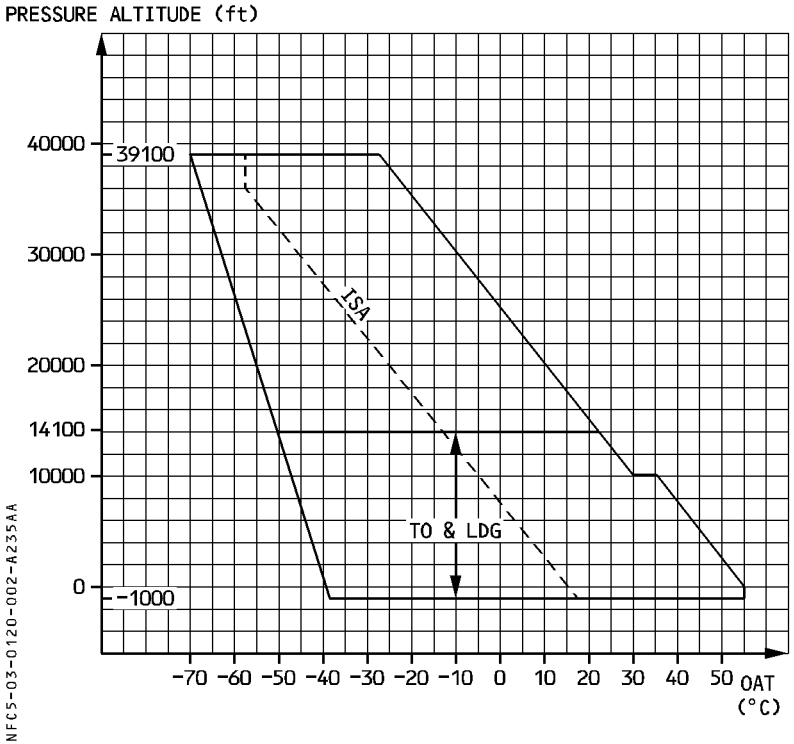
* Dual MTOW is certified. A placard fitted on the aircraft must reflect the current MTOW.

FLIGHT MANEUVERING LOAD ACCELERATION LIMITS

Clean configuration . . . . . – 1 g to + 2.5 g
Slats and flaps extended . . . . . 0 g to + 2 g
Slats extended and flaps retracted . . . . . 0 g to + 2 g

ENVIRONMENTAL ENVELOPE

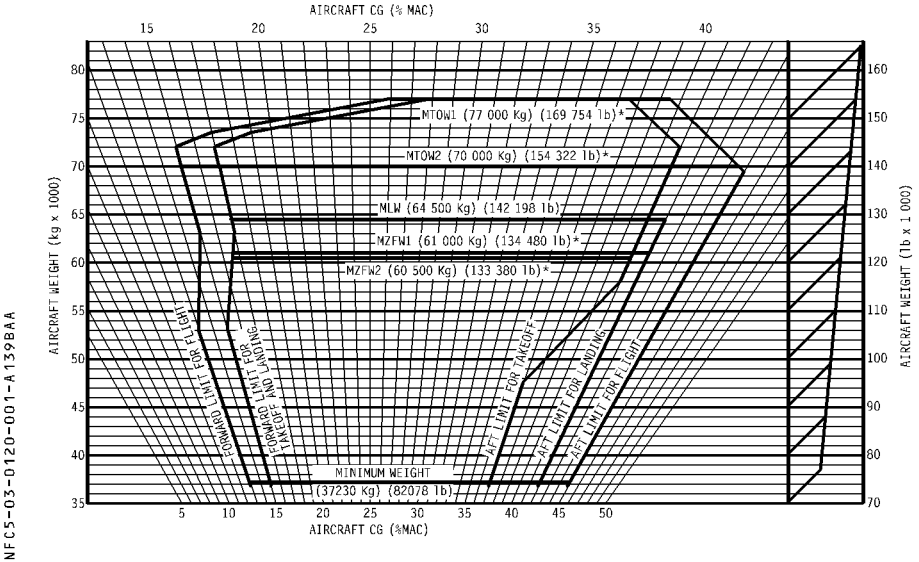
R



MINIMUM FLIGHT CREW

The minimum flight crew consists of 2 pilots.

CENTER OF GRAVITY LIMITS



NFC5-03-0120-001-A139BAA

- CG limits are given in percentage of the reference chord length aft of the leading edge.
- The reference chord length is 4.193 m (13.76 ft). It is 16.31 m (53.51 ft) aft of the aircraft nose.
- The CG must always be within these limits, regardless of fuel load.

WEIGHT LIMITATIONS

Maximum taxi weight 1 . . . . . 77 400 kg (170 636 lb)
Maximum takeoff weight 1 (brake release)* . . . . . 77 000 kg (169 754 lb)
Maximum taxi weight 2 . . . . . 70 400 kg (155 203 lb)
Maximum takeoff weight 2 (brake release)* . . . . . 70 000 kg (154 322 lb)
Maximum landing weight . . . . . 64 500 kg (142 198 lb)
Maximum zero fuel weight (for MTOW 1)* . . . . . 61 000 kg (134 480 lb)
Maximum zero fuel weight (for MTOW 2)* . . . . . 60 500 kg (133 380 lb)
Minimum weight . . . . . 37 230 kg (82 078 lb)

In exceptional cases (in flight turn back or diversion), an immediate landing at weight above maximum landing weight is permitted, provided the pilot follows the overweight landing procedure.

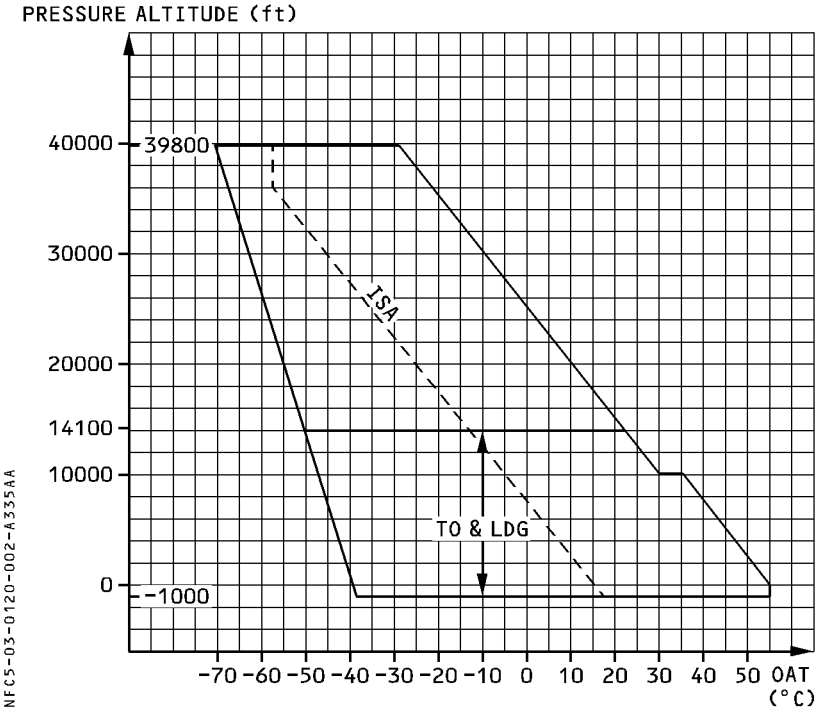
* Dual MTOW is certified. A placard fitted on the aircraft must reflect the current MTOW.

FLIGHT MANEUVERING LOAD ACCELERATION LIMITS

Clean configuration . . . . . – 1 g to + 2.5 g
Slats and flaps extended . . . . . 0 g to + 2 g
Slats extended and flaps retracted . . . . . 0 g to + 2 g

ENVIRONMENTAL ENVELOPE

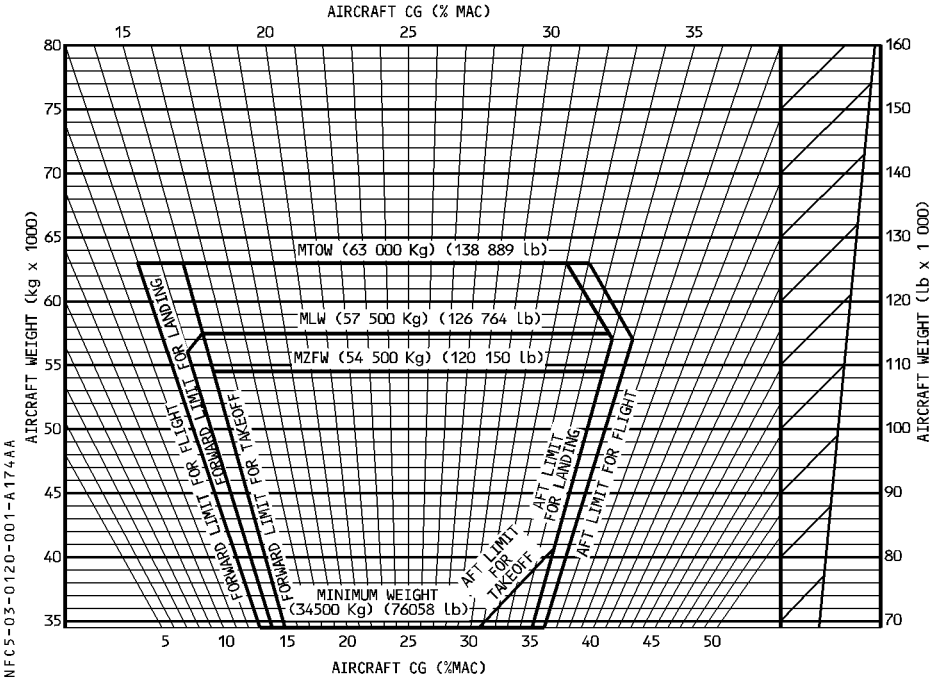
R



MINIMUM FLIGHT CREW

The minimum flight crew consists of 2 pilots.

CENTER OF GRAVITY LIMITS



- CG limits are given in percentage of the reference chord length aft of the leading edge.
- The reference chord length is 4.193 meters (13.76 feet). It is 13.92 meters (45.34 feet) aft of the aircraft nose.
- The CG must always be within these limits, regardless of fuel load.

WEIGHT LIMITATIONS

Maximum taxi weight . . . . . 63 400 kg (139 771 lb)
Maximum takeoff weight (brake release) . . . . . 63 000 kg (138 889 lb)
Maximum landing weight . . . . . 57 500 kg (126 764 lb)
Maximum zero fuel weight . . . . . 54 500 kg (120 150 lb)
Minimum weight . . . . . 34 500 kg (76 058 lb)

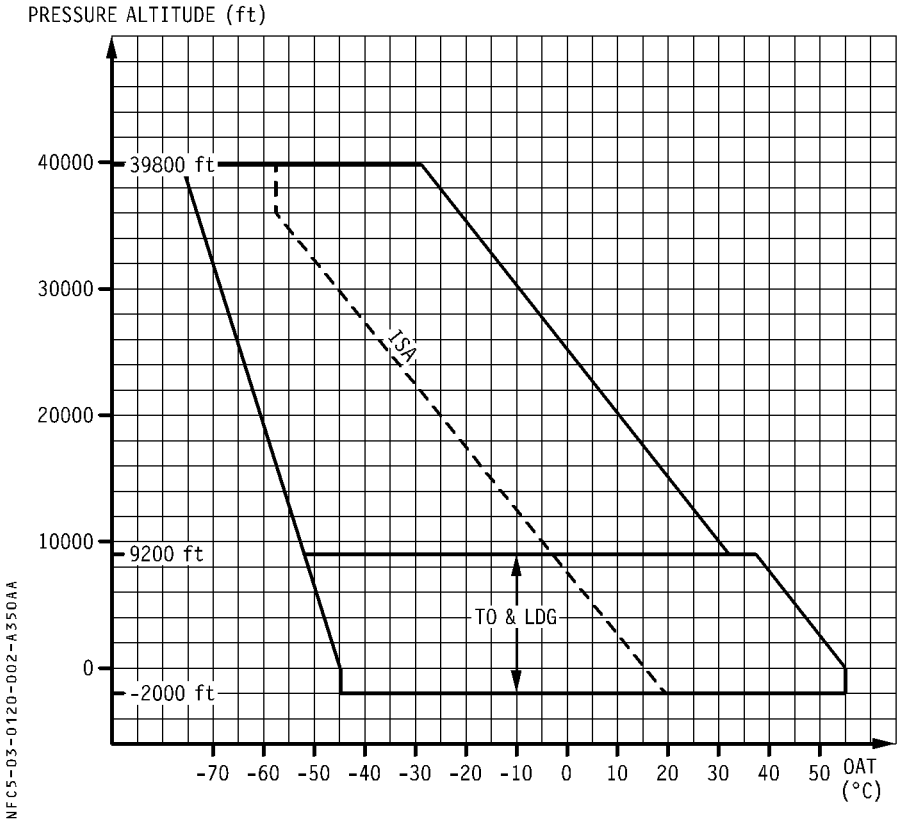
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FLIGHT MANEUVERING LOAD ACCELERATION LIMITS

Clean configuration . . . . . – 1 g to + 2.5 g
Slats and flaps extended . . . . . 0 g to + 2 g
Slats extended and flaps retracted . . . . . 0 g to + 2 g

ENVIRONMENTAL ENVELOPE

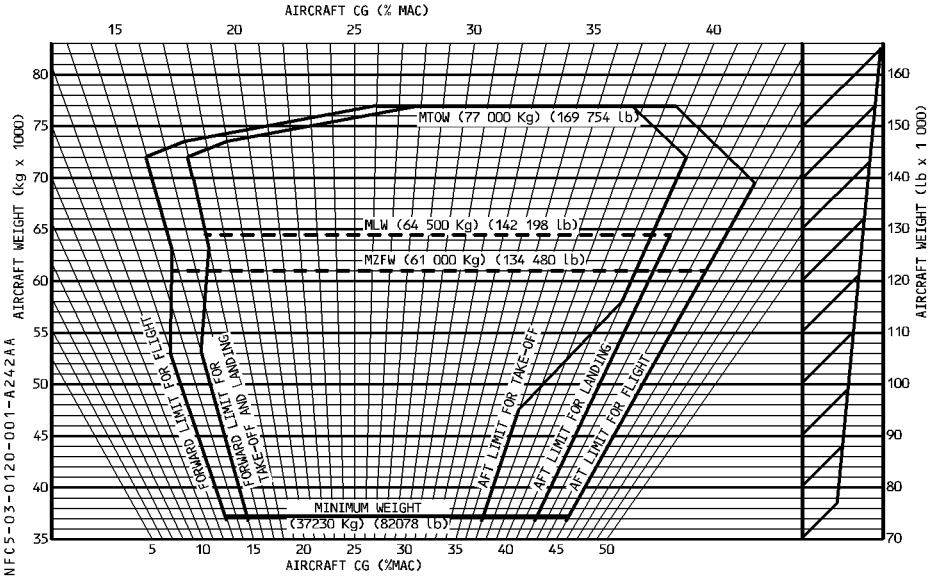
R



MINIMUM FLIGHT CREW

The minimum flight crew consists of 2 pilots.

CENTER OF GRAVITY LIMITS



- CG limits are given in percentage of the reference chord length aft of the leading edge.
- The reference chord length is 4.193 m (13.76 ft). It is 16.31 m (53.51 ft) aft of the aircraft nose.
- The CG must always be within these limits, regardless of fuel load.

WEIGHT LIMITATIONS

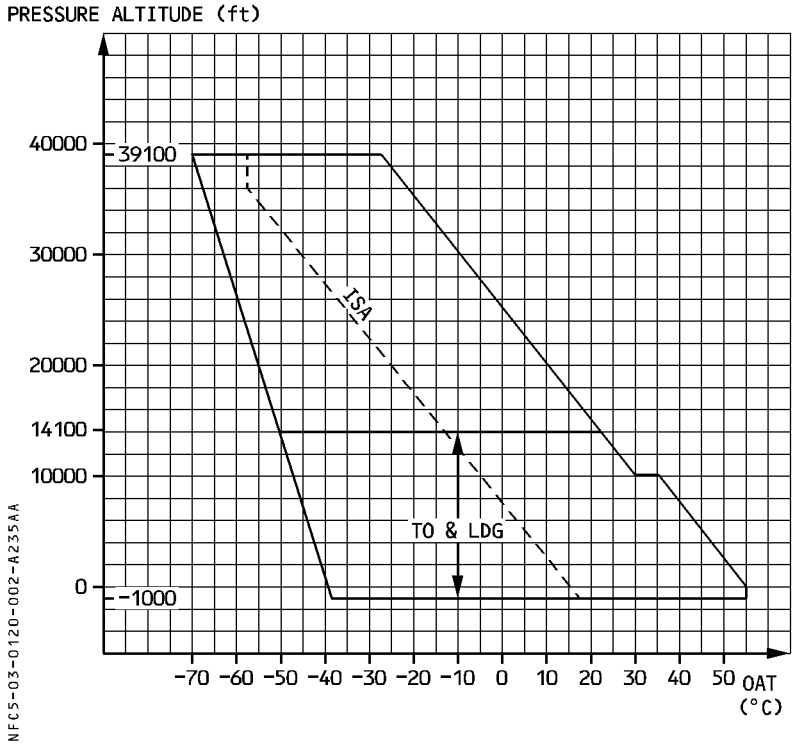
Maximum taxi weight . . . . . 77 400 kg (170 635 lb)
Maximum takeoff weight (brake release) . . . . . 77 000 kg (169 754 lb)
Maximum landing weight . . . . . 64 500 kg (142 198 lb)
Maximum zero fuel weight . . . . . 61 000 kg (134 480 lb)
Minimum weight . . . . . 37 230 kg (82 078 lb)
In exceptional cases (in flight turn back or diversion), an immediate landing at weight above maximum landing weight is permitted, provided the pilot follows the overweight landing procedure.

FLIGHT MANEUVERING LOAD ACCELERATION LIMITS

Clean configuration . . . . . – 1 g to + 2.5 g
Slats and flaps extended . . . . . 0 g to + 2 g
Slats extended and flaps retracted . . . . . 0 g to + 2 g

ENVIRONMENTAL ENVELOPE

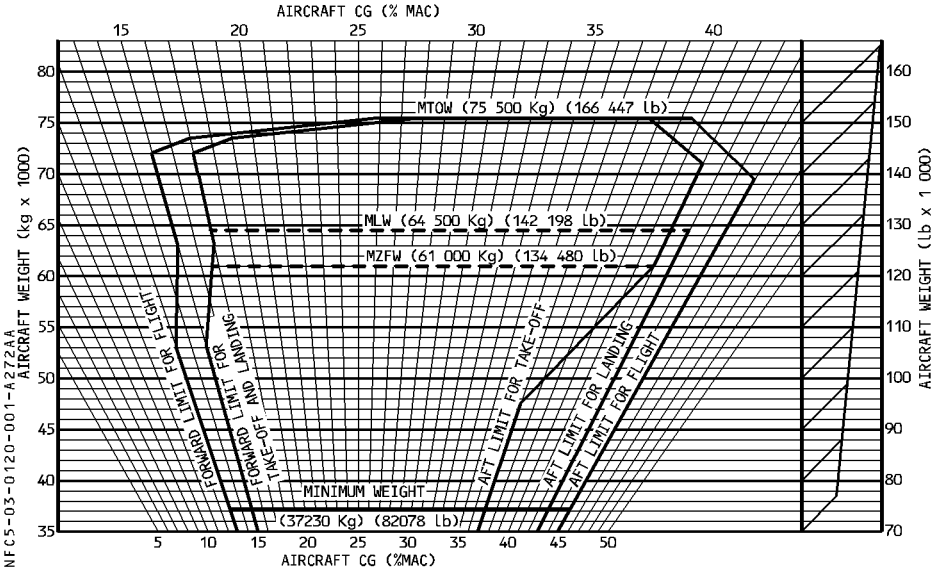
R



MINIMUM FLIGHT CREW

The minimum flight crew consists of 2 pilots.

CENTER OF GRAVITY LIMITS



- CG limits are given in percentage of the reference chord length aft of the leading edge.
- The reference chord length is 4.193 m (13.76 ft). It is 16.31 m (53.51 ft) aft of the aircraft nose.
- The CG must always be within these limits, regardless of fuel load.

WEIGHT LIMITATIONS

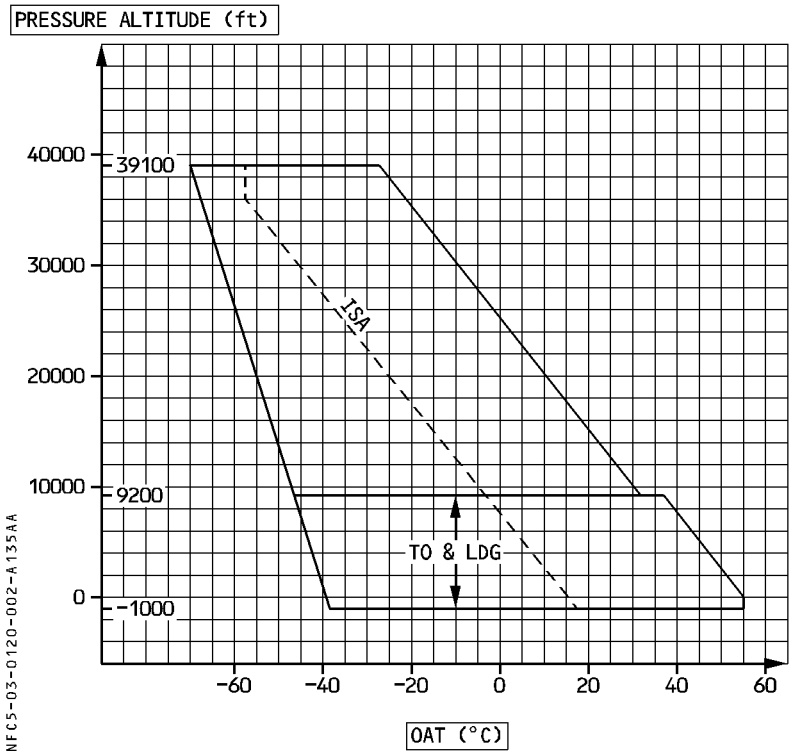
Maximum taxi weight . . . . . 75 900 kg (167 329 lb)
Maximum takeoff weight (brake release) . . . . . 75 500 kg (166 447 lb)
Maximum landing weight . . . . . 64 500 kg (142 198 lb)
Maximum zero fuel weight . . . . . 61 000 kg (134 480 lb)
Minimum weight . . . . . 37 230 kg (82 078 lb)

In exceptional cases (in flight turn back or diversion), an immediate landing at weight above maximum landing weight is permitted, provided the pilot follows the overweight landing procedure.

FLIGHT MANEUVERING LOAD ACCELERATION LIMITS

Clean configuration . . . . . – 1 g to + 2.5 g
Slats and flaps extended . . . . . 0 g to + 2 g
Slats extended and flaps retracted . . . . . 0 g to + 2 g

ENVIRONMENTAL ENVELOPE



AIRPORT OPERATIONS

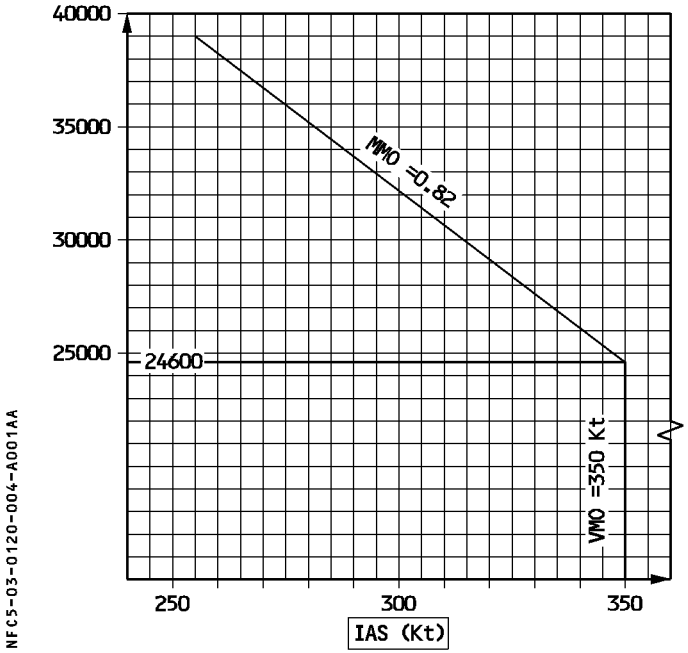
- Runway slope (mean) . . . . . ± 2 %
- Runway altitude . . . . . 9200 feet
- Nominal runway width . . . . . 45 meters
- Wind for takeoff and landing :
  - Maximum crosswind demonstrated for takeoff . . 29 knots gusting up to 38 knots*
  - Maximum crosswind demonstrated for landing . . 33 knots gusting up to 38 knots*
  - Maximum tailwind . . . . . 10 knots

  * : Maximum crosswind values have been demonstrated with flight controls in normal law, as well as in direct law with and without yaw damper.
- Wind for passenger / cargo door operation :
  - Maximum wind for passenger door operation : . . . . . 65 knots
  - R Maximum wind for cargo door operation : 40 knots (or 50 knots, if the aircraft nose R is oriented into the wind, or the cargo door is on the leeward side).
  - The cargo door must be closed, before the wind speed exceeds 65 knots.

SPEED LIMITATIONS

R

MAXIMUM OPERATING SPEED VMO/MMO



The maximum operating limit speed VMO/MMO may not be exceeded deliberately in any regime of flight.

AIRPORT OPERATIONS

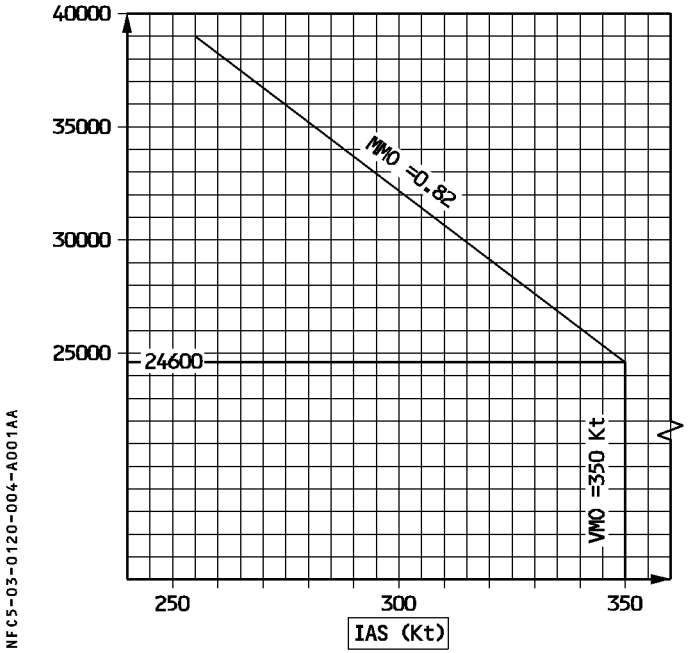
- Runway slope (mean) . . . . . ± 2 %
- Runway altitude . . . . . 9200 feet
- Nominal runway width . . . . . 45 meters
- Wind for takeoff and landing :
  - · Maximum crosswind demonstrated for takeoff . . . . . 39 knots (gust included)*
  - · Maximum crosswind demonstrated for landing . . . . . 38.5 knots (gust included)*
  - · Maximum tailwind . . . . . 10 knots

  * : Maximum crosswind values have been demonstrated with flight controls in normal law, as well as in direct law with and without yaw damper.
- Wind for passenger / cargo door operation :
  - · Maximum wind for passenger door operation : . . . . . 65 knots
  - R · Maximum wind for cargo door operation : 40 knots (or 50 knots, if the aircraft nose R is oriented into the wind, or the cargo door is on the leeward side).
  - · The cargo door must be closed, before the wind speed exceeds 65 knots.

SPEED LIMITATIONS

R

MAXIMUM OPERATING SPEED VMO/MMO



The maximum operating limit speed VMO/MMO may not be exceeded deliberately in any regime of flight.

AIRPORT OPERATIONS

- Runway slope (mean) . . . . . ± 2 %
- Runway altitude . . . . . 14100 feet
- Nominal runway width . . . . . 45 meters
- Wind for takeoff and landing :
  - Maximum crosswind demonstrated for takeoff . . 29 knots gusting up to 38 knots*
  - Maximum crosswind demonstrated for landing . . 33 knots gusting up to 38 knots*
  - Maximum tailwind for takeoff . . . . . 15 knots
R - Maximum tailwind for landing . . . . . 15 knots

Note : The maximum tailwind for automatic landing and rollout remains 10 knots.

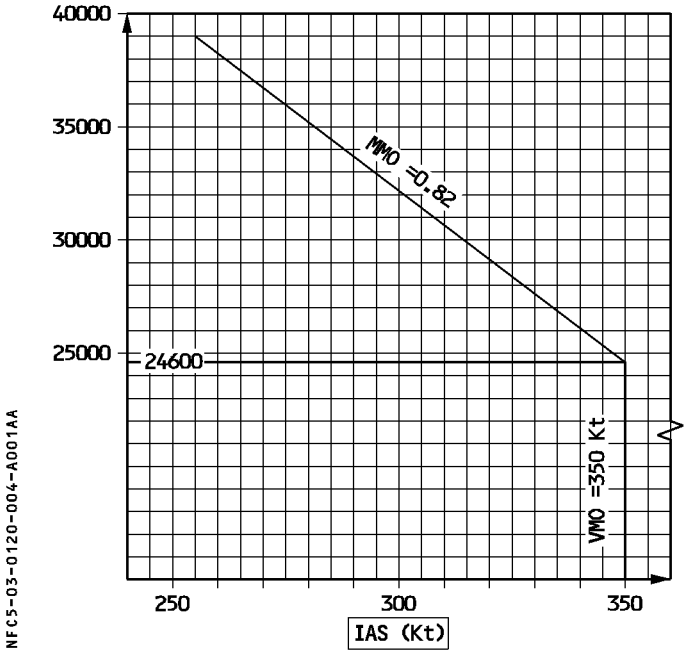
* : Maximum crosswind values have been demonstrated with flight controls in normal law, as well as in direct law with, and without, yaw damper.

- Wind for passenger / cargo door operation :
  - Maximum wind for passenger door operation : . . . . . 65 knots
R - Maximum wind for cargo door operation : 40 knots (or 50 knots, if the aircraft nose
R is oriented into the wind, or the cargo door is on the leeward side).
  - The cargo door must be closed, before the wind speed exceeds 65 knots.

SPEED LIMITATIONS

R

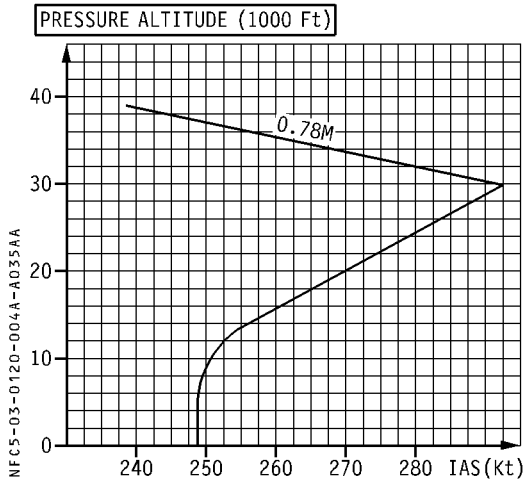
MAXIMUM OPERATING SPEED VMO/MMO



The maximum operating limit speed VMO/MMO may not be exceeded deliberately in any regime of flight.

MAXIMUM DESIGN MANOEUVERING SPEED VA

(Applies in alternate or direct flight control laws only).



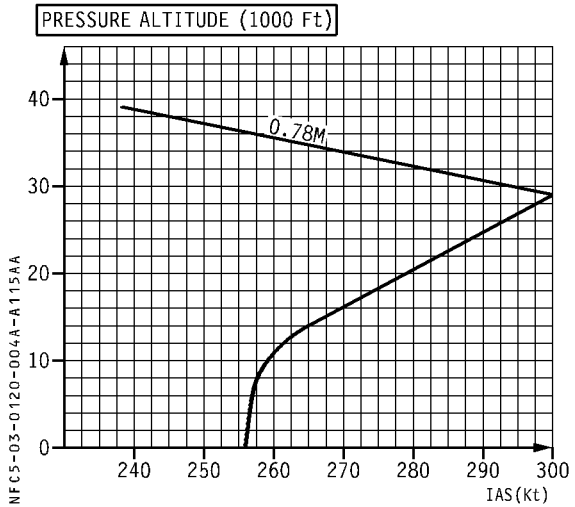
If alternate or direct law is active, full ailerons and rudder application should be confined to speeds below VA.
If alternate or direct law is active manoeuvres involving angle of attack near stall should be confined to speeds below VA.

CAUTION

Rapid and large alternating control inputs, especially in combination with large changes in pitch, roll, or yaw (e.g. large sideslip angles) may result in structural failures at any speed, even below VA.

MAXIMUM DESIGN MANOEUVERING SPEED VA

(Applies in alternate or direct flight control laws only).



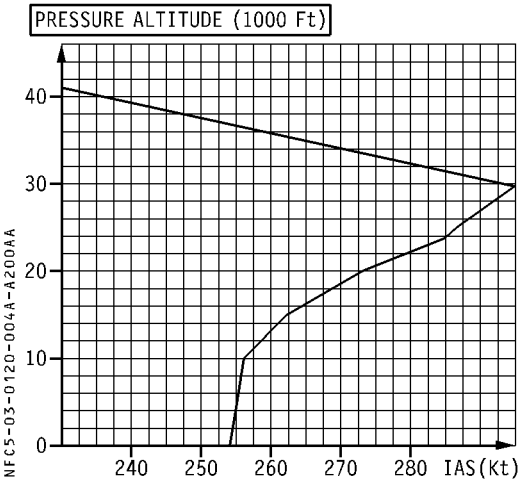
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MAXIMUM DESIGN MANOEUVERING SPEED VA

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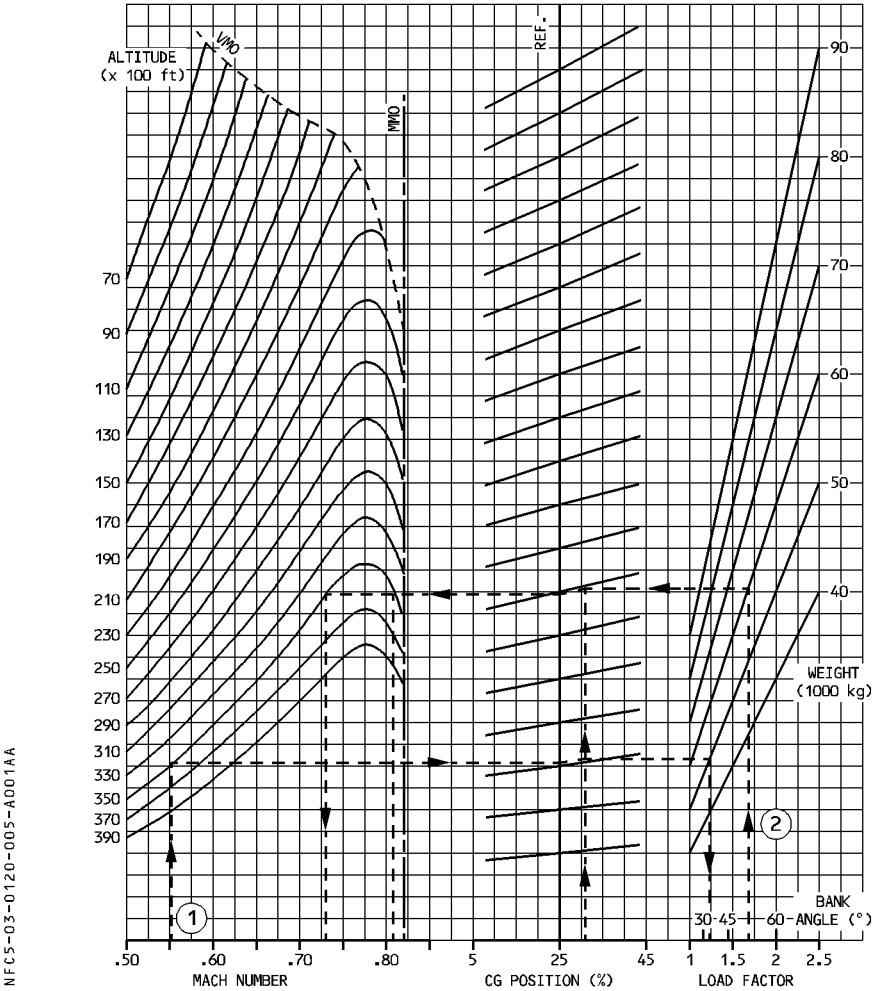
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CAUTION

Rapid and large alternating control inputs, especially in combination with large changes in pitch, roll, or yaw (e.g. large sideslip angles) may result in structural failures at any speed, even below VA.

BUFFET ONSET

R



R Examples :

R 1. Determine Maximum Bank Angle limited by buffet :

R DATA : M = 0.55, FL = 350, CG = 31 %, WEIGHT = 50000 kg

R RESULT : load factor = 1.25 g or 35° bank

R 2. Determine low and high speed limited by buffet :

R DATA : 52° bank or 1.7 g, WEIGHT = 60000 kg, CG = 31%, FL = 350

R RESULT : M = 0.73 (low speed buffet) and M = 0.81 (high speed buffet).

MINIMUM CONTROL SPEEDS

R

Altitude (ft)	VMCA (KT CAS)	VMCG (KT IAS)		
		CONF 1 + F	CONF 2	CONF 3
0	111.5	110.5	108.5	108
2000	110.5	109.5	107.5	107
4000	108	107	105	104.5
6000	105	104	102	101.5
8000	102.5	101.5	99.5	99
9200	101	100	98	97.5

MAXIMUM FLAPS/SLATS SPEEDS

LEVER POSITION	SLATS	FLAPS	Ind. on ECAM	MAX SPD	FLIGHT PHASE
1	18	0	1	230	HOLDING
1	18	10	1 + F	215	TAKEOFF
2	22	15	2	200	TAKEOFF/APPROACH
3	22	20	3	185	TAKEOFF/APPROACH/LANDING
FULL	27	40	FULL	177	LANDING

GEAR DOWN SPEEDS

- Maximum speed with landing gear extended (VLE) 280 kt/M.67
- Maximum speed at which the landing gear may be extended (VLO extension) . 250 kt
- Maximum speed at which the landing gear may be retracted (VLO retraction) . 220 kt
- Maximum altitude at which the landing gear may be extended . . . . . 25 000 ft

MAXIMUM TIRE SPEED

- Ground speed . . . . . 195 knots

WINDSHIELD WIPERS IN USE

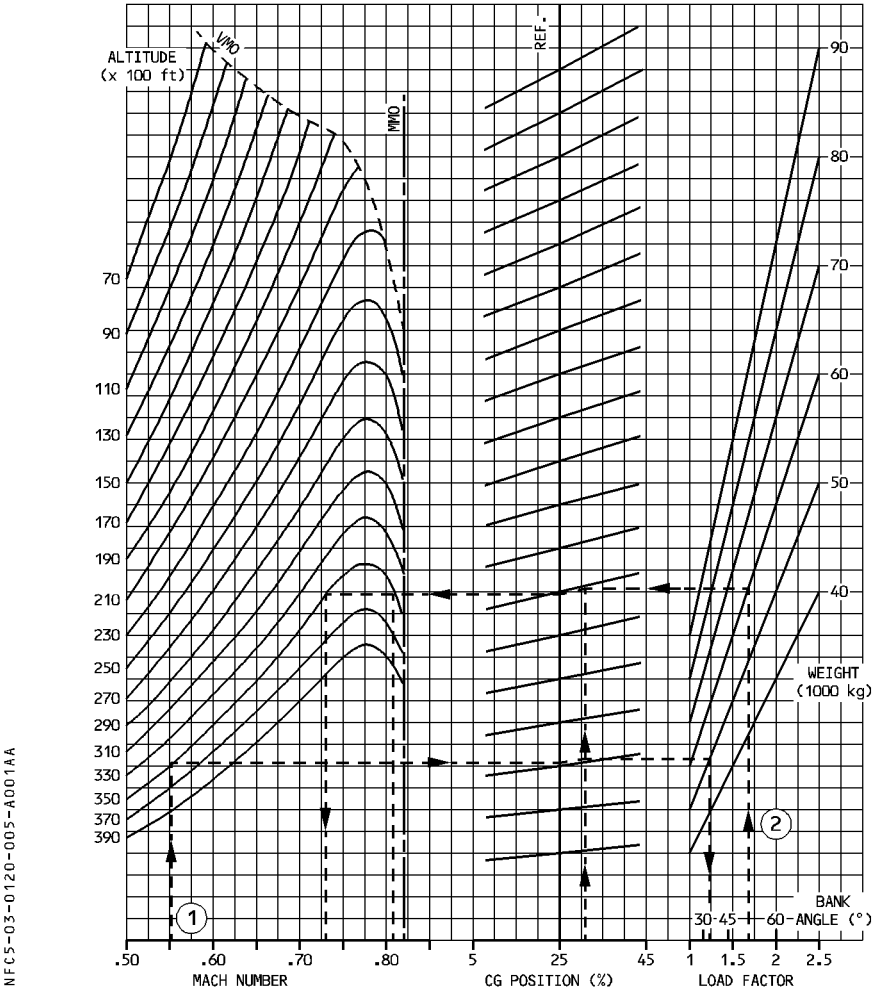
- Maximum speed . . . . . 230 knots

COCKPIT WINDOW OPEN

- Maximum speed . . . . . 200 knots

BUFFET ONSET

R



R Examples :

R 1. Determine Maximum Bank Angle limited by buffet :

R DATA : M = 0.55, FL = 350, CG = 31 %, WEIGHT = 50000 kg

R RESULT : load factor = 1.25 g or 35° bank

R 2. Determine low and high speed limited by buffet :

R DATA : 52° bank or 1.7 g, WEIGHT = 60000 kg, CG = 31%, FL = 350

R RESULT : M = 0.73 (low speed buffet) and M = 0.81 (high speed buffet).

MINIMUM CONTROL SPEEDS

R

Altitude (ft)	VMCA (KT CAS)	VMCG (KT IAS)		
		CONF 1 + F	CONF 2	CONF 3
0	111.5	110.5	108.5	108
2000	111.5	110	108	107.5
4000	111	110	108	107.5
6000	109.5	108.5	106.5	106
8000	106.5	105.5	103.5	103
9200	104	103	101	100.5
10000	102.5	101.5	99.5	99
12000	98.5	98	96	95.5
14100	95	94.5	92.5	92

MAXIMUM FLAPS/SLATS SPEEDS

R

LEVER POSITION	SLATS	FLAPS	Ind. on ECAM	MAX SPD	FLIGHT PHASE
1	18	0	1	230	HOLDING
1	18	10	1 + F	215	TAKEOFF
2	22	15	2	200	TAKEOFF/APPROACH
3	22	20	3	185	TAKEOFF/APPROACH/LANDING
FULL	27	40	FULL	177	LANDING

GEAR DOWN SPEEDS

- Maximum speed with landing gear extended (VLE) 280 kt/M.67
- Maximum speed at which the landing gear may be extended (VLO extension) . 250 kt
- Maximum speed at which the landing gear may be retracted (VLO retraction) . 220 kt
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MAXIMUM TIRE SPEED

- Ground speed . . . . . 195 knots

WINDSHIELD WIPERS IN USE

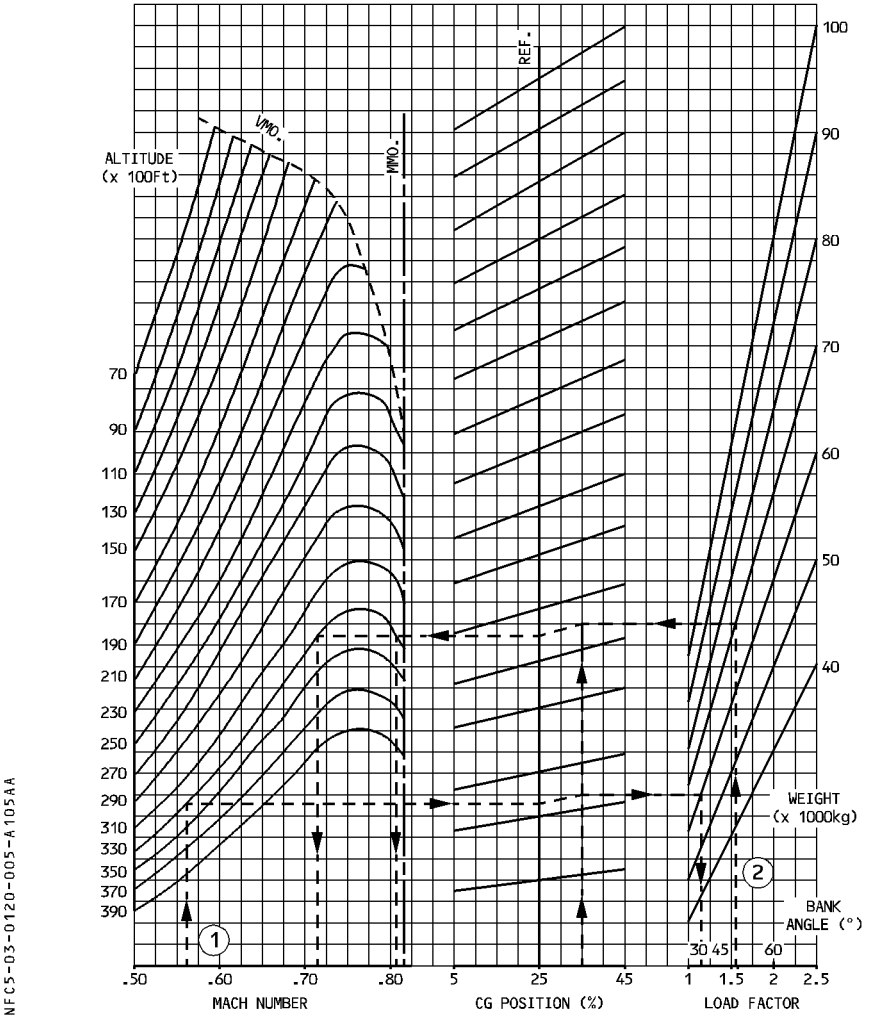
- Maximum speed . . . . . 230 knots

COCKPIT WINDOW OPEN

- Maximum speed . . . . . 200 knots

BUFFET ONSET

R



R Examples :

R 1. Determine Maximum Bank Angle limited by buffet :

R DATA : M = 0.56, FL = 330, CG = 35 %, WEIGHT = 60000 kg

R RESULT : load factor = 1.2 g or 30° bank

R 2. Determine low and high speed limited by buffet :

R DATA : 47° bank or 1.6 g, WEIGHT = 70000 kg, CG = 35%, FL = 330

R RESULT : M = 0.72 (low speed buffet) and M = 0.81 (high speed buffet).

MINIMUM CONTROL SPEEDS

Altitude (ft)	VMCA (KT CAS)	VMCG (KT IAS)		
		CONF 1 + F	CONF 2	CONF 3
0	109.5	106.5	106.5	106.5
2000	108	105	105	105
4000	106.5	103.5	103.5	103.5
6000	105	102	102	102
8000	102.5	100	100	100
10000	100.5	98.5	98.5	98.5
12000	98.5	96.5	96.5	96.5
14100	95.5	94	94	94

MAXIMUM FLAPS/SLATS SPEEDS

LEVER POSITION	SLATS	FLAPS	Ind. on ECAM	MAX SPD	FLIGHT PHASE
1	18	0	1	230	HOLDING
1	18	10	1 + F	215	TAKEOFF
2	22	15	2	200	TAKEOFF/APPROACH
3	22	20	3	185	TAKEOFF/APPROACH/LANDING
FULL	27	40	FULL	177	LANDING

GEAR DOWN SPEEDS

- Maximum speed with landing gear extended (VLE) 280 kt/M.67
- Maximum speed at which the landing gear may be extended (VLO extension) . 250 kt
- Maximum speed at which the landing gear may be retracted (VLO retraction) . 220 kt
- Maximum altitude at which the landing gear may be extended . . . . . 25 000 ft

MAXIMUM TIRE SPEED

- Ground speed . . . . . 195 knots

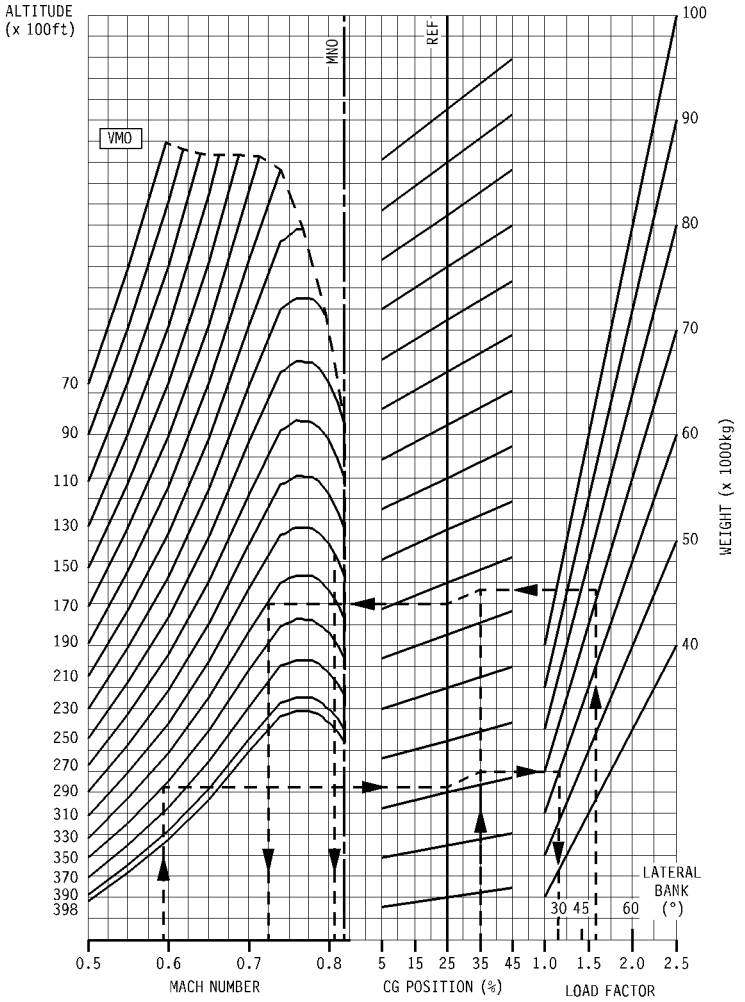
WINDSHIELD WIPERS IN USE

- Maximum speed . . . . . 230 knots

COCKPIT WINDOW OPEN

- Maximum speed . . . . . 200 knots

BUFFET ONSET



NFC5-03-0120-005-A110AA

Examples :

1. Determine Maximum Bank Angle limited by buffet :
   DATA : M = 0.56, FL = 330, CG = 35 %, WEIGHT = 60000 kg
   RESULT : load factor = 1.2 g or 30° bank
2. Determine low and high speed limited by buffet :
   DATA : 47° bank or 1.6 g, WEIGHT = 70000 kg, CG = 35%, FL = 330
   RESULT : M = 0.725 (low speed buffet) and M = 0.81 (high speed buffet).

TAXI SPEED

R When the taxi weight is higher than 76 000 kg (167 550 lb), do not exceed a taxi speed of 20 kt during a turn.

STALLING SPEEDS

The following graphs serve to determine the VS according to the configuration.
These graphs have been established for

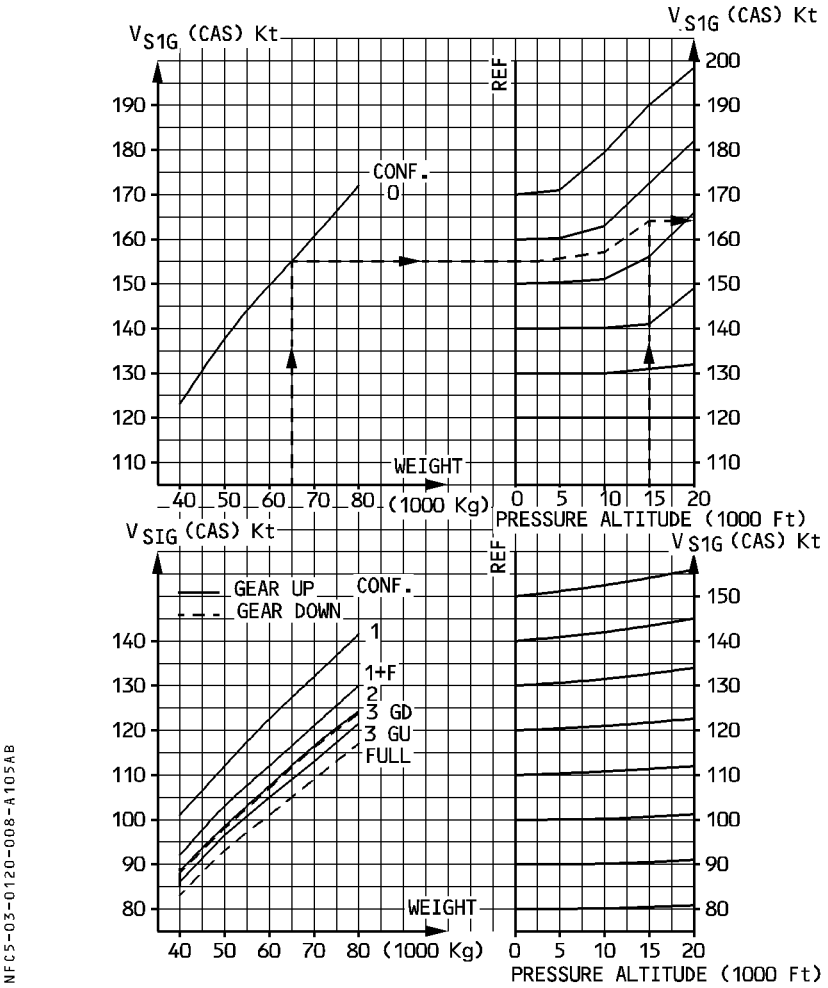
- Basic forward CG
  - 23 % CG location in clean configuration
  - 25 % CG location in takeoff, approach and landing configuration
- Alternate forward CG
  - forward CG limit. See 3.01.20 p 1.

In most cases the CG location remains within the CG envelope below. Consequently the basic forward CG must be retained for any performance determination.
In some rare cases, if more forward CG is anticipated during any part of the flight, the alternate forward CG must be retained for any performance determination.

INTENTIONALLY LEFT BLANK

STALLING SPEEDS

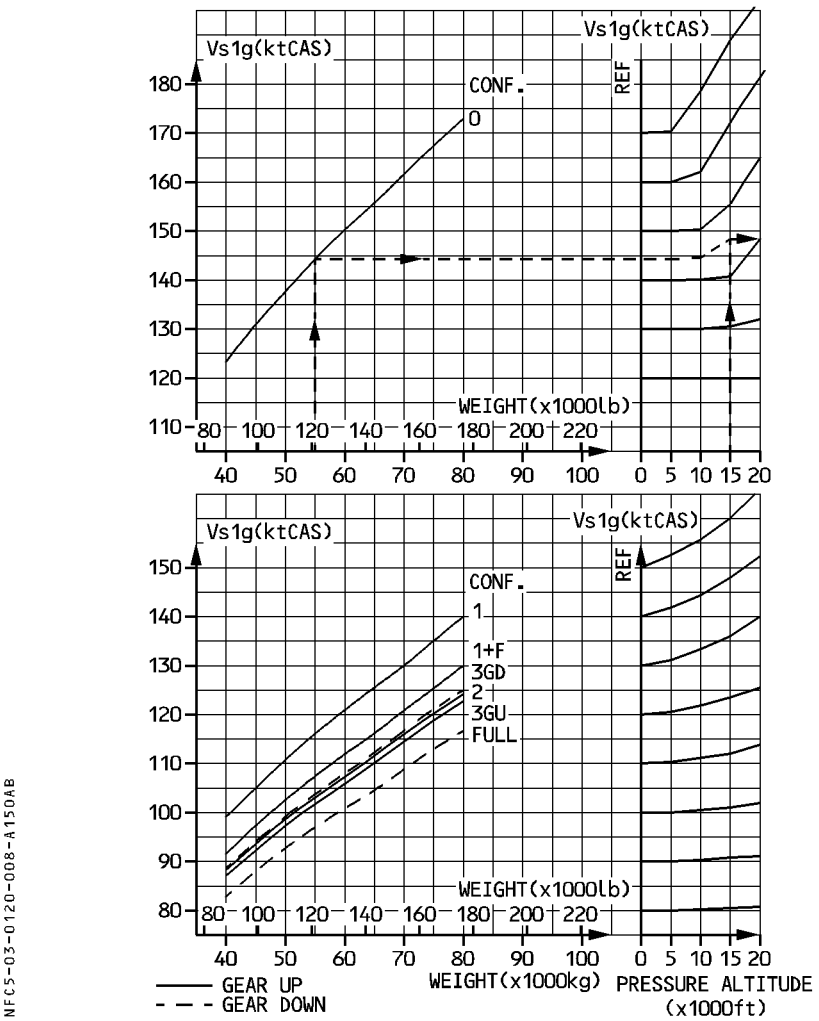
R



R EXAMPLE : DATA : 65000 kg (143299 lb), pressure altitude 15000 ft, clean
R configuration.
R RESULT : VS1G CAS = 164 kt

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R **STALLING SPEEDS**



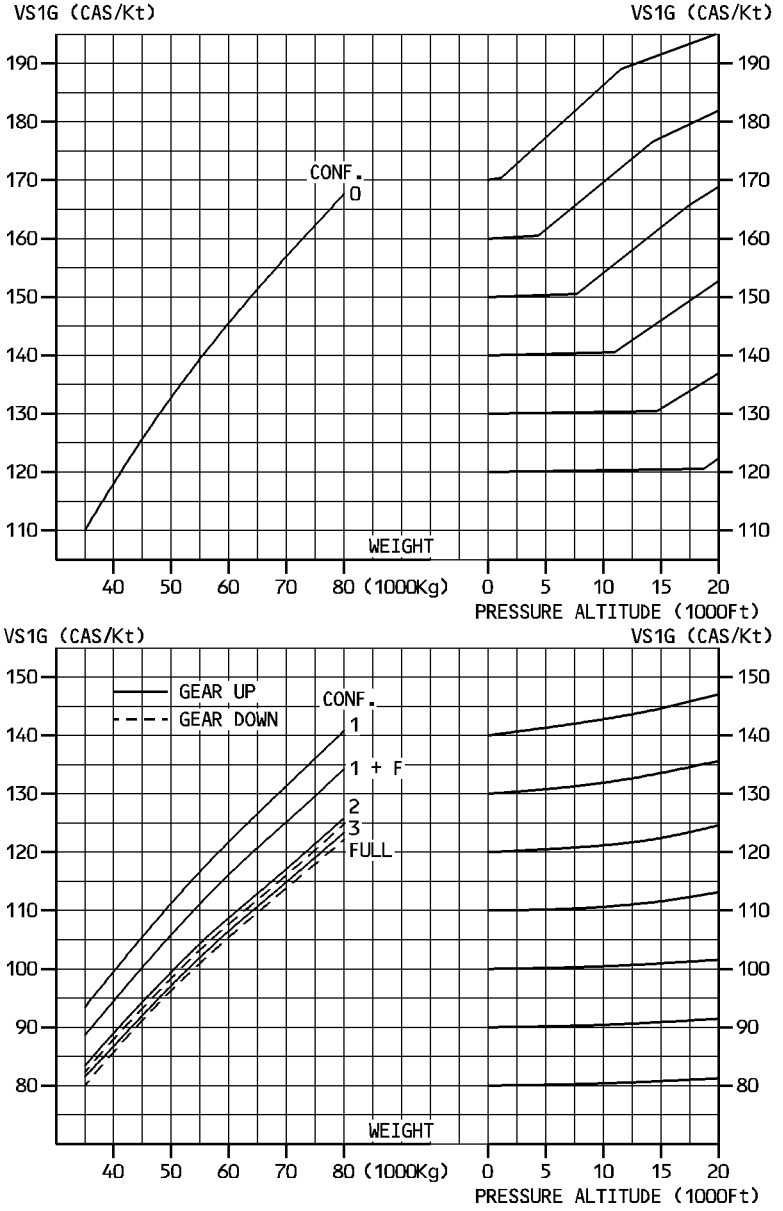
R EXAMPLE : DATA : 55000 kg (121253 lb), pressure altitude 15000 ft, clean
R configuration.
R RESULT : VS1G CAS = 148 kt

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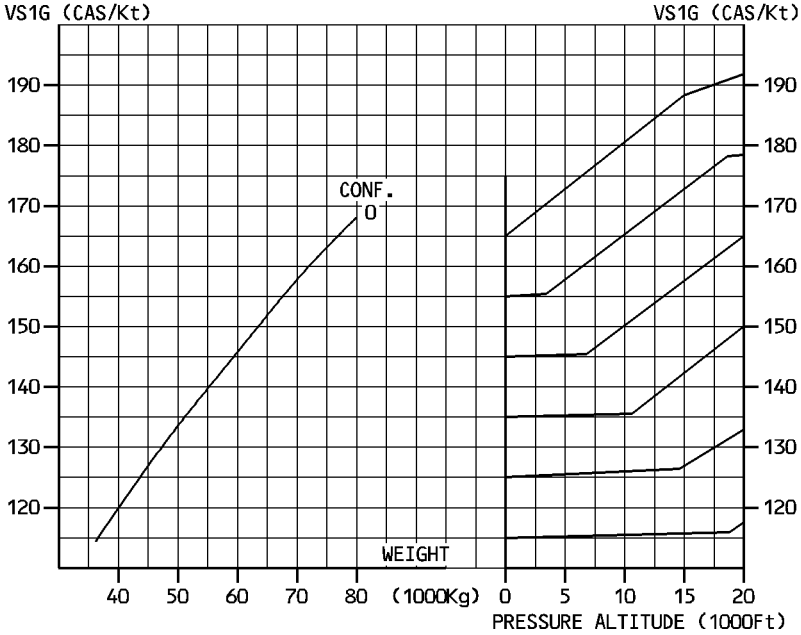
STALLING SPEEDS (BASIC FORWARD C.G.)

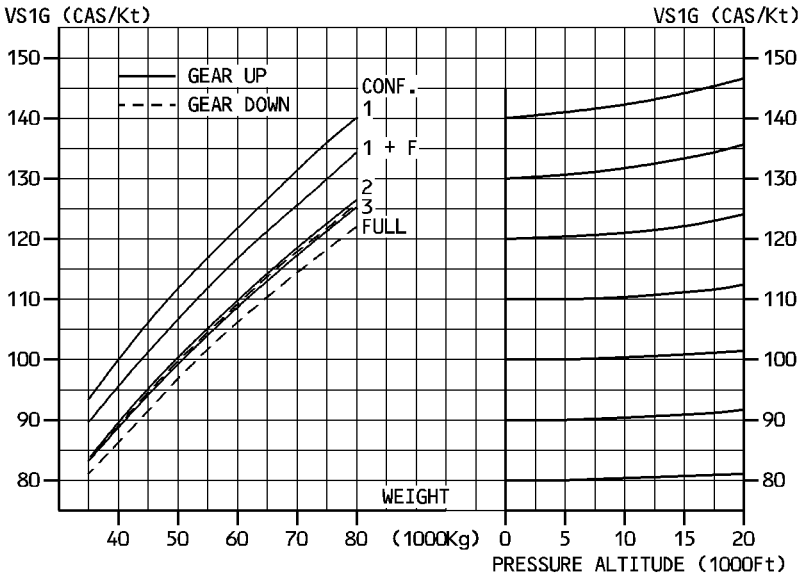
R



NFCS-03-0120-009-A130AB

STALLING SPEEDS (ALTERNATE FORWARD C.G.)

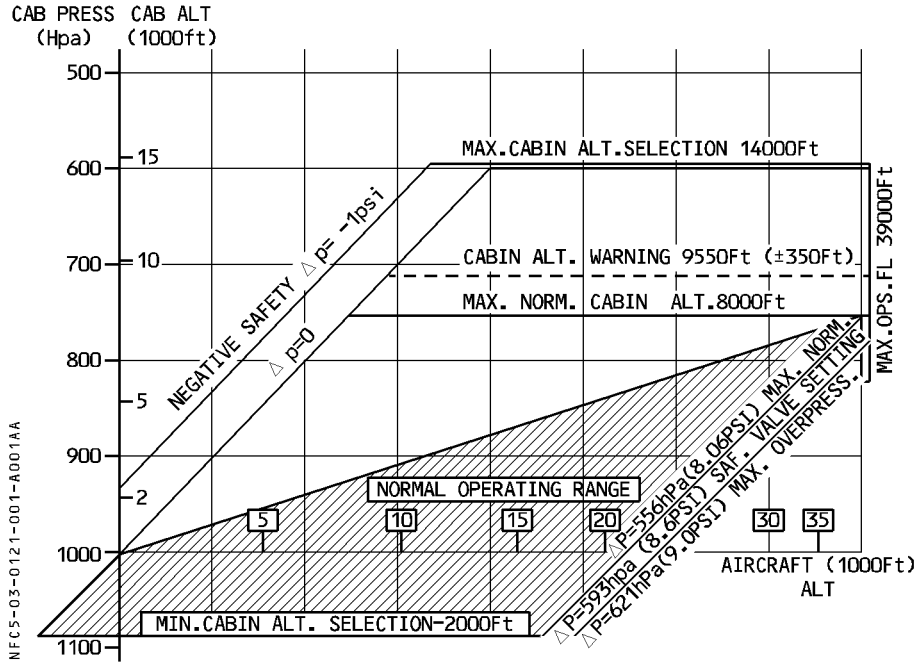




NFC5-03-0120-010-A130AB

CABIN PRESSURE

- Maximum positive differential pressure . . . . . 8.6 psi
- Maximum negative differential pressure . . . . . - 1 psi



Note : Max △p and safety valve setting tolerance = ± 7 hPa (0.1 psi)

RAM AIR INLET

Only open if differential pressure is lower than 1 psi.

AIR CONDITIONING WITH LP GROUND UNIT

- Do not use conditioned air simultaneously from packs and LP ground unit (to avoid chattering of the non return valves).
- Airflow supplied by the ground cart shall not exceed 1.2 kg/s (2.60 lb/s).

R **AIR CONDITIONING WITH HP GROUND UNIT**

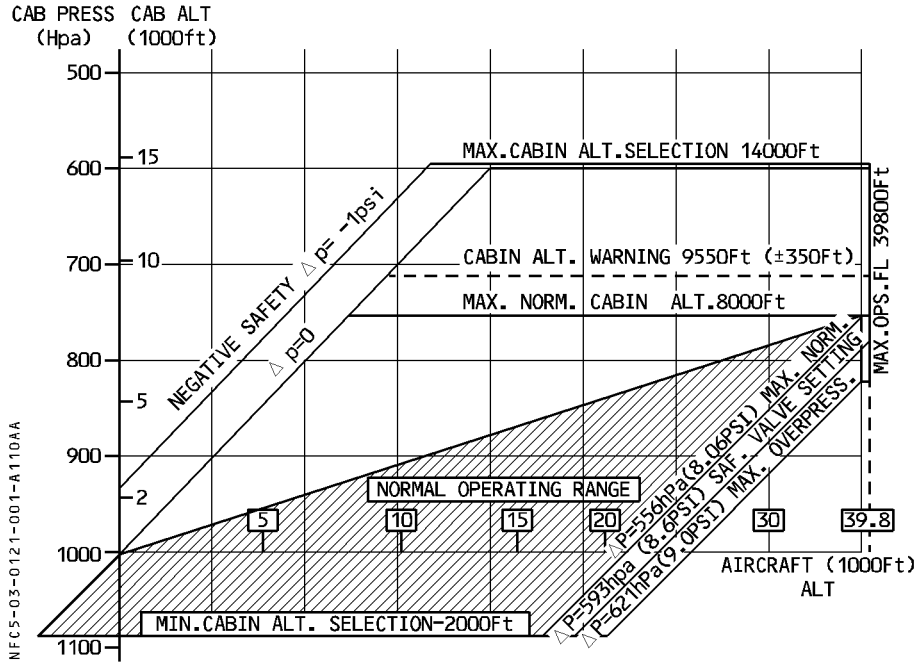
R — Do not use HP ground unit when APU supplies bleed air to avoid bleed system damage.

AVIONICS VENTILATION

During ground operations, limit the aircraft electric power supply with avionics ventilation system in normal configuration as follows :
OAT = 49°C no limitation
OAT = 55°C time limit 2 hours
OAT = 60°C time limit 1 hour
OAT = 64°C time limit 1/2 hour

CABIN PRESSURE

- Maximum positive differential pressure . . . . . 8.6 psi
- Maximum negative differential pressure . . . . . - 1 psi



Note : Max △p and safety valve setting tolerance = ± 7 hPa (0.1 psi)

RAM AIR INLET

Only open if differential pressure is lower than 1 psi.

AIR CONDITIONING WITH LP GROUND UNIT

- Do not use conditioned air simultaneously from packs and LP ground unit (to avoid chattering of the non return valves).
- Airflow supplied by the ground cart shall not exceed 1.2 kg/s (2.60 lb/s).

AIR CONDITIONING WITH HP GROUND UNIT

- Do not use HP ground unit when APU supplies bleed air to avoid bleed system damage.

AVIONICS VENTILATION

During ground operations, limit the aircraft electric power supply with avionics ventilation system in normal configuration as follows :
OAT = 49°C no limitation
OAT = 55°C time limit 2 hours
OAT = 60°C time limit 1 hour
OAT = 64°C time limit 1/2 hour

GENERAL

AUTO PILOT FUNCTION

Minimum height for use of autopilot on takeoff with SRS mode . . . . . 100 ft AGL
(An internal FMGS logic prevents the autopilot from engaging during the 5 seconds after liftoff).
Minimum height for use of the autopilot in :
Straight-in non precision approach . . . . . applicable MDA (MDH)
Circling approach . . . . . applicable MDA - 100 ft (or MDH - 100 ft)
ILS approach with CAT 1 displayed on FMA . . . . . 160 ft AGL
Go-around (AP or FD engagement) . . . . . 100 ft AGL
All other phases . . . . . 500 ft AGL
Use of the AP or FD in OPEN DES or DES mode is not permitted in approach, unless the FCU altitude is set to, or above, MDA (MDH) or 500 feet, whichever is the highest.

AUTOTHRUST FUNCTION

R Use of the autothrust is approved with, or without, AP/FD in selected or managed mode.

FLIGHT MANAGEMENT FUNCTION

FMGS lateral and vertical navigation has been certified for after takeoff, en route, and terminal area operations, for instrument approach procedures (except ILS, LOC, LOC-BC, LDA, SDF and MLS), and for missed approach procedures.
RNP accuracy with GPS PRIMARY, or radio updating, has been demonstrated to be :

R

	With AP ON in NAV	With AP OFF and FD ON in NAV	With AP OFF and FD OFF
En route	2 NM	2 NM	2 NM
In terminal area	0.5 NM	0.52 NM	0.52 NM
In approach	0.3 NM	0.3 NM with GPS 0.37 NM without GPS	Not authorized

Without GPS PRIMARY (or GPS deselected or inoperative), the accuracy has been demonstrated, provided the appropriate RNP value is checked or entered on the MCDU, and HIGH accuracy is displayed.
Without GPS PRIMARY (or GPS deselected or inoperative), navigation accuracy is a function of ground radio navaid infrastructure, or elapsed time since the last radio update.
The FMGS is also certified for navigation within BRNAV, PRNAV, and RNP 10 airspace.
RNP10 oceanic/remote area operations are approved with GPS PRIMARY, or without GPS PRIMARY (or GPS deselected or inoperative), provided time limitations in IRS only navigation (acceptable to operational authorities), are established.
FMGS approval is based on the assumption that the navigation database has been validated for intended use.
Obstacle clearance and adherence to airspace constraints remains the flight crew's responsibility.
Fuel, time predictions/performance information is provided for advisory purposes only.
NAV mode may be used after takeoff, provided FMGS runway updating has been checked.

TAKEOFF IN GPS PRIMARY

For certain airports, where the difference between the local coordinate system and WGS 84 (geodesic standard used by GPS, FMS) is not negligible, a map shift may occur after takeoff.
GPS must be deselected for takeoff from these airports, until a safe altitude is reached.

GENERAL

AUTO PILOT FUNCTION

Minimum height for use of autopilot on takeoff with SRS mode . . . . . 100 ft AGL
(An internal FMGS logic prevents the autopilot from engaging during the 5 seconds after liftoff).
Minimum height for use of the autopilot in :
Straight-in non precision approach . . . . . applicable MDA (MDH)
Circling approach . . . . . applicable MDA - 100 ft (or MDH - 100 ft)
ILS approach with CAT 1 displayed on FMA . . . . . 160 ft AGL
Go-around (AP or FD engagement) . . . . . 100 ft AGL
All other phases . . . . . 500 ft AGL
Use of the AP or FD in OPEN DES or DES mode is not permitted in approach, unless the FCU altitude is set to, or above, MDA (MDH) or 500 feet, whichever is the highest.

AUTOTHRUST FUNCTION

R Use of the autothrust is approved with, or without, AP/FD in selected or managed mode.

FLIGHT MANAGEMENT FUNCTION

FMGS lateral and vertical navigation has been certified for after takeoff, en route, and terminal area operations, for instrument approach procedures (except ILS, LOC, LOC-BC, LDA, SDF and MLS), and for missed approach procedures.
RNP accuracy with GPS PRIMARY, or radio updating, has been demonstrated to be :

R

	With AP ON in NAV	With AP OFF and FD ON in NAV	With AP OFF and FD OFF
En route	1 NM	1 NM	1.1 NM
In terminal area	0.5 NM	0.51 NM	0.51 NM
In approach	0.3 NM	0.3 NM	Not authorized

Without GPS PRIMARY (or GPS deselected or inoperative), the accuracy has been demonstrated, provided the appropriate RNP value is checked or entered on the MCDU, and HIGH accuracy is displayed.
Without GPS PRIMARY (or GPS deselected or inoperative), navigation accuracy is a function of ground radio navaid infrastructure, or elapsed time since the last radio update.
The FMGS is also certified for navigation within BRNAV, PRNAV, and RNP 10 airspace.
RNP10 oceanic/remote area operations are approved with GPS PRIMARY or, without GPS PRIMARY (or GPS deselected or inoperative), provided time limitations in IRS only navigation (acceptable to operational authorities), are established.
FMGS approval is based on the assumption that the navigation database has been validated for intended use.
Obstacle clearance and adherence to airspace constraints remains the flight crew's responsibility.
Fuel, time predictions/performance information is provided for advisory purposes only.
NAV mode may be used after takeoff, provided FMGS runway updating has been checked.

TAKEOFF IN GPS PRIMARY

For certain airports, where the difference between the local coordinate system and WGS 84 (geodesic standard used by GPS, FMS) is not negligible, an incorrect NAV guidance may occur after takeoff.
GPS must be deselected for takeoff from these airports, until a safe altitude is reached.

GENERAL

AUTO PILOT FUNCTION

Minimum height for use of the autopilot on takeoff with SRS mode . . . . . 100 ft AGL
(An internal FMGS logic prevents the autopilot from engaging during the 5 seconds after liftoff).
Minimum height for use of the autopilot in :
Straight-in non precision approach . . . . . applicable MDA (MDH)
Circling approach . . . . . applicable MDA - 100 ft (or MDH - 100 ft)
ILS approach with CAT 1 displayed on FMA . . . . . 160 ft AGL
PAR approach (Precision Approach Radar) . . . . . 250 ft AGL
Use of the AP and/or FD is authorized in PAR approach, with HDG V/S or TRK FPA.
Go-around (AP or FD engagement) . . . . . 100 ft AGL
All other phases . . . . . 500 ft AGL
Use of the AP or FD in OPEN DES or DES mode is not permitted in approach, unless the FCU altitude is set to, or above, MDA (MDH) or 500 feet, whichever is the highest.

AUTOTHRUST FUNCTION

R Use of the autothrust is approved with, or without, AP/FD in selected or managed mode.

FLIGHT MANAGEMENT FUNCTION

FMGS lateral and vertical navigation has been certified for after takeoff, en route, and terminal area operations, for instrument approach procedures (except ILS, LOC, LOC-BC, LDA, SDF and MLS), and for missed approach procedures.
RNP accuracy with GPS PRIMARY, or radio updating, has been demonstrated to be :

R

	With AP ON in NAV	With AP OFF and FD ON in NAV	With AP OFF and FD OFF
En route	1 NM	1 NM	1.1 NM
In terminal area	0.5 NM	0.51 NM	0.51 NM
In approach	0.3 NM	0.3 NM	Not authorized

Without GPS PRIMARY (or GPS deselected or inoperative), the accuracy has been demonstrated, provided the appropriate RNP value is checked or entered on the MCDU, and HIGH accuracy is displayed.
Without GPS PRIMARY (or GPS deselected or inoperative), navigation accuracy is a function of ground radio navaid infrastructure, or elapsed time since the last radio update.
The FMGS is also certified for navigation within BRNAV, PRNAV, and RNP 10 airspace.
RNP10 oceanic/remote area operations are approved with GPS PRIMARY or, without GPS PRIMARY (or GPS deselected or inoperative), provided time limitations in IRS only navigation (acceptable to operational authorities), are established.
FMGS approval is based on the assumption that the navigation database has been validated for intended use.
Obstacle clearance and adherence to airspace constraints remains the flight crew's responsibility.
Fuel, time predictions/performance information is provided for advisory purposes only.
NAV mode may be used after takeoff, provided FMGS runway updating has been checked.

TAKEOFF IN GPS PRIMARY

For certain airports, where the difference between the local coordinate system and WGS 84 (geodesic standard used by GPS, FMS) is not negligible, an incorrect NAV guidance may occur after takeoff.
GPS must be deselected for takeoff from these airports, until a safe altitude is reached.

GENERAL

AUTO PILOT FUNCTION

Minimum height for use of the autopilot on takeoff with SRS mode . . . . . 100 ft AGL
(An internal FMGS logic prevents the autopilot from engaging during the 5 seconds after liftoff).
Minimum height for use of the autopilot in :
Straight-in non precision approach . . . . . applicable MDA (MDH)
Circling approach . . . . . applicable MDA - 100 ft (or MDH - 100 ft)
ILS approach with CAT 1 displayed on FMA . . . . . 160 ft AGL
PAR approach (Precision Approach Radar) . . . . . 250 ft AGL
Use of the AP and/or FD is authorized in PAR approach, with HDG V/S or TRK FPA.
Go-around (AP or FD engagement) . . . . . 100 ft AGL
All other phases . . . . . 500 ft AGL
Use of the AP or FD in OPEN DES or DES mode is not permitted in approach, unless the FCU altitude is set to, or above, MDA (MDH) or 500 feet, whichever is the highest.

AUTOTHRUST FUNCTION

Use of the autothrust is approved with, or without, AP/FD in selected or managed mode.

ENGINE OUT

Managed speed must not be used during descent or drift down with one engine inoperative.

Note : In takeoff, climb, approach and go-around phases, managed speed mode may be used.

FLIGHT MANAGEMENT FUNCTION

FMGS lateral and vertical navigation has been certified for after takeoff, en route, and terminal area operations, for instrument approach procedures (except ILS, LOC, LOC-BC, LDA, SDF and MLS), and for missed approach procedures.
RNP accuracy with GPS PRIMARY, or radio updating, has been demonstrated to be :

R

	With AP ON in NAV	With AP OFF and FD ON in NAV	With AP OFF and FD OFF
En route	1 NM	1 NM	1.1 NM
In terminal area	0.5 NM	0.51 NM	0.51 NM
In approach	0.3 NM	0.3 NM	Not authorized

Without GPS PRIMARY (or GPS deselected or inoperative), the accuracy has been demonstrated, provided the appropriate RNP value is checked or entered on the MCDU, and HIGH accuracy is displayed.
Without GPS PRIMARY (or GPS deselected or inoperative), navigation accuracy is a function of ground radio navaid infrastructure, or elapsed time since the last radio update.
The FMGS is also certified for navigation within BRNAV, PRNAV, and RNP 10 airspace.
RNP10 oceanic/remote area operations are approved with GPS PRIMARY or without GPS PRIMARY (or GPS deselected or inoperative), provided time limitations in IRS only navigation (acceptable to operational authorities), are established.
FMGS approval is based on the assumption that the navigation database has been validated for intended use.
Obstacle clearance and adherence to airspace constraints remains the flight crew's responsibility.
Fuel, time predictions/performance information is provided for advisory purposes only.
NAV mode may be used after takeoff, provided FMGS runway updating has been checked.

TAKEOFF IN GPS PRIMARY

For certain airports, where the difference between the local coordinate system and WGS 84 (geodesic standard used by GPS, FMS) is not negligible, an incorrect NAV guidance may occur after takeoff.
GPS must be deselected for takeoff from these airports, until a safe altitude is reached.

USE OF NAV AND FINAL APP MODES FOR NON PRECISION APPROACH

NAV, or NAV and FINAL APP mode may be used for VOR, VOR/DME, NDB, NDB/DME or RNAV (including GPS) approach, but not for ILS, LOC, LOC-BC, LDA, SDF, or MLS final approach.

R For instrument procedures not coded in the WGS 84 coordinate system, the GPS must be
R deselected, unless the shift between the local coordinate system and the WGS 84 is found
R acceptable for the intended operation.

R *Note : 1. The assesment of this shift can be done :*
R *– in flight, monitoring the navaid raw data in non RNAV procedures,*
R *– on ground performing a GPS survey of the procedure waypoints.*
R *2. RNAV (GPS) and RNP RNAV approach procedures require WGS 84 coordinates*
R *and GPS.*

FINAL APP mode guidance capability with GPS PRIMARY has been demonstrated down to MDH/DH (barometric) 250 feet.
VOR, VOR/DME, NDB or NDB/DME approach procedures may be performed, in NAV, or NAV and FINAL APP mode, provided AP or FD is used, and :

- GPS PRIMARY is available. In this case, the reference navaid may be unserviceable, or the airborne radio equipment may be inoperative, or not installed, provided operational approval is obtained.
- Without GPS PRIMARY :
  - The reference navaid and the corresponding airborne equipment is serviceable, tuned, and monitored during the approach, or
  - The radio navaid coverage supports the RNP value, specified for the approach procedure, and an operational approval is obtained.

For GPS approach, GPS PRIMARY must be available.
RNAV approach without GPS PRIMARY may be performed only if the radio navaid coverage supports the RNP value and HIGH accuracy is displayed on the MCDU with the specified RNP, and operational approval is obtained.
NAV mode may be used in the terminal area, provided :

- GPS PRIMARY is available, or
- HIGH accuracy is displayed, and the appropriate RNP is checked or entered on the MCDU, or
- Navaid raw data is monitored.

Non Precision Approaches with engine-out

If one engine is inoperative, it is not permitttted to use the autopilot to perform NPAs in the following modes : FINAL APP, NAV V/S, NAV/FPA.
Only FD use is permitted.

AUTOMATIC APPROACH, LANDING AND ROLL OUT

CATEGORY II

Minimum decision height . . . . . 100 feet AGL
At least one autopilot must be engaged in APPR mode, and CAT 2, CAT 3 SINGLE or CAT
R 3 DUAL must be displayed on the FMA.

CATEGORY III FAIL PASSIVE (SINGLE)

Minimum decision height . . . . . 50 feet
At least one autopilot must be engaged in APPR mode, and CAT 3 SINGLE or CAT 3 DUAL must be displayed on the FMA.
A/THR must be used in selected or managed speed.

CATEGORY III FAIL OPERATIONAL (DUAL)

A/THR must be used in selected or managed speed .
Alert height . . . . . 100 feet
– CAT III with DH :
Minimum decision height . . . . . 25 feet
2 autopilots must be engaged in APPR mode and CAT 3 DUAL must be displayed on the FMA.
– CAT III without DH :
2 autopilots must be engaged in APPR mode and CAT 3 DUAL must be displayed on the FMA.
Minimum Runway Visual Range . . . . . 75 meters

ENGINE OUT

CAT II and CAT III fail passive autoland are only approved in configuration FULL, and if engine-out procedures are completed before reaching 1000 feet in approach.

MAXIMUM WIND CONDITIONS FOR CAT II OR CAT III AUTOMATIC APPROACH LANDING AND ROLL OUT

Headwind : 30 knots
Tailwind : 10 knots
Crosswind : 20 knots

Note : Wind limitation is based on the surface wind reported by the tower. If the wind displayed on ND exceeds the above-noted autoland limitations, but the tower reports a surface wind within the limitations, then the autopilot can remain engaged. If the tower reports a surface wind beyond limitations, only CAT I automatic approach without autoland can be performed.

AUTOMATIC LANDING

CAT II and CAT III autoland are approved in CONF 3 and CONF FULL.
Automatic landing is demonstrated :
– With CAT II and CAT III ILS beam.
– With slope angle within (– 2.5°, – 3.15°) range.
– For airport altitude at or below 2500 feet.
– At or below the maximum landing weight.
– At approach speed (VAPP) = VLS + 5 knots + wind correction.
Automatic rollout performance has been approved on dry and wet runways, but performance on snow-covered or icy runways has not been demonstrated.

AUTOMATIC LANDING IN CAT I OR BETTER WEATHER CONDITIONS

The automatic landing system's performance has been demonstrated on runways equipped with CAT II or CAT III ILS approaches. However, automatic landing in CAT I or better
R weather conditions is possible on CAT I ground installations or on CAT II/III ground
R installations when ILS sensitive areas are not protected, if the following precautions are taken :

– The airline has checked that the ILS beam quality, and the effect of terrain profile before the runway have no adverse effect on AP/FD guidance. In particular, the effect of terrain discontinuities within 300 meters before runway threshold must be evaluated.
– The crew is aware that LOC or GS beam fluctuations, independent of the aircraft systems, may occur and the PF is prepared to immediately disconnect the AP and take appropriate action, should unsatisfactory guidance occur.
– At least CAT2 capability is displayed on the FMA, and CAT II/CAT III procedures are used.
– Visual references are obtained at an altitude appropriate to the performed CAT I
R approach, otherwise go–around is initiated.

AUTOMATIC APPROACH, LANDING AND ROLL OUT

CATEGORY II

Minimum decision height . . . . . 100 feet AGL
At least one autopilot must be engaged in APPR mode, and CAT 2, CAT 3 SINGLE or CAT
R 3 DUAL must be displayed on the FMA.

CATEGORY III FAIL PASSIVE (SINGLE)

Minimum decision height . . . . . 50 feet
At least one autopilot must be engaged in APPR mode, and CAT 3 SINGLE or CAT 3 DUAL must be displayed on the FMA.
A/THR must be used in selected or managed speed.

CATEGORY III FAIL OPERATIONAL (DUAL)

A/THR must be used in selected or managed speed .
Alert height . . . . . 100 feet
– CAT III with DH :
Minimum decision height . . . . . 25 feet
2 autopilots must be engaged in APPR mode and CAT 3 DUAL must be displayed on the FMA.
– CAT III without DH :
2 autopilots must be engaged in APPR mode and CAT 3 DUAL must be displayed on the FMA.
Minimum Runway Visual Range . . . . . 75 meters

ENGINE OUT

CAT II and CAT III fail passive autoland are only approved in configuration FULL, and if engine-out procedures are completed before reaching 1000 feet in approach.

MAXIMUM WIND CONDITIONS FOR CAT II OR CAT III AUTOMATIC APPROACH LANDING AND ROLL OUT

Headwind : 30 knots
Tailwind : 10 knots
Crosswind : 20 knots

Note : Wind limitation is based on the surface wind reported by the tower. If the wind displayed on the ND exceeds the above-noted autoland limitations, but the tower reports surface wind within the limitations, then the autopilot can remain engaged. If the tower reports a surface wind beyond the limitations, only a CAT I automatic approach without autoland can be performed.

AUTOMATIC LANDING

CAT II and CAT III autoland are approved in CONF 3 and CONF FULL.
Automatic landing is demonstrated :
- With CAT II and CAT III ILS beam.
- With slope angle within (– 2.5°, – 3.15°) range.
- At or below the maximum landing weight.
- For airport altitude at or below 6500 feet.
- At approach speed (VAPP) = VLS + wind correction.
  Minimum wind correction of 5 knots ; maximum wind correction of 15 knots.

Automatic rollout performance has been approved on dry and wet runways, but performance on snow-covered or icy runways has not been demonstrated.

AUTOMATIC LANDING IN CAT I OR BETTER WEATHER CONDITIONS

The automatic landing system's performance has been demonstrated on runways equipped with CAT II or CAT III ILS approaches. However, automatic landing in CAT I or better
R weather conditions is possible on CAT I ground installations or on CAT II/III ground
R installations when ILS-sensitive areas are not protected, if the following precautions are taken :
- The airline has checked that the ILS beam quality, and the effect of terrain profile before the runway, have no adverse effect on AP/FD guidance. In particular, the effect of terrain discontinuities within 300 meters before the runway threshold must be evaluated.
- The crew is aware that LOC or GS beam fluctuations, independent of the aircraft systems, may occur. The PF is prepared to immediately disconnect the AP and take appropriate action, should unsatisfactory guidance occur.
- At least CAT2 capability is displayed on the FMA, and CAT II / CAT III procedures are used.
- Visual references are obtained at an altitude appropriate to the performed CAT I
R approach, otherwise go–around is initiated.

AUTOMATIC APPROACH, LANDING AND ROLL OUT

CATEGORY II

Minimum decision height . . . . . 100 feet AGL
At least one autopilot must be engaged in APPR mode, and CAT 2, CAT 3 SINGLE or CAT
R 3 DUAL must be displayed on FMA.

CATEGORY III FAIL PASSIVE (SINGLE)

Minimum decision height . . . . . 50 feet
At least one autopilot must be engaged in APPR mode, and CAT 3 SINGLE or CAT 3 DUAL must be displayed on FMA.
A/THR must be used in selected or managed speed .

CATEGORY III FAIL OPERATIONAL (DUAL)

A/THR must be used in selected or managed speed .
Alert height . . . . . 100 feet
2 autopilots must be engaged in APPR mode and CAT 3 DUAL must be displayed on FMA
Minimum Runway Visual Range . . . . . 75 meters
A/THR in selected or managed speed must be used.

ENGINE OUT

CAT II and CAT III fail passive autoland are only approved in configuration 3 and FULL, and if engine-out procedures are completed before reaching 1000 feet in approach.

MAXIMUM WIND CONDITIONS FOR CAT II OR CAT III AUTOMATIC APPROACH LANDING AND ROLLOUT

Headwind : 30 knots
Tailwind : 10 knots
Crosswind : 20 knots

Note : Wind limitation is based on the surface wind reported by the tower. If the wind displayed on ND exceeds the above-noted autoland limitations, but the tower reports a surface wind within the limitations, then the autopilot can remain engaged. If the tower reports a surface wind beyond limitations, only CAT I automatic approach without autoland can be performed.

AUTOMATIC LANDING

CAT II and CAT III autoland are approved in CONF 3 and CONF FULL.
Automatic landing is demonstrated :
- With CAT II and CAT III ILS beam.
- With slope angle within (– 2.5°, – 3.15°) range.
- For airport altitude at or below 9200 feet.
- At or below the maximum landing weight.
- At approach speed (VAPP) = VLS + wind correction.
  Minimum wind correction 5 knots ; maximum wind correction 15 knots.

Automatic rollout performance has been approved on dry and wet runways, but performance on snow-covered or icy runways has not been demonstrated.

R During automatic rollout with one engine inoperative, the flight crew can use the remaining
R thrust reverser, provided that :
R – Only IDLE reverse thrust is used
R – The crosswind does not exceed 15 knots.

Note : Under crew responsability and in case of emergency, autoland can be performed up
R *to 69 tons (152 117 lb).*

MAXIMUM WIND CONDITIONS FOR CAT II OR CAT III AUTOMATIC APPROACH LANDING AND ROLL OUT

Headwind : 30 knots
Tailwind : 10 knots
Crosswind : 20 knots

Note : Wind limitation is based on the surface wind reported by the tower. If the wind displayed on ND exceeds the above–noted autoland limitations, but the tower reports a surface wind within the limitations, then the autopilot can remain engaged. If the tower reports a surface wind beyond limitations, only CAT I automatic approach without autoland can be performed.

AUTOMATIC LANDING

CAT II and CAT III autoland are approved in CONF 3 and CONF FULL.
Automatic landing is demonstrated :
- With CAT II and CAT III ILS beam.
- With slope angle within (– 2.85°, – 3.15°) range.
- For airport altitude at or below 5750 feet.
- At or below the maximum landing weight.
- At approach speed (VAPP) = VLS + wind correction.
  Minimum wind correction 5 kt, maximum wind correction 15 kt.

Automatic rollout performance has been approved on dry and wet runways, but performance on snow-covered or icy runways has not been demonstrated.

R During automatic rollout with one engine inoperative, the flight crew can use the remaining
R thrust reverser, provided that :
R – Only IDLE reverse thrust is used
R – The crosswind does not exceed 15 knots.

Note : Under crew responsability and in case of emergency, autoland can be performed up
R *to 67 tons (147 708 lb).*

AUTOMATIC LANDING IN CAT I OR BETTER WEATHER CONDITIONS

The automatic landing system's performance has been demonstrated on runways equipped with CAT II or CAT III ILS/MLS approaches. However, automatic landing in CAT I or better
R weather conditions is possible on CAT I ground installations or on CAT II/III ground
R installations when ILS sensitive areas are not protected, if the following precautions are taken :

- The airline has checked that the ILS/MLS beam quality and the effect of terrain profile before the runway have no adverse effect on AP/FD guidance. In particular, the effect of terrain discontinuities within 300 meters before runway threshold must be evaluated.
- The crew is aware that LOC or GS beam fluctuations, independent of the aircraft systems, may occur and the PF is prepared to immediately disconnect the AP and take appropriate action, should unsatisfactory guidance occur.
- At least CAT2 capability is displayed on the FMA and CAT II/III procedures are used.
- Visual references are obtained at an altitude appropriate to the performed CAT I
R approach, otherwise go–around is initiated.

ELECTRICAL

- MAX continuous load per generator . . . . . 100 % (90 kVA)
- MAX continuous load per TR (continuous) . . . . . 200 A

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ELECTRICAL

- MAX continuous load per generator . . . . . 100 % (90 kVA)
- MAX continuous load per TR (continuous) . . . . . 200 A

In-Seat Power Supply System (IS PSS)

The In-Seat Power Supply System (ISPSS) for Portable Electronic Devices (PED carried by the passengers) must be switched off during takeoff and landing. The airworthiness approval of the ISPSS for PED does not constitute an operational approval to connect a PED to the system.

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ELECTRICAL

- MAX continuous load per generator . . . . . 100 % (90 kVA)
- MAX continuous load per TR (continuous) . . . . . 200 A

Electrical Outlets

It is forbidden to use the electrical outlets during takeoff and landing.

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FLIGHT CONTROL

Flaps and slats :
Max operating altitude with slats or slats and flaps extended is 20 000 feet.

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GENERAL

FUEL AND ADDITIVE SPECIFICATIONS

– See engine manufacturer specification
– Fuel system has been certified for JET A1, JP 8, JET A, JP 5, RT, TS-1, JET B or JP 4.

MAXIMUM ALLOWED WING FUEL IMBALANCE

R · INNER TANKS (OUTER BALANCED)

Tank Fuel Quantity (Heavier tank)	Maximum allowed imbalance
Full (5 350 kg) (11 795 lb)	1 500 kg (3 307 lb)
4 300 kg (9 480 lb)	1 600 kg (3 520 lb)
2 250 kg (4 960 lb)	2 250 kg (4 960 lb)

The variation is linear between these values (No limitation below 2 250 kg/4 960 lb)
· OUTER TANKS

Maximum allowed imbalance	530 kg (11 68 lb)*

* Maximum outer wing tank imbalance (one full/one empty) is allowed provided :
  · Fuel content of one side (outer + inner) is equal to the fuel content of the other side (outer + inner), or
  · On the side of the lighter outer tank, the inner tank fuel quantity is higher than the opposite inner tank quantity, up to a maximum of 3000 kg/6614 lb higher.

R *Note : In exceptional conditions (i.e., fuel system failures) the above-mentioned maximum*
R *fuel imbalance values may be exceeded without significantly affecting the aircraft*
R *handling qualities. The aircraft remains fully controllable in all phases of the flight.*

FUEL TEMPERATURE

	JET A1/ JP 8	JET A	JP 5	RT	TS-1	JET B	JP 4
MINI	– 43°C	– 36°C (1)	– 42°C	– 45°C	– 45°C	– 46°C	– 54°C
MAXI	54°C					49°C	

(1) : For JET A only, if TAT reaches – 34°C, monitor on ECAM FUEL page that fuel temperature remains higher than – 36°C.

MINIMUM FUEL QUANTITY FOR TAKEOFF : 1 500 kg/3 307 lb

WING TK LO LVL warning must not be displayed on ECAM for takeoff.

WHEN USING JP 4 or JET B

Fuel in center tank is to be regarded as unusable if the wing fuel temperature exceeds the following values before engine start and if the given flight level is exceeded before the center tank fuel has been used :

+ 30°C not above FL 350
+ 40°C not above FL 300
+ 49°C not above FL 250

Reason : At high altitude with high fuel temperature, the pressure delivered by the center tank pumps becomes lower than the pressure delivered by the wing tank pumps.

FUEL MANAGEMENT

- Tanks must be emptied in the following order :
  - center tank then wing tanks
- Takeoff on center tank is prohibited

GENERAL

FUEL AND ADDITIVE SPECIFICATIONS

– See engine manufacturer specification
– Fuel system has been certified for JET A1, JP 8, JET A, JP 5, RT and TS-1.

MAXIMUM ALLOWED WING FUEL IMBALANCE

· INNER TANKS (OUTER BALANCED)

Tank Fuel Quantity (Heavier tank)	Maximum allowed imbalance
Full (5 350 kg) (11 795 lb)	1 500 kg (3 307 lb)
4 300 kg (9 480 lb)	1 600 kg (3 520 lb)
2 250 kg (4 960 lb)	2 250 kg (4 960 lb)

The variation is linear between these values (No limitation below 2 250 kg/4 960 lb)
· OUTER TANKS

Maximum allowed imbalance	530 kg (11 68 lb)*

* Maximum outer wing tank imbalance (one full/one empty) is allowed provided :
  · Fuel content of one side (outer + inner) is equal to the fuel content of the other side (outer + inner), or
  · On the side of the lighter outer tank, the inner tank fuel quantity is higher than the opposite inner tank quantity, up to a maximum of 3000 kg/6614 lb higher.

Note : In exceptional conditions (i.e., fuel system failures) the above-mentioned maximum fuel imbalance values may be exceeded without significantly affecting the aircraft handling qualities. The aircraft remains fully controllable in all phases of the flight.

FUEL TEMPERATURE

	JET A1/ JP 8	JET A	JP 5	RT	TS-1
MINI	– 43°C	– 36°C (1)	– 42°C	– 45°C	– 45°C
MAXI	54°C				

(1) : For JET A only, if TAT reaches – 34°C, monitor on ECAM FUEL page that fuel temperature remains higher than – 36°C.

MINIMUM FUEL QUANTITY FOR TAKEOFF : 1 500 kg/3 307 lb

WING TK LO LVL warning must not be displayed on ECAM for takeoff.

FUEL MANAGEMENT

- Tanks must be emptied in the following order :
  · center tank then wing tanks
- Takeoff on center tank is prohibited

HYDRAULIC

Normal operating pressure 3000 psi ± 200

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GENERAL

BRAKES

Maximum brake temperature for takeoff (brake fans (◁) off) . . . . . 300° C

AUTOBRAKE

Use of the autobrake does not relieve the pilot of his responsibility to safely stop within the available runway length, by taking over brake control with brake pedals, if necessary. The pilot may disengage the automatic braking system, either by pressing the armed mode pushbutton, or by applying firm action on the brake pedals.

PARKING BRAKE

CAUTION

Do not set EPR above 1.18 on both engines with the parking brake ON.

TAXI WITH DEFLATED TIRES

If tire damage is suspected after landing or after a rejected takeoff, an inspection of the tires is required before taxi. If the tire is deflated but not damaged, the aircraft can be taxied at low speed with the following limitations :

1. If one tire is deflated on one or more gears (ie. a maximum of three tires), the speed should be limited to 7 knots when turning.
2. If two tires are deflated on the same main gear (the other main gear tires not being deflated), speed should be limited to 3 knots and the nose wheel steering angle limited to 30 degrees.

R NOSEWHEEL STEERING (NWS)

R The nosewheel steering angle is limited to 75° when using the handwheels.
R For towing and pushback, the nosewheel steering angle is limited to 95°.
R Towbarless towing and pushback on the nose landing gear is approved for the “accepted
R towbarless towing vehicles” that are listed in the Airbus SIL 09–002, but the nosewheel
R steering angle must be limited to 85°.

INERTIAL REFERENCE SYSTEM

R IRS ground alignment has been demonstrated to be satisfactory up to 70 degrees latitude.
In NAV mode, the IRS will not provide a valid magnetic heading :
R · For latitude greater than 73 degrees North,
R · For latitude greater than 60 degrees South.
Flight outside the above-noted limits is prohibited.

ENHANCED GROUND PROXIMITY WARNING SYSTEM (EGPWS) ◁

· Aircraft navigation is not to be predicated on the use of the terrain display.
The terrain display is only intended as a situational awareness tool, and may not provide the accuracy on which to solely base terrain avoidance maneuvers.
The EGPWS database, display, and alerting algorithms, do not currently take into account man-made obstructions.
· The EGPWS enhanced function should be inhibited (TERR pushbutton to OFF, on the GPWS panel) when the aircraft position is less than 15 NM from the airfield :
— For operations to/from runways not incorporated in the EGPWS database.
— For specific approach procedures, which have previously been identified as potentially producing false terrain alerts.

INERTIAL REFERENCE SYSTEM

IRS ground alignment is possible up to 82 degrees latitude.

In NAV mode, the IRS will not provide a valid magnetic heading :

R · For latitude greater than 82 degrees North

R · For latitude greater than 73 degrees North, between 90 degrees and 120 degrees West

R (magnetic polar region),

R · For latitude greater than 60 degrees South.

Flight outside the above-noted limits is prohibited.

ENHANCED GROUND PROXIMITY WARNING SYSTEM (EGPWS) ◁

· Aircraft navigation is not to be predicated on the use of the terrain display.
The terrain display is only intended as a situational awareness tool, and may not provide the accuracy on which to solely base terrain avoidance maneuvers.
The EGPWS database, display, and alerting algorithms, do not currently take into account man-made obstructions.

· The EGPWS enhanced function should be inhibited (TERR pushbutton to OFF, on the GPWS panel) when the aircraft position is less than 15 NM from the airfield :
  — For operations to/from runways not incorporated in the EGPWS database.
  — For specific approach procedures, which have previously been identified as potentially producing false terrain alerts.

INERTIAL REFERENCE SYSTEM

Ground alignment of the IRS is possible up to 82 degrees latitude.
In NAV mode, the IRS will not provide a valid magnetic heading :

R · For latitude greater than 82 degrees North,
R · For latitude greater than 73 degrees North, between 90 degrees and 120 degrees West
R (magnetic polar region),
R · For latitude greater than 60 degrees South.

Flight outside of the above–noted limits is not permitted.

ENHANCED GROUND PROXIMITY WARNING SYSTEM (EGPWS) ◁

– Aircraft navigation is not to be predicated upon the use of the terrain display.
The terrain display is intended to serve as a situational awareness tool only, and may not provide the accuracy on which to solely base terrain avoidance maneuvering.
The EGPWS database, display, and alerting algorithms currently do not account for man made obstructions.
– The EGPWS enhanced function should be inhibited (TERR pushbutton switched OFF on the GPWS panel) when the aircraft position is less than 15 NM from the airfield :
  · For operations to/from runways not incorporated in the EGPWS database ;
  · For specific approach procedures, which have previously been identified as potentially producing false terrain alerts.

ISIS

When both PFDs are lost, the ISIS bugs function must not be used.

COCKPIT FIXED OXYGEN SYSTEM

MINIMUM FLIGHT CREW OXYGEN PRESSURE

REF TEMPERATURE *		Deg. C	– 10	0	10	20	30	40	50
		Deg. F	14	32	50	68	86	104	122
MIN ** BOTTLE PRESSURE (PSI)	2 CREWMEMBERS		656	681	706	731	756	781	806
	2 CREWMEMBERS	+1 OBS	861	893	926	959	992	1024	1057
	2 CREWMEMBERS	+2 OBS	1090	1132	1173	1215	1256	1298	1339

* REF TEMPERATURE :
. On ground : (OAT + COCKPIT TEMP) / 2
. In flight : CAB TEMP (deg. C) – 10 deg. C
or
CAB TEMP (deg. F) – 18 deg. F

** MINIMUM BOTTLE PRESSURE TO TAKE INTO ACCOUNT :
– Preflight checks
– The use of oxygen, when only one flight crewmember is in the cockpit
– Unusable quantity (to ensure that the regulator functions with minimum pressure)
– Normal system leakage
and
· Protection after loss of cabin pressure, with mask regulator on NORMAL (diluted oxygen):
R – During an emergency descent : For all cockpit members for 13 minutes
R – During cruise at FL 100 : For 2 flight crewmembers for 107 minutes.
or
R · Protection in case of smoke, with 100 % oxygen : For all cockpit members for 15 minutes at a cabin altitude of 8000 feet.

Note : The above times are based on the use of a sealed mask, but may be shorter if the flight crewmember has a beard.

COCKPIT FIXED OXYGEN SYSTEM

MINIMUM FLIGHT CREW OXYGEN PRESSURE

REF TEMPERATURE *		Deg. C	– 10	0	10	20	30	40	50
		Deg. F	14	32	50	68	86	104	122
MIN ** BOTTLE PRESSURE (PSI)	2 CREWMEMBERS		509	529	548	567	587	606	626
	2 CREWMEMBERS	+1 OBS	615	638	661	685	708	732	755
	2 CREWMEMBERS	+2 OBS	768	798	827	856	885	915	944

* REF TEMPERATURE :
. On ground : (OAT + COCKPIT TEMP) / 2
. In flight : CAB TEMP (deg. C) – 10 deg. C
or
CAB TEMP (deg. F) – 18 deg. F

** MINIMUM BOTTLE PRESSURE TO TAKE INTO ACCOUNT :
– Preflight checks
– The use of oxygen, when only one flight crewmember is in the cockpit
– Unusable quantity (to ensure that the regulator functions with minimum pressure)
– Normal system leakage
and
· Protection after loss of cabin pressure, with mask regulator on NORMAL (diluted oxygen):
R – During an emergency descent : For all cockpit members for 22 minutes
R – During cruise at FL 100 : For 2 flight crewmembers for 98 minutes.
or
R · Protection in case of smoke, with 100 % oxygen : For all cockpit members for 15 minutes at a cabin altitude of 8000 feet.

Note : The above times are based on the use of a sealed mask, but may be shorter if the flight crewmember has a beard.

GENERAL

OIL QUANTITY

R The APU may be started and operated even if the LOW OIL LEVEL ECAM advisory is
R displayed. Maintenance action is required within next 10 hours of APU operation.

APU STARTER

After 3 starter motor duty cycles, wait 60 minutes before attempting 3 more cycles.

ROTOR SPEED

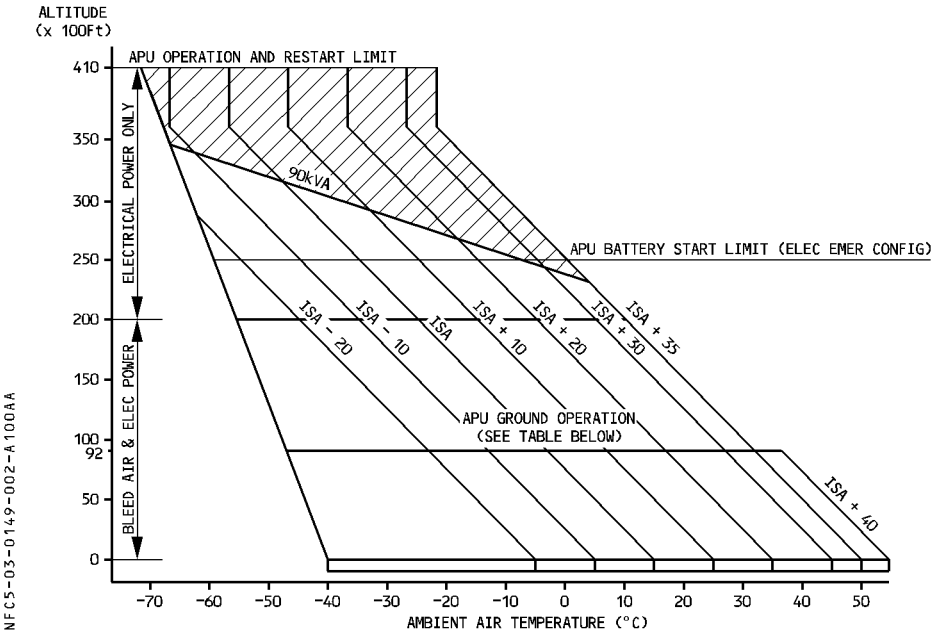
· Maximum N (ECAM display) . . . . . 107 %

Note : The APU automatically shuts down at 107 % N speed, that appears on the ECAM. This corresponds to an actual N speed of 105 %.

EGT

Maximum EGT for start :
· Below 25000 feet . . . . . 900 degrees C
· Above 25000 feet . . . . . 982 degrees C
Maximum EGT, with APU running :
– 682 degrees C, with 5 seconds confirmation time for shutdown, or
– From 700 degrees C to 742 degrees C for immediate shutdown, depending on the ambient temperature.

ENVELOPE



GENERATOR LOAD IN FLIGHT			
TEMP ▶ MAX ALT (FT) ▼	ISA	ISA + 20	ISA + 35
25000	100 % (90 KVA)	100 % (90 KVA)	100 % (90 KVA)
30000	100 % (90 KVA)	92 % (83 KVA)	84 % (76 KVA)
35000	86 % (78 KVA)	71 % (64 KVA)	67 % (60 KVA)
39000	70 % (63 KVA)	56 % (51 KVA)	53 % (48 KVA)

GENERATOR LOAD ON THE GROUND				
TEMP ▶ ALT (FT) ▼		ISA	ISA + 20	ISA + 40
0	ENG START	100 % (90 KVA)	100 % (90 KVA)	71 % (64 KVA)
	PACKS			39 % (35 KVA*)
9200	ENG START			57 % (51 KVA)
	PACKS			60 % (54 KVA)

(*) : generator load with maximum air conditioning demand.

GENERAL

OIL QUANTITY

R The APU may be started and operated even if the LOW OIL LEVEL ECAM advisory is
R displayed. Maintenance action is required within next 10 hours of APU operation.

APU STARTER

After 3 starter motor duty cycles, wait 60 minutes before attempting 3 more cycles.

ROTOR SPEED

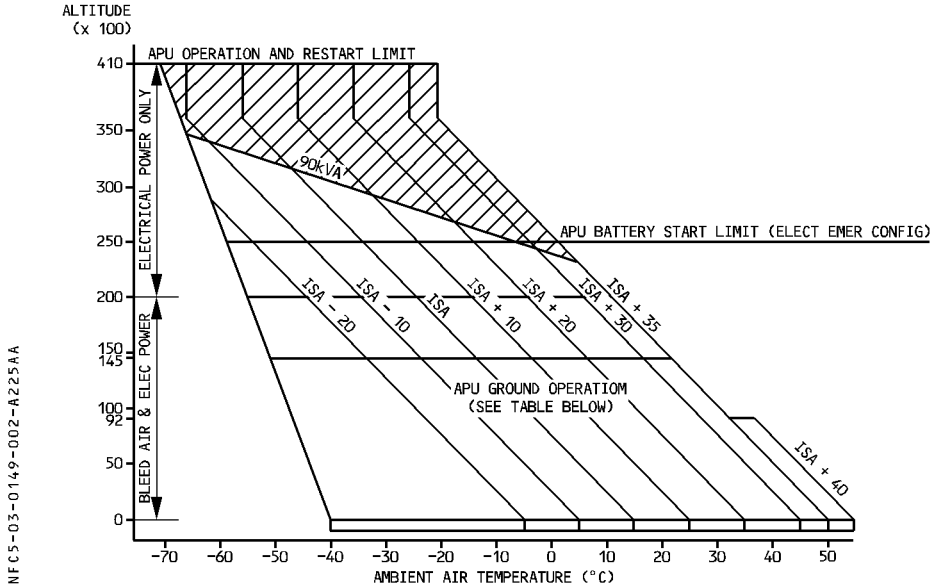
· Maximum N (ECAM display) . . . . . 107 %

Note : The APU automatically shuts down at 107 % N speed, that appears on the ECAM. This corresponds to an actual N speed of 105 %.

EGT

Maximum EGT for start :
· Below 25000 feet . . . . . 900 degrees C
· Above 25000 feet . . . . . 982 degrees C
Maximum EGT, with APU running :
– 682 degrees C, with 5 seconds confirmation time for shutdown, or
– From 700 degrees C to 742 degrees C for immediate shutdown, depending on the ambient temperature.

ENVELOPE



GENERATOR LOAD IN FLIGHT			
TEMP ▶ MAX ALT (FT) ▼	ISA	ISA + 20	ISA + 35
25000	100 % (90 KVA)	100 % (90 KVA)	100 % (90 KVA)
30000	100 % (90 KVA)	92 % (83 KVA)	84 % (76 KVA)
35000	86 % (78 KVA)	71 % (64 KVA)	67 % (60 KVA)
39000	70 % (63 KVA)	56 % (51 KVA)	53 % (48 KVA)

GENERATOR LOAD ON GROUND				
TEMP ▶ ALT (FT) ▼		ISA	ISA + 20	ISA + 40
0	ENG START	100 % (90 KVA)	100 % (90 KVA)	71 % (64 KVA)
	PACKS			39 % (35 KVA*A)
9200	ENG START			57 % (51 KVA)
	PACKS			60 % (54 KVA)
14500	ENG START	57 % (51 KVA)	55 % (50 KVA)	41 % (37 KVA **)
	PACKS	100 % (90 KVA)	83 % (75 KVA)	65 % (59 KVA**)

(*) : Generator load with maximum air conditioning demand.
(**): Above 9200 feet, maximum temperature : ISA + 35°C.

– Electric power extraction :
At or below 25000 ft :
· ISA + 35° and below . . . . . 90 kVA
– Air bleed and generator load in flight :

R

MAXIMUM ALTITUDE FOR BLEED AIR AND GENERATOR LOAD IN FLIGHT			
TEMP ▶ MAX ALT (FT) ▼	ISA	ISA + 20	ISA + 35
ENG START UP TO 15000 ft IF SPEED BELOW 150 kt	58 % (53 KVA)	51 % (46 KVA)	45 % (41 KVA)
ENG START UP TO 20000 ft IF SPEED ABOVE 150 kt			
ONE PACK UP TO 20000 ft	71 % (64 KVA)	64 % (58 KVA)	61 % (55 KVA)
TWO PACKS UP TO 15000 ft	88 % (80 KVA)	76 % (69 KVA)	64 % (58 KVA)

– Air bleed extraction for wing anti-icing is not permitted.

THRUST SETTING/EGT LIMITS

OPERATING CONDITION	TIME LIMIT	EGT LIMIT	NOTE
TAKEOFF and GO AROUND	5 mn	635° C	
	10 mn		Only in case of engine failure
MCT	Unlimited	610° C	
STARTING		635° C	

OIL

Oil temperature

Minimum prior to exceeding idle . . . . . – 10° C
Minimum prior to takeoff . . . . . 50° C
Maximum continuous temperature . . . . . 155° C
Maximum transient temperature (15 minutes) . . . . . 165° C
Minimum starting temperature . . . . . – 40° C
Minimum oil quantity . . . . . refer to 3.03.04

Minimum oil pressure

Minimum oil pressure . . . . . 60 psi

RPM

N1 max . . . . . 100 %

Note : The N1 limit depends upon ambient conditions and engine airbleed configuration. These may limit N1 to a value lower than the one noted above (see 3.05.06).

N2 max . . . . . 100 %

STARTER

- 3 consecutive cycles : 2 cycles of 2 minutes each, followed by a 3rd cycle of 1 minute.
- Pause between start attempts : 15 seconds.
- Cooling period, following 3 starts attempts or 4 minutes of continuous cranking : 30 minutes.
- No running engagement of the starter, when N2 is above 10 % on ground, and 18 % in flight.

REVERSE THRUST

- It is not permitted to select reverse thrust in flight.
- It is not permitted to back up the aircraft with reverse thrust.
- Maximum reverse should not be used below 70 knots (or when the airspeed indication starts to fluctuate). Idle reverse is permitted down to aircraft stop.

REDUCED THRUST TAKEOFF

- Takeoff at reduced thrust is only permitted, if the airplane meets all applicable performance requirements at the planned takeoff weight, with the operating engines at the thrust available for the assumed temperature.
- Thrust reduction must not exceed 25 % of the full rated takeoff thrust. To meet the
R requirement, the flexible temperature must not be higher than ISA + 55 (T MAX FLEX).
- The assumed temperature must not be lower than the flat rating temperature, or the actual OAT.
- Takeoff at reduced thrust is not permitted on contaminated runways.
- Takeoff at reduced thrust is permitted with any inoperative item affecting the performance, only if the associated performance shortfall has been applied to meet all performance requirements at the takeoff weight, with the operating engines at the thrust available for the flex temperature.

THRUST SETTING/EGT LIMITS

OPERATING CONDITION	TIME LIMIT	EGT LIMIT	NOTE
TAKEOFF and GO AROUND	5 mn	635° C	
	10 mn		Only in case of engine failure
MCT	Unlimited	610° C	
STARTING		635° C	

OIL

Oil temperature

Minimum prior to exceeding idle . . . . . – 10° C
Minimum prior to takeoff . . . . . 50° C
Maximum continuous temperature . . . . . 155° C
Maximum transient temperature (15 minutes) . . . . . 165° C
Minimum starting temperature . . . . . – 40° C
Minimum oil quantity . . . . . refer to 3.03.04

Minimum oil pressure

Minimum oil pressure . . . . . 60 psi

RPM

N1 max . . . . . 100 %

Note : The N1 limit depends upon ambient conditions and engine airbleed configuration. These may limit N1 to a value lower than the one noted above (see 3.05.06).

N2 max . . . . . 100 %

STARTER

- 3 consecutive cycles : 2 cycles of 2 minutes each, followed by a 3rd cycle of 1 minute.
- Pause between start attempts : 15 seconds.
- Cooling period, following 3 starts attempts or 4 minutes of continuous cranking : 30 minutes.
- No running engagement of the starter, when N2 is above 10 % on ground, and 18 % in flight.

REVERSE THRUST

- It is not permitted to select reverse thrust in flight.
- It is not permitted to back up the aircraft with reverse thrust.
- Maximum reverse should not be used below 70 knots (or when the airspeed indication starts to fluctuate). Idle reverse is permitted down to aircraft stop.

REDUCED THRUST TAKEOFF

- Takeoff at reduced thrust is only permitted, if the airplane meets all applicable performance requirements at the planned takeoff weight, with the operating engines at the thrust available for the assumed temperature.
- Thrust reduction must not exceed 25 % of the full rated takeoff thrust. To meet the
R requirement, the flexible temperature must not be higher than ISA + 65 (T MAX FLEX).
- The assumed temperature must not be lower than the flat rating temperature, or the actual OAT.
- Takeoff at reduced thrust is not permitted on contaminated runways.
- Takeoff at reduced thrust is permitted with any inoperative item affecting the performance, only if the associated performance shortfall has been applied to meet all performance requirements at the takeoff weight, with the operating engines at the thrust available for the flex temperature.

THRUST SETTING/EGT LIMITS

OPERATING CONDITION	TIME LIMIT	EGT LIMIT	NOTE
TAKEOFF and GO AROUND	5 mn	749° C	
	10 mn		Only in case of engine failure
MCT	Unlimited	727° C	
STARTING		749° C 727° C	On ground In flight

OIL

Oil temperature

Minimum prior to takeoff . . . . . 50° C
Max continuous temperature . . . . . 163° C
Max transient temperature (20 min) . . . . . 177° C
Minimum oil quantity . . . . . refer to 3.03.04

Minimum oil pressure

Minimum oil pressure . . . . . 25 psi

RPM

N1 max . . . . . 100 %

Note : The N1 limit depends upon ambient conditions and engine airbleed configuration. These may limit N1 to a value lower than the one noted above (see 3.05.06).

N2 max . . . . . 100 %

STARTER

- 3 consecutive cycles.
- Pause between start attempts : 15 seconds.
- Cooling period, following 3 start attempts : 30 minutes.
- Maximum starter re-engagement speed : 35 % N2.

Note : Abnormally high tailwinds (> 15 knots) or crosswinds (> 35 knots) may have an adverse effect on starting. It may be neccessary to reposition the airplane into the wind.

REVERSE THRUST

- It is not permitted to select reverse thrust in flight.
- It is not permitted to back up the aircraft with reverse thrust.
- Maximum reverse should not be used below 70 knots. Idle reverse is permitted down to aircraft stop.

REDUCED THRUST TAKEOFF

- Takeoff at reduced thrust is only permitted, if the airplane meets all applicable performance requirements at the planned takeoff weight, with the operating engines at the thrust available for the assumed temperature.
- R Thrust reduction must not exceed 25 % of the full rated takeoff thrust. To meet the requirement, the flexible temperature must not be higher than ISA + 46 (T MAX FLEX).
- The assumed temperature must not be lower than the flat rating temperature, or the actual OAT.
- Takeoff at reduced thrust is not permitted on contaminated runways.
- Takeoff at reduced thrust is permitted with any inoperative item affecting the performance, only if the associated performance shortfall has been applied to meet all performance requirements at the takeoff weight, with the operating engines at the thrust available for the flex temperature.

CROSS WIND OPERATION ON GROUND

R This engine is capable of starting in crosswinds up to 35 knots.

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02.21 AIR/PRESS/VENT

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BLOWER FAULT 13
CABIN OVERPRESSURE 10
CRG HEAT FAULT (◁) 5
CRG ISOL VALVE (◁) 5
CRG VENT FAULT (◁) 5
DUCT OVHT 3
EXCESS CAB ALT 8
EXTRACT FAULT 13
GND COOL FAULT(◁) 14
HOT AIR FAULT 4
L + R CAB FAN FAULT 6
LAV + GALLEY FAN FAULT 6
LDG ELEV FAULT 11
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PACK 1 + 2 FAULT 2
PACK 1(2) FAULT or OVHT or OFF 1
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YAW DAMPER 1(2) 1
YAW DAMPER SYS 1

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CIDS 1 + 2 FAULT 1
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02.21 AIR/PRESS/VENT

AVNCS SYS FAULT 14
BLOWER FAULT 13
CABIN OVERPRESSURE 10
CRG HEAT FAULT (◁) 5
CRG ISOL VALVE (◁) 5
CRG VENT FAULT (◁) 5
DUCT OVHT 3
EXCESS CAB ALT 8
EXTRACT FAULT 13
GND COOL FAULT(◁) 14
HOT AIR FAULT 4
L + R CAB FAN FAULT 6
LAV + GALLEY FAN FAULT 6
LDG ELEV FAULT 11
LO DIFF PR 11
OUTFLOW VALVE NOT OPEN 11
PACK 1 + 2 FAULT 2
PACK 1(2) FAULT or OVHT or OFF 1
R PACK 1(2) REGUL FAULT 2A
SAFETY VALVE OPEN 12
SKIN VALVE FAULT 13
SYS 1(2) (1 + 2) FAULT 9
TOO HOT/COLD COCKPIT AND CABIN TEMPERATURE IN FLIGHT (◁) 7
TRIM AIR SYS FAULT 4
ZONE REGUL FAULT 6

02.22 AUTO FLT

AP OFF / A / THR OFF/A/THR LIMITED (◁) 6
FAC 1(2) FAULT 3
FAC 1 + 2 FAULT 4
FCU 1(2) (1 + 2) FAULT 5
LOSS OF FMS DATA IN DESCENT/APPROACH (SEVERE RESET) 8
LOW ENERGY WARNING (◁) 7
R REAC W/S DET FAULT (◁) 7
RUD TRIM 1(2) FAULT 2
RUD TRIM SYS 2
RUD TRV LIM 1(2) 2
RUD TRV LIM SYS 3
WINDSHEAR DET FAULT (◁) 7
YAW DAMPER 1(2) 1
YAW DAMPER SYS 1

02.23 COMUNICATIONS

ACARS FAULT (◁) 1
CIDS 1 + 2 FAULT 1
HF EMITTING (◁) 1
SATCOM FAULT (◁) 1
VHF EMITTING 1

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R CIRCLING APPROACH WITH ONE ENGINE INOPERATIVE 6a
LANDING WITH SLATS OR FLAPS JAMMED 7

02.21 AIR/PRESS/VENT

AVNCS SYS FAULT 14
BLOWER FAULT 13
CABIN OVERPRESSURE 10
CRG HEAT FAULT (◁) 5
CRG ISOL VALVE (◁) 5
CRG VENT FAULT (◁) 5
DUCT OVHT 3
EXCESS CAB ALT 8
EXTRACT FAULT 13
GND COOL FAULT(◁) 14
HOT AIR FAULT 4
L + R CAB FAN FAULT 6
LAV + GALLEY FAN FAULT 6
LDG ELEV FAULT 11
LO DIFF PR 11
OUTFLOW VALVE NOT OPEN 11
PACK 1 + 2 FAULT 2
PACK 1(2) FAULT or OVHT or OFF 1
R PACK 1(2) REGUL FAULT 2A
SAFETY VALVE OPEN 12
SKIN VALVE FAULT 13
SYS 1(2) (1 + 2) FAULT 9
TOO HOT/COLD COCKPIT AND CABIN TEMPERATURE IN FLIGHT(◁) 7
TRIM AIR SYS FAULT 4
ZONE REGUL FAULT 6

02.22 AUTO FLT

AP OFF / A / THR OFF/A/THR LIMITED (◁) 6
FAC 1(2) FAULT 3
FAC 1 + 2 FAULT 4
FCU 1(2) (1 + 2) FAULT 5
LOSS OF FMS DATA IN DESCENT/APPROACH (SEVERE RESET) 8
LOW ENERGY WARNING (◁) 7
R REAC W/S DET FAULT (◁) 7
RUD TRIM 1(2) FAULT 2
RUD TRIM SYS 2
RUD TRV LIM 1(2) 2
RUD TRV LIM SYS 3
WINDSHEAR DET FAULT (◁) 7
YAW DAMPER 1(2) 1
YAW DAMPER SYS 1

02.23 COMMUNICATIONS

CIDS 1 + 2 FAULT 1
HF EMITTING (◁) 1
VHF EMITTING 1
ACARS FAULT (◁) 1
SATCOM FAULT (◁) 1
SATCOM DATA FAULT (◁) 2
VHF 3 DATA FAULT (◁) 2
HF 1(2) DATA FAULT (◁) 2

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CIRCLING APPROACH WITH ONE ENGINE INOPERATIVE 6a
LANDING WITH SLATS OR FLAPS JAMMED 7

02.21 AIR/PRESS/VENT

AVNCS SYS FAULT 14
BLOWER FAULT 13
CABIN OVERPRESSURE 10
COND CTL 1(2) – A(B) FAULT 14
CRG HEAT FAULT (◁) 5
CRG ISOL VALVE (◁) 5
CRG VENT FAULT (◁) 5
DUCT OVHT 3
EXCESS CAB ALT 8
EXTRACT FAULT 13
GND COOL FAULT(◁) 14
HOT AIR FAULT 4
L + R CAB FAN FAULT 6
LAV + GALLEY FAN FAULT 6
LDG ELEV FAULT 11
LO DIFF PR 11
OUTFLOW VALVE NOT OPEN 11
PACK 1 + 2 FAULT 2
PACK 1(2) FAULT or OVHT or OFF 1
R PACK 1(2) REGUL FAULT 2A
SAFETY VALVE OPEN 12
SKIN VALVE FAULT 13
SYS 1(2) (1 + 2) FAULT 9
TOO HOT/COLD COCKPIT AND CABIN TEMPERATURE IN FLIGHT (◁) 7
TRIM AIR SYS FAULT 4

02.22 AUTO FLT

AP OFF / A / THR OFF/A/THR LIMITED (◁) 6
FAC 1(2) FAULT 3
FAC 1 + 2 FAULT 4
FCU 1(2) (1 + 2) FAULT 5
LOSS OF FMS DATA IN DESCENT/APPROACH (SEVERE RESET) 8
LOW ENERGY WARNING (◁) 7
R REAC W/S DET FAULT (◁) 7
RUD TRIM 1(2) FAULT 2
RUD TRIM SYS 2
RUD TRV LIM 1(2) 2
RUD TRV LIM SYS 3
WINDSHEAR DET FAULT (◁) 7
YAW DAMPER 1(2) 1
YAW DAMPER SYS 1

02.23 COMMUNICATIONS

CIDS 1 + 2 FAULT 1
HF EMITTING (◁) 1
VHF EMITTING 1
ACARS FAULT (◁) 1
SATCOM FAULT (◁) 1
SATCOM DATA FAULT (◁) 2
VHF 3 DATA FAULT (◁) 2
HF 1(2) DATA FAULT (◁) 2

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CIRCLING APPROACH WITH ONE ENGINE INOPERATIVE 6a
LANDING WITH SLATS OR FLAPS JAMMED 7

02.21 AIR/PRESS/VENT

AVNCS SYS FAULT 14
BLOWER FAULT 13
CABIN OVERPRESSURE 10
COND CTL 1(2) – A(B) FAULT 14
CRG HEAT FAULT (◁) 5
CRG ISOL VALVE (◁) 5
CRG VENT FAULT (◁) 5
DUCT OVHT 3
EXCESS CAB ALT 8
EXCESS RESIDUAL PR 11
EXTRACT FAULT 13
GND COOL FAULT(◁) 14
HOT AIR FAULT 4
L + R CAB FAN FAULT 6
LAV + GALLEY FAN FAULT 6
LDG ELEV FAULT 11
LO DIFF PR 11
OFV NOT OPEN 11
PACK 1 + 2 FAULT 2
PACK 1(2) FAULT or OVHT or OFF 1
PACK 1(2) REGUL FAULT 2A
SAFETY VALVE OPEN 12
SKIN VALVE FAULT 13
SYS 1(2) (1 + 2) FAULT 9
TOO HOT/COLD COCKPIT AND CABIN TEMPERATURE IN FLIGHT (◁) 7
TRIM AIR SYS FAULT 4

02.22 AUTO FLT

AP OFF / A / THR OFF/A/THR LIMITED (◁) 6
FAC 1(2) FAULT 3
FAC 1 + 2 FAULT 4
FCU 1(2) (1 + 2) FAULT 5
LOSS OF FMS DATA IN DESCENT/APPROACH (SEVERE RESET) 8
LOW ENERGY WARNING (◁) 7
R REAC W/S DET FAULT (◁) 7
RUD TRIM 1(2) FAULT 2
RUD TRIM SYS 2
RUD TRV LIM 1(2) 2
RUD TRV LIM SYS 3
WINDSHEAR DET FAULT (◁) 7
YAW DAMPER 1(2) 1
YAW DAMPER SYS 1

02.23 COMMUNICATIONS

CIDS 1 + 2 FAULT 1
HF EMITTING (◁) 1
VHF EMITTING 1
ACARS FAULT (◁) 1
SATCOM FAULT (◁) 1
SATCOM DATA FAULT (◁) 2
VHF 3 DATA FAULT (◁) 2
HF 1(2) DATA FAULT (◁) 2

02.24 ELECTRICAL

AC BUS 1 FAULT 3
AC BUS 2 FAULT 5
AC ESS BUS FAULT 6
AC ESS BUS SHED 7
APU GEN FAULT 2
BAT 1(2) FAULT/OFF 2
BCL 1(2) FAULT 2
C / B TRIPPED 28
DC BAT BUS FAULT 24
DC BUS 1 + 2 FAULT 13
DC BUS 1 FAULT 8
DC BUS 2 FAULT 9
DC EMER CONFIG 25
DC ESS BUS FAULT 10
DC ESS BUS SHED 12
EMER CONFIG 15
ELEC EMER CONFIG – SYS REMAINING 20
EMER GEN 1 LINE OFF 27
ESS BUSSES ON BAT 19
R FLT ON BAT ONLY 19
GEN 1(2) FAULT 1
GEN 1(2) OFF 1
GEN 1(2) or APU GEN OVER LOAD 24
IDG 1(2) OIL PR / OVHT 1
STAT INV FAULT 27
TR 1(2) or ESS TR FAULT 24

02.25 COCKPIT DOOR

COCKPIT DOOR FAULT 1

02.26 FIRE PROTECTION

APU FIRE 3
ENG 1(2) FIRE (IN FLIGHT). 3
ENG 1(2) FIRE (ON GROUND) 2
ENG 1(2) / APU FIRE DET FAULT 1
ENG 1(2) / APU FIRE LOOP A(B) FAULT 1
FWD (AFT) BTL SQUIB FAULT (◁) 11
FWD (AFT) CARGO SMOKE 11
FWD (AFT) CRG DET FAULT (◁) 11
LAV + CRG DET FAULT 12
LAVATORY DET FAULT 12
LAVATORY SMOKE (◁) 12
SMOKE/FUMES/AVNCS SMOKE 4
SMOKE/FUMES REMOVAL 9

02.27 FLIGHT CONTROLS

ACTIVE CONTROL LAW 20
ADR DISAGREE . . . . . REFER TO 02.34
AIL SERVO FAULT 11
ALTN LAW 10
CONFIG L(R) SIDESTICK FAULT 9
CONFIG PITCH TRIM NOT IN T.O RANGE 9
CONFIG RUD TRIM NOT IN T.O RANGE ◁ 10
R CONFIG SLATS (FLAPS) NOT IN T.O. CONFIG 5
CONFIG SPD BRK NOT RETRACTED 8
DIRECT LAW 9
ELAC 1(2) PITCH FAULT 7
R ELAC 1(2) FAULT 6
ELEV and STAB CONTROL AFTER FAILURE 21
ELEV SERVO FAULT 12
FCDC FAULT 11
FLAP ATTACH SENSOR 5
FLAPS/SLATS FAULT/LOCKED 3
FLAP/SLAT SYS 1(2) FAULT 5
FLAP/SLAT TIP BRK FAULT 5
FLAPS FAULT/LOCKED 1
GND SPLR FAULT 14
IR DISAGREE . . . . . REFER TO 02.34
L(R) AIL FAULT 11
L(R) ELEV FAULT 13
L(R) SIDESTICK FAULT 5
L + R ELEV FAULT 12
LAF ACCU FAULT (A320 with LAF only) 15
RUDDER JAM 19
R SEC 1(2)(3) FAULT 8
SIDESTICK PRIORITY(◁) 16
SLATS and FLAPS FAULT in conf 0 4
SLATS FAULT/LOCKED 2
SPD BRK DISAGREE 14
SPD BRK FAULT 15
R SPLR FAULT 13a
STABILIZER JAM 17

02.24 ELECTRICAL

AC BUS 1 FAULT 3
AC BUS 2 FAULT 5
AC ESS BUS FAULT 6
AC ESS BUS SHED 7
APU GEN FAULT 2
BAT 1(2) FAULT/OFF 2
BCL 1(2) FAULT 2
C / B TRIPPED 28
DC BAT BUS FAULT 24
DC BUS 1 + 2 FAULT 13
DC BUS 1 FAULT 8
DC BUS 2 FAULT 9
DC EMER CONFIG 25
DC ESS BUS FAULT 10
DC ESS BUS SHED 12
EMER CONFIG 15
ELEC EMER CONFIG – SYS REMAINING 20
EMER GEN 1 LINE OFF 27
ESS BUSSES ON BAT 19
GEN 1(2) FAULT 1
GEN 1(2) OFF 1
GEN 1(2) or APU GEN OVER LOAD 24
IDG 1(2) OIL PR / OVHT 1
STAT INV FAULT 27
TR 1(2) or ESS TR FAULT 24

02.25 COCKPIT DOOR

COCKPIT DOOR FAULT 1

02.26 FIRE PROTECTION

APU FIRE 3
ENG 1(2) FIRE (IN FLIGHT). 3
ENG 1(2) FIRE (ON GROUND) 2
ENG 1(2) / APU FIRE DET FAULT 1
ENG 1(2) / APU FIRE LOOP A(B) FAULT 1
FWD (AFT) CARGO SMOKE 11
FWD (AFT) CRG BTL (1) (2 ◁) FAULT 11
FWD (AFT) CRG DET FAULT (◁) 11
LAV + CRG DET FAULT 12
LAVATORY DET FAULT 12
LAVATORY SMOKE (◁) 12
SMOKE/FUMES/AVNCS SMOKE 4
SMOKE/FUMES REMOVAL 9

02.27 FLIGHT CONTROLS

ACTIVE CONTROL LAW 20
ADR DISAGREE . . . . . REFER TO 02.34
AIL SERVO FAULT 11
ALTN LAW 10
CONFIG L(R) SIDESTICK FAULT 9
CONFIG PITCH TRIM NOT IN T.O RANGE 9
CONFIG RUD TRIM NOT IN T.O RANGE ◁ 10
CONFIG SLATS (FLAPS) NOT IN T.O. CONFIG 5
CONFIG SPD BRK NOT RETRACTED 8
DIRECT LAW 9
ELAC 1(2) PITCH FAULT 7
ELAC 1(2) FAULT 6
ELEV and STAB CONTROL AFTER FAILURE 21
ELEV SERVO FAULT 12
FCDC FAULT 11
R FLAP ATTACH SENSOR 5
FLAPS/SLATS FAULT/LOCKED 3
FLAP/SLAT SYS 1(2) FAULT 5
FLAP/SLAT TIP BRK FAULT 5
FLAPS FAULT/LOCKED 1
GND SPLR FAULT 14
IR DISAGREE . . . . . REFER TO 02.34
L(R) AIL FAULT 11
L(R) ELEV FAULT 13
L(R) SIDESTICK FAULT 5
L + R ELEV FAULT 12
LAF ACCU FAULT (A320 with LAF only) 15
RUDDER JAM 19
SEC 1(2)(3) FAULT 8
SIDESTICK PRIORITY(◁) 16
SLATS and FLAPS FAULT in conf 0 4
SLATS FAULT/LOCKED 2
SPD BRK DISAGREE 14
SPD BRK FAULT 15
SPD BRK STILL OUT 19
SPLR FAULT 13a
STABILIZER JAM 17

02.24 ELECTRICAL

AC BUS 1 FAULT 3
AC BUS 2 FAULT 5
AC ESS BUS FAULT 6
AC ESS BUS SHED 7
APU GEN FAULT 2
BAT 1(2) FAULT/OFF 2
BCL 1(2) FAULT 2
C / B TRIPPED 28
DC BAT BUS FAULT 24
DC BUS 1 + 2 FAULT 13
DC BUS 1 FAULT 8
DC BUS 2 FAULT 9
DC EMER CONFIG 25
DC ESS BUS FAULT 10
DC ESS BUS SHED 12
EMER CONFIG 15
ELEC EMER CONFIG – SYS REMAINING 20
EMER GEN 1 LINE OFF 27
ESS BUSSES ON BAT 19
GEN 1(2) FAULT 1
GEN 1(2) OFF 1
GEN 1(2) or APU GEN OVER LOAD 24
IDG 1(2) OIL PR / OVHT 1
STAT INV FAULT 27
TR 1(2) or ESS TR FAULT 24

02.25 COCKPIT DOOR

COCKPIT DOOR FAULT 1

02.26 FIRE PROTECTION

APU FIRE 3
ENG 1(2) FIRE (IN FLIGHT). 3
ENG 1(2) FIRE (ON GROUND) 2
ENG 1(2) / APU FIRE DET FAULT 1
ENG 1(2) / APU FIRE LOOP A(B) FAULT 1
FWD (AFT) BTL SQUIB FAULT (◁) 11
FWD (AFT) CARGO SMOKE 11
FWD (AFT) CRG DET FAULT (◁) 11
LAV + CRG DET FAULT 12
LAVATORY DET FAULT 12
LAVATORY SMOKE (◁) 12
SMOKE/FUMES/AVNCS SMOKE 4
SMOKE/FUMES REMOVAL 9

02.27 FLIGHT CONTROLS

ACTIVE CONTROL LAW 20
ADR DISAGREE . . . . . REFER TO 02.34
AIL SERVO FAULT 11
ALTN LAW 10
CONFIG L(R) SIDESTICK FAULT 9
CONFIG PITCH TRIM NOT IN T.O RANGE 9
CONFIG RUD TRIM NOT IN T.O RANGE ◁ 10
CONFIG SLATS (FLAPS) NOT IN T.O. CONFIG 5
CONFIG SPD BRK NOT RETRACTED 8
DIRECT LAW 9
ELAC 1(2) PITCH FAULT 7
ELAC 1(2) FAULT 6
ELEV and STAB CONTROL AFTER FAILURE 21
ELEV SERVO FAULT 12
FCDC FAULT 11
FLAP ATTACH SENSOR 5
FLAP LVR NOT ZERO 19
FLAPS/SLATS FAULT/LOCKED 3
FLAP/SLAT SYS 1(2) FAULT 5
FLAP/SLAT TIP BRK FAULT 5
FLAPS FAULT/LOCKED 1
GND SPLR FAULT 14
IR DISAGREE . . . . . REFER TO 02.34
L(R) AIL FAULT 11
L(R) ELEV FAULT 13
L(R) SIDESTICK FAULT 5
L + R ELEV FAULT 12
LAF ACCU FAULT (A320 with LAF only) 15
RUDDER JAM 19
SEC 1(2)(3) FAULT 8
SIDESTICK PRIORITY(◁) 16
SLATS and FLAPS FAULT in conf 0 4
SLATS FAULT/LOCKED 2
SPD BRK DISAGREE 14
SPD BRK FAULT 15
SPD BRK STILL OUT 19
SPLR FAULT 13a
STABILIZER JAM 17

02.28 FUEL

R ACT PUMP LO PR (◁) 11
R ACT XFR FAULT (◁) 11
APU LP VALVE FAULT 6
AUTO FEED FAULT (◁) 7
CTR TK PUMP 1(2) LO PR (◁) 7
CTR TK PUMPS LO PR (◁) 7
R CTR TK PUMPS OFF (◁) 10
ENG 1(2) LP VALVE OPEN 6
FQI CH 1(2) FAULT 6
R FUEL IMBALANCE 9
FUEL LEAK 8
R GRVTY FUEL FEEDING 10
L(R) INNER (OUTER) TK HI TEMP 6
L(R) INNER (OUTER) TK LO TEMP 5
L(R) TK PUMP 1(2) LO PR 2
L(R) TK PUMP 1 + 2 LO PR 1
L(R) WING TK LO LVL 3
L(R) XFR VALVE CLOSED or OPEN 4
L + R WING TK LO LVL 3
XFEED VALVE FAULT 5

02.29 HYDRAULIC

B ELEC PUMP LO PR or OVHT 16
B RSVR LO AIR PR / OVHT / LO LVL 1
B + Y SYS LO PR 12
G RSVR LO AIR PR / OVHT / LO LVL 2
G(Y) ENG PUMP LO PR 15
G + B SYS LO PR 6
G + Y SYS LO PR 9
PTU FAULT 16
RAT FAULT 16
Y RSVR LO AIR PR / OVHT / LO LVL 4
Y ELEC PUMP LO PR or OVHT 14

02.30 ICE AND RAIN PROTECTION

CAPT (F / O) (STBY) PROBES 4
CAPT (F / O) AOA or TAT 3
CAPT PITOT or L(R) STAT 2
DOUBLE PROBE HEAT FAILURE 3
ENG 1(2) VALVE CLSD or OPEN 5
F / O PITOT or L(R) STAT 2
L(R) WINDSHIELD (WINDOW) 1
L + R WINDSHIELD 1
STBY PITOT or L(R) STAT or AOA 3
WING A ICE L(R) HI PR 8
WING A ICE L(R) VALVE OPEN 6
WING A ICE OPEN ON GND 8
WING A ICE SYS FAULT 8

02.31 INDICATING/RECORDING

DFDR or FDIU FAULT 1
DISPLAY UNIT FAILURE 4
R DMC 1(2)(3) FAULT 3
ECAM SINGLE DISPLAY 5
FWC 1(2) FAULT 3
FWC 1 + 2 FAULT 3
SDAC 1(2)FAULT 2
SDAC 1 + 2 FAULT 2
R TAILSTRIKE . . . . . REFER TO 02.80

02.28 FUEL

R ACT PUMP LO PR (◁) 11
R ACT XFR FAULT (◁) 11
APU LP VALVE FAULT 6
AUTO FEED FAULT (◁) 7
CTR TK PUMP 1(2) LO PR (◁) 7
CTR TK PUMPS LO PR (◁) 7
R CTR TK PUMPS OFF (◁) 10
ENG 1(2) LP VALVE OPEN 6
FQI CH 1(2) FAULT 6
R FUEL IMBALANCE 9
FUEL LEAK 8
R GRVTY FUEL FEEDING 10
L(R) INNER (OUTER) TK HI TEMP 6
L(R) INNER (OUTER) TK LO TEMP 5
L(R) TK PUMP 1(2) LO PR 2
L(R) TK PUMP 1 + 2 LO PR 1
L(R) WING TK LO LVL 3
L(R) XFR VALVE CLOSED or OPEN 4
L + R WING TK LO LVL 3
XFEED VALVE FAULT 5

02.29 HYDRAULIC

B ELEC PUMP LO PR or OVHT 16
B RSVR LO AIR PR / OVHT / LO LVL 1
B + Y SYS LO PR 12
G RSVR LO AIR PR / OVHT / LO LVL 2
G(Y) ENG PUMP LO PR 15
G + B SYS LO PR 6
G + Y SYS LO PR 9
PTU FAULT 16
RAT FAULT 16
Y RSVR LO AIR PR / OVHT / LO LVL 4
Y ELEC PUMP LO PR or OVHT 14

02.30 ICE AND RAIN PROTECTION

CAPT (F / O) (STBY) PROBES 4
CAPT (F / O) AOA or TAT 3
CAPT PITOT or L(R) STAT 2
DOUBLE PROBE HEAT FAILURE 3
ENG 1(2) VALVE CLSD or OPEN 5
F / O PITOT or L(R) STAT 2
L(R) WINDSHIELD (WINDOW) 1
L + R WINDSHIELD 1
STBY PITOT or L(R) STAT or AOA 3
WING A ICE L(R) HI PR 8
WING A ICE L(R) VALVE OPEN 6
WING A ICE OPEN ON GND 8
WING A ICE SYS FAULT 8

02.31 INDICATING/RECORDING

DFDR or FDIU FAULT 1
DISPLAY UNIT FAILURE 4
R DMC 1(2)(3) FAULT 3
ECAM SINGLE DISPLAY 5
FWC 1(2) FAULT 3
FWC 1 + 2 FAULT 3
FWS OEB/FWC DISCREPANCY 1
SDAC 1(2) FAULT 2
SDAC 1 + 2 FAULT 2
R TAILSTRIKE . . . . . REFER TO 02.80

02.28 FUEL

R ACT PUMP LO PR (◁) 11
R ACT XFR FAULT (◁) 11
APU LP VALVE FAULT 6
AUTO FEED FAULT (◁) 7
CTR TK PUMP 1(2) LO PR (◁) 7
CTR TK PUMPS LO PR (◁) 7
R CTR TK PUMPS OFF (◁) 10
ENG 1(2) LP VALVE OPEN 6
FQI CH 1(2) FAULT 6
R FUEL IMBALANCE 9
FUEL LEAK 8
R GRVTY FUEL FEEDING 10
L(R) INNER (OUTER) TK HI TEMP 6
L(R) INNER (OUTER) TK LO TEMP 5
L(R) TK PUMP 1(2) LO PR 2
L(R) TK PUMP 1 + 2 LO PR 1
L(R) WING TK LO LVL 3
L(R) XFR VALVE CLOSED or OPEN 4
L + R WING TK LO LVL 3
XFEED VALVE FAULT 5

02.29 HYDRAULIC

B ELEC PUMP LO PR or OVHT 16
B RSVR LO AIR PR / OVHT / LO LVL 1
B + Y SYS LO PR 12
G RSVR LO AIR PR / OVHT / LO LVL 2
G(Y) ENG PUMP LO PR 15
G + B SYS LO PR 6
G + Y SYS LO PR 9
PTU FAULT 16
RAT FAULT 16
Y RSVR LO AIR PR / OVHT / LO LVL 4
Y ELEC PUMP LO PR or OVHT 14

02.30 ICE AND RAIN PROTECTION

ALL PITOT 12
CAPT + F / O PITOT 9
CAPT + STBY PITOT 10
CAPT (F / O) (STBY) PROBES 4
CAPT (F / O) AOA or TAT 3
CAPT PITOT or L(R) STAT 2
DOUBLE STAT or AOA HEAT FAILURE 3
ENG 1(2) VALVE CLSD or OPEN 5
F / O PITOT or L(R) STAT 2
F / O + STBY PITOT 11
L(R) WINDSHIELD (WINDOW) 1
L + R WINDSHIELD 1
STBY PITOT or L(R) STAT or AOA 3
WING A ICE L(R) HI PR 8
WING A ICE L(R) VALVE OPEN 6
WING A ICE OPEN ON GND 8
WING A ICE SYS FAULT 8

02.31 INDICATING/RECORDING

DFDR or SYS FAULT 1
DISPLAY UNIT FAILURE 4
DMC 1(2)(3) FAULT 3
ECAM SINGLE DISPLAY 5
FWC 1(2) or 1 + 2 FAULT 3
OEB/FWC DISCREPANCY 1
SDAC 1(2) or 1 + 2 FAULT 2
R TAILSTRIKE . . . . . REFER TO 02.80

02.28 FUEL

R ACT PUMP LO PR (◁) 11
R ACT XFR FAULT (◁) 11
APU LP VALVE FAULT 6
AUTO FEED FAULT (◁) 7
CTR TK PUMP 1(2) LO PR (◁) 7
CTR TK PUMPS LO PR (◁) 7
R CTR TK PUMPS OFF (◁) 10
ENG 1(2) LP VALVE OPEN 6
FQI CH 1(2) FAULT 6
R FUEL IMBALANCE 9
FUEL LEAK 8
R GRVTY FUEL FEEDING 10
L(R) INNER (OUTER) TK HI TEMP 6
L(R) INNER (OUTER) TK LO TEMP 5
L(R) TK PUMP 1(2) LO PR 2
L(R) TK PUMP 1 + 2 LO PR 1
L(R) WING TK LO LVL 3
L(R) XFR VALVE CLOSED or OPEN 4
L + R WING TK LO LVL 3
XFEED VALVE FAULT 5

02.29 HYDRAULIC

B ELEC PUMP LO PR or OVHT 16
B RSVR LO AIR PR / OVHT / LO LVL 1
B + Y SYS LO PR 12
G RSVR LO AIR PR / OVHT / LO LVL 2
G(Y) ENG PUMP LO PR 15
G + B SYS LO PR 6
G + Y SYS LO PR 9
PTU FAULT 16
RAT FAULT 16
Y RSVR LO AIR PR / OVHT / LO LVL 4
Y ELEC PUMP LO PR or OVHT 14

02.30 ICE AND RAIN PROTECTION

ALL PITOT 12
CAPT (F / O) (STBY) PROBES 4
CAPT (F / O) TAT 3
CAPT PITOT or L(R) STAT or AOA 2
CAPT + F/O PITOT 9
CAPT + STBY PITOT 10
DETECT FAULT 5
DOUBLE STAT or AOA HEAT FAILURE 3
ENG 1(2) VALVE CLSD or OPEN 5
F / O PITOT or L(R) STAT 2
F / O + STBY PITOT 11
L(R) WINDSHIELD (WINDOW) 1
L + R WINDSHIELD 1
SEVERE ICE DETECTED 5
STBY PITOT or L(R) STAT or AOA 3
WING A ICE L(R) HI PR 8
WING A ICE L(R) VALVE OPEN 6
WING A ICE OPEN ON GND/ICE SYS FAULT 8

02.31 INDICATING/RECORDING

DFDR or SYS FAULT 1
DISPLAY UNIT FAILURE 4
DMC 1(2)(3) FAULT 3
ECAM SINGLE DISPLAY 5
FWC 1(2) or 1 + 2 FAULT 3
FWS OEB/FWC DISCREPANCY 1
SDAC 1(2) or 1 + 2 FAULT 2
TAILSTRIKE . . . . . REFER TO 02.80

02.28 FUEL

ACT PUMP LO PR (◁) 11
ACT XFR FAULT (◁) 11
APU LP VALVE FAULT 6
AUTO FEED FAULT (◁) 7
CTR TK PUMP 1(2) LO PR (◁) 7
CTR TK PUMPS LO PR (◁) 7
CTR TK PUMPS OFF (◁) 10
ENG 1(2) LP VALVE OPEN 6
FQI CH 1(2) FAULT 6
FUEL IMBALANCE 9
FUEL LEAK 8
F. USED/FOB DISAGREE 8
GRVTY FUEL FEEDING 10
L(R) INNER (OUTER) TK HI TEMP 6
L(R) INNER (OUTER) TK LO TEMP 5
L(R) TK PUMP 1(2) LO PR 2
L(R) TK PUMP 1 + 2 LO PR 1
L(R) WING TK LO LVL 3
L(R) XFR VALVE CLOSED or OPEN 4
L + R WING TK LO LVL 3
XFEED VALVE FAULT 5

02.29 HYDRAULIC

B ELEC PUMP LO PR or OVHT 16
B RSVR LO AIR PR / OVHT / LO LVL 1
B + Y SYS LO PR 12
G RSVR LO AIR PR / OVHT / LO LVL 2
G(Y) ENG PUMP LO PR 15
G + B SYS LO PR 6
G + Y SYS LO PR 9
PTU FAULT 16
RAT FAULT 16
Y RSVR LO AIR PR / OVHT / LO LVL 4
Y ELEC PUMP LO PR or OVHT 14

02.30 ICE AND RAIN PROTECTION

ALL PITOT 12
CAPT + F / O PITOT 9
CAPT + STBY PITOT 10
CAPT (F / O) (STBY) PROBES 4
CAPT (F / O) AOA or TAT 3
CAPT PITOT or L(R) STAT 2
DOUBLE STAT or AOA HEAT FAILURE 3
ENG 1(2) VALVE CLSD or OPEN 5
F / O PITOT or L(R) STAT 2
F / O + STBY PITOT 11
L(R) WINDSHIELD (WINDOW) 1
L + R WINDSHIELD 1
STBY PITOT or L(R) STAT or AOA 3
WING A ICE L(R) HI PR 8
WING A ICE L(R) VALVE OPEN 6
WING A ICE OPEN ON GND 8
WING A ICE SYS FAULT 8

02.31 INDICATING/RECORDING

DFDR or SYS FAULT 1
DISPLAY UNIT FAILURE 4
DMC 1(2)(3) FAULT 3
ECAM SINGLE DISPLAY 5
FWC 1(2) or 1 + 2 FAULT 3
OEB/FWC DISCREPANCY 1
SDAC 1(2) or 1 + 2 FAULT 2
R TAILSTRIKE . . . . . REFER TO 02.80

02.32 LANDING GEAR

BRAKES
A/SKID NWS FAULT 9
ANTI SKID / NWS OFF 9
AUTOBRK FAULT 10
BSCU CH 1(2) FAULT 9
CONFIG PARK BRAKE ON 9
HOT 10
LOSS OF BRAKING 11
R RESIDUAL BRAKING PROC 12

L/G
BOGIE ALIGN FAULT(◁) 4
DOORS NOT CLOSED 4
GEAR NOT DOWN 5
GEAR NOT DOWNLOCKED 2
GEAR NOT UPLOCKED 1
GEAR UPLOCK FAULT 4
GRAVITY EXTENSION 3
LDG WITH ABNORMAL L / G 6
LGCIU FAULT 5
SHOCK ABSORBER FAULT 1
R SYS DISAGREE 4A

WHEEL
HYD SEL FAULT 11
N.W. STEER FAULT 9
TYRE LO PR (◁) 11

02.34 NAVIGATION

R ADR DISAGREE 18
ADR FAULT 2
ADR 1 + 2 + 3 FAULT 4
BARO REF DISCREPANCY (◁) 1
EGPWS ALERTS (◁) 15
FM/GPS POS DISAGREE (◁) 13
GPS 1(2) FAULT (◁) 13
GPWS ALERTS (◁) 15
GPWS FAULT (◁) 14
GPWS TERR DET FAULT (◁) 16
HDG / ATT / ALTI DISCREPANCY 1
ILS 1(2) FAULT 14
IR ALIGNMENT IN ATT MODE 10
IR DISAGREE 11
IR FAULT 7
OVER SPEED 1
PRED W/S DET FAULT (◁) 10
RA 1(2) FAULT 12
TCAS FAULT (◁) 12
TCAS WARNINGS (◁) 17
R UNRELIABLE SPEED INDICATION/ADR CHECK PROC 20

02.32 LANDING GEAR

	BRAKES	A/SKID NWS FAULT	9
		ANTI SKID / NWS OFF	9
		AUTOBRK FAULT	10
		CONFIG PARK BRAKE ON	9
		HOT	10
		LOSS OF BRAKING	11
R		RESIDUAL BRAKING PROC	12
		SYS 1(2) FAULT	9
	L/G	BOGIE ALIGN FAULT(◁)	4
		DOORS NOT CLOSED	4
		GEAR NOT DOWN	5
		GEAR NOT DOWNLOCKED	2
		GEAR NOT UPLOCKED	1
		GEAR UPLOCK FAULT	4
		GRAVITY EXTENSION	3
		LDG WITH ABNORMAL L / G	6
		LGCIU FAULT	5
		SHOCK ABSORBER FAULT	1
R		SYS DISAGREE	4A
	WHEEL	HYD SEL FAULT	11
		N/W STRG FAULT	9
		TYRE LO PR (◁)	11

02.34 NAVIGATION

R ADR DISAGREE 18
ADR FAULT 2
ADR 1 + 2 + 3 FAULT 4
BARO REF DISCREPANCY (◁) 1
EGPWS ALERTS (◁) 15
FM/GPS POS DISAGREE (◁) 13
GPS 1(2) FAULT (◁) 13
GPWS ALERTS (◁) 15
GPWS FAULT (◁) 14
GPWS TERR DET FAULT (◁) 16
HDG / ATT / ALTI DISCREPANCY 1
ILS 1(2) FAULT 14
IR ALIGNMENT IN ATT MODE 10
IR DISAGREE 11
IR FAULT 7
OVER SPEED 1
PRED W/S DET FAULT (◁) 10
RA 1(2) FAULT 12
TCAS FAULT (◁) 12
TCAS WARNINGS (◁) 17
R UNRELIABLE SPEED INDICATION/ADR CHECK PROC 20

02.32 LANDING GEAR

	BRAKES	A/SKID NWS FAULT	9
		ANTI SKID / NWS OFF	9
		AUTOBRK FAULT	10
		CONFIG PARK BRAKE ON	9
		HOT	10
		LOSS OF BRAKING	11
R		RESIDUAL BRAKING PROC	12
		SYS 1(2) FAULT	9
	L/G	BOGIE ALIGN FAULT(◁)	4
		DOORS NOT CLOSED	4
		GEAR NOT DOWN	5
		GEAR NOT DOWNLOCKED	2
		GEAR NOT UPLOCKED	1
		GEAR UPLOCK FAULT	4
		GRAVITY EXTENSION	3
		LDG WITH ABNORMAL L / G	6
		LGCIU FAULT	5
		SHOCK ABSORBER FAULT	1
R		SYS DISAGREE	4A
	WHEEL	HYD SEL FAULT	11
		N/W STRG FAULT	9
		TYRE LO PR (◁)	11

02.34 NAVIGATION

R ADR DISAGREE 18
ADR FAULT 2
ADR 1 + 2 + 3 FAULT 4
BARO REF DISCREPANCY (◁) 1
EGPWS ALERTS (◁) 15
FM/GPS POS DISAGREE (◁) 13
GPS 1(2) FAULT (◁) 13
GPWS ALERTS (◁) 15
GPWS FAULT (◁) 14
GPWS TERR DET FAULT (◁) 16
HDG / ATT / ALTI DISCREPANCY 1
R IAS DISCREPANCY 19
ILS 1(2) FAULT 14
IR ALIGNMENT IN ATT MODE 10
IR DISAGREE 11
IR FAULT 7
OVER SPEED 1
PRED W/S DET FAULT (◁) 10
RA 1(2) FAULT 12
TCAS FAULT (◁) 12
TCAS WARNINGS (◁) 17
R UNRELIABLE SPEED INDICATION/ADR CHECK PROC 20

02.32 LANDING GEAR

BRAKES
A/SKID NWS FAULT 9
ALTN BRK FAULT 14
ALTN L(R) RELEASED 14
ANTI SKID / NWS OFF 9
ASYMMETRIC BRAKING 14
AUTOBRK FAULT 10
BRK Y ACCU LO PR 13
CONFIG PARK BRAKE ON 9
HOT 10
LOSS OF BRAKING 11
MINOR FAULT 14
NORM + ALTN FAULT 13
NORM BRK FAULT 13
RELEASED 13
RESIDUAL BRAKING PROC 12
SYS 1(2) FAULT 9

L/G
BOGIE ALIGN FAULT(◁) 4
DOORS NOT CLOSED 4
GEAR NOT DOWN 5
GEAR NOT DOWNLOCKED 2
GEAR NOT UPLOCKED 1
GEAR UPLOCK FAULT 4
GRAVITY EXTENSION 3
LDG WITH ABNORMAL L / G 6
LGCIU FAULT 5
SHOCK ABSORBER FAULT 1
SYS DISAGREE 4A

WHEEL
HYD SEL FAULT 11
N/W STRG FAULT 9
TYRE LO PR (◁) 11

02.34 NAVIGATION

R ADR DISAGREE 18
ADR FAULT 2
ADR 1 + 2 + 3 FAULT 4
BARO REF DISCREPANCY (◁) 1
EGPWS ALERTS (◁) 15
FM/GPS POS DISAGREE (◁) 13
GPS 1(2) FAULT (◁) 13
GPWS ALERTS (◁) 15
GPWS FAULT (◁) 14
GPWS TERR DET FAULT (◁) 16
HDG / ATT / ALTI DISCREPANCY 1
R IAS DISCREPANCY 19
ILS 1(2) FAULT 14
IR ALIGNMENT IN ATT MODE 10
IR DISAGREE 11
IR FAULT 7
OVER SPEED 1
PRED W/S DET FAULT (◁) 10
RA 1(2) FAULT 12
TCAS FAULT (◁) 12
TCAS WARNINGS (◁) 17
R UNRELIABLE SPEED INDICATION/ADR CHECK PROC 20

02.32 LANDING GEAR

BRAKES
A/SKID NWS FAULT 9
ALTN BRK FAULT 14
ALTN L(R) RELEASED 14
ANTI SKID / NWS OFF 9
ASYMMETRIC BRAKING 14
AUTOBRK FAULT 10
BRK Y ACCU LO PR 13
CONFIG PARK BRAKE ON 9
HOT 10
LOSS OF BRAKING 11
MINOR FAULT 14
NORM + ALTN FAULT 13
NORM BRK FAULT 13
PRK BRK ON 12
RELEASED 13
RESIDUAL BRAKING PROC 12
SYS 1(2) FAULT 9

L/G
BOGIE ALIGN FAULT(◁) 4
DOORS NOT CLOSED 4
GEAR NOT DOWN 5
GEAR NOT DOWNLOCKED 2
GEAR NOT UPLOCKED 1
GEAR UPLOCK FAULT 4
GRAVITY EXTENSION 3
LDG WITH ABNORMAL L / G 6
LGCIU FAULT 5
SHOCK ABSORBER FAULT 1
SYS DISAGREE 4A

WHEEL
HYD SEL FAULT 11
N/W STRG FAULT 9
TYRE LO PR (◁) 11

02.34 NAVIGATION

R ADR DISAGREE 18
ADR FAULT 2
ADR 1 + 2 + 3 FAULT 4
BARO REF DISCREPANCY (◁) 1
EGPWS ALERTS (◁) 15
FM/GPS POS DISAGREE (◁) 13
GPS 1(2) FAULT (◁) 13
GPWS ALERTS (◁) 15
GPWS FAULT (◁) 14
GPWS TERR DET FAULT (◁) 16
HDG / ATT / ALTI DISCREPANCY 1
R IAS DISCREPANCY 19
ILS 1(2) FAULT 14
IR ALIGNMENT IN ATT MODE 10
IR DISAGREE 11
IR FAULT 7
OVER SPEED 1
PRED W/S DET FAULT (◁) 10
RA 1(2) FAULT 12
TCAS FAULT (◁) 12
TCAS WARNINGS (◁) 17
R UNRELIABLE SPEED INDICATION/ADR CHECK PROC 20

02.36 PNEUMATIC

AIR
– APU BLEED FAULT 5
– APU BLEED LEAK 5
– BLEED 1(2) OFF 1
– DUAL BLEED FAULT 3
– ENG 1(2) BLEED ABNORM PR 1
– ENG 1(2) BLEED FAULT 2
– ENG 1(2) BLEED LEAK 4
– ENG 1(2) BLEED NOT CLSD 1
– ENG 1(2) (1 + 2) BLEED LO TEMP 7
– ENG HP VALVE FAULT 6
– L(R) WING LEAK 4
– L(R) WNG LEAK DET FAULT 6
– XBLEED FAULT 5
BLEED
– MONITORING FAULT 6

02.49 APU

– APU AUTO (EMER) SHUT DOWN 1

02.52 DOORS

– DOORS NOT CLOSED 1

02.70 POWERPLANT

A/C FADEC SUPPLY 27
After ENG SHUTDOWN 13
AIR EXCHANGER FAULT 19
BEARING 4 OIL SYS 27
COMPRESSOR VANE 18
EGT EXCEEDED DURING AIR START 11
EIU FAULT 1
ENG DUAL FAILURE 20
ENG FAIL 11
ENG RELIGHT (in flight) 10
ENG STALL 5
ENG TAILPIPE FIRE 25
EPR MODE FAULT 9
EPR / N1 / N2 / EGT / FF DISCREPANCY 5
FADEC A(B) FAULT 23
FADEC ALTERNATOR 19
FADEC FAULT 23
FADEC OVHT 23
FADEC PLUG FAULT 27
FLEX TEMP NOT SET 9
FUEL CTL FAULT 24
FUEL FILTER CLOG 1
FUEL HEAT SYS 19
FUEL VALVE FAULT 8
HIGH ENGINE VIBRATION 26
HOT FUEL 18
IGN FAULT 15
N1 / N2 / EGT OVERLIMIT 3
OIL FILTER CLOG 2
OIL HI TEMP 2
OIL LO PR 2
OIL LO TEMP 2
ONE TLA FAULT 15
OVSPD PROT FAULT 19
REV ISOL FAULT 12
REV PRESSURIZED 1
REV SWITCH FAULT 1
REVERSE UNLOCKED 4
REVERSER FAULT 1
SENSOR FAULT 19
START FAULT 7
START VALVE FAULT 6
SYSTEM FAULT 8
THR LEVER DISAGREE 16
THR LEVER FAULT 17
THRUST LOCKED 24

02.36 PNEUMATIC

AIR
– APU BLEED FAULT 5
– APU BLEED LEAK 5
– BLEED 1(2) OFF 1
– DUAL BLEED FAULT 3
– ENG 1(2) BLEED ABNORM PR 1
– ENG 1(2) BLEED FAULT 2
– ENG 1(2) BLEED LEAK 4
– ENG 1(2) BLEED NOT CLSD 1
– ENG 1(2) (1 + 2) BLEED LO TEMP 7
– ENG HP VALVE FAULT 6
– L(R) WING LEAK 4
– L(R) WNG LEAK DET FAULT 6
– XBLEED FAULT 5
BLEED
– MONITORING FAULT 6

02.49 APU

– APU AUTO (EMER) SHUT DOWN 1

02.52 DOORS

– DOORS NOT CLOSED 1

02.70 POWERPLANT

A/C FADEC SUPPLY 27
After ENG SHUTDOWN 13
AIR EXCHANGER FAULT 19
BEARING 4 OIL SYS 27
COMPRESSOR VANE 18
EGT EXCEEDED DURING AIR START 11
EIU FAULT 1
ENG DUAL FAILURE 20
ENG FAIL 11
ENG RELIGHT (in flight) 10
ENG STALL 5
ENG TAILPIPE FIRE 25
EPR MODE FAULT 9
EPR / N1 / N2 / EGT / FF DISCREPANCY 5
FADEC A(B) FAULT 23
FADEC ALTERNATOR 19
FADEC FAULT 23
FADEC OVHT 23
FADEC PLUG FAULT 27
FLEX TEMP NOT SET 9
FUEL CTL FAULT 24
FUEL FILTER CLOG 1
FUEL HEAT SYS 19
FUEL VALVE FAULT 8
HIGH ENGINE VIBRATION 26
HOT FUEL 18
IGN FAULT 15
N1 / N2 / EGT OVERLIMIT 3
OIL FILTER CLOG 2
OIL HI TEMP 2
OIL LO PR 2
OIL LO TEMP 2
ONE TLA FAULT 15
OVSPD PROT FAULT 19
REV ISOL FAULT 12
REV PRESSURIZED 1
REV SET. 3
REV SWITCH FAULT 1
REVERSE UNLOCKED 4
REVERSER FAULT 1
SENSOR FAULT 19
START FAULT 7
START VALVE FAULT 6
SYSTEM FAULT 8
THR LEVER DISAGREE 16
THR LEVER FAULT 17
R THRUST LOCKED 24

02.36 PNEUMATIC

AIR
– APU BLEED FAULT 5
– APU BLEED LEAK 5
– BLEED 1(2) OFF 1
– DUAL BLEED FAULT 3
– ENG 1(2) BLEED ABNORM PR 1
– ENG 1(2) BLEED FAULT 2
– ENG 1(2) BLEED LEAK 4
– ENG 1(2) BLEED NOT CLSD 1
– ENG 1(2) (1 + 2) BLEED LO TEMP 7
– ENG HP VALVE FAULT 6
– L(R) WING LEAK 4
– L(R) WNG LEAK DET FAULT 6
– XBLEED FAULT 5
BLEED
– MONITORING FAULT 6

02.46 INFORMATION SYSTEM

– ATSU FAULT 1
– COMPANY FAULT 1

02.49 APU

– APU AUTO (EMER) SHUTDOWN 1

02.52 DOORS

– DOORS NOT CLOSED 1

02.70 POWERPLANT

A/C FADEC SUPPLY 27
After ENG SHUTDOWN 13
AIR EXCHANGER FAULT 19
BEARING 4 OIL SYS 27
COMPRESSOR VANE 18
EGT EXCEEDED DURING AIR START 11
EIU FAULT 1
ENG DUAL FAILURE 20
ENG FAIL 11
ENG RELIGHT (in flight) 10
ENG STALL 5
ENG TAILPIPE FIRE 25
EPR MODE FAULT 9
EPR / N1 / N2 / EGT / FF DISCREPANCY 5
FADEC A(B) FAULT 23
FADEC ALTERNATOR 19
FADEC FAULT 23
FADEC OVHT 23
FADEC PLUG FAULT 27
FLEX TEMP NOT SET 9
FUEL CTL FAULT 24
FUEL FILTER CLOG 1
FUEL HEAT SYS 19
FUEL VALVE FAULT 8
HIGH ENGINE VIBRATION 26
HOT FUEL 18
IGN FAULT 15
N1 / N2 / EGT OVERLIMIT 3
OIL FILTER CLOG 2
OIL HI TEMP 2
OIL LO PR 2
OIL LO TEMP 2
ONE TLA FAULT 15
OVSPD PROT FAULT 19
REV ISOL FAULT 12
REV PRESSURIZED 1
REV SWITCH FAULT 1
REVERSE UNLOCKED 4
REVERSER FAULT 1
SENSOR FAULT 19
START FAULT 7
START VALVE FAULT 6
SYSTEM FAULT 8
THR LEVER DISAGREE 16
THR LEVER FAULT 17
THRUST LOCKED 24

02.36 PNEUMATIC

AIR
– APU BLEED FAULT 5
– APU BLEED LEAK 5
– BLEED 1(2) OFF 1
– DUAL BLEED FAULT 3
– ENG 1(2) BLEED ABNORM PR 1
– ENG 1(2) BLEED FAULT 2
– ENG 1(2) BLEED LEAK 4
– ENG 1(2) BLEED NOT CLSD 1
– ENG 1(2) (1 + 2) BLEED LO TEMP 7
– ENG HP VALVE FAULT 6
– L(R) WING LEAK 4
– L(R) WNG LEAK DET FAULT 6
– XBLEED FAULT 5
BLEED
– MONITORING FAULT 6

02.46 INFORMATION SYSTEM

– ATSU FAULT 1
– COMPANY FAULT 1

02.49 APU

– APU AUTO (EMER) SHUTDOWN 1

02.52 DOORS

– DOORS NOT CLOSED 1

02.70 POWERPLANT

A/C FADEC SUPPLY 27
After ENG SHUTDOWN 13
AIR EXCHANGER FAULT 19
BEARING 4 OIL SYS 27
COMPRESSOR VANE 18
EGT EXCEEDED DURING AIR START 11
EIU FAULT 1
ENG DUAL FAILURE 20
ENG FAIL 11
ENG RELIGHT (in flight) 10
ENG STALL 5
ENG TAILPIPE FIRE 25
EPR MODE FAULT 9
EPR / N1 / N2 / EGT / FF DISCREPANCY 5
FADEC A(B) FAULT 23
FADEC ALTERNATOR 19
FADEC FAULT 23
FADEC OVHT 23
FADEC PLUG FAULT 27
FLEX TEMP NOT SET 9
FUEL CTL FAULT 24
FUEL FILTER CLOG 1
FUEL HEAT SYS 19
FUEL VALVE FAULT 8
HIGH ENGINE VIBRATION 26
HOT FUEL 18
IGN FAULT 15
N1 / N2 / EGT OVERLIMIT 3
OIL FILTER CLOG 2
OIL HI TEMP 2
OIL LO PR 2
OIL LO TEMP 2
ONE TLA FAULT 15
OVSPD PROT FAULT 19
REV ISOL FAULT 12
REV PRESSURIZED 1
REV SET. 3
REV SWITCH FAULT 1
REVERSE UNLOCKED 4
REVERSER FAULT 1
SENSOR FAULT 19
START FAULT 7
START VALVE FAULT 6
SYSTEM FAULT 8
THR LEVER DISAGREE 16
THR LEVER FAULT 17
R THRUST LOCKED 24

02.36 PNEUMATIC

AIR
– APU BLEED FAULT 5
– APU BLEED LEAK 5
– BLEED 1(2) OFF 1
– DUAL BLEED FAULT 3
– ENG 1(2) BLEED ABNORM PR 1
– ENG 1(2) BLEED FAULT 2
– ENG 1(2) BLEED LEAK 4
– ENG 1(2) BLEED NOT CLSD 1
– ENG 1(2) (1 + 2) BLEED LO TEMP 7
– ENG 1(2) HP VALVE FAULT 6
– ENG 1(2) LEAK DET FAULT 6
– L(R) WING LEAK 4
– L(R) WNG LEAK DET FAULT 6
– XBLEED FAULT 5
BLEED
– MONITORING FAULT 6
– MONIT SYS 1(2) FAULT 6

02.46 INFORMATION SYSTEM

– ATSU FAULT 1
– COMPANY FAULT 1

02.49 APU

– APU AUTO (EMER) SHUTDOWN 1

02.52 DOORS

– DOORS NOT CLOSED 1

02.70 POWERPLANT (CONT'D)

TYPE DISAGREE 23
VIB SYS FAULT 2

02.80 MISCELLANEOUS

BOMB ON BOARD 10
COCKPIT WINDSHIELD/WINDOW ARCING 14
COCKPIT WINDSHIELD/WINDOW CRACKED 14
CREW INCAPACITATION 9
DITCHING 2
ECAM ADVISORY CONDITIONS 15
EMER DESCENT 7
R EMERGENCY EVACUATION 1
FORCED LANDING 5
LDG CONF – APPR SPD – LDG DIST – CORRECTIONS FOR FAILURE 17
OVERWEIGHT LANDING 8
TAILSTRIKE 21
UNRELIABLE SPEED INDICATION . . . . . REFER TO 02.34
VOLCANIC ASH ENCOUNTER 13
WINDSHEAR 19

02.90 DETAILED CABIN/COCKPIT EVAC PROC

GENERAL 1
COCKPIT ASSIGNED DUTIES FOR EVACUATION 2
CABIN CREW ASSIGNED AREAS FOR EVACUATION 2
COMMUNICATIONS 3
COCKPIT EVACUATION THROUGH WINDOW 6
R EMERGENCY EVACUATION 1
EVACUATION ON WATER 7

02.70 POWERPLANT (CONT'D)

TYPE DISAGREE 23
VIB SYS FAULT 2

02.80 MISCELLANEOUS

BOMB ON BOARD 10
COCKPIT WINDSHIELD/WINDOW ARCING 14
COCKPIT WINDSHIELD/WINDOW CRACKED 14
CREW INCAPACITATION 9
DITCHING 2
ECAM ADVISORY CONDITIONS 15
EMER DESCENT 7
R EMERGENCY EVACUATION 1
FORCED LANDING 5
LDG CONF – APPR SPD – LDG DIST – CORRECTIONS FOR FAILURE 17
OVERWEIGHT LANDING 8
TAILSTRIKE 21
UNRELIABLE SPEED INDICATION . . . . . REFER TO 02.34
VOLCANIC ASH ENCOUNTER 13
WINDSHEAR 19
WINDSHEAR AHEAD 20

02.90 DETAILED CABIN/COCKPIT EVAC PROC

GENERAL 1
COCKPIT ASSIGNED DUTIES FOR EVACUATION 2
CABIN CREW ASSIGNED AREAS FOR EVACUATION 2
COMMUNICATIONS 3
COCKPIT EVACUATION THROUGH WINDOW 6
R EMERGENCY EVACUATION 1
EVACUATION ON WATER 7

GENERAL

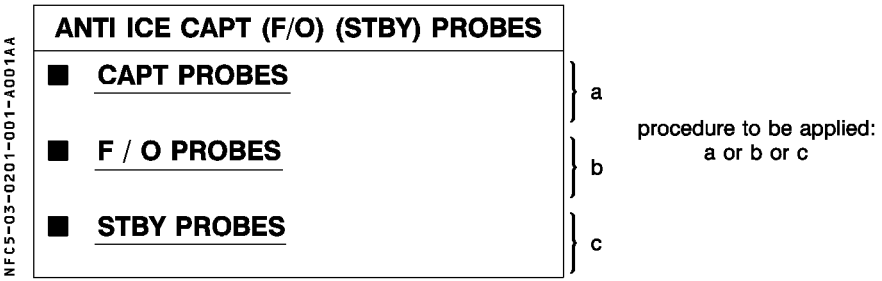
R Abnormal and Emergency procedures maintain adequate safety and help to ensure the
R conduct of the flight. The flight crew uses the "READ and DO" oral reading principle when
R performing these procedures.

PRESENTATION

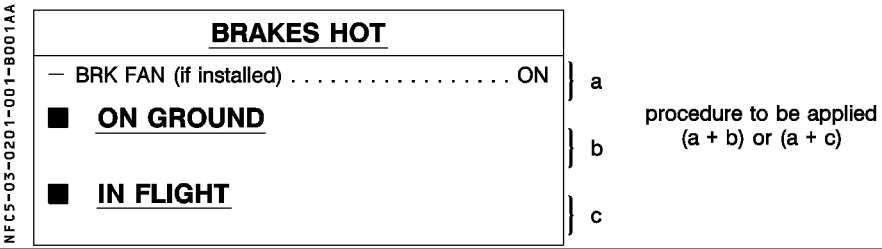
The presentation of procedures is, as far as practicable, identical to the presentation on ECAM. The abbreviations are identical to those used on the cockpit panels. All actions and information displayed on ECAM are printed in large letters. Other information, not on ECAM, is printed in small letters.
Expanded information, when inserted in the procedure, appears in italics. This information:
– identifies the particular failure
– explains actions for which the reason is not self-evident
– furnishes additional background.

R BLACK SQUARE

When several procedures appear under the same title, a black square marks the starting point of each procedure.
Only one procedure is applicable at a time.
For example :



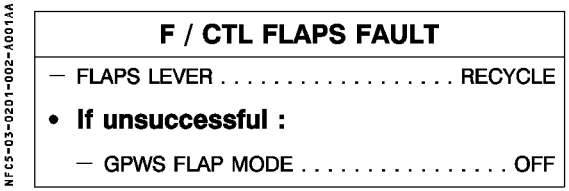
Black squares also indicate parts of a procedure among which only one is applicable.
For example :



The ECAM does not display black squares.

R **BLACK DOT**

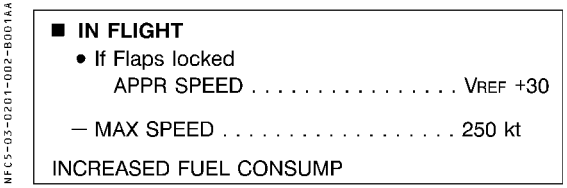
If an action depends on a precondition, a black dot identifies the precondition. If the precondition appears on ECAM, it appears in LARGE LETTERS. If not, it appears in small letters.
For example :



"If unsuccessful" does not appear on ECAM

R **INDENTATION**

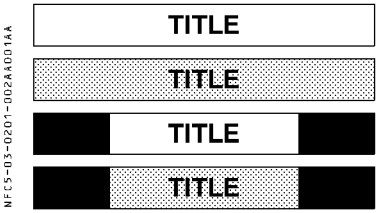
R Indentation is used in order to identify when an action depends on a precondition/flight
R phase/procedure.
R For example :
R



R – The APPR SPEED is equal to VREF + 30 kt, only if the flaps are locked, because "APPR
R SPEED.....VREF + 30" is indented below "• If flaps locked".
R – The MAX SPEED of 250 kt does not depend on the flaps locked condition because it is
R aligned with "• If flaps locked". Therefore, MAX SPEED has to be respected whether the
R flaps are locked or not.
R – INCREASED FUEL CONSUMP is aligned with IN FLIGHT. Therefore, this information is
R valid in flight and on ground.

PROCEDURE TITLES

Titles of the procedures appear in the following ways :



Abnormal procedure displayed on ECAM (amber caution)

Abnormal procedure not displayed on ECAM

Emergency procedure displayed on ECAM (red warning)

Emergency procedure not displayed on ECAM

TASKSHARING

The general tasksharing shown below applies to all procedures.
The pilot flying remains the pilot flying throughout the procedure.
The PF (pilot flying), is responsible for the :
- Thrust levers
- Control of flight path and airspeed
- Aircraft configuration (request configuration change)
- Navigation
- Communications.

The PNF (pilot not flying), is responsible for :
- Monitoring and reading aloud the ECAM and checklists
- Performing required actions, or actions requested by the PF, if applicable
- Using the engine master switches, IR and guarded switches, with PF's confirmation.

MEMORY ITEMS

The following procedures are to be applied without referring to paper : Windshear ◁, windshear ahead ◁, TCAS ◁, EGPWS ◁, loss of braking, immediate actions of EMER DESCENT, immediate actions of UNRELIABLE SPEED INDICATION/ADR CHECK PROC, CREW INCAPACITATION.

USE OF AUTOPILOT

The autopilot (AP) may be used in most failure cases, when available :

- In case of engine failure, including CAT II/CAT III ILS approaches and fail-passive automatic landing.
  When performing an engine-out non precision approach, the use of the AP is not permitted in the following modes : FINAL APP, NAV V/S, NAV FPA.
- In case of other failures, down to 500 ft AGL in all modes.
  However, the AP has not been certified in all configurations, and its performance cannot be guaranteed. If the pilot chooses to use the AP in such circumstances, extra vigilance is required, and the AP must be disconnected, if the aircraft deviates from the desired or safe flight path.

INITIATION OF PROCEDURES

Procedures are initiated on the Pilot Flying's command.
No action is taken (apart from canceling audio warnings, through the MASTER WARN light) until :

- The appropriate flight path is established, and
- The aircraft is at least 400 feet above the runway, if a failure occurs during takeoff, approach or go-around.

A height of 400 feet is recommended, because it is a good compromise between the necessary time for stabilization, and excessive delay in procedure initiation.
In some emergency cases, provided that the appropriate flight path is established, the Pilot Flying may initiate actions before this height.

R If an emergency causes LAND ASAP to appear in red on the ECAM, the flight crew must
R land as soon as possible at the nearest suitable airport at which a safe approach and
R landing can be made.
R If an abnormal procedure causes LAND ASAP to appear in amber on the ECAM, the flight
R crew should consider landing at the nearest suitable airport.

LANDING DISTANCE

Any increase in landing distance, resulting from an emergency or abnormality, must be based on the actual landing distance in Conf FULL (Refer to 3.02.80).

ECAM

Warning inhibition during takeoff

Some warnings (non-inhibited) appear when the situation that prompts them occurs. Other warnings (inhibited) do not appear immediately, when the situation that prompts them occurs during takeoff.

CREW COORDINATION

When carrying out a procedure displayed on ECAM, both pilots must be aware of the present display. Before any "CLEAR" action, the pilots should crosscheck to confirm that there remains no blue message (except in case of no action feedback) that they can eliminate by a direct action.

NO CLEAR ACTION BEFORE CROSS CONFIRMATION

Example of crew coordination and cross confirmation :

WARNING DISPLAY	PILOT FLYING	PILOT NOT FLYING
HYD B RSVR OVHT BLUE ELEC PUMP.....OFF	READ FAILURE TAKE ATC RADIO CTL – REQUEST ECAM ACTION (1)	READ FAILURE – READ ACTION (full line) – PERFORM ECAM ACTION OR REQUEST EXECUTION BY THE PF (thrust levers)
HYD B RSVR OVHT * F/CTL B SYS LO PR	– CHECK ECAM ACTION COMPLETED – CONFIRM CLEAR	– REQUEST CLEAR
SEAT BELTS * F/CTL	– CONFIRM CLEAR	– REVIEW ALL AFFECTED EQUIPMENT SHOWN IN AMBER ON F/CTL PAGE – REQUEST CLEAR
STATUS APPR PROC HYD LO PR INOP SYS IF BLUE OVHT OUT : CAT 3 BLUE ELEC PUMP .... ON BLUE HYD SPLR 3 CAT 2 ONLY SLATS SLOW	– CONFIRM CLEAR	– READ STATUS LINE BY LINE – REQUEST CLEAR

For standard calls, refer to 3.03.90.

(1) Although it is the responsibility of the pilot flying to request ECAM actions, this does not preclude the captain from either taking control of the aircraft or ordering ECAM actions he considers to be necessary.

R *Note : ECAM procedures and, STATUS information, supplemented by a PFD/ND check*
R *suffice for handling the fault. However, before applying the ECAM procedures,*
R *the fault should be confirmed on the system display. When ECAM actions have*
R *been performed, and the ECAM STATUS has been reviewed, the crew may refer*
R *to FCOM procedure (3.02) for supplementary information, if time permits.*

INTENTIONALLY LEFT BLANK

USE OF SUMMARIES

GENERAL

The summaries consist of QRH procedures. They have been created to help the crew handle the actions to be carried out, in the event of an electrical emergency configuration or dual hydraulic failure.
In any case, the ECAM should be applied first.
This includes both the procedure and the STATUS review.
Only after announcing "ECAM ACTIONS COMPLETED", should the PNF refer to the corresponding QRH summary.
When the failure occurs, and after performing the ECAM actions, the PNF should refer to the "CRUISE" portion of the summary, in order to determine the landing distance coefficient.
Since normal landing distances are also given on this page, the PNF will be able to compute the landing distance taking failure(s) into account, in order for the pilot to decide whether to divert or not.

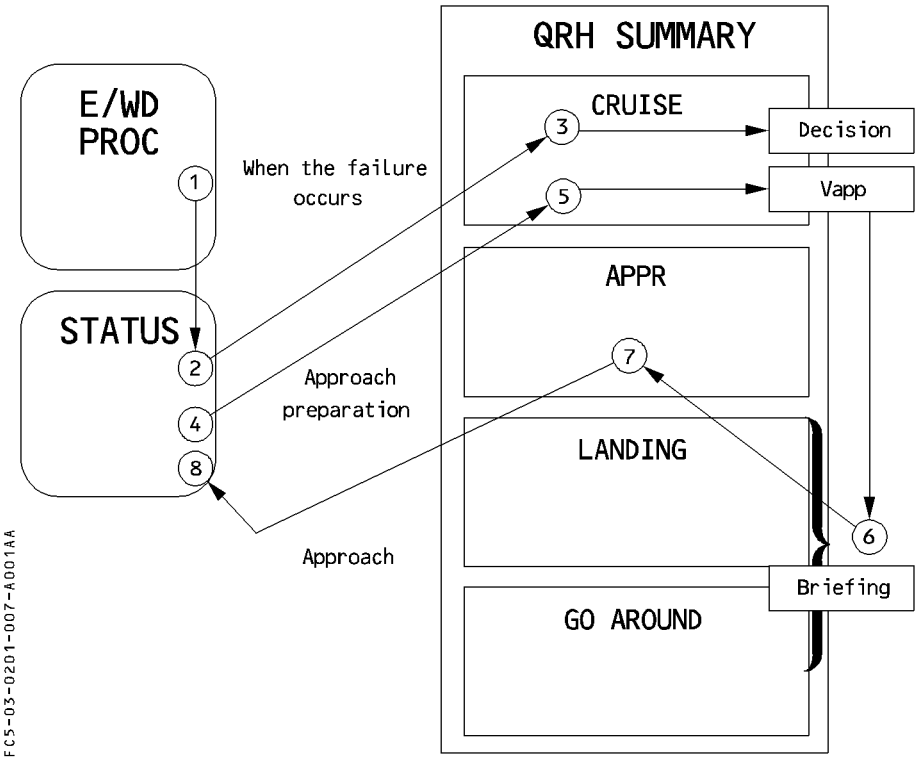
APPROACH PREPARATION

As always, approach preparation includes a review of the ECAM STATUS.
After reviewing the STATUS, the PNF should refer to the "CRUISE" portion of the summary to determine the VREF correction, and compute the VAPP.
The pilot is presumed to know the computation method, and use the VREF given on the MCDU (the destination having been previously updated).
A VREF table is provided in the summary, for failure cases leading to the loss of the MCDU.
The LANDING and GO-AROUND portions of the summary should be used for the approach briefing.

APPROACH

The APPR PROC actions should be performed by reading the APPROACH portion of the summary. This portion has primarily been added due to the flap extension procedure, which is not fully addressed on the ECAM.
As the recommendations provided in this portion of the summary are deemed sufficient, it is not necessary to refer to the "LANDING WITH FLAPS (SLATS) JAMMED" paper procedure.
After referring to the APPROACH portion of the summary, the PNF should then review the ECAM STATUS, and check that all APPR PROC actions have been completed.

SEQUENCE



REJECTED TAKEOFF

GENERAL

The decision to reject the takeoff and the stop action is made by the Captain.
It is therefore recommended that the Captain keeps his hand on the thrust levers until the aircraft reaches V1, whether he is Pilot Flying (PF) or Pilot Not Flying (PNF). As soon as he decides to abort, he calls "stop", takes over control of the aircraft and performs the stop actions.
It is not possible to list all the factors that could lead to the decision to reject the takeoff. However, in order to help the Captain to make a decision, the ECAM inhibits the warnings that are not essential from 80 knots to 1 500 feet (or 2 minutes after lift-off, whichever occurs first).
Experience has shown that rejected takeoffs can be hazardous even if the performance is correctly calculated, based on flight tests.
This may be due to the following factors :
- Delay in Performing the stopping procedure.
- Damaged tires.
- Brakes worn, brakes not working correctly, or higher than normal initial brakes temperature.
- The brakes not being fully applied.
- A runway friction coefficient lower than assumed in computations.
- An error in gross weight calculation.
- Runway line up not considered.

When the aircraft speed is at or above 100 knots, it may become hazardous to reject a takeoff. Therefore, when the aircraft speed approaches V1, the Captain should be "Go-minded" if none of the main failures quoted below ("Above 100 knots and below V1") have occured.

REJECTED TAKEOFF (CONT'D)

DECISION MANAGEMENT

- **Below 100 knots** :
  The decision to reject the takeoff may be taken at the Captain's discretion, depending on the circumstances.
  Although we cannot list all the causes, the Captain should seriously consider discontinuing the takeoff, if any ECAM warning/caution is activated.
  Note : The speed of 100 knots is not critical : It was chosen in order to help the Captain make his decision, and to avoid unnecessary stops from high speed.
- **Above 100 knots and below V1** :
  Rejecting the takeoff at these speeds is a more serious matter, particularly on slippery runways. It could lead to a hazardous situation, if the speed is approaching V1. At these speeds the Captain should be "go-minded" and very few situations should lead to the decision to reject the takeoff :
  1. Fire warning or severe damage.
  2. Sudden loss of engine thrust.
  3. Malfunctions or conditions that give unambiguous indications that the aircraft will not fly safely.
  4. ECAM warnings/cautions, such as :
     . ENG or APU FIRE
     . ENG FAIL
R   . ENG OIL LO PR
     . CONFIG.
     . SIDESTICK FAULT
     . ENG REV UNLOCKED
     . L + R ELEV FAULT

  Nose gear vibration should not lead to an RTO above 100 knots.
  In case of tire failure between V1 minus 20 knots and V1 :
  Unless debris from the tires has caused serious engine anomalies, it is far better to get airborne, reduce the fuel load, and land with a full runway length available.
  The V1 call has precedence over any other call.
- **Above V1**
  Takeoff must be continued, because it may not be possible to stop the aircraft on the remaining runway.



REJECTED TAKEOFF (CONT'D)

PROCEDURE DURING A REJECTED TAKEOFF

R

CAPT	F/O
– CALL . . . . . "STOP" Simultaneously : – THRUST LEVERS . . . . . IDLE – REVERSE THRUST . . . . . MAX AVAIL.	– BRAKE RESPONSE . . . . . MONITOR – REVERSE . . . . . CONFIRM – ANY AUDIO . . . . . CANCEL
Aircraft stopped Consider positioning the aircraft to keep any possible fire away from the fuselage. – REVERSE . . . . . STOWED – PARKING BRAKE . . . . . APPLY *Set parking brake ON after aircraft stops.* – PA call . "ATTENTION CREW!AT STATIONS" – CALL . . . . . "ECAM ACTIONS"	– ATC . . . . . INFORM – EMER EVAC checklist . . . . LOCATE – ECAM ACTIONS . . . . . INITIATE
The aircraft should remain stationary while the crew evaluates the situation.	
Evacuation phase If required, refer to the EMERGENCY EVACUATION Checklist for evacuation.	Inform ATC of intention and required assistance.

REVERSERS : Full reverse may be used until coming to a complete stop. But, if there is enough runway available at the end of the deceleration, it is preferable to reduce reverse thrust when passing 70 knots.

Note : 1. If the brake response does not seem appropriate for the runway condition, FULL manual braking should be applied and maintained. If IN DOUBT, TAKE OVER MANUALLY. Do not attempt to clear the runway, until it is absolutely clear that an evacuation is not necessary and that it is safe to do so.

2. If the autobrake is unserviceable, the Captain simultaneously reduces thrust and applies maximum pressure on both pedals.
The aircraft will stop in the minimum distance, only if the brake pedals are maintained fully pressed until the aircraft comes to a stop.

3. If normal braking is inoperative, immediately switch the A/SKID & NOSE WHEEL switch OFF and modulate brake pressure, as required, at or below 1000 PSI.
If the brake pedals were fully pressed when switching the A/SKID & NOSE WHEEL switch OFF, full pressure would be applied to the brakes.

4. After a rejected takeoff, if the aircraft comes to a complete stop using autobrake MAX, release brakes prior to taxi by disarming spoilers.

ENG FAILURE AFTER V1 – CONTINUED TAKEOFF

– If an engine fails after the aircraft passes V1, the takeoff must be continued.
– Use rudder conventionally to stay on the runway centerline.
– At VR, rotate the aircraft smoothly using a continuous pitch rate to a pitch attitude of 12.5 degrees. After lift-off, follow the Speed Reference System (SRS).
– When airborne with a positive rate of climb, select the landing gear up.
– Use rudder to prevent yaw. Shortly after lift-off, β target will appear. Adjust rudder position to zero the β target. Control heading conventionally with bank, keeping the β target at zero with rudder.
– Consider the use of TOGA thrust.
– Consider the use of autopilot.
– At 400 feet minimum, apply the ECAM procedure
– At acceleration height, level off and allow the speed to increase.
  · At F speed select CONF 1.
  · At S speed select CONF 0.
– When the flap handle is at zero, β target reverts to side-slip indication. Center the sideslip indication conventionally.
– At green dot speed (engine-out operating speed in clean configuration) resume the climb using maximum continuous thrust and maintain green dot speed.
  (If already in the FLX/MCT gate, move to CL and back to MCT).
– MAXIMUM TAKEOFF THRUST IS ONLY ALLOWED FOR 10 MINUTES.

ENGINE FAILURE DURING INITIAL CLIMB-OUT

– Proceed as above. However, if the failure occurs above V2 maintain the SRS commanded attitude (or the speed reached after recovery). In any case, the minimum speed must be equal to V2.



REJECTED TAKEOFF (CONT'D)

PROCEDURE DURING A REJECTED TAKEOFF

R

CAPT	F/O
– CALL . . . . . "STOP" Simultaneously : – THRUST LEVERS . . . . . IDLE – REVERSE THRUST . . . . . MAX AVAIL.	– BRAKE RESPONSE . . . . . MONITOR – REVERSE . . . . . CONFIRM – ANY AUDIO . . . . . CANCEL
Aircraft stopped Consider positioning the aircraft to keep any possible fire away from the fuselage. – REVERSE . . . . . STOWED – PARKING BRAKE . . . . . APPLY *Set parking brake ON after aircraft stops.* – PA call . "ATTENTION CREW!AT STATIONS" – CALL . . . . . "ECAM ACTIONS" The aircraft should remain stationary while the crew evaluates the situation.	– ATC . . . . . INFORM – EMER EVAC checklist . . . . LOCATE – ECAM ACTIONS . . . . . INITIATE
Evacuation phase If required, refer to the EMERGENCY EVACUATION Checklist for evacuation.	Inform ATC of intention and required assistance.

REVERSERS : Full reverse may be used until coming to a complete stop. But, if there is enough runway available at the end of the deceleration, it is preferable to reduce reverse thrust when passing 70 knots. The use of full reverse until complete stop must be reported in the logbook for maintenance action.

Note : 1. If the brake response does not seem appropriate for the runway condition, FULL manual braking should be applied and maintained. If IN DOUBT, TAKE OVER MANUALLY. Do not attempt to clear the runway, until it is absolutely clear that an evacuation is not necessary and that it is safe to do so.

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– MAXIMUM TAKEOFF THRUST IS ONLY ALLOWED FOR 10 MINUTES.

ENGINE FAILURE DURING INITIAL CLIMB-OUT

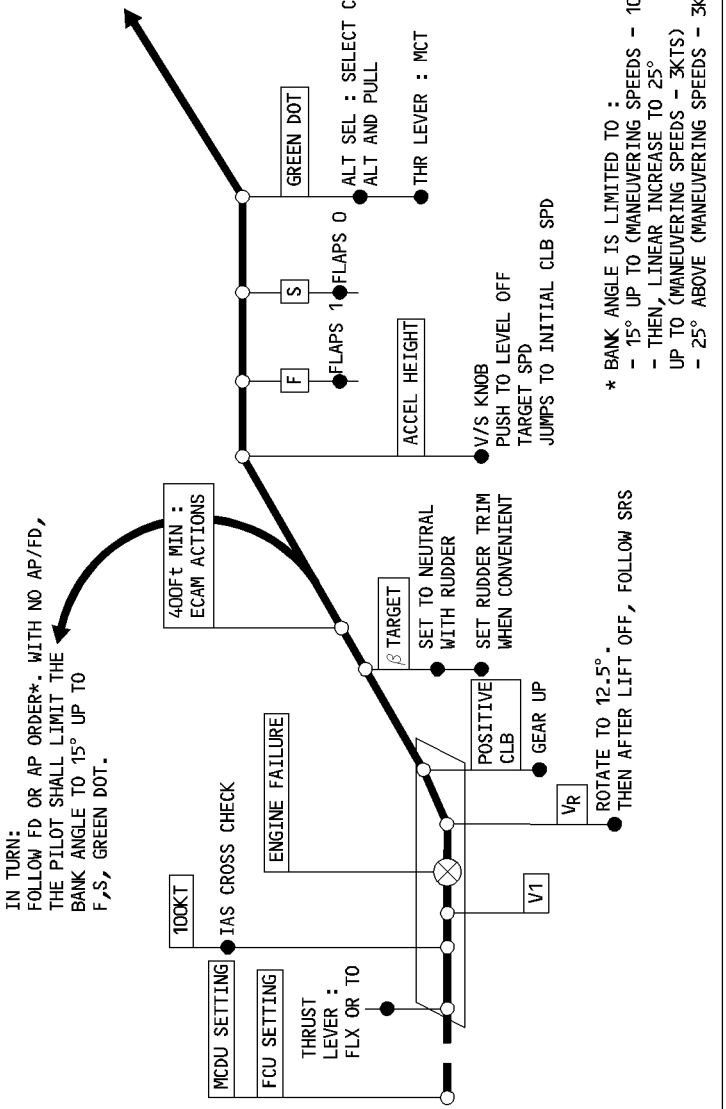
– Proceed as above. However, if the failure occurs above V2 maintain the SRS commanded attitude (or the speed reached after recovery). In any case, the minimum speed must be equal to V2.



ENG FAILURE AFTER V1 – CONTINUED TAKEOFF (CONT'D)

ENGINE OPERATION AT MAX T.O. THRUST IS LIMITED TO 10 MINUTES

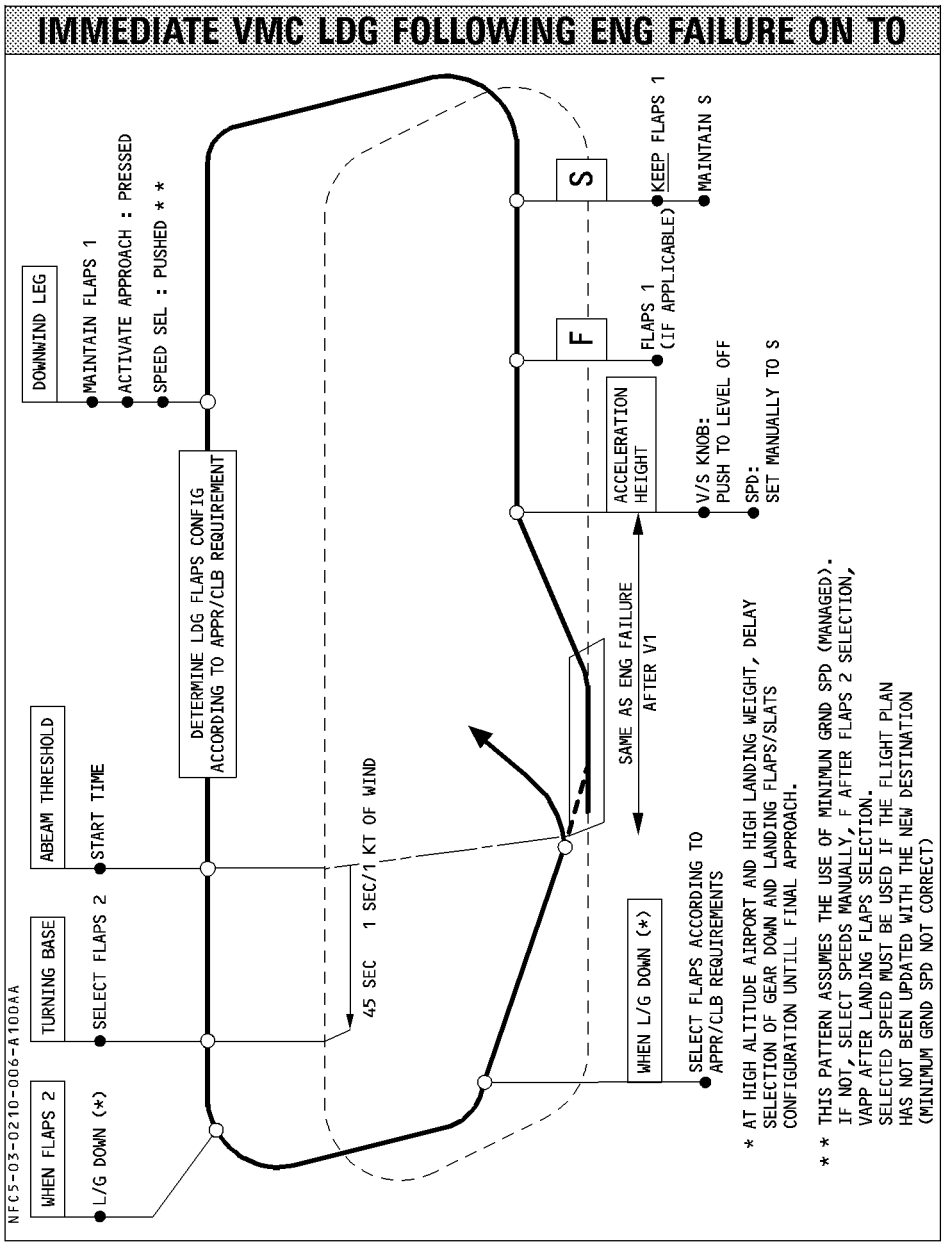
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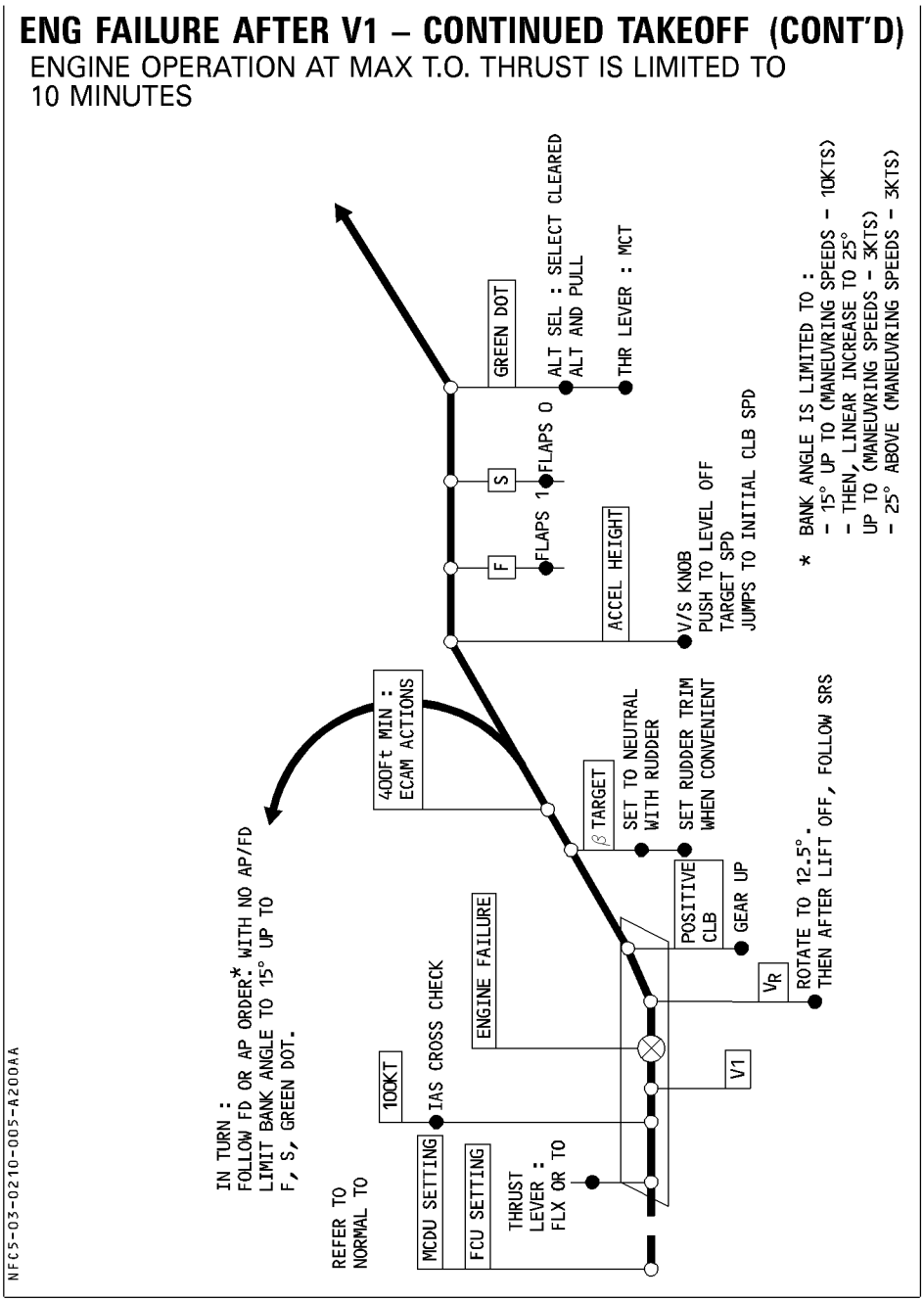
IMMEDIATE VMC LDG FOLLOWING ENG FAILURE ON TO



ENG FAILURE AFTER V1 – CONTINUED TAKEOFF (CONT'D)

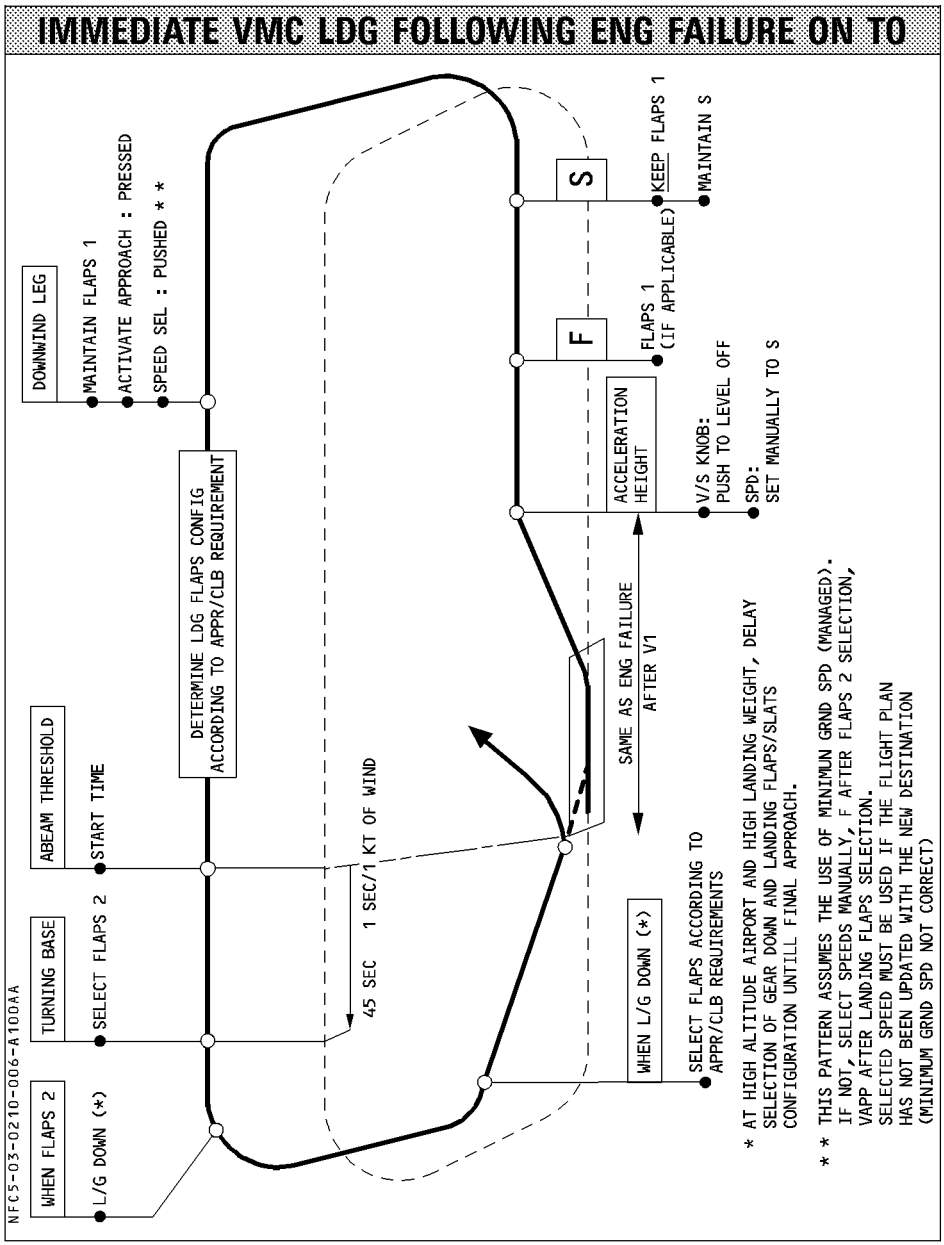
ENGINE OPERATION AT MAX T.O. THRUST IS LIMITED TO 10 MINUTES

R



R

IMMEDIATE VMC LDG FOLLOWING ENG FAILURE ON TO



STRAIGHT-IN APPROACH WITH ONE ENGINE INOPERATIVE

For performance reasons, do not extend flaps full until established on a final descent to landing.
If a level off is expected during the final approach, perform the approach and landing in CONF 3.

CIRCLING APPROACH WITH ONE ENGINE INOPERATIVE

– LANDING WEIGHT ..... CHECK

● **If the aircraft weight is above the maximum weight for circling in CONF 3 (given in the table below) :**

The aircraft cannot maintain flight level with CONF 3 and the landing gear down.

– FOR LDG ..... USE FLAP 3

Conf 3 is preferred, to minimize a configuration change in short final.

– GPWS LDG FLAP 3 ..... ON

– Delay gear extension.

Note : – If the approach is flown at less than 750 feet RA, the "L/G NOT DOWN" warning will be triggered. The pilot can cancel the aural warning by pressing the EMER CANC pushbutton, located on the ECAM control panel.

– A "TOO LOW GEAR" warning is to be expected, if the landing gear is not downlocked at 500 feet RA.

MAXIMUM WEIGHT FOR CIRCLING IN CONF 3 (1000 KG)

OAT (°C)	AIRPORT ELEVATION (feet)							
	0	2000	4000	6000	8000	10000	12000	14000
0	65.0	64.0	63.0	62.0	62.0	62.0	60.0	57.0
5	65.0	64.0	63.0	62.0	62.0	62.0	59.0	55.0
10	65.0	64.0	63.0	62.0	61.0	60.0	57.0	52.0
15	65.0	64.0	63.0	61.0	59.0	58.0	55.0	50.0
20	65.0	64.0	62.0	59.0	57.0	55.0	52.0	48.0
25	65.0	62.0	60.0	58.0	55.0	53.0	50.0	46.0
30	63.0	60.0	58.0	56.0	53.0	50.0	47.0	
35	60.0	58.0	56.0	53.0	50.0	48.0		
40	59.0	56.0	54.0	51.0				
45	56.0	54.0	51.0					
50	53.0	51.0						
55	50.0							

STRAIGHT-IN APPROACH WITH ONE ENGINE INOPERATIVE

For performance reasons, do not extend flaps full until established on a final descent to landing.
If a level off is expected during the final approach, perform the approach and landing in CONF 3.

CIRCLING APPROACH WITH ONE ENGINE INOPERATIVE

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	0	2000	4000	6000	8000	10000	12000	14000
0	70.0	69.0	68.0	67.0	65.0	64.0	62.0	57.0
5	70.0	69.0	68.0	67.0	65.0	64.0	60.0	55.0
10	70.0	69.0	68.0	67.0	65.0	61.0	57.0	52.0
15	70.0	69.0	68.0	66.0	63.0	59.0	54.0	50.0
20	70.0	69.0	66.0	64.0	61.0	56.0	52.0	48.0
25	70.0	67.0	64.0	62.0	58.0	54.0	50.0	46.0
30	67.0	65.0	63.0	60.0	56.0	51.0	47.0	
35	65.0	62.0	60.0	57.0	53.0	49.0		
40	62.0	60.0	58.0	54.0				
45	59.0	57.0	55.0					
50	56.0	54.0						
55	53.0							

LANDING WITH SLATS OR FLAPS JAMMED

– LANDING CONF . . . . . CONF 3

■ **Repeat the following until landing configuration is reached :**

– SPEED SEL . . . . . VFE NEXT – 5 KT

Decelerate towards VFE NEXT – 5 KT but not below VLS. In case of turbulence, to avoid VFE exceedance, the pilot may decide to decelerate to a lower speed, but not below VLS.

Note : · *The autopilot may be used down to 500 feet AGL. As it is not tuned for abnormal configurations, its behavior can be less than optimum and must be monitored.*
· *Approach with selected speed is recommended.*
· *A/THR is recommended, except in the case of a G+B SYS LO PR warning.*
· *OVERSPEED warning and VLS, displayed on the PFD, are computed according to the actual flaps/slats position.*
· *VFE and VFE NEXT are displayed on the PFD according to the FLAPS' lever position. If not displayed, use the placard speeds.*
· *If VLS is greater than VFE NEXT (overweight landing case), the FLAPS lever can be set in the required next position, while the speed is reduced to follow VLS reduction as surfaces extend. The VFE warning threshold should not be triggered.*
In this case, disconnect the A/THR. A/THR can be re-engaged when the landing configuration is established.

As speed reduces through VFE NEXT :

– FLAPS LEVER . . . . . ONE STEP DOWN

● **When landing configuration is established** :

– DECELERATE TO CALCULATED APPROACH SPEED IN FINAL APPROACH

FOR GO AROUND

The table on page 8 provides the MAX SPEEDS for the abnormal configurations.

■ **IF SLATS FAULT :**

● **FOR CIRCUIT** :

– MAINTAIN SLATS/FLAPS CONFIGURATION

– Recommended speed : MAX SPEED – 10 KT

R ● **FOR DIVERSION**

R – SELECT CLEAN CONFIGURATION

R *Recommended flaps retraction speed is between MAX SPEED – 10 knots and*
R *MAX SPEED.*

R – Recommended diversion speed : MAX SPEED – 10 KT.

LANDING WITH SLATS OR FLAPS JAMMED (CONT'D)

■ **IF FLAPS FAULT :**

● **FOR CIRCUIT :**
- MAINTAIN SLATS/FLAPS CONFIGURATION
- Recommended speed : MAX SPEED – 10 KT

● **FOR DIVERSION :**

● **If FLAPS jammed at 0**
- SELECT CLEAN CONFIGURATION

Note : Recommended speed for slats retraction is between MAX SPEED – 10 KT and MAX SPEED of actual slat/flap position.

- Normal operating speeds

● **If FLAPS jammed > 0**
- MAINTAIN SLAT/FLAP CONFIGURATION
- Recommended speed for diversion : MAX SPEED – 10 KT

Note :
- *In the majority of cases, VFE on PFD is equal to the MAX SPEED. In this case, VFE can be used as MAX SPEED. In case the SPD LIM flag is displayed on the PFD, use the MAX SPEED displayed on the ECAM status page.*
- *In some cases, MAX SPEED – 10 knots may be a few knots higher than the VFE. In this situation, pilot may follow the VFE.*
- *In case of a go-around with CONF FULL selected, the L/G NOT DOWN warning is triggered at landing gear retraction.*

R
R

MAX SPEED					
Flaps / Slats	F = 0	0 < F ≤ 1	1 < F ≤ 2	2 < F ≤ 3	F > 3
S = 0	NO LIMITATION	215 knots	200 knots	185 knots	Not allowed (177 knots)
0 < S ≤ 1	230 knots				
1 < S ≤ 3	200 knots		200 knots	185 knots	177 knots
S > 3	177 knots		177 knots	177 knots	177 knots

CAUTION

For flight with SLATS or FLAPS extended, fuel consumption is increased. Refer to the fuel flow indication. As a guideline, determine the fuel consumption in clean configuration at the same altitude without airspeed limitation (e.g. From ALTERNATE FLIGHT PLANNING tables, refer to 2.05.50) and multiply this result by 1.6 (SLATS EXTENDED), or 1.8 (FLAPS EXTENDED, or 2 (SLATS and FLAPS EXTENDED), to obtain the fuel consumption required to reach the destination in the current configuration.

AIR PACK 1(2) OVHT

– PACK (affected) . . . . . OFF

High flow is automatically selected on the remaining pack.
Fault light goes out when the overheat disappears.

● **WHEN PACK OVHT OUT :**

– PACK (affected) . . . . . ON

	STATUS
● **WHEN PACK OVHT OUT :** – PACK (affected) . . . . . ON	INOP SYS
● **If pack not recovered :**	INOP SYS PACK 1(2)

R

AIR PACK 1(2) FAULT

– PACK (affected) . . . . . OFF

	STATUS
	INOP SYS PACK 1(2)

R

AIR PACK 1(2) OFF

Crew awareness.

One pack is abnormally selected off

	STATUS
	INOP SYS PACK 1(2)

AIR PACK 1 + 2 FAULT

– PACK (affected) . . . . . OFF

The fault light goes off, when the failure disappears.

– DESCENT TO FL 100/MEA.

Descend to FL 100, or MEA, whichever is higher.

● **WHEN DIFF PR < 1 PSI AND FL BELOW 100 :**

– RAM AIR . . . . . ON

MAX FL 100/MEA

● **If FAULT was due to an overheat :**

AIR PACK 1 (2) OVHT

● **WHEN PACK OVHT OUT :**

– PACK (affected) . . . . . ON

STATUS

● **If packs not recovered :**

MAX FL 100/MEA

● **If FAULT was due to an overheat :**

● **WHEN PACK OVHT OUT :**

– PACK (affected) . . . . . ON

INOP SYS

PACK 1 + 2

AIR PACK 1(2) OVHT

– PACK (affected) . . . . . OFF

High flow is automatically selected on the remaining pack.
Fault light goes out when the overheat disappears.

● **WHEN PACK OVHT OUT :**

– PACK (affected) . . . . . ON

STATUS

● **WHEN PACK OVHT OUT :** | INOP SYS
– PACK (affected) . . . . . ON |

● **If pack not recovered :** | INOP SYS
PACK 1(2)

AIR PACK 1(2) FAULT

– PACK (affected) . . . . . OFF

STATUS

R ■ **If ACSC 1 failed** | INOP SYS
R CKPT AT FIXED TEMP | PACK 1
R | COND CTL 1
R | FWD CRG HEAT◁

R ■ **If ACSC 2 failed** | INOP SYS
R CAB AT FIXED TEMP | PACK 2
R | COND CTL 2

AIR PACK 1(2) OFF

Crew awareness.

One pack is abnormally selected off

STATUS

INOP SYS
PACK 1(2)

AIR PACK 1 + 2 FAULT

– PACK . . . . . OFF

The fault light goes off when the failure disappears.

– DESCENT TO FL 100/MEA.

Descend to FL 100, or MEA, whichever is higher.

● **WHEN DIFF PR < 1 PSI AND FL BELOW 100 :**

– RAM AIR . . . . . ON

MAX FL 100/MEA

● **If FAULT was due to an overheat :**

AIR PACK 1 (2) OVHT

● **WHEN PACK OVHT OUT :**

– PACK (affected) . . . . . ON

● **If packs not recovered :**

MAX FL 100/MEA

– CKPT AT FIXED TEMP

– CAB AT FIXED TEMP

● **If FAULT was due to an overheat :**

● **WHEN PACK OVHT OUT :**

– PACK (affected) . . . . . ON

STATUS

INOP SYS
PACK 1 + 2
COND CTL 1
COND CTL 2
FWD CRG HEAT◁

AIR PACK 1(2) REGUL FAULT

Crew awareness.

The temperature regulation performance is degraded.

	STATUS
■ **In case of By Pass Valve or RAM Air Inlet failure**	INOP SYS PACK 1(2) REGUL
■ **In case of Flow Control Valve in backup mode :**	INOP SYS HOT AIR

AIR PACK 1(2) REGUL FAULT

Pack primary channel, or pack primary and secondary channels fault.

Crew awareness.

STATUS

■ **If the primary channel fails :**

The pack air inlet flap fully opens ; pack flow is fixed at the previous setting.

■ **If the primary and secondary channels fail :**

PACK 1(2) AT FIXED TEMP

The pack outlet temperature is controlled by the pack anti-ice valve and is stabilized to a temperature between 5°C (41°F) and 30°C (86°F) within a maximum of 6 minutes.

INOP SYS

PACK 1(2) REGUL

COND FWD CAB/AFT CAB/CKPT DUCT OVHT

- **WHEN DUCT TEMP < 70 DEG C :**
  - HOT AIR . . . . . OFF THEN ON

    Hot air pressure regulating valve reopens.

- **If system not recovered :**

  CAB TEMP BY PACK ONLY

  Basic temperature regulation is by packs only (remains automatic).

STATUS
INOP SYS
HOT AIR

COND HOT AIR FAULT

– HOT AIR (if not closed) . . . . . OFF

● **IF HOT AIR STILL OPEN and DUCT OVHT persists :**

– PACK 1 . . . . . OFF

– PACK 2 . . . . . OFF

– DESCENT TO FL 100/MEA

Descend to FL 100, or MEA, whichever is higher.

● **WHEN DIFF PR < 1 PSI AND FL BELOW 100**

– RAM AIR . . . . . ON

MAX FL 100/MEA

STATUS

	INOP SYS
CAB TEMP BY PACK ONLY (only if HOT AIR closed) *Basic temperature regulation by packs only (remains automatic).*	PACK 1 + 2 (if PACKS closed) HOT AIR

R

COND TRIM AIR SYS FAULT

■ **One trim valve failed :**

A message corresponding to the affected valve is displayed :
AFT CAB TRIM VALVE
FWD CAB TRIM VALVE
CKPT TRIM VALVE

■ **High pressure detected downstream of the hot air pressure regulating valve :**

TRIM AIR HI PR

Note : If the warning and the TRIM AIR HI PR message are triggered when all trim air valves are closed (during the first 30 seconds after the packs are selected on, or in flight, if all zone heating demands are fulfilled), disregard them.

INTENTIONALLY LEFT BLANK

COND ZONE REGUL FAULT

Crew awareness.

The hot air pressure regulating valve and trim air valves close.

STATUS

■ **If primary channel failed :** — INOP SYS

R CAB ZONE AT FIXED TEMP

Zones are controlled to 24°C (75°F) by the packs through the zone controller secondary channel :

· Pack 1 controls the cockpit.

· Pack 2 controls the cabin.

■ **If primary and secondary channels failed:** — INOP SYS: ZONE REGUL

ENG 1 APPR IDLE ONLY

ENG 2 APPR IDLE ONLY

R *As the FADEC no longer receives a bleed demand correction, only approach idle can be selected.*

PACKS AT FIXED TEMP

The packs are controlled to deliver a fixed temperature of 20°C (68°F) for pack 1, and 10°C (50°F) for pack 2.

COND L + R CAB FAN FAULT

Both cabin fan motors overheat. Cabin fans stop.

– PACK FLOW . . . . . HI

STATUS

INOP SYS: L + R CAB FAN

COND LAV + GALLEY FAN FAULT

Crew awareness.

Cabin zone temperature sensors are normally ventilated by the air extracted by the fan. Therefore, cabin zone temperature regulation is lost.

STATUS

CAB ZONE AT FIXED TEMP — INOP SYS: GALLEY FAN

· Cabin zone inlet duct temperature is constant (15°C or 59°F).

R *· Cockpit temperature regulation is normal.*

COND AFT CRG ISOL VALVE

Crew awareness

STATUS

INOP SYS
AFT CRG VENT

AIR AFT CRG VENT FAULT

Crew awareness

Failure of ventilation fan.

STATUS

INOP SYS
AFT CRG VENT

COND ZONE REGUL FAULT

Crew awareness.

The hot air pressure regulating valve and trim air valves close.

STATUS

■ **If primary channel failed :** — INOP SYS

R CAB ZONE AT FIXED TEMP

Zones are controlled to 24°C (75°F) by the packs through the zone controller secondary channel :

· Pack 1 controls the cockpit.

· Pack 2 controls the cabin.

■ **If primary and secondary channels failed:** — INOP SYS: ZONE REGUL

ENG 1 APPR IDLE ONLY

ENG 2 APPR IDLE ONLY

R *As the FADEC no longer receives a bleed demand correction, only approach idle can be selected.*

PACKS AT FIXED TEMP

The packs are controlled to deliver a fixed temperature of 20°C (68°F) for pack 1, and 10°C (50°F) for pack 2.

COND L + R CAB FAN FAULT

Both cabin fan motors overheat. Cabin fans stop.

– PACK FLOW . . . . . HI

STATUS

INOP SYS: L + R CAB FAN

COND LAV + GALLEY FAN FAULT

Crew awareness.

Cabin zone temperature sensors are normally ventilated by the air extracted by the fan. Therefore, cabin zone temperature regulation is lost.

STATUS

CAB ZONE AT FIXED TEMP — INOP SYS: GALLEY FAN

· Cabin zone inlet duct temperature is constant (15°C or 59°F).

R *· Cockpit temperature regulation is normal.*

COND AFT CRG ISOL VALVE

Crew awareness

STATUS

INOP SYS
AFT CRG VENT

AIR AFT CRG VENT FAULT

Crew awareness

Failure of ventilation fan.

STATUS

INOP SYS
AFT CRG VENT

R

COND L + R CAB FAN FAULT

Both cabin fan motors overheat. Cabin fans stop.

– PACK FLOW . . . . . HI

STATUS

INOP SYS
L + R CAB FAN

COND LAV + GALLEY FAN FAULT

Crew awareness.

Cabin zone temperature sensors are normally ventilated by the air extracted by the fan. Therefore, cabin zone temperature regulation is lost.

STATUS

CAB AT FIXED TEMP

· Cabin zone inlet duct temperature is constant (15°C or 59°F).

· Cockpit temperature regulation is normal.

INOP SYS
GALLEY FAN

COND AFT CRG ISOL VALVE

Crew awareness

STATUS

INOP SYS
AFT CRG VENT

AIR AFT CRG VENT FAULT

Crew awareness

Failure of ventilation fan.

STATUS

INOP SYS
AFT CRG VENT

COND L + R CAB FAN FAULT

Both cabin fan motors overheat. Cabin fans stop.

– PACK FLOW . . . . . HI

STATUS

INOP SYS
L + R CAB FAN

COND LAV + GALLEY FAN FAULT

Crew awareness.

Cabin zone temperature sensors are normally ventilated by the air extracted by the fan. Therefore, cabin zone temperature regulation, from the cabin, is lost.

STATUS

■ **If ACSC 2 is operative :**

CAB TEMP CKPT CTL ONLY

– *To adjust the cabin zone temperature, use the FWD CABIN and AFT CABIN zone temperature selectors (overhead panel). The selectors control the cabin duct temperature directly.*
– *Cockpit temperature regulation is normal.*

INOP SYS
GALLEY FAN

■ **If ACSC 2 is inoperative :**

CAB AT FIXED TEMP

– *FWD CABIN and AFT CABIN zone temperature selectors are inoperative.*
– *To adjust the cabin zone temperature, use the COCKPIT zone temperature selector (overhead panel). Cabin duct temperature is the same as cockpit duct temperature.*
– *Cockpit temperature regulation is normal.*

INOP SYS
GALLEY FAN
PACK 2
COND CTL 2

INTENTIONALLY LEFT BLANK

CAB PR EXCESS CAB ALT

– CREW OXY MASK (if above FL100) . . . . . ON

The recommendation is to descend with autopilot engaged :

· turn ALT selector knob and pull

· turn HDG selector knob and pull

· set target SPD/MACH.

The use of autopilot is also permitted in EXPEDITE mode (◁).

– DESCENT (if above FL100) . . . . . INITIATE

● **IF RAPID DECOMPRESSION**

EMER DESCENT FL100/MEA (or minimum obstacle clearance altitude)

– THR LEVERS (if A/THR not engaged) . . . . . IDLE

– SPD BRK . . . . . FULL

R *Extension of speedbrakes will significantly increase Vls.*

R *In order to avoid autopilot disconnection and automatic retraction of speedbrakes due*

R *to possible activation of angle of attack protection, allow the speed to increase before*

R *starting to use speedbrakes.*

– SPD . . . . . MAX/APPROPRIATE

Descend at maximum appropriate speed or, if structural damage is suspected use the flight controls with care and reduce speed as appropriate. Landing gear may be extended below 25000 feet ; speed must be reduced to VLO/VLE.

– SIGNS . . . . . ON

– ENG MODE . . . . . IGN

– ATC . . . . . NOTIFY

Notify ATC of the nature of the emergency and state the intentions.

If ATC cannot be contacted, select ATC code A7700 or transmit a distress message on one of the following frequencies :

(VHF) 121.5 MHz or (HF) 2.182 KHz or 8364 KHz.

To save oxygen, set oxygen diluter selector to N position.

With oxygen diluter left to 100%, oxygen quantity may not be sufficient to cover the entire descent profile.

Ensure that the crew can communicate wearing oxygen masks. Avoid the continuous use of interphone position to minimize the interference from oxygen mask breathing noise.

● **IF CAB ALT > 14 000 FT :**

– PAX OXY MASKS . . . . . MAN ON

Note : When descent is established and if time permits select manual mode and check parameters on ECAM CAB PRESS.

R *Notify the cabin crew when a safe flight level has been reached and oxygen*

R *mask use can be stopped.*

INTENTIONALLY LEFT BLANK

CAB PR EXCESS CAB ALT

– CREW OXY MASK (if above FL100) . . . . . ON

It is recommended to descend with autopilot engaged :

· turn ALT selector knob and pull

· turn HDG selector knob and pull

· set target SPD/MACH.

The use of autopilot is also permitted in EXPEDITE mode (◁).

R – DESCENT . . . . . INITIATE

R EMER DESCENT FL 100/MEA (or minimum obstacle clearance altitude)

– THR LEVERS (if A/THR not engaged) . . . . . IDLE

– SPD BRK . . . . . FULL

Extension of speedbrakes will significantly increase Vls.

In order to avoid autopilot disconnection and automatic retraction of speedbrakes due to possible activation of angle of attack protection, allow the speed to increase before starting to use speedbrakes.

– SPD . . . . . MAX/APPROPRIATE

Descend at maximum appropriate speed or, if structural damage is suspected use the flight controls with care and reduce speed as appropriate. Landing gear may be extended below 25000 feet ; speed must be reduced to VLO/VLE.

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– ENG MODE . . . . . IGN

– ATC . . . . . NOTIFY

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With oxygen diluter left to 100%, oxygen quantity may not be sufficient to cover the entire descent profile.

Ensure that the crew can communicate wearing oxygen masks. Avoid the continuous use of interphone position to minimize the interference from oxygen mask breathing noise.

● **IF CAB ALT > 14 000 FT :**

– PAX OXY MASKS . . . . . MAN ON

Note : When descent is established and if time permits select manual mode and check parameters on ECAM CAB PRESS.

Notify the cabin crew when a safe flight level has been reached and oxygen mask use can be stopped.

CAB PR SYS 1 (2) (1 + 2) FAULT

■ **if one system affected :**

Crew awareness

STATUS

INOP SYS
CAB PR 1 (2)

■ **if both systems affected :**

R *Due to the slow closure of the outflow valve in manual pressurization mode and*
R *depending on the failure, the following procedure may not avoid the depressurization.*

– MODE SEL . . . . . MAN
– MAN V/S CTL . . . . . AS RQRD

R · *It may take 10 seconds in manual mode before the crew notices a change of the*
R *outflow valve position. Use the cabin V/S indication to confirm the outlfow valve*
R *operation.*
· *Monitor cabin V/S and CAB ALT frequently and adjust as necessary.*
Maintain aircraft altitude at or above cabin altitude.
· *The two safety valves limit △P to 8.6 psi.*

STATUS

MAN CAB PR CTL
TGT V/S :
CLIMB 500 FT/MIN
DESC 300 FT/MIN

INOP SYS
CAB PR 1 + 2

A/C FL	CAB ALT TGT
390	8 000
350	6 500
300	5 000
250	2 500
< 200	0

DURING FINAL APPR :
– V/S CTL . . . . . FULL UP

CAUTION
Check that △P is zero before opening the doors.

R R R

CABIN OVERPRESSURE

Apply the following procedure (not displayed on ECAM) in case of total loss of cabin pressure control leading to overpressure.

– PACK 1 or 2 ..... OFF
– BLOWER + EXTRACT ..... OVRD
Cabin air is extracted overboard
– △P ..... FREQUENTLY MONITOR
● **If △P > 9 PSI**
– PACK 1 + 2 ..... OFF
LAND ASAP

Before 10 minutes from landing :
– PACK 1 + 2 ..... OFF
– BLOWER + EXTRACT ..... AUTO

CAUTION
Check that △P is zero before opening the doors.

CAB PR SYS 1 (2) (1 + 2) FAULT

■ **if one system affected :**

Crew awareness

STATUS

INOP SYS
CAB PR 1 (2)

■ **if both systems affected :**

Due to the slow closure of the outflow valve in manual pressurization mode and depending on the failure, the following procedure may not avoid the depressurization.

– MODE SEL . . . . . MAN

– MAN V/S CTL . . . . . AS RQRD

· *It may take 10 seconds in manual mode before the crew notices a change of the outflow valve position. Use the cabin V/S indication to confirm the outlfow valve operation.*

· *Monitor cabin V/S and CAB ALT frequently and adjust as necessary. Maintain aircraft altitude at or above cabin altitude.*

· *The two safety valves limit △P to 8.6 psi.*

STATUS

INOP SYS
CAB PR 1 + 2

MAN CAB PR CTL

TGT V/S :

CLIMB 500 FT/MIN

DESC 300 FT/MIN

A/C FL	CAB ALT TGT
390	8 000
350	6 500
300	5 000
250	2 500
< 200	0

DURING FINAL APPR :

– MAN V/S CTL . . . . . FULL UP

CAUTION

Check that △P is zero before opening the doors.

R R R

CABIN OVERPRESSURE

Apply the following procedure (not displayed on ECAM) in case of total loss of cabin pressure control leading to overpressure.

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– △P ..... FREQUENTLY MONITOR
● **If △P > 9 PSI**
– PACK 1 + 2 ..... OFF
LAND ASAP

Before 10 minutes from landing :
– PACK 1 + 2 ..... OFF
– BLOWER + EXTRACT ..... AUTO

CAUTION
Check that △P is zero before opening the doors.

CAB PR LO DIFF PR

– EXPECT HI CAB RATE
– A/C V/S ..... REDUCE

CAB PR OUTFLOW VALVE NOT OPEN (on ground)

– MODE SEL ..... MAN
– MAN V/S CTL ..... FULL UP
R *It may take 10 seconds in manual mode before the crew notices a change of the outflow*
R *valve position.*
● **IF UNSUCCESSFUL :**
– PACK 1 and 2 ..... OFF

CAB PR LDG ELEV FAULT

– LDG ELEV ..... MAN ADJUST
Landing field elevation from FMGC is not available. Landing elevation must be manually
R *selected with LDG ELEV selector. Refer to the LDG ELEV indication on the CRUISE page*
R *or CAB PRESS page to adjust the required landing elevator.*
Note : If the landing is performed on QFE, set 0 feet on LDG ELEV selector.

CAB PR SAFETY VALVE OPEN

The failure is probably due to an overpressure.

● **IF DIFF PR ABV 8 PSI :**

– MODE SEL . . . . . MAN

– MAN V/S CTL . . . . . AS RQRD

If overpressure is confirmed, reduce cabin △P.

R *It may take 10 seconds in manual mode before the crew notices a change of the*

R *outflow valve position.*

● **IF UNSUCCESSFUL :**

– A/C FL . . . . . REDUCE

STATUS

MAN CAB PR CTL

TGT V/S :

CLIMB 500 FT/MIN

DESC 300 FT/MIN

A/C FL	CAB ALT TGT
390	8 000
350	6 500
300	5 000
250	2 500
< 200	0

● **DURING FINAL APPR :**

– V/S CTL . . . . . FULL UP

CAUTION

Check that △P is zero before opening the doors.

CAB PR LO DIFF PR

– EXPECT HI CAB RATE
– A/C V/S ..... REDUCE
This line is not displayed in case of Emergency Descent due to Excessive Cabin Altitude.

CAB PR OUTFLOW VALVE NOT OPEN (on ground)

– MODE SEL ..... MAN
– MAN V/S CTL ..... FULL UP
It may take 10 seconds in manual mode before the crew notices a change of the outflow valve position.
● **IF UNSUCCESSFUL** :
– PACK 1 and 2 ..... OFF

CAB PR LDG ELEV FAULT

– LDG ELEV ..... MAN ADJUST
Landing field elevation from FMGC is not available. Landing elevation must be manually selected with LDG ELEV selector. Refer to the LDG ELEV indication on the CRUISE page or CAB PRESS page to adjust the required landing elevator.
Note : If the landing is performed on QFE, set 0 feet on LDG ELEV selector.

CAB PR SAFETY VALVE OPEN

The failure is probably due to an overpressure.

● **IF DIFF PR ABV 8 PSI :**

– MODE SEL . . . . . MAN

– MAN V/S CTL . . . . . AS RQRD

If overpressure is confirmed, reduce cabin △P.

R *It may take 10 seconds in manual mode before the crew notices a change of the*

R *outflow valve position.*

● **IF UNSUCCESSFUL :**

– A/C FL . . . . . REDUCE

STATUS

MAN CAB PR CTL

TGT V/S :

CLIMB 500 FT/MIN

DESC 300 FT/MIN

A/C FL	CAB ALT TGT
390	8 000
350	6 500
300	5 000
250	2 500
< 200	0

● **DURING FINAL APPR :**

– V/S CTL . . . . . FULL UP

CAUTION

Check that △P is zero before opening the doors.

CAB PR LO DIFF PR

– EXPECT HI CAB RATE
– A/C V/S ..... REDUCE
This line is not displayed in case of Emergency Descent due to Excessive Cabin Altitude.

CAB PR OFV NOT OPEN (on ground)

– MODE SEL ..... MAN
– MAN V/S CTL ..... FULL UP
It may take 10 seconds in manual mode before the crew notices a change of the outflow valve position.
● **IF UNSUCCESSFUL :**
– PACK 1 ..... OFF
– PACK 2 ..... OFF

CAB PR EXCESS RESIDUAL PR

– PACK 1 ..... OFF
– PACK 2 ..... OFF
– CABIN CREW ..... ALERT

CAB PR LDG ELEV FAULT

– LDG ELEV ..... MAN ADJUST
Landing field elevation from FMGC is not available. Landing elevation must be manually selected with LDG ELEV selector. Refer to the LDG ELEV indication on the CRUISE page or CAB PRESS page to adjust the required landing elevator.
Note : If the landing is performed on QFE, set 0 feet on LDG ELEV selector.

CAB PR SAFETY VALVE OPEN

The safety valve has opened due to cabin overpressure, or negative differential pressure.

■ **IF DIFF PR ABV 8 PSI :**

– MODE SEL . . . . . MAN

– MAN V/S CTL . . . . . AS RQRD

If overpressure is confirmed, reduce cabin △P.

It may take 10 seconds in manual mode before the crew notices a change of the outflow valve position.

● **IF UNSUCCESSFUL :**

– A/C FL . . . . . REDUCE

■ **IF DIFF PR BELOW 0 PSI :**

– EXPECT HI CAB RATE

– A/C V/S . . . . . REDUCE

STATUS

MAN CAB PR CTL

TGT V/S :

CLIMB 500 FT/MIN

DESC 300 FT/MIN

A/C FL	CAB ALT TGT
390	8 000
350	6 500
300	5 000
250	2 500
< 200	0

● **DURING FINAL APPR :**

– MAN V/S CTL . . . . . FULL UP

CAUTION

Check that △P is zero before opening the doors.

VENT BLOWER FAULT

● **If NO DC ESS BUS FAULT**

– BLOWER ..... OVRD

The ventilation system is in closed circuit configuration, and air from the air conditioning is added to the ventilation air.

● **If DC ESS BUS FAULT**

– MAX FLT TIME : 2 HOURS

● **If DC ESS BUS FAULT**

– MAX FLT TIME : 2 HOURS

STATUS

INOP SYS
VENT BLOWER

VENT EXTRACT FAULT

– EXTRACT ..... OVRD

The ventilation system is in closed circuit configuration and air from air conditioning is added to the ventilation air.

STATUS

INOP SYS
VENT EXTRACT

VENT SKIN VALVE FAULT

● **If INLET valve not fully closed in flight :**

Crew awareness

No action is required, since there is a non-return valve at the air inlet.

● **If EXTRACT valve affected :**

– BLOWER ..... OVRD

– EXTRACT ..... OVRD

These actions send additional closure signals to the inlet and extract valves.

The weather radar image on both NDs may be lost, in case of insufficient ventilation.

● **IF UNSUCCESSFUL :**

MAX FL 100/MEA

– CAB PR MODE SEL ..... MAN

– MAN V/S CTL ..... FULL UP

The aircraft is manually depressurized.

It may take 10 seconds in manual mode before the crew notices a change of the outlfow valve position.

STATUS

MAX FL : 100/MEA (or minimum obstacle clearance altitude)

INOP SYS
AVNCS VALVE

VENT AVNCS SYS FAULT

Triggered when the AEVC is not supplied or when valve position disagrees with the commanded position or when the power-up test is not satisfactory.

STATUS

INOP SYS
AVNCS VENT
VENT BLOWER (a)
VENT EXTRACT(a)

(a) If AEVC not supplied.

VENT BLOWER FAULT

● **If NO DC ESS BUS FAULT**

– BLOWER . . . . . OVRD

The ventilation system is in closed circuit configuration, and air from the air conditioning is added to the ventilation air.

● **If DC ESS BUS FAULT**

LAND ASAP

● **If DC ESS BUS FAULT**

STATUS

INOP SYS
VENT BLOWER

VENT EXTRACT FAULT

– EXTRACT . . . . . OVRD

The ventilation system is in closed circuit configuration and air from air conditioning is added to the ventilation air.

STATUS

INOP SYS
VENT EXTRACT

VENT SKIN VALVE FAULT

● **If INLET valve not fully closed in flight :**

Crew awareness

No action is required, since there is a non-return valve at the air inlet.

● **If EXTRACT valve affected :**

– BLOWER . . . . . OVRD

– EXTRACT . . . . . OVRD

These actions send additional closure signals to the inlet and extract valves.

The weather radar image on both NDs may be lost, in case of insufficient ventilation.

● **IF UNSUCCESSFUL :**

MAX FL 100/MEA

– CAB PR MODE SEL . . . . . MAN

– MAN V/S CTL . . . . . FULL UP

The aircraft is manually depressurized.

It may take 10 seconds in manual mode before the crew notices a change of the outlfow valve position.

STATUS

MAX FL : 100/MEA (or minimum obstacle clearance altitude)	INOP SYS
	AVNCS VALVE

VENT AVNCS SYS FAULT

Triggered when the AEVC is not supplied or when valve position disagrees with the commanded position or when the power-up test is not satisfactory.

STATUS

INOP SYS
AVNCS VENT
VENT BLOWER (a)
VENT EXTRACT(a)

(a) If AEVC not supplied.

VENT BLOWER FAULT

● **If NO DC ESS BUS FAULT**

– BLOWER . . . . . OVRD

The ventilation system is in closed circuit configuration, and air from the air conditioning is added to the ventilation air.

● **If DC ESS BUS FAULT**

LAND ASAP

STATUS

● **If DC ESS BUS FAULT**

INOP SYS
VENT BLOWER

VENT EXTRACT FAULT

– EXTRACT . . . . . OVRD

The ventilation system is in closed circuit configuration and air from air conditioning is added to the ventilation air.

STATUS

INOP SYS
VENT EXTRACT

VENT SKIN VALVE FAULT

● **If INLET valve not fully closed in flight :**

Crew awareness

No action is required, since there is a non-return valve at the air inlet.

● **If EXTRACT valve affected :**

– BLOWER . . . . . OVRD

– EXTRACT . . . . . OVRD

These actions send additional closure signals to the inlet and extract valves.

The weather radar image on both NDs may be lost, in case of insufficient ventilation.

● **IF UNSUCCESSFUL :**

MAX FL 100/MEA

– CAB PR MODE SEL . . . . . MAN

– MAN V/S CTL . . . . . FULL UP

The aircraft is manually depressurized.

It may take 10 seconds in manual mode before the crew notices a change of the outlfow valve position.

STATUS

MAX FL : 100/MEA (or minimum obstacle clearance altitude)

INOP SYS
AVNCS VALVE

VENT AVNCS SYS FAULT

Crew awareness.

Triggered when the AEVC is not supplied, or when the valve position disagrees with the commanded position, or when the power-up test is not satisfactory.

STATUS

INOP SYS
AVNCS VENT
VENT BLOWER (a)
VENT EXTRACT(a)

(a) If AEVC not supplied.

R

AIR COND CTL 1(2) - A(B) FAULT

Crew awareness

R *Informs pilots of which air conditioning system controller (1 or 2) lane (A or B) is faulty.*

STATUS

R

INOP SYS
COND CTL 1(2)-A(B)

AUTO FLT YAW DAMPER 1(2)

Crew awareness.

Note : The crew can try to reset the affected FAC by using the FAC pushbutton. On ground only, if the reset is unsuccessful, the taxi and takeoff can be continued with the failed yaw damper inoperative.

STATUS

	INOP SYS
CAT 3 SINGLE ONLY	CAT 3 DUAL YAW DAMPER1(2)

AUTO FLT YAW DAMPER SYS

Loss of yaw dampers 1 + 2.

– FAC 1 + 2 . . . . . OFF THEN ON

● **If fault remains :**

F/CTL ALTN LAW
(PROT LOST)

F/CTL normal laws are lost. All protections, except maneuver protections, are lost.

MAX SPEED . . . . . 320 KT

STATUS

	INOP SYS
MAX SPEED . . . . . 320 KT *Speed is limited, due to the loss of high-speed protections.* APPR PROC – FOR LDG . . . . . USE FLAP 3 – GPWS LDG FLAP 3 . . . . . ON *Will be displayed, when flaps in CONF 3.* APPR SPD . . . . . VREF + 10 KT LDG DIST PROC . . . . . APPLY *Refer to the QRH Part 2, or to the FCOM 3.02.80.* ALTN LAW : PROT LOST WHEN L/G DN : DIRECT LAW *At landing gear extension, control reverts to direct law in pitch, as well as in roll (refer to the DIRECT LAW procedure 3.02.27).* CAT 1 ONLY	F/CTL PROT YAW DAMPER AP 1 + 2

R

AUTO FLT RUD TRIM 1(2) FAULT

Crew awareness.

	STATUS
CAT 3 SINGLE ONLY	INOP SYS CAT 3 DUAL RUD TRIM 1(2)

AUTO FLT RUD TRIM SYS

– FAC 1 + 2 . . . . . OFF THEN ON

	STATUS
CAT 1 ONLY	INOP SYS RUD TRIM AP 1 + 2

AUTO FLT RUD TRV LIM 1(2)

Crew awareness.

	STATUS
	INOP SYS RUD TRV LIM 1(2)

AUTO FLT YAW DAMPER 1(2)

Crew awareness.

Note : The crew can try to reset the affected FAC by using the FAC pushbutton. On ground only, if the reset is unsuccessful, the taxi and takeoff can be continued with the failed yaw damper inoperative.

STATUS	
	INOP SYS
CAT 3 SINGLE ONLY	CAT 3 DUAL YAW DAMPER1(2)

AUTO FLT YAW DAMPER SYS

Loss of yaw dampers 1 + 2.

– FAC 1 . . . . . OFF THEN ON

– FAC 2 . . . . . OFF THEN ON

● **If fault remains :**

F/CTL ALTN LAW
(PROT LOST)

F/CTL normal laws are lost. All protections, except maneuver protections, are lost.

MAX SPEED . . . . . 320 KT

STATUS	
	INOP SYS
MAX SPEED . . . . . 320 KT *Speed is limited, due to the loss of high-speed protections.* APPR PROC – FOR LDG . . . . . USE FLAP 3 – GPWS LDG FLAP 3 . . . . . ON *Will be displayed, when flaps in CONF 3.* APPR SPD . . . . . VREF + 10 KT LDG DIST PROC . . . . . APPLY *Refer to the QRH Part 2, or to the FCOM 3.02.80.* ALTN LAW : PROT LOST WHEN L/G DN : DIRECT LAW *At landing gear extension, control reverts to direct law in pitch, as well as in roll (refer to the DIRECT LAW procedure 3.02.27).* CAT 1 ONLY	F/CTL PROT YAW DAMPER AP 1 + 2

R

AUTO FLT RUD TRIM 1(2) FAULT

Crew awareness.

STATUS

	INOP SYS
CAT 3 SINGLE ONLY	CAT 3 DUAL RUD TRIM 1(2)

AUTO FLT RUD TRIM SYS

– FAC 1 . . . . . OFF THEN ON
– FAC 2 . . . . . OFF THEN ON

STATUS

	INOP SYS
CAT 1 ONLY	RUD TRIM AP 1 + 2

AUTO FLT RUD TRV LIM 1(2)

Crew awareness.

STATUS

	INOP SYS
	RUD TRV LIM 1(2)

AUTO FLT YAW DAMPER 1(2)

Crew awareness.

CAT 3 SINGLE ONLY

STATUS

INOP SYS
CAT 3 DUAL YAW DAMPER1(2)

AUTO FLT YAW DAMPER SYS

Loss of yaw dampers 1 + 2.

– FAC 1 . . . . . OFF THEN ON

– FAC 2 . . . . . OFF THEN ON

● **If fault remains :**

F/CTL ALTN LAW
(PROT LOST)

F/CTL normal laws are lost. All protections, except maneuver protections, are lost.

MAX SPEED . . . . . 320 KT

STATUS

MAX SPEED . . . . . 320 KT

Speed is limited, due to the loss of high-speed protections.

APPR PROC

– FOR LDG . . . . . USE FLAP 3

– GPWS LDG FLAP 3 . . . . . ON

Will be displayed, when flaps in CONF 3.

APPR SPD . . . . . VREF + 10 KT

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

ALTN LAW : PROT LOST

WHEN L/G DN : DIRECT LAW

At landing gear extension, control reverts to direct law in pitch, as well as in roll (refer to the DIRECT LAW procedure 3.02.27).

CAT 1 ONLY

INOP SYS
F/CTL PROT YAW DAMPER AP 1 + 2

AUTO FLT RUD TRIM 1(2) FAULT

Crew awareness.

STATUS

	INOP SYS
CAT 3 SINGLE ONLY	CAT 3 DUAL RUD TRIM 1(2)

AUTO FLT RUD TRIM SYS

– FAC 1 . . . . . OFF THEN ON
– FAC 2 . . . . . OFF THEN ON

STATUS

	INOP SYS
CAT 1 ONLY	RUD TRIM AP 1 + 2

AUTO FLT RUD TRV LIM 1(2)

Crew awareness.

STATUS

	INOP SYS
	RUD TRV LIM 1(2)

AUTO FLT YAW DAMPER 1(2)

Crew awareness.

	STATUS
CAT 3 SINGLE ONLY	INOP SYS CAT 3 DUAL YAW DAMPER1(2)

AUTO FLT YAW DAMPER SYS

Loss of yaw dampers 1 + 2.

– FAC 1 . . . . . OFF THEN ON
– FAC 2 . . . . . OFF THEN ON

● **If fault remains :**

F/CTL ALTN LAW
(PROT LOST)
F/CTL normal laws are lost. All protections, except maneuver protections, are lost.
MAX SPEED 320/.77
MANEUVER WITH CARE
MAX FL 350

	STATUS
MAX SPEED . . . . . 320/.77 *Speed is limited, due to the loss of high-speed protections.* MANEUVER WITH CARE MAX FL . . . . . 350 APPR PROC – FOR LDG . . . . . USE FLAP 3 – GPWS LDG FLAP 3 . . . . . ON *Will be displayed, when flaps in CONF 3.* APPR SPD . . . . . VREF + 10 KT LDG DIST PROC . . . . . APPLY *Refer to the QRH Part 2, or to the FCOM 3.02.80.* ALTN LAW : PROT LOST WHEN L/G DN : DIRECT LAW *At landing gear extension, control reverts to direct law in pitch, as well as in roll (refer to the DIRECT LAW procedure 3.02.27).* CAT 1 ONLY	INOP SYS F/CTL PROT YAW DAMPER AP 1 + 2

AUTO FLT RUD TRIM 1(2) FAULT

Crew awareness.

STATUS

	INOP SYS
CAT 3 SINGLE ONLY	CAT 3 DUAL RUD TRIM 1(2)

AUTO FLT RUD TRIM SYS

– FAC 1 . . . . . OFF THEN ON
– FAC 2 . . . . . OFF THEN ON

STATUS

	INOP SYS
CAT 1 ONLY	RUD TRIM AP 1 + 2

AUTO FLT RUD TRV LIM 1(2)

Crew awareness.

STATUS

	INOP SYS
	RUD TRV LIM 1(2)

AUTO FLT RUD TRV LIM SYS

RUD WITH CARE ABV 160 KT

Depending on when the failure occurs, the rudder travel limiter system may not be in the correct position for the flight speed. Therefore, to prevent damage to the aircraft structure, use the rudder with care, when the speed is greater than 160 knots.
At slats' extension, full rudder travel authority can be recovered.

– FAC 1 + 2 . . . . . OFF THEN ON

STATUS

	INOP SYS
RUD WITH CARE ABV 160 KT R *Note : An autoland must not be performed with a crosswind* R *greater than 12 knots.*	RUD TRV LIM

AUTO FLT FAC 1 (2) FAULT

– FAC (affected) . . . . . OFF THEN ON

● **IF UNSUCCESSFUL :**

– FAC (affected) . . . . . OFF

All functions are performed by the remaining FAC.

STATUS

	INOP SYS
BOTH PFD ON SAME FAC *Characteristic speeds, displayed on the two PFDs, are computed by the same FAC.* CAT 3 SINGLE ONLY	CAT 3 DUAL FAC 1(2)

AUTO FLT FAC 1 + 2 FAULT

RUD WITH CARE ABV 160 KT

R *Depending on when the failure occurs, the rudder travel limiter system may not be in the*
R *correct position for the flight speed. Therefore, to prevent damage to the aircraft structure, use the rudder with care, when the speed is above 160 knots.*

At slats' extension, full rudder travel authority is recovered.

– FAC 1 + 2 . . . . . OFF THEN ON

● **IF UNSUCCESSFUL :**

– FAC 1 + 2 . . . . . OFF

With FAC 1 + 2 inoperative, the rudder travel limit system, rudder trim control, yaw damper and PFD characteristic speeds are lost.

F/CTL ALTN LAW

(PROT LOST)

F/CTL normal laws are lost. All protections, except maneuver protections, are lost.

MAX SPEED . . . . . 320 KT

Speed is limited, due to the loss of high-speed protections.

STATUS

MAX SPEED . . . . . 320 KT
RUD WITH CARE ABV 160 KT
APPR PROC
– FOR LDG . . . . . USE FLAP 3
– GPWS LDG FLAP 3 . . . . . ON
Displayed, when flaps in CONF 3.
APPR SPD . . . . . VREF + 10 KT
LDG DIST PROC . . . . . APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80.
ALTN LAW : PROT LOST
WHEN L/G DN : DIRECT LAW
At landing gear extension, control reverts to direct law in pitch, as well as in roll (refer to the DIRECT LAW procedure 3.02.27).
CAT 1 ONLY

INOP SYS
WNDSHEAR DET
F/CTL PROT
FAC 1 + 2
AP 1 + 2
A/THR

AUTO FLT RUD TRV LIM SYS

RUD WITH CARE ABV 160 KT

Depending on when the failure occurs, the rudder travel limiter system may not be in the correct position for the flight speed. Therefore, to prevent damage to the aircraft structure, use the rudder with care, when the speed is greater than 160 knots.

At slats' extension, full rudder travel authority can be recovered.

– FAC 1 + 2 . . . . . OFF THEN ON

STATUS

RUD WITH CARE ABV 160 KT R *Note : An autoland must not be performed with a crosswind* R *greater than 12 knots.*	INOP SYS RUD TRV LIM

AUTO FLT FAC 1 (2) FAULT

– FAC (affected) . . . . . OFF THEN ON

● **IF UNSUCCESSFUL :**

– FAC (affected) . . . . . OFF

All functions are performed by the remaining FAC.

STATUS

BOTH PFD ON SAME FAC *Characteristic speeds, displayed on the two PFDs, are computed by the same FAC.* CAT 3 SINGLE ONLY	INOP SYS CAT 3 DUAL FAC 1(2)

AUTO FLT FAC 1 + 2 FAULT

RUD WITH CARE ABV 160 KT

Depending on when the failure occurs, the rudder travel limiter system may not be in the correct position for the flight speed. Therefore, to prevent damage to the aircraft structure, use the rudder with care, when the speed is above 160 knots.

At slats' extension, full rudder travel authority is recovered.

– FAC 1 + 2 . . . . . OFF THEN ON

● **IF UNSUCCESSFUL :**

– FAC 1 + 2 . . . . . OFF

With FAC 1 + 2 inoperative, the rudder travel limit system, rudder trim control, yaw damper and PFD characteristic speeds are lost.

F/CTL ALTN LAW

(PROT LOST)

F/CTL normal laws are lost. All protections, except maneuver protections, are lost.

MAX SPEED . . . . . 320 KT

Speed is limited, due to the loss of high-speed protections.

STATUS

MAX SPEED . . . . . 320 KT
RUD WITH CARE ABV 160 KT
APPR PROC
– FOR LDG . . . . . USE FLAP 3
– GPWS LDG FLAP 3 . . . . . ON
Displayed, when flaps in CONF 3.
APPR SPD . . . . . VREF + 10 KT
LDG DIST PROC . . . . . APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80.
ALTN LAW : PROT LOST
WHEN L/G DN : DIRECT LAW
At landing gear extension, control reverts to direct law in pitch, as well as in roll (refer to the DIRECT LAW procedure 3.02.27).
CAT 1 ONLY

INOP SYS
REAC W/S DET
F/CTL PROT
FAC 1 + 2
AP 1 + 2
A/THR

AUTO FLT RUD TRV LIM SYS

RUD WITH CARE ABV 160 KT

Depending on when the failure occurs, the rudder travel limiter system may not be in the correct position for the flight speed. Therefore, to prevent damage to the aircraft structure, use the rudder with care, when the speed is greater than 160 knots.

At slats' extension, full rudder travel authority can be recovered.

– FAC 1 . . . . . OFF THEN ON

– FAC 2 . . . . . OFF THEN ON

● **AT LDG ROLL :**

– DIFF BRAKING . . . . . AS RQRD

STATUS

RUD WITH CARE ABV 160 KT ● **AT LDG ROLL :** – DIFF BRAKING : . . . . . AS RQRD CAT 3 SINGLE ONLY *Note : An autoland must not be performed with a crosswind greater than 12 knots.*	INOP SYS RUD TRV LIM CAT 3 DUAL

AUTO FLT FAC 1 (2) FAULT

– FAC (affected) . . . . . OFF THEN ON

● **IF UNSUCCESSFUL :**

– FAC (affected) . . . . . OFF

All functions are performed by the remaining FAC.

STATUS

BOTH PFD ON SAME FAC *Characteristic speeds, displayed on the two PFDs, are computed by the same FAC.* CAT 3 SINGLE ONLY	INOP SYS CAT 3 DUAL FAC 1(2)

AUTO FLT FAC 1 + 2 FAULT

RUD WITH CARE ABV 160 KT

Depending on when the failure occurs, the rudder travel limiter system may not be in the correct position for the flight speed. Therefore, to prevent damage to the aircraft structure, use the rudder with care, when the speed is above 160 knots.

At slats' extension, full rudder travel authority is recovered.

– FAC 1 . . . . . OFF THEN ON

– FAC 2 . . . . . OFF THEN ON

● **IF UNSUCCESSFUL :**

– FAC 1 + 2 . . . . . OFF

With FAC 1 + 2 inoperative, the rudder travel limit system, rudder trim control, yaw damper and PFD characteristic speeds are lost.

F/CTL ALTN LAW

(PROT LOST)

F/CTL normal laws are lost. All protections, except maneuver protections, are lost.

MAX SPEED . . . . . 320 KT

Speed is limited, due to the loss of high-speed protections.

STATUS

MAX SPEED . . . . . 320 KT

RUD WITH CARE ABV 160 KT

APPR PROC

– FOR LDG . . . . . USE FLAP 3

– GPWS LDG FLAP 3 . . . . . ON

Displayed, when flaps in CONF 3.

APPR SPD . . . . . VREF + 10 KT

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80

ALTN LAW : PROT LOST

WHEN L/G DN : DIRECT LAW

At landing gear extension, control reverts to direct law in pitch, as well as in roll (refer to the DIRECT LAW procedure 3.02.27).

CAT 1 ONLY

INOP SYS

REAC W/S DET

F/CTL PROT

FAC 1 + 2

AP 1 + 2

A/THR

AUTO FLT RUD TRV LIM SYS

RUD WITH CARE ABV 140 KT

Depending on when the failure occurs, the rudder travel limiter system may not be in the correct position for the flight speed. Therefore, to prevent damage to the aircraft structure, use the rudder with care, when the speed is greater than 140 knots.
At slats' extension, full rudder travel authority can be recovered.

– FAC 1 . . . . . OFF THEN ON
– FAC 2 . . . . . OFF THEN ON
● **AT LDG ROLL :**
  – DIFF BRAKING . . . . . AS RQRD

STATUS

	INOP SYS
RUD WITH CARE ABV 140 KT ● **AT LDG ROLL :** – DIFF BRAKING : . . . . . AS RQRD CAT 3 SINGLE ONLY *Note : An autoland must not be performed with a crosswind greater than 12 knots.*	RUD TRV LIM CAT 3 DUAL

AUTO FLT FAC 1 (2) FAULT

– FAC (affected) . . . . . OFF THEN ON
● **IF UNSUCCESSFUL :**
  – FAC (affected) . . . . . OFF
  All functions are performed by the remaining FAC.

STATUS

	INOP SYS
BOTH PFD ON SAME FAC *Characteristic speeds, displayed on the two PFDs, are computed by the same FAC.* CAT 3 SINGLE ONLY	CAT 3 DUAL FAC 1(2)

AUTO FLT FAC 1 + 2 FAULT

RUD WITH CARE ABV 140 KT

Depending on when the failure occurs, the rudder travel limiter system may not be in the correct position for the flight speed. Therefore, to prevent damage to the aircraft structure, use the rudder with care, when the speed is above 140 knots.

At slats' extension, full rudder travel authority is recovered.

– FAC 1 . . . . . OFF THEN ON

– FAC 2 . . . . . OFF THEN ON

● **IF UNSUCCESSFUL :**

– FAC 1 + 2 . . . . . OFF

With FAC 1 + 2 inoperative, the rudder travel limit system, rudder trim control, yaw damper and PFD characteristic speeds are lost.

F/CTL ALTN LAW

(PROT LOST)

F/CTL normal laws are lost. All protections, except maneuver protections, are lost.

MAX SPEED . . . . . 320 KT

Speed is limited, due to the loss of high-speed protections.

STATUS

MAX SPEED . . . . . 320 KT

RUD WITH CARE ABV 140 KT

APPR PROC

– FOR LDG . . . . . USE FLAP 3

– GPWS LDG FLAP 3 . . . . . ON

Displayed, when flaps in CONF 3.

APPR SPD . . . . . VREF + 10 KT

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

ALTN LAW : PROT LOST

WHEN L/G DN : DIRECT LAW

At landing gear extension, control reverts to direct law in pitch, as well as in roll (refer to the DIRECT LAW procedure 3.02.27).

CAT 1 ONLY

INOP SYS

WNDSHEAR DET

F/CTL PROT

FAC 1 + 2

AP 1 + 2

A/THR

AUTO FLT FCU 1 + 2 FAULT

– PFD BARO REF : STD ONLY

If both FCU channels fail, the barometric reference on the PFD automatically changes to 1013 hPa. Use the standby altimeter, and set it to the actual barometric setting.

R *Do not insert the MDA (MDH) value on the MCDU PERF APPR page (because the PFD*
R *altitude is referenced to STD, and not to the correct barometric value).*
R *The PNF must then perform the standard callouts ("HUNDRED ABOVE" and "MINIMUM"),*
R *using the STBY altimeter.*

In addition :

– *All FCU controls are inoperative*
– *A/THR, AP 1 + 2, and FD 1 + 2 are not available*
(Except in LAND or GO AROUND mode, where only A/THR is lost)
– *On the PFD :*
· *The altitude alert is inoperative*
· *The ILS deviation scales are displayed*
· *The flight path vector is displayed*
· *The Mach indication is inoperative*
· *The FMA is lost, except in LAND or GA mode.*
– *On the ND :*
· *The ROSE NAV mode with map (80 NM range) is displayed*
· *VOR/ADF needles :*
Needle 1 relates to VOR1 only
Needle 2 relates to ADF2 only (ADF1, if ADF2 not installed)
(VOR selection on DDRMI is not affected)
(ADF selection on DDRMI, if available, is not affected)
· *The weather radar image may be lost. Disregard the image, if it remains displayed. In all cases, the red "WXR RNG" message appears.*

STATUS

PFD BARO REF : STD ONLY
- **if not in LAND or GA**
  CAT 1 ONLY
- **if in LAND or GA**
  CAT 2 ONLY

INOP SYS
FCU 1 + 2
AP 1 + 2 (if not LAND or GA)
A/THR
CAT 3 (if in LAND or GA mode)
GPWS TERR

AUTO FLT FCU 1 (2) FAULT

– BARO REF ..... X CHECK

One FCU channel is lost :

Therefore, crosscheck the barometric reference settings on the FCU and PFDs.

STATUS

INOP SYS
FCU 1 (2)

AUTO FLT AP OFF

This warning is displayed only for involuntary disconnection. For voluntary disconnection a red AP OFF message is displayed in the right lower part of ECAM upper DU.

Crew awareness

STATUS

	INOP SYS
CAT 1 ONLY (if both AP lost)	(affected) AP

AUTO FLT A/THR OFF

In case of involuntary disconnection, amber "A/THR OFF" and "ENG THRUST LOCKED" messages are displayed in the left lower part of ECAM upper DU.

For voluntary disconnection, an amber A/THR OFF message is displayed on the right lower part of ECAM upper DU.

If the A/THR is failed, the flight crew may recover it by engaging the other AP, and then trying to re-engage the A/THR.

Note : It the A/THR is recovered with AP 2, A/THR will be lost again at AP 2 disengagement.

– THR LEVERS ..... MOVE

If the thrust levers are not moved within 5 seconds, the "ENG THRUST LOCKED" warning is displayed (refer to 3.02.70).

STATUS

	INOP SYS
CAT 2 ONLY	A/THR
	CAT 3

AUTO FLT A/THR LIMITED

This warning is displayed when A/THR is active and the thrust levers are below the CL detent (or the MCT detent when one engine is out). The caution is repeated every 5 seconds as long as the thrust levers are not moved.

– THR LEVERS ..... MOVE

Thrust lever(s) must be set in the relevant detent.

WINDSHEAR DET FAULT

Crew awareness

STATUS

| INOP SYS
| WNDSHEAR DET

Note : On the ground, this warning may appear spuriously. Flight crew can cancel it by resetting both FACs one after the other:

- *FAC 1: Pull then push AUTO FLT/FAC 1/26VAC and 28VDC circuit breakers B03 and B04 ON 49VU.*
- *FAC 2 : Pull then push AUTO FLT/FAC 2/26VAC and 28VDC circuit breakers M18 and M19 on 121VU.*

LOW ENERGY WARNING

The "SPEED SPEED SPEED" synthetic voice sounds every 5 seconds whenever the aircraft energy goes below a threshold under which thrust must be increased in order to recover a positive flight path angle.

R – THR LEVERS . . . . . MOVE FORWARD

Increase the thrust until the warning disappears.

LOSS OF FMS DATA IN DESCENT/APPROACH (SEVERE RESET)

AP/FD lateral and vertical selected modes, and A/THR, are available immediately after the reset. If necessary, the pilot may perform the FCU selections for short-term navigation.
When the FMS has automatically recovered :
– The database cycle may have changed
– The FMGS does not autotune the ILS and ADF
– The FMS position bias is lost
– Lateral and vertical managed modes cannot re-engage
– The "CAB PR LDG ELEV FAULT" message is displayed on the ECAM
– A "MAP NOT AVAIL" message may be displayed on one ND.
With respect to the Auto Flight System, and depending on when the flight plan is lost, the following two procedures list the actions to be performed, in their order of priority :

■ INITIAL APPROACH OR CLOSE TO ILS INTERCEPTION

● **When the system has recovered** :
– Access the RAD NAV page, and manually tune the ILS (preferably using Ident). Enter the ILS course, if a frequency has been entered.
– Fly in selected speed.

Note : – LOC and G/S guidance modes are available.
– VLS speed is still available and displayed on the PFD.
– Missed approach trajectory is not available.

■ DESCENT or TERMINAL AREA

● **When the system has recovered** :
– Select the initial database
– Perform DIR TO a downpath waypoint. Select heading, if required.
– Perform a LAT REV at the downpath waypoint and redefine the DESTINATION in the NEW DEST field.
– Redefine the arrival and/or the approach procedure.
– Select the FUEL PRED page, and enter the GW.
– Activate the APPROACH phase.

Enter destination data on the PERF APPR page, as required. Managed speed is available.

R

AUTO FLT REAC W/S DET FAULT

Crew awareness.

STATUS

| INOP SYS
REAC W/S DET

Note : On ground, this warning may appear spuriously. This warning is cancelled by resetting both FACs, one after the other.

- *FAC 1: Pull then push AUTO FLT/FAC 1/26VAC and 28VDC circuit breakers B03 and B04 on 49VU.*
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– THR LEVERS . . . . . MOVE FORWARD

Increase thrust until the warning disappears.

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– Fly in selected speed.

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– VLS speed is still available and displayed on the PFD.
– Missed approach trajectory is not available.

■ DESCENT or TERMINAL AREA

● **When the system has recovered :**
– Select the initial database
– Perform DIR TO a downpath waypoint. Select heading, if required.
– Perform a LAT REV at the downpath waypoint and redefine the DESTINATION in the NEW DEST field.
– Redefine the arrival and/or the approach procedure.
– Select the FUEL PRED page, and enter the GW.
– Activate the APPROACH phase.

Enter destination data on the PERF APPR page, as required. Managed speed is available.

R

AUTO FLT REAC W/S DET FAULT

Crew awareness.

STATUS

| INOP SYS
REAC W/S DET

Note : On ground, this warning may appear spuriously. This warning is cancelled by resetting both FACs, one after the other.

- *FAC 1: Pull then push AUTO FLT/FAC 1/26VAC and 28VDC circuit breakers B03 and B04 on 49VU.*
- *FAC 2: Pull then push AUTO FLT/FAC 2/26VAC and 28VDC circuit breakers M18 and M19 on 121VU.*

LOW ENERGY WARNING

The "SPEED SPEED SPEED" synthetic voice sounds every 5 seconds, whenever the aircraft's energy goes below a threshold under which the thrust must be increased in order to recover a positive flight path angle.

– THR LEVERS . . . . . MOVE FORWARD

Increase thrust until the warning disappears.

LOSS OF FMS DATA IN DESCENT/APPROACH (SEVERE RESET)

AP/FD lateral and vertical selected modes, and A/THR, are available immediately after the reset. If necessary, the pilot may perform the FCU selections for short-term navigation.
When the FMS has automatically recovered (i.e. when the FMGC prompt is available and selectable on the MCDU MENU page) :
– The FMGS does not autotune the ILS and ADF
– The FMS position bias is lost
– Lateral and vertical managed modes cannot re-engage
– The "CAB PR LDG ELEV FAULT" message is displayed on the ECAM
– A "MAP NOT AVAIL" message may be displayed on one ND.
With respect to the Auto Flight System, and depending on when the flight plan is lost, the following two procedures list the actions to be performed, in their order of priority :

■ INITIAL APPROACH OR CLOSE TO ILS INTERCEPTION

● **When the system has recovered** :
– Access the RAD NAV page, and manually tune the ILS (preferably using Ident). Enter the ILS course, if a frequency has been entered.
– Fly in selected speed.

Note : – LOC and G/S guidance modes are available.
– VLS speed is still available and displayed on the PFD.
– Missed approach trajectory is not available.

■ DESCENT or TERMINAL AREA

● **When the system has recovered** :
– Perform DIR TO a downpath waypoint. Select heading, if required.
– Perform a LAT REV at the downpath waypoint and redefine the DESTINATION in the NEW DEST field.
– Redefine the arrival and/or the approach procedure.
– Select the FUEL PRED page, and enter the GW.
– Activate the APPROACH phase.
Enter destination data on the PERF APPR page, as required.
Managed speed is available.

COM CIDS 1 + 2 FAULT

Crew awareness.

Passenger address, cabin and service interphone, and passenger signs are inoperative.

STATUS

| INOP SYS
CIDS

◁* COM VHF 1(2)(3)/HF 1(2) EMITTING

1. *If any Push To Talk (PTT) transmission selector (sidestick radio selector, hand mike selector, or PTT switch ◁) is jammed in the transmit position, try to release it in order to remove the caution.*

R 2. *If unsuccessful, deselect the identified failed VHF/HF transmission keys on the associated*
R *Audio Control Panel (ACP) to remove the caution. This ACP should only be used in*
R *reception mode. The associated PTT transmission selectors must not be used.*

Note : In this case, the ACP of the unaffected side may be used to recover the deselected
R *VHF/HF channel.*

3. *If no transmission key on the ACP is found in the "transmit" position, pull the affected VHF/HF C/B associated to the ECAM message : COM\HF1 C/B HA 14 on 49 VU, COM NAV\HF2 C/B L13 on 121 VU, COM\VHF\1 C/B G09 on 49 VU, COM NAV\VHF\2 C/B L04 on 121 VU, COM\VHF\3 C/B L05 on 121 VU.*

◁* COM ACARS FAULT

No crew action required.

STATUS

| INOP SYS
ACARS

COM CIDS 1 + 2 FAULT

Crew awareness.

Passenger address, cabin and service interphone, and passenger signs are inoperative.

STATUS

| INOP SYS
CIDS

◁* COM VHF 1(2)(3)/HF 1(2) EMITTING

1. *If any Push To Talk (PTT) transmission selector (sidestick radio selector, hand mike selector, or PTT switch ◁) is jammed in the transmit position, try to release it in order to remove the caution.*

R 2. *If unsuccessful, deselect the identified failed VHF/HF transmission keys on the associated*
R *Audio Control Panel (ACP) to remove the caution. This ACP should only be used in*
R *reception mode. The associated PTT transmission selectors must not be used.*

Note : In this case, the ACP of the unaffected side may be used to recover the deselected
R *VHF/HF channel.*

3. *If no transmission key on the ACP is found in the "transmit" position, pull the affected VHF/HF C/B associated to the ECAM message : COM\HF1 C/B HA 14 on 49 VU, COM NAV\HF2 C/B L13 on 121 VU, COM\VHF\1 C/B G09 on 49 VU, COM NAV\VHF\2 C/B L04 on 121 VU, COM\VHF\3 C/B L05 on 121 VU.*

◁* COM ACARS FAULT

Crew awareness.

STATUS

| INOP SYS
ACARS

◁* COM SATCOM FAULT

Crew awareness.

ACARS ◁ and telephone communications are inoperative.

STATUS

| INOP SYS
SATCOM

COM CIDS 1 + 2 FAULT

Crew awareness.

Passenger address, cabin and service interphone, and passenger signs are inoperative.

STATUS

| INOP SYS
CIDS

◁* COM VHF 1(2)(3)/HF 1(2) EMITTING

1. *If any Push To Talk (PTT) transmission selector (sidestick radio selector, hand mike selector, or PTT switch ◁) is jammed in the transmit position, try to release it in order to remove the caution.*

R 2. *If unsuccessful, deselect the identified failed VHF/HF transmission keys on the associated*
R *Audio Control Panel (ACP) to remove the caution. This ACP should only be used in*
R *reception mode. The associated PTT transmission selectors must not be used.*

Note : In this case, the ACP of the unaffected side may be used to recover the deselected
R *VHF/HF channel.*

3. *If no transmission key on the ACP is found in the "transmit" position, pull the affected VHF/HF C/B associated to the ECAM message : COM\HF1 C/B HA 14 on 49 VU, COM NAV\HF2 C/B L13 on 121 VU, COM\VHF\1 C/B G09 on 49 VU, COM NAV\VHF\2 C/B L04 on 121 VU, COM\VHF\3 C/B L05 on 121 VU.*

◁* COM ACARS FAULT

Crew awareness.

STATUS

| INOP SYS
ACARS

◁* COM SATCOM FAULT

Crew awareness.

ACARS ◁ and telephone communications are inoperative.

STATUS

| INOP SYS
SATCOM

COM SATCOM DATA FAULT ◁

Crew awareness.

STATUS

| INOP SYS
| SATCOM DATA

COM VHF 3 DATA FAULT ◁

Crew awareness.

STATUS

| INOP SYS
| VHF3 DATA

COM HF 1(2) DATA FAULT ◁

Crew awareness.

Triggered to indicate the loss of the HFs' DATA mode.

STATUS

| INOP SYS
| HF 1(2) DATA

ELEC IDG 1(2) OIL LO PR/OVHT

– IDG (affected) . . . . . OFF

If the associated engine is running, the IDG (integrated drive generator) must be disconnected from the engine at, or above, idle to prevent damage to the disconnect mechanism.

Press the IDG pushbutton until the GEN FAULT light comes on. However, do not press for more than 3 seconds, to avoid damage to the disengage solenoid.

The IDG FAULT light goes off, when the IDG is disconnected.

STATUS

Note : If available, the APU may be started and the APU GEN used.

R CAT 3 SINGLE ONLY

INOP SYS
MAIN GALLEY (only if APU GEN is not online)
GEN 1(2)

R CAT 3 DUAL

ELEC GEN 1(2) FAULT

– GEN (affected) . . . . . OFF THEN ON

● **IF UNSUCCESSFUL :**

– GEN (affected) . . . . . OFF

STATUS

Note : If available, the APU may be started, and the APU GEN used.

CAT 3 SINGLE ONLY

INOP SYS
MAIN GALLEY (only if APU GEN is not online)
GEN 1(2)
CAT 3 DUAL

ELEC GEN 1(2) OFF

Crew awareness

Turn affected GEN ON, with the applicable pushbutton.

STATUS

CAT 3 SINGLE

INOP SYS
MAIN GALLEY (only if APU GEN is not online)
GEN 1(2)
CAT 3 DUAL

ELEC APU GEN FAULT

– APU GEN ..... OFF THEN ON

● **IF UNSUCCESSFUL :**

– APU GEN ..... OFF

STATUS

INOP SYS
MAIN GALLEY (when only one gen operating)
APU GEN

ELEC BAT 1(2) FAULT

Crew awareness

Battery contactor is opened automatically by battery charge limiter.

STATUS

APU BAT START NOT AVAIL	INOP SYS
	BAT 1(2)

ELEC BAT 1(2) OFF

Crew awareness

Battery is abnormally selected off.

STATUS

APU BAT START NOT AVAIL	

ELEC BCL 1(2) FAULT

Crew awareness

STATUS

APU BAT START NOT AVAIL	INOP SYS
	BCL 1(2)

ELEC AC BUS 1 FAULT

R *AC BUS 1 normally supplies the AC ESS BUS and, through TR1, the DC ESS BUS. In case*
R *of an AC BUS 1 FAULT both the AC and DC ESS BUS will be lost and therefore the AC ESS*
R *BUS FAULT and the DC ESS BUS FAULT will be displayed on the ECAM. However, both AC*
R *and DC ESS BUS can be recovered by switching the AC ESS FEED pushbutton to ALTN as*
R *displayed in the AC ESS BUS FAULT ECAM procedure.*

– BLOWER . . . . . OVRD

The avionics ventilation system is in the closed circuit configuration.
Air conditioning is added to the ventilation air.

WHEEL N.W. STEER FAULT

VENT EXTRACT FAULT

– EXTRACT . . . . . OVRD

ENG 1 EPR MODE FAULT

(for IAE engine only)
Refer to associated procedure

Affected systems
* AVNCS VENT
* HYD
* FUEL
* F/CTL



ELEC AC BUS 1 FAULT (CONT'D)

STATUS

– LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

SLATS SLOW

CAT 2 ONLY

INOP SYS

See below

INOP SYS displayed on ECAM

BLUE HYD	L+R TK PUMP 1	MAIN GALLEY
SPLR 3	CTR TK PUMP 1	B ELEC PUMP
ADR 3	VENT BLOWER	BRAKES SYS 1
RA 1	GALLEY FAN	DMC 3
CAPT TAT	CRG VENT ◁	GPWS
L WSHLD HEAT	GND COOL ◁	LAV DET
L WNDW HEAT	N.W. STEER	CAT 3
REVERSER 1		

Other inoperative systems

Left cabin fan	Engine 1 ignition B	COND controller lane A
Radar 1	EVMU eng 1 and eng 2	Hydraulic quantity indication
Stby Pitot/AOA		Partial galley
ATSU	Printer	PVI
Brake fans 5, 6, 7 and 8 ◁		TCAS
HUD ◁		
MCDU 3 ◁		

Note : The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC AC BUS 1 FAULT

R *AC BUS 1 normally supplies the AC ESS BUS and, through TR1, the DC ESS BUS. In case*
R *of an AC BUS 1 FAULT both the AC and DC ESS BUS will be lost and therefore the AC ESS*
R *BUS FAULT and the DC ESS BUS FAULT will be displayed on the ECAM. However, both AC*
R *and DC ESS BUS can be recovered by switching the AC ESS FEED pushbutton to ALTN as*
R *displayed in the AC ESS BUS FAULT ECAM procedure.*

– BLOWER . . . . . OVRD

The avionics ventilation system is in the closed circuit configuration.
Air conditioning is added to the ventilation air.

WHEEL N.W. STEER FAULT

VENT EXTRACT FAULT

– EXTRACT . . . . . OVRD

ENG 1 EPR MODE FAULT

Refer to associated procedure

Affected systems
* AVNCS VENT
* HYD
* FUEL
* F/CTL



ELEC AC BUS 1 FAULT (CONT'D)

STATUS

– LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

CAB ZONE AT FIXED TEMP

Due to the loss of the galley fan, the Pack 1 controller, and the primary zone controller channel. (See associated procedures).

SLATS SLOW

CAT 2 ONLY

INOP SYS

See below

INOP SYS displayed on ECAM

BLUE HYD	L+R TK PUMP 1	MAIN GALLEY
SPLR 3	CTR TK PUMP 1	B ELEC PUMP
ADR 3	VENT BLOWER	BSCU CH 1
RA 1	GALLEY FAN	DMC 3
CAPT TAT	CRG VENT ◁	GPWS
L WSHLD HEAT	GND COOL ◁	LAV DET
L WNDW HEAT	N.W. STEER	PACK 1 REGUL
CAT 3	REVERSER 1	

Other inoperative systems

Left cabin fan	Engine 1 ignition B	Zone controller prim channel
Radar 1	EVMU eng 1 and eng 2	Hydraulic quantity indication
Stby Pitot/AOA		Partial galley
ACARS ◁	Printer	PVI ◁
Brake fans 5, 6, 7 and 8 ◁	MCDU 3 ◁	TCAS ◁
HUD ◁		

Note : The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC AC BUS 1 FAULT

AC BUS 1 normally supplies the AC ESS BUS and, through TR1, the DC ESS BUS. In case of an AC BUS 1 FAULT both the AC and DC ESS BUS will be lost and therefore the AC ESS BUS FAULT and the DC ESS BUS FAULT will be displayed on the ECAM. However, both AC and DC ESS BUS can be recovered by switching the AC ESS FEED pushbutton to ALTN as displayed in the AC ESS BUS FAULT ECAM procedure.

– BLOWER . . . . . OVRD

The avionics ventilation system is in the closed circuit configuration.
Air conditioning is added to the ventilation air.

WHEEL N.W. STEER FAULT

VENT EXTRACT FAULT

– EXTRACT . . . . . OVRD

ENG 1 EPR MODE FAULT

Refer to associated procedure

Affected systems
* AVNCS VENT
* HYD
* FUEL
* F/CTL

ELEC AC BUS 1 FAULT (CONT'D)

STATUS

– LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

CAB ZONE AT FIXED TEMP

Due to the loss of the galley fan, the Pack 1 controller, and the primary zone controller channel. (See associated procedures).

SLATS SLOW

CAT 2 ONLY

INOP SYS

See below

INOP SYS displayed on ECAM

BLUE HYD	L+R TK PUMP 1	MAIN GALLEY
SPLR 3	CTR TK PUMP 1	B ELEC PUMP
ADR 3	VENT BLOWER	BRAKES SYS 1
RA 1	GALLEY FAN	DMC 3
CAPT TAT	CRG VENT ◁	GPWS
L WSHLD HEAT	GND COOL ◁	LAV DET
L WNDW HEAT	N.W. STEER	PACK 1 REGUL
CAT 3	REVERSER 1	

Other inoperative systems

Left cabin fan	Engine 1 ignition B	Zone controller prim channel
Radar 1	EVMU eng 1 and eng 2	Hydraulic quantity indication
Stby Pitot/AOA		Partial galley
ACARS ◁	Printer	PVI
Brake fans 5, 6, 7 and 8 ◁	MCDU 3 ◁	TCAS
HUD ◁		

Note : The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC AC BUS 1 FAULT

AC BUS 1 normally supplies the AC ESS BUS and, through TR1, the DC ESS BUS. In case of an AC BUS 1 FAULT both the AC and DC ESS BUS will be lost and therefore the AC ESS BUS FAULT and the DC ESS BUS FAULT will be displayed on the ECAM. However, both AC and DC ESS BUS can be recovered by switching the AC ESS FEED pushbutton to ALTN as displayed in the AC ESS BUS FAULT ECAM procedure.

– BLOWER . . . . . OVRD

The avionics ventilation system is in the closed circuit configuration.
Air conditioning is added to the ventilation air.

WHEEL N.W. STEER FAULT

VENT EXTRACT FAULT

– EXTRACT . . . . . OVRD

ENG 1 EPR MODE FAULT

Refer to associated procedure

Affected systems
* AVNCS VENT
* HYD
* FUEL
* F/CTL

ELEC AC BUS 1 FAULT (CONT'D)

STATUS

– LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

SLATS SLOW

CAT 2 ONLY

INOP SYS

See below

INOP SYS displayed on ECAM

BLUE HYD	L+R TK PUMP 1	MAIN GALLEY
SPLR 3	CTR TK PUMP 1	B ELEC PUMP
ADR 3	VENT BLOWER	BRAKES SYS 1
RA 1	GALLEY FAN	DMC 3
CAPT TAT	CRG VENT ◁	GPWS
L WSHLD HEAT	GND COOL ◁	LAV DET
L WNDW HEAT	N.W. STEER	CAT 3
REVERSER 1		

Other inoperative systems

Left cabin fan	Engine 1 ignition B	COND controller lane A
Radar 1	EVMU eng 1 and eng 2	Hydraulic quantity indication
Stby Pitot/AOA		Partial galley
ATSU	Printer	PVI
Brake fans 5, 6, 7 and 8 ◁		TCAS
HUD ◁		
MCDU 3 ◁		

Note : The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC AC BUS 2 FAULT

– EXTRACT . . . . . OVRD

The avionics ventilation system is in the closed circuit configuration.
Air conditioning is added to the ventilation air.

L/G LGCIU 2 FAULT

ENG 2 EPR MODE FAULT

Refer to the associated procedures.

Affected systems
* AVNCS VENT
* FUEL

STATUS

PACK 2 AT FIXED TEMP

INOP SYS
See below

R *Due to the loss of Pack 2 controller, the pack outlet*
R *temperature is controlled by the pack anti-ice valve and is*
R *stabilized to a temperature between 5°C (41°F) and 30°C*
R *(86°F) within a maximum of 6 minutes.*

CAT 1 ONLY

INOP SYS displayed on ECAM

ADR 2	CTR TK PUMP 2	RUD TRV LIM 2
ILS 2	LGCIU 2	BSCU CH 2
GPS 2	RA 2	REVERSER 2
Y ELEC PUMP	F/O PITOT	VENT EXTRACT
SDAC 2	F/O AOA	GND COOL ◁
FWC 2	F/O TAT	PACK 2 REGUL
DMC 2	R WNDW HEAT	MAIN GALLEY
FDIU	CAT 2	YAW DAMPER 2
R WSHLD HEAT	L+R TK PUMP 2	RUD TRIM 2

OTHER INOP SYS

Right cabin fan	MCDU 2	QAR
Brake fans 1, 2, 3 and 4 ◁	ENG 2 ignition B	ATC 2
ADF 2 ◁	VOR 2	ECAM lower DU
DME 2	F/O PFD and ND	HF 2 ◁
RADAR 2 ◁		

Note : The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC AC ESS BUS FAULT

– AC ESS FEED ..... ALTN

AC BUS 2 supplies AC ESS BUS.

– ATC ..... SYS 2

AUTO FLT YAW DAMPER 1

AUTO FLT RUD TRIM 1 FAULT

AUTO FLT RUD TRV LIM 1

CAT 1 ONLY

STATUS

INOP SYS

See below

INOP SYS displayed on ECAM

	ADR 1	CAT 2	GPWS
	ILS 1	SDAC 1	YAW DAMPER 1
	GPS 1	CAPT PITOT	FWC 1
	RUD TRIM 1	CAPT AOA	DMC 1
R	RUD TRV LIM 1		ENG 1 + 2 IGN A

Other inoperative systems

	RMP's lighting (RMP's still operative)	ECAM upper display	DDRMI
R	VOR 1	CAPT PFD	
	MCDU 1	ATC 1	APU fuel pump
	CAPT ND	DME 1	Passenger oxygen masks (auto + manual)
	CVR	HF 1	ADF 1 ◁

R *Note : The warning may be caused by a sub BUS failure. As a result, only a part of the above-listed systems may be lost.*

ELEC AC BUS 2 FAULT

– EXTRACT . . . . . OVRD

The avionics ventilation system is in the closed circuit configuration.
Air conditioning is added to the ventilation air.

L/G LGCIU 2 FAULT

ENG 2 EPR MODE FAULT

Refer to the associated procedures.

Affected systems
* AVNCS VENT
* FUEL

STATUS

PACK 2 AT FIXED TEMP

Due to the loss of the Pack 2 controller, the pack outlet temperature is controlled by the pack anti-ice valve and is stabilized to a temperature between 5°C (41°F) and 30°C (86°F) within a maximum of 6 minutes.

CAT 1 ONLY

INOP SYS
See below

INOP SYS displayed on ECAM

ADR 2	CTR TK PUMP 2	RUD TRV LIM 2
ILS 2	LGCIU 2	BRAKES SYS 2
GPS 2	RA 2	REVERSER 2
Y ELEC PUMP	F/O PITOT	VENT EXTRACT
SDAC 2	F/O AOA	GND COOL ◁
FWC 2	F/O TAT	PACK 2 REGUL
DMC 2	R WNDW HEAT	MAIN GALLEY
FDIU	CAT 2	YAW DAMPER 2
R WSHLD HEAT	L+R TK PUMP 2	RUD TRIM 2

OTHER INOP SYS

Right cabin fan	MCDU 2	QAR
Brake fans 1, 2, 3 and 4 ◁	ENG 2 ignition B	ATC 2
ADF 2 ◁	VOR 2	ECAM lower DU
DME 2	F/O PFD and ND	HF 2 ◁
RADAR 2 ◁		

Note : The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC AC ESS BUS FAULT

– AC ESS FEED ..... ALTN

AC BUS 2 supplies AC ESS BUS.

– ATC ..... SYS 2

AUTO FLT YAW DAMPER 1

AUTO FLT RUD TRIM 1 FAULT

AUTO FLT RUD TRV LIM 1

CAT 1 ONLY

STATUS

INOP SYS

See below

INOP SYS displayed on ECAM

	ADR 1	CAT 2	GPWS
	ILS 1	SDAC 1	YAW DAMPER 1
	GPS 1	CAPT PITOT	FWC 1
	RUD TRIM 1	CAPT AOA	DMC 1
R	RUD TRV LIM 1		ENG 1 + 2 IGN A

Other inoperative systems

	RMP's lighting (RMP's still operative)	ECAM upper display	DDRMI
R	VOR 1	CAPT PFD	
	MCDU 1	ATC 1	APU fuel pump
	CAPT ND	DME 1	Passenger oxygen masks (auto + manual)
	CVR	HF 1	ADF 1 ◁

R *Note : The warning may be caused by a sub BUS failure. As a result, only a part of the above-listed systems may be lost.*

ELEC AC BUS 2 FAULT

– EXTRACT . . . . . OVRD

The avionics ventilation system is in the closed circuit configuration.
Air conditioning is added to the ventilation air.

L/G LGCIU 2 FAULT

ENG 2 EPR MODE FAULT

Refer to the associated procedures.

Affected systems
* AVNCS VENT
* FUEL

STATUS

CAT 1 ONLY

INOP SYS
See below

INOP SYS displayed on ECAM

ADR 2	CTR TK PUMP 2	RUD TRV LIM 2
ILS 2	LGCIU 2	BRAKES SYS 2
GPS 2	RA 2	REVERSER 2
Y ELEC PUMP	F/O PITOT	VENT EXTRACT
SDAC 2	F/O AOA	GND COOL ◁
FWC 2	F/O TAT	DMC 2
R WNDW HEAT	MAIN GALLEY	RECORDER SYS
CAT 2	YAW DAMPER 2	R WSHLD HEAT
L+R TK PUMP 2	RUD TRIM 2	

OTHER INOP SYS

Right cabin fan	MCDU 2	QAR
Brake fans 1, 2, 3 and 4 ◁	ENG 2 ignition B	ATC 2
ADF 2 ◁	VOR 2	ECAM lower DU
DME 2	F/O PFD and ND	HF 2 ◁
RADAR 2 ◁		

Note : The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC AC ESS BUS FAULT

– AC ESS FEED ..... ALTN

AC BUS 2 supplies AC ESS BUS.

– ATC ..... SYS 2

AUTO FLT YAW DAMPER 1

AUTO FLT RUD TRIM 1 FAULT

AUTO FLT RUD TRV LIM 1

CAT 1 ONLY

STATUS

INOP SYS

See below

INOP SYS displayed on ECAM

	ADR 1	CAT 2	GPWS
	ILS 1	SDAC 1	YAW DAMPER 1
	GPS 1	CAPT PITOT	FWC 1
	RUD TRIM 1	CAPT AOA	DMC 1
R	RUD TRV LIM 1		ENG 1 + 2 IGN A

Other inoperative systems

	RMP's lighting (RMP's still operative)	ECAM upper display	DDRMI
R	VOR 1	CAPT PFD	
	MCDU 1	ATC 1	APU fuel pump
	CAPT ND	DME 1	Passenger oxygen masks (auto + manual)
	CVR	HF 1	ADF 1 ◁

R *Note : The warning may be caused by a sub BUS failure. As a result, only a part of the above-listed systems may be lost.*

ELEC AC ESS BUS FAULT

– AC ESS FEED ..... ALTN
AC BUS 2 supplies AC ESS BUS.
– ATC ..... SYS 2

AUTO FLT YAW DAMPER 1

AUTO FLT RUD TRIM 1 FAULT

AUTO FLT RUD TRV LIM 1

STATUS

CAT 1 ONLY

INOP SYS
See below

INOP SYS displayed on ECAM

	ADR 1	CAT 2	GPWS
	ILS 1	SDAC 1	YAW DAMPER 1
	GPS 1	CAPT PITOT	FWC 1
	RUD TRIM 1	CAPT AOA	DMC 1
R	RUD TRV LIM 1		ENG 1 + 2 IGN A

Other inoperative systems

	RMP's lighting (RMP's still operative)	ECAM upper display	DDRMI
R	VOR 1	CAPT PFD	
	MCDU 1	ATC 1	APU fuel pump
	CAPT ND	DME 1	Passenger oxygen masks (auto + manual)
	CVR	HF 1	ADF 1 ◁

R *Note : The warning may be caused by a sub BUS failure. As a result, only a part of the above-listed systems may be lost.*

ELEC AC ESS BUS SHED

ATC . . . . . SYS 2

STATUS

INOP SYS
CAPT AOA
See below

Other inoperative systems

MCDU 1	ATC 1	APU fuel pump
CAPT ND	DME 1	Passenger oxygen masks (auto + manual)
CAPT AOA heat	CVR	HF 1
R ADF 1 ◁		

Note : The warning may be caused by a failure in a sub BUS. Consequently only a part of the systems listed above may be lost.

ELEC DC BUS 1 FAULT

– BLOWER . . . . . OVRD
– EXTRACT . . . . . OVRD

Avionic ventilation air is supplied to the air conditioning, and exhausted overboard.

Affected systems
* AVNCS VENT
* FUEL

STATUS

CAB ZONE AT FIXED TEMP

Due to the loss of the galley fan, the Pack 1 controller, and the primary zone controller channel. (See associated procedures).

INOP SYS
See below

INOP SYS displayed on ECAM

ACP 3	CTR TK PUMP 1	BSCU CH 1
CAPT STAT heat	AVNCS VENT	LAV DET
STBY STAT heat	GALLEY FAN	PACK 1 REGUL
L. WSHLD HEAT	GND COOL ◁	L. WNDW HEAT
REVERSER 1		

Other inoperative systems

Left cab fan	VHF 3 ◁	Eng 1 oil press and qty ind.
Zone controller primary channel	RMP 3 ◁	TPIS ◁
Sel cal	Hot air	Brake temps ind.
CFDIU	Capt wiper	

Note : The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC AC ESS BUS SHED

ATC . . . . . SYS 2

STATUS

INOP SYS
CAPT AOA
See below

Other inoperative systems

MCDU 1	ATC 1	APU fuel pump
CAPT ND	DME 1	Passenger oxygen masks (auto + manual)
CAPT AOA heat	CVR	HF 1
R ADF 1 ◁		

Note : The warning may be caused by a failure in a sub BUS. Consequently only a part of the systems listed above may be lost.

ELEC DC BUS 1 FAULT

– BLOWER . . . . . OVRD
– EXTRACT . . . . . OVRD

Avionic ventilation air is supplied from the air conditioning system, and exhausted overboard.

Affected systems
* AVNCS VENT
* FUEL

STATUS

CAB ZONE AT FIXED TEMP
Due to the loss of the galley fan, the Pack 1 controller, and the primary zone controller channel. (See associated procedures).

INOP SYS
See below

INOP SYS displayed on ECAM

ACP 3	CTR TK PUMP 1	BRAKES SYS 1
CAPT STAT heat	AVNCS VENT	LAV DET
STBY STAT heat	GALLEY FAN	PACK 1 REGUL
L. WSHLD HEAT	GND COOL ◁	L. WNDW HEAT
REVERSER 1		

Other inoperative systems

Left cab fan	VHF 3 ◁	Eng 1 oil press and qty ind.
Zone controller primary channel	RMP 3 ◁	TPIS ◁
Sel cal	Hot air	Brake temps ind.
CFDIU	Capt wiper	

Note : The warning may be caused by a sub BUS failure. As result, only a part of the above-listed systems may be lost.

ELEC AC ESS BUS SHED

ATC . . . . . SYS 2

STATUS

INOP SYS
CAPT AOA
See below

Other inoperative systems

MCDU 1	ATC 1	APU fuel pump
CAPT ND	DME 1	Passenger oxygen masks (auto + manual)
CAPT AOA heat	CVR	HF 1
R ADF 1 ◁		

Note : The warning may be caused by a failure in a sub BUS. Consequently only a part of the systems listed above may be lost.

ELEC DC BUS 1 FAULT

– BLOWER . . . . . OVRD
– EXTRACT . . . . . OVRD

Avionic ventilation air is supplied to the air conditioning, and exhausted overboard.

Affected systems
* AVNCS VENT
* FUEL

STATUS

INOP SYS
See below

INOP SYS displayed on ECAM

ACP 3	CTR TK PUMP 1	BRAKES SYS 1
CAPT STAT heat	AVNCS VENT	LAV DET
STBY STAT heat	GALLEY FAN	
L. WSHLD HEAT	GND COOL ◁	
L. WNDW HEAT	REVERSER 1	

Other inoperative systems

Left cab fan	VHF 3 ◁	Eng 1 oil press and qty ind.
COND controller lane A	RMP 3 ◁	TPIS ◁
Sel cal	Hot air	Brake temps ind.
CFDIU	Capt wiper	

Note : The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC DC BUS 2 FAULT

– AIR DATA SWTG ..... F/O
– BARO REF ..... CHECK
Since one FCU channel is lost, crosscheck the barometer reference settings on the FCU and PFD.

Affected systems
* CAB PRESS
* FUEL
* WHEEL
* F/CTL

STATUS

LDG DIST PROC ..... APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

ENG 2 APPR IDLE ONLY
BOTH PFD ON SAME FAC
PACK 2 AT FIXED TEMP
SLATS/FLAPS SLOW
CAT 3 SINGLE ONLY

INOP SYS
See below

INOP SYS displayed on ECAM

SPLR 1+2+5	CAT 3 DUAL	MAIN GALLEY
ELAC 2 (a)	FAC 2	Y ELEC PUMP (if selected ON)
SEC 2 + 3	L TK PUMP 2	BSCU CH 2
VHF 2	R TK PUMP 2	F/O STAT
CTR TK PUMP 2 ◁	ENG 1 LOOP B	R WSLHD HEAT
LGCIU 2	ENG 2 LOOP A	R WNDW HEAT
REVERSER 2	PACK 2 REGUL	AP 2
CAB PR 2	FCDC 2	FCU 2

Other inoperative systems

SFCC 2	BMC 2	Brake fan ◁
R cabin fan	Bleed X feed auto control	Eng 2 oil low press and qty ind
F/O wiper	RMP 2	R loudspeaker
F/O rain rplnt	FQI channel 2	rudder trim ind
Eng 1 and 2 fire ext btl 2	zone controller sec	FMGC 2
Autobrake (due to loss of 2 SECs)	SDCU 2	CDLS ◁

(a) Lost after 30 seconds, but recovered at landing gear extension.

Note : The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC DC ESS BUS FAULT

– VHF 2 or 3 ..... USE
– AUDIO SWTG ..... SELECT
ACP 1 and 2 are lost. Therefore, set the AUDIO SWTG selector to CAPT 3 or F/O 3 to recover communications.
– BARO REF ..... CHECK
Crosscheck the barometer reference settings on the FCU and the PFD.
– GPWS ..... OFF

NAV GPWS FAULT

– GPWS ..... OFF

FUEL L TANK PUMP 1 LO PR

R

FUEL R TANK PUMP 1 LO PR

Note : To shut down the engines on ground, use the ENG FIRE pushbutton.

Affected systems
* CAB PRESS
* HYD
* F/CTL



ELEC DC BUS 2 FAULT

– AIR DATA SWTG ..... F/O
– BARO REF ..... CHECK
Since one FCU channel is lost, crosscheck the barometer reference settings on the FCU and PFD.

Affected systems
* CAB PRESS
* FUEL
* WHEEL
* F/CTL

STATUS

LDG DIST PROC ..... APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80.
ENG 2 APPR IDLE ONLY
BOTH PFD ON SAME FAC
PACK 2 AT FIXED TEMP
SLATS/FLAPS SLOW
CAT 3 SINGLE ONLY

INOP SYS
See below

INOP SYS displayed on ECAM

SPLR 1+2+5	CAT 3 DUAL	MAIN GALLEY
ELAC 2 (a)	FAC 2	Y ELEC PUMP (if selected ON)
SEC 2 + 3	L TK PUMP 2	BRAKES SYS 2
VHF 2	R TK PUMP 2	F/O STAT
CTR TK PUMP 2	ENG 1 LOOP B	R WSLHD HEAT
LGCIU 2	ENG 2 LOOP A	R WNDW HEAT
REVERSER 2	PACK 2 REGUL	AP 2
CAB PR 2	FCDC 2	FCU 2

Other inoperative systems

SFCC 2	BMC 2	Brake fan ◁
R cabin fan	Bleed X feed auto control	Eng 2 oil low press and qty ind
F/O wiper	RMP 2	R loudspeaker
F/O rain rplnt	FQI channel 2	rudder trim ind
Eng 1 and 2 fire ext btl 2	zone controller sec	FMGC 2
Autobrake (due to loss of 2 SECs)	SDCU 2	CDLS ◁

(a) Lost after 30 seconds, but recovered at landing gear extension.

Note : The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC DC ESS BUS FAULT

– VHF 2 or 3 ..... USE
– AUDIO SWTG ..... SELECT
ACP 1 and 2 are lost. Therefore, set the AUDIO SWTG selector to CAPT 3 or F/O 3 to recover communications.
– BARO REF ..... CHECK
Crosscheck the barometer reference settings on the FCU and the PFD.
– GPWS ..... OFF

NAV GPWS FAULT

– GPWS ..... OFF

FUEL L TANK PUMP 1 LO PR

R

FUEL R TANK PUMP 1 LO PR

Note : To shut down the engines on ground, use the ENG FIRE pushbutton.

Affected systems
* CAB PRESS
* HYD
* F/CTL



ELEC DC BUS 2 FAULT

– AIR DATA SWTG ..... F/O
– BARO REF ..... CHECK
Since one FCU channel is lost, crosscheck the barometer reference settings on the FCU and PFD.

Affected systems
* CAB PRESS
* FUEL
* WHEEL
* F/CTL

STATUS

LDG DIST PROC ..... APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80.
ENG 2 APPR IDLE ONLY
BOTH PFD ON SAME FAC
SLATS/FLAPS SLOW
CAT 3 SINGLE ONLY

INOP SYS
See below

INOP SYS displayed on ECAM

SPLR 1+2+5	CAT 3 DUAL	MAIN GALLEY
ELAC 2 (a)	FAC 2	Y ELEC PUMP (if selected ON)
SEC 2 + 3	L TK PUMP 2	BRAKES SYS 2
VHF 2	R TK PUMP 2	F/O STAT
CTR TK PUMP 2	ENG 1 LOOP B	R WSLHD HEAT
LGCIU 2	ENG 2 LOOP A	R WNDW HEAT
REVERSER 2		AP 2
CAB PR 2	FCDC 2	FCU 2

Other inoperative systems

SFCC 2	BMC 2	Brake fan ◁
R cabin fan	Bleed X feed auto control	Eng 2 oil low press and qty ind
F/O wiper	RMP 2	R loudspeaker
F/O rain rplnt	FQI channel 2	rudder trim ind
Eng 1 and 2 fire ext btl 2		FMGC 2
Autobrake (due to loss of 2 SECs)	SDCU 2	CDLS ◁

(a) Lost after 30 seconds, but recovered at landing gear extension.

Note : The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC DC ESS BUS FAULT

– VHF 2 or 3 ..... USE
– AUDIO SWTG ..... SELECT
ACP 1 and 2 are lost. Therefore, set the AUDIO SWTG selector to CAPT 3 or F/O 3 to recover communications.
– BARO REF ..... CHECK
Crosscheck the barometer reference settings on the FCU and the PFD.
– GPWS ..... OFF

NAV GPWS FAULT

– GPWS ..... OFF

FUEL L TANK PUMP 1 LO PR

R

FUEL R TANK PUMP 1 LO PR

Note : To shut down the engines on ground, use the ENG FIRE pushbutton.

Affected systems
* CAB PRESS
* HYD
* F/CTL



ELEC DC BUS 2 FAULT

– AIR DATA SWTG ..... F/O
– BARO REF ..... CHECK
Since one FCU channel is lost, crosscheck the barometer reference settings on the FCU and PFD.

Affected systems
* CAB PRESS
* FUEL
* WHEEL
* F/CTL

STATUS

LDG DIST PROC ..... APPLY
R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*
ENG 2 APPR IDLE ONLY
BOTH PFD ON SAME FAC
SLATS/FLAPS SLOW
CAT 3 SINGLE ONLY

INOP SYS
See below

INOP SYS displayed on ECAM

SPLR 1+2+5	CAT 3 DUAL	MAIN GALLEY
ELAC 2 (a)	FAC 2	Y ELEC PUMP (if selected ON)
SEC 2 + 3	L TK PUMP 2	BRAKES SYS 2
VHF 2	R TK PUMP 2	F/O STAT
CTR TK PUMP 2	ENG 1 LOOP B	R WSLHD HEAT
LGCIU 2	ENG 2 LOOP A	R WNDW HEAT
REVERSER 2	AP 2	CAB PR 2
FCDC 2	FCU 2	

Other inoperative systems

SFCC 2	BMC 2	Brake fan ◁
R cabin fan	Bleed X feed auto control	Eng 2 oil low press and qty ind
F/O wiper	RMP 2	R loudspeaker
F/O rain rplnt	FQI channel 2	rudder trim ind
Eng 1 and 2 fire ext btl	Autobrake (due to loss of 2	CIDS 2 SMOKE DETECT
2FMGC 2	SECs)	
CDLS		

(a) Lost after 30 seconds, but recovered at landing gear extension.

Note : The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC DC ESS BUS FAULT

– VHF 2 or 3 ..... USE
– AUDIO SWTG ..... SELECT
ACP 1 and 2 are lost. Therefore, set the AUDIO SWTG selector to CAPT 3 or F/O 3 to recover communications.
– BARO REF ..... CHECK
Crosscheck the barometer reference settings on the FCU and the PFD.
– GPWS ..... OFF

NAV GPWS FAULT

– GPWS ..... OFF

FUEL L TANK PUMP 1 LO PR

R

FUEL R TANK PUMP 1 LO PR

Note : To shut down the engines on ground, use the ENG FIRE pushbutton.

Affected systems
* CAB PRESS
* HYD
* F/CTL



ELEC DC BUS 2 FAULT

– AIR DATA SWTG F/O3
– BARO REF . . . . . CHECK
Since one FCU channel is lost, crosscheck the barometer reference settings on the FCU and PFD.

Affected systems
* CAB PRESS
* FUEL
* WHEEL
* F/CTL

STATUS

LDG DIST PROC . . . . . APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80.
ENG 2 APPR IDLE ONLY
BOTH PFD ON SAME FAC
SLATS/FLAPS SLOW
CAT 3 SINGLE ONLY

INOP SYS
See below

INOP SYS displayed on ECAM

SPLR 1+2+5	CAT 3 DUAL	MAIN GALLEY
ELAC 2 (a)	FAC 2	Y ELEC PUMP (if selected ON)
SEC 2 + 3	L TK PUMP 2	BRAKES SYS 2
VHF 2	R TK PUMP 2	F/O STAT
CTR TK PUMP 2	ENG 1 LOOP B	R WSLHD HEAT
LGCIU 2	ENG 2 LOOP A	R WNDW HEAT
REVERSER 2	AP 2	CAB PR 2
FCDC 2	FCU 2	

Other inoperative systems

SFCC 2	BMC 2	Brake fan ◁
R cabin fan	Bleed X feed auto control	Eng 2 oil low press and qty ind
F/O wiper	RMP 2	R loudspeaker
F/O rain rplnt	FQI channel 2	rudder trim ind
Eng 1 and 2 fire ext btl	Autobrake (due to loss of 2	CIDS 2 SMOKE DETECT
2FMGC 2	SECs)	
CDLS		

(a) Lost after 30 seconds, but recovered at landing gear extension.

Note : The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC DC ESS BUS FAULT

– VHF 2 or 3 ..... USE
– AUDIO SWTG ..... SELECT
ACP 1 and 2 are lost. Therefore, set the AUDIO SWTG selector to CAPT 3 or F/O 3 to recover communications.
– BARO REF ..... CHECK
Crosscheck the barometer reference settings on the FCU and the PFD.
– GPWS ..... OFF

NAV GPWS FAULT

– GPWS ..... OFF

FUEL L TANK PUMP 1 LO PR

R

FUEL R TANK PUMP 1 LO PR

Note : To shut down the engines on ground, use the ENG FIRE pushbutton.

Affected systems
* CAB PRESS
* HYD
* F/CTL



ELEC DC ESS BUS FAULT (CONT'D)

STATUS

LDG DIST PROC ..... APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

ENG 1 APPR IDLE ONLY
ENG 2 APPR IDLE ONLY
BOTH PFD ON SAME FAC
SLATS/FLAPS SLOW
CAT 2 ONLY (1)

INOP SYS
See below

INOP SYS displayed on ECAM

B HYD	A/THR	VENT EXTRACT
R SPLR 3	FCU 1	B ELEC PUMP
R VHF 1	FAC 1	GPWS
ACP 1+2	REV 2	ENG 1 LOOP A
WING A. ICE	ENG 2 START	ENG 2 LOOP B
AP 1	CAB PR 1	FCDC 1
		CAT 3

Other inoperative systems

BRK PRESS indicator		Hyd fire valves Eng 1 and 2
Flight interphone	Standby Horizon	Ram air inlet
EIU 2 (autothrust, eng start and reverser inop)	Standby compass light	ECAM Control Panel
Capt rain repellent ◁		
Avionics air cond valve	HP fuel shutoff valves	
	SFCC 1	Left loudspeaker
	RMP 1	DC SHED ESS BUS

Note : 1. Before arming the approach mode, the ECAM STATUS displays "CAT 3 SINGLE". When the approach mode is armed, the ECAM displays "CAT 2 ONLY", and the FMA displays CAT 2. However, when the attitude indicator (Standby Horizon) is inoperative, the real landing category is CAT I (Refer to the QRH 5.04, that indicates the "Required Equipment for CAT II and CAT III Landings".

2. The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC DC ESS BUS SHED

– EXTRACT . . . . . OVRD

Cooling air is supplied by the air conditioning system, without overboard extraction.

AVOID ICING CONDITIONS

Affected systems
* AVNCS VENT

STATUS

AVOID ICING CONDITIONS
BOTH PFD ON SAME FAC
CAT 3 SINGLE ONLY

INOP SYS
WING A. ICE
AP 1
CAT 3 DUAL
FAC 1
VENT EXTRACT
AFT CRG HEAT◁
FWD CRG HEAT◁
AFT CRG VENT◁
FWD CRG VENT◁
FCDC 1
See below

R

OTHER INOP SYS

Cabin oxygen mask (auto drop out)	STBY ALTI vib	BMC 1
X BLEED valve man ctl	Crew oxygen valve	SDCU 1
FQ1 channel 1	FMGC 1	

Note : The warning may be caused by a failure in a sub BUS. Consequently only a part of the systems listed above may be lost.

ELEC DC ESS BUS FAULT (CONT'D)

STATUS

LDG DIST PROC ..... APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

ENG 1 APPR IDLE ONLY
ENG 2 APPR IDLE ONLY
BOTH PFD ON SAME FAC
SLATS/FLAPS SLOW
CAT 2 ONLY (1)

INOP SYS
See below

INOP SYS displayed on ECAM

B HYD	A/THR	VENT EXTRACT
R SPLR 3	FCU 1	B ELEC PUMP
R VHF 1	FAC 1	GPWS
ACP 1+2	REV 2	ENG 1 LOOP A
WING A. ICE	ENG 2 START	ENG 2 LOOP B
AP 1	CAB PR 1	FCDC 1
		CAT 3

Other inoperative systems

BRK PRESS indicator		Hyd fire valves Eng 1 and 2
Flight interphone	Standby Horizon	Ram air inlet
EIU 2 (autothrust, eng start and reverser inop)	Standby compass light	ECAM Control Panel
Capt rain repellent ◁		
Avionics air cond valve	HP fuel shutoff valves	
	SFCC 1	Left loudspeaker
	RMP 1	DC SHED ESS BUS

Note : 1. Before arming the approach mode, the ECAM STATUS displays "CAT 3 SINGLE". When the approach mode is armed, the ECAM displays "CAT 2 ONLY", and the FMA displays CAT 2. However, when the attitude indicator (Standby Horizon) is inoperative, the real landing category is CAT I (Refer to the QRH 5.04, that indicates the "Required Equipment for CAT II and CAT III Landings".

2. The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC DC ESS BUS SHED

– EXTRACT . . . . . OVRD

Cooling air is supplied by the air conditioning system, without overboard extraction.

AVOID ICING CONDITIONS

Affected systems
* AVNCS VENT

STATUS

AVOID ICING CONDITIONS
BOTH PFD ON SAME FAC
● **IF A/C ICING SEVERE** :
– MIN SPD . . . . . ALPHA PROT
CAT 3 SINGLE ONLY

R

INOP SYS
WING A. ICE
AP 1
FAC 1
CAT 3 DUAL
VENT EXTRACT
AFT CRG HEAT◁
FWD CRG HEAT◁
AFT CRG VENT◁
FWD CRG VENT◁
FCDC 1
See below

OTHER INOP SYS

Cabin oxygen mask (auto drop out)	STBY ALTI vib	BMC 1
X BLEED valve man ctl	Crew oxygen valve	FQ1 channel 1
SDCU 1	FMGC 1	

Note : The warning may be caused by a failure in a sub BUS. Consequently only a part of the systems listed above may be lost.

ELEC DC ESS BUS FAULT (CONT'D)

STATUS

LDG DIST PROC . . . . . APPLY *Refer to the QRH Part 2, or to the FCOM 3.02.80.* ENG 1 APPR IDLE ONLY ENG 2 APPR IDLE ONLY BOTH PFD ON SAME FAC SLATS/FLAPS SLOW CAT 2 ONLY (1)	INOP SYS See below

INOP SYS displayed on ECAM

B HYD	A/THR	VENT EXTRACT
R SPLR 3	FCU 1	B ELEC PUMP
R VHF 1	FAC 1	GPWS
ACP 1+2	REV 2	ENG 1 LOOP A
WING A. ICE	ENG 2 START	ENG 2 LOOP B
AP 1	CAB PR 1	FCDC 1
		CAT 3

Other inoperative systems

BRK PRESS indicator		Hyd fire valves Eng 1 and 2
Flight interphone		Ram air inlet
EIU 2 (autothrust, eng start	Standby compass light	ECAM Control Panel
and reverser inop)	HP fuel shutoff valves	Left loudspeaker
Capt rain repellent ◁	SFCC 1	DC SHED ESS BUS
Avionics air cond valve	RMP 1	

Note : 1. Before arming the approach mode, the ECAM STATUS displays "CAT 3 SINGLE". However, the real landing capability is CAT 2, and is correctly displayed on the FMA when the approach mode is armed.

2. The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC DC ESS BUS SHED

– EXTRACT . . . . . OVRD

Cooling air is supplied by the air conditioning system, without overboard extraction.

AVOID ICING CONDITIONS

Affected systems
* AVNCS VENT

STATUS

AVOID ICING CONDITIONS
BOTH PFD ON SAME FAC
● **IF A/C ICING SEVERE** :
– MIN SPD . . . . . ALPHA PROT
CAT 3 SINGLE ONLY

INOP SYS
WING A. ICE
AP 1
FAC 1
CAT 3 DUAL
VENT EXTRACT
AFT CRG HEAT◁
FWD CRG HEAT◁
AFT CRG VENT◁
FWD CRG VENT◁
FCDC 1
See below

R

OTHER INOP SYS

Cabin oxygen mask (auto drop out)	STBY ALTI vib	BMC 1
X BLEED valve man ctl	Crew oxygen valve	FQ1 channel 1
SDCU 1	FMGC 1	

Note : The warning may be caused by a failure in a sub BUS. Consequently only a part of the systems listed above may be lost.

ELEC DC ESS BUS FAULT (CONT'D)

STATUS

LDG DIST PROC ..... APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

ENG 1 APPR IDLE ONLY
ENG 2 APPR IDLE ONLY
BOTH PFD ON SAME FAC
SLATS/FLAPS SLOW
CAT 2 ONLY (1)

INOP SYS
See below

INOP SYS displayed on ECAM

B HYD	A/THR	VENT EXTRACT
R SPLR 3	FCU 1	B ELEC PUMP
R VHF 1	FAC 1	GPWS
ACP 1+2	REV 2	ENG 1 LOOP A
WING A. ICE	ENG 2 START	ENG 2 LOOP B
AP 1	CAB PR 1	FCDC 1
		CAT 3

Other inoperative systems

BRK PRESS indicator		Hyd fire valves Eng 1 and 2
Flight interphone		Ram air inlet
EIU 2 (autothrust, eng start	Standby compass light	ECAM Control Panel
and reverser inop)	HP fuel shutoff valves	Left loudspeaker
Capt rain repellent ◁	SFCC 1	DC SHED ESS BUS
Avionics air cond valve	RMP 1	

Note : 1. Before arming the approach mode, the ECAM STATUS displays "CAT 3 SINGLE". However, the real landing capability is CAT 2, and is correctly displayed on the FMA when the approach mode is armed.

2. The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC DC ESS BUS SHED

– EXTRACT . . . . . OVRD

Cooling air is supplied by the air conditioning system, without overboard extraction.

AVOID ICING CONDITIONS

Affected systems
* AVNCS VENT

STATUS

AVOID ICING CONDITIONS
BOTH PFD ON SAME FAC
● **IF A/C ICING SEVERE** :
– MIN SPD . . . . . ALPHA PROT
CAT 3 SINGLE ONLY

R

INOP SYS
WING A. ICE
AP 1
FAC 1
CAT 3 DUAL
VENT EXTRACT
AFT CRG VENT◁
FWD CRG VENT◁
FCDC 1
See below

OTHER INOP SYS

Cabin oxygen mask (auto drop out)	STBY ALTI vib	BMC 1
X BLEED valve man ctl	Crew oxygen valve	FQ1 channel 1
CIDS 1 SMOKE DETECT	FMGC 1	

Note : The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC DC BUS 1 + 2 FAULT

– BLOWER ..... OVRD
– EXTRACT ..... OVRD
– BARO REF ..... CHECK
Crosscheck the barometer reference settings on the FCU and PFDs.
MAX BRK PR ..... 1000 PSI
Brake pressure must be limited to approximately 1000 psi, since antiskid is lost.

ELEC DC BAT BUS FAULT

Affected systems
* CAB PRESS
* FUEL
* AIR COND
* BRAKES
* WHEEL
* F/CTL

STATUS

– MAX BRK PR ..... 1000 PSI
LDG DIST PROC ..... APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80.
ENG 1 APPR IDLE ONLY
ENG 2 APPR IDLE ONLY
BOTH PFD ON SAME FAC
CTR TK FUEL UNUSABLE



ELEC DC BUS 1 + 2 FAULT (CONT'D)

STATUS

APU BAT START NOT AVAIL
CAB ZONE AT FIXED TEMP
PACKS AT FIXED TEMP
SLATS/FLAPS SLOW
CAT 2 ONLY

INOP SYS
See below

INOP SYS displayed on ECAM

SPLR 1 + 2 + 5	CAT 3	GND COOL ◁
ELAC 2 (a)	FAC 2	MAIN GALLEY
SEC 2 + 3		Y ELEC PUMP
VHF 2	ANTI SKID	BSCU CH 1
ACP 3	N.W. STEER	BSCU CH 2
CAPT STAT heat	LGCIU 2	APU FIRE DET
F/O STAT heat	REVERSER 1 + 2	LAV DET
STBY STAT heat	CAB PRESS 2	ENG 1 LOOP B
WSHLD HEAT	AVNCS VENT	ENG 2 LOOP A
WNDW HEAT	L + R CAB FAN	PACK 1 REGUL
AP 2	GALLEY FAN	PACK 2 REGUL
R FCU 2		L TK PUMP 2
FCDC 2		R TK PUMP 2
		CTR TK PUMPS

Other inoperative systems

Selcal	VHF 3 ◁	FMGC 2
Brake temp indication	RMP 2	Rudder trim indication
Brake fans ◁	RMP 3 ◁	BMC 2
TPIS ◁	CFDIU	FQI channel 2
Capt and F/O wipers	Right loudspeakers	Eng 1 and 2 fire ext btl 2
Eng 1 and 2 oil pressure and	SFCC 2	X Bleed auto control
R quantity indication	CDLS ◁	
Autobrake	APU ECB	APU fuel LP valve
Stick and rudder pedals lock (by AP)	Manual pressure control	SDCU 2

(a) Lost after 30 seconds, but is recovered at landing gear extension.

Note : The warning may be caused by a failure in a sub BUS. Consequently, only a part of the above-listed systems may be lost.

ELEC DC BUS 1 + 2 FAULT

– BLOWER ..... OVRD
– EXTRACT ..... OVRD
– BARO REF ..... CHECK
Crosscheck the barometer reference settings on the FCU and PFDs.
MAX BRK PR ..... 1000 PSI
Brake pressure must be limited to approximately 1000 psi, since antiskid is lost.

ELEC DC BAT BUS FAULT

Affected systems
* CAB PRESS
* FUEL
* AIR COND
* BRAKES
* WHEEL
* F/CTL

STATUS

– MAX BRK PR ..... 1000 PSI
LDG DIST PROC ..... APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80.
ENG 1 APPR IDLE ONLY
ENG 2 APPR IDLE ONLY
BOTH PFD ON SAME FAC
CTR TK FUEL UNUSABLE



ELEC DC BUS 1 + 2 FAULT (CONT'D)

STATUS

APU BAT START NOT AVAIL
CAB ZONE AT FIXED TEMP
PACKS AT FIXED TEMP
SLATS/FLAPS SLOW
CAT 2 ONLY

INOP SYS
See below

INOP SYS displayed on ECAM

SPLR 1 + 2 + 5	CAT 3	GND COOL ◁
ELAC 2 (a)	FAC 2	MAIN GALLEY
SEC 2 + 3		Y ELEC PUMP
VHF 2	ANTI SKID	BRAKES SYS 1
ACP 3	N/W STRG	BRAKES SYS 2
CAPT STAT heat	LGCIU 2	APU FIRE DET
F/O STAT heat	REVERSER 1 + 2	LAV DET
STBY STAT heat	CAB PRESS 2	ENG 1 LOOP B
WSHLD HEAT	AVNCS VENT	ENG 2 LOOP A
WNDW HEAT	L + R CAB FAN	PACK 1 REGUL
AP 2	GALLEY FAN	PACK 2 REGUL
FCU 2		L TK PUMP 2
FCDC 2		R TK PUMP 2
		CTR TK PUMPS

Other inoperative systems

Selcal	VHF 3 ◁	FMGC 2
Brake temp indication	RMP 2	Rudder trim indication
Brake fans ◁	RMP 3 ◁	BMC 2
TPIS ◁	CFDIU	FQI channel 2
Capt and F/O wipers	Right loudspeakers	Eng 1 and 2 fire ext btl 2
Eng 1 and 2 oil pressure and quantity indication	SFCC 2	X Bleed auto control
	CDLS ◁	
Autobrake	APU ECB	APU fuel LP valve
Stick and rudder pedals lock (by AP)	Manual pressure control	SDCU 2

(a) Lost after 30 seconds, but is recovered at landing gear extension.

Note : The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC DC BUS 1 + 2 FAULT

– BLOWER ..... OVRD
– EXTRACT ..... OVRD
– BARO REF ..... CHECK
Crosscheck the barometer reference settings on the FCU and PFDs.
MAX BRK PR ..... 1000 PSI
Brake pressure must be limited to approximately 1000 psi, since antiskid is lost.

ELEC DC BAT BUS FAULT

Affected systems
* CAB PRESS
* FUEL
* AIR COND
* BRAKES
* WHEEL
* F/CTL

STATUS

– MAX BRK PR ..... 1000 PSI
LDG DIST PROC ..... APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80.
ENG 1 APPR IDLE ONLY
ENG 2 APPR IDLE ONLY
BOTH PFD ON SAME FAC
CTR TK FUEL UNUSABLE



ELEC DC BUS 1 + 2 FAULT (CONT'D)

STATUS

APU BAT START NOT AVAIL
CAB ZONE AT FIXED TEMP
SLATS/FLAPS SLOW
CAT 2 ONLY

INOP SYS
See below

INOP SYS displayed on ECAM

SPLR 1 + 2 + 5	CAT 3	GND COOL ◁
ELAC 2 (a)	FAC 2	MAIN GALLEY
SEC 2 + 3		Y ELEC PUMP
VHF 2	ANTI SKID	BRAKES SYS 1
ACP 3	N/W STRG	BRAKES SYS 2
CAPT STAT heat	LGCIU 2	APU FIRE DET
F/O STAT heat	REVERSER 1 + 2	LAV DET
STBY STAT heat	CAB PRESS 2	ENG 1 LOOP B
WSHLD HEAT	AVNCS VENT	ENG 2 LOOP A
WNDW HEAT	L + R CAB FAN	
AP 2	GALLEY FAN	
FCU 2		L TK PUMP 2
FCDC 2		R TK PUMP 2
		CTR TK PUMPS

Other inoperative systems

Selcal	VHF 3 ◁	FMGC 2
Brake temp indication	RMP 2	Rudder trim indication
Brake fans ◁	RMP 3 ◁	BMC 2
TPIS ◁	CFDIU	FQI channel 2
Capt and F/O wipers	Right loudspeakers	Eng 1 and 2 fire ext btl 2
Eng 1 and 2 oil pressure and quantity indication	SFCC 2	X Bleed auto control
	CDLS ◁	
Autobrake	APU ECB	APU fuel LP valve
Stick and rudder pedals lock (by AP)	Manual pressure control	SDCU 2

(a) Lost after 30 seconds, but is recovered at landing gear extension.

Note : The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC DC BUS 1 + 2 FAULT

– BLOWER ..... OVRD
– EXTRACT ..... OVRD
– BARO REF ..... CHECK
Crosscheck the barometer reference settings on the FCU and PFDs.
MAX BRK PR ..... 1000 PSI
Brake pressure must be limited to approximately 1000 psi, since antiskid is lost.

ELEC DC BAT BUS FAULT

Affected systems
* CAB PRESS
* FUEL
* AIR COND
* BRAKES
* WHEEL
* F/CTL

STATUS

– MAX BRK PR ..... 1000 PSI
LDG DIST PROC ..... APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80.
ENG 1 APPR IDLE ONLY
ENG 2 APPR IDLE ONLY
BOTH PFD ON SAME FAC
CTR TK FUEL UNUSABLE



ELEC DC BUS 1 + 2 FAULT (CONT'D)

STATUS

APU BAT START NOT AVAIL
CAB ZONE AT FIXED TEMP
PACKS AT FIXED TEMP
SLATS/FLAPS SLOW
CAT 2 ONLY

INOP SYS
See below

INOP SYS displayed on ECAM

SPLR 1 + 2 + 5	CAT 3	GND COOL ◁
ELAC 2 (a)	FAC 2	MAIN GALLEY
SEC 2 + 3		Y ELEC PUMP
VHF 2	ANTI SKID	BRAKES SYS 1
ACP 3	N/W STRG	BRAKES SYS 2
CAPT STAT heat	LGCIU 2	APU FIRE DET
F/O STAT heat	REVERSER 1 + 2	LAV DET
STBY STAT heat	CAB PRESS 2	ENG 1 LOOP B
WSHLD HEAT	AVNCS VENT	ENG 2 LOOP A
WNDW HEAT	L + R CAB FAN	PACK 1 REGUL
AP 2	GALLEY FAN	PACK 2 REGUL
FCU 2		L TK PUMP 2
FCDC 2		R TK PUMP 2
		CTR TK PUMPS

Other inoperative systems

Selcal	VHF 3 ◁	FMGC 2
Brake temp indication	RMP 2	Rudder trim indication
Brake fans ◁	RMP 3 ◁	BMC 2
TPIS ◁	CFDIU	FQI channel 2
Capt and F/O wipers	Right loudspeakers	Eng 1 and 2 fire ext btl 2
Eng 1 and 2 oil pressure and quantity indication	SFCC 2	X Bleed auto control
	CDLS ◁	
Autobrake	APU ECB	APU fuel LP valve
Stick and rudder pedals lock (by AP)	Manual pressure control	CIDS 2 SMOKE DETECT

(a) Lost after 30 seconds, but is recovered at landing gear extension.

Note : The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC EMER CONFIG

LAND ASAP

MIN RAT SPEED . . . . . 140 KT

CAUTION

At a speed below 140 KT the RAT will stall, and the aircraft electrical supply will be from batteries only.

– GEN 1 + 2 . . . . . OFF THEN ON

● **IF UNSUCCESSFUL** :

– BUS TIE . . . . . OFF

Setting BUS TIE pushbutton switch to OFF segregates both generator channels.

– GEN 1 + 2 . . . . . OFF THEN ON

Note : If any generator reset is successful, reset both FAC's.

· *DC and AC ESS BUSES are still supplied by EMER GEN. After landing gear extension emergency generator is no longer powered ; DC and AC ESS BUSES are supplied by normal electrical network. If landing gear is reselected up, essential bus bars remain supplied by the restored generator(s).*

– EMER ELEC PWR (if EMER GEN not in line) . . . . . MAN ON

CAUTION

In case of simultaneous engine generator failure, the probability of a successful APU GEN coupling is low. Therefore APU start attempts should be avoided, as this will consequently reduce the flight time on batteries only (by about 3.5 minutes for one start attempt).

– ENG MODE SEL . . . . . IGN

Engines are fed by gravity only.

R – VHF1/HF1 ◁/ATC1 . . . . . USE

Only VHF 1, HF1 and ATC 1 are supplied in the electrical emergency configuration.

Note : FMGC 1, which is lost temporarily, can be regained by flight crew passing through the MCDU MENU page.

– APPR NAVAID . . . . . ON RMP1

– IR 2 + 3 (IF IR 1 OK) . . . . . OFF

ADIRS 2 and 3 will be lost 5 minutes after the loss of both engine generators. Therefore switching them off will save battery charge.



ELEC EMER CONFIG (CONT'D)

FUEL GRVTY FEED

Engines are fed by gravity only. Avoid negative Gs.

PROC : GRVTY FUEL FEEDING

Apply GRVTY FUEL FEEDING procedure (3.02.28).

● **IF TIME TO LDG > 5 MN and landing gear is down**

With landing gear down, batteries only supply the aircraft. If landing cannot be made within 5 minutes, emergency generator must be connected to avoid excessive batteries discharge.

– L/G . . . . . UP

Select landing gear up to allow EMER GEN operation.

– EMER ELEC PWR . . . . . MAN ON

Depress the EMER ELEC PWR MAN ON pushbutton to reset the emergency generator.

– APU MASTER SW (if APU not running) . . . . . CHECK OFF

Make sure that the APU master switch is off.

With the APU master switch ON, batteries supply the DC BAT BUS for 3 minutes.

– FAC 1 . . . . . OFF THEN ON

The rudder trim is recovered, although no indication is available.

– BLOWER + EXTRACT . . . . . OVRD

Cooling air is supplied by the air conditioning system and exhausted overboard through the extract valve.

– LDG ELEV . . . . . MAN ADJUST

Landing elevation has to be manually set since no FMGC is supplied after landing gear extension.

Note : On IAE powered aircraft, the warning "EPR MODE FAULT N1 DEGRADED MODE" is displayed.

FLT CTL ALTN LAW

(PROT LOST)

MAX SPEED . . . . . 320 KT

Speed limited due to loss of flight control normal laws.



ELEC EMER CONFIG

LAND ASAP

MIN RAT SPEED . . . . . 140 KT

CAUTION

The RAT is capable of supplying the EMER GEN down to 125 kt, except during flare.

– GEN 1 + 2 . . . . . OFF THEN ON

● **IF UNSUCCESSFUL** :

– BUS TIE . . . . . OFF

Setting BUS TIE pushbutton switch to OFF segregates both generator channels.

– GEN 1 + 2 . . . . . OFF THEN ON

Note : If any generator reset is successful, reset both FAC's.

– EMER ELEC PWR (if EMER GEN not in line) . . . . . MAN ON

– ENG MODE SEL . . . . . IGN

Engines are fed by gravity only.

R – VHF1/HF1 ◁ /ATC1/ . . . . . USE

Only VHF 1, HF 1 and ATC 1 are supplied in the electrical emergency configuration.

Note : FMGC1, which is lost temporarily, can be regained by flight crew passing through the MCDU MENU page.



ELEC EMER CONFIG (CONT'D)

FUEL GRVTY FEED

Engines are fed by gravity only. Avoid negative Gs.

PROC : GRVTY FUEL FEEDING

Apply the GRVTY FUEL FEEDING procedure (3.02.28).

– FAC 1 ..... OFF THEN ON

The rudder trim is recovered, although no indication is available.

– BUS TIE ..... ON

– APU (IF AVAIL) ..... START

APU start is not available for 45 seconds after the loss of both engine generators. This 45-second delay prevents any interference with emergency generator coupling.

R *If the APU is available, the APU may be started when below FL 250.*

– BLOWER + EXTRACT ..... OVRD

Cooling air is supplied by the air conditioning system, and exhausted overboard through the extract valve.

Note : On IAE-powered aircraft, the "EPR MODE FAULT N1 DEGRADED MODE" warning is displayed.

FLT CTL ALTN LAW

(PROT LOST)

MAX SPEED ..... 320 KT

Speed limited due to the loss of flight control normal laws.



ELEC EMER CONFIG

LAND ASAP

MIN RAT SPEED . . . . . 140 KT

CAUTION

The RAT is capable of supplying the EMER GEN down to 125 kt, except during flare.

– GEN 1 + 2 . . . . . OFF THEN ON

● **IF UNSUCCESSFUL** :

– BUS TIE . . . . . OFF

Setting BUS TIE pushbutton switch to OFF segregates both generator channels.

– GEN 1 + 2 . . . . . OFF THEN ON

Note : If any generator reset is successful, reset both FAC's.

– EMER ELEC PWR (if EMER GEN not in line) . . . . . MAN ON

– ENG MODE SEL . . . . . IGN

Engines are fed by gravity only.

R – VHF1/HF1 ◁ /ATC1/ . . . . . USE

Only VHF 1, HF 1 and ATC 1 are supplied in the electrical emergency configuration.

Note : FMGC1, which is lost temporarily, can be regained by flight crew passing through the MCDU MENU page.



ELEC EMER CONFIG (CONT'D)

FUEL GRVTY FEED

Engines are fed by gravity only. Avoid negative Gs.

PROC : GRVTY FUEL FEEDING

Apply the GRVTY FUEL FEEDING procedure (3.02.28).

– FAC 1 . . . . . OFF THEN ON

The rudder trim is recovered, although no indication is available.

– BUS TIE . . . . . AUTO

R *Setting BUS TIE pushbutton to AUTO enables the APU to take an available electrical*
R *channel.*

– APU (IF AVAIL) . . . . . START

APU start is not available for 45 seconds after the loss of both engine generators. This 45-second delay prevents any interference with emergency generator coupling.
If the APU is available, the APU may be started when below FL 250.

– BLOWER + EXTRACT . . . . . OVRD

Cooling air is supplied by the air conditioning system, and exhausted overboard via the extract valve.

Note : On IAE-powered aircraft, the "EPR MODE FAULT N1 DEGRADED MODE" warning is displayed.

FLT CTL ALTN LAW

(PROT LOST)

MAX SPEED . . . . . 320 KT

Speed limited, due to the loss of flight control normal laws.



ELEC EMER CONFIG (CONT'D)

STATUS

ECAM lower display is not available. STATUS page is displayed on the upper ECAM display, as long as the STATUS pushbutton is pressed.

MIN RAT SPEED . . . . . 140 KT
MAX SPEED . . . . . 320 KT
MAX BRK PR . . . . . 1000 PSI
FUEL GRVTY FEED
AVOID NEGATIVE G FACTOR

Note : If there are discrepancies between airspeed indications on the Captain's PFD and on the STBY indicator, disregard the STBY indication (probe not deiced).

APPR PROC :
– FOR LDG . . . . . USE FLAP 3



ELEC EMER CONFIG (CONT'D)

STATUS

● **AT 1000 FT AGL :**

– L/G . . . . . DN

Note : 1. With the landing gear down, electrical power is supplied by batteries only. Battery endurance time is approximately 22 minutes.

2. Both FACs are not supplied after landing gear extension. Check the approach speed on the QRH.

APPR SPD . . . . . VREF + 10 kt

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

ALTN LAW : PROT LOST

WHEN L/G DN : DIRECT LAW
BAT ONLY

R CTR TK FUEL UNUSABLE

SLATS/FLAPS SLOW

INOP SYS

See below

INOP SYS displayed on ECAM

F/CTL PROT	SPLR 1 + 2 + 5	A/THR
REVERSER 1 + 2	ELAC 2	FUEL PUMPS
ADR 2 + 3	SEC 2 + 3	ANTI SKID
IR 2 + 3	A/CALL OUT	N.W. STEER
RA 1 + 2	AP 1 + 2	

For other systems' status : Refer to the "ELEC EMER CONFIG SYS REMAINING" table.

Note : For go-around procedure, refer to the ESS BUSES ON BAT procedure (see next page).

ELEC EMER CONFIG (CONT'D)

STATUS

ECAM lower display is not available. STATUS page is displayed on the upper ECAM display, as long as the STATUS pushbutton is pressed.

MIN RAT SPEED . . . . . 140 KT
MAX SPEED . . . . . 320 KT
MAX BRK PR . . . . . 1000 PSI
FUEL GRVTY FEED
AVOID NEGATIVE G FACTOR

Note : If there are discrepancies between airspeed indications on the Captain's PFD and on the STBY indicator, disregard the STBY indication (probe not deiced).

APPR PROC :

– FOR LDG . . . . . USE FLAP 3



ELEC EMER CONFIG (CONT'D)

STATUS

APPR SPD . . . . . VREF + 10/140 kt

Approach speed must be at least minimum RAT speed (140 knots).

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

ALTN LAW : PROT LOST

WHEN L/G DN : DIRECT LAW

CTR TK FUEL UNUSABLE

SLATS/FLAPS SLOW

INOP SYS

See below

INOP SYS displayed on ECAM

	F/CTL PROT	SPLR 1 + 2 + 5	A/THR
	REVERSER 1 + 2	ELAC 2	FUEL PUMPS
	ADR 2 + 3	SEC 2 + 3	ANTI SKID
R	IR 2 + 3	A/CALL OUT	N/W STRG
	RA 1 + 2	AP 1 + 2	

R *For other systems' status : Refer to the "ELEC EMER CONFIG SYS REMAINING" table.*

FLT ON BAT ONLY

Flight time on batteries only may be increased to at least 30 minutes, as follows:

– ENG MODE SEL ..... NORM
– ANTI ICE PITOT 1 C/B (D 02) ..... PULL
– 26 V ADIRU 1 C/B (F 07) ..... PULL

Loss of the CM1 altitude speed, and vertical speed indication on the PFD. Use standby instruments.

● **7 minutes before landing :**

– ANTI ICE PITOT 1 C/B (D02) ..... RESET

● **After 1 minute :**

CAUTION

This time delay is necessary to ensure reliable speed information even in icing conditions, when the ADIRU is reset to ON.

– 26 V ADIRU 1 C/B (F07) ..... RESET

ELEC ESS BUSES ON BAT

R *DC ESS BUS is supplied by the batteries. AC ESS BUS is also supplied by the batteries, via*
R *the STATIC INVERTER.*

LAND ASAP

■ **WHEN L/G UPLOCKED :**

– EMER ELEC PWR ..... MAN ON

ESS BUSES are supplied by the emergency generator.

■ **IF L/G RETRACT FAULT :**

If the landing gear fails to retract during a go-around, when in emergency configuration, the emergency generator can be recovered as follows :

MIN RAT SPD ..... 180 KT

Accelerate to 180 knots to recover RAT operation, with the landing gear down.

– LGCIU 1 C/B (C09) ..... PULL

Pull LGCIU 1 C/B to simulate the landing gear up condition, in order to allow emergency generator operation.

– EMER ELEC PWR ..... MAN ON

Allows coupling of the emergency generator.
When the emergency generator is in line, reset FAC 1.
During final approach, reset the C/B.

ELEC EMER CONFIG SYS REMAINING		EMER GEN RUNNING	BAT ONLY	
			IN FLIGHT	ON THE GROUND
AIR COND PRESS	PRESS AUTO SYS 1	Norm	Norm	Norm
	MAN PRESS CTL	Inop	Inop	Inop (1)
	RAM AIR	Norm	Norm	Norm
	PACK VALVE 1	Norm	Closure Inop	Closure Inop
	PACK VALVE 2	Closure Inop	Closure Inop	Closure Inop (1)
	AVIONIC VENT	Norm	Norm	Partial
APU	ECB-STARTER	Norm (3)	Inop	Inop (1)
	FUEL LP VALVE	Norm	Norm	Norm
	FUEL PUMP	Norm	Norm	Norm
COM	VHF 1	Norm	Norm	Norm
	HF 1	Norm	Inop	Inop
	RMP 1	Norm	Norm	Norm
	ACP (capt., F/O)	Norm	Norm	Norm
	CIDS	Norm	Norm	Norm
	INTERPHONE	Norm	Norm	Norm
	CVR	Norm	Inop	Inop
	LOUDSPEAKER 1	Norm	Norm	Norm
EIS	PFD 1	Norm	Norm	Norm (2)
	ND 1	Norm	Inop	Inop
	ECAM upper disp.	Norm	Norm	Norm (2)
	DMC 1 or 3	Norm	Norm	Norm (2)
	SDAC 1, FWC 1	Norm	Norm	Norm (2)
	ECAM cont. panel	Norm	Norm	Norm

(1) Restored, when the speed is below 100 knots.

R (2) Lost, when the speed is below 50 knots.

(3) For APU start only.

ELEC ESS BUSES ON BAT

R *DC ESS BUS is supplied by the batteries. AC ESS BUS is also supplied by the batteries, via*
R *the STATIC INVERTER.*

LAND ASAP

– MIN RAT SPD . . . . . 140 KT
Displayed, if the RAT is extended.

– EMER ELEC PWR . . . . . MAN ON
ESS BUSES are supplied by the emergency generator.

R

ELEC EMER CONFIG SYS REMAINING		EMER GEN RUNNING	BAT ONLY	
			IN FLIGHT	ON THE GROUND
AIR COND PRESS	PRESS AUTO SYS 1	Norm	Norm	Norm
	MAN PRESS CTL	Inop	Inop	Inop (1)
	RAM AIR	Norm	Norm	Norm
	PACK VALVE 1	Norm	Closure Inop	Closure Inop
	PACK VALVE 2	Closure Inop	Closure Inop	Closure Inop (1)
	AVIONIC VENT	Norm	Norm	Partial
	AFT CRG ISOL VALVES	Norm	Inop	Inop
APU	ECB-STARTER	Norm (3)	Inop	Inop (1)
	FUEL LP VALVE	Norm	Norm	Norm
	FUEL PUMP	Norm	Norm	Norm
COM	VHF 1	Norm	Norm	Norm
	HF 1	Norm	Inop	Inop
	RMP 1	Norm	Norm	Norm
	ACP (capt., F/O)	Norm	Norm	Norm
	CIDS	Norm	Norm	Norm
	INTERPHONE	Norm	Norm	Norm
	CVR	Norm	Inop	Inop
	LOUDSPEAKER 1	Norm	Norm	Norm
EIS	PFD 1	Norm	Norm	Norm (2)
	ND 1	Norm	Inop	Inop
	ECAM upper disp.	Norm	Norm	Norm (2)
	DMC 1 or 3	Norm	Norm	Norm (2)
	SDAC 1, FWC 1	Norm	Norm	Norm (2)
	ECAM cont. panel	Norm	Norm	Norm

(1) Restored, when the speed is below 100 knots.

R (2) Lost, when the speed is below 50 knots.

(3) For APU start only.

ELEC EMER CONFIG SYS REMAINING CONT'D		EMER GEN RUNNING	BAT ONLY	
			IN FLIGHT	ON THE GROUND
EMER EQPT	CREW OXY	Norm	Norm (4)	Norm (4)
	PAX OXY mask release (auto + man)	Norm	Inop	Inop
	SLIDES ARM/WARN	Norm	Norm	Norm
FLT INS	CLOCKS	Norm	Norm	Norm
FIRE	ENG 1 LOOP	A only	A only	A only
	ENG 2 LOOP	B only	B only	B only
	APU LOOP	Inop	Inop	Inop (1)
	CARGO SMOKE DET	Channel 1	Inop	Inop
	ENG FIRE EXT.	Bottle 1 only	Bottle 1 only	Bottle 1 only
	APU FIRE EXT.	Squib A only	Squib A only	Squib A only
	CARGO FIRE EXT.	Inop	Inop	Inop (1)
	APU AUTO EXT.	Inop	Inop	Inop (1)
FLT CTL	ELAC	N°1 only	N°1 + 2	N°1 + 2 (3)
	SEC	N°1 only	N°1	N°1 (3)
	FCDC	N°1 only	Inop	Inop
	SFCC	N°1 only	N°1 only	N°1 only
	Flaps pos ind	Norm	Norm	Norm (2)
FMGS	FMGC (NAV FUNCTION)	N°1 only	Inop	Inop
	MCDU	N°1 only	Inop	Inop
	FAC	N°1 only	Inop	Inop
	FCU	ch 1 only	ch 1 only	ch 1 only
FUEL	LP VALVE	Norm	Norm	Norm
	FQI channel 1	Norm	Inop	Inop
	X FEED VALVE	Norm	Inop	Inop
	TRANSFER VALVE	Norm	Inop	Inop

(1) Restored, when the speed is below 100 knots.

R (2) Lost, when the speed is below 50 knots.

(3) Lost, 30 seconds after the last engine shutdown.

(4) Crew oxygen valve inoperative.

R

ELEC EMER CONFIG SYS REMAINING (cont'd)		EMER GEN RUNNING	BAT ONLY	
			IN FLIGHT	ON THE GROUND
HYD	FIRE VALVES	Norm	Norm	Norm
ICE-RAIN	WING A. ICE	Norm	Inop	Inop
	ENG A.ICE VALVE	OPEN	OPEN	OPEN
	CAPT PITOT	Norm	Norm	Norm (1)
	CAPT AOA	Norm	Inop	Inop
	RAIN REPELLENT (Capt)	Norm	Norm	Norm
L/G	LGCIU SYS 1	Norm	Norm	Norm
	BRK PRESS IND	Norm	Norm	Norm
	PARK BRK	Norm	Norm	Norm
LIGHTS	EMER CKPT	Norm	Norm	Norm
	EMER CAB	Norm	Norm	Norm
NAV	IR	N°1 only (2)	N°1 only (2)	N°1 only (2)
	ADR	N°1 only	N°1 only	N°1 only
	ADF ◁	N°1 only	Inop	Inop
	VOR/MMR	N°1 only	N°1 only	N°1 only (1)
	DME	N°1 only	Inop	Inop
	VOR/DDRMI	Norm	Norm	Norm (1)
	ATC	N°1 only	Inop	Inop
	STBY HORIZON	Norm	Norm	Norm
	STBY COMP (LT)	Norm	Norm	Norm
	STBY ALTI (VIB)	Norm	Inop	Inop

(1) lost when speed below 50 kt

(2) IR 2 and IR 3 are lost 5 minutes after failure of main generators but if IR 3 replaces IR 1 (ATT-HDG selector at CAPT 3), IR 3 remains supplied.

ELEC EMER CONFIG SYS REMAINING CONT'D		EMER GEN RUNNING	BAT ONLY	
			IN FLIGHT	ON THE GROUND
EMER EQPT	CREW OXY	Norm	Norm (4)	Norm (4)
	PAX OXY mask release (auto + man)	Norm	Inop	Inop
	SLIDES ARM/WARN	Norm	Norm	Norm
FLT INS	CLOCKS	Norm	Norm	Norm
FIRE	ENG 1 LOOP	A only	A only	A only
	ENG 2 LOOP	B only	B only	B only
	APU LOOP	Inop	Inop	Inop (1)
	CARGO SMOKE DET	Channel 1	Inop	Inop
	ENG FIRE EXT.	Bottle 1 only	Bottle 1 only	Bottle 1 only
	APU FIRE EXT.	Squib A only	Squib A only	Squib A only
	CARGO FIRE EXT.	Inop	Inop	Inop (1)
	APU AUTO EXT.	Inop	Inop	Inop (1)
FLT CTL	ELAC	N°1 only	N°1 + 2	N°1 + 2 (3)
	SEC	N°1 only	N°1	N°1 (3)
	FCDC	N°1 only	Inop	Inop
	SFCC	N°1 only	N°1 only	N°1 only
	Flaps pos ind	Norm	Norm	Norm (2)
FMGS	FMGC (NAV FUNCTION)	N°1 only	Inop	Inop
	MCDU	N°1 only	Inop	Inop
	FAC	N°1 only	Inop	Inop
	FCU	ch 1 only	ch 1 only	ch 1 only
FUEL	LP VALVE	Norm	Norm	Norm
	FQI channel 1	Norm	Inop	Inop
	X FEED VALVE	Norm	Inop	Inop
	TRANSFER VALVE	Norm	Inop	Inop

(1) Restored, when the speed is below 100 knots.

R (2) Lost, when the speed is below 50 knots.

(3) Lost, 30 seconds after the last engine shutdown.

(4) Crew oxygen valve inoperative.

ELEC EMER CONFIG SYS REMAINING (cont'd)		EMER GEN RUNNING	BAT ONLY	
			IN FLIGHT	ON THE GROUND
HYD	FIRE VALVES	Norm	Norm	Norm
ICE-RAIN	WING A. ICE	Norm	Inop	Inop
	ENG A.ICE VALVE	OPEN	OPEN	OPEN
	CAPT PITOT	Norm	Norm	Norm (1)
	CAPT AOA	Norm	Inop	Inop
	RAIN REPELLENT (Capt)	Norm	Norm	Norm
L/G	LGCIU SYS 1	Norm	Norm	Norm
	BRK PRESS IND	Norm	Norm	Norm
	PARK BRK	Norm	Norm	Norm
	ABCU	Norm	Norm	Norm
LIGHTS	EMER CKPT	Norm	Norm	Norm
	EMER CAB	Norm	Norm	Norm
NAV	IR	N°1 only (2)	N°1 only (2)	N°1 only (2)
	ADR	N°1 only	N°1 only	N°1 only
	ADF ◁	N°1 only	Inop	Inop
	VOR/MMR	N°1 only	N°1 only	N°1 only (1)
	DME	N°1 only	Inop	Inop
	VOR/DDRMI	Norm	Norm	Norm (1)
	ATC	N°1 only	Inop	Inop
	ISIS	Norm	Norm	Norm

(1) lost when speed below 50 kt

(2) IR 2 and IR 3 are lost 5 minutes after failure of main generators but if IR 3 replaces IR 1 (ATT-HDG selector at CAPT 3), IR 3 remains supplied.

ELEC EMER CONFIG SYS REMAINING (cont'd)		EMER GEN RUNNING	BAT ONLY	
			IN FLIGHT	ON THE GROUND
PNEU	ENG 1 BLEED	Norm	BMC 1 inop	BMC 1 inop
	ENG 2 BLEED	BMC 2 inop	BMC 2 inop	BMC 2 inop
	APU BLEED	Inop	Inop	Inop (1)
	X BLEED (man ctl)	Norm	Inop	Inop
PWR PLT	FADEC	A + B (2)	A + B (2)	A + B (2)
	IGNITION	A only	A only	A only
	HP FUEL VALVE closure	Norm	Norm	Norm
MISC	MECH HORN	Norm	Norm	Norm

(1) Restored when speed is below 100 kt
(2) Channels A and B self-powered above 10 % N2. If N2 is below 10 % only channel A is powered.

ELEC GEN 1(2) or APU GEN OVERLOAD

– GALLEY . . . . . OFF

STATUS

INOP SYS
GALLEY

ELEC TR 1(2) or ESS TR FAULT

R Crew awareness.

STATUS

R CAT 3 SINGLE ONLY (if TR1 or TR2 FAULT)

R

INOP SYS
ESS TR or TR1(2)
CAT 3 DUAL (if TR1 or TR2 FAULT)

ELEC DC BAT BUS FAULT

Crew awareness.

STATUS

APU BAT START NOT AVAIL
ECB is no longer supplied

INOP SYS
APU FIRE DET
See below

OTHER INOP SYS

APU ECB	Fwd (aft) cargo heat controller ◁	APU fuel LP valve
Stick and rudder pedals lock (by AP)	Fwd (aft) cargo isol valves ◁	Manual pressure control
Fwd (aft) cargo fire ext ◁		

Note : The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC EMER CONFIG SYS REMAINING (cont'd)		EMER GEN RUNNING	BAT ONLY	
			IN FLIGHT	ON THE GROUND
PNEU	ENG 1 BLEED	Norm	BMC 1 inop	BMC 1 inop
	ENG 2 BLEED	BMC 2 inop	BMC 2 inop	BMC 2 inop
	APU BLEED	Inop	Inop	Inop (1)
	X BLEED (man ctl)	Norm	Inop	Inop
PWR PLT	FADEC	A + B (2)	A + B (2)	A + B (2)
	IGNITION	A only	A only	A only
	HP FUEL VALVE closure	Norm	Norm	Norm
MISC	MECH HORN	Norm	Norm	Norm

(1) Restored when speed is below 100 kt
(2) Channels A and B self-powered above 10 % N2. If N2 is below 10 % only channel A is powered.

ELEC GEN 1(2) or APU GEN OVERLOAD

– GALY/CAB ..... OFF

STATUS

INOP SYS
GALY/CAB

ELEC TR 1(2) or ESS TR FAULT

R Crew awareness.

STATUS

R CAT 3 SINGLE ONLY (if TR1 or TR2 FAULT)

R

INOP SYS
ESS TR or TR1(2)
CAT 3 DUAL (if TR1 or TR2 FAULT)

ELEC DC BAT BUS FAULT

Crew awareness.

STATUS

APU BAT START NOT AVAIL
ECB is no longer supplied

INOP SYS
APU FIRE DET
See below

OTHER INOP SYS

APU ECB	Fwd (aft) cargo heat controller ◁	APU fuel LP valve
Stick and rudder pedals lock (by AP)	Fwd cargo isol valves ◁	Manual pressure control
Fwd (aft) cargo fire ext ◁		

Note : The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC GEN 1(2) or APU GEN OVERLOAD

– GALY/CAB ..... OFF

STATUS

INOP SYS
GALY/CAB

ELEC TR 1(2) or ESS TR FAULT

R Crew awareness.

STATUS

R CAT 3 SINGLE ONLY (if TR1 or TR2 FAULT)

INOP SYS
ESS TR or TR1(2)
CAT 3 DUAL (if
R TR1 or TR2
FAULT)

ELEC DC BAT BUS FAULT

Crew awareness.

STATUS

APU BAT START NOT AVAIL
ECB is no longer supplied

INOP SYS
APU FIRE DET
See below

OTHER INOP SYS

APU ECB	Fwd (aft) cargo heat controller ◁	APU fuel LP valve
Stick and rudder pedals lock (by AP)	Fwd cargo isol valves ◁	Manual pressure control
Fwd (aft) cargo fire ext ◁		

Note : The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.

ELEC DC EMER CONFIG

LAND ASAP

Triggered, if DC BUS 1, DC BUS 2 and DC ESS BUS are lost. In addition, DC BAT BUS is lost.

– EMER ELEC PWR . . . . . MAN ON

The emergency generator supplies DC ESS BUS, as long as the landing gear is up.
But, DC BUS 1, DC BUS 2, and DC BAT BUS are still not supplied.

ELEC DC BUS 1 + 2 FAULT

– BLOWER . . . . . OVRD
– EXTRACT . . . . . OVRD
– BARO REF . . . . . CHECK

Crosscheck the barometer reference settings on the FCU and PFDs.

MAX BRK PR . . . . . 1000 PSI

Brake pressure must be limited to approximately 1000 psi, since antiskid is lost.

ELEC DC BAT BUS FAULT

Affected systems
* CAB PRESS
* HYD
* FUEL
* AIR COND
* BRAKES
* WHEEL
* F/CTL

STATUS

MIN RAT SPEED . . . . . 140 KT
PROC : GRVTY FUEL FEEDING
MAX BRK PR . . . . . 1000 PSI
FUEL GRVTY FEED
LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

ENG 1 APPR IDLE ONLY
ENG 2 APPR IDLE ONLY



ELEC DC EMER CONFIG (CONT'D)

STATUS

BOTH PFD ON SAME FAC
CTR TK ◁ FUEL UNUSABLE
APU BAT START NOT AVAIL
CAB ZONE AT FIXED TEMP
PACKS AT FIXED TEMP
SLATS/FLAPS SLOW
CAT 2 ONLY

Note : DC ESS BUS is lost at landing gear extension. Consequently, all means of communications are lost since all ACPs are lost.



ELEC DC EMER CONFIG

LAND ASAP

Triggered, if DC BUS 1, DC BUS 2 and DC ESS BUS are lost. In addition, DC BAT BUS is lost.

– EMER ELEC PWR . . . . . MAN ON

The emergency generator supplies DC ESS BUS.

But, DC BUS 1, DC BUS 2, and DC BAT BUS are still not supplied.

ELEC DC BUS 1 + 2 FAULT

– BLOWER . . . . . OVRD
– EXTRACT . . . . . OVRD
– BARO REF . . . . . CHECK

Crosscheck the barometer reference settings on the FCU and PFDs.

MAX BRK PR . . . . . 1000 PSI

Brake pressure must be limited to approximately 1000 psi, since antiskid is lost.

ELEC DC BAT BUS FAULT

Affected systems
* CAB PRESS
* HYD
* FUEL
* AIR COND
* BRAKES
* WHEEL
* F/CTL

STATUS

MIN RAT SPEED . . . . . 140 KT
PROC : GRVTY FUEL FEEDING
MAX BRK PR . . . . . 1000 PSI
FUEL GRVTY FEED
LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

ENG 1 APPR IDLE ONLY
ENG 2 APPR IDLE ONLY



ELEC DC EMER CONFIG (CONT'D)

STATUS

BOTH PFD ON SAME FAC
CTR TK ◁ FUEL UNUSABLE
APU BAT START NOT AVAIL
CAB ZONE AT FIXED TEMP
PACKS AT FIXED TEMP
SLATS/FLAPS SLOW
CAT 2 ONLY



ELEC DC EMER CONFIG

LAND ASAP

Triggered, if DC BUS 1, DC BUS 2 and DC ESS BUS are lost. In addition, DC BAT BUS is lost.

– EMER ELEC PWR . . . . . MAN ON

The emergency generator supplies DC ESS BUS.

But, DC BUS 1, DC BUS 2, and DC BAT BUS are still not supplied.

ELEC DC BUS 1 + 2 FAULT

– BLOWER . . . . . OVRD
– EXTRACT . . . . . OVRD
– BARO REF . . . . . CHECK

Crosscheck the barometer reference settings on the FCU and PFDs.

MAX BRK PR . . . . . 1000 PSI

Brake pressure must be limited to approximately 1000 psi, since antiskid is lost.

ELEC DC BAT BUS FAULT

Affected systems
* CAB PRESS
* HYD
* FUEL
* AIR COND
* BRAKES
* WHEEL
* F/CTL

STATUS

MIN RAT SPEED . . . . . 140 KT
PROC : GRVTY FUEL FEEDING
MAX BRK PR . . . . . 1000 PSI
FUEL GRVTY FEED
LDG DIST PROC . . . . . APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80.
ENG 1 APPR IDLE ONLY
ENG 2 APPR IDLE ONLY



ELEC DC EMER CONFIG (CONT'D)

	STATUS
BOTH PFD ON SAME FAC	
CTR TK FUEL UNUSABLE	
APU BAT START NOT AVAIL	
CAB AT FIXED TEMP	
COCKPIT AT FIXED TEMP	
SLATS/FLAPS SLOW	
CAT 2 ONLY	



ELEC DC EMER CONFIG (CONT'D)

STATUS

INOP SYS
See below

INOP SYS displayed on ECAM

R	FCU 2	GALLEY FAN	SPLR 1 + 2 + 5
	CAT 3	CRG HEAT ◁	ELAC 2
	FAC 2	GND COOL ◁	SEC 2 + 3
	FUEL PUMPS	MAIN GALLEY	VHF 2
R	ANTI SKID	ACP 3	N.W. STEER
	Y ELEC PUMP	CAPT STAT	LGCIU 2
	BSCU CH 1	F/O STAT	REVERSER 2
R	BSCU CH 2	STBY STAT	CAB PRESS 2
	APU FIRE DET	WSHLD HEAT	AVNCS VENT
	LAV DET	WNDW HEAT	VENT BLOWER
R	ENG 1 LOOP B	PACK 1 REGUL	ENG 2 LOOP A
	L+R CAB FAN	PACK 2 REGUL	AP2
		FCDC 2	
R		GPS 1 + 2 ◁	

INOP SYS displ on ECAM after L/G extension (DC ESS BUS Lost)

	BLUE HYD	FCU 1	GALLEY FAN
	SPLR 3	FCU 2	CRG HEAT ◁
	SPLR 1 + 2 + 5	CAT 3	GND COOL ◁
	ELAC 2	FAC 1	MAIN GALLEY
R	SEC 2 + 3	FAC 2	B ELEC PUMP
	VHF 1	FUEL PUMPS	Y ELEC PUMP
	VHF 2	ANTI SKID	BSCU CH 1
R	ACP 1 + 2 + 3	N.W. STEER	BSCU CH 2
	LGCIU 2	GPWS	CAPT STAT
	REVERSER 2	APU FIRE DET	F/O STAT
	ENG 2 START	LAV DET	STBY STAT
	CAB PRESS 1	ENG 1 LOOP A	WING A. ICE
	CAB PRESS 2	ENG 1 LOOP B	WSHLD HEAT
	AVNCS VENT	ENG 2 LOOP A	WNDW HEAT
R	VENT BLOWER	ENG 2 LOOP B	VENT EXTRACT
	PACK 1 REGUL	AP 1 + 2	L + R CAB FAN
	PACK 2 REGUL	A/THR	
	FCDC 1		
	FCDC 2		
	GPS 1 + 2 ◁		

R *Note : To verify the other INOP SYS not displayed on the ECAM, refer to the DC BUS 1+2,*
R *DC BAT BUS procedure and after L/G extension also to the DC ESS BUS procedures.*

ELEC STAT INV FAULT

Crew awareness.

ELEC EMER GEN 1 LINE OFF

With the GEN 1 LINE pushbutton (on the EMER ELEC PWR panel) in the OFF position, the GEN 1 line contactor is open and GEN 2 supplies the AC BUS 1 channel.

Crew awareness.

Set the GEN 1 LINE pushbutton to ON.

C/B TRIPPED

R Crew awareness.

R *If one green circuit breaker (C/B) is tripped, one of the following messages appears after one*
R *minute, depending on the location of the affected C/B :*

C/B TRIPPED ON OVHD PNL
C/B TRIPPED ON L(R) ELEC BAY
C/B TRIPPED REAR PNL J-M or N-R or S-V or W-Z

R *Note : Do not reengage a C/B that has tripped by itself, unless the Captain judges it*
R *necessary to do so for the safe continuation of the flight. This procedure should be*
R *adopted only as a last resort, and only one reengagement should be attempted.*
R *On ground, do not reengage the C/B of the fuel pump(s) of any tank. For all other*
R *C/Bs, if the flight crew coordinates the action with maintenance, the flight crew may*
R *reengage a tripped C/B, provided that the cause of the tripped C/B is identified.*

ELEC DC EMER CONFIG (CONT'D)

STATUS

INOP SYS
See below

INOP SYS displayed on ECAM

R	FCU 2	GALLEY FAN	SPLR 1 + 2 + 5
	CAT 3	CRG HEAT ◁	ELAC 2
	FAC 2	GND COOL ◁	SEC 2 + 3
	FUEL PUMPS	MAIN GALLEY	VHF 2
R	ANTI SKID	ACP 3	N.W. STEER
	Y ELEC PUMP	CAPT STAT	LGCIU 2
	BSCU CH 1	F/O STAT	REVERSER 2
R	BSCU CH 2	STBY STAT	CAB PRESS 2
	APU FIRE DET	WSHLD HEAT	AVNCS VENT
	LAV DET	WNDW HEAT	VENT BLOWER
R	ENG 1 LOOP B	PACK 1 REGUL	ENG 2 LOOP A
	L+R CAB FAN	PACK 2 REGUL	AP2
R	FCDC 2	GPS 1 + 2 ◁	

R *Note : To verify the other INOP SYS not displayed on the ECAM, refer to the DC BUS 1+2*
R *and DC BAT BUS procedures.*

ELEC STAT INV FAULT

Crew awareness.

ELEC EMER GEN 1 LINE OFF

With the GEN 1 LINE pushbutton (on the EMER ELEC PWR panel) in the OFF position, the GEN 1 line contactor is open and GEN 2 supplies the AC BUS 1 channel.

Crew awareness.

Set the GEN 1 LINE pushbutton to ON.

C/B TRIPPED

R Crew awareness.

R *If one green circuit breaker (C/B) is tripped, one of the following messages appears after one*
R *minute, depending on the location of the affected C/B :*

C/B TRIPPED ON OVHD PNL

C/B TRIPPED ON L(R) ELEC BAY

C/B TRIPPED REAR PNL J-M or N-R or S-V or W-Z

R *Note : Do not reengage a C/B that has tripped by itself, unless the Captain judges it*
R *necessary to do so for the safe continuation of the flight. This procedure should be*
R *adopted only as a last resort, and only one reengagement should be attempted.*
R *On ground, do not reengage the C/B of the fuel pump(s) of any tank. For all other*
R *C/Bs, if the flight crew coordinates the action with maintenance, the flight crew may*
R *reengage a tripped C/B, provided that the cause of the tripped C/B is identified.*

ELEC DC EMER CONFIG (CONT'D)

STATUS

INOP SYS
See below

INOP SYS displayed on ECAM

FCU 2	GALLEY FAN	SPLR 1 + 2 + 5
CAT 3	CRG HEAT ◁	ELAC 2
FAC 2	GND COOL ◁	SEC 2 + 3
FUEL PUMPS	MAIN GALLEY	VHF 2
ANTI SKID	ACP 3	N.W. STEER
Y ELEC PUMP	CAPT STAT	LGCIU 2
BRAKES SYS 1	F/O STAT	REVERSER 2
BRAKES SYS 2	STBY STAT	CAB PRESS 2
APU FIRE DET	WSHLD HEAT	AVNCS VENT
LAV DET	WNDW HEAT	VENT BLOWER
ENG 1 LOOP B	PACK 1	ENG 2 LOOP A
L+R CAB FAN	PACK 2	AP2
FCDC 2	COND CTL 1	COND CTL 2

Note : To verify the other INOP SYS not displayed on the ECAM, refer to the DC BUS 1+2 and DC BAT BUS procedures.

ELEC STAT INV FAULT

Crew awareness.

ELEC EMER GEN 1 LINE OFF

With the GEN 1 LINE pushbutton (on the EMER ELEC PWR panel) in the OFF position, the GEN 1 line contactor is open and GEN 2 supplies the AC BUS 1 channel.

Crew awareness.

Set the GEN 1 LINE pushbutton to ON.

C/B TRIPPED

R Crew awareness.

R *If one green circuit breaker (C/B) is tripped, one of the following messages appears after one*
R *minute, depending on the location of the affected C/B :*

C/B TRIPPED ON OVHD PNL

C/B TRIPPED ON L(R) ELEC BAY

C/B TRIPPED REAR PNL J-M or N-R or S-V or W-Z

R *Note : Do not reengage a C/B that has tripped by itself, unless the Captain judges it*
R *necessary to do so for the safe continuation of the flight. This procedure should be*
R *adopted only as a last resort, and only one reengagement should be attempted.*
R *On ground, do not reengage the C/B of the fuel pump(s) of any tank. For all other*
R *C/Bs, if the flight crew coordinates the action with maintenance, the flight crew may*
R *reengage a tripped C/B, provided that the cause of the tripped C/B is identified.*

ELEC DC EMER CONFIG (CONT'D)

STATUS

INOP SYS
See below

INOP SYS displayed on ECAM

FCU 2	GALLEY FAN	SPLR 1 + 2 + 5
CAT 3	CRG HEAT ◁	ELAC 2
FAC 2	GND COOL ◁	SEC 2 + 3
FUEL PUMPS	MAIN GALLEY	VHF 2
ANTI SKID	ACP 3	N/W STRG
Y ELEC PUMP	CAPT STAT	LGCIU 2
BRAKE SYS 1	F/O STAT	REVERSER 2
BRAKE SYS 2	STBY STAT	CAB PRESS 2
APU FIRE DET	WSHLD HEAT	AVNCS VENT
LAV DET	WNDW HEAT	VENT BLOWER
ENG 1 LOOP B	PACK 1 REGUL	ENG 2 LOOP A
L+R CAB FAN	PACK 2 REGUL	AP2
FCDC 2	GPS 1 + 2 ◁	

Note : To verify the other INOP SYS not displayed on the ECAM, refer to the DC BUS 1+2 and DC BAT BUS procedures.

ELEC STAT INV FAULT

Crew awareness.

ELEC EMER GEN 1 LINE OFF

With the GEN 1 LINE pushbutton (on the EMER ELEC PWR panel) in the OFF position, the GEN 1 line contactor is open and GEN 2 supplies the AC BUS 1 channel.

Crew awareness.

Set the GEN 1 LINE pushbutton to ON.

C/B TRIPPED

R Crew awareness.

R *If one green circuit breaker (C/B) is tripped, one of the following messages appears after one*
R *minute, depending on the location of the affected C/B :*

C/B TRIPPED ON OVHD PNL
C/B TRIPPED ON L(R) ELEC BAY
C/B TRIPPED REAR PNL J-M or N-R or S-V or W-Z

R *Note : Do not reengage a C/B that has tripped by itself, unless the Captain judges it*
R *necessary to do so for the safe continuation of the flight. This procedure should be*
R *adopted only as a last resort, and only one reengagement should be attempted.*
R *On ground, do not reengage the C/B of the fuel pump(s) of any tank. For all other*
R *C/Bs, if the flight crew coordinates the action with maintenance, the flight crew may*
R *reengage a tripped C/B, provided that the cause of the tripped C/B is identified.*

COCKPIT DOOR FAULT

This procedure should be applied, if the Cockpit Door Locking System (CDLS) fails. This failure is indicated when the FAULT light on the center pedestal's COCKPIT DOOR panel comes on.

In the case of a DC BUS 2 fault, no FAULT indication appears on the center pedestal's COCKPIT DOOR panel. The CDLS is not electrically-supplied, and is inoperative.

– CKPT DOOR CONT panel . . . . . CHECK

This panel is located on the overhead panel. It is used to identify the faulty CDLS item, and to verify the status of the pressure sensors and the three electrical latches (referred to as strikes).

- **If two or more electrical latches (strikes) are faulty :**

  The cockpit door is not intrusion-proof.

  The system may be recovered by performing the following steps:

  – Cockpit door . . . . . OPEN

  – COCKPIT DOOR toggle switch . . . . . SET to UNLOCK

  After 10 seconds :

  – COCKPIT DOOR toggle switch . . . . . SET to NORM

- **If two pressure sensors are faulty :**

  Automatic latch release is not available, in case of cockpit decompression.

- **If no LED on the CKPT DOOR CONT panel is on :**

  The CDLS control unit is faulty, therefore, the cockpit door might unlock automatically. If it does not, consider using the mechanical override system to unlock the door.

ENG 1(2)/APU FIRE LOOP A (B) FAULT

No crew action required in flight.

STATUS

INOP SYS
ENG 1(2) LOOP A(B) or APU LOOP A(B)

R

ENG 1(2)/APU FIRE DET FAULT

Loss of both fire detection loops.

Crew awareness.

STATUS

INOP SYS
FIRE DET 1(2) or APU FIRE DET

ENG 1(2) FIRE (on ground)

R – THR LEVERS ..... IDLE

Full reverse may be used to stop the aircraft.

● **WHEN A/C IS STOPPED :**

– PARKING BRK ..... ON

– ENG MASTER (affected) ..... OFF

Associated LP and HP valves close.

– ENG FIRE P/B (affected) ..... PUSH

· *Aural warning stops.*

· *ENG FIRE pushbutton remains on, as long as a fire is detected.*

· *FADEC is no longer supplied. So, the THR LEVERS .... IDLE line reappears, even if the thrust levers are at idle.*

– AGENT 1 + 2 ..... DISCH

– ENG MASTER (opposite side) ..... OFF

The following items are not displayed on the ECAM, if the APU is not running :

– ATC (VHF 1) ..... NOTIFY

Notify ATC of the nature of the emergency, and state intentions.

Only VHF1 is available on batteries.

– CABIN CREW (PA) ..... ALERT

● **IF EVAC RQRD :**

– EVAC COMMAND ..... ON

– APU MASTER SW ..... OFF

– BAT 1 + 2 (if time permits before leaving aircraft) .. OFF

Batteries are left ON, until leaving the aircraft, to ensure cabin communications.

Note : Keep the batteries on, for at least 10 seconds after switching the 2nd ENG MASTER to OFF, to allow the fuel LP valves to close completely.

ENG 1(2)/APU FIRE LOOP A (B) FAULT

No crew action required in flight.

STATUS

INOP SYS
ENG 1(2) LOOP A(B) or APU LOOP A(B)

R

ENG 1(2)/APU FIRE DET FAULT

Loss of both fire detection loops.

Crew awareness.

STATUS

INOP SYS
FIRE DET 1(2) or APU FIRE DET

ENG 1(2) FIRE (on ground)

– THR LEVERS . . . . . IDLE

Full reverse may be used to stop the aircraft.

● **WHEN A/C IS STOPPED :**

– PARKING BRK . . . . . ON

– ATC (VHF 1) . . . . . NOTIFY

Notify ATC of the nature of the emergency, and state intentions.

Only VHF1 is available on batteries.

– CABIN CREW (PA) . . . . . ALERT

– ENG MASTER (affected) . . . . . OFF

Associated LP and HP valves close.

– ENG FIRE P/B (affected) . . . . . PUSH

· *Aural warning stops.*

· *ENG FIRE pushbutton remains on, as long as a fire is detected.*

· *FADEC is no longer supplied.*

– AGENT 1 + 2 . . . . . DISCH

– EMER EVAC PROC . . . . . APPLY

Refer to the EMERGENCY EVACUATION procedure in FCOM 3.02.80 or in QRH 7.00

R

ENG 1(2) FIRE (in flight)

LAND ASAP

– THR LEVER (affected) . . . . . IDLE
– ENG MASTER (affected) . . . . . OFF
LP and HP valves close.
– ENG FIRE P/B (affected) . . . . . PUSH
· Aural warning stops.
· ENG FIRE pushbutton remains on, as long as a fire is detected.
· FADEC is no longer supplied. So, the THR LEVER ... IDLE line reappears, even if the thrust lever is at idle.
– AGENT 1 AFT 10 S . . . . . DISCH
The 10–second delay allows N1 to decrease, reducing nacelle ventilation, and thereby increasing the effect of the agent.
Automatic countdown on the ECAM.
– ATC . . . . . NOTIFY
Notify ATC of the nature of the emergency, and state intentions

● **IF FIRE AFTER 30 S :**
– AGENT 2 . . . . . DISCH
Discharge the second agent, if the fire warning remains 30 seconds after the discharge of the first agent.

ENG 1(2) SHUTDOWN

Do not attempt to restart the engine.
For the after ENG SHUTDOWN procedure, see the ENG section. (Refer to 3.02.70).

APU FIRE

LAND ASAP

– APU FIRE P/B . . . . . PUSH
· APU LP valve closes.
· Aural warning stops.
· APU FIRE pushbutton remains on, as long as a fire is detected.
– AGENT AFT 10 S . . . . . DISCH
The 10–second delay allows the airflow to decrease, which increases the effect of the agent.
Automatic countdown on the ECAM.
– MASTER SW . . . . . OFF
Do not attempt to restart the APU.

STATUS
INOP SYS
APU

SMOKE/FUMES/AVNCS SMOKE

R *This paper procedure includes all the steps of the AVIONICS SMOKE ECAM procedure.*
R *Apply this paper procedure when :*
R – *The flight (cabin) crew suspect that smoke is coming from the avionics, and/or the air conditioning, and/or the cabin equipment.*
R – *The AVIONICS SMOKE ECAM caution is triggered, or, at the latest, after completing the immediate actions of the AVIONICS SMOKE ECAM procedure (before reaching the 5–minutes countdown procedure line)*
R – *There is a smell of smoke/fumes in the cockpit :*
R · *If the smell is similar to that of orange peels, suspect a toxic leak of rain repellent fluid.*
R · *If the smell is similar to that of pine needles, suspect a non-toxic leak.*
R *If any other ECAM SMOKE alert triggers (CARGO, ...), the crew must first apply the ECAM procedure, then consider applying this paper procedure.*
R *Note that these ECAM alerts may be caused by another source, that should usually first be detected by the flight crew/cabin crew/avionics smoke detectors.*
R *The following explains the layout of this paper procedure :*
R – *The procedure lines above the text boxes indicate the actions that the flight crew must immediately perform, if smoke is detected (with or without ECAM activation and regardless of the smoke source). These immediate actions correspond to the most common steps to be taken in smoke cases. In all cases, the flight crew must also be prepared to immediately perform a diversion. However, this diversion may be avoided if the smoke source is obvious, accessible and extinguishable or confirmed isolated (after completion of the immediate actions).*
R – *The text boxes indicate the actions that the flight crew must consider, if at any time during the remainder of the procedure but always after the initial steps :*
R · *Smoke/fumes become the greatest threat and smoke/fumes removal is required, and/or*
R · *The situation becomes critical and can no longer be controlled.*
R – *The procedure lines below the text boxes indicate the actions that the flight crew must perform, as soon as they suspect a source of smoke. The actions will depend on whether the smoke is coming from the avionics, and/or air conditioning, and/or cabin equipment.*

LAND ASAP

● IF PERCEPTIBLE SMOKE APPLY IMMEDIATELY :

If smoke is confirmed, the following procedure must be applied.

– BLOWER ..... OVRD
– EXTRACT ..... OVRD
R *Avionics ventilation air is extracted overboard.*
– CAB FANS ..... OFF
To prevent smoke from entering the cockpit and cabin.
– GALLEY ..... OFF
– SIGNS ..... ON



R

ENG 1(2) FIRE (in flight)

LAND ASAP

– THR LEVER (affected) ..... IDLE

– ENG MASTER (affected) ..... OFF

LP and HP valves close.

– ENG FIRE P/B (affected) ..... PUSH

· Aural warning stops.

· ENG FIRE pushbutton remains on, as long as a fire is detected.

· FADEC is no longer supplied. So, the THR LEVER ... IDLE line reappears, even if the thrust lever is at idle.

– AGENT 1 AFT 10 S ..... DISCH

The 10–second delay allows N1 to decrease, reducing nacelle ventilation, and thereby increasing the effect of the agent.

Automatic countdown on the ECAM.

– ATC ..... NOTIFY

Notify ATC of the nature of the emergency, and state intentions

● **IF FIRE AFTER 30 S :**

– AGENT 2 ..... DISCH

Discharge the second agent, if the fire warning remains 30 seconds after the discharge of the first agent.

ENG 1(2) SHUTDOWN

Do not attempt to restart the engine.

For the after ENG SHUTDOWN procedure, see the ENG section. (Refer to 3.02.70).

APU FIRE

LAND ASAP

– APU FIRE P/B ..... PUSH

· APU LP valve closes.

· Aural warning stops.

· APU FIRE pushbutton remains on, as long as a fire is detected.

– AGENT AFT 10 S ..... DISCH

The 10–second delay allows the airflow to decrease, which increases the effect of the agent.

Automatic countdown on the ECAM.

– MASTER SW ..... OFF

Do not attempt to restart the APU.

STATUS

INOP SYS

APU

SMOKE/FUMES/AVNCS SMOKE

R *This paper procedure includes all the steps of the AVIONICS SMOKE ECAM procedure.*
R *Apply this paper procedure when :*
R – *The flight (cabin) crew suspect that smoke is coming from the avionics, and/or the air conditioning, and/or the cabin equipment.*
R – *The AVIONICS SMOKE ECAM caution is triggered, or, at the latest, after completing the immediate actions of the AVIONICS SMOKE ECAM procedure (before reaching the 5–minutes countdown procedure line)*
R – *There is a smell of smoke/fumes in the cockpit :*
R · *If the smell is similar to that of orange peels, suspect a toxic leak of rain repellent fluid.*
R · *If the smell is similar to that of pine needles, suspect a non-toxic leak.*
R *If any other ECAM SMOKE alert triggers (CARGO, ...), the crew must first apply the ECAM procedure, then consider applying this paper procedure.*
R *Note that these ECAM alerts may be caused by another source, that should usually first be detected by the flight crew/cabin crew/avionics smoke detectors.*
R *The following explains the layout of this paper procedure :*
R – *The procedure lines above the text boxes indicate the actions that the flight crew must immediately perform, if smoke is detected (with or without ECAM activation and regardless of the smoke source). These immediate actions correspond to the most common steps to be taken in smoke cases. In all cases, the flight crew must also be prepared to immediately perform a diversion. However, this diversion may be avoided if the smoke source is obvious, accessible and extinguishable or confirmed isolated (after completion of the immediate actions).*
R – *The text boxes indicate the actions that the flight crew must consider, if at any time during the remainder of the procedure but always after the initial steps :*
R · *Smoke/fumes become the greatest threat and smoke/fumes removal is required, and/or*
R · *The situation becomes critical and can no longer be controlled.*
R – *The procedure lines below the text boxes indicate the actions that the flight crew must perform, as soon as they suspect a source of smoke. The actions will depend on whether the smoke is coming from the avionics, and/or air conditioning, and/or cabin equipment.*

LAND ASAP

● **IF PERCEPTIBLE SMOKE, APPLY IMMEDIATELY :**

If smoke is confirmed, the following procedure must be applied.

– BLOWER ..... OVRD
– EXTRACT ..... OVRD
R *Avionics ventilation air is extracted overboard.*
– CAB FANS ..... OFF
To prevent smoke from entering the cockpit and cabin.
– GALY & CAB ..... OFF
– SIGNS ..... ON



ENG 1(2) FIRE (in flight)

LAND ASAP

– THR LEVER (affected) ..... IDLE

– ENG MASTER (affected) ..... OFF

LP and HP valves close.

– ENG FIRE P/B (affected) ..... PUSH

· Aural warning stops.

· ENG FIRE pushbutton remains on, as long as a fire is detected.

· FADEC is no longer supplied. So, the THR LEVER ... IDLE line reappears, even if the thrust lever is at idle.

– AGENT 1 AFTER 10 S ..... DISCH

The 10–second delay allows N1 to decrease, reducing nacelle ventilation, and thereby increasing the effect of the agent.

Automatic countdown on the ECAM.

– ATC ..... NOTIFY

Notify ATC of the nature of the emergency, and state intentions

● **IF FIRE AFTER 30 S :**

– AGENT 2 ..... DISCH

Discharge the second agent, if the fire warning remains 30 seconds after the discharge of the first agent.

ENG 1(2) SHUTDOWN

Do not attempt to restart the engine.

For the after ENG SHUTDOWN procedure, see the ENG section. (Refer to 3.02.70).

APU FIRE

LAND ASAP

– APU FIRE P/B ..... PUSH

· APU LP valve closes.

· Aural warning stops.

· APU FIRE pushbutton remains on, as long as a fire is detected.

– AGENT AFTER 10 S ..... DISCH

The 10–second delay allows the airflow to decrease, which increases the effect of the agent.

Automatic countdown on the ECAM.

– MASTER SW ..... OFF

Do not attempt to restart the APU.

STATUS

INOP SYS

APU

SMOKE/FUMES/AVNCS SMOKE

R *This paper procedure includes all the steps of the AVIONICS SMOKE ECAM procedure.*
R *Apply this paper procedure when :*
R – *The flight (cabin) crew suspect that smoke is coming from the avionics, and/or the air conditioning, and/or the cabin equipment.*
R – *The AVIONICS SMOKE ECAM caution is triggered, or, at the latest, after completing the immediate actions of the AVIONICS SMOKE ECAM procedure (before reaching the 5–minutes countdown procedure line)*
R – *There is a smell of smoke/fumes in the cockpit :*
R · *If the smell is similar to that of orange peels, suspect a toxic leak of rain repellent fluid.*
R · *If the smell is similar to that of pine needles, suspect a non-toxic leak.*
R *If any other ECAM SMOKE alert triggers (CARGO, ...), the crew must first apply the ECAM procedure, then consider applying this paper procedure.*
R *Note that these ECAM alerts may be caused by another source, that should usually first be detected by the flight crew/cabin crew/avionics smoke detectors.*
R *The following explains the layout of this paper procedure :*
R – *The procedure lines above the text boxes indicate the actions that the flight crew must immediately perform, if smoke is detected (with or without ECAM activation and regardless of the smoke source). These immediate actions correspond to the most common steps to be taken in smoke cases. In all cases, the flight crew must also be prepared to immediately perform a diversion. However, this diversion may be avoided if the smoke source is obvious, accessible and extinguishable or confirmed isolated (after completion of the immediate actions).*
R – *The text boxes indicate the actions that the flight crew must consider, if at any time during the remainder of the procedure but always after the initial steps :*
R · *Smoke/fumes become the greatest threat and smoke/fumes removal is required, and/or*
R · *The situation becomes critical and can no longer be controlled.*
R – *The procedure lines below the text boxes indicate the actions that the flight crew must perform, as soon as they suspect a source of smoke. The actions will depend on whether the smoke is coming from the avionics, and/or air conditioning, and/or cabin equipment.*

LAND ASAP

● **IF PERCEPTIBLE SMOKE, APPLY IMMEDIATELY :**

If smoke is confirmed, the following procedure must be applied.

– BLOWER ..... OVRD
– EXTRACT ..... OVRD
R *Avionics ventilation air is extracted overboard.*
– CAB FANS ..... OFF
To prevent smoke from entering the cockpit and cabin.
– GALY & CAB ..... OFF
– SIGNS ..... ON



ENG 1(2) FIRE (in flight)

LAND ASAP

– THR LEVER (affected) ..... IDLE

– ENG MASTER (affected) ..... OFF

LP and HP valves close.

– ENG FIRE P/B (affected) ..... PUSH

· Aural warning stops.

· ENG FIRE pushbutton remains on, as long as a fire is detected.

· FADEC is no longer supplied. So, the THR LEVER ... IDLE line reappears, even if the thrust lever is at idle.

– AGENT 1 AFTER 10 S ..... DISCH

The 10–second delay allows N1 to decrease, reducing nacelle ventilation, and thereby increasing the effect of the agent.

Automatic countdown on the ECAM.

– ATC ..... NOTIFY

Notify ATC of the nature of the emergency, and state intentions

● **IF FIRE AFTER 30 S :**

– AGENT 2 ..... DISCH

Discharge the second agent, if the fire warning remains 30 seconds after the discharge of the first agent.

ENG 1(2) SHUTDOWN

Do not attempt to restart the engine.

For the after ENG SHUTDOWN procedure, see the ENG section. (Refer to 3.02.70).

APU FIRE

LAND ASAP

– APU FIRE P/B ..... PUSH

· APU LP valve closes.

· Aural warning stops.

· APU FIRE pushbutton remains on, as long as a fire is detected.

– AGENT AFTER 10 S ..... DISCH

The 10–second delay allows the airflow to decrease, which increases the effect of the agent.

Automatic countdown on the ECAM.

– MASTER SW ..... OFF

Do not attempt to restart the APU.

STATUS

INOP SYS

APU

SMOKE/FUMES/AVNCS SMOKE

This paper procedure includes all the steps of the AVIONICS SMOKE ECAM procedure.
Apply this paper procedure when :

- *The flight (cabin) crew suspect that smoke is coming from the avionics, and/or the air conditioning, and/or the cabin equipment.*
- *Requested by the AVIONICS SMOKE ECAM procedure.*
- *There is a smell of smoke/fumes in the cockpit :*
  - *If the smell is similar to that of orange peels, suspect a toxic leak of rain repellent fluid.*
  - *If the smell is similar to that of pine needles, suspect a non-toxic leak.*

If any other ECAM SMOKE alert triggers (CARGO, ...), the crew must first apply the ECAM procedure, then consider applying this paper procedure.
Note that these ECAM alerts may be caused by another source, that should usually first be detected by the flight crew/cabin crew/avionics smoke detectors.
The following explains the layout of this paper procedure :

- *The procedure lines above the text boxes indicate the actions that the flight crew must immediately perform, if smoke is detected (with or without ECAM activation and regardless of the smoke source). These immediate actions correspond to the most common steps to be taken in smoke cases. In all cases, the flight crew must also be prepared to immediately perform a diversion. However, this diversion may be avoided if the smoke source is obvious, accessible and extinguishable or confirmed isolated (after completion of the immediate actions).*
- *The text boxes indicate the actions that the flight crew must consider, if at any time during the remainder of the procedure but always after the initial steps :*
  - *Smoke/fumes become the greatest threat and smoke/fumes removal is required, and/or*
  - *The situation becomes critical and can no longer be controlled.*
- *The procedure lines below the text boxes indicate the actions that the flight crew must perform, as soon as they suspect a source of smoke. The actions will depend on whether the smoke is coming from the avionics, and/or air conditioning, and/or cabin equipment.*

LAND ASAP

● **IF PERCEPTIBLE SMOKE, APPLY IMMEDIATELY :**

If smoke is confirmed, the following procedure must be applied.

– BLOWER ..... OVRD
– EXTRACT ..... OVRD

Avionics ventilation air is extracted overboard.

– CAB FANS ..... OFF

To prevent smoke from entering the cockpit and cabin.

– GALY & CAB ..... OFF
– SIGNS ..... ON



SMOKE/FUMES/AVNCS SMOKE (CONT'D)

– CKPT/CABIN COM . . . . . ESTABLISH

Communication must be established with the cabin crew in order to follow up on the smoke origin and dissipation.

- **If required**

– OXY MASK/GOGGLE ON/100%/EMERG

Ensure crew communication is established. Avoid continuous use of the interphone to minimize interference from the oxygen mask breathing noise.
Turn the emergency knob to remove condensation or smoke from the mask.

- **If smoke source immediately obvious, accessible, and extinguishable :**

– FAULTY EQPT . . . . . ISOLATE

- **If smoke source not immediately isolated :**

– DIVERSION . . . . . INITIATE

– DESCENT (FL 100, or MEA, or minimum obstacle clearance altitude) . . . . . INITIATE

R

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- At ANY TIME of the remainder of the procedure, if smoke/fumes becomes the GREATEST THREAT:
  - SMOKE FUMES REMOVAL.....CONSIDER
  - ELEC EMER CONFIG..... CONSIDER
    Refer to the end of the procedure to set ELEC EMER CONFIG

- At ANY TIME of the procedure, if situation becomes critical and can no longer be controlled :
  - IMMEDIATE LANDING.....CONSIDER

Guidelines to determine smoke source :

– *If smoke initially comes out of the ventilation outlets, the crew may suspect AIR COND SMOKE. In addition, very shortly thereafter, several SMOKE warnings (cargo, lavatory, avionics) will be triggered. The displayed ECAM procedures must be applied.*

– *After an ENG or APU failure, smoke may come from the faulty item via the bleed system and be perceived in the cockpit and/or cabin. In such a case, it will be recirculated throughout the aircraft, until it completely disappears from the air conditioning system.*

– *If only the AVIONICS SMOKE warning is triggered, the crew may suspect avionics smoke.*

– *If the smoke is detected while an equipment is declared faulty, the crew may suspect that smoke is coming from this equipment.*

– *Avionics or forward galley smoke may be smelt, or may enter in the cockpit before ECAM warning activation.*

SMOKE/FUMES/AVNCS SMOKE (CONT'D)

R ● **IF AIR COND SMOKE SUSPECTED :**
- – APU BLEED ..... OFF
- – BLOWER and EXTRACT ..... AUTO

Note : When both BLOWER and EXTRACT are in the OVRD position, a single pack may not be able to maintain the cabin pressure.

- – PACK 1 ..... OFF

● **If smoke continues :**
- – PACK 1 ..... ON
- – PACK 2 ..... OFF

● **If smoke still continues:**
- – PACK 2 ..... ON

Restore normal configuration if PACK 2 is not suspected to cause smoke.

- – BLOWER and EXTRACT ..... OVRD
- – SMOKE/FUMES REMOVAL ..... CONSIDER

R ● **IF CAB EQUIPMENT SMOKE SUSPECTED :**

● **If smoke continues :**
- – EMER EXIT LIGHT ..... ON
- – BUS TIE ..... OFF
- – GEN 2 ..... OFF

AC BUS 2 shedding can be considered in order to isolate most of the cabin equipments. The ECAM lower display, and the F/O's PFD and ND will be lost.

- – SMOKE DISSIPATION ..... CHECK
- – FAULTY EQPT ..... SEARCH/ISOLATE

Once the cabin has been secured, try to find the smoke source and isolate it. Cabin lights, reading lights, passenger systems, galleys have dedicated control C/B in the cabin or cockpit.

● **If smoke still continues or if faulty equipment confirmed isolated :**
- – GEN 2 ..... ON

All busbars recovered when GEN 2 restored. But, TR 2 remains inop.

- – BUS TIE ..... AUTO

● **If faulty equipment not confirmed isolated, before L/G extension :**
- – GEN 2 ..... ON
- – BUS TIE ..... AUTO
- – SMOKE/FUMES REMOVAL ..... CONSIDER

At any time of the procedure, consider applying the SMOKE/FUMES REMOVAL.



SMOKE/FUMES/AVNCS SMOKE (CONT'D)

– CKPT/CABIN COM . . . . . ESTABLISH

Communication must be established with the cabin crew in order to follow up on the smoke origin and dissipation.

- **If required**

– OXY MASK/GOGGLE ON/100%/EMERG

Ensure crew communication is established. Avoid continuous use of the interphone to minimize interference from the oxygen mask breathing noise.
Turn the emergency knob to remove condensation or smoke from the mask.

- **If smoke source immediately obvious, accessible, and extinguishable :**

– FAULTY EQPT . . . . . ISOLATE

- **If smoke source not immediately isolated :**

– DIVERSION . . . . . INITIATE

– DESCENT (FL 100, or MEA, or minimum obstacle clearance altitude) . . . . . INITIATE

R

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- At ANY TIME of the remainder of the procedure, if smoke/fumes becomes the GREATEST THREAT:
  - SMOKE FUMES REMOVAL.....CONSIDER
  - ELEC EMER CONFIG..... CONSIDER
    Refer to the end of the procedure to set ELEC EMER CONFIG

- At ANY TIME of the procedure, if situation becomes critical and can no longer be controlled :
  - IMMEDIATE LANDING.....CONSIDER

Guidelines to determine smoke source :

– *If smoke initially comes out of the ventilation outlets, the crew may suspect AIR COND SMOKE. In addition, very shortly thereafter, several SMOKE warnings (cargo, lavatory, avionics) will be triggered. The displayed ECAM procedures must be applied.*

– *After an ENG or APU failure, smoke may come from the faulty item via the bleed system and be perceived in the cockpit and/or cabin. In such a case, it will be recirculated throughout the aircraft, until it completely disappears from the air conditioning system.*

– *If only the AVIONICS SMOKE warning is triggered, the crew may suspect avionics smoke.*

– *If the smoke is detected while an equipment is declared faulty, the crew may suspect that smoke is coming from this equipment.*

– *Avionics or forward galley smoke may be smelt, or may enter in the cockpit before ECAM warning activation.*

SMOKE/FUMES/AVNCS SMOKE (CONT'D)

R ● **IF AIR COND SMOKE SUSPECTED :**
- – APU BLEED ..... OFF
- – BLOWER and EXTRACT ..... AUTO

Note : When both BLOWER and EXTRACT are in the OVRD position, a single pack may not be able to maintain the cabin pressure.

- – PACK 1 ..... OFF
- ● **If smoke continues :**
  - – PACK 1 ..... ON
  - – PACK 2 ..... OFF
  - – CRG FWD (AFT) ISOL VALVE ◁ ..... OFF

  To prevent a cargo smoke warning from being triggered due to cabin smoke.
  - ● **If smoke still continues:**
    - – PACK 2 ..... ON

    Restore normal configuration if PACK 2 is not suspected to cause smoke.
    - – BLOWER and EXTRACT ..... OVRD
- – SMOKE/FUMES REMOVAL ..... CONSIDER

R ● **IF CAB EQUIPMENT SMOKE SUSPECTED :**
- ● **If smoke continues :**
  - – EMER EXIT LIGHT ..... ON
  - – BUS TIE ..... OFF
  - – GEN 2 ..... OFF

  AC BUS 2 shedding can be considered in order to isolate most of the cabin equipments. The ECAM lower display, and the F/O's PFD and ND will be lost.
  - – SMOKE DISSIPATION ..... CHECK
  - – FAULTY EQPT ..... SEARCH/ISOLATE

  Once the cabin has been secured, try to find the smoke source and isolate it. Cabin lights, reading lights, passenger systems, galleys have dedicated control C/B in the cabin or cockpit.
  - ● **If smoke still continues or if faulty equipment confirmed isolated :**
    - – GEN 2 ..... ON

    All busbars recovered when GEN 2 restored. But, TR 2 remains inop.
    - – BUS TIE ..... AUTO
  - ● **If faulty equipment not confirmed isolated, before L/G extension :**
    - – GEN 2 ..... ON
    - – BUS TIE ..... AUTO
  - – SMOKE/FUMES REMOVAL ..... CONSIDER



SMOKE/FUMES/AVNCS SMOKE (CONT'D)

– CKPT/CABIN COM . . . . . ESTABLISH

Communication must be established with the cabin crew in order to follow up on the smoke origin and dissipation.

- **If required**

– OXY MASK/GOGGLE ON/100%/EMERG

Ensure crew communication is established. Avoid continuous use of the interphone to minimize interference from the oxygen mask breathing noise.
Turn the emergency knob to remove condensation or smoke from the mask.

- **If smoke source immediately obvious, accessible, and extinguishable :**

– FAULTY EQPT . . . . . ISOLATE

- **If smoke source not immediately isolated :**

– DIVERSION . . . . . INITIATE

– DESCENT (FL 100, or MEA, or minimum obstacle clearance altitude) . . . . . INITIATE

R

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- At ANY TIME of the remainder of the procedure, if smoke/fumes becomes the GREATEST THREAT:
  - SMOKE FUMES REMOVAL.....CONSIDER
  - ELEC EMER CONFIG..... CONSIDER
    Refer to the end of the procedure to set ELEC EMER CONFIG

- At ANY TIME of the procedure, if situation becomes critical and can no longer be controlled :
  - IMMEDIATE LANDING.....CONSIDER

Guidelines to determine smoke source :

– *If smoke initially comes out of the ventilation outlets, the crew may suspect AIR COND SMOKE. In addition, very shortly thereafter, several SMOKE warnings (cargo, lavatory, avionics) will be triggered. The displayed ECAM procedures must be applied.*

– *After an ENG or APU failure, smoke may come from the faulty item via the bleed system and be perceived in the cockpit and/or cabin. In such a case, it will be recirculated throughout the aircraft, until it completely disappears from the air conditioning system.*

– *If only the AVIONICS SMOKE warning is triggered, the crew may suspect avionics smoke.*

– *If the smoke is detected while an equipment is declared faulty, the crew may suspect that smoke is coming from this equipment.*

– *Avionics or forward galley smoke may be smelt, or may enter in the cockpit before ECAM warning activation.*

SMOKE/FUMES/AVNCS SMOKE (CONT'D)

R ● **IF AIR COND SMOKE SUSPECTED :**

– APU BLEED ..... OFF

– BLOWER and EXTRACT ..... AUTO

Note : When both BLOWER and EXTRACT are in the OVRD position, a single pack may not be able to maintain the cabin pressure.

– PACK 1 ..... OFF

● **If smoke continues :**

– PACK 1 ..... ON

– PACK 2 ..... OFF

– CRG FWD (AFT) ISOL VALVE ◁ ..... OFF

To prevent a cargo smoke warning from being triggered due to cabin smoke.

● **If smoke still continues :**

– PACK 2 ..... ON

Restore normal configuration if PACK 2 is not suspected to cause smoke.

– BLOWER and EXTRACT ..... OVRD

– SMOKE/FUMES REMOVAL ..... CONSIDER

R ● **IF CABIN EQUIPMENT SMOKE SUSPECTED :**

● **If smoke continues :**

– EMER EXIT LIGHT ..... ON

– COMMERCIAL ..... OFF

– SMOKE DISSIPATION ..... CHECK

– FAULTY EQPT ..... SEARCH/ISOLATE

Once the cabin has been secured, try to find the smoke source and isolate it. Cabin lights, reading lights, passenger systems, galleys have dedicated control C/B in the cabin or cockpit.

● **If smoke still continues or if faulty equipment confirmed isolated :**

– COMMERCIAL ..... NORM

– SMOKE/FUMES REMOVAL ..... CONSIDER

At any time of the procedure, considered applying the SMOKE/FUMES REMOVAL procedure.



SMOKE/FUMES/AVNCS SMOKE (CONT'D)

● **IF SMOKE SOURCE CANNOT BE DETERMINED AND STILL CONTINUES OR AVNCS/ELECTRICAL SMOKE SUSPECTED :**

Consider shedding the AC BUS bar on one side. Then, if unsuccessful, on the other. When it is clear that the shedded side is not involved, reconnect it.

● **Shed AC BUS 1 as follows :**

– GEN 2 ..... CHECK ON
– ELEC page ..... SELECT
– BUS TIE ..... OFF

The BUS TIE OFF caution is triggered after 5 seconds.

– AC ESS FEED ..... ALTN

This action avoids autopilot and autothrust disconnection during electrical transients.

R – GEN 1 ..... OFF

Note : If this electrical configuration is maintained, the Captain's total Air Temperature and Angle Of Attack, and pitot are not de-iced. PFD1 and STBY instruments may display erroneous data in icing conditions. Use PFD2.

– SMOKE DISSIPATION ..... CHECK

● **If smoke continues :**

– GEN 1 ..... ON
– AC ESS FEED ..... NORM

● **Shed AC BUS 2 as follows :**

– GEN 1 ..... CHECK ON
– ELEC page ..... SELECT
– BUS TIE ..... CHECK OFF
– AC ESS FEED ..... CHECK NORM
– GEN 2 ..... OFF

R *PFD2, ND2 and lower ECAM are lost*

– SMOKE DISSIPATION ..... CHECK

● **If smoke continues :**

– GEN 2 ..... ON

R – BUS TIE ..... AUTO

– SMOKE/FUMES REMOVAL ..... CONSIDER

R – ELEC EMER CONFIG ..... CONSIDER



SMOKE/FUMES/AVNCS SMOKE (CONT'D)

R

● **IF SMOKE disappears within 5 minutes :**

– NORMAL VENTILATION . . . . . RESTORE

To set EMER ELEC CONFIG :

– EMER ELEC GEN 1 LIN . . . . . OFF

GEN 1 LINE contactor opens. GEN 1 remains running and supplies one fuel pump in each wing tank. AC BUS 1 is supplied by GEN 2 through the bus tie contactor.

– EMER ELEC PWR . . . . . MAN ON

RAT is extended and the emer gen is connected to the aircraft network. Check emergency generator parameters on the ECAM ELEC page (displayed automatically).

● **WHEN EMER GEN AVAIL :**

– APU GEN . . . . . OFF

– GEN 2 . . . . . OFF

ELEC **EMER CONFIG**

MIN RAT SPEED . . . . . 140 KT

Note : *The electrical configuration is the same as for loss of both generators (except that one fuel pump in each wing tank remains supplied).*

– VHF 1/HF 1ATC 1 . . . . . USE

Only VHF 1, HF 1 and ATC 1 are supplied in this configuration. Notify the ATC of the nature of the emergency, and state intentions. If there is no contact with the ATC, switch to code A7700, or transmit a distress message on one of the following frequencies : VHF 121.5 MHz, HF 2182 kHz, or 8364 kHz.



SMOKE/FUMES/AVNCS SMOKE (CONT'D)

– FAC 1 . . . . . OFF THEN ON

Rudder trim is recovered, despite the fact that no indication is available.

● **BEFORE L/G EXTENSION**

Restore normal electrical supply for landing.

– GEN 2 . . . . . ON

– EMER ELEC GEN 1 LIN . . . . . ON

F/CTL ALTN LAW

(PROT LOST)

Flight control normal laws and associated protections are lost. Only the load factor limitation, and the high and low speed stability remain (ALTN law with reduced protection).

MAX SPEED . . . . . 320 KT

Note : The "EPR MODE FAULT N1 DEGRADED MODE" warning is triggered.

STATUS

ECAM lower display is not available. STATUS page is displayed on the upper ECAM display, as long as the STATUS pushbutton is pressed.

MIN RAT SPEED . . . . . 140 KT

MAX SPEED . . . . . 320 KT

MAX BRK PR . . . . . 1000 PSI



SMOKE/FUMES/AVNCS SMOKE (CONT'D)

STATUS

– FOR LDG . . . . . USE FLAPS 3
– GPWS LDG FLAP 3 . . . . . ON
APPR SPD . . . . . VREF + 10 KT
LDG DIST PROC . . . . . APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80
ENG 1 + 2 APPR IDLE ONLY
ENG 1 + 2 N1 DEGRADED MODE
(IAE–powered aircraft ◁)
ALTN LAW : PROT LOST
WHEN L/G DN : DIRECT LAW
CTR TK (◁) FUEL UNUSABLE
INCREASED FUEL CONSUMP
SLATS/FLAPS SLOW
CAT 1 ONLY
APPR PROC

- **BEFORE L/G EXTENSION**
  – GEN 2 . . . . . ON
  – EMER ELEC GEN 1 LINE . . . . . ON
- **After recovery of normal electrical supply, the following STATUS will be displayed :**

  MIN RAT SPEED . . . . . 140 KT
  Will disappear at landing gear extension.
  MAX SPEED . . . . . 320 KT
  – FOR LDG . . . . . USE FLAPS 3
  – GPWS LDG FLAP 3 . . . . . ON
  Will be displayed when flaps in CONF3.
  APPR SPD . . . . . VREF + 10 KT
  LDG DIST PROC . . . . . APPLY
  Refer to the QRH Part 2, or to the FCOM 3.02.80
  ALTN LAW : PROT LOST
  Flight controls remain in alternate law, due to the loss of IR 2 and 3.
  WHEN L/G DN : DIRECT LAW
  At landing gear extension, control reverts to direct law in pitch, as well as in roll (refer to the DIRECT LAW procedure 3.02.27).

INOP SYS

See ELEC EMER CONFIG SYS REMAINING, 3.02.24 (except for fuel pumps)

SMOKE/FUMES/AVNCS SMOKE (CONT'D)

– APU MASTER switch (if APU not running) . . . . . OFF
With the APU master switch ON, the DC BAT BUS is supplied by the batteries.
– FAC 1 . . . . . OFF THEN ON
Rudder trim is recovered, despite the fact that no indication is available.
– LDG ELEV . . . . . MAN ADJUST
The LDG ELEV may be manually adjusted since, if the normal electrical supply is not restored before landing gear extension, the FMGC is no longer supplied.

● **BEFORE L/G EXTENSION**

Restore normal electrical supply for landing.
– GEN 2 . . . . . ON
– EMER ELEC GEN 1 LIN . . . . . ON

F/CTL ALTN LAW

(PROT LOST)
Flight control normal laws and associated protections are lost. Only the load factor limitation, and the high and low speed stability remain (ALTN law with reduced protection).
MAX SPEED . . . . . 320 KT
R *Note : The "EPR MODE FAULT N1 DEGRADED MODE" warning is triggered.*

STATUS

ECAM lower display is not available. STATUS page is displayed on the upper ECAM display, as long as STATUS pushbutton is pressed.
MIN RAT SPEED . . . . . 140 KT
MAX SPEED . . . . . 320 KT
MAX BRK PR . . . . . 1000 PSI

SMOKE/FUMES/AVNCS SMOKE (CONT'D)

STATUS

– FOR LDG . . . . . USE FLAPS 3
– GPWS LDG FLAP 3 . . . . . ON
APPR SPD . . . . . VREF + 10 KT
LDG DIST PROC . . . . . APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80
ENG 1 + 2 APPR IDLE ONLY
ENG 1 + 2 N1 DEGRADED MODE
(IAE–powered aircraft ◁)
ALTN LAW : PROT LOST
WHEN L/G DN : DIRECT LAW
CTR TK (◁) FUEL UNUSABLE
INCREASED FUEL CONSUMP
SLATS/FLAPS SLOW
CAT 1 ONLY
APPR PROC

- **BEFORE L/G EXTENSION**
  – GEN 2 . . . . . ON
  – EMER ELEC GEN 1 LINE . . . . . ON
- **After recovery of normal electrical supply, the following STATUS will be displayed :**

  MIN RAT SPEED . . . . . 140 KT
  Will disappear at landing gear extension.
  MAX SPEED . . . . . 320 KT
  – FOR LDG . . . . . USE FLAPS 3
  – GPWS LDG FLAP 3 . . . . . ON
  Will be displayed when flaps in CONF3.
  APPR SPD . . . . . VREF + 10 KT
  LDG DIST PROC . . . . . APPLY
  Refer to the QRH Part 2, or to the FCOM 3.02.80
  ALTN LAW : PROT LOST
  Flight controls remain in alternate law, due to the loss of IR 2 and 3.
  WHEN L/G DN : DIRECT LAW
  At landing gear extension, control reverts to direct law in pitch, as well as in roll (refer to the DIRECT LAW procedure 3.02.27).

INOP SYS

See ELEC EMER CONFIG SYS REMAINING, 3.02.24 (except for fuel pumps)

SMOKE/FUMES/AVNCS SMOKE (CONT'D)

– FAC 1 ..... OFF THEN ON

Rudder trim is recovered, despite the fact that no indication is available.

● **BEFORE L/G EXTENSION**

Restore normal electrical supply for landing.

– GEN 2 ..... ON

– EMER ELEC GEN 1 LIN ..... ON

F/CTL ALTN LAW

(PROT LOST)

Flight control normal laws and associated protections are lost. Only the load factor limitation, and the high and low speed stability remain (ALTN law with reduced protection).

MAX SPEED 320/.77

MANEUVER WITH CARE

MAX FL 350

STATUS

ECAM lower display is not available. STATUS page is displayed on the upper ECAM display, as long as the STATUS pushbutton is pressed.

MIN RAT SPEED ..... 140 KT

MAX SPEED 320/.77

MAX BRK PR ..... 1000 PSI



SMOKE/FUMES/AVNCS SMOKE (CONT'D)

STATUS

– FOR LDG . . . . . USE FLAPS 3
– GPWS LDG FLAP 3 . . . . . ON
APPR SPD . . . . . VREF + 10/140 KT
LDG DIST PROC . . . . . APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80
ENG 1 + 2 APPR IDLE ONLY
ALTN LAW : PROT LOST
MANEUVER WITH CARE
MAX FL : 350
WHEN L/G DN : DIRECT LAW
CTR TK FUEL UNUSABLE
INCREASED FUEL CONSUMP
SLATS/FLAPS SLOW
CAT 1 ONLY
APPR PROC

- **BEFORE L/G EXTENSION**
  – GEN 2 . . . . . ON
  – EMER ELEC GEN 1 LINE . . . . . ON
- **After recovery of normal electrical supply, the following STATUS will be displayed :**
  MIN RAT SPEED . . . . . 140 KT
  Will disappear at landing gear extension.
  MAX SPEED 320/.77
  – FOR LDG . . . . . USE FLAPS 3
  – GPWS LDG FLAP 3 . . . . . ON
  Will be displayed when flaps in CONF3.
  APPR SPD . . . . . VREF + 10/140 KT
  LDG DIST PROC . . . . . APPLY
  Refer to the QRH Part 2, or to the FCOM 3.02.80
  ALTN LAW : PROT LOST
  MANEUVER WITH CARE
  MAX FL : 350
  Flight controls remain in alternate law, due to the loss of IR 2 and 3.
  WHEN L/G DN : DIRECT LAW
  At landing gear extension, control reverts to direct law in pitch, as well as in roll (refer to the DIRECT LAW procedure 3.02.27).

INOP SYS

See ELEC EMER CONFIG SYS REMAINING, 3.02.24 (except for fuel pumps)

SMOKE/FUMES REMOVAL

R *Apply the SMOKE/FUMES REMOVAL paper procedure, if smoke/fumes become the greatest*
R *threat when applying the SMOKE/FUMES/AVNICS SMOKE paper procedure.*

– EMER EXIT LIGHT . . . . . ON

● **If fuel vapors :**

– CAB FANS . . . . . ON

The recirculating air ventilates the air mixer bay and other fuselage area. This prevents fuel vapors from accumulating and the risk of explosion. Passenger health is not affected.

– PACK 1+2 . . . . . OFF

● **If no fuel vapors :**

– CAB FANS . . . . . OFF

To prevent smoke from entering the cockpit and cabin.

– PACK FLOW . . . . . HI

To provide maximum airflow from the packs.

Do not shut down the air conditioning packs, and do not reduce ventilation in an attempt to smother the fire.

Do not deploy oxygen masks, if fire is suspected in the cabin.

– LDG ELEV . . . . . 10000 FT/MEA

– DESCENT (FL 100, or MEA, or minimum obstacle clearance altitude) . . . . . INITIATE

The most effective means of smoke removal is use of ram air. Therefore, descent is initiated to FL100, or the MEA, or the minimum obstacle clearance altitude, while the cabin altitude is increased to 10 000 feet or the MEA.

The increase in cabin altitude also reduces, at least temporarily, the smoke concentration.

Cabin depressurization starts, when descent is initiated.

Passenger oxygen, as required by regulation.

– ATC . . . . . NOTIFY

– SMOKE/FUMES/AVNCS SMOKE PROC . . . . . CONTINUE

While descending, continue applying the appropriate steps of the SMOKE/FUMES/AVNCS SMOKE procedure depending on the suspected smoke source.



SMOKE/FUMES REMOVAL (CONT'D)

- **At FL100, or MEA :**
  - **If electrical emergency configuration :**
    - – APU MASTER SW ..... ON

      In electrical emergency configuration, when the APU MASTER switch is ON, the battery contactors will automatically close for a maximum of 3 minutes. This will enable the flight crew to manually control the outflow valves that are powered by the DC BAT BUS.
    - – PACKS 1 + 2 ..... OFF

      In electrical emergency configuration, PACK 2 isolation valve is not powered.
    - – MODE SEL ..... MAN
    - – MAN V/S CTL ..... FULL UP
    - – RAM AIR ..... ON

      At FL100, or MEA, or minimum obstacle clearance altitude, it is possible to open the RAM AIR valve when $\triangle P$ is 1 psi or below. Opening the RAM AIR enables flying with both packs OFF.
    - – APU MASTER SW ..... OFF
  - **If smoke persists, open CKPT window :**

    If there is smoke in the cockpit, open the cockpit (CKPT) window to evacuate the smoke.

    MAX SPEED ..... 200 KT
    - – COCKPIT DOOR ..... OPEN
    - – HEADSETS ..... ON
    - – PNF COCKPIT WINDOW ..... OPEN
    - **When window is open :**
      - – NON-AFFECTED PACK(s) ..... ON
      - – VISUAL WARNINGS (noisy CKPT) ..... MONITOR

        Due to the increased noise level, pay particular attention to visual warnings.
      - – SMOKE/FUMES/AVNCS SMOKE PROC ... CONTINUE

        Continue applying the appropriate steps of the SMOKE/FUMES/AVNCS SMOKE paper procedure depending on the suspected smoke source.

SMOKE/FUMES REMOVAL

R *Apply the SMOKE/FUMES REMOVAL paper procedure, if smoke/fumes become the greatest*
R *threat when applying the SMOKE/FUMES/AVNICS SMOKE paper procedure.*

– EMER EXIT LIGHT . . . . . ON

● **If fuel vapors :**

– CAB FANS . . . . . ON

The recirculating air ventilates the air mixer bay and other fuselage area. This prevents fuel vapors from accumulating and the risk of explosion. Passenger health is not affected.

– PACK 1+2 . . . . . OFF

● **If no fuel vapors :**

– CAB FANS . . . . . OFF

To prevent smoke from entering the cockpit and cabin.

– HI FLOW . . . . . ON

To provide maximum airflow from the packs.

Do not shut down the air conditioning packs, and do not reduce ventilation in an attempt to smother the fire.

Do not deploy oxygen masks, if fire is suspected in the cabin.

– LDG ELEV . . . . . 10000 FT/MEA

– DESCENT (FL 100, or MEA, or minimum obstacle clearance altitude) . . . . . INITIATE

The most effective means of smoke removal is use of the ram air. Therefore, descent is initiated to FL100, or the MEA, or the minimum obstacle clearance altitude, while the cabin altitude is increased to 10 000 feet or the MEA.

The increase in cabin altitude also reduces, at least temporarily, the smoke concentration.

Cabin depressurization starts when descent is initiated.

Passenger oxygen, as required by regulation.

– ATC . . . . . NOTIFY

– SMOKE/FUMES/AVNCS SMOKE PROC . . . . . CONTINUE

While descending, continue applying the appropriate steps of the SMOKE/FUMES/AVNCS SMOKE paper procedure depending on the suspected smoke source.



SMOKE/FUMES REMOVAL (CONT'D)

- **At FL100, or MEA :**
  - **If electrical emergency configuration :**
    - APU MASTER SW ..... ON

      In electrical emergency configuration, when the APU MASTER switch is ON, the battery contactors will automatically close for a maximum of 3 minutes. This will enable the flight crew to manually control the outflow valves that are powered by the DC BAT BUS.
    - PACKS 1 + 2 ..... OFF

      In electrical emergency configuration, PACK 2 isolation valve is not powered.
    - MODE SEL ..... MAN
    - MAN V/S CTL ..... FULL UP
    - RAM AIR ..... ON

      At FL100, or MEA, or minimum obstacle clearance altitude, it is possible to open the RAM AIR valve when $\triangle P$ is 1 psi or below. Opening the RAM AIR enables flying with both packs OFF.
    - APU MASTER SW ..... OFF
  - **If smoke persists, open CKPT window :**

    If there is smoke in the cockpit, open the cockpit (CKPT) window to evacuate the smoke.

    MAX SPEED ..... 200 KT
    - COCKPIT DOOR ..... OPEN
    - HEADSETS ..... ON
    - PNF COCKPIT WINDOW ..... OPEN
    - **When window is open :**
      - NON-AFFECTED PACK(s) ..... ON
      - VISUAL WARNINGS (noisy CKPT) ..... MONITOR

        Due to the increased noise level, pay particular attention to visual warnings.
      - SMOKE/FUMES/AVNCS SMOKE PROC ... CONTINUE

        Continue applying the appropriate steps of the SMOKE/FUMES/AVNCS SMOKE paper procedure depending on the suspected smoke source.

SMOKE FWD (AFT) CARGO SMOKE

LAND ASAP

– AGENT . . . . . DISCH

If the SMOKE warning is displayed on ground, with the cargo doors open, do not initiate AGENT DISCH. Request the ground crew to investigate and eliminate the smoke source.

Note : Expect the SMOKE warning to remain after agent discharge, even if the smoke source is extinguished. Gases from the smoke source are not evacuated, and smoke detectors are also sensitive to the extinguishing agent.
order the ground crew not to open the door of the affected cargo compartment, unless the passengers have disembarked and fire services are present.

CARGO SMOKE FWD (AFT) BTL SQUIB FAULT

Crew awareness.

R *Fire extinguishing capability is lost in the FWD (AFT) cargo compartment.*

SMOKE FWD (AFT) CRG DET FAULT

Crew awareness.

SMOKE LAV + CRG DET FAULT

Crew awareness.

SMOKE LAVATORY SMOKE

Crew awareness.

R *Communication must be established with the cabin crew in order to follow up on the smoke*
R *origin and dissipation.*
R *Consider applying the SMOKE/FUMES/AVNCS SMOKE paper procedure.*

SMOKE LAVATORY DET FAULT

Toilet smoke detection is lost.

Crew awareness.

STATUS

| INOP SYS
LAV DET

SMOKE FWD (AFT) CARGO SMOKE

LAND ASAP

Note : If the warning has been displayed temporarily, and no crew action has been taken, normal cargo ventilation may be recovered when ventilation is required for livestock transportation :
C/B of CARGO VENT controller (S20 on 122VU, or C7 on 49VU, as installed ..... PULL then PUSH

– AFT ISOL VALVE (if aft affected) . . . . . OFF
If not automatically closed :

– AGENT . . . . . DISCH
If the SMOKE warning is displayed on the ground with the cargo doors open, do not initiate AGENT DISCH. Request the ground crew to investigate and eliminate the smoke source.

Note : Expect the SMOKE warning to remain after agent discharge, even if the smoke source is extinguished. Gases from the smoke source are not evacuated, and smoke detectors are also sensitive to the extinguishing agent.
Order the ground crew not to open the door of the affected cargo compartment, unless the passengers have disembarked and fire services are present.

STATUS

INOP SYS
AFT CRG VENT
AFT CRG HEAT◁ (if aft affected)

CARGO SMOKE FWD (AFT) BTL SQUIB FAULT

Crew awareness.

R *Fire extinguishing capability is lost in the FWD (AFT) cargo compartment.*

SMOKE FWD (AFT) CRG DET FAULT

● **IF NO LIVE STOCK :**

– AFT ISOL VALVE (if aft affected) . . . . . OFF

STATUS

INOP SYS
FWD (AFT) CRG DET

SMOKE LAV + CRG DET FAULT

Both SDCU channels fail. Cargo and toilet smoke detection are lost.

● **IF NO LIVE STOCK :**

– AFT ISOL VALVE . . . . . OFF

STATUS

| INOP SYS
SDCU

SMOKE LAVATORY SMOKE

Crew awareness.

R *Communication must be established with the cabin crew in order to follow up on the smoke*
R *origin and dissipation.*
R *Consider applying the SMOKE/FUMES/AVNCS SMOKE paper procedure.*

SMOKE LAVATORY DET FAULT

Toilet smoke detection is lost.

Crew awareness.

STATUS

| INOP SYS
LAV DET

SMOKE FWD (AFT) CARGO SMOKE

LAND ASAP

Note : If the warning has been displayed temporarily, and no crew action has been taken, normal cargo ventilation may be recovered when ventilation is required for livestock transportation :
C/B of CARGO VENT controller (S20 on 122VU, or C7 on 49VU, as installed) ..... PULL then PUSH

– FWD (AFT) ISOL VALVE ..... OFF

If not automatically closed :

– AGENT ..... DISCH

If the SMOKE warning is displayed on ground, with the cargo doors open, do not initiate AGENT DISCH. Request the ground crew to investigate and eliminate the smoke source.

Note : Expect the SMOKE warning to remain after agent discharge, even if the smoke source is extinguished. Gases from the smoke source are not evacuated, and smoke detectors are also sensitive to the extinguishing agent.
Order the ground crew not to open the door of the affected cargo compartment, unless the passengers have disembarked and fire services are present.

STATUS

INOP SYS
FWD CRG VENT (AFT)
FWD CRG HEAT (AFT)

SMOKE FWD (AFT) CRG BTL (1)(2◁) FAULT

Crew awareness.

R *If bottle 1 is lost, fire extinguishing capability is lost in the FWD (AFT) cargo compartment.*

R *If bottle 2 is lost, agent concentration will not be ensured after fire extinguishing.*

SMOKE FWD (AFT) CRG DET FAULT

● **IF NO LIVE STOCK :**

– FWD (AFT) ISOL VALVE ..... OFF

STATUS

INOP SYS
FWD (AFT) CRG DET

SMOKE LAV + CRG DET FAULT

● **IF NO LIVE STOCK :**

– AFT ISOL VALVE . . . . . OFF

STATUS

| INOP SYS
| SMOKE DET

SMOKE LAVATORY SMOKE

Crew awareness.

Communication must be established with the cabin crew in order to follow up on the smoke origin and dissipation.

Consider applying the SMOKE/FUMES/AVNCS SMOKE paper procedure.

SMOKE LAVATORY DET FAULT

Toilet smoke detection is lost.

Crew awareness.

STATUS

| INOP SYS
| LAV DET

SMOKE FWD (AFT) CARGO SMOKE

LAND ASAP

Note : If the warning has been displayed temporarily, and no crew action has been taken, normal cargo ventilation may be recovered when ventilation is required for livestock transportation :
C/B of CARGO VENT controller (S20 on 122VU, or C7 on 49VU, as installed) ..... PULL then PUSH

– AFT ISOL VALVE (if aft affected) . . . . . OFF
– CAB FANS . . . . . OFF

● **IF FWD (AFT) CRG CLOSED (displayed on ground only)**

Order the ground crew not to open the door of the affected cargo compartment, unless the passengers have disembarked and fire services are present. Also ensure that the FWD (AFT) cargo door is closed before discharging the extinguishing agent.
If not automatically closed :

– AGENT . . . . . DISCH

Note : Expect the SMOKE warning to remain after agent discharge, even if the smoke source is extinguished. Gases from the smoke source are not evacuated, and smoke detectors are also sensitive to the extinguishing agent.

STATUS

INOP SYS
AFT CRG VENT
AFT CRG HEAT ◁ (if aft affected)

SMOKE FWD (AFT) CRG BTL (1)(2◁) FAULT

Crew awareness.
If bottle 1 is lost, fire extinguishing capability is lost in the FWD (AFT) cargo compartment.
If bottle 2 is lost, agent concentration will not be ensured after fire extinguishing.

SMOKE FWD (AFT) CRG DET FAULT

● **IF NO LIVE STOCK :**
– AFT ISOL VALVE (if aft affected) . . . . . OFF

STATUS

INOP SYS
FWD (AFT) CRG DET

SMOKE LAV + CRG DET FAULT

Crew awareness.

STATUS

| INOP SYS
| SMOKE DET

SMOKE LAVATORY SMOKE

– CKPT/CAB COM . . . . . ESTABLISH

Communication must be established with the cabin crew in order to follow up on the smoke origin and dissipation.

Consider applying the SMOKE/FUMES/AVNCS SMOKE paper procedure.

SMOKE LAVATORY DET FAULT

Toilet smoke detection is lost.

Crew awareness.

STATUS

| INOP SYS
| LAV DET

F/CTL FLAPS FAULT/LOCKED

● **If flaps locked :**

– WING TIP BRK ON or ALIGNMENT FAULT

– MAX SPEED . . . . . See page 3

Limit speed to the VFE corresponding to the next flap position.

– FLAPS LEVER (if flaps not locked) . . . . . RECYCLE

● **If unsuccessful :**

See FCOM 3.02.10 for LANDING WITH SLATS OR FLAPS JAMMED.

The autopilot may be used down to 500 feet AGL. As it is not tuned for the abnormal configurations, its behaviour can be less than optimum and must be monitored.

STATUS

APPR PROC

– FOR LDG (if flaps ≤ 3) . . . USE FLAP 3

Do not select CONF FULL so as not to degrade handling qualities.

– FLAPS (if flaps>3) .. KEEP CONF FULL

– GPWS FLAP MODE (if flaps < 3) . OFF

– GPWS LDG FLAP 3 (if flaps ≥ 3) . . ON

APPR SPD . . . . . See page 3

R LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

ENG 1 APPR IDLE ONLY (only in case of FLAPS FAULT)

ENG 2 APPR IDLE ONLY (only in case of FLAPS FAULT)

INCREASED FUEL CONSUMP (see page 3)

CAT 1 ONLY (a)

INOP SYS

FLAPS

AP 1+2 (a)

A/THR (a)

Moreover, both FDs are lost (a)

(a) If both flap channels fault.

F/CTL SLATS FAULT/LOCKED

– WING TIP BRK ON (if slats locked)
– MAX SPEED . . . . . See page 3
Speed is limited to the VFE corresponding to the next slat position.
– FLAPS LEVER (if slats not locked) . . . . . RECYCLE

● **If unsuccessful** :

See FCOM 3.02.10 for LANDING WITH SLATS OR FLAPS JAMMED.
The autopilot may be used down to 500 feet AGL. As it is not tuned for the abnormal configurations, its behavior could be less than optimum and must be monitored.
Note : If there is a SLATS FAULT after both slat channels fail, alternate law becomes active (see associated procedure).

● **If slats not at zero** :

– FUEL MODE SEL . . . . . MAN
To allow CTR TK feeding.
– CTR TK PUMPS . . . . . AS RQRD
Set CTR TK PUMPS to OFF when CTR TK is empty or during approach.

STATUS

APPR PROC

– FOR LDG . . . . . USE FLAP 3
Do not select CONF FULL, so as not to degrade handling qualities.
– CTR TK PUMPS . . . . . OFF
– GPWS LDG FLAP 3 . . . . . ON
APPR SPD . . . . . See page 3
R LDG DIST PROC . . . . . APPLY
R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*
CTR TK FEED : MAN ONLY

● **If both slat channels fail** :

ALTN LAW : PROT LOST
WHEN L/G DN : DIRECT LAW
INCREASED FUEL CONSUMP (see page 3)
CAT 1 ONLY (a)

INOP SYS
F/CTL PROT (a)
SLATS
AP 1 + 2 (a)
A/THR (a)
Moreover, both FDs are lost (a).

(a) If both slat channels fail.

F/CTL FLAPS FAULT/LOCKED

● **If flaps locked :**

– WING TIP BRK ON or ALIGNMENT FAULT

– MAX SPEED . . . . . See page 3

Limit speed to the VFE corresponding to the next flap position.

– FLAPS LEVER (if flaps not locked) . . . . . RECYCLE

● **If unsuccessful :**

See FCOM 3.02.10 for LANDING WITH SLATS OR FLAPS JAMMED.

The autopilot may be used down to 500 feet AGL. As it is not tuned for the abnormal configurations, its behaviour can be less than optimum and must be monitored.

STATUS

APPR PROC

– FOR LDG (if flaps ≤ 3) . . . USE FLAP 3

Do not select CONF FULL so as not to degrade handling qualities.

– FLAPS (if flaps>3) .. KEEP CONF FULL

– GPWS FLAP MODE (if flaps < 3) . OFF

– GPWS LDG FLAP 3 (if flaps ≥ 3) . . ON

APPR SPD . . . . . See page 3

R LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

ENG 1 APPR IDLE ONLY (only in case of FLAPS FAULT)

ENG 2 APPR IDLE ONLY (only in case of FLAPS FAULT)

INCREASED FUEL CONSUMP (see page 3)

CAT 1 ONLY (a)

INOP SYS

FLAPS

AP 1+2 (a)

A/THR (a)

Moreover, both FDs are lost (a)

(a) If both flap channels fault.

F/CTL SLATS FAULT/LOCKED

– WING TIP BRK ON (if slats locked)
– MAX SPEED . . . . . See page 3
Speed is limited to the VFE corresponding to the next slat position.
– FLAPS LEVER (if slats not locked) . . . . . RECYCLE
● **If unsuccessful** :
See FCOM 3.02.10 for LANDING WITH SLATS OR FLAPS JAMMED.
The autopilot may be used down to 500 feet AGL. As it is not tuned for the abnormal configurations, its behavior could be less than optimum and must be monitored.
Note : 1. If there is a SLATS FAULT after both slat channels fail, alternate law becomes active (see associated procedure).
2. If the slats are locked in clean configuration (<18°), alternate law without protection is selected.
● **If slats not at zero** :
– FUEL MODE SEL . . . . . MAN
To allow CTR TK feeding.
– CTR TK PUMPS . . . . . AS RQRD
Set CTR TK PUMPS to OFF when CTR TK is empty or during approach.

STATUS

APPR PROC
– FOR LDG . . . . . USE FLAP 3
Do not select CONF FULL, so as not to degrade handling qualities.
– CTR TK PUMPS . . . . . OFF
– GPWS LDG FLAP 3 . . . . . ON
APPR SPD . . . . . See page 3
R LDG DIST PROC . . . . . APPLY
R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*
CTR TK FEED : MAN ONLY
● **If both slat channels fail or slats are locked in clean configuration** :
ALTN LAW : PROT LOST
WHEN L/G DN : DIRECT LAW
INCREASED FUEL CONSUMP (see page 3)
CAT 1 ONLY (a)

INOP SYS
F/CTL PROT (a)
SLATS
AP 1 + 2 (a)
A/THR (a)
Moreover, both FDs are lost (a).

(a) If both slat channels fail.

FLAPS/SLATS FAULT/LOCKED

R

MAX SPEED

Flaps (1) / Slats (1)	F = 0	0 < F ≤ 1	1 < F ≤ 2	2 < F ≤ 3	F > 3
S = 0	NO LIMITATION	215 kt	200 kt	185 kt	Not allowed (177 kt)
0 < S ≤ 1	230 kt				
1 < S ≤ 3	200 kt				
S > 3	177 kt				

APPR SPD

Flaps (1) / Slats (1)	F = 0	0 < F < 1	1 ≤ F < 2	2 ≤ F < 3	F ≥ 3
S = 0	VREF + 60 (Appr) VREF + 50 (Touch Down)	VREF + 45	VREF + 30	VREF + 25	(FLAPS > 3 not allowed) VREF + 25
0 < S < 1					
1 ≤ S ≤ 3	VREF + 25		VREF + 15	VREF + 10	VREF + 10
S > 3					VREF + 5

(1) Slats/Flaps position displayed on the upper ECAM display.

CAUTION

For flight with SLATS or FLAPS extended, fuel consumption is increased.
Refer to the fuel flow indication.
As a guideline, determine the fuel consumption in clean configuration, at the same altitude without airspeed limitation (e.g. from ALTERNATE FLIGHT PLANNING tables), and multiply this result by 1.6 (SLATS EXTENDED), or 1.8 (FLAPS EXTENDED), or 2 (SLATS and FLAPS EXTENDED) to obtain the fuel consumption required to reach the destination in the current configuration.

SLATS and FLAPS FAULT in Conf 0

– FLAPS LEVER . . . . . RECYCLE

● **If both slat channels fail :**

F/CTL ALTN LAW

(PROT LOST)
MAX SPEED . . . . . 320 KT

STATUS

R ● **If both slat channels fail :**
R MAX SPEED . . . . . 320 KT
R ALTN LAW : PROT LOST

APPR PROC
– FOR LDG . . . . . USE FLAP 1
With FLAPS lever set at 1, AP/FD GO AROUND mode is available.
– CTR TK PUMPS . . . . . OFF
– GPWS FLAP MODE . . . . . OFF
APPR SPD . . . . . VREF + 60 KT
Approach with A/THR in selected mode is recommended.

R ● **If both slat channels fail :**
WHEN L/G DN : DIRECT LAW
● **AT 300 FT AGL :**
TARGET SPD . . . . . VREF + 50
Reduce speed between 500 and 300 feet to reach VREF + 50 knots at runway threshold and disconnect A/THR, as the target speed may be below VLS.
LDG DIST PROC . . . . . APPLY
Refer to the QRH Part 2 or, to the FCOM 3.02.80.
ENG 1 APPR IDLE ONLY (b)
R ENG 2 APPR IDLE ONLY (b)
CAT 1 ONLY (a)

INOP SYS
F/CTL PROT (c)
SLATS
FLAPS
AP 1 + 2 (a)
A/THR (a)
Moreover, both FDs are lost (a)

(a) If both slat or flap channels fail.
(b) only in case of FLAPS FAULT.
(c) If both slat channels fail.

FLAPS/SLATS FAULT/LOCKED

R

MAX SPEED

Flaps (1) / Slats (1)	F = 0	0 < F ≤ 1	1 < F ≤ 2	2 < F ≤ 3	F > 3
S = 0	NO LIMITATION	215 kt	200 kt	185 kt	Not allowed (177 kt)
0 < S ≤ 1	230 kt				
1 < S ≤ 3	200 kt				
S > 3	177 kt				

R

APPR SPD

Flaps (1) / Slats (1)	F = 0	0 < F < 1	1 ≤ F < 2	2 ≤ F < 3	F ≥ 3
S = 0	VREF + 60 (Appr) VREF + 50 (Touch Down)	VREF + 45	VREF + 30	VREF + 25	(FLAPS > 3 not allowed) VREF + 25
0 < S < 1					
1 ≤ S ≤ 3	VREF + 25		VREF + 15	VREF + 10	VREF + 10
S > 3					VREF + 5

(1) Slats/Flaps position displayed on the upper ECAM display.

CAUTION

For flight with SLATS or FLAPS extended, fuel consumption is increased.
Refer to the fuel flow indication.
As a guideline, determine the fuel consumption in clean configuration, at the same altitude without airspeed limitation (e.g. from ALTERNATE FLIGHT PLANNING tables), and multiply this result by 1.6 (SLATS EXTENDED), or 1.8 (FLAPS EXTENDED), or 2 (SLATS and FLAPS EXTENDED) to obtain the fuel consumption required to reach the destination in the current configuration.

SLATS and FLAPS FAULT in Conf 0

– FLAPS LEVER . . . . . RECYCLE

● **If both slat channels fail :**

F/CTL ALTN LAW

(PROT LOST)
MAX SPEED . . . . . 320 KT

STATUS

R ● **If both slat channels fail :**
R MAX SPEED . . . . . 320 KT
R ALTN LAW : PROT LOST

APPR PROC
– FOR LDG . . . . . USE FLAP 1
With FLAPS lever set at 1, AP/FD GO AROUND mode is available.
– CTR TK PUMPS . . . . . OFF
– GPWS FLAP MODE . . . . . OFF
APPR SPD . . . . . VREF + 60 KT
Approach with A/THR in selected mode is recommended.

R ● **If both slat channels fail :**
WHEN L/G DN : DIRECT LAW
● **AT 300 FT AGL :**
TARGET SPD . . . . . VREF + 50
Reduce speed between 500 and 300 feet to reach VREF + 50 knots at runway threshold and disconnect A/THR, as the target speed may be below VLS.
LDG DIST PROC . . . . . APPLY
Refer to the QRH Part 2 or, to the FCOM 3.02.80.
ENG 1 APPR IDLE ONLY (b)
R ENG 2 APPR IDLE ONLY (b)
CAT 1 ONLY (a)

INOP SYS
F/CTL PROT (c)
SLATS
FLAPS
AP 1 + 2 (a)
A/THR (a)
Moreover, both FDs are lost (a)

(a) If both slat or flap channels fail.
(b) only in case of FLAPS FAULT.
(c) If both slat channels fail.

FLAPS/SLATS FAULT/LOCKED

R

MAX SPEED

Flaps (1) / Slats (1)	F = 0	0 < F ≤ 1	1 < F ≤ 2	2 < F ≤ 3	F > 3
S = 0	NO LIMITATION	215 kt	200 kt	185 kt	Not allowed (177 kt)
0 < S ≤ 1	230 kt				
1 < S ≤ 3	200 kt				
S > 3	177 kt				

R

APPR SPD

Flaps (1) / Slats (1)	F = 0	0 < F < 1	1 ≤ F < 2	2 ≤ F < 3	F ≥ 3
S = 0	VREF + 65 (Appr) VREF + 55 (Touch Down)	VREF + 45	VREF + 40	VREF + 30	(FLAPS > 3 not allowed) VREF + 30
0 < S < 1					
1 ≤ S ≤ 3	VREF + 35		VREF + 15	VREF + 10	VREF + 10 FLAPS = 3 FLAPS > 3
S > 3					VREF + 5

(1) Slats/Flaps position displayed on the upper ECAM display.

CAUTION

For flight with SLATS or FLAPS extended, fuel consumption is increased.
Refer to the fuel flow indication.
As a guideline, determine the fuel consumption in clean configuration, at the same altitude without airspeed limitation (e.g. from ALTERNATE FLIGHT PLANNING tables), and multiply this result by 1.6 (SLATS EXTENDED), or 1.8 (FLAPS EXTENDED), or 2 (SLATS and FLAPS EXTENDED) to obtain the fuel consumption required to reach the destination in the current configuration.

SLATS and FLAPS FAULT in Conf 0

– FLAPS LEVER . . . . . RECYCLE

● **If both slat channels fail :**

F/CTL ALTN LAW

(PROT LOST)
MAX SPEED 320/.77
MANEUVER WITH CARE
MAX FL 350

STATUS

MAX SPEED 320/.77
MANEUVER WITH CARE
MAX FL : 350

APPR PROC
– FOR LDG . . . . . USE FLAP 1
If FLAPS at 1, AP/FD GO AROUND mode available.
– CTR TK PUMPS . . . . . OFF
– GPWS FLAP MODE . . . . . OFF
APPR SPD . . . . . VREF + 65 KT
Approach with A/THR in selected mode is recommended.
● **If both slat channels fail :**
ALTN LAW : PROT LOST
WHEN L/G DN : DIRECT LAW
● **AT 300 FT AGL :**
TARGET SPD . . . . . VREF + 55
Reduce speed between 500 and 300 feet to reach VREF + 55 knots at runway threshold, and disconnect A/THR, as the target speed may be below VLS.
LDG DIST PROC . . . . . APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80.
ENG 1 APPR IDLE ONLY (b)
R ENG 2 APPR IDLE ONLY (b)
CAT 1 ONLY (a)

INOP SYS
F/CTL PROT (c)
SLATS
FLAPS
AP 1 + 2 (a)
A/THR (a)
Moreover, both FDs are lost (a)

(a) If both slat or flap channels fail.
(b) Only in case of FLAPS FAULT.
(c) If both slat channels fail.

F/CTL SLAT SYS 1(2) FAULT

Crew awareness

	STATUS
SLATS SLOW	I

F/CTL FLAP SYS 1(2) FAULT

- **If FLAP sys 1 fault**
  - GPWS FLAP MODE . . . . . OFF

	STATUS
ENG 1(2) APPR IDLE ONLY	
FLAPS SLOW	I

F/CTL SLAT (FLAP) TIP BRK FAULT

Failure of one slat or flap wingtip brake.

Crew awareness

F/CTL L (R) SIDESTICK FAULT

Crew awareness

F/CTL FLAP ATTACH SENSOR

Failure of flap attachment failure detection sensor.

Crew awareness

R

CONFIG SLATS (FLAPS) NOT IN T.O CONFIG

R Crew awareness.

F/CTL ELAC 1 (2) FAULT

■ **One computer failed :**

CAUTION

Do not reset ELAC, if uncommanded maneuvers occurred during the flight.

– ELAC (affected) . . . . . OFF THEN ON

Note : 1. In some sidestick transducer failure cases, ELAC 1(2) FAULT is triggered without the proc., and FAULT lt on associated pb does not come on.

2. ELAC FAULT may be triggered during engine start, due to the electrical transient. To recover the affected ELAC on the ground, if the reset was unsuccessful, switch OFF the G, Y and B HYD PUMPS (PARKING BRK ON), wait 1minute, then reset the ELAC pushbutton. After 8 seconds (end of power up test indicated by the disappearance of the ELAC FAULT warning), switch the G, Y and B HYD PUMPS to ON/AUTO.

R R *3. If the ELAC 1 computer is reset on ground, the pitch trim returns to the ground setting position (0°).*

● **IF UNSUCCESSFUL :**

– ELAC (affected) . . . . . OFF

Functions are performed by the other ELAC. LAF is degraded (A320 with LAF only).

STATUS

	INOP SYS
CAT 3 SINGLE ONLY	ELAC 1(2) CAT 3 DUAL

■ **Both computers failed :**

– ELAC 1 . . . . . OFF THEN ON

R R *Note : If the ELAC 1 computer is reset on ground, the pitch trim returns to the ground setting position (0°).*

– ELAC 2 . . . . . OFF THEN ON

● **If both ELAC FAULT remain :**

– ELAC 1 . . . . . OFF

– ELAC 2 . . . . . OFF

F/CTL ALTN LAW

(PROT LOST)

Pitch and roll normal laws are lost : Refer to F/CTL ALTN LAW procedure. THS motor 1 and both ailerons are lost. LAF is degraded and uses spoilers only (A320 only).

MAX SPEED . . . . . 320 KT



F/CTL SLAT SYS 1(2) FAULT

Crew awareness

	STATUS
SLATS SLOW	I

F/CTL FLAP SYS 1(2) FAULT

- **If FLAP sys 1 fault**
  - GPWS FLAP MODE . . . . . OFF

	STATUS
ENG 1(2) APPR IDLE ONLY	
FLAPS SLOW	I

F/CTL SLAT (FLAP) TIP BRK FAULT

Failure of one slat or flap wingtip brake.

Crew awareness

F/CTL L (R) SIDESTICK FAULT

Crew awareness

F/CTL FLAP ATTACH SENSOR

Failure of flap attachment failure detection sensor.

Crew awareness

R

CONFIG SLATS (FLAPS) NOT IN T.O CONFIG

R Crew awareness.

F/CTL ELAC 1 (2) FAULT

■ One computer failed :

CAUTION

Do not reset ELAC, if uncommanded maneuvers occurred during the flight.

– ELAC (affected) . . . . . OFF THEN ON

Note : 1. In some cases of sidestick transducer failure, ELAC 1(2) FAULT is triggered without the procedure, and the FAULT light on the associated pushbutton does not come on.

R *2. If the ELAC 1 computer is reset on ground, the pitch trim returns to the*
R *ground setting position (0°).*

● **IF UNSUCCESSFUL :**

– ELAC (affected) . . . . . OFF

Functions are performed by the other ELAC. LAF is degraded (A320 with LAF only).

STATUS

	INOP SYS
CAT 3 SINGLE ONLY	ELAC 1(2) CAT 3 DUAL

■ Both computers failed :

– ELAC 1 . . . . . OFF THEN ON

R *Note : If the ELAC 1 computer is reset on ground, the pitch trim returns to the ground*
R *setting position (0°).*

– ELAC 2 . . . . . OFF THEN ON

● **If both ELAC FAULT remain :**

– ELAC 1 . . . . . OFF

– ELAC 2 . . . . . OFF

F/CTL ALTN LAW

(PROT LOST)

Pitch and roll normal laws are lost : Refer to the F/CTL ALTN LAW procedure.
THS motor 1 and both ailerons are lost.
LAF is degraded and uses spoilers only (A320 only).

MAX SPEED . . . . . 320 KT



F/CTL SLAT SYS 1(2) FAULT

Crew awareness

	STATUS
SLATS SLOW	I

F/CTL FLAP SYS 1(2) FAULT

- **If FLAP sys 1 fault**
  - GPWS FLAP MODE . . . . . OFF

	STATUS
ENG 1(2) APPR IDLE ONLY	
FLAPS SLOW	I

F/CTL SLAT (FLAP) TIP BRK FAULT

Failure of one slat or flap wingtip brake.

Crew awareness

F/CTL L (R) SIDESTICK FAULT

Crew awareness

F/CTL FLAP ATTACH SENSOR

Failure of flap attachment failure detection sensor.

Crew awareness

R

CONFIG SLATS (FLAPS) NOT IN T.O CONFIG

R Crew awareness.

F/CTL ELAC 1 (2) FAULT

■ One computer failed :

CAUTION

Do not reset ELAC, if uncommanded maneuvers occurred during the flight.

– ELAC (affected) . . . . . OFF THEN ON

Note : 1. In some cases of sidestick transducer failure, the ELAC 1(2) FAULT is triggered without the procedure, and the FAULT light on the associated pushbutton does not come on.

2. If the ELAC 1 computer is reset on ground, the pitch trim returns to the ground setting position (0°).

● **IF UNSUCCESSFUL :**

– ELAC (affected) . . . . . OFF

Functions are performed by the other ELAC.

STATUS

	INOP SYS
CAT 3 SINGLE ONLY	ELAC 1(2) CAT 3 DUAL

■ Both computers failed :

– ELAC 1 . . . . . OFF THEN ON

Note : If the ELAC 1 computer is reset on ground, the pitch trim returns to the ground setting position (0°).

– ELAC 2 . . . . . OFF THEN ON

● **If both ELAC FAULT remain :**

– ELAC 1 . . . . . OFF

– ELAC 2 . . . . . OFF

F/CTL ALTN LAW

(PROT LOST)

Pitch and roll normal laws are lost : Refer to the F/CTL ALTN LAW procedure.

THS motor 1 and both ailerons are lost.

MAX SPEED 320/.77

MANEUVER WITH CARE

MAX FL 350



F/CTL ELAC 1 (2) FAULT (CONT'D)

STATUS

MAX SPEED . . . . . 320 KT

APPR PROC

– FOR LDG . . . . . USE FLAP 3

Do not select CONF FULL, so as not to degrade handling qualities.

– GPWS LDG FLAP 3 . . . . . ON

Will be displayed when flaps in CONF 3

APPR SPD . . . . . VREF + 10 KT

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

ALTN LAW : PROT LOST

WHEN L/G DOWN : DIRECT LAW

At landing gear extension, control reverts to direct law in pitch, as well as in roll (Refer to DIRECT LAW procedure).

CAT 1 ONLY

INOP SYS

F/CTL PROT
L + R AIL
ELAC 1 + 2
AP 1 + 2

F/CTL ELAC 1(2) PITCH FAULT

Crew awareness

Pitch function is achieved by the other ELAC.

STATUS

CAT 3 SINGLE ONLY

INOP SYS

ELAC PITCH (if ELAC 1 and 2 PITCH FAULT)
CAT 3 DUAL

F/CTL SEC 1 (2) (3) FAULT

– SEC (affected) . . . . . OFF THEN ON

● **IF UNSUCCESSFUL :**

– SEC (affected) . . . . . OFF

Associated spoilers are lost. If SEC 1 or 2 fails, LAF is degraded (A320 with LAF only). If all spoilers are inoperative (3 SECs failed), roll direct law and pitch alternate law become active.

– SPD BRK (if SEC 1 affected) . . . . . DO NOT USE

VLS would not be corrected, if speedbrakes 2 extend (no speedbrake position sent to FACs).

F/CTL ALTN LAW (b)

(PROT LOST) (b)

STATUS

– SPD BRK . . . . . DO NOT USE
(If SEC 1 is affected).
– FOR LDG . . . . . USE FLAP 3 (b)
APPR SPD . . . . . VREF + 10 (b)
LDG DIST PROC . . . . . APPLY
(Not displayed, if only SEC 2 is affected).

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

ALTN LAW : PROT LOST(b)
WHEN L/G DN : DIRECT LAW(b)

R *When the three SECs are lost, the LGCIU information can no*
R *longer be sent to the ELAC. This prevents activation of DIRECT*
R *law upon landing gear extension. So, the aircraft will revert to*
R *DIRECT law, when slats are extended.*

INOP SYS
F/CTL PROT(b)
SPLR (associated)
SEC (affected)
REVERSER 1(2)(a)

(a) If at least 2 SECs fail, the autobrake is lost.
If SEC 1 + 2 fail, reverser 1 is not available for landing.
If SEC 1 + 3 fail, reverser 2 is not available for landing.
(b) If SEC 1 + 2 + 3 fail.

CONFIG SPD BRK NOT RETRACTED

Crew awareness.

F/CTL ELAC 1 (2) FAULT (CONT'D)

STATUS

MAX SPEED . . . . . 320 KT

APPR PROC

– FOR LDG . . . . . USE FLAP 3

Do not select CONF FULL, so as not to degrade handling qualities.

– GPWS LDG FLAP 3 . . . . . ON

Will be displayed when flaps in CONF 3

APPR SPD . . . . . VREF + 10 KT

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

ALTN LAW : PROT LOST

WHEN L/G DOWN : DIRECT LAW

At landing gear extension, control reverts to direct law in pitch, as well as in roll (Refer to DIRECT LAW procedure).

CAT 1 ONLY

INOP SYS

F/CTL PROT
L + R AIL
ELAC 1 + 2
AP 1 + 2

F/CTL ELAC 1(2) PITCH FAULT

Crew awareness

Pitch function is achieved by the other ELAC.

STATUS

CAT 3 SINGLE ONLY

INOP SYS

ELAC PITCH (if ELAC 1 and 2 PITCH FAULT)
CAT 3 DUAL

F/CTL SEC 1 (2) (3) FAULT

– SEC (affected) . . . . . OFF THEN ON

● **IF UNSUCCESSFUL :**

– SEC (affected) . . . . . OFF

Associated spoilers are lost. If SEC 1 or 2 fails, LAF is degraded (A320 with LAF only). If all spoilers are inoperative (3 SECs failed), roll direct law and pitch alternate law become active.

– SPD BRK (if SEC 1 affected) . . . . . DO NOT USE

VLS would not be corrected, if speedbrakes 2 extend (no speedbrake position sent to FACs).

F/CTL ALTN LAW (c)

(PROT LOST) (c)

STATUS

– SPD BRK . . . . . DO NOT USE
(If SEC 1 is affected).
– FOR LDG . . . . . USE FLAP 3 (c)
APPR SPD . . . . . VREF + 10 (c)
LDG DIST PROC . . . . . APPLY
(Not displayed, if only SEC 2 is affected).
R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*
ALTN LAW : PROT LOST(c)
WHEN L/G DN : DIRECT LAW(c)
R *When the three SECs are lost, the LGCIU information can no*
R *longer be sent to the ELAC. This prevents activation of DIRECT*
R *law upon landing gear extension. So, the aircraft will revert to*
R *DIRECT law, when slats are extended.*

INOP SYS
F/CTL PROT(c)
SPLR (associated)
SEC (affected)
REVERSER 1(2)(b)
AUTO BRK (a)

(a) If at least 2 SECs fail.
(b) If SEC 1 + 2 fail, reverser 1 is not available for landing.
If SEC 1 + 3 fail, reverser 2 is not available for landing.
(c) If SEC 1 + 2 + 3 fail.

CONFIG SPD BRK NOT RETRACTED

Crew awareness.

F/CTL ELAC 1 (2) FAULT (CONT'D)

STATUS

MAX SPEED 320/.77
MANEUVER WITH CARE
MAX FL : 350
APPR PROC
– FOR LDG . . . . . USE FLAP 3
Do not select CONF FULL, so as not to degrade handling qualities.
– GPWS LDG FLAP 3 . . . . . ON
Will be displayed when flaps in CONF 3
APPR SPD . . . . . VREF + 10 KT
LDG DIST PROC . . . . . APPLY
R *Refer to the QRH Part 2, or the FCOM 3.02.80.*
ALTN LAW : PROT LOST
WHEN L/G DOWN : DIRECT LAW
At landing gear extension, control reverts to direct law in pitch, as well as in roll. Refer to the DIRECT LAW procedure.
CAT 1 ONLY

INOP SYS
F/CTL PROT
L + R AIL
ELAC 1 + 2
AP 1 + 2

F/CTL ELAC 1(2) PITCH FAULT

Crew awareness
Pitch function is achieved by the other ELAC.

STATUS

CAT 3 SINGLE ONLY

INOP SYS
ELAC PITCH (if ELAC 1 and 2 PITCH FAULT)
CAT 3 DUAL

F/CTL SEC 1 (2)(3) FAULT

– SEC (affected) . . . . . OFF THEN ON

● **IF UNSUCCESSFUL :**

– SEC (affected) . . . . . OFF

Associated spoilers are lost. If all spoilers are inoperative (3 SECs failed), roll direct law and pitch alternate law become active.

– SPD BRK (if SEC 1 affected) . . . . . DO NOT USE

VLS would not be corrected, if speedbrakes 2 extend (no speedbrake position sent to FACs).

F/CTL ALTN LAW (c)

(PROT LOST) (c)

STATUS

– SPD BRK . . . . . DO NOT USE

(If SEC 1 is affected).

– FOR LDG . . . . . USE FLAP 3 (c)

APPR SPD . . . . . VREF + 10 (c)

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

ALTN LAW : PROT LOST(c)

R WHEN L/G DN : DIRECT LAW (c)

Note : When the three SECs are lost, the LGCIU information can no longer be sent to the ELAC. This prevents activation of DIRECT law upon landing gear extension. So, the aircraft will revert to DIRECT law, when slats are extended.

INOP SYS

F/CTL PROT (c)
SPLR (associated)
SEC (affected)
REVERSER 1(2)(b)
AUTO BRK (a)

(a) If at least 2 SECs fail.
(b) If SEC 1 + 2 fail, reverser 1 is not available for landing.
If SEC 1 + 3 fail, reverser 2 is not available for landing.
(c) If SEC 1 + 2 + 3 fail.

CONFIG SPD BRK NOT RETRACTED

Crew awareness.

F/CTL DIRECT LAW

PFD displays « USE MAN PITCH TRIM » in amber. See the FCOM 3.04.27 for flight characteristics.

(PROT LOST)

Note : In case of GPWS (EGPWS ◁) alerts, since protections are lost, respect stall warning when applying the GPWS (EGPWS ◁) procedure.

MAX SPEED 320/.77

Speed is limited, due to the loss of high-speed protection. Do not exceed M .77, so as not to degrade handling qualities.

– MAN PITCH TRIM (except if HYD Y + G SYS LO PR) . . . USE

Automatic trim is inoperative in direct law.

MANEUVER WITH CARE

Use small control inputs at high speed, since in direct law the controls are powerful. Use of manual thrust is recommended. Avoid large thrust changes.

USE SPD BRK WITH CARE

At high Mach numbers, use speedbrakes with care to avoid too strong nose up changes.

STATUS

	INOP SYS
MAX SPEED 320/.77	F/CTL PROT
MANEUVER WITH CARE	
USE SPD BRK WITH CARE	
APPR PROC	
– FOR LDG . . . . . USE FLAPS 3	
– GPWS LDG FLAP 3 . . . . . ON	
MAN PITCH TRIM . . . . . USE	
APPR SPD . . . . . VREF + 10	
LDG DIST PROC . . . . . APPLY	
R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*	
DIRECT LAW	

CONFIG L (R) SIDESTICK FAULT

BY TAKE OVER

The warning is triggered, when on the ground, if either stick is inoperative (takeover pushbutton pressed more than 30 seconds).

– L (R) TAKEOVER . . . . . DEPRESS

The affected stick becomes operative.

CONFIG PITCH TRIM NOT IN T.O RANGE

Crew awareness.

F/CTL ALTN LAW

See the FCOM 3.04.27 for flight characteristics.
With the autopilot engaged, the FMGC (AP mode) controls the aircraft.
(PROT LOST)
All protections, except maneuver protections, are lost.
Depending on the failure, static stability may be introduced.
Note : In case of GPWS (EGPWS ◁) alerts, since protections are lost, respect stall warnings when applying the GPWS (EGPWS ◁) procedure.
MAX SPEED . . . . . 320 KT
(320/.77, if dual hydraulic system low pressure).
Speed is limited to 320/.82 or 320/.77 for dual hydraulic failure, due to the loss of high-speed protection.
– SPD BRK (if L or R elevator fault) . . . . . DO NOT USE

STATUS

MAX SPEED . . . . . 320 KT
(320/.77, if dual hydraulic system low pressure).
– SPD BRK (if L or R elevator fault) . . . DO NOT USE
APPR PROC
– FOR LDG . . . . . USE FLAP 3
– GPWS LDG FLAP 3 . . . . . ON
APPR SPD . . . . . VREF + 10
LDG DIST PROC . . . . . APPLY

INOP SYS
F/CTL PROT

R *Refer to the QRH Part 2, or to FCOM 3.02.80.*

- **If no AP engaged :**
  WHEN L/G DN : DIRECT LAW
  At landing gear extension, control reverts to direct law in pitch, as well as in roll.
  See the DIRECT LAW procedure.
- **If AP engaged :**
  WHEN L/G DN AND AP OFF : DIRECT LAW
  If the autopilot is disengaged :
  – *Before landing gear extension, flight control alternate law is active.*
  – *After landing gear extension, flight control direct law is active.*
  See the DIRECT LAW procedure.

ALTN LAW : PROT LOST

CONFIG RUD TRIM NOT IN T.O RANGE

Crew awareness.

F/CTL DIRECT LAW

PFD displays «USE MAN PITCH TRIM» in amber. See 3.04.27 : Flight characteristics.

(PROT LOST)

Note : In case of GPWS (EGPWS ◁) alerts, since protections are lost, respect stall warning when applying the GPWS (EGPWS ◁) procedure.

MAX SPEED 320/.77

Speed limited, due to the loss of high-speed protection.

Do not exceed M .77, so as not to degrade handling qualities.

– MAN PITCH TRIM (except if HYD Y + G SYS LO PR or if STABILIZER JAM) . . . . . USE

Automatic trim is inoperative in direct law.

MANEUVER WITH CARE

Use small control inputs at high speed since, in direct law, the controls are powerful. Use of manual thrust is recommended. Avoid large thrust changes.

MAX FL 350

FL is limited, due to possible strong pitch-up moment when flying at higher FL.

USE SPD BRK WITH CARE

At high Mach numbers, use speedbrakes with care to avoid too strong nose-up changes.

STATUS

MAX SPEED 320/.77	INOP SYS
MANEUVER WITH CARE	F/CTL PROT
MAX FL : 350	ELAC PITCH
USE SPD BRK WITH CARE	
APPR PROC	
– FOR LDG . . . . . USE FLAPS 3	
– GPWS LDG FLAP 3 . . . . . ON	
MAN PITCH TRIM . . . . . USE	
APPR SPD . . . . . VREF + 10	
LDG DIST PROC . . . . . APPLY	

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

DIRECT LAW

CONFIG L (R) SIDESTICK FAULT

BY TAKEOVER

Warning triggered on ground, if either stick is inop (takeover pb pressed more than 30 sec).

– L (R) TAKEOVER . . . . . DEPRESS

The affected stick becomes operative.

CONFIG PITCH TRIM NOT IN T.O RANGE

Crew awareness.

F/CTL ALTN LAW

See FCOM 3.04.27 for flight characteristics. With the autopilot engaged, the FMGC (AP mode) controls the aircraft.

(PROT LOST)

All protections, except maneuver protections, are lost. Depending on the failure, static stability may be introduced.

Note : In case of GPWS (EGPWS ◁) alerts, since protections are lost, respect stall warnings when applying the GPWS (EGPWS ◁) procedure.

MAX SPEED 320/.77

MANEUVER WITH CARE

MAX FL 350

FL is limited, due to possible, strong, pitch-up moment when flying at a higher FL.

– SPD BRK (if L or R elevator fault) . . . . . DO NOT USE

STATUS

MAX SPEED . . . . . 320/.77 MANEUVER WITH CARE MAX FL : 350 – SPD BRK (if L or R elevator fault) . . . DO NOT USE APPR PROC – FOR LDG . . . . . USE FLAP 3 – GPWS LDG FLAP 3 . . . . . ON APPR SPD . . . . . VREF + 10 LDG DIST PROC . . . . . APPLY	INOP SYS F/CTL PROT

Refer to the QRH Part 2, or to the FCOM 3.02.80.

- **If no AP is engaged :**
  WHEN L/G DN : DIRECT LAW
  At landing gear extension, control reverts to direct law in pitch, as well as in roll. See DIRECT LAW procedure.
- **If AP is engaged :**
  WHEN L/G DN AND AP OFF : DIRECT LAW
  If autopilot is disengaged :
  – *Before landing gear extension, flight control alternate law is active.*
  – *After landing gear extension, flight control direct law is active.*
  Refer to the DIRECT LAW procedure.

ALTN LAW : PROT LOST

CONFIG RUD TRIM NOT IN T.O RANGE

Crew awareness.

F/CTL FCDC FAULT

■ **FCDC 1(2) FAULT :**

Crew awareness

STATUS

INOP SYS
FCDC 1(2)

■ **FCDC 1 + 2 FAULT :**

– MONITOR F/CTL OVHD PNL

F/CTL data on the ECAM is lost.
Control laws remain normal.
Note : When both FCDCs fail :
- *– F/CTL warnings are not available on the ECAM.*
- *– Stall warning may be triggered as in alternate or direct law (it may occur at speeds greater than Vα max).*
- *– Bank and pitch limits are no longer displayed on the PFD.*
- *– Vα prot, Vα max are lost on the PFD.*
- *– Vsw, displayed on the PFD, corresponds to the stall warning of the alternate and direct law.*

STATUS

F/CTL INDICATIONS LOST

INOP SYS
FCDC 1 + 2

F/CTL AIL SERVO FAULT

Crew awareness

LAF is degraded (A320 only).

F/CTL L (R) AIL FAULT

Crew awareness

LAF is degraded and uses spoilers only (A320 only).

STATUS

R *Note : With one or both aileron fault(s), fuel consumption*
R *increases by approximately 6 %.*

INOP SYS
L (R) AIL

F/CTL L + R ELEV FAULT

MAX SPEED 320/.77

Due to loss of high speed protections.

– MAN PITCH TRIM . . . . . USE

Only manual trim is available for pitch control.

– SPD BRK . . . . . DO NOT USE

Do not use speedbrakes, because it is difficult to control the induced pitch moment with manual pitch trim only.

STATUS

MAX SPEED 320/.77
SPD BRK . . . . . DO NOT USE
APPR PROC
– FOR LDG . . . . . USE FLAP 3
Do not select CONF FULL, so as not to degrade handling qualities.
– GPWS LDG FLAP 3 . . . . . ON
Will be displayed when flaps in CONF 3.
– MAN PITCH TRIM . . . . . USE
APPR SPD . . . . . VREF + 10
LDG DIST PROC . . . . . APPLY
R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*
PITCH MECH BACK UP
ROLL DIRECT LAW
CAT 1 ONLY

INOP SYS
L + R ELEV
ELAC PITCH
LAF (A320 with LAF only)
AP 1 + 2

F/CTL ELEV SERVO FAULT

Crew awareness

The remaining servojack controls the elevator.

CAUTION

Do not use speedbrakes above 350 KT/M 0.82 (VMO/MMO).

STATUS

CAT 3 SINGLE ONLY

INOP SYS
CAT 3 DUAL

F/CTL FCDC FAULT

■ **FCDC 1(2) FAULT :**

Crew awareness

STATUS

INOP SYS
FCDC 1(2)

■ **FCDC 1 + 2 FAULT :**

– MONITOR F/CTL OVHD PNL

F/CTL data on the ECAM is lost.
Control laws remain normal.
Note : When both FCDCs fail :
- *– F/CTL warnings are not available on the ECAM.*
- *– Stall warning may be triggered as in alternate or direct law (it may occur at speeds greater than Vα max).*
- *– Bank and pitch limits are no longer displayed on the PFD.*
- *– Vα prot, Vα max are lost on the PFD.*
- *– Vsw, displayed on the PFD, corresponds to the stall warning of the alternate and direct law.*

STATUS

F/CTL INDICATIONS LOST

INOP SYS
FCDC 1 + 2

F/CTL AIL SERVO FAULT

Crew awareness
LAF is degraded (A320 only).

F/CTL L (R) AIL FAULT

Crew awareness
LAF is degraded and uses spoilers only (A320 only).

STATUS

R *Note : With one or both aileron fault(s), fuel consumption*
R *increases by approximately 6 %.*

INOP SYS
L (R) AIL

F/CTL L + R ELEV FAULT

MAX SPEED 320/.77
Due to loss of high speed protections.
– MAN PITCH TRIM . . . . . USE
Only manual trim is available for pitch control.
MANEUVER WITH CARE
MAX FL 350
FL is limited, due to possible, strong, pitch-up moment when flying at a higher FL.
– SPD BRK . . . . . DO NOT USE
Do not use speedbrakes, because it is difficult to control the induced pitch moment with manual pitch trim only.

STATUS

MAX SPEED 320/.77
MANEUVER WITH CARE
MAX FL : 350
SPD BRK . . . . . DO NOT USE
APPR PROC
– FOR LDG . . . . . USE FLAP 3
Do not select CONF FULL, so as not to degrade handling qualities.
– GPWS LDG FLAP 3 . . . . . ON
Will be displayed when flaps are in CONF 3.
– MAN PITCH TRIM . . . . . USE
APPR SPD . . . . . VREF + 10
LDG DIST PROC . . . . . APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80.
PITCH MECH BACK UP
ROLL DIRECT LAW
CAT 1 ONLY

INOP SYS
L + R ELEV
ELAC PITCH
AP 1 + 2

F/CTL ELEV SERVO FAULT

Crew awareness
The remaining servojack controls the elevator.

CAUTION
Do not use speedbrakes above 350 KT/M 0.82 (VMO/MMO).

STATUS

CAT 3 SINGLE ONLY

INOP SYS
CAT 3 DUAL

F/CTL L (R) ELEV FAULT

F/CTL ALTN LAW (PROT LOST)

Note : *If the L(R) elevator fails, the ELACs loose pitch control through the elevator. Therefore, the SECs control pitch in alternate law. This is not the case, if the right elevator is lost, due to the failure of B+Y hydraulic circuits. Pitch normal law remains active in ELAC.*

MAX SPEED . . . . . 320 KT

Speed is limited, due to the loss of high-speed protection.

– SPD BRK . . . . . DO NOT USE

STATUS

MAX SPEED . . . . . 320 KT
SPD BRK . . . . . DO NOT USE
APPR PROC
– FOR LDG . . . . . USE FLAP 3
Do not select CONF FULL, so as not to degrade handling qualities.
– GPWS LDG FLAP 3 . . . . . ON
Will be displayed, when flaps in CONF 3.
APPR SPD . . . . . VREF + 10 KT
LDG DIST PROC . . . . . APPLY
R *Refer to the QRH part 2, or to the FCOM 3.02.80.*
ALTN LAW : PROT LOST
WHEN L/G DN : DIRECT LAW
At landing gear extension, control reverts to direct law in pitch, as well as in roll. Refer to the DIRECT LAW procedure.
CAT 1 ONLY

INOP SYS
F/CTL PROT
L (R) ELEV
ELAC PITCH
AP 1 + 2

F/CTL L (R) ELEV FAULT

F/CTL ALTN LAW (PROT LOST)

Note : If the L(R) elevator fails, the ELACs loose pitch control through the elevator. Therefore, the SECs control pitch in alternate law. This is not the case, if the right elevator is lost, due to the failure of B+Y hydraulic circuits. Pitch normal law remains active in ELAC.

MAX SPEED . . . . . 320 KT

Speed is limited, due to the loss of high-speed protection.

– SPD BRK . . . . . DO NOT USE

STATUS

MAX SPEED . . . . . 320 KT
SPD BRK . . . . . DO NOT USE
APPR PROC
– FOR LDG . . . . . USE FLAP 3
Do not select CONF FULL, so as not to degrade handling qualities.
– GPWS LDG FLAP 3 . . . . . ON
Will be displayed, when flaps in CONF 3.
APPR SPD . . . . . VREF + 15 KT
LDG DIST PROC . . . . . APPLY
R *Refer to the QRH part 2, or to the FCOM 3.02.80.*
ALTN LAW : PROT LOST
WHEN L/G DN : DIRECT LAW
At landing gear extension, control reverts to direct law in pitch, as well as in roll. Refer to the DIRECT LAW procedure.
CAT 1 ONLY

INOP SYS
F/CTL PROT
L (R) ELEV
ELAC PITCH
AP 1 + 2

F/CTL L (R) ELEV FAULT

F/CTL ALTN LAW (PROT LOST)

Note : *If the L(R) elevator fails, the ELACs loose pitch control through the elevator. Therefore, the SECs control pitch in alternate law. This is not the case, if the right elevator is lost, due to the failure of B+Y hydraulic circuits. Pitch normal law remains active in ELAC.*

MAX SPEED 320/.77

Speed is limited, due to the loss of high-speed protections.

MANEUVER WITH CARE

MAX FL 350

– SPD BRK . . . . . DO NOT USE

STATUS

MAX SPEED 320/.77

MANEUVER WITH CARE

MAX FL : 350

SPD BRK . . . . . DO NOT USE

APPR PROC

– FOR LDG . . . . . USE FLAP 3

Do not select CONF FULL, so as not to degrade handling qualities.

– GPWS LDG FLAP 3 . . . . . ON

Will be displayed when flaps are in CONF 3.

APPR SPD . . . . . VREF + 15 KT

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

ALTN LAW : PROT LOST

WHEN L/G DN : DIRECT LAW

At landing gear extension, control reverts to direct law in pitch, as well as in roll. Refer to the DIRECT LAW procedure.

CAT 1 ONLY

INOP SYS

F/CTL PROT

L (R) ELEV

ELAC PITCH

AP 1 + 2

F/CTL SPLR FAULT

Loss of one or more spoilers.

Note : If heavy vibrations are felt, CONF 3 may be used for landing in order to reduce the buffeting.

– SPD BRK (if spoilers 3 + 4 affected) . . . . . DO NOT USE

Do not use speedbrakes, since using only surfaces N° 2 is not efficient and would activate the SPD BRK DISAGREE caution.

	STATUS
	INOP SYS
● **If spoilers 3 + 4 affected :**	
– SPD BRK . . . . . DO NOT USE	SPLR (affected)
LDG DIST PROC . . . . . APPLY	SPD BRK (if spoilers 2 + 3 + 4 affected)

See GND SPLR FAULT below.

F/CTL GND SPLR / 1 + 2 / 3 + 4 / FAULT

Crew awareness.

- **GND SPLR FAULT :**

  Loss of ground spoiler function in SEC 1 + 3, or 1 + 2, or 2 + 3, or 1 + 2 + 3.

- **GND SPLR 1 + 2 (3 + 4) FAULT :**

  Loss of ground spoiler function in SEC 3 (or 1).

	STATUS	
– LDG DIST PROC . . . . . APPLY *Refer to the QRH Part 2, or to the FCOM 3.02.80.*		INOP SYS GND SPLR (affected)

R

F/CTL SPD BRK DISAGREE

■ **Surfaces 3 + 4 affected**

Surfaces' position not in agreement with the handle position.

– SPD BRK LEVER . . . . . RETRACT
– SPD BRK . . . . . DO NOT USE

	STATUS	
– SPD BRK . . . . . DO NOT USE		INOP SYS SPD BRK 3 + 4

■ **Surfaces 2 + 3 + 4 affected :**

After automatic retraction (due to activation of alpha protection or slats/flaps in configuration FULL), surface position is not in agreement with the handle position.

– SPD BRK LEVER . . . . . RETRACT

F/CTL SPD BRK FAULT or SPD BRK 2 (3 + 4) FAULT

Loss of speedbrake surfaces, due to failure of the speedbrake lever transducer(s). In addition, associated ground spoilers are only available through reverse selection.

– SPD BRK (if SPD BRK 3 + 4 affected) . . . . . DO NOT USE

Do not use speedbrakes, since it is not efficient to use only Surface n° 2, and would activate the SPD BRK DISAGREE caution.

STATUS

R – SPD BRK . . . . . DO NOT USE
(if SPD BRK 3 + 4 affected)

LDG DIST PROC . . . . . APPLY

R *If reversers are not used, refer to the QRH Part 2, or to the*
R *FCOM 3.02.80.*

INOP SYS
SPD BRK (affected)

F/CTL SIDESTICK PRIORITY

A failure is detected in the sidestick priority logic circuit.

– CHECK PRIORITY LOGIC

Check the integrity of flight control priority, as follows (not displayed on ECAM) :

– ELAC 1 . . . . . OFF THEN ON

R *Note : When the ELAC 1 computer is reset on ground, the pitch trim returns to the*
R *ground setting position (0°).*

– ELAC 2 . . . . . OFF THEN ON

● **If the warning disappears :**

– CAPT TAKE OVER pb . . . . . PRESS (at least 3 seconds)

Check that the :

– Aural "priority left" message is activated.

– F/O red arrow light is on.

– CAPT TAKE OVER pb . . . . . RELEASE

– F/O TAKE OVER pb . . . . . PRESS (at least 3 seconds)

Check that the :

– Aural "priority right" message is activated

– CAPT red arrow light is on.

– F/O TAKE OVER pb . . . . . RELEASE

– Check that the warning does not reappear.

Note : There is no need to move the sidestick for the check.

● **If the warning does not disappear, or if the warning reappears after the above check :**

Maintenance action is due.

F/CTL STABILIZER JAM

When the ELACs detect a stabilizer jam, the pitch control law reverts to alternate law.

– MAN PITCH TRIM . . . . . CHECK

The force needed on the PITCH TRIM wheel may be higher than during pre-takeoff manual setting.

● **IF MAN TRIM AVAIL :**

– TRIM FOR NEUTRAL ELEV

If manual pitch trim is available, trim to maintain the elevator at the zero position (indications on ECAM F/CTL page).

F/CTL ALTN LAW

(PROT LOST)

MAX SPEED . . . . . 320 KT

STATUS

R MAX SPEED . . . . . 320 KT

APPR PROC :

– FOR LDG . . . . . USE FLAP 3

Do not select configuration FULL, so as not to degrade the handling qualities.

– GPWS LDG FLAP 3 . . . . . ON

Will be displayed when flaps in CONF 3

● **IF MAN TRIM NOT AVAIL :**

● **WHEN CONF 3 AND VAPP :**

– L/G . . . . . DN

Landing gear extension is delayed, in order to delay the switching to direct law.

APPR SPD : . . . . . VREF + 10 KT

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

ALTN LAW : PROT LOST

WHEN L/G DN : DIRECT LAW

At landing gear extension, control reverts to direct law in pitch, as well as in roll. Refer to DIRECT LAW procedure.

CAT 1 ONLY

INOP SYS

F/CTL PROT

STABILIZER

ELAC PITCH

AP 1 + 2

STABILIZER JAM

The ELACs may not detect a stabilizer jam when the pitch trim wheel is jammed.
The flight control normal law remains active in this case and there is no ECAM warning.
Apply the following procedure.

– AP ..... OFF
– MAN PITCH TRIM ..... CHECK
The pitch trim wheel may not be fully jammed, the force needed may be higher than pre-takeoff manual setting.

● **IF MAN TRIM AVAIL :**
– TRIM FOR NEUTRAL ELEV
If manual pitch trim is available, trim to maintain the elevator at the zero position (indications on ECAM F/CTL page).

APPR PROC

● **IF MAN TRIM NOT AVAIL :**
– FOR LDG ..... USE FLAP 3
Do not select configuration full so as not to degrade the handling qualities.
– GPWS LDG FLAP 3 ..... ON

CAT 1 ONLY

F/CTL STABILIZER JAM

When the ELACs detect a stabilizer jam, the pitch control law reverts to alternate law.

– MAN PITCH TRIM . . . . . CHECK

The force needed on the PITCH TRIM wheel may be higher than during pre-takeoff manual setting.

● **IF MAN TRIM AVAIL :**

– TRIM FOR NEUTRAL ELEV

If manual pitch trim is available, trim to maintain the elevator at the zero position (indications on ECAM F/CTL page).

F/CTL ALTN LAW

(PROT LOST)
MAX SPEED 320/.77
MANEUVER WITH CARE
MAX FL 350

STATUS

MAX SPEED 320/.77
MANEUVER WITH CARE
MAX FL : 350
APPR PROC :

– FOR LDG . . . . . USE FLAP 3

Do not select configuration FULL, so as not to degrade the handling qualities.

– GPWS LDG FLAP 3 . . . . . ON

Will be displayed when flaps in CONF 3

● **IF MAN TRIM NOT AVAIL :**

● **WHEN CONF 3 AND VAPP :**

– L/G . . . . . DN

Landing gear extension is delayed, in order to delay the switching to direct law.

APPR SPD : . . . . . VREF + 10 KT
LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

ALTN LAW : PROT LOST
WHEN L/G DN : DIRECT LAW

At landing gear extension, control reverts to direct law in pitch, as well as in roll. Refer to the DIRECT LAW procedure.

CAT 1 ONLY

INOP SYS
F/CTL PROT
STABILIZER
ELAC PITCH
AP 1 + 2

STABILIZER JAM

The ELACs may not detect a stabilizer jam when the pitch trim wheel is jammed.
The flight control normal law remains active in this case and there is no ECAM warning.
Apply the following procedure.

– AP . . . . . OFF
– MAN PITCH TRIM . . . . . CHECK
The pitch trim wheel may not be fully jammed, the force needed may be higher than pre-takeoff manual setting.

● **IF MAN TRIM AVAIL :**
– TRIM FOR NEUTRAL ELEV
If manual pitch trim is available, trim to maintain the elevator at the zero position (indications on ECAM F/CTL page).

APPR PROC

● **IF MAN TRIM NOT AVAIL :**
– FOR LDG . . . . . USE FLAP 3
Do not select configuration full so as not to degrade the handling qualities.
– GPWS LDG FLAP 3 . . . . . ON

CAT 1 ONLY

F/CTL RUDDER JAM

Rudder jamming may be detected by undue (and adverse) pedal movement during rolling maneuvers.
This is because the yaw damper orders can no longer be sent to the rudder, but are fed back to the pedals.
Use ECAM F/CTL page for a visual check of the rudder position.

FOR APPROACH

- AVOID LANDING WITH CROSSWIND from the side where the rudder is deflected.
- MAX CROSSWIND 15 KT
- FOR LDG . . . . . USE NORMAL CONF
- SPEED AND TRAJECTORY . . . . . STABILIZE ASAP

ON GROUND

- DIFFERENTIAL BRAKING . . . . . USE ASAP
  Do not use asymmetric reverse thrust.
  Use nosewheel steering handle below 70 knots.

R

ACTIVE CONTROL LAW

ACTIVE LAW ► / SYS FAILED ▼	PITCH		ROLL	YAW
	LAW	PROTEC		
ELAC 1 or 2 or SEC 1 or 2	NORM	NORM	NORM	NORM
ELAC 1 and 2 or both ailerons	ALTN	REDUCED	DIRECT	ALTN
2 SEC	NORM	NORM	NORM	NORM
3 SEC	ALTN	REDUCED	DIRECT	ALTN
2 FAC	ALTN	REDUCED	DIRECT	MECH
Yaw damper	ALTN	REDUCED	DIRECT	MECH
2 SFCC (slat channel)	ALTN	NO	DIRECT	ALTN
2 ADR or 2 IR (2nd self detected)	ALTN	REDUCED	DIRECT	ALTN
2 ADR (2nd not self detec.)	ALTN	NO – – – – – REDUCED (1)	DIRECT	ALTN
2 IR (2nd not self detec.)	DIRECT – – – – – ALTN (2)	NO – – – – – REDUCED (2)	DIRECT	MECH – – – – – ALTN (2)
3 ADR	ALTN	NO	DIRECT	MECH
3 IR	DIRECT	NO	DIRECT	MECH
2 RADIO ALT	NORM – – – – – DIRECT (4)	NORM – – – – – NO (4)	NORM – – – – – DIRECT (4)	NORM – – – – – MECH (4)
SPOILER 4 or 5 or (4 and 5)	NORM	NORM	NORM	NORM
All SPOILERS	ALTN	REDUCED	DIRECT	ALTN
1 AIL SERVO or 1 AILERON	NORM	NORM	NORM	NORM
1 ELEV SERVO	NORM	NORM	NORM	NORM
1 ELEVATOR	ALTN	NO	DIRECT	ALTN
THS (jammed) (5)	NORM	NORM	NORM	NORM
	ALTN	REDUCED	DIRECT	ALTN
HYD G or Y or B	NORM	NORM	NORM	NORM
HYD G + Y	ALTN	REDUCED	DIRECT	MECH
HYD G + B	ALTN	NO	DIRECT	ALTN
HYD Y + B	NORM	NORM	NORM	NORM
on BATTERIES	ALTN	REDUCED	DIRECT	MECH
on EMER GEN	ALTN	REDUCED	DIRECT	MECH – – – – – ALTN (3)

(1) In case of AOA disagree
(2) After the faulty IR is selected OFF
(3) After FAC 1 is reset
(4) When landing gear down (or CONF 2, if both LGCIUs faulty)
(5) Depending where the failure is, control law may revert to alternate law

F/CTL RUDDER JAM

Rudder jams may be detected by undue (and adverse) pedal movement during rolling maneuvers.
This is because yaw damper orders can no longer be sent to the rudder, but are fed back to the pedals.
Use the ECAM F/CTL page for a visual check of the rudder position.

FOR APPROACH

- AVOID LANDING WITH CROSSWIND from the side where the rudder is deflected.
- MAX CROSSWIND 15 KT
- FOR LDG . . . . . USE NORMAL CONF
- SPEED AND TRAJECTORY . . . . . STABILIZE ASAP

ON GROUND

- DIFFERENTIAL BRAKING . . . . . USE ASAP
  Do not use asymmetric reverse thrust.
  Use the nosewheel steering handle below 70 knots.

F/CTL SPD BRK STILL OUT

The speedbrakes are commanded to extension :
– While the engines are not at idle, or
– For more than 5 seconds, when the aircraft is below 800 feet during final approach.

R

ACTIVE CONTROL LAW

ACTIVE LAW ► / SYS FAILED ▼	PITCH		ROLL	YAW
	LAW	PROTEC		
ELAC 1 or 2 or SEC 1 or 2	NORM	NORM	NORM	NORM
ELAC 1 and 2 or both ailerons	ALTN	REDUCED	DIRECT	ALTN
2 SEC	NORM	NORM	NORM	NORM
3 SEC	ALTN	REDUCED	DIRECT	ALTN
2 FAC	ALTN	REDUCED	DIRECT	MECH
Yaw damper	ALTN	REDUCED	DIRECT	MECH
2 SFCC (slat channel)	ALTN	NO	DIRECT	ALTN
2 ADR or 2 IR (2nd self detected)	ALTN	REDUCED	DIRECT	ALTN
2 ADR (2nd not self detec.)	ALTN	NO – – – – – REDUCED (1)	DIRECT	ALTN
2 IR (2nd not self detec.)	DIRECT – – – – – ALTN (2)	NO – – – – – REDUCED (2)	DIRECT	MECH – – – – – ALTN (2)
3 ADR	ALTN	NO	DIRECT	MECH
3 IR	DIRECT	NO	DIRECT	MECH
2 RADIO ALT	NORM – – – – – DIRECT (4)	NORM – – – – – NO (4)	NORM – – – – – DIRECT (4)	NORM – – – – – MECH (4)
SPOILER 4 or 5 or (4 and 5)	NORM	NORM	NORM	NORM
All SPOILERS	ALTN	REDUCED	DIRECT	ALTN
1 AIL SERVO or 1 AILERON	NORM	NORM	NORM	NORM
1 ELEV SERVO	NORM	NORM	NORM	NORM
1 ELEVATOR	ALTN	NO	DIRECT	ALTN
THS (jammed) (5)	NORM	NORM	NORM	NORM
	ALTN	REDUCED	DIRECT	ALTN
HYD G or Y or B	NORM	NORM	NORM	NORM
HYD G + Y	ALTN	REDUCED	DIRECT	MECH
HYD G + B	ALTN	NO	DIRECT	ALTN
HYD Y + B	NORM	NORM	NORM	NORM
on BATTERIES	ALTN	REDUCED	DIRECT	MECH
on EMER GEN	ALTN	REDUCED	DIRECT	MECH – – – – – ALTN (3)

(1) In case of AOA disagree
(2) After the faulty IR is selected OFF
(3) After FAC 1 is reset
(4) When landing gear down (or CONF 2, if both LGCIUs faulty)
(5) Depending where the failure is, control law may revert to alternate law

F/CTL RUDDER JAM

Rudder jams may be detected by undue (and adverse) pedal movement during rolling maneuvers.
This is because yaw damper orders can no longer be sent to the rudder, but are fed back to the pedals.
Use the ECAM F/CTL page for a visual check of the rudder position.

FOR APPROACH

- AVOID LANDING WITH CROSSWIND from the side where the rudder is deflected.
- MAX CROSSWIND 15 KT
- FOR LDG . . . . . USE NORMAL CONF
- SPEED AND TRAJECTORY . . . . . STABILIZE ASAP

ON GROUND

- DIFFERENTIAL BRAKING . . . . . USE ASAP
  Do not use asymmetric reverse thrust.
  Use the nosewheel steering handle below 70 knots.

F/CTL FLAP LVR NOT ZERO

Crew awareness.
The flap lever is not in the zero position, and the aircraft is above 22 000 ft.

F/CTL SPD BRK STILL OUT

Crew awareness.
Speedbrakes are out, with at least one engine not at idle.

R

ACTIVE CONTROL LAW

ACTIVE LAW ► / SYS FAILED ▼	PITCH		ROLL	YAW
	LAW	PROTEC		
ELAC 1 or 2 or SEC 1 or 2	NORM	NORM	NORM	NORM
ELAC 1 and 2 or both ailerons	ALTN	REDUCED	DIRECT	ALTN
2 SEC	NORM	NORM	NORM	NORM
3 SEC	ALTN	REDUCED	DIRECT	ALTN
2 FAC	ALTN	REDUCED	DIRECT	MECH
Yaw damper	ALTN	REDUCED	DIRECT	MECH
2 SFCC (slat channel)	ALTN	NO	DIRECT	ALTN
2 ADR or 2 IR (2nd self detected)	ALTN	REDUCED	DIRECT	ALTN
2 ADR (2nd not self detec.)	ALTN	NO – – – – – REDUCED (1)	DIRECT	ALTN
2 IR (2nd not self detec.)	DIRECT – – – – – ALTN (2)	NO – – – – – REDUCED (2)	DIRECT	MECH – – – – – ALTN (2)
3 ADR	ALTN	NO	DIRECT	MECH
3 IR	DIRECT	NO	DIRECT	MECH
2 RADIO ALT	NORM – – – – – DIRECT (4)	NORM – – – – – NO (4)	NORM – – – – – DIRECT (4)	NORM – – – – – MECH (4)
SPOILER 4 or 5 or (4 and 5)	NORM	NORM	NORM	NORM
All SPOILERS	ALTN	REDUCED	DIRECT	ALTN
1 AIL SERVO or 1 AILERON	NORM	NORM	NORM	NORM
1 ELEV SERVO	NORM	NORM	NORM	NORM
1 ELEVATOR	ALTN	NO	DIRECT	ALTN
THS (jammed) (5)	NORM	NORM	NORM	NORM
	ALTN	REDUCED	DIRECT	ALTN
HYD G or Y or B	NORM	NORM	NORM	NORM
HYD G + Y	ALTN	REDUCED	DIRECT	MECH
HYD G + B	ALTN	NO	DIRECT	ALTN
HYD Y + B	NORM	NORM	NORM	NORM
on BATTERIES	ALTN	REDUCED	DIRECT	MECH
on EMER GEN	ALTN	REDUCED	DIRECT	MECH – – – – – ALTN (3)

(1) In case of AOA disagree
(2) After the faulty IR is selected OFF
(3) After FAC 1 is reset
(4) When landing gear down (or CONF 2, if both LGCIUs faulty)
(5) Depending where the failure is, control law may revert to alternate law

ELEVATORS AND STABILIZER CONTROL AFTER FAILURE

	LEFT ELEVATOR		THS	RIGHT ELEVATOR	
	BLUE	GREEN	GREEN AND YELLOW	YELLOW	BLUE
NORM OPERATION		ELAC2	ELAC2	ELAC2	
SINGLE FAILURE					
ELAC2	ELAC1		ELAC1		ELAC1
ELAC1		ELAC2	ELAC2	ELAC2	
SEC2		ELAC2	ELAC2	ELAC2	
SEC1		ELAC2	ELAC2	ELAC2	
G	ELAC1		ELAC1		ELAC1
Y	ELAC1		ELAC1		ELAC1
B		ELAC2	ELAC2	ELAC2	
DOUBLE FAILURE					
ELAC2 + ELAC1		SEC2	SEC2	SEC2	
+ SEC2	ELAC1		ELAC1		ELAC1
+ SEC1	ELAC1		ELAC1		ELAC1
+ G	ELAC1		ELAC1		ELAC1
+ Y	ELAC1		ELAC1		ELAC1
+ B		SEC2	SEC2	SEC2	
ELAC1 + SEC2		ELAC2	ELAC2	ELAC2	
+ SEC1		ELAC2	ELAC2	ELAC2	
+ G	SEC1		SEC2	SEC2	
+ Y		SEC2	SEC2		SEC1
+ B		ELAC2	ELAC2	ELAC2	
SEC2 + SEC1		ELAC2	ELAC2	ELAC2	
+ G	ELAC1		ELAC1		ELAC1
+ Y	ELAC1		ELAC1		ELAC1
+ B		ELAC2	ELAC2	ELAC2	
SEC1 + G	ELAC1		ELAC1		ELAC1
+ Y	ELAC1		ELAC1		ELAC1
+ B		ELAC2	ELAC2	ELAC2	
G + Y	ELAC1		inop		ELAC1
B + G	Damped		ELAC2	ELAC2	
B + Y		ELAC2	ELAC2	Damped	

R

	LEFT ELEVATOR		THS	RIGHT ELEVATOR	
	BLUE	GREEN	GREEN AND YELLOW	YELLOW	BLUE
TRIPLE FAILURE					
ELAC2					
ELAC1 + SEC2	SEC1		SEC1		SEC1
+ SEC1		SEC2	SEC2	SEC2	
+ G	SEC1		SEC2	SEC2	
+ Y		SEC2	SEC2		SEC1
+ B		SEC2	SEC2	SEC2	
SEC2 + SEC1	ELAC1		ELAC1		ELAC1
+ G	ELAC1		ELAC1		ELAC1
+ Y	ELAC1		ELAC1		ELAC1
+ B	Centered		Mechanical	Centered	
SEC1 + G	ELAC1		ELAC1		ELAC1
+ Y	ELAC1		ELAC1		ELAC1
+ B		SEC2	SEC2	SEC2	
G + Y	ELAC1		inop		ELAC1
B + G	Damped		SEC2	SEC2	
B + Y		SEC2	SEC2	Damped	
ELAC1					
SEC2 + SEC1		ELAC2	ELAC2	ELAC2	
+ G	SEC1		SEC1		SEC1
+ Y	SEC1		SEC1		SEC1
+ B		ELAC2	ELAC2	ELAC2	
SEC1 + G	Damped		SEC2	SEC2	
+ Y		SEC2	SEC2	Damped	
+ B		ELAC2	ELAC2	ELAC2	
G + Y	SEC1		inop		SEC1
B + G	Damped		ELAC2	ELAC2	
B + Y		ELAC2	ELAC2	Damped	
SEC2					
SEC1 + G	ELAC1		ELAC1		ELAC1
+ Y	ELAC1		ELAC1		ELAC1
+ B		ELAC2	ELAC2	ELAC2	
G + Y	ELAC1		inop		ELAC1
B + G	Damped		ELAC2	ELAC2	
B + Y		ELAC2	ELAC2	Damped	
SEC1					
G + Y	ELAC1		inop		ELAC1
B + G	Damped		ELAC2	ELAC2	
B + Y		ELAC2	ELAC2	Damped	

FUEL L (R) TK PUMP 1 + 2 LO PR

■ **Center tank not empty :**

– FUEL MODE SEL (if CTR TK not feeding) . . . . . MAN

Setting FUEL MODE SEL to MAN will allow center tank pumps to run.

– TK PUMP 1 (affected) . . . . . OFF

– TK PUMP 2 (affected) . . . . . OFF

● **WHEN TK (affected) FUEL RQRD :**

Apply GRVTY FUEL FEEDING procedure.

– TK (affected) FEED . . . . . GRVTY ONLY

– PROC : GRVTY FUEL FEEDING

R – TK (affected) GRVTY FEED ONLY

STATUS
INOP SYS
TK PUMPS (affected)

■ **Center tank empty :**

– FUEL X FEED (if above FL150) . . . . . ON

– ENG MODE SEL . . . . . IGN

The selection of continuous relight protects against flame-out, caused by possible fuel supply surging.

– TK PUMP 1 (affected) . . . . . OFF

– TK PUMP 2 (affected) . . . . . OFF

● **If FUEL X FEED off :**

As long as fuel X feed is closed, associated engine is fed by gravity only.

– PROC : GRVTY FUEL FEEDING

Apply GRVTY FUEL FEEDING procedure.

AVOID NEGATIVE G FACTOR

Avoiding negative g factors will prevent fuel surging and, therefore, reduce the risk of engine malfunction.

● **WHEN TK (affected) FUEL RQRD :**

– TK (affected) FEED . . . . . GRVTY ONLY

Apply GRVTY FUEL FEEDING procedure.

Fuel from the affected tank may be used immediately, if there is no ceiling limitation for gravity fuel feeding.

TK (affected) GRVTY FEED ONLY

STATUS
INOP SYS
TK PUMPS (affected)

FUEL L (R) TK PUMP 1 + 2 LO PR (CONT'D)

R ● **When reaching FL 150 :**

R *FUEL L(R) TK PUMP 1 + 2 LO PR caution is automatically recalled.*

– ENG MODE SEL ..... IGN

● **WHEN TK (affected) FUEL RQRD :**

– TK (affected) FEED ..... GRVTY ONLY

– FUEL X FEED ..... OFF

– PROC : GRVTY FUEL FEEDING
AVOID NEGATIVE G FACTOR

STATUS

	INOP SYS
– PROC : GRVTY FUEL FEEDING AVOID NEGATIVE G FACTOR TK (affected) GRVTY FEED ONLY	TK PUMPS (affected)

FUEL L (R) TK PUMP 1(2) LO PR

– TK PUMP (affected) ..... OFF

STATUS

	INOP SYS
	TK PUMP (affected)

FUEL L (R) TK PUMP 1 + 2 LO PR

■ **Center tank not empty :**

– FUEL MODE SEL (if CTR TK not feeding) . . . . . MAN

Setting FUEL MODE SEL to MAN will enable the center tank pumps to run.

– TK PUMP 1 (affected) . . . . . OFF

– TK PUMP 2 (affected) . . . . . OFF

● **WHEN TK (affected) FUEL RQRD :**

Apply the GRVTY FUEL FEEDING procedure.

– TK (affected) FEED . . . . . GRVTY ONLY

– PROC : GRVTY FUEL FEEDING

STATUS

– TK (affected) GRVTY FEED ONLY | INOP SYS: TK PUMPS (affected)

■ **Center tank empty :**

● **IF NO FUEL LEAK :**

– FUEL X FEED (if above FL150) . . . . . ON

– ENG MODE SEL . . . . . IGN

The selection of continuous relight protects against flameout, caused by possible fuel supply surging.

– TK PUMP 1 (affected) . . . . . OFF

– TK PUMP 2 (affected) . . . . . OFF

● **If FUEL X FEED off :**

As long as the fuel crossfeed valve is closed, the associated engine is fed by gravity only.

– PROC : GRVTY FUEL FEEDING

Apply the GRVTY FUEL FEEDING procedure.

AVOID NEGATIVE G FACTOR

Avoiding negative g factors will prevent fuel surging and, therefore, reduce the risk of engine malfunction.



FUEL L (R) TK PUMP 1 + 2 LO PR (CONT'D)

● **WHEN TK (affected) FUEL RQRD :**

– TK (affected) FEED ..... GRVTY ONLY

Apply the GRVTY FUEL FEEDING procedure.

Fuel from the affected tank may be used immediately, if there is no ceiling limitation for gravity fuel feeding.

STATUS

	INOP SYS
TK (affected) GRVTY FEED ONLY	TK PUMPS (affected)

● **When reaching FL 150 :**

FUEL L(R) TK PUMP 1 + 2 LO PR caution is automatically recalled.

– ENG MODE SEL ..... IGN

● **WHEN TK (affected) FUEL RQRD :**

– TK (affected) FEED ..... GRVTY ONLY

– FUEL X FEED ..... OFF

– PROC : GRVTY FUEL FEEDING
AVOID NEGATIVE G FACTOR

STATUS

	INOP SYS
– PROC : GRVTY FUEL FEEDING AVOID NEGATIVE G FACTOR TK (affected) GRVTY FEED ONLY	TK PUMPS (affected)

FUEL L (R) TK PUMP 1(2) LO PR

– TK PUMP (affected) ..... OFF

STATUS

	INOP SYS
	TK PUMP (affected)

FUEL L (R) WING TK LO LVL

CAUTION

Do not apply this procedure if a fuel leak is suspected. Refer to FUEL LEAK procedure.

- **If center tank not empty :**
  - FUEL MODE SEL ..... MAN
- **IF FUEL UNBALANCE**
  - FUEL X FEED ..... ON
  - TK PUMP 1 (on side with LO LVL) ..... OFF
  - TK PUMP 2 (on side with LO LVL) ..... OFF

Note : TK PUMP 1+2 (on side with LO LVL) LO PR warning will be triggered.

R

	STATUS
CTR TK FEED : MAN ONLY (if center tank not empty)	INOP SYS TK PUMPS

FUEL L + R WING TK LO LVL

LAND ASAP

- FUEL MODE SEL (if center tank not empty) ..... MAN
- ALL TK PUMPS ..... ON

All pumps in center tank and in wing tanks will run.

- FUEL X FEED ..... OFF

FUEL L (R) XFR VALVE CLOSED

Note : When fuel quantity in affected wing reaches low level, corresponding WING TK LO LVL warning is triggered.

OUTER TK UNUSABLE (affected side)

	STATUS
OUTER TK UNUSABLE (affected side)	I

FUEL L (R) XFR VALVE OPEN

Crew awareness

	STATUS
	INOP SYS L (R) CELL VALVE

FUEL L (R) WING TK LO LVL

- **If center tank not empty :**
  - FUEL MODE SEL ..... MAN
- **IF NO FUEL LEAK AND FUEL IMBALANCE :**
  - FUEL X FEED ..... ON
  - TK PUMP 1 (on side with LO LVL) ..... OFF
  - TK PUMP 2 (on side with LO LVL) ..... OFF

  Note : TK PUMP 1+2 (on side with LO LVL) LO PR warning will be triggered.

STATUS

CTR TK FEED : MAN ONLY (if center tank not empty) | INOP SYS TK PUMPS

FUEL L + R WING TK LO LVL

LAND ASAP

- FUEL MODE SEL (if center tank not empty) ..... MAN
- ALL TK PUMPS ..... ON

  All pumps in the center tank and in wing tanks will run.
- FUEL X FEED ..... OFF

FUEL L (R) XFR VALVE CLOSED

Note : When fuel quantity in affected wing reaches low level, corresponding WING TK LO LVL warning is triggered.

OUTER TK UNUSABLE (affected side)

	STATUS
OUTER TK UNUSABLE (affected side)	I

FUEL L (R) XFR VALVE OPEN

Crew awareness

	STATUS
	INOP SYS L (R) CELL VALVE

FUEL X FEED VALVE FAULT

Crew awareness

If valve failed open, maintain fuel balance with selective use of pumps.

If valve failed closed and if unable to maintain an acceptable balance, land as soon as possible.

STATUS

INOP SYS

FUEL X FEED

FUEL L (R) OUTER TK LO TEMP

R ■ **on the ground before takeoff :**

– DELAY T.O

Do not takeoff until temperatures are within limits.

■ **in flight**

Crew awareness

Consider descending to a lower altitude and/or increasing Mach to increase TAT.

FUEL L (R) INNER TK LO TEMP

R ■ **on the ground before takeoff :**

– DELAY T.O

Do not takeoff until temperatures are within limits.

■ **in flight**

Crew awareness

Consider descending to a lower altitude and/or increasing Mach to increase TAT.

FUEL X FEED VALVE FAULT

Crew awareness

If valve failed open, maintain fuel balance with selective use of pumps.

If valve failed closed and if unable to maintain an acceptable balance, land as soon as possible.

STATUS

INOP SYS

FUEL X FEED

FUEL L (R) OUTER TK LO TEMP

R ■ **on the ground before takeoff :**

– DELAY T.O

Do not takeoff until temperatures are within limits.

■ **in flight**

Crew awareness

Consider descending to a lower altitude and/or increasing Mach to increase TAT.

FUEL L (R) INNER TK LO TEMP

R ■ **on the ground before takeoff :**

– DELAY T.O

Do not takeoff until temperatures are within limits.

■ **in flight**

Crew awareness

Consider descending to a lower altitude and/or increasing Mach to increase TAT.

FUEL L (R) OUTER (INNER) TK HI TEMP

R *This caution may spuriously trigger due to interference from communication equipment.*
R *Therefore, the flight crew should wait two minutes while the fuel temperature measurement*
R *is updated. After two minutes, if the ECAM caution has not disappeared, the flight crew must*
R *apply the following procedure :*

– GEN (affected side) . . . . . OFF

■ **on the ground :**

– DELAY T.O.
– ENG MASTER (affected side) . . . . . OFF

■ **in flight :**

– ENG F. FLOW (affected side) . . . . . INCREASE

Disconnect autothrust. Adjust the thrust lever to increase fuel flow through the IDG oil heat exchanger and decrease the temperature of the fuel returning to the outer cell.

● **If TEMP ABV 65 DEG C in outer cell or 57 DEG C in inner cell**

– APU . . . . . AS RQRD

APU if available may be started and APU GEN used to allow IDG disconnection.

● **if opposite GEN avail :**

– IDG (affected side) . . . . . OFF

FUEL FQI CH 1(2) FAULT

Crew awareness

FUEL ENG 1(2) LP VALVE OPEN

Crew awareness

FUEL APU LP VALVE FAULT

Crew awareness

FUEL CTR TK PUMP 1(2) LO PR

– FUEL X FEED ..... ON
– CTR TK PUMP (affected) ..... OFF

FUEL X FEED may be switched OFF when the center tank is empty to avoid possible fuel imbalance (if performance of pumps of one wing differs from that of other wing).

STATUS

INOP SYS
CTR TK PUMP 1(2)

FUEL CTR TK PUMPS LO PR

R *Selecting FUEL MOD SEL to MAN position will prevent repetitive triggering of the warning.*

– CTR TK PUMP 1 ..... OFF
– CTR TK PUMP 2 ..... OFF
– CTR TK UNUSABLE

Gravity feeding from the center tank is not possible (no by-pass valve fitted on the center tank pumps).

STATUS

CTR TK FUEL UNUSABLE — INOP SYS: CTR TK PUMPS

FUEL AUTO FEED FAULT

– FUEL MODE SEL ..... MAN

The center tank pumps will run and feed the engines.

■ **Fuel in one wing tank < 5000 kg (11000 lb) and in center tank > 250 kg (550 lb) :**

– CTR TK PUMP 1 ..... ON
– CTR TK PUMP 2 ..... ON

When the center tank is empty, CTR TK PUMP LO PR warning will come on.

■ **CTR TK PUMPS running after slat extension or LO LVL in center tank**

– CTR TK PUMP 1 ..... OFF
– CTR TK PUMP 2 ..... OFF

STATUS

CTR TK FEED : MAN ONLY

FUEL LEAK

A fuel leak may be detected, if :

· The sum of FOB and FU significantly less than FOB at engine start or is decreasing, or

· A passenger observes fuel spray from engine/pylon or wing tip, or

· The total fuel quantity is decreasing at an abnormal rate, or

· A fuel imbalance is developing, or

· Fuel quantity in a tank is decreasing too fast (leak from engine/pylon, or hole in a tank), or

· The Fuel flow is excessive (leak from engine), or

· Fuel is smelt in the cabin.

If visibility permits, leak source may be identified by a visual check from the cabin.

WHEN A LEAK IS CONFIRMED

LAND ASAP

■ **LEAK FROM ENGINE/PYLON CONFIRMED:**

Engine fuel leak can be confirmed by excessive fuel flow indication, or a visual check.

– THR LEVER (of affected engine) . . . . . IDLE

– ENG MASTER (of affected engine) . . . . . OFF

– FUEL X FEED . . . . . USE AS RQRD

If the leak stops, the crossfeed valve can now be opened to re-balance fuel quantity, or to enable use of fuel from both wings. Do not restart the engine.

■ **LEAK FROM ENGINE/PYLON NOT CONFIRMED or LEAK NOT LOCATED:**

Stop any fuel transfer, and then monitor the depletion rate of each inner tank, to determine if the leak is from an engine or a wing (case 1), or from the Center tank, or the APU feeding line (case 2).

– FUEL X FEED . . . . . MAINTAIN CLOSED

The crossfeed valve must remain closed to prevent the leak from affecting both sides.

– CTR TK PUMP 1+2 . . . . . OFF

Each engine is fed via its associated inner tank only.

– INNER TANK FUEL QUANTITIES . . . . . MONITOR

Monitor the depletion rate of each inner tank.



FUEL CTR TK PUMP 1(2) LO PR

● **IF NO FUEL LEAK :**

– FUEL X FEED ..... ON

– CTR TK PUMP (affected) ..... OFF

FUEL X FEED may be switched OFF, when the center tank is empty, to avoid possible fuel imbalance (if the pump performance of one wing differs from that of the other wing).

STATUS

| INOP SYS
CTR TK PUMP 1(2)

FUEL CTR TK PUMPS LO PR

Selecting FUEL MOD SEL to MAN position will prevent repetitive triggering of the warning.

– CTR TK PUMP 1 ..... OFF

– CTR TK PUMP 2 ..... OFF

– CTR TK UNUSABLE

Gravity feeding from the center tank is not possible (no bypass valve fitted on the center tank pumps).

STATUS

CTR TK FUEL UNUSABLE | INOP SYS
CTR TK PUMPS

FUEL AUTO FEED FAULT

– FUEL MODE SEL ..... MAN

The center tank pumps will run and feed the engines.

■ **Fuel in one wing tank < 5000 kg (11000 lb) and in center tank > 250 kg (550 lb) :**

– CTR TK PUMP 1 ..... ON

– CTR TK PUMP 2 ..... ON

When the center tank is empty, CTR TK PUMP LO PR warning will come on.

■ **CTR TK PUMPS running after slat extension, or LO LVL in center tank**

– CTR TK PUMP 1 ..... OFF

– CTR TK PUMP 2 ..... OFF

STATUS

CTR TK FEED : MAN ONLY |

FUEL LEAK

A fuel leak may be detected, if :

· The sum of FOB and FU significantly less than FOB at engine start or is decreasing, or

· A passenger observes fuel spray from engine/pylon or wing tip, or

· The total fuel quantity is decreasing at an abnormal rate, or

· A fuel imbalance is developing, or

· Fuel quantity in a tank is decreasing too fast (leak from engine/pylon, or hole in a tank), or

· The Fuel flow is excessive (leak from engine), or

· Fuel is smelt in the cabin.

If visibility permits, leak source may be identified by a visual check from the cabin.

WHEN A LEAK IS CONFIRMED

LAND ASAP

■ **LEAK FROM ENGINE/PYLON CONFIRMED:**

Engine fuel leak can be confirmed by excessive fuel flow indication, or a visual check.

– THR LEVER (of affected engine) . . . . . IDLE

– ENG MASTER (of affected engine) . . . . . OFF

– FUEL X FEED . . . . . USE AS RQRD

If the leak stops, the crossfeed valve can now be opened to re-balance fuel quantity, or to enable use of fuel from both wings. Do not restart the engine.

■ **LEAK FROM ENGINE/PYLON NOT CONFIRMED or LEAK NOT LOCATED:**

Stop any fuel transfer, and then monitor the depletion rate of each inner tank, to determine if the leak is from an engine or a wing (case 1), or from the Center tank, or the APU feeding line (case 2).

– FUEL X FEED . . . . . MAINTAIN CLOSED

The crossfeed valve must remain closed to prevent the leak from affecting both sides.

– CTR TK PUMP 1+2 . . . . . OFF

Each engine is fed via its associated inner tank only.

– INNER TANK FUEL QUANTITIES . . . . . MONITOR

Monitor the depletion rate of each inner tank.



FUEL CTR TK PUMP 1(2) LO PR

● **IF NO FUEL LEAK :**

– FUEL X FEED ..... ON

– CTR TK PUMP (affected) ..... OFF

FUEL X FEED may be switched OFF, when the center tank is empty, to avoid possible fuel imbalance (if the pump performance of one wing differs from that of the other wing).

STATUS

INOP SYS
CTR TK PUMP 1(2)

FUEL CTR TK PUMPS LO PR

Selecting FUEL MOD SEL to MAN position will prevent repetitive triggering of the warning.

– CTR TK PUMP 1 ..... OFF

– CTR TK PUMP 2 ..... OFF

– CTR TK UNUSABLE

Gravity feeding from the center tank is not possible (no bypass valve fitted on the center tank pumps).

STATUS

CTR TK FUEL UNUSABLE

INOP SYS
CTR TK PUMPS

FUEL AUTO FEED FAULT

– FUEL MODE SEL ..... MAN

The center tank pumps will run and feed the engines.

■ **Fuel in one wing tank < 5000 kg (11000 lb) and in center tank > 250 kg (550 lb) :**

– CTR TK PUMP 1 ..... ON

– CTR TK PUMP 2 ..... ON

When the center tank is empty, CTR TK PUMP LO PR warning will come on.

■ **CTR TK PUMPS running after slat extension, or LO LVL in center tank**

– CTR TK PUMP 1 ..... OFF

– CTR TK PUMP 2 ..... OFF

STATUS

CTR TK FEED : MAN ONLY

FUEL F. USED/FOB DISAGREE

This caution is triggered, if the difference between the initial FOB and the (actual FOB + fuel used) data is significant.

– FUEL LEAK PROC ..... APPLY

FUEL LEAK

R *A fuel leak may be detected, if :*
R *· The sum of FOB and FU significantly less than FOB at engine start or is decreasing, or*
R *· A passenger observes fuel spray from engine/pylon or wing tip, or*
R *· The total fuel quantity is decreasing at an abnormal rate, or*
R *· A fuel imbalance is developing, or*
R *· Fuel quantity in a tank is decreasing too fast (leak from engine/pylon, or hole in a tank), or*
R *· The Fuel flow is excessive (leak from engine), or*
R *· Fuel is smelt in the cabin.*
R *If visibility permits, leak source may be identified by a visual check from the cabin.*

WHEN A LEAK IS CONFIRMED

LAND ASAP

R ■ **LEAK FROM ENGINE/PYLON CONFIRMED:**

R *Engine fuel leak can be confirmed by excessive fuel flow indication, or a visual check.*

– THR LEVER (of affected engine) ..... IDLE
– ENG MASTER (of affected engine) ..... OFF
– FUEL X FEED ..... USE AS RQRD

R *If the leak stops, the crossfeed valve can now be opened to re-balance fuel quantity,*
R *or to enable use of fuel from both wings. Do not restart the engine.*

R ■ **LEAK FROM ENGINE/PYLON NOT CONFIRMED or LEAK NOT**
R **LOCATED:**

R *Stop any fuel transfer, and then monitor the depletion rate of each inner tank, to*
R *determine if the leak is from an engine or a wing (case 1), or from the Center tank, or*
R *the APU feeding line (case 2).*

– FUEL X FEED ..... MAINTAIN CLOSED
The crossfeed valve must remain closed to prevent the leak from affecting both sides.
R – CTR TK PUMP 1+2 ..... OFF
R *Each engine is fed via its associated inner tank only.*
R – INNER TANK FUEL QUANTITIES ..... MONITOR
R *Monitor the depletion rate of each inner tank.*



FUEL CTR TK PUMP 1(2) LO PR

● **IF NO FUEL LEAK :**

– FUEL X FEED ..... ON

– CTR TK PUMP (affected) ..... OFF

FUEL X FEED may be switched OFF, when the center tank is empty, to avoid possible fuel imbalance (if the pump performance of one wing differs from that of the other wing).

STATUS

| INOP SYS
CTR TK PUMP 1(2)

FUEL CTR TK PUMPS LO PR

Selecting FUEL MOD SEL to MAN position will prevent repetitive triggering of the warning.

– CTR TK PUMP 1 ..... OFF

– CTR TK PUMP 2 ..... OFF

– CTR TK UNUSABLE

Gravity feeding from the center tank is not possible (no bypass valve fitted on the center tank pumps).

STATUS

CTR TK FUEL UNUSABLE | INOP SYS
CTR TK PUMPS

FUEL AUTO FEED FAULT

– FUEL MODE SEL ..... MAN

The center tank pumps will run and feed the engines.

■ **Fuel in one wing tank < 5000 kg (11000 lb) and in center tank > 250 kg (550 lb) :**

– CTR TK PUMP 1 ..... ON

– CTR TK PUMP 2 ..... ON

When the center tank is empty, CTR TK PUMP LO PR warning will come on.

■ **CTR TK PUMPS running after slat extension, or LO LVL in center tank**

– CTR TK PUMP 1 ..... OFF

– CTR TK PUMP 2 ..... OFF

STATUS

CTR TK FEED : MAN ONLY |

FUEL LEAK

A fuel leak may be detected, if :

· The sum of FOB and FU is significantly less than FOB at engine start or is decreasing, or

· A passenger observes fuel spray from engine/pylon or wing tip, or

· The total fuel quantity decreases at an abnormal rate, or

· A fuel imbalance develops, or

· Fuel quantity of a tank decreases too fast (leak from engine/pylon, or hole in a tank), or

· Fuel flow is excessive (leak from engine), or

· Fuel is smelt in the cabin, or

· The destination EFOB turns to amber on the F.PLN (or on the FUEL PRED) page, or

· "DEST EFOB BELOW MIN" appears on the MCDU scratchpad.

If visibility permits, leak source may be identified by a visual check from the cabin.

WHEN A LEAK IS CONFIRMED

LAND ASAP

■ **LEAK FROM ENGINE/PYLON CONFIRMED:**

Engine fuel leak can be confirmed by excessive fuel flow indication, or a visual check.

– THR LEVER (of affected engine) . . . . . IDLE

– ENG MASTER (of affected engine) . . . . . OFF

– FUEL X FEED . . . . . USE AS RQRD

If the leak stops, the crossfeed valve can now be opened to re-balance fuel quantity, or to enable use of fuel from both wings. Do not restart the engine.

■ **LEAK FROM ENGINE/PYLON NOT CONFIRMED or LEAK NOT LOCATED:**

Stop any fuel transfer, and then monitor the depletion rate of each inner tank, to determine if the leak is from an engine or a wing (case 1), or from the Center tank, or the APU feeding line (case 2).

– FUEL X FEED . . . . . MAINTAIN CLOSED

The crossfeed valve must remain closed to prevent the leak from affecting both sides.

– CTR TK PUMP 1+2 . . . . . OFF

Each engine is fed via its associated inner tank only.

– INNER TANK FUEL QUANTITIES . . . . . MONITOR

Monitor the depletion rate of each inner tank.

FUEL LEAK (CONT'D)

R ● **CASE 1: IF ONE INNER TANK DEPLETES FASTER THAN**
R **THE OTHER BY AT LEAST 300 kg (660 lb) IN LESS THAN**
R **30 MINUTES:**
R *An engine leak may still be suspected. Therefore :*
R – THR LEVER (engine on leaking side) ..... IDLE
R – ENG MASTER (engine on leaking side) ..... OFF
R – CTR TK PUMP 1+2 ..... ON
R – FUEL LEAK ..... MONITOR
R ● **If leak stops:**
R *If the inner tank fuel quantity of the affected side stops decreasing, the engine*
R *leak is confirmed and stopped.*
R – FUEL X FEED ..... USE AS RQRD
R *The crossfeed valves can now be opened to re-balance fuel quantity, or to*
R *enable use of fuel from both wings. Do not restart the engine.*
R ● **If leak continues (after engine shutdown):**
R *The inner tank fuel quantity of the affected side continues to decrease. If the leak*
R *has not stopped after engine shut down, a leak from the wing may be suspected.*
R – ENGINE RESTART ..... CONSIDER

CAUTION

Do not open the FUEL X FEED valve, even if requested by another ECAM procedure.
R Do not apply the FUEL IMBALANCE procedure. Approach and landing can be
R done, even with one full wing/one empty wing.

R ● **CASE 2: IF BOTH INNER TANKS DEPLETE AT A SIMILAR**
R **RATE:**
R *A leak from the Center tank or the APU feeding line may be suspected.*
R ● **If fuel smell in the cabin:**
R – APU (if ON) ..... OFF
R *This prevents additional fuel loss through the APU feeding line.*
R ● **When fuel quantity in one inner tank is less than 3 tons**
R **(6600 lb):**
R – CTR TK PUMP 1+2 ..... ON

FUEL LEAK (CONT'D)

R ● **CASE 1: IF ONE INNER TANK DEPLETES FASTER THAN**
R **THE OTHER BY AT LEAST 300 kg (660 lb) IN LESS THAN**
R **30 MINUTES:**
R *An engine leak may still be suspected. Therefore :*
R – THR LEVER (engine on leaking side) ..... IDLE
R – ENG MASTER (engine on leaking side) ..... OFF
R – CTR TK PUMP 1+2 ..... ON
R – FUEL LEAK ..... MONITOR
R ● **If leak stops:**
R *If the inner tank fuel quantity of the affected side stops decreasing, the engine*
R *leak is confirmed and stopped.*
R – FUEL X FEED ..... USE AS RQRD
R *The crossfeed valves can now be opened to re-balance fuel quantity, or to*
R *enable use of fuel from both wings. Do not restart the engine.*
R ● **If leak continues (after engine shutdown):**
R *The inner tank fuel quantity of the affected side continues to decrease. If the leak*
R *has not stopped after engine shut down, a leak from the wing may be suspected.*
R – ENGINE RESTART ..... CONSIDER

CAUTION

R Do not apply the FUEL IMBALANCE procedure. Approach and landing can be
R done, even with one full wing/one empty wing.

R ● **CASE 2: IF BOTH INNER TANKS DEPLETE AT A SIMILAR**
R **RATE:**
R *A leak from the Center tank or the APU feeding line may be suspected.*
R ● **If fuel smell in the cabin:**
R – APU (if ON) ..... OFF
R *This prevents additional fuel loss through the APU feeding line.*
R ● **When fuel quantity in one inner tank is less than 3 tons**
R **(6600 lb):**
R – CTR TK PUMP 1+2 ..... ON

FUEL IMBALANCE

– FOB ..... CHECK

Compare the FOB + FU, with the FOB at departure.
If the difference is significant, or if the FOB + FU decreases, suspect a fuel leak.

CAUTION

A fuel imbalance may indicate a fuel leak.
Do not apply this procedure, if a fuel leak is suspected.
Refer to the FUEL LEAK procedure.

– FUEL X FEED ..... ON

● **On the lighter side and in the center tank :**

– FUEL PUMPS ..... OFF

● **When fuel is balanced :**

– FUEL PUMPS (WING + CTR) ..... ON
– FUEL X FEED ..... OFF

Note : There is no requirement to correct an imbalance, until the ECAM fuel advisory is displayed.

FUEL CTR TK PUMPS OFF

The center tank pumps pushbuttons are OFF, with slats retracted.

– CTR TK PUMP 1 . . . . . ON
– CTR TK PUMP 2 . . . . . ON

GRVTY FUEL FEEDING

– ENG MODE SEL . . . . . IGN

AVOID NEGATIVE G FACTOR

● **DETERMINE GRAVITY FEED CEILING** :

R Consult the following table to determine the flight altitude
R limitation.

Flight conditions at time of gravity feeding	Gravity feed ceiling
Flight time above FL300 more than 30 minutes (Fuel deaerated)	Current FL*
Flight time above FL300 less than 30 minutes (Fuel non-deaerated)	FL 300*
Aircraft flight level never exceeded FL300 (Fuel non-deaerated)	FL150*, or 7000 ft above takeoff airport, whichever is higher

* For JET B, gravity feed ceiling is FL100 in all cases.

DESCEND TO GRVTY FEED CEILING (if applicable).

● **WHEN REACHING GRVTY FEED CEILING** :

– FUEL X FEED . . . . . OFF

● **IF NO FUEL LEAK AND FOR AIRCRAFT HANDLING** :

If no fuel leak and for flight with only one engine running (this engine being fed by gravity) apply the following :

– FUEL X FEED . . . . . ON
– BANK ANGLE . . . . 1° WING DOWN ON LIVE ENGINE SIDE
The fuel from the wing tank on the engine running side is used.
– RUDDER TRIM . . . . . USE
Use rudder trim to maintain constant course and neutral stick.

● **WHEN FUEL IMBALANCE REACHES 1000 kg (2200 lbs)** :

– BANK ANGLE . 2° or 3° WING DOWN ON LIVE ENG SIDE
Fuel from the opposite wing tank is used, until fuel imbalance is reduced to 0.

HYD B RSVR LO AIR PR/OVHT/LO LVL

■ **RSVR OVHT or LO LVL :**

– BLUE ELEC PUMP . . . . . OFF

■ **RSVR LO AIR PR :**

● **IF PRESS FLUCTUATES :**

– BLUE ELEC PUMP . . . . . OFF

B SYS LO PR

Affected systems
* F/CTL

STATUS

■ **Sys lost by RSVR LO AIR PR :**

The probability of cavitation increases with altitude. Therefore, it may be possible to restore the system after descending to a lower altitude.

APPR PROC HYD LO PR

– BLUE ELEC PUMP . . . . . AUTO

● **If sys not recovered :**

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

SLATS SLOW

CAT 3 SINGLE ONLY

INOP SYS
BLUE HYD
SPLR 3
CAT 3 DUAL
B ELEC PUMP

■ **Sys lost by RSVR OVHT :**

APPR PROC HYD LO PR

● **IF BLUE OVHT OUT**

– BLUE ELEC PUMP . . . . . AUTO

● **If sys not recovered :**

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

SLATS SLOW

CAT 3 SINGLE ONLY

■ **Sys lost by RSVR LO LVL :**

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

SLATS SLOW

CAT 3 SINGLE ONLY

INOP SYS
BLUE HYD
SPLR 3
CAT 3 DUAL
EMER GEN
B ELEC PUMP

HYD G RSVR LO AIR PR/OVHT/LO LVL

■ **RSVR OVHT or LO LVL :**

– PTU ..... OFF
– GREEN ENG 1 PUMP ..... OFF

■ **RSVR LO AIR PR :**

● **IF PRESS FLUCTUATES :**

– PTU ..... OFF
– GREEN ENG 1 PUMP ..... OFF

R G ENG 1 PUMP LO PR

R **G SYS LO PR**

Affected systems
R *WHEEL
R *F/CTL



HYD B RSVR LO AIR PR/OVHT/LO LVL

■ **RSVR OVHT or LO LVL :**

– BLUE ELEC PUMP . . . . . OFF

■ **RSVR LO AIR PR :**

● **IF PRESS FLUCTUATES :**

– BLUE ELEC PUMP . . . . . OFF

B SYS LO PR

Affected systems
* F/CTL

STATUS

■ **Sys lost by RSVR LO AIR PR :**

The probability of cavitation increases with altitude. Therefore, it may be possible to restore the system after descending to a lower altitude.

APPR PROC HYD LO PR

– BLUE ELEC PUMP . . . . . AUTO

● **If sys not recovered :**

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

SLATS SLOW

CAT 3 SINGLE ONLY

INOP SYS
BLUE HYD
SPLR 3
CAT 3 DUAL
B ELEC PUMP

■ **Sys lost by RSVR OVHT :**

APPR PROC HYD LO PR

● **IF BLUE OVHT OUT**

– BLUE ELEC PUMP . . . . . AUTO

● **If sys not recovered :**

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

SLATS SLOW

CAT 3 SINGLE ONLY

■ **Sys lost by RSVR LO LVL :**

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

SLATS SLOW

CAT 3 SINGLE ONLY

INOP SYS
BLUE HYD
SPLR 3
CAT 3 DUAL
EMER GEN
B ELEC PUMP

HYD G RSVR LO AIR PR/OVHT/LO LVL

■ **RSVR OVHT or LO LVL :**

– PTU ..... OFF
– GREEN ENG 1 PUMP ..... OFF

■ **RSVR LO AIR PR :**

● **IF PRESS FLUCTUATES :**

– PTU ..... OFF
– GREEN ENG 1 PUMP ..... OFF

R G ENG 1 PUMP LO PR

R **G SYS LO PR**

Affected systems
R *WHEEL
R *F/CTL



HYD G RSVR LO AIR PR/OVHT/LO LVL (CONT'D)

STATUS

■ **sys lost by RSVR LO AIR PR :**

APPR PROC HYD LO PR

The probability of cavitation increases with altitude. Therefore, it may be possible to restore the system after descending to a lower altitude.

– GREEN ENG 1 PUMP . . . . . ON

– PTU . . . . . AUTO

● **IF HYD NOT RECOVERED :**

– L/G . . . . . GRVTY EXTN

Refer to 3.02.32

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

SLATS/FLAPS SLOW

CAT 3 SINGLE ONLY

■ **sys lost by RSVR OVHT :**

APPR PROC HYD LO PR

● **IF GREEN OVHT OUT**

– GREEN ENG 1 PUMP . . . . . ON

– PTU . . . . . AUTO

● **IF HYD NOT RECOVERED :**

– L/G . . . . . GRVTY EXTN

Refer to 3.02.32

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

SLATS/FLAPS SLOW

CAT 3 SINGLE ONLY

■ **sys lost by RSVR LO LVL :**

– L/G . . . . . GRVTY EXTN

Refer to 3.02.32

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

SLATS/FLAPS SLOW

CAT 3 SINGLE ONLY

INOP SYS

GREEN HYD

SPLR 1 + 5

CAT 3 DUAL

N.W. STEER

AUTO BRK

NORM BRK

L/G RETRACT

REVERSER 1

YAW DAMPER 1

HYD Y RSVR LO AIR PR/OVHT/LO LVL

- **RSVR OVHT or LO LVL**
  - PTU ..... OFF
  - YELLOW ENG 2 PUMP ..... OFF
  - YELLOW ELEC PUMP ..... OFF
- **RSVR LO AIR PR**
  - **IF PRESS FLUCTUATES :**
    - PTU ..... OFF
    - YELLOW ENG 2 PUMP ..... OFF
    - YELLOW ELEC PUMP ..... OFF

R Y ENG 2 PUMP LO PR

R **Y SYS LO PR**

Affected systems
*F/CTL



HYD G RSVR LO AIR PR/OVHT/LO LVL (CONT'D)

STATUS

■ **sys lost by RSVR LO AIR PR :**

APPR PROC HYD LO PR

The probability of cavitation increases with altitude. Therefore, it may be possible to restore the system after descending to a lower altitude.

– GREEN ENG 1 PUMP . . . . . ON

– PTU . . . . . AUTO

● **IF HYD NOT RECOVERED :**

– L/G . . . . . GRVTY EXTN

Refer to 3.02.32

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

SLATS/FLAPS SLOW

CAT 3 SINGLE ONLY

■ **sys lost by RSVR OVHT :**

APPR PROC HYD LO PR

● **IF GREEN OVHT OUT**

– GREEN ENG 1 PUMP . . . . . ON

– PTU . . . . . AUTO

● **IF HYD NOT RECOVERED :**

– L/G . . . . . GRVTY EXTN

Refer to 3.02.32

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

SLATS/FLAPS SLOW

CAT 3 SINGLE ONLY

■ **sys lost by RSVR LO LVL :**

– L/G . . . . . GRVTY EXTN

Refer to 3.02.32

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

SLATS/FLAPS SLOW

CAT 3 SINGLE ONLY

INOP SYS

GREEN HYD

SPLR 1 + 5

CAT 3 DUAL

N.W. STEER

AUTO BRK

NORM BRK

L/G RETRACT

REVERSER 1

YAW DAMPER 1

HYD Y RSVR LO AIR PR/OVHT/LO LVL

- **RSVR OVHT**
  - PTU ..... OFF
  - YELLOW ENG 2 PUMP ..... OFF
  - YELLOW ELEC PUMP ..... OFF
- **RSVR LO AIR PR**
  - **IF PRESS FLUCTUATES :**
    - PTU ..... OFF
    - YELLOW ENG 2 PUMP ..... OFF
    - YELLOW ELEC PUMP ..... OFF
- **RSVR LO LVL**
  - PTU ..... OFF
  - YELLOW ENG 2 PUMP ..... OFF

R - YELLOW ELEC 2 PUMP ..... OFF

R Y ENG 2 PUMP LO PR.

R **Y SYS LO PR**

Affected systems
*F/CTL



HYD G RSVR LO AIR PR/OVHT/LO LVL (CONT'D)

STATUS

■ **sys lost by RSVR LO AIR PR :**

APPR PROC HYD LO PR

The probability of cavitation increases with altitude. Therefore, it may be possible to restore the system after descending to a lower altitude.

– GREEN ENG 1 PUMP . . . . . ON

– PTU . . . . . AUTO

● **IF HYD NOT RECOVERED :**

– L/G . . . . . GRVTY EXTN

Refer to 3.02.32

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

SLATS/FLAPS SLOW

CAT 3 SINGLE ONLY

■ **sys lost by RSVR OVHT :**

APPR PROC HYD LO PR

● **IF GREEN OVHT OUT**

– GREEN ENG 1 PUMP . . . . . ON

– PTU . . . . . AUTO

● **IF HYD NOT RECOVERED :**

– L/G . . . . . GRVTY EXTN

Refer to 3.02.32

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

SLATS/FLAPS SLOW

CAT 3 SINGLE ONLY

■ **sys lost by RSVR LO LVL :**

– L/G . . . . . GRVTY EXTN

Refer to 3.02.32

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

SLATS/FLAPS SLOW

CAT 3 SINGLE ONLY

INOP SYS

GREEN HYD

SPLR 1 + 5

CAT 3 DUAL

N.W. STEER

AUTO BRK

NORM BRK

L/G RETRACT

REVERSER 1

YAW DAMPER 1

HYD Y RSVR LO AIR PR/OVHT/LO LVL

- **RSVR OVHT**
  - – PTU . . . . . OFF
  - – YELLOW ENG 2 PUMP . . . . . OFF
  - – YELLOW ELEC PUMP . . . . . OFF
- **RSVR LO AIR PR**
  - **IF PRESS FLUCTUATES :**
    - – PTU . . . . . OFF
    - – YELLOW ENG 2 PUMP . . . . . OFF
    - – YELLOW ELEC PUMP . . . . . OFF
- **RSVR LO LVL**
  - – PTU . . . . . OFF
  - – YELLOW ENG 2 PUMP . . . . . OFF
  - – YELLOW ELEC 2 PUMP . . . . . OFF

R

BRK Y ACCU PR MONITOR

This check is recommended to cover the case of a pipe rupture, which could lead to the simultaneous loss of the hydraulic system and the accumulator fluid. If this occurs, the loss of the accumulator should be observed on the indicator within 10 minutes. In that case : The only remaining braking means is normal braking, using green pressure. The parking brake should not be used since, it is not available. And, the chocks should be in place before Engine 1 shutdown.

Y ENG 2 PUMP LO PR.

R **Y SYS LO PR**

Affected systems
*F/CTL

HYD G RSVR LO AIR PR/OVHT/LO LVL (CONT'D)

STATUS

■ **Sys lost by RSVR LO AIR PR :**

APPR PROC HYD LO PR

The probability of cavitation increases with altitude. Therefore, it may be possible to restore the system after descending to a lower altitude.

– GREEN ENG 1 PUMP . . . . . ON

– PTU . . . . . AUTO

● **IF HYD NOT RECOVERED :**

– L/G . . . . . GRVTY EXTN

Refer to 3.02.32.

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

SLATS/FLAPS SLOW

CAT 3 SINGLE ONLY

■ **Sys lost by RSVR OVHT :**

APPR PROC HYD LO PR

● **IF GREEN OVHT OUT**

– GREEN ENG 1 PUMP . . . . . ON

– PTU . . . . . AUTO

● **IF HYD NOT RECOVERED :**

– L/G . . . . . GRVTY EXTN

Refer to 3.02.32.

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

SLATS/FLAPS SLOW

CAT 3 SINGLE ONLY

■ **Sys lost by RSVR LO LVL :**

– L/G . . . . . GRVTY EXTN

Refer to 3.02.32.

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

SLATS/FLAPS SLOW

CAT 3 SINGLE ONLY

INOP SYS

GREEN HYD

SPLR 1 + 5

CAT 3 DUAL

AUTO BRK

NORM BRK

L/G RETRACT

REVERSER 1

YAW DAMPER 1

HYD Y RSVR LO AIR PR/OVHT/LO LVL

- **RSVR OVHT**
  - PTU ..... OFF
  - YELLOW ENG 2 PUMP ..... OFF
  - YELLOW ELEC PUMP ..... OFF
- **RSVR LO AIR PR**
  - **IF PRESS FLUCTUATES :**
    - PTU ..... OFF
    - YELLOW ENG 2 PUMP ..... OFF
    - YELLOW ELEC PUMP ..... OFF
- **RSVR LO LVL**
  - PTU ..... OFF
  - YELLOW ENG 2 PUMP ..... OFF

R - YELLOW ELEC 2 PUMP ..... OFF

BRK Y ACCU PR MONITOR

This check is recommended to cover the case of a pipe rupture, which could lead to the simultaneous loss of the hydraulic system and the accumulator fluid. If this occurs, the loss of the accumulator should be observed on the indicator within 10 minutes. In that case : The only remaining braking means is normal braking, using green pressure. The parking brake should not be used since, it is not available. And, the chocks should be in place before Engine 1 shutdown.

Y ENG 2 PUMP LO PR.

R **Y SYS LO PR**

Affected systems
*F/CTL

HYD G RSVR LO AIR PR/OVHT/LO LVL (CONT'D)

STATUS

■ **Sys lost by RSVR LO AIR PR :**

APPR PROC HYD LO PR

The probability of cavitation increases with altitude. Therefore, it may be possible to restore the system after descending to a lower altitude.

– GREEN ENG 1 PUMP . . . . . ON

● **IF HYD NOT RECOVERED :**

– L/G . . . . . GRVTY EXTN

Refer to 3.02.32.

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

SLATS/FLAPS SLOW

CAT 3 SINGLE ONLY

■ **Sys lost by RSVR OVHT :**

APPR PROC HYD LO PR

● **IF GREEN OVHT OUT**

– GREEN ENG 1 PUMP . . . . . ON

● **IF HYD NOT RECOVERED :**

– L/G . . . . . GRVTY EXTN

Refer to 3.02.32.

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

SLATS/FLAPS SLOW

CAT 3 SINGLE ONLY

■ **Sys lost by RSVR LO LVL :**

– L/G . . . . . GRVTY EXTN

Refer to 3.02.32.

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

SLATS/FLAPS SLOW

CAT 3 SINGLE ONLY

INOP SYS

GREEN HYD

SPLR 1 + 5

CAT 3 DUAL

AUTO BRK

NORM BRK

L/G RETRACT

REVERSER 1

YAW DAMPER 1

HYD Y RSVR LO AIR PR/OVHT/LO LVL

- **RSVR OVHT**
  - PTU ..... OFF
  - YELLOW ENG 2 PUMP ..... OFF
  - YELLOW ELEC PUMP ..... OFF
- **RSVR LO AIR PR**
  - **IF PRESS FLUCTUATES :**
    - PTU ..... OFF
    - YELLOW ENG 2 PUMP ..... OFF
    - YELLOW ELEC PUMP ..... OFF
- **RSVR LO LVL**
  - PTU ..... OFF
  - YELLOW ENG 2 PUMP ..... OFF

R - YELLOW ELEC 2 PUMP ..... OFF

BRK Y ACCU PR MONITOR

This check is recommended to cover the case of a pipe rupture, which could lead to the simultaneous loss of the hydraulic system and the accumulator fluid. If this occurs, the loss of the accumulator should be observed on the indicator within 10 minutes. In that case : The only remaining braking means is normal braking, using green pressure. The parking brake should not be used since, it is not available. And, the chocks should be in place before Engine 1 shutdown.

Y ENG 2 PUMP LO PR.

R **Y SYS LO PR**

Affected systems
*F/CTL

HYD Y RSVR LO AIR PR/OVHT/LO LVL (CONT'D)

STATUS

■ **sys lost by RSVR LO AIR PR :**

The probability of cavitation increases with altitude. Therefore it may be possible to restore the system after descending to a lower altitude.

APPR PROC HYD LO PR

– YELLOW ENG 2 PUMP . . . . . ON
– PTU . . . . . AUTO

● **if sys not recovered :**

LDG DIST PROC . . . . . APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80.
FLAPS SLOW
CAT 3 SINGLE

■ **sys lost by RSVR OVHT :**

APPR PROC HYD LO PR

● **IF YELLOW OVHT OUT**

– YELLOW ENG 2 PUMP . . . . . ON
– PTU . . . . . AUTO

● **if not recovered :**

LDG DIST PROC . . . . . APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80.
FLAPS SLOW
CAT 3 SINGLE

■ **sys lost by RSVR LO LVL :**

LDG DIST PROC . . . . . APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80.
FLAPS SLOW
CAT 3 SINGLE

Note : Following a yellow hydraulic system failure, the parking brake may be inoperative due to a yellow accumulator low pressure.

INOP SYS

YELLOW HYD
SPLR 2 + 4
CAT 3 DUAL
ALTN BRK
REVERSER 2
CARGO DOOR (if LO LVL)
YAW DAMPER 2

HYD G + B SYS LO PR

Note : If green system has been lost because of fluid low level or overheat, "HYD PTU FAULT" should appear demanding that the flight crew switches the PTU OFF.

LAND ASAP

● **if blue sys lost by ELEC PUMP LO PR**

– RAT ..... MAN ON
MIN RAT SPD ..... 140 KT
– Affected PUMPS ..... OFF
– MANEUVER WITH CARE

F/CTL ALTN LAW

(PROT LOST)

The flight control normal laws and associated protections are lost. Only load factor limitation is furnished (alternate law without protection).

MAX SPEED 320/.77

Speed is limited due to loss of high speed protection.

– SPD BRK ..... DO NOT USE

■ **if blue sys recovered :**

See procedure for single failure

■ **if blue sys not recovered :**

(Refer to 3.02.10) LANDING WITH SLATS OR FLAPS JAMMED.

Affected systems
* WHEEL
* F/CTL

R
R



HYD Y RSVR LO AIR PR/OVHT/LO LVL (CONT'D)

STATUS

■ **Sys lost by RSVR LO AIR PR :**

The probability of cavitation increases with altitude. Therefore, it may be possible to restore the system after descending to a lower altitude.

APPR PROC HYD LO PR

– YELLOW ENG 2 PUMP . . . . . ON
– PTU . . . . . AUTO

● **If sys not recovered :**

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

FLAPS SLOW
CAT 3 SINGLE

■ **Sys lost by RSVR OVHT :**

APPR PROC HYD LO PR

● **IF YELLOW OVHT OUT**

– YELLOW ENG 2 PUMP . . . . . ON
– PTU . . . . . AUTO

● **If not recovered :**

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

FLAPS SLOW
CAT 3 SINGLE

■ **Sys lost by RSVR LO LVL :**

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

FLAPS SLOW
CAT 3 SINGLE

Note : Following a yellow hydraulic system failure, the parking brake may be inoperative due to a yellow accumulator low pressure.

INOP SYS

YELLOW HYD
SPLR 2 + 4
CAT 3 DUAL
N.W. STEER
ALTN BRK
REVERSER 2
CARGO DOOR (if LO LVL)
YAW DAMPER 2

HYD G + B SYS LO PR

Note : If green system has been lost because of fluid low level or overheat, "HYD PTU FAULT" should appear demanding that the flight crew switches the PTU OFF.

LAND ASAP

● **if blue sys lost by ELEC PUMP LO PR**

– RAT ..... MAN ON
MIN RAT SPD ..... 140 KT
– Affected PUMPS ..... OFF
– MANEUVER WITH CARE

F/CTL ALTN LAW

(PROT LOST)

The flight control normal laws and associated protections are lost. Only load factor limitation is furnished (alternate law without protection).

MAX SPEED 320/.77

Speed is limited due to loss of high speed protection.

– SPD BRK ..... DO NOT USE

■ **if blue sys recovered :**

See procedure for single failure

■ **if blue sys not recovered :**

(Refer to 3.02.10) LANDING WITH SLATS OR FLAPS JAMMED.

Affected systems
* WHEEL
* F/CTL

R
R

HYD Y RSVR LO AIR PR/OVHT/LO LVL (CONT'D)

STATUS

■ **Sys lost by RSVR LO AIR PR :**

The probability of cavitation increases with altitude. Therefore, it may be possible to restore the system after descending to a lower altitude.

APPR PROC HYD LO PR

– YELLOW ENG 2 PUMP . . . . . ON

● **If sys not recovered :**

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

FLAPS SLOW

CAT 3 SINGLE

■ **Sys lost by RSVR OVHT :**

APPR PROC HYD LO PR

● **IF YELLOW OVHT OUT**

– YELLOW ENG 2 PUMP . . . . . ON

● **If not recovered :**

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

FLAPS SLOW

CAT 3 SINGLE

■ **Sys lost by RSVR LO LVL :**

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

FLAPS SLOW

CAT 3 SINGLE

Note : Following a yellow hydraulic system failure, the parking brake may be inoperative due to a yellow accumulator low pressure.

INOP SYS

YELLOW HYD
SPLR 2 + 4
CAT 3 DUAL
N/W STRG
ALTN BRK
REVERSER 2
CARGO DOOR (if LO LVL)
YAW DAMPER 2

HYD G + B SYS LO PR

Note : If the green system is lost due to fluid low level or overheat, "HYD PTU FAULT" should appear demanding that the flight crew switches the PTU OFF.

LAND ASAP

● **If blue sys lost by ELEC PUMP LO PR**

– RAT ..... MAN ON
MIN RAT SPD ..... 140 KT
– Affected PUMPS ..... OFF
MANEUVER WITH CARE

F/CTL ALTN LAW

(PROT LOST)

Flight control normal laws and associated protections are lost. Only load factor limitation is provided (alternate law without protection).

MAX SPEED 320/.77

Speed is limited, due to the loss of high speed protection.

MAX FL 350
– SPD BRK ..... DO NOT USE

This line is not shown in case of failures leading to an aircraft depressurization.

■ **If blue sys recovered :**

Refer to the procedure for single failure.

■ **If blue sys not recovered :**

Refer to 3.02.10 : LANDING WITH SLATS OR FLAPS JAMMED.

Affected systems
* WHEEL
* F/CTL



HYD G + B SYS LO PR (CONT'D)

STATUS

MIN RAT SPD (if RAT out) . . . . . 140 KT
(if B PUMP LO PR)
MAX SPEED 320/.77
MANEUVER WITH CARE
R – SPD BRK . . . . . DO NOT USE
APPR PROC DUAL HYD LO PR (line not displayed for a double LO LVL) :

- **if sys lost by RSVR LO AIR PR** :
  - related PUMPS . . . . . ON
  - PTU (if green affected) . . . . . AUTO
- **if sys lost by RSVR OVHT** :
  - **IF BLUE OVHT OUT** :
    - BLUE ELEC PUMP . . . . . AUTO
  - **IF GREEN OVHT OUT** :
    - GREEN ENG 1 PUMP . . . . . ON
    - PTU . . . . . AUTO



HYD G + B SYS LO PR (CONT'D)

STATUS

● **IF HYD NOT RECOVERED (line not displayed for a double LO LVL) :**

– A/THR . . . . . OFF

Select the target speed on the FCU. Due to the loss of slats and some flight control surfaces, the A/THR may not satisfactorily maintain speed.

– FOR LDG . . . . . USE FLAP 3

– GPWS LDG FLAP 3 . . . . . ON

– L/G . . . . . GRVTY EXTN

Refer to 3.02.32.

R *Extend landing gear at 200 knots, to improve*
R *controllability when on a single elevator.*

APPR SPD . . . . . VREF + 25 KT

Approach speed must be increased, due to the loss of ailerons and slats.

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

ALTN LAW : PROT LOST

WHEN L/G DN : DIRECT LAW

At landing gear extension, control reverts to direct law in pitch, as well as in roll. (See the DIRECT LAW procedure 3.02.27)

FLAPS SLOW

CAT 1 ONLY

INOP SYS

G + B HYD
F/CTL PROT
L ELEV
L + R AIL
SPLR 1+3+5
ELAC 1
SLATS
AP 1 + 2
N.W. STEER
AUTO BRK
NORM BRK
L/G RETRACT
REVERSER 1
EMER GEN
(if B RSVR LO LVL)
B ELEC PUMP
YAW DAMPER 1

HYD G + B SYS LO PR (CONT'D)

STATUS

MIN RAT SPD (if RAT out) . . . . . 140 KT
(if B PUMP LO PR)
MAX SPEED 320/.77
MANEUVER WITH CARE
R – SPD BRK . . . . . DO NOT USE
APPR PROC DUAL HYD LO PR (line not displayed for a double LO LVL) :

- **if sys lost by RSVR LO AIR PR** :
  - related PUMPS . . . . . ON
  - PTU (if green affected) . . . . . AUTO
- **if sys lost by RSVR OVHT** :
  - **IF BLUE OVHT OUT** :
    - BLUE ELEC PUMP . . . . . AUTO
  - **IF GREEN OVHT OUT** :
    - GREEN ENG 1 PUMP . . . . . ON
    - PTU . . . . . AUTO



HYD G + B SYS LO PR (CONT'D)

STATUS

R

- **IF HYD NOT RECOVERED (line not displayed for a double LO LVL) :**
  - A/THR . . . . . OFF
    Select the target speed on the FCU. Due to the loss of slats and some flight control surfaces, the A/THR may not satisfactorily maintain speed.
  - FOR LDG . . . . . USE FLAP 3
  - GPWS LDG FLAP 3 . . . . . ON
  - L/G . . . . . GRVTY EXTN
    Refer to FCOM 3.02.32.
    Extend landing gear at 200 knots, for improved controllability, when on a single elevator.

  APPR SPD . . . . . VREF + 25 KT
  Approach speed must be increased, due to the loss of ailerons and slats.
  LDG DIST PROC . . . . . APPLY
  Refer to the QRH Part 2, or to the FCOM 3.02.80.
  ALTN LAW : PROT LOST
  WHEN L/G DN : DIRECT LAW
  At landing gear extension, control reverts to direct law in pitch, as well as in roll. (See the DIRECT LAW procedure 3.02.27)
  FLAPS SLOW
  CAT 1 ONLY

INOP SYS
G + B HYD
F/CTL PROT
L ELEV
L + R AIL
SPLR 1+3+5
SLATS
AP 1 + 2
N/W STRG
AUTO BRK
NORM BRK
L/G RETRACT
REVERSER 1
EMER GEN
(if B RSVR LO LVL)
B ELEC PUMP
YAW DAMPER 1

HYD G + B SYS LO PR (CONT'D)

STATUS

MIN RAT SPD (if RAT out) . . . . . 140 KT
(if B PUMP LO PR)
MAX SPEED 320/.77
MANEUVER WITH CARE
R – SPD BRK . . . . . DO NOT USE
APPR PROC DUAL HYD LO PR (line not displayed for a double LO LVL) :

- **if sys lost by RSVR LO AIR PR** :
  - related PUMPS . . . . . ON
  - PTU (if green affected) . . . . . AUTO
- **if sys lost by RSVR OVHT** :
  - **IF BLUE OVHT OUT** :
    - BLUE ELEC PUMP . . . . . AUTO
  - **IF GREEN OVHT OUT** :
    - GREEN ENG 1 PUMP . . . . . ON
    - PTU . . . . . AUTO

HYD G + B SYS LO PR (CONT'D)

STATUS

R

- **IF HYD NOT RECOVERED (line not displayed for a double LO LVL) :**
  - A/THR . . . . . OFF
    Select the target speed on the FCU. Due to the loss of slats and some flight control surfaces, the A/THR may not satisfactorily maintain speed.
  - FOR LDG . . . . . USE FLAP 3
  - GPWS LDG FLAP 3 . . . . . ON
  - **WHEN SPD 200 KT (displayed when slats are retracted)**
    - L/G . . . . . GRVTY EXTN
      Refer to FCOM 3.02.32.
      Extend landing gear at 200 knots, for improved controllability, when on a single elevator.

  APPR SPD . . . . . VREF + 25 KT
  Approach speed must be increased, due to the loss of ailerons and slats.
  LDG DIST PROC . . . . . APPLY
  Refer to the QRH Part 2, or to the FCOM 3.02.80.
  ALTN LAW : PROT LOST
  WHEN L/G DN : DIRECT LAW
  At landing gear extension, control reverts to direct law in pitch, as well as in roll. (See the DIRECT LAW procedure 3.02.27)
  FLAPS SLOW
  CAT 1 ONLY

INOP SYS
G + B HYD
F/CTL PROT
L ELEV
L + R AIL
SPLR 1+3+5
SLATS
AP 1 + 2
N/W STRG
AUTO BRK
NORM BRK
L/G RETRACT
REVERSER 1
EMER GEN
(if B RSVR LO LVL)
B ELEC PUMP
YAW DAMPER 1

HYD G + B SYS LO PR (CONT'D)

STATUS

MIN RAT SPD (if RAT out) . . . . . 140 KT
(if B PUMP LO PR)
MAX SPEED 320/.77
MANEUVER WITH CARE
R – SPD BRK . . . . . DO NOT USE
APPR PROC DUAL HYD LO PR (line not displayed for a double LO LVL) :

- **if sys lost by RSVR LO AIR PR** :
  - related PUMPS . . . . . ON
  - PTU (if green affected) . . . . . AUTO
- **if sys lost by RSVR OVHT** :
  - **IF BLUE OVHT OUT** :
    - BLUE ELEC PUMP . . . . . AUTO
  - **IF GREEN OVHT OUT** :
    - GREEN ENG 1 PUMP . . . . . ON
    - PTU . . . . . AUTO

HYD G + B SYS LO PR (CONT'D)

STATUS

- **IF HYD NOT RECOVERED (line not displayed for a double LO LVL) :**
  - ATHR . . . . . OFF
    Select the target speed on the FCU. Due to the loss of slats and some flight control surfaces, the A/THR may not satisfactorily maintain the speed.
  - FOR LDG . . . . . USE FLAP 3
  - GPWS LDG FLAP 3 . . . . . ON
  - **WHEN SPD 200 KT (displayed when slats are retracted)**
    - L/G . . . . . GRVTY EXTN
      Refer to FCOM 3.02.32.
      Extend landing gear at 200 knots, for improved controllability, when on a single elevator.

APPR SPD . . . . . VREF + 25 KT
Approach speed must be increased due to loss of ailerons and slats.
LDG DIST PROC . . . . . APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80.
ALTN LAW : PROT LOST
WHEN L/G DN : DIRECT LAW
At landing gear extension control reverts to direct law in pitch as well as in roll. (See DIRECT LAW procedure 3.02.27)
FLAPS SLOW
CAT 1 ONLY

INOP SYS
G + B HYD
F/CTL PROT
L ELEV
L + R AIL
SPLR 1+3+5
SLATS
AP 1 + 2
AUTO BRK
NORM BRK
L/G RETRACT
REVERSER 1
EMER GEN
(if B RSVR LO LVL)
B ELEC PUMP
YAW DAMPER 1

HYD G + B SYS LO PR (CONT'D)

STATUS

MIN RAT SPD (if RAT out) . . . . . 140 KT
(If B PUMP LO PR)
MAX SPEED 320/.77
MANEUVER WITH CARE
MAX FL : 350
– SPD BRK . . . . . DO NOT USE
This sentence is not shown, in case of failures leading to aircraft depressurization.

APPR PROC DUAL HYD LO PR (line not displayed for a double LO LVL).

- **If sys lost by RSVR LO AIR PR :**
  In approach, system lost by RSVR LO AIR PR may be recovered at low altitude.
  – related PUMPS . . . . . ON
- **If sys lost by RSVR OVHT :**
  In approach, system lost by RSVR OVHT may be recovered if OVHT indication disappears.
  - **IF BLUE OVHT OUT :**
    – BLUE ELEC PUMP . . . . . AUTO
  - **IF GREEN OVHT OUT :**
    – GREEN ENG 1 PUMP . . . . . ON



HYD G + B SYS LO PR (CONT'D)

STATUS

- **IF HYD NOT RECOVERED (line not displayed for a double LO LVL) :**
  - ATHR . . . . . OFF
    Select the target speed on the FCU. Due to the loss of slats and some flight control surfaces, the A/THR may not satisfactorily maintain the speed.
  - FOR LDG . . . . . USE FLAP 3
  - GPWS LDG FLAP 3 . . . . . ON
  - **WHEN SPD 200 KT (displayed when slats are retracted)**
    - L/G . . . . . GRVTY EXTN
      Refer to FCOM 3.02.32.
      Extend landing gear at 200 knots, for improved controllability, when on a single elevator.

APPR SPD . . . . . VREF + 30 KT
Approach speed must be increased, due to the loss of ailerons and slats.

LDG DIST PROC . . . . . APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80.

ALTN LAW : PROT LOST

WHEN L/G DN : DIRECT LAW
At landing gear extension, control reverts to direct law in pitch, as well as in roll. (See DIRECT LAW procedure 3.02.27).

FLAPS SLOW

CAT 1 ONLY

Note : In case of go-around, be ready to counteract the pitch up moment induced by TOGA application.

INOP SYS

G + B HYD
F/CTL PROT
L ELEV
L + R AIL
SPLR 1+3+5
SLATS
AP 1 + 2
AUTO BRK
NORM BRK
L/G RETRACT
REVERSER 1
EMER GEN
(if B RSVR LO LVL)
B ELEC PUMP
YAW DAMPER 1

HYD G + Y SYS LO PR

LAND ASAP

– Affected PUMPS ..... OFF

● **if yellow sys lost by ENG 2 PUMP LO PR**

R – YELLOW ELEC PUMP ..... ON

MAINTAIN WITH CARE

F/CTL ALTN LAW

(PROT LOST)

Flight control normal laws and associated protections are lost. Only load factor limitation, high and low speed stability are provided (alternate law with reduced protection).

MAX SPEED 320/.77

Speed is limited due to loss of high speed protection.

■ **if yellow sys recovered :**

Refer to procedure for single failure

■ **if yellow sys not recovered**

R *Refer to 3.02.10 LANDING WITH SLATS OR FLAPS JAMMED.*

Affected systems
* F/CTL
* WHEEL

HYD G + Y SYS LO PR (CONT'D)

STATUS

MAX SPEED 320/.77
MAX BRK PR . . . . . 1000 PSI
MANEUVER WITH CARE
R APPR PROC DUAL HYD LO PR (line not
R displayed for a double LO LVL)
- **if sys lost by RSVR LO AIR PR :**
  - related PUMP . . . . . ON
R – PTU (if no RSVR OVHT and no RSVR
R LO LVL) . . . . . AUTO
- **if sys lost by RSVR OVHT :**
  - **IF GREEN OVHT OUT :**
    - GREEN ENG 1 PUMP . . . . . ON
R – PTU (if no Y RSVR OVHT and no
R RSVR LO LVL) . . . . . AUTO
  - **IF YELLOW OVHT OUT :**
    - YELLOW ENG 2 PUMP . . . . . ON
R – PTU (if no G RSVR OVHT and no
R RSVR LO LVL) . . . . . AUTO
R - **IF HYD NOT RECOVERED (line not**
R **displayed for a double LO LVL) :**
  - FOR LDG . . . . . USE FLAP 3
  - GPWS FLAP MODE . . . . . OFF



HYD G + Y SYS LO PR

LAND ASAP

– Affected PUMPS ..... OFF

● **If yellow sys lost by ENG 2 PUMP LO PR**

– YELLOW ELEC PUMP ..... ON

MANEUVER WITH CARE

F/CTL ALTN LAW

(PROT LOST)

Flight control normal laws and associated protections are lost. Only load factor limitation, high and low speed stability are provided (alternate law with reduced protection).

MAX SPEED 320/.77

MAX FL 350

Speed is limited, due to the loss of high speed protection.

■ **If yellow sys recovered :**

Refer to the procedure for single failure.

■ **If yellow sys not recovered**

Refer to 3.02.10 : LANDING WITH SLATS OR FLAPS JAMMED.

Affected systems
* F/CTL
* WHEEL



HYD G + Y SYS LO PR (CONT'D)

STATUS

MAX SPEED 320/.77
MAX BRK PR . . . . . 1000 PSI
MANEUVER WITH CARE
MAX FL : 350
APPR PROC DUAL HYD LO PR (line not displayed for a double LO LVL).

- **If sys lost by RSVR LO AIR PR :**
  In approach, system lost by RSVR LO AIR PR may be recovered at low altitude.
  – related PUMP . . . . . ON
- **If sys lost by RSVR OVHT :**
  In approach, system lost by RSVR OVHT may be recovered if OVHT indication disappears.
  - **IF GREEN OVHT OUT :**
    – GREEN ENG 1 PUMP . . . . . ON
  - **IF YELLOW OVHT OUT :**
    – YELLOW ENG 2 PUMP . . . . . ON

- **IF HYD NOT RECOVERED (line not displayed for a double LO LVL) :**
  – FOR LDG . . . . . USE FLAP 3
  – GPWS FLAP MODE . . . . . OFF



HYD G + Y SYS LO PR (CONT'D)

STATUS

● **WHEN CONF 3 AND VAPP :**

– L/G . . . . . GRVTY EXTN

(Refer to 3.02.32). Being stabilized at VAPP before selecting the gear down enables the aircraft to be trimmed for approach.

APPR SPD . . . . . VREF + 25 KT

Approach speed must be increased, due to the loss of flaps.

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

ALTN LAW : PROT LOST

WHEN L/G DN : DIRECT LAW

At landing gear extension, control reverts to direct law in pitch as well as in roll (see DIRECT LAW procedure 3.02.27).

BRK Y ACCU PR ONLY

7 full brake applications are available.

SLATS SLOW

CAT 1 ONLY

Note : Following a yellow hydraulic system failure, the parking brake may be inoperative due to yellow accumulator low pressure.

INOP SYS

G + Y HYD
F/CTL PROT
STABILIZER
REVERSER 1 + 2
SPLR 1+2+4+5
FLAPS
YAW DAMPER
AP 1 + 2
ANTI SKID
N.W. STEER
L/G RETRACT
CARGO DOOR
(if Y RSVR LO LVL)

HYD B + Y SYS LO PR

Note : If the yellow system has been lost by low level or overheat, "HYD PTU FAULT" should appear to demand the PTU switch at OFF.

LAND ASAP

- **if yellow sys lost by ENG 2 PUMP LO PR :**
  - YELLOW ELEC PUMP ..... ON
- **if blue sys lost by ELEC PUMP LO PR :**
  - RAT ..... MAN ON

  MIN RAT SPD ..... 140 KT
- Affected PUMPS ..... OFF

MAX SPEED 320/.77

Note : Flight controls remain in normal law

- MANEUVER WITH CARE

■ **if blue or yellow sys recovered**

See procedure for single failure

■ **if neither system recovered**

Affected systems
* F/CTL



HYD G + Y SYS LO PR (CONT'D)

STATUS

● **WHEN CONF 3 AND VAPP :**

– L/G . . . . . GRVTY EXTN

(Refer to 3.02.32). Being stabilized at VAPP before selecting the gear down enables the aircraft to be trimmed for approach.

APPR SPD . . . . . VREF + 25 KT

Approach speed must be increased, due to the loss of flaps.

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

ALTN LAW : PROT LOST

WHEN L/G DN : DIRECT LAW

At landing gear extension, control reverts to direct law in pitch as well as in roll (see DIRECT LAW procedure 3.02.27). A slight transient pitch up may occur, depending on the frozen THS position.

BRK Y ACCU PR ONLY

7 full brake applications are available.

SLATS SLOW

CAT 1 ONLY

Note : Following a yellow hydraulic system failure, the parking brake may be inoperative due to yellow accumulator low pressure.

INOP SYS

G + Y HYD
F/CTL PROT
STABILIZER
REVERSER 1 + 2
SPLR 1+2+4+5
FLAPS
YAW DAMPER
AP 1 + 2
ANTI SKID
N.W. STEER
L/G RETRACT
CARGO DOOR
(if Y RSVR LO LVL)

HYD B + Y SYS LO PR

Note : If the yellow system has been lost by low level or overheat, "HYD PTU FAULT" should appear to demand the PTU switch at OFF.

LAND ASAP

- **if yellow sys lost by ENG 2 PUMP LO PR :**
  - YELLOW ELEC PUMP ..... ON
- **if blue sys lost by ELEC PUMP LO PR :**
  - RAT ..... MAN ON
  - MIN RAT SPD ..... 140 KT
- Affected PUMPS ..... OFF
- MAX SPEED 320/.77

Note : Flight controls remain in normal law

- MANEUVER WITH CARE

■ **if blue or yellow sys recovered**

See procedure for single failure

■ **if neither system recovered**

Affected systems
* F/CTL



HYD G + Y SYS LO PR (CONT'D)

STATUS

● **WHEN CONF 3 AND VAPP :**

– L/G . . . . . GRVTY EXTN

(Refer to 3.02.32). Being stabilized at VAPP, before selecting the gear down, enables the aircraft to be trimmed for approach.

APPR SPD . . . . . VREF + 35 KT

Approach speed must be increased, due to the loss of flaps.

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

ALTN LAW : PROT LOST

WHEN L/G DN : DIRECT LAW

At landing gear extension, control reverts to direct law in pitch, as well as in roll (see DIRECT LAW procedure 3.02.27).

R

BRK Y ACCU PR ONLY

7 full brake applications are available.

SLATS SLOW

CAT 1 ONLY

Note : Following a yellow hydraulic system failure, the parking brake may be inoperative due to yellow accumulator low pressure.

INOP SYS

G + Y HYD
F/CTL PROT
STABILIZER
REVERSER 1 + 2
SPLR 1+2+4+5
FLAPS
YAW DAMPER
AP 1 + 2
ANTI SKID
N.W. STEER
L/G RETRACT
CARGO DOOR
(if Y RSVR LO LVL)

HYD B + Y SYS LO PR

Note : If the yellow system has been lost by low level or overheat, "HYD PTU FAULT" should appear to demand the PTU switch at OFF.

LAND ASAP

- **if yellow sys lost by ENG 2 PUMP LO PR :**
  - YELLOW ELEC PUMP ..... ON
- **if blue sys lost by ELEC PUMP LO PR :**
  - RAT ..... MAN ON
  - MIN RAT SPD ..... 140 KT
- Affected PUMPS ..... OFF

MAX SPEED 320/.77

Note : Flight controls remain in normal law

- MANEUVER WITH CARE

■ **if blue or yellow sys recovered**

See procedure for single failure

■ **if neither system recovered**

Affected systems
* F/CTL



HYD B + Y SYS LO PR (CONT'D)

STATUS

MIN RAT SPD . . . . . 140 KT
(If B PUMP LO PR)
MAX SPEED 320/.77
MANEUVER WITH CARE
APPR PROC : DUAL HYD LO PR (line not displayed for dual LO LVL)

- **If sys lost by RSVR LO AIR PR** :
  - Related PUMP . . . . . ON
  - PTU (if yellow affected) . . . . AUTO
- **If sys lost by RSVR OVHT** :
  - **IF BLUE OVHT OUT**
    - BLUE ELEC PUMP . . . . . AUTO
  - **IF YELLOW OVHT OUT**
    - YELLOW ENG 2 PUMP . . . . . ON
    - PTU . . . . . AUTO
- **IF HYD NOT RECOVERED (line not displayed for dual LO LVL)** :
  - L/G . . . . . GRVTY EXTN
    Landing gear is extended by gravity to preserve green system integrity (Refer to 3.02.32).

LDG DIST PROC . . . . . APPLY
R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*
SLATS/FLAPS SLOW
CAT 1 ONLY

Note : Following a yellow hydraulic system failure, the parking brake may be inoperative due to yellow accumulator low pressure.

INOP SYS

B + Y HYD
R ELEV
SPLR 2+3+4
SPD BRK
AP 1 + 2
ALTN BRK
CARGO DOOR
(if Y RSVR LO LVL)
REVERSER 2
B ELEC PUMP
EMER GEN
(if B RSVR LO LVL)
YAW DAMPER 2

HYD Y ELEC PUMP LO PR or OVHT

If the ELEC PUMP overheats, or if the Y ELEC PUMP fails, while the Y ENG PUMP and the PTU are inoperative :

– YELLOW ELEC PUMP . . . . . OFF

Y SYS LO PR

Affected systems
*F/CTL

STATUS

APPR PROC HYD LO PR

- **IF YELLOW OVHT OUT**
  - – YELLOW ENG 2 PUMP . . . . . ON
  - – PTU . . . . . AUTO

  The above two lines are only displayed, in case of an electrical pump overheat.

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

FLAPS SLOW

CAT 3 SINGLE ONLY

INOP SYS
YELLOW HYD
SPLR 2 + 4
CAT 3 DUAL
ALTN BRK
REVERSER 2
Y ELEC PUMP
YAW DAMPER 2

HYD B + Y SYS LO PR (CONT'D)

STATUS

MIN RAT SPD . . . . . 140 KT
(If B PUMP LO PR)
MAX SPEED 320/.77
MANEUVER WITH CARE
APPR PROC : DUAL HYD LO PR (line not displayed for dual LO LVL)

- **If sys lost by RSVR LO AIR PR** :
  - Related PUMP . . . . . ON
  - PTU (if yellow affected) . . . . AUTO
- **If sys lost by RSVR OVHT** :
  - **IF BLUE OVHT OUT**
    - BLUE ELEC PUMP . . . . . AUTO
  - **IF YELLOW OVHT OUT**
    - YELLOW ENG 2 PUMP . . . . . ON
    - PTU . . . . . AUTO
- **IF HYD NOT RECOVERED (line not displayed for dual LO LVL)** :
  - L/G . . . . . GRVTY EXTN
    Landing gear is extended by gravity to preserve green system integrity (Refer to 3.02.32).

LDG DIST PROC . . . . . APPLY
R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*
SLATS/FLAPS SLOW
CAT 1 ONLY

Note : Following a yellow hydraulic system failure, the parking brake may be inoperative due to yellow accumulator low pressure.

INOP SYS

B + Y HYD
R ELEV
SPLR 2+3+4
SPD BRK
AP 1 + 2
ALTN BRK
CARGO DOOR
(if Y RSVR LO LVL)
REVERSER 2
B ELEC PUMP
EMER GEN
(if B RSVR LO LVL)
YAW DAMPER 2

HYD Y ELEC PUMP LO PR or OVHT

If the ELEC PUMP overheats, or if the Y ELEC PUMP fails, while the Y ENG PUMP and the PTU are inoperative :

– YELLOW ELEC PUMP . . . . . OFF

Y SYS LO PR

BRK Y ACCU PR MONITOR

This check is recommended to cover the case of a pipe rupture, which could lead to the simultaneous loss of the hydraulic system and the accumulator fluid. If this occurs, the loss of the accumulator should be observed on the indicator whithin 10 minutes. In that case : The only remaining braking means is the normal braking using the green pressure, the parking brake should not be used since it is not available and the chocks should be in place before the engine 1 shutdown.

Affected systems
*F/CTL

STATUS

APPR PROC HYD LO PR

- **IF YELLOW OVHT OUT**
  - – YELLOW ENG 2 PUMP . . . . . ON
  - – PTU . . . . . AUTO

  The above three lines are only displayed, in case of an electrical pump overheat.

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

FLAPS SLOW

CAT 3 SINGLE ONLY

INOP SYS
YELLOW HYD
SPLR 2 + 4
CAT 3 DUAL
ALTN BRK
REVERSER 2
Y ELEC PUMP
YAW DAMPER 2

HYD B + Y SYS LO PR (CONT'D)

STATUS

MIN RAT SPD . . . . . 140 KT
(If B PUMP LO PR)
MAX SPEED 320/.77
MANEUVER WITH CARE
APPR PROC : DUAL HYD LO PR (line not displayed for dual LO LVL)

- **If sys lost by RSVR LO AIR PR**
  - Related PUMP . . . . . ON
  - PTU (if yellow affected) . . . . AUTO
- **If sys lost by RSVR OVHT**
  - **IF BLUE OVHT OUT**
    - BLUE ELEC PUMP . . . . . AUTO
  - **IF YELLOW OVHT OUT**
    - YELLOW ENG 2 PUMP . . . . . ON
    - PTU . . . . . AUTO
- **IF HYD NOT RECOVERED (line not displayed for dual LO LVL) :**
  - L/G . . . . . GRVTY EXTN
    Landing gear is extended by gravity to preserve green system integrity (Refer to 3.02.32).

LDG DIST PROC . . . . . APPLY
R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*
SLATS/FLAPS SLOW
CAT 1 ONLY
Note : Following a yellow hydraulic system failure, the parking brake may be inoperative due to yellow accumulator low pressure.

INOP SYS
B + Y HYD
R ELEV
SPLR 2+3+4
SPD BRK
AP 1 + 2
ALTN BRK
CARGO DOOR
(if Y RSVR LO LVL)
REVERSER 2
B ELEC PUMP
EMER GEN
(if B RSVR LO LVL)
YAW DAMPER 2

HYD Y ELEC PUMP LO PR or OVHT

If the ELEC PUMP overheats, or if the Y ELEC PUMP fails, while the Y ENG PUMP and the PTU are inoperative :

– YELLOW ELEC PUMP . . . . . OFF

Y SYS LO PR

BRK Y ACCU PR MONITOR

This check is recommended to cover the case of a pipe rupture, which could lead to the simultaneous loss of the hydraulic system and the accumulator fluid. If this occurs, the loss of the accumulator should be observed on the indicator whithin 10 minutes. In that case : The only remaining braking means is the normal braking using the green pressure, the parking brake should not be used since it is not available and the chocks should be in place before the engine 1 shutdown.

Affected systems
*F/CTL

STATUS

APPR PROC HYD LO PR
- **IF YELLOW OVHT OUT**
  - – YELLOW ENG 2 PUMP . . . . . ON
  - – PTU . . . . . AUTO

  The above three lines are only displayed, in case of an electrical pump overheat.

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

FLAPS SLOW
CAT 3 SINGLE ONLY

INOP SYS
YELLOW HYD
SPLR 2 + 4
CAT 3 DUAL
ALTN BRK
REVERSER 2
Y ELEC PUMP
YAW DAMPER 2

HYD B + Y SYS LO PR (CONT'D)

STATUS

MIN RAT SPD . . . . . 140 KT
(If B PUMP LO PR)
MAX SPEED 320/.77
MANEUVER WITH CARE
APPR PROC : DUAL HYD LO PR (line not displayed for dual LO LVL).

- **If sys lost by RSVR LO AIR PR**

R *In approach, system lost by RSVR LO AIR PR may be*
R *recovered at low altitude.*

– Related PUMP . . . . . ON
– PTU (if yellow affected) . . . . AUTO

- **If sys lost by RSVR OVHT**

R *In approach, system lost by RSVR OVHT may be*
R *recovered if OVHT indication disappears.*

- **IF BLUE OVHT OUT**
  – BLUE ELEC PUMP . . . . . AUTO
- **IF YELLOW OVHT OUT**
  – YELLOW ENG 2 PUMP . . . . . ON
  – PTU . . . . . AUTO

- **IF HYD NOT RECOVERED (line not displayed for dual LO LVL) :**

– L/G . . . . . GRVTY EXTN
Landing gear is extended by gravity to preserve green system integrity. Refer to 3.02.32.

LDG DIST PROC . . . . . APPLY
R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*
SLATS/FLAPS SLOW
CAT 1 ONLY

Note : Following a yellow hydraulic system failure, the parking brake may be inoperative due to yellow accumulator low pressure.

INOP SYS
B + Y HYD
R ELEV
SPLR 2+3+4
SPD BRK
AP 1 + 2
N.W. STEER
ALTN BRK
CARGO DOOR
(if Y RSVR LO LVL)
REVERSER 2
B ELEC PUMP
EMER GEN
(if B RSVR LO LVL)
YAW DAMPER 2

HYD Y ELEC PUMP LO PR or OVHT

If the ELEC PUMP overheats, or if Y ELEC PUMP fails, while the Y ENG PUMP and the PTU are inoperative :

– YELLOW ELEC PUMP . . . . . OFF

Y SYS LO PR

BRK Y ACCU PR MONITOR

This check is recommended to cover the case of a pipe rupture, which could lead to the simultaneous loss of the hydraulic system and the accumulator fluid. If this occurs, the loss of the accumulator should be observed on the indicator within 10 minutes. In that case : The only remaining braking means is the normal braking using the green pressure ; the parking brake should not be used, since it is not available, and the chocks should be in place before engine 1 shutdown.

Affected systems
*F/CTL

STATUS

APPR PROC HYD LO PR

R ● **IF YELLOW OVHT OUT**

– YELLOW ENG 2 PUMP . . . . . ON

– PTU . . . . . AUTO

The above two lines are only displayed, in case of an electrical pump overheat.

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

FLAPS SLOW

CAT 3 SINGLE ONLY

INOP SYS
YELLOW HYD
SPLR 2 + 4
CAT 3 DUAL
N.W. STEER
ALTN BRK
REVERSER 2
Y ELEC PUMP
YAW DAMPER 2

HYD B + Y SYS LO PR (CONT'D)

STATUS

MIN RAT SPD . . . . . 140 KT
(If B PUMP LO PR)
MAX SPEED 320/.77
MANEUVER WITH CARE
APPR PROC : DUAL HYD LO PR (line not displayed for dual LO LVL).

- **If sys lost by RSVR LO AIR PR**
  In approach, system lost by RSVR LO AIR PR may be recovered at low altitude.
  – Related PUMP . . . . . ON
- **If sys lost by RSVR OVHT**
  In approach, system lost by RSVR OVHT may be recovered if OVHT indication disappears.
  - **IF BLUE OVHT OUT**
    – BLUE ELEC PUMP . . . . . AUTO
  - **IF YELLOW OVHT OUT**
    – YELLOW ENG 2 PUMP . . . . . ON

- **IF HYD NOT RECOVERED (line not displayed for dual LO LVL) :**
  – L/G . . . . . GRVTY EXTN
  Landing gear is extended by gravity to preserve green system integrity. Refer to 3.02.32.
  LDG DIST PROC . . . . . APPLY
  Refer to the QRH Part 2, or to the FCOM 3.02.80.
  SLATS/FLAPS SLOW
  CAT 1 ONLY
  Note : Following a yellow hydraulic system failure, the parking brake may be inoperative due to yellow accumulator low pressure.

INOP SYS
B + Y HYD
R ELEV
SPLR 2+3+4
SPD BRK
AP 1 + 2
N/W STRG
ALTN BRK
CARGO DOOR
(if Y RSVR LO LVL)
REVERSER 2
B ELEC PUMP
EMER GEN
(if B RSVR LO LVL)
YAW DAMPER 2

HYD Y ELEC PUMP LO PR or OVHT

If the ELEC PUMP overheats, or if Y ELEC PUMP fails, while the Y ENG PUMP and the PTU are inoperative :

– YELLOW ELEC PUMP . . . . . OFF

Y SYS LO PR

BRK Y ACCU PR MONITOR

This check is recommended to cover the case of a pipe rupture, which could lead to the simultaneous loss of the hydraulic system and the accumulator fluid. If this occurs, the loss of the accumulator should be observed on the indicator within 10 minutes. In that case : The only remaining braking means is the normal braking using the green pressure ; the parking brake should not be used, since it is not available, and the chocks should be in place before engine 1 shutdown.

Affected systems
*F/CTL

STATUS

APPR PROC HYD LO PR

R ● **IF YELLOW OVHT OUT**

– YELLOW ENG 2 PUMP . . . . . ON

– PTU . . . . . AUTO

The above two lines are only displayed, in case of an electrical pump overheat.

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

FLAPS SLOW

CAT 3 SINGLE ONLY

INOP SYS
YELLOW HYD
SPLR 2 + 4
CAT 3 DUAL
N.W. STEER
ALTN BRK
REVERSER 2
Y ELEC PUMP
YAW DAMPER 2

HYD G (Y) ENG 1(2) PUMP LO PR

– ENG PUMP (affected) . . . . . OFF

■ **PTU operative**

STATUS

INOP SYS
G (Y) ENG 1(2) PUMP

■ **PTU inoperative**

G (Y) SYS LO PR

Note : If yellow system is affected, the yellow elec pump may be used

Affected systems
* WHEEL (if G SYS affected)
* F/CTL

STATUS

● **G sys lost**

– L/G . . . . . GRVTY EXTN

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

SLATS/FLAPS SLOW

CAT 3 SINGLE

INOP SYS
GREEN HYD
SPLR 1 + 5
CAT 3 DUAL
N.W. STEER
AUTO BRK
NORM BRK
L/G RETRACT
REVERSER 1
PTU
G ENG 1 PUMP
YAW DAMPER 1

● **Y sys lost :**

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

FLAPS SLOW

CAT 3 SINGLE

Note : Following a yellow hydraulic system failure, the parking brake may be inoperative due to a yellow accumulator low pressure.

INOP SYS
YELLOW HYD
SPLR 2 + 4
CAT 3 DUAL
ALTN BRK
REVERSER 2
PTU
Y ENG 2 PUMP
YAW DAMPER 2

HYD PTU FAULT

Note : This warning is triggered, if the second engine is started within 40 seconds, following the end of the cargo doors operation. In this case, reset the warning by switching the yellow elec pump ON, then OFF.

● **If green or yellow reservoir low level and system low press:**

– PTU ..... OFF

STATUS

INOP SYS
PTU

HYD RAT FAULT

Crew awareness.

STATUS

INOP SYS
RAT

HYD B ELEC PUMP LO PR or OVHT

– BLUE ELEC PUMP ..... OFF

B SYS LO PR

Affected systems
*F/CTL

STATUS

APPR PROC HYD LO PR

● **IF BLUE OVHT OUT**

– BLUE ELEC PUMP ..... AUTO

LDG DIST PROC ..... APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

SLATS SLOW

CAT 3 SINGLE ONLY

INOP SYS
BLUE HYD
SPLR 3
CAT 3 DUAL
B ELEC PUMP

HYD G (Y) ENG 1(2) PUMP LO PR

– ENG PUMP (affected) . . . . . OFF

■ **PTU operative :**

STATUS

INOP SYS
G (Y) ENG 1(2) PUMP

■ **PTU inoperative :**

G (Y) SYS LO PR

Note : If the yellow system is affected, the yellow elec pump may be used.

Affected systems
* WHEEL (if G SYS affected)
* F/CTL

STATUS

● **G sys lost :**

– L/G . . . . . GRVTY EXTN

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

SLATS/FLAPS SLOW

CAT 3 SINGLE

INOP SYS
GREEN HYD
SPLR 1 + 5
CAT 3 DUAL
AUTO BRK
NORM BRK
L/G RETRACT
REVERSER 1
PTU
G ENG 1 PUMP
YAW DAMPER 1

● **Y sys lost :**

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

FLAPS SLOW

CAT 3 SINGLE

Note : Following a yellow hydraulic system failure, the parking brake may be inoperative due to yellow accumulator low pressure.

INOP SYS
YELLOW HYD
SPLR 2 + 4
CAT 3 DUAL
N.W. STEER
ALTN BRK
REVERSER 2
PTU
Y ENG 2 PUMP
YAW DAMPER 2

HYD PTU FAULT

Note : This warning is triggered, if the second engine is started within 40 seconds, following the end of the cargo doors operation. In this case, reset the warning by switching the yellow elec pump ON, then OFF.

● **If green or yellow reservoir low level and system low press:**

– PTU ..... OFF

STATUS

INOP SYS
PTU

HYD RAT FAULT

Crew awareness.

STATUS

INOP SYS
RAT

HYD B ELEC PUMP LO PR or OVHT

– BLUE ELEC PUMP ..... OFF

B SYS LO PR

Affected systems
*F/CTL

STATUS

APPR PROC HYD LO PR
● **IF BLUE OVHT OUT**
– BLUE ELEC PUMP ..... AUTO
LDG DIST PROC ..... APPLY
R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*
SLATS SLOW
CAT 3 SINGLE ONLY

INOP SYS
BLUE HYD
SPLR 3
CAT 3 DUAL
B ELEC PUMP

ANTI ICE L (R) WINDSHIELD (WINDOW)

R Crew awareness.

STATUS

INOP SYS
L (R) WSHLD (WNDW) HEAT

ANTI ICE L + R WINDSHIELD

R Crew awareness.

STATUS

INOP SYS
WSHLD HEAT

ANTI ICE CAPT PITOT or L (R) STAT

Failure of probe heating.

– AIR DATA SWTG ..... CAPT

ADR 3 supplies data to PFD 1 and ND 1.

When ADR 3 is selected on captain side, deicing of pitot associated with ADR 1 is lost.

Note : AIR DATA SWTG should not be selected to CAPT 3 if ADR 3 is not available.

STATUS

INOP SYS
CAPT PITOT/ L STAT/ R STAT

ANTI ICE F/O PITOT or L (R) STAT

Failure of probe heating.

– AIR DATA SWTG ..... F/O

ADR 3 supplies data to PFD 2 and ND 2.

Note : AIR DATA SWTG should not be selected to F/O 3 if ADR 3 is not available.

STATUS

INOP SYS
F/O PITOT/ L STAT/ R STAT

ANTI ICE L (R) WINDSHIELD (WINDOW)

R Crew awareness.

STATUS

INOP SYS
L (R) WSHLD (WNDW) HEAT

ANTI ICE L + R WINDSHIELD

R Crew awareness.

STATUS

INOP SYS
WSHLD HEAT

ANTI ICE CAPT PITOT or L (R) STAT or AOA

Failure of probe heating.

– AIR DATA SWTG . . . . . CAPT 3

ADR 3 supplies data to PFD 1 and ND 1.

When ADR 3 is selected on the captain's side, deicing of the pitot associated with ADR 1 is lost.

Note : AIR DATA SWTG should not be set to CAPT 3, if ADR 3 is not available.

STATUS

INOP SYS
CAPT PITOT/ L STAT/ R STAT CAPT AOA

ANTI ICE F/O PITOT or L (R) STAT or AOA

Failure of probe heating.

– AIR DATA SWTG . . . . . F/O 3

ADR 3 supplies data to PFD 2 and ND 2.

Note : AIR DATA SWTG should not be set to F/O 3, if ADR 3 is not available.

STATUS

INOP SYS
F/O PITOT/ L STAT/ R STAT F/O AOA

ANTI ICE CAPT (F/O) AOA or TAT

Crew awareness

STATUS

INOP SYS
CAPT (F/O) AOA/TAT

ANTI ICE STBY PITOT or L (R) STAT or AOA

Crew awareness

If standby instruments are used, monitor air data information.

STATUS

INOP SYS
STBY PITOT/ L(R) STAT/ AOA

DOUBLE PROBE HEAT FAILURE

In case of double failure of pitot or alpha probe heaters in icing conditions, the choice made by the computers among the 3 ADR values is erroneous.

- **If icing conditions cannot be avoided :**
  - One of affected ADRs . . . . . OFF

    There will be a disagreement between the two remaining ADRs : see F/CTL ADR DISAGREE (3.02.34).

ANTI ICE CAPT (F/O) (STBY) PROBES

■ **CAPT PROBES fault :**

– AIR DATA SWTG . . . . . CAPT

Note : AIR DATA SWTG should not be selected to CAPT 3 if ADR 3 is not available.

STATUS

| INOP SYS
CAPT PROBES

■ **F/O PROBES fault :**

– AIR DATA SWTG . . . . . F/O

Note : AIR DATA SWTG should not be selected to F/O 3 if ADR 3 is not available.

STATUS

| INOP SYS
F/O PROBES

■ **STBY PROBES fault :**

Crew awareness

STATUS

| INOP SYS
STBY PROBES

ANTI ICE CAPT (F/O) AOA or TAT

Crew awareness.

STATUS

INOP SYS
CAPT (F/O) AOA/TAT

ANTI ICE STBY PITOT or L (R) STAT or AOA

Crew awareness.

When using standby instruments, monitor air data information.

STATUS

INOP SYS
STBY PITOT/ L(R) STAT/ AOA

R R

DOUBLE AOA HEAT FAILURE

In case of double failure of the alpha probe heaters in icing conditions, the choice made by the computers among the 3 ADR values may be erroneous.

- **If icing conditions cannot be avoided :**
  - One of affected ADRs . . . . . OFF

    There will be a disagreement between the two remaining ADRs, which will trigger the NAV ADR DISAGREE ECAM caution.

ANTI ICE CAPT (F/O) (STBY) PROBES

■ **CAPT PROBES fault :**

– AIR DATA SWTG ..... CAPT

Note : AIR DATA SWTG should not be selected to CAPT 3 if ADR 3 is not available.

STATUS

| INOP SYS
CAPT PROBES

■ **F/O PROBES fault :**

– AIR DATA SWTG ..... F/O

Note : AIR DATA SWTG should not be selected to F/O 3 if ADR 3 is not available.

STATUS

| INOP SYS
F/O PROBES

■ **STBY PROBES fault :**

Crew awareness

STATUS

| INOP SYS
STBY PROBES

ANTI ICE CAPT (F/O) TAT

Crew awareness.

STATUS

INOP SYS
CAPT (F/O) TAT

ANTI ICE STBY PITOT or L (R) STAT or AOA

Crew awareness.

When using standby instruments, monitor air data information.

STATUS

INOP SYS
STBY PITOT/ L(R) STAT/ AOA

R R

DOUBLE AOA HEAT FAILURE

In case of double failure of the alpha probe heaters in icing conditions, the choice made by the computers among the three ADR values may be erroneous.

- **If icing conditions cannot be avoided :**
  - One of the affected ADRs . . . . . OFF

    There will be a disagreement between the two remaining ADRs, which will trigger the F/CTL ADR DISAGREE ECAM caution.

ANTI ICE CAPT (F/O) (STBY) PROBES

■ **CAPT PROBES fault :**

– AIR DATA SWTG . . . . . CAPT 3

Note : AIR DATA SWTG should not be set to CAPT 3, if ADR 3 is not available.

STATUS

| INOP SYS
CAPT PROBES

■ **F/O PROBES fault :**

– AIR DATA SWTG . . . . . F/O 3

Note : AIR DATA SWTG should not be set to F/O 3, if ADR 3 is not available.

STATUS

| INOP SYS
F/O PROBES

■ **STBY PROBES fault :**

Crew awareness

STATUS

| INOP SYS
STBY PROBES

ANTI ICE ENG 1 (2) VALVE CLSD

AVOID ICING CONDITIONS

	STATUS
AVOID ICING CONDITIONS	INOP SYS ENG 1 (2) A. ICE

ANTI ICE ENG 1 (2) VALVE OPEN

THRUST LIM PENALTY

	STATUS
THRUST LIM PENALTY	

WING ANTI ICE L (R) VALVE OPEN

■ **Failure detected on ground :**

– WING ANTI ICE . . . . . OFF
– ENG BLEED (affected side) . . . . . OFF
– X BLEED (if not closed) . . . . . SHUT
– APU BLEED (if left wing affected and if APU running) .. OFF

WAI AVAIL IN FLT

STATUS

WAI AVAIL IN FLT	INOP SYS
	ENG 1 (2) BLEED PACK 1 (2)

● **After takeoff when above 1500 feet (automatic recall) :**

WAI AVAIL IN FLT

– ENG BLEED . . . . . ON
– WING ANTI ICE . . . . . AS RQRD

Wing anti ice is available if needed and anyway is continually on, on failed side.

– THRUST LIM PENALTY

STATUS

R | THRUST LIM PENALTY

● **After landing (automatic recall) :**

– WING ANTI ICE . . . . . OFF
– ENG BLEED (affected side) . . . . . OFF
– X BLEED (if not closed) . . . . . SHUT
– APU BLEED (if left wing affected) . . . . . OFF

STATUS

	INOP SYS
	ENG 1 (2) BLEED PACK 1 (2)



WING ANTI ICE L (R) VALVE OPEN (CONT'D)

■ **Failure detected in flight :**

WAI AVAIL IN FLT

– WING ANTI ICE ..... AS RQRD

Wing anti-ice is available if needed and anyway is continually on on failed side.

– THRUST LIM PENALTY

STATUS

THRUST LIM PENALTY
WAI AVAIL IN FLT

● **After landing (automatic recall) :**

– ENG BLEED (affected side) ..... OFF
– X BLEED (if not closed) ..... SHUT
– APU BLEED (if left wing affected) ..... OFF
– WING ANTI ICE ..... OFF

STATUS

INOP SYS
ENG 1(2) BLEED
PACK 1 (2)

WING ANTI ICE OPEN ON GND

Following ground test the valves are still open after 35 seconds.

– WING ANTI ICE ..... OFF

	STATUS
WAI AVAIL IN FLT	I

WING ANTI ICE SYS FAULT

- **If one wing valve remains closed when the wing anti-ice is turned on :**
  – WING ANTI ICE ..... OFF
  AVOID ICING CONDITIONS

R *Note : If ice accretion, the speed must not be lower than :*
R – *VLS + 15 knots when in CONF 0.*
R – *VLS + 10 knots when in other configurations*
R – *For landing distance determination, refer to QRH part 2 or to FCOM 3.02.80*

	STATUS
AVOID ICING CONDITIONS	INOP SYS WING ANTI ICE

- **If the wing anti-ice is turned on after one engine shutdown or after the loss of one bleed :**
  – X BLEED ..... OPEN
  Note : The affected pack has to be selected OFF due to precooler performance.

WING ANTI ICE L (R) HI PR

THRUST LIM PENALTY

	STATUS
THRUST LIM PENALTY	INOP SYS WAI REGUL

WING ANTI ICE L (R) VALVE OPEN (CONT'D)

■ **Failure detected in flight :**

WAI AVAIL IN FLT

– WING ANTI ICE ..... AS RQRD

Wing anti-ice is available if needed and anyway is continually on on failed side.

– THRUST LIM PENALTY

STATUS

THRUST LIM PENALTY
WAI AVAIL IN FLT

● **After landing (automatic recall) :**

– ENG BLEED (affected side) ..... OFF
– X BLEED (if not closed) ..... SHUT
– APU BLEED (if left wing affected) ..... OFF
– WING ANTI ICE ..... OFF

STATUS

INOP SYS
ENG 1(2) BLEED
PACK 1 (2)

WING ANTI ICE OPEN ON GND

Following ground test the valves are still open after 35 seconds.

– WING ANTI ICE ..... OFF

STATUS

WAI AVAIL IN FLT | I

WING ANTI ICE SYS FAULT

● **If one wing valve remains closed when the wing anti-ice is turned on :**

– WING ANTI ICE ..... OFF

AVOID ICING CONDITIONS

R *Note : If ice accretion, the speed must not be lower than :*

R – *VLS + 15 knots when in CONF 0.*

R – *VLS + 10 knots when in other configurations*

R – *For landing distance determination, refer to QRH part 2 or to FCOM 3.02.80*

STATUS

● **If one wing valve remains closed when the wing anti ice is turned on :**

● **IF A/C ICING SEVERE**

– MIN SPD ..... ALPHA PROT

Never fly below Vα prot since the margin versus stall may be reduced.

INOP SYS
WING ANTI ICE

● **If the wing anti-ice is turned on after one engine shutdown or after the loss of one bleed :**

– X BLEED ..... OPEN

Note : The affected pack has to be selected OFF due to precooler performance.

WING ANTI ICE L (R) HI PR

THRUST LIM PENALTY

STATUS

THRUST LIM PENALTY | INOP SYS: WAI REGUL

ANTI ICE CAPT + F/O PITOT

Capt and F/O pitot heating is lost. In case of simultaneous pitot icing and in the same amount, ADR 1 and ADR 2 speeds will be in agreement, but incorrect. Therefore, flight controls will consider the remaining correct source as being faulty, and will reject the only correct source. The following ECAM procedure avoids that the flight controls use 2 erroneous, but coherent, sources.

■ **If ADR 3 operative and ON**

– ADR 1 (2) . . . . . OFF

Depending on the status of the static, AOA, and TAT heating, the ECAM requires that either ADR 1 or 2 be switched OFF.

Note : In case of subsequent, significant, speed discrepancy between the 2 remaining ADRs, the "ADR DISAGREE" ECAM caution will be triggered.

■ **If ADR 3 failed or OFF**

No action is required, as long as there are no icing conditions, in order to keep 2 independent speed sources.

● **IF ICING EXPECTED :**

– ADR 1 (2) . . . . . OFF

Depending on the status of the static, AOA, and TAT heating, the ECAM requires that either ADR 1 or 2 be switched OFF.

– UNREL SPD PROC . . . . . CONSIDER

R *Only one ADR is available, and the corresponding pitot probe may be affected by*
R *ice accretion. Be prepared to use the UNRELIABLE SPEED INDICATION/ADR CHECK PROC procedure.*

NAV ADR FAULT

STATUS

■ **If ADR 3 failed or OFF**

● **IF ICING EXPECTED :**

– ADR 1 (2) . . . . . OFF

– UNREL SPD PROC . . . . CONSIDER

INOP SYS

CAPT PITOT
F/O PITOT
CAPT PROBES
(If all CAPT PROBES heating is lost)
F/O PROBES
(If all F/O PROBES heating is lost)

ANTI ICE CAPT + STBY PITOT

Capt and STBY pitot heating is lost. In case of simultaneous pitot icing and in the same amount, ADR 1 and ADR 3 speeds will be in agreement, but incorrect. Flight controls will consider the remaining correct source as being faulty, and will reject the only correct source. The following ECAM procedure avoids that the flight controls use 2 erroneous, but coherent, sources.

■ **If ADR 2 operative and ON**

– ADR 1 (3) . . . . . OFF

Depending on the status of the static, AOA, and TAT heating, the ECAM requires that either ADR 1 or 3 be switched OFF.

Note : In case of subsequent, significant, speed discrepancy between the 2 remaining ADRs, the "ADR DISAGREE" ECAM caution will be triggered.

■ **If ADR 2 failed or OFF**

No action is required, as long as there are no icing conditions, in order to keep 2 independent speed sources.

● **IF ICING EXPECTED :**

– ADR 1 (3) . . . . . OFF

Depending on the status of the static, AOA, and TAT heating, the ECAM requires that either ADR 1 or 3 be switched OFF.

– UNREL SPD PROC . . . . . CONSIDER

R *Only one ADR is available, and the corresponding pitot probe may be affected by*
R *ice accretion. Be prepared to use the UNRELIABLE SPEED INDICATION/ADR CHECK PROC procedure.*

NAV ADR FAULT

■ **If ADR 2 failed or OFF**

● **IF ICING EXPECTED :**

– ADR 1 (3) . . . . . OFF

– UNREL SPD PROC . . . . CONSIDER

STATUS

INOP SYS
CAPT PITOT
STBY PITOT
CAPT PROBES (If all CAPT PROBES heating is lost)
STBY PROBES (If all STBY PROBES heating is lost)

ANTI ICE CAPT + F/O PITOT

Capt and F/O pitot heating is lost. In case of simultaneous pitot icing, and in the same amount, ADR 1 and ADR 2 speeds will be in agreement, but incorrect. Therefore, flight controls will consider the remaining correct source as being faulty, and will reject the only correct source. The following ECAM procedure avoids that the flight controls use two erroneous, but coherent, sources.

■ **If ADR 3 operative and ON**

– ADR 1 (2) . . . . . OFF

Depending on the status of the static, AOA, and TAT heating, the ECAM requires that either ADR 1 or 2 be switched OFF.

Note : In case of subsequent, significant, speed discrepancy between the two remaining ADRs, the "ADR DISAGREE" ECAM caution will be triggered.

■ **If ADR 3 failed or OFF**

No action is required, as long as there are no icing conditions, in order to keep two independent speed sources.

● **IF ICING EXPECTED :**

– ADR 1 (2) . . . . . OFF

Depending on the status of the static, AOA, and TAT heating, the ECAM requires that either ADR 1 or 2 be switched OFF.

– UNREL SPD PROC . . . . . APPLY

R *Only one ADR is available, and the corresponding pitot probe may be affected by*
R *ice accretion. Be prepared to use the UNRELIABLE SPEED INDICATION/ADR CHECK PROC procedure.*

NAV ADR FAULT

■ **If ADR 3 failed or OFF**

● **IF ICING EXPECTED :**

– ADR 1 (2) . . . . . OFF

– UNREL SPD PROC . . . . . APPLY

STATUS

INOP SYS

CAPT PITOT
F/O PITOT
CAPT PROBES
(If all CAPT PROBES heating is lost)
F/O PROBES
(If all F/O PROBES heating is lost)

ANTI ICE CAPT + STBY PITOT

Capt and STBY pitot heating is lost. In case of simultaneous pitot icing, and in the same amount, ADR 1 and ADR 3 speeds will be in agreement, but incorrect. Flight controls will consider the remaining correct source as being faulty, and will reject the only correct source. The following ECAM procedure avoids that the flight controls use two erroneous, but coherent, sources.

■ **If ADR 2 operative and ON**

– ADR 1 (3) . . . . . OFF

Depending on the status of the static, AOA, and TAT heating, the ECAM requires that either ADR 1 or 3 be switched OFF.

Note : In case of subsequent, significant, speed discrepancy between the two remaining ADRs, the "ADR DISAGREE" ECAM caution will be triggered.

■ **If ADR 2 failed or OFF**

No action is required, as long as there are no icing conditions, in order to keep two independent speed sources.

● **IF ICING EXPECTED :**

– ADR 1 (3) . . . . . OFF

Depending on the status of the static, AOA, and TAT heating, the ECAM requires that either ADR 1 or 3 be switched OFF.

– UNREL SPD PROC . . . . . APPLY

R *Only one ADR is available, and the corresponding pitot probe may be affected by*
R *ice accretion. Be prepared to use the UNRELIABLE SPEED INDICATION/ADR CHECK PROC procedure.*

NAV ADR FAULT

■ **If ADR 2 failed or OFF**

● **IF ICING EXPECTED :**

– ADR 1 (3) . . . . . OFF

– UNREL SPD PROC . . . . . APPLY

STATUS

INOP SYS
CAPT PITOT
STBY PITOT
CAPT PROBES (If all CAPT PROBES heating is lost)
STBY PROBES (If all STBY PROBES heating is lost)

ANTI ICE F/O + STBY PITOT

F/O and STBY pitot heating is lost. In case of simultaneous pitot icing and in the same amount, ADR 2 and ADR 3 speeds will be in agreement, but incorrect. Therefore, flight controls will consider the remaining correct source as being faulty, and will reject the only correct source. The following ECAM procedure avoids that the flight controls use 2 erroneous, but coherent, sources.

■ **If ADR 1 operative and ON**

– ADR 2 (3) . . . . . OFF

Depending on the status of the static, AOA, and TAT heating, the ECAM requires that either ADR 2 or 3 be switched OFF.

Note : In case of subsequent, significant, speed discrepancy between the 2 remaining ADRs, the "ADR DISAGREE" ECAM caution will be triggered.

■ **If ADR 1 failed or OFF**

No action is required, as long as there are no icing conditions, in order to keep 2 independent speed sources.

● **IF ICING EXPECTED :**

– ADR 2 (3) . . . . . OFF

Depending on the status of the static, AOA, and TAT heating, the ECAM requires that either ADR 2 or 3 be switched OFF.

– UNREL SPD PROC . . . . . CONSIDER

Only one ADR is available, and the corresponding pitot probe may be affected by ice accretion. Be prepared to use the UNRELIABLE SPEED INDICATION/ADR CHECK PROC procedure.

R
R

NAV ADR FAULT

STATUS

■ **If ADR 1 failed or OFF**

● **IF ICING EXPECTED :**

– ADR 2 (3) . . . . . OFF

– UNREL SPD PROC . . . . CONSIDER

INOP SYS

F/O PITOT
STBY PITOT
F/O PROBES
(If all F/O PROBES heating is lost)
STBY PROBES
(If all STBY PROBES heating is lost)

ANTI ICE ALL PITOT

Capt, F/O and STBY pitot heating is lost. In case of simultaneous pitot icing and in the same amount, ADR 1, ADR 2, and ADR 3 speeds will be in agreement, but incorrect. The following ECAM procedure avoids that the flight controls use erroneous, but coherent, sources.

– ADR 1 (2) (3) . . . . . OFF

Depending on the status of the static, AOA, and TAT heating, the ECAM requires that either ADR 1, 2 or 3 be switched OFF.

Note : In case of subsequent, significant, speed discrepancy between the 2 remaining ADRs, the "ADR DISAGREE" ECAM caution will be triggered.

● **IF ICING EXPECTED :**

– ADR 2 (3) . . . . . OFF

Depending on the status of the static, AOA, and TAT heating, the ECAM requires that either ADR 2 or 3 be switched OFF.

– UNREL SPD PROC . . . . . CONSIDER

R *Only one ADR is available, and the corresponding pitot probe may be affected by ice*
R *accretion. Be prepared to use the UNRELIABLE SPEED INDICATION/ADR CHECK PROC procedure.*

NAV ADR FAULT

Single ADR FAULT or double ADR FAULT ECAM cautions may be triggered, depending on the number of ADRs switched OFF.

F/CTL ALTN LAW (PROT LOST)

Alternate law becomes active, if :

– *One ADR has already been switched OFF, and the 2 remaining ADRs are not in agreement, or*
– *Two ADRs have been switched OFF.*



ANTI ICE F/O + STBY PITOT

F/O and STBY pitot heating is lost. In case of a simultaneous pitot icing, and in the same amount, ADR 2 and ADR 3 speeds will be in agreement, but incorrect. Therefore, flight controls will consider the remaining correct source as being faulty, and will reject the only correct source. The following ECAM procedure avoids that the flight controls use two erroneous, but coherent, sources.

■ **If ADR 1 operative and ON**

– ADR 2 (3) . . . . . OFF

Depending on the status of the static, AOA, and TAT heating, the ECAM requires that either ADR 2 or 3 be switched OFF.

Note : In case of subsequent, significant, speed discrepancy between the two remaining ADRs, the "ADR DISAGREE" ECAM caution will be triggered.

■ **If ADR 1 failed or OFF**

No action is required, as long as there are no icing conditions, in order to keep two independent speed sources.

● **IF ICING EXPECTED :**

– ADR 2 (3) . . . . . OFF

Depending on the status of the static, AOA, and TAT heating, the ECAM requires that either ADR 2 or 3 be switched OFF.

– UNREL SPD PROC . . . . . APPLY

R *Only one ADR is available, and the corresponding pitot probe may be affected by*
R *ice accretion. Be prepared to use the UNRELIABLE SPEED INDICATION/ADR CHECK PROC procedure.*

NAV ADR FAULT

■ **If ADR 1 failed or OFF**

● **IF ICING EXPECTED :**

– ADR 2 (3) . . . . . OFF

– UNREL SPD PROC . . . . . APPLY

STATUS

INOP SYS

F/O PITOT
STBY PITOT
F/O PROBES
(If all F/O PROBES heating is lost)
STBY PROBES
(If all STBY PROBES heating is lost)

ANTI ICE ALL PITOT

Capt, F/O and STBY pitot heating is lost. In case of a simultaneous pitot icing, and in the same amount, ADR 1, ADR 2, and ADR 3 speeds will be in agreement, but incorrect. The following ECAM procedure avoids that the flight controls use erroneous, but coherent, sources.

– ADR 1 (2) (3) . . . . . OFF

Depending on the status of the static, AOA, and TAT heating, the ECAM requires that either ADR 1, 2 or 3 be switched OFF.

Note : In case of subsequent, significant, speed discrepancy between the two remaining ADRs, the "ADR DISAGREE" ECAM caution will be triggered.

● **IF ICING EXPECTED :**

– ADR 2 (3) . . . . . OFF

Depending on the status of the static, AOA, and TAT heating, the ECAM requires that either ADR 2 or 3 be switched OFF.

– UNREL SPD PROC . . . . . APPLY

R *Only one ADR is available, and the corresponding pitot probe may be affected by ice*
R *accretion. Be prepared to use the UNRELIABLE SPEED INDICATION/ADR CHECK PROC procedure.*

NAV ADR FAULT

Single ADR FAULT or double ADR FAULT ECAM cautions may be triggered, depending on the number of ADRs switched OFF.

F/CTL ALTN LAW (PROT LOST)

Alternate law becomes active, if :

– *One ADR has already been switched OFF, and the two remaining ADRs are not in agreement, or*
– *Two ADRs have been switched OFF.*



ANTI ICE ALL PITOT (CONT'D)

STATUS

● **IF ICING EXPECTED :**
- ADR 2 (3) . . . . . OFF
- UNREL SPD PROC . . . . . CONSIDER

INOP SYS
CAPT PITOT
F/O PITOT
STBY PITOT
CAPT PROBES (If all CAPT PROBES heating is lost)
F/O PROBES (If all F/O PROBES heating is lost)
STBY PROBES (If all STBY PROBES heating is lost)

ANTI ICE ALL PITOT (CONT'D)

STATUS

	INOP SYS
● **IF ICING EXPECTED :**	
– ADR 2 (3) . . . . . OFF	CAPT PITOT
– UNREL SPD PROC . . . . . APPLY	F/O PITOT
	STBY PITOT
	CAPT PROBES (If all CAPT PROBES heating is lost)
	F/O PROBES (If all F/O PROBES heating is lost)
	STBY PROBES (If all STBY PROBES heating is lost)

RECORDER DFDR FAULT

Crew awareness.

STATUS

INOP SYS
DFDR

RECORDER FDIU FAULT

Crew awareness.

STATUS

INOP SYS
FDIU

FWS SDAC 1(2) FAULT

Crew awareness

STATUS

R *Note : Although the ECAM may display some symbols and/or*
R *parameters in amber, this does not always signify that*
R *additional systems are failed.*

INOP SYS
SDAC 1(2)

FWS SDAC 1 + 2 FAULT

– MONITOR OVERHEAD PANEL

Amber cautions are lost. Aircraft status on the ECAM STATUS page is lost.
Only red warnings, engine and fuel parameters, and slat/flap positions are available on the upper ECAM DU.

– ECAM ENG FUEL F/CTL WHEEL (L/G pos ind) SYS PAGES AVAIL.

STATUS

Note : Although this failure does not affect engine idle, the "ENG 1 APPR IDLE ONLY" and "ENG 2 APPR IDLE ONLY" messages are displayed. Disregard them.

INOP SYS
SDAC 1 + 2

RECORDER DFDR FAULT

Crew awareness.

STATUS

INOP SYS
DFDR

RECORDER FDIU FAULT

Crew awareness.

STATUS

INOP SYS
FDIU

FWS OEB/FWC DISCREPANCY

– OEB DATABASE . . . . . XCHECK

This action is normally performed by maintenance.

FWS SDAC 1(2) FAULT

Crew awareness

STATUS

R *Note : Although the ECAM may display some symbols and/or*
R *parameters in amber, this does not always signify that*
R *additional systems are failed.*

INOP SYS
SDAC 1(2)

FWS SDAC 1 + 2 FAULT

– MONITOR OVERHEAD PANEL

Amber cautions are lost. Aircraft status on the ECAM STATUS page is lost.
Only red warnings, engine and fuel parameters, and slat/flap positions are available on the upper ECAM DU.

– ECAM ENG FUEL F/CTL WHEEL (L/G pos ind) SYS PAGES AVAIL.

STATUS

Note : Although this failure does not affect engine idle, the "ENG 1 APPR IDLE ONLY" and "ENG 2 APPR IDLE ONLY" messages are displayed. Disregard them.

INOP SYS
SDAC 1 + 2

RECORDER DFDR FAULT

Crew awareness.

STATUS

INOP SYS
DFDR

RECORDER SYS FAULT

Crew awareness.

STATUS

INOP SYS
RECORDER SYS

FWS OEB/FWC DISCREPANCY

– OEB DATABASE . . . . . XCHECK

This action is normally performed by maintenance.

FWS SDAC 1(2) FAULT

Crew awareness

STATUS

R Note : *Although the ECAM may display some symbols and/or*
R *parameters in amber, this does not always signify that*
R *additional systems are failed.*

INOP SYS
SDAC 1(2)

FWS SDAC 1 + 2 FAULT

– MONITOR OVERHEAD PANEL

Amber cautions are lost. Aircraft status on the ECAM STATUS page is lost.
Only red warnings, engine and fuel parameters, and slat/flap positions are available on the upper ECAM DU.

– ECAM ENG FUEL F/CTL WHEEL (L/G pos ind) SYS PAGES AVAIL.

STATUS

Note : *Although this failure does not affect engine idle, the "ENG 1 APPR IDLE ONLY" and "ENG 2 APPR IDLE ONLY" messages are displayed. Disregard them.*

INOP SYS
SDAC 1 + 2

EIS DMC 1(2)(3) FAULT

■ **DMC 1**

– EIS DMC SWITCH . . . . . CAPT

DMC 3 replaces DMC 1.

■ **DMC 2**

– EIS DMC SWITCH . . . . . F/O

DMC 3 replaces DMC 2.

■ **DMC 3**

Crew awareness.

STATUS

INOP SYS
DMC 1(2)(3)

FWS FWC 1(2) FAULT

Crew awareness.

CAT 3 SINGLE ONLY

STATUS

INOP SYS
CAT 3 DUAL
FWC 1(2)

FWS FWC 1 + 2 FAULT

– MONITOR SYS

– MONITOR OVERHEAD PANEL

R CAT 1 ONLY (not displayed on the ECAM)

NOT AVAIL
ECAM WARN
ALTI ALERT
STATUS
A/CALL OUT
MEMO

ECAM cautions and warnings, aural warnings, master caution and warning lights are lost. ECAM system pages are still available. Therefore cockpit panels must be monitored for local warnings and ECAM system pages must be regularly called for system checks.

DISPLAY UNIT FAILURE

■ **The AFFECTED DU IS BLANK or the DISPLAY IS DISTORTED :**

– DU (affected) . . . . . AS RQRD

The DU can be switched off.

– ECAM/ND XFR (if the ECAM DUs are affected) . . . . . USE

Transfer SD to F/O or CAPT ND.

– PFD/ND XFR (if the EFIS DUs are affected) . . . . . USE

■ **DIAGONAL LINE ON THE AFFECTED DU :**

This failure may be because of a DMC FAULT, or a communication interruption between the DMC and DU.

– EIS DMC SWITCHING . . . . . AS RQRD

● **If unsuccessful :**

– DU (affected) . . . . . OFF THEN ON

Note : The ND display may disappear, if too many waypoints and associated information are displayed. Reduce the range, or deselect WPT or CSTR, and the display will automatically recover, after about 30 seconds.

■ **INVERSION OF THE EWD AND THE SD :**

– ECAM UPPER DISPLAY . . . . . OFF THEN ON

The same action on the EIS DMC SWITCHING selector produces the same effect.

EIS DMC 1(2)(3) FAULT

■ **DMC 1**

– EIS DMC SWITCH . . . . . CAPT

DMC 3 replaces DMC 1.

■ **DMC 2**

– EIS DMC SWITCH . . . . . F/O

DMC 3 replaces DMC 2.

■ **DMC 3**

Crew awareness.

STATUS

INOP SYS
DMC 1(2)(3)

FWS FWC 1(2) FAULT

Crew awareness.

STATUS

CAT 3 SINGLE ONLY

INOP SYS
CAT 3 DUAL
FWC 1(2)

FWS FWC 1 + 2 FAULT

– MONITOR SYS

– MONITOR OVERHEAD PANEL

R CAT 1 ONLY (not displayed on the ECAM)

NOT AVAIL
ECAM WARN
ALTI ALERT
STATUS
A/CALL OUT
MEMO

ECAM cautions and warnings, aural warnings, master caution and warning lights are lost. ECAM system pages are still available. Therefore cockpit panels must be monitored for local warnings and ECAM system pages must be regularly called for system checks.

DISPLAY UNIT FAILURE

R ■ **The DU is blank, or the display is distorted :**

– DU (affected) . . . . . AS RQRD
The DU can be switched off.
– ECAM/ND XFR (if the ECAM DUs are affected) . . . . . USE
Transfer SD to F/O or CAPT ND.
– PFD/ND XFR (if the EFIS DUs are affected) . . . . . USE

R ■ **INVALID DISPLAY UNIT message is displayed :**

R *This may be caused by a DU failure.*
R – FOR AUTOMATIC DU RECOVERY .. WAIT MORE THAN 40s
R ● **IF DU IS AUTOMATICALLY RECOVERED :**
R No crew action is required.
R ● **IF DU IS NOT RECOVERED :**
R – Non-recovered DU . . . . . AS RQRD
R *The DU can be switched off.*

■ **The INVALID DATA message appears (not on all DUs) :**

This failure may be because of a DMC FAULT, or a communication interruption between the DMC and DU.
– EIS DMC SWITCHING . . . . . AS RQRD
● **If unsuccessful :**
– DU (affected) . . . . . OFF THEN ON
Note : The ND display may disappear, if too many waypoints and associated information are displayed. Reduce the range, or deselect WPT or CSTR, and the display will automatically recover, after about 30 seconds.

■ **The INVALID DATA message appears on all DUs :**

The autopilot, autothrust and MCDU navigation data are still available, and may be used.
– FOR AUTOMATIC DUs RECOVERY . WAIT MORE THAN 40S
● **IF ALL DUs ARE AUTOMATICALLY RECOVERED :**
No crew action is required.
● **IF ONE OR MORE DUs ARE NOT RECOVERED :**
– Non-recovered DUs . . . . . OFF FOR 40S
– Non-recovered DUs . . . . . BACK ON sequentially
● **If the initial failure re-occurs (the INVALID DATA message appears on all DUs), when switching a given DU back ON :**
Apply the entire procedure again, from the beginning. Leave this specific DU permanently OFF.

■ **INVERSION OF THE EWD AND THE SD :**

– ECAM UPPER DISPLAY . . . . . OFF THEN ON
The action on the EIS DMC SWITCHING selector produces the same effect.

EIS DMC 1(2)(3) FAULT

■ **DMC 1**

– EIS DMC SWITCH . . . . . CAPT 3

DMC 3 replaces DMC 1.

■ **DMC 2**

– EIS DMC SWITCH . . . . . F/O 3

DMC 3 replaces DMC 2.

■ **DMC 3**

Crew awareness.

STATUS

INOP SYS
DMC 1(2)(3)

FWS FWC 1(2) FAULT

Crew awareness.

CAT 3 SINGLE ONLY

STATUS

INOP SYS
CAT 3 DUAL
FWC 1(2)

FWS FWC 1 + 2 FAULT

– MONITOR SYS

– MONITOR OVERHEAD PANEL

R CAT 1 ONLY (not displayed on the ECAM)

NOT AVAIL
ECAM WARN
ALTI ALERT
STATUS
A/CALL OUT
MEMO

ECAM cautions and warnings, aural warnings, master caution and warning lights are lost. ECAM system pages are still available. Therefore cockpit panels must be monitored for local warnings and ECAM system pages must be regularly called for system checks.

DISPLAY UNIT FAILURE

R ■ **The DU is blank, or the display is distorted :**

– DU (affected) . . . . . AS RQRD
The DU can be switched off.
– ECAM/ND XFR (if the ECAM DUs are affected) . . . . . USE
Transfer SD to F/O or CAPT ND.
– PFD/ND XFR (if the EFIS DUs are affected) . . . . . USE

R ■ **INVALID DISPLAY UNIT message is displayed :**

R *This may be caused by a DU failure.*
R – FOR AUTOMATIC DU RECOVERY .. WAIT MORE THAN 40s
R ● **IF DU IS AUTOMATICALLY RECOVERED :**
R No crew action is required.
R ● **IF DU IS NOT RECOVERED :**
R – Non-recovered DU . . . . . AS RQRD
R *The DU can be switched off.*

■ **The INVALID DATA message appears (not on all DUs) :**

This failure may be because of a DMC FAULT, or a communication interruption between the DMC and DU.
– EIS DMC SWITCHING . . . . . AS RQRD
● **If unsuccessful :**
– DU (affected) . . . . . OFF THEN ON
Note : The ND display may disappear, if too many waypoints and associated information are displayed. Reduce the range, or deselect WPT or CSTR, and the display will automatically recover, after about 30 seconds.

■ **The INVALID DATA message appears on all DUs :**

The autopilot, autothrust and MCDU navigation data are still available, and may be used.
– FOR AUTOMATIC DUs RECOVERY . WAIT MORE THAN 40S
● **IF ALL DUs ARE AUTOMATICALLY RECOVERED :**
No crew action is required.
● **IF ONE OR MORE DUs ARE NOT RECOVERED :**
– Non-recovered DUs . . . . . OFF FOR 40S
– Non-recovered DUs . . . . . BACK ON sequentially
● **If the initial failure re-occurs (the INVALID DATA message appears on all DUs), when switching a given DU back ON :**
Apply the entire procedure again, from the beginning. Leave this specific DU permanently OFF.

■ **INVERSION OF THE EWD AND THE SD :**

– ECAM UPPER DISPLAY . . . . . OFF THEN ON
The action on the EIS DMC SWITCHING selector produces the same effect.

ECAM SINGLE DISPLAY

Only the EWD is available. There is no SD on the other DUs.

■ **To call a SYS page :**

– PRESS AND MAINTAIN the SYS page key on the ECP.

■ **OVERFLOW ON THE STATUS page :**

– PRESS AND MAINTAIN the STS KEY ON the ECP
The first page of STATUS appears.

– RELEASE IT, THEN PRESS AGAIN WITHIN 2 SECONDS
The second page of STATUS appears.

– CONTINUE UNTIL THE OVERFLOW ARROW DISAPPEARS.
When the STS key is released for more than 2 seconds, the EWD reappears.

L/G SHOCK ABSORBER FAULT

■ **Shock absorber not extended after liftoff :**

MAX SPEED 280/.67
– L/G . . . . . KEEP DOWN

STATUS

MAX SPEED 280/.67	INOP SYS
– L/G . . . . . KEEP DOWN	L/G RETRACT
INCREASED FUEL CONSUMP	

Flight with landing gear extended has a significant effect on fuel consumption and climb gradient (see "SPECIAL OPERATIONS" - FLIGHT WITH GEAR DOWN).

R *Note : If WHEEL N.W. STEER FAULT is also displayed, then the nose wheels may be at*
R *maximum deflection. (turned 90 degrees from center). During landing, delay nose*
R *wheel touchdown for as long as possible.*

■ **Shock absorber extended on the ground :**

Crew awareness.

L/G GEAR NOT UPLOCKED

This warning appears if the landing gear sequence is not completed after 30 seconds.

■ **L/G doors closed :**

AVOID EXCESS G FACTOR

Because the gear rests on the doors, avoid excessive load factors in order not to damage door structure.



L/G GEAR NOT UPLOCKED (CONT'D)

■ **L/G doors not closed :**

MAX SPEED 220/.54
– L/G . . . . . RECYCLE

● **IF UNSUCCESSFUL :**

– L/G . . . . . DOWN
MAX SPEED 280/.67

STATUS

MAX SPEED 280/.67	INOP SYS
INCREASED FUEL CONSUMP	L/G RETRACT

R *Note : – Flight with landing gear extended has a significant effect on fuel consumption and*
R *climb gradient (see "SPECIAL OPERATIONS" - FLIGHT WITH GEAR DOWN - FCOM*
R *2.04.25). Multiply fuel consumption by approximately 2.8. Disregard FM fuel*
R *predictions.*
R *– Other predictions should also be disregarded (altitude, speed and time), except*
R *time predictions at waypoints when in cruise.*
R *– Do not use managed speed (except in approach) and CLB and DES autopilot*
R *modes.*

L/G GEAR NOT DOWNLOCKED

This warning appears, if the landing gear sequence is not completed after 30 seconds.

– L/G lever . . . . . RECYCLE

● **IF UNSUCCESSFUL :**

– L/G . . . . . GRVTY EXTN
Rotate the handle clockwise about 3 turns until reaching the mechanical stop. See the procedure on the next page.

STATUS

– L/G . . . . . GRVTY EXTN	INOP SYS
CAT 3 SINGLE ONLY	CAT 3 DUAL
If gravity extension is unsuccessful, see "LDG WITH ABNORMAL L/G" procedure.	N.W. STEER

Note : As nose gear doors remain open, hydraulic power for nosewheel steering is lost.

L/G SHOCK ABSORBER FAULT

■ **Shock absorber not extended after liftoff :**

MAX SPEED 280/.67
– L/G . . . . . KEEP DOWN

STATUS

MAX SPEED 280/.67	INOP SYS
– L/G . . . . . KEEP DOWN	L/G RETRACT
INCREASED FUEL CONSUMP	

Flight with landing gear extended has a significant effect on fuel consumption and climb gradient (see "SPECIAL OPERATIONS" - FLIGHT WITH GEAR DOWN).

R *Note : If WHEEL N.W. STEER FAULT is also displayed, then the nose wheels may be at*
R *maximum deflection. (turned 90 degrees from center). During landing, delay nose*
R *wheel touchdown for as long as possible.*

■ **Shock absorber extended on the ground :**

Crew awareness.

L/G GEAR NOT UPLOCKED

This warning appears if the landing gear sequence is not completed after 30 seconds.

■ **L/G doors closed :**

AVOID EXCESS G FACTOR

Because the gear rests on the doors, avoid excessive load factors in order not to damage door structure.



L/G GEAR NOT UPLOCKED (CONT'D)

■ **L/G doors not closed :**

MAX SPEED 220/.54
– L/G . . . . . RECYCLE

● **IF UNSUCCESSFUL :**

– L/G . . . . . DOWN
MAX SPEED 280/.67

STATUS

MAX SPEED 280/.67	INOP SYS
INCREASED FUEL CONSUMP	L/G RETRACT

Note : – Flight with landing gear extended has a significant effect on fuel consumption and climb gradient (see "SPECIAL OPERATIONS" - FLIGHT WITH GEAR DOWN - FCOM 2.04.25). Multiply fuel consumption by approximately 2.3. Disregard FM fuel predictions.

– Other predictions should also be disregarded (altitude, speed and time), except time predictions at waypoints when in cruise.

– Do not use managed speed (except in approach) and CLB and DES autopilot modes.

L/G GEAR NOT DOWNLOCKED

This warning appears, if the landing gear sequence is not completed after 30 seconds.

– L/G lever . . . . . RECYCLE

● **IF UNSUCCESSFUL :**

– L/G . . . . . GRVTY EXTN
Rotate the handle clockwise about 3 turns until reaching the mechanical stop. See the procedure on the next page.

STATUS

– L/G . . . . . GRVTY EXTN	INOP SYS
CAT 3 SINGLE ONLY	CAT 3 DUAL
If gravity extension is unsuccessful, see "LDG WITH ABNORMAL L/G" procedure.	

L/G GRAVITY EXTENSION

– GRAVITY GEAR EXTN handcrank . . . . . PULL AND TURN

Rotate the handle clockwise 3 turns until reaching the mechanical stop, even if resistance is felt.

– L/G lever . . . . . DOWN

The landing gear lever should be confirmed in the DOWN position for the following reasons :

- *To extinguish the UNLK lights on the landing gear indication panel.*
- *To prevent the L/G CTL message from appearing on the WHEEL page.*
- *To minimize the risk of landing gear retraction on the ground, due to an unknown system fault, when the free-fall system is reset.*

– GEAR DOWN indications (if available) . . . . . CHECK

Note : 1. Depending on aircraft speed, the display may show the landing gear doors in the amber transit position.

2. In the event of gravity extension, caused by the failure of both LGCIUs, landing gear position indications on the ECAM are lost. LDG GEAR lights on the LDG GEAR control panel remain available, if LGCIU 1 is electrically-supplied.

R *3. The LGCIU 2 FAULT or BRAKES BSCU CH 1(2) FAULT warning may be spuriously triggered after a gravity extension.*

4. If the three green downlock arrows are not on, it is possible that the handcrank is not at the mechanical stop. Check that the handcrank is firmly against the mechanical stop.

CAUTION

Nosewheel steering is lost.

■ **if successful :**

Do not reset the freefall system. This will avoid such undesirable effects as further loss of fluid, in the event of a leak, or possible landing gear unlocking, in the event of a gear selector valve jamming in the UP position.

Note : The freefall system may be reset in flights used for training. If the green hydraulic system is available, resetting the freefall system allows the landing gear doors to be closed and the nosewheel steering to operate.

The flight crew should not reset the freefall system on ground after the flight.

■ **If unsuccessful :**

– LDG WITH ABNORMAL L/G procedure . . . . . APPLY

L/G DOORS NOT CLOSED

- **If aircraft speed is below 220 knots and the L/G lever is UP:**
  – L/G ..... RECYCLE
- **IF UNSUCCESSFUL :**
  MAX SPEED 250/.60

STATUS

	INOP SYS
MAX SPEED 250/.60	L/G DOOR
INCREASED FUEL CONSUMP	

L/G GEAR UPLOCK FAULT

– L/G ..... KEEP DOWN

The landing gear must be left down to avoid structural damage, because the uplock device will stay in the locked position.

MAX SPEED 280/.67

STATUS

	INOP SYS
MAX SPEED 280/.67	L/G RETRACT
– L/G ..... KEEP DOWN	
INCREASED FUEL CONSUMP	

Flight with the landing gear extended has a significant effect on fuel consumption and climb gradient (see "SPECIAL OPERATIONS" - FLIGHT WITH GEAR DOWN). Multiply fuel consumption by approximately 2.8.

L/G GRAVITY EXTENSION

– GRAVITY GEAR EXTN handcrank . . . . . PULL AND TURN

Rotate the handle clockwise 3 turns until reaching the mechanical stop, even if resistance is felt.

– L/G lever . . . . . DOWN

The landing gear lever should be confirmed in the DOWN position for the following reasons :

- *To extinguish the UNLK lights on the landing gear indication panel.*
- *To prevent the L/G CTL message from appearing on the WHEEL page.*
- *To minimize the risk of landing gear retraction on the ground, due to an unknown system fault, when the free-fall system is reset.*

– GEAR DOWN indications (if available) . . . . . CHECK

Note : 1. Depending on aircraft speed, the display may show the landing gear doors in the amber transit position.

2. In the event of gravity extension, caused by the failure of both LGCIUs, landing gear position indications on the ECAM are lost. LDG GEAR lights on the LDG GEAR control panel remain available, if LGCIU 1 is electrically-supplied.

3. The LGCIU 2 FAULT or BRAKES SYS 1(2) FAULT warning may be spuriously triggered after a gravity extension.

4. If the three green downlock arrows are not on, it is possible that the handcrank is not at the mechanical stop. Check that the handcrank is firmly against the mechanical stop.

CAUTION

Nosewheel steering is lost.

■ **If successful :**

Do not reset the freefall system. This will avoid such undesirable effects as further loss of fluid, in the event of a leak, or possible landing gear unlocking, in the event of a gear selector valve jamming in the UP position.

Note : The freefall system may be reset in flights used for training. If the green hydraulic system is available, resetting the freefall system allows the landing gear doors to be closed and the nosewheel steering to operate.

The flight crew should not reset the freefall system on ground after the flight.

■ **If unsuccessful :**

– LDG WITH ABNORMAL L/G procedure . . . . . APPLY

L/G DOORS NOT CLOSED

- **If aircraft speed is below 220 knots and the L/G lever is UP:**
  – L/G ..... RECYCLE
- **IF UNSUCCESSFUL :**
  MAX SPEED 250/.60

STATUS

MAX SPEED 250/.60	INOP SYS
INCREASED FUEL CONSUMP	L/G DOOR

L/G GEAR UPLOCK FAULT

– L/G ..... KEEP DOWN

The landing gear must be left down to avoid structural damage, because the uplock device will stay in the locked position.

MAX SPEED 280/.67

STATUS

MAX SPEED 280/.67	INOP SYS
– L/G ..... KEEP DOWN	L/G RETRACT
INCREASED FUEL CONSUMP	

Flight with the landing gear extended has a significant effect on fuel consumption and climb gradient (see "SPECIAL OPERATIONS" - FLIGHT WITH GEAR DOWN). Multiply fuel consumption by approximately 2.8.

L/G GRAVITY EXTENSION

– GRAVITY GEAR EXTN handcrank . . . . . PULL AND TURN

Rotate the handle clockwise 3 turns until reaching the mechanical stop, even if resistance is felt.

– L/G lever . . . . . DOWN

The landing gear lever should be confirmed in the DOWN position for the following reasons :

- *To extinguish the UNLK lights on the landing gear indication panel.*
- *To prevent the L/G CTL message from appearing on the WHEEL page.*
- *To minimize the risk of landing gear retraction on the ground, due to an unknown system fault, when the free-fall system is reset.*

– GEAR DOWN indications (if available) . . . . . CHECK

Note : 1. Depending on aircraft speed, the display may show the landing gear doors in the amber transit position.

2. In the event of gravity extension, caused by the failure of both LGCIUs, landing gear position indications on the ECAM are lost. LDG GEAR lights on the LDG GEAR control panel remain available, if LGCIU 1 is electrically-supplied.

3. The LGCIU 2 FAULT or BRAKES SYS 1(2) FAULT warning may be spuriously triggered after a gravity extension.

4. If the three green downlock arrows are not on, it is possible that the handcrank is not at the mechanical stop. Check that the handcrank is firmly against the mechanical stop.

■ **If successful :**

Do not reset the freefall system. This will avoid such undesirable effects as further loss of fluid, in the event of a leak, or possible landing gear unlocking, in the event of a gear selector valve jamming in the UP position.

Note : The freefall system may be reset in flights used for training. If the green hydraulic system is available, resetting the freefall system allows the landing gear doors to be closed.

The flight crew should not reset the freefall system on ground after the flight.

■ **If unsuccessful :**

– LDG WITH ABNORMAL L/G procedure . . . . . APPLY

L/G DOORS NOT CLOSED

- **If aircraft speed is below 220 knots and the L/G lever is UP:**
  – L/G ..... RECYCLE
- **IF UNSUCCESSFUL :**
  MAX SPEED 250/.60

STATUS

	INOP SYS
MAX SPEED 250/.60	L/G DOOR
INCREASED FUEL CONSUMP	

L/G GEAR UPLOCK FAULT

– L/G ..... KEEP DOWN

The landing gear must be left down to avoid structural damage, because the uplock device will stay in the locked position.

MAX SPEED 280/.67

STATUS

	INOP SYS
MAX SPEED 280/.67	L/G RETRACT
– L/G ..... KEEP DOWN	
INCREASED FUEL CONSUMP	

Flight with the landing gear extended has a significant effect on fuel consumption and climb gradient (see "SPECIAL OPERATIONS" - FLIGHT WITH GEAR DOWN). Multiply fuel consumption by approximately 2.8.

L/G GRAVITY EXTENSION

– GRAVITY GEAR EXTN handcrank . . . . . PULL AND TURN

Rotate the handle clockwise 3 turns until reaching the mechanical stop, even if resistance is felt.

– L/G lever . . . . . DOWN

The landing gear lever should be confirmed in the DOWN position for the following reasons :

- *To extinguish the UNLK lights on the landing gear indication panel.*
- *To prevent the L/G CTL message from appearing on the WHEEL page.*
- *To minimize the risk of landing gear retraction on the ground, due to an unknown system fault, when the free-fall system is reset.*

– GEAR DOWN indications (if available) . . . . . CHECK

Note : 1. Depending on aircraft speed, the display may show the landing gear doors in the amber transit position.

2. In the event of gravity extension, caused by the failure of both LGCIUs, landing gear position indications on the ECAM are lost. LDG GEAR lights on the LDG GEAR control panel remain available, if LGCIU 1 is electrically-supplied.

3. The LGCIU 2 FAULT or BRAKES SYS 1(2) FAULT warning may be spuriously triggered after a gravity extension.

4. If the three green downlock arrows are not on, it is possible that the handcrank is not at the mechanical stop. Check that the handcrank is firmly against the mechanical stop.

■ **If successful :**

Do not reset the freefall system. This will avoid such undesirable effects as further loss of fluid, in the event of a leak, or possible landing gear unlocking, in the event of a gear selector valve jamming in the UP position.

Note : The freefall system may be reset in flights used for training. If the green hydraulic system is available, resetting the freefall system allows the landing gear doors to be closed.

The flight crew should not reset the freefall system on ground after the flight.

■ **If unsuccessful :**

– LDG WITH ABNORMAL L/G procedure . . . . . APPLY

L/G DOORS NOT CLOSED

- **If the L/G lever is UP :**
  - **WHEN SPD < 220/.54**
    - L/G ..... RECYCLE
- **IF UNSUCCESSFUL :**

MAX SPEED 250/.60

STATUS

	INOP SYS
MAX SPEED 250/.60	
INCREASED FUEL CONSUMP	L/G DOOR

L/G GEAR UPLOCK FAULT

- L/G ..... KEEP DOWN

The landing gear must be kept down to avoid structural damage, because the uplock device will stay in the locked position.

MAX SPEED 280/.67

STATUS

	INOP SYS
MAX SPEED 280/.67	
- L/G ..... KEEP DOWN	L/G RETRACT
INCREASED FUEL CONSUMP	

Flight with the landing gear extended has a significant effect on fuel consumption and climb gradient (see "SPECIAL OPERATIONS" - FLIGHT WITH GEAR DOWN). Multiply the fuel consumption by approximately 2.8.

L/G SYS DISAGREE

Disagreement between the landing gear positions are detected by LGCIU 1 and LGCIU 2. Provided there is no other L/G ECAM warning, the landing gear position is in agreement with the landing gear lever position.

Crew awareness.

L/G LGCIU 1(2) FAULT

■ **one LGCIU faulty :**

– GPWS (if LGCIU 1 affected) . . . . . OFF

If LGCIU 1 is lost, GPWS receives "L/G in up position" information even if the landing gear is down.

Setting the GPWS SYS pushbutton to OFF will prevent untimely warnings during the approach.

STATUS

	INOP SYS
ENG 1(2) APPR IDLE ONLY *When idle is selected on the ground with slats extended, only approach idle is available.*	LGCIU 1(2) REV 1(2) GPWS (if LGCIU 1 fault)

■ **both LGCIUs faulty :**

Normal landing gear control and position indications are lost. LDG GEAR lights on LDG GEAR control panel remain available if LGCIU 1 is electrically supplied.

– L/G . . . . . GRVTY EXTN

See the L/G GRAVITY EXTENSION procedure.

– GPWS . . . . . OFF

As LGCIU 1 is lost, GPWS receives "L/G in up position" information even if the landing gear is down.

Setting the GPWS SYS pushbutton to OFF will prevent untimely warnings during approach.

STATUS

	INOP SYS
– L/G . . . . . GRVTY EXTN L/G CONTROL NOT AVAIL ENG 1 APPR IDLE ONLY ENG 2 APPR IDLE ONLY CAT 1 ONLY	REVERSER 1 + 2 AP 1 + 2 (except in LAND mode) A/THR N.W STEER LGCIU 1 and 2 GPWS

Note : 1. The partial spoiler extension (◁) at landing when only one main landing gear is compressed is not available. The spoilers extend normally on ground when wheel speed greater than 72 knots.

2. Depending on the LGCIU failure, only a part of the above systems may be lost.

L/G GEAR NOT DOWN

Select landing gear down.

LDG WITH ABNORMAL L/G

The procedure is intended for use when the nose or main landing gear fail to extend and/or lock down following the application of the L/G GRVTY EXTN procedure.
It is preferable to use any available landing gear, rather than carry out a belly landing.
Under these circumstances, a hard surface runway landing is recommended.
Full advantage should be taken of any foam, spread on the runway.

PREPARATION

– CABIN CREW ..... NOTIFY
Notify the cabin crew of the nature of the emergency encountered and state intentions. Specify the amount of available preparation time.
– ATC ..... NOTIFY
Notify ATC of the nature of the emergency and state intentions.
Consider fuel reduction to a safe minimum. This reduces VREF and, consequently, the load factor at impact and the energy to be dissipated.
– GALLEY ..... OFF

● **If NOSE L/G abnormal**
– CG location (if possible) ..... AFT
· *10 passengers from front to rear moves the CG roughly 4 % aft*
· *10 passengers from mid to rear moves the CG roughly 2.5 aft.*

● **If one MAIN L/G abnormal**
– FUEL IMBALANCE ..... CONSIDER
Open the fuel X-FEED valve and switch off the pumps on the side with landing gear normally extended.

– OXYGEN CREW SUPPLY ..... OFF
R – SIGNS ..... ON
– CABIN and COCKPIT ..... PREPARE
· *Loose equipment secured.*
· *Survival equipment prepared.*
· *Belts and shoulder harnesses locked.*

APPROACH

– GPWS SYS ..... OFF
– L/G lever ..... CHECK DOWN
– GRVTY GEAR EXTN handcrank .. TURN BACK TO NORMAL
Rotating three turns back to normal may, in certain cases, pressurize the landing gear down actuators, thereby reducing the probability of gear collapse after touchdown.



L/G LGCIU 1(2) FAULT

■ **One LGCIU is faulty the:**

– GPWS (if LGCIU 1 affected) . . . . . OFF

If LGCIU 1 is lost, the GPWS receives "L/G in up position" information, even if the landing gear is down.

Setting the GPWS SYS pushbutton to OFF will prevent untimely warnings during the approach.

STATUS

	INOP SYS
ENG 1(2) APPR IDLE ONLY *When idle is selected on ground with slats extended, only approach idle is available.*	LGCIU 1(2) REV 1(2) GPWS (if LGCIU 1 fault)

■ **Both LGCIUs are faulty :**

Normal landing gear control and position indications are lost. LDG GEAR lights on LDG GEAR control panel remain available, if LGCIU 1 is electrically–supplied.

– L/G . . . . . GRVTY EXTN

See the L/G GRAVITY EXTENSION procedure.

– GPWS . . . . . OFF

As LGCIU 1 is lost, the GPWS receives "L/G in up position" information, even if the landing gear is down.

Setting the GPWS SYS pushbutton to OFF will prevent untimely warnings during approach.

STATUS

	INOP SYS
– L/G . . . . . GRVTY EXTN L/G CONTROL NOT AVAIL ENG 1 APPR IDLE ONLY ENG 2 APPR IDLE ONLY CAT 1 ONLY	REVERSER 1 + 2 AP 1 + 2 (except in LAND mode) A/THR LGCIU 1 and 2 GPWS

Note : 1. The partial spoiler extension (◁) at landing, when only one main landing gear is compressed, is not available. The spoilers extend normally on ground, when the wheel speed greater than 72 knots.

2. Depending on the LGCIU failure, only a part of the above systems may be lost.

L/G GEAR NOT DOWN

Crew awareness.

Select landing gear down.

LDG WITH ABNORMAL L/G

The procedure is intended for use when the nose or main landing gear fail to extend and/or lock down following the application of the L/G GRVTY EXTN procedure.
It is preferable to use any available landing gear, rather than carry out a belly landing.
Under these circumstances, a hard surface runway landing is recommended.
Full advantage should be taken of any foam, spread on the runway.

PREPARATION

– CABIN CREW ..... NOTIFY
Notify the cabin crew of the nature of the emergency encountered and state intentions. Specify the amount of available preparation time.
– ATC ..... NOTIFY
Notify ATC of the nature of the emergency and state intentions.
Consider fuel reduction to a safe minimum. This reduces VREF and, consequently, the load factor at impact and the energy to be dissipated.
– GALLEY ..... OFF

● **If NOSE L/G abnormal**
– CG location (if possible) ..... AFT
· *10 passengers from front to rear moves the CG roughly 4 % aft*
· *10 passengers from mid to rear moves the CG roughly 2.5 aft.*

● **If one MAIN L/G abnormal**
– FUEL IMBALANCE ..... CONSIDER
Open the fuel X-FEED valve and switch off the pumps on the side with landing gear normally extended.

– OXYGEN CREW SUPPLY ..... OFF
R – SIGNS ..... ON
– CABIN and COCKPIT ..... PREPARE
· *Loose equipment secured.*
· *Survival equipment prepared.*
· *Belts and shoulder harnesses locked.*

APPROACH

– GPWS SYS ..... OFF
– L/G lever ..... CHECK DOWN
– GRVTY GEAR EXTN handcrank .. TURN BACK TO NORMAL
Rotating three turns back to normal may, in certain cases, pressurize the landing gear down actuators, thereby reducing the probability of gear collapse after touchdown.



LDG WITH ABNORMAL L/G (CONT'D)

– AUTOBRAKE . . . . . DO NOT ARM

R *Manual braking will enable better pitch and roll control. Moreover, with at least one*
R *main landing gear in the abnormal position the autobrake cannot be activated (ground*
R *spoilers not armed).*

– EMER EXIT LT . . . . . ON

– CABIN REPORT . . . . . OBTAIN

● **If one or both MAIN L/G abnormal**

– A/SKID & N/S STRG . . . . . OFF

R *With one main landing gear not extended, the reference speed used by the*
R *anti-skid to detect a wheel blockage is not correctly initialized. Consequently, the*
R *anti-skid must be switched off to prevent permanent brake release.*

– MAX BRAKE PR 1000PSI

R *Modulate the brake pressure to 1000 psi because the anti-skid is off.*

– GROUND SPOILERS . . . . . DO NOT ARM

R *To keep as much roll authority as possible for maintaining the wings level.*
R *Ground spoiler extension would prevent spoilers from acting as roll surfaces.*

BEFORE LANDING

– RAM AIR . . . . . ON

To ensure full depressurization of the aircraft before impact.

– BRACE FOR IMPACT . . . . . ORDER

FLARE, TOUCH DOWN AND ROLL OUT

Engines should be shut down sufficiently early to ensure fuel is shut off before the nacelles impact, but sufficiently late to ensure adequate hydraulic supplies for the flight controls.

Engine pumps continue to supply adequate hydraulic pressure for 30 seconds after engine shutdown.

– REVERSE . . . . . DO NOT USE

R *Do not use reverse to prevent ground spoiler extension, and because the engine will*
R *touch the ground during roll-out.*

● **if NOSE L/G abnormal**

– NOSE . . . . . MAINTAIN UP

After touchdown, keep the nose off the runway by the use of the elevator. Then, lower the nose on to the runway before elevator control is lost.

– BRAKES (compatible with elevator efficiency) . . . APPLY

– ENG MASTERS . . . . . OFF

Shutdown the engines before nose impact.



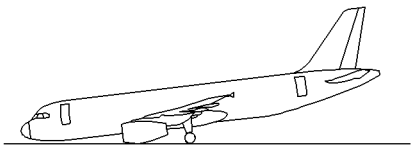
LDG WITH ABNORMAL L/G (CONT'D)

- **If one MAIN L/G abnormal**
  - ENG MASTERS . . . . . OFF
    At touchdown, shut down both engines.
  - FAILURE SIDE WING . . . . . MAINTAIN UP
    Use roll control, as necessary, to maintain the unsupported wing up as long as possible.
  - DIRECTIONAL CONTROL . . . . . MAINTAIN
    Use rudder and brakes (maximum 1000 psi) to maintain the runway axis as long as possible.
- **If both MAIN L/G abnormal**
  - ENG MASTERS . . . . . OFF
    Shut down the engines in the flare, before touchdown.
  - PITCH ATTITUDE (at touchdown) . . NOT LESS THAN 6°

WHEN A/C STOPPED

- ENG (all) and APU FIRE pushbutton . . . . . PUSH
  Pressing the ENG FIRE pushbutton shuts off the related hydraulic pressure within a short time.
- ALL ENG and APU AGENT . . . . . DISCH

R
- EVACUATION . . . . . INITIATE
  · *Announce : "PASSENGER EVACUATION" over the Passenger Address system, and press the EVAC COMMAND pushbutton.*
  · *All emergency and passenger doors may be used to evacuate the aircraft.*



NOSE L/G ABNORMAL



ONE MAIN L/G ABNORMAL



BOTH MAIN L/G ABNORMAL

REFERENCE AIRCRAFT ATTITUDE
AFTER IMPACT

NFC5-03-0232-008-A001AA

R

CONFIG PARK BRK ON

Check that the parking brake handle is in the OFF position. If warning stays on, check that the brake pressure is at zero on the BRAKES PRESSURE indicator.

WHEEL N.W. STEER FAULT

STATUS

CAT 3 SINGLE ONLY

Note : 1. Use differential braking to steer the aircraft during taxi.

2. If the L/G SHOCK ABSORBER FAULT is also displayed, then the nose wheels may be at maximum deflection. (turned 90 degrees from center). During landing, delay nosewheel touchdown as long as possible.

3. As specified in the QRH 5.04, automatic rollout is not permitted.

INOP SYS
CAT 3 DUAL
N.W. STEER

BRAKES A/SKID NWS FAULT or ANTI SKID/NWS OFF

Either both BSCU channels are failed, or the A/SKID & N/W STRG switch is OFF.

MAX BRK PR . . . . . 1000 PSI

Monitor brake pressure on the BRAKES PRESS indicator. Limit brake pressure to approximately 1000 psi and, at low ground speed, adjust brake pressure as required. Avoid landing on an icy runway.

STATUS

MAX BRK PR . . . . . 1000 PSI

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

CAT 3 SINGLE ONLY

Note : 1. Autobrake is lost.

2. As specified in the QRH 5.04, automatic rollout is not permitted.

INOP SYS
CAT 3 DUAL
ANTI SKID
N.W. STEER
BSCU CH 1
BSCU CH 2

BRAKES BSCU CH 1(2) FAULT

Crew awareness.

STATUS

INOP SYS
BSCU CH 1(2)

BRAKES HOT

– BRK FAN (if installed) . . . . . ON

Note : If the caution is displayed during taxi in, brake fan selection should be delayed for a minimum of about 5 minutes, or done just before stopping at the gate (whichever occurs first), to allow thermal equalization and stabilization, and thus avoid oxidation of brake surface hot spots.

■ **On ground :**

– DELAY T.O. FOR COOL

· *Delay takeoff, until the brake temperature is below 300° C with the brake fans OFF, and 150°C with the brake fans ON (◁).*

· *Refer to 3.04.32 for brake temperature limitations requiring maintenance actions.*

· *If the BRAKES HOT message is still on when the aircraft is parked, the flight crew should not set the PARKING BRK ON.*

■ **In flight :**

● **IF PERF PERMITS :**

– L/G . . . . . DN FOR COOL

MAX SPEED 250/.60

· *If performance permits, the landing gear should be extended or, if already extended, it should remain so, to improve brake cooling.*

· *Reduce speed to 220 knots, for landing gear retraction, when the brake temperature is within limits.*

STATUS

MAX SPEED 280/.67

As long as the landing gear is extended, limit the speed to 280kt/M.67.

For landing gear retraction when the brake temperature is within limits, reduce the speed to 220 knots.

BRAKES AUTO BRK FAULT

Crew awareness

BRAKE RELEASED

The AUTOBRAKE FAULT warning may be due to a failure of the autobrake mode itself, or to a brake released condition. The crew should, therefore, be prepared to counter a possible slight lateral drift at landing, by using the rudder.

STATUS

LDG DIST PROC . . . . . APPLY | INOP SYS AUTO BRK

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

R

CONFIG PARK BRK ON

Check that the parking brake handle is in the OFF position. If warning stays on, check that the brake pressure is at zero on the BRAKES PRESSURE indicator.

WHEEL N/W STRG FAULT

STATUS

CAT 3 SINGLE ONLY

Note : 1. Use differential braking to steer the aircraft during taxi.

2. If the L/G SHOCK ABSORBER FAULT is also displayed, then the nose wheels may be at maximum deflection. (turned 90 degrees from center). During landing, delay nose wheel touchdown as long as possible.

3. As specified in the QRH 5.04, automatic rollout is not permitted.

INOP SYS
CAT 3 DUAL
N/W STRG

BRAKES A/SKID NWS FAULT or ANTI SKID/NWS OFF

Either both BSCU channels are failed, or the A/SKID & NOSEWHEEL switch is OFF.

MAX BRK PR . . . . . 1000 PSI

Monitor brake pressure on the BRAKES PRESS indicator. Limit brake pressure to approximately 1000 psi and, at low ground speed, adjust brake pressure as required. Avoid landing on an icy runway.

STATUS

MAX BRK PR . . . . . 1000 PSI

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

CAT 3 SINGLE ONLY

Note : 1. Autobrake is lost.

2. As specified in the QRH 5.04, automatic rollout is not permitted.

INOP SYS
CAT 3 DUAL
ANTI SKID
N/W STRG
BRK SYS 1
BRK SYS 2

BRAKES SYS 1(2) FAULT

Crew awareness.

STATUS

INOP SYS
BRK SYS 1(2)

BRAKES HOT

■ **On ground :**

– BRK FAN (if installed) . . . . . ON

Note : If the caution is displayed during taxi in, brake fan selection should be delayed for a minimum of about 5 minutes, or done just before stopping at the gate (whichever occurs first), to allow thermal equalization and stabilization, and thus avoid oxidation of brake surface hot spots.

– DELAY T.O. FOR COOL

· Delay takeoff, until the brake temperature is below 300° C with the brake fans OFF, and 150°C with the brake fans ON (◁).

· Refer to 3.04.32 for brake temperature limitations requiring maintenance actions.

· If the BRAKES HOT message is still on when the aircraft is parked, the flight crew should not set the PARKING BRK ON.

■ **In flight :**

● **IF PERF PERMITS :**

– L/G . . . . . DN FOR COOL

– BRK FAN (if installed) . . . . . ON

MAX SPEED 250/.60

· If performance permits, the landing gear should be extended or, if already extended, it should remain so, to improve brake cooling.

· Reduce speed to 220 knots, for landing gear retraction, when the brake temperature is within limits.

STATUS

MAX SPEED 280/.67

As long as the landing gear is extended, limit the speed to 280kt/M.67.

For landing gear retraction when the brake temperature is within limits, reduce the speed to 220 knots.

BRAKES AUTO BRK FAULT

Crew awareness

BRAKE RELEASED

The AUTOBRAKE FAULT warning may be due to a failure of the autobrake mode itself, or to a brake released condition. The crew should, therefore, be prepared to counter a possible slight lateral drift at landing, by using the rudder.

STATUS

LDG DIST PROC . . . . . APPLY | INOP SYS AUTO BRK

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

R

CONFIG PARK BRK ON

Check that the parking brake handle is in the OFF position. If warning stays on, check that the brake pressure is at zero on the BRAKES PRESSURE indicator.

WHEEL N/W STRG FAULT

STATUS

CAT 3 SINGLE ONLY

Note : 1. Use differential braking to steer the aircraft during taxi.

2. If the L/G SHOCK ABSORBER FAULT is also displayed, then the nose wheels may be at maximum deflection. (turned 90 degrees from center). During landing, delay nose wheel touchdown as long as possible.

3. As specified in the QRH 5.04, automatic rollout is not permitted.

INOP SYS
CAT 3 DUAL
N/W STRG

BRAKES A/SKID NWS FAULT or ANTI SKID/NWS OFF

Either both BSCU channels are failed, or the A/SKID & N/W STRG switch is OFF.

MAX BRK PR . . . . . 1000 PSI

Monitor brake pressure on the BRAKES PRESS indicator. Limit brake pressure to approximately 1000 psi and, at low ground speed, adjust brake pressure as required. Avoid landing on an icy runway.

STATUS

MAX BRK PR . . . . . 1000 PSI

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80

● **If Y SYS LO PR**

BRK Y ACCU PR ONLY

CAT 3 SINGLE ONLY

Note : As specified in the QRH 5.04, automatic rollout is not permitted.

INOP SYS
CAT 3 DUAL
ANTI SKID
N/W STRG
NORM BRK
AUTO BRK

BRAKES SYS 1(2) FAULT

Crew awareness.

STATUS

INOP SYS
BRK SYS 1(2)

BRAKES HOT

■ **On ground :**

– PARK BRK : PREFER CHOCKS

· *If the BRAKES HOT message is still on when the aircraft is parked, the flight crew should not set the PARKING BRK ON.*

– BRK FAN (if installed) . . . . . ON

– DELAY T.O. FOR COOL

· *Delay takeoff, until the brake temperature is below 300° C with the brake fans OFF, and 150°C with the brake fans ON (◁).*

· *Refer to 3.04.32 for brake temperature limitations requiring maintenance actions.*

■ **In flight :**

● **IF PERF PERMITS :**

– L/G . . . . . DN FOR COOL

MAX SPEED 250/.60

· *If performance permits, the landing gear should be extended or, if already extended, it should remain so, to improve brake cooling.*

· *Reduce speed to 220 knots, for landing gear retraction, when the brake temperature is within limits.*

STATUS

MAX SPEED 280/.67

As long as the landing gear is extended, limit the speed to 280kt/M.67.

For landing gear retraction when the brake temperature is within limits, reduce the speed to 220 knots.

BRAKES AUTO BRK FAULT

Crew awareness

BRAKE RELEASED

The AUTOBRAKE FAULT warning may be due to a failure of the autobrake mode itself, or to a brake released condition. The crew should, therefore, be prepared to counter a possible slight lateral drift at landing, by using the rudder.

STATUS

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

INOP SYS

AUTO BRK

R

CONFIG PARK BRK ON

Check that the parking brake handle is in the OFF position. If warning stays on, check that the brake pressure is at zero on the BRAKES PRESSURE indicator.

WHEEL N/W STRG FAULT

STATUS

CAT 3 SINGLE ONLY

Note : 1. Use differential braking to steer the aircraft during taxi.

2. If the L/G SHOCK ABSORBER FAULT is also displayed, then the nose wheels may be at maximum deflection. (turned 90 degrees from center). During landing, delay nose wheel touchdown as long as possible.

3. As specified in the QRH 5.04, automatic rollout is not permitted.

INOP SYS
CAT 3 DUAL
N/W STRG

BRAKES A/SKID NWS FAULT or ANTI SKID/NWS OFF

Either both BSCU channels are failed, or the A/SKID & N/W STRG switch is OFF.

MAX BRK PR . . . . . 1000 PSI

Monitor brake pressure on the BRAKES PRESS indicator. Limit brake pressure to approximately 1000 psi and, at low ground speed, adjust brake pressure as required. Avoid landing on an icy runway.

STATUS

MAX BRK PR . . . . . 1000 PSI

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80

● **If Y SYS LO PR**

BRK Y ACCU PR ONLY

CAT 3 SINGLE ONLY

Note : As specified in the QRH 5.04, automatic rollout is not permitted.

INOP SYS
CAT 3 DUAL
ANTI SKID
N/W STRG
NORM BRK
AUTO BRK

BRAKES SYS 1(2) FAULT

Crew awareness.

STATUS

INOP SYS
BRK SYS 1(2)

BRAKES HOT

■ **On ground :**

– BRK FAN (if installed) . . . . . ON

Note : If the caution is displayed during taxi in, brake fan selection should be delayed for a minimum of about 5 minutes, or done just before stopping at the gate (whichever occurs first), to allow thermal equalization and stabilization, and thus avoid oxidation of brake surface hot spots.

– DELAY T.O. FOR COOL

· Delay takeoff, until the brake temperature is below 300° C with the brake fans OFF, and 150°C with the brake fans ON (◁).

· Refer to 3.04.32 for brake temperature limitations requiring maintenance actions.

· If the BRAKES HOT message is still on when the aircraft is parked, the flight crew should not set the PARKING BRK ON.

■ **In flight :**

● **IF PERF PERMITS :**

– L/G . . . . . DN FOR COOL

– BRK FAN (if installed) . . . . . ON

MAX SPEED 250/.60

· If performance permits, the landing gear should be extended or, if already extended, it should remain so, to improve brake cooling.

· Reduce speed to 220 knots, for landing gear retraction, when the brake temperature is within limits.

STATUS

MAX SPEED 280/.67

As long as the landing gear is extended, limit the speed to 280kt/M.67.

For landing gear retraction when the brake temperature is within limits, reduce the speed to 220 knots.

BRAKES AUTO BRK FAULT

Crew awareness

BRAKE RELEASED

The AUTOBRAKE FAULT warning may be due to a failure of the autobrake mode itself, or to a brake released condition. The crew should, therefore, be prepared to counter a possible slight lateral drift at landing, by using the rudder.

STATUS

LDG DIST PROC . . . . . APPLY | INOP SYS

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.* | AUTO BRK

R

CONFIG PARK BRK ON

Check that the parking brake handle is in the OFF position. If warning stays on, check that the brake pressure is at zero on the BRAKES PRESSURE indicator.

WHEEL N/W STRG FAULT

STATUS

CAT 3 SINGLE ONLY

Note : 1. Use differential braking to steer the aircraft during taxi.

2. If the L/G SHOCK ABSORBER FAULT is also displayed, then the nose wheels may be at maximum deflection. (turned 90 degrees from center). During landing, delay nose wheel touchdown as long as possible.

3. As specified in the QRH 5.04, automatic rollout is not permitted.

INOP SYS
CAT 3 DUAL
N/W STRG

BRAKES A/SKID NWS FAULT or ANTI SKID/NWS OFF

Either both BSCU channels are failed, or the A/SKID & N/W STRG switch is OFF.

MAX BRK PR . . . . . 1000 PSI

Monitor brake pressure on the BRAKES PRESS indicator. Limit brake pressure to approximately 1000 psi and, at low ground speed, adjust brake pressure as required. Avoid landing on an icy runway.

STATUS

MAX BRK PR . . . . . 1000 PSI

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80

● **If Y SYS LO PR**

BRK Y ACCU PR ONLY

CAT 3 SINGLE ONLY

Note : As specified in the QRH 5.04, automatic rollout is not permitted.

INOP SYS
CAT 3 DUAL
ANTI SKID
N/W STRG
NORM BRK
AUTO BRK

BRAKES SYS 1(2) FAULT

Crew awareness.

STATUS

INOP SYS
BRK SYS 1(2)

BRAKES HOT

■ **On ground :**

– PARK BRK : PREFER CHOCKS

· *If the BRAKES HOT message is still on when the aircraft is parked, the flight crew should not set the PARKING BRK ON.*

– BRK FAN (if installed) . . . . . ON

– DELAY T.O. FOR COOL

· *Delay takeoff, until the brake temperature is below 300° C with the brake fans OFF, and 150°C with the brake fans ON (◁).*

· *Refer to 3.04.32 for brake temperature limitations requiring maintenance actions.*

■ **In flight :**

● **IF PERF PERMITS :**

– L/G . . . . . DN FOR COOL

MAX SPEED 250/.60

If performance permits, the landing gear should be extended or, if already extended, it should remain so, to improve brake cooling.

● **For L/G RETRACTION :**

MAX SPEED 220/.52

Reduce speed for landing gear retraction, when the brake temperature is within limits.

STATUS

MAX SPEED 280/.67

As long as the landing gear is extended, limit the speed to 280kt/M.67.

For landing gear retraction when the brake temperature is within limits, reduce the speed to 220 knots.

BRAKES AUTO BRK FAULT

Crew awareness

BRAKE RELEASED

The AUTOBRAKE FAULT warning may be due to a failure of the autobrake mode itself, or to a brake released condition. The crew should, therefore, be prepared to counter a possible slight lateral drift at landing, by using the rudder.

STATUS

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

INOP SYS

AUTO BRK

R

CONFIG PARK BRK ON

Check that the parking brake handle is in the OFF position. If warning stays on, check that the brake pressure is at zero on the BRAKES PRESSURE indicator.

WHEEL N/W STRG FAULT

STATUS

CAT 3 SINGLE ONLY

Note : 1. Use differential braking to steer the aircraft during taxi.

2. If the L/G SHOCK ABSORBER FAULT is also displayed, then the nose wheels may be at maximum deflection. (turned 90 degrees from center). During landing, delay nose wheel touchdown as long as possible.

3. As specified in the QRH 5.04, automatic rollout is not permitted.

INOP SYS
CAT 3 DUAL
N/W STRG

BRAKES A/SKID NWS FAULT or ANTI SKID/NWS OFF

Either both BSCU channels are failed, or the A/SKID & N/W STRG switch is OFF.

MAX BRK PR . . . . . 1000 PSI

Monitor brake pressure on the BRAKES PRESS indicator. Limit brake pressure to approximately 1000 psi and, at low ground speed, adjust brake pressure as required. Avoid landing on an icy runway.

STATUS

MAX BRK PR . . . . . 1000 PSI

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80

● **If Y SYS LO PR**

BRK Y ACCU PR ONLY

CAT 3 SINGLE ONLY

Note : As specified in the QRH 5.04, automatic rollout is not permitted.

INOP SYS
CAT 3 DUAL
ANTI SKID
N/W STRG
NORM BRK
AUTO BRK

BRAKES SYS 1(2) FAULT

Crew awareness.

STATUS

INOP SYS
BRK SYS 1(2)

BRAKES HOT

■ **On ground :**

– PARK BRK : PREFER CHOCKS

· *If the BRAKES HOT message is still on when the aircraft is parked, the flight crew should not set the PARKING BRK ON.*

– BRK FAN (if installed) . . . . . ON

– DELAY T.O. FOR COOL

· *Delay takeoff, until the brake temperature is below 300° C with the brake fans OFF, and 150°C with the brake fans ON (◁).*

· *Refer to 3.04.32 for brake temperature limitations requiring maintenance actions.*

■ **In flight :**

● **IF PERF PERMITS :**

– L/G . . . . . DN FOR COOL

MAX SPEED 250/.60

· *If performance permits, the landing gear should be extended or, if already extended, it should remain so, to improve brake cooling.*

· *Reduce speed to 220 knots, for landing gear retraction, when the brake temperature is within limits.*

STATUS

MAX SPEED 280/.67

As long as the landing gear is extended, limit the speed to 280kt/M.67.

For landing gear retraction when the brake temperature is within limits, reduce the speed to 220 knots.

BRAKES AUTO BRK FAULT

Autobrake function is lost.

STATUS

INOP SYS

AUTO BRK

LOSS OF BRAKING

● **IF AUTOBRAKE IS SELECTED :**

– BRAKE PEDALS ..... PRESS

This will override the autobrake.

● **IF NO BRAKING AVAILABLE :**

– REV ..... MAX

– BRAKE PEDALS ..... RELEASE

Brake pedals should be released when the A/SKID & N/W STRG selector is switched OFF, since the pedal force or displacement produces more braking action in alternate mode than in normal mode.

– A/SKID & N/W STRG ..... OFF

Braking system reverts to alternate mode.

– BRAKE PEDALS ..... PRESS

Apply brake with care, since initial pedal force or displacement produces more braking action in alternate mode than in normal mode.

– MAX BRK PR ..... 1000 PSI

Monitor brake pressure or BRAKES PRESS indicator. Limit brake pressure to approximately 1000 psi and, at low ground speed, adjust brake pressure as required.

● **If STILL NO BRAKING :**

– PARKING BRAKE ..... USE

Use short successive parking brake applications to stop the aircraft. Brake onset asymmetry may be felt at each parking brake application. If possible, delay the use of the parking brake until low speed, to reduce the risk of tire burst and lateral control difficulties.

WHEEL HYD SEL FAULT

Failure of normal brake selector valve, or the steering selector valve, in the open position.

– If the normal brake selector valve is failed open, full green hydraulic pressure is present at normal servovalves' entry.

Nosewheel steering remains available.

– On ground, do not tow the aircraft with the green hydraulic system pressurized : Nosewheel steering remains pressurized, and so towing may either break the towbar shear pin, or the nose gear (if towbarless towing).

– Selecting A/SKID & N/W STRG OFF, or resetting the BSCU, will cause the nosewheel to go to maximum deflection.

– A/SKID & N/W STRG ..... KEEP ON

As long as antiskid is operative, brake pressure is regulated by normal servovalves.

RESIDUAL BRAKING PROC

R ■ **IN FLIGHT :**

– BRAKE PEDALS . . . . . APPLY SEVERAL TIMES

Press the brake pedals several times. This could zero a residual pressure on the alternate system.

● **IF RESIDUAL PRESSURE REMAINS :**

– A/SKID & N/W STRG selector . . . . . KEEP ON

■ **IF AUTOBRAKE IS AVAILABLE :**

– FOR LANDING . . . . . AUTO/BRK MED

Using MED mode gives immediate priority to normal braking upon landing gear touchdown, which cancels residual alternate pressure.

■ **IF AUTOBRAKE IS NOT AVAILABLE :**

– JUST AFTER TOUCHDOWN . . . . . APPLY BRAKING

Pressing the brake pedals gives immediate priority to normal braking, which cancels residual alternate pressure.

– Beware of possible braking asymmetry after touchdown, which can be controlled by using the pedals.

R *Note : In case of taxi with deflated or damaged tires, refer to the TAXI WITH DEFLATED TIRES procedure (FCOM 3.01.32).*

LOSS OF BRAKING

● **IF AUTOBRAKE IS SELECTED :**

– BRAKE PEDALS ..... PRESS

This will override the autobrake.

● **IF NO BRAKING AVAILABLE :**

– REV ..... MAX

– BRAKE PEDALS ..... RELEASE

Brake pedals should be released when the A/SKID & N/W STRG selector is switched OFF, since the pedal force or displacement produces more braking action in alternate mode than in normal mode.

– A/SKID & N/W STRG ..... OFF

Braking system reverts to alternate mode.

– BRAKE PEDALS ..... PRESS

Apply brake with care, since initial pedal force or displacement produces more braking action in alternate mode than in normal mode.

– MAX BRK PR ..... 1000 PSI

Monitor brake pressure or BRAKES PRESS indicator. Limit brake pressure to approximately 1000 psi and, at low ground speed, adjust brake pressure as required.

● **If STILL NO BRAKING :**

– PARKING BRAKE ..... USE

Use short successive parking brake applications to stop the aircraft. Brake onset asymmetry may be felt at each parking brake application. If possible, delay the use of the parking brake until low speed, to reduce the risk of tire burst and lateral control difficulties.

WHEEL HYD SEL FAULT

Failure of normal brake selector valve, or the steering selector valve, in the open position.

– *If the normal brake selector valve is failed open, full green hydraulic pressure is present at normal servovalves' entry.*
Nosewheel steering remains available.

– *On ground, do not tow the aircraft with the yellow hydraulic system pressurized : Nosewheel steering remains pressurized, and so towing may either break the towbar shear pin, or the nose gear (if towbarless towing).*

– *Selecting A/SKID & N/W STRG OFF, or resetting the BSCU, will cause the nosewheel to go to maximum deflection.*

– A/SKID & N/W STRG ..... KEEP ON

As long as antiskid is operative, brake pressure is regulated by normal servovalves.

RESIDUAL BRAKING PROC

R ■ **IN FLIGHT :**

– BRAKE PEDALS . . . . . APPLY SEVERAL TIMES

Press the brake pedals several times. This could zero a residual pressure on the alternate system.

● **IF RESIDUAL PRESSURE REMAINS :**

– A/SKID & N/W STRG selector . . . . . KEEP ON

■ **IF AUTOBRAKE IS AVAILABLE :**

– FOR LANDING . . . . . AUTO/BRK MED

Using MED mode gives immediate priority to normal braking upon landing gear touchdown, which cancels residual alternate pressure.

■ **IF AUTOBRAKE IS NOT AVAILABLE :**

– JUST AFTER TOUCHDOWN . . . . . APPLY BRAKING

Pressing the brake pedals gives immediate priority to normal braking, which cancels residual alternate pressure.

– Beware of possible braking asymmetry after touchdown, which can be controlled by using the pedals.

R *Note : In case of taxi with deflated or damaged tires, refer to the TAXI WITH DEFLATED TIRES procedure (FCOM 3.01.32).*

LOSS OF BRAKING

● **IF AUTOBRAKE IS SELECTED :**

– BRAKE PEDALS ..... PRESS

This will override the autobrake.

● **IF NO BRAKING AVAILABLE :**

– REV ..... MAX

– BRAKE PEDALS ..... RELEASE

Brake pedals should be released when the A/SKID & N/W STRG selector is switched OFF, since the pedal force or displacement produces more braking action in alternate mode than in normal mode.

– A/SKID & N/W STRG ..... OFF

Braking system reverts to alternate mode.

– BRAKE PEDALS ..... PRESS

Apply brake with care, since initial pedal force or displacement produces more braking action in alternate mode than in normal mode.

– MAX BRK PR ..... 1000 PSI

Monitor brake pressure or BRAKES PRESS indicator. Limit brake pressure to approximately 1000 psi and, at low ground speed, adjust brake pressure as required.

● **If STILL NO BRAKING :**

– PARKING BRAKE ..... USE

Use short successive parking brake applications to stop the aircraft. Brake onset asymmetry may be felt at each parking brake application. If possible, delay the use of the parking brake until low speed, to reduce the risk of tire burst and lateral control difficulties.

WHEEL HYD SEL FAULT

Failure of normal brake selector valve, or the steering selector valve, in the open position.

– *If the normal brake selector valve is failed open, full green hydraulic pressure is present at normal servovalves' entry.*
Nosewheel steering remains available.

– *On ground, do not tow the aircraft with the yellow hydraulic system pressurized : Nosewheel steering remains pressurized, and so towing may either break the towbar shear pin, or the nose gear (if towbarless towing).*

– *Selecting A/SKID & N/W STRG OFF, or resetting the BSCU, will cause the nosewheel to go to maximum deflection.*

– A/SKID & N/W STRG ..... KEEP ON

As long as antiskid is operative, brake pressure is regulated by normal servovalves.

RESIDUAL BRAKING PROC

■ **IN FLIGHT :**

– BRAKE PEDALS . . . . . APPLY SEVERAL TIMES

Press the brake pedals several times. This could zero a residual pressure on the alternate system.

● **IF RESIDUAL PRESSURE REMAINS :**

– A/SKID & N/W STRG selector . . . . . KEEP ON

■ **IF AUTOBRAKE IS AVAILABLE :**

– FOR LANDING . . . . . AUTO/BRK MED

Using MED mode gives immediate priority to normal braking upon landing gear touchdown, which cancels residual alternate pressure.

■ **IF AUTOBRAKE IS NOT AVAILABLE :**

– JUST AFTER TOUCHDOWN . . . . . APPLY BRAKING

Pressing the brake pedals gives immediate priority to normal braking, which cancels residual alternate pressure.

– Beware of possible braking asymmetry after touchdown, which can be controlled by using the pedals.

Note : In case of taxi with deflated or damaged tires, refer to the TAXI WITH DEFLATED TIRES procedure (FCOM 3.01.32).

R

BRAKES PRK BRK ON

Parking brake is selected in flight.

– PARK BRK . . . . . OFF

BRAKES NORM + ALTN FAULT

Normal and alternate braking functions are lost.

PARK BRK ONLY

STATUS

	INOP SYS
PARK BRK ONLY	
LDG DIST PROC . . . . . APPLY	CAT 3
R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*	ANTI SKID
CAT 2 ONLY	N/W STRG
	NORM BRK
	AUTO BRK
	ALTN BRK

BRAKES NORM BRK FAULT

Crew awareness.

Normal braking function is lost.

STATUS

	INOP SYS
LDG DIST PROC . . . . . APPLY	
R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*	CAT 3
ALTN Y BRK WITH A/SKID	NORM BRK
CAT 2 ONLY	AUTO BRK

BRAKES BRK Y ACCU LO PR

R *The yellow electrical pump can be used to pressurize the accumulator. If the accu pressure*
R *is still low, chocks are required before Engine 1 shut down.*

- **On ground :**
  - **BEFORE ENG SHUT DOWN :**
    - CHOCKS CONSIDER

STATUS

	INOP SYS
● **If Y SYS LO PR**	
NORM BRK ONLY	BRK Y ACCU

BRAKES RELEASED

Crew awareness

At least one wheel is released.

STATUS

	INOP SYS
LDG DIST PROC . . . . . APPLY	
R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*	AUTO BRK

BRAKES – N/WS MINOR FAULT

Crew awareness.

BRAKES ALTN BRK FAULT

Crew awareness.

Alternate braking function is lost.

STATUS

INOP SYS
ALTN BRK

BRAKES ALTN L(R) RELEASED

As long as the normal braking system is available, braking is normal.

In alternate braking mode, braking of all wheels on one gear is lost.

- **If normal braking is lost** :
  - ASYM BRK PROC ..... APPLY

STATUS

INOP SYS
ALTN L(R) BRK

- **If normal braking is lost** :

  LDG DIST PROC ..... APPLY

  Refer to the QRH Part 2, or to the FCOM 3.02.80.

ASYMMETRIC BRAKING

Normal braking is faulty, or the green hydraulic system is in low pressure, and one gear is released.

- Progressively apply brake on the available side. Counter swing with the rudder.
- Avoid crosswind in excess of 10 knots from the side of available brake.
- **IF ONLY ONE REVERSE IS AVAILABLE**
  - Do not use Reverse on the side of available brake
- LDG DIST PROC ..... APPLY

  Refer to the QRH Part 2, or to the FCOM 3.02.80.

NAV HDG DISCREPANCY

– HDG ..... X CHECK
Compare the 3 IR headings on ADIRS CDU or crosscheck with standby compass.
– ATT HDG SWTG ..... AS RQRD
Select IR 3 (if available) to faulty side.

NAV ATT DISCREPANCY

– ATT ..... X CHECK
Crosscheck with standby horizon.
– ATT HDG SWTG ..... AS RQRD
Select IR 3 (if available) to faulty side.

NAV ALTI DISCREPANCY

Crew awareness.

OVERSPEED

VMO/MMO 350/.82
(235/.60 in case of dispatch with landing gear down).
VLE 280/.67
VFE ..... see below

CONF	VFE
FULL	177
3	185
2	200
1 + F	215
1	230

NAV ADR FAULT

Note : In case of simultaneous failure of ADR and IR (same ADIRU), apply ADR FAULT procedure before IR FAULT procedure.

■ **ADR 1 FAULT :**

– AIR DATA SWTG ..... CAPT

R *Select ADR 3 (if available) to captain side.*

The GPWS TERR amber FAULT light comes on as the enhanced functions of the EGPWS are inhibited. As such, the GPWS TERR pushbutton should be switched OFF.

– ADR 1 ..... OFF

Depending on ADR failure, ADR should be switched off.

	STATUS
	INOP SYS
CAT 3 SINGLE ONLY	ADR 1 CAT 3 DUAL GPWS

■ **ADR 2 FAULT :**

– AIR DATA SWTG ..... F/O

Select ADR 3 (if available) to first officer side.

– ADR 2 ..... OFF

– BARO REF ..... CHECK

If ADR 2 fails, both baro reference channels are driven by the same FCU channel. Consequently the baro reference displays must be checked.

	STATUS
	INOP SYS
CAT 3 SINGLE ONLY	ADR 2 CAT 3 DUAL

■ **ADR 3 FAULT :**

– AIR DATA SWTG (if ADR 3 in use) ..... NORM

– ADR 3 ..... OFF

	STATUS
	INOP SYS
CAT 3 SINGLE ONLY	ADR 3 CAT 3 DUAL



NAV HDG DISCREPANCY

– HDG ..... X CHECK
Compare the 3 IR headings on ADIRS CDU or crosscheck with standby compass.
– ATT HDG SWTG ..... AS RQRD
Select IR 3 (if available) to faulty side.

NAV ATT DISCREPANCY

– ATT ..... X CHECK
Crosscheck with standby horizon.
– ATT HDG SWTG ..... AS RQRD
Select IR 3 (if available) to faulty side.

NAV ALTI DISCREPANCY

Crew awareness.

OVERSPEED

VMO/MMO 350/.82
(235/.60 in case of dispatch with landing gear down).
VLE 280/.67
VFE ..... see below

CONF	VFE
FULL	177
3	185
2	200
1 + F	215
1	230

NAV ADR FAULT

Note : In the case of a simultaneous failure of ADR and IR (same ADIRU), apply ADR FAULT procedure before IR FAULT procedure.

■ **ADR 1 FAULT :**

– AIR DATA SWTG ..... CAPT 3

Set ADR 3 (if available) to the Captain's side.

The GPWS TERR amber FAULT light comes on, because the enhanced functions of the EGPWS are inhibited. So, the GPWS TERR pushbutton should be switched OFF.

– ADR 1 ..... OFF

Depending on ADR failure, ADR should be switched off.

STATUS

CAT 3 SINGLE ONLY	INOP SYS
	ADR 1
	CAT 3 DUAL
	GPWS

■ **ADR 2 FAULT :**

– AIR DATA SWTG ..... F/O 3

Set ADR 3 (if available) to the First Officer's side.

– ADR 2 ..... OFF

– BARO REF ..... CHECK

If ADR 2 fails, both baro reference channels are driven by the same FCU channel. Consequently, the baro reference displays must be checked.

STATUS

CAT 3 SINGLE ONLY	INOP SYS
	ADR 2
	CAT 3 DUAL

■ **ADR 3 FAULT :**

– AIR DATA SWTG (if ADR 3 in use) ..... NORM

– ADR 3 ..... OFF

STATUS

CAT 3 SINGLE ONLY	INOP SYS
	ADR 3
	CAT 3 DUAL



NAV ADR FAULT (CONT'D)

■ **Two ADR FAULT :**

R *Flight control normal laws are lost. Pitch alternate law preserves the neutral static*
R *stability. All protections, except maneuver protections, are lost.*

● **ADR 1 + 2 FAULT :**

– AIR DATA SWTG ..... CAPT

Set ADR 3 (if available) to the captain's side.

– ADR (affected) ..... OFF

The GPWS TERR amber FAULT light comes on, as the enhanced functions of the EGPWS are inhibited. As such, the GPWS TERR pushbutton should be switched OFF.

F/CTL ALTN LAW (PROT LOST)

MAX SPEED ..... 320 KT

Speed is limited, due to the loss of high-speed protections.

● **ADR 1 + 3 (or 2 + 3) FAULT :**

Air data information is lost on one PFD.

Note : In case of an ADR 1 + 3 FAULT, the landing gear safety valve is controlled closed:

- *Landing gear retraction is inoperative.*
- *Landing gear extension must be performed by gravity.*

– AIR DATA SWTG ..... NORM

– ATC (if ADR 1 failed) ..... SYS 2

– ATC (if ADR 2 failed) ..... SYS 1

– ADR (affected) ..... OFF

R *In case of an ADR 1 + 3 FAULT, the GPWS TERR amber FAULT light comes on, as*
R *the enhanced functions of the EGPWS are inhibited. As such, the GPWS TERR*
R *pushbutton should be switched OFF.*

F/CTL ALTN LAW

(PROT LOST)

MAX SPEED ..... 320 KT

Speed is limited, due to the loss of high-speed protections.



NAV ADR FAULT (CONT'D)

STATUS

MAX SPEED . . . . . 320 KT

APPR PROC

Note : In the case of an ADR 1 + 3 FAULT, the landing gear safety valve remains closed. Landing gear extension must be performed by gravity. (Refer to 3.02.32).

– FOR LDG . . . . . USE FLAP 3

Do not select CONF FULL to not degrade handling qualities.

– GPWS LDG FLAP 3 . . . . . ON

R *Appears when CONF 3 is selected.*

R APPR SPD . . . . . VREF + 10 KT

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

ALTN LAW : PROT LOST

– WHEN L/G DN : DIRECT LAW

At L/G extension, control reverts to direct law in pitch and roll (Ref. DIRECT LAW proc. 3.02.27).

CAT 1 ONLY

● **ADR 1 + 3 (or 2 + 3) FAULT** :

BOTH PFD ON THE SAME FAC

In the case of an ADR 1 + 3 FAULT, the GPWS TERR amber FAULT light comes on, because the enhanced EGPWS functions are inhibited. So, the GPWS TERR pushbutton should be switched OFF.

INOP SYS

F/CTL PROT

ADR 1 + 2 or (2 + 3) or (1 + 3)

AP 1 + 2

A/THR

RUD TRV LIM 1(2)(a)

GPWS (if ADR1 fault)

YAM DAMPER 1(2)(a)

R (a) 1, in the case of an ADR 1 + 3 FAULT

R 2, in the case of an ADR 2 + 3 FAULT

ADR 1 + 2 + 3 FAULT

The ECAM does not display this procedure. In the case of a triple ADR failure, the ECAM only displays dual ADR warnings.

– ADR (all) . . . . . OFF

– STBY INST (ALT + ASI) . . . . . USE

Note : Disregard ECAM actions for AIR DATA SWTG and ATC, because these have no effect in the case of a total loss of ADRs.



NAV ADR FAULT (CONT'D)

■ **Two ADR FAULT :**

R *Flight control normal laws are lost. Pitch alternate law preserves the neutral static*
R *stability. All protections, except maneuver protections, are lost.*

● **ADR 1 + 2 FAULT :**

– AIR DATA SWTG ..... CAPT
Set ADR 3 (if available) to the captain's side.

– ADR (affected) ..... OFF
The GPWS TERR amber FAULT light comes on, as the enhanced functions of the EGPWS are inhibited. As such, the GPWS TERR pushbutton should be switched OFF.

F/CTL ALTN LAW (PROT LOST)

MAX SPEED ..... 320 KT
Speed is limited, due to the loss of high-speed protections.

● **ADR 1 + 3 (or 2 + 3) FAULT :**

Air data information is lost on one PFD.
Note : In case of an ADR 1 + 3 FAULT, the landing gear safety valve is controlled closed:
- *Landing gear retraction is inoperative.*
- *Landing gear extension must be performed by gravity.*

– AIR DATA SWTG ..... NORM
– ATC (if ADR 1 failed) ..... SYS 2
– ATC (if ADR 2 failed) ..... SYS 1
– ADR (affected) ..... OFF

R *In case of an ADR 1 + 3 FAULT, the GPWS TERR amber FAULT light comes on, as*
R *the enhanced functions of the EGPWS are inhibited. As such, the GPWS TERR*
R *pushbutton should be switched OFF.*

F/CTL ALTN LAW

(PROT LOST)
MAX SPEED ..... 320 KT
Speed is limited, due to the loss of high-speed protections.



NAV ADR FAULT (CONT'D)

STATUS

MAX SPEED . . . . . 320 KT

APPR PROC

– FOR LDG . . . . . USE FLAP 3

Do not select CONF FULL to not degrade handling qualities.

– GPWS LDG FLAP 3 . . . . . ON

Appears when CONF 3 is selected.

● **If ADR 1+3 FAULT**

– L/G . . . . . GRVTY EXTN

(Refer to 3.02.32).

R APPR SPD . . . . . VREF + 10 KT

R LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

ALTN LAW : PROT LOST

– WHEN L/G DN : DIRECT LAW

At L/G extension, control reverts to direct law in pitch and roll (Ref. DIRECT LAW proc. 3.02.27).

CAT 1 ONLY

● **ADR 1 + 3 (or 2 + 3) FAULT** :

BOTH PFD ON THE SAME FAC

In the case of an ADR 1 + 3 FAULT, the GPWS TERR amber FAULT light comes on, because the enhanced EGPWS functions are inhibited. So, the GPWS TERR pushbutton should be switched OFF.

INOP SYS

F/CTL PROT

ADR 1 + 2 or (2 + 3) or (1 + 3)

AP 1 + 2

A/THR

RUD TRV LIM 1(2)(a)

GPWS (if ADR1 fault)

YAM DAMPER 1(2)(a)

R (a) 1, in the case of an ADR 1 + 3 FAULT

R 2, in the case of an ADR 2 + 3 FAULT

ADR 1 + 2 + 3 FAULT

The ECAM does not display this procedure. In the case of a triple ADR failure, the ECAM only displays dual ADR warnings.

– ADR (all) . . . . . OFF

– STBY INST (ALT + ASI) . . . . . USE

Note : Disregard ECAM actions for AIR DATA SWTG and ATC, because these have no effect in the case of a total loss of ADRs.

NAV ADR FAULT (CONT'D)

■ **Two ADR FAULT :**

R *Flight control normal laws are lost. Pitch alternate law preserves the neutral static*
R *stability. All protections, except maneuver protections, are lost.*

● **ADR 1 + 2 FAULT :**

– AIR DATA SWTG ..... CAPT
Set ADR 3 (if available) to the captain's side.

– ADR (affected) ..... OFF
The GPWS TERR amber FAULT light comes on, as the enhanced functions of the EGPWS are inhibited. As such, the GPWS TERR pushbutton should be switched OFF.

F/CTL ALTN LAW (PROT LOST)

MAX SPEED ..... 320 KT
Speed is limited, due to the loss of high-speed protections.

● **ADR 1 + 3 (or 2 + 3) FAULT :**

Air data information is lost on one PFD.
Note : In case of an ADR 1 + 3 FAULT, the landing gear safety valve is controlled closed:
- *Landing gear retraction is inoperative.*
- *Landing gear extension must be performed by gravity.*

– AIR DATA SWTG ..... NORM
– ATC (if ADR 1 failed) ..... SYS 2
– ATC (if ADR 2 failed) ..... SYS 1
– ADR (affected) ..... OFF

R *In case of an ADR 1 + 3 FAULT, the GPWS TERR amber FAULT light comes on, as*
R *the enhanced functions of the EGPWS are inhibited. As such, the GPWS TERR*
R *pushbutton should be switched OFF.*

F/CTL ALTN LAW

(PROT LOST)
MAX SPEED ..... 320 KT
Speed is limited, due to the loss of high-speed protections.



NAV ADR FAULT (CONT'D)

STATUS

MAX SPEED . . . . . 320 KT

APPR PROC

– FOR LDG . . . . . USE FLAP 3

Do not select CONF FULL to not degrade handling qualities.

– GPWS LDG FLAP 3 . . . . . ON

Appears when CONF 3 is selected.

● **If ADR 1+3 FAULT**

– L/G . . . . . GRVTY EXTN

(Refer to 3.02.32).

APPR SPD . . . . . VREF + 10 KT

R LDG DIST PROC . . . . . APPLY

R *Refer to the QRH Part 2, or to the FCOM 3.02.80.*

ALTN LAW : PROT LOST

– WHEN L/G DN : DIRECT LAW

At L/G extension, control reverts to direct law in pitch and roll (Ref. DIRECT LAW proc. 3.02.27).

CAT 1 ONLY

● **ADR 1 + 3 (or 2 + 3) FAULT** :

BOTH PFD ON THE SAME FAC

In the case of an ADR 1 + 3 FAULT, the GPWS TERR amber FAULT light comes on, because the enhanced EGPWS functions are inhibited. So, the GPWS TERR pushbutton should be switched OFF.

INOP SYS
F/CTL PROT
ADR 1 + 2 or (2 + 3) or (1 + 3)
AP 1 + 2
A/THR
RUD TRV LIM 1(2)(a)
GPWS (if ADR1 fault)
N.W. STEER (if ADR 1 + 3 fault)
YAM DAMPER 1(2)(a)

R (a) 1, in the case of an ADR 1 + 3 FAULT

R 2, in the case of an ADR 2 + 3 FAULT

ADR 1 + 2 + 3 FAULT

The ECAM does not display this procedure. In the case of a triple ADR failure, the ECAM only displays dual ADR warnings.

– ADR (all) . . . . . OFF

– STBY INST (ALT + ASI) . . . . . USE

Note : Disregard ECAM actions for AIR DATA SWTG and ATC, because these have no effect in the case of a total loss of ADRs.



NAV ADR FAULT (CONT'D)

■ **Two ADR FAULT :**

Flight control normal laws are lost. Pitch alternate law preserves the neutral static stability. All protections, except maneuver protections, are lost.

● **ADR 1 + 2 FAULT :**

– AIR DATA SWTG ..... CAPT 3

Set ADR 3 (if available) to the Captain's side.

– ADR (affected) ..... OFF

The GPWS TERR amber FAULT light comes on, because the enhanced functions of the EGPWS are inhibited. So, the GPWS TERR pushbutton should be switched OFF.

F/CTL ALTN LAW (PROT LOST)

MAX SPEED 320/.77

Speed is limited, due to the loss of high-speed protections.

MANEUVER WITH CARE

MAX FL 350

FL is limited due to possible strong pitch-up moment, when flying at higher FL.

● **ADR 1 + 3 (or 2 + 3) FAULT :**

Air data information is lost on one PFD.

Note : In the case of an ADR 1 + 3 FAULT, the landing gear safety valve is controlled closed:

- *Landing gear retraction is inoperative.*
- *Landing gear extension must be performed by gravity.*

– AIR DATA SWTG ..... NORM

– ATC (if ADR 1 failed) ..... SYS 2

– ATC (if ADR 2 failed) ..... SYS 1

– ADR (affected) ..... OFF

In the case of an ADR 1 + 3 FAULT, the GPWS TERR amber FAULT light comes on, because the enhanced functions of the EGPWS are inhibited. So, the GPWS TERR pushbutton should be switched OFF.

F/CTL ALTN LAW

(PROT LOST)

MAX SPEED 320/.77

Speed is limited due to the loss of high-speed protections.

MANEUVER WITH CARE

MAX FL 350

FL is limited due to possible strong pitch-up moment, when flying at higher FL.



NAV ADR FAULT (CONT'D)

STATUS

MAX SPEED 320/.77
MANEUVER WITH CARE
MAX FL : 350
APPR PROC
– FOR LDG . . . . . USE FLAP 3
Do not select CONF FULL to not degrade handling qualities.
– GPWS LDG FLAP 3 . . . . . ON
Appears when CONF 3 is selected.

R ● **If ADR 1+3 FAULT**
R – L/G . . . . . GRVTY EXTN
(Refer to 3.02.32).
APPR SPD . . . . . VREF + 10 KT
LDG DIST PROC . . . . . APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80.
ALTN LAW : PROT LOST
– WHEN L/G DN : DIRECT LAW
At L/G extension, control reverts to direct law in pitch and roll (Ref. DIRECT LAW proc. 3.02.27).
CAT 1 ONLY
● **ADR 1 + 3 (or 2 + 3) FAULT** :
BOTH PFD ON THE SAME FAC
In the case of an ADR 1 + 3 FAULT, the GPWS TERR amber FAULT light comes on, because the enhanced EGPWS functions are inhibited. So, the GPWS TERR pushbutton should be switched OFF.

INOP SYS
F/CTL PROT
ADR 1 + 2 or (2 + 3) or (1 + 3)
AP 1 + 2
A/THR
RUD TRV LIM 1(2)(a)
GPWS (if ADR1 fault)
YAM DAMPER 1(2)(a)

R (a) 1, in the case of an ADR 1 + 3 FAULT
R 2, in the case of an ADR 2 + 3 FAULT

ADR 1 + 2 + 3 FAULT

The ECAM does not display this procedure. In the case of a triple ADR failure, the ECAM only displays dual ADR warnings.
– ADR (all) . . . . . OFF
– STBY INST (ALT + ASI) . . . . . USE
Note : *Disregard ECAM actions for AIR DATA SWTG and ATC, because these have no effect in the case of a total loss of ADRs.*

ADR 1 + 2 + 3 FAULT (CONT'D)

F/CTL ALTN LAW

(PROT LOST)

Note : The STALL WARNING is lost.

MAX SPEED 320/.82

See the following table for the IAS/M relationship for .82

FL	390	370	350	330	310	290	280 and below
MAX SPD	252	265	278	290	305	315	320

– WHEN L/G DN : DIRECT LAW

At landing gear extension, control reverts to direct law in pitch, as well as in roll (see the DIRECT LAW procedure 3.02.27).

Note : Use manual control of cabin pressurization :

– MODE SEL . . . . . MAN

– MAN V/S CTL . . . . . AS REQD

These lines are not displayed on the ECAM. (For details, refer to 3.02.21).

STATUS

MAX SPEED 320/.82

RUD WITH CARE ABV 160 KT

R *The rudder travel limit value is frozen at the moment when the*
R *failure occurs. Therefore, to prevent damage to the aircraft*
R *structure, use the rudder with care, when the speed is above 160 knots. At slats' extension, full rudder travel authority is recovered.*

APPR PROC :

Note : As the landing gear safety valve is closed, landing gear extension must be performed by gravity (Refer to 3.02.32).

WHEN L/G DN : DIRECT LAW

At landing gear extension, control reverts to direct law in pitch, as well as in roll.

– FOR LDG . . . . . USE FLAP 3

Do not select CONF FULL, so as not to degrade handling qualities.

– GPWS LDG FLAP 3 . . . . . ON

Displayed, when CONF 3 is selected.

APPR SPD . . . . . VREF + 10 KT

CAT 1 ONLY

ADR 1 + 2 + 3 FAULT (CONT'D)

STATUS

● **DURING FINAL APPR**

– V/S CTL . . . . . FULL UP

– LDG DIST PROC . . . . . APPLY

Refer to the QRH part 2, or to the FCOM 3.02.80.

Note : In case of a go-around, respect the maximum speed of 215 knots in CONF 1+F, due to loss of flap auto retraction to CONF 1.

INOP SYS

See below

R CAUTION

R Check that the outflow valve is fully open and

R that cabin altitude is at airfield elevation before opening the doors.

INOP SYS displayed on ECAM

F/CTL PROT	ADR 1+2+3	A/THR
WINDSHEAR DET	AP 1 + 2	RUD TRV LIM 1+2
GPWS		CAB PR 1 + 2

Other inoperative systems

ATC ALTI MODE	TCAS ◁
	L/G RETRACT

RAT automatic extension.

ADR 1 + 2 + 3 FAULT (CONT'D)

F/CTL ALTN LAW

(PROT LOST)
MAX SPEED 320/.77
Refer to the following table for the IAS/M relationship for .77

FL	390	370	350	330	310	290	280 and below
MAX SPD	237	247	258	270	283	295	320

MANEUVER WITH CARE
MAX FL 350
– WHEN L/G DN : DIRECT LAW
At L/G ext., control reverts to direct law in pitch and roll (See DIRECT LAW proc. 3.02.27).
Note : Use manual control of cabin pressurization :
– MODE SEL . . . . . MAN
– MAN V/S CTL . . . . . AS RQRD
These lines are not displayed on the ECAM. (For details, refer to 3.02.21).

STATUS

MAX SPEED 320/.77
MANEUVER WITH CARE
MAX FL : 350
RUD WITH CARE ABV 160 KT
The rudder travel limit value is frozen at the moment when the failure occurs. Therefore, to prevent damage to the aircraft structure, use the rudder with care, when the speed is above 160 knots. At slats' extension, full rudder travel authority is recovered.
APPR PROC :
Note : As the L/G safety valve is closed, L/G extension must be performed by gravity (Refer to 3.02.32).
WHEN L/G DN : DIRECT LAW
At L/G ext., control reverts to direct law in pitch and roll.
– FOR LDG . . . . . USE FLAP 3
Do not select CONF FULL, so as not to degrade handling qualities.
– GPWS LDG FLAP 3 . . . . . ON
Displayed, when CONF 3 is selected.
APPR SPD . . . . . VREF + 10 KT
CAT 1 ONLY

ADR 1 + 2 + 3 FAULT (CONT'D)

STATUS

● **DURING FINAL APPR**

– V/S CTL . . . . . FULL UP

– LDG DIST PROC . . . . . APPLY

Refer to the QRH part 2, or to the FCOM 3.02.80.

Note : In case of a go-around, respect the maximum speed of 215 knots in CONF 1+F, due to loss of flap auto retraction to CONF 1.

INOP SYS

See below

R CAUTION

R Check that the outflow valve is fully open and

R that cabin altitude is at airfield elevation before opening the doors.

INOP SYS displayed on ECAM

F/CTL PROT	ADR 1+2+3	A/THR
WINDSHEAR DET	AP 1 + 2	RUD TRV LIM 1+2
GPWS		CAB PR 1 + 2

Other inoperative systems

ATC ALTI MODE	TCAS ◁
	L/G RETRACT

RAT automatic extension.

NAV IR FAULT

Note : In case of a simultaneous ADR and IR (same ADIRU) failure, apply the ADR FAULT procedure prior to the IR FAULT procedure.

■ **IR 1 FAULT :**

R – ATT HDG SWTG . . . . . CAPT

STATUS

IR MAY BE AVAIL IN ATT
Refer to the IR ALIGNMENT IN ATT MODE procedure.
CAT 3 SINGLE ONLY

INOP SYS
IR 1
CAT 3 DUAL
R GPWS TERR
TCAS (*)

Note : (*) In case of an IR 1 fault, the TCAS may be inoperative (depending on the TCAS manufacturer). If the IR 1 is available in ATT mode, the TCAS can be recovered by entering the aircraft magnetic heading into the CDU, as per IR ALIGNMENT IN ATT MODE procedure.

■ **IR 2 FAULT :**

– ATT HDG SWTG . . . . . F/O

STATUS

IR MAY BE AVAIL IN ATT
Refer to the IR ALIGNMENT IN ATT MODE procedure.
CAT 3 SINGLE ONLY

INOP SYS
IR 2
CAT 3 DUAL

■ **IR 3 FAULT :**

– ATT HDG SWTG (if IR 3 in use) . . . . . NORM
This line is not displayed on the ECAM.

STATUS

IR MAY BE AVAIL IN ATT
Refer to the IR ALIGNMENT IN ATT MODE procedure.
CAT 3 SINGLE ONLY

INOP SYS
IR 3
CAT 3 DUAL



NAV IR FAULT (CONT'D)

■ **Two IR FAULT :**

● **If IR 1 + 2 FAULT :**

– ATT HDG SWTG . . . . . CAPT

Select IR 3 (if available) to captain side.

Attitude information on F/O PFD is lost.

● **If IR 1 + 3 (or 2 + 3) FAULT :**

– ATT HDG SWTG . . . . . NORM

Attitude information is lost on one side (captain or first officer).

F/CTL ALTN LAW

(PROT LOST)

Flight control normal laws are lost. Pitch alternate law with static stability becomes active.

All protections except maneuver protections are lost.

MAX SPEED . . . . . 320 KT

Speed is limited because of loss of high-speed protection.



NAV IR FAULT

Note : In the case of a simultaneous ADR and IR (same ADIRU) failure, apply the ADR FAULT procedure before the IR FAULT procedure.

■ **IR 1 FAULT :**

R – ATT HDG SWTG . . . . . CAPT 3

STATUS

	INOP SYS
IR MAY BE AVAIL IN ATT *Refer to the IR ALIGNMENT IN ATT MODE procedure.* CAT 3 SINGLE ONLY	IR 1 CAT 3 DUAL GPWS TERR TCAS (*)

R

Note : (*) In case of an IR 1 fault, the TCAS may be inoperative (depending on the TCAS manufacturer). If the IR 1 is available in ATT mode, the TCAS can be recovered by entering the aircraft magnetic heading into the CDU, as per IR ALIGNMENT IN ATT MODE procedure.

■ **IR 2 FAULT :**

– ATT HDG SWTG . . . . . F/O 3

STATUS

	INOP SYS
IR MAY BE AVAIL IN ATT *Refer to the IR ALIGNMENT IN ATT MODE procedure.* CAT 3 SINGLE ONLY	IR 2 CAT 3 DUAL

■ **IR 3 FAULT :**

– ATT HDG SWTG (if IR 3 in use) . . . . . NORM

This line is not displayed on the ECAM.

Note : Disregard all bearings computed by the FMGS and displayed on the :

- *ND upper right corner : TO waypoint bearing*
- *MCDU F-PLN page : TO waypoint bearing*
- *PROG page : Bearing/distance to any pilot-selected waypoint.*

STATUS

	INOP SYS
IR MAY BE AVAIL IN ATT *Refer to the IR ALIGNMENT IN ATT MODE procedure.* CAT 3 SINGLE ONLY	IR 3 CAT 3 DUAL



NAV IR FAULT (CONT'D)

■ **Two IR FAULT :**

● **If IR 1 + 2 FAULT :**

– ATT HDG SWTG . . . . . CAPT 3

Set IR 3 (if available) to the Captain's side.

Loss of attitude information on the F/O's PFD.

● **If IR 1 + 3 (or 2 + 3) FAULT :**

– ATT HDG SWTG . . . . . NORM

Attitude information is lost on one side (Captain or First Officer).

F/CTL ALTN LAW

(PROT LOST)

Flight control normal laws are lost. Pitch alternate law with static stability becomes active.

All protections, except maneuver protections, are lost.

MAX SPEED 320/.77

Speed is limited, due to the because of a loss of high-speed protections.

MANEUVER WITH CARE

MAX FL 350



NAV IR FAULT (CONT'D)

STATUS

MAX SPEED . . . . . 320 KT

APPR PROC

– FOR LDG . . . . . USE FLAP 3

Do not select CONF FULL, so as not to degrade handling qualities.

– GPWS LDG FLAP 3 . . . . . ON

Will appear, when CONF 3 is selected.

APPR SPD : VREF + 10 KT

LDG DIST PROC . . . . . APPLY

Refer to the QRH part 2, or to the FCOM 3.02.80.

ALTN LAW : PROT LOST

WHEN L/G DN : DIRECT LAW

At landing gear extension, control reverts to direct law, in pitch, as well as in roll (see the DIRECT LAW procedure 3.02.27).

IR (affected) MAY BE AVAIL IN ATT

Refer to the IR ALIGNMENT IN ATT MODE procedure.

CAT 1 ONLY

INOP SYS

F/CTL PROT

IR 1 (2)(3)

IR 1 + 2 or 1 + 3 or 2 + 3

AP 1 + 2

A/THR

YAW DAMPER 1(2)(a)

GPWS TERR (if IR 1 fault)

TCAS (*)

(a) Yaw damper 1, in case of an IR 1 + 3 fault
Yaw damper 2, in case of an IR 2 + 3 fault

Note : (*) In case of an IR 1 fault, the TCAS may be inoperative (depending on the TCAS manufacturer). If the IR 1 is available in ATT mode, the TCAS can be recovered by entering the aircraft magnetic heading into the CDU, as per IR ALIGNMENT IN ATT MODE procedure.

IR ALIGNMENT IN ATT MODE

If IR alignment is lost, the navigation mode is inoperative (red ATT flag on PFD and red HDG flag on ND).

Aircraft attitude and heading may be recovered by applying the following procedure.

R *Aircraft must stay level with constant speed during 30 seconds.*

– MODE SELECTOR ..... ATT

ALIGN light on during 30 seconds.

ATT MODE displayed on CDU.

– LEVEL A/C ATTITUDE ..... HOLD

– CONSTANT A/C SPEED ..... MAINTAIN

– DISPLAY SYS switch ..... AFFECTED SYS

– DISPLAY DATA switch ..... HDG

Depending on the CDU keyboard installed, an "H" may be written on the "5" key :

■ **If "H" is written on the "5" key :**

– H KEY ..... PRESS

Degree marker, 0 decimal point, ENT and CLR lights come on.

– A/C HEADING ..... ENTER

■ **If "H" is not written on the "5" key :**

– A/C HEADING ..... ENTER

Enter aircraft magnetic heading on CDU keyboard. Then press ENT key to enter data.

Example : to enter heading 320°, dial 3, 2, 0, 0 then press ENT.

Heading will be displayed on the associated ND.

"HDG–ATT MODE" will be displayed on CDU.

Due to IR drift, magnetic heading has to be periodically crosschecked with standby compass and updated if required.

NAV IR FAULT (CONT'D)

STATUS

MAX SPEED . . . . . 320 KT

APPR PROC

– FOR LDG . . . . . USE FLAP 3

Do not select CONF FULL, so as not to degrade handling qualities.

– GPWS LDG FLAP 3 . . . . . ON

Will appear, when CONF 3 is selected.

APPR SPD : VREF + 10 KT

LDG DIST PROC . . . . . APPLY

Refer to the QRH part 2, or to the FCOM 3.02.80.

ALTN LAW : PROT LOST

WHEN L/G DN : DIRECT LAW

At landing gear extension, control reverts to direct law, in pitch, as well as in roll (see the DIRECT LAW procedure 3.02.27).

IR (affected) MAY BE AVAIL IN ATT

Refer to the IR ALIGNMENT IN ATT MODE procedure.

CAT 1 ONLY

INOP SYS

F/CTL PROT

IR 1 (2)(3)

IR 1 + 2 or 1 + 3 or 2 + 3

AP 1 + 2

A/THR

YAW DAMPER 1(2)(a)

GPWS TERR (if IR 1 fault)

TCAS (*)

(a) Yaw damper 1, in case of an IR 1 + 3 fault
Yaw damper 2, in case of an IR 2 + 3 fault

Note : (*) In case of an IR 1 fault, the TCAS may be inoperative (depending on the TCAS manufacturer). If the IR 1 is available in ATT mode, the TCAS can be recovered by entering the aircraft magnetic heading into the CDU, as per IR ALIGNMENT IN ATT MODE procedure.

IR ALIGNMENT IN ATT MODE

If IR alignment is lost, the navigation mode is inoperative (red ATT flag on PFD and red HDG flag on ND). Aircraft attitude and heading may be recovered by applying the following procedure. Aircraft must stay level with constant speed during 30 seconds.

R

– MODE SELECTOR ..... ATT
ALIGN light on during 30 seconds. ATT MODE displayed on CDU.
– LEVEL A/C ATTITUDE ..... HOLD
– CONSTANT A/C SPEED ..... MAINTAIN
– DISPLAY SYS switch ..... AFFECTED SYS
– DISPLAY DATA switch ..... HDG

■ **MCDU INITIALIZATION :**

– DATA (MCDU KEY) ..... PRESS
The DATA INDEX page is displayed.
– IRS MONITOR (2L KEY) ..... PRESS
The IRS MONITOR page is displayed.
– A/C HEADING ..... ENTER
The heading must be entered in the SET HDG field (5R KEY).

■ **CDU INITIALIZATION :**

Depending on the CDU keyboard installed, an "H" may be written on the "5" key :

■ **If "H" is written on the "5" key :**

– H KEY ..... PRESS
Degree marker, 0 decimal point, ENT and CLR lights come on.
– A/C HEADING ..... ENTER

■ **If "H" is not written on the "5" key :**

– A/C HEADING ..... ENTER
Enter the aircraft's magnetic heading on the CDU keyboard. Then, press the ENT key to enter data.
Example : To enter heading of 320°, dial 3, 2, 0, 0 then press ENT. Heading will be displayed on the associated ND. "HDG–ATT MODE" will be displayed on the CDU.
Due to IR drift, the magnetic heading has to be periodically crosschecked and updated with standby compass, if required.

NAV PRED W/S DET FAULT

The predictive windshear function is lost.
Crew awareness

STATUS
| INOP SYS
PRED W/S DET

NAV IR FAULT (CONT'D)

STATUS

MAX SPEED 320/.77
MANEUVER WITH CARE
MAX FL : 350
APPR PROC
– FOR LDG . . . . . USE FLAP 3
Do not select CONF FULL, so as not to degrade handling qualities.
– GPWS LDG FLAP 3 . . . . . ON
Will appear, when CONF 3 is selected.
APPR SPD : VREF + 10 KT
LDG DIST PROC . . . . . APPLY
Refer to the QRH part 2, or to the FCOM 3.02.80.
ALTN LAW : PROT LOST
WHEN L/G DN : DIRECT LAW
At landing gear extension, control reverts to direct law, in pitch, as well as in roll (see the DIRECT LAW procedure 3.02.27).
IR (affected) MAY BE AVAIL IN ATT
Refer to the IR ALIGNMENT IN ATT MODE procedure.
CAT 1 ONLY

INOP SYS
F/CTL PROT
IR 1 (2)(3)
IR 1 + 2 or 1 + 3 or 2 + 3
AP 1 + 2
A/THR
YAW DAMPER 1(2)(a)
GPWS TERR (if IR 1 fault)
TCAS (*)

(a) Yaw damper 1, in case of an IR 1 + 3 fault
Yaw damper 2, in case of an IR 2 + 3 fault

Note : *(*) In case of an IR 1 fault, the TCAS may be inoperative (depending on the TCAS manufacturer). If the IR 1 is available in ATT mode, the TCAS can be recovered by entering the aircraft magnetic heading into the CDU, as per IR ALIGNMENT IN ATT MODE procedure.*

NAV IR NOT ALIGNED

This caution is available in Phase 2 (after first engine start, until takeoff)

■ **POSITION DISAGREE**
■ **POSITION MISSING**
– PRESENT POS . . . . . INSERT
■ **EXCESS MOTION**
■ **IR 1 (2) (3) (1+2) (2+3) (1+2+3) IN ALIGN**

IR ALIGNMENT IN ATT MODE

If IR alignment is lost, the navigation mode is inoperative (red ATT flag on PFD and red HDG flag on ND). Aircraft attitude and heading may be recovered by applying the following procedure. Aircraft must stay level with constant speed during 30 seconds.

R

– MODE SELECTOR ..... ATT
ALIGN light on during 30 seconds. ATT MODE displayed on CDU.
– LEVEL A/C ATTITUDE ..... HOLD
– CONSTANT A/C SPEED ..... MAINTAIN
– DISPLAY SYS switch ..... AFFECTED SYS
– DISPLAY DATA switch ..... HDG

■ **MCDU INITIALIZATION :**

– DATA (MCDU KEY) ..... PRESS
The DATA INDEX page is displayed.
– IRS MONITOR (2L KEY) ..... PRESS
The IRS MONITOR page is displayed.
– A/C HEADING ..... ENTER
The heading must be entered in the SET HDG field (5R KEY).

■ **CDU INITIALIZATION :**

Depending on the CDU keyboard installed, an "H" may be written on the "5" key :

■ **If "H" is written on the "5" key :**

– H KEY ..... PRESS
Degree marker, 0 decimal point, ENT and CLR lights come on.
– A/C HEADING ..... ENTER

■ **If "H" is not written on the "5" key :**

– A/C HEADING ..... ENTER
Enter the aircraft's magnetic heading on the CDU keyboard. Then, press the ENT key to enter data.
Example : To enter heading of 320°, dial 3, 2, 0, 0 then press ENT. Heading will be displayed on the associated ND. "HDG–ATT MODE" will be displayed on the CDU.
Due to IR drift, the magnetic heading has to be periodically crosschecked and updated with standby compass, if required.

NAV PRED W/S DET FAULT

The predictive windshear function is lost.

Crew awareness

STATUS

| INOP SYS
PRED W/S DET

F/CTL IR DISAGREE

Disagreement between two IRs, the third one having failed or been rejected by the ELACs. Pitch direct, roll direct, and yaw mechanical laws become active. All protections (pitch and roll) are lost.

– ATT . . . . . X CHECK

Use the standby horizon to determine the faulty IR.

● **IF DISAGREE CONFIRMED :**

– FAULTY IR . . . . . OFF

This will also switch off the associated ADR.

– ELAC 2 . . . . . OFF THEN ON

– ELAC 1 . . . . . OFF THEN ON

Note : When the ELAC 1 computer is reset on ground, the pitch trim returns to the ground setting position (0°).

After corrective action (faulty IR switched off and ELACs reset), pitch alternate law with reduced protections is recovered.

F/CTL ALTN LAW

(PROT LOST)

– MAX SPEED . . . . . 320 KT

STATUS

– MAX SPEED . . . . . 320 KT

INOP SYS

F/CTL PROT

APPR PROC

– FOR LDG . . . . . USE FLAP 3

Do not select CONF FULL, so as not to degrade handling qualities.

– GPWS LDG FLAP 3 . . . . . ON

Will be displayed, when CONF 3 is selected.

APPR SPD . . . . . VREF + 10

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH part 2, or to the FCOM 3.02.80.*

ALTN LAW : PROT LOST

WHEN L/G DN : DIRECT LAW

At landing gear extension, control reverts to direct law in pitch, as well as in roll (see the DIRECT LAW procedure 3.02.27).

NAV RA 1(2) FAULT

Crew awareness.

STATUS

■ **One RA FAULT :**

CAT 2 ONLY

R

INOP SYS
RA 1(2)
CAT 3
GPWS (if RA 1 fault)

■ **Both RA FAULT :**

WHEN L/G DN : DIRECT LAW

At landing gear extension, flight controls revert to direct law in pitch, as well as in roll (see DIRECT LAW procedure 3.02.27).

CAT 1 ONLY

R *ILS APPR mode cannot be engaged ; LOC mode is*
R *available via the FCU LOC pushbutton.*

INOP SYS
RA 1 + 2
A/CALLOUT
AP 1 + 2 (when landing gear is down)
GPWS

NAV TCAS FAULT ◁

Crew awareness.

STATUS

INOP SYS
TCAS

NAV IR DISAGREE

Disagreement between two IRs, the third one having failed or been rejected by the ELACs. Pitch direct, roll direct, and yaw mechanical laws become active. All protections (pitch and roll) are lost.

– ATT . . . . . X CHECK

Use the standby horizon to determine the faulty IR.

● **IF DISAGREE CONFIRMED :**

– FAULTY IR . . . . . OFF

This will also switch off the associated ADR.

– ELAC 2 . . . . . OFF THEN ON

– ELAC 1 . . . . . OFF THEN ON

Note : *When the ELAC 1 computer is reset on ground, the pitch trim returns to the ground setting position (0°).*

After corrective action (faulty IR switched off and ELACs reset), pitch alternate law with reduced protections is recovered.

F/CTL ALTN LAW

(PROT LOST)

– MAX SPEED . . . . . 320 KT

STATUS

– MAX SPEED . . . . . 320 KT

INOP SYS

F/CTL PROT

APPR PROC

– FOR LDG . . . . . USE FLAP 3

Do not select CONF FULL, so as not to degrade handling qualities.

– GPWS LDG FLAP 3 . . . . . ON

Will be displayed, when CONF 3 is selected.

APPR SPD . . . . . VREF + 10

LDG DIST PROC . . . . . APPLY

R *Refer to the QRH part 2, or to the FCOM 3.02.80.*

ALTN LAW : PROT LOST

WHEN L/G DN : DIRECT LAW

At landing gear extension, control reverts to direct law in pitch, as well as in roll (see the DIRECT LAW procedure 3.02.27).

NAV RA 1(2) FAULT

Crew awareness.

STATUS

■ **One RA FAULT :**

CAT 2 ONLY

R

INOP SYS
RA 1(2)
CAT 3
GPWS (if RA 1 fault)

■ **Both RA FAULT :**

WHEN L/G DN : DIRECT LAW

At landing gear extension, flight controls revert to direct law in pitch, as well as in roll (see DIRECT LAW procedure 3.02.27).

CAT 1 ONLY

R *ILS APPR mode cannot be engaged ; LOC mode is*
R *available via the FCU LOC pushbutton.*

INOP SYS
RA 1 + 2
A/CALLOUT
AP 1 + 2 (when landing gear is down)
GPWS

NAV TCAS FAULT ◁

Crew awareness.

STATUS

INOP SYS
TCAS

NAV IR DISAGREE

Disagreement between two IRs, the third one having failed or been rejected by the ELACs. Pitch direct, roll direct, and yaw mechanical laws become active. All protections (pitch and roll) are lost.

– ATT . . . . . X CHECK

Use the standby horizon to determine the faulty IR.

● **IF DISAGREE CONFIRMED :**

– FAULTY IR . . . . . OFF

This will also switch off the associated ADR.

– ELAC 2 . . . . . OFF THEN ON

– ELAC 1 . . . . . OFF THEN ON

Note : When the ELAC 1 computer is reset on ground, the pitch trim returns to the ground setting position (0°).

After corrective action (faulty IR switched off and ELACs reset), pitch alternate law with reduced protections is recovered.

F/CTL ALTN LAW

(PROT LOST)

MAX SPEED 320/.77

MANEUVER WITH CARE

MAX FL 350

STATUS

MAX SPEED 320/.77

MANEUVER WITH CARE

MAX FL : 350

APPR PROC

– FOR LDG . . . . . USE FLAP 3

Do not select CONF FULL, so as not to degrade handling qualities.

– GPWS LDG FLAP 3 . . . . . ON

Will be displayed, when CONF 3 is selected.

APPR SPD . . . . . VREF + 10

LDG DIST PROC . . . . . APPLY

Refer to the QRH part 2, or to the FCOM 3.02.80.

ALTN LAW : PROT LOST

WHEN L/G DN : DIRECT LAW

At landing gear extension, control reverts to direct law in pitch, as well as in roll (see the DIRECT LAW procedure 3.02.27).

INOP SYS

F/CTL PROT

NAV RA 1(2) FAULT

Crew awareness.

STATUS

■ **One RA FAULT :**

CAT 2 ONLY

R

INOP SYS
RA 1(2)
CAT 3
GPWS (if RA 1 fault)

■ **Both RA FAULT :**

WHEN L/G DN : DIRECT LAW

At landing gear extension, flight controls revert to direct law in pitch, as well as in roll (see DIRECT LAW procedure 3.02.27).

CAT 1 ONLY

R *ILS APPR mode cannot be engaged ; LOC mode is*
R *available via the FCU LOC pushbutton.*

INOP SYS
RA 1 + 2
A/CALLOUT
AP 1 + 2 (when landing gear is down)
GPWS

NAV TCAS FAULT ◁

Crew awareness.

STATUS

INOP SYS
TCAS

NAV GPS 1(2) FAULT

Crew awareness.

STATUS

| INOP SYS
GPS 1(2)

NAV FM/GPS POS DISAGREE

This message is generated, when either one of the FM positions differ from either of the GPS positions by more than 0.5 minutes of latitude or longitude.

– A/C POS . . . . . CHECK

The following procedure is not displayed on the ECAM :

R ● **If the message occurs during takeoff initiation** :
R – Continue takeoff and monitor navigation.
R ● **If the message occurs during ILS/LOC approach (LOC**
R **green)**:
R – DISREGARD it.

● **If the message occurs during climb, cruise, or descent** :
– CHECK navigation accuracy, using raw data :
■ **If the check is positive** :
– NAV mode and ND ARC/ROSE NAV may be used.
■ **If the check is negative** :
– HDG/TRK mode and raw data must be used.
– Consider switching off the terrain functions of the EGPWS.
– When possible, compare the FM position versus the GPIRS position, on the POSITION MONITOR page :
■ **If one FM position agrees with the GPIRS position on the POSITION MONITOR page** :
– Use the associated FD/AP.
■ **If not** :
– Deselect GPS and revert to basic information.

● **If the message occurs during a non-precision approach** :
■ **Overlay approach** :
– SELECT HDG or TRK, and use raw data.
■ **GPS or RNAV approach** :
– GO AROUND or fly visual, if visual conditions are met.

NAV ILS 1(2) FAULT

Crew awareness.

STATUS

CAT 1 ONLY	INOP SYS
	ILS 1(2) CAT 2

NAV GPWS FAULT

– GPWS . . . . . OFF

R *This line remains displayed, even after the GPWS pushbutton has been switched OFF.*

STATUS

INOP SYS
GPWS

NAV GPS 1(2) FAULT

Crew awareness.

STATUS

| INOP SYS
GPS 1(2)

NAV FM/GPS POS DISAGREE

The FMS and GPS positions differ by more than :

– A longitude threshold that depends on the latitude :

· 0.5 minutes for latitudes below 55 degrees

· 0.9 minutes for latitudes at, or above, 55 degrees, and below 70 degrees

– A latitude threshold of 0.5 minutes, regardless of the latitude.

– A/C POS . . . . . CHECK

The following procedure is not displayed on the ECAM :

R ● **If the message occurs during takeoff initiation** :

R – Continue takeoff and monitor navigation.

R ● **If the message occurs during ILS/LOC approach (LOC**

R **green)**:

R – DISREGARD it.

● **If the message occurs during climb, cruise, or descent** :

– CHECK navigation accuracy, using raw data :

■ **If the check is positive :**

– NAV mode and ND ARC/ROSE NAV may be used.

■ **If the check is negative :**

– HDG/TRK mode and raw data must be used.

– Consider switching off the terrain functions of the EGPWS.

– When possible, compare the FM position with the GPIRS position, on the POSITION MONITOR page :

■ **If one FM position agrees with the GPIRS position on the POSITION MONITOR page :**

– Use the associated FD/AP.

■ **If not :**

– Deselect GPS and revert to basic information.

● **If the message occurs during a non-precision approach** :

■ **Overlay approach :**

– SELECT HDG or TRK, and use raw data.

■ **GPS or RNAV approach :**

– GO AROUND or fly visual, if visual conditions are met.

NAV ILS 1(2) FAULT

Crew awareness.

CAT 1 ONLY

STATUS

INOP SYS
ILS 1(2)
CAT 2

NAV GPWS FAULT

– GPWS . . . . . OFF

R *This line remains displayed, even after the GPWS pushbutton has been switched OFF.*

STATUS

INOP SYS
GPWS

NAV GPS 1(2) FAULT

Crew awareness.

STATUS

| INOP SYS
GPS 1(2)

NAV FM/GPS POS DISAGREE

The FMS and GPS positions differ by more than :

– A longitude threshold that depends on the latitude :

· 0.5 minutes for latitudes below 55 degrees

· 0.9 minutes for latitudes at, or above, 55 degrees, and below 70 degrees

– A latitude threshold of 0.5 minutes, regardless of the latitude.

– A/C POS . . . . . CHECK

The following procedure is not displayed on the ECAM :

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■ **Overlay approach :**

– SELECT HDG or TRK, and use raw data.

■ **GPS or RNAV approach :**

– GO AROUND or fly visual, if visual conditions are met.

NAV ILS 1(2) FAULT

Crew awareness.

STATUS

INOP SYS
ILS 1(2)
CAT 2

NAV GPWS FAULT

– GPWS . . . . . OFF

This line remains displayed, even after the GPWS pushbutton has been switched OFF.

STATUS

INOP SYS
GPWS

EGPWS ALERTS

CAUTION

During night or IMC conditions, apply the procedure immediately. Do not delay reaction for diagnosis.
During daylight VMC conditions, with terrain and obstacles clearly in sight, the alert may be considered cautionary. Take positive corrective action until the alert stops, or a safe trajectory is ensured.

■ **"PULL UP" - "TERRAIN TERRAIN PULL UP" - "TERRAIN AHEAD PULL UP"**

Simultaneously :

– AP ..... OFF
– PITCH ..... PULL UP

Pull up to full backstick and maintain.

– THRUST LEVERS ..... TOGA
– SPEEDBRAKE lever ..... CHECK RETRACTED
R – BANK ..... WINGS LEVEL or ADJUST
R *Best climb performance is obtained when close to wings level. Then, for "TERRAIN AHEAD PULL UP" only, and if the crew concludes that turning is the safest way of action, a turning maneuver can be initiated.*

R ● **When the flight path is safe and the warning stops** :
Decrease pitch attitude and accelerate.

● **When speed is above VLS, and vertical speed is positive** :
Clean up aircraft, as required.

■ **"TERRAIN TERRAIN" "TOO LOW TERRAIN"** :

Adjust the flight path, or initiate a go-around.

■ **"TERRAIN AHEAD"** :

Adjust the flight path. Stop descent. Climb and/or turn, as necessary, based on analysis of all available instruments and information.

■ **"SINK RATE" "DON'T SINK"** :

Adjust pitch attitude and thrust to silence the alert.

■ **"TOO LOW GEAR" - "TOO LOW FLAPS"** :

R Perform a go-around.

■ **"GLIDE SLOPE"** :

Establish the aircraft on the glideslope, or switch OFF the G/S mode pushbutton, if flight below the glideslope is intentional (non precision approach (NPA)).

NAV GPWS TERR DET FAULT

The enhanced TCF and TAD modes of the EGPWS are inoperative.

– GPWS TERR . . . . . OFF

The basic GPWS mode 1 to mode 5 are still operative if the SYS pushbutton switch lights FAULT or OFF are not illuminated.

EGPWS ALERTS

CAUTION

During night or IMC conditions, apply the procedure immediately. Do not delay reaction for diagnosis.
During daylight VMC conditions, with terrain and obstacles clearly in sight, the alert may be considered cautionary. Take positive corrective action until the alert stops or a safe trajectory is ensured.

■ **"PULL UP" - "TERRAIN TERRAIN PULL UP" - "TERRAIN AHEAD PULL UP" - "OBSTACLE AHEAD PULL UP" :**

Simultaneously :

– AP ..... OFF
– PITCH ..... PULL UP

Pull up to full backstick and maintain.

– THRUST LEVERS ..... TOGA
– SPEEDBRAKE lever ..... CHECK RETRACTED
R – BANK ..... WINGS LEVEL or ADJUST
R *Best climb performance is obtained when close to wings level. Then, for "TERRAIN AHEAD PULL UP" only, and if the crew concludes that turning is the safest way of action, a turning maneuver can be initiated.*

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Adjust the flight path, or initiate a go-around.

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Perform a go-around.

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Establish the aircraft on the glideslope, or switch OFF the G/S mode pushbutton, if flight below the glideslope is intentional (non precision approach (NPA)).

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The enhanced TCF and TAD modes of the EGPWS are inoperative.

– GPWS TERR . . . . . OFF

The basic GPWS mode 1 to mode 5 are still operative if the SYS pushbutton switch lights FAULT or OFF are not illuminated.

TCAS WARNINGS

■ **Traffic advisory : "TRAFFIC" messages**

Do not maneuver based on a TA alone.
Attempt to see the reported traffic.

R ■ **Resolution advisory : All "CLIMB" and "DESCEND" or**
R **"MAINTAIN VERTICAL SPEED MAINTAIN" or "ADJUST**
R **VERTICAL SPEED ADJUST" or "MONITOR VERTICAL SPEED"**
R **type messages**

R – AP (if engaged) ..... OFF
R – BOTH FDs ..... OFF
R – Respond promptly and smoothly to an RA by adjusting or
R maintaining the vertical speed, as required, to reach the
R green area and/or avoid the red area of the vertical speed
R scale.
R *Note : Avoid excessive maneuvers while aiming to keep the vertical speed just*
R *outside the red area of the VSI, and within the green area. If necessary, use*
R *the full speed range between Vαmax and Vmax.*
R – Respect stall, GPWS, or windshear warning.
R – Notify ATC.
R – When "CLEAR OF CONFLICT" is announced :
R *– Resume normal navigation in accordance with ATC clearance.*
R *– AP/FD can be re-engaged as desired.*

● **GO AROUND procedure must be performed when a RA "CLIMB" or "INCREASE CLIMB" is triggered on final approach.**

Note : Resolution Advisories (RA) are inhibited below 900 feet.

F/CTL ADR DISAGREE

If one ADR is faulty, or has been rejected by the ELAC, and if there is a speed or alpha disagrement between the 2 remaining ADRs, alternate law becomes active, and protections are lost.

– AIR SPD ..... X CHECK

■ **IF SPD DISAGREE :**

Refer to the ADR CHECK PROC paper procedure to determine the faulty ADR.

– FAULTY ADR ..... OFF

■ **IF NO SPD DISAGREE :**

– AOA DISCREPANCY

F/CTL ALTN LAW

(PROT LOST)

– MAX SPEED ..... 320 KT

STATUS	
– MAX SPEED ..... 320 KT	INOP SYS
APPR PROC	F/CTL PROT
– FOR LDG ..... USE FLAP 3	
Do not select CONF FULL, so as not to degrade handling qualities.	
– GPWS LDG FLAP 3 ..... ON	
Displayed, when CONF 3 is selected.	
APPR SPD ..... VREF + 10	
LDG DIST PROC ..... APPLY	
Refer to the QRH part 2, or to the FCOM 3.02.80.	
ALTN LAW : PROT LOST	
WHEN L/G DN : DIRECT LAW	
At landing gear extension, control reverts to direct law in pitch, as well as in roll (see DIRECT LAW procedure 3.02.27).	
● **IF NO SPD DISAGREE :**	
RISK OF UNDUE STALL WARN	

TCAS WARNINGS

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R **type messages**

R – AP (if engaged) ..... OFF
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R – Respond promptly and smoothly to an RA by adjusting or
R maintaining the vertical speed, as required, to reach the
R green area and/or avoid the red area of the vertical speed
R scale.
R *Note : Avoid excessive maneuvers while aiming to keep the vertical speed just*
R *outside the red area of the VSI, and within the green area. If necessary, use*
R *the full speed range between Vαmax and Vmax.*
R – Respect stall, GPWS, or windshear warning.
R – Notify ATC.
R – When "CLEAR OF CONFLICT" is announced :
R *– Resume normal navigation in accordance with ATC clearance.*
R *– AP/FD can be re-engaged as desired.*

● **GO AROUND procedure must be performed when a RA "CLIMB" or "INCREASE CLIMB" is triggered on final approach.**

Note : Resolution Advisories (RA) are inhibited below 900 feet.

NAV ADR DISAGREE

If one ADR is faulty, or has been rejected by the ELAC, and if there is a speed or alpha disagrement between the 2 remaining ADRs, alternate law becomes active, and protections are lost.

– AIR SPD ..... X CHECK

■ **IF SPD DISAGREE :**

R – ADR CHECK PROC ..... APPLY

Refer to the ADR CHECK PROC paper procedure to determine the faulty ADR.

■ **IF NO SPD DISAGREE :**

– AOA DISCREPANCY

F/CTL ALTN LAW

(PROT LOST)

– MAX SPEED ..... 320 KT

STATUS

– MAX SPEED ..... 320 KT

APPR PROC

– FOR LDG ..... USE FLAP 3

Do not select CONF FULL, so as not to degrade handling qualities.

– GPWS LDG FLAP 3 ..... ON

Displayed, when CONF 3 is selected.

APPR SPD ..... VREF + 10

LDG DIST PROC ..... APPLY

R *Refer to the QRH part 2, or to the FCOM 3.02.80.*

ALTN LAW : PROT LOST

WHEN L/G DN : DIRECT LAW

At landing gear extension, control reverts to direct law in pitch, as well as in roll (see DIRECT LAW procedure 3.02.27).

● **IF NO SPD DISAGREE :**

RISK OF UNDUE STALL WARN

INOP SYS

F/CTL PROT

TCAS WARNINGS

■ **Traffic advisory : "TRAFFIC" messages**

Do not maneuver based on a TA alone.
Attempt to see the reported traffic.

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R **"MAINTAIN VERTICAL SPEED MAINTAIN" or "ADJUST**
R **VERTICAL SPEED ADJUST" or "MONITOR VERTICAL SPEED"**
R **type messages**

R – AP (if engaged) ..... OFF
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R – Respond promptly and smoothly to an RA by adjusting or
R maintaining the vertical speed, as required, to reach the
R green area and/or avoid the red area of the vertical speed
R scale.
R *Note : Avoid excessive maneuvers while aiming to keep the vertical speed just*
R *outside the red area of the VSI, and within the green area. If necessary, use*
R *the full speed range between Vαmax and Vmax.*
R – Respect stall, GPWS, or windshear warning.
R – Notify ATC.
R – When "CLEAR OF CONFLICT" is announced :
R *– Resume normal navigation in accordance with ATC clearance.*
R *– AP/FD can be re-engaged as desired.*

● **GO AROUND procedure must be performed when a RA "CLIMB" or "INCREASE CLIMB" is triggered on final approach.**

Note : Resolution Advisories (RA) are inhibited below 900 feet.

NAV ADR DISAGREE

If one ADR is faulty, or has been rejected by the ELAC, and if there is a speed or alpha disagrement between the 2 remaining ADRs, alternate law becomes active, and protections are lost.

– AIR SPD ..... X CHECK

■ **IF SPD DISAGREE :**

– ADR CHECK PROC ..... APPLY

Refer to the ADR CHECK PROC paper procedure to determine the faulty ADR.

■ **IF NO SPD DISAGREE :**

– AOA DISCREPANCY

F/CTL ALTN LAW

(PROT LOST)
MAX SPEED 320/.77
MANEUVER WITH CARE
MAX FL 350

STATUS

MAX SPEED 320/.77
MANEUVER WITH CARE
MAX FL : 350
APPR PROC

– FOR LDG ..... USE FLAP 3

Do not select CONF FULL, so as not to degrade handling qualities.

– GPWS LDG FLAP 3 ..... ON

Displayed, when CONF 3 is selected.

APPR SPD ..... VREF + 10
LDG DIST PROC ..... APPLY

R *Refer to the QRH part 2, or to the FCOM 3.02.80.*

ALTN LAW : PROT LOST
WHEN L/G DN : DIRECT LAW

At landing gear extension, control reverts to direct law in pitch, as well as in roll (see DIRECT LAW procedure 3.02.27).

● **IF NO SPD DISAGREE :**
RISK OF UNDUE STALL WARN

INOP SYS
F/CTL PROT

INTENTIONALLY LEFT BLANK

R

UNRELIABLE SPEED INDIC/ADR CHECK PROC

Unreliable speed indication may be due to radome damage, or due to air probe failure or obstruction.

The indicated altitude may also be affected, if static probes are affected.

Unreliable speed cannot be detected by the ADIRU. The flight control and flight guidance computers normally reject erroneous speed/altitude source(s), provided a significant difference is detected.

However, they will not be able to reject two erroneous speeds or altitudes that synchronously and similarly drift away. In this remote case, the aircraft systems will consider the remaining correct source as being faulty and will reject it. Consequently, the flight control and flight guidance computers will use the remaining two wrong ADRs for their computation.

Therefore, in all cases of unreliable speed situation, the pilots must identify the faulty ADR(s) and then switch it (them) OFF. If all ADRs provide unreliable data, keep one ADR on to keep the stall warning protection. During this failure identification time, since the flight control laws may be affected, it is recommended to maneuver the aircraft with care until the ADR(s) is (are) switched OFF.

Unreliable speed indications may be suspected, either by :

- Speed discrepancies (between ADR 1, 2, 3, and standby instruments).
- Fluctuating or unexpected increase/decrease/steady indicated speed, or pressure altitude.
- Abnormal correlation of the basic flight parameters (speed, pitch attitude, thrust, climb rate).
- Abnormal AP/FD/ATHR behavior.
- STALL warning, or OVERSPEED warnings, that contradicts with at least one of the indicated speeds.
  - Rely on the stall warning that could be triggered in alternate or direct law. It is not affected by unreliable speeds, because it is based on angle of attack.
  - Depending on the failure, the OVERSPEED warning may be false or justified. Buffet, associated with the OVERSPEED VFE warning, is a symptom of a real overspeed condition.
- Inconsistency between radio altitude and pressure altitude.
- Reduction in aerodynamic noise with increasing speed, or increase in aerodynamic noise with decreasing speed.
- Impossibility of extending the landing gear by the normal landing gear control.



NAV IAS DISCREPANCY

– AIR SPD ..... X CHECK
– AIR DATA SWTG ..... AS RQRD

STATUS

	INOP SYS
CAT 3 SINGLE ONLY	CAT 3 DUAL

R

UNRELIABLE SPEED INDIC/ADR CHECK PROC

Unreliable speed indication may be due to radome damage, or due to air probe failure or obstruction.

The indicated altitude may also be affected, if static probes are affected.

Unreliable speed cannot be detected by the ADIRU. The flight control and flight guidance computers normally reject erroneous speed/altitude source(s), provided a significant difference is detected.

However, they will not be able to reject two erroneous speeds or altitudes that synchronously and similarly drift away. In this remote case, the aircraft systems will consider the remaining correct source as being faulty and will reject it. Consequently, the flight control and flight guidance computers will use the remaining two wrong ADRs for their computation.

Therefore, in all cases of unreliable speed situation, the pilots must identify the faulty ADR(s) and then switch it (them) OFF. If all ADRs provide unreliable data, keep one ADR on to keep the stall warning protection. During this failure identification time, since the flight control laws may be affected, it is recommended to maneuver the aircraft with care until the ADR(s) is (are) switched OFF.

Unreliable speed indications may be suspected, either by :

- Speed discrepancies (between ADR 1, 2, 3, and standby instruments).
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- Abnormal correlation of the basic flight parameters (speed, pitch attitude, thrust, climb rate).
- Abnormal AP/FD/ATHR behavior.
- STALL warning, or OVERSPEED warnings, that contradicts with at least one of the indicated speeds.
  - Rely on the stall warning that could be triggered in alternate or direct law. It is not affected by unreliable speeds, because it is based on angle of attack.
  - Depending on the failure, the OVERSPEED warning may be false or justified. Buffet, associated with the OVERSPEED VFE warning, is a symptom of a real overspeed condition.
- Inconsistency between radio altitude and pressure altitude.
- Reduction in aerodynamic noise with increasing speed, or increase in aerodynamic noise with decreasing speed.
- Impossibility of extending the landing gear by the normal landing gear control.



UNRELIABLE SPEED INDIC/ADR CHECK PROC (CONT'D)

R ● **If the safe conduct of the flight is impacted** :

MEMORY ITEMS :

- AP/FD.....OFF
- A/THR.....OFF
- PITCH/THRUST :
  - Below THRUST RED ALT.....15°/TOGA
  - Above THRUST RED ALT and Below FL 100.....10°/CLB
  - Above THRUST RED ALT and Above FL 100.....5°/CLB
- FLAPS.....Maintain current CONFIG
- SPEEDBRAKES.....Check retracted
- L/G.....UP

When at, or above MSA or Circuit Altitude: level off for troubleshooting

NFCS-03-0234-021-A258AA

– GPS ALTITUDE ..... Display on MCDU

R ● **To level off for troubleshooting** :

R *Note : Check the actual slat/flap config. on ECAM, as flap auto-retraction may occur.*

PITCH/THRUST FOR INITIAL LEVEL OFF

SLATS/FLAPS EXTENDED				
		Above 66 t	66 t – 56 t	Below 56 t
CONF	Speed	Pitch (°)/Thrust (% N1)		
3	F	7.0/62.0	7.0/57.9	7.0/53.3
2	F	8.5/61.3	8.5/57.1	8.5/52.7
1 + F	S	3.5/62.6	3.5/58.5	3.5/54.2
1	S	7.5/59.1	7.5/55.5	7.5/51.1
CLEAN				
FL	Speed	Pitch (°)/Thrust (% N1)		
Below FL 200	250 kts	3.5/62.4	3.0/60.3	2.0/58.8
FL 200 - FL 320	275 kts	2.5/74.3	2.0/72.7	1.5/71.4
Above FL 320	M 0.76	3.0/80.1	2.5/78.6	2.0/76.3

R **Flying technique to stabilize speed :**

– Adjust pitch in order to fly the required flight path.
– When target pitch is reached, flying intended flight path, adjust thrust to target.
  · If the aircraft pitch tends to increase, aircraft is slow, then increase thrust ;
  · If the aircraft pitch tends to decrease, aircraft is fast, then decrease thrust.

R

UNRELIABLE SPEED INDIC/ADR CHECK PROC (CONT'D)

WHEN FLIGHT PATH IS STABILIZED

– PROBE/WINDOW HEAT . . . . . ON

Technical recommendations :

– Respect Stall Warning.
– To monitor speed, refer to IRS Ground Speed or GPS Ground Speed variations.

● **If remaining altitude indication is unreliable** :
  – Do not use FPV and/or V/S, which are affected.
  – ATC altitude is affected. Notify the ATC.
  – Refer to GPS altitude : altitude variations may be used to control level flight, and is an altitude cue.
  – Refer to Radio altimeter.

CAUTION

If the failure is due to radome destruction, the drag will increase and therefore N1 must be increased by 5. Fuel flow will increase by about 27 %.



UNRELIABLE SPEED INDIC/ADR CHECK PROC (CONT'D)

R ● **If the safe conduct of the flight is impacted** :

MEMORY ITEMS :

- AP/FD.....OFF
- A/THR.....OFF
- PITCH/THRUST :
  - Below THRUST RED ALT.....15°/TOGA
  - Above THRUST RED ALT and Below FL 100.....10°/CLB
  - Above THRUST RED ALT and Above FL 100.....5°/CLB
- FLAPS.....Maintain current CONFIG
- SPEEDBRAKES.....Check retracted
- L/G.....UP

When at, or above MSA or Circuit Altitude: level off for troubleshooting

NFCS-03-0234-021-A260AA

– GPS ALTITUDE ..... Display on MCDU

R ● **To level off for troubleshooting** :

R *Note : Check the actual slat/flap config. on ECAM, as flap auto-retraction may occur.*

PITCH/THRUST FOR INITIAL LEVEL OFF

SLATS/FLAPS EXTENDED				
		Above 67 t	67 t – 57 t	Below 57 t
CONF	Speed	Pitch (°)/Thrust (% N1)		
3	F	7.5/61.8	7.5/57.5	7.5/53.0
2	F	9.0/61.6	9.0/57.3	9.0/52.8
1 + F	S	4.5/60.2	4.5/56.1	4.5/51.2
1	S	7.5/58.0	7.5/53.9	7.5/48.9
CLEAN				
FL	Speed	Pitch (°)/Thrust (% N1)		
Below FL 200	250 kts	4.0/62.4	3.0/60.1	2.0/58.3
FL 200 - FL 320	275 kts	3.0/73.4	2.0/71.6	1.5/70.2
Above FL 320	M 0.76	2.5/79.2	2.5/78.1	2.0/77.0

R **Flying technique to stabilize speed :**

– Adjust pitch in order to fly the required flight path.
– When target pitch is reached, flying intended flight path, adjust thrust to target.
  · If the aircraft pitch tends to increase, aircraft is slow, then increase thrust ;
  · If the aircraft pitch tends to decrease, aircraft is fast, then decrease thrust.

R

UNRELIABLE SPEED INDIC/ADR CHECK PROC (CONT'D)

WHEN FLIGHT PATH IS STABILIZED

– PROBE/WINDOW HEAT ..... ON

Technical recommendations :

– Respect Stall Warning.
– To monitor speed, refer to IRS Ground Speed or GPS Ground Speed variations.
● **If remaining altitude indication is unreliable** :
  – Do not use FPV and/or V/S, which are affected.
  – ATC altitude is affected. Notify the ATC.
  – Refer to GPS altitude : altitude variations may be used to control level flight, and is an altitude cue.
  – Refer to Radio altimeter.

CAUTION

If the failure is due to radome destruction, the drag will increase and therefore N1 must be increased by 5. Fuel flow will increase by about 27 %.



R

UNRELIABLE SPEED INDIC/ADR CHECK PROC (CONT'D)

WHEN FLIGHT PATH IS STABILIZED

– PROBE/WINDOW HEAT . . . . . ON

Technical recommendations :

– Respect Stall Warning.
– To monitor speed, refer to IRS Ground Speed or GPS Ground Speed variations.

● **If remaining altitude indication is unreliable** :
  – Do not use FPV and/or V/S, which are affected.
  – ATC altitude is affected. Notify the ATC.
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  – Refer to Radio altimeter.

CAUTION

If the failure is due to radome destruction, the drag will increase and therefore N1 must be increased by 5. Fuel flow will increase by about 27 %.



UNRELIABLE SPEED INDIC/ADR CHECK PROC (CONT'D)

Affected ADR identification :

– Crosscheck all speed indications and refer to QRH 4.01 (for F, S speeds) or 5.01 (for speed in clean CONF):

■ **If at least one ADR is reliable :**

– Faulty ADR(s) ..... OFF
– REMAINING AIR DATA ..... CONFIRM

Alternate sources may be used to evaluate the air data :
– GPS altitude
– GPS and IRS ground speeds, taking into account altitude and wind effect.

■ **If affected ADR(s) cannot be identified, or if all ADRs are affected :**

– ONE ADR ..... KEEP ON
Keep one ADR ON to maintain the STALL WARNING protection.
– TWO ADRS ..... OFF
This prevents flight control laws from using two coherent but unreliable ADR data.
– LDG CONF ..... USE FLAP 3
– APP SPD ..... VLS + 10
– LDG DIST PROC ..... APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80.

■ **To return to departure airport :**

Keep takeoff configuration preferably.
Refer to initial and intermediate approach, and final approach tables.

■ **To accelerate and clean up after takeoff :**

Accelerate and clean up the aircraft in level flight :
– THRUST ..... CLB
– FLAPS ..... RETRACT
Retract from 3 or 2 to 1, once CLB thrust is set.
Retract from 1 to 0, when the aircraft pitch is lower than the pitch for S speed (refer to the "Pitch/Thrust for initial level off" table).
Once in clean configuration, refer to climb, cruise, descent, approach tables for flight continuation.

■ **Other cases :**

– Refer to climb, cruise, descent, approach tables for flight continuation.

UNRELIABLE SPEED INDIC/ADR CHECK PROC (CONT'D)

Affected ADR identification :

– Crosscheck all speed indications and refer to QRH 4.01 (for F, S speeds) or 5.01 (for speed in clean CONF):

■ **If at least one ADR is reliable :**

– Faulty ADR(s) ..... OFF
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Alternate sources may be used to evaluate the air data :
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Once in clean configuration, refer to climb, cruise, descent, approach tables for flight continuation.

■ **Other cases :**

– Refer to climb, cruise, descent, approach tables for flight continuation.

R

UNRELIABLE SPEED INDIC/ADR CHECK PROC (CONT'D)

CLIMB

Set the thrust to CL.

CLEAN				
		Above 66 t	66 t - 56 t	Below 56 t
FL	Speed	Pitch (°)/Thrust (% N1)		
Below FL 50	250 kts	10.5/CLB	11.5/CLB	12.5/CLB
FL 50 - FL 100		9.5/CLB	10.0/CLB	11.0/CLB
FL 100 - FL 150		8.5/CLB	8.5/CLB	9.5/CLB
FL 150 - FL 200		7.5/CLB	7.5/CLB	8.0/CLB
FL 200 - FL 250	275 kts	5.0/CLB	5.0/CLB	5.0/CLB
FL 250 - FL 320		4.0/CLB	4.0/CLB	4.0/CLB
Above FL 320	M 0.76	3.5/CLB	4.0/CLB	4.0/CLB

CRUISE

Adjust N1 to maintain approximate level flight with pitch attitude held constant. When time permits, refer to FCOM 3.04.91 (SEVERE TURBULENCE) and adjust pitch to maintain level flight.

CLEAN				
		Above 66 t	66 t - 56 t	Below 56 t
FL	Speed	Pitch (°)/Thrust (% N1)		
Below FL 200	250 kts	3.5/62.4	3.0/60.3	2.0/58.8
FL 200 - FL 320	275 kts	2.5/74.3	2.0/72.7	1.5/71.4
Above FL 320	M 0.76	3.0/80.1	2.5/78.6	2.0/76.3

DESCENT

Set the thrust to IDLE

CLEAN				
		Above 66 t	66 t - 56 t	Below 56 t
FL	Speed	Pitch (°)/Thrust (% N1)		
Above FL 320	M 0.76	-0.5/IDLE	-0.5/IDLE	-1.5/IDLE
FL 320 - FL 200	275 kts	0.0/IDLE	-1.0/IDLE	-2.0/IDLE
FL 200 - FL 100	250 kts	1.0/IDLE	0.0/IDLE	-1.0/IDLE
Below FL 100	250 kts	1.0/IDLE	0.0/IDLE	-1.0/IDLE
Below FL 100	G-DOT	2.5/IDLE	2.5/IDLE	2.5/IDLE

UNRELIABLE SPEED INDIC/ADR CHECK PROC (CONT'D)

Affected ADR identification :

– Crosscheck all speed indications and refer to QRH 4.01 (for F, S speeds) or 5.01 (for speed in clean CONF):

■ **If at least one ADR is reliable :**

– Faulty ADR(s) ..... OFF
– REMAINING AIR DATA ..... CONFIRM

Alternate sources may be used to evaluate the air data :
– GPS altitude
– GPS and IRS ground speeds, taking into account altitude and wind effect.

■ **If affected ADR(s) cannot be identified, or if all ADRs are affected :**

– ONE ADR ..... KEEP ON
Keep one ADR ON to maintain the STALL WARNING protection.
– TWO ADRS ..... OFF
This prevents flight control laws from using two coherent but unreliable ADR data.
– LDG CONF ..... USE FLAP 3
– APP SPD ..... VLS + 10
– LDG DIST PROC ..... APPLY
Refer to the QRH Part 2, or to the FCOM 3.02.80.

■ **To return to departure airport :**

Keep takeoff configuration preferably.
Refer to initial and intermediate approach, and final approach tables.

■ **To accelerate and clean up after takeoff :**

Accelerate and clean up the aircraft in level flight :
– THRUST ..... CLB
– FLAPS ..... RETRACT
Retract from 3 or 2 to 1, once CLB thrust is set.
Retract from 1 to 0, when the aircraft pitch is lower than the pitch for S speed (refer to the "Pitch/Thrust for initial level off" table).
Once in clean configuration, refer to climb, cruise, descent, approach tables for flight continuation.

■ **Other cases :**

– Refer to climb, cruise, descent, approach tables for flight continuation.

R

UNRELIABLE SPEED INDIC/ADR CHECK PROC (CONT'D)

CLIMB

Set the thrust to CL.

CLEAN				
		Above 67 t	67 t - 57 t	Below 57 t
FL	Speed	Pitch (°)/Thrust (% N1)		
Below FL 50	250 kts	10.0/CLB	10.5/CLB	11.5/CLB
FL 50 - FL 100		9.0/CLB	9.5/CLB	10.0/CLB
FL 100 - FL 150		8.0/CLB	8.5/CLB	8.5/CLB
FL 150 - FL 200		7.0/CLB	7.0/CLB	7.0/CLB
FL 200 - FL 250	275 kts	5.0/CLB	5.0/CLB	5.0/CLB
FL 250 - FL 320		4.0/CLB	4.0/CLB	4.0/CLB
Above FL 320	M 0.76	3.5/CLB	3.5/CLB	3.5/CLB

CRUISE

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CLEAN				
		Above 67 t	67 t - 57 t	Below 57 t
FL	Speed	Pitch (°)/Thrust (% N1)		
Below FL 200	250 kts	4.0/62.4	3.0/60.1	2.0/58.3
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Above FL 320	M 0.76	2.5/79.2	2.5/78.1	2.0/77.0

DESCENT

Set the thrust to IDLE

CLEAN				
		Above 67 t	67 t - 57 t	Below 57 t
FL	Speed	Pitch (°)/Thrust (% N1)		
Above FL 320	M 0.76	-0.5/IDLE	-1.0/IDLE	-1.5/IDLE
FL 320 - FL 200	275 kts	0.0/IDLE	-0.5/IDLE	-1.5/IDLE
FL 200 - FL 100	250 kts	1.5/IDLE	0.5/IDLE	-0.5/IDLE
Below FL 100	250 kts	1.0/IDLE	0.0/IDLE	-1.0/IDLE
Below FL 100	G-DOT	2.0/IDLE	2.5/IDLE	2.5/IDLE



R

UNRELIABLE SPEED INDIC/ADR CHECK PROC (CONT'D)

INITIAL AND INTERMEDIATE APPROACH IN LEVEL FLIGHT

R The approach phase between Green Dot speed (clean configuration) and the landing configuration (CONF 3), is flown in level flight.

R

LANDING GEAR UP IN LEVEL FLIGHT				
		Above 66 t	66 t - 56 t	Below 56 t
CONF	Speed (kts)	Pitch (°)/Thrust (% N1)		
0	G-DOT	5.0/57.0	5.5/53.1	5.5/49.4
1	S	7.5/59.2	7.5/55.5	7.5/51.1
1+F (a)	S	3.5/62.5	3.5/58.5	3.5/54.2
2	F	8.5/61.2	8.5/57.0	8.5/52.6
LANDING GEAR DOWN IN LEVEL FLIGHT (EXPECT GRVTY EXTENSION)				
3	F	7.5/66.6	7.0/62.6	7.0/58.0

(a) Due to the fact that the speed is unreliable, the SFCC may select the 1+F configuration in approach, instead of 1.

FINAL APPROACH AT STANDARD - 3° DESCENT FLIGHT PATH

LANDING GEAR DOWN				
		Above 66 t	66 t - 56 t	Below 56 t
CONF	Speed (kts)	Pitch (°)/Thrust (% N1)		
3	VLS + 10	4.5/49.9	4.5/47.2	4.0/43.9

Flying technique to stabilize speed :

– Adjust pitch in order to fly the required flight path.
– When target pitch is reached, flying intended flight path, adjust thrust to target.
  · If the aircraft pitch tends to increase, aircraft is slow, then increase thrust ;
  · If the aircraft pitch tends to decrease, aircraft is fast, then decrease thrust.

R

UNRELIABLE SPEED INDIC/ADR CHECK PROC (CONT'D)

INITIAL AND INTERMEDIATE APPROACH IN LEVEL FLIGHT

R The approach phase between Green Dot speed (clean configuration) and the landing configuration (CONF 3), is flown in level flight.

LANDING GEAR UP IN LEVEL FLIGHT				
		Above 67 t	67 t - 57 t	Below 57 t
CONF	Speed (kts)	Pitch (°)/Thrust (% N1)		
0	G-DOT	5.5/55.7	5.5/51.5	6.0/47.3
1	S	7.5/58.2	7.5/54.0	7.5/49.0
1+F (a)	S	4.5/60.2	4.5/56.1	4.5/51.2
2	F	9.0/61.7	9.0/57.3	9.0/52.8
LANDING GEAR DOWN IN LEVEL FLIGHT (EXPECT GRVTY EXTENSION)				
3	F	7.5/67.2	7.5/62.7	7.5/57.9

(a) Due to the fact that the speed is unreliable, the SFCC may select the 1+F configuration in approach, instead of 1.

FINAL APPROACH AT STANDARD - 3° DESCENT FLIGHT PATH

LANDING GEAR DOWN				
		Above 67 t	67 t - 57 t	Below 57 t
CONF	Speed (kts)	Pitch (°)/Thrust (% N1)		
3	VLS + 10	4.5/48.0	4.5/44.4	4.5/41.4

Flying technique to stabilize speed :

– Adjust pitch in order to fly the required flight path.
– When target pitch is reached, flying intended flight path, adjust thrust to target.
  · If the aircraft pitch tends to increase, aircraft is slow, then increase thrust ;
  · If the aircraft pitch tends to decrease, aircraft is fast, then decrease thrust.

AIR BLEED 1(2) OFF

One engine bleed is switched off with no fault.

Crew awareness.

AIR ENG BLEED NOT CLSD

Engine bleed valve fails to close :

– during engine start or when APU BLEED is selected on.

– at engine shutdown or when APU BLEED is selected OFF with engine not running.

– ENG BLEED . . . . . OFF

Note : The warning may be triggered

– after engine shutdown, or

– after APU BLEED is selected OFF with engine not running

due to residual pressure between the HP or IP valves and the engine bleed valve.

Select the ENG BLEED pushbutton OFF then on. If the warning disappears, no maintenance action is due.

	STATUS
	INOP SYS
ONE PACK ONLY IF WAI ON	ENG 1(2) BLEED

AIR ENG 1(2) BLEED ABNORM PR

● **If wing anti-ice is on and both packs are on :**

– PACK (affected) . . . . . OFF

One pack must be closed when the pilot is using wing anti-ice because of precooler performance.

– X BLEED . . . . . OPEN

	STATUS
	INOP SYS
ONE PACK ONLY IF WAI ON	ENG 1(2) BLEED PACK 1(2) (if closed)

AIR ENG 1(2) BLEED FAULT

– ENG BLEED affected (if not automatically closed) . . . . . OFF

· *With the ENG BLEED pushbutton switch on, the FAULT light remains on.*

· *With the ENG BLEED pushbutton switch OFF, the FAULT light goes out when the failure (overheat or overpressure) disappears.*

R

● **If wing anti-ice is on and both packs are on :**

– PACK affected . . . . . OFF

One pack must be closed when the pilot is using wing anti-ice because of precooler perfomance.

– X BLEED . . . . . OPEN

	STATUS
	INOP SYS
ONE PACK ONLY IF WAI ON	ENG 1(2) BLEED PACK 1(2) (if closed)

AIR DUAL BLEED FAULT

■ **If ENG 1 BLEED was lost due to a :**

LEAK on side 1
ENG 1 FIRE
Start Air Valve 1 failed open.

– DESCENT TO FL100/MEA ..... INITIATE

Descend rapidly to FL100/MEA, to prevent excessive cabin altitude.

AVOID ICING CONDITIONS

■ **If ENG 2 BLEED was lost due to a :**

LEAK on side 2
ENG 2 FIRE
Start Air Valve 2 failed open.

– X BLEED ..... CHECK CLOSED
– DESCENT TO FL200/MEA ..... INITIATE

Descend rapidly to FL200, to recover the bleed supply from the APU.

– APU ..... START

Start the APU during the descent.

● **AT, OR BELOW, FL200 :**

– WING A.ICE ..... OFF

APU BLEED must not be used for wing anti-ice.

– APU BLEED ..... ON

MAX FL200
AVOID ICING CONDITIONS

■ **In all other cases :**

– DESCENT ..... INITIATE

Descend rapidly to FL200, so that the bleed supply may be supplied by the APU, if the bleed system recovery is not successful.

● **If both packs are available :**

If both packs are operative, it can be suspected that the second bleed system failed due to excessive demand. Recovery of the second failed engine bleed may be attempted.

■ **If ENG 1 BLEED is lost first :**

R – PACK 1 ..... OFF
– ENGINE 2 BLEED ..... ON

■ **If ENG 2 BLEED is lost first :**

R – PACK 2 ..... OFF
– ENGINE 1 BLEED ..... ON

AIR DUAL BLEED FAULT (CONT'D)

- **If engine bleed recovery was not successful, or if one pack is inoperative :**
  - X BLEED ..... CHECK OPEN
R - DESCENT TO FL200/MEA ..... CONTINUE
  Descend rapidly to FL200, to recover the bleed supply from the APU.
  - APU ..... START
  Start the APU during the descent.
R - **AT, OR BELOW, FL200 :**
    - WING A.ICE ..... OFF
    APU BLEED must not be used for wing anti-ice.
    - APU BLEED ..... ON

    MAX FL200

    AVOID ICING CONDITIONS

AIR L (R) WING or ENG 1(2) BLEED LEAK

Note : Spurious ENG 1(2) BLEED LEAK or L(R) WING LEAK warnings may be triggered after electrical transients. Reset in these cases the affected ENG BLEED pushbutton for an ENG BLEED LEAK, or both ENG BLEED pushbuttons for a WING LEAK.

- ENG BLEED affected (if not automatically closed) ..... OFF
  - *With the ENG BLEED pushbutton on, the FAULT light remains on*
  - *With the ENG BLEED pushbutton off, the FAULT light goes off when the overheat disappears.*
- **If left wing or bleed leak :**
  - APU BLEED (if not closed) ..... OFF
- X BLEED (if not closed) ..... SHUT
- WING ANTI-ICE ..... OFF
- AVOID ICING CONDITIONS

STATUS

AVOID ICING CONDITIONS

INOP SYS
WING A.ICE
ENG 1(2) BLEED
PACK 1(2)

AIR DUAL BLEED FAULT

■ **If ENG 1 BLEED was lost due to a :**

LEAK on side 1
ENG 1 FIRE
Start Air Valve 1 failed open.

– DESCENT TO FL100/MEA . . . . . INITIATE

Descend rapidly to FL100/MEA, to prevent excessive cabin altitude.

AVOID ICING CONDITIONS

■ **If ENG 2 BLEED was lost due to a :**

LEAK on side 2
ENG 2 FIRE
Start Air Valve 2 failed open.

– X BLEED . . . . . CHECK CLOSED
– DESCENT TO FL200/MEA . . . . . INITIATE

Descend rapidly to FL200, to recover the bleed supply from the APU.

– APU . . . . . START

Start the APU during the descent.

● **AT, OR BELOW, FL200 :**

– WING A.ICE . . . . . OFF

APU BLEED must not be used for wing anti-ice.

– APU BLEED . . . . . ON

MAX FL200
AVOID ICING CONDITIONS

■ **In all other cases :**

– DESCENT . . . . . INITIATE

Descend rapidly to FL200, so that the bleed supply may be supplied by the APU, if the bleed system recovery is not successful.

● **If both packs are available :**

If both packs are operative, it can be suspected that the second bleed system failed due to excessive demand. Recovery of the second failed engine bleed may be attempted.

■ **If ENG 1 BLEED is lost first :**

R – PACK 1 . . . . . OFF
– ENGINE 2 BLEED . . . . . ON

■ **If ENG 2 BLEED is lost first :**

R – PACK 2 . . . . . OFF
– ENGINE 1 BLEED . . . . . ON

AIR DUAL BLEED FAULT (CONT'D)

● **If engine bleed recovery was not successful, or if one pack is inoperative :**

– X BLEED ..... CHECK OPEN

R – DESCENT TO FL200/MEA ..... CONTINUE

Descent rapidly to FL200, to recover the bleed supply from the APU.

– APU ..... START

Start the APU during the descent.

R ● **AT, OR BELOW, FL200 :**

– WING A.ICE ..... OFF

APU BLEED must not be used for wing anti-ice.

– APU BLEED ..... ON

MAX FL200

AVOID ICING CONDITIONS

AIR L (R) WING or ENG 1(2) BLEED LEAK

Note : Spurious ENG 1(2) BLEED LEAK or L(R) WING LEAK warnings may be triggered after electrical transients. Reset in these cases the affected ENG BLEED pushbutton switch for an ENG BLEED LEAK, or reset both ENG BLEED pushbutton switches for a WING LEAK.

– ENG BLEED affected (if not automatically closed) ..... OFF

· *With the ENG BLEED pushbutton switch on, the FAULT light remains on.*

· *With the ENG BLEED pushbutton switch off, the FAULT light goes off when the overheat disappears.*

● **If left wing or bleed leak :**

– APU BLEED (if not closed) ..... OFF

– X BLEED (if not closed) ..... SHUT

– WING ANTI-ICE ..... OFF

– AVOID ICING CONDITIONS

STATUS

AVOID ICING CONDITIONS

● **IF A/C ICING SEVERE**

– MIN SPD ..... ALPHA PROT

INOP SYS

WING A.ICE

ENG 1(2) BLEED

PACK 1(2)

AIR X BLEED FAULT

– X BLEED ..... MAN CTL

Select OPEN, when the APU BLEED pushbutton is ON, or for engine start, or when WING
R *ANTI-ICE is ON and one bleed is inoperative.*
Select SHUT in other cases.

● **If manual opening inoperative, and only one bleed available:**

– WING ANTI ICE ..... OFF

AVOID ICING CONDITIONS

STATUS

INOP SYS
X BLEED
WING A. ICE

● **If manual opening inoperative :**

AVOID ICING CONDITIONS

R X BLEED MAN CTL

AIR APU BLEED LEAK

Note : *This warning may spuriously appear after electrical transients. In that case, an APU bleed reset may be attempted by switching the APU BLEED pushbutton OFF, then on.*

– APU BLEED (if not closed) ..... OFF

· *With the APU BLEED pushbutton ON, the FAULT light remains on.*

· *With the APU BLEED pushbutton off, the FAULT light goes off, when the overheat disappears.*

STATUS

INOP SYS
APU BLEED

AIR APU BLEED FAULT

The valve position disagrees with the commanded position, when the APU is running.

Crew awareness.

Note : *Switching the APU BLEED pushbutton once may allow APU bleed recovery.*

STATUS

INOP SYS
APU BLEED (if valve closed)

AIR ENG HP VALVE FAULT

Crew awareness.

	STATUS
AIR PRESS LOW AT IDLE	I

AIR L (R) WNG LEAK DET FAULT

Crew awareness.

	STATUS
	INOP SYS
	L(R) LEAK DET

BLEED MONITORING FAULT

Crew awareness.

	STATUS
	INOP SYS
	BMC 1 + 2

AIR X BLEED FAULT

– X BLEED . . . . . MAN CTL

Select OPEN, when the APU BLEED pushbutton is ON, or for engine start, or when WING
R *ANTI-ICE is on with one bleed inoperative.*
Select SHUT in other cases.

● **If manual opening inoperative, and only one bleed available:**

– WING ANTI ICE . . . . . OFF

AVOID ICING CONDITIONS

STATUS

● **If manual opening inoperative, and only one bleed available :**

AVOID ICING CONDITIONS

● **IF A/C ICING SEVERE :**

– MIN SPD . . . . . ALPHA PROT

X BLEED MAN CTL

INOP SYS
WING A. ICE
X BLEED

AIR APU BLEED LEAK

Note : This warning may spuriously appear after electrical transients. In that case, an APU bleed reset may be attempted by switching the APU BLEED pushbutton OFF, than ON.

– APU BLEED (if not closed) . . . . . OFF

· *With the APU BLEED pushbutton ON, the FAULT light remains on.*
· *With the APU BLEED pushbutton off, the FAULT light goes off, when the overheat disappears.*

STATUS

INOP SYS
APU BLEED

AIR APU BLEED FAULT

The valve position disagrees with the commanded position, when the APU is running.

Crew awareness.

Note : Switching the APU BLEED pushbutton once may allow APU bleed recovery.

STATUS

INOP SYS
APU BLEED (if valve closed)

AIR ENG HP VALVE FAULT

Crew awareness.

	STATUS
AIR PRESS LOW AT IDLE	I

AIR L (R) WNG LEAK DET FAULT

Crew awareness.

	STATUS
	INOP SYS
	L(R) LEAK DET

BLEED MONITORING FAULT

Crew awareness.

	STATUS
	INOP SYS
	BMC 1 + 2

AIR X BLEED FAULT

– X BLEED . . . . . MAN CTL

Select OPEN, when the APU BLEED pushbutton is ON, or for engine start, or when WING
R *ANTI-ICE is on with one bleed inoperative.*
Select SHUT in other cases.

● **If manual opening inoperative, and only one bleed available:**

– WING ANTI ICE . . . . . OFF

AVOID ICING CONDITIONS

STATUS

● **If manual opening inoperative, and only one bleed available :**

AVOID ICING CONDITIONS

● **IF A/C ICING SEVERE :**

– MIN SPD . . . . . ALPHA PROT

X BLEED MAN CTL

INOP SYS
WING A. ICE
X BLEED

AIR APU BLEED LEAK

Note : This warning may spuriously appear after electrical transients. In that case, an APU bleed reset may be attempted by switching the APU BLEED pushbutton OFF, than ON.

– APU BLEED (if not closed) . . . . . OFF

· *With the APU BLEED pushbutton ON, the FAULT light remains on.*

· *With the APU BLEED pushbutton off, the FAULT light goes off, when the overheat disappears.*

STATUS

INOP SYS
APU BLEED

AIR APU BLEED FAULT

The valve position disagrees with the commanded position, when the APU is running.

Crew awareness.

Note : Switching the APU BLEED pushbutton once may allow APU bleed recovery.

STATUS

INOP SYS
APU BLEED (if valve closed)

AIR ENG 1(2) HP VALVE FAULT

Crew awareness.

	STATUS
AIR PRESS LOW AT IDLE	I

AIR ENG 1(2) LEAK DET FAULT

Crew awareness.

STATUS
INOP SYS
ENG 1 (2) LK DET

AIR L (R) WNG LEAK DET FAULT

Crew awareness.

STATUS
INOP SYS
L(R) WNG LK DET

BLEED MONIT SYS 1(2) FAULT

Crew awareness.

STATUS
INOP SYS
BMC 1 (2)

BLEED MONITORING FAULT

Crew awareness.

STATUS
INOP SYS
BMC 1 + 2

AIR ENG 1(2) BLEED LO TEMP

In flight, engine bleed temperature is too low for correct wing de-icing.

– A/THR ..... OFF

– THR LEVER (affected engine) ..... ADVANCE

R *The thrust lever of the affected engine must be advanced, with the autothrust OFF.*

R *Low bleed temperature may be due to low outside air temperature. Therefore, increasing*

R *engine thrust may increase bleed temperature and clear the ECAM caution.*

● **IF UNSUCCESSFUL and opposite bleed available :**

– X BLEED ..... OPEN

– ENG BLEED (affected) ..... OFF

– associated PACK (if opposite pack ON) ..... OFF

One pack must be closed, when the pilot is using wing anti-ice, due to precooler performance.

STATUS

ONE PACK ONLY IF WAI ON

INOP SYS
ENG 1(2) BLEED
PACK 1(2) (if selected OFF)

● **IF UNSUCCESSFUL and opposite bleed not available :**

– WING A. ICE ..... OFF

AVOID ICING CONDITIONS

STATUS

AVOID ICING CONDITIONS I

AIR ENG 1 + 2 BLEED LO TEMP

– A/THR ..... OFF

– THR LEVERS ..... ADVANCE

R *The thrust lever of the affected engine must be advanced, with the autothrust OFF.*

R *Low bleed temperature may be due to low outside air temperature. Therefore, increasing*

R *engine thrust may increase bleed temperature and clear the ECAM caution.*

● **IF UNSUCCESSFUL :**

– WING A. ICE ..... OFF

AVOID ICING CONDITIONS

STATUS

AVOID ICING CONDITIONS I

AIR ENG 1(2) BLEED LO TEMP

In flight, ENG BLEED temperature is too low for correct wing de-icing.

– A/THR ..... OFF

– THR LEVER (affected engine) ..... ADVANCE

R *The thrust lever of the affected engine must be advanced, with the autothrust OFF.*

R *Low bleed temperature may be due to low outside air temperature. Therefore, increasing*

R *engine thrust may increase bleed temperature and clear the ECAM caution.*

● **IF UNSUCCESSFUL and opposite bleed available :**

– X BLEED ..... OPEN

– ENG BLEED (affected) ..... OFF

– associated PACK (if opposite pack ON) ..... OFF

One pack must be closed, when the pilot is using wing anti-ice, due to precooler performance.

STATUS

ONE PACK ONLY IF WAI ON

INOP SYS
ENG 1(2) BLEED
PACK 1(2) (if selected OFF)

● **IF UNSUCCESSFUL and opposite bleed not available :**

– WING A. ICE ..... OFF

AVOID ICING CONDITIONS

STATUS

AVOID ICING CONDITIONS

● **IF A/C ICING SEVERE :**

– MIN SPD ..... ALPHA PROT

AIR ENG 1 + 2 BLEED LO TEMP

– A/THR ..... OFF

– THR LEVERS ..... ADVANCE

R *The thrust lever of the affected engine must be advanced, with the autothrust OFF.*

R *Low bleed temperature may be due to low outside air temperature. Therefore, increasing*

R *engine thrust may increase bleed temperature and clear the ECAM caution.*

● **IF UNSUCCESSFUL :**

– WING A. ICE ..... OFF

AVOID ICING CONDITIONS

STATUS

AVOID ICING CONDITIONS

● **IF A/C ICING SEVERE :**

– MIN SPD ..... ALPHA PROT

R

DATALINK ATSU FAULT

Crew awareness.

ATSU INIT FAULT

Displayed, in case of failure upon ATSU initialization. Refer to 3.04.46, for ATSU initialization.

STATUS

INOP SYS

ATSU

DATA COMPANY

DATALINK COMPANY FAULT

Crew awareness.

STATUS

INOP SYS

DATA COMPANY

APU AUTO (EMER) SHUT DOWN

APU EMER SHUT DOWN is triggered if :

- *an APU fire is detected on ground, or*
- *the ground crew shuts down the APU manually by pushing the APU SHUT OFF pushbutton on the nose gear interphone panel, or*
- *the flight crew presses the APU FIRE pushbutton in the cockpit.*

– MASTER SW . . . . . OFF

STATUS

INOP SYS

APU

DOORS (L/R/FWD/AFT) AVIONICS

■ **On the ground**

Crew awareness.

■ **In flight**

No crew action required as long as cabin pressure is normal.

● **IF ABN CAB V/S :**

– MAX FL 100/MEA

Limit maximum flight level to FL100 or MEA or minimum obstacle clearance altitude.

Avionics doors are of plug type. Therefore full depressurization is not recommended.

STATUS

MAX FL . . . . . 100/MEA ▌

DOORS CABIN/EMER EXIT/CARGO

Crew may confirm a cabin door warning by checking the visual indicator on the door.

■ **On the ground**

Crew awareness.

Crew may confirm a cargo door warning by removing the detachable inspection panel on the base of cargo door.

■ **In flight**

No crew action required as long as cabin pressure is normal.

● **IF ABN CAB V/S :**

– MAX FL 100/MEA

Limit maximum flight level to FL100 or MEA or minimum obstacle clearance altitude.

If door warning is accompanied by abnormal increase of cabin altitude, flight crew must reduce cabin $\triangle P$ and altitude by descending.

STATUS

MAX FL . . . . . 100/MEA ▌

ENG 1(2) FUEL FILTER CLOG

Crew awareness.

Maintenance action is due.

ENG 1(2) REVERSER FAULT

● **if reverser position fault with reverser pressurized :**

ENG 1(2) AT IDLE

– THR LEVER 1(2) ..... IDLE

STATUS

INOP SYS
REVERSER 1(2)

ENG 1(2) REV PRESSURIZED

Reverse thrust system is pressurized without reverse deployment order.

– THR LEVER 1(2) ..... IDLE

If flight conditions permit, reduce the thrust of the affected engine to IDLE as a precautionary measure.

ENG 1(2) EIU FAULT

The data bus between the EIU and EEC fails. Therefore :

· affected engine start is lost

· autothrust control is lost

· thrust reverser on the affected engine is lost

· when idle is selected, only approach idle is available

· bleed corrections on EPR limit are lost

· continuous ignition is on.

Crew awareness.

ENG 1(2) APPR IDLE ONLY

Minimum idle is lost.

CAT 2 ONLY

STATUS

INOP SYS
A/THR
CAT 3
REVERSER 1(2)
ENG 1(2) START

ENG VIB SYS FAULT

Crew awareness.

ENG 1(2) OIL LO PR

- **If oil pressure is between 60 and 80 PSI :**

  Only the ECAM warning title is displayed (amber).

- **IF OIL PR < 60 PSI :**

  Check oil pressure indication on the ECAM ENG page.

  – THR LEVER (of affected engine) . . . . . IDLE
  – ENG MASTER (of affected engines) . . . . . OFF

ENG 1(2) **SHUT DOWN**

Apply the after ENG SHUT DOWN procedure.

Note : If low oil pressure (< 60 psi) is only indicated on the ECAM ENG page (red indication), without the ENG OIL LO PR red warning, it can be assumed that the oil pressure transducer is faulty. The flight crew may continue engine operation while monitoring other engine parameters.

ENG 1(2) OIL HI TEMP

Oil temp between 155° C and 165° C for more than 15 minutes, or oil temp above 165° C.

– THR LEVER (of affected engine) . . . . . IDLE
– ENG MASTER (of affected engine) . . . . . OFF

Operations above the maximum temperature require engine shutdown.

ENG 1(2) **SHUT DOWN**

Apply the after ENG SHUT DOWN procedure.

ENG 1 (2) OIL LO TEMP

– DELAY T.O

The engine should be warmed up until oil temp is at, or above, 50° C prior to takeoff.

- **If temperature is below – 10° C :**

  – AVOID HI POWER

  The engine should be warmed up until oil temp is at, or above, –10° C prior to accelerating the engine above idle.

ENG 1(2) OIL FILTER CLOG

Crew awareness.

R *If message appears during cold engine start with low engine oil temp, temporarily run engine*
R *at idle for 5 minutes. If message disappears, no maintenance is required.*

ENG 1(2) FUEL FILTER CLOG

Crew awareness.

Maintenance action is due.

ENG 1(2) REVERSER FAULT

LAND ASAP

● **if reverser position fault with reverser pressurized :**

ENG 1(2) AT IDLE

– THR LEVER 1(2) . . . . . IDLE

STATUS

INOP SYS
REVERSER 1(2)

ENG 1(2) REV PRESSURIZED

Reverse thrust system is pressurized without reverse deployment order.

– THR LEVER 1(2) . . . . . IDLE

If flight conditions permit, reduce the thrust of the affected engine to IDLE as a precautionary measure.

ENG 1(2) EIU FAULT

The data bus between the EIU and EEC fails. Therefore :

· affected engine start is lost

· autothrust control is lost

· thrust reverser on the affected engine is lost

· when idle is selected, only approach idle is available

· bleed corrections on EPR limit are lost

· continuous ignition is on.

Crew awareness.

STATUS

ENG 1(2) APPR IDLE ONLY

Minimum idle is lost.

CAT 2 ONLY

INOP SYS
A/THR
CAT 3
REVERSER 1(2)
ENG 1(2) START

ENG VIB SYS FAULT

Crew awareness.

ENG 1(2) OIL LO PR

- **If oil pressure is between 60 and 80 PSI :**

  Only the ECAM warning title is displayed (amber).

- **IF OIL PR < 60 PSI :**

  Check oil pressure indication on the ECAM ENG page.

  – THR LEVER (of affected engine) . . . . . IDLE
  – ENG MASTER (of affected engines) . . . . . OFF

ENG 1(2) **SHUT DOWN**

Apply the after ENG SHUT DOWN procedure.

Note : If low oil pressure (< 60 psi) is only indicated on the ECAM ENG page (red indication), without the ENG OIL LO PR red warning, it can be assumed that the oil pressure transducer is faulty. The flight crew may continue engine operation while monitoring other engine parameters.

ENG 1(2) OIL HI TEMP

Oil temp between 155° C and 165° C for more than 15 minutes, or oil temp above 165° C.

– THR LEVER (of affected engine) . . . . . IDLE
– ENG MASTER (of affected engine) . . . . . OFF

Operations above the maximum temperature require engine shutdown.

ENG 1(2) **SHUT DOWN**

Apply the after ENG SHUT DOWN procedure.

ENG 1 (2) OIL LO TEMP

– DELAY T.O

The engine should be warmed up until oil temp is at, or above, 50° C prior to takeoff.

- **If temperature is below – 10° C :**

  – AVOID HI POWER

  The engine should be warmed up until oil temp is at, or above, –10° C prior to accelerating the engine above idle.

ENG 1(2) OIL FILTER CLOG

Crew awareness.

R *If message appears during cold engine start with low engine oil temp, temporarily run engine*
R *at idle for 5 minutes. If message disappears, no maintenance is required.*

ENG 1(2) N1/N2/EGT OVERLIMIT

■ **Max pointer indication :**

R EGT 635° C or above, or
R N1 between 100 % and 109.4 %, or
R N2 between 100 % and 105.7 %.

– THR LEVER (of affected engine) . . . . . BELOW LIMIT

Normal operation may be resumed and maintained until next landing.
Report the max value observed and the length of time above limits in maintenance log. If unable to maintain engine within limits, affected engine should be shut down. If conditions do no permit engine shut-down, land ASAP using the minimum thrust required to substain safe flight.

■ **Max pointer indication :**

N1 109.4 % or above, or
N2 105.7 % or above.

FADEC automatically reduces the engine power below idle.
Engine shut down must be performed.

– THR LEVER (of affected engine) . . . . . IDLE
– ENG MASTER (of affected engine) . . . . . OFF

ENG 1(2) SHUT DOWN

Apply after ENG SHUT DOWN procedure.

ENG 1(2) REVERSE UNLOCKED

The FADEC may automatically set the engine at idle.

■ **On ground :**

Note : On V2527 or V2530 engines, disregard the warning at landing, if momentarily displayed during reverser stowing.

ENG 1(2) AT IDLE

Only displayed, if engine is automatically set at idle.

– THR LEVER (affected engine, if IDLE not automatically selected) . . . . . IDLE

– ENG MASTER (affected engine) . . . . . OFF

■ **In flight :**

● **If the FADEC automatically sets the engine at idle :**

ENG 1(2) AT IDLE

– THR LEVER (affected engine) . . . . . IDLE

● **IF BUFFET :**

The warning alone, without buffet or vibration, may be a false warning.

MAX SPEED . . . . . 240 KT

– ENG MASTER (affected engine) . . . . . OFF

● **If the FADEC does not automatically set the engine at idle:**

● **IF BUFFET :**

– THR LEVER . . . . . IDLE

MAX SPEED . . . . . 240 KT

– ENG MASTER (affected engine) . . . . . OFF

● **If reverser is actually deployed :**

– RUD TRIM . . . . . FULL R (L)

– CONTROL HDG WITH ROLL

ENG 1(2) **SHUT DOWN**

Apply the after ENG SHUT DOWN procedure.

ENG 1(2) N1/N2/EGT OVERLIMIT

■ **Max pointer indication :**

R EGT 635° C or above, or
R N1 between 100 % and 109.4 %, or
R N2 between 100 % and 105.7 %.

– THR LEVER (of affected engine) . . . . . BELOW LIMIT

Normal operation may be resumed and maintained until next landing.
Report the max value observed and the length of time above limits in maintenance log. If unable to maintain engine within limits, affected engine should be shut down. If conditions do no permit engine shut-down, land ASAP using the minimum thrust required to substain safe flight.

■ **Max pointer indication :**

N1 109.4 % or above, or
N2 105.7 % or above.

FADEC automatically reduces the engine power below idle.
Engine shut down must be performed.

– THR LEVER (of affected engine) . . . . . IDLE
– ENG MASTER (of affected engine) . . . . . OFF

ENG 1(2) SHUT DOWN

Apply after ENG SHUT DOWN procedure.

ENG 1(2) REVERSE UNLOCKED

The FADEC may automatically set the engine at idle.

■ **On ground :**

Note : On V2527 or V2530 engines, disregard the warning at landing, if momentarily displayed during reverser stowing.

ENG 1(2) AT IDLE

Only displayed, if engine is automatically set at idle.

– THR LEVER (affected engine if IDLE not automatically selected) . . . . . IDLE

– ENG MASTER (affected engine) . . . . . OFF

■ **In flight :**

R LAND ASAP

ENG 1(2) AT IDLE

Only displayed, if the engine is automatically set at idle.

– THR LEVER (affected engine) . . . . . IDLE

MAX SPEED 300/.78

● **IF BUFFET :**

The warning alone, without buffet or vibration, may be a false warning.

MAX SPEED . . . . . 240 KT

– ENG MASTER (affected engine) . . . . . OFF

● **If reverser is actually deployed :**

– RUD TRIM . . . . . FULL R (L)

– CONTROL HDG WITH ROLL

ENG 1(2) **SHUT DOWN**

Apply the after ENG SHUT DOWN procedure.

ENG 1(2) N1/N2/EGT OVERLIMIT

■ **Max pointer indication :**

EGT 635° C or above, or EGT between 610° and 635° (except during takeoff, alpha floor protection, or reverse selected), or
N1 between 100 % and 109.4 %, or
N2 between 100 % and 105.7 %.

– THR LEVER (of affected engine) . . . . . BELOW LIMIT

Normal operation may be resumed and maintained, until the next landing.

Report the max value observed, and the length of time above limits, in the maintenance log. If unable to maintain the engine within limits, the affected engine should be shut down.

If conditions do not permit engine shutdown, land ASAP, using the minimum thrust required to sustain safe flight.

■ **Max pointer indication :**

N1 109.4 % or above, or
N2 105.7 % or above.

FADEC automatically reduces the engine power below idle.

Engine shutdown must be performed.

– THR LEVER (of affected engine) . . . . . IDLE
– ENG MASTER (of affected engine) . . . . . OFF

ENG 1(2) SHUT DOWN

Apply the after ENG SHUT DOWN procedure.

R

ENG REV SET

Reverse thrust has been selected in flight.

– THR LEVER (affected engine) . . . . . FWD THR

ENG 1(2) REVERSE UNLOCKED

The FADEC may automatically set the engine at idle.

■ **On ground :**

Note : On V2527 or V2530 engines, disregard the warning at landing, if momentarily displayed during reverser stowing.

ENG 1(2) AT IDLE

Only displayed, if engine is automatically set at idle.

– THR LEVER (affected engine if IDLE not automatically selected) . . . . . IDLE

– ENG MASTER (affected engine) . . . . . OFF

■ **In flight :**

R LAND ASAP

ENG 1(2) AT IDLE

Only displayed, if the engine is automatically set at idle.

– THR LEVER (affected engine) . . . . . IDLE

MAX SPEED 300/.78

● **IF BUFFET :**

The warning alone, without buffet or vibration, may be a false warning.

MAX SPEED . . . . . 240 KT

– ENG MASTER (affected engine) . . . . . OFF

● **If reverser is actually deployed :**

– RUD TRIM . . . . . FULL R (L)

– CONTROL HDG WITH ROLL

ENG 1(2) **SHUT DOWN**

Apply the after ENG SHUT DOWN procedure.

ENG 1(2) STALL

A stall may be indicated by varying degrees of abnormal engine noises, accompanied by flame from the engine exhaust (and possibly from the engine inlet in severe case), fluctuating performance parameters, sluggish or no throttle response, high EGT and/or a rapid EGT rise when thrust lever is advanced.

■ **On the ground :**

– ENG MASTER (affected engine) . . . . . OFF

■ **In flight :**

Only ENG 1(2) STALL is displayed on ECAM.
The following procedure is not displayed :

– THR LEVER (affected engine) . . . . . IDLE
– ENG PARAMETERS (affected engine) . . . . . CHECK

● **Abnormal :**

– ENG MASTER (affected engine) . . . . . OFF

ENG 1(2) SHUT DOWN

Apply after ENG SHUT DOWN procedure.
Engine restart at crew discretion.

● **Normal :**

– ENG A. ICE (affected engine) . . . . . ON
– WING A. ICE . . . . . ON
Operation of engine and wing anti ice will increase the stall margin, but EGT will increase accordingly.
– THR LEVER (affected engine) . . . . . SLOWLY ADVANCE

● **If stall recurs :**

– THR LEVER (affected engine) . . . . . REDUCE
Reduce thrust and operate below the stall threshold.

● **If stall does not recur :**

Continue engine operation.

ENG 1(2) EPR or N1 or N2 or EGT of FF DISCREPANCY

Discrepancy between displayed value on ECAM and real value. On ECAM upper display a CHK message is displayed besides affected indication.

Crew awareness.

If both thrust levers are at the same position, cross check with the opposite parameter.

ENG 1(2) START VALVE FAULT

■ **START VALVE NOT CLOSED :**

Remove all bleed sources supplying the faulty start valve.

– APU BLEED (if ENG 1 affected) . . . . . OFF
– X BLEED . . . . . SHUT

If opposite engine is supplying, X BLEED must be closed.

● **In flight :**
– ENG BLEED (affected side) . . . . . OFF

● **On the ground :**
– MAN START (if man start performed) . . . . . OFF
– ENG MASTER . . . . . OFF

On the ground, consider application of "START VALVE MANUAL OPERATION" procedure.

■ **START VALVE NOT OPEN :**

● **If opposite engine running :**
– X BLEED . . . . . ON

● **If APU AVAIL below FL 200 :**
– APU BLEED . . . . . ON

● **If UNSUCCESSFUL :**
– MAN START (if man start performed) . . . . . OFF
– ENG MASTER (affected) (if auto start performed) . . OFF

MAN START procedure is useless since in both cases, the start valve is controlled by FADEC.

On the ground, consider application of "START VALVE MANUAL OPERATION" procedure.

■ **EEC control of start valve failed :**

● **On the ground :**
START VALVE MAN ONLY

Start valve must be manually opened (refer to START VALVE MANUAL OPERATION procedure).

● **In flight :**
WINDMILL START ONLY.

Windmilling start only is available since EEC cannot control the start valve.

	STATUS
ENG 1(2) WINDMILL START ONLY.	I

ENG 1(2) REV SWITCH FAULT

Crew awareness.

ENG 1(2) START FAULT

■ **ENG 1(2) IGNITION FAULT**

No light up within 20 seconds (30 seconds in flight) or

■ **NO N1 ROTATION or**

■ **STALL or**

■ **EGT OVERLIMIT or**

■ **HUNG START :**

● **In flight :**

– ENG MASTER (affected) . . . . . OFF

Wait 30 seconds before attempting new start (to drain the engine).

● **On ground (auto start) :**

R *In case of no light up, detected stall, potential EGT overheat or hung start, the FADEC*
R *will immediately shut off fuel and turn off ignition. Then a dry crank phase is*
R *automatically performed. At the end of the dry crank sequence, the start valve is closed. Following message is displayed on ECAM during crank phase :*

– AUTO CRANK IN PROGRESS.

● **When dry cranking process is finished :**

– ENG MASTER (affected) . . . . . OFF

Setting ENG MASTER to OFF confirms automatic start abort.

Following starter cooldown, the pilot must decide whether to attempt auto or manual start or report the nostart condition for appropriate maintenance action.

Note : With engine above idle, if EGT limit is exceeded ECAM requires to set engine master lever at OFF.

● **On the ground (manual start) :**

– MAN START (affected) . . . . . OFF
– ENG MASTER (affected) . . . . . OFF
– MODE SEL . . . . . CRANK
– MAN START (affected) . . . . . ON

Note : The last two lines are not displayed on ECAM.

Dry crank the engine for 30 seconds. The start valve will reopen automatically when N2 is below 10 %.

The pilot must decide whether to attempt a new start, or report the no start condition for appropriate maintenance action.



ENG 1(2) START FAULT (CONT'D)

■ **LO START AIR PRESS**

– BLEED AIR SUPPLY . . . . . CHECK

■ **THR LEVER NOT AT IDLE :**

– THR LEVER . . . . . IDLE

ENG 1(2) FUEL VALVE FAULT

■ **Associated engine at or below idle :**

FUEL VALVE NOT OPEN.

● **On the ground :**

IF NO ENG LIGHT UP (HP fuel valve failed in closed position) : if no EGT rise, warning is confirmed :

– MAN START (if man start performed) . . . . . OFF

– ENG MASTER (affected) . . . . . OFF

■ **Associated engine above idle :**

● **Failure of HP fuel valve position switch :**

– FUEL SWITCH FAULT.

● **Failure of HP fuel valve in open position :**

– FUEL VALVE OPEN.

– ENG (affected) SHUT BY FIRE PB.

R *Due to the fact that the HP fuel valve is failed in the open position, the engine can*
R *only be shut down by pressing the ENG FIRE PB. This will close the LP fuel valve. Due to fuel quantity between LP valve and nozzles, the engine will shut down after about 1 minute.*

ENG 1(2) SYSTEM FAULT

Failure of internal engine bleed or failure of engine probe heat resulting in EGT increase.

■ **On ground :**

– ENG MASTER (affected) . . . . . OFF

■ **In flight :**

RISK OF HI EGT.

Continue normal operation.

ENG 1(2) START FAULT

■ **ENG 1(2) IGNITION FAULT**

No light up within 20 seconds (30 seconds in flight) or

■ **NO N1 ROTATION or**

■ **STALL or**

■ **EGT OVERLIMIT or**

■ **HUNG START :**

● **In flight :**

– ENG MASTER (affected) . . . . . OFF

Wait 30 seconds before attempting new start (to drain the engine).

● **On ground (auto start) :**

R *In case of no light up, detected stall, potential EGT overheat or hung start, the FADEC*
R *will immediately shut off fuel and turn off ignition. Then a dry crank phase is*
R *automatically performed. At the end of the dry crank sequence, the start valve is closed. Following message is displayed on ECAM during crank phase :*

– AUTO CRANK IN PROGRESS.

● **When dry cranking process is finished :**

– ENG MASTER (affected) . . . . . OFF

Setting ENG MASTER to OFF confirms automatic start abort.

Following starter cooldown, the pilot must decide whether to attempt auto or manual start or report the nostart condition for appropriate maintenance action.

Note : With engine above idle, if EGT limit is exceeded ECAM requires to set engine master lever at OFF.

● **On the ground (manual start) :**

– MAN START (affected) . . . . . OFF
– ENG MASTER (affected) . . . . . OFF
– MODE SEL . . . . . CRANK
– MAN START (affected) . . . . . ON

Note : The last two lines are not displayed on ECAM.

Dry crank the engine for 30 seconds. The start valve will reopen automatically when N2 is below 10 %.

The pilot must decide whether to attempt a new start, or report the no start condition for appropriate maintenance action.



ENG 1(2) START FAULT (CONT'D)

■ **LO START AIR PRESS**

– BLEED AIR SUPPLY . . . . . CHECK

■ **THR LEVER NOT AT IDLE :**

– THR LEVER . . . . . IDLE

ENG 1(2) FUEL VALVE FAULT

■ **Associated engine at or below idle :**

FUEL VALVE NOT OPEN.

● **On the ground :**

IF NO ENG LIGHT UP (HP fuel valve failed in closed position) :
If no EGT rise, warning is confirmed :

– MAN START (if man start performed) . . . . . OFF
– ENG MASTER (affected) . . . . . OFF

■ **Associated engine above idle :**

● **Failure of HP fuel valve position switch :**

– FUEL SWITCH FAULT.

● **Failure of HP fuel valve in open position :**

– FUEL VALVE OPEN.
– ENG (affected) SHUT BY FIRE PB.

R *Due to the fact that the HP fuel valve is failed in the open position, the engine can*
R *only be shut down by pressing the ENG FIRE PB. This will close the LP fuel valve. Due to fuel quantity between LP valve and nozzles, the engine will shut down after about 1 minute.*

ENG 1(2) SYSTEM FAULT

Failure of internal engine bleed or failure of engine probe heat resulting in EGT increase.

■ **On ground :**

– THR LEVER 1(2) . . . . . IDLE
– ENG MASTER 1(2) . . . . . OFF

■ **In flight :**

RISK OF HI EGT.
Continue normal operation.

ENG 1(2) EPR MODE FAULT

EEC has reverted to the N1 MODE. Autothrust control is lost.

● **If unrated N1 MODE is active :**

Max N1, N1 thrust lever, N1 mode and N1 rating limit indications on the upper ECAM are lost.

– N1 DEGRADED MODE.

– ENG 1 N1 MODE ..... ON

– ENG 2 N1 MODE ..... ON

N1 mode is confirmed on the affected engine.

The other engine must be reverted to the rated N1 mode to ease thrust setting.

– NOT EXCEED N1 LIMIT.

As there is no N1 limit, an overboost can occur at full forward thrust lever position.

– MAN THR ..... ADJUST

R *Align the N1 of the affected engine on the N1 of the other engine. Refer to 3.05.06,*
R *for power management tables.*

● **If rated N1 MODE is active :**

– ENG 1 N1 MODE ..... ON

– ENG 2 N1 MODE ..... ON

– MAN THR ..... ADJUST

R *Refer to 3.05.06, for power management tables.*

As the reversion to N1 mode is seen by the FMGC as an engine-out condition, E.O. CLR prompt key on MCDU should be pressed to recover FM capabilities for 2 engines.

Note : Recovery of EPR MODE on both engines may be attempted by switching off both ENG N1 MODE pushbuttons.

STATUS

● **If unrated N1 MODE is active :**	INOP SYS
ENG 1(2) N1 DEGRADED MODE	A/THR
CAT 2 only	CAT 3

ENG FLEX TEMP NOT SET

At takeoff, the pilot sets the thrust levers at MCT/FLEX without having entered the flex TO temperature. The FADEC selects MCT thrust.

– THR LEVERS ..... TO/GA

ENG RELIGHT (in flight)

No attempt should be made to restart an engine, if there are indications of engine damage, if the engine had been shut down because of an engine fire, or if there is a recognizable possibility that an attempted relight may result in fire.

MAX ALTITUDE ..... See below

– ENG MASTER (affected) ..... OFF

– THR LEVER (affected) ..... Check IDLE

– MAN START pushbutton ..... OFF

Note : Autostart is recommended in flight. Be aware that, unlike the procedure for auto start on the ground, the crew must take appropriate action in case of abn start.

– ENG MODE SEL ..... IGN

– X BLEED ..... OPEN

If outside the windmilling start envelope, the FADEC will open the starter valve.

– WING A. ICE (for starter assist) ..... OFF

– ENG MASTER (affected) ..... ON

R *Engine light-up must be achieved within 30 seconds after the fuel flow increases.*

Note : Zero is displayed, instead of N1 and N2 indications, until actual N1 and N2 respectively reach approximately 3.5 % and 9 %. Monitor N2. If uncertain about successful relight, move the thrust lever forward and check engine response.

■ When idle is reached :

– ENG MODE SEL ..... NORM

– TCAS MODE SEL ◁ ..... check TA/RA

Check that the selector is at TA/RA since, if the ENG SHUT DOWN procedure has been applied, the TCAS mode selector may have been set to the TA position.

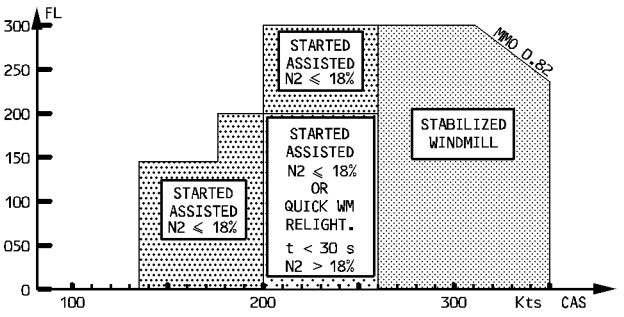
– Affected SYS ..... RESTORE

Restore affected systems, and set the X BLEED selector to AUTO.

■ If no relight :

– ENG MASTER ..... OFF

Wait 30 seconds before attempting a new start (to drain the engine).



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ENG 1(2) EGT EXCEEDED DURING AIR START

EGT limit has been exceeded during eng relight in flight (only displayed on ground).
Report in maintenance log.

ENG 1(2) FAIL

An engine flame-out may be recognized by a rapid decrease in EGT, N2, FF and EPR.
Engine damage may be accompanied by :
- *Loud noise,*
- *Significant increase in aircraft vibrations and/or buffeting,*
- *Repeated or uncontrollable engine stalls,*
- *Associated abnormal indications such as hydraulic fluid loss, or no N2 indication.*

LAND ASAP

■ **Before takeoff or after landing**

– THR LEVER (affected engine) . . . . . IDLE
R – ENG MASTER (affected engine) . . . . . OFF

● **IF DAMAGE**

R – ENG FIRE P/B (affected engine) . . . . . PUSH
– AGENT 1 . . . . . DISCH

● **IF NO DAMAGE**

– ENG (affected) RELIGHT . . . . . INITIATE
If no damage, a new start sequence may be initiated.

ENG 1(2) SHUT DOWN

Apply the After ENG SHUT DOWN procedure, if damage or if engine relight is unsuccessful.



ENG 1(2) FAIL (CONT'D)

■ **In flight**

– ENG MODE SEL ..... IGN

Selection of continuous ignition confirms the immediate relight attempt made by the FADEC.

– THR LEVER (affected engine) ..... IDLE

Note : In case of GPWS (EGPWS ◁) alerts, reduce speed with care below VLS with flaps extended (at light weights VMC may be reached before αMax) when applying the GPWS (EGPWS ◁) procedure.

● **IF NO ENG RELIGHT**

– ENG MASTER (affected engine) ..... OFF

● **IF DAMAGE**

R – ENG FIRE P/B (affected engine) ..... PUSH

– AGENT 1 (after 10 seconds in flight) ..... DISCH

ENG 1(2) SHUT DOWN

Apply the After ENG SHUT DOWN procedure if damage or if engine relight unsuccessfull.

If high vibration occurs and continues after engine shutdown, reduce airspeed and descent to a safe altitude.

Attempt to determine and use a pratical airspeed and altitude for minimum vibrations.

● **IF NO DAMAGE**

– ENG (affected) RELIGHT ..... INITIATE

Apply ENG RELIGHT (in flight) procedure.

ENG 1(2) REV ISOL FAULT

Crew awareness.

The thrust reverser shut off valve is detected failed open.

ENG 1(2) EGT EXCEEDED DURING AIR START

EGT limit has been exceeded during eng relight in flight (only displayed on ground).
Report in maintenance log.

ENG 1(2) FAIL

An engine flame-out may be recognized by a rapid decrease in EGT, N2, FF and EPR.
Engine damage may be accompanied by :
- *Loud noise,*
- *Significant increase in aircraft vibrations and/or buffeting,*
- *Repeated or uncontrollable engine stalls,*
- *Associated abnormal indications such as hydraulic fluid loss, or no N2 indication.*

LAND ASAP

■ **Before takeoff or after landing**

– THR LEVER (affected engine) . . . . . IDLE

R – ENG MASTER (affected engine) . . . . . OFF

● **IF DAMAGE**

R – ENG FIRE P/B (affected engine) . . . . . PUSH

– AGENT 1 . . . . . DISCH

● **IF NO DAMAGE**

– ENG (affected) RELIGHT . . . . . INITIATE

If no damage, a new start sequence may be initiated.

ENG 1(2) SHUT DOWN

Apply the After ENG SHUT DOWN procedure, if damage or if engine relight is unsuccessful.



ENG 1(2) FAIL (CONT'D)

■ **In flight :**

– ENG MODE SEL ..... IGN

Selection of continuous ignition confirms the immediate relight attempt made by the FADEC.

– THR LEVER (affected engine) ..... IDLE

Note : In case of GPWS (EGPWS ◁) alerts, reduce speed with care below VLS with flaps extended (at light weights VMC may be reached before αMax) when applying the GPWS (EGPWS ◁) procedure.

● **IF NO ENG RELIGHT AFTER 30 S**

– ENG MASTER (affected engine) ..... OFF

● **IF DAMAGE**

R – ENG FIRE P/B (affected engine) ..... PUSH

– AGENT 1 (after 10 seconds in flight) ..... DISCH

ENG 1(2) SHUT DOWN

Apply the After ENG SHUT DOWN procedure if damage or if engine relight unsuccessfull.

If high vibration occurs and continues after engine shutdown, reduce airspeed and descent to a safe altitude.

Attempt to determine and use a pratical airspeed and altitude for minimum vibrations.

● **IF NO DAMAGE**

– ENG (affected) RELIGHT ..... INITIATE

Apply ENG RELIGHT (in flight) procedure.

ENG 1(2) REV ISOL FAULT

Crew awareness.

The thrust reverser shut off valve is detected failed open.

ENG 1(2) EGT EXCEEDED DURING AIR START

EGT limit has been exceeded during eng relight in flight (only displayed on ground).
Report in maintenance log.

ENG 1(2) FAIL

An engine flame-out may be recognized by a rapid decrease in EGT, N2, FF and EPR.
Engine damage may be accompanied by :
- *Loud noise,*
- *Significant increase in aircraft vibrations and/or buffeting,*
- *Repeated or uncontrollable engine stalls,*
- *Associated abnormal indications such as hydraulic fluid loss, or no N2 indication.*

LAND ASAP

■ **Before takeoff or after landing**

– THR LEVER (affected engine) . . . . . IDLE
R – ENG MASTER (affected engine) . . . . . OFF

● **IF DAMAGE**

R – ENG FIRE P/B (affected engine) . . . . . PUSH
– AGENT 1 . . . . . DISCH

● **IF NO DAMAGE**

– ENG (affected) RELIGHT . . . . . CONSIDER
If no damage, a new start sequence may be initiated.

ENG 1(2) SHUT DOWN

Apply the After ENG SHUT DOWN procedure, if damage or if engine relight is unsuccessful.



ENG 1(2) FAIL (CONT'D)

■ **In flight :**

– ENG MODE SEL ..... IGN

Selection of continuous ignition confirms the immediate relight attempt made by the FADEC.

– THR LEVER (affected engine) ..... IDLE

Note : In case of GPWS (EGPWS ◁) alerts, reduce speed with care below VLS, with flaps extended (at light weights VMC may be reached before αMax), when applying the GPWS (EGPWS ◁) procedure.

● **IF NO ENG RELIGHT AFTER 30 S**

– ENG MASTER (affected engine) ..... OFF

● **IF DAMAGE**

R – ENG FIRE P/B (affected engine) ..... PUSH

– AGENT 1 AFTER 10 s ..... DISCH

ENG 1(2) SHUT DOWN

Apply the After ENG SHUT DOWN procedure, if damage, or if engine relight unsuccessful.

If high vibration occurs and continues after engine shutdown, reduce airspeed and descend to a safe altitude.

Attempt to determine and use a pratical airspeed and altitude for minimum vibrations.

● **IF NO DAMAGE**

– ENG (affected) RELIGHT ..... CONSIDER

If there is no damage, an engine relight can be considered. To restart the engine, apply the ENG RELIGHT (in flight) procedure.

ENG 1(2) REV ISOL FAULT

Crew awareness.

The thrust reverser shut-off valve is detected failed open.

ENG 1(2) FAIL (CONT'D)

■ **In flight :**

– ENG MODE SEL . . . . . IGN

Selection of continuous ignition confirms the immediate relight attempt made by the FADEC.

– THR LEVER (affected engine) . . . . . IDLE

Note : In case of GPWS (EGPWS ◁) alerts, reduce speed with care below VLS, with flaps extended (at light weights VMC may be reached before α.Max), when applying the GPWS (EGPWS ◁) procedure.

● **IF NO ENG RELIGHT AFTER 30 S**

– ENG MASTER (affected engine) . . . . . OFF

● **IF DAMAGE**

R – ENG FIRE P/B (affected engine) . . . . . PUSH

– AGENT 1 AFTER 10 s . . . . . DISCH

ENG 1(2) **SHUT DOWN**

Apply the After ENG SHUT DOWN procedure, if damage, or if engine relight unsuccessful.

If high vibration occurs and continues after engine shutdown, reduce airspeed and descend to a safe altitude.

Attempt to determine and use a pratical airspeed and altitude for minimum vibrations.

● **IF NO DAMAGE**

– ENG (affected) RELIGHT . . . . . CONSIDER

If there is no damage, an engine relight can be considered. To restart the engine, apply the ENG RELIGHT (in flight) procedure.

ENG 1(2) REV ISOL FAULT

Crew awareness.

The thrust reverser shut-off valve is detected failed open.

After ENG 1(2) SHUT DOWN

LAND ASAP

- **If Wing Anti-ice ON :**
  - **If Elec Emer Config :**
    - PACK 1 ..... OFF

      In Emer Elec, only Pack 1 can be controlled off.
  - **If not Elec Emer Config :**
    - PACK (affected side) ..... OFF

      One pack must be closed when wing anti-ice is in use, due to precooler performance.

R - X BLEED (if ENG FIRE pb not pushed) ..... OPEN

  X BLEED must be opened to have symmetrical wing anti-icing.

- ENG MODE SEL ..... IGN

  Continuous ignition is selected, in order to protect the remaining engine.

- FUEL X FEED ..... ON

  Fuel X Feed valve is opened to avoid fuel imbalance.

  Note : Select "TA" on the TCAS control panel (if installed).

- **If REV unlocked and if BUFFET :**

  MAX SPEED ..... 240 KT

- **If ENG FIRE pushbutton pushed :**
  - XBLEED ..... SHUT
  - WING ANTI ICE ..... OFF

  AVOID ICING CONDITIONS

Affected systems
* HYD
* ELEC
* AIR BLEED

Note : In some conditions, with full asymmetric power, the aircraft may be control-limited before reaching the protection system limit. Therefore, in extreme conditions, where low speed may be advantageous (GPWS, WINDSHEAR, etc), reduce speed with care below VLS and respect the minimum control speed.

STATUS

- **If ENG 1(2) FIRE pushbutton pushed :**

  AVOID ICING CONDITIONS



After ENG 1(2) SHUT DOWN (CONT'D)

STATUS

- **If REV unlocked :**

  APPR PROC

  - **4 doors not stowed (CFM) or reverser deployed (IAE) :**
    - **IF BUFFET :**
      - FOR LDG . . . . . USE FLAP 1
      - APPR SPD . . . . . VREF + 55 KT
      - RUD TRIM . . . . . 5 DEG R(L)

        When committed to land, set 5° rudder trim towards live engine.
      - A/THR . . . . . OFF
      - GPWS FLAP MODE . . . . . OFF
    - **WHEN LDG ASSURED :**
      - L/G . . . . . DOWN
    - **AT 800 FT AGL :**
      - TARGET SPD . . . VREF + 40 KT

      LDG DIST PROC . . . . . APPLY

      See QRH part 2, or FCOM 3.02.80.
  - **1, 2, or 3 doors not stowed (CFM), or reverse detected unlocked (IAE) :**
    - **IF BUFFET :**
      - FOR LDG . . . . . USE FLAP 3
      - GPWS LDG FLAP 3 . . . . . ON

      APPR SPD . . . . . VREF + 10 kt
      - LDG DIST PROC . . . . . APPLY

      See QRH part 2, or FCOM 3.02.80.

- **If WING A/ICE off and ENG 1(2) FIRE pushbutton not pushed :**
  - **IF PERF PERMITS**
    - X BLEED . . . . . OPEN

      If no obstacle constraint exists, the XBLEED should be selected OPEN, and the single engine gross ceiling (Refer to 3.06.20 p. 1) must be decreased by 1200 feet.

After ENG 1(2) SHUT DOWN

LAND ASAP

- **If Wing Anti-ice is ON :**
  - **If Elec Emer Config :**
    - PACK 1 ..... OFF
      In Emer ELEC, only Pack 1 can be controlled off.
  - **If not Elec Emer Config :**
    - PACK (affected side) ..... OFF
      One pack must be closed, when wing anti-ice is in use, due to precooler performance.
    - X BLEED (if ENG FIRE pb not pushed) ..... OPEN
      X BLEED must be opened to have symmetrical wing anti-icing.
  - ENG MODE SEL ..... IGN
    Continuous ignition is selected, in order to protect the remaining engine.
  - FUEL X FEED ..... ON
    The FUEL X FEED valve is opened, to avoid fuel imbalance.
  - TCAS MODE SEL (if installed) ..... TA
- **If REV unlocked, and if BUFFET :**
  MAX SPEED ..... 240 KT
- **If ENG FIRE pushbutton pushed :**
  - XBLEED ..... SHUT
  - WING ANTI ICE ..... OFF

  AVOID ICING CONDITIONS

Affected systems
* HYD
* ELEC
* AIR BLEED

Note : In some conditions, with full asymmetric power, the aircraft may be control-limited before reaching the protection system limit. Therefore, in extreme conditions, where low speed may be advantageous (GPWS, WINDSHEAR, etc), reduce speed with care below VLS and respect the minimum control speed.

STATUS

- **If ENG 1(2) FIRE pushbutton pushed :**
  AVOID ICING CONDITIONS

After ENG 1(2) SHUT DOWN (CONT'D)

STATUS

- **If REV unlocked :**

  APPR PROC

  - **4 doors not stowed (CFM) or reverser deployed (IAE) :**
    - **IF BUFFET :**
      - FOR LDG . . . . . USE FLAP 1
      - APPR SPD . . . . . VREF + 55 KT
      - RUD TRIM . . . . . 5 DEG R(L)

        When committed to land, set 5° rudder trim towards live engine.
      - A/THR . . . . . OFF
      - GPWS FLAP MODE . . . . . OFF
    - **WHEN LDG ASSURED :**
      - L/G . . . . . DOWN
    - **AT 800 FT AGL :**
      - TARGET SPD . . . VREF + 40 KT

      LDG DIST PROC . . . . . APPLY

      See QRH part 2, or FCOM 3.02.80.
  - **1, 2, or 3 doors not stowed (CFM), or reverse detected unlocked (IAE) :**
    - **IF BUFFET :**
      - FOR LDG . . . . . USE FLAP 3
      - GPWS LDG FLAP 3 . . . . . ON

      APPR SPD . . . . . VREF + 10 kt
      - LDG DIST PROC . . . . . APPLY

      See QRH part 2, or FCOM 3.02.80.

- **If WING A/ICE off and ENG 1(2) FIRE pushbutton not pushed :**
  - **IF PERF PERMITS**
    - X BLEED . . . . . OPEN

      If no obstacle constraint exists, the XBLEED should be selected OPEN, and the single engine gross ceiling (Refer to 3.06.20 p. 1) must be decreased by 1200 feet.

After ENG 1(2) SHUT DOWN

LAND ASAP

- **If Wing Anti-ice is 0N :**
  - **If Elec Emer Config :**
    - PACK 1 ..... OFF
      In Emer ELEC, only Pack 1 can be controlled off.
  - **If not Elec Emer Config :**
    - PACK (affected side) ..... OFF
      One pack must be closed, when wing anti-ice is in use, due to precooler performance.
    - X BLEED (if ENG FIRE pb not pushed) ..... OPEN
      X BLEED must be opened to have symmetrical wing anti-icing.
  - ENG MODE SEL ..... IGN
    Continuous ignition is selected, in order to protect the remaining engine.
  - FUEL X FEED ..... ON
R *The FUEL X FEED valve is opened, to avoid fuel imbalance.*
  - TCAS MODE SEL (if installed) ..... TA
- **If REV unlocked, and if BUFFET :**
  MAX SPEED ..... 240 KT
- **If ENG FIRE pushbutton pushed :**
  - XBLEED ..... SHUT
  - WING ANTI ICE ..... OFF

  AVOID ICING CONDITIONS

Affected systems
* HYD
* ELEC
* AIR BLEED

Note : In some conditions, with full asymmetric power, the aircraft may be control-limited before reaching the protection system limit. Therefore, in extreme conditions, where low speed may be advantageous (GPWS, WINDSHEAR, etc), reduce speed with care below VLS and respect the minimum control speed.

STATUS

- **If ENG 1(2) FIRE pushbutton pushed :**
  AVOID ICING CONDITIONS



After ENG 1(2) SHUT DOWN (CONT'D)

STATUS

- **IF A/C ICING SEVERE**
  MIN SPD . . . . . ALPHA PROT
- **If REV unlocked :**
  MAX SPEED 300/.78
  APPR PROC
  - **4 doors not stowed (CFM) or reverser deployed (IAE) :**
    - **IF BUFFET :**
      - FOR LDG . . . . . USE FLAP 1
      - APPR SPD . . . . . VREF + 55 KT
      - RUD TRIM . . . . . 5 DEG R(L)
        When committed to land, set 5° rudder trim towards live engine.
      - A/THR . . . . . OFF
      - GPWS FLAP MODE . . . . . OFF
    - **WHEN LDG ASSURED :**
      - L/G . . . . . DOWN
    - **AT 800 FT AGL :**
      - TARGET SPD . . . VREF + 40 KT

      LDG DIST PROC . . . . . APPLY
      See QRH part 2, or FCOM 3.02.80.
  - **1, 2, or 3 doors not stowed (CFM) or reverse detected unlocked (IAE) :**
    - **IF BUFFET :**
      - FOR LDG . . . . . USE FLAP 3
      - GPWS LDG FLAP 3 . . . . . ON
      - APPR SPD . . . . . VREF + 10 kt
      - LDG DIST PROC . . . . . APPLY

      See QRH part 2, or FCOM 3.02.80.
- **If WING A/ICE off and ENG 1(2) FIRE pushbutton not pressed :**
  - **IF PERF PERMITS :**
    - X BLEED . . . . . OPEN

      If no obstacle constraint, open the XBLEED, and decrease the single engine gross ceiling by 1200 feet (Refer to 3.06.20 p 1).

After ENG 1(2) SHUT DOWN

LAND ASAP

- **If wing Anti-ice is 0N :**
  - **If Elec Emer Config :**
    - PACK 1 ..... OFF
      In Emer ELEC, only Pack 1 can be controlled off.
  - **If not Elec Emer Config :**
    - PACK (affected side) ..... OFF
      One pack must be closed, when wing anti-ice is in use, due to precooler performance.
    - X BLEED (if ENG FIRE pb not pushed) ..... OPEN
      X BLEED must be opened to have symmetrical wing anti-icing.
- ENG MODE SEL ..... IGN
  Continuous ignition is selected, in order to protect the remaining engine.
- **IF NO FUEL LEAK :**
  - IMBALANCE ..... MONITOR
- TCAS MODE SEL (if installed) ..... TA
- **If REV unlocked, and if BUFFET :**
  MAX SPEED ..... 240 KT
- **If ENG FIRE pushbutton pushed :**
  - XBLEED ..... SHUT
  - WING ANTI ICE ..... OFF

  AVOID ICING CONDITIONS

Affected systems
* HYD
* ELEC
* AIR BLEED

Note : In some conditions, with full asymmetric power, the aircraft may be control-limited before reaching the protection system limit. Therefore, in extreme conditions, where low speed may be advantageous (GPWS, WINDSHEAR, etc), reduce speed with care below VLS and respect the minimum control speed.

STATUS

- **If ENG 1(2) FIRE pushbutton pushed :**
  AVOID ICING CONDITIONS



After ENG 1(2) SHUT DOWN (CONT'D)

STATUS

- **If REV unlocked :**

  MAX SPEED 300/.78

  APPR PROC

  - **4 doors not stowed (CFM) or reverser deployed (IAE) :**
    - **IF BUFFET :**
      - FOR LDG . . . . . USE FLAP 1
      - APPR SPD . . . . . VREF + 55 KT
      - RUD TRIM . . . . . 5 DEG R(L)

        When committed to land, set 5° rudder trim towards live engine.
      - A/THR . . . . . OFF
      - GPWS FLAP MODE . . . . . OFF
    - **WHEN LDG ASSURED :**
      - L/G . . . . . DOWN
    - **AT 800 FT AGL :**
      - TARGET SPD . . . VREF + 40 KT

      LDG DIST PROC . . . . . APPLY

      See QRH part 2, or FCOM 3.02.80.
  - **1, 2, or 3 doors not stowed (CFM), or reverse detected unlocked (IAE) :**
    - **IF BUFFET :**
      - FOR LDG . . . . . USE FLAP 3
      - GPWS LDG FLAP 3 . . . . . ON
      - APPR SPD . . . . . VREF + 10 kt
      - LDG DIST PROC . . . . . APPLY

        See QRH part 2, or FCOM 3.02.80.
- **If WING A/ICE off and ENG 1(2) FIRE pushbutton not pressed :**
  - **IF PERF PERMITS**
    - X BLEED . . . . . OPEN

      If no obstacle constraint exists, the XBLEED should be selected OPEN, and the single engine gross ceiling (Refer to 3.06.20 p. 1) must be decreased by 1200 feet.



After ENG 1(2) SHUT DOWN

LAND ASAP

- **If wing Anti-ice is 0N :**
  - **If Elec Emer Config :**
    - PACK 1 ..... OFF

      In Emer ELEC, only Pack 1 can be controlled off.
  - **If not Elec Emer Config :**
    - PACK (affected side) ..... OFF

      One pack must be closed, when wing anti-ice is in use, due to precooler performance.
    - X BLEED (if ENG FIRE pb not pushed) ..... OPEN

      X BLEED must be opened to have symmetrical wing anti-icing.
- ENG MODE SEL ..... IGN

  Continuous ignition is selected, in order to protect the remaining engine.
- **IF NO FUEL LEAK :**
  - IMBALANCE ..... MONITOR
- TCAS MODE SEL (if installed) ..... TA
- **If REV unlocked, and if BUFFET :**

  MAX SPEED ..... 240 KT
- **If ENG FIRE pushbutton pushed :**
  - XBLEED ..... SHUT
  - WING ANTI ICE ..... OFF

  AVOID ICING CONDITIONS

Affected systems
* HYD
* ELEC
* AIR BLEED

Note : In some conditions, with full asymmetric power, the aircraft may be control-limited before reaching the protection system limit. Therefore, in extreme conditions, where low speed may be advantageous (GPWS, WINDSHEAR, etc), reduce speed with care below VLS and respect the minimum control speed.

STATUS

- **If ENG 1(2) FIRE pushbutton pushed :**

  AVOID ICING CONDITIONS



After ENG 1(2) SHUT DOWN (CONT'D)

STATUS

- **IF A/C ICING SEVERE**
  MIN SPD . . . . . ALPHA PROT
- **If REV unlocked :**
  MAX SPEED 300/.78
  APPR PROC
  - **4 doors not stowed (CFM) or reverser deployed (IAE) :**
    - **IF BUFFET :**
      - FOR LDG . . . . . USE FLAP 1
      - APPR SPD . . . . . VREF + 55 KT
      - RUD TRIM . . . . . 5 DEG R(L)
        When committed to land, set 5° rudder trim towards live engine.
      - A/THR . . . . . OFF
      - GPWS FLAP MODE . . . . . OFF
    - **WHEN LDG ASSURED :**
      - L/G . . . . . DOWN
    - **AT 800 FT AGL :**
      - TARGET SPD . . . VREF + 40 KT

      LDG DIST PROC . . . . . APPLY
      See QRH part 2, or FCOM 3.02.80.
  - **1, 2, or 3 doors not stowed (CFM) or reverse detected unlocked (IAE) :**
    - **IF BUFFET :**
      - FOR LDG . . . . . USE FLAP 3
      - GPWS LDG FLAP 3 . . . . . ON
      - APPR SPD . . . . . VREF + 10 kt
      - LDG DIST PROC . . . . . APPLY

        See QRH part 2, or FCOM 3.02.80.
- **If WING A/ICE off and ENG 1(2) FIRE pushbutton not pressed :**
  - **IF PERF PERMITS :**
    - X BLEED . . . . . OPEN

      If no obstacle constraint, open the XBLEED, and decrease the single engine gross ceiling by 1200 feet (Refer to 3.06.20 p 1).

After ENG 1(2) SHUT DOWN (CONT'D)

STATUS

ONE PACK ONLY IF WAI ON

Note : – *If available, the APU may be started and the APU GEN used.*
– *If the ENG 1 FIRE pushbutton is pushed, APU bleed must not be used.*
If ENG 2 FIRE pushbutton is pushed, APU bleed may be used, provided the X BLEED selector is set at SHUT.
– *After landing, the Fuel Used value of the engine, shutdown in flight, becomes incorrect.*

INOP SYS
ENG 1(2) BLEED
PACK 1(2)
MAIN GALLEY
GEN 1(2)
G ENG 1 PUMP or
Y ENG 2 PUMP
WING A. ICE
(if affected ENG FIRE pushbutton pushed)
AFT CRG HEAT

ENG 1(2) ONE TLA FAULT

Crew awareness.

ENG 1(2) IGN FAULT

■ **IGN A or B FAULT :**

Crew awareness.

STATUS

INOP SYS
ENG 1(2) IGN A (B)

■ **IGN A + B FAULT :**

AVOID ADVERSE CONDITIONS

STATUS

INOP SYS
ENG 1(2) IGN
ENG 1(2) START
(if EIU is failed)

ENG 1(2) THR LEVER DISAGREE

Both Thrust Lever Angle (TLA) sensors not in agreement on one engine.

■ **On ground (if both TLA not at TOGA or FLX/MCT or if only one TLA is at TOGA or FLX/MCT and the other is below IDLE) :**

ENG (affected) IDLE POWER ONLY.

In that situation, the FADEC automatically selects IDLE

– THR LEVER (affected) . . . . . IDLE

■ **During take-off (if both TLA are above IDLE) :**

ENG (affected) TO, FLX, or DRT TO ◁

If both TLA are above IDLE, the FADEC automatically selects TO, FLX TO, or DRT TO ◁ thrust until thrust reduction, after which the maximum available thrust is CLB.

■ **In cruise (with slats retracted) :**

AVAIL MAX POWER : MCT

In flight, if the failure occurs while the thrust lever is between idle and MCT, and if the slats are not extended, (or when MN > 0.55, if the onside EIU is failed) the FADEC selects the larger TLA limited to CLB.

Even if AVAIL MAX POWER : MCT appears on the ECAM, only CLB power is available.

– A/THR (if engaged) . . . . . KEEP ON

– A/THR (if not engaged and if slats are not extended) . . ON

With A/THR engaged, thrust is automatically managed between IDLE and higher TLA position.

■ **In approach (with slats extended) :**

ENG (affected) AT IDLE (when slats are extended for approach).

If TLA at, or below, MCT with slats extended for approach (or when MN < 0.47, if the onside EIU is failed).

– THR LEVER (affected) (when slats are extended for approach) . . . . . IDLE



After ENG 1(2) SHUT DOWN (CONT'D)

ONE PACK ONLY IF WAI ON

Note : – *If available, the APU may be started and the APU GEN used.*
– *If the ENG 1 FIRE pushbutton is pushed, APU bleed must not be used.*
If ENG 2 FIRE pushbutton is pushed, APU bleed may be used, provided the X BLEED selector is set at SHUT.
– *After landing, the Fuel Used value of the engine, shutdown in flight, becomes incorrect.*

STATUS

INOP SYS
ENG 1(2) BLEED
PACK 1(2)
MAIN GALLEY
GEN 1(2)
G ENG 1 PUMP or Y ENG 2 PUMP
WING A. ICE (if affected ENG FIRE pushbutton pushed)
AFT CRG HEAT

ENG 1(2) ONE TLA FAULT

Crew awareness.

ENG 1(2) IGN FAULT

■ **IGN A or B FAULT :**

Crew awareness.

STATUS

INOP SYS
ENG 1(2) IGN A (B)

■ **IGN A + B FAULT :**

AVOID ADVERSE CONDITIONS

STATUS

INOP SYS
ENG 1(2) IGN
ENG 1(2) START (if EIU is failed)

ENG 1(2) THR LEVER DISAGREE

LAND ASAP

Both Thrust Lever Angle (TLA) sensors not in agreement on one engine.

■ **On ground (if both TLA not at TOGA or FLX/MCT or if only one TLA is at TOGA or FLX/MCT and the other is below IDLE) :**

ENG (affected) IDLE POWER ONLY.

In that situation, the FADEC automatically selects IDLE.

– THR LEVER (affected) . . . . . IDLE

■ **During take-off (if both TLA are above IDLE) :**

ENG (affected) TO, FLX, or DRT TO ◁

If both TLA are above IDLE, the FADEC automatically selects TO, FLX TO, or DRT TO ◁ thrust until thrust reduction, after which the maximum available thrust is CLB.

■ **In cruise (with slats retracted) :**

AVAIL MAX POWER : MCT

In flight, if the failure occurs while the thrust lever is between idle and MCT, and if the slats are not extended, (or when MN > 0.55, if the onside EIU is failed) the FADEC selects the larger TLA limited to CLB.

Even if AVAIL MAX POWER : MCT appears on the ECAM, only CLB power is available.

– A/THR (if engaged) . . . . . KEEP ON

– A/THR (if not engaged and if slats are not extended) . . ON

With A/THR engaged, thrust is automatically managed between IDLE and higher TLA position.

■ **In approach (with slats extended) :**

ENG (affected) AT IDLE (when slats are extended for approach).

If TLA at, or below, MCT with slats extended for approach (or when MN < 0.47, if the onside EIU is failed).

– THR LEVER (affected) . . . . . IDLE



After ENG 1(2) SHUT DOWN (CONT'D)

● **IF NO ENG 1(2) DAMAGE :**
CONSIDER ENG 1(2) RELIGHT
ONE PACK ONLY IF WAI ON

Note : – If available, the APU may be started and the APU GEN used.
– If the ENG 1 FIRE pushbutton is pushed, APU bleed must not be used.
If ENG 2 FIRE pushbutton is pushed, APU bleed may be used, provided the X BLEED selector is set at SHUT.
– After landing, the Fuel Used value of the engine, shutdown in flight, becomes incorrect.

STATUS

INOP SYS
ENG 1(2) BLEED
PACK 1(2)
MAIN GALLEY
GEN 1(2)
G ENG 1 PUMP or Y ENG 2 PUMP
WING A. ICE (if affected ENG FIRE pushbutton pushed)
AFT CRG HEAT

ENG 1(2) ONE TLA FAULT

Crew awareness.

ENG 1(2) IGN FAULT

■ **IGN A or B FAULT :**
Crew awareness.

STATUS

INOP SYS
ENG 1(2) IGN A (B)

■ **IGN A + B FAULT :**
AVOID ADVERSE CONDITIONS

STATUS

INOP SYS
ENG 1(2) IGN
ENG 1(2) START (if EIU is failed)

ENG 1(2) THR LEVER DISAGREE

LAND ASAP

Both Thrust Lever Angle (TLA) sensors not in agreement on one engine.

■ **On ground (if both TLA not at TOGA or FLX/MCT or if only one TLA is at TOGA or FLX/MCT and the other is below IDLE) :**

ENG (affected) IDLE POWER ONLY.

In that situation, the FADEC automatically selects IDLE.

– THR LEVER (affected) . . . . . IDLE

■ **During take-off (if both TLA are above IDLE) :**

ENG (affected) TO, FLX, or DRT TO ◁

If both TLA are above IDLE, the FADEC automatically selects TO, FLX TO, or DRT TO ◁ thrust until thrust reduction, after which the maximum available thrust is CLB.

■ **In cruise (with slats retracted) :**

AVAIL MAX POWER : MCT

In flight, if the failure occurs while the thrust lever is between idle and MCT, and if the slats are not extended, (or when MN > 0.55, if the onside EIU is failed) the FADEC selects the larger TLA limited to CLB.

Even if AVAIL MAX POWER : MCT appears on the ECAM, only CLB power is available.

– A/THR (if engaged) . . . . . KEEP ON

– A/THR (if not engaged and if slats are not extended) . . ON

With A/THR engaged, thrust is automatically managed between IDLE and higher TLA position.

■ **In approach (with slats extended) :**

ENG (affected) AT IDLE (when slats are extended for approach).

If TLA at, or below, MCT with slats extended for approach (or when MN < 0.47, if the onside EIU is failed).

– THR LEVER (affected) . . . . . IDLE



ENG 1(2) THR LEVER DISAGREE

Both Thrust Lever Angle (TLA) sensors not in agreement on one engine.
If the failure occurs during takeoff (with thrust lever in TOGA or FLX/MCT gate), FADEC maintains TO., FLX TO. or DRT TO thrust until thrust reduction, after which the maximum available thrust is MCT. If the failure occurs while the thrust lever is between idle and MCT, the FADEC selects the larger TLA limited at MCT in flight or FADEC selects idle thrust on ground.

■ **On the ground (if TLA not at TOGA or FLX) :**

– ENG (affected) IDLE POWER ONLY.
FADEC selects idle power automatically.

■ **In flight :**

– AVAIL MAX POWER : MCT (if TLA at or below MCT).
– A/THR (if engaged) . . . . . KEEP ON
– A/THR (if not engaged) . . . . . ON
With autothrust engaged, thrust is managed automatically between idle and higher TLA position.



ENG 1(2) THR LEVER DISAGREE (CONT'D)

STATUS

- **If TLA at, or below, MCT**
  - **WHEN SLATS OUT**
    (Displayed, if slats not extended), or
  - **WHEN MN < 0.47**
    (Displayed, if the onside EIU is failed)

ENG (affected) AT IDLE

For any case of thrust lever disagree (TO, FLEX, or between Idle and MCT), the FADEC will command idle thrust for the approach when slats are extended (or when the Mach number is less than 0.47, if associated EIU is failed). It is independent of the autothrust condition. The affected engine's thrust remains definitively at idle, even for go-around.

ENG (affected) AVAIL MAX PWR : MCT

Even if AVAIL MAX PWR : MCT appears on the ECAM, only CLB power is available.

ON GND ENG (affected) MAX PWR : IDLE.

INOP SYS

ENG 1(2) THR

ENG 1(2) THR LEVER FAULT

R *No validated thrust lever angle for one engine thrust lever.*

■ **On the ground :**

ENG (affected) IDLE POWER ONLY.

FADEC selects idle power automatically.

If associated thrust reverser is already deployed, FADEC commands restow.

■ **In flight :**

If the selected thrust lever position at the time of fault detection is :

TO or FLEX : FADEC freezes TO or flex TO thrust until slat retraction. At slat retraction it will select MCT thrust.

Between IDLE and MCT : in manual thrust setting mode, engine rating increases and freezes at max continuous. It is possible to activate autothrust. If selected, autothrust mode will manage thrust between idle and MCT.

● **A/THR engaged :**

– A/THR ..... KEEP ON

● **A/THR not engaged :**

ENG (affected) HI PWR IN MAN THR.

● **BEFORE SLATS IN :**

– A/THR ..... ON

STATUS

APPR PROC

THR LEVER

– AUTOLAND ..... USE

● **IF AUTOLAND NOT USED :**

● **AT 500 FT AGL :**

– ENG MASTER (affected) . . . OFF

Affected engine must be shut down, because when thrust levers are retarded, autothrust would remain in SPEED mode. During flare the thrust of the affected engine would increase to maintain the autothrust target speed.

● **If autoland scheduled :**

Thrust is reduced automatically during flare.

ON GND ENG 1(2) MAX PWR : IDLE.

INOP SYS

REVERSER 1(2)

ENG 1(2) THR

ENG 1(2) THR LEVER FAULT

No validated thrust lever angle for one engine thrust lever.

■ **On the ground :**

ENG (affected) IDLE POWER ONLY.

Idle power is automatically selected by FADEC.

If associated thrust reverser is already deployed, FADEC commands restow.

– THR LEVER (affected) . . . . . IDLE

■ **In flight :**

If selected thrust lever position at the time of fault detection is :

TO or FLEX : FADEC freezes TO or flex TO thrust until slat retraction. At slat retraction it will select MCT thrust.

Between IDLE and MCT : in manual thrust setting mode, engine rating increases and freezes at MCT or IDLE with slats extended (or MN < 0.47 if the FADEC no longer receives the slats position due to EIU failure). It is possible to activate autothrust. If selected, autothrust mode will manage thrust between idle and MCT.

– ENG (affected) AT IDLE

For any case of thrust lever fault (TO, FLEX or between IDLE and MCT) the FADEC will command idle thrust for the approach when slats are extended (or when MN < 0.47 if associated EIU is failed). It is independant of the autothrust condition. Thrust of affected engine remains definitively at idle even for go around.

– THR LEVER (affected) . . . . . IDLE

When slats are extended or MN < 0.47, if on side EIU is failed.

● **A/THR engaged :**

– A/THR . . . . . KEEP ON

● **A/THR not engaged :**

ENG (affected) HI PWR IN MAN THR.

Inhibited when the FADEC commands the affected engine at IDLE.

● **BEFORE SLATS IN :**

– A/THR . . . . . ON

HI POWER ONLY (if thrust lever angle failed in TO or flex position).

STATUS

● **WHEN SLATS OUT**

(Displayed if slats not extended) or,

● **WHEN MN < 0.47**

(Displayed if the onside EIU is failed).

ENG 1(2) AT IDLE

INOP SYS

REVERSER 1(2)

ENG 1(2) THR

ENG 1(2) COMPRESSOR VANE

Low Pressure Compressor Bleed Valve (LPCBV) or Variable Stator Vane (VSV) failure.
Engine stall may occur at any thrust change.

– AVOID THR CHANGES (not displayed if LPCBV goes to open position).
If autothrust engaged, adjust thrust lever (of affected engine) to align thrust lever command with actual EPR and disconnect autothrust.

– AVOID RAPID THRUST CHANGES (displayed when the VSV position disagrees with the command).
Engine stall may occur at any rapid thrust change.

● **IF ENG STALL :**

– ENG MASTER 1(2) . . . . . OFF

ENG 1(2) **SHUT DOWN**

Apply after ENG SHUT DOWN procedure.

STATUS

AVOID THR CHANGES

ENG 1(2) HOT FUEL

– GEN 1(2) . . . . . OFF

STATUS

CAT 3 SINGLE ONLY.

INOP SYS
GEN 1(2)
MAIN GALLEY
(only if APU GEN not in line)
CAT 3 DUAL

ENG 1(2) THR LEVER FAULT

No validated thrust lever angle for one engine thrust lever.

LAND ASAP

■ **On the ground :**

ENG (affected) IDLE POWER ONLY.

Idle power is automatically selected by FADEC.

If associated thrust reverser is already deployed, FADEC commands restow.

– THR LEVER (affected) . . . . . IDLE

■ **In flight :**

If selected thrust lever position at the time of fault detection is :

TO or FLEX : FADEC freezes TO or flex TO thrust until slat retraction. At slat retraction it will select CLB thrust.

Between IDLE and MCT : in manual thrust setting mode, engine rating increases and freezes at CLB or IDLE with slats extended (or MN < 0.47 if the FADEC no longer receives the slats position due to EIU failure). It is possible to activate autothrust. If selected, autothrust mode will manage thrust between idle and CLB.

– ENG (affected) AT IDLE

For any case of thrust lever fault (TO, FLEX or between IDLE and MCT) the FADEC will command idle thrust for the approach when slats are extended (or when MN < 0.47 if associated EIU is failed). It is independant of the autothrust condition. Thrust of affected engine remains definitively at idle even for go around.

– THR LEVER (affected) . . . . . IDLE

When slats are extended or MN < 0.47, if on side EIU is failed.

● **A/THR engaged :**

– A/THR . . . . . KEEP ON

● **A/THR not engaged :**

ENG (affected) HI PWR IN MAN THR.

Inhibited when the FADEC commands the affected engine at IDLE.

● **BEFORE SLATS IN :**

– A/THR . . . . . ON

HI POWER ONLY (if thrust lever angle failed in TO or flex position).

STATUS

● **WHEN SLATS OUT**

(Displayed if slats not extended) or,

● **WHEN MN < 0.47**

(Displayed if the onside EIU is failed).

ENG 1(2) AT IDLE

INOP SYS

REVERSER 1(2)

ENG 1(2) THR

ENG 1(2) COMPRESSOR VANE

Low Pressure Compressor Bleed Valve (LPCBV) or Variable Stator Vane (VSV) failure.
Engine stall may occur at any thrust change.

– AVOID THR CHANGES (not displayed if LPCBV goes to open position).
If autothrust engaged, adjust thrust lever (of affected engine) to align thrust lever command with actual EPR and disconnect autothrust.

– AVOID RAPID THRUST CHANGES (displayed when the VSV position disagrees with the command).
Engine stall may occur at any rapid thrust change.

● **IF ENG STALL :**

– ENG MASTER 1(2) . . . . . OFF

ENG 1(2) **SHUT DOWN**

Apply after ENG SHUT DOWN procedure.

STATUS

AVOID THR CHANGES

ENG 1(2) HOT FUEL

– GEN 1(2) . . . . . OFF

STATUS

CAT 3 SINGLE ONLY.

INOP SYS
GEN 1(2)
MAIN GALLEY
(only if APU GEN not in line)
CAT 3 DUAL

ENG 1(2) THR LEVER FAULT

No validated thrust lever angle for one engine thrust lever.

LAND ASAP

■ **On the ground :**

ENG (affected) IDLE POWER ONLY.

Idle power is automatically selected by FADEC.

If associated thrust reverser is already deployed, FADEC commands restow.

– THR LEVER (affected) . . . . . IDLE

■ **In flight :**

If selected thrust lever position at the time of fault detection is :

TO or FLEX : FADEC freezes TO or flex TO thrust until slat retraction. At slat retraction it will select CLB thrust.

Between IDLE and MCT : in manual thrust setting mode, engine rating increases and freezes at CLB or IDLE with slats extended (or MN < 0.47 if the FADEC no longer receives the slats position due to EIU failure). It is possible to activate autothrust. If selected, autothrust mode will manage thrust between idle and CLB.

– ENG (affected) AT IDLE

For any case of thrust lever fault (TO, FLEX or between IDLE and MCT) the FADEC will command idle thrust for the approach when slats are extended (or when MN < 0.47 if associated EIU is failed). It is independant of the autothrust condition. Thrust of affected engine remains definitively at idle even for go around.

– THR LEVER (affected) . . . . . IDLE

When slats are extended or MN < 0.47, if on side EIU is failed.

● **A/THR engaged :**

– A/THR . . . . . KEEP ON

● **A/THR not engaged :**

ENG (affected) HI PWR IN MAN THR.

Inhibited when the FADEC commands the affected engine at IDLE.

● **BEFORE SLATS IN :**

– A/THR . . . . . ON

HI POWER ONLY (if thrust lever angle failed in TO or flex position).

STATUS

● **WHEN SLATS OUT**

(Displayed if slats not extended) or,

● **WHEN MN < 0.47**

(Displayed if the onside EIU is failed).

ENG 1(2) AT IDLE

INOP SYS

REVERSER 1(2)

ENG 1(2) THR

ENG 1(2) COMPRESSOR VANE

Low Pressure Compressor Bleed Valve or Variable Stator Vane failure.
Engine stall may occur at any thrust change.

– AVOID THR CHANGES (not displayed, if LPCBV goes to open position).
If the A/THR is engaged, adjust the thrust lever (of the affected engine) to align the thrust lever command with the actual EPR and disconnect the A/THR.

– AVOID RAPID THRUST CHANGES (displayed, when the VSV position disagrees with the command).
Engine stall may occur at any rapid thrust change.

● **IF ENG STALL :**
– THR LEVER 1(2) ..... IDLE
– ENG MASTER 1(2) ..... OFF

● **ON GROUND**
– THR LEVER 1(2) ..... IDLE
– ENG MASTER 1(2) ..... OFF

ENG 1(2) **SHUT DOWN**

Apply after the ENG SHUT DOWN procedure.

STATUS

AVOID THR CHANGES

ENG 1(2) HOT FUEL

– GEN 1(2) ..... OFF

STATUS

CAT 3 SINGLE ONLY.

INOP SYS
GEN 1(2)
MAIN GALLEY
(only if APU GEN not in line)
CAT 3 DUAL

ENG 1(2) SENSOR FAULT

N1 or N2 or fuel metering valve position disagree between both EEC channels or Loss of N1 or N2 sensors.

AVOID RAPID THR CHANGES (if N1 sensor fault).

STATUS

R AVOID RAPID THR CHANGES (if N1 sensor fault) |

ENG 1(2) AIR EXCHANGER FAULT

Failure of air/oil heat exchanger valve on ground.

Depending of the failure one of the following messages is displayed :

– AIR VALVE OPEN

Refer to MMEL.

– AIR VALVE CLOSED

ENG 1(2) OVSPD PROT FAULT

Crew awareness.

R *The automatic fuel flow restriction in case of engine N1 or N2 overspeed may not be*
R *available. Fault was detected during last engine shut down.*
R *Some cases of spurious fault detection have been experienced.*
R *The caution can be considered as spurious if it disappears after application of the following*
R *procedure :*
R *– enter a new FLT NBR on INIT page on MCDU (to change the maintenance phase).*
R *– start the affected engine and wait for 4 minutes at idle.*
R *– then switch off the affected ENG GEN and shutdown the engine.*

ENG 1(2) FADEC ALTERNATOR

Loss of electrical auto supply of FADEC.

Crew awareness.

ENG 1(2) FUEL HEAT SYS

■ **FUEL RETURN VALVE OPEN.**

■ **FUEL DIVERTER VALVE.**

■ **TEMPS SENSORS**

Maintenance action is due.

ENG DUAL FAILURE

R *The ENG DUAL FAILURE warning inhibits the ELEC EMER CONFIG warning.*

R *The FCOM Volume 3 includes all steps of the ECAM ENG DUAL FAILURE procedure. However, to facilitate handling of all the ECAM procedures associated with a dual engine failure, it is recommended using the QRH ENG DUAL FAILURE paper procedure that also includes the DITCHING and FORCED LANDING procedures. When applying the QRH ENG DUAL FAILURE paper procedure :*

R *– If one or more engines are recovered, apply the corresponding ECAM procedure instead*

R *– If no engines are recovered, continue to apply the QRH ENG DUAL FAILURE paper procedure. If time permits, clear ECAM alerts, and check the ECAM STATUS page.*

LAND ASAP

– ENG MODE SEL ..... IGN

An immediate relight attempt is made.

– THR LEVERS ..... IDLE

OPTIMUM RELIGHT SPD ..... 280 KT

The optimum airspeed to allow an effective windmilling start attempt is 280 kt.

In case of a speed indication failure (volcanic ash), the pitch attitude for optimum relight speed is 2.5 degrees down. For weight above 50 000 kg/110 000 lb, raise the nose by 1 degree for every additional 10 000 kg/22 000 lb (e.g. if weight is 60 000 kg/132 000 lb pitch is 1.5 degrees down).

At 280 kt, the aircraft can fly up to about :

· 2.2 NM per 1000 ft at 50 000 kg/110 000 lb

· 2.5 NM per 1000 ft at 60 000 kg/132 000 lb

· 2.7 NM per 1000 ft at 70 000 kg/154 000 lb

– EMER ELEC PWR (if EMER GEN not in line) ..... MAN ON

Pressing EMER ELEC PWR MAN ON pushbutton allows extension of RAT and emer gen coupling.

– VHF1/HF1 (◁) /ATC1 ..... USE

· In Elec emer configuration only VHF1, HF1 (◁) and ATC1 are supplied.

· Notify traffic control of the nature of the emergency and state intention.

If there is no contact with air traffic control, switch to code A7700 or transmit a distress message on one of the following frequencies, VHF frequency 121.5 MHz, HF 2182 KHz or 8364 KHz.

– FAC1 ..... OFF THEN ON

Aircraft is out of trim due to right aileron up float.

Resetting FAC 1 permits to recover rudder trim even if no indication is available.

● **IF NO RELIGHT AFTER 30 S :**

– ENG MASTERS ..... OFF 30 S/ON

Engine masters must be left OFF for 30 seconds to allow ventilation of combustion chamber.



ENG 1(2) SENSOR FAULT

N1 or N2 or fuel metering valve position disagree between both EEC channels or Loss of N1 or N2 sensors.

AVOID RAPID THR CHANGES

■ **On ground :**

– THR LEVER (affected) . . . . . IDLE

– ENG MASTER (affected) . . . . . OFF

STATUS

AVOID RAPID THR CHANGES I

ENG 1(2) AIR EXCHANGER FAULT

Failure of air/oil heat exchanger valve on ground.

Depending on the failure, one of the following messages is displayed :

– AIR VALVE OPEN

Refer to MMEL.

– AIR VALVE CLOSED

ENG 1(2) OVSPD PROT FAULT

Crew awareness.

The automatic fuel flow restriction, in case of engine N1 or N2 overspeed, may not be available. Fault was detected during last engine shutdown.

Some cases of spurious fault detection have been experienced.

The caution can be considered as spurious, if it disappears after applying the following procedure :

– *Enter a new FLT NBR on the INIT page on the MCDU (to change the maintenance phase).*

– *Start the affected engine, and wait for 4 minutes at idle.*

– *Then, switch off the affected ENG GEN and shut down the engine.*

ENG 1(2) FADEC ALTERNATOR

Loss of electrical auto supply of FADEC.

Crew awareness.

ENG 1(2) FUEL HEAT SYS

■ **FUEL RETURN VALVE OPEN.**

■ **FUEL DIVERTER VALVE.**

■ **TEMPS SENSORS**

Maintenance action is due.

ENG DUAL FAILURE

R *The ENG DUAL FAILURE warning inhibits the ELEC EMER CONFIG warning.*

R *The FCOM Volume 3 includes all steps of the ECAM ENG DUAL FAILURE procedure. However, to facilitate handling of all the ECAM procedures associated with a dual engine failure, it is recommended using the QRH ENG DUAL FAILURE paper procedure that also includes the DITCHING and FORCED LANDING procedures. When applying the QRH ENG DUAL FAILURE paper procedure :*

R *– If one or more engines are recovered, apply the corresponding ECAM procedure instead*

R *– If no engines are recovered, continue to apply the QRH ENG DUAL FAILURE paper procedure. If time permits, clear ECAM alerts, and check the ECAM STATUS page.*

LAND ASAP

– ENG MODE SEL ..... IGN

An immediate relight attempt is made.

– THR LEVERS ..... IDLE

OPTIMUM RELIGHT SPD ..... 280 KT

The optimum airspeed to allow an effective windmilling start attempt is 280 kt.

In case of a speed indication failure (volcanic ash), the pitch attitude for optimum relight speed is 2.5 degrees down. For weight above 50 000 kg/110 000 lb, raise the nose by 1 degree for every additional 10 000 kg/22 000 lb (e.g. if weight is 60 000 kg/132 000 lb pitch is 1.5 degrees down).

At 280 kt, the aircraft can fly up to about :

· 2.2 NM per 1000 ft at 50 000 kg/110 000 lb

· 2.5 NM per 1000 ft at 60 000 kg/132 000 lb

· 2.7 NM per 1000 ft at 70 000 kg/154 000 lb

– EMER ELEC PWR (if EMER GEN not in line) ..... MAN ON

Pressing EMER ELEC PWR MAN ON pushbutton allows extension of RAT and emer gen coupling.

– VHF1/HF1 (◁) /ATC1 ..... USE

· In Elec emer configuration only VHF1, HF1 (◁) and ATC1 are supplied.

· Notify traffic control of the nature of the emergency and state intention.

If there is no contact with air traffic control, switch to code A7700 or transmit a distress message on one of the following frequencies, VHF frequency 121.5 MHz, HF 2182 KHz or 8364 KHz.

– FAC1 ..... OFF THEN ON

Aircraft is out of trim due to right aileron up float.

Resetting FAC 1 permits to recover rudder trim even if no indication is available.

● **IF NO RELIGHT AFTER 30 S :**

– ENG MASTERS ..... OFF 30 S/ON

Engine masters must be left OFF for 30 seconds to allow ventilation of combustion chamber.



ENG DUAL FAILURE

The ENG DUAL FAILURE warning inhibits the ELEC EMER CONFIG warning.

The FCOM Volume 3 includes all steps of the ECAM ENG DUAL FAILURE procedure. However, to facilitate handling of all the ECAM procedures associated with a dual engine failure, it is recommended using the QRH ENG DUAL FAILURE paper procedure that also includes the DITCHING and FORCED LANDING procedures. When applying the QRH ENG DUAL FAILURE paper procedure :

– If one or more engines are recovered, apply the corresponding ECAM procedure instead

– If no engines are recovered, continue to apply the QRH ENG DUAL FAILURE paper procedure. If time permits, clear ECAM alerts, and check the ECAM STATUS page.

LAND ASAP

– ENG MODE SEL ..... IGN

An immediate relight attempt is made.

– THR LEVERS ..... IDLE

OPTIMUM RELIGHT SPD ..... 280 KT

The optimum airspeed to allow an effective windmilling start attempt is 280 kt.

In case of a speed indication failure (volcanic ash), the pitch attitude for optimum relight speed is 2.5 degrees down. For weight above 50 000 kg/110 000 lb, raise the nose by 1 degree for every additional 10 000 kg/22 000 lb (e.g. if weight is 60 000 kg/132 000 lb pitch is 1.5 degrees down).

At 280 kt, the aircraft can fly up to about :

· 2.2 NM per 1000 ft at 50 000 kg/110 000 lb

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· 2.7 NM per 1000 ft at 70 000 kg/154 000 lb

– EMER ELEC PWR (if EMER GEN not in line) ..... MAN ON

Pressing EMER ELEC PWR MAN ON pushbutton allows extension of RAT and emer gen coupling.

– VHF1/HF1 (◁) /ATC1 ..... USE

· In Elec emer configuration only VHF1, HF1 (◁) and ATC1 are supplied.

· Notify traffic control of the nature of the emergency and state intention.
If there is no contact with air traffic control, switch to code A7700 or transmit a distress message on one of the following frequencies, VHF frequency 121.5 MHz, HF 2182 KHz or 8364 KHz.

– FAC1 ..... OFF THEN ON

Aircraft is out of trim due to right aileron up float.

Resetting FAC 1 permits to recover rudder trim even if no indication is available.

● **IF NO RELIGHT AFTER 30 S :**

– ENG MASTERS ..... OFF 30 S/ON

Engine masters must be left OFF for 30 seconds to allow ventilation of combustion chamber.



ENG DUAL FAILURE (CONT'D)

● **WHEN APU AVAIL FL < 200 :**

If the APU is available, APU BLEED may be used for engine start below FL 200 if the speed is ≥ 150 knots, or below FL 150 if the speed is < 150 knots.
APU start is unavailable for 45 seconds after the loss of both engine generators.
This 45–second delay prevents any interference with emergency generator coupling.

– APU BLEED ..... ON
– ENG MASTERS ..... OFF 30 S/ON
Start one engine at a time.
OPTIMUM SPEED ..... G DOT
Green dot is displayed on the Captain's PFD. It represents the best lift-to-drag ratio.

● **EARLY IN APPR**

(If ditching is foreseen, apply the DITCHING procedure, instead of the following) :

– CAB SECURE ..... ORDER
– USE RUDDER WITH CARE
– FOR LDG ..... FLAP CONF 3
As only blue hydraulic power is available, only the slats will extend and operating times are noticeably increased.

● **AT 5000 FEET AGL :**

– L/G ..... GRVTY EXTN
See the L/G GRVTY EXTN procedure (3.02.32).
TARGET SPEED ..... 150 KT

● **AT TOUCHDOWN :**

– ENG MASTERS ..... OFF
LP and HP valves close.
– APU MASTER SW ..... OFF
APU LP valve closes.
– EVAC ..... INITIATE
– BAT 1 + 2 (if time permits before leaving aircraft) .... OFF
Batteries are left ON, until the flight crew leaves the aircraft, to ensure cabin communications.

Note : Keep batteries on for at least 10 seconds after switching the ENG MASTERS to OFF, to allow complete closure of fuel LP valves.

R HYD **G + Y SYS LO PR**



ENG DUAL FAILURE (CONT'D)

STATUS

MIN RAT SPEED . . . . . 140 KT
MAX SPEED 320/.77
MAX BRK PR . . . . . 1000 PSI
MANEUVER WITH CARE
FUEL GRVTY FEED
AVOID NEGATIVE G FACTOR
APPR PROC :

- **IF HYD NOT RECOVERED**
  - FOR LDG . . . . . USE FLAP 3
- **WHEN CONF 3 AND VAPP :**
  - L/G . . . . . GRVTY EXTN

    (Refer to 3.02.32). Being stabilized at VAPP before selecting the gear down enables the aircraft to be trimmed for approach.

    APPR SPD . . . . . VREF + 25 KT

    Approach speed must be increased, due to the loss of flaps.

    LDG DIST PROC . . . . . APPLY

    Refer to the QRH Part 2, or to the FCOM 3.02.80.

    ALTN LAW : PROT LOST
    WHEN L/G DN : DIRECT LAW

    At landing gear extension, control reverts to direct law in pitch as well as in roll (see DIRECT LAW procedure 3.02.27). A slight transient pitch up may occur, depending on the frozen THS position.

    BAT ONLY
    BRK Y ACCU PR ONLY

    7 full brake applications are available.

    SLATS SLOW

INOP SYS
G+Y HYD
F/CTL PROT
STABILIZER
R AIL
REVERSER 1+2
ADR 2+3
IR 2+3
RA 1+2
SPLR 1+2+4+5
ELAC 2
SEC 2+3
FLAPS
YAW DAMPER
A/CALL OUT
AP 1+2
A/THR
FUEL PUMPS
ANTI SKID
N/W. STEER
AUTO BRK
L/G RETRACT
CAB PR 1+2
PACK 1+2

ENG DUAL FAILURE (CONT'D)

- **If UNSUCCESSFUL :**
  - APU (IF AVAIL) ..... START
    If the APU is available, APU may be started when below FL 250, and APU BLEED may be used for engine start below FL 200 if the speed is ≥ 180 knots, or below FL 150 if the speed is < 150 knots.
    APU start is unavailable for 45 seconds after the loss of both engine generators. This 45–second delay prevents any interference with emergency generator coupling.
  - APU BLEED ..... ON
  - ENG MASTERS ..... OFF 30 S/ON
    Start one engine at a time.

  OPTIMUM SPEED ..... G DOT
  Green dot is displayed on the Captain's PFD. It represents the best lift-to-drag ratio.
- **EARLY IN APPR**

  (If ditching is foreseen, apply the DITCHING procedure, instead of the following) :
  - CAB SECURE ..... ORDER
  - USE RUDDER WITH CARE
  - FOR LDG ..... FLAP CONF 3

    As only blue hydraulic power is available, only the slats will extend and operating times are noticeably increased.
- **AT 5000 FEET AGL :**
  - L/G ..... GRVTY EXTN

    See the L/G GRVTY EXTN procedure (3.02.32).

  TARGET SPEED ..... 150 KT
- **AT TOUCHDOWN :**
  - ENG MASTERS ..... OFF

    LP and HP valves close.
  - APU MASTER SW ..... OFF

    APU LP valve closes.
  - EVAC ..... INITIATE
  - BAT 1 + 2 (if time permits before leaving aircraft) .... OFF

    Batteries are left ON, until the flight crew leaves the aircraft, to ensure cabin communications.

  Note : Keep batteries on for at least 10 seconds after switching the ENG MASTERS to OFF, to allow complete closure of fuel LP valves.

R HYD **G + Y SYS LO PR**

ENG DUAL FAILURE (CONT'D)

STATUS

MIN RAT SPEED . . . . . 140 KT
MAX SPEED 320/.77
MAX BRK PR . . . . . 1000 PSI
MANEUVER WITH CARE
FUEL GRVTY FEED
AVOID NEGATIVE G FACTOR
APPR PROC :

- **IF HYD NOT RECOVERED**
  - FOR LDG . . . . . USE FLAP 3
- **WHEN CONF 3 AND VAPP :**
  - L/G . . . . . GRVTY EXTN

    (Refer to 3.02.32). Being stabilized at VAPP before selecting the gear down enables the aircraft to be trimmed for approach.

    APPR SPD . . . . . VREF + 25 KT

    Approach speed must be increased, due to the loss of flaps.

    LDG DIST PROC . . . . . APPLY

    Refer to the QRH Part 2, or to the FCOM 3.02.80.

    ALTN LAW : PROT LOST
    WHEN L/G DN : DIRECT LAW

    At landing gear extension, control reverts to direct law in pitch as well as in roll (see DIRECT LAW procedure 3.02.27). A slight transient pitch up may occur, depending on the frozen THS position.

    BRK Y ACCU PR ONLY

    7 full brake applications are available.

    SLATS SLOW

INOP SYS
G+Y HYD
F/CTL PROT
STABILIZER
R AIL
REVERSER 1+2
ADR 2+3
IR 2+3
RA 1+2
SPLR 1+2+4+5
ELAC 2
SEC 2+3
FLAPS
YAW DAMPER
A/CALL OUT
AP 1+2
A/THR
FUEL PUMPS
ANTI SKID
N/W. STEER
AUTO BRK
L/G RETRACT
CAB PR 1+2
PACK 1+2

ENG DUAL FAILURE (CONT'D)

- **If UNSUCCESSFUL :**
  - APU (IF AVAIL) ..... START
    If the APU is available, APU may be started when below FL 250, and APU BLEED may be used for engine start below FL 200 if the speed is ≥ 150 knots, or below FL 150 if the speed is < 150 knots.
    APU start is unavailable for 45 seconds after the loss of both engine generators. This 45–second delay prevents any interference with emergency generator coupling.
  - WING ANTI ICE ..... OFF
  - APU BLEED ..... ON
  - ENG MASTERS ..... OFF 30 S/ON
    Start one engine at a time.

  OPTIMUM SPEED ..... G DOT
  Green dot is displayed on the Captain's PFD. It represents the best lift-to-drag ratio.
- **EARLY IN APPR**

  (If ditching is foreseen, apply the DITCHING procedure, instead of the following) :
  - CAB SECURE ..... ORDER
  - FOR LDG ..... FLAP CONF 3
    As only blue hydraulic power is available, only the slats will extend and operating times are noticeably increased.
- **AT 5000 FEET AGL :**
  - L/G ..... GRVTY EXTN
    See the L/G GRVTY EXTN procedure (3.02.32).

  TARGET SPEED ..... 150 KT
- **AT TOUCHDOWN :**
  - ENG MASTERS ..... OFF
    LP and HP valves close.
  - APU MASTER SW ..... OFF
    APU LP valve closes.
  - EVAC ..... INITIATE
  - BAT 1 + 2 (if time permits before leaving aircraft) .... OFF
    Batteries are left ON, until the flight crew leaves the aircraft, to ensure cabin communications.

  Note : Keep batteries on for at least 10 seconds after switching the ENG MASTERS to OFF, to allow complete closure of fuel LP valves.

R HYD **G + Y SYS LO PR**

ENG DUAL FAILURE (CONT'D)

STATUS

MIN RAT SPEED . . . . . 140 KT
MAX SPEED 320/.77
MAX BRK PR . . . . . 1000 PSI
MANEUVER WITH CARE
FUEL GRVTY FEED
AVOID NEGATIVE G FACTOR
APPR PROC :

- **IF HYD NOT RECOVERED**
  - FOR LDG . . . . . USE FLAP 3
- **WHEN CONF 3 AND VAPP :**
  - L/G . . . . . GRVTY EXTN

    (Refer to 3.02.32). Being stabilized at VAPP before selecting the gear down enables the aircraft to be trimmed for approach.

    APPR SPD . . . . . VREF + 25 KT

    Approach speed must be increased, due to the loss of flaps.

    LDG DIST PROC . . . . . APPLY

    Refer to the QRH Part 2, or to the FCOM 3.02.80.

    ALTN LAW : PROT LOST
    WHEN L/G DN : DIRECT LAW

    At landing gear extension, control reverts to direct law in pitch as well as in roll (see DIRECT LAW procedure 3.02.27). A slight transient pitch up may occur, depending on the frozen THS position.

    BRK Y ACCU PR ONLY

    7 full brake applications are available.

    SLATS SLOW

INOP SYS
G+Y HYD
F/CTL PROT
STABILIZER
R AIL
REVERSER 1+2
ADR 2+3
IR 2+3
RA 1+2
SPLR 1+2+4+5
ELAC 2
SEC 2+3
FLAPS
YAW DAMPER
A/CALL OUT
AP 1+2
A/THR
FUEL PUMPS
ANTI SKID
N/W. STEER
AUTO BRK
L/G RETRACT
CAB PR 1+2
PACK 1+2

ENG DUAL FAILURE (CONT'D)

- **If UNSUCCESSFUL :**
  - APU (IF AVAIL) ..... START
    If the APU is available, APU may be started when below FL 250, and APU BLEED may be used for engine start below FL 200 if the speed is ≥ 150 knots, or below FL 150 if the speed is < 150 knots.
    APU start is unavailable for 45 seconds after the loss of both engine generators. This 45–second delay prevents any interference with emergency generator coupling.
  - WING ANTI ICE ..... OFF
  - APU BLEED ..... ON
  - ENG MASTERS ..... OFF 30 S/ON
    Start one engine at a time.

  OPTIMUM SPEED ..... G DOT
  Green dot is displayed on the Captain's PFD. It represents the best lift-to-drag ratio.
- **EARLY IN APPR**

  (If ditching is foreseen, apply the DITCHING procedure, instead of the following) :
  - CAB SECURE ..... ORDER
  - FOR LDG ..... FLAP CONF 3
    As only blue hydraulic power is available, only the slats will extend and operating times are noticeably increased.
- **AT 5000 FEET AGL :**
  - L/G ..... GRVTY EXTN
    See the L/G GRVTY EXTN procedure (3.02.32).

  TARGET SPEED ..... 150 KT
- **AT TOUCHDOWN :**
  - ENG MASTERS ..... OFF
    LP and HP valves close.
  - APU MASTER SW ..... OFF
    APU LP valve closes.
  - EVAC ..... INITIATE
  - BAT 1 + 2 (if time permits before leaving aircraft) .... OFF
    Batteries are left ON, until the flight crew leaves the aircraft, to ensure cabin communications.

  Note : Keep batteries on for at least 10 seconds after switching the ENG MASTERS to OFF, to allow complete closure of fuel LP valves.

R HYD **G + Y SYS LO PR**

ENG DUAL FAILURE (CONT'D)

STATUS

MIN RAT SPEED . . . . . 140 KT
MAX SPEED 320/.77
MAX BRK PR . . . . . 1000 PSI
MANEUVER WITH CARE
FUEL GRVTY FEED
AVOID NEGATIVE G FACTOR
APPR PROC :

- **IF HYD NOT RECOVERED**
  - FOR LDG . . . . . USE FLAP 3
- **WHEN CONF 3 AND VAPP :**
  - L/G . . . . . GRVTY EXTN

    (Refer to 3.02.32). Being stabilized at VAPP before selecting the gear down enables the aircraft to be trimmed for approach.

    APPR SPD . . . . . VREF + 25 KT

    Approach speed must be increased, due to the loss of flaps.

    LDG DIST PROC . . . . . APPLY

    Refer to the QRH Part 2, or to the FCOM 3.02.80.

    ALTN LAW : PROT LOST
    WHEN L/G DN : DIRECT LAW

    At landing gear extension, control reverts to direct law in pitch as well as in roll (see DIRECT LAW procedure 3.02.27).

    BRK Y ACCU PR ONLY

    7 full brake applications are available.

    SLATS SLOW

INOP SYS
G+Y HYD
F/CTL PROT
STABILIZER
R AIL
REVERSER 1+2
ADR 2+3
IR 2+3
RA 1+2
SPLR 1+2+4+5
ELAC 2
SEC 2+3
FLAPS
YAW DAMPER
A/CALL OUT
AP 1+2
A/THR
FUEL PUMPS
ANTI SKID
N/W. STEER
AUTO BRK
L/G RETRACT
CAB PR 1+2
PACK 1+2

ENG DUAL FAILURE (CONT'D)

- **If UNSUCCESSFUL :**
  - APU (IF AVAIL) ..... START
    If the APU is available, APU may be started when below FL 250, and APU BLEED may be used for engine start below FL 200 if the speed is ≥ 150 knots, or below FL 150 if the speed is < 150 knots.
    APU start is unavailable for 45 seconds after the loss of both engine generators. This 45–second delay prevents any interference with emergency generator coupling.
  - APU BLEED ..... ON
  - ENG MASTERS ..... OFF 30 S/ON
    Start one engine at a time.

  OPTIMUM SPEED ..... G DOT
  Green dot is displayed on the Captain's PFD. It represents the best lift-to-drag ratio.
- **EARLY IN APPR**

  (If ditching is foreseen, apply the DITCHING procedure, instead of the following) :
  - CAB SECURE ..... ORDER
  - USE RUDDER WITH CARE
  - FOR LDG ..... FLAP CONF 3

    As only blue hydraulic power is available, only the slats will extend and operating times are noticeably increased.
- **AT 5000 FEET AGL :**
  - L/G ..... GRVTY EXTN

    See the L/G GRVTY EXTN procedure (3.02.32).

  TARGET SPEED ..... 150 KT
- **AT TOUCHDOWN :**
  - ENG MASTERS ..... OFF

    LP and HP valves close.
  - APU MASTER SW ..... OFF

    APU LP valve closes.
  - EVAC ..... INITIATE
  - BAT 1 + 2 (if time permits before leaving aircraft) .... OFF

    Batteries are left ON, until the flight crew leaves the aircraft, to ensure cabin communications.

  Note : Keep batteries on for at least 10 seconds after switching the ENG MASTERS to OFF, to allow complete closure of fuel LP valves.

R HYD **G + Y SYS LO PR**

ENG DUAL FAILURE (CONT'D)

STATUS

MIN RAT SPEED . . . . . 140 KT
MAX SPEED 320/.77
MAX BRK PR . . . . . 1000 PSI
MANEUVER WITH CARE
FUEL GRVTY FEED
AVOID NEGATIVE G FACTOR
APPR PROC :

- **IF HYD NOT RECOVERED**
  - FOR LDG . . . . . USE FLAP 3
- **WHEN CONF 3 AND VAPP :**
  - L/G . . . . . GRVTY EXTN

    (Refer to 3.02.32). Being stabilized at VAPP before selecting the gear down enables the aircraft to be trimmed for approach.

    APPR SPD . . . . . VREF + 25 KT

    Approach speed must be increased, due to the loss of flaps.

    LDG DIST PROC . . . . . APPLY

    Refer to the QRH Part 2, or to the FCOM 3.02.80.

    ALTN LAW : PROT LOST
    WHEN L/G DN : DIRECT LAW

    At landing gear extension, control reverts to direct law in pitch as well as in roll (see DIRECT LAW procedure 3.02.27). A slight transient pitch up may occur, depending on the frozen THS position.

    BRK Y ACCU PR ONLY

    7 full brake applications are available.

    SLATS SLOW

INOP SYS
G+Y HYD
F/CTL PROT
STABILIZER
R AIL
REVERSER 1+2
ADR 2+3
IR 2+3
RA 1+2
SPLR 1+2+4+5
ELAC 2
SEC 2+3
FLAPS
YAW DAMPER
A/CALL OUT
AP 1+2
A/THR
FUEL PUMPS
ANTI SKID
N/W. STEER
AUTO BRK
L/G RETRACT
CAB PR 1+2
PACK 1+2

ENG DUAL FAILURE (CONT'D)

STATUS

MIN RAT SPEED . . . . . 140 KT
MAX SPEED 320/.77
MAX BRK PR . . . . . 1000 PSI
MANEUVER WITH CARE
FUEL GRVTY FEED
MAX FL : 350
FUEL GRVTY FEED
AVOID NEGATIVE G FACTOR
APPR PROC :

- **IF HYD NOT RECOVERED**
  - FOR LDG . . . . . USE FLAP 3
- **WHEN CONF 3 AND VAPP :**
  - L/G . . . . . GRVTY EXTN

(Refer to 3.02.32). Being stabilized at VAPP before selecting the gear down enables the aircraft to be trimmed for approach.

APPR SPD . . . . . VREF + 35 KT

Approach speed must be increased, due to the loss of flaps.

LDG DIST PROC . . . . . APPLY

Refer to the QRH Part 2, or to the FCOM 3.02.80.

ALTN LAW : PROT LOST
WHEN L/G DN : DIRECT LAW

At landing gear extension, control reverts to direct law in pitch as well as in roll (see DIRECT LAW procedure 3.02.27).

BRK Y ACCU PR ONLY

7 full brake applications are available.

SLATS SLOW

INOP SYS
G+Y HYD
F/CTL PROT
STABILIZER
R AIL
REVERSER 1+2
ADR 2+3
IR 2+3
RA 1+2
SPLR 1+2+4+5
ELAC 2
SEC 2+3
FLAPS
YAW DAMPER
A/CALL OUT
AP 1+2
A/THR
FUEL PUMPS
ANTI SKID
N/W. STEER
AUTO BRK
L/G RETRACT
CAB PR 1+2
PACK 1+2

ENG 1(2) FADEC A(B) FAULT

Loss of one channel of FADEC.

Crew awareness.

ENG 1(2) FADEC FAULT

– CONFIRM ENG STATUS.

ON SYS PAGES

Since engine indications are lost, other system pages such as HYD ELEC or BLEED must be used to confirm engine status.

● **IF ENG FAIL CONFIRMED :**

– ENG MASTER (affected) . . . . . OFF

ENG 1(2) **SHUT DOWN**

Apply after ENG SHUT DOWN procedure.

ENG 1(2) FADEC A(B) FAULT

Loss of one channel of FADEC

Crew awareness.

ENG 1(2) FADEC FAULT

– CONFIRM ENG STATUS.

ON SYS PAGES

Since engine indications are lost, other system pages such as HYD ELEC or BLEED must be used to confirm engine status.

● **IF ENG FAIL CONFIRMED :**

– THR LEVER (affected) . . . . . IDLE

– ENG MASTER (affected) . . . . . OFF

ENG 1(2) **SHUT DOWN**

Apply after ENG SHUT DOWN procedure.

ENG 1(2) FADEC OVHT

■ **on the ground :**

– ENG MASTER (associated engine) . . . . . OFF
– ENG MODE SEL . . . . . NORM
– FADEC GND PWR . . . . . Check OFF

■ **In flight :**

Reducing engine power should decrease temperature in area of ECU.
If overheating is severe enough, EEC failure could result with consequent loss of engine function.

CONFIRM ENG STATUS
ON SYS PAGES

● **If ABN ENG OPERATION :**

– THR LEVER 1(2) . . . . . IDLE
– ENG MASTER 1(2) . . . . . OFF

ENG 1(2) **SHUT DOWN**

Apply after ENG SHUT DOWN procedure.

ENG TYPE DISAGREE

This caution is triggered when a rating discrepancy is detected between two engines.
Crew awareness

ENG THRUST LOCKED

Displayed following a disconnection of the A/THR (the failure or throught FCU pb) if the thrust levers are not moved within 5 seconds.

– THR LEVERS . . . . . MOVE

ENG 1(2) FUEL CTL FAULT

■ **FMV position disagreement**

Crew awareness.

Fuel Metering Valve position disagreement between the commanded position and the real one.

■ **Failure of FMV command or FMV position feedback**

ENG 1(2) MIN FUEL FLOW.

FADEC is no longer able to control the fuel flow. It automatically sets a fail safe minimum fuel flow corresponding to idle or sub-idle fuel flow which may result in an engine shut-down.

– THR LEVER (affected) . . . . . IDLE

■ **In flight :**

● **If ENG (affected) NOT AT IDLE :**

– ENG MASTER (affected) . . . . . OFF

■ **On the ground :**

– ENG MASTER (affected) . . . . . OFF

STATUS

ENG (affected) MIN FUEL FLOW.
APPR PROC
– REV (affected) . . . . . DO NOT USE

● **AFTER TOUCH DOWN :**
– ENG MASTER (affected) . . . . . OFF

ENG 1(2) FADEC OVHT

■ **on the ground :**

– THR LEVER 1(2) ..... IDLE
– ENG MASTER 1(2) ..... OFF
– ENG MODE SEL ..... NORM
– FADEC GND PWR ..... Check OFF

■ **In flight :**

Reducing engine power should decrease temperature in area of ECU.
If overheating is severe enough, EEC failure could result with consequent loss of engine function.

CONFIRM ENG STATUS
ON SYS PAGES

● **If ABN ENG OPERATION :**

– THR LEVER 1(2) ..... IDLE
– ENG MASTER 1(2) ..... OFF

ENG 1(2) **SHUT DOWN**

Apply after ENG SHUT DOWN procedure.

ENG TYPE DISAGREE

This caution is triggered when a rating discrepancy is detected between two engines.
Crew awareness

ENG THRUST LOCKED

The thrust is frozen on one, or more, engine after a failure or an involuntary autothrust disconnection.
This caution is automatically repeated every 5 seconds, until thrust levers are moved.
– THR LEVERS . . . . . MOVE

ENG 1(2) FUEL CTL FAULT

■ **FMV position disagree**

Crew awareness.
The commanded position of the Fuel Metering Valve disagrees with the actual position.

■ **Failure of FMV command or FMV position feedback**

ENG 1(2) MIN FUEL FLOW.
FADEC is no longer able to control the fuel flow. It automatically sets a fail safe minimum fuel flow, corresponding to idle or sub-idle fuel flow. This may result in an engine shutdown.
– THR LEVER (affected) . . . . . IDLE

■ **In flight :**

● **If ENG (affected) NOT AT IDLE :**
– ENG MASTER (affected) . . . . . OFF

R ■ **On ground :**
– ENG MASTER (affected) . . . . . OFF

STATUS

ENG (affected) MIN FUEL FLOW.
APPR PROC
– REV (affected) . . . . . DO NOT USE

● **AFTER TOUCH DOWN :**
– THR LEVER (affected) . . . . . IDLE
– ENG MASTER (affected) . . . . . OFF

ENG TAILPIPE FIRE

Internal engine fire may be encountered during engine start or engine shutdown.
It may be seen by the ground crew, or the EGT may fail to decrease after the MASTER switch is turned OFF.

CAUTION

External fire agents can cause severe corrosive damage and should, therefore, only be considered after having applied the following procedure :

– MAN START (if manual start performed) . . . . . OFF
– ENG MASTER (affected) . . . . . OFF

Note : Do not press the engine fire pushbutton, since this would cut off the FADEC power supply, which would prevent motoring sequence.

– AIR BLEED PRESS . . . . . ESTABLISH

· *Select the APU, or opposite BLEED, to motor the engine.*
· *If APU BLEED is not available, and the opposite engine is shut down, connect external pneumatic power (if readily available).*

R – BEACON . . . . . ON
– ENG MODE SEL . . . . . CRANK
– MAN START . . . . . ON

The start valve automatically reopens, when N2 is below 10 %.

● **When burning has stopped :**

– MAN START . . . . . OFF
– ENG MODE SEL . . . . . NORM
– Maintenance action is due.

HIGH ENGINE VIBRATION

R ■ **High N2 vibrations during engine start on ground :**

R *Engine start should be aborted (if vibration indication are available) when N2 vibration*
R *level exceeds the 6.5 units advisory threshold. The subsequent start is to be initiated*
R *after the engine has completely spooled down. This procedure may be repeated a*
R *maximum of three times. Report in log book any N2 vibration advisory condition.*

R ■ **High N1 or N2 vibrations in operation :**

The VIB advisory on ECAM (N1 ≥ 5 units, N2 ≥ 5 units) is mainly a guideline to induce the crew to monitor engine parameters more closely.
VIB detection alone does not require engine shut down.

Note : 1. High engine vibrations may be accompanied by cockpit and cabin smoke and/or the smell of burning. This may be due only to compressor blade tip contact with associated abradable seals.

2. High N1 vibrations are generally accompanied by perceivable airframe vibrations.
High N2 vibrations can occur without perceivable airframe vibrations.

■ **If no icing conditions :**

– ENG PARAMETERS . . . . . CHECK
Check engine parameters and especially EGT ; crosscheck with other engine.
Report in maintenance log.

● **If rapid increase above the advisory :**

– THRUST LEVER (affected engine) . . . . . RETARD
Flight conditions permitting reduce N1 to maintain vibration level below advisory threshold.

Note : If the VIB indication does not decrease following thrust reduction, this may indicate other problems on the engine. Apply adequate procedure.

R ■ **If icing conditions :**

R *An increase of engine vibration in icing conditions with or without engine anti-ice may*
R *be due to fan blades and/or spinner icing.*
R – ATHR . . . . . OFF
R – ENGINE ANTI ICE . . . . . CHECK
R *If ENG ANTI ICE is off, switch it ON at idle fan speed, one engine after the other with*
R *approximately 30 seconds interval.*
R – THRUST LEVER (one engine at a time) . INCREASE THRUST
R *Increase thrust to a setting compatible with the flight phase. VIB level will come back*
R *to normal after the ice has been shed, despite a slight increase during acceleration.*
R *Resume normal operation.*
R *Note : After landing if possible shut the engine down for taxiing, when vibrations above the*
R *advisory level have been experienced during the flight.*

ENG 1(2) FADEC PLUG FAULT

Crew awareness.

Maintenance action is due.

ENG 1(2) AIRCRAFT FADEC SUPPLY

On ground, loss of aircraft 28V supply of either EEC channel, or, in flight, loss of aircraft 28V supply of :

– Both EEC channels, or

– One EEC channel without switching to the other channel.

Crew awareness.

STATUS

INOP SYS

REVERSER 1(2)

ENG 1(2) START

The ECAM only displays these inoperative systems, if there is :

– A loss of aircraft 28V supply of both EEC channels, or

– A loss of aircraft 28V supply of one EEC channel without switching to the other channel.

ENG 1(2) BEARING 4 OIL SYS

One of the two following messages is displayed :

– SCAVENGE VALVE FAULT :

R *N° 4 bearing scavenge valve stuck open.*

– HI PRESS :

R *N° 4 bearing carbon seal is failed or due to scavenge valve stuck closed or due to a*

R *clogged scavenge valve restrictor.*

Maintenance action is due.

ENG 1(2) THR LEVER ABV IDLE

This alert is triggered at landing when one thrust lever is in the reverse detent while the other lever is above IDLE.

– THR LEVER (affected engine) . . . . . IDLE

ENG DUAL FAILURE – FUEL REMAINING (CONT'D)

AT 2000 FEET AGL

– CABIN ..... NOTIFY FOR LANDING

AT 500 FEET AGL

– BRACE FOR IMPACT ..... ORDER

AT TOUCHDOWN

– ENG MASTERS ..... OFF
– APU MASTER SW ..... OFF
– BRAKES ON ACCU ONLY

AFTER LANDING

● **When the aircraft has stopped :**
– PARKING BRK ..... ON
– ATC ..... NOTIFY
– FIRE pushbutton (ENG and APU) ..... PUSH
– AGENTS (ENG and APU) ..... DISCH
Engine Agent 2 is not available.
– EVACUATION ..... INITIATE
– ELT ◁ ..... CHECK EMITTING
If not, switch on the transmitter.



ENG DUAL FAILURE – NO FUEL REMAINING (CONT'D)

– CREW OXY MASKS (Above FL 100) . . . . . ON

Cabin altitude will increase due to the lack of engine bleed : The EXCESS CAB ALT ECAM warning could be triggered. Depending on the situation, to gain gliding distance, the flight crew may disregard the ECAM emergency descent requirement, because passengers will be provided with oxygen for a sufficient period of time.

– CABIN AND COCKPIT . . . . . PREPARE

  – *Loose equipment secured.*
  – *Survival equipments prepared.*
  – *Belts and shoulder harnesses locked.*

– SIGNS . . . . . ON

– GALY & CAB . . . . . OFF

– USE RUDDER WITH CARE

As hydraulic power is only available from the RAT, avoid large and rapid rudder deflection.

● **WHEN BELOW FL 150**

  – RAM AIR . . . . . ON

  Switch ON the RAM AIR to ensure complete depressurization.

APPROACH PREPARATION

Note : Final descent slope, when configured (CONF 3/L/G DOWN), will be approximately 800 feet/NM (with no wind).

– BARO . . . . . SET

– CREW MASKS/OXY SUPPLY (below FL 100) . . . . . OFF



EMERGENCY EVACUATION

Apply this procedure when considering an emergency evacuation, or when required by the ECAM. Carefully analyze the situation before deciding to evacuate passengers. However do not waste valuable time.

– AIRCRAFT/PARKING BRK . . . . . STOP/ON

– ATC (VHF1) . . . . . NOTIFY

Notify ATC of the nature of the emergency, and state intentions.
Only VHF 1 is available on batteries.

– CABIN CREW (PA) . . . . . ALERT

Make a short and precise announcement to warn that an emergency evacuation may be required.

– △P (only if MAN CAB PR has been used) . . . . . CHECK ZERO

If △P is not at zero, MODE SEL on MAN and V/S CTL FULL UP, to fully open the outflow valve.

– ENG MASTER (ALL) . . . . . OFF

Associated LP and HP valves close.

– FIRE Pushbuttons (ALL : ENG and APU) . . . . . PUSH

– AGENTS (ENG and APU) . . . . . AS RQRD

Engine Agent 2 is not available.
The use of agents is required if the ENG FIRE or APU FIRE is displayed.

■ **If Evacuation required :**

– EVACUATION . . . . . INITIATE

Announce an appropriate command such as "PASSENGER EVACUATION-EVACUATE THROUGH LH or RH DOORS" using the Passenger Address (PA) system, and press the EVAC COMMAND pushbutton, if installed.

■ **If Evacuation not required :**

– CABIN CREW and PASSENGERS (PA) . . . . . NOTIFY

DITCHING

This procedure applies when engines are running. If engines are not running, refer to the QRH "ENG DUAL FAILURE" (with or without fuel remaining) procedure, which has been amended to include the ditching procedure when the engines are not running.

PREPARATION

– ATC/TRANSPONDER . . . . . NOTIFY/AS RQRD
Notify ATC of the nature of emergency encountered, and state intentions.
If not in contact with ATC, select transponder code A7700 or transmit a distress message on : (VHF) 121.5 MHZ or (HF) 2182 KHZ or 8364 KHZ.

– CABIN and COCKPIT . . . . . PREPARE
Notify the cabin crew of the nature of the emergency, and state intentions.
Specify the available time.
· Loose equipment secured
· Survival equipment prepared
· Belts and shoulder harnesses locked.

– GPWS SYS . . . . . OFF

– GPWS TERR . . . . . OFF
Setting the SYS and TERR pushbuttons to OFF avoids nuisance warnings.

R – SIGNS . . . . . ON

– GALLEY . . . . . OFF

– LDG ELEV . . . . . SELECT 00

– BARO . . . . . SET
Omit normal approach and landing checklist.

– CREW MASKS/OXY SUPPLY (below FL100) . . . . . OFF

APPROACH

– L/G lever . . . . . UP

– SLATS and FLAPS . . . . . MAX AVAIL



EMERGENCY EVACUATION

Apply this procedure when considering an emergency evacuation, or when required by the ECAM. Carefully analyze the situation before deciding to evacuate passengers. However do not waste valuable time.

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– △P (only if MAN CAB PR has been used) . . . . . CHECK ZERO

If △P is not at zero, MODE SEL on MAN and V/S CTL FULL UP, to fully open the outflow valve.

– ENG MASTER (ALL) . . . . . OFF

Associated LP and HP valves close.

– FIRE Pushbuttons (ALL : ENG and APU) . . . . . PUSH

– AGENTS (ENG and APU) . . . . . AS RQRD

Engine Agent 2 is not available.
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– CABIN AND COCKPIT . . . . . PREPARE
Notify the cabin crew of the nature of the emergency and state intentions.
Specify the available time.
· Loose equipment secured
· Survival equipment prepared
· Belts and shoulder harnesses locked

– GPWS SYS . . . . . OFF

– GPWS TERR . . . . . OFF
Pressing OFF the SYS and TERR pushbuttons avoids nuisance warnings.

R – SIGNS . . . . . ON

– GALY & CAB . . . . . OFF

– LDG ELEV . . . . . SELECT 00

– BARO . . . . . SET
Omit normal approach and landing checklist.

– CREW MASKS/OXY SUPPLY (below FL100) . . . . . OFF

APPROACH

– L/G lever . . . . . UP

– SLATS and FLAPS . . . . . MAX AVAIL



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– ENG MASTER (ALL) . . . . . OFF

Associated LP and HP valves close.

– FIRE Pushbuttons (ALL : ENG and APU) . . . . . PUSH

– AGENTS (ENG and APU) . . . . . AS RQRD

Engine Agent 2 is not available.
The use of agents is required if the ENG FIRE or APU FIRE is displayed.

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This procedure applies when engines are running. If engines are not running, refer to the QRH "ENG DUAL FAILURE" (with or without fuel remaining) procedure, which has been amended to include the ditching procedure when the engines are not running.

PREPARATION

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Notify ATC of the nature of emergency encountered and state intentions.
If not in contact with ATC, select transponder code A7700 or transmit a distress message on : (VHF) 121.5 MHZ or (HF) 2182 KHZ or 8364 KHZ.

– CABIN AND COCKPIT ..... PREPARE

Notify the cabin crew of the nature of the emergency and state intentions.
Specify the available time.
· loose equipment secured
· survival equipment prepared
· belts and shoulder harnesses locked

– GPWS SYS ..... OFF
– GPWS TERR ..... OFF

Pressing OFF the SYS and TERR pushbuttons avoids nuisance warnings.

R – SIGNS ..... ON
– EMER EXIT LT ..... ON
– COMMERCIAL ..... OFF
– LDG ELEV ..... SELECT 00
– BARO ..... SET

Omit normal approach and landing check list.

– CREW MASKS/OXY SUPPLY (below FL100) ..... OFF

APPROACH

– L/G lever ..... UP
– SLATS and FLAPS ..... MAX AVAIL



DITCHING (CONT'D)

R **AT 2000 FEET AGL**

– CAB PRESS MODE SEL . . . . . CHECK AUTO

The outflow valve would remain open, if the MODE SEL were not at AUTO.

– BLEED (ENGs and APU) . . . . . OFF

R – CABIN . . . . . NOTIFY FOR DITCHING

– DITCHING pushbutton . . . . . ON

The outflow valve, emergency ram air inlet, avionics ventilation inlet and extract valves, and pack flow control valves close.

The ditching direction mainly depends on the wind direction, and on the state of the sea. These factors may be considered as follows :

1. *Wind direction :*

   This may be determined by observing of the waves, which move and break downwind. Spray from the wave tops is also a reliable indicator.

2. *Wind speed :*

   The following guidelines can be used to evaluate wind speed :

   A few white crests . . . . . 8-17 knots
   Many white crests . . . . . 17-26 knots
   Streaks of foam along the water . . . . . 23-35 knots
   Spray from the waves . . . . . 35-43 knots

3. *Sea state :*

   This is best determined from a height of 500 to 1000 feet.

   At a lower altitude, the swell direction may be less obvious than the wave direction, even though the waves are much smaller.

4. *When there is no swell, align into the wind. In the presence of swell, and provided that drift does not exceed 10 degrees, ditch parallel to the swell and as nearly into wind as possible. If drift exceeds 10 degrees, ditch into the wind. The presence of drift on touchdown is not dangerous, but every effort should be made to minimize roll.*

   Touch down with approximately 11 degrees of pitch, and minimum aircraft vertical speed.



DITCHING (CONT'D)

R **AT 500 FEET AGL**

R – BRACE FOR IMPACT ..... ORDER

R **AT TOUCHDOWN**

R – ENG MASTERS ..... OFF

R – APU MASTER SW ..... OFF

AFTER DITCHING

– ATC (VHF 1) ..... NOTIFY

With engine and APU shut down, only VHF 1 is supplied.

– FIRE pushbutton (ENG and APU) ..... PUSH

– AGENTS (ENG and APU) ..... DISCH

– EVACUATION ..... INITIATE

After impact the lowest point of the passenger exits (aft door) remains above the waterline for more than 7 minutes.

DITCHING (CONT'D)

R **AT 2000 FEET AGL**

– CAB PRESS MODE SEL . . . . . CHECK AUTO

The outflow valve would remain open, if the MODE SEL were not at AUTO.

– BLEED (ENGs and APU) . . . . . OFF

R – CABIN . . . . . NOTIFY FOR DITCHING

– DITCHING pushbutton . . . . . ON

The outflow valve, emergency ram air inlet, avionics ventilation inlet and extract valves, and pack flow control valves close.

The ditching direction mainly depends on the wind direction, and on the state of the sea. These factors may be considered as follows :

1. *Wind direction :*

   This may be determined by observing of the waves, which move and break downwind. Spray from the wave tops is also a reliable indicator.

2. *Wind speed :*

   The following guidelines can be used to evaluate wind speed :

   A few white crests . . . . . 8-17 knots
   Many white crests . . . . . 17-26 knots
   Streaks of foam along the water . . . . . 23-35 knots
   Spray from the waves . . . . . 35-43 knots

3. *Sea state :*

   This is best determined from a height of 500 to 1000 feet.

   At a lower altitude, the swell direction may be less obvious than the wave direction, even though the waves are much smaller.

4. *When there is no swell, align into the wind. In the presence of swell, and provided that drift does not exceed 10 degrees, ditch parallel to the swell and as nearly into wind as possible. If drift exceeds 10 degrees, ditch into the wind. The presence of drift on touchdown is not dangerous, but every effort should be made to minimize roll.*

   Touch down with approximately 11 degrees of pitch, and minimum aircraft vertical speed.



DITCHING (CONT'D)

R **AT 500 FEET AGL**

R – BRACE FOR IMPACT ..... ORDER

R **AT TOUCHDOWN**

R – ENG MASTERS ..... OFF

R – APU MASTER SW ..... OFF

AFTER DITCHING

– ATC (VHF 1) ..... NOTIFY

With engine and APU shutdown, only VHF 1 is supplied.

– FIRE pushbutton (ENG and APU) ..... PUSH

– AGENTS (ENG and APU) ..... DISCH

– EVACUATION ..... INITIATE

– ELT ..... CHECK EMITTING

If not, switch on the transmitter.

After impact, the lowest point of the passenger exits (aft door) remains above the waterline for more than 7 minutes.

DITCHING (CONT'D)

R **AT 2000 FEET AGL**

– CAB PRESS MODE SEL . . . . . CHECK AUTO

The outflow valve would remain open, if the MODE SEL were not at AUTO.

– BLEED (ENGs and APU) . . . . . OFF

R – CABIN . . . . . NOTIFY FOR DITCHING

– DITCHING pushbutton . . . . . ON

The outflow valve, emergency ram air inlet, avionics ventilation inlet and extract valve, and pack flow control valves close.

The ditching direction mainly depends on the wind direction, and on the state of the sea. These factors may be considered as follows:

1. *Wind direction :*

   This may be determined by observing the waves, which move and break downwind. Spray from the wave tops is also a reliable indicator.

2. *Wind speed :*

   The following guidelines can be used to evaluate wind speed :

   A few white crests . . . . . 8-17 knots
   Many white crests . . . . . 17-26 knots
   Streaks of foam along the water . . . . . 23-35 knots
   Spray from the waves . . . . . 35-43 knots

3. *Sea state :*

   This is best determined from a height of 500 to 1000 feet. At a lower altitude, the swell direction may be less obvious than the wave direction, even though the waves are much smaller.

4. *When there is no swell, align into the wind. In the presence of swell, and provided that drift does not exceed 10 degrees, ditch parallel to the swell and as nearly into wind as possible. If drift exceeds 10 degrees, ditch into the wind. The presence of drift on touchdown is not dangerous, but every effort should be made to minimize roll.*

   Touch down with approximately 13 degrees of pitch, and minimum aircraft vertical speed.



DITCHING (CONT'D)

R **AT 500 FEET AGL**

R – BRACE FOR IMPACT ..... ORDER

R **AT TOUCHDOWN**

R – ENG MASTERS ..... OFF

R – APU MASTER SW ..... OFF

AFTER DITCHING

– ATC (VHF 1) ..... NOTIFY

With engine and APU shutdown, only VHF 1 is supplied.

– FIRE pushbutton (ENG and APU) ..... PUSH

– AGENTS (ENG and APU) ..... DISCH

– EVACUATION ..... INITIATE

– ELT ..... CHECK EMITTING

If not, switch on the transmitter.

After impact, the lowest point of the passenger exits (aft door) remains above the waterline for more than 7 minutes.

FORCED LANDING

R *This procedure applies when engines are running. If engines are not running, refer to the QRH*
R *"ENG DUAL FAILURE" (with or without fuel remaining) procedure, which has been amended*
R *to include the forced landing procedure when the engines are not running.*

PREPARATION

R – ATC/TRANSPONDER ..... NOTIFY/AS RQRD
Notify the ATC of the emergency encountered and state intentions.
If not in contact with the ATC, select transponder code A7700, or transmit a distress message on (VHF) 121.5 MHZ, or (HF) 2182 khz, or 8364 khz.

– CABIN and COCKPIT ..... PREPARE
Notify the cabin crew of the nature of the emergency and state intentions.
Specify the available time.
· Loose equipment secured.
· Survival equipment prepared.
· Belts and shoulder harnesses locked.

– GPWS SYS ..... OFF

R – GPWS TERR ..... OFF
R *Switching OFF the SYS and TERR pushbuttons avoids nuisance warnings.*

R – CABIN SIGNS ..... ON

R – GALLEY ..... OFF

– LDG ELEV ..... SET
If not known, select an approximate value.

R – BARO ..... SET
Omit normal approach and landing checklist.

R – CREW MASKS/OXY SUPPLY (below FL100) ..... OFF

APPROACH

– RAM AIR ..... ON
Switch ON the RAM AIR to ensure complete cabin depressurization on ground.

– L/G lever ..... DOWN

R – SLATS and FLAPS ..... MAX AVAIL

– GND SPLR ..... ARM

R – MAX BRK PR ..... 1000 PSi



FORCED LANDING (CONT'D)

R **AT 2000 FEET AGL**

R – CABIN ..... NOTIFY FOR LANDING

R **AT 500 FEET AGL**

R – BRACE FOR IMPACT ..... ORDER

R **AT TOUCHDOWN**

– ENG MASTERS ..... OFF

R – APU MASTER SW ..... OFF

R – BRAKES ON ACCU ONLY

R **AFTER LANDING**

● **When aircraft has stopped :**

– PARKING BRK ..... ON

– ATC (VHF 1) ..... USE

With both engines and APU shut down, only VHF 1 is supplied.

– FIRE pushbutton (ENG and APU) ..... PUSH

– AGENTS (ENG and APU) ..... DISCH

– EVACUATION ..... INITIATE

FORCED LANDING

This procedure applies when engines are running. If engines are not running, refer to the QRH "ENG DUAL FAILURE" (with or without fuel remaining) procedure, which has been amended to include the forced landing procedure when the engines are not running.

PREPARATION

– ATC/TRANSPONDER . . . . . NOTIFY/AS RQRD
Notify the ATC of the emergency encountered and state intentions.
If not in contact with the ATC, select transponder code A7700, or transmit a distress message on (VHF) 121.5 MHZ, or (HF) 2182 khz, or 8364 khz.

– CABIN and COCKPIT . . . . . PREPARE
Notify the cabin crew of the nature of the emergency and state intentions.
Specify the available time.
· Loose equipment secured.
· Survival equipment prepared.
· Belts and shoulder harnesses locked.

– GPWS SYS . . . . . OFF

– GPWS TERR . . . . . OFF
Switching the SYS and TERR pushbuttons OFF avoids nuisance warnings.

R – SIGNS . . . . . ON

– EMER EXIT LT . . . . . ON

– COMMERCIAL . . . . . OFF

– LDG ELEV . . . . . SET
If not known, select an approximate value.

– BARO . . . . . SET
Omit normal approach and landing checklist.

– CREW MASKS/OXY SUPPLY (below FL100) . . . . . OFF

APPROACH

– RAM AIR . . . . . ON
Switch ON the RAM AIR to ensure complete cabin depressurization on ground.

– L/G lever . . . . . DOWN

– SLATS and FLAPS . . . . . MAX AVAIL

– GND SPLR . . . . . ARM

– MAX BRK PR . . . . . 1000 PSi



FORCED LANDING (CONT'D)

R **AT 2000 FEET AGL**

R – CABIN ..... NOTIFY FOR LANDING

R **AT 500 FEET AGL**

R – BRACE FOR IMPACT ..... ORDER

R **AT TOUCHDOWN**

– ENG MASTERS ..... OFF

R – APU MASTER SW ..... OFF

R – BRAKES ON ACCU ONLY

R **AFTER LANDING**

● **When the aircraft has stopped** :

– PARKING BRK ..... ON

– ATC (VHF 1) ..... USE

With both engines and APU shutdown, only VHF 1 is supplied.

– FIRE pushbutton (ENG and APU) ..... PUSH

– AGENTS (ENG and APU) ..... DISCH

– EVACUATION ..... INITIATE

– ELT ..... CHECK EMITTING

If not, switch on the transmitter.

FORCED LANDING

This procedure applies when engines are running. If engines are not running, refer to the QRH "ENG DUAL FAILURE" (with or without fuel remaining) procedure, which has been amended to include the forced landing procedure when the engines are not running.

PREPARATION

– ATC/TRANSPONDER ..... NOTIFY/AS RQRD
Notify the ATC of the emergency encountered and state intentions.
If not in contact with the ATC, select transponder code A7700, or transmit a distress message on (VHF) 121.5 MHZ, or (HF) 2182 khz, or 8364 khz.

– CABIN and COCKPIT ..... PREPARE
Notify the cabin crew of the nature of the emergency and state intentions.
Specify the available time.
· Loose equipment secured.
· Survival equipment prepared.
· Belts and shoulder harnesses locked.

– GPWS SYS ..... OFF

– GPWS TERR ..... OFF
Switching the SYS and TERR pushbuttons OFF avoids nuisance warnings.

R – SIGNS ..... ON

– GALY & CAB ..... OFF

– LDG ELEV ..... SET
If not known, select an approximate value.

– BARO ..... SET
Omit normal approach and landing checklist.

– CREW MASKS/OXY SUPPLY (below FL100) ..... OFF

APPROACH

– RAM AIR ..... ON
Switch ON the RAM AIR to ensure complete cabin depressurization on ground.

– L/G lever ..... DOWN

– SLATS and FLAPS ..... MAX AVAIL

– GND SPLR ..... ARM

– MAX BRK PR ..... 1000 PSi



FORCED LANDING (CONT'D)

R **AT 2000 FEET AGL**

R – CABIN ..... NOTIFY FOR LANDING

R **AT 500 FEET AGL**

R – BRACE FOR IMPACT ..... ORDER

R **AT TOUCHDOWN**

– ENG MASTERS ..... OFF

R – APU MASTER SW ..... OFF

R – BRAKES ON ACCU ONLY

R **AFTER LANDING**

● **When the aircraft has stopped :**

– PARKING BRK ..... ON

– ATC (VHF 1) ..... USE

With both engines and APU shutdown, only VHF 1 is supplied.

– FIRE pushbutton (ENG and APU) ..... PUSH

– AGENTS (ENG and APU) ..... DISCH

– EVACUATION ..... INITIATE

– ELT ..... CHECK EMITTING

If not, switch on the transmitter.

EMER DESCENT

R **IMMEDIATE ACTIONS**

– CREW OXY MASKS . . . . . ON

Descend with the autopilot engaged :
. Turn the ALT selector knob and pull.
. Turn the HDG selector knob and pull.
. Adjust the target SPD/MACH.
Use of the autopilot is also permitted in EXPEDITE mode (◁).

– THR LEVERS (if A/THR not engaged) . . . . . IDLE

– SPD BRK . . . . . FULL

Extension of the speedbrakes will significantly increase Vls.
To avoid autopilot disconnection and automatic retraction of the speedbrakes, due to possible activation of the angle of attack protection, allow the speed to increase before starting to use the speedbrakes.

R **WHEN DESCENT ESTABLISHED**

– EMER DESCENT FL 100 or minimum allowable altitude.

– SPEED . . . . . MAX/APPROPRIATE

CAUTION

Descend at the maximum appropriate speed. If structural damage is suspected, use the flight controls with care and reduce speed as appropriate.

Landing gear may be extended below 25000 feet. Speed must be reduced to VLO/VLE.

– SIGNS . . . . . ON

– ENG MODE SEL . . . . . IGN

– ATC . . . . . NOTIFY

Notify ATC of the nature of the emergency, and state intentions.
If not in contact with ATC, select transponder code A 7700, or transmit a distress message on (VHF) 121.5 MHZ, or (HF) 2182 KHZ, or 8364 KHZ.
· To save oxygen, set the oxygen diluter selector to the N position.
· With the oxygen diluter selector left at 100 %, oxygen quantity may be insufficient to cover the entire emergency descent profile.
· Ensure crew communication is established with oxygen masks. Avoid continuous use of the interphone to minimize interference from the oxygen mask breathing noise.

● **IF CAB ALT > 14 000 feet :**

– PAX OXY MASKS . . . . . MAN ON

Confirm passenger oxygen masks released.
Note : Notify the cabin crew, when a safe flight level has been reached and oxygen mask use can be terminated.

OVERWEIGHT LANDING

R *Note : Automatic landing is certified up to MLW, but flight tests have been performed*
R *successfully up to 69 tons (152 117 lb). In case of emergency, and under crew responsibility, an automatic landing may be performed up to 69 tons (152 117 lb) provided that the runway is approved for automatic landing.*

– LDG CONF . . . . . AS REQUIRED

Use the ECAM flap setting, if required for abnormal operations. In all other cases :

– FULL is preferred for optimized landing performance.

– If the aircraft weight is above the maximum weight for go-around (given in FCOM 3.02.80 p 8a), use FLAP 3 for landing.

In all cases, if landing configuration is different from FLAP FULL, use 1+F for go-around.

Note : For weights greater than 68000 kg (150 000 lb) S speed is greater than VFE CONF 2 (200 knots). Consequently the crew must select on FCU a speed below 200 knots before setting FLAPS 2. When in FLAPS 2, the crew can use managed speed again.

– LDG DIST . . . . . CHECK

– PACK 1 and 2 . . . . . OFF or supplied by APU

Selecting packs OFF (or supplied from APU) will increase the maximum thrust available from the engines, in the event of a go-around.

● **In the final stages of approach**

– TARGET SPEED . . . . . VLS

Reduce the selected speed on the FCU to reach VLS at runway threshold.
Touch down as smoothly as possible (Maximum V/S at touchdown 360 ft/min)

● **At main landing gear touchdown**

– REVERSE THRUST . . . . . USE MAX AVAILABLE

● **After nosewheel touchdown**

– BRAKES . . . . . APPLY AS NECESSARY

Maximum braking may be used after nosewheel touchdown. But, if landing distance permits, delay or reduce braking to take full benefit of the available runway length.

● **Landing complete**

– BRAKE FANS (◁) . . . . . ON

Be prepared for tire deflation, if temperatures exceed 800° C.



EMER DESCENT

R **IMMEDIATE ACTIONS**

– CREW OXY MASKS . . . . . ON

Descend with the autopilot engaged :
. Turn the ALT selector knob and pull.
. Turn the HDG selector knob and pull.
. Adjust the target SPD/MACH.
Use of the autopilot is also permitted in EXPEDITE mode (◁).

– THR LEVERS (if A/THR not engaged) . . . . . IDLE

– SPD BRK . . . . . FULL

Extension of the speedbrakes will significantly increase Vls.
To avoid autopilot disconnection and automatic retraction of the speedbrakes, due to possible activation of the angle of attack protection, allow the speed to increase before starting to use the speedbrakes.

R **WHEN DESCENT ESTABLISHED**

– EMER DESCENT FL 100 or minimum allowable altitude.

– SPEED . . . . . MAX/APPROPRIATE

CAUTION

Descend at the maximum appropriate speed. If structural damage is suspected, use the flight controls with care and reduce speed as appropriate.

Landing gear may be extended below 25000 feet. Speed must be reduced to VLO/VLE.

– SIGNS . . . . . ON

– ENG MODE SEL . . . . . IGN

– ATC . . . . . NOTIFY

Notify ATC of the nature of the emergency, and state intentions.
If not in contact with ATC, select transponder code A 7700, or transmit a distress message on (VHF) 121.5 MHZ, or (HF) 2182 KHZ, or 8364 KHZ.
· To save oxygen, set the oxygen diluter selector to the N position.
· With the oxygen diluter selector left at 100 %, oxygen quantity may be insufficient to cover the entire emergency descent profile.
· Ensure crew communication is established with oxygen masks. Avoid continuous use of the interphone to minimize interference from the oxygen mask breathing noise.

● **IF CAB ALT > 14 000 feet :**

– PAX OXY MASKS . . . . . MAN ON

Confirm passenger oxygen masks released.
Note : Notify the cabin crew, when a safe flight level has been reached and oxygen mask use can be terminated.

OVERWEIGHT LANDING

Note : Automatic landing is certified up to MLW, but flight tests have been performed successfully up to 67 tons (147 708 lb). In case of emergency, and under crew responsibility, an automatic landing may be performed up to 67 tons (147 708 lb) provided that the runway is approved for automatic landing.

– LDG CONF . . . . . AS REQUIRED

Use the ECAM flap setting, if required for abnormal operations. In all other cases :

- *– FULL is preferred for optimized landing performance if aircraft weight is less than shown in TABLE 1.*
- *– If the aircraft weight is above the maximum weight for go-around given in the TABLE 1 and less than the max weight given in TABLE 2, use FLAP 3 for landing and FLAP 1+F for go-around.*
- *– If the aircraft weight is above the maximum weight for go-around (given in the TABLE 2), refer to the HIGH/HOT go-around procedure. Use FLAPS 3 for landing and FLAP 1+F for go-around. During the approach briefing, calculate the increase in the go-around target speed for the landing weight (see table in the SPEED DETERMINATION paragraph). Verify also that the landing weight is not higher than the maximum allowed corresponding to 1.41 Vs1g (M2).*

– LDG DIST . . . . . CHECK

– PACK 1 and 2 . . . . . OFF or supplied by APU

Selecting packs OFF (or supplied from APU) will increase the maximum thrust available from the engines, in the event of a go-around.

- **In the final stages of approach**
  - – TARGET SPEED . . . . . VLS
    Reduce the selected speed on the FCU to reach VLS at runway threshold.
    Touch down as smoothly as possible (Maximum V/S at touchdown 360 ft/min)
- **At main landing gear touchdown**
  - – REVERSE THRUST . . . . . USE MAX AVAILABLE
- **After nosewheel touchdown**
  - – BRAKES . . . . . APPLY AS NECESSARY
    Maximum braking may be used after nosewheel touchdown. But if landing distance permits, delay or reduce braking to take full benefit of the available runway length.
- **Landing complete**
  - – BRAKE FANS (if installed) . . . . . ON
    Be prepared for tyre deflation if temperatures exceed 800° C.

EMER DESCENT

R **IMMEDIATE ACTIONS**

– CREW OXY MASKS . . . . . ON

Descend with the autopilot engaged :
. Turn the ALT selector knob and pull.
. Turn the HDG selector knob and pull.
. Adjust the target SPD/MACH.
Use of the autopilot is also permitted in EXPEDITE mode (◁).

– THR LEVERS (if A/THR not engaged) . . . . . IDLE

– SPD BRK . . . . . FULL

Extension of the speedbrakes will significantly increase Vls.
To avoid autopilot disconnection and automatic retraction of the speedbrakes, due to possible activation of the angle of attack protection, allow the speed to increase before starting to use the speedbrakes.

R **WHEN DESCENT ESTABLISHED**

– EMER DESCENT FL 100 or minimum allowable altitude.

– SPEED . . . . . MAX/APPROPRIATE

CAUTION

Descend at the maximum appropriate speed. If structural damage is suspected, use the flight controls with care and reduce speed as appropriate.

Landing gear may be extended below 25000 feet. Speed must be reduced to VLO/VLE.

– SIGNS . . . . . ON

– ENG MODE SEL . . . . . IGN

– ATC . . . . . NOTIFY

Notify ATC of the nature of the emergency, and state intentions.
If not in contact with ATC, select transponder code A 7700, or transmit a distress message on (VHF) 121.5 MHZ, or (HF) 2182 KHZ, or 8364 KHZ.
· To save oxygen, set the oxygen diluter selector to the N position.
· With the oxygen diluter selector left at 100 %, oxygen quantity may be insufficient to cover the entire emergency descent profile.
· Ensure crew communication is established with oxygen masks. Avoid continuous use of the interphone to minimize interference from the oxygen mask breathing noise.

● **IF CAB ALT > 14 000 feet :**

– PAX OXY MASKS . . . . . MAN ON

Confirm passenger oxygen masks released.
Note : Notify the cabin crew, when a safe flight level has been reached and oxygen mask use can be terminated.

OVERWEIGHT LANDING

– LDG CONF . . . . . AS REQUIRED

Use the ECAM flap setting, if required for abnormal operations. In all other cases :

– FULL is preferred for optimized landing performance.

– If the aircraft weight is above the maximum weight for go-around (given in the table below), use FLAP 3 for landing.

In all cases, if landing configuration is different from FLAP FULL, use 1+F for go-around.

R *Note : For weights greater than 70000 kg (or 154 000 lb) S speed is greater than VFE*
R *CONF 2 (200 knots). Consequently the crew must select on FCU a speed below*
R *200 knots before setting FLAPS 2. When in FLAPS 2, the crew can use managed*
R *speed again.*

– LDG DIST . . . . . CHECK

– PACK 1 and 2 . . . . . OFF or supplied by APU

Selecting packs OFF (or supplied from APU) will increase the maximum thrust available from the engines, in the event of a go-around.

● **In the final stages of approach**

– TARGET SPEED . . . . . VLS

Reduce the selected speed on the FCU to reach VLS at runway threshold.
Touch down as smoothly as possible (Maximum V/S at touchdown 360 ft/min)

● **At main landing gear touchdown**

– REVERSE THRUST . . . . . USE MAX AVAILABLE

● **After nosewheel touchdown**

– BRAKES . . . . . APPLY AS NECESSARY

Maximum braking may be used after nosewheel touchdown. But, if landing distance permits, delay or reduce braking to take full benefit of the available runway length.

● **Landing complete**

– BRAKE FANS (◁) . . . . . ON

Be prepared for tire deflation, if temperatures exceed 800° C.

MAXIMUM WEIGHT FOR GO AROUND IN CONF 3 (1000 kg)

OAT °C	AIRPORT ELEVATION (FT)							
	0	2000	4000	6000	8000	10000	12000	14000
<10	83	81	78	74	71	66	62	58
15	83	81	78	74	71	66	62	58
20	83	81	78	74	71	66	61	56
25	83	81	78	74	70	64	59	
30	83	81	78	73	67			
35	83	81	76	70	65			
40	83	80	73	67				
45	82	76	70					
50	79	73						
55								

EMER DESCENT

R **IMMEDIATE ACTIONS**

– CREW OXY MASKS . . . . . ON

Descend with the autopilot engaged :
. Turn the ALT selector knob and pull.
. Turn the HDG selector knob and pull.
. Adjust the target SPD/MACH.
Use of the autopilot is also permitted in EXPEDITE mode (◁).

– THR LEVERS (if A/THR not engaged) . . . . . IDLE

– SPD BRK . . . . . FULL

Extension of the speedbrakes will significantly increase Vls.
To avoid autopilot disconnection and automatic retraction of the speedbrakes, due to possible activation of the angle of attack protection, allow the speed to increase before starting to use the speedbrakes.

R **WHEN DESCENT ESTABLISHED**

– EMER DESCENT FL 100 or minimum allowable altitude.

– SPEED . . . . . MAX/APPROPRIATE

CAUTION

Descend at the maximum appropriate speed. If structural damage is suspected, use the flight controls with care and reduce speed as appropriate.

Landing gear may be extended below 25000 feet. Speed must be reduced to VLO/VLE.

– SIGNS . . . . . ON

– ENG MODE SEL . . . . . IGN

– ATC . . . . . NOTIFY

Notify ATC of the nature of the emergency, and state intentions.
If not in contact with ATC, select transponder code A 7700, or transmit a distress message on (VHF) 121.5 MHZ, or (HF) 2182 KHZ, or 8364 KHZ.
· To save oxygen, set the oxygen diluter selector to the N position.
· With the oxygen diluter selector left at 100 %, oxygen quantity may be insufficient to cover the entire emergency descent profile.
· Ensure crew communication is established with oxygen masks. Avoid continuous use of the interphone to minimize interference from the oxygen mask breathing noise.

● **IF CAB ALT > 14 000 feet :**

– PAX OXY MASKS . . . . . MAN ON

Confirm passenger oxygen masks released.
Note : Notify the cabin crew, when a safe flight level has been reached and oxygen mask use can be terminated.

OVERWEIGHT LANDING

– LDG CONF . . . . . AS REQUIRED

Use the ECAM flap setting, if required for abnormal operations. In all other cases :

– FULL is preferred for optimized landing performance.

– If the aircraft weight is above the maximum weight for go-around (given in the table below), use FLAP 3 for landing.

In all cases, if landing configuration is different from FLAP FULL, use 1+F for go-around.

R *Note : For weights greater than 70000 kg (or 154 000 lb) S speed is greater than VFE*
R *CONF 2 (200 knots). Consequently the crew must select on FCU a speed below*
R *200 knots before setting FLAPS 2. When in FLAPS 2, the crew can use managed*
R *speed again.*

– LDG DIST . . . . . CHECK

– PACK 1 and 2 . . . . . OFF or supplied by APU

Selecting packs OFF (or supplied from APU) will increase the maximum thrust available from the engines, in the event of a go-around.

● **In the final stages of approach**

– TARGET SPEED . . . . . VLS

Reduce the selected speed on the FCU to reach VLS at runway threshold.
Touch down as smoothly as possible (Maximum V/S at touchdown 360 ft/min)

● **At main landing gear touchdown**

– REVERSE THRUST . . . . . USE MAX AVAILABLE

● **After nosewheel touchdown**

– BRAKES . . . . . APPLY AS NECESSARY

Maximum braking may be used after nosewheel touchdown. But, if landing distance permits, delay or reduce braking to take full benefit of the available runway length.

● **Landing complete**

– BRAKE FANS (◁) . . . . . ON

Be prepared for tire deflation, if temperatures exceed 800° C.

MAXIMUM WEIGHT FOR GO AROUND IN CONF 3 (1000 kg)

OAT °C	AIRPORT ELEVATION (FT)							
	0	2000	4000	6000	8000	10000	12000	14000
<10	83	83	82	80	76	70	65	60
15	83	83	82	80	75	69	64	59
20	83	83	82	79	73	67	62	57
25	83	83	82	76	70	65	60	
30	83	83	79	73	68			
35	83	82	76	71	65			
40	83	80	73	68				
45	83	77	70					
50	79	73						
55								

OVERWEIGHT LANDING (CONT'D)

MAXIMUM WEIGHT FOR GO AROUND IN CONF 3 (1000 kg)								
OAT °C	AIRPORT ELEVATION (FT)							
	0	2000	4000	6000	8000	10000	12000	14000
<10	76	74	72	70	67	64	61	58
15	76	74	72	70	67	64	61	58
20	76	74	72	70	67	64	61	56
25	76	74	72	70	67	64	59	54
30	76	74	72	70	66	62	57	
35	76	74	72	69	65			
40	76	74	72	67				
45	76	74	69					
50	76	72						
55								

CREW INCAPACITATION

If a cockpit crew member becomes incapacitated, the remaining crew member must call a cabin attendant as soon as practicable. The best way to request assistance from the cabin crew, is by means of the passenger address system :
"ATTENTION, PURSER TO COCKPIT PLEASE". The purser or any other cabin attendant must proceed to the cockpit immediately.
The cabin attendant must then :

- tighten and manually lock the shoulder harness of the incapacitated crew member ;
- push the seat completely aft ;
- recline the seat back.

It takes 2 people to remove the dead weight of an unconscious body from a seat without endangering any controls and switches.
If it is not possible to remove the body, one cabin attendant must remain in the cockpit to take care of and observe the incapacited crew member.
In coordination with the purser :

- request assistance from any medically qualified passenger.
- check if a type qualified company pilot is on board to replace the incapacitated crew member.

BOMB ON BOARD

R IF POSSIBLE, LAND AND EVACUATE THE AIRCRAFT IMMEDIATELY.
If it is not possible to land and evacuate the aircraft within 30 minutes, apply the following procedures :

COCKPIT PROCEDURES

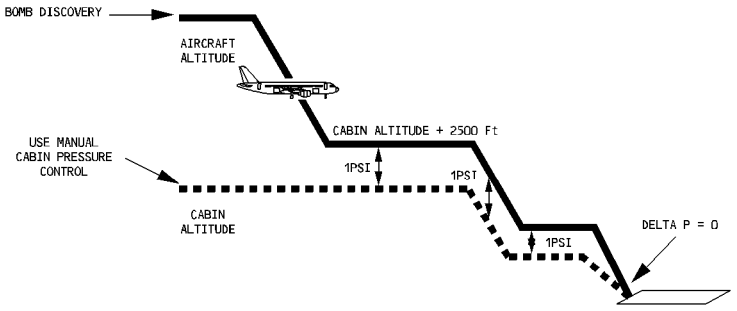
Background

To avoid the activation of an altitude-sensitive bomb, the cabin altitude should not exceed the value at which the bomb has been discovered.
To reduce the effects of the explosion, the aircraft should fly as long as possible with approximately 1 PSI differential pressure, to help the blast go outwards. 1 PSI differential pressure corresponds to a 2500 feet difference between the aircraft and the cabin altitude.
These conditions are achieved by using the manual pressure control.

Procedure

The following procedure assumes that it is initiated during climb or cruise :
- First, maintain the cabin altitude.
- While maintaining the cabin altitude, descend the aircraft to the cabin altitude + 2500 feet and maintain delta P at 1 PSI.
- During further steps of descent, maintain delta P at 1 PSI.
- For landing, reduce the differential pressure to zero, until the final approach.

If flight conditions are different, the crew should adapt the procedure, bearing in mind the above-mentioned principles (background paragraph).



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BOMB ON BOARD (CONT'D)

R – AIRCRAFT (if climbing) . . . . . LEVEL OFF
R – CABIN PRESS MODE SEL . . . . . MAN
R *The purpose is to immediately prevent the cabin altitude from increasing, in order to avoid*
R *the activation of an altitude-sensitive bomb.*
R – CAB ALT . . . . . MAINTAIN
R *Use MAN V/S CTL to maintain the cabin altitude at the value it had when the bomb was*
R *discovered.*
R – CABIN CREW . . . . . NOTIFY
R – ATC/COMPANY OPERATIONS . . . . . NOTIFY
R *To obtain expert advice from explosive specialists.*
R – FUEL RESERVES . . . . . DETERMINE
R *Keep in mind that when flying at cabin altitude + 2500ft, fuel consumption in CONF 1,*
R *with landing gear down, will be about 2.1 times that consumed in clean configuration.*
R – NEXT SUITABLE AIRPORT . . . . . DETERMINE
R – FCU SPEED SELECTION KNOB . . . . . PULL AND TURN
R *Select the most appropriate speed, taking into account the time to destination, the fuel*
R *consumption and the fact that low speed could reduce the consequences of possible*
R *structural damage, if the bomb explodes.*
R – DESCENT TO CAB ALT + 2500 FT or MEA or minimum obstacle
R clearance altitude . . . . . INITIATE
R *Descending to 2500ft above the cabin altitude gives a cabin differential pressure of*
R *approximately 1 PSI, which helps to ensure that the blast goes outwards, if the bomb*
R *explodes.*
R – AVOID SHARP MANEUVERS
R *which might result in the bomb moving.*
R – CAB ALT . . . . . MAINTAIN
R *Use MAN V/S CTL to maintain the cabin altitude. Initially brief UP input should be*
R *required; but, be careful not to increase the cabin altitude.*
R ● **When at CAB ALT + 2500 FT** :
R – 1 PSI DELTA P . . . . . MAINTAIN
R *Use MAN V/S CTL to adjust delta P to 1 PSI. Brief DN input should be initially required*
R *to set 0 ft/min cabin vertical speed.*
R – GALLEY/COMMERCIAL (◁) . . . . . OFF
R – FLAPS (fuel permitting) . . . . . AT LEAST CONF 1
R *For landing, use normal configuration.*



BOMB ON BOARD (CONT'D)

– LANDING GEAR (fuel permitting, except for flight over water) . . . . . DOWN

The detonation could damage the landing systems. Therefore, if fuel permits, configure the aircraft for landing as soon as possible. Reducing the speed will minimize stress on the aircraft structure.

- **For any other steps of descent :**
  – 1 PSI DELTA P . . . . . MAINTAIN
  Use MAN V/S CTL to DN to adjust delta P to 1 PSI.
- **During approach :**
  – CABIN PRESS MODE SEL . . . . . AUTO
  The purpose is to allow the CPC to automatically control the cabin altitude to 0 during final approach.
- **When the aircraft is on ground and stopped in a remote area (if possible) :**
  – EVACUATION . . . . . INITIATE
  Avoid exits and exiting on the same side as the bomb and near the bomb.

CABIN PROCEDURES

R If a suspect device is found in the cabin :

WARNING

R Do not cut or disconnect any wires and do not open or attempt to gain entry to internal
R components of a closed or concealed suspect device. Any attempt may result in an
R explosion. Booby-trapped closed devices have been used on aircraft in the past.

WARNING

R Alternate locations must not be used without consulting with an aviation explosives
R security specialist. Never take a suspect device to the flight deck.

CAUTION

R The least risk bomb location for the aircraft structure and systems is center of the RH
R aft cabin door.

R – EOD PERSONNEL ON BOARD . . . . . CHECK
R *Announce "Is there any EOD personnel on board ?". By using the initials, only persons*
R *familiar with EOD (Explosive Ordnance Disposal) will be made aware of the problem.*

BOMB ON BOARD (CONT'D)

– BOMB ..... DO NOT OPEN, DO NOT CUT WIRES, SECURE AGAINST SLIPPING, AVOID SHOCKS

Secure in the attitude found and do not lift before having checked for an anti-lift ignition device.

– PASSENGERS ..... LEAD AWAY FROM BOMB

Move passengers at least 4 seat rows away from the bomb location. On full flights, it may be necessary to double up passengers to achieve standoff from the suspect device.
Passengers near the bomb should protect their heads with pillows, blankets.
All passengers must remain seated with seatbelts on and, if possible, head below the top of the head rest. Seat backs and tray tables should be in their full upright position.
Service items may need to be collected in order to secure tray tables.

– PORTABLE ELECTRONIC DEVICES ..... SWITCH OFF

The cabin crews must command passengers to switch off all portable electronic devices.

– BOMB ..... CHECK NO ANTI-LIFT DEVICE

To check for an anti-lift switch or lever, slide a string or stiff card, (such as the emergency information card) under the bomb, without disturbing the bomb.
If the string or card cannot be slipped under the bomb, it may indicate that an anti-lift switch or lever is present and that the bomb cannot be moved.
If a card is used and can be slid under the bomb, leave it under the bomb and move together with the bomb.
If it is not possible to move the bomb, then it should be surrounded with a single thin sheet of plastic (e. g. trash bag), then with wetted materials, and other blast attenuation materials such as seat cushions and soft carry-on baggage. Move personnel as far away from the bomb location as possible.

– EMERGENCY EQUIPMENTS ..... REMOVE AND STOW

Emergency equipments (PBE, fire extinguisher, ...) located close to the LRBL must be removed and stowed in alternate location.

– GALLEY/IFE POWER ..... OFF

All galley and IFE equipments located close to the LRBL must be switched off.

● **If the bomb can be moved :**

– RH AFT CABIN DOOR SLIDE ..... DISARM



BOMB ON BOARD (CONT'D)

– LEAST RISK BOMB LOCATION (LRBL) . . . . . PREPARE

Build up a platform of solid baggage against the door up to about 25 cm (10 in) below the middle of the door.

On top of this, build up at least 25 cm (10 in) of wetted material such as blankets and pillows.

Place a single thin sheet of plastic (e. g. trash bag) on top of the wetted materials. This prevents any possible short circuit.

CAUTION

DO NOT OMIT THE PLASTIC SHEETS, AS THE SUSPECT DEVICE COULD GET WET AND POSSIBLY SHORT CIRCUIT ELECTRONIC COMPONENTS CAUSING INADVERTENT DEVICE ACTIVATION.

– BOMB INDICATION LINE . . . . . POSITION

Note : A bomb location indicator line is a 6 to 8 foot (1.8 to 2.4 m) (e.g. neckties, headset cord, or belts connected together) preferably of constrating color, that helps the responding bomb squad find the precise location of the suspect device within the LRBL stack once constructed.

Position the bomb indication line from the location on the platform where you will place the suspect device, EXTENDING outward into the aisle.

– BOMB . . . . . MOVE TO LRBL

Carefully carry in the attitude found and place on top of the wetted materials in the same attitude and as close to the door structure as possible.

CAUTION

Ensure that the suspect device, when placed on the stack against the door, is above the slide pack but not against the door handle, and if possible, avoid placement in the view port.

– LEAST RISK BOMB LOCATION (LRBL) . . . . . COMPLETE

Place an additional single thin sheet of plastic over the bomb.

CAUTION

DO NOT OMIT THE PLASTIC SHEETS, AS THE SUSPECT DEVICE COULD GET WET AND POSSIBLY SHORT CIRCUIT ELECTRONIC COMPONENTS CAUSING INADVERTENT DEVICE ACTIVATION.



BOMB ON BOARD (CONT'D)

Build up at 25 cm (10 in) of wetted material around the sides and on top of the bomb.

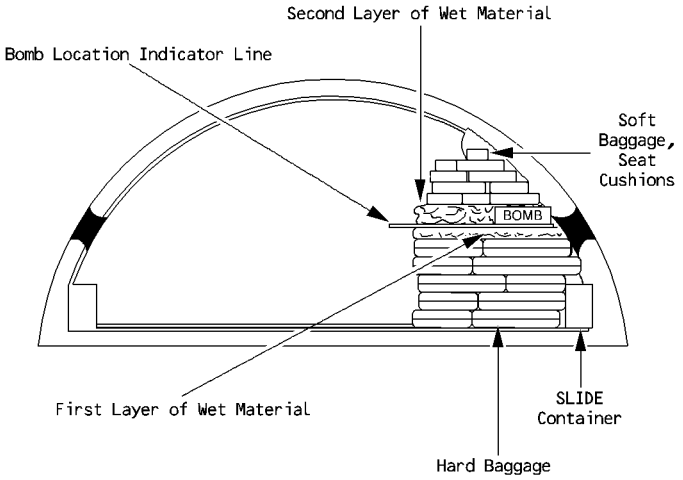
DO NOT PLACE ANYTHING BETWEEN THE BOMB AND THE DOOR, AND MINIMIZE AIRSPACE AROUND THE BOMB.

The idea is to build up a protective surrounding of the bomb so that the explosive force is directed in the only unprotected area into the door structure.

Fill the area around the bomb with seat cushions and other soft materials such as hand luggage (saturated with water or any other nonflammable liquid) up to the cabin ceiling, compressing as much as possible. Secure the LRBL stack in place using belt, ties or other appropriate materials. The more material stacked around the bomb, the less the damage will be.

USE ONLY SOFT MATERIAL. AVOID USING MATERIALS CONTAINING ANY INFLAMMABLE LIQUID AND ANY METAL OBJECTS WHICH COULD BECOME DANGEROUS PROJECTILES.

LRBL STACK



NFC5-03-0280-012BA001AA

BOMB ON BOARD (CONT'D)

– PASSENGERS . . . . . MOVE/ADVISE

Move passengers at least 4 seat rows away from the least risk bomb location (RH aft cabin door). On full flights, it may be necessary to double up passengers to achieve standoff from the suspect device.

Passengers near the bomb should protect their heads with pillows, blankets. All passengers must remain seated with seatbelts on and, if possible, head below the top of the head rest. Seat backs and tray tables must be in their full upright position.

– CABIN CREW . . . . . NOTIFY COCKPIT CREW

Cabin crew notify the flight crew that the bomb is secured at the LRBL.

– EVACUATION/DISEMBARKATION . . . . . EXECUTE

Evacuate through normal and emergency exits on the opposite side of the "bomb" location. Do not use the door just opposite the "bomb".

Use all available airport facilities to disembark without delay.

VOLCANIC ASH ENCOUNTER

Accomplish the following while making a 180 degrees turn:

– ATC ..... NOTIFY

– A/THR ..... OFF

This prevents the autothrust from generating thrust variations.

– THRUST (conditions permitting) ..... DECREASE

So as to reduce ash ingestion.

If altitude permits, reduce thrust to idle. This maximizes engine surge margin and lowers engine turbine temperature.

– CREW OXYGEN MASKS ..... ON/100 %

– CABIN CREW ..... NOTIFY

– PASSENGER OXYGEN ..... AS RQRD

Depending on contamination.

– ENG ANTI ICE ..... ON

– WING ANTI ICE ..... ON

– PACK FLOW ..... HI

– APU ..... START

If possible, start the APU and have it ready for an assisted engine relight in the event of an engine flame-out. Refer to APU limitations (refer to 3.01.49).

– ENGINE PARAMETERS ..... MONITOR

Monitor particularly EGT. If EGT exceeds limits, it may become necessary to consider a precautionary engine shutdown and engine restart in flight.

– AIRSPEED INDICATIONS ..... MONITOR

R *If airspeed is unreliable or lost, use the UNRELIABLE SPEED INDICATION/ADR CHECK*
R *PROC procedure.*

Note : · If both engines flame out and speed indications are lost, use the DUAL ENGINE FAILURE procedure to get the required pitch attitude for the optimum relight speed.

· In case of engine failure, switch off the wing anti ice before engine restart.

COCKPIT WINDSHIELD/WINDOW CRACKED

In case of a one ply failure, whichever one it may be, the windshield is still able to sustain the maximum differential pressure. However, because the pilot is unable to accurately determine how many plies have failed, the differential pressure must be reduced to 5 PSI by applying the following procedure :

MAX FL 230

The maximum flight level is restricted to FL230 to obtain △P 5 PSI, without resulting in an excessive cabin altitude and corresponding EXCESS CAB ALT warning.

The following procedure, allows maintaining △P 5 PSI in manual cabin pressure mode.

– CAB PRESS MODE SEL . . . . . MAN

– MAN V/S CTL . . . . . AS RQRD

Set the cabin altitude, according to the table below :

△P = 5 PSI	FL	100	150	200	230
	CABIN ALTITUDE	0	3 000	6 000	8 000

● **When starting the final descent :**

– CAB PRESS MODE SEL . . . . . AUTO

COCKPIT WINDSHIELD/WINDOW ARCING

– Affected WINDOW/WINSHIELD ANTI ICE C/B . . . . . PULL

In case of electrical arcing, pull the circuit breaker of the affected window/windshield heating system on the rear C/B panel :

R *. ANTI ICE L WHSLD (AF10 on 123VU) . ANTI ICE/WINDOWS L C/B (X14 on 122VU)*

R *. ANTI ICE R WHSLD (AF03 on 123VU) . ANTI ICE/WINDOWS R C/B (W14 on 122VU)*

VOLCANIC ASH ENCOUNTER

Accomplish the following, while making a 180 degree turn:

– ATC ..... NOTIFY

– A/THR ..... OFF

This prevents the autothrust from generating thrust variations.

– THRUST (conditions permitting) ..... DECREASE

So as to reduce ash ingestion.

If altitude permits, reduce thrust to idle. This maximizes engine surge margin and lowers engine turbine temperature.

– CREW OXYGEN MASKS ..... ON/100 %

– CABIN CREW ..... NOTIFY

– PASSENGER OXYGEN ..... AS REQUIRED

Depending on contamination.

– ENG ANTI ICE ..... ON

– WING ANTI ICE ..... ON

– HI FLOW ..... ON

– APU ..... START

If possible, start the APU and have it ready for an assisted engine relight, in the event of an engine flame-out. Refer to APU limitations (refer to 3.01.49).

– ENGINE PARAMETERS ..... MONITOR

Monitor particularly EGT. If EGT exceeds limits, it may become necessary to consider a precautionary engine shutdown and engine restart in flight.

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In case of a one ply failure, whichever one it may be, the windshield is still able to sustain the maximum differential pressure. However, because the pilot is unable to accurately determine how many plies have failed, the differential pressure must be reduced to 5 PSI by applying the following procedure :

MAX FL 230

The maximum flight level is restricted to FL230 to obtain △P 5 PSI, without resulting in an excessive cabin altitude and corresponding EXCESS CAB ALT warning.

The following procedure, allows maintaining △P 5 PSI in manual cabin pressure mode.

– CAB PRESS MODE SEL . . . . . MAN

– MAN V/S CTL . . . . . AS RQRD

Set the cabin altitude, according to the table below :

△P = 5 PSI	FL	100	150	200	230
	CABIN ALTITUDE	0	3 000	6 000	8 000

● **When starting the final descent :**

– CAB PRESS MODE SEL . . . . . AUTO

COCKPIT WINDSHIELD/WINDOW ARCING

– Affected WINDOW/WINSHIELD ANTI ICE C/B . . . . . PULL

In case of electrical arcing, pull the circuit breaker of the affected window/windshield heating system on the rear C/B panel :

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R *. ANTI ICE R WHSLD (AF03 on 123VU) . ANTI ICE/WINDOWS R C/B (W14 on 122VU)*

R ECAM ADVISORY CONDITIONS

SYSTEM	CONDITIONS	RECOMMENDED ACTION
CAB PRESS	CAB VERTICAL SPEED V/S > 1800 ft/min	CPC changeover may be attempted : MODE SEL . . . . . MAN Wait 10 seconds then : MODE SEL . . . . . .AUTO
	CAB ALTITUDE altitude ≥ 8800 ft	MODE SEL . . . . . MAN Manual pressure control
	CAB DIFF PRESS △P ≥ 1.5 psi in phase 7	LDG ELEV . . . . . MAN ADJUST If unsuccessful : MODE SEL . . . . . MAN Manual pressure control
ELEC	IDG OIL TEMP T ≥ 147°C	Reduce IDG load if possible (GALLEY or GEN OFF). If required, restore when temperature has dropped. Restrict use of generator to short time, if temperature rises again excessively.
FUEL	Difference between wing fuel quantities greater than 1500 kg (3307 lb)	FUEL MANAGEMENT. . . . . CHECK If a fuel leak is suspected, refer to FUEL LEAK procedure. For limitations, see 3.01.28.
	Fuel temp greater than 45°C in inner cell or 55° in outer cell	GALLEY . . . . . OFF
	Fuel temp lower than – 40°C in inner or outer cell	Consider descending to a lower altitude and/or increasing Mach to increase TAT.
APU	FLAP OPEN Flap not fully closed when APU master switch is at off.	
	EGT > EGT MAX – 33°C (inhibited during APU start)	
	OIL QTY (message LOW OIL LEVEL pulsing)	If there is no oil leak, then the remaining oil quantity allows normal APU operation for about 10 hours.

R ECAM ADVISORY CONDITIONS

SYSTEM	CONDITIONS	RECOMMENDED ACTION
ENG	OIL PRESS P < 80 PSI	· If the oil pressure is between 80 and 60 psi, continue normal engine operation. · If the oil pressure is below 60 psi (red indication) without the ENG OIL LO PR warning, continue normal engine operation (it can be assumed that the oil pressure transducer is faulty). In both cases, monitor other engine parameters, particularly oil temperature and oil quantity.
	OIL PRESS P > 390 PSI	Closely monitor other engine parameters for symptoms of engine malfunction. If a high oil pressure is not accompanied by other abnormal indications, operate the engine normally for the remainder of the flight. Record high oil pressure, and corresponding N2 readings, for maintenance action.
	OIL TEMP T > 155 deg. C	An increase in oil temperature during normal, steady-state operation indicates a system malfunction and should be closely monitored for other symptoms of engine malfunction. *Note : If the OIL TEMP increase thrust reduction : Increasing thrust may decrease oil temperature.* In addition, an increase in oil temperature could be related to the IDG oil cooling system. To decrease oil temperature, before limits are reached, the following are recommended : 1. Low Speed : Increase engine speed to increase fuel flow and cool IDG oil. 2. High Speed : Reduce generator load, or turn off generator. If the oil temperature continues to increase, mechanically disconnect IDG.
	OIL QTY < 5 qt	If the quantity of oil is low at a high power setting, expect level increase after power reduction.
	NAC TEMP ≥ 320 deg. C	Monitor engine parameters and crosscheck with the other engine.
	VIBRATION N1 ≥ 5 units N2 ≥ 5 units	Refer to HIGH ENGINE VIBRATION procedure.

ECAM ADVISORY CONDITIONS

SYSTEM	CONDITIONS	RECOMMENDED ACTION
CAB PRESS	CAB VERTICAL SPEED V/S > 1800 ft/min	CPC changeover may be attempted : MODE SEL . . . . . MAN Wait 10 seconds, then : MODE SEL . . . . . .AUTO
	CAB ALTITUDE altitude ≥ 8800 ft	MODE SEL . . . . . MAN Manual pressure control
	CAB DIFF PRESS △P ≥ 1.5 psi in phase 7	LDG ELEV . . . . . MAN ADJUST If unsuccessful : MODE SEL . . . . . MAN Manual pressure control
ELEC	IDG OIL TEMP T ≥ 147°C	Reduce IDG load, if possible (GALLEY or GEN OFF). If required, restore when the temperature has dropped. Restrict generator use to a short time, if temperature rises again excessively.
FUEL	Difference between wing fuel quantities is greater than 1500 kg (3307 lb).	FUEL MANAGEMENT. . . . . CHECK If a fuel leak is suspected, refer to the FUEL LEAK procedure. For limitations, see 3.01.28.
	Fuel temp is greater than : 45°C in inner cell, or 55° in outer cell.	GALLEY . . . . . OFF
	Fuel temp is lower than – 40°C in inner or outer cell.	Consider descending to a lower altitude, and/or increasing Mach to increase TAT.
OXY	Cockpit oxygen bottle pressure < 600 psi.	If mask is not being used, check if it is correctly stowed, as per FCOM 1.35.20.
APU	FLAP OPEN Flap not fully closed, when APU master switch is off.	
	EGT > EGT MAX – 33°C (inhibited during APU start).	
	OIL QTY (LOW OIL LEVEL message pulses).	If there is no oil leak, then the remaining oil quantity allows normal APU operation for about 10 hours.

ECAM ADVISORY CONDITIONS

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CAB PRESS	CAB VERTICAL SPEED V/S > 1800 ft/min	CPC changeover may be attempted : MODE SEL . . . . . MAN Wait 10 seconds, then : MODE SEL . . . . . .AUTO
	CAB ALTITUDE altitude ≥ 8800 ft	MODE SEL . . . . . MAN Manual pressure control
	CAB DIFF PRESS △P ≥ 1.5 psi in phase 7	LDG ELEV . . . . . MAN ADJUST If unsuccessful : MODE SEL . . . . . MAN Manual pressure control
ELEC	IDG OIL TEMP T ≥ 147°C	Reduce IDG load, if possible (GALLEY or GEN OFF). If required, restore when the temperature has dropped. Restrict generator use to a short time, if temperature rises again excessively.
FUEL	Difference between wing fuel quantities is greater than 1500 kg (3307 lb).	FUEL MANAGEMENT. . . . . CHECK If a fuel leak is suspected, refer to the FUEL LEAK procedure. For limitations, see 3.01.28.
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OXY	Cockpit oxygen bottle pressure < 600 psi.	If mask is not being used, check if it is correctly stowed, as per FCOM 1.35.20.
APU	FLAP OPEN Flap not fully closed, when APU master switch is off.	
	EGT > EGT MAX – 33°C (inhibited during APU start).	
	OIL QTY (LOW OIL LEVEL message pulses).	If there is no oil leak, then the remaining oil quantity allows normal APU operation for about 10 hours.

R ECAM ADVISORY CONDITIONS

SYSTEM	CONDITIONS	RECOMMENDED ACTION
ENG	OIL PRESS P < 80 PSI	· If the oil pressure is between 80 and 60 psi, continue normal engine operation. · If the oil pressure is below 60 psi (red indication) without the ENG OIL LO PR warning, continue normal engine operation (it can be assumed that the oil pressure transducer is faulty). In both cases, monitor other engine parameters, particularly oil temperature and oil quantity.
	OIL PRESS P > 390 PSI	Closely monitor other engine parameters for symptoms of engine malfunction. If a high oil pressure is not accompanied by other abnormal indications, operate the engine normally for the remainder of the flight. Record high oil pressure, and corresponding N2 readings, for maintenance action.
	OIL TEMP T > 155 deg. C	An increase in oil temperature during normal, steady-state operation indicates a system malfunction and should be closely monitored for other symptoms of engine malfunction. *Note : If the OIL TEMP increase thrust reduction : Increasing thrust may decrease oil temperature.* In addition, an increase in oil temperature could be related to the IDG oil cooling system. To decrease oil temperature, before limits are reached, the following are recommended : 1. Low Speed : Increase engine speed to increase fuel flow and cool IDG oil. 2. High Speed : Reduce generator load, or turn off generator. If the oil temperature continues to increase, mechanically disconnect IDG.
	OIL QTY < 5 qt	If the quantity of oil is low at a high power setting, expect level increase after power reduction.
	NAC TEMP ≥ 320 deg. C	Monitor engine parameters and crosscheck with the other engine.
	VIBRATION N1 ≥ 5 units N2 ≥ 5 units	Refer to HIGH ENGINE VIBRATION procedure.

R

LDG CONF/APPR SPD/LDG DIST FOLLOWING FAILURES

A320 FAMILY	FAILURE		FLAPS LEVER POSITION FOR LDG	△ VREF APPR SPD INCREMENT	MULTIPLY LDG DIST (CONF FULL) BY		
					DRY	WET (b)	CONTA (b)
ELEC	AC BUS 1		Norm (a)	–	1.20	1.20	1.10
	DC BUS 2		Norm (a)	–	1.25	1.35	1.25
	DC ESS BUS (if no Ice accretion)		Norm (a)	–	1.20	1.25	1.20
	DC ESS BUS (if Ice accretion)		Norm (a)	10	1.35	1.40	1.30
	DC EMER CONF		Norm (a)	–	3.05	2.55	2.25
	DC BUS 1+2 (if no Ice accretion)		Norm (a)	–	1.95	1.65	1.45
	DC BUS 1+2 (if Ice accretion)		Norm (a)	10	2.20	1.85	1.65
	EMER ELEC CONF		3	10	2.65	2.30	2.15
FTL CTL	ONE SPLR FAULT		Norm (a)	–	1.20	1.20	1.10
	TWO SPLR FAULT		Norm (a)	–	1.25	1.25	1.15
	THREE SPLR FAULT		Norm (a)	–	1.30	1.25	1.20
	ALL SPLR FAULT		Norm (a)	–	1.50	1.50	1.40
	SEC 1 or SEC 3 FAULT		Norm (a)	–	1.25	1.25	1.15
	SEC 2 FAULT		Norm (a)	–	1.20	1.20	1.10
	SEC 2+3 FAULT		Norm (a)	–	1.25	1.25	1.15
	SEC 1+3 FAULT		Norm (a)	–	1.35	1.45	1.40
	SEC 1+2 FAULT		Norm (a)	–	1.25	1.30	1.25
	SEC 1+2+3 FAULT		3	10	1.60	2.20	2.25
	ALTN LAW/DIRECT LAW/ELAC 1+2/L+R ELEV FAULT/L(R) ELEV FAULT/STAB JAM		3	10	1.35*	1.30*	1.25*
FLAPS/ SLATS	FLAPS and SLATS at zero		1	60 (APPR) 50 (THRESHOLD)	2.40*	2.10*	2.10*
	FLAPS <1	S<1	3	45	2.30*	2.00*	2.00*
		S≥1	3	25	1.95*	1.60*	1.60*
	1≤FLAPS<2	S<1	3	30	1.85*	1.70*	1.60*
		S≥1	3	15	1.50*	1.45*	1.35*
	2≤FLAPS<3	S<1	3	25	1.70*	1.55*	1.50*
		S≥1	3	10	1.40*	1.35*	1.25*
	FLAPS = 3	S<1	3	25	1.65*	1.55*	1.50*
		1≤S≤3	3	10	1.35*	1.30*	1.25*
		S>3	3	5	1.30*	1.25*	1.20*
	FLAPS > 3	S<1	NOT ALLOWED				
		1≤S≤3	FULL	10	1.30*	1.30*	1.20*
		S>3	FULL	5	1.25*	1.25*	1.15*
HYD	GREEN		Norm (a)	–	1.30	1.35	1.30
	BLUE		Norm (a)	–	1.20	1.20	1.10
	YELLOW		Norm (a)	–	1.25	1.30	1.20
	GREEN + BLUE		3	25	1.80	2.00	1.95
	GREEN + YELLOW		3	25	2.80	2.45	2.45
	BLUE + YELLOW		Norm (a)	–	1.70	1.90	1.85

(a) If "CONF 3" is used when "NORM" is indicated in the table, add 6 knots to the VREF and multiply the resulting landing distance by an additional factor of 1.10.

(b) The landing distance coefficients for wet or contaminated runways assume the use of maximum reverse thrust on all of the operative reversers. Apply these coefficients to the actual landing distance with reversers.

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A320 FAMILY	FAILURE	FLAPS LEVER POSITION FOR LDG	△ VREF APPR SPD INCREMENT	MULTIPLY LDG DIST (CONF FULL) BY		
				DRY	WET (b)	CONTA (b)
BRK	ANTI SKID	Norm (a)	–	1.75	1.30	1.10
	AUTO BRK FAULT	Norm (a)	–	1.40	1.25	1.20
NAV	IR 1+2+3 FAULT	3	10	2.60	2.10	1.70
	UNRELIABLE SPEED INDICATION/ADR CHECK PROC	3	15	1.45*	1.4*	1.3*
	DUAL IR FAULT/DUAL ADR FAULT ADR 1+2+3 FAULT	3	10	1.35*	1.30*	1.25*
BLEED	WING ANTI ICE NOT AVAIL (if Ice Accretion)	Norm (a)	10	1.30	1.30	1.20
ENG	REV UNLOCK with buffet	1**	55 (APPR) 40 (THRESHOLD)	2.15*	2.05*	2.05*
	REV UNLOCK with buffet	3**	10	1.35*	1.40*	1.35*

(a) If “CONF 3” is used when “NORM” is indicated in the table, add 6 knots to the VREF and multiply the resulting landing distance by an additional factor of 1.10.

(b) The landing distance coefficients for wet or contaminated runways assume the use of maximum reverse thrust on all of the operative reversers. Apply these coefficients to the actual landing distance with reversers.

* See below for multiple failures

** The applicable landing configuration (CONF 1 or CONF 3) is displayed on the ECAM STATUS page.

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LDG CONF/APPR SPD/LDG DIST FOLLOWING FAILURES

A320 FAMILY	FAILURE		FLAPS LEVER POSITION FOR LDG	△ VREF APPR SPD INCREMENT	MULTIPLY LDG DIST (CONF FULL) BY		
					DRY	WET (b)	CONTA (b)
ELEC	DC BUS 2		Norm (a)	–	1.30	1.35	1.30
	DC ESS BUS (if no Ice accretion)/AC BUS 1		Norm (a)	–	1.20	1.25	1.20
	DC ESS BUS (if Ice accretion)		Norm (a)	10	1.35	1.40	1.35
	DC EMER CONF		Norm (a)	–	3.00	2.40	2.15
	DC BUS 1+2 (if no Ice accretion)		Norm (a)	–	2.05	1.65	1.50
	DC BUS 1+2 (if Ice accretion)		Norm (a)	10	2.30	1.85	1.70
	EMER ELEC CONF		3	10	2.85	2.35	2.25
FTL CTL	ONE SPLR FAULT		Norm (a)	–	1.25	1.20	1.15
	TWO SPLR FAULT		Norm (a)	–	1.30	1.25	1.20
	THREE SPLR FAULT		Norm (a)	–	1.35	1.30	1.25
	ALL SPLR FAULT		Norm (a)	–	1.50	1.50	1.40
	SEC 1 or SEC 3 FAULT		Norm (a)	–	1.30	1.25	1.20
	SEC 2 FAULT		Norm (a)	–	1.20	1.20	1.15
	SEC 2+3 FAULT		Norm (a)	–	1.30	1.30	1.20
	SEC 1+3 FAULT		Norm (a)	–	1.40	1.45	1.40
	SEC 1+2 FAULT		Norm (a)	–	1.30	1.30	1.30
	SEC 1+2+3 FAULT		3	10	1.60	2.05	2.20
	L (R) ELEV FAULT		3	15	1.45*	1.40*	1.35*
	ALTN LAW/DIRECT LAW/ELAC 1+2/L+R ELEV FAULT/STAB JAM		3	10	1.35*	1.35*	1.30*
FLAPS/ SLATS	FLAPS and SLATS at zero		1	60 (APPR) 50 (THRESHOLD)	2.20*	2.15*	2.20*
	FLAPS <1	S<1	3	45	2.10*	2.05*	2.10*
		S≥1	3	25	1.65*	1.65*	1.60*
	1≤FLAPS<2	S<1	3	30	1.70*	1.70*	1.65*
		S≥1	3	15	1.45*	1.45*	1.40*
	2≤FLAPS<3	S<1	3	25	1.60*	1.60*	1.55*
		S≥1	3	10	1.40*	1.35*	1.30*
	FLAPS = 3	S<1	3	25	1.60*	1.60*	1.50*
		1≤S≤3	3	10	1.35*	1.35*	1.30*
		S>3	3	5	1.30*	1.25*	1.20*
	FLAPS > 3	S<1	NOT ALLOWED				
		1≤S≤3	FULL	10	1.35*	1.30*	1.25*
		S>3	FULL	5	1.25*	1.25*	1.15*
HYD	GREEN		Norm (a)	–	1.35	1.35	1.30
	BLUE		Norm (a)	–	1.20	1.20	1.15
	YELLOW		Norm (a)	–	1.25	1.30	1.25
	GREEN + BLUE		3	25	1.80	2.05	2.00
	GREEN + YELLOW		3	25	2.80	2.35	2.40
	BLUE + YELLOW		Norm (a)	–	1.75	1.90	1.85

(a) If "CONF 3" is used when "NORM" is indicated in the table, add 10 knots to the VREF and multiply the resulting landing distance by an additional factor of 1.15.

(b) The landing distance coefficients for wet or contaminated runways assume the use of maximum reverse thrust on all of the operative reversers. Apply these coefficients to the actual landing distance with reversers.

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A320 FAMILY	FAILURE	FLAPS LEVER POSITION FOR LDG	△ VREF APPR SPD INCREMENT	MULTIPLY LDG DIST (CONF FULL) BY		
				DRY	WET (b)	CONTA (b)
BRK	ANTI SKID	Norm (a)	–	1.80	1.30	1.15
	AUTO BRK FAULT	Norm (a)	–	1.40	1.30	1.25
NAV	IR 1+2+3 FAULT	3	10	2.55	1.95	1.55
	UNRELIABLE SPEED INDICATION/ADR CHECK PROC	3	15	1.5*	1.4*	1.35*
	DUAL IR FAULT/DUAL ADR FAULT ADR 1+2+3 FAULT	3	10	1.35*	1.35*	1.30*
BLEED	WING ANTI ICE NOT AVAIL (if Ice Accretion)	Norm (a)	10	1.35	1.30	1.25
ENG	REV UNLOCK with buffet	1**	55 (APPR) 40 (THRESHOLD)	1.90*	2.05*	2.10*
	REV UNLOCK with buffet	3**	10	1.35*	1.40*	1.40*

(a) If “CONF 3” is used when “NORM” is indicated in the table, add 10 knots to the VREF and multiply the resulting landing distance by an additional factor of 1.15.

(b) The landing distance coefficients for wet or contaminated runways assume the use of maximum reverse thrust on all of the operative reversers. Apply these coefficients to the actual landing distance with reversers.

* See below for multiple failures

** The applicable landing configuration (CONF 1 or CONF 3) is displayed on the ECAM STATUS page.

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LDG CONF/APPR SPD/LDG DIST FOLLOWING FAILURES

A320 FAMILY	FAILURE		FLAPS LEVER POSITION FOR LDG	△ VREF APPR SPD INCREMENT	MULTIPLY LDG DIST (CONF FULL) BY		
					DRY	WET (b)	CONTA (b)
ELEC	DC BUS 2		Norm (a)	–	1.30	1.35	1.30
	DC ESS BUS (if no Ice accretion)/AC BUS 1		Norm (a)	–	1.20	1.25	1.20
	DC ESS BUS (if Ice accretion)		Norm (a)	10	1.35	1.40	1.35
	DC EMER CONF		Norm (a)	–	3.00	2.40	2.15
	DC BUS 1+2 (if no Ice accretion)		Norm (a)	–	2.05	1.65	1.50
	DC BUS 1+2 (if Ice accretion)		Norm (a)	10	2.30	1.85	1.70
	EMER ELEC CONF		3	10	2.85	2.35	2.25
FTL CTL	ONE SPLR FAULT		Norm (a)	–	1.25	1.20	1.15
	TWO SPLR FAULT		Norm (a)	–	1.30	1.25	1.20
	THREE SPLR FAULT		Norm (a)	–	1.35	1.30	1.25
	ALL SPLR FAULT		Norm (a)	–	1.50	1.50	1.40
	SEC 1 or SEC 3 FAULT		Norm (a)	–	1.30	1.25	1.20
	SEC 2 FAULT		Norm (a)	–	1.20	1.20	1.15
	SEC 2+3 FAULT		Norm (a)	–	1.30	1.30	1.20
	SEC 1+3 FAULT		Norm (a)	–	1.40	1.45	1.40
	SEC 1+2 FAULT		Norm (a)	–	1.30	1.30	1.30
	SEC 1+2+3 FAULT		3	10	1.60	2.05	2.20
	L (R) ELEV FAULT		3	15	1.45*	1.40*	1.35*
	ALTN LAW/DIRECT LAW/ELAC 1+2/L+R ELEV FAULT/STAB JAM		3	10	1.35*	1.35*	1.30*
FLAPS/ SLATS	FLAPS and SLATS at zero		1	60 (APPR) 50 (THRESHOLD)	2.20*	2.15*	2.20*
	FLAPS <1	S<1	3	45	2.10*	2.05*	2.10*
		S≥1	3	25	1.65*	1.65*	1.60*
	1≤FLAPS<2	S<1	3	30	1.70*	1.70*	1.65*
		S≥1	3	15	1.45*	1.45*	1.40*
	2≤FLAPS<3	S<1	3	25	1.60*	1.60*	1.55*
		S≥1	3	10	1.40*	1.35*	1.30*
	FLAPS = 3	S<1	3	25	1.60*	1.60*	1.50*
		1≤S≤3	3	10	1.35*	1.35*	1.30*
		S>3	3	5	1.30*	1.25*	1.20*
	FLAPS > 3	S<1	NOT ALLOWED				
		1≤S≤3	FULL	10	1.35*	1.30*	1.25*
		S>3	FULL	5	1.25*	1.25*	1.15*
HYD	GREEN		Norm (a)	–	1.35	1.35	1.30
	BLUE		Norm (a)	–	1.20	1.20	1.15
	YELLOW		Norm (a)	–	1.25	1.30	1.25
	GREEN + BLUE		3	25	1.80	2.05	2.00
	GREEN + YELLOW		3	25	2.80	2.35	2.40
	BLUE + YELLOW		Norm (a)	–	1.75	1.90	1.85

(a) If "CONF 3" is used when "NORM" is indicated in the table, add 10 knots to the VREF and multiply the resulting landing distance by an additional factor of 1.15.

(b) The landing distance coefficients for wet or contaminated runways assume the use of maximum reverse thrust on all of the operative reversers. Apply these coefficients to the actual landing distance with reversers.

R

A320 FAMILY	FAILURE	FLAPS LEVER POSITION FOR LDG	△ VREF APPR SPD INCREMENT	MULTIPLY LDG DIST (CONF FULL) BY		
				DRY	WET (b)	CONTA (b)
BRK	ANTI SKID	Norm (a)	–	1.80	1.30	1.15
	BRK RELEASED	Norm (a)	–	1.40	1.30	1.25
	ALTN L(R) RELEASED (IF NORM BRK FAULT)	Norm (a)	–	2.30	1.85	1.90
	ALTN L(R) RELEASED (if G SYS LO PR)	Norm (a)	–	2.45	2.25	2.70
	NORM BRK FAULT	Norm (a)	–	1.25	1.20	1.15
	NORM + ALTN BRK FAULT	Norm (a)	–	1.80	1.30	1.15
NAV	IR 1+2+3 FAULT	3	10	2.55	1.95	1.55
	UNRELIABLE SPEED INDICATION/ADR CHECK PROC	3	15	1.5*	1.4*	1.35*
	DUAL IR FAULT/DUAL ADR FAULT ADR 1+2+3 FAULT	3	10	1.35*	1.35*	1.30*
BLEED	WING ANTI ICE NOT AVAIL (if Ice Accretion)	Norm (a)	10	1.35	1.30	1.25
ENG	REV UNLOCK with buffet	1**	55 (APPR) 40 (THRESHOLD)	1.90*	2.05*	2.10*
	REV UNLOCK with buffet	3**	10	1.35*	1.40*	1.40*

(a) If “CONF 3” is used when “NORM” is indicated in the table, add 10 knots to the VREF and multiply the resulting landing distance by an additional factor of 1.15.

(b) The landing distance coefficients for wet or contaminated runways assume the use of maximum reverse thrust on all of the operative reversers. Apply these coefficients to the actual landing distance with reversers.

* See below for multiple failures

** The applicable landing configuration (CONF 1 or CONF 3) is displayed on the ECAM STATUS page.

R LDG CONF/APPR SPD/LDG DIST FOLLOWING FAILURES

A320 FAMILY	FAILURE		FLAPS LEVER POSITION FOR LDG	△ VREF APPR SPD INCREMENT	MULTIPLY LDG DIST (CONF FULL) BY		
					DRY	WET (b)	CONTA (b)
ELEC	AC BUS 1		Norm (a)	–	1.20	1.15	1.10
	DC BUS 2		Norm (a)	–	1.35	1.35	1.30
	DC ESS BUS (if no Ice accretion)		Norm (a)	–	1.20	1.20	1.20
	DC ESS BUS (if Ice accretion)		Norm (a)	10	1.35	1.35	1.30
	DC EMER CONF		Norm (a)	–	3.00	2.55	2.30
	DC BUS 1+2 (if no Ice accretion)		Norm (a)	–	1.90	1.55	1.45
	DC BUS 1+2 (if Ice accretion)		Norm (a)	10	2.15	1.75	1.65
	EMER ELEC CONF		3	10	2.90	2.50	2.45
FTL CTL	ONE SPLR FAULT		Norm (a)	–	1.20	1.15	1.10
	TWO SPLR FAULT		Norm (a)	–	1.30	1.25	1.20
	THREE SPLR FAULT		Norm (a)	–	1.35	1.30	1.20
	ALL SPLR FAULT		Norm (a)	–	1.45	1.45	1.35
	SEC 1 or SEC 3 FAULT		Norm (a)	–	1.30	1.25	1.20
	SEC 2 FAULT		Norm (a)	–	1.20	1.15	1.10
	SEC 2+3 FAULT		Norm (a)	–	1.35	1.30	1.20
	SEC 1+2 FAULT		Norm (a)	–	1.30	1.30	1.30
	SEC 1+3 FAULT		Norm (a)	–	1.40	1.45	1.40
	SEC 1+2+3 FAULT		3	10	1.60	2.00	2.15
	L (R) ELEV FAULT		3	15	1.45*	1.40*	1.35*
	ALTN LAW/DIRECT LAW ELAC 1+2/L+R ELEV FAULT/STAB JAM		3	10	1.35*	1.30*	1.25*
FLAPS/ SLATS	FLAPS and SLATS at zero		1	65 (APPR) 55 (THRESHOLD)	2.15*	2.15*	2.20*
	FLAPS <1	S<1	3	45	1.95*	2.00*	2.00*
		S≥1	3	35	1.80*	1.80*	1.80*
	1≤FLAPS<2	S<1	3	40	1.80*	1.80*	1.75*
		S≥1	3	15	1.45*	1.40*	1.35*
	2≤FLAPS<3	S<1	3	30	1.65*	1.65*	1.55*
		S≥1	3	10	1.35*	1.35*	1.30*
	FLAPS = 3	S<1	3	30	1.65*	1.65*	1.55*
		1≤S≤3	3	10	1.35*	1.30*	1.25*
		S>3	3	5	1.30*	1.25*	1.20*
	FLAPS > 3	S<1	NOT ALLOWED				
		1≤S≤3	FULL	10	1.35*	1.30*	1.20*
		S>3	FULL	5	1.25*	1.20*	1.15*
HYD	GREEN		Norm (a)	–	1.35	1.35	1.30
	BLUE		Norm (a)	–	1.20	1.15	1.10
	YELLOW		Norm (a)	–	1.25	1.25	1.25
	GREEN + BLUE		3	30	1.85	2.05	2.00
	GREEN + YELLOW		3	35	2.85	2.50	2.65
	BLUE + YELLOW		Norm (a)	–	1.80	1.95	1.80

R (a) If "CONF 3" is used when "NORM" is indicated in the table, add 10 knots to the VREF and multiply the resulting landing distance by an additional factor of 1.15.

R (b) The landing distance coefficients for wet or contaminated runways assume the use of maximum reverse thrust on all of the operative reversers. Apply these coefficients to the actual landing distance with reversers.

R

A320 FAMILY	FAILURE	FLAPS LEVER POSITION FOR LDG	△ VREF APPR SPD INCREMENT	MULTIPLY LDG DIST (CONF FULL) BY		
				DRY	WET (b)	CONTA (b)
BRK	ANTI SKID	Norm (a)	–	1.70	1.25	1.10
	BRK RELEASED	Norm (a)	–	1.35	1.25	1.20
	ALTN L(R) RELEASED (IF NORM BRK FAULT)	Norm (a)	–	2.35	1.85	1.90
	ALTN L(R) RELEASED (if G SYS LO PR)	Norm (a)	–	2.50	2.25	2.70
	NORM BRK FAULT	Norm (a)	–	1.25	1.20	1.15
	NORM + ALTN BRK FAULT	Norm (a)	–	1.70	1.25	1.10
NAV	IR 1+2+3 FAULT	3	10	2.55	1.95	1.50
	UNRELIABLE SPEED INDICATION/ADR CHECK PROC	3	15	1.5*	1.45*	1.35*
	DUAL IR FAULT/DUAL ADR FAULT ADR 1+2+3 FAULT	3	10	1.35*	1.30*	1.25*
BLEED	WING ANTI ICE NOT AVAIL (if Ice Accretion)	Norm (a)	10	1.35	1.30	1.20
ENG	REV UNLOCK with buffet	1**	55 (APPR) 40 (THRESHOLD)	1.85*	2.00*	2.05*
	REV UNLOCK with buffet	3**	10	1.35*	1.40*	1.35*

(a) If “CONF 3” is used when “NORM” is indicated in the table, add 10 knots to the VREF and multiply the resulting landing distance by an additional factor of 1.15.

(b) The landing distance coefficients for wet or contaminated runways assume the use of maximum reverse thrust on all of the operative reversers. Apply these coefficients to the actual landing distance with reversers.

* See below for multiple failures

** The applicable landing configuration (CONF 1 or CONF 3) is displayed on the ECAM STATUS page.

USE OF THE TABLE (PREVIOUS PAGES)

- *△ VREF values take into account the necessary corrections, due to failures and the required landing configuration. The △ VREF values are rounded off to take into account all possible weight ranges.*
  LDG DIST factors must be applied to the actual "LANDING DISTANCE WITHOUT AUTOBRAKE-CONFIGURATION FULL" (Refer to QRH 4.03).
- *For a single failure :*
  - *Determine the LDG CONF to be selected*
  - *Determine the △ VREF*
  - *VAPP = VREF + △ VREF + WIND CORRECTION (Refer to QRH 2.31).*
  - *Determine the LDG DIST factor.*
- *For multiple failures :*
  - *Only combine PRIMARY or SINGLE failures. In the case of a PRIMARY failure, the associated effects of SECONDARY(s) failure are taken into account by the △ VREF and LDG DIST factor computation.*
  - *Use the lowest LDG CONF*
  - *Use the highest △ VREF to compute the VAPP.*
  - *Multiply the applicable LDG DIST factors together, unless all values are marked with an asterisk (*). If all values are marked with an asterisk, use the highest LDG DIST factor.*
  - *Examples Applicable to Dry Runways :*

FLAPS FAULT (F < 3, S ≥ 1)	LDG CONF 3	△ VREF = 10 KT	LDG DIST × 1.40*
BRK ANTI SKID	NORM CONF (1)	△ VREF = 0	LDG DIST × 1.75
TOTAL	LDG CONF 3	△ VREF = 10 KT	LDG DIST × 2.45

VREF = 131 KT → VAPP = 131 + 10 + WIND (10 KT MAX)
= 141 KT + WIND (10 KT MAX)

ALTN LAW	LDG CONF 3	△ VREF = 10 KT	LDG DIST × 1.35*
FLAPS FAULT (F < 1, S ≥ 1)	LDG CONF 3	△ VREF = 25 KT	LDG DIST × 1.95*
TOTAL	LDG CONF 3	△ VREF = 25 KT	LDG DIST × 1.95

VREF = 140 KT → VAPP = 140 + 25 + 0 (No wind correction) = 165 KT

USE OF THE TABLE (PREVIOUS PAGES)

- *△ VREF values take into account the necessary corrections, due to failures and the required landing configuration. The △ VREF values are rounded off to take into account all possible weight ranges.*
  LDG DIST factors must be applied to the actual "LANDING DISTANCE WITHOUT AUTOBRAKE-CONFIGURATION FULL" (Refer to QRH 4.03).
- *For a single failure :*
  - *Determine the LDG CONF to be selected*
  - *Determine the △ VREF*
  - *VAPP = VREF + △ VREF + WIND CORRECTION (Refer to QRH 2.31).*
  - *Determine the LDG DIST factor.*
- *For multiple failures :*
  - *Only combine PRIMARY or SINGLE failures. In the case of a PRIMARY failure, the associated effects of SECONDARY(s) failure are taken into account by the △ VREF and LDG DIST factor computation.*
  - *Use the lowest LDG CONF*
  - *Use the highest △ VREF to compute the VAPP.*
  - *Multiply the applicable LDG DIST factors together, unless all values are marked with an asterisk (*). If all values are marked with an asterisk, use the highest LDG DIST factor.*
  - *Examples Applicable to Dry Runways :*

FLAPS FAULT (F < 3, S ≥ 1)	LDG CONF 3	△ VREF = 10 KT	LDG DIST × 1.40*
BRK ANTI SKID	NORM CONF (1)	△ VREF = 0	LDG DIST × 1.80
TOTAL	LDG CONF 3	△ VREF = 10 KT	LDG DIST × 2.52

VREF = 131 KT → VAPP = 131 + 10 + WIND (10 KT MAX)
= 141 KT + WIND (10 KT MAX)

ALTN LAW	LDG CONF 3	△ VREF = 10 KT	LDG DIST × 1.35*
FLAPS FAULT (F < 1, S ≥ 1)	LDG CONF 3	△ VREF = 25 KT	LDG DIST × 1.65*
TOTAL	LDG CONF 3	△ VREF = 25 KT	LDG DIST × 1.65

VREF = 140 KT → VAPP = 140 + 25 + 0 (No wind correction) = 165 KT

USE OF THE TABLE (PREVIOUS PAGES)

- *△ VREF values take into account the necessary corrections, due to failures and the required landing configuration. The △ VREF values are rounded off to take into account all possible weight ranges.*
  LDG DIST factors must be applied to the actual "LANDING DISTANCE WITHOUT AUTOBRAKE-CONFIGURATION FULL" (Refer to QRH 4.03).
- *For a single failure :*
  - *Determine the LDG CONF to be selected*
  - *Determine the △ VREF*
  - *VAPP = VREF + △ VREF + WIND CORRECTION (Refer to QRH 2.31).*
  - *Determine the LDG DIST factor.*
- *For multiple failures :*
  - *Only combine PRIMARY or SINGLE failures. In the case of a PRIMARY failure, the associated effects of SECONDARY(s) failure are taken into account by the △ VREF and LDG DIST factor computation.*
  - *Use the lowest LDG CONF*
  - *Use the highest △ VREF to compute the VAPP.*
  - *Multiply the applicable LDG DIST factors together, unless all values are marked with an asterisk (*). If all values are marked with an asterisk, use the highest LDG DIST factor.*
  - *Examples Applicable to Dry Runways :*

FLAPS FAULT (F < 3, S ≥ 1)	LDG CONF 3	△ VREF = 10 KT	LDG DIST × 1.35*
BRK ANTI SKID	NORM CONF	△ VREF = 0	LDG DIST × 1.70
TOTAL	LDG CONF 3	△ VREF = 10 KT	LDG DIST × 2.30

VREF = 131 KT → VAPP = 131 + 10 + WIND (10 KT MAX)
= 141 KT + WIND (10 KT MAX)

ALTN LAW	LDG CONF 3	△ VREF = 10 KT	LDG DIST × 1.35*
FLAPS FAULT (F < 1, S ≥ 1)	LDG CONF 3	△ VREF = 35 KT	LDG DIST × 1.80*
TOTAL	LDG CONF 3	△ VREF = 35 KT	LDG DIST × 1.80

VREF = 140 KT → VAPP = 140 + 35 + 0 (No wind correction) = 175 KT

WINDSHEAR

A red flag "WINDSHEAR" is displayed on each PFD associated with an aural synthetic voice "WINDSHEAR" repeated three times.

If windshear is detected either by the system or by pilot observation, apply the following recovery technique:

■ **At takeoff**

● **If before V1**

The takeoff should be rejected only if significant airspeed variations occur below indicated V1 and the pilot decides that there is sufficient runway remaining to stop the airplane.

● **If after V1**

– THR LEVERS ..... TOGA
– REACHING VR ..... ROTATE
– SRS ORDERS ..... FOLLOW

■ **Airborne, initial climb or landing**

– THR LEVERS AT TOGA ..... SET OR CONFIRM
– AP (if engaged) ..... KEEP
– SRS ORDERS ..... FOLLOW

This includes the use of full back stick, if demanded.

Note : 1. If engaged, the autopilot disengages when α is greater than α prot.

R *2. If the FD bars are not available, use an initial pitch attitude up to 17.5° with*
R *full backstick, if necessary. If needed, to minimize the loss of height, increase this pitch attitude.*

– DO NOT CHANGE CONFIGURATION (SLATS/FLAPS, GEAR) UNTIL OUT OF SHEAR.
– CLOSELY MONITOR FLIGHT PATH AND SPEED.
– RECOVER SMOOTHLY TO NORMAL CLIMB OUT OF SHEAR.

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A red flag "WINDSHEAR" is displayed on each PFD associated with an aural synthetic voice "WINDSHEAR" repeated three times.

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■ **At takeoff**

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● **If after V1**

– THR LEVERS ..... TOGA
– REACHING VR ..... ROTATE
– SRS ORDERS ..... FOLLOW

■ **Airborne, initial climb or landing**

– THR LEVERS AT TOGA ..... SET OR CONFIRM
– AP (if engaged) ..... KEEP
– SRS ORDERS ..... FOLLOW

This includes the use of full back stick, if demanded.

Note : 1. If engaged, the autopilot disengages when α is greater than α prot.

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R *full backstick, if necessary. If needed, to minimize the loss of height, increase this pitch attitude.*

– DO NOT CHANGE CONFIGURATION (SLATS/FLAPS, GEAR) UNTIL OUT OF SHEAR.
– CLOSELY MONITOR FLIGHT PATH AND SPEED.
– RECOVER SMOOTHLY TO NORMAL CLIMB OUT OF SHEAR.

WINDSHEAR AHEAD

The "W/S AHEAD" message is displayed on each PFD. The color of the message depends on the severity and location of the windshear.

W/S AHEAD red

■ Takeoff

Associated with an aural synthetic voice "WINDSHEAR AHEAD, WINDSHEAR AHEAD".

- **Before takeoff**
  - Delay takeoff, or select the most favorable runway.
- **During the takeoff run**
  - Reject takeoff.

    Note : Predictive windshear alerts are inhibited above 100 knots until 50 feet.
- **When airborne**
  - THR LEVERS ..... TOGA

    As usual, the slat/flap configuration can be changed, provided the windshear is not entered.
  - SRS ORDERS ..... FOLLOW

    Note : If engaged, the autopilot disengages when α is greater than α prot.

■ Landing

Associated with an aural synthetic voice "GO AROUND, WINDSHEAR AHEAD".

Note : If a positive verification is made that no hazard exists, the warning may be considered cautionary.

- THR LEVERS ..... TOGA
- ANNOUNCE ..... "GO AROUND-FLAPS"
- FLAPS ..... RETRACT ONE STEP
- L/G UP ..... SELECT

This includes the use of full backstick, if demanded.

Note : 1. If engaged, the autopilot disengages when α is greater than α prot.

2. If the FD is not available, use a pitch initial attitude up to 17.5°. If necessary to minimize the loss of height, increase this pitch attitude.

W/S AHEAD amber

Apply precautionary measures, as indicated in the SUPPLEMENTARY TECHNIQUES 3.04.91.

TAILSTRIKE

In the event of a tailstrike, apply the following procedure :

LAND ASAP

– MAX FL ..... 100 or MSA

500 feet/minute should be targeted for the climb, to minimize pressure changes, and for passenger and crew comfort. Similarly, the rate of descent must be limited to about 1000 feet/minute, except for the final approach that must be performed normally.
Notify the ATC of the aircraft's rate of climb.

– RAM AIR ..... ON

– PACK 1 and 2 ..... OFF

GENERAL

A successful outcome for an emergency situation depends, first of all, upon each crew member's perfect knowledge and execution of the duties assigned to him.
The captain should check frequently that all crew members know exactly their assigned positions and their specific duties, as well as the duties of the other crew members, in case of an abnormal or an emergency condition.
Since it is not possible to cover all the situations that may occur, the captain will be responsible for adapting the following instructions to obtain the best coordination of the emergency operation. Should it be physically impossible for the captain to carry out his duties, another crew member will substitute for him according to the chain of command.
The procedures in this manual are AIRBUS INDUSTRIE procedures and should be considered to be a reference.

R **COCKPIT-ASSIGNED DUTIES FOR EVACUATION**

- If it is NOT POSSIBLE to reach the passenger cabin :
  The cockpit crew should evacuate the aircraft via the cockpit clearview windows, by using the escape ropes.
  On ground, each crewmember must help passengers, and direct them away from the aircraft.
- If it is POSSIBLE to reach the passenger cabin :

R

CAPT	– Is the last person to leave the cockpit : Proceeds to the cabin, and helps with passenger evacuation, as necessary. – Is the last person to leave the aircraft : Checks that all persons have evacuated the aircraft. – Evacuates the aircraft, via the rear door, or any other available exit, if he/she cannot reach the rear door. – On ground, he/she takes command of operations until rescue units arrive.
F/O	– Proceeds to the cabin, and takes the emergency equipment. – Evacuates the aircraft, using any available exit. – Helps passengers on ground, and directs them away from the aircraft.

CABIN CREW-ASSIGNED AREAS FOR EVACUATION

R

CABIN CREW DESIGNATION	ASSIGNED JUMPSEAT AND DOOR	ASSIGNED JUMPSEAT	ASSIGNED AREA
1 PURSER	DOOR 1 LH	FWD OUTBOARD	FWD/MID
1 CABIN CREW	DOOR 1 LH	FWD INBOARD	FWD/MID
1 CABIN CREW	DOOR 2 RH	AFT CENTER	MID/AFT
1 CABIN CREW	DOOR 2 LH	REARWARD	MID/AFT

R R *Note : These procedures are established for the minimum required number of 4 cabin crews.*

GENERAL

A successful outcome for an emergency situation depends, first of all, upon each crew member's perfect knowledge and execution of the duties assigned to him.
The captain should check frequently that all crew members know exactly their assigned positions and their specific duties, as well as the duties of the other crew members, in case of an abnormal or an emergency condition.
Since it is not possible to cover all the situations that may occur, the captain will be responsible for adapting the following instructions to obtain the best coordination of the emergency operation. Should it be physically impossible for the captain to carry out his duties, another crew member will substitute for him according to the chain of command.
The procedures in this manual are AIRBUS INDUSTRIE procedures and should be considered to be a reference.

R **COCKPIT-ASSIGNED DUTIES FOR EVACUATION**

- If it is NOT POSSIBLE to reach the passenger cabin :
  The cockpit crew should evacuate the aircraft via the cockpit clearview windows, by using the escape ropes.
  On ground, each crewmember must help passengers, and direct them away from the aircraft.
- If it is POSSIBLE to reach the passenger cabin :

R

CAPT	– Is the last person to leave the cockpit : Proceeds to the cabin and helps with passenger evacuation, as necessary. – Is the last person to leave the aircraft : Checks that all persons have evacuated the aircraft. – Evacuates the aircraft, via the rear door, or any other available exit, if he/she cannot reach the rear door. – On ground, he/she takes command of operations until the rescue units arrive.
F/O	– Proceeds to the cabin, and takes the emergency equipment. – Evacuates the aircraft, using any available exit. – Helps passengers on ground, and directs them away from the aircraft.

CABIN CREW-ASSIGNED AREAS FOR EVACUATION

R

CABIN CREW DESIGNATION	ASSIGNED JUMPSEAT AND DOOR	ASSIGNED JUMPSEAT	ASSIGNED AREA
1 PURSER	DOOR 1 LH	FWD OUTBOARD	FWD/MID
1 CABIN CREW	DOOR 1 RH/LH	FWD INBOARD	FWD/MID
1 CABIN CREW	DOOR 2 RH/LH	AFT CENTER	MID/AFT

R R *Note : These procedures are established for the minimum required number of 3 cabin crews.*

COMMUNICATIONS

1. EMERGENCY CALL			
FROM	TO	COMMUNICATION METHOD(S)	REMARKS
COCKPIT	CABIN	– Press "EMER" CALL pushbutton on the CALLS panel, or – Passenger Address (PA) System : "PURSER TO COCKPIT PLEASE!"	Purser must immediately go to the cockpit.
CABIN	COCKPIT	– Interphone : "PRIO CAPT"	Any cabin crewmember can make such a call. The cockpit crew must reply.

2. EMERGENCY ALERT			
FROM	TO	COMMUNICATION METHOD(S)	REMARKS
COCKPIT	CABIN	– PA System : "ATTENTION CREW! AT STATIONS !"	The cockpit crew makes a short and precise announcement to warn that an emergency evacuation may soon be required. Cabin crews must proceed to their emergency stations, and fasten their seatbelts.

R

3. NOTIFICATION TO PASSENGERS			
FROM	TO	COMMUNICATION METHOD(S)	REMARKS
COCKPIT	CABIN	– SIGNS ON – PA System	For psychological reasons, the cockpit crew should be the first to inform of an intended emergency landing.
PURSER	CABIN	– CABIN LIGHTS 100 % – PA System	Purser informs passengers that they have to pay special attention to these warnings : – "FINISH PREPARATION" – "BRACE FOR IMPACT" – "PASSENGERS EVACUATE"

R

4. FINISH PREPARATION			
FROM	TO	COMMUNICATION METHOD(S)	REMARKS
COCKPIT	CABIN	– Passenger Address (PA) System : "FINISH PREPARATION"	The cockpit crew gives this order a short time before an emergency landing.

R

5. BRACE FOR IMPACT			
FROM	TO	COMMUNICATION METHOD(S)	REMARKS
COCKPIT	CABIN	– PA System : "BRACE FOR IMPACT !"	The cockpit crew gives this order no later than 1 minute before impact.

R

6. INITIATE EVACUATION (RESTRICTED EXITS)			
FROM	TO	COMMUNICATION METHOD(S)	REMARKS
COCKPIT	CABIN	– PA System : "PASSENGERS EVACUATE" – Activate EVAC signals ◁	The cockpit crew orders an immediate evacuation, and the cabin crew directs passengers to all available exists.
CABIN	COCKPIT AND CABIN	– EVAC SIGNAL SYSTEM ◁ on FWD ATTND panel (FAP) – PA System or megaphone	Used by the cabin crew, if there is no signal or order from the cockpit, and if it is unmistakably clear that the aircraft must be evacuated.
CABIN	CABIN	– Verbal	The cabin crew stands up and shouts : – "SEATBELTS OFF!" – "LEAVE EVERYTHING!" – "GET OUT!" – "COME THIS WAY!"

R

7. EVACUATION NOT REQUIRED			
FROM	TO	COMMUNICATION METHOD(S)	REMARKS
COCKPIT	CABIN	– PA System : "CABIN CREW and PASSENGERS REMAIN SEATED !"	When the Captain decides that an evacuation is not required, the cockpit crew makes an immediate announcement to this effect.

ON GROUND EVACUATION

COCKPIT CREW PROCEDURES

– **The cockpit crew notifies the cabin crew of the nature of the emergency, and states intentions.**

– **The cockpit crew uses the Passenger Address system to make an appropriate announcement, such as : "PASSENGERS EVACUATE", and presses the EVAC COMMAND pushbutton.**

CABIN CREW PROCEDURES

When the cabin receives the order to evacuate, each cabin crewmember must proceed as follows :

– **STAND UP AND SHOUT . . . . . "UNFASTEN SEATBELTS"**

– **OUTSIDE CONDITIONS . . . . . CHECK**

● **If outside conditions are safe :**

– **DOOR IN ARMED POSITION . . . . . OPEN FIRMLY**

– **SHOUT . . . . . "COME THIS WAY"**

● **If the door does not open automatically :**

– **DOOR . . . . . PUSH AND OPEN MANUALLY**

R – **SLIDE (or SLIDERAFT) DEPLOYMENT . . . . . CHECK FULL DEPLOYMENT**

R It takes approximately four seconds for the slide (or slideraft) to deploy.

R ● **If the slide (or slideraft) does not automatically inflate :**

– **RED, MANUAL INFLATION HANDLE . . . . . PULL**

R The red, manual inflation handle is located on the right-hand side of the slide (or slideraft) girt extension.

R – **ORDER . . . . . "PASSENGERS EVACUATE"**

– **PASSENGER EVACUATION . . . . . EXPEDITE**

R ● **If the slide (or slideraft) becomes unserviceable :**

– **PASSENGER EVACUATION . . . . . STOP**

– **PASSENGERS TO ANOTHER USABLE EXIT . . . . . REDIRECT**

– **TOTAL ZONE EVACUATION . . . . . CHECK**

– **CABIN CREW . . . . . EVACUATE**

– **PASSENGERS AWAY FROM THE AIRCRAFT . . . . . DIRECT**

● **If outside conditions are unsafe :**

– **EXIT DOOR . . . . . BLOCK**

R – **PASSENGERS TO NEAREST USABLE EXIT . . . . . REDIRECT**

COCKPIT EVACUATION THROUGH WINDOW

OPENING THE SLIDING WINDOW

– **HANDLE . . . . . PUSH DOWN AND PULL BACK**
Pulling the handle backwards, opens the sliding window.

COCKPIT EVACUATION WITH ESCAPE ROPE

– **ESCAPE ROPE STOWAGE . . . . . OPEN**
The escape rope stowage is located above the sliding window, on either side of the overhead panel.

– **ESCAPE ROPE . . . . . UNROLL**
Unroll the escape rope until the red flag appears, and throw it through the window.

– **SEAT . . . . . STEP ON**

– **ESCAPE ROPE . . . . . GRASP**
Grasp the escape rope firmly with both hands, and slide down along the rope.

R **EVACUATION ON WATER**

CABIN CREW RESPONSIBLE FOR TYPE "I" DOORS

When the cabin receives the order to evacuate, each cabin crewmember must proceed as follows :

– **CHILDREN LIFEVESTS . . . . . DISTRIBUTE**

– **STAND UP AND SHOUT . . "UNFASTEN SEATBELTS – PUT ON YOUR LIFEVEST"**
Inflate the lifevest, only once outside the aircraft.

R – **ORDER . . . . . "REMOVE SHOES"**

● **If the Type I door is usable :**

– **DOOR IN ARMED POSITION . . . . . OPEN**

– **SLIDE . . . . . DEPLOY**

– **RED, MANUAL INFLATION HANDLE . . . . . PULL**
Do not wait for automatic inflation of the slide.

■ **If the water level is close to the door sill :**
The slide inflates on the water.

– **SLIDE . . . . . LEAVE ATTACHED TO CABIN FLOOR**

R – **PASSENGER LIFEVESTS . . . . . INFLATE WHEN EVACUATING AIRCRAFT**

R – **PASSENGERS . . . . . EVACUATE**
R Evacuate passengers into the water. The slide is used as a flotation device.

– **TOTAL ZONE EVACUATION . . . . . CHECK**

– **LAST CREWMEMBER . . . . . EVACUATE**

– **SLIDE . . . . . SEPARATE FROM DOOR SILL**
The last crewmember must separate the slide from the door sill.

– **MOORING LINE . . . . . CUT**

■ **If the water level is too far away from the door sill :**

– **SLIDE . . . . . DISCONNECT FROM DOOR SILL**
The slide remains tied to the aircraft by a 6–meter (20 feet) mooring line.

– **MOORING LINE . . . . . HOLD**
To keep the slide close to the exit, hold the mooring line.

R – **PASSENGER LIFEVESTS . . . . . INFLATE WHEN EVACUATING AIRCRAFT**

– **PASSENGERS . . . . . EVACUATE**
R Evacuate passengers into the water. The slide is used as a flotation device.

– **TOTAL ZONE EVACUATION . . . . . CHECK**

– **LAST CREWMEMBER . . . . . EVACUATE**

– **MOORING LINE . . . . . CUT**

R **EVACUATION ON WATER**

CABIN CREW RESPONSIBLE FOR TYPE "I" DOORS

When the cabin receives the order to evacuate, each cabin crewmember must proceed as follows :

– **CHILDREN LIFEVESTS . . . . . DISTRIBUTE**

– **STAND UP AND SHOUT . . "UNFASTEN SEATBELTS – PUT ON YOUR LIFEVEST"**
Inflate the lifevest, only once outside the aircraft.

R – **ORDER . . . . . "REMOVE SHOES"**

● **If the Type I door is usable :**

– **DOOR IN ARMED POSITION . . . . . OPEN**

– **SLIDERAFT . . . . . DEPLOY**

– **RED, MANUAL INFLATION HANDLE . . . . . PULL**
Do not wait for automatic inflation of the slideraft.

■ **If the water level is close to the door sill :**
The slideraft inflates on the water.

– **SLIDERAFT . . . . . LEAVE ATTACHED TO CABIN FLOOR**

R – **PASSENGER LIFEVESTS . . . . . INFLATE WHEN BOARDING SLIDERAFT**

R – **PASSENGERS . . . . . BOARD SLIDERAFT**

– **TOTAL ZONE EVACUATION . . . . . CHECK**

– **LAST CREWMEMBER . . . . . BOARD SLIDERAFT**

– **SLIDERAFT . . . . . SEPARATE FROM DOOR SILL**
The last crewmember must separate the slideraft from the door sill, and board with all the necessary safety equipment.

– **MOORING LINE . . . . . CUT**

– **SURVIVAL KIT . . . . . RETRIEVE**
The survival kit is attached to the slideraft via a lanyard.

■ **If the water level is too far away from the door sill :**

– **SLIDERAFT . . . . . DISCONNECT FROM DOOR SILL**
The slideraft remains tied to the aircraft by a 6–meter (20 feet) mooring line.

– **MOORING LINE . . . . . HOLD**
To keep the slideraft close to the exit, hold the mooring line.

R – **PASSENGER LIFEVESTS . . . . . INFLATE WHEN BOARDING SLIDERAFT**

R – **PASSENGERS . . . . . BOARD SLIDERAFT**

– **TOTAL ZONE EVACUATION . . . . . CHECK**

– **LAST CREWMEMBER . . . . . BOARD SLIDERAFT**
The last crewmember must board with all the necessary safety equipment.

– **MOORING LINE . . . . . CUT**

– **SURVIVAL KIT . . . . . RETRIEVE**
The survival kit is attached to the slideraft via a lanyard.

R *Note : Evacuation is usually done through the passenger doors. However, if one of the*
R *passenger doors is not usable, the overwing exit may be used for evacuation. The*
R *cabin crew should install the lifeline to help passenger to stay on the wing. These*
R *passengers will, however, be obliged to wait on the wing until the slideraft arrives,*
R *and until all other passengers have evacuated from the passenger door exits, and*
R *have finished boarding the sliderafts.*

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FOREWORD

The procedures contained in this Chapter are recommended by Airbus, and are consistent with the other Chapters of this manual.

The Authorities do not certificate Standard Operating Procedures. The manufacturer presents them herein as the best way to proceed, from a technical and operational standpoint. They are continually updated and the revisions take into account Operator input, as well as manufacturer experience.

In addition, Operators may amend them, as needed. However, the manufacturer recommends that Operators using the FCOM as onboard operational manual submit suggested changes to expedite publication, and maintain consistency of the manual.

The Operator should note that they may rewrite this Chapter, at their own responsibility ; this could, however, make it difficult to update the manual and keep it consistent with the other Chapters.

The following sections contain expanded information on normal procedures.

Standard Operating Procedures consist of inspections, preparations, and normal procedures. All items of a given procedure are listed in a sequence that follows a standardized scan of the cockpit panels, unless that sequence goes against the action priority logic, to ensure that all actions are performed in the most efficient way.

Standard Operating Procedures are divided into flight phases, and are performed by memory.

These procedures assume that all systems are operating normally, and that all automatic functions are used normally.

R Some normal procedures, that are non-routine will be found in the SUPPLEMENTARY TECHNIQUES Chapter (3.04), and in the SPECIAL OPERATIONS Chapter (2.04).

TECHNICAL CONDITION OF THE AIRCRAFT

– The crew will verify the technical state of the aircraft (deferred defect list), with regard to airworthiness, acceptability of malfunctions (MEL), and influence on the flight plan.

WEATHER BRIEFING

– The crew will get a weather briefing.
– The briefing should include :
  · Actual and expected weather conditions, including runway conditions for takeoff and climb-out.
  · Significant weather enroute, including winds and temperatures.
  · Terminal forecasts for destination and alternate airports.
  · Actual weather for destination and alternates, for short range flights and recent past weather, if available.
  · Survey of the meteorological conditions at airports along the planned route.

Weather can affect the choice of routing (for example, influence which route is quickest) and the choice of flight level. The flight crew must also consider the possibility of runways being contaminated at the departure and destination airfields. The flight crew must also verify ISA deviations and enroute icing conditions, and must consider the possibility of holding due to weather at the destination.

NOTAMS

– The flight crew must examine NOTAMs for changes to routings, unserviceable navaids, availability of runways and approach aids etc, all of which may affect the final fuel requirement.
– In order to prevent the risks of projection of debris towards the trimmable horizontal stabilizer and the elevators, it is not recommended to takeoff from runways in bad condition (loose surface, under repair, covered with debris...).

FLIGHT PLAN AND OPERATIONAL REQUIREMENTS

– The crew will check the company flight plan for routing, altitudes, and flight time.
– The Captain will check the ATC flight plan and ensure that it :
R · Is filled in and filed, in accordance with the prescribed procedures,
  · It agrees with the fuel flight plan routing.
– The crew will check the estimated load figures, and will calculate the maximum allowable takeoff and landing weights.

OPTIMUM FLIGHT LEVEL

The flight crew should choose a flight level that is as close to the optimum as possible. To obtain the optimum flight level, use the chart in the QRH or in the FCOM (Refer to FCOM
R 2.05.20).
As a general rule, an altitude that is 4000 feet below the optimum produces a significant penalty (approximately 5 % of fuel). Flight 8000 feet below the optimum altitude produces a penalty of more than 10 % against trip fuel. (The usual contingency allowance is 5 %).

FUEL REQUIREMENTS

COMPUTERIZED FLIGHT PLAN CHECK

In most cases the flight crew uses a computer-derived flight plan to obtain the correct fuel requirements. Although these computerized requirements are normally accurate, the flight crew must check them for gross errors.
The easiest way to do this is to use the "Quick Determination of F-PLN" tables in FCOM
R 2.05.40. Although the aircraft will fly at ECON MACH that is based on the cost index, the 0.78 Mach table is accurate enough to permit the crew to check for gross error.
Ensure that both the captain and the first officer have verified that the fuel calculations and required fuel on board are correct and that the figure complies with the applicable regulations.

FUEL TRANSPORTATION

The flight crew must check the policy covering the "tankering" of fuel on sectors where there is a favourable fuel price differential or operational requirement.
Remember that carrying unnecessary extra fuel increases the fuel consumption for that sector and therefore reduces the economy of the operation (lower flex temperature, more tire and brake wear, more time in climb phase, lower optimum flight level etc).

SAFETY EXTERIOR INSPECTION

Items marked by (*) are the only steps to be completed during a transit stop.
This inspection ensures that the aircraft and its surroundings are safe for operations.
On arriving at the aircraft, check for obstructions in the vicinity, engineering activity, refueling, etc.

*– **WHEEL CHOCKS** . . . . . **CHECK IN PLACE**

*– **LANDING GEAR DOORS** . . . . . **CHECK POSITION**

WARNING

Do not pressurize the green hydraulic system without clearance from ground personnel, if any gear door is open. Remember that the green hydraulic system is pressurized if the yellow system is pressurized and the PTU is on auto.

*– **APU AREA** . . . . . **CHECK**
Observe that the APU inlet and outlet are clear.

PRELIMINARY COCKPIT PREPARATION

Items marked by asterisks (*) are the only steps to be completed during a transit stop.
The following procedure, performed by the PNF ensures that all required checks are performed before the application of electrical power to avoid inadvertent operation of systems and danger to the aircraft and personnel.
Included is APU starting and the establishment of electrical and pneumatic power.

ENG

– **MASTER 1 and 2** . . . . . **OFF**

– **MODE selector** . . . . . **NORM**

L/G

– **L/G lever** . . . . . **Check DOWN position**

WIPERS

– **WIPERS** . . . . . **OFF**

ELEC

■ **If the aircraft has not been electrically supplied for 6 hours or more, perform the following check :**

– **BAT 1 and 2** . . . . . **CHECK OFF**

– **BAT 1 and 2 VOLTAGE** . . . . . **CHECK ABOVE 25.5 V**
Battery voltage above 25.5 V ensures a charge above 50 %.

● **If battery voltage is below 25.5 V :**
a charging cycle of about 20 minutes is required.

– **BAT 1 and 2** . . . . . **AUTO**

– **EXT PWR** . . . . . **ON**
Check on ECAM ELEC page, battery contactor closed and batteries charging.

● **after 20 minutes :**

– **BAT 1 + 2** . . . . . **OFF**

– **BAT 1 and 2 VOLTAGE** . . . . . **CHECK ABOVE 25.5 V**

● **If battery voltage is above 25.5 V :**

– **BAT 1 and 2 . . . . . AUTO**
If the APU is started on batteries only, it should be started within 30 minutes after the selection of batteries to AUTO (35 minutes after battery selection to AUTO, the battery charge is less than 25 % of maximum capacity).

■ **If the aircraft has been electrically supplied during the last 6 hours :**

– **BAT 1 and 2 . . . . . AUTO**

– **EXT PWR (when AVAIL light is on) . . . . . ON**
AVAIL light goes out.

HYD

WARNING

R Do not pressurize hydraulic systems without clearance from ground crew.

APU FIRE

– **APU FIRE pushbutton . . . . . IN and GUARDED**

– **AGENT light . . . . . OUT**
If the APU is already running, ensure that the following check has already been completed. If not, perform it.

– **APU FIRE TEST pushbutton . . . . . PRESS**
Check :
· APU FIRE warning on ECAM + CRC + MASTER WARN light (if AC Power available).
· APU FIRE pushbutton lighted red.
· SQUIB and DISCH lights on

APU START

■ **If EXT PWR ON light is on :**

– **APU MASTER switch** . . . . . **ON**
ON light comes on.
APU page appears on ECAM.

R – **APU START** . . . . . **ON**
FLAP OPEN indication appears on ECAM APU page.
On ECAM APU page, N and EGT rise.
When N = 95 % :
. On ECAM APU page, AVAIL indication appears.
. On APU panel : START ON light goes out.
AVAIL light comes on.
10 seconds later :
. ECAM DOOR page replaces ECAM APU page.

– **EXT PWR** . . . . . **AS RQRD**

■ **if EXT PWR ON light is out:**

– **APU MASTER switch** . . . . . **ON**
ON light comes on.

– **APU START** . . . . . **ON**
At 95% RPM :
· START ON light goes out.
· AVAIL light comes on.
· APU GEN comes on line.
· ECAM APU page appears after 10 seconds.
If required, adjust brightness on ECAM control panel.
10 seconds later :
· ECAM DOOR page replaces ECAM APU page.

COCKPIT LIGHTS

*— **COCKPIT LIGHTS . . . . . AS RQRD**
· Set OVHD INTEG LT, STBY COMPASS, DOME, ANN LT switches as required.
· Set FLOOD LT, and INTEG LT as required.
DOME light should be on because it is the only lighting source in the EMER ELEC configuration. The DIM position is recommended for takeoff.

* PARKING BRAKE

*— **PARKING BRAKE . . . . . ON**

*— **ACCU PRESS & BRAKES PRESS indicators . . . . . CHECK**
— Check for normal indications.
— The ACCU PRESS indication must be in the green band. If required use the electric pump on yellow hydraulic system to recharge the brake accumulator.

WARNING

Yellow and green hydraulic systems are pressurized from yellow electric pump. Get ground crew clearance before using the electric pump.

APU START

■ **If the EXT PWR ON light is on :**

– **APU MASTER switch . . . . . ON**
The ON light comes on.
The APU page appears on the ECAM.

– **APU START . . . . . ON**

R *Note : Wait at least 5 seconds before selecting APU START.*

The FLAP OPEN indication appears on the ECAM APU page.
On the ECAM APU page, N and EGT rise.
When N = 95 % :
. On the ECAM APU page, the AVAIL indication appears.
. On the APU panel : The START ON light goes off.
The AVAIL light comes on.
10 seconds later :
. The ECAM DOOR page replaces the ECAM APU page.

– **EXT PWR . . . . . AS RQRD**

■ **If the EXT PWR ON light is off :**

– **APU MASTER switch . . . . . ON**
The ON light comes on.

– **APU START . . . . . ON**

R *Note : Wait at least 5 seconds before selecting APU START.*

At 95% RPM :
· The START ON light goes off.
· The AVAIL light comes on.
· The APU GEN comes on line.
· The ECAM APU page appears after 10 seconds.
If required, adjust brightness on the ECAM control panel.
10 seconds later :
· The ECAM DOOR page replaces the ECAM APU page.

COCKPIT LIGHTS

*– **COCKPIT LIGHTS . . . . . AS RQRD**
· Set OVHD INTEG LT, STBY COMPASS, DOME, ANN LT switches as required.
· Set FLOOD LT, and INTEG LT as required.
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* PARKING BRAKE

*– **PARKING BRAKE . . . . . ON**

*– **ACCU PRESS & BRAKES PRESS indicators . . . . . CHECK**
– Check for normal indications.
– The ACCU PRESS indication must be in the green band. If required use the electric pump on yellow hydraulic system to recharge the brake accumulator.

WARNING

Yellow and green hydraulic systems are pressurized from yellow electric pump. Get ground crew clearance before using the electric pump.

ALTERNATE BRAKING SYSTEM

Note : The purpose of this check is to verify, before the first flight of the day, the efficiency of the alternate braking system (absence of "spongy pedals").

– **Y ELEC PUMP . . . . . CHECK OFF**

– **CHOCKS . . . . . CHECK IN PLACE**

– **PARKING BRAKE . . . . . OFF**

– **BRAKE PEDALS . . . . . PRESS**
Apply maximum pressure on both pedals.

– **BRAKE PRESSURE (on BRAKE press indicator) . . . . . CHECK**
Pressure must build up without delay symmetrically on left and right sides for the same application simultaneously applied on left and right pedals. With full pedal deflection, the
R pressure must be between 2000 and 2700 psi.

– **BRAKE PEDALS . . . . . RELEASE**

– **PARKING BRAKE . . . . . ON**
The parking brake must be on during the exterior inspection to allow the flight crew to check brake wear indicators.

APU START

■ **If the EXT PWR ON light is on :**

– **APU MASTER switch . . . . . ON**
The ON light comes on.
The APU page appears on the ECAM.

– **APU START . . . . . ON**

R *Note : Wait at least 5 seconds before selecting APU START.*

The FLAP OPEN indication appears on the ECAM APU page.
On the ECAM APU page, N and EGT rise.
When N = 95 % :
. On the ECAM APU page, the AVAIL indication appears.
. On the APU panel : The START ON light goes off.
The AVAIL light comes on.
10 seconds later :
. The ECAM DOOR page replaces the ECAM APU page.

– **EXT PWR . . . . . AS RQRD**

■ **If the EXT PWR ON light is off :**

– **APU MASTER switch . . . . . ON**
The ON light comes on.

– **APU START . . . . . ON**

R *Note : Wait at least 5 seconds before selecting APU START.*

At 95% RPM :
· The START ON light goes off.
· The AVAIL light comes on.
· The APU GEN comes on line.
· The ECAM APU page appears after 10 seconds.
If required, adjust brightness on the ECAM control panel.
10 seconds later :
· The ECAM DOOR page replaces the ECAM APU page.

COCKPIT LIGHTS

*— **COCKPIT LIGHTS . . . . . AS RQRD**
· Set OVHD INTEG LT, STBY COMPASS, DOME, ANN LT switches as required.
· Set FLOOD LT, and INTEG LT as required.
DOME light should be on because it is the only lighting source in the EMER ELEC configuration. The DIM position is recommended for takeoff.

* PARKING BRAKE

*— **PARKING BRAKE . . . . . ON**

*— **ACCU PRESS & BRAKES PRESS indicators . . . . . CHECK**
— Check for normal indications.
— The ACCU PRESS indication must be in the green band. If required use the electric pump on yellow hydraulic system to recharge the brake accumulator.

WARNING

Yellow and green hydraulic systems are pressurized from yellow electric pump. Get ground crew clearance before using the electric pump.

F/CTL

– **FLAPS . . . . . CHECK POSITION**
Check the upper ECAM display to confirm that the FLAPS position agrees with the handle position.

R *– **SPEEDBRAKE lever . . . . . CHECK RETRACTED and DISARMED**

WARNING
If flight control surface positions do not agree with the control handle positions, check with the maintenance crew before applying hydraulic power.

PROBE/WINDOW HEAT

– **PROBE/WINDOW HEAT . . . . . CHECK AUTO**

AIR COND

– **APU BLEED . . . . . ON**
R Do not use APU BLEED, if ground personnel confirms that ground air unit is connected.
R Pilots should also check the ECAM BLEED page to determine whether an HP ground air
R unit is connected (pressure in the bleed system).

– **ALL WHITE LIGHTS . . . . . OFF**

– **X BLEED . . . . . AUTO**

– **Zone temperature selectors . . . . . AS RQRD**
Full range temperature 24 ± 6° C (75 ± 11° F).

CARGO HEAT ◁

– **SELECTORS . . . . . AS RQRD**
Set temperature selectors, as required.

ELEC

– **Scan and check that there are no amber lights, except GEN FAULT lights.**

VENT

– **Check all lights off.**

INTENTIONALLY LEFT BLANK

*** ECAM**

*– **RECALL . . . . . PRESS**

· Press the RECALL pushbutton for at least 3 seconds, to recall all warnings that have been cleared or canceled.

· If applicable, check warnings are compatible with the MEL, then CLEAR or CANCEL them.

If any action is required, call maintenance personnel as soon as possible.

*– **DOOR . . . . . PRESS**

R If the oxygen pressure is half boxed in amber, check the "MIN FLT CREW OXY CHART" to verify if the pressure is sufficient for the scheduled flight (Refer to 3.01.35).

*– **HYD . . . . . PRESS**

Check that the quantity indexes are in the normal filling range.

*– **ENG . . . . . PRESS**

Check that the oil quantity is at, or above, 11 qt + estimated consumption (maximum average estimated consumption ~ 0.3 qt/h).

EMERGENCY EQUIPMENT

– **Check the following equipment :**
  · Life jackets stowed
  · Axe stowed
  · Smoke hoods ◁ or portable oxygen equipment and full face masks ◁ stowed and serviceable
  · Portable fire extinguisher lockwired and pressure in the green area
  · Smoke goggles stowed (smoke hoods if installed)
  · Oxygen masks stowed
  · Flashlights stowed
  · Escape ropes stowed

RAIN REPELLENT

– **Pressure and quantity indicators . . . . . CHECK**

CAUTION

Never use rain repellent to wash the windshield and never use it on a dry windshield.

REAR and OVERHEAD CIRCUIT BREAKERS panels

– **REAR and OVERHEAD CIRCUIT BREAKERS panels . . . . . CHECK**
Check that all circuit breakers are set. Reset as necessary.

EMERGENCY EQUIPMENT

– **Check the following equipment :**
  · Life jackets stowed
  · Axe stowed
  · Smoke hoods ◁ or portable oxygen equipment and full face masks ◁ stowed and serviceable
  · Portable fire extinguisher lockwired and pressure in the green area
  · Smoke goggles stowed (smoke hoods if installed)
  · Oxygen masks stowed
  · Flashlights stowed
  · Escape ropes stowed

RAIN REPELLENT

– **Pressure and quantity indicators . . . . . CHECK**

CAUTION

Never use rain repellent to wash the windshield and never use it on a dry windshield.

REAR and OVERHEAD CIRCUIT BREAKERS panels

– **REAR and OVERHEAD CIRCUIT BREAKERS panels . . . . . CHECK**
Check that all circuit breakers are set. Reset as necessary.

GENERAL

The exterior inspection ensures that the overall condition of the aircraft and its visible components and equipment are safe for the flight.

Complete inspection is normally performed by maintenance personnel or in the absence of maintenance personnel by a flight crew member before each originating flight.

Items marked by asteriks (*) must be performed again by a flight crew member before each flight.

The parking brake must be on during the exterior inspection to allow the flight crew to check brake wear indicators.

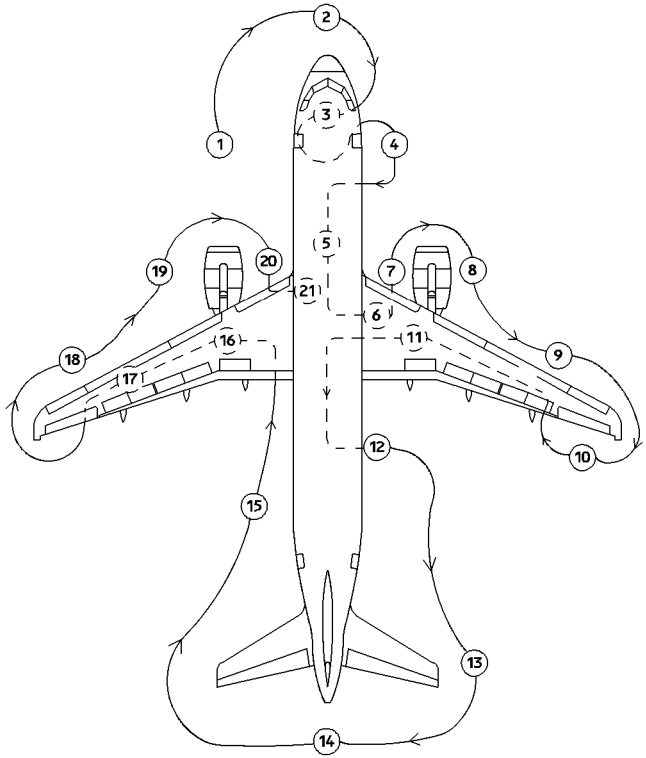
· Check structure for impact damage

R · Check that there is no evident fuel, oil or hydraulic leaks.

WARNING

If a landing gear door is open, contact the maintenance crew before applying hydraulic power.

EXTERIOR WALK-AROUND



NFC5-03-0305-001-A001AA

(1) LH FWD FUSELAGE

*— AOA probes . . . . . CONDITION
— F/O and CAPT static ports . . . . . CLEAR
— Avionics equipment vent air inlet valve . . . . . CONDITION
— Oxygen bay . . . . . CLOSED
— Oxygen overboard discharge indicator . . . . . GREEN
*— Toilet servicing door (if installed) . . . . . CLOSED

(2) NOSE SECTION

*— Pitot probes . . . . . CONDITION
— STBY static ports . . . . . CLEAR
*— TAT probes . . . . . CONDITION
*— Radome and latches . . . . . CONDITION/LATCHED
— Forward avionics compartment door . . . . . CLOSED
— Ground electrical power door (if not required.) . . . . . CLOSED

(3) NOSE L/G

*— Nose wheel chocks . . . . . IN PLACE
*— Wheels and tires . . . . . CONDITION
— Nose gear structure . . . . . CONDITION
— Taxi, TO, turn-off lights . . . . . CONDITION
— Hydraulic lines and electrical wires . . . . . CONDITION
— Wheel well . . . . . CHECK
— Safety pin . . . . . REMOVED

(4) RH FWD FUSELAGE

— RH + AFT avionic compartment doors . . . . . CLOSED
— Avionic equipment vent air outlet valve . . . . . CONDITION
— F/O-CAPT static ports . . . . . CLEAR
*— AOA probe . . . . . CONDITION
— Forward cargo door and selector panel . . . . . CHECK

(5) LOWER CENTER FUSELAGE

- Potable water drain panel (if installed) . . . . . CLOSED
- Antennas . . . . . CONDITION
- Drain mast . . . . . CONDITION
- RAM air inlet flap . . . . . CONDITION
- LP and HP ground connection doors . . . . . CLOSED
- Anticollision light . . . . . CHECK
- CTR TK magnetic fuel level . . . . . FLUSH
- Pack air intakes and outlets . . . . . CLEAR

(6) RH CENTER WING

- Yellow hydraulic bay door . . . . . CLOSED
- Fuel panel . . . . . CLOSED
- Inner tank magnetic fuel . . . . . FLUSH
- Fuel water drain valve inner tank . . . . . NO LEAK
- Landing light . . . . . CONDITION
*- Slat 1 . . . . . CONDITION

(7) ENG 2 LH SIDE

- Oil fill access door . . . . . CLOSED
- Master magnetic chip detector access door (IAE only) . . . . . CLOSED
*- Fan cowl doors . . . . . CLOSED/LATCHED
*- Drain mast . . . . . CONDITION/NO LEAK
*- Engine inlet and fan blades . . . . . CHECK

(8) ENG 2 RH SIDE

- Vent inlet (CFM only) . . . . . CLEAR
- Pressure-relief/Start valve handle access door . . . . . CLOSED
- Turbine exhaust (CFM only) . . . . . CLEAR
- Pylon/access panel . . . . . CONDITION/CLOSED

(9) RH WING LEADING EDGE

*- Slats 2, 3, 4, 5 . . . . . CONDITION
- Inner and outer cells magnetic fuel level . . . . . FLUSH
- Fuel water drain valves (outer cell, surge tank) . . . . . NO LEAK
- Refuel coupling . . . . . CLOSED
- Surge tank air inlet . . . . . CLEAR
*- Fuel ventilation overpressure disc . . . . . INTACT
- Navigation light . . . . . CONDITION
*- Wing tip . . . . . CONDITION

(10) RH WING TRAILING EDGE

– Static dischargers . . . . . CHECK
*– Control surfaces . . . . . CONDITION
*– Flaps and fairings . . . . . CONDITION

(11) RH L/G AND FUSELAGE

*– Chocks . . . . . REMOVED
*– Wheels and tires . . . . . CONDITION
– Brakes and brake wear ind. . . . . CONDITION
– Torque link damper ◁ . . . . . CONDITION
– Hydraulic lines . . . . . CHECK
– Landing gear structure . . . . . CHECK
– Downlock springs . . . . . CHECK
– Safety pin . . . . . REMOVED
– Ground hydraulic connection yellow . . . . . CLOSED
– Water drain mast ◁ . . . . . CONDITION
– Shroud fuel drain . . . . . CONDITION/NO LEAK

(12) RH AFT FUSELAGE

– Cargo door and selector panel . . . . . CHECK
– Bulk door ◁ . . . . . CHECK
*– Toilet service access door . . . . . CLOSED
– Outflow valve . . . . . CONDITION
– Drain mast . . . . . CONDITION
– Flight recorder access door . . . . . CLOSED

(13) TAIL

*– Stabilizer, elevator, fin, and rudder . . . . . CONDITION
– Static dischargers . . . . . CHECK
*– Lower fuselage structure (tail impact on runway) . . . . . CONDITION

(14) APU

– Access doors . . . . . CLOSED
– Air intake . . . . . CONDITION
– Drain . . . . . CONDITION/NO LEAK
– Oil cooler air outlet . . . . . CLEAR
– Exhaust . . . . . CLEAR
– Navigation light . . . . . CONDITION
– Fire extinguisher overpressure indication (red disc) . . . . . IN PLACE

⑮ LH AFT FUSELAGE

*– Stabilizer, elevator, fin, and rudder . . . . . CONDITION
*– Potable water service door . . . . . CLOSED
– Ground hydraulic connection blue and green doors . . . . . CLOSED
– Hydraulic reservoir filling door . . . . . CLOSED

⑯ LH LANDING GEAR

*– Chocks . . . . . REMOVED
*– Wheels and tires . . . . . CONDITION
– Brakes and brake wear indicator . . . . . CONDITION
– Torque link damper ◁ . . . . . CONDITION
– Hydraulic lines . . . . . CHECK
– Landing gear structure . . . . . CHECK
– Downlock springs . . . . . CHECK
– Safety pin . . . . . REMOVED

⑰ LH WING TRAILING EDGE

*– Flaps and fairing . . . . . CONDITION
*– Control surfaces . . . . . CONDITION
– Static dischargers . . . . . CHECK

⑱ LH WING LEADING EDGE

*– Wing tip . . . . . CONDITION
– Navigation light . . . . . CONDITION
– Surge tank air inlet . . . . . CLEAR
R *– Fuel ventilation overpressure disc . . . . . INTACT
– Fuel water drain valve . . . . . NO LEAK
– Inner and outer cell magnetic fuel level . . . . . FLUSH
*– Slats 2, 3, 4, 5 . . . . . CONDITION

⑲ ENG 1 LH SIDE

– Oil fill access door . . . . . CLOSED
– Master magnetic chip detector access door (IAE only) . . . . . CLOSED
*– Fan cowl doors . . . . . CLOSED/LATCHED
*– Drain mast . . . . . CONDITION/NO LEAK
*– Engine inlet and fan blades . . . . . CHECK

(20) ENG 1 RH SIDE

- Vent inlet (CFM only) . . . . . CLEAR
- Pressure relief/Start valve handle access door . . . . . CLOSED
- Turbine exhaust (CFM only) . . . . . CLEAR
- Pylon/access panel . . . . . CONDITION/CLOSED

(21) LH CENTER WING

*– Slat 1 . . . . . CONDITION
– Wing leading edge ventilation intake ◁ . . . . . CLEAR
– Fuel water drain valves . . . . . NO LEAK
R – Inner tank magnetic fuel . . . . . FLUSH
– Landing lights . . . . . CONDITION
– Hydraulic reservoir pressurization door . . . . . CLOSED
– RAT doors . . . . . CLOSED

INTRODUCTION

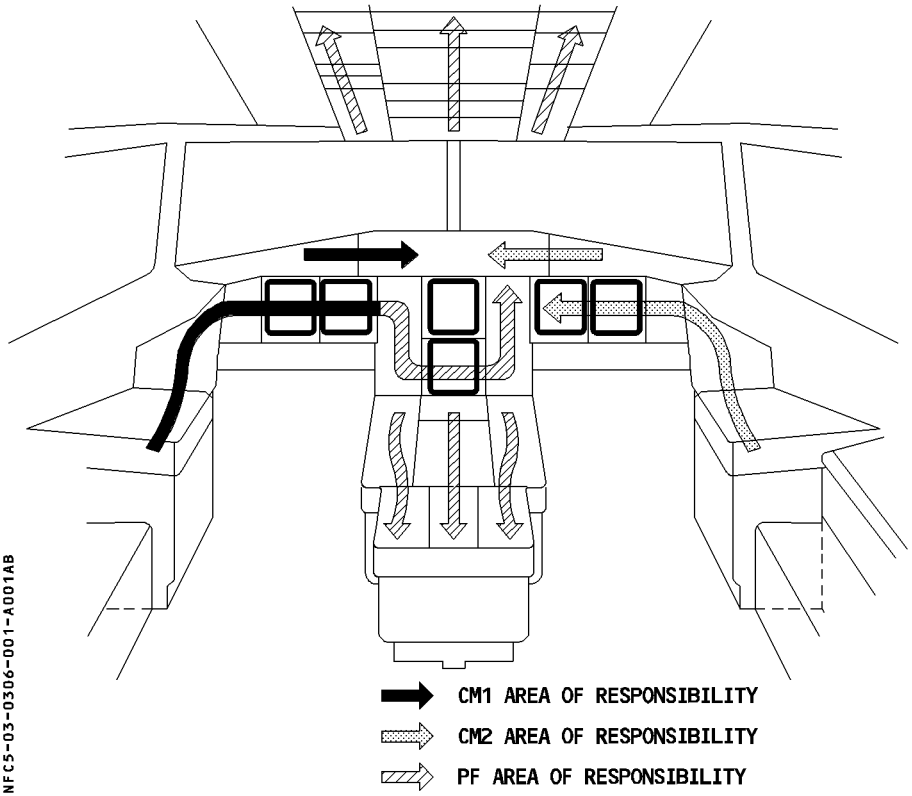
Items marked by (*) are the only steps to be completed during a transit stop.
The PF and PNF should perform the cockpit preparation according to the panel scan sequence, defined below, and the task sharing defined in the Quick Reference Handbook (QRH).

DOCUMENTATION AND MAINTENANCE

On entering the aircraft, obtain the technical (maintenance) log and verify that the certificate of maintenance and daily inspection (or similar) are up to date and signed. Check the deferred or carried-forward defects. If refueling has already been completed, check the uplift.

PANEL SCAN SEQUENCE

R



NFCS-03-0306-001-A001AB

*– **GEAR PINS and COVERS** . . . . . **CHECK**
Check that three are on board and stowed.

OVERHEAD PANEL

IT IS A GENERAL RULE TO TURN OFF ALL WHITE LIGHTS FOR ALL THE SYSTEMS DURING THE SCAN SEQUENCE. THEREFORE, THESE ACTIONS ARE NOT LISTED HERE.

RCDR

*– **RCDR GND CTL** . . . . . **ON**

– **CVR TEST** . . . . . **PRESS AND RELEASE**
Check low frequency signal through the loudspeakers.

Note : The parking brake must be ON to perform the CVR test.

R **EVAC**

– **CAPT and PURS/CAPT switch** . . . . . **AS RQRD**
The usual position is CAPT.

*** ADIRS**

– **Mode selectors (3) . . . . . NAV**
- The ADIRS outputs are used by many of the aircraft's systems : Set the selectors to NAV as soon as possible, to provide data to the related systems.
- Perform a complete alignment if :
  * It is the first flight of the day
  * The GPS is not available, and long segments in poor radio NAVAID coverage airspace are expected.
- For other flights, perform a fast alignment, if the residual ground speed is greater than 5 knots. The alignment is not necessary, if the residual ground speed is less than 5 knots.
- In case of ADIRS alignment, check that the ALIGN lights of the three ADIRS are on.
- For more information on ADIRS OPERATION, refer to SUPPLEMENTARY TECHNIQUES, 3.04.34.

EXT LT

– **EXTERIOR LIGHTS . . . . . AS RQRD**
Set STROBE switch to AUTO, BEACON switch to OFF and remaining switches as required.

*** SIGNS**

*– **SEAT BELTS . . . . . ON/AUTO**

*– **NO SMOKING . . . . . AUTO**

*– **EMER EXIT LT . . . . . ARM**

Note : If the CIDS has been programmed (option) for a non-smoking flight, NO SMOKING signs are permanently on, with the NO SMOKING switch at AUTO.

CABIN PRESS

– **LDG ELEV . . . . . AUTO**

*** AIR COND**

*– **PACK FLOW** . . . . . **AS RQRD**
Select :
LO : If the number of passengers is below 115.
HI : For abnormally hot and humid conditions.
NORM : For all other normal operating cases.
If the APU is supplying, pack controllers select HI flow automatically, independent of the selector position.

ELEC

– **ECAM ELEC PAGE** . . . . . **CALL**

– **BAT 1 + 2** . . . . . **OFF then ON**
R 10 seconds after selecting ON, check on the ECAM ELEC page that both battery charge currents are below 60 A and decreasing.

*** FUEL**
Apply the following procedure, if your airline is affected by FUEL CTR TK PUMP LO PR warnings in flight when the center tank is empty :

● **If the center tank is empty for the flight :**

– **FUEL MODE SEL** . . . . . **MAN**

– **CTR TK PUMP 1 and 2** . . . . . **OFF**

ENG 1 – ENG 2 FIRE

– **ENG 1 and 2 FIRE pushbuttons** . . . . . **CHECK IN and GUARDED**

– **AGENT 1 and AGENT 2 lights** . . . . . **CHECK OUT**

– **ENG 1 (2) TEST pushbutton** . . . . . **PRESS**
Check :
· ENG 1 (2) FIRE warning on ECAM + CRC + MASTER WARN light.
· ENG FIRE pushbutton lighted red.
· SQUIB and DISCH lights on.
· FIRE light (on ENG panel) on.

*** ADIRS**

– **Mode selectors (3)** . . . . . **NAV**
- The ADIRS outputs are used by many of the aircraft's systems : Set the selectors to NAV as soon as possible, to provide data to the related systems.
- Perform a complete alignment if :
  * It is the first flight of the day
  * The GPS is not available, and long segments in poor radio NAVAID coverage airspace are expected.
- For other flights, perform a fast alignment, if the residual ground speed is greater than 5 knots. The alignment is not necessary, if the residual ground speed is less than 5 knots.
- In case of ADIRS alignment, check that the ALIGN lights of the three ADIRS are on.
- For more information on ADIRS OPERATION, refer to SUPPLEMENTARY TECHNIQUES, 3.04.34.

EXT LT

– **EXTERIOR LIGHTS** . . . . . **AS RQRD**
Set STROBE switch to AUTO, BEACON switch to OFF and remaining switches as required.

*** SIGNS**

*– **SEAT BELTS** . . . . . **ON/AUTO**

*– **NO SMOKING** . . . . . **AUTO**

*– **EMER EXIT LT** . . . . . **ARM**

Note : If the CIDS has been programmed (option) for a non-smoking flight, NO SMOKING signs are permanently on, with the NO SMOKING switch at AUTO.

CABIN PRESS

– **LDG ELEV** . . . . . **AUTO**

*** AIR COND**

- **If the external conditions are abnormally hot and humid :**

  – **HI FLOW . . . . . ON**
  If the APU bleed is supplying air-conditionning system, the controllers select the HI flow automatically, independently of the crew selection.

ELEC

– **ECAM ELEC PAGE . . . . . CALL**

– **BAT 1 + 2 . . . . . OFF then ON**
10 seconds after selecting ON, check on the ECAM ELEC page that both battery charge currents are below 60 A and decreasing.

*** FUEL**

Apply the following procedure, if your airline is affected by FUEL CTR TK PUMP LO PR warnings in flight when the center tank is empty :

- **If the center tank is empty for the flight :**

  – **FUEL MODE SEL . . . . . MAN**

  – **CTR TK PUMP 1 and 2 . . . . . OFF**

ENG 1 – ENG 2 FIRE

– **ENG 1 and 2 FIRE pushbuttons . . . . . CHECK IN and GUARDED**

– **AGENT 1 and AGENT 2 lights . . . . . CHECK OUT**

– **ENG 1 (2) TEST pushbutton . . . . . PRESS**
Check :
· ENG 1 (2) FIRE warning on ECAM + CRC + MASTER WARN light.
· ENG FIRE pushbutton lighted red.
· SQUIB and DISCH lights on.
· FIRE light (on ENG panel) on.

AUDIO SWITCHING panel

— **AUDIO SWITCHING panel . . . . . NORM**

THIRD OCCUPANT AUDIO CONTROL PANEL

— **PA reception knob . . . . . Select reception**
· This allows cabin attendant announcements to be recorded on the CVR.
· For proper recording, set volume at or above medium range.

MAINTENANCE PANEL

— **Check all lights out. If not out, select associated pushbutton switch to off.**

RMP

— **RMP . . . . . ON**

— **Green NAV light . . . . . CHECK OFF**

— **SEL light . . . . . CHECK OFF**

— **COM FREQUENCIES . . . . . TUNE**
Use VHF 1 for ATC (only VHF1 is available in emergency electrical configuration), VHF2 for ATIS and company frequencies. VHF3 is normally devoted to ACARS.

*** AIRFIELD DATA**

Obtain data needed for initializing the system and preparing the cockpit. This should include, RUNWAY IN USE, ALTIMETER SETTING, and WEATHER DATA.

*** ATC CLEARANCE**

Obtain ATC clearance or use the probable clearance.

*** ACARS ◁**

R Initialize ACARS at that point or after FMGS INITIALIZATION, as per company policy.

*FMGS INITIALIZATION

At electrical power-up, the FMGSs and FCU run through various internal tests. Allow enough time (3 minutes) for tests' completion, and do not start to press pushbuttons until the tests are over. If the "PLEASE WAIT" message appears, do not press any MCDU key until the message clears.

*– **ENGINE & AIRCRAFT TYPE** . . . . . **CHECK**

*– **FM database validity** . . . . . **CHECK**
· Press the DATA key, and display the STATUS page (if not displayed).
· Check DATA BASE validity and stored WPT/NAVAIDS/RWY/ROUTES, if any.
If applicable, review the stored data for deletion decision.

*– **NAVAID DESELECTION** . . . . . **AS RQRD**
If NOTAMs warn of any unreliable DME or VOR/DME, display DATA, then POSITION MONITOR. Access the SEL NAVAID page, and deselect the related navaid.

*– **FLIGHT PLAN INITIALIZATION** . . . . . **COMPLETE**
· Press the INIT key.
· Insert CO RTE or city pair, and check FROM/TO.
· Check/modify ALTN/CO RTE.
· Enter flight number.

Note : For ATC needs, the crew should enter exactly the entire flight number, as shown on the ICAO flight plan, without inserting any space, on the MCDU INIT page.

· Enter (and/or check) cost index.
· Enter intended initial CRZ FL, or check if it was already supplied by the database. Modify it, if necessary, taking into account ATC constraints or expected gross weight.
· Check and modify CRZ FL TEMP and tropopause level to agree with forecast.
· Check latitude/longitude.

R *– **ADIRS POSITION INITIALIZATION** . . . . . **AS APPROPRIATE**
R · ADIRS position initialization involves setting the ADIRS navigation starting point. This
R is only necessary for a complete or fast alignment.
R · Press the ALIGN IRS prompt to send the coordinates displayed on the MCDU INIT
R page to the three ADIRS.
R · Use the defaulted departure airport reference point coordinates to initialize the ADIRS.
R · When flying without GPS on long segments without radio coverage, it is better to use
R the gate coordinates to initialize the ADIRS : To insert these coordinates, slew them
R on the MCDU, and then press the ALIGN IRS prompt.

AUDIO SWITCHING panel

— **AUDIO SWITCHING panel . . . . . NORM**

THIRD OCCUPANT AUDIO CONTROL PANEL

— **PA reception knob . . . . . Select reception**
· This allows cabin attendant announcements to be recorded on the CVR.
· For proper recording, set volume at or above medium range.

MAINTENANCE PANEL

— **Check all lights out. If not out, select associated pushbutton switch to off.**

RMP

— **RMP . . . . . ON**

— **Green NAV light . . . . . CHECK OFF**

— **SEL light . . . . . CHECK OFF**

— **COM FREQUENCIES . . . . . TUNE**
Use VHF 1 for ATC (only VHF1 is available in emergency electrical configuration), VHF2 for ATIS and company frequencies. VHF3 is normally devoted to ACARS.

*** AIRFIELD DATA**

Obtain data needed for initializing the system and preparing the cockpit. This should include, RUNWAY IN USE, ALTIMETER SETTING, and WEATHER DATA.

*** ATC CLEARANCE**

Obtain ATC clearance or use the probable clearance.

*** ACARS ◁**

R Initialize ACARS at that point or after FMGS INITIALIZATION, as per company policy.

*FMGS INITIALIZATION

At electrical power-up, the FMGSs and FCU run through various internal tests. Allow enough time (3 minutes) for tests' completion, and do not start to press pushbuttons until the tests are over. If the "PLEASE WAIT" message appears, do not press any MCDU key until the message clears.

*– **ENGINE & AIRCRAFT TYPE . . . . . CHECK**

*– **FM database validity . . . . . CHECK**
· Press the DATA key, and display the STATUS page (if not displayed).
· Check DATA BASE validity and stored WPT/NAVAIDS/RWY/ROUTES, if any.
If applicable, review the stored data for deletion decision.

*– **NAVAID DESELECTION . . . . . AS RQRD**
If NOTAMs warn of any unreliable DME or VOR/DME, display DATA, then POSITION MONITOR. Access the SEL NAVAID page, and deselect the related navaid.

*– **FLIGHT PLAN INITIALIZATION . . . . . COMPLETE**
· Press the INIT key.
· Insert CO RTE or city pair, and check FROM/TO.
· Check/modify ALTN/CO RTE.
· Enter flight number.

Note : For ATC needs, the crew should enter exactly the entire flight number, as shown on the ICAO flight plan, without inserting any space, on the MCDU INIT page.

· Enter (and/or check) cost index.
· Enter intended initial CRZ FL, or check if it was already supplied by the database.
Modify it, if necessary, taking into account ATC constraints or expected gross weight.
· Check and modify CRZ FL TEMP and tropopause level to agree with forecast.
· Check latitude/longitude.

R *– **ADIRS POSITION INITIALIZATION . . . . . AS APPROPRIATE**
R · ADIRS position initialization involves setting the ADIRS navigation starting point. This
R only occurs for a complete or fast alignment. The ADIRS are automatically initialized
R using the GPS position, without pilot intervention.
R · If the GPS position is not available, the pilot manually initializes the ADIRS, by
R pressing the ALIGN IRS prompt. This sends the coordinates displayed on the MCDU
R INIT page to the three ADIRS.
R · When performing a manual initialization, use the defaulted departure airport reference
R point coordinates. If flying long segments in poor radio navaid coverage airspace ; it
R is better to use the gate coordinates to initialize the ADIRS : To insert these
R coordinates, slew them on the MCDU, and then press the ALIGN IRS prompt.

*— **F-PLN A page . . . . . COMPLETE AND CHECK**

If CO RTE has been inserted, the F-PLN should automatically include the preferential or probable takeoff runway approach and landing runway, associated SIDs, STARs, transition and en-route waypoints. However some databases will only include departure and arrival airport idents and en-route waypoints.

The flight crew must check, modify, or insert (as applicable) the F-PLN in the following order, according to the data given by ATIS, ATC, or MET :

· Lateral revision at departure airport. Select RWY, then SID, then TRANS using scroll keys.

R · Lateral revision at WPT for ROUTE modification if needed. (Refer to FCOM 4.04,
R LATERAL FUNCTIONS).

· Vertical revision. Check or enter climb speed limit, constraints according to ATC clearance. Enter step altitude as appropriate.

*— **WINDS . . . . . AS APPROPRIATE**

R Enter the forecast wind for CLB or CRZ phases.
R (Refer to FCOM 4.04, VERTICAL FUNCTIONS).

*— **F-PLN . . . . . CHECK**

· Check the F-PLN using F-PLN page and ND PLAN mode versus the computer (paper) flight plan or navigation chart.

· Check DIST TO DEST along the F-PLN. Compare it with the total distance computed for the flight with the computer (paper) flight plan.

*— **SECONDARY FLIGHT PLAN . . . . . AS APPROPRIATE**

This is routinely a copy of the active flight plan. However, consideration may be given to the following :

a) Copy the active F-PLN, but modify it at a suitable WPT for an immediate return to the departure airfield in the event of, for example, engine failure.

b) If weather is below landing minimums at the departure airfield, the secondary flight plan should be that required for a diversion immediately after takeoff.

c) If there is a chance of a change in runway or SID during taxi, prepare for it by copying the active flight plan and making the necessary modifications.

*— **RADIO NAV . . . . . CHECK**

· Check the VOR, ILS and ADF tuned by the FMGC.

· Modify them if required, and check that the correct identifier is displayed on the ND and PFD (ILS). If unsatisfactory, go through the audio check.

* FMGS DATA INSERTION

GROSS WEIGHT INSERTION (INIT B page) :

*– **ZFCG/ZFW** . . . . . **INSERT**

*– **BLOCK FUEL** . . . . . **INSERT**

CAUTION

The characteristic speeds displayed on the MCDU (green dot, F, S, VLS) are computed from the ZFW and ZFCG entered by the crew on the MCDU. Therefore, this data must be carefully checked (Captain's responsibility).

- The flight crew should insert the weights after completing all other insertions. This is to avoid cycles of prediction computations at each change in flight plan, constraints, etc.
- If ZFCG and ZFW are unavailable, it is acceptable to enter the expected values in order to obtain predictions. Similarly, the flight crew may enter the expected fuel on board, if refueling has not been completed at that time.
- If ZFCG, ZFW, and BLOCK FUEL are inserted, the FM will provide all predictions, as well as the EXTRA fuel, if any.

TAKEOFF DATA INSERTION (PERF TAKEOFF page) :

*– **V1, VR, V2** . . . . . **INSERT**

*– **FLX TO TEMP** . . . . . **INSERT**

*– **THR RED/ACC altitude** . . . . . **SET or CHECK**

R For noise abatement procedure, the crew must set the acceleration altitude at, or
R above, 3000 feet, and adjust the values according to local noise abatement regulations.

*– **ENG OUT ACC altitude** . . . . . **SET or CHECK**

*– **FLAPS/THS reminder** . . . . . **INSERT**

*– **TO SHIFT** . . . . . **AS RQRD**

Enter the takeoff SHIFT distance, if takeoff is to be from an intersection. This is essential for position updating at takeoff and, consequently, for navigation accuracy.

*— **F-PLN A page . . . . . COMPLETE AND CHECK**

If CO RTE has been inserted, the F-PLN should automatically include the preferential or probable takeoff runway, approach and landing runway, associated SIDs, STARs, transition and en-route waypoints. However some databases will only include departure and arrival airport idents and en-route waypoints.

The flight crew must check, modify, or insert (as applicable) the F-PLN in the following order, according to the data given by ATIS, ATC, or MET :

· Lateral revision at departure airport. Select RWY, then SID, then TRANS using scroll keys.

R · Lateral revision at WPT for ROUTE modification if needed. (Refer to FCOM 4.04,
R LATERAL FUNCTIONS).

· Vertical revision. Check or enter climb speed limit, constraints according to ATC clearance. Enter step altitude as appropriate.

*— **WINDS . . . . . AS APPROPRIATE**

Choose between using TRIP WIND or forecast wind for CLB or CRZ phases.

R (Refer to FCOM 4.04, VERTICAL FUNCTIONS).

*— **F-PLN . . . . . CHECK**

· Check the F-PLN using F-PLN page and ND PLAN mode versus the computer (paper) flight plan or navigation chart.

· Check DIST TO DEST along the F-PLN. Compare it with the total distance computed for the flight with the computer (paper) flight plan.

*— **SECONDARY FLIGHT PLAN . . . . . AS APPROPRIATE**

This is routinely a copy of the active flight plan. However, consideration may be given to the following :

a) Copy the active F-PLN, but modify it at a suitable WPT for an immediate return to the departure airfield in the event of, for example, engine failure.

b) If weather is below landing minimums at the departure airfield, the secondary flight plan should be that required for a diversion immediately after takeoff.

c) If there is a chance of a change in runway or SID during taxi, prepare for it by copying the active flight plan and making the necessary modifications.

*— **RADIO NAV . . . . . CHECK**

· Check the VOR, ILS and ADF tuned by the FMGC.

· Modify them if required, and check that the correct identifier is displayed on the ND and PFD (ILS). If unsatisfactory, go through the audio check.

* FMGS DATA INSERTION

GROSS WEIGHT INSERTION (INIT B page) :

*– **ZFCG/ZFW** . . . . . **INSERT**

*– **BLOCK FUEL** . . . . . **INSERT**

CAUTION

The characteristic speeds displayed on the MCDU (green dot, F, S, VLS) are computed from the ZFW and ZFCG entered by the crew on the MCDU. Therefore, this data must be carefully checked (Captain's responsibility).

- The flight crew should insert the weights after completing all other insertions. This is to avoid cycles of prediction computations at each change in flight plan, constraints, etc.
- If ZFCG and ZFW are unavailable, it is acceptable to enter the expected values in order to obtain predictions. Similarly, the flight crew may enter the expected fuel on board, if refueling has not been completed at that time.
- If ZFCG, ZFW, and BLOCK FUEL are inserted, the FM will provide all predictions, as well as the EXTRA fuel, if any.

TAKEOFF DATA INSERTION (PERF TAKEOFF page) :

*– **V1, VR, V2** . . . . . **INSERT**

*– **FLX TO TEMP** . . . . . **INSERT**

*– **THR RED/ACC altitude** . . . . . **SET or CHECK**

R For noise abatement procedure, the crew must set the acceleration altitude at, or
R above, 3000 feet, and adjust the values according to local noise abatement regulations.

*– **ENG OUT ACC altitude** . . . . . **SET or CHECK**

*– **FLAPS/THS reminder** . . . . . **INSERT**

*– **TO SHIFT** . . . . . **AS RQRD**

Enter the takeoff SHIFT distance, if takeoff is to be from an intersection. This is essential for position updating at takeoff and, consequently, for navigation accuracy.

CLIMB, CRUISE, DESCENT, SPEED PRESELECTION

*— **PRESET SPEEDS . . . . . AS RQRD**

If the flight is cleared for a close-in turn or close-in altitude constraint, the flight crew may preselect green dot speed on the PERF CLB page. Once the CLB phase is active, the preselected speed will be displayed in the FCU speed window and on the PFD (blue symbol). Once the turn is completed or the altitude cleared, the pilot will resume the managed speed profile by pressing the SPD selector on the FCU.

Similarly the pilot may select a CRZ MACH number on the PERF CRZ page (constant CRZ Mach segment, for example). When the CRZ phase is active, the preselected CRZ MACH number will be displayed in the FCU speed window and on the PFD. When ECON MACH number may be resumed, the crew presses the FCU SPD selector.

In either of the above cases, the pilot may cancel the CLB or CRZ preselected SPD/MACH prior to activating the related phase, by selecting ECON on the PERF CLB or CRZ pages.

SPD LIM is defaulted to 250 knots below 10000 feet in the managed speed profile. This may be either cleared or modified on the VERT REV page at the origin (or a climb waypoint).

GLARESHIELD

— **Glareshield integral light and flood light** . . . . . **AS RQRD**

*— **BARO REF** . . . . . **SET**
· Set QNH on EFIS control panel and on standby altimeter
· Check barometer settings and altitude indications on PFD and standby altimeter. (Tolerance limits are given in 3.04.34).

*— **FD** . . . . . **CHECK ON**

*— **ILS** . . . . . **AS RQRD**

R *Note : Do not engage the autothrust on ground as it may generate the AUTO FLT*
R *A/THR OFF warning at engine start.*

*** EFIS CONTROL PANEL**

*— **ND mode and range** . . . . . **AS RQRD**
MODE : Display the ARC mode on the ND if the takeoff direction is approximately the departure direction, or the ROSE NAV mode if the direction change is to be more than 70° after takeoff (to allow the ND to display the area behind the aircraft).
RANGE : Set the minimum range to display the first waypoint after departure, or as required for weather radar.

*— **VOR/ADF selector** . . . . . **AS RQRD**
Display VOR and ADF needles as needed.

*** FCU**

*— **SPD MACH window** . . . . . **DASHED**

*— **HDG V/S-TRK FPA** . . . . . **HDG V/S**

*— **ALT window** . . . . . **INITIAL EXPECTED CLEARANCE ALT**

CLIMB, CRUISE, DESCENT, SPEED PRESELECTION

*— **PRESET SPEEDS . . . . . AS RQRD**

If the flight is cleared for a close-in turn or close-in altitude constraint, the flight crew may preselect green dot speed on the PERF CLB page. Once the CLB phase is active, the preselected speed will be displayed in the FCU speed window and on the PFD (blue symbol). Once the turn is completed or the altitude cleared, the pilot will resume the managed speed profile by pressing the SPD selector on the FCU.

Similarly the pilot may select a CRZ MACH number on the PERF CRZ page (constant CRZ Mach segment, for example). When the CRZ phase is active, the preselected CRZ MACH number will be displayed in the FCU speed window and on the PFD. When ECON MACH number may be resumed, the crew presses the FCU SPD selector.

In either of the above cases, the pilot may cancel the CLB or CRZ preselected SPD/MACH prior to activating the related phase, by selecting ECON on the PERF CLB or CRZ pages.

SPD LIM is defaulted to 250 knots below 10000 feet in the managed speed profile. This may be either cleared or modified on the VERT REV page at the origin (or a climb waypoint).

GLARESHIELD

— **Glareshield integral light and flood light** . . . . . **AS RQRD**

*— **BARO REF** . . . . . **SET**
· Set QNH on the EFIS control panel and on the standby altimeter
· Check barometer settings and altitude indications on the PFD and standby altimeter. (Tolerance limits are given in 3.04.34).

*— **FD** . . . . . **CHECK ON**

*— **LS** . . . . . **AS RQRD**

Note : Do not engage the autothrust on ground, as it may generate the AUTO FLT A/THR OFF warning at engine start.

* EFIS CONTROL PANEL

*— **ND mode and range** . . . . . **AS RQRD**
MODE : Display the ARC mode on the ND, if the takeoff direction is approximately the departure direction ; or, the ROSE NAV mode, if the direction change is to be more than 70° after takeoff (to allow the ND to display the area behind the aircraft).
RANGE : Set the minimum range to display the first waypoint after departure, or as required for weather radar.

*— **VOR/ADF selector** . . . . . **AS RQRD**
Display VOR and ADF needles, as needed.

* FCU

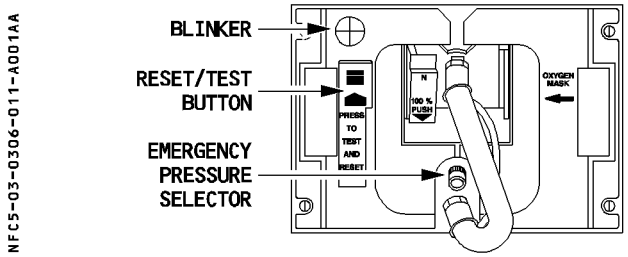
*— **SPD MACH window** . . . . . **DASHED**

*— **HDG V/S-TRK FPA** . . . . . **HDG V/S**

*— **ALT window** . . . . . **INITIAL EXPECTED CLEARANCE ALT**

LATERAL CONSOLES

OXYGEN MASK TEST



On the OXYGEN panel :

– **CREW SUPPLY . . . . . CHECK ON**

On the glareshield :

– **LOUDSPEAKERS . . . . . ON**

On the audio control panel :

– **INT reception knob . . . . . PRESS OUT-ADJUST**

– **INT/RAD switch . . . . . INT**

On the mask stowage box :

· Press and hold the reset/test button in the direction of the arrow.
  – Check that the blinker turns yellow for a short time, and then goes black.
· Hold the reset/test button down, and press the emergency pressure selector.
  – Check that the blinker turns yellow and remains yellow, as long as the emergency pressure selector is pressed.
  – Listen for oxygen flow through the loudspeakers. Warn any engineer, whose headset may be connected to the nose intercom, that a loud noise may be heard when performing this check.
· Check that the reset/test button returns to the up position and the N 100 % selector is in the 100 % position.

R · Press the emergency pressure selector again, and check that the blinker does not turn
R yellow. This ensures that the mask is not supplied.

On the ECAM DOOR/OXY page :

– **REGUL LO PR message . . . . . CHECK OFF**
· The crew must perform this check after having checked all masks. It ensures that the LP valve is open, (due to residual pressure between the LP valve and the oxygen masks, an LP valve failed in the closed position may not be detected during the oxygen mask test).

CM 1/2 INSTRUMENT PANELS

– **PFD and ND brightness knob . . . . . AS RQRD**
Check the ND outer ring to maximum range (radar display)

– **LOUDSPEAKER . . . . . SET**
One o'clock position.

R *– **PFD . . . . . CHECK**
– Check PFD/ND not transferred.
– Check for correct display when ATT and HDG are available.
– Check IAS, FMA, initial target ALT, altimeter readings, VSI, altimeter settings, heading and attitude display.

R *– **ND . . . . . CHECK**
– Check for correct display.
– Crosscheck compass indication on the ND and DDRMI.
– Check ground speed less than 5 knots, heading, initial waypoint, VOR ADF indications.

CTR INSTRUMENT PANEL

R *– **STBY ASI . . . . . CHECK**

R *– **STBY ALTI (and STBY ALTI in meter ◁) . . . . . CHECK**

R *– **STBY HORIZON . . . . . CHECK**
Check no flag – Erect if necessary.

R *** CLOCK**

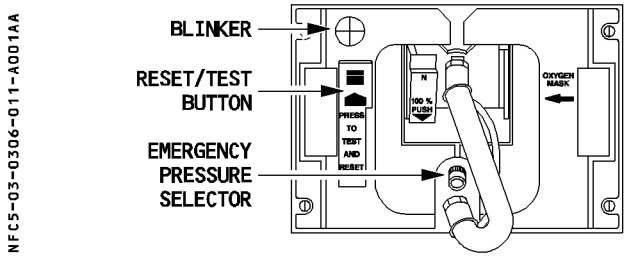
– **Check time adjust if necessary ; elapsed time at zero, chrono at zero.**

NOSEWHEEL STEERING

R *– **A/SKID & N/W STRG . . . . . ON**

LATERAL CONSOLES

OXYGEN MASK TEST



On the OXYGEN panel :

– **CREW SUPPLY . . . . . CHECK ON**

On the glareshield :

– **LOUDSPEAKERS . . . . . ON**

On the audio control panel :

– **INT reception knob . . . . . PRESS OUT-ADJUST**

– **INT/RAD switch . . . . . INT**

On the mask stowage box :

· Press and hold the reset/test button in the direction of the arrow.
  – Check that the blinker turns yellow for a short time, and then goes black.
· Hold the reset/test button down, and press the emergency pressure selector.
  – Check that the blinker turns yellow and remains yellow, as long as the emergency pressure selector is pressed.
  – Listen for oxygen flow through the loudspeakers. Warn any engineer, whose headset may be connected to the nose intercom, that a loud noise may be heard when performing this check.
· Check that the reset/test button returns to the up position and the N 100 % selector is in the 100 % position.

R · Press the emergency pressure selector again, and check that the blinker does not turn
R yellow. This ensures that the mask is not supplied.

On the ECAM DOOR/OXY page :

– **REGUL LO PR message . . . . . CHECK OFF**
· The crew must perform this check after having checked all masks. It ensures that the LP valve is open. (Due to residual pressure between the LP valve and the oxygen masks, an LP valve failed in the closed position may not be detected during the oxygen mask test).

CM 1/2 INSTRUMENT PANELS

– **PFD and ND brightness knob . . . . . AS RQRD**
Check the ND outer ring to maximum range (radar display).

– **LOUDSPEAKER . . . . . SET**
One o'clock position.

*– **PFD . . . . . CHECK**
– Check that the PFD/ND not transferred.
– Check for correct display, when ATT and HDG are available.
– Check IAS, FMA, initial target ALT, altimeter readings, VSI, altimeter settings, heading and attitude display.

*– **ND . . . . . CHECK**
– Check for the correct display, and crosscheck the compass indication on the ND and DDRMI.
– Check that the ground speed is less than 5 knots, and check heading, initial waypoint, VOR ADF indications.

CTR INSTRUMENT PANEL

*– **ISIS . . . . . CHECK**
– Adjust brightness, check IAS, altimeter readings, altimeter settings and attitude display.
– Check no flags - Reset attitude, if necessary.

Note : Use of the ISIS bugs function is not recommended (Refer to FCOM 1.34.25).

*** CLOCK**

– **Check time ; and adjust, if necessary ; elapsed time at zero, chrono at zero.**

NOSEWHEEL STEERING

*– **A/SKID & N/W STRG . . . . . ON**

PEDESTAL

ACP

– **INT knob . . . . . PRESS OUT / VOLUME CHECK**
Make sure that INT volume is turned up to permit contact with the ground crew.

– **VHF . . . . . CHECK**
Check transmission and reception.

– **HF (if required for flight) . . . . . CHECK**
· Check transmission and reception.
· Do not transmit on HF during refueling.

* WEATHER RADAR

*– **Power supply switch . . . . . CHECK OFF**

*– **WINDSHEAR switch (◁) . . . . . CHECK OFF**

*– **GAIN . . . . . AUTO**

*– **MODE . . . . . AS RQRD**

SWITCHING panel

– **SWITCHING panel . . . . . CHECK**
Check all selectors at NORM.

*** ECAM control panel**

*– **STS** . . . . . **PRESS**
Check that INOP SYS display is compatible with MEL.
If a message is displayed in MAINTENANCE STATUS, see PARKING procedure (Refer to 3.03.25).

*– **PRESS** . . . . . **PRESS**
Check that the CAB PRESS page displays LDG ELEV AUTO, to confirm the correct position of the LDG ELEV selector.

COCKPIT DOOR

If required by local Airworthiness Authorities :

– **ANN LT** . . . . . **TEST**
· Check that the OPEN and FAULT lights (on the pedestal), and the three LED lights (on the overhead panel) come on.

– **ANN LT** . . . . . **BRT**
· Check that all lights go off.

– **CKPIT DOOR** . . . . . **CHECK CORRECT OPERATION**
· Set the toggle switch to the UNLOCK position. Check that the door opens, and that the OPEN light comes on.
· Then, with the door fully open, release the toggle switch (check that it returns to the NORM position). Close the door. Check that it is locked, and that the OPEN indication goes off.

– **CKPIT DOOR MECHANICAL OVERRIDE** . . . . . **CHECK**
· Check that the door opens normally, and that it closes when the mechanical override is used.

***THRUST LEVERS**

*– **THRUST LEVERS . . . . . CHECK IDLE**

*** ENG**

*– **ENG MASTER switch . . . . . CHECK OFF**

*– **ENG MODE selector . . . . . CHECK NORM**

*** PARKING BRK**

*– **PARKING BRAKE . . . . . ON THEN OFF**
· Check pressure on the BRAKE PRESS indicator.
· If chocks are in place, release the parking brake to increase brake cooling.

GRAVITY GEAR EXTN

– **GRAVITY GEAR EXTN . . . . . CHECK STOWED**

ATC

– **ATC . . . . . SET FOR OPERATION**
R Perform the appropriate ATC selection to allow the ATC transponder to operate in mode
R S (refer to FCOM 1.34.50), TCAS is on standby. To prevent possible interference to radar
R surveillance systems, TCAS should not be selected before the holding point/lining up.

– **ALT RPTG . . . . . ON**

– **System 1 . . . . . SELECT**
Only system 1 is available, in emergency electrical configuration.

*** FMGS DATA CONFIRMATION**

*– **AIRFIELD DATA** . . . . . **CONFIRM**

*– **ATC CLEARANCE** . . . . . **OBTAIN**

*– **IRS ALIGN** . . . . . **CHECK**

R On the POSITION MONITOR page, check that the IRS are in NAV mode, and check that
R the distance between each IRS and the FMS position is lower than 5 NM. Select ND
R in ROSE-NAV or ARC mode, and confirm that the aircraft position is consistent with the
R position of the airport, the SID and the surrounding NAVAIDs.

*– **GROSS WEIGHT INSERTION** . . . . . **CHECK**

The PNF checks FMGS data.

*– **TO DATA** . . . . . **CALCULATE/CHECK**

The PNF calculates and check takeoff data.

*– **F-PLN A and B pages** . . . . . **CHECK**

· Select the EFIS CSTR pushbutton switch on.
· Ensure that the inserted F-PLN agrees with planned routes. (Refer to 4.05.10)
· If company policy requires it, use the scroll key to check the whole F-PLN thoroughly.
Tracks and distances between waypoints are displayed on the second line from the top of the MCDU. Compare them with the navigation charts, if necessary.
Check correct stringing, using ND in PLAN mode.
SID and EOSID tracks and distances must be checked from the appropriate navigation charts.

*** ATC**

*– **ATC CODE** . . . . . **SET**

*** FUEL**

*– **FUEL QTY** . . . . . **CHECK**

· Check that ECAM fuel on board corresponds to the F-PLN.
· Check that fuel imbalance is within limits.

***TAKEOFF BRIEFING**

R *– **TAKEOFF BRIEFING** . . . . . **PERFORM**

***PC DEDICATED TO MAINTENANCE** ◁

Check that the Personal Computer (PC) dedicated to maintenance use and located in front of lower stowage at RH rear corner is stowed.
Check that the light of its manual switch is off. If not, switch it off.
Check that its associated printer located in front of RH rear panel of the cockpit is stowed.

BEFORE PUSHBACK or START

– **LOADSHEET . . . . . CHECK**
The Captain should thoroughly check the Load and Trim Sheet (LTS), particularly for gross errors. Make sure that the loadsheet data is correct : Correct flight, correct aircraft, dry operating index, configuration, Fuel On Board, etc.
Compare the ZFW/ZFCG with the previously-entered data, and adjust if necessary.
R Check that the takeoff CG is within the LTS operational limits.

– **TAKEOFF DATA . . . . . PREPARE and CHECK/REVISE**
When the loadsheet is checked :
  – The PNF checks or recalculates the takeoff speeds and flexible temperature, using the RTOW charts.
  – The PF independently calculates the takeoff speeds and flexible temperature, as a crosscheck.
  Take particular care in determining the takeoff configuration. (Refer to 2.02.20).
  Confirm any takeoff weight limitation.
  – The PF checks (or revises) the takeoff data in the INIT B and PERF pages of the MCDU.

– **SEATS, SEAT BELTS, HARNESSES, RUDDER PEDALS, ARMRESTS . . . . ADJUST**
The seat is correctly adjusted, when the pilot's eyes are in line with the red and white balls.

– **MCDU . . . . . IN TAKEOFF CONFIGURATION**
It is recommended that the crew display F-PLN on the PNF side, and PERF TAKEOFF on the PF side.

– **EXT PWR . . . . . CHECK OFF**
Request that external power be removed.

– **BEFORE START CHECKLIST down to the line . . . . . COMPLETE**

– **PUSHBACK/START UP CLEARANCE . . . . . OBTAIN**
Obtain ATC pushback/startup clearance.
Obtain ground crew clearance.

– **NW STRG DISC . . . . . CHECK AS RQRD**
In case of pushback (conventional or towbarless), the nosewheel steering selector bypass pin must be in the tow position. The ECAM's NW STRG DISC, or N WHEEL STEERG DISC memos indicate this to the flight crew.

CAUTION
If NW STRG DISC is not displayed on the ECAM, but the ground crew confirms that the steering selector bypass pin is in the towing position, then the pushback must not be performed. This is to avoid possible nose landing gear damage upon green hydraulic pressurization.
To dispatch the aircraft in such a case, refer to the MMEL.

In case of a powerpush by the main landing gear, the nosewheel steering selector should remain in the normal position to steer the aircraft (Refer to 3.04.80).

– **WINDOWS and DOORS . . . . . CHECK CLOSED**
– Check that the cockpit windows are closed and locked.
– Check, on the ECAM lower display, that all the aircraft doors are closed.
– When required by local airworthines authorities, check that the cockpit door is closed and locked (no cockpit door open/fault indication).
If entry is requested, identify the person requesting entry before unlocking the door. With the cockpit door selector on NORM, the cockpit door is closed and locked. If entry is requested from the cabin, and if no further action is performed by the pilot, the cabin crew will be able to unlock the door by using the emergency access procedure. Except for crew entry/exit, the cockpit door should remain closed until engine shutdown.

– **BEACON . . . . . ON**

– **THR LEVERS . . . . . IDLE**

CAUTION
Engines will start, regardless of the thrust lever position ; thrust will rapidly increase to the corresponding thrust lever position, causing a hazardous situation, if thrust levers are not at IDLE.

BEFORE PUSHBACK or START

– **LOADSHEET . . . . . CHECK**
The Captain should thoroughly check the Load and Trim Sheet (LTS), particularly for gross errors. Make sure that the loadsheet data is correct : Correct flight, correct aircraft, dry operating index, configuration, Fuel On Board, etc.
Compare the ZFW/ZFCG with the previously-entered data, and adjust if necessary.
R Check that the takeoff CG is within the LTS operational limits.

– **TAKEOFF DATA . . . . . PREPARE and CHECK/REVISE**
When the loadsheet is checked :
  – The PNF checks or recalculates the takeoff speeds and flexible temperature, using the RTOW charts.
  – The PF independently calculates the takeoff speeds and flexible temperature, as a crosscheck.
  Take particular care in determining the takeoff configuration. (Refer to 2.02.20).
  Confirm any takeoff weight limitation.
  – The PF checks (or revises) the takeoff data in the INIT B and PERF pages of the MCDU.

– **SEATS, SEAT BELTS, HARNESSES, RUDDER PEDALS, ARMRESTS . . . . ADJUST**
The seat is correctly adjusted, when the pilot's eyes are in line with the red and white balls.

– **MCDU . . . . . IN TAKEOFF CONFIGURATION**
It is recommended that the crew display F-PLN on the PNF side, and PERF TAKEOFF on the PF side.

– **EXT PWR . . . . . CHECK OFF**
Request that external power be removed.

– **BEFORE START CHECKLIST down to the line . . . . . COMPLETE**

– **PUSHBACK/START UP CLEARANCE . . . . . OBTAIN**
Obtain ATC pushback/startup clearance.
Obtain ground crew clearance.

– **NW STRG DISC . . . . . CHECK AS RQRD**
In case of pushback (conventional or towbarless), the nosewheel steering selector bypass pin must be in the tow position. The ECAM's NW STRG DISC, or N WHEEL STEERG DISC memos indicate this to the flight crew.

CAUTION
If NW STRG DISC is not displayed on the ECAM, but the ground crew confirms that the steering selector bypass pin is in the towing position, then the pushback must not be performed. This is to avoid possible nose landing gear damage upon yellow hydraulic pressurization.
To dispatch the aircraft in such a case, refer to the MMEL.

In case of a powerpush by the main landing gear, the nosewheel steering selector should remain in the normal position to steer the aircraft (Refer to 3.04.80).

– **WINDOWS and DOORS . . . . . CHECK CLOSED**
– Check that the cockpit windows are closed and locked.
– Check, on the ECAM lower display, that all the aircraft doors are closed.
– When required by local airworthines authorities, check that the cockpit door is closed and locked (no cockpit door open/fault indication).
If entry is requested, identify the person requesting entry before unlocking the door. With the cockpit door selector on NORM, the cockpit door is closed and locked. If entry is requested from the cabin, and if no further action is performed by the pilot, the cabin crew will be able to unlock the door by using the emergency access procedure. Except for crew entry/exit, the cockpit door should remain closed until engine shutdown.

– **BEACON . . . . . ON**

– **THR LEVERS . . . . . IDLE**

CAUTION
Engines will start, regardless of the thrust lever position ; thrust will rapidly increase to the corresponding thrust lever position, causing a hazardous situation, if thrust levers are not at IDLE.

R — **PARKING BRAKE ACCU PRESS . . . . . CHECK**
R The ACCU PRESS indication must be in the green band.

— **PARKING BRAKE . . . . . AS RQRD**
— If no pushback is required, check that the PARKING BRK handle is ON, and check the BRAKES PRESS indication.

CAUTION
If, during engine start with parking brake on, the aircraft starts to move due to a parking brake failure, immediately release the PARKING BRK handle to restore braking by pedals.

— If pushback is required, set the PARKING BRK to OFF.

CAUTION
Do not use brakes during pushback, unless required due to an emergency.

After pushback is completed, set the PARKING BRAKE to ON and inform the ground crew to allow towbar to be disconnected.

— **BEFORE START CHECKLIST below the line . . . . . COMPLETE**

AUTOMATIC ENGINE START

Use the automatic engine start procedure in most circumstances. However, if the start aborts due to insufficient starter inlet air pressure (e.g. on high airfields, or in case of low pressure from an external pneumatic power group), it is recommended to use the manual start procedure, instead of the automatic procedure.
If, during the engine start, the ground crew reports a fuel leak from the engine drain mast, run the engine at idle for 5 minutes. If the leak disappears during these 5 minutes, the aircraft can be dispatched without maintenance action. If the leak is still present after 5 minutes, maintenance action may be required before the flight.

– **ENG MODE selector . . . . . IGN/START**
The lower ECAM displays the ENG page.

– **ANNOUNCE . . . . . "STARTING ENGINE 2"**
Engine 2 is usually started first (it powers the yellow hydraulic system, that pressurizes the parking brake).

– **MASTER switch 2 . . . . . ON**
· Do not turn the MASTER switch ON before all amber crosses (except on N1 and N2) and messages have disappeared on engine parameters (upper ECAM display).
· The N1 and N2 indications show amber crosses, until the actual N1 and N2 reach about 3.5%.

R

ON ECAM UPPER DISPLAY	ON ECAM LOWER DISPLAY
N2 increases	Corresponding start valve inline. Bleed pressure indication green. Oil pressure increases.
30 seconds after MASTER switch is ON : – FF increases.	Indication of the active igniter (A or B).
20 seconds (maximum) after fuel is on – EGT increases – N1 increases prior to 34 % N2.	
At 43 % N2	Igniter indication off.
Slightly above 43 % N2	Start valve crossline.

Note : When the FADEC detects an impending hung start or hot start, the FADEC applies an automatic recovery sequence without an ECAM message. The crew will notice that dual ignition (A+B) is applied, and that fuel will be commanded OFF, and then re-commanded ON within 0.5 seconds. It is not necessary for the crew to shut down the engine.

– Parameter callouts are not mandatory.
– In case the electrical power supply is interrupted during the start sequence (indicated by the loss of ECAM DUs), abort the start by switching OFF the MASTER switch. Then, perform a 30-second dry crank.

– **MAIN AND SECONDARY ENG. IDLE PARAMETERS . . . . . CHECK NORMAL**
At ISA sea level : N1 about 21.4 % EGT about 414° C
N2 about 57.8 % FF about 350 kg/h (775 lb/h)
EPR about 1.01
The grey background on the N2 indication disappears.

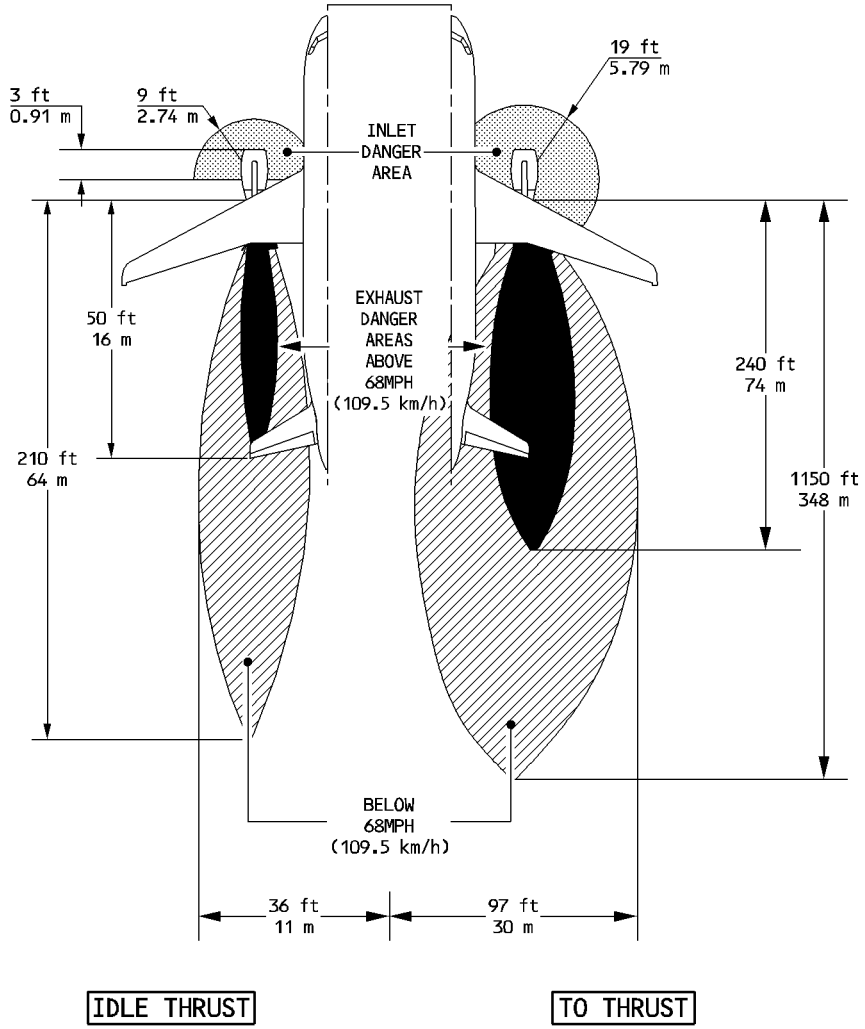
– **ANNOUNCE . . . . . "STARTING ENGINE 1"**

– **MASTER switch 1 . . . . . ON**
Same procedure as for engine 2.
Both pack valves reopen, with a 30–second delay, after the second engine N2 is above 50 %.

Note : A PTU FAULT is triggered, if the second engine is started within 40 seconds after ending the operation of the cargo doors.

R

GROUND RUN UP – DANGER AREAS



NFCS-03-0308-003-A035AA

AFTER START

– **ENG MODE selector** . . . . . **NORM**
- Turning the ENG MODE selector to NORM indicates the end of the start sequence. AFTER START actions may be performed.
- On ECAM lower display the WHEEL page replaces the ENG page .
- Leaving the ENG MODE selector at the START/IGN position would prevent continuous relight selection on the ground (would be supplied at lift off). In addition, the ENG page would remain displayed. The selector must be cycled to recover normal control of ignition and to display WHEEL page.
- After a shutdown period greater than two hours, to avoid thermal shock, the pilot should operate the engine at idle or near idle for at least 5 minutes before advancing the thrust lever to high power. Taxi time at idle may be included in the warm-up period.

– **APU BLEED** . . . . . **OFF**
- Turn APU BLEED off just after engine start to avoid ingesting engine exhaust gases.
- APU BLEED valve closes, ENG BLEED valves open.

– **GROUND SPOILERS** . . . . . **ARM**

– **RUD TRIM** . . . . . **ZERO**
If RUD TRIM position indication is not at zero, press the RESET pushbutton.

– **FLAPS lever** . . . . . **SET**
- Set flaps for takeoff.
- Check their position on the ECAM upper display.
- If taxiing in slush, keep the flaps retracted until reaching the holding point before takeoff.

– **PITCH TRIM** . . . . . **SET**
Set takeoff CG on pitch trim wheel.

– **ECAM STATUS** . . . . . **CHECK**
- Check that there is no status reminder (STS) on the ECAM upper display.
- If the status reminder is displayed, press the STS pushbutton.

AFTER START

– **ENG MODE selector** . . . . . **NORM**
- Turning the ENG MODE selector to NORM indicates the end of the start sequence. AFTER START actions may be performed.
- On ECAM lower display the WHEEL page replaces the ENG page .
- Leaving the ENG MODE selector at the START/IGN position would prevent continuous relight selection on the ground (would be supplied at lift off). In addition, the ENG page would remain displayed. The selector must be cycled to recover normal control of ignition and to display WHEEL page.
- After a shutdown period greater than two hours, to avoid thermal shock, the pilot should operate the engine at idle or near idle for at least 5 minutes before advancing the thrust lever to high power. Taxi time at idle may be included in the warm-up period.

– **APU BLEED** . . . . . **OFF**
- Turn APU BLEED off just after engine start to avoid ingesting engine exhaust gases.
- APU BLEED valve closes, ENG BLEED valves open.

– **GROUND SPOILERS** . . . . . **ARM**

– **RUD TRIM** . . . . . **ZERO**
If RUD TRIM position indication is not at zero, press the RESET pushbutton.

– **FLAPS lever** . . . . . **SET**
- Set flaps for takeoff.
- Check their position on the ECAM upper display.
- If taxiing in slush, keep the flaps retracted until reaching the holding point before takeoff.

– **PITCH TRIM** . . . . . **SET**
Set takeoff CG on pitch trim wheel.

– **ECAM STATUS** . . . . . **CHECK**
- Check that there is no status reminder (STS) on the ECAM upper display.
- If the status reminder is displayed, press the STS pushbutton.

– **ENG ANTI ICE . . . . . AS RQRD**

Note : Icing conditions may be expected when the OAT (on the ground and for takeoff), or when TAT (in flight) is 10° C or below with visible moisture in the air, or standing water, slush, ice or snow is present on the taxiways or runways.

· During ground operation when engine anti-ice is required and the OAT is plus 3 deg C or less, periodic engine run-up to as high a thrust setting as practical (50 % N1 recommended) may be performed at the pilot's discretion to centrifuge any ice from the spinner, fan blades, and low compressor stators. There is no requirement to sustain the high thrust setting. The run-ups should be performed at intervals not greater than 15 minutes.
Subsequent takeoff under these conditions should be preceded by a static run-up, to as high a thrust as practical (50 % N1 recommended), with observation of all primary parameters to ensure normal engine operation.

Note : When performing the static run-up, the 61–74 % N1 range should be avoided.

· If ENG ANTI ICE is selected ON and the valve(s) do not open (FAULT light(s) remain on, increase the N2 of the associated engine by about 5 %.
When the valves are open, retard the thrust lever(s) to idle.
· IGNITION memo appears on ECAM as continuous ignition is automatically selected.

– **WING ANTI ICE . . . . . AS RQRD**
When wing ANTI ICE is switched on, on ground, the anti-ice valves open for about 30 seconds (test sequence) then close as long as the aircraft is on ground.

– **APU MASTER switch (if APU not required) . . . . . OFF**
· The AVAIL light goes off, after the APU cooling period.

– **ECAM DOOR page . . . . . SELECT**
· Check that all slides are armed.
· Deselect the DOOR page after verifying the slides.

– **ANNOUNCE . . . . . "CLEAR TO DISCONNECT"**
Request : Chocks removed.
Nosewheel steering bypass pin removed (NW STRG DISC memo not displayed).
Interphone disconnect
Hand signal on the left/right side

– **AFTER START CHECKLIST . . . . . COMPLETE**

TAXI

– **TAXI clearance** . . . . . **OBTAIN**

R – **NOSE light** . . . . . **TAXI**
Turn on the nosewheel light to TAXI day and night.
R RWY TURN OFF lights may be switched ON, as required.

– **PARKING BRAKE** . . . . . **OFF**
Check that brake pressure is zero (triple indicator). Slight residual pressure may be indicated for a short period of time.

– **ELAPSED TIME** . . . . . **AS RQRD**
If ACARS is not installed, start ELAPSED TIME to record block time.

– **THRUST LEVERS** . . . . . **AS RQRD**
· Little, if any, power above idle thrust will be needed to get the aircraft moving (40 % N1 maximum). Thrust should normally be used symmetrically. Once the aircraft starts to move, little thrust is required.
· Use of the engine anti-ice increases ground idle thrust, so the pilot must use care on slippery surfaces.
· The engines are close to the ground. Avoid positioning them over unconsolidated, or unprepared ground (beyond the edge of the taxiways, for example).
Avoid high thrust settings at low ground speeds, which increase the risk of ingestion (FOD), and the risk of projection of debris towards the trimmable horizontal stabilizer and towards the elevators.

– **BRAKES . . . . . CHECK**

– Once the aircraft starts moving :

· Check the brake efficiency of the normal braking system : The aircraft must slow down when pressing the brake pedals.

CAUTION

If the aircraft has been parked in wet conditions for a long period, the efficiency of the first brake application at low speed will be reduced.

· Also check that green pressure has taken over yellow pressure : The yellow
R pressure on the brake pressure triple indicator should remain at 0 when pressing the
R brake pedals. Although green hydraulic power supplies the braking system, each
R time pedals are quickly pressed, a brief brake pressure indication may appear on the
R BRAKE PRESS indicator.

– If a "spongy" pedal is felt during taxi, this indicates a degraded performance of the alternate braking system.

– If an arc is displayed on the ECAM WHEEL page, above the brake temperature, set the brake fans on (if installed).

– **FLIGHT CONTROLS . . . . . CHECK**

1. At a convenient stage, prior to or during taxi, and before arming the autobrake, the PF silently applies full longitudinal and lateral sidestick deflection.

R On the F/CTL page, the PNF checks full travel and the correct sense of all elevators and all ailerons, and the correct deflection and retraction of all spoilers.
The PNF calls out "full up", "full down", "neutral", "full left", "full right", "neutral", as each full travel/neutral position is reached.
The PF silently checks that the PNF calls are in accordance with the sidestick order.

Note : In order to reach full travel, full sidestick must be held for a sufficient period of time.

2. The PF presses the PEDAL DISC pushbutton on the nosewheel tiller, and silently applies full left rudder, full right rudder, and neutral. The PNF calls out "full left", "full right", "neutral", as each full travel/neutral position is reached.
3. The PNF applies full longitudinal and lateral sidestick deflection, and silently checks full travel and the correct sense of all elevators and all ailerons, and the correct deflection and retraction of all spoilers, on the ECAM F/CTL page.

Note : The F/CTL page is automatically displayed for 20 seconds.

TAXI

– **TAXI clearance** . . . . . **OBTAIN**

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Turn on the nosewheel light to TAXI day and night.
R RWY TURN OFF lights may be switched ON, as required.

– **PARKING BRAKE** . . . . . **OFF**
Check that brake pressure is zero (triple indicator). Slight residual pressure may be indicated for a short period of time.

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If ACARS is not installed, start ELAPSED TIME to record block time.

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· Little, if any, power above idle thrust will be needed to get the aircraft moving (40 % N1 maximum). Thrust should normally be used symmetrically. Once the aircraft starts to move, little thrust is required.
· Use of the engine anti-ice increases ground idle thrust, so the pilot must use care on slippery surfaces.
· The engines are close to the ground. Avoid positioning them over unconsolidated, or unprepared ground (beyond the edge of the taxiways, for example).
Avoid high thrust settings at low ground speeds, which increase the risk of ingestion (FOD), and the risk of projection of debris towards the trimmable horizontal stabilizer and towards the elevators.

– **BRAKES . . . . . CHECK**

– Once the aircraft starts moving :

· Check the brake efficiency of the normal braking system : The aircraft must slow down when pressing the brake pedals.

CAUTION

If the aircraft has been parked in wet conditions for a long period, the efficiency of the first brake application at low speed will be reduced.

R · If an arc is displayed on the ECAM WHEEL page, above the brake temperature, set the brake fans on (if installed).

– **FLIGHT CONTROLS . . . . . CHECK**

1. At a convenient stage, prior to or during taxi, and before arming the autobrake, the PF silently applies full longitudinal and lateral sidestick deflection.

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The PF silently checks that the PNF calls are in accordance with the sidestick order.

Note : In order to reach full travel, full sidestick must be held for a sufficient period of time.

2. The PF presses the PEDAL DISC pushbutton on the nosewheel tiller, and silently applies full left rudder, full right rudder, and neutral. The PNF calls out "full left", "full right", "neutral", as each full travel/neutral position is reached.
3. The PNF applies full longitudinal and lateral sidestick deflection, and silently checks full travel and the correct sense of all elevators and all ailerons, and the correct deflection and retraction of all spoilers, on the ECAM F/CTL page.

Note : The F/CTL page is automatically displayed for 20 seconds.

INTENTIONALLY LEFT BLANK

– **ATC clearance** . . . . . **CONFIRM**

TAKEOFF DATA/CONDITIONS

If takeoff data has changed, or in case of a runway change, prepare updated takeoff data, as appropriate :

– **F-PLN (Runway)** . . . . . **REVISE**

– **FLAPS LEVER** . . . . . **AS APPROPRIATE**
Select takeoff position.

– **V1, VR, V2** . . . . . **REINSERT**

– **FLX TO temperature** . . . . . **REINSERT**

FMGS

– **F-PLN (SID,TRANS)** . . . . . **REVISE or CHECK**
Carefully confirm that the ATC clearance agrees with the FMGS, if NAV mode is to be used.

– **INITIAL CLIMB SPEED AND SPEED LIMIT** . . . . . **MODIFY or CHECK**
Use VERT REV at departure, or at a CLB waypoint.

– **CLEARED ALTITUDE ON FCU** . . . . . **SET**

– **HDG ON FCU** . . . . . **IF REQUIRED, PRESET**
· If a heading is required by the ATC after takeoff, in case of a radar vector departure, preset the heading on the FCU. NAV mode will be disarmed.
· RWY TRK mode will keep the aircraft on the runway track.

R – **FD** . . . . . **CHECK BOTH SELECTED ON**

– **FMA** . . . . . **CHECK**

– **FLIGHT INSTRUMENTS** . . . . . **CHECK**

R – **RADAR (if required)** . . . . . **ON**

– **PREDICTIVE WINDSHEAR SYSTEM** ◁ . . . . . **AUTO**

– **ATC code** . . . . . **CONFIRM/SET**

– **TERR ON ND** ◁ . . . . . **AS RQRD**
· In mountainous areas, consider displaying terrain on ND.
· If use of radar is required, consider selecting the radar display on the PF side, and TERR ON ND on the PNF side only.

– **AUTO BRK** . . . . . **MAX**
· ON light comes on.
· Autobrake may be armed, with the parking brake on.
· In the event of an aborted takeoff, selecting the MAX mode before takeoff improves safety.
If the takeoff must be aborted, the autobrake system applies maximum braking as soon as the thrust levers are set to idle, if the ground speed is above 72 knots.

R – **TAKEOFF BRIEFING** . . . . . **CONFIRM**

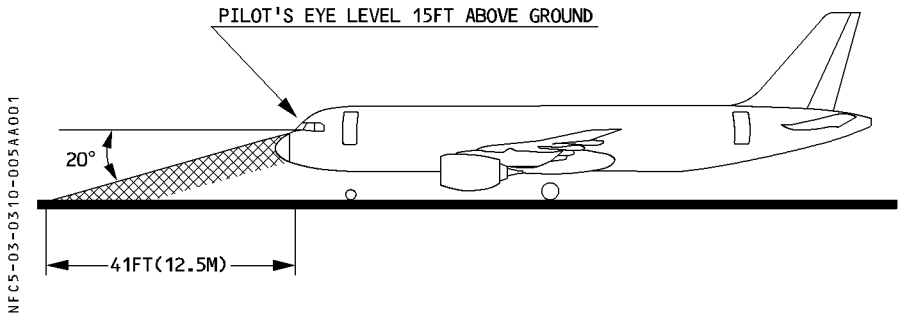
– **CABIN REPORT** . . . . . **RECEIVE**
Obtain cabin report from the purser, as a minimum : "CABIN SECURED FOR TAKEOFF"

– **TO CONFIG pushbutton** . . . . . **PRESS**
Check that ECAM upper display shows "TO CONFIG NORMAL".

– **TO MEMO** . . . . . **CHECK NO BLUE LINE**

– **BEFORE TAKEOFF CHECKLIST down to the line** . . . . . **COMPLETE**

VISUAL GROUND GEOMETRY

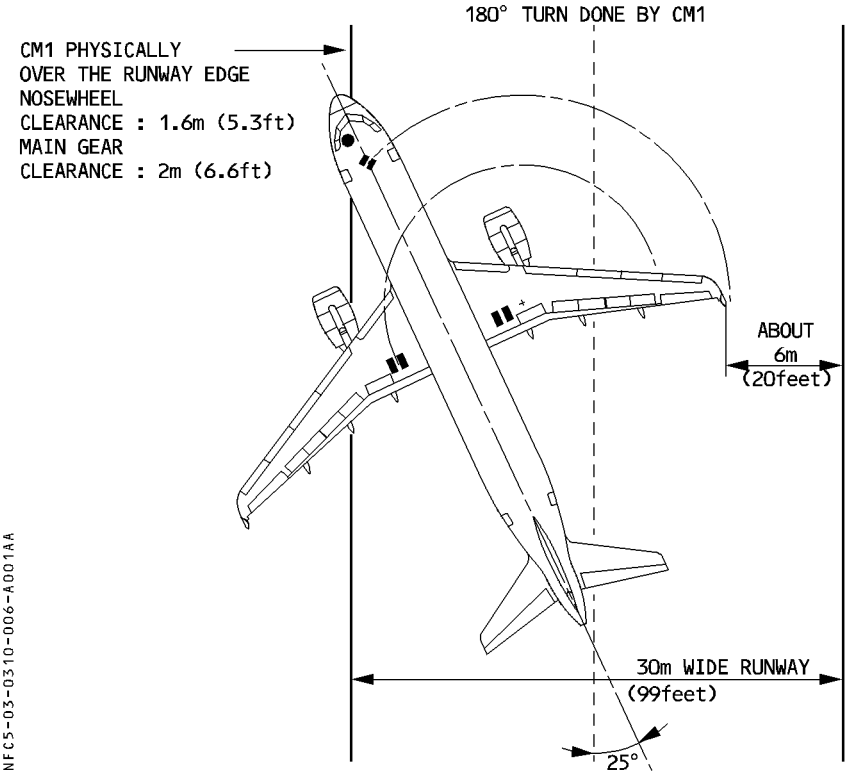


180° TURN ON RUNWAY

A standard runway is 45 meters wide. However, this aircraft only needs a pavement of 30 meters (99 feet) wide for a 180° turn.
The following procedure is recommended for making such a turn in the most efficient way.

- **FOR THE CM1**
  - Taxi on the right-hand side of the runway and turn left, maintaining 25° divergence from the runway axis. Maximum ground speed is 10 knots.
  - When the CM1 is physically over the runway edge, he turns the nosewheel full right and sets 50 % to 55 % N1 for CFM engines, or 1.05 EPR for IAE engines.
- **FOR THE CM2**
  The procedure is symmetrical. (Taxi on the left-hand side of the runway).

R



NFC5-03-0310-006-A001AA

Note : To avoid skidding the nosewheel on a wet runway, perform the turn at very low speed, using asymmetric thrust and differential braking as necessary.

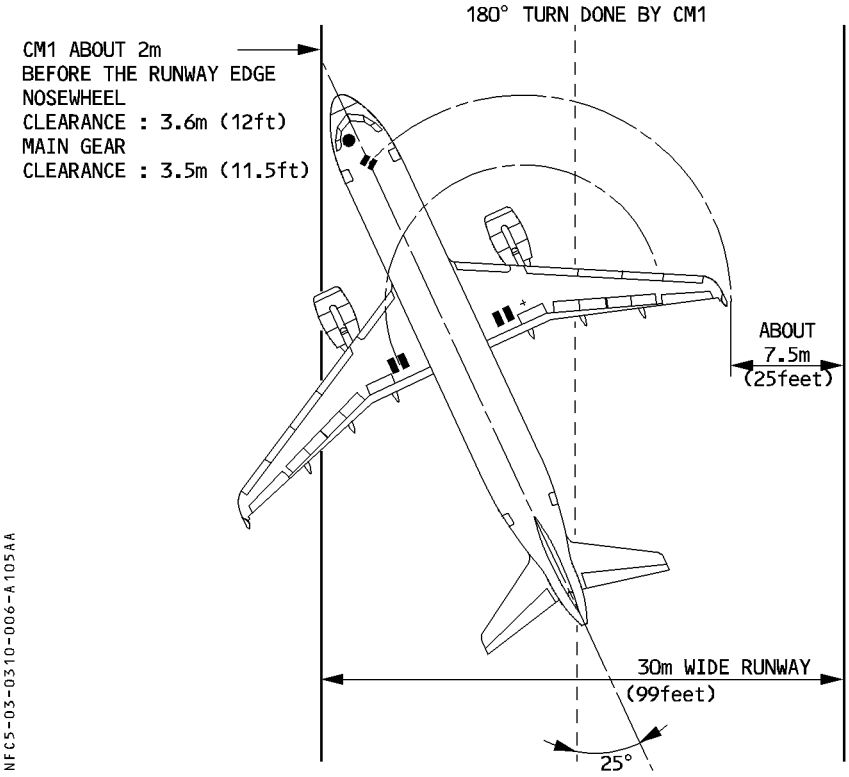
180° TURN ON RUNWAY

A standard runway is 45 meters wide. However, this aircraft only needs a pavement of 30 meters (99 feet) wide for a 180° turn.
The following procedure is recommended for making such a turn in the most efficient way.

- **FOR THE CM1**
  - Taxi on the right-hand side of the runway and turn left, maintaining 25° divergence from the runway axis. Maximum ground speed is 10 knots.
  - R When the CM1 is at about 2 meters before the runway edge, he turns the nosewheel full right and sets 40 % to 43 % N1 for CFM engines, or 1.05 EPR for IAE engines.
- **FOR THE CM2**

  The procedure is symmetrical. (Taxi on the left-hand side of the runway).

R



NFC5-03-0310-006-A105AA

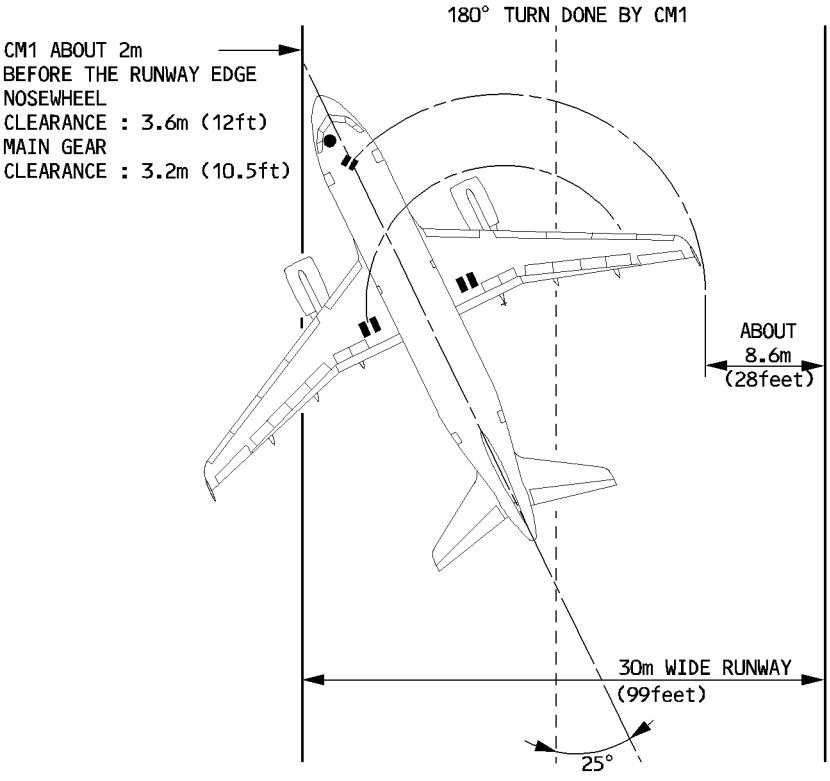
Note : To avoid skidding the nosewheel on a wet runway, perform the turn at very low speed, using asymmetric thrust and differential braking as necessary.

180° TURN ON RUNWAY

A standard runway is 45 meters wide. However, this aircraft only needs a pavement of 30 meters (99 feet) wide for a 180° turn.
The following procedure is recommended for making such a turn in the most efficient way.

- **FOR THE CM1**
  - Taxi on the right-hand side of the runway and turn left, maintaining 25° divergence from the runway axis. Maximum ground speed is 10 knots.
  - When the CM1 is at about 2 meters before the runway edge, he turns the nosewheel full right and sets asymmetrical thrust of about 35 % N1 on external engine with differential braking as necessary.
- **FOR THE CM2**

  The procedure is symmetrical. (Taxi on the left-hand side of the runway).



NFC5-03-0310-006-A110AA

BEFORE TAKEOFF

● **If the brake fans are running ◁ :**

– **BRAKE TEMP . . . . . CHECK**
· If brake temperature is above 150°C, delay takeoff.
· If brake temperature is below 150°C, select brake fans off.

– **TAKEOFF OR LINE UP CLEARANCE . . . . . OBTAIN**

– **APPROACH PATH CLEAR OF TRAFFIC . . . . . CHECK**

– **CABIN CREW . . . . . ADVISE**

– **ENG MODE selector . . . . . AS RQRD**
Select IGN START, if heavy rain or severe turbulence is expected after takeoff.

Note : Continuous ignition is automatically selected, if the ENG ANTI ICE pushbutton is ON.

– **TCAS (◁) Mode selector . . . . . TA or TA/RA**
The FAA recommends selecting TA mode :
– In case of known nearby traffic, which is in visual contact.
– At particular airports and during particular procedures, identified by an Operator as having a significant potential for unwanted or inappropriate resolution advisories (closely-spaced parallel runways, converging runways...)

– **PACK 1 and 2 . . . . . AS RQRD**
R Consider selecting packs OFF, or APU bleed ON.
R This will improve performance when using TOGA thrust.
R In case of a FLEX takeoff, selecting packs OFF or APU bleed ON will reduce takeoff EGT,
R and thus reduce maintenance costs.
The use of flex thrust may reduce maintenance costs. The effect is particularly
R significant with the first degrees of FLEX.
Use of APU bleed is not authorized, if wing anti-ice is to be used.

– **EXTERIOR LIGHTS** . . . . . **SET**
Set the RWY TURN OFF, LAND, and NOSE switches to ON/TO, in order to minimize bird strike hazard during takeoff.
Set the STROBE lights to ON, before entering the runway.

R – **SLIDING TABLE** ◁ . . . . . **STOW**

– **BEFORE TAKEOFF CHECKLIST below the line** . . . . . **COMPLETE**
Read the checklist below the line, when line up or takeoff clearance is received.

– **EXTERIOR LIGHTS** . . . . . **SET**
Set the RWY TURN OFF, LAND, and NOSE switches to ON/TO, in order to minimize bird strike hazard during takeoff.
Set the STROBE lights to ON, before entering the runway.

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– **BEFORE TAKEOFF CHECKLIST below the line** . . . . . **COMPLETE**
Read the checklist below the line, when line up or takeoff clearance is received.

TAKEOFF

Rolling takeoff is permitted.

– **ANNOUNCE . . . . . « TAKEOFF »**

– **BRAKES . . . . . RELEASE**

● **If the crosswind is at or below 20 knots and there is no tailwind :**

– **THRUST LEVERS . . . . . FLX or TOGA**
  – To counter the nose-up effect of setting engine takeoff thrust, apply half forward stick until the airspeed reaches 80 knots. Release the stick gradually to reach neutral at 100 knots.
R – PF progressively adjusts engine thrust in two steps :
  · from idle to about 50 % N1 (1.05 EPR).
  · from both engines at similar N1 to takeoff thrust.
    * Once the thrust is set, the captain keeps his hand on the thrust levers until the aircraft reaches V1.

● **In case of tailwind or if crosswind is greater than 20 knots :**

– **THRUST LEVERS . . . . . FLX or TOGA**
R – PF applies full forward stick.
  – PF sets 50 % N1 (1.05 EPR) on both engines then rapidly increases thrust to about 70 % N1 (1.15 EPR) then progressively to reach takeoff thrust at 40 knots ground speed, while maintaining stick full forward up to 80 knots. Release stick gradually to reach neutral at 100 knots.
  – Once the thrust is set, the captain keeps his hand on the thrust levers until the aircraft reaches V1.

Note : ENG page replaces WHEEL page on the ECAM lower display.

– **DIRECTIONAL CONTROL . . . . . USE RUDDER**
At 130 knots (wheel speed), the connection between nosewheel steering and the rudder pedals is removed. Therefore, in strong crosswinds, more rudder input will be required at this point to prevent the aircraft from turning into the wind.

– **CHRONO . . . . . START**

– **PFD/ND . . . . . SCAN**
· Check the Flight Mode Annunciator on the PFD :
R MAN TOGA (MAN FLX xx), SRS, RWY (or blank).
· Check the FMGS position (aircraft on runway centerline).

● **Before reaching 80 knots :**

– **TAKEOFF N1 . . . . . CHECK**
Check that the actual N1 of the individual engines has reached the N1 rating limit, before the aircraft reaches 80 knots. Check EGT.

Note : If there is a discrepancy of more than 1 % of N1 between the engines, it should be entered in the logbook after the flight.

R – **ANNOUNCE . . . . . THRUST SET**

– **PFD and ENG indications . . . . . SCAN**
· Scan airspeed, N1, and EGT throughout the takeoff.

– **ANNOUNCE . . . . . "ONE HUNDRED KNOTS"**
· The PF crosschecks the speed indicated on the PFD and announces "checked".
· Below 100 knots the Captain may decide to abort the takeoff, depending on the circumstances.
· Above 100 knots, rejecting the takeoff is a more serious matter.

– **ANNOUNCE . . . . . "V1"**

– **ANNOUNCE . . . . . "ROTATE"**

TAKEOFF

Rolling takeoff is permitted.

– **ANNOUNCE . . . . . « TAKEOFF »**

– **BRAKES . . . . . RELEASE**

● **If the crosswind is at or below 20 knots and there is no tailwind :**

– **THRUST LEVERS . . . . . FLX or TOGA**

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– **THRUST LEVERS . . . . . FLX or TOGA**

R – PF applies full forward stick.

– PF sets 50 % N1 (1.05 EPR) on both engines then increases thrust progressively to reach takeoff thrust at 40 knots ground speed, while maintaining stick full forward up to 80 knots. Release stick gradually to reach neutral at 100 knots.

– Once the thrust is set, the captain keeps his hand on the thrust levers until the aircraft reaches V1.

Note : ENG page replaces WHEEL page on the ECAM lower display.

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At 130 knots (wheel speed), the connection between nosewheel steering and the rudder pedals is removed. Therefore, in strong crosswinds, more rudder input will be required at this point to prevent the aircraft from turning into the wind.

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– **PFD/ND . . . . . SCAN**
· Check the Flight Mode Annunciator on the PFD :
R MAN TOGA (MAN FLX xx), SRS, RWY (or blank).
· Check the FMGS position (aircraft on runway centerline).

● **Before reaching 80 knots :**

– **TAKEOFF EPR . . . . . CHECK**
Check that the actual EPR of the individual engines has reached the EPR rating limit, before the aircraft reaches 80 knots. Check EGT.

R – **ANNOUNCE . . . . . THRUST SET**

– **PFD and ENG indications . . . . . SCAN**
· Scan airspeed, EPR, and EGT throughout the takeoff.

– **ANNOUNCE . . . . . "ONE HUNDRED KNOTS"**
· The PF crosschecks the speed indicated on the PFD and announces "checked".
· Below 100 knots the Captain may decide to abort the takeoff, depending on the circumstances.
· Above 100 knots, rejecting the takeoff is a more serious matter.

– **ANNOUNCE . . . . . "V1"**

– **ANNOUNCE . . . . . "ROTATE"**

– **ROTATION** . . . . . **PERFORM**

R · At VR, initiate the rotation to achieve a continuous rotation with a rate of about 3°/sec,
R towards a pitch attitude of 15° (12.5° if one engine is failed).
R · Minimize lateral inputs on ground and during the rotation, to avoid spoiler extension.
R · After lift-off, follow the SRS pitch command bar.

CAUTION

If a tailstrike occurs, avoid flying at an altitude requiring a pressurized cabin, and return to the originating airport for damage assessment.

– **ANNOUNCE** . . . . . **"POSITIVE CLIMB"**

– **ORDER** . . . . . **"GEAR UP"**

– **LDG GEAR** . . . . . **SELECT UP**

– **GRND SPLRS** . . . . . **DISARM**

– **EXTERIOR LIGHTS** . . . . . **SET**

Set NOSE & RWY TURN OFF light switches to OFF.
LAND lights may be left ON, depending on the airline policy or regulatory recommendation.

– **AP** . . . . . **AS RQRD**

Above 100 feet AGL, AP 1 or 2 may be engaged.

– **ANNOUNCE** . . . . . **"FMA"**

– **ANNOUNCE** . . . . . **"GEAR UP"**

● **At thrust reduction altitude (LVR CLB flashing on FMA)**

– **THRUST LEVERS . . . . . CL**
Move the thrust levers promptly to the CL detent, when the flashing LVR CLB prompt appears on the FMA. A/THR is now active.
In manual flight, the pilot must anticipate the change in pitch attitude in order to prevent the speed from decaying when thrust is reduced.

– **PACK 1 and 2 (if applicable) . . . . . ON**
· Select PACK 1 on after CLB thrust reduction.
· Select PACK 2 on after flap retraction.

Note : 1. Selecting pack on before reducing takeoff thrust would result in an EGT increase.

R *2. PACK 2 may be selected earlier, but not sooner than 10 seconds after PACK*
R *1 is selected on, for passenger comfort.*

3. If packs are not switched on after the takeoff phase, an ECAM caution will
R *be triggered.*

● **At acceleration altitude :**

– **ANNOUNCE FMA . . . . . "THR CLB/OP CLB" or "THR CLB/CLB"**
Check the target speed change from V2 + 10 to the first CLB speed (either preselected or managed).

Note : 1. For most normal operations, thrust reduction and acceleration altitudes will be the same. So, the FMA will change from FLX/SRS/NAV to THR CLB/CLB/NAV.

2. If FCU-selected altitude is equal to or close to the acceleration altitude, then the FMA will switch from SRS to ALT.*

● **Above acceleration altitude (or once in climb phase) :**
The following procedure ensures that the aircraft is effectively accelerating toward climb speed.

• **At F speed**

– **ORDER . . . . . "FLAPS 1"**

– **FLAPS 1 . . . . . SELECT**

R – **CONFIRM/ANNOUNCE . . . . . "FLAPS 1"**

Note : For takeoff in CONF 1 + F, "F" speed is not displayed.

• **At S speed**

– **ORDER . . . . . "FLAPS ZERO"**

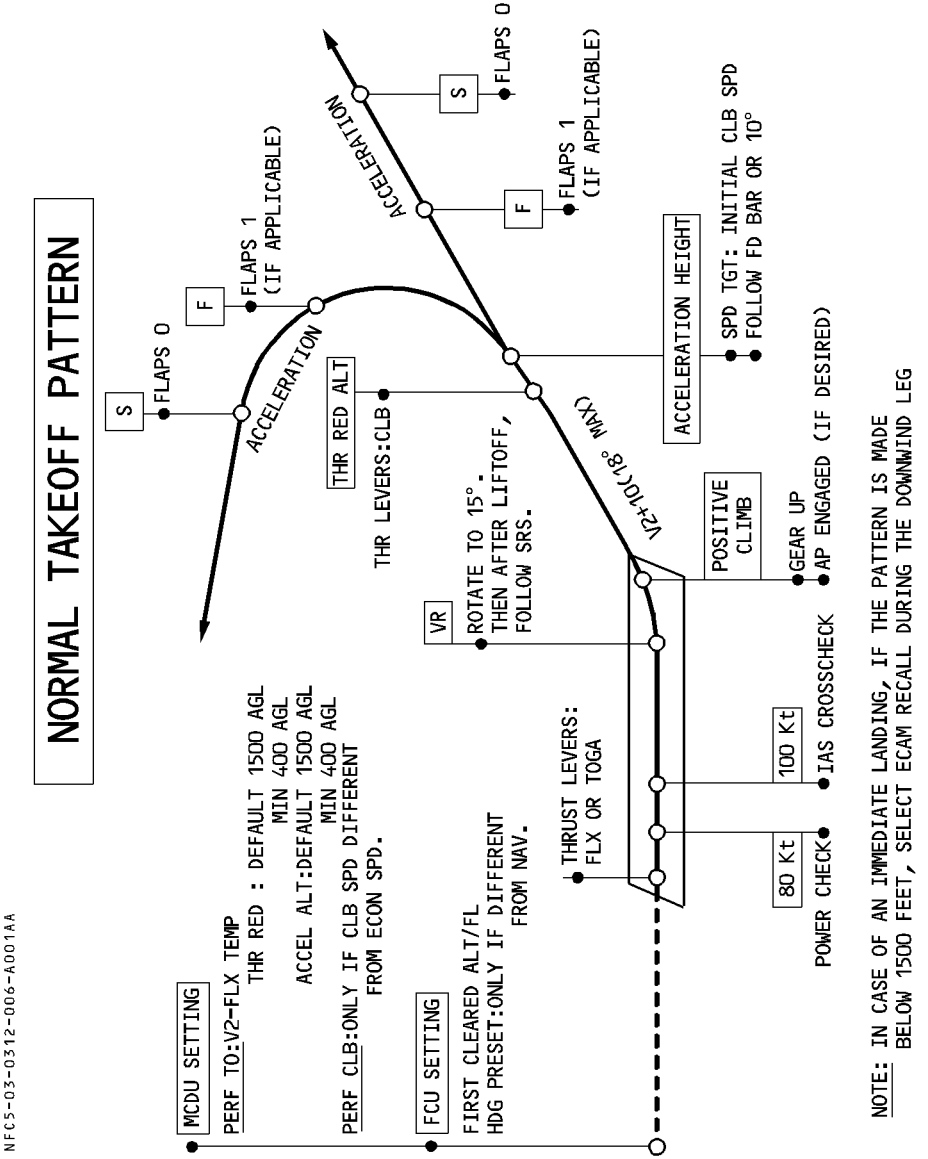
– **FLAPS ZERO . . . . . SELECT**

R – **CONFIRM/ANNOUNCE . . . . . "FLAPS ZERO"**

Note : CRUISE page replaces ECAM ENG page.

– **DERATED CLB OPS ◁ . . . . . REFER TO 3.04**

R


NORMAL TAKEOFF PATTERN
S
FLAPS 0
F
FLAPS 1
(IF APPLICABLE)
ACCELERATION
ACCELERATION
S
FLAPS 0
F
FLAPS 1
(IF APPLICABLE)
THR RED ALT
THR LEVERS:CLB
VR
ROTATE TO 15°.
THEN AFTER LIFTOFF,
FOLLOW SRS.
V2+10(18° MAX)
ACCELERATION HEIGHT
SPD TGT: INITIAL CLB SPD
FOLLOW FD BAR OR 10°
POSITIVE
CLIMB
GEAR UP
AP ENGAGED (IF DESIRED)
MCDU SETTING
PERF TO:V2-FLX TEMP
THR RED : DEFAULT 1500 AGL
MIN 400 AGL
ACCEL ALT:DEFAULT 1500 AGL
MIN 400 AGL
PERF CLB:ONLY IF CLB SPD DIFFERENT
FROM ECON SPD.
FCU SETTING
FIRST CLEARED ALT/FL
HDG PRESET:ONLY IF DIFFERENT
FROM NAV.
THRUST LEVERS:
FLX OR TOGA
80 Kt
100 Kt
POWER CHECK
IAS CROSSCHECK
NOTE: IN CASE OF AN IMMEDIATE LANDING, IF THE PATTERN IS MADE
BELOW 1500 FEET, SELECT ECAM RECALL DURING THE DOWNWIND LEG
NFC5-03-0312-006-A001AA

AFTER TAKEOFF

– **APU BLEED . . . . . AS RQRD**
If the APU has been used to supply air conditioning during takeoff, set the APU BLEED to OFF. For use of the APU BLEED, refer to the APU LIMITATION Chapter (3.01.49).

– **APU MASTER switch . . . . . AS RQRD**

– **ENG MODE selector . . . . . AS RQRD**
Select IGN, if severe turbulence or heavy rain is encountered.

– **TCAS (◁) Mode selector . . . . . TA/RA**
Select TA/RA, if the takeoff has been performed with TA only.

– **ANTI ICE PROTECTION . . . . . AS RQRD**
R ENG ANTI ICE should be ON, when icing conditions are expected with a TAT at, or
R below, 10°C.

Note : With ENG ANTI ICE ON, the FADEC automatically selects continuous ignition. The IGNITION memo appears on ECAM.

– **AFTER TAKEOFF/CLIMB CHECKLIST down to the line . . . . . COMPLETE**

CLIMB

– **Normal vertical mode is CLB or OP CLB with managed speed active.**

R – **PF MCDU . . . . . PERF CLB**

· PF MCDU should be showing the PERF CLB page (allowing PF to monitor when the aircraft will reach the FCU selected altitude) but he may select other pages such as F-PLN page as may be tactically necessary.
With the AP engaged, the PF will make any required flight plan revisions.

· The MCDU PROG page displays OPT FL and MAX REC FL. It is worth noting that this OPT FL is a function of the cost index.

· The displayed MAX REC FL gives the aircraft at least a 0.3 g buffet margin. The pilot may enter a cruise flight level above this level into the MCDU and the FMGS will accept it, provided that it does not exceed the level at which the margin is reduced to 0.2 g.

– **PNF MCDU . . . . . F-PLN**

PNF MCDU should be showing the F-PLN page (allowing him to enter any ATC long-term revisions to the lateral or vertical flight plan).

– **CLIMB SPEED MODIFICATIONS :**

● **If ATC, turbulence or operational considerations lead to a speed change :**

Select the new speed with FCU SPD selection knob and pull. Speed target is now "selected". To return to managed speed mode, push FCU SPD selection knob. The speed target is now "managed".

Note : The best speed (and rate of climb) for long-term situations lies between green dot speed and ECON speed. At high altitude, acceleration from green dot to ECON speed can take a long time.

– **EXPEDITE CLIMB** ◁

● **If ATC requires a rapid climb through a particular level :**

Push the EXP pushbutton on the FCU. The target speed is now green dot speed.
FMA : THR CLB/EXP CLB/NAV

Note : Use EXP (◁) only for short-term tactical situations. For the best overall economy fly at ECON IAS.
To return to ECON CLB speed :
Push ALT selector knob.
Check FMA : THR CLB/CLB/NAV

– **BARO REF . . . . . SET**
· At transition altitude (baro setting flashing on PFD) set STD on the EFIS control panel and STBY ALT.
· Cross-check baro settings and altitude readings.

– **CRZ FL . . . . . SET AS RQRD**
· If ATC clears the aircraft to its intended CRZ FL or above, there is no need to modify the CRZ FL entered in the INIT A page during cockpit preparation. The FCU will automatically take into account a higher CRZ FL selected with the FCU ALT knob.
· If ATC limits CRZ FL to a lower level than the one entered in the INIT A page (or present on the PROG page) the flight crew must insert this lower CRZ FL in the PROG page. Otherwise there is no transition into CRZ phase : the managed speed targets and Mach are not modified, and SOFT ALT mode is not available. In that case FMA will display: MACH/ALT/NAV instead of MACH/ALT CRZ/NAV.

– **AFTER TAKEOFF/CLIMB CHECKLIST below the line . . . . . COMPLETE**

– **ENG ANTI ICE . . . . . AS RQRD**
ENG ANTI ICE should be ON when the aircraft encounters icing conditions, unless the SAT is below – 40° C.

– **RADAR TILT . . . . . ADJUST**

● **At 10 000 ft :**

R – **LAND lights . . . . . RETRACT**

– **SEAT BELTS . . . . . AS RQRD**

– **EFIS option . . . . . AS RQRD**
Select CSTR on one side, for grid MORA, and ARPT on the other side.

– **ECAM MEMO . . . . . REVIEW**

– **RAD NAV page . . . . . CHECK**
Clear manually tuned VORs from MCDU RAD NAV page.

– **SEC F-PLN page . . . . . AS RQRD**
Recopy the active flight plan in the secondary if an immediate return flight plan has been constructed previously.

– **OPT/MAX ALT . . . . . CHECK**

CRUISE

– **ECAM MEMO** . . . . . **REVIEW**

– **ECAM SYS PAGES** . . . . . **REVIEW**

Periodically review system display pages and, in particular :

ENG : Oil pressure and temperature
BLEED : BLEED parameters
ELEC : Parameters, GEN loads
HYD : A slight decrease in quantity is normal.
Fluid contraction during cold soak can be expected.
Green system is lower than on ground, following landing gear retraction.
FUEL : Fuel distribution.
COND : Duct temperature, compared with zone temperature.
Avoid large differences for passenger comfort.
FLT CTL : Note any unusual control surface position.

– **FLIGHT PROGRESS** . . . . . **CHECK**

Monitor flight progress in the conventional way.

When overflying a waypoint :

· Check track and distance to the next waypoint.

R When overflying the waypoint, or every 30 minutes :

· Check FUEL : Check FOB (ECAM), and fuel prediction (FMGC), and compare with the computer flight plan or the in-cruise quick-check table (Refer to 3.05.20).
Check that the sum of the fuel on board and the fuel used is consistent with the fuel on board at departure. If the sum is unusually greater than the fuel on board at departure, suspect a frozen fuel quantity indication. Maintenance action is due before
R the next flight. If the sum is unusually smaller than the fuel on board at departure, or
R if it decreases, suspect a fuel leak.

CAUTION

This check must also be performed each time a FUEL IMBALANCE procedure is necessary. Perform the check before applying the FUEL IMBALANCE procedure. If a fuel leak is confirmed, apply the FUEL LEAK procedure.

– **STEP FLIGHT LEVEL** . . . . . **AS APPROPRIATE**

(Refer to 3.05.15).

– **NAVIGATION ACCURACY . . . . . CHECK**

On aircraft equipped with GPS primary, no navigation accuracy check is required, as long as GPS PRIMARY is available.

Otherwise, navigation accuracy must be monitored, at all times but especially when any of the following occurs :

· IRS only navigation

· The PROG page displays LOW accuracy.

· "NAV ACCUR DOWNGRAD" appears on the MCDU.

R Methods for checking accuracy :

If the check is positive (error ≤ 3NM) : FM position is reliable.

– Use ND (ARC or NAV) and managed lateral guidance.

If the check is negative (error > 3NM) : FM position is not reliable.

– Use raw data for navigation and monitor it.

– If there is a significant mismatch between the display and the real position : Disengage MANAGED NAV mode and use raw data navigation (possibly switching to ROSE VOR, so as not to be misled by FM data).

R – **RADAR TILT . . . . . ADJUST**

– **CABIN TEMP . . . . . MONITOR**

Pay regular attention to the ECAM CRUISE page, in order to monitor passenger cabin temperatures and adjust them, as necessary.

● **If the oxygen mask has been used :**

– **OXYGEN MASK . . . . . CHECK**

Check that the oxygen mask has been properly stowed, as indicated in the FCOM 1.35.20.

DESCENT PREPARATION

Descent preparation and approach briefing can take approximately 10 minutes, so they should begin approximately 80 NM before top of descent.

– **LDG ELEV** . . . . . **CHECK**
Check on ECAM CRUISE page that LDG ELEV AUTO is displayed.

– **WEATHER AND LANDING INFORMATION** . . . . . **OBTAIN**
Check weather reports at ALTERNATE and DESTINATION airports. Airfield data should include runway in use for arrival.

FMGS

– **ARRIVAL page** . . . . . **COMPLETE/CHECK**
Insert TRANS, APPR, STAR, and APPR VIA if applicable. (Access by lateral revision at destination.)

– **F-PLN A page** . . . . . **CHECK**
Check speeds and altitude constraints.
Add new speed or altitude constraints if required.

– **PERF CRUISE page** . . . . . **CHECK**
Enter winds for descent at cruise flight level.
Modify the cabin descent rate if different pressure rate is required.

– **PERF DES page** . . . . . **CHECK**
Prior to descent, access PERF DES page and check ECON MACH/SPD. If a speed other than ECON is required, insert that MACH or SPD into the ECON field. This new MACH or SPD is now the one for the descent path and TOD computation, and it will be used for the managed speed descent profile (instead of ECON).
A speed limit of 250 knots below 10000 feet is the defaulted speed, in the managed speed descent profile. The flight crew may delete or modify it if necessary on the VERT REV at DEST page.

– **PERF APPR page . . . . . COMPLETE/CHECK**
– Enter the QNH, temperature, and wind at destination.

Note : The entered wind should be the average wind given by the ATC or ATIS. Do not enter gust values. For example, if the wind is 150/20-25, insert the lower speed 150/20 (ground speed mini-function will cope with the gust).

– Insert the MDA (MDH, if QFE used), or DH, whichever applies.

Note : To avoid undershooting the published MDA (MDH) during go-around, due to aircraft inertia during pull-up, some Authorities may require Operators to add a specific number of feet to the published MDA (MDH).

CAUTION

If the QNH altimeter setting is used for an aircraft with the QFE option, refer to 3.04.34.

Note : Changing the RWY or type of arrival (VOR, ILS) automatically erases the previous MDA/MDH or DH.

– Check or modify the landing configuration. Always select the landing configuration on the PERF APP page : CONF FULL in the normal landing configuration. CONF 3 should be considered, depending on the available runway length and go-around performance, or if windshear/severe turbulence is considered possible during approach.

R

– **GO-AROUND page . . . . . CHECK/MODIFY**
Check THR RED ALT and ACC ALT, and modify, if necessary.

– **RAD NAV page . . . . . CHECK**
Set navaids, as required, and check idents on the NDs (VOR-ADF) and PFDs (ILS). If a VOR/DME exists close to the airfield, select it and enter its ident in the BRG/DIST field of the PROG page, for NAV ACCY monitoring during descent.

DESCENT PREPARATION

Descent preparation and approach briefing can take approximately 10 minutes, so they should begin approximately 80 NM before top of descent.

– **LDG ELEV** . . . . . **CHECK**
Check on ECAM CRUISE page that LDG ELEV AUTO is displayed.

– **WEATHER AND LANDING INFORMATION** . . . . . **OBTAIN**
Check weather reports at ALTERNATE and DESTINATION airports. Airfield data should include runway in use for arrival.

FMGS

– **ARRIVAL page** . . . . . **COMPLETE/CHECK**
Insert TRANS, APPR, STAR, and APPR VIA if applicable. (Access by lateral revision at destination.)

– **F-PLN A page** . . . . . **CHECK**
Check speeds and altitude constraints.
Add new speed or altitude constraints if required.

– **DES WIND** . . . . . **CHECK**
Enter winds for descent starting at cruise flight level.

– **PERF CRUISE page** . . . . . **CHECK**
Modify the cabin descent rate if different pressure rate is required.

– **PERF DES page** . . . . . **CHECK**
Prior to descent, access PERF DES page and check ECON MACH/SPD. If a speed other than ECON is required, insert that MACH or SPD into the ECON field. This new MACH or SPD is now the one for the descent path and TOD computation, and it will be used for the managed speed descent profile (instead of ECON).
A speed limit of 250 knots below 10000 feet is the defaulted speed, in the managed speed descent profile. The flight crew may delete or modify it if necessary on the VERT REV at DEST page.

– **PERF APPR page . . . . . COMPLETE/CHECK**
– Enter the QNH, temperature, and wind at destination.

Note : The entered wind should be the average wind given by the ATC or ATIS. Do not enter gust values. For example, if the wind is 150/20-25, insert the lower speed 150/20 (ground speed mini-function will cope with the gust).

– Insert the MDA (MDH, if QFE used), or DH, whichever applies.

Note : To avoid undershooting the published MDA (MDH) during go-around, due to aircraft inertia during pull-up, some Authorities may require Operators to add a specific number of feet to the published MDA (MDH).

CAUTION

If the QNH altimeter setting is used for an aircraft with the QFE option, refer to 3.04.34.

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R

– **GO-AROUND page . . . . . CHECK/MODIFY**
Check THR RED ALT and ACC ALT, and modify, if necessary.

– **RAD NAV page . . . . . CHECK**
Set navaids, as required, and check idents on the NDs (VOR-ADF) and PFDs (ILS). If a VOR/DME exists close to the airfield, select it and enter its ident in the BRG/DIST field of the PROG page, for NAV ACCY monitoring during descent.

– **SEC F-PLN page** . . . . . **AS RQRD**
Before the top of descent, the SEC F-PLN should either be set to an alternate runway for destination, or to the landing runway in case of circling. In all cases, routing to the alternate should be available. If there is a last-minute runway change, then the flight crew only needs to activate the secondary F-PLN, without forgetting to set the new MDA or DH and navaids.

– **GPWS LDG FLAP 3** . . . . . **AS RQRD**
If the pilot plans on landing in FLAPS 3 configuration, the GPWS LDG FLAP 3 switch should be set to ON.

R – **APPROACH BRIEFING** . . . . . **PERFORM**

– **AUTO BRK** . . . . . **AS RQRD**
Use of autobrake is preferable.
Use of MAX mode is not recommended at landing.
On short or contaminated runways, use MED mode.
On long runways, LO mode is recommended.

Note : If, on very long runways, the flight crew anticipates that braking will not be needed, use of the autobrake is not necessary.

Firmly press the appropriate pushbutton, according to the runway length and condition, and check that the related ON light comes on.

– **DESCENT CLEARANCE** . . . . . **OBTAIN**
When clearance is obtained, set the ATC-cleared altitude (FL) on the FCU (also considering what is the safe altitude).
If the lowest safe altitude is higher than the ATC-cleared altitude, check with the ATC that this constraint applies.
If it is confirmed, set the FCU altitude to the safe altitude, until it is safe to go to the ATC-cleared altitude.

– **ANTI ICE PROTECTION** . . . . . **AS RQRD**
· During descent, ENG ANTI ICE must be ON when icing conditions are encountered. (Refer to 3.04.30 p. 1).
· With engine ANTI ICE ON, the FADEC automatically controls continuous ignition and selects a higher idle thrust which gives better protection against flame-out. The IGNITION memo appears on the ECAM.
· ANTI ICE ON reduces the descent path angle (when the engines are at idle). The pilot can compensate for this by increasing the descent speed, or by extending up to half speedbrakes.

DESCENT INITIATION

– **DESCENT . . . . . INITIATE**
The normal method of initiating the descent is to select DES mode at the FMGS calculated top of descent (TOD).

■ **If ATC requires an early descent :**
Use DES mode which will guide the aircraft down at a lower vertical speed in order to converge on the required descent path. (The pilot may use a V/S of – 1000 ft/mn).

■ **If ATC delays the descent :**
Beyond TOD, a DECELERATE message comes up on the PFD and MCDU. This suggests to the crew that it starts reducing speed towards green dot speed (with ATC permission). When cleared to descend, select DES mode with managed speed active.

DESCENT MONITORING

– **PF MCDU . . . . . PROG/PERF DES**
PF MCDU should be set to PROG or PERF DES page :
· PROG page in order to get VDEV or RQD DIST TO LAND/DIRECT DIST TO DEST information.
· PERF DES in order to get predictions down to any inserted altitude in DES/OP DES modes and EXP mode (◁).

R – **PNF MCDU . . . . . F-PLN**

– **DESCENT . . . . . MONITOR**
(Refer to FCOM 4 05.60)
– When flying in NAV mode, use DES mode.
The aircraft descends along the descent flight path : the PFD and PROG page display VDEV, and so it can be monitored. All constraints of the flight plan are taken into account for the guidance.
– When the aircraft is flying in HDG or TRK mode, and thus out of the lateral F-PLN, DES mode is not available.
However the PFD still displays VDEV, and this is useful whenever cross track error is small (up to 5 NM).
R The NDs show a level-off symbol ↘ along the flight path. Its position is based on the
R current active AP/FD and A/THR modes.
The flight crew can use this symbol to monitor the descent.
MCDU predictions assume a return to the lateral F-PLN and descent flight path.
Note that whenever the lateral mode is changed from NAV to HDG/TRK the vertical mode reverts to V/S at the value pertaining at the time of the mode change.
– From time to time during stabilized descent, the flight crew may select FPA to check that the remaining distance to destination is approximately the altitude change required divided by the FPA in degrees.

FPA (°) = △ FL/DIST (NM)

DESCENT ADJUSTMENT

To increase the rate of descent :
– Increase descent speed (by use of selected speed) if comfort and ATC permit. It is economically better (Time/Fuel) than the following procedures.
– Maintain high speed as long as possible. (SPD LIM may be suspended, subject to ATC clearance).
– If the aircraft is high and at high speed, it is more efficient to keep the high speed to ALT* and decelerate, rather than to mix descent and deceleration.
– If the aircraft goes below the desired profile, use SPEED and the V/S mode to adjust the rate of descent.

Note : EXPEDITE DESCENT.
If a high rate of descent is required, push the EXPED pushbutton ◁ on the FCU. The target speed for the descent now becomes Mach 0.8 or 340 knots, whichever is lower. The FMA will display THR IDLE/EXP DES/NAV.
To return to DES mode, push the FCU ALT knob.
To return to SPEED/V/S modes, pull the FCU V/S knob.
In all cases, monitor the FMA to ensure that the mode engages properly.

– **SPEEDBRAKES . . . . . AS RQRD**

In OPEN DES : Use speedbrakes to increase the rate of descent. The pilot may use up to half speedbrakes to maintain the required rate of descent, when engine anti-ice is used.

In DES mode : If the aircraft is on, or below, the flight path and the ATC requires a higher rate of descent, do not use speedbrakes because the rate of descent is dictated by the planned flight path. Thus, the A/THR may increase thrust to compensate for the increase in drag. In this case, use OPEN DES with speedbrakes.

Note : 1. If speedbrakes are used above 315 knots/M.75 with the AP engaged, their rate of retraction is low (total time for retraction from full extension is approximately 25 seconds). The ECAM memo page displays SPD BRAKES in amber until retraction is complete.
2. In order to avoid overshooting the altitude, due to speedbrake retraction in ALT mode, retract the speedbrakes at least 2000 feet before the selected altitude.*

R – **RADAR . . . . . ADJUST**

– **BARO REF . . . . . SET**

· Set QNH on the EFIS control panel and on the standby altimeter, when approaching the transition level and when cleared for an altitude.
· Crosscheck baro settings and altitude readings.

Note : When operating in low OAT, altitude corrections, as defined in 3.05.05 page 6, should be considered.

– **TERR ON ND ◁ . . . . . AS RQRD**

· In mountainous areas, consider displaying terrain on ND.
· If use of radar is required, consider selecting the radar display on the PF side, and TERR ON ND on the PNF side only.

– **ECAM STATUS** . . . . . **CHECK**
· Check that there is no status reminder on the upper ECAM display.
· If there is a status reminder, check the aircraft STATUS.
· Check the ECAM status page before completing the approach checks. Take particular note of any degradation in landing capability, or any other aspect affecting the approach and landing.

● **At 10 000 feet :**

– **LAND lights** . . . . . **ON**
LAND lights may be switched ON, according to the airline policy/regulatory recommendations.

– **SEAT BELTS** . . . . . **AS RQRD**

R – **EFIS option** . . . . . **CSTR**
R Select CSTR on both sides.

– **ILS pushbutton** . . . . . **AS RQRD**
Select ILS, if an ILS or LOC approach is intended.
The PFD displays the LOC and glide scales and deviation symbol, if there is a valid ILS signal.

– **RAD NAVAIDS** . . . . . **SELECTED/IDENTIFIED**
Ensure that appropriate radio navaids are tuned and identified.
For NDB approaches, manually select the reference navaid.

– **NAV ACCURACY** . . . . . **CHECK**
On aircraft equipped with GPS primary, no navigation accuracy check is required, as long as GPS PRIMARY function is available.
Otherwise, crosscheck NAV ACCURACY using the PROG page (BRG/DIST computed data), and the ND (VOR/DME raw data).
The navigation accuracy check determines which autopilot mode the flight crew should use for the approach, and the type of displays to be shown on the ND.

Note : EXPEDITE DESCENT.
If a high rate of descent is required, push the EXPED pushbutton ◁ on the FCU. The target speed for the descent now becomes Mach 0.8 or 340 knots, whichever is lower. The FMA will display THR IDLE/EXP DES/NAV.
To return to DES mode, push the FCU ALT knob.
To return to SPEED/V/S modes, pull the FCU V/S knob.
In all cases, monitor the FMA to ensure that the mode engages properly.

– **SPEEDBRAKES . . . . . AS RQRD**
In OPEN DES : Use speedbrakes to increase the rate of descent. The pilot may use up to half speedbrakes to maintain the required rate of descent, when engine anti-ice is used.
In DES mode : If the aircraft is on, or below, the flight path and the ATC requires a higher rate of descent, do not use speedbrakes because the rate of descent is dictated by the planned flight path. Thus, the A/THR may increase thrust to compensate for the increase in drag. In this case, use OPEN DES with speedbrakes.

Note : 1. If speedbrakes are used above 315 knots/M.75 with the AP engaged, their rate of retraction is low (total time for retraction from full extension is approximately 25 seconds). The ECAM memo page displays SPD BRAKES in amber until retraction is complete.
2. In order to avoid overshooting the altitude, due to speedbrake retraction in ALT mode, retract the speedbrakes at least 2000 feet before the selected altitude.*

R – **RADAR . . . . . ADJUST**

– **BARO REF . . . . . SET**
· Set QNH on the EFIS control panel and on the standby altimeter, when approaching the transition level and when cleared for an altitude.
· Crosscheck baro settings and altitude readings.

Note : When operating in low OAT, altitude corrections, as defined in 3.05.05 page 6, should be considered.

– **TERR ON ND ◁ . . . . . AS RQRD**
· In mountainous areas, consider displaying terrain on ND.
· If use of radar is required, consider selecting the radar display on the PF side, and TERR ON ND on the PNF side only.

– **ECAM STATUS** . . . . . **CHECK**
· Check that there is no status reminder on the upper ECAM display.
· If there is a status reminder, check the aircraft STATUS.
· Check the ECAM status page before completing the approach checks. Take particular note of any degradation in landing capability, or any other aspect affecting the approach and landing.

● **At 10,000 feet :**

– **LAND lights** . . . . . **ON**
LAND lights may be switched ON, according to the airline policy/regulatory recommendations.

– **SEATBELTS** . . . . . **AS RQRD**

R – **EFIS option** . . . . . **CSTR**
R Select CSTR on both sides.

– **LS pushbutton** . . . . . **AS RQRD**
Select LS, if an ILS or LOC approach is intended.
The PFD displays the LOC and glide scales and deviation symbol, if there is a valid ILS signal.

– **RAD NAVAIDS** . . . . . **SELECTED/IDENTIFIED**
Ensure that appropriate radio navaids are tuned and identified.
For NDB approaches, manually select the reference navaid.

– **NAV ACCURACY** . . . . . **CHECK**
On aircraft equipped with GPS primary, no navigation accuracy check is required, as long as GPS PRIMARY function is available.
Otherwise, crosscheck NAV ACCURACY using the PROG page (BRG/DIST computed data), and the ND (VOR/DME raw data).
The navigation accuracy check determines which autopilot mode the flight crew should use for the approach, and the type of displays to be shown on the ND.

GENERAL

For more information about precision approaches and how to use the FMGS see FMGS pilot's guide (Refer to 4.05.70). The approach procedures described here assume that the flight crew uses managed speed guidance which is recommended.

INITIAL APPROACH

– **ENG MODE selector . . . . . AS RQRD**
Select IGN if the runway is covered with standing water, or if heavy rain or severe turbulence is expected during approach or go-around.

R – **SEAT BELTS . . . . . ON/AUTO**

– **APPROACH PHASE . . . . . CHECK/ACTIVATE**
· If the aircraft overflies the DECEL pseudo waypoint in NAV mode, the APPR phase activates automatically.
· If the aircraft is in HDG/TRK mode, approximately 15 NM from touchdown activate and
R confirm APPROACH phase on the MCDU.

– **POSITIONING . . . . . MONITOR**
· In NAV mode, use VDEV information on the PFD and PROG page.
· In HDG or TRK mode, use the energy circle on ND representing the required distance to land.

– **MANAGED SPEED . . . . . CHECK**
If ATC requires a particular speed, then use selected speed. When the ATC speed constraint ("maintain 170 knots to the outer marker", for example) no longer applies, return to managed speed.

– **SPEEDBRAKES** . . . . . **AS RQRD**

If the pilot uses speedbrakes to increase the rate of deceleration, or to increase the rate of descent, it is important to note that VLS with speedbrakes fully extended, in the clean configuration, may be higher than green dot speed and possibly than VFE FLAP 1. The A/THR in speed mode, or the pitch demand in OPEN DES, will limit the speed to VLS. In this situation, the pilot should begin to retract speedbrakes upon reaching VLS + 5 knots

and should select FLAP 1, as soon as speed is below VFE NEXT. The speedbrakes may then be extended, if necessary. The landing gear may always be extended out of sequence to facilitate deceleration.

– **NAV ACCURACY** . . . . . **MONITOR**

When GPS PRIMARY is available, no NAV ACCURACY monitoring is required.

When GPS PRIMARY is lost, check the PROG page to verify that the required navigation accuracy is appropriate to the flight phase. Monitor NAV accuracy, and be prepared to change approach strategy. If NAV ACCURACY DOWNGRAD occurs, use raw data to crosscheck navigation accuracy.

Navigation accuracy determines which autopilot modes the flight crew should use, and the type of displays to be shown on the ND.

<table>
<tr><th rowspan="2">NAVIGATION ACCURACY</th><th colspan="2">ND</th><th rowspan="2">AP/FD mode</th></tr>
<tr><th>PF</th><th>PNF</th></tr>
<tr><td>GPS PRIMARY</td><td colspan="2" rowspan="3">ARC or ROSE NAV with NAVAID raw data</td><td rowspan="3">NAV</td></tr>
<tr><td>NAV ACCUR HIGH</td></tr>
<tr><td>NAV ACCUR LOW and NAV ACCURACY check ≤ 1 NM</td></tr>
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</table>

R – **RADAR TILT** . . . . . **ADJUST**

– **APPROACH CHECKLIST** . . . . . **COMPLETE**

GENERAL

For more information about precision approaches and how to use the FMGS see FMGS pilot's guide (Refer to 4.05.70). The approach procedures described here assume that the flight crew uses managed speed guidance which is recommended.

INITIAL APPROACH

– **ENG MODE selector . . . . . AS REQD**
Select IGN if the runway is covered with standing water, or if heavy rain or severe turbulence is expected during approach or go-around.

R – **SEAT BELTS . . . . . ON/AUTO**

– **APPROACH PHASE . . . . . CHECK/ACTIVATE**
· If the aircraft overflies the DECEL pseudo waypoint in NAV mode, the APPR phase activates automatically.
· If the aircraft is in HDG/TRK mode, approximately 15 NM from touchdown activate and
R confirm APPROACH phase on the MCDU.

– **POSITIONING . . . . . MONITOR**
· In NAV mode, use VDEV information on the PFD and PROG page.
· In HDG or TRK mode, use the energy circle on ND representing the required distance to land.

– **MANAGED SPEED . . . . . CHECK**
If ATC requires a particular speed, then use selected speed. When the ATC speed constraint ("maintain 170 knots to the outer marker", for example) no longer applies, return to managed speed.

– **SPEEDBRAKES** . . . . . **AS RQRD**

If the pilot uses speedbrakes to increase the rate of deceleration, or to increase the rate of descent, it is important to note that VLS with speedbrakes fully extended, in the clean configuration, may be higher than green dot speed and possibly than VFE FLAP 1. The A/THR in speed mode, or the pitch demand in OPEN DES, will limit the speed to VLS. In this situation, the pilot should begin to retract speedbrakes upon reaching VLS + 5 knots and should select FLAP 1, as soon as speed is below VFE NEXT. The speedbrakes may then be extended, if necessary. The landing gear may always be extended out of sequence to facilitate deceleration.

– **NAV ACCURACY** . . . . . **MONITOR**

When GPS PRIMARY is available, no NAV ACCURACY monitoring is required.

When GPS PRIMARY is lost, check the PROG page to verify that the required navigation accuracy is appropriate to the flight phase. Monitor NAV accuracy, and be prepared to change approach strategy. If NAV ACCURACY DOWNGRAD occurs, use raw data to check navigation accuracy.

Navigation accuracy determines which autopilot modes the flight crew should use, the type of displays to be shown on the ND, as well as the use of EGPWS.

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R – **RADAR TILT** . . . . . **ADJUST**

– **APPROACH CHECKLIST** . . . . . **COMPLETE**

GENERAL

For more information about precision approaches and how to use the FMGS see FMGS pilot's guide (Refer to 4.05.70). The approach procedures described here assume that the flight crew uses managed speed guidance which is recommended.

Note : If the forecasted tail wind at landing is greater than 10 knots, decelerated approach is not allowed, and the speed should be stabilized around VREF + 5 knots in final.

INITIAL APPROACH

– **ENG MODE selector . . . . . AS RQRD**
Select IGN if the runway is covered with standing water, or if heavy rain or severe turbulence is expected during approach or go-around.

R – **SEAT BELTS . . . . . ON/AUTO**

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R – **RADAR TILT** . . . . . **ADJUST**

– **APPROACH CHECKLIST** . . . . . **COMPLETE**

GENERAL

For more information about precision approaches and how to use the FMGS see FMGS pilot's guide (Refer to 4.05.70). The approach procedures described here assume that the flight crew uses managed speed guidance which is recommended.

Note : If the forecasted tail wind at landing is greater than 10 knots, decelerated approach is not allowed, and the speed should be stabilized around VREF + 5 knots in final.

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Select IGN if the runway is covered with standing water, or if heavy rain or severe turbulence is expected during approach or go-around.

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– **NAV ACCURACY** . . . . . **MONITOR**

When GPS PRIMARY is available, no NAV ACCURACY monitoring is required.

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R – **RADAR TILT** . . . . . **ADJUST**

– **APPROACH CHECKLIST** . . . . . **COMPLETE**

INTERMEDIATE/FINAL APPROACH (ILS approach entered in the F-PLN)

The objective is to be stabilized on the final descent path at VAPP, thrust above idle, in the
R landing configuration, at 1000 feet in instrument conditions, or at 500 feet in visual
R conditions, after continuous deceleration on the glideslope.
To be stabilized, all of the following conditions must be achieved prior to, or upon, reaching this stabilization height :

- The aircraft is on the correct lateral flight plan,
- The aircraft is in the desired landing configuration,
- The thrust is stabilized above idle, to maintain the target speed on the desired glide path,
R - No excessive flight parameter deviation.

If the aircraft is not stabilized on the approach path in landing configuration, at 1000 feet in instrument conditions, or at 500 feet in visual conditions, or as restricted by Operator policy/regulations, a go-around must be initiated.

- **APPR pushbutton on FCU . . . . . PRESS**
  - Press the APPR pushbutton, only when ATC cleares the aircraft for the approach. This arms the LOC and G/S modes.
  - LOC and/or G/S capture modes will engage no sooner than 3 seconds after being armed.

- **Both APs . . . . . ENGAGE**
  When APPR mode is selected, both autopilots should be engaged.

AT GREEN DOT SPEED

- **ORDER . . . . . "FLAPS 1"**

- **FLAPS 1 . . . . . SELECT**

– **CONFIRM/ANNOUNCE . . . . . "FLAPS 1"**
– FLAPS 1 should be selected more than 3 NM before the FAF (Final Approach Fix).

Note : The ECAM automatically displays the STATUS page, if it is applicable, and if the flight crew has not already selected a system page manually.

– Check deceleration toward "S" speed.
– The aircraft must reach, or be established on, the glideslope with FLAPS 1 and S speed at, or above, 2 000 feet AGL.
– If the aircraft speed is significantly higher than S on the glideslope, or if the aircraft does not decelerate on the glideslope, extend the landing gear to slow it down. It is also possible to use speedbrakes. However, the flight crew should be aware that the use of speedbrakes causes an increase in VLS.

– **TCAS (◁) . . . . . TA or TA/RA**
The FAA recommends selecting TA only mode :
– In case of known nearby traffic, which is in visual contact.
– At particular airports, and during particular procedures, identified by an Operator as having a significant potential for unwanted or inappropriate resolution advisories (closely-spaced parallel runways, converging runway, low terrain along the final approach...).

– **FMA . . . . . CHECK**

– **LOC CAPTURE . . . . . MONITOR**
The flight crew must always monitor the capture of LOC beam. During this evolution, the associated deviation indications on the PFD and ND must indicate movement towards the center of the scale.

– **ANNOUNCE . . . . . "LOC*"**

– **G/S CAPTURE . . . . . MONITOR**

● **If above the glideslope :**

– **V/S mode . . . . . SELECT**

– **FCU ALTITUDE . . . . . SET ABOVE A/C ALTITUDE**

Note : 1. When reaching VFE, the AP maintains VFE and reduces the V/S without MODE REVERSION.
2. If the aircraft intercepts the ILS above the radio altimeter validity range (no radio altitude indication available on the PFD), CAT 1 is displayed on the FMA. Check that the FMA displays the correct capability for the intended approach, when the aircraft is below 5 000 feet.

– **ANNOUNCE** . . . . . **"G/S*"**

– **GO-AROUND ALT** . . . . . **SET**
Set the go around altitude on the FCU.

AT 2000 FT AGL (minimum)

– **ORDER** . . . . . **"FLAPS 2"**

– **FLAPS 2** . . . . . **SELECT**

R – **CONFIRM/ANNOUNCE** . . . . . **"FLAPS 2"**
- Check deceleration toward F speed.
- If the aircraft intercepts the ILS glideslope below 2000 feet AGL, select FLAPS 2 at one dot below the glideslope.
- If the aircraft speed is significantly higher than S on the glide slope, or the aircraft does not decelerate on the glide slope, extend the landing gear in order to slow down the aircraft. The use of speedbrakes is not recommended.
- When the speedbrakes are deployed, extending the flaps beyond FLAPS 1 may induce a slight roll movement, and in calm conditions a small lateral control asymmetry may remain until disturbed by a control input or by an atmospheric disturbance.

WHEN FLAPS ARE AT 2

– **ORDER** . . . . . **"GEAR DOWN"**

– **L/G DOWN** . . . . . **SELECT**

– **GROUND SPOILERS** . . . . . **ARM**

R – **AUTO BRK** . . . . . **CONFIRM**
R If the runway conditions have changed from the approach briefing, consider another
R braking mode.

– **CONFIRM/ANNOUNCE** . . . . . **"GEAR DOWN"**

WHEN LANDING GEAR IS DOWN

– **ORDER** . . . . . **"FLAPS 3"**

– **FLAPS 3** . . . . . **SELECT**
Select FLAPS 3 below VFE.

– **CONFIRM/ANNOUNCE** . . . . . **"FLAPS 3"**

– **ECAM WHEEL page** . . . . . **CHECK**
· ECAM WHEEL page appears below 800 feet, or at landing gear extension.
· Check for three landing gear green indications.

● **If residual pressure is indicated on the triple indicator :**

– **RESIDUAL BRAKING PROC** . . . . . **APPLY**

– **ORDER** . . . . . **"FLAPS FULL"**

– **FLAPS FULL** . . . . . **SELECT**
R · Select FLAPS FULL below VFE.
· Retract the speedbrakes before selecting FLAPS FULL to avoid an unexpected pitch down, when the speedbrakes retract automatically.

– **CONFIRM/ANNOUNCE** . . . . . **"FLAPS FULL"**
Check deceleration towards VAPP.

– **A/THR . . . . . CHECK IN SPEED MODE OR OFF**

– **WING ANTI ICE . . . . . OFF**
Only switch the WING ANTI ICE to ON, in severe icing conditions.

– **EXTERIOR LIGHTS . . . . . SET**
Set : The NOSE switch to TAXI
The RWY TURN OFF switch to ON
The LAND switch to ON.

– **SLIDING TABLE ◁ . . . . . STOW**

– **LDG MEMO . . . . . CHECK NO BLUE LINE**

– **CABIN REPORT . . . . . OBTAIN**

– **CABIN CREW . . . . . ADVISE**

– **LANDING CHECKLIST . . . . . COMPLETE**

– **FLIGHT PARAMETERS . . . . . CHECK**
The PF announces any FMA modification.
The PNF calls out, if :
– The speed becomes less than the speed target – 5 knots, or greater than the speed target + 10 knots.
– The pitch attitude becomes less than – 2.5°, or greater than 10° nose up.
– The bank angle becomes greater than 7°.
– The descent rate becomes greater than 1000 feet/min.
– Excessive LOC or GLIDE deviation occurs.
R 1/4 dot LOC ; 1 dot GS

AT DH + 100 FT (or MDA/MDH + 100 FT) :

– **MONITOR (or ANNOUNCE) . . . . . "ONE HUNDRED ABOVE"**

AT DH (or MDA/MDH)

– **MONITOR (or ANNOUNCE) . . . . . "MINIMUM"**

R – **ANNOUNCE . . . . . "CONTINUE" or "GO AROUND/FLAPS"**
Do not duck under the glideslope. Maintain a stabilized flight path down to the flare.
R At 50 feet, one dot below the glideslope is 7 feet below the glideslope.

WHEN LANDING GEAR IS DOWN

– **ORDER** . . . . . **"FLAPS 3"**

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Note : Due to the accomplishment of the alternate braking functional test after the landing is downlocked, brief brake pressure indications may be observed on BRAKE PRESS indicator.

– **ORDER** . . . . . **"FLAPS FULL"**

– **FLAPS FULL** . . . . . **SELECT**
R · Select FLAPS FULL below VFE.

– **CONFIRM/ANNOUNCE** . . . . . **"FLAPS FULL"**
Check deceleration towards VAPP.

– **A/THR . . . . . CHECK IN SPEED MODE OR OFF**

– **WING ANTI ICE . . . . . OFF**
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AT DH + 100 FT (or MDA/MDH + 100 FT) :

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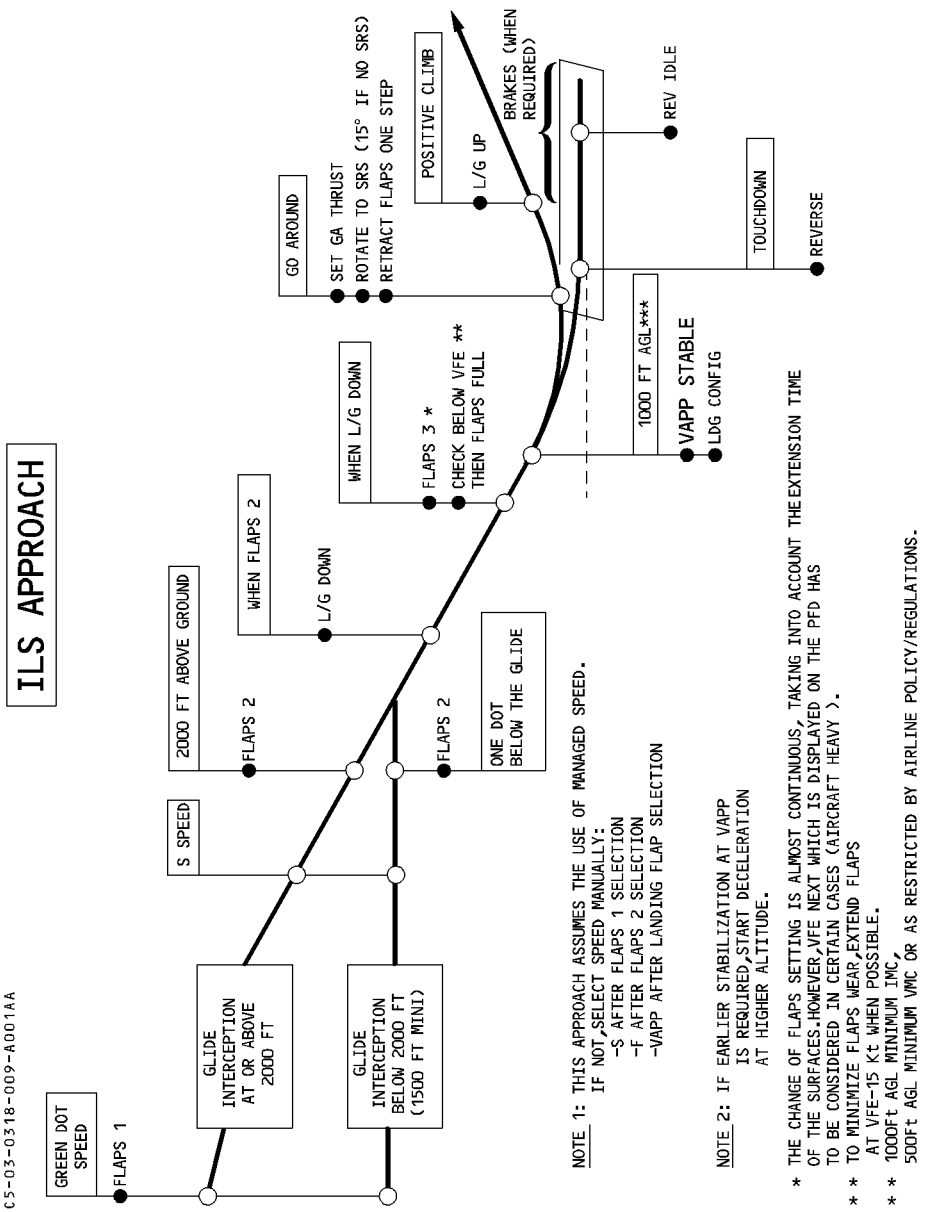
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ILS APPROACH
NFCS-03-0318-009-A001AA
GREEN DOT SPEED
FLAPS 1
GLIDE INTERCEPTION AT OR ABOVE 2000 FT
GLIDE INTERCEPTION BELOW 2000 FT (1500 FT MINI)
S SPEED
2000 FT ABOVE GROUND
FLAPS 2
WHEN FLAPS 2
L/G DOWN
FLAPS 2
ONE DOT BELOW THE GLIDE
WHEN L/G DOWN
FLAPS 3 *
CHECK BELOW VFE **
THEN FLAPS FULL
GO AROUND
SET GA THRUST
ROTATE TO SRS (15° IF NO SRS)
RETRACT FLAPS ONE STEP
POSITIVE CLIMB
L/G UP
BRAKES (WHEN REQUIRED)
REV IDLE
1000 FT AGL***
VAPP STABLE
LDG CONFIG
TOUCHDOWN
REVERSE
NOTE 1: THIS APPROACH ASSUMES THE USE OF MANAGED SPEED.
IF NOT,SELECT SPEED MANUALLY:
-S AFTER FLAPS 1 SELECTION
-F AFTER FLAPS 2 SELECTION
-VAPP AFTER LANDING FLAP SELECTION
NOTE 2: IF EARLIER STABILIZATION AT VAPP
IS REQUIRED,START DECELERATION
AT HIGHER ALTITUDE.
* THE CHANGE OF FLAPS SETTING IS ALMOST CONTINUOUS, TAKING INTO ACCOUNT THE EXTENSION TIME OF THE SURFACES.HOWEVER,VFE NEXT WHICH IS DISPLAYED ON THE PFD HAS TO BE CONSIDERED IN CERTAIN CASES (AIRCRAFT HEAVY).
** TO MINIMIZE FLAPS WEAR,EXTEND FLAPS AT VFE-15 Kt WHEN POSSIBLE.
*** 1000ft AGL MINIMUM IMC,
500ft AGL MINIMUM VMC OR AS RESTRICTED BY AIRLINE POLICY/REGULATIONS.

INTRODUCTION

APPROACH GUIDANCE FOR NON PRECISION APPROACHES OTHER THAN LOC AND RNAV NON PRECISION APPROACHES

Three different approach strategies are available to perform non-precision approaches :

1. Lateral and vertical guidance, selected by the crew : TRK-FPA (or HDG-V/S) modes.
2. Lateral guidance, managed by the FM, and vertical guidance selected by the crew : NAV-FPA (or NAV-V/S) modes.
3. Lateral and vertical guidance, managed by the FM : FINAL APP mode.

R For straight in approaches, the recommended flying reference is FPV, which should be selected during the initial approach.

– Approach procedures including a PI-CF leg (PROC-T indicated on the MCDU F-PLN) are not eligible for the use of NAV and FINAL APP modes.

– Lateral managed guidance (NAV) can be used, provided the approach is stored in the navigation database and the final approach is laterally and vertically monitored, using the adequate raw data (reference navaid, altimeter).

– Lateral and vertical managed guidance (FINAL APP) in IMC conditions can be used, provided the following conditions are met :

R · The approach stored in the navigation database has been produced by approved
R suppliers compliant with ED76/DO200A requirements, or has been validated and
R approved by the operator.

R · The effect of low OAT on obstacle clearance needs to be evaluated. A minimum OAT,
R below which selected vertical guidance should be used, may have to be defined.

· The final approach (FAF to runway or MAP), as extracted from the navigation database and inserted in the primary F-PLN including altitude constraints, is not revised by the crew.

· Before starting the approach, the crew must check the lateral and the vertical FM F-PLN against the published approach chart, using the MCDU and ND.

· The approach trajectory is laterally and vertically intercepted, before the FAF, or equivalent waypoint in the FM F-PLN, so that the aircraft is correctly established on the final approach course before starting the descent.

R · Conventional radio navaids must be available and monitored during the approach, and
R must be considered with altitude as the primary means of navigation.

Note : For additional information on recommended flight crew procedures, and on navigation database vertical flight path validation, refer to the dedicated FCOM Bulletin "Use of managed guidance in approach and NAV database validation" and the FMGS Pilot's Guide (4.05.70).

If the FM/GPS POS DISAGREE ECAM caution is triggered during the approach, use selected guidance to continue the approach with radio navaid raw data.
If GPS PRIMARY is lost, NAV and FINAL APP mode can be used to continue the approach, provided the radio navaid raw date indicates the correct navigation.

APPROACH GUIDANCE FOR RNAV APPROACH

Two different approach strategies are available to perform RNAV approaches :

1. Lateral guidance, managed by the FM, and vertical guidance selected by the crew : NAV-FPA (or NAV-V/S) modes.
   This strategy applies, when LNAV ONLY (Lateral Navigation only) RNAV approach is intended.
2. Lateral and vertical guidance, managed by the FM : FINAL APP mode.
   This strategy applies, when LNAV/VNAV (Lateral and Vertical Navigation) RNAV approach is intended.
   For straight in approaches, the recommended flying reference is FPV, which should be selected during the initial approach.
   Approach procedures including a Pi-CF leg (PROC-T indicated on the MCDU F-PLN) are not eligible for the use of NAV and FINAL APP modes.

R Before starting a RNAV (GPS) approach, two navigation systems must be operative : 2
R FMS and 2 GPS.

RNAV approach can be performed in NAV-FPA (or NAV-V/S) modes provided :

- The approach stored in the navigation database has been produced by approved suppliers compliant with ED76/DO200A requirements, or has been validated and is approved by the operator.
- Before starting the approach, the crew must check the lateral FM F-PLN against the published approach chart using MCDU and ND.
- The final approach is laterally and vertically monitored, using the appropriate data : the distance to the runway or to the MAP versus altitude is the primary means of vertical navigation, the deviation on the PFD may be unreliable.

RNAV approach can be performed in FINAL APP mode provided :

- The approach stored in the navigation database has been produced by approved suppliers compliant with ED76/DO200A requirements, and the vertical flight path has been validated by the operator, or, the lateral and vertical flight path has been validated and approved by the operator.
- The RNAV approaches with the MAP before the runway threshold are not eligible for the use of FINAL APP mode.

Note : RNP SAAAR approaches coded in the navigation database must be fully validated by the operator.

If no minimum OAT is published on the approach chart, the effect of low OAT on obstacle clearance needs to be evaluated.

INTRODUCTION

APPROACH GUIDANCE FOR NON PRECISION APPROACHES OTHER THAN LOC, LOC B/C AND RNAV NON PRECISION APPROACHES

Three different approach strategies are available to perform non-precision approaches :

1. Lateral and vertical guidance, selected by the crew : TRK-FPA (or HDG-V/S) modes.
2. Lateral guidance, managed by the FM, and vertical guidance selected by the crew : NAV-FPA (or NAV-V/S) modes.
3. Lateral and vertical guidance, managed by the FM : FINAL APP mode.

R For straight in approaches, the recommended flying reference is FPV, which should be selected during the initial approach.

– Approach procedures including a PI-CF leg (PROC-T indicated on the MCDU F-PLN) are not eligible for the use of NAV and FINAL APP modes.

– Lateral managed guidance (NAV) can be used, provided the approach is stored in the navigation database and the final approach is laterally and vertically monitored, using the adequate raw data (reference navaid, altimeter).

– Lateral and vertical managed guidance (FINAL APP) in IMC conditions can be used, provided the following conditions are met :

R · The approach stored in the navigation database has been produced by approved
R suppliers compliant with ED76/DO200A requirements, or has been validated and
R approved by the operator.

R · The effect of low OAT on obstacle clearance needs to be evaluated. A minimum OAT,
R below which selected vertical guidance should be used, may have to be defined.

· The final approach (FAF to runway or MAP), as extracted from the navigation database and inserted in the primary F-PLN including altitude constraints, is not revised by the crew.

· Before starting the approach, the crew must check the lateral and the vertical FM F-PLN against the published approach chart, using the MCDU and ND.

· The approach trajectory is laterally and vertically intercepted, before the FAF, or equivalent waypoint in the FM F-PLN, so that the aircraft is correctly established on the final approach course before starting the descent.

R · Conventional radio navaids must be available and monitored during the approach, and
R must be considered with altitude as the primary means of navigation.

Note : For additional information on recommended flight crew procedures, and on navigation database vertical flight path validation, refer to the dedicated FCOM Bulletin "Use of managed guidance in approach and NAV database validation" and the FMGS Pilot's Guide (4.05.70).

If the FM/GPS POS DISAGREE ECAM caution is triggered during the approach, use selected guidance to continue the approach with radio navaid raw data.
If GPS PRIMARY is lost, NAV and FINAL APP mode can be used to continue the approach, provided the radio navaid raw date indicates the correct navigation.

APPROACH GUIDANCE FOR RNAV APPROACH

Two different approach strategies are available to perform RNAV approaches :

1. Lateral guidance, managed by the FM, and vertical guidance selected by the crew : NAV-FPA (or NAV-V/S) modes.
   This strategy applies, when LNAV ONLY (Lateral Navigation only) RNAV approach is intended.
2. Lateral and vertical guidance, managed by the FM : FINAL APP mode.
   This strategy applies, when LNAV/VNAV (Lateral and Vertical Navigation) RNAV approach is intended.
   For straight in approaches, the recommended flying reference is FPV, which should be selected during the initial approach.
   Approach procedures including a Pi-CF leg (PROC-T indicated on the MCDU F-PLN) are not eligible for the use of NAV and FINAL APP modes.

R Before starting a RNAV (GPS) approach, two navigation systems must be operative : 2
R FMS and 2 GPS.

RNAV approach can be performed in NAV-FPA (or NAV-V/S) modes provided :

- The approach stored in the navigation database has been produced by approved suppliers compliant with ED76/DO200A requirements, or has been validated and is approved by the operator.
- Before starting the approach, the crew must check the lateral FM F-PLN against the published approach chart using MCDU and ND.
- The final approach is laterally and vertically monitored, using the appropriate data : the distance to the runway or to the MAP versus altitude is the primary means of vertical navigation, the deviation on the PFD may be unreliable.

RNAV approach can be performed in FINAL APP mode provided :

- The approach stored in the navigation database has been produced by approved suppliers compliant with ED76/DO200A requirements, and the vertical flight path has been validated by the operator, or, the lateral and vertical flight path has been validated and approved by the operator.
- The RNAV approaches with the MAP before the runway threshold are not eligible for the use of FINAL APP mode.

Note : RNP SAAAR approaches coded in the navigation database must be fully validated by the operator.

If no minimum OAT is published on the approach chart, the effect of low OAT on obstacle clearance needs to be evaluated.

INTRODUCTION

APPROACH GUIDANCE FOR NON PRECISION APPROACHES OTHER THAN LOC, LOC B/C AND RNAV NON PRECISION APPROACHES

Three different approach strategies are available to perform non-precision approaches :

1. Lateral and vertical guidance, selected by the crew : TRK-FPA (or HDG-V/S) modes.
2. Lateral guidance, managed by the FM, and vertical guidance selected by the crew : NAV-FPA (or NAV-V/S) modes.
3. Lateral and vertical guidance, managed by the FM : FINAL APP mode.

R For straight in approaches, the recommended flying reference is FPV, which should be selected during the initial approach.

– Lateral managed guidance (NAV) can be used, provided the approach is stored in the navigation database and the final approach is laterally and vertically monitored, using the adequate raw data (reference navaid, altimeter).

– Lateral and vertical managed guidance (FINAL APP) in IMC conditions can be used, provided the following conditions are met :

R · The approach stored in the navigation database has been produced by approved
R suppliers compliant with ED76/DO200A requirements, or has been validated and
R approved by the operator.

R · The effect of low OAT on obstacle clearance needs to be evaluated. A minimum OAT,
R below which selected vertical guidance should be used, may have to be defined.

· The final approach (FAF to runway or MAP), as extracted from the navigation database and inserted in the primary F-PLN including altitude constraints, is not revised by the crew.

· Before starting the approach, the crew must check the lateral and the vertical FM F-PLN against the published approach chart, using the MCDU and ND.

· The approach trajectory is laterally and vertically intercepted, before the FAF, or equivalent waypoint in the FM F-PLN, so that the aircraft is correctly established on the final approach course before starting the descent.

R · Conventional radio navaids must be available and monitored during the approach, and
R must be considered with altitude as the primary means of navigation.

Note : For additional information on recommended flight crew procedures, and on navigation database vertical flight path validation, refer to the dedicated FCOM Bulletin "Use of managed guidance in approach and NAV database validation" and the FMGS Pilot's Guide (4.05.70).

If the FM/GPS POS DISAGREE ECAM caution is triggered during the approach, use selected guidance to continue the approach with radio navaid raw data.
If GPS PRIMARY is lost, NAV and FINAL APP mode can be used to continue the approach, provided the radio navaid raw date indicates the correct navigation.

APPROACH GUIDANCE FOR RNAV APPROACH

Two different approach strategies are available to perform RNAV approaches :

1. Lateral guidance, managed by the FM, and vertical guidance selected by the crew : NAV-FPA (or NAV-V/S) modes.
   This strategy applies, when LNAV ONLY (Lateral Navigation only) RNAV approach is intended.
2. Lateral and vertical guidance, managed by the FM : FINAL APP mode.
   This strategy applies, when LNAV/VNAV (Lateral and Vertical Navigation) RNAV approach is intended.
   For straight in approaches, the recommended flying reference is FPV, which should be selected during the initial approach.

R Before starting a RNAV (GPS) approach, two navigation systems must be operative : 2
R FMS and 2 GPS.

RNAV approach can be performed in NAV-FPA (or NAV-V/S) modes provided :

- The approach stored in the navigation database has been produced by approved suppliers compliant with ED76/DO200A requirements, or has been validated and is approved by the operator.
- Before starting the approach, the crew must check the lateral FM F-PLN against the published approach chart using MCDU and ND.
- The final approach is laterally and vertically monitored, using the appropriate data : the distance to the runway or to the MAP versus altitude is the primary means of vertical navigation, the deviation on the PFD may be unreliable.

RNAV approach can be performed in FINAL APP mode provided :

- The approach stored in the navigation database has been produced by approved suppliers compliant with ED76/DO200A requirements, and the vertical flight path has been validated by the operator, or, the lateral and vertical flight path has been validated and approved by the operator.

Note : RNP SAAAR approaches coded in the navigation database must be fully validated by the operator.

If no minimum OAT is published on the approach chart, the effect of low OAT on obstacle clearance needs to be evaluated.

- The final approach (FAF to runway or MAP), as extracted from the navigation database and inserted in the primary F-PLN including altitude constraints, is not revised by the crew.
- Before starting the approach, the crew must check the lateral and the vertical FM F-PLN against the published approach chart, using the MCDU and ND.

CAUTION

R Do not use the FINAL APP mode if the MAP is located before the runway threshold. In
R this case, the approach can be flown using NAV-FPA (or NAV-V/S), the VDEV on the PFD
R must be disregarded since it will be incorrect.

- The approach trajectory is laterally and vertically intercepted, before the FAF, or equivalent waypoint in the FM F-PLN, so that the aircraft is correctly established on the final approach course before starting the descent.
- The final approach is laterally and vertically monitored, using the VDEV and appropriate raw data (distance to the runway, altitude, FPV).
- The VDEV indication on the PFD must be disregarded since it may be incorrect if the MAP is located before the runway threshold.

Note : For additional information on recommended flight crew procedures, and on navigation database flight path validation, refer to the FCOM Bulletin "Use of managed guidance in approach and NAV database validation" and the FMGS Pilot's guide (4.02.20 and 4.05.70).

- The final approach (FAF to runway or MAP), as extracted from the navigation database and inserted in the primary F-PLN including altitude constraints, is not revised by the crew.
- Before starting the approach, the crew must check the lateral and the vertical FM F-PLN against the published approach chart, using the MCDU and ND.
- The approach trajectory is laterally and vertically intercepted, before the FAF, or equivalent waypoint in the FM F-PLN, so that the aircraft is correctly established on the final approach course before starting the descent.
- The final approach is laterally and vertically monitored, using the VDEV and appropriate raw data (distance to the runway, altitude, FPV).

Note : For additional information on recommended flight crew procedures, and on navigation database flight path validation, refer to the FCOM Bulletin "Use of managed guidance in approach and NAV database validation" and the FMGS Pilot's guide (4.02.20 and 4.05.70).

For RNAV approach with GPS PRIMARY

An instrument approach procedure, not requiring GPS PRIMARY, must be available at destination or destination alternate (and at required takeoff alternate, and en route alternate). Check RAIM availability, using the PREDICTIVE GPS MCDU page. Before starting the approach, check that GPS PRIMARY is available on both MCDUs.

If the GPS PRIMARY LOST indication appears on the ND during the approach, discontinue the approach, unless :

R — GPS is not required and navigation accuracy is confirmed against the radio navaid raw
R data, or

— For RNAV approach not requiring GPS, HIGH accuracy appears on the MCDU with the appropriate RNP value.

— If GPS PRIMARY is lost on only one FMGC, the approach can be continued, using the AP/FD associated to the other FMGC.

If the FM/GPS POS DISAGREE ECAM caution is triggered during the approach, discontinue
R the approach, unless radio navaid raw data is available and indicates correct navigation to
R continue the approach using selected FMGS modes.

For RNAV approach without GPS PRIMARY

Before starting the approach, check the FM position accuracy with radio NAVAID raw data. Check, in addition, that HIGH accuracy appears on the MCDU with the specified RNP value.

If HIGH accuracy is lost on one FMGC, the approach can be continued with the AP/FD associated to the other FMGC.

If HIGH accuracy is lost on both FMGCs, discontinue the approach.

APPROACH GUIDANCE FOR LOC AND LOC B/C NON PRECISION APPROACHES

The Standard Operating Procedure of this section can be used for flying LOC or LOC B/C approaches, provided the following approach guidance items are observed.
The FM NAV mode can be used down to LOC or LOC B/C interception.
For LOC or LOC B/C intermediate and final approach, use the LOC or LOC B/C AP/FD mode for lateral navigation, associated with the FPA (or V/S) for vertical navigation.
Vertical navigation must be monitored using raw data (altimeter, distance to the runway given by radio-navaid).
The VDEV indication on the PFD must be disregarded, since it may be incorrect if the MAP is located before the runway threshold.

APPROACH SPEED TECHNIQUE

In all cases, the crew should use managed speed.
The standard speed technique is to make a stabilized approach using AP/FD and A/THR : The aircraft intercepts the final descent path in landing configuration, and at VAPP. For this purpose, the flight crew should insert VAPP as a speed constraint at the FAF.
If the operator adopts a decelerated approach technique and the crew uses managed guidance, the aircraft should intercept the final descent path at S speed in CONF 1.
The objective is to be stabilized on the final descent path thrust above idle, in the landing configuration at 1000 feet.
To be stabilized, all of the following conditions must be achieved prior to, or upon, reaching this stabilization height :

- The aircraft is on the correct lateral flight plan,
- The aircraft is in the desired landing configuration,
- The thrust is stabilized above idle, to maintain the target speed on the desired descent path,
- No excessive flight parameter deviation.

If the aircraft is not stabilized on the approach and in landing configuration, at 1000 feet in instrument conditions, or at 500 feet in visual conditions, or as restricted by airline policy/regulations, a go-around must be initiated.

R If the forecasted tailwind at landing is greater than 10 knots, a decelerated approach is not
R allowed, and the speed should be stabilized around VREF + 5 knots in final.

For RNAV approach with GPS PRIMARY

Unless an instrument approach procedure, not requiring GPS PRIMARY, is available at destination or destination alternate (and at required takeoff alternate, and en route alternate), the GPS PRIMARY availability must be verified before flight.
AIME is available worldwide, if 24 GPS satellites or more are operative.
If the number of GPS satellites is 23 or less, check AIME availability using the approved version of the Litton ground-based AIME prediction software. Before starting the approach, check that GPS PRIMARY is available on both MCDUs.
If the GPS PRIMARY LOST indication appears on the ND during the approach, discontinue the approach, unless :

R — GPS is not required and navigation accuracy is confirmed against the radio navaid raw
R data, or
— For RNAV approach not requiring GPS, HIGH accuracy appears on the MCDU with the appropriate RNP value.
— If GPS PRIMARY is lost on only one FMGC, the approach can be continued, using the AP/FD associated to the other FMGC.

If the FM/GPS POS DISAGREE ECAM caution is triggered during the approach, discontinue
R the approach, unless radio navaid raw data is available and indicates correct navigation to
R continue the approach using selected FMGS modes.

For RNAV approach without GPS PRIMARY

Before starting the approach, check FM position accuracy with radio NAVAID raw data.
Check, in addition, that HIGH accuracy appears on the MCDU with the specified RNP value.
If HIGH accuracy is lost on one FMGC, the approach can be continued with the AP/FD associated to the other FMGC.
If HIGH accuracy is lost on both FMGCs, discontinue the approach.

APPROACH GUIDANCE FOR LOC NON PRECISION APPROACHES

The Standard Operating Procedure of this section can be used for flying LOC approaches, provided the following approach guidance items are observed.
The FM NAV mode can be used down to LOC interception.
For LOC intermediate and final approach, use the LOC AP/FD mode for lateral navigation, associated with the FPA (or V/S) for vertical navigation.
Vertical navigation must be monitored using raw data (altimeter, distance to the runway given by radio-navaid).
The VDEV indication on the PFD must be disregarded, since it may be incorrect if the MAP is located before the runway threshold.

APPROACH SPEED TECHNIQUE

In all cases, the crew should use managed speed.
The standard speed technique is to make a stabilized approach using AP/FD and A/THR : The aircraft intercepts the final descent path in landing configuration, and at VAPP. For this purpose, the flight crew should insert VAPP as a speed constraint at the FAF.
If the operator adopts a decelerated approach technique and the crew uses managed guidance, the aircraft should intercept the final descent path at S speed in CONF 1.

R The objective is to be stabilized on the final descent path thrust above idle, in the landing
R configuration at 1000 feet.
R To be stabilized, all of the following conditions must be achieved prior to, or upon, reaching
R this stabilization height :
R — The aircraft is on the correct lateral flight plan,
R — The aircraft is in the desired landing configuration,
R — The thrust is stabilized above idle, to maintain the target speed on the desired descent
R path,
R — No excessive flight parameter deviation.
R If the aircraft is not stabilized on the approach and in landing configuration, at 1000 feet in
R instrument conditions, or at 500 feet in visual conditions, or as restricted by airline
R policy/regulations, a go-around must be initiated.

For RNAV Approach with GPS PRIMARY

Unless an instrument approach procedure, not requiring GPS PRIMARY, is available at destination or destination alternate (and at required takeoff alternate, and enroute alternate), the GPS PRIMARY availability must be verified before flight.
RAIM is available worldwide, if 24 or more GPS satellites are operative.
If the number of GPS satellites is 23 or less, check RAIM availability, using the approved version of the Honeywell ground-based prediction software.
If the GPS PRIMARY availability cannot be verified before flight, RAIM availability can be checked in flight, using the PREDICTIVE GPS MCDU page.
Before starting the approach, check that GPS PRIMARY is available on both MCDUs.
If the GPS PRIMARY LOST indication appears on the ND during the approach, discontinue the approach, unless :

- GPS is not required and navigation accuracy is confirmed against the radio NAVAID raw data, or
- For RNAV approach not requiring GPS, HIGH accuracy appears on the MCDU, with the appropriate RNP value.
- If GPS PRIMARY is lost on only one FMGC, the approach can be continued, using the AP/FD associated to the other FMGC.

If the FM/GPS POS DISAGREE ECAM caution is triggered during the approach, discontinue the approach, unless radio NAVAID raw data is available and indicates correct navigation to continue the approach using selected FMGS modes.

For RNAV approach without GPS PRIMARY

Before starting the approach, check FM position accuracy with radio NAVAID raw data. Check, in addition, that HIGH accuracy appears on the MCDU, with the specified RNP value.
If HIGH accuracy is lost on one FMGC, the approach can be continued with the AP/FD associated to the other FMGC.
If HIGH accuracy is lost on both FMGCs, discontinue the approach.

APPROACH GUIDANCE FOR LOC AND LOC B/C NON PRECISION APPROACHES

The Standard Operating Procedure of this section can be used for flying LOC or LOC B/C approaches, provided the following approach guidance items are observed.
The FM NAV mode can be used down to LOC or LOC B/C interception.
For LOC or LOC B/C intermediate and final approach, use the LOC or LOC B/C AP/FD mode for lateral navigation, associated with the FPA (or V/S) for vertical navigation.
Vertical navigation must be monitored using raw data (altimeter, distance to the runway given by radio-navaid).
The VDEV indication on the PFD must be disregarded, since it may be incorrect if the MAP is located before the runway threshold.

APPROACH SPEED TECHNIQUE

In all cases, the crew should use managed speed.
The standard speed technique is to make a stabilized approach using AP/FD and A/THR : The aircraft intercepts the final descent path in landing configuration, and at VAPP. For this purpose, the flight crew should insert VAPP as a speed constraint at the FAF.
If the operator adopts a decelerated approach technique and the crew uses managed guidance, the aircraft should intercept the final descent path at S speed in CONF 1.
The objective is to be stabilized on the final descent path thrust above idle, in the landing configuration at 1000 feet.
To be stabilized, all of the following conditions must be achieved prior to, or upon, reaching this stabilization height :
- The aircraft is on the correct lateral flight plan,
- The aircraft is in the desired landing configuration,
- The thrust is stabilized above idle, to maintain the target speed on the desired descent path,
- No excessive flight parameter deviation.

If the aircraft is not stabilized on the approach and in landing configuration, at 1000 feet in instrument conditions, or at 500 feet in visual conditions, or as restricted by airline policy/regulations, a go-around must be initiated.

For RNAV Approach with GPS PRIMARY

Unless an instrument approach procedure, not requiring GPS PRIMARY, is available at destination or destination alternate (and at required takeoff alternate, and enroute alternate), the GPS PRIMARY availability must be verified before flight.
RAIM is available worldwide, if 24 or more GPS satellites are operative.
If the number of GPS satellites is 23 or less, check RAIM availability, using the approved version of the Honeywell ground-based prediction software.
If the GPS PRIMARY availability cannot be verified before flight, RAIM availability can be checked in flight, using the PREDICTIVE GPS MCDU page.
Before starting the approach, check that GPS PRIMARY is available on both MCDUs.
If the GPS PRIMARY LOST indication appears on the ND during the approach, discontinue the approach, unless :

- GPS is not required and navigation accuracy is confirmed against the radio NAVAID raw data, or
- For RNAV approach not requiring GPS, HIGH accuracy appears on the MCDU, with the appropriate RNP value.
- If GPS PRIMARY is lost on only one FMGC, the approach can be continued, using the AP/FD associated to the other FMGC.

If the FM/GPS POS DISAGREE ECAM caution is triggered during the approach, discontinue the approach, unless radio NAVAID raw data is available and indicates correct navigation to continue the approach using selected FMGS modes.

For RNAV approach without GPS PRIMARY

Before starting the approach, check FM position accuracy with radio NAVAID raw data. Check, in addition, that HIGH accuracy appears on the MCDU, with the specified RNP value.
If HIGH accuracy is lost on one FMGC, the approach can be continued with the AP/FD associated to the other FMGC.
If HIGH accuracy is lost on both FMGCs, discontinue the approach.

APPROACH GUIDANCE FOR LOC AND LOC B/C NON PRECISION APPROACHES

The Standard Operating Procedure of this section can be used for flying LOC or LOC B/C approaches, provided the following approach guidance items are observed.
The FM NAV mode can be used down to LOC or LOC B/C interception.
For LOC or LOC B/C intermediate and final approach, use the LOC or LOC B/C AP/FD mode for lateral navigation, associated with the FPA (or V/S) for vertical navigation.
Vertical navigation must be monitored using raw data (altimeter, distance to the runway given by radio-navaid).
The VDEV indication on the PFD must be disregarded, since it may be incorrect if the MAP is located before the runway threshold.

APPROACH SPEED TECHNIQUE

In all cases, the crew should use managed speed.
The standard speed technique is to make a stabilized approach using AP/FD and A/THR : The aircraft intercepts the final descent path in landing configuration, and at VAPP. For this purpose, the flight crew should insert VAPP as a speed constraint at the FAF.
If the operator adopts a decelerated approach technique and the crew uses managed guidance, the aircraft should intercept the final descent path at S speed in CONF 1.
The objective is to be stabilized on the final descent path thrust above idle, in the landing configuration at 1000 feet.
To be stabilized, all of the following conditions must be achieved prior to, or upon, reaching this stabilization height :

- The aircraft is on the correct lateral flight plan,
- The aircraft is in the desired landing configuration,
- The thrust is stabilized above idle, to maintain the target speed on the desired descent path,
- No excessive flight parameter deviation.

If the aircraft is not stabilized on the approach and in landing configuration, at 1000 feet in instrument conditions, or at 500 feet in visual conditions, or as restricted by airline policy/regulations, a go-around must be initiated.

R If the forecasted tailwind at landing is greater than 10 knots, a decelerated approach is not
R allowed, and the speed should be stabilized around VREF + 5 knots in final.

INITIAL APPROACH

– **ENG START selector . . . . . AS RQRD**
Select IGN if the runway is covered with standing water, or heavy rain, or if severe turbulence is expected in the approach or go-around area.

– **SEATBELTS . . . . . ON/AUTO**

– **APPROACH PHASE . . . . . ACTIVATE**
· In NAV mode, the APPR phase automatically activates at the DECEL pseudo waypoint.
· In HDG or TRK mode, manually activate the APPR phase on the PERF APPR page, when the distance to land is approximately 15 NM.

– **POSITIONING . . . . . MONITOR**
· In NAV mode, use VDEV information on the PFD and PROG page.
· In HDG or TRK mode, use the energy circle displayed on ND representing the required distance to land.

– **MANAGED SPEED . . . . . CHECK**
If the ATC requires a particular speed, use selected speed. When the ATC speed constraint no longer applies, return to managed speed.

– **SPEEDBRAKES . . . . . AS RQRD**

– **NAVIGATION ACCURACY . . . . . MONITOR**

· When GPS PRIMARY is available, no accuracy check is required.

· When GPS PRIMARY is lost, check the PROG page to ensure that the required navigation accuracy is appropriate to the phase of flight. Perform a navigation accuracy check (as described in 3.03.15).

If the approach is stored in the navigation database, determine the strategy to be used for the final approach, according to the table below :

NAVIGATION ACCURACY	Approach guidance	ND		AP/FD mode
		PF	PNF	
GPS PRIMARY	Managed***	ARC or ROSE NAV * With NAVAID raw data		NAV-FPA or APP-NAV/ FINAL ***
NAV ACCUR HIGH				
NAV ACCUR LOW and NAV ACCURACY check ≤ 1NM				
GPS PRIMARY LOST and NAV ACCUR LOW and NAV ACCURACY check > 1 NM	Selected	ROSE VOR **	ARC or ROSE NAV or ROSE VOR ** With NAVAID raw data	TRK-PFA
GPS PRIMARY LOST and aircraft flying within unreliable radio NAVAID area				

(*) For VOR approaches, one pilot may select ROSE VOR.

(**) For LOC approaches, select ROSE ILS.

(***) Managed vertical guidance can be used, provided the approach coding in the navigation database has been validated.

Note : 1. During approach in overlay to a conventional radio navaid procedure, monitor raw data. If raw data indicates unsatisfactory managed guidance, revert to selected guidance.

2. The pilot can continue to fly a managed approach, after receiving a NAV ACCUR DOWNGRADED message, if raw data indicates that the guidance is satisfactory.

R – **RADAR TILT . . . . . ADJUST**

– **APPROACH CHECKLIST . . . . . PERFORM**

INITIAL APPROACH

– **ENG START selector . . . . . AS RQRD**
Select IGN if the runway is covered with standing water, or heavy rain, or if severe turbulence is expected in the approach or go-around area.

– **SEATBELTS . . . . . ON/AUTO**

– **APPROACH PHASE . . . . . ACTIVATE**
· In NAV mode, the APPR phase automatically activates at the DECEL pseudo waypoint.
· In HDG or TRK mode, manually activate the APPR phase on the PERF APPR page, when the distance to land is approximately 15 NM.

– **POSITIONING . . . . . MONITOR**
· In NAV mode, use VDEV information on the PFD and PROG page.
· In HDG or TRK mode, use the energy circle displayed on ND representing the required distance to land.

– **MANAGED SPEED . . . . . CHECK**
If the ATC requires a particular speed, use selected speed. When the ATC speed constraint no longer applies, return to managed speed.

– **SPEEDBRAKES . . . . . AS RQRD**

– **NAVIGATION ACCURACY . . . . . MONITOR**

· When GPS PRIMARY is available, no accuracy check is required.

· When GPS PRIMARY is lost, check the PROG page to ensure that the required navigation accuracy is appropriate to the phase of flight. Perform a navigation accuracy check (as described in 3.03.15).

If the approach is stored in the navigation database, determine the strategy to be used for the final approach, according to the table below :

NAVIGATION ACCURACY	Approach guidance	ND		AP/FD mode	TERR pushbutton
		PF	PNF		
GPS PRIMARY	Managed***	ARC or ROSE NAV * With NAVAID raw data		NAV-FPA or APP-NAV/ FINAL ***	ON
NAV ACCUR HIGH					
NAV ACCUR LOW and NAV ACCURACY check ≤ 1NM					
GPS PRIMARY LOST and NAV ACCUR LOW and NAV ACCURACY check > 1 NM	Selected	ROSE VOR **	ARC or ROSE NAV or ROSE VOR ** With NAVAID raw data	TRK-PFA	OFF
GPS PRIMARY LOST and aircraft flying within unreliable radio NAVAID area					

(*) For VOR approaches, one pilot may select ROSE VOR.

(**) For LOC approaches, select ROSE ILS.

(***) Managed vertical guidance can be used, provided the approach coding in the navigation database has been validated.

Note : 1. During approach in overlay to a conventional radio navaid procedure, monitor raw data. If raw data indicates unsatisfactory managed guidance, revert to selected guidance.

2. The pilot can continue to fly a managed approach, after receiving a NAV ACCUR DOWNGRADED message, if raw data indicates that the guidance is satisfactory.

R – **RADAR TILT . . . . . ADJUST**

– **APPROACH CHECKLIST . . . . . PERFORM**

INTERMEDIATE/FINAL APPROACH

R ● **For RNAV approach :**

R — **GPS 1+2 on GPS MONITOR page . . . . . CHECK BOTH IN NAV**

R — **GPS PRIMARY on PROG page . . . . . CHECK AVAILABLE**

R ● **If GPS PRIMARY is not available**

R — **RNP for approach . . . . . CHECK/ENTER**

R — **HIGH accuracy . . . . . CHECK**

R *Note : RNAV approach without GPS is subject to a specific operational approval.*

● **For approach in managed vertical guidance :**

— **APPR pushbutton on FCU . . . . . PRESS**
Once cleared for the approach, press the pushbutton when flying towards the FAF. Check that APPR NAV is engaged, FINAL is armed, and the VDEV scale is on the PFD.

Note : For instructions for switching from a non ILS to an ILS approach, see the FMGS pilot's guide. (Refer to 4.05.70)

AT GREEN DOT SPEED

— **ORDER . . . . . "FLAPS 1"**

— **FLAPS 1 . . . . . SELECT**

— **CONFIRM/ANNOUNCE . . . . . "FLAPS 1"**

— **TCAS Mode Selector . . . . . TA OR TA/RA**
· See ILS approach (Refer to 3.03.18)

— **ND DISPLAY . . . . . SELECT RANGE/MODE**

AT S SPEED

— **ORDER . . . . . "FLAPS 2"**

— **FLAPS 2 . . . . . SELECT**

— **CONFIRM/ANNOUNCE . . . . . "FLAPS 2"**

WHEN FLAPS ARE AT 2

– **ORDER** . . . . . **"GEAR DOWN"**

– **L/G DOWN** . . . . . **SELECT**

– **GROUND SPOILERS** . . . . . **ARM**

R – **AUTO BRK** . . . . . **CONFIRM**
R If the runway conditions have changed from the approach briefing, consider another
R braking mode.

– **CONFIRM/ANNOUNCE** . . . . . **"GEAR DOWN"**

WHEN LANDING GEAR DOWN :

– **ORDER** . . . . . **"FLAPS 3"**

– **FLAPS 3** . . . . . **SELECT**
· Select FLAPS 3 below VFE.

– **CONFIRM/ANNOUNCE** . . . . . **"FLAPS 3"**

– **ECAM WHEEL page** . . . . . **CHECK**
· The ECAM WHEEL page appears below 800 feet, or at landing gear extension.
· Check the three landing gear green indications.

● **If residual pressure is indicated on the triple indicator :**

– **RESIDUAL BRAKING PROC** . . . . . **APPLY**

INTERMEDIATE/FINAL APPROACH

R ● **For RNAV approach :**

R — **GPS 1+2 on GPS MONITOR page . . . . . CHECK BOTH IN NAV**

R — **GPS PRIMARY on PROG page . . . . . CHECK AVAILABLE**

R ● **If GPS PRIMARY is not available**

R — **RNP for approach . . . . . CHECK/ENTER**

R — **HIGH accuracy . . . . . CHECK**

R *Note : RNAV approach without GPS is subject to a specific operational approval.*

● **For approach in managed vertical guidance :**

— **APPR pushbutton on FCU . . . . . PRESS**
Once cleared for the approach, press the pushbutton when flying towards the FAF. Check that APPR NAV is engaged, FINAL is armed, and the VDEV scale is on the PFD.

Note : For instructions for switching from a non ILS to an ILS approach, see the FMGS pilot's guide. (Refer to 4.05.70)

AT GREEN DOT SPEED

— **ORDER . . . . . "FLAPS 1"**

— **FLAPS 1 . . . . . SELECT**

— **CONFIRM/ANNOUNCE . . . . . "FLAPS 1"**

— **TCAS Mode Selector . . . . . TA OR TA/RA**
· See ILS approach (Refer to 3.03.18)

— **ND DISPLAY . . . . . SELECT RANGE/MODE**

AT S SPEED

— **ORDER . . . . . "FLAPS 2"**

— **FLAPS 2 . . . . . SELECT**

— **CONFIRM/ANNOUNCE . . . . . "FLAPS 2"**

WHEN FLAPS ARE AT 2

– **ORDER** . . . . . **"GEAR DOWN"**

– **L/G DOWN** . . . . . **SELECT**

– **GROUND SPOILERS** . . . . . **ARM**

R – **AUTO BRK** . . . . . **CONFIRM**
R If the runway conditions have changed from the approach briefing, consider another
R braking mode.

– **CONFIRM/ANNOUNCE** . . . . . **"GEAR DOWN"**

WHEN LANDING GEAR DOWN :

– **ORDER** . . . . . **"FLAPS 3"**

– **FLAPS 3** . . . . . **SELECT**
· Select FLAPS 3 below VFE.

– **CONFIRM/ANNOUNCE** . . . . . **"FLAPS 3"**

– **ECAM WHEEL page** . . . . . **CHECK**
· The ECAM WHEEL page appears below 800 feet, or at landing gear extension.
· Check the three landing gear green indications.

● **If residual pressure is indicated on the triple indicator :**

– **RESIDUAL BRAKING PROC** . . . . . **APPLY**

Note : Due to the accomplishment of the alternate braking functional test after the landing gear is downlocked, brief brake pressure indications may be observed on BRAKE PRESS indicator.

– **ORDER** . . . . . **"FLAPS FULL"**

– **FLAPS FULL** . . . . . **SELECT**

R · Select FLAPS FULL below VFE.

· Retract the speedbrakes before selecting FLAPS FULL to avoid an unexpected pitch down when the speedbrakes automatically retract.

– **CONFIRM/ANNOUNCE** . . . . . **"FLAPS FULL"**

· Check deceleration towards VAPP.

· Check correct TO waypoint on the ND.

MANAGED VERTICAL GUIDANCE	SELECTED VERTICAL OR SELECTED LATERAL AND VERTICAL GUIDANCE
	. At FAF : **– FPA for final approach . . . . . SET**
. After the FAF : **– FINAL APP . . . . . CHECK** Check FINAL APP green on the FMA. **– GO AROUND ALTITUDE . . . . . SET** Set, when below the go-around altitude.	**. After the FAF :** **– GO AROUND ALTITUDE . . . . . SET** Set, when below the go-around altitude.
– POSITION/FLIGHT PATH . . . . MONITOR **· For approach in overlay to a conventional radio navaid procedure :** Use radio navaid raw data and altitude to monitor the lateral and vertical navigation. If the navigation is unsatisfactory, revert to selected guidance. In particular, monitor the vertical guidance, using altitude indication versus radio navaid position, and be prepared to revert to NAV-FPA, if the vertical guidance is unsatisfactory. **· For RNAV approach :** Monitor VDEV and FPV (on the PFD) and XTK error (on the ND). Use altitude indication versus distance to the runway to monitor the vertical navigation. If the vertical guidance is unsatisfactory, revert to NAV/FPA or consider the go-around. If the lateral guidance is unsatisfactory, perform a go-around.	**– POSITION/FLIGHT PATH . . MONITOR/ADJUST** **· For approach in overlay to a conventional radio navaid procedure :** Use radio navaid raw data to monitor the lateral navigation. Using altitude indication versus radio navaid position, adjust the FPA, as necessary, to follow the published descent profile, taking into account the minimum altitudes. Do not use the FMGC VDEV on the PFD. If the lateral navigation is unsatisfactory, revert to TRK/FPA. **· For RNAV approach :** Monitor XTK error on ND. Using altitude indication versus distance to the runway, adjust the FPA as necessary to follow the published descent profile, taking into account the minimum altitudes. If the lateral guidance is unsatisfactory, perform a go-around.

– **A/THR** . . . . . **CHECK IN SPEED MODE OR OFF**

– **WING ANTI ICE** . . . . . **OFF**
Switch WING ANTI ICE ON in severe icing conditions only.

– **EXTERIOR LIGHTS** . . . . . **SET**
Set NOSE switch to TAXI, set RWY TURN OFF switch to ON, and set LAND switch to ON.

– **SLIDING TABLE** . . . . . **STOW**

– **LDG MEMO** . . . . . **CHECK NO BLUE LINE**

– **CABIN REPORT** . . . . . **OBTAIN**

– **CABIN CREW** . . . . . **ADVISE**

– **LANDING CHECKLIST** . . . . . **COMPLETE**

– **FLIGHT PARAMETERS** . . . . . **CHECK**
PF announces any FMA modification.
PNF calls out :
– "SPEED", when the speed goes below V target – 5, or goes above the speed target + 10
– "SINK RATE", when V/S is greater than – 1000 feet/minute.
– "BANK", when the bank angle goes above 7 degrees.
– "PITCH", when the pitch attitude goes below – 2.5 degrees, or goes above + 10 degrees.
R – "COURSE", when the course deviation is greater than 1/2 dot or 2.5 degrees (VOR),
R or 5 degrees (ADF).
– "_ FT HIGH (LOW)" at altitude checkpoints.

– **ORDER** . . . . . **"FLAPS FULL"**

– **FLAPS FULL** . . . . . **SELECT**

R · Select FLAPS FULL below VFE.

– **CONFIRM/ANNOUNCE** . . . . . **"FLAPS FULL"**

· Check deceleration towards VAPP.

· Check correct TO waypoint on the ND.

MANAGED VERTICAL GUIDANCE	SELECTED VERTICAL OR SELECTED LATERAL AND VERTICAL GUIDANCE
	. At FAF : **– FPA for final approach . . . . . SET**
. After the FAF : **– FINAL APP . . . . . CHECK** Check FINAL APP green on the FMA.	**. After the FAF :**
– GO AROUND ALTITUDE . . . . . SET Set, when below the go-around altitude.	**– GO AROUND ALTITUDE . . . . . SET** Set, when below the go-around altitude.
– POSITION/FLIGHT PATH . . . . MONITOR **· For approach in overlay to a conventional radio navaid procedure :** Use radio navaid raw data and altitude to monitor the lateral and vertical navigation. If the navigation is unsatisfactory, revert to selected guidance. In particular, monitor the vertical guidance, using altitude indication versus radio navaid position, and be prepared to revert to NAV-FPA, if the vertical guidance is unsatisfactory. **· For RNAV approach :** Monitor VDEV and FPV (on the PFD) and XTK error (on the ND). Use altitude indication versus distance to the runway to monitor the vertical navigation. If the vertical guidance is unsatisfactory, revert to NAV/FPA or consider the go-around. If the lateral guidance is unsatisfactory, perform a go-around.	**– POSITION/FLIGHT PATH . . MONITOR/ADJUST** **· For approach in overlay to a conventional radio navaid procedure :** Use radio navaid raw data to monitor the lateral navigation. Using altitude indication versus radio navaid position, adjust the FPA, as necessary, to follow the published descent profile, taking into account the minimum altitudes. Do not use the FMGC VDEV on the PFD. If the lateral navigation is unsatisfactory, revert to TRK/FPA. **· For RNAV approach :** Monitor XTK error on ND. Using altitude indication versus distance to the runway, adjust the FPA as necessary to follow the published descent profile, taking into account the minimum altitudes. If the lateral guidance is unsatisfactory, perform a go-around.

– **A/THR** . . . . . **CHECK IN SPEED MODE OR OFF**

– **WING ANTI ICE** . . . . . **OFF**
Switch WING ANTI ICE ON in severe icing conditions only.

– **EXTERIOR LIGHTS** . . . . . **SET**
Set NOSE switch to TAXI, set RWY TURN OFF switch to ON, and set LAND switch to ON.

– **SLIDING TABLE** . . . . . **STOW**

– **LDG MEMO** . . . . . **CHECK NO BLUE LINE**

– **CABIN REPORT** . . . . . **OBTAIN**

– **CABIN CREW** . . . . . **ADVISE**

– **LANDING CHECKLIST** . . . . . **COMPLETE**

– **FLIGHT PARAMETERS** . . . . . **CHECK**
PF announces any FMA modification.
PNF calls out :
– "SPEED", when the speed goes below V target – 5, or goes above the speed target + 10
– "SINK RATE", when V/S is greater than – 1000 feet/minute.
– "BANK", when the bank angle goes above 7 degrees.
– "PITCH", when the pitch attitude goes below – 2.5 degrees, or goes above + 10 degrees.
R – "COURSE", when the course deviation is greater than 1/2 dot or 2.5 degrees (VOR),
R or 5 degrees (ADF).
– "_ FT HIGH (LOW)" at altitude checkpoints.

- **AT ENTERED MDA/MDH + 100 FT :**

  – **MONITOR or ANNOUNCE . . . . . "ONE HUNDRED ABOVE"**

- **AT ENTERED MDA/MDH**

  – **MONITOR or ANNOUNCE . . . . . "MINIMUM"**

  - **If ground references are visible :**

R – **ANNOUNCE . . . . . "CONTINUE"**

  – **AP . . . . . OFF**
  Continue, as with a visual approach (Refer to 3.03.20).

  - **If ground references are not visible :**

  – **ANNOUNCE . . . . . "GO AROUND/FLAPS"**
  Begin a go-around.

  Note : 1. In managed guidance (FINAL APP mode engaged), when the aircraft reaches MDA (MDH) or MAP altitude (if no MDA/MDH entered), the autopilot automatically disengages.

  2. In selected guidance, if ground references are not visible when the aircraft reaches MDA, the pilot should make an immediate go-around. However, if the distance to the runway is not properly assessed, a step descent approach may be considered and a level-off at MDA may be performed while searching for visual references. If the pilot has no visual reference at MAP, at the latest, he must begin a go-around.

CIRCLING APPROACH

For a circling approach, the flight crew should prepare the flight plan as follows :
Primary flight plan : Introduce the instrument approach
Secondary flight plan : – Copy the ACTIVE F-PLN
– Revise the Landing runway
The aircraft should circle in CONF 3 at F speed.
Upon reaching MDA :
– Push the V/S/FPA knob to level off.
– Search for visual reference.

- **If the flight crew finds no visual reference :**

  – **AT MAP : Initiate go-around**

- **If the flight crew finds sufficient visual references :**

  – **Select TRK for downwind**

  – **Early on downwind : Activate SEC F-PLN**

  CAUTION
  The PNF should activate the SEC F-PLN.
  The PF should maintain visual contact during all the circling.

  – **Disengage autopilot before reaching the base leg.**

R – **Select both FDs OFF.**

- **AT ENTERED MDA/MDH + 100 FT :**

  – **MONITOR or ANNOUNCE . . . . . "ONE HUNDRED ABOVE"**

- **At ENTERED MDA or MDH**

  – **MONITOR or ANNOUNCE . . . . . "MINIMUM"**

  - **If ground references are visible :**

R – **ANNOUNCE . . . . . "CONTINUE"**

  – **AP . . . . . OFF**
  Continue, as with a visual approach (Refer to 3.03.20).

  - **If ground references are not visible :**

  – **ANNOUNCE . . . . . "GO AROUND/FLAPS"**
  Begin a go-around.

  Note : 1. In managed guidance (FINAL APP mode engaged), when the aircraft reaches MDA (MDH) – 50 or 400 feet (if no MDA/MDH entered), the autopilot automatically disengages.

  2. In selected guidance, if ground references are not visible when the aircraft reaches MDA, the pilot should make an immediate go-around. However, if the distance to the runway is not properly assessed, a step descent approach may be considered and a level-off at MDA may be performed while searching for visual references. If the pilot has no visual reference at MAP, at the latest, he must begin a go-around.

CIRCLING APPROACH

For a circling approach, the flight crew should prepare the flight plan as follows :
Primary flight plan : Introduce the instrument approach
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- **If the flight crew finds no visual reference :**

  – **AT MAP : Initiate go-around**

- **If the flight crew finds sufficient visual references :**

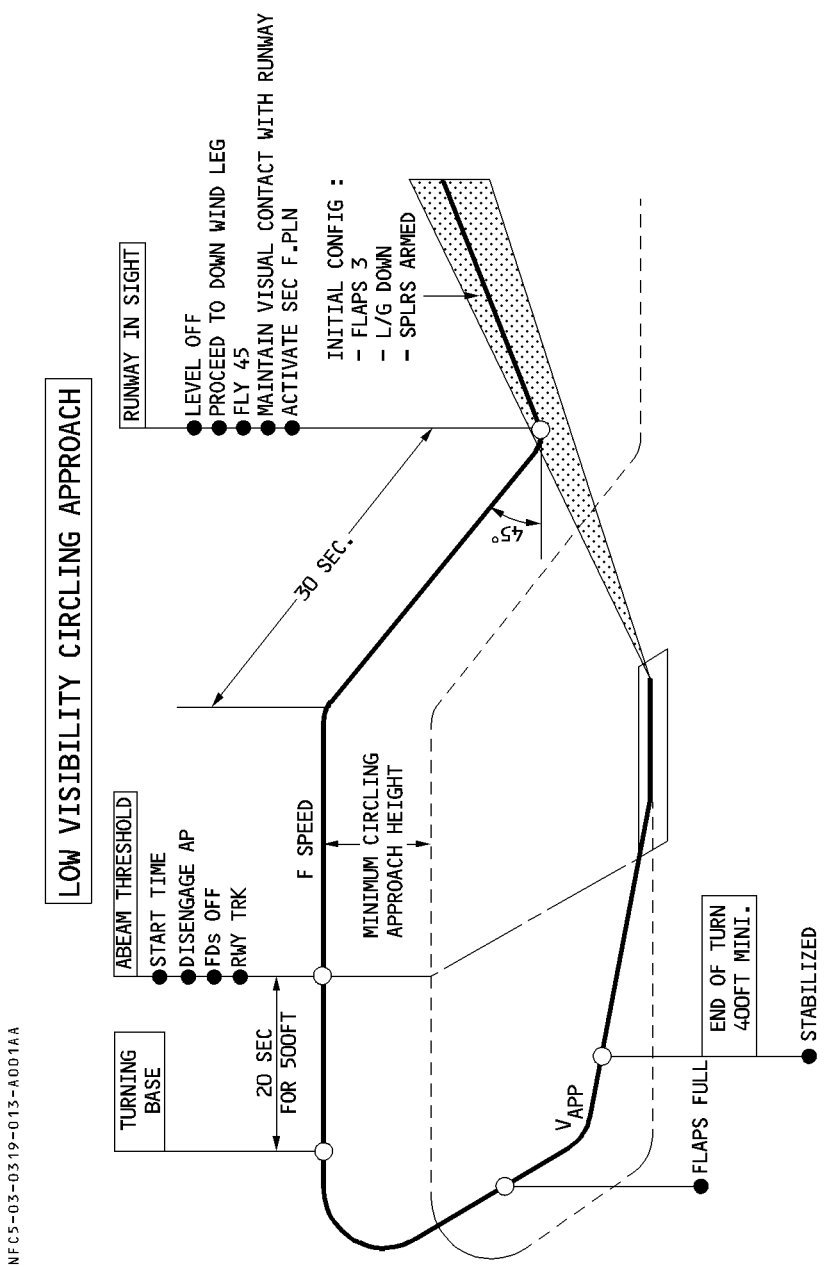
  – **Select TRK for downwind**

  – **Early on downwind : Activate SEC F-PLN**

  CAUTION
  The PNF should activate the SEC F-PLN.
  The PF should maintain visual contact during all the circling.

  – **Disengage autopilot before reaching the base leg.**

R – **Select both FDs OFF.**


LOW VISIBILITY CIRCLING APPROACH
RUNWAY IN SIGHT
LEVEL OFF
PROCEED TO DOWN WIND LEG
FLY 45
MAINTAIN VISUAL CONTACT WITH RUNWAY
ACTIVATE SEC F.PLN
INITIAL CONFIG :
- FLAPS 3
- L/G DOWN
- SPLRS ARMED
30 SEC.
45°
ABEAM THRESHOLD
START TIME
DISENGAGE AP
FDs OFF
RWY TRK
F SPEED
MINIMUM CIRCLING
APPROACH HEIGHT
TURNING
BASE
20 SEC
FOR 500FT
VAPP
FLAPS FULL
END OF TURN
400FT MINI.
STABILIZED
NFCS-03-0319-013-A001AA

OBJECTIVE

Perform the approach on a nominal 3 degree glideslope using visual references. Approach to be stabilized by 500 feet AGL on the correct approach path, in the landing configuration, at VAPP.

Method :

- The autopilot is not used.
- Both FDs are off.
- FPV use is recommended.
- A/THR use is recommended with managed speed.

R Bear in mind the possible risk of optical illusions due to hindered night vision.

VISUAL CIRCUIT

INITIAL/INTERMEDIATE APPROACH

The flight plan selected on the MCDU should include the selection of the landing runway. The downwind leg may also be part of the flight plan. This may be a useful indication of the aircraft position in the circuit on the ND.

However, visual references must be used.

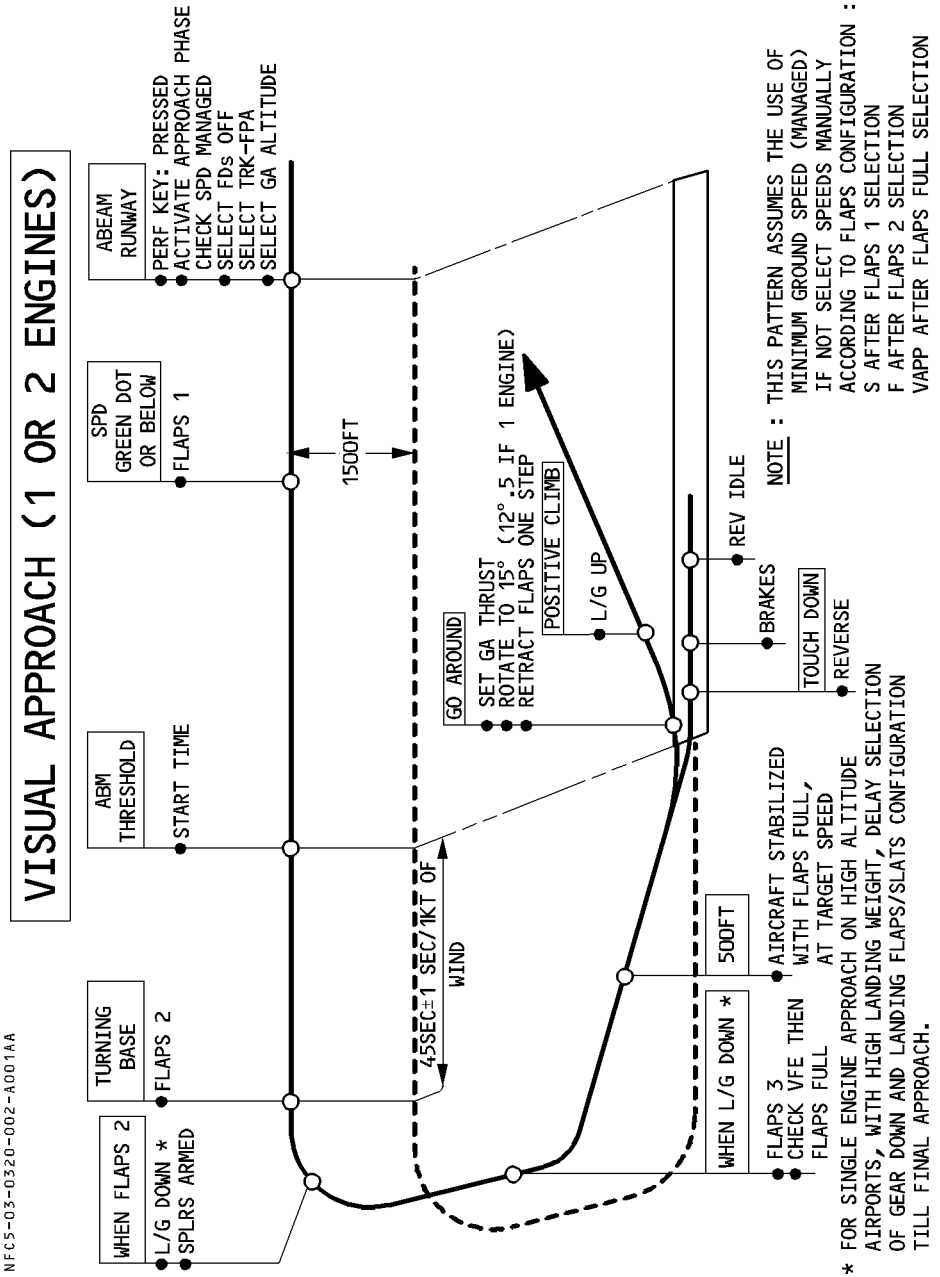
Therefore, at the beginning of the downwind leg :

- **Manually ACTIVATE APPR.**
- **Select FDs to OFF.**
- **Select TRK-FPA to have FPV displayed.**
- **Check A/THR active.**
  Extend the downwind leg to 45 seconds (± wind correction).
  Turn into base leg with a maximum of 30° of bank. Descent with approximate FPA, in FLAPS 2, at F speed.

FINAL APPROACH

- The speed trend arrow and FPV help the flight crew make timely and correct thrust settings (if in manual thrust), and approach path corrections. Avoid descending through the correct approach path with idle thrust. (Late recognition of this situation without a prompt thrust increase may lead to considerable speed decay and altitude loss).
- Have the aircraft stabilized by 500 feet AGL, on the correct approach path at VAPP (or ground speed mini) with the appropriate thrust applied. If not stabilized, a go-around should be considered.
- Avoid any tendency to “duck under” in the late stages of the approach.
- Avoid destabilizing the approach in the last 100 feet, in order to have the best chance of performing a good touchdown at the desired position.

R


VISUAL APPROACH (1 OR 2 ENGINES)
ABEAM RUNWAY
PERF KEY: PRESSED
ACTIVATE APPROACH PHASE
CHECK SPD MANAGED
SELECT FDs OFF
SELECT TRK-FPA
SELECT GA ALTITUDE
SPD GREEN DOT OR BELOW
FLAPS 1
1500FT
ABM THRESHOLD
START TIME
TURNING BASE
FLAPS 2
WHEN FLAPS 2
L/G DOWN *
SPLRS ARMED
4.5SEC±1 SEC/1KT OF WIND
GO AROUND
SET GA THRUST
ROTATE TO 15°
RETRACT FLAPS ONE STEP
POSITIVE CLIMB
L/G UP
REV IDLE
BRAKES
TOUCH DOWN
REVERSE
WHEN L/G DOWN *
500FT
FLAPS 3
CHECK VFE THEN FLAPS FULL
AIRCRAFT STABILIZED WITH FLAPS FULL, AT TARGET SPEED
NOTE : THIS PATTERN ASSUMES THE USE OF
MINIMUM GROUND SPEED (MANAGED)
IF NOT SELECT SPEEDS MANUALLY
ACCORDING TO FLAPS CONFIGURATION :
S AFTER FLAPS 1 SELECTION
F AFTER FLAPS 2 SELECTION
VAPP AFTER FLAPS FULL SELECTION
* FOR SINGLE ENGINE APPROACH ON HIGH ALTITUDE AIRPORTS, WITH HIGH LANDING WEIGHT, DELAY SELECTION OF GEAR DOWN AND LANDING FLAPS/SLATS CONFIGURATION TILL FINAL APPROACH.
NF05-03-0320-002-A001AA

OBJECTIVE

Perform the approach on a nominal 3 degree glideslope using visual references. Approach to be stabilized by 500 feet AGL on the correct approach path, in the landing configuration, at VAPP.

Method :

- The autopilot is not used.
- Both FDs are off.
- FPV use is recommended.
- A/THR use is recommended with managed speed.

R Bear in mind the possible risk of optical illusions due to hindered night vision.

Note : If the forecasted tailwind at landing is greater than 10 knots, decelerated approach is not allowed, and the speed should be stabilized around VREF + 5 knots in final.

VISUAL CIRCUIT

INITIAL/INTERMEDIATE APPROACH

The flight plan selected on the MCDU should include the selection of the landing runway. The downwind leg may also be part of the flight plan. This may be a useful indication of the aircraft position in the circuit on the ND.

However, visual references must be used.

Therefore, at the beginning of the downwind leg :

- **Manually ACTIVATE APPR phase.**

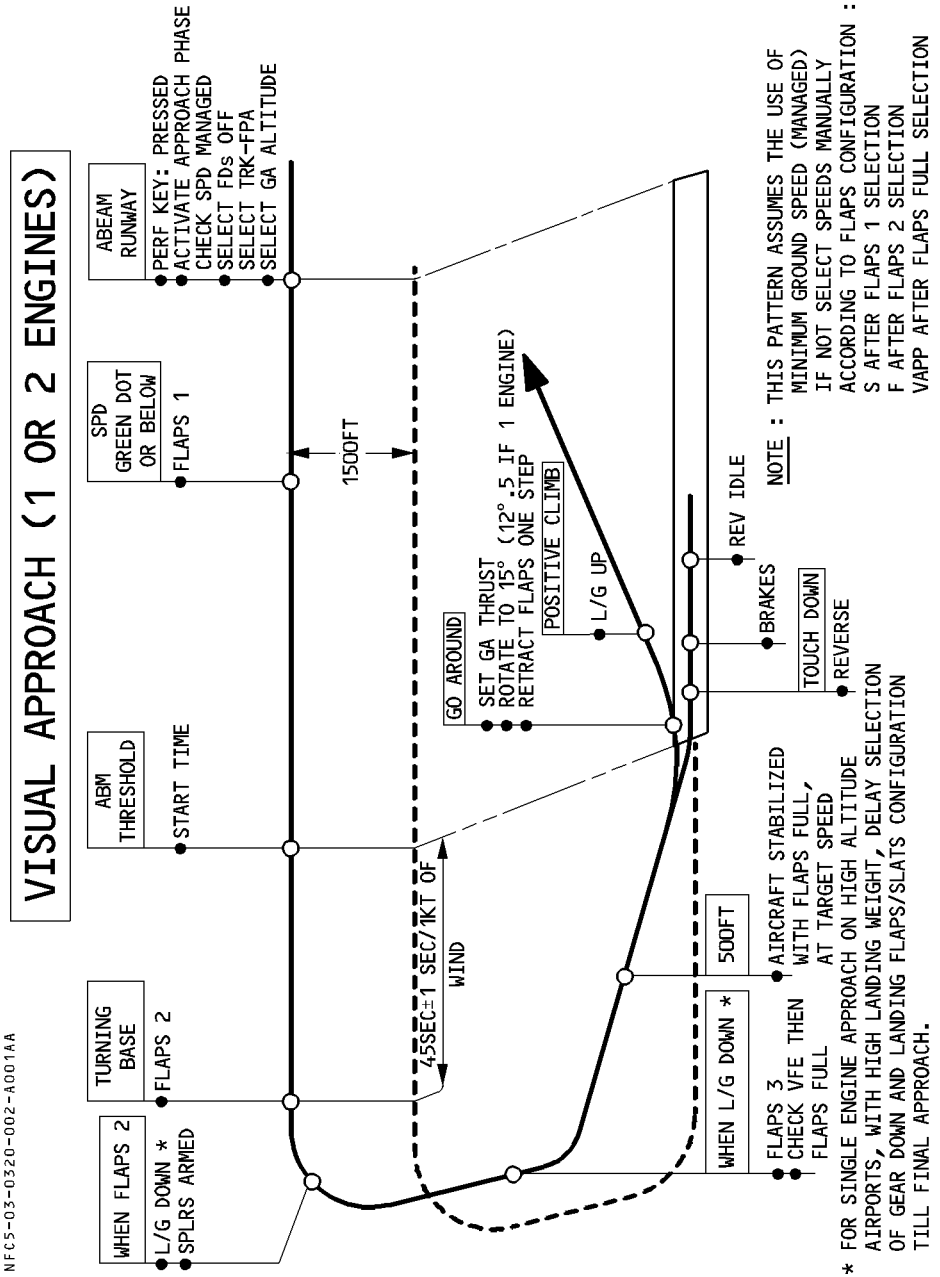
- **Select FDs to OFF. Select TRK-FPA to have FPV displayed.**

- **Check A/THR active.**
  Extend the downwind leg to 45 seconds (± wind correction). Turn into base leg with a maximum of 30° of bank. Descent with approximate FPA, in FLAPS 2, at F speed.

FINAL APPROACH

- The speed trend arrow and FPV help the flight crew make timely and correct thrust settings (if in manual thrust), and approach path corrections. Avoid descending through the correct approach path with idle thrust. (Late recognition of this situation without a prompt thrust increase may lead to considerable speed decay and altitude loss).
- Have the aircraft stabilized by 500 feet AGL, on the correct approach path at VAPP (or ground speed mini) with the appropriate thrust applied. If not stabilized, a go-around should be considered.
- Avoid any tendency to "duck under" in the late stages of the approach.
- Avoid destabilizing the approach in the last 100 feet, in order to have the best chance of performing a good touchdown at the desired position.

R

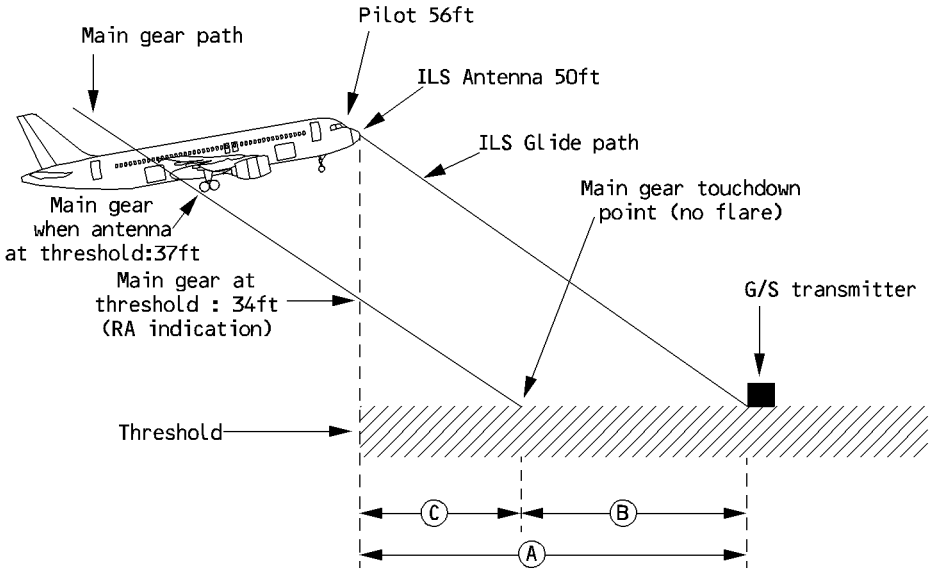

VISUAL APPROACH (1 OR 2 ENGINES)
ABEAM RUNWAY
PERF KEY: PRESSED
ACTIVATE APPROACH PHASE
CHECK SPD MANAGED
SELECT FDs OFF
SELECT TRK-FPA
SELECT GA ALTITUDE
SPD GREEN DOT OR BELOW
FLAPS 1
1500FT
ABM THRESHOLD
START TIME
TURNING BASE
FLAPS 2
WHEN FLAPS 2
L/G DOWN *
SPLRS ARMED
4.5SEC±1 SEC/1KT OF WIND
GO AROUND
SET GA THRUST
ROTATE TO 15°
RETRACT FLAPS ONE STEP
POSITIVE CLIMB
L/G UP
REV IDLE
BRAKES
TOUCH DOWN
REVERSE
WHEN L/G DOWN *
500FT
FLAPS 3
CHECK VFE THEN FLAPS FULL
AIRCRAFT STABILIZED WITH FLAPS FULL, AT TARGET SPEED
NOTE : THIS PATTERN ASSUMES THE USE OF MINIMUM GROUND SPEED (MANAGED)
IF NOT SELECT SPEEDS MANUALLY
ACCORDING TO FLAPS CONFIGURATION :
S AFTER FLAPS 1 SELECTION
F AFTER FLAPS 2 SELECTION
VAPP AFTER FLAPS FULL SELECTION
* FOR SINGLE ENGINE APPROACH ON HIGH ALTITUDE AIRPORTS, WITH HIGH LANDING WEIGHT, DELAY SELECTION OF GEAR DOWN AND LANDING FLAPS/SLATS CONFIGURATION TILL FINAL APPROACH.
NF65-03-0320-002-A001AA

PRECISION APPROACH

R (Refer to FCOM 4.05.70).

R

ILS FINAL APPROACH AND LANDING GEOMETRY

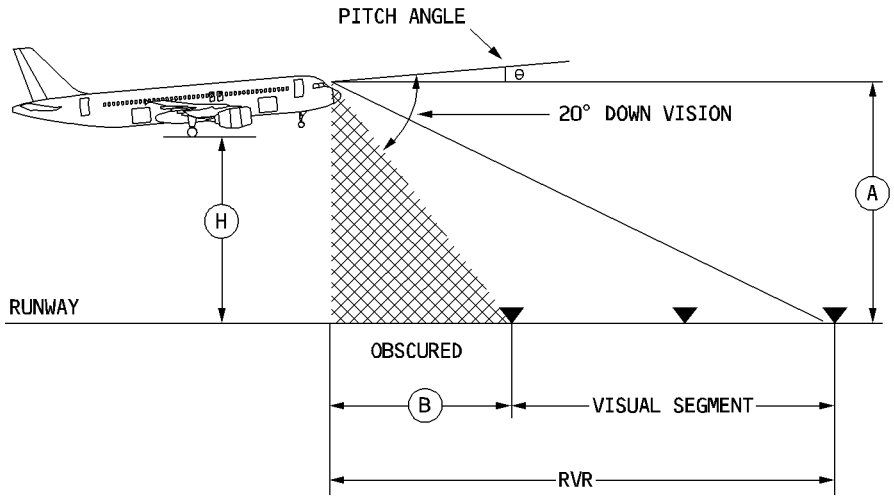


NFC5-03-0322-001-A040AA

CONDITIONS : - FLAPS FULL - ILS ANTENNA AT 50 ft AT THRESHOLD - NO FLARE - PITCH ANGLE : 4°	GLIDE PATH (°)	(A)	(B)	TOUCHDOWN POINT (C)
	2°5	348 m 1145 ft	112 m 366 ft	236 m 779 ft
	3°	291 m 954 ft	93 m 306 ft	198 m 648 ft

R

MINIMUM VISUAL GROUND SEGMENTS (Flare phase)



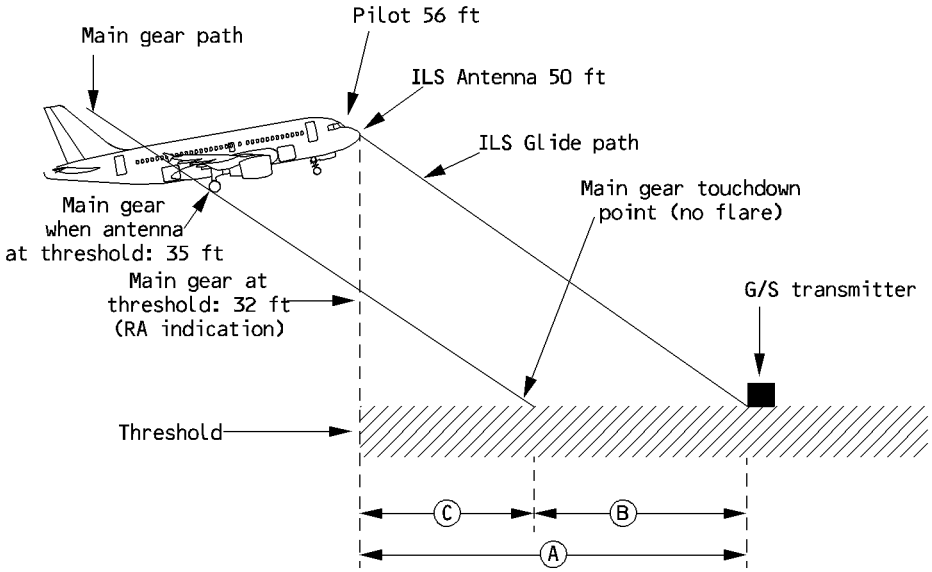
	CAT III		CAT II
(H)	15 ft (θ = 5.4°)	50 ft (θ = 4.7°)	100 ft (θ = 4.7°)
VISUAL SEGMENT	60 m (197 ft)		120 m (394 ft)
(A)	36 ft	71 ft	121 ft
OBSCURED (B)	43 m (140 ft)	79 m (259 ft)	134 m (442 ft)
MINIMUM RVR	103 m (337 ft)	139 m (456 ft)	254 m (836 ft)

NFC5-03-0322-002-A040AA

R *Note : This drawing shows that, for a CAT III landing (60 meters minimum visual segment),*
R *the minimum RVR is 103 meters at 15 feet.*

R

ILS FINAL APPROACH AND LANDING GEOMETRY

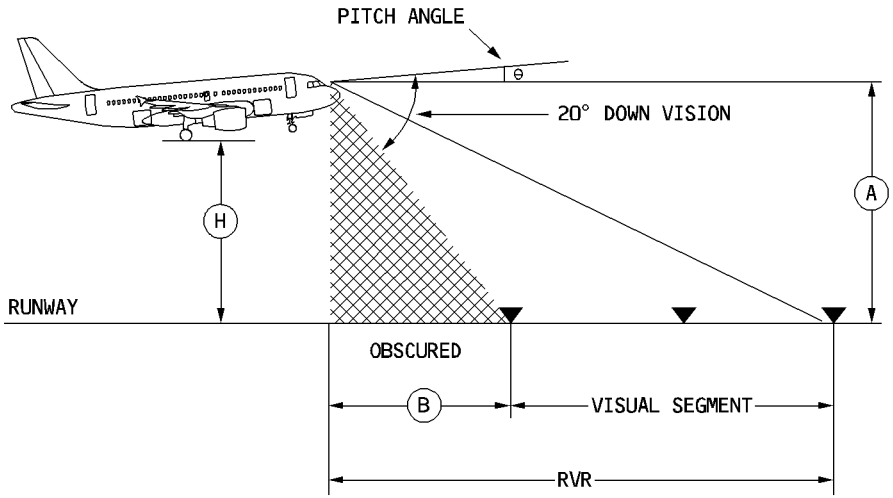


CONDITIONS :	PITCH ANGLE	GLIDE PATH (°)	Ⓐ	Ⓑ	TOUCHDOWN POINT Ⓒ
- FLAPS FULL - ILS ANTENNA AT 50 ft AT THRESHOLD	5°7	2°5	349 m 1145 ft	122 m 399 ft	227 m 746 ft
- NO FLARE	6°2	3°	291 m 954 ft	104 m 342 ft	187 m 612 ft

NFCS-03-0322-001-A060AA

R

MINIMUM VISUAL GROUND SEGMENTS (Flare phase)



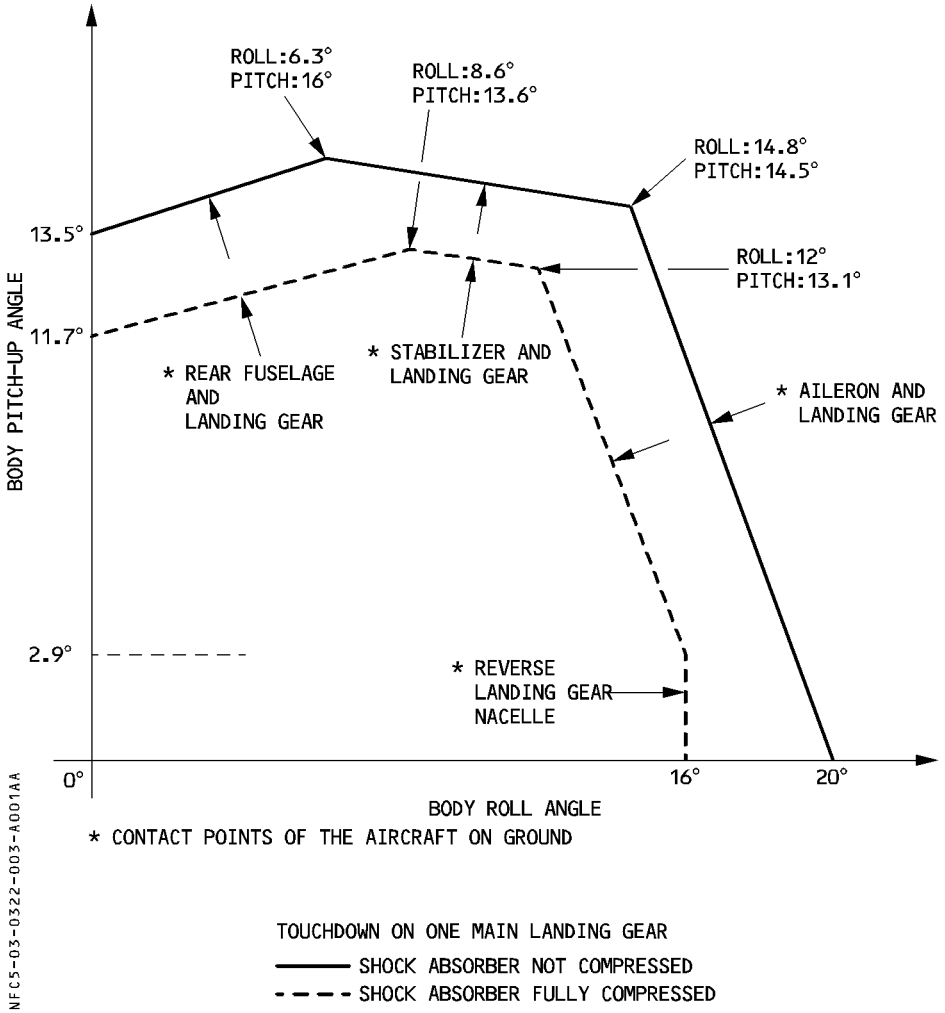
	CAT III		CAT II
(H)	15 ft (θ = 6.6°)	50 ft (θ = 6.2°)	100 ft (θ = 6.2°)
VISUAL SEGMENT	60 m (197 ft)		120 m (394 ft)
(A)	37 ft	71 ft	121 ft
OBSCURED (B)	47 m (154 ft)	88 m (290 ft)	151 m (494 ft)
MINIMUM RVR	107 m (351 ft)	148 m (487 ft)	271 m (888 ft)

NFC5-03-0322-002-A060AA

Note : This drawing shows that, for a CAT III landing (60 meters minimum visual segment), the minimum RVR is 107 meters at 15 feet.

GROUND CLEARANCE DIAGRAM

R



LANDING

The cockpit cut-off angle is 20 degrees.

● **From stabilized approach conditions, the flare height is about 30 feet :**

– **FLARE . . . . . PERFORM**

– **ATTITUDE . . . . . MONITOR**
The PNF should monitor the attitude, and call out :
– "PITCH, PITCH", if the pitch angle reaches 10 degrees.
– "BANK, BANK", if the bank angle reaches 7 degrees.

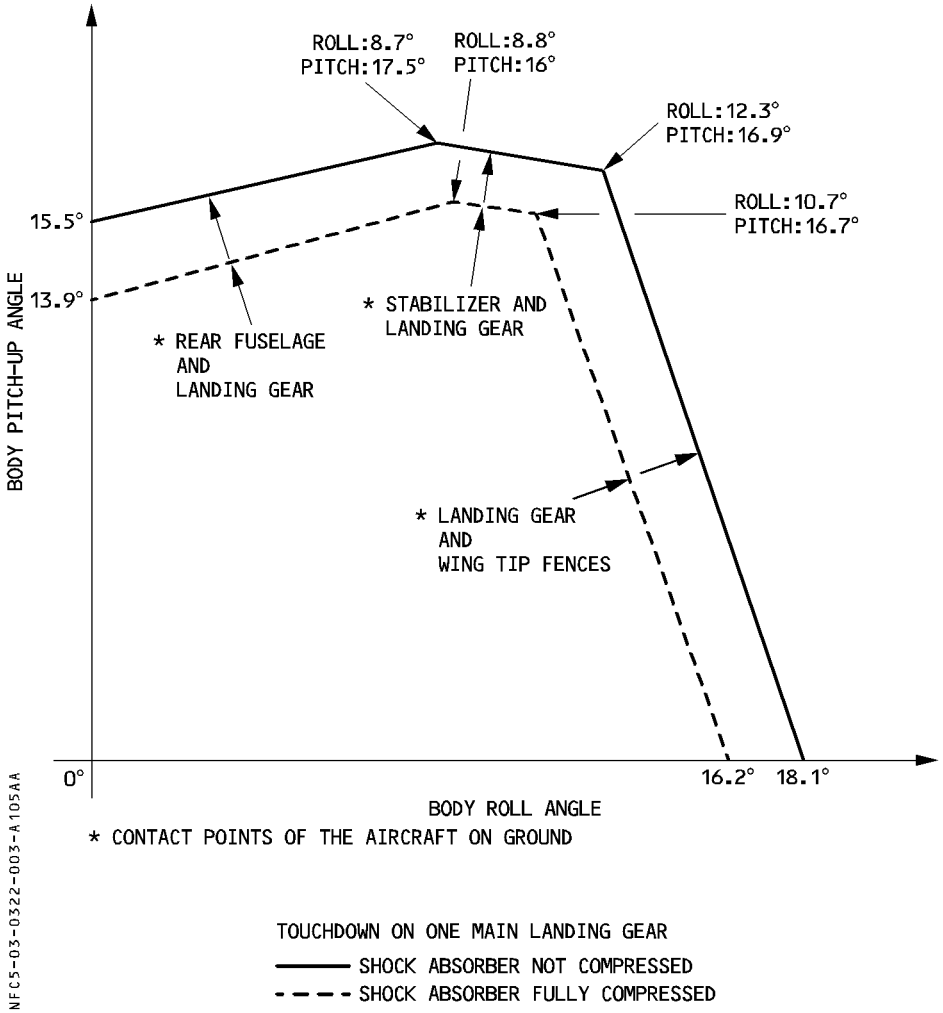
– **THRUST levers . . . . . IDLE**
R In manual landing conditions, the "RETARD" callout is generated at 20 feet RA, as a reminder.

Ground clearance

· Avoid flaring high.
· A tailstrike occurs, if the pitch attitude exceeds 13.5 degrees (11 degrees with the landing gear compressed).
A wingtip or engine scrape occurs, if the roll angle exceeds 20 degrees (16 degrees with the landing gear compressed).
· Be aware of the pitch-up tendency, with ground spoiler extension.

R

GROUND CLEARANCE DIAGRAM



NFC5-03-0322-003-A105AA

LANDING

The cockpit cut-off angle is 20 degrees.

● **From stabilized approach conditions, the flare height is about 30 feet :**

– **FLARE . . . . . PERFORM**

– **ATTITUDE . . . . . MONITOR**
The PNF should monitor the attitude, and call out :
– "PITCH, PITCH", if the pitch angle reaches 10 degrees.
– "BANK, BANK", if the bank angle reaches 7 degrees.

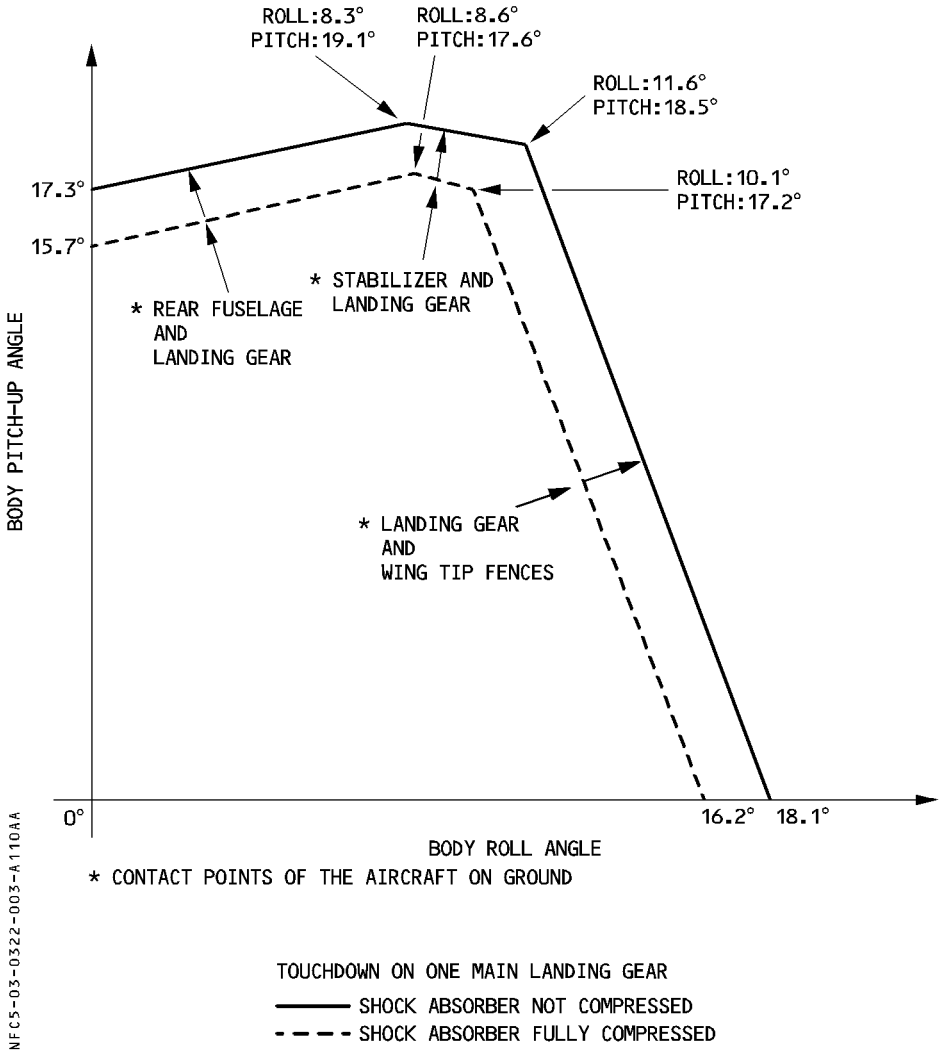
– **THRUST levers . . . . . IDLE**
In manual landing conditions, the "RETARD" callout is generated at 20 feet RA, as a reminder.

R

Ground clearance

· Avoid flaring high.
· A tailstrike occurs, if the pitch attitude exceeds 15.5 degrees (13.5 degrees with the landing gear compressed).
A wingtip or engine scrape occurs, if the roll angle exceeds 18 degrees (16 degrees with the landing gear compressed).
· Be aware of the pitch-up tendency, with ground spoiler extension.

GROUND CLEARANCE DIAGRAM



NFC5-03-0322-003-A110AA

LANDING

The cockpit cut-off angle is 20 degrees.

● **From stabilized approach conditions, the flare height is about 30 feet :**

– **FLARE . . . . . PERFORM**

– **ATTITUDE . . . . . MONITOR**
The PNF should monitor the attitude, and call out :
– "PITCH, PITCH", if the pitch angle reaches 10 degrees.
– "BANK, BANK", if the bank angle reaches 7 degrees.

– **THRUST levers . . . . . IDLE**
In manual landing conditions, the "RETARD" callout is generated at 20 feet RA, as a reminder.

R

Ground clearance

· Avoid flaring high.
· A tailstrike occurs, if the pitch attitude exceeds 17 degrees (15.5 degrees with the landing gear compressed).
A wingtip or engine scrape occurs, if the roll angle exceeds 18 degrees (16 degrees with the landing gear compressed).
· Be aware of the pitch-up tendency, with ground spoiler extension.

● **At touchdown :**

– **REV . . . . . MAX**

· Select MAX REV immediately after the main landing gear touches down.
If the airport regulations restrict the use of reversers, select and maintain reverse idle until taxi speed is reached.
A slight pitch-up, easily controlled by the flight crew, may appear when the thrust reversers are deployed before the nose landing gear touches down.

R Lower the nosewheel without undue delay.

R · The PNF continues to monitor the attitude.

· In case of engine failure, the use of the remaining reverser is recommended.

· Braking may begin before nosewheel is down, if required for performance reasons. However, when comfort is the priority, braking should be delayed until the nosewheel has touched down.
During roll out, sidestick inputs (either lateral or longitudinal) should be avoided.
If directional control problems are encountered, reduce thrust to reverse idle until directional control is satisfactory.

· After reverse thrust is initiated, a full stop landing must be performed.

– **GROUND SPOILERS . . . . . CHECK**

Check that the ECAM WHEEL page shows the ground spoilers fully deployed after touchdown. Announce "Ground spoilers", then "Reverse green".

– **DIRECTIONAL CONTROL . . . . . ENSURE**

· Use rudder pedals for directional control.

· Do not use the nosewheel steering control handle before reaching taxi speed.

– **BRAKES . . . . . AS RQRD**

· Monitor the autobrake, if it is on. When required, brake with the pedals.

· Although the green hydraulic system supplies the braking system, if pedals are pressed quickly a brief brake pressure indication appears on the BRAKE PRESS indicator.

● **At 70 knots :**

– **THRUST levers . . . . . REV IDLE**

70 knots is the minimum recommended speed, with full reverse thrust.

CAUTION

Avoid using high levels of reverse thrust at low airspeed, because gases re-entering the compressor can cause engine stalls, that may result in excessive EGT.

- **At taxi speed :**

  – **THRUST levers . . . . . FWD IDLE**

  · Deselect the REV position upon reaching taxi speed and before leaving the runway. On snow-covered grounds, reversers should be stowed when the aircraft speed reaches 25 knots. When deselecting REV, be careful not to apply forward thrust by moving the thrust levers beyond the FWD IDLE position.

  CAUTION

  On taxiways, the use of reversers, even when restricted to idle thrust, may have the following effects :
  – The engines may ingest fine sand and debris that may be detrimental to both the engines and the airframe systems.
  – On snow covered areas, snow will recirculate into the air inlet, which may result in engine flame-out or roll back.Except in an emergency, do not use reverse thrust to control aircraft speed while taxiing.

- **Before 20 knots :**

  – **AUTO BRK . . . . . DISENGAGE**

  Disengage the autobrake to avoid some brake jerks at low speed.

GO AROUND WITH FD ON

Apply the following three actions simultaneously :

– **THRUST LEVERS** . . . . . **TOGA**

– **ANNOUNCE** . . . . . **"GO AROUND – FLAPS"**

– **ROTATION** . . . . . **PERFORM**
· Rotate the aircraft to get a positive rate of climb, and establish the required pitch attitude, as directed by the SRS pitch command bar.
· Check and announce the FMA : TOGA (or MAN TOGA), SRS, GA TRK.

– **FLAPS** . . . . . **RETRACT ONE STEP**
Announce "FLAPS..." when indicated.

– **ANNOUNCE** . . . . . **"POSITIVE CLIMB"**

– **ORDER** . . . . . **"GEAR UP"**

– **L/G UP** . . . . . **SELECT**

– **CONFIRM/ANNOUNCE** . . . . . **"GEAR UP–FLAPS"**

Note : Consider retarding to CL detent, if TOGA thrust is not required.

– **NAV or HDG mode** . . . . . **SELECT**
Reselect NAV or HDG, as required (minimum height 100 feet).

Note : Go-around may be flown with both autopilots engaged. Whenever any other mode engages, AP 2 disengages.

● **At go-around thrust reduction altitude (CLB or LVR CLB flashing on FMA) :**

R – **THRUST LEVERS** . . . . . **CL**

- **At go-around acceleration altitude :**

  – **Monitor that the target speed increases to green dot.**

  - **If the target speed does not increase to green dot :**

    – **FCU ALT . . . . . CHECK and PULL**

  – **Retract flaps on schedule.**

    Note : Consider the next step :
    – Engage NAV mode, to follow the published missed approach procedure, or
    – Prepare for a second approach by selecting the ACTIVATE APP PHASE, and CONFIRM on the PERF page.

GO-AROUND FROM AN INTERMEDIATE APPROACH ALTITUDE

To interrupt the approach, or to perform a go-around, from an intermediate altitude in the approach, and if TOGA thrust is not required, proceed as follows :

– **SET the thrust levers to TOGA detent, then retard the thrust levers as required.**
This enables to engage the GO-AROUND phase, with associated AP/FD modes.

– **SELECT the applicable AP/FD and A/THR modes on the FCU.**

Note : If the thrust levers are not set briefly to TOGA detent, the FMS does not engage the GO AROUND phase, and flying over, or close to the airport (less than 7 NM) will sequence the Destination waypoint in the F-PLN.

GO AROUND

Apply the following three actions simultaneously :

– **THRUST LEVERS** . . . . . **TOGA**

– **ANNOUNCE** . . . . . **"GO AROUND – FLAPS"**

– **ROTATION** . . . . . **PERFORM**
· Rotate the aircraft to get a positive rate of climb, and establish the required pitch attitude, as directed by the SRS pitch command bar.
· Check and announce the FMA : MAN TOGA, SRS, GA TRK.

– **FLAPS** . . . . . **RETRACT ONE STEP**
Announce "FLAPS..." when indicated.

– **ANNOUNCE** . . . . . **"POSITIVE CLIMB"**

– **ORDER** . . . . . **"GEAR UP"**

– **L/G UP** . . . . . **SELECT**

– **CONFIRM/ANNOUNCE** . . . . . **"GEAR UP–FLAPS"**

Note : Consider retarding to CL detent, if TOGA thrust is not required.

– **NAV or HDG mode** . . . . . **SELECT**
Reselect NAV or HDG, as required (minimum height 100 feet).

Note : Go-around may be flown with both autopilots engaged. Whenever any other mode engages, AP 2 disengages.

● **At go-around thrust reduction altitude (LVR CLB flashing on FMA) :**

R – **THRUST LEVERS** . . . . . **CL**

- **At go-around acceleration altitude :**

  – **Monitor that the target speed increases to green dot.**

  - **If the target speed does not increase to green dot :**

    – **FCU ALT . . . . . CHECK and PULL**

  – **Retract flaps on schedule.**

    Note : Consider the next step :
    – Engage NAV mode, to follow the published missed approach procedure, or
    – Prepare for a second approach by selecting the ACTIVATE APP PHASE, and CONFIRM on the PERF page.

GO-AROUND FROM AN INTERMEDIATE APPROACH ALTITUDE

To interrupt the approach, or to perform a go-around, from an intermediate altitude in the approach, and if TOGA thrust is not required, proceed as follows :

– **SET the thrust levers to TOGA detent, then retard the thrust levers as required.**
This enables to engage the GO-AROUND phase, with associated AP/FD modes.

– **SELECT the applicable AP/FD and A/THR modes on the FCU.**

Note : If the thrust levers are not set briefly to TOGA detent, the FMS does not engage the GO AROUND phase, and flying over, or close to the airport (less than 7 NM) will sequence the Destination waypoint in the F-PLN.

GO AROUND

Apply the following three actions simultaneously :

– **THRUST LEVERS . . . . . TOGA**

– **ANNOUNCE . . . . . "GO AROUND – FLAPS"**

– **ROTATION . . . . . PERFORM**
· Rotate the aircraft to get a positive rate of climb, and establish the required pitch attitude, as directed by the SRS pitch command bar.
· Check and announce the FMA : MAN TOGA, SRS, GA TRK.

– **FLAPS . . . . . RETRACT ONE STEP**
Announce "FLAPS..." when indicated.

– **ANNOUNCE . . . . . "POSITIVE CLIMB"**

– **ORDER . . . . . "GEAR UP"**

– **L/G UP . . . . . SELECT**

– **CONFIRM/ANNOUNCE . . . . . "GEAR UP–FLAPS"**

Note : Consider retarding to CL detent, if TOGA thrust is not required.

– **NAV or HDG mode . . . . . SELECT**
Reselect NAV or HDG, as required (minimum height 100 feet).

Note : Go-around may be flown with both autopilots engaged. Whenever any other mode engages, AP 2 disengages.

● **At go-around thrust reduction altitude (LVR CLB flashing on FMA) :**

R – **THRUST LEVERS . . . . . CL**

- **At go-around acceleration altitude :**

  – **Monitor that the target speed increases to green dot.**

  - **If the target speed does not increase to green dot :**

    – **FCU ALT . . . . . CHECK and PULL**

  – **Retract flaps on schedule.**

    Note : Consider the next step :
    – Engage NAV mode, to follow the published missed approach procedure, or
    – Prepare for a second approach by selecting the ACTIVATE APP PHASE, and CONFIRM on the PERF page.

GO-AROUND FROM AN INTERMEDIATE APPROACH ALTITUDE

To interrupt the approach, or to perform a go-around, from an intermediate altitude in the approach, and if TOGA thrust is not required, proceed as follows :

– **SET the thrust levers to TOGA detent, then retard the thrust levers as required.**
This enables to engage the GO-AROUND phase, with associated AP/FD modes.

– **SELECT the applicable AP/FD and A/THR modes on the FCU.**

Note : If the thrust levers are not set briefly to TOGA detent, the FMS does not engage the GO AROUND phase, and flying over, or close to the airport (less than 5 NM) will sequence the Destination waypoint in the F-PLN.

GO-AROUND WITH NO FD

A go-around may have to be made without FD guidance (visual or non-precision approaches).
Apply the following three actions simultaneously :

– **THRUST LEVERS . . . . . TOGA**

– **ANNOUNCE . . . . . "GO AROUND – FLAPS"**

– **ROTATION . . . . . 15° OF PITCH**
Rotate to 12.5°, if one engine is out.

– **FLAPS . . . . . RETRACT ONE STEP**
Announce "FLAPS" when indicated.

– **ANNOUNCE . . . . . "POSITIVE CLIMB"**

– **ORDER . . . . . "GEAR UP"**

– **L/G UP . . . . . SELECT**

– **CONFIRM/ANNOUNCE . . . . . "GEAR UP–FLAPS"**

● **At GA thrust reduction altitude :**
Disregard CLB or LVR CLB flashing on the FMA.

- **At go-around acceleration attitude :**
  For a go-around with no FD, thrust reduction and acceleration altitude should be the same.

  – **Select speed target to green dot.**

  – **Adjust aircraft attitude to 10/12°.**

  – **Select thrust levers to CL detent and activate the A/THR.**

  – **Set FD to ON. (Basic mode HDG V/S or TRK FPA engages).**

  – **Select appropriate mode.**

  – **Check FMA.**

  – **Retract the flaps at appropriate speeds.**

  – **Monitor go-around routing and first cleared altitude.**

  Note : If thrust levers are set to CL detent at thrust reduction altitude, a thrust reduction may occur, if the current speed is above the speed target (Refer to 4.05.80).

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INTENTIONALLY LEFT BLANK

AFTER LANDING

– **LAND lights** . . . . . **RETRACT**
Retract landing lights, unless they are needed.
Set the STROBE lights to AUTO, when leaving the runway.

– **GROUND SPOILERS** . . . . . **DISARM**

R – **RADAR** . . . . . **OFF/STBY**

R – **PREDICTIVE WINDSHEAR SYSTEM** ◁ . . . . . **OFF**
Switching the radar and predictive windshear system OFF after landing avoids risk of radiating persons at the gate area.

R – **ENG MODE selector** . . . . . **NORM**

R – **FLAPS** . . . . . **RETRACT**
· Set the FLAP lever to position 0.
· If the approach was made in icing conditions, or if the runway was contaminated with slush or snow, do not retract the flaps and slats until after engine shutdown and after the ground crew has confirmed that flaps and slats are clear of obstructing ice.
· On ground, hot weather conditions may cause overheating to be detected around the bleed ducts in the wings, resulting in "AIR L(R) WING LEAK" warnings. Such warnings may be avoided during transit by keeping the slats in Configuration 1 when the OAT is above 30°C.

R – **TCAS** . . . . . **SET on standby**

R – **ATC** . . . . . **AS RQRD**
R Depending on local regulation, ATC transponder may be operated in mode S (Refer to
R FCOM 1.34.50).

R – **APU** . . . . . **START**
APU START may be delayed until just prior to engine shutdown.

R – **ANTI ICE** . . . . . **AS RQRD**
If engine anti-ice is used, take care to control taxi speed, especially on wet or slippery surfaces. (N1 ground idle is increased).

– **BRAKE TEMPERATURE . . . . . CHECK**

· Check brake temperature on the ECAM WHEEL page for discrepancies and high temperature.

· If brake fans are installed (◁) :

R Brake fans selection should be delayed for a minimum of about 5 minutes, or done just
R before stopping at the gate (whichever occurs first), to allow thermal equalization and stabilization and thus avoid oxidation of brake surface hot spots.
However, when turnaround times are short, or brake temperatures are likely to exceed 500°C, use the brake fans, disregarding possible oxidation phenomenon.

· Refer to 3.04.32 for the brake temperature limitations requiring maintenance actions.

– **AFTER LANDING CHECKLIST . . . . . COMPLETE**

Ensure that the after-landing checks are completed, once the aircraft has cleared the runway.

AFTER LANDING

— **LAND lights** . . . . . **RETRACT**
Retract landing lights, unless they are needed.
Set the STROBE lights to AUTO, when leaving the runway.

— **GROUND SPOILERS** . . . . . **DISARM**

R — **RADAR** . . . . . **OFF/STBY**

R — **PREDICTIVE WINDSHEAR SYSTEM** ◁ . . . . . **OFF**
Switching the radar and predictive windshear system OFF after landing avoids risk of radiating persons at the gate area.

R — **ENG MODE selector** . . . . . **NORM**

R — **FLAPS** . . . . . **RETRACT**
· Set the FLAP lever to position 0.
· If the approach was made in icing conditions, or if the runway was contaminated with slush or snow, do not retract the flaps and slats until after engine shutdown and after the ground crew has confirmed that flaps and slats are clear of obstructing ice.
· On ground, hot weather conditions may cause overheating to be detected around the bleed ducts in the wings, resulting in "AIR L(R) WING LEAK" warnings. Such warnings may be avoided during transit by keeping the slats in Configuration 1 when the OAT is above 30°C.

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R FCOM 1.34.50).

R — **APU** . . . . . **START**
APU START may be delayed until just prior to engine shutdown.

R — **ANTI ICE** . . . . . **AS RQRD**
— If engine anti-ice is used, take care to control taxi speed, especially on wet or slippery surfaces. (N1 ground idle is increased).
— During ground operation, when engine anti-ice is required and the OAT is + 3°C or less, periodic engine run-ups to as high a thrust setting as practical (50 % N1 recommended), may be performed at the pilot's discretion to centrifuge any ice from the spinner and fan blades. There is no requirement to sustain the high thrust setting, and the run-ups need not be performed more frequently than at 15 minute intervals.

– **BRAKE TEMPERATURE . . . . . CHECK**

· Check brake temperature on the ECAM WHEEL page for discrepancies and high temperature.

· If brake fans are installed (◁) :

R Brake fans selection should be delayed for a minimum of about 5 minutes, or done just
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However, when turnaround times are short, or brake temperatures are likely to exceed 500°C, use the brake fans, disregarding possible oxidation phenomenon.

· Refer to 3.04.32 for the brake temperature limitations requiring maintenance actions.

– **AFTER LANDING CHECKLIST . . . . . COMPLETE**

Ensure that the after-landing checks are completed, once the aircraft has cleared the runway.

PARKING

Prior to performing this check, consider "GROUND OPERATIONS IN HEAVY RAIN" (Refer to 3.04.30).

– **PARKING BRAKE ACCU PRESS . . . . . CHECK**
The ACCU PRESS indication must be in the green band. In case of low accumulator pressure, chocks are required before engine 1 shutdown.

– **PARKING BRK . . . . . ON**
· When one brake temperature is above 500°C (or 350°C with brake fans ON ◁), avoid applying the parking brake, unless operationally necessary.
· Check the brake pressure on the Triple Indicator for the left and right brakes.

CAUTION
If the aircraft starts to move with the parking brake ON : Immediately release the PARKING BRK handle, to restore braking with the pedals.

– **ANTI-ICE . . . . . OFF**

– **APU BLEED . . . . . ON**
Select APU bleed ON, just before engine shutdown, to prevent engine exhaust fumes from entering the air conditioning.

– **ENG MASTER switch 1 and 2 . . . . . OFF**
· After operation above REV IDLE thrust, or after operation at power level above normal taxi maneuvering power : Operate the engine at, or near, idle for a three-minute cooling period, to avoid rotor case interactions that could cause performance degradation of the engine, and possible HPC blade damage.
· If APU is not available, set EXT PWR to ON, then set ENG MASTERS to OFF.
· Check that engine parameters decrease.

Note : If the engine fails to shut down, switch the corresponding master lever to ON, then to OFF. If the engine still fails to shut down, press the corresponding ENG FIRE pushbutton (The engine will shut down after approx. 1 minute, during which time it uses the fuel between the LP valve and the nozzles).

· The DOOR page is displayed on the lower ECAM display.

– **GROUND CONTACT . . . . . ESTABLISH**
· Establish ground communication.
· Check chocks in place.

– **SLIDE DISARMED . . . . . CHECK**
Check slides disarmed on the ECAM DOOR page. Warn the cabin crew, if any slide is not disarmed.

– **EXTERIOR LIGHTS . . . . . AS RQRD**
Switch off the BEACON switch, when all engines have obviously spooled down.

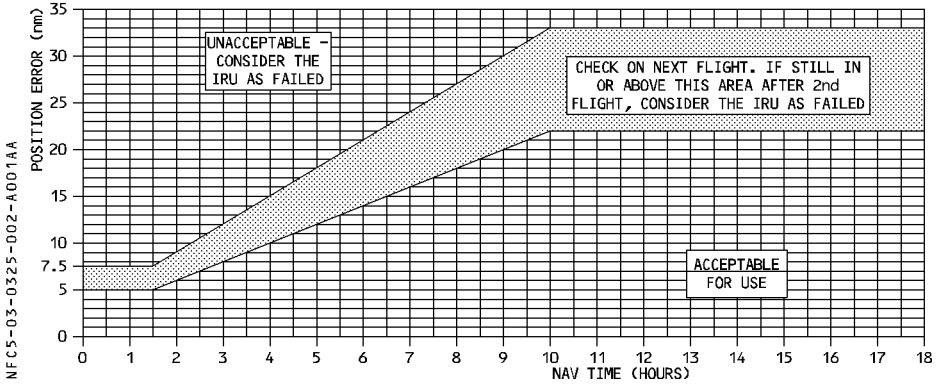
– **SEAT BELTS . . . . . OFF**

– **ELAPSED TIME (◁) . . . . . STOP**

– **FUEL PUMPS . . . . . OFF**

R – **ATC . . . . . SET on standby**

– **IRS PERFORMANCE . . . . . CHECK**
· Drift check
– Call up the POSITION MONITOR page. Check that the drift does not exceed the following:



– **GROUND CONTACT** . . . . . **ESTABLISH**
· Establish ground communication.
· Check chocks in place.

– **SLIDE DISARMED** . . . . . **CHECK**
Check slides disarmed on the ECAM DOOR page. Warn the cabin crew, if any slide is not disarmed.

– **EXTERIOR LIGHTS** . . . . . **AS REQRD**
Switch off the BEACON switch, when all engines have obviously spooled down.

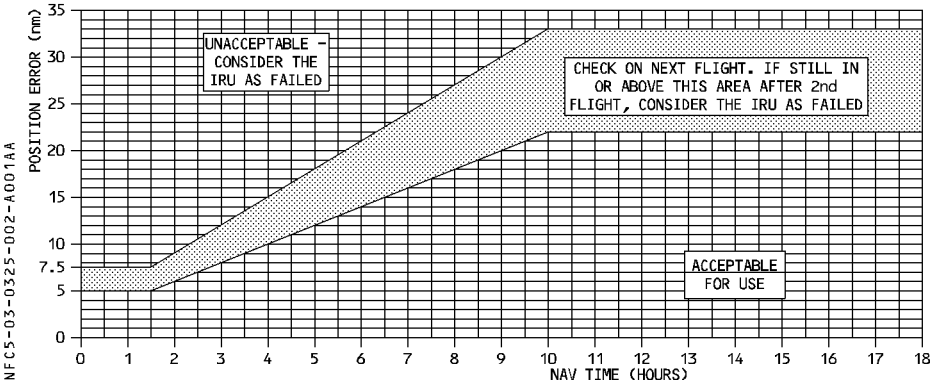
– **SEAT BELTS** . . . . . **OFF**

– **ELAPSED TIME (◁)** . . . . . **STOP**

– **FUEL PUMPS** . . . . . **OFF**

R – **ATC** . . . . . **SET on standby**

– **IRS PERFORMANCE** . . . . . **CHECK**
· Drift check
– Call up the POSITION MONITOR page. Check that the drift does not exceed the following:



· Residual ground speed check :
  – CAPT and F/O NDs display the IRS 1 and 2 residual ground speeds respectively. The IRS 3 residual ground speed can be read on the CAPT ND by switching the ATT HDG selector to CAPT ON 3.
    · If ground speed ≥ 15 knots : Report (The IR part of the ADIRU must be considered as failed, if the excessive deviation occurs after two consecutive flights).
    · If ground speed ≥ 21 knots : Report (The IR part of the ADIRU must be considered as failed).

Note : On aircraft equipped with LITTON IRS, the ground speed check must be performed within the 2 minutes following aircraft stop. (Ground speed reset to 0 after 2 minutes).

– **FUEL QUANTITY . . . . . CHECK**
Check that the sum of the fuel on board and the fuel used is consistent with the fuel on board at departure. If an unusual discrepancy is found, maintenance action is due.

– **STATUS (ECAM Control panel) . . . . . PRESS**
  – Check the STATUS page.
    If maintenance status messages are displayed :
    · At transit : Disregard, unless AIR BLEED maintenance status.
    · At main base, or at an airport where repairs can easily be made (at the end of the last flight of the day) : Report for maintenance analysis.

– **BRAKE FAN (◁) . . . . . OFF**
Switch off, when not required.

– **PARKING BRAKE . . . . . AS RQRD**
· The parking brake should be released after chocks are in place, if the "BRAKES HOT" ECAM caution is displayed (or if one brake temperature is above 150°C with brake fans ON ◁).
Releasing the parking brake prevents the critical structures from being exposed to high temperature levels for an extended time. However, if operational conditions dictate (e.g. slippery tarmac), the parking brake may remain applied.
· When parking with a flat tire on the nose gear, keep the parking brake on, to avoid aircraft yawing at parking brake release.

– **DUs . . . . . DIM**
Dim EFIS, ECAM and MCDU display units.

– **PARKING CHECKLIST . . . . . COMPLETE**

· Residual ground speed check :
— CAPT and F/O NDs display the IRS 1 and 2 residual ground speeds respectively. The IRS 3 residual ground speed can be read on the CAPT ND by switching the ATT HDG selector to CAPT ON 3.
· If ground speed ≥ 15 knots : Report (The IR part of the ADIRU must be considered as failed, if the excessive deviation occurs after two consecutive flights).
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· At main base, or at an airport where repairs can easily be made (at the end of the last flight of the day) : Report for maintenance analysis.

— **BRAKE FAN (◁) . . . . . OFF**
Switch off, when not required.

— **PARKING BRAKE . . . . . AS RQRD**
· The parking brake should be released after chocks are in place, if one brake temperature is above 300°C (or above 150°C with brake fans ON ◁).
Releasing the parking brake prevents the critical structures from being exposed to high temperature levels for an extended time. However, if operational conditions dictate (e.g. slippery tarmac), the parking brake may remain applied.
· When parking with a flat tire on the nose gear, keep the parking brake on, to avoid aircraft yawing at parking brake release.

— **DUs . . . . . DIM**
Dim EFIS, ECAM and MCDU display units.

— **PARKING CHECKLIST . . . . . COMPLETE**

SECURING THE AIRCRAFT

Prior to performing this check, COLD WEATHER should be taken into account (Refer to 3.04.91).

– **PARKING BRAKE . . . . . CHECK ON**
To reduce hydraulic leak rate in the brake accumulator, keep the parking brake on.

– **OXYGEN CREW SUPPLY . . . . . OFF**

– **ADIRS (1 + 2 + 3) . . . . . OFF**
ADIRS should not be switched off during transits at latitudes above 70°N, to avoid their requiring excessive alignment time.
After having switched off the ADIRS, wait at least 10 seconds before switching off the electrical supply to ensure that the ADIRS memorize the latest data.

– **EXTERIOR LIGHTS . . . . . OFF**

– **MAINT BUS switch . . . . . AS RQRD**
Should electrical power be required for the crew or servicing personnel, consider setting the overhead MAINT BUS switch (in the forward cabin) to the ON position, prior to setting aircraft power to off.

– **APU BLEED . . . . . OFF**

– **APU MASTER switch . . . . . OFF**
Switch off the APU after the passengers have disembarked.

– **EMER EXIT LT . . . . . OFF**

– **NO SMOKING . . . . . OFF**

– **EXT PWR . . . . . AS RQRD**

– **BAT 1 and 2 . . . . . OFF**
Wait until the APU flap is fully closed (about 2 minutes after the APU AVAIL light goes out), before switching off the batteries. Switching the batteries off before the APU flap is closed may cause smoke in the cabin during the next flight.
If the batteries are off while the APU is running, APU fire extinguishing is not available.

– **SECURING THE AIRCRAFT CHECKLIST . . . . . COMPLETE**

SECURING THE AIRCRAFT

Prior to performing this check consideration should be given to COLD WEATHER (Refer to 3.04.91).

– **PARKING BRAKE . . . . . CHECK ON**
Keep the parking brake on to reduce hydraulic leak rate in the brake accumulator.

– **OXYGEN CREW SUPPLY . . . . . OFF**

– **ADIRS (1 + 2 + 3) . . . . . OFF**
ADIRS should not be switched off during transits at latitudes above 82°N, in order to avoid their requiring excessive alignment time.
After having switched off the ADIRS, wait at least 10 seconds before switching off the electrical supply to ensure that the ADIRS memorize the last data.

– **EXTERIOR LIGHTS . . . . . OFF**

– **MAINT BUS switch . . . . . AS RQRD**
Should electrical power be required for crew or servicing personnel consider selecting the MAINT BUS switch (overhead in the forward cabin) to the ON position prior to selecting aircraft power off.

– **APU BLEED . . . . . OFF**

– **APU MASTER switch . . . . . OFF**
Switch off the APU after the passengers have disembarked.

– **EMER EXIT LT . . . . . OFF**

– **NO SMOKING . . . . . OFF**

– **EXT PWR . . . . . AS RQRD**

– **BAT 1 and 2 . . . . . OFF**
Wait until the APU flap is fully closed (about 2 minutes after the APU AVAIL light goes out) before switching off the batteries. Switching the batteries off before the APU flap is closed may cause smoke in the cabin during the next flight. If the batteries are off while the APU is running, there is no APU fire extinguishing.

– **SECURING THE AIRCRAFT CHECKLIST . . . . . COMPLETE**

COMMUNICATIONS AND STANDARD TERMS

Standard phraseology is essential to ensure effective crew communication. The
R phraseology should be concise and exact. The following Chapter lists the callouts that should be used as standard. They supplement the callouts identified in the SOP.
These standard Airbus callouts are also designed to promote situational awareness, and to ensure crew understanding of systems and their use in line operation.

CHECKLIST CALLOUTS

– "CHECK" : A command for the other pilot to check an item.
– "CHECKED" : A response that an item has been checked.
R – "CROSSCHECKED" : A callout verifying information from both pilot stations.
If a checklist needs to be interrupted, announce : "HOLD CHECKLIST AT ___" and "RESUME CHECKLIST AT ___" for the continuation.
Upon completion of a checklist announce : "__CHECKLIST COMPLETE".

ACTIONS COMMANDED BY PF

The following commands do not necessarily initiate a guidance mode change, eg : selected to managed/managed to selected. The intent is to ensure clear, consistent, standard communication between crewmembers.
R All actions performed on the FCU and MCDU must be checked on the PFD and ND (eg :
R "FL 350 blue", "FL 200 magenta). Ensure that the correct FCU knob is used, then verify
R indications on the PFD/ND.

SET

The "SET" command means using an FCU knob to set a value, but not to change a mode. SET is accomplished by only rotating the appropriate selection knob. Example :
– "SET GO AROUND ALTITUDE__"
– "SET QNH __"
– "SET FL __"
– "SET HDG __"

MANAGE/PULL

The "MANAGE" command means pushing an FCU knob to engage, or arm, a managed
R mode or target.

R The "PULL" command means pulling an FCU knob to engage a selected mode or target. Example :

R – "PULL HDG 090" (Heading knob is pulled and turned).
– "MANAGE NAV" (Heading knob is pushed).
– "FL 190 PULL" (Altitude knob is turned and pulled).
– "FL 190 MANAGE" (Altitude knob is turned and pushed).
R – "PULL SPEED 250 KNOTS" (Speed knob is pulled and turned).
– "MANAGE SPEED" (Speed knob is pushed).

Note : If the value was previously set, there is no requirement to repeat the figure.
R *Simply call e.g. PULL HDG : PULL SPEED : FL PULL*

The VS/FPA selector knob has no managed function. The standard callouts for the use of this knob are as follows :
V/S Plus (or Minus) 700 PULL or
FPA Minus 3° PULL (V/S (FPA) knob is turned and pulled)
PUSH TO LEVEL OFF (V/S (FPA) knob is pushed)

ARM

The "ARM __" command means arming a system by pushing the specified FCU button.
e.g. : "ARM APPROACH"
e.g. : "ARM LOC."

ON/OFF

The simple ON or OFF command is used for the autopilot, flight directors, autothrust and the bird (flight path vector).
R e.g. : BIRD ON (The HDG-V/S/TRK-FPA pushbutton is pushed.)

FMA

Unless listed otherwise (eg CAT II & III task sharing), all FMA changes will be normally
R called out by the PF and checked by the PNF :
R – All armed modes are announced by calling out their associated color (blue, magenta)
R e.g. : "G/S blue", "LOC blue".
R – All active modes are announced without calling out the color (green, white)
R e.g. : "NAV", "ALT".

ALTITUDE

R The PNF calls out "one thousand to go" when passing 1000 feet before the cleared altitude
R or FL, and the PF calls out "checked".

FLAPS OR GEAR CONFIGURATION

FLAPS' CALLOUTS

FLAPS' CONFIGURATION	CALLOUT
1	"FLAPS ONE"
1 + F	"FLAPS ONE"
0	"FLAPS ZERO"

The reply will be given when selecting the new flap position.
e.g. :

	CALLOUT	REMARK
PF	"FLAPS ONE"	
PNF	"SPEED CHECKED"	PNF checks the speed : – Above the S or F speed and accelerating (Takeoff) – Below Vfe next and decelerating (Approach)
	"FLAPS ONE"	PNF selects the flaps lever position and replies after checking the blue number on the ECAM flaps indicator to confirm the correct selection has been made.

GEAR CALLOUTS

	CALLOUT	REMARK
PF	"GEAR UP (DOWN)"	
PNF	"GEAR UP (DOWN)"	The PNF selects the gear lever position and replies after checking the red lights on the landing gear indicator to confirm gear operation.

FLIGHT PARAMETERS

PNF will make callouts for the following conditions during final approach. Attitude callouts also to be made through to landing.

– "SPEED" when speed becomes less than Vapp – 5 or more than speed target + 10.
– "SINK RATE" when V/S is greater than – 1000 ft/min.
– "BANK" when bank angle becomes greater than 7°.
– "PITCH" when pitch attitude becomes lower than – 2.5° or higher than + 10°.
– 'LOC" or "GLIDE" when either localizer or glide slope deviation is :
R · 1/4 dot LOC ; 1 dot GS
R – "COURSE" when greater than 1/2 dot or 2.5 degrees (VOR) or 5 degrees (ADF).
– "__ FT HIGH (LOW)" at altitude checks points.

PF/PNF DUTIES TRANSFER

To tranfer control, flight crewmembers must use the following callouts :

R To give control : The pilot calls out "YOU HAVE CONTROL". The other pilot accepts this
R transfer by calling out "I HAVE CONTROL", before assuming PF duties.
R To take control : The pilot calls out "I HAVE CONTROL". The other pilot accepts this transfer
R by calling out "YOU HAVE CONTROL", before assuming PNF duties.

ABNORMAL AND EMERGENCY CALL OUTS

ECAM Procedures

1. "ECAM ACTION" is commanded by PF when required.
2. "CLEAR __ (title of the system) ?" is asked by the PNF for confirmation by the PF, that all actions have been taken/reviewed on the present ECAM WARNING/CAUTION or SYSTEM PAGE. e.g. : CLEAR HYDRAULIC ?

R 3. "CLEAR __ (title of the system)" is the command by the PF that the action and review
R is confirmed. For status page ; REMOVE STATUS will be used.

4. "ECAM ACTIONS COMPLETE" is the announcement by the PNF that all APPLICABLE ACTIONS have been completed.
5. Should the PF require an action from the PNF during ECAM procedures, the order "STOP ECAM" will be used. When ready to resume the ECAM the order "CONTINUE ECAM" will be used.

R MEMORY ITEMS

R The aim of such callouts is to callout the appropriate procedure by calling out, in most
R cases, the title of the procedure. This will allow the crew to be aware of the situation and
R be prepared to properly react (crew coordination, task sharing and communication).
R GPWS
R As soon as avoidance manoeuver is envisaged.
R "PULL UP TOGA"
R WINDSHEAR
R "WINDSHEAR TOGA"
R UNRELIABLE SPEED INDICATION
R "UNRELIABLE SPEED"
R TCAS
R As soon as "TRAFFIC" warning is triggered
R "TCAS, I have control"
R EMERGENCY DESCENT
R "EMERGENCY DESCENT"
R LOSS OF BRAKING
R "LOSS OF BRAKING"

SUMMARY FOR EACH PHASE

TO REMOVE GROUND SUPPLY		
EVENT	**PF or PNF**	**GND Mech**
Initial ground contact	GROUND (from) COCKPIT	COCKPIT (from) GROUND
External __ disconnection	REMOVE EXTERNAL __	EXTERNAL__ REMOVED

R

BEFORE ENGINE START/PUSH BACK		
EVENT	**PF**	**PNF**
Before start up clearance received	BEFORE START C/L DOWN TO THE LINE	BEFORE START C/L DOWN TO THE LINE COMPLETE
After start up clearance received	BEFORE START C/L BELOW THE LINE	BEFORE START C/L COMPLETE

PUSH BACK/ENGINE START		
EVENT	**PF**	**GND Mech.**
When ready for pushback, and pushback clearance received from ATC	GROUND (from) COCKPIT, CLEARED FOR PUSH	COCKPIT (from) GROUND, RELEASE BRAKES
Start of push	BRAKES RELEASED READY TO PUSH	
When ready to start engines	CLEAR TO START ? STARTING ENG(S)—	CLEAR TO START
When pushback complete	BRAKES SET	SET BRAKES
When ready to disconnect (after engine started, and parameters are stabilized)	CLEAR TO DISCONNECT (hand signals on left/right)	DISCONNECTING (hand signals on left/right)

AFTER ENGINE START		
EVENT	**PF**	**PNF**
All engines started and stabilized and GND is disconnected	AFTER START C/L	AFTER START C/L COMPLETE

TAXI		
EVENT	**PF**	**PNF**
When taxi clearance obtained	CLEAR LEFT (RIGHT) SIDE	CLEAR RIGHT (LEFT) SIDE
Brake transfer check	BRAKE CHECK	PRESSURE ZERO
Flight control check in following sequence (can be done before start of taxi)	FLIGHT CONTROL CHECK	
1. Elevators		FULL UP, FULL DOWN, NEUTRAL
2. Ailerons/Spoilers		FULL LEFT, FULL RIGHT, NEUTRAL
3. Rudder *	RUDDER	FULL LEFT, FULL RIGHT, NEUTRAL
During taxi	BEFORE TAKEOFF C/L DOWN TO THE LINE	BEFORE TAKEOFF C/L DOWN TO THE LINE COMPLETE
Lining up on the runway	BEFORE TAKEOFF C/L BELOW THE LINE	BEFORE TAKEOFF C/L COMPLETE

*Note : * The PNF should follow pedal movement with his/her feet*

R

TAKEOFF		
EVENT	**PF**	**PNF**
Setting thrust levers to initial stabilisation value	TAKEOFF	
Before passing 80 kts		THRUST SET
At 100 kts	CHECKED	ONE HUNDRED
At V1		V1
At VR		ROTATE
Gear retraction	GEAR UP	POSITIVE CLIMB GEAR UP
If AP is engaged by PNF	AP 1(2) ON	
Check List	AFTER TAKEOFF/CLIMB C/L DOWN TO THE LINE	AFTER TAKEOFF/CLIMB C/L DOWN TO THE LINE COMPLETE
At transition altitude	AFTER TAKEOFF/CLIMB C/L BELOW THE LINE	AFTER TAKEOFF/CLIMB C/L COMPLETE

R

REJECTED TAKEOFF		
EVENT	**CAPT**	**F/O**
RTO decision	STOP	
REV green on EWD		REVERSE GREEN*
Deceleration		DECEL**

R In case of failure or no positive deceleration :
R * NO REVERSE ENGINE__or NO REVERSE
R ** NO DECEL
R DECEL callout means that the deceleration is felt by the crew, and confirmed by the speed
R trend on the PFD. It can also be confirmed by the DECEL light.

R

ALTIMETER SETTING CHANGES TO/FROM QNH/QFE-STD		
EVENT	**PF**	**PNF**
Barometric setting change and subsequent altimeter cross-check	SET STANDARD (SET QNH/QFE) CHECKED	 STANDARD CROSS-CHECKED (QNH/QFE) PASSING FL__(__FT) NOW

APPROACH AND LANDING		
EVENT	**PF**	**PNF**
Approach check list	APPROACH C/L	APPROACH C/L COMPLETE
Activation of approach Phase	ACTIVATE APPROACH PHASE	APPROACH PHASE ACTIVATED
RA alive	CHECKED	RADIO ALTIMETER ALIVE (see Note 4 and 5 below)
At "GS*" or below GO altitude for NPA	SET GA ALTITUDE __FT	GA ALTITUDE — SET,
FAF	CHECKED	PASSING__(Fix Name),__FT,
Landing check list	LANDING C/L	LANDING C/L COMPLETE
1000 feet RA	CHECKED	ONE THOUSAND (see Note 5 below)
100 feet above MDA/DH	CHECKED	ONE HUNDRED ABOVE
MDA/DH visual reference	CONTINUE	MINIMUM
MDA/DH no visual reference	GO AROUND-FLAPS	MINIMUM
		ONE HUNDRED FIFTY (see Note 5 below)
After touchdown Ground spoilers extended REV green on EWD		SPOILERS (see Note 6 below), REVERSE GREEN, (See note 7 below)
Deceleration		DECEL (See Note 8 below)
At 70 knots	CHECKED	SEVENTY KNOTS
Note 4 : Crew awareness, crew should now keep RA in scan to landing Note 5 : PNF monitors pin-programmed auto callout, or announces if inoperative. Note 6 : If the spoilers are not extended, call NO SPOILER Note 7 : If reverse deployment is not as expected, call NO REVERSE ENGINE__ or NO REVERSE, as appropriate. Note 8 : DECEL Callout means that the deceleration is felt by the crew, and confirmed by the speed trend on the PFD. It can also be confirmed by the DECEL light. If no positive deceleration, call NO DECEL.		

GO AROUND		
EVENT	**PF**	**PNF**
GO AROUND decision	GO AROUND – FLAPS	
Flaps retraction		FLAPS—
Gear retraction	GEAR UP	POSITIVE CLIMB GEAR UP
Check list	AFTER TAKEOFF/CLIMB C/L DOWN TO THE LINE	AFTER TAKEOFF/CLIMB C/L DOWN TO THE LINE COMPLETE
At transition altitude	AFTER TAKEOFF/CLIMB C/L BELOW THE LINE	AFTER TAKEOFF/CLIMB C/L COMPLETE

AFTER LANDING		
EVENT	**PF**	**PNF**
Check list	AFTER LANDING C/L	AFTER LANDING C/L COMPLETE

PARKING		
EVENT	**PF**	**PNF**
Check list	PARKING C/L	PARKING C/L COMPLETE

SECURING THE AIRCRAFT		
EVENT	**PF**	**PNF**
Check list	SECURINT THE AIRCRAFT C/L	SECURING THE AIRCRAFT C/L COMPLETE

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GENERAL

This chapter shows the symbology and definition of speeds.
Source of computation is also given when applicable.

CHARACTERISTIC SPEEDS

The characteristic speeds displayed on the PFD are computed by the FAC (Flight Augmentation Computer) according to aerodynamic data.
VLS (of normal landing configuration : CONF 3 or FULL), F, S and Green Dot speeds are also displayed on the MCDU TAKEOFF and/or APPR pages.
These values are computed by the FMGC, based on the aircraft gross weight (which is computed according to the entered ZFW and the FOB) or predicted grossweight (for approach or go around).

VS : Stalling speed.
Not displayed.
For a conventional aircraft, the reference stall speed, VSmin, is based on a load factor that is less than 1g. This gives a stall speed that is lower than the stall speed at 1g. All operating speeds are expressed as functions of this speed (for example, VREF = 1.3 VSmin).
Because aircraft of the A320 family have a low-speed protection feature (alpha limit) that the flight crew cannot override, the airworthiness authorities have reconsidered the definition of stall speed for these aircraft.
All the operating speeds must be referenced to a speed that can be demonstrated by flight test. This speed is designated VS1g.
Airworthiness authorities have agreed that a factor of 0.94 represents the relationship between VS1g for aircraft of the A320 family and VSmin for conventional aircraft types. As a result the authorities allow aircraft of the A320 family to use the following factors :
V2 = 1.2 × 0.94 VS1g = 1.13 VS1g
VREF = 1.3 × 0.94 VS1g = 1.23 VS1g
These speeds are identical to those that the conventional 94 % rule would have defined for these aircraft. The A319, A320 and A321 have exactly the same maneuver margin that a conventional aircraft would have at its reference speeds.
The FCOM uses VS for VS1g.

VLS : Lowest Selectable Speed.
Represented by the top of an amber strip along the airspeed scale on the PFD.
Computed by the FAC, based on aerodynamic data, and corresponds to 1.13 VS during takeoff, or after a touch and go.
Becomes 1.23 VS, after retraction of one step of flaps.
Becomes 1.28 VS, when in clean configuration.

Note : If in CONF 0 VLS were 1.23 VS (instead of 1.28 VS), the alpha protection strip would hit the VLS strip on the PFD.

Above 20 000 feet, VLS is corrected for Mach effect to maintain a buffet margin of 0.2g.

F : Minimum speed at which the flaps may be retracted at takeoff.
In approach, used as a target speed when the aircraft is in CONF 2 or CONF 3.
Represented by "F" on the PFD speed scale. Equal to about 1.23 VS of CONF 1 + F.

S : Minimum speed at which the slats may be retracted at takeoff.
In approach, used as a target speed when the aircraft is in CONF 1.
Represented by "S" on the PFD airspeed scale.
Equal to about 1.29 VS of clean configuration.

0 : Green dot speed.
Engine-out operating speed in clean configuration.
(Best lift-to-drag ratio speed).
Also corresponds to the final takeoff speed.
Represented by a green dot on the PFD scale.

R Below 20 000 feet equal to 2 × weight (tons) + 80
Above 20 000 feet, add 1 knot per 1000 feet

GENERAL

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VLS : Lowest Selectable speed.
Represented by the top of an amber strip along the airspeed scale on the PFD.
Computed by the FAC based on aerodynamic data, corresponds to 1.13 VS during takeoff or following a touch and go.
Becomes 1.23 VS after retraction of one step of flaps.

R Becomes 1.28 VS when in clean configuration.

Note : If in CONF 0 VLS were 1.23 VS (instead of 1.28 VS), the alpha protection strip would hit the VLS strip on the PFD.

Above 20000 feet, VLS is corrected for Mach effect to maintain a 0.2g buffet margin.

F : Minimum speed at which the flaps may be retracted at takeoff.
In approach, used as a target speed when the aircraft is in CONF 2 or CONF 3.
Represented by "F" on the PFD speed scale. Equal to about 1.26 VS of CONF 1 + F.

S : Minimum speed at which the slats may be retracted at takeoff.
In approach, used as a target speed when the aircraft is in CONF 1.
Represented by "S" on the PFD airspeed scale.
Equal to about 1.23 VS of clean configuration.

0 : Green dot speed.
Engine out operating speed in clean configuration.
(Best lift to drag ratio speed).
Corresponds also to the final takeoff speed.
Represented by a green dot on the PFD scale.
Below 20000 feet equal to 2 × weight (tonnes) + 85
Above 20000 feet add 1 knot per 1000 feet

GENERAL

This chapter shows the speed symbols and definitions.
The source of the computation is also given, when applicable.

CHARACTERISTIC SPEEDS

The characteristic speeds displayed on the PFD are computed by the Flight Augmentation Computer (FAC), according to the FMS weight data (for PFD/MCDU display consistency and accuracy purposes), and aerodynamic data as a backup.
VLS (of normal landing configuration : CONF 3 or FULL), F, S, and Green Dot speeds are also displayed on the MCDU TAKEOFF and/or APPR pages.
These values are computed by the FMS, based on the aircraft gross weight (which is computed according to the entered ZFW and the FOB), or the predicted grossweight (for approach or go-around).

VS : Stalling speed.
Not displayed.
For a conventional aircraft, the reference stall speed, VSmin, is based on a load factor that is less than 1g. This gives a stall speed that is lower than the stall speed at 1g. All operating speeds are expressed as functions of this speed (for example, VREF = 1.3 VSmin).
Because aircraft of the A320 family have a low-speed protection feature (alpha limit) that the flight crew cannot override, Airworthiness Authorities have reconsidered the definition of stall speed for these aircraft.
All the operating speeds must be referenced to a speed that can be demonstrated fight tests. This speed is designated VS1g.
Airworthiness Authorities have agreed that a factor of 0.94 represents the relationship between VS1g for aircraft of the A320 family and VSmin for conventional aircraft types. As a result, Authorities allow aircraft of the A320 family to use the following factors :
V2 = 1.2 × 0.94 VS1g = 1.13 VS1g
VREF = 1.3 × 0.94 VS1g = 1.23 VS1g
These speeds are identical to those that the conventional 94 % rule would have defined for these aircraft. The A318, A319, A320, and A321 have exactly the same maneuver margin that a conventional aircraft would have at its reference speeds.
The FCOM uses VS for VS1g.

VLS : Lowest Selectable speed.
Represented by the top of an amber strip along the airspeed scale on the PFD.
Computed by the FAC based on FMS weight data, and on aerodynamic data as a backup, and corresponds to 1.13 VS during takeoff or following a touch and go.
Becomes 1.23 VS, after retraction of one step of flaps.
Becomes 1.28 VS, when in clean configuration.

Note : If in CONF 0 VLS were 1.23 VS (instead of 1.28 VS), the alpha protection strip would hit the VLS strip on the PFD.

Above 20000 feet, VLS is corrected for Mach effect to maintain a 0.2g buffet margin.
In addition, VLS is increased, when the speedbrakes are extended.
The VMC is taken into ccount for VLS computation, as follows :
- At takeoff, until retraction of one step of flaps, VLS is equal to, or greater than, the lowest of :
  · V2/1.05
  · 1.05 VMCA maximum certified.
- In all the other phases, it is equal to or greater than, VMCL.

F : Minimum speed at which the flaps may be retracted at takeoff.
In approach, used as a target speed when the aircraft is in CONF 2 or CONF 3.
Represented by "F" on the PFD speed scale. Equal to about 1.26 VS of CONF 1 + F.

S : Minimum speed at which the slats may be retracted at takeoff.
In approach, used as a target speed when the aircraft is in CONF 1.
Represented by "S" on the PFD airspeed scale.
Equal to about 1.23 VS of clean configuration.

0 : Green dot speed.
Engine-out operating speed in clean configuration.
(Best lift-to-drag ratio speed).
Also corresponds to the final takeoff speed.
Represented by a green dot on the PFD scale.
Below 20000 feet equal to 2 × weight (tons) + 85
Above 20000 feet, add 1 knot per 1000 feet

GENERAL

This chapter shows the speed symbols and definitions.
The source of the computation is also given, when applicable.

CHARACTERISTIC SPEEDS

The characteristic speeds displayed on the PFD are computed by the Flight Augmentation Computer (FAC), according to the FMS weight data (for PFD/MCDU display consistency and accuracy purposes), and aerodynamic data as a backup.
VLS (of normal landing configuration : CONF 3 or FULL), F, S, and Green Dot speeds are also displayed on the MCDU TAKEOFF and/or APPR pages.
These values are computed by the FMS, based on the aircraft gross weight (which is computed according to the entered ZFW and the FOB), or the predicted grossweight (for approach or go-around).

VS : Stalling speed.
Not displayed.
For a conventional aircraft, the reference stall speed, VSmin, is based on a load factor that is less than 1g. This gives a stall speed that is lower than the stall speed at 1g. All operating speeds are expressed as functions of this speed (for example, VREF = 1.3 VSmin).
Because aircraft of the A320 family have a low-speed protection feature (alpha limit) that the flight crew cannot override, Airworthiness Authorities have reconsidered the definition of stall speed for these aircraft.
All the operating speeds must be referenced to a speed that can be demonstrated fight tests. This speed is designated VS1g.
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VREF = 1.3 × 0.94 VS1g = 1.23 VS1g
These speeds are identical to those that the conventional 94 % rule would have defined for these aircraft. The A318, A319, A320, and A321 have exactly the same maneuver margin that a conventional aircraft would have at its reference speeds.
The FCOM uses VS for VS1g.

VLS : Lowest Selectable speed.
Represented by the top of an amber strip along the airspeed scale on the PFD.
Computed by the FAC based on FMS weight data, and on aerodynamic data as a backup, and corresponds to 1.13 VS during takeoff, or following a touch and go.
Becomes 1.23 VS, after retraction of one step of flaps.
Becomes 1.28 VS, when in clean configuration.

Note : If, in CONF 0, VLS were 1.23 VS (instead of 1.28 VS), the alpha protection strip would hit the VLS strip on the PFD.

Above 20000 feet, VLS is corrected for Mach effect to maintain a 0.3g buffet margin.
In addition, VLS is increased when the speedbrakes are extended.
The VMC is taken into account for VLS computation as follows :
- At takeoff, until retraction of one step of flaps, VLS is equal to, or greater than the lowest of :
  · V2/1.05
  · 1.05 VMCA maximum certified.
- In all the other phases, it is equal to or greater than VMCL.

F : Minimum speed at which the flaps may be retracted at takeoff.
In approach, used as a target speed when the aircraft is in CONF 2 or CONF 3.
Represented by "F" on the PFD speed scale. Equal to about 1.26 VS of CONF 1 + F.

S : Minimum speed at which the slats may be retracted at takeoff.
In approach, used as a target speed, when the aircraft is in CONF 1.
Represented by an "S" on the PFD's airspeed scale.
Equal to about 1.23 VS of clean configuration.

0 : Green dot speed.
Engine-out operating speed in clean configuration.
(Best lift-to-drag ratio speed).
Also corresponds to the final takeoff speed.
Represented by a green dot on the PFD scale.
Below 20000 feet equal to 2 × weight (tons) + 90
Above 20000 feet, add 1 knot per 1000 feet

PROTECTION SPEEDS

Vα PROT, Vα MAX and VSW are computed by the FAC, based on aerodynamic data. They are only used for display on the PFD, and not for flight control protection (the activation of the protections is computed by the ELAC).

Vα PROT : Angle of attack protection speed.
Corresponds to the angle of attack at which the angle of attack protection becomes active.
Represented by the top of a black and amber strip along the PFD speed scale, in normal law.

Vα MAX : Maximum angle of attack speed.
Corresponds to the maximum angle of attack that may be reached in pitch normal law.
Represented by the top of a red strip along the PFD speed scale, in normal law.

VSW : Stall warning speed.
Represented by a red and black strip along the speed scale when the flight control normal law is inoperative.

VMAX : Represented by the bottom of a red and black strip along the speed scale.
Determined by the FAC according to the aircraft configuration.
Is equal to VMO (or speed corresponding to MMO), VLE or VFE.

LIMIT SPEEDS

R VA : Maximum design maneuvering speed. This corresponds to the
R maximum structural speed permitted for full control deflection, if
R alternate or direct law is active.

VMCG : Minimum speed, on the ground during takeoff, at which the aircraft can be controlled by only using the primary flight controls, after a sudden failure of the critical engine, the other engine remaining at takeoff power.

VMCA : Minimum control speed in flight at which the aircraft can be controlled with a maximum bank of 5°, if one engine fails, the other engine remaining at takeoff power (takeoff flap setting, gear retracted).

VMCL : Minimum control speed in flight, at which the aircraft can be controlled with a maximum bank of 5°, if one engine fails, the other engine remaining at takeoff power (approach flap setting).

VFE : Maximum speed for each flap configuration.

VLE : Maximum speed with landing gear extended.

VLO : Maximum speed for landing gear operation.

VMO : Maximum speed.

VFE NEXT : Maximum speed for the next (further extended) flap lever position.

OTHER SPEEDS

V1 : The highest speed, during takeoff, at which the flight crew has a choice between continuing the takeoff or stopping the aircraft.
Represented by "1" on the airspeed scale (or the V1 value when it is off the airspeed scale).
Inserted manually through the MCDU by the crew.
Displayed on the MCDU TAKEOFF page.

VR : The speed at which the pilot rotates in order to reach V2 at an altitude of 35 feet at the latest after an engine failure.
Inserted manually through the MCDU by the crew.
Displayed on the MCDU TAKEOFF page.

V2 : Takeoff safety speed that the aircraft attains at the latest at an altitude of 35 feet with one engine failed and maintains during the second segment of the takeoff.
Represented by the SPEED SELECT symbol on the speed scale.
Minimum value equal to 1.13 VS for the corresponding configuration.
Inserted manually through the MCDU by the crew.
Displayed on the MCDU TAKEOFF page.

VREF : Reference speed used for normal final approach.
Equal to 1.23 × VS of configuration FULL.
Displayed on the MCDU APPR page if landing is planned in CONF FULL (VLS CONF FULL)

VAPP : Final approach speed.
Displayed on MCDU APPR page.
Calculated by the FMGCs.
Represents : VAPP = VLS + wind correction + 5 knots.
The flight crew may modify VAPP through the MCDU.
– During autoland or when A/THR is on or in case of ice accretion or gusty crosswing greater than 20 knots, VAPP must not be lower than VLS + 5 knots.

VAPP TARGET : Represented by a magenta triangle.
Calculated by the FMGCs
Gives efficient speed guidance in approach during various windy conditions.
Represents :
VAPP TARGET = GS mini + actual headwind (measured by ADIRS)
GS mini = VAPP – TOWER WIND (headwind component along runway axis calculated by FMGC from tower wind entered on MCDU).

PROTECTION SPEEDS

Vα PROT, Vα MAX and VSW are computed by the FAC, based on aerodynamic data. They are only used for display on the PFD, and not for flight control protection (the activation of the protections is computed by the ELAC).

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Corresponds to the angle of attack at which the angle of attack protection becomes active.
Represented by the top of a black and amber strip along the PFD speed scale, in normal law.

Vα MAX : Maximum angle of attack speed.
Corresponds to the maximum angle of attack that may be reached in pitch normal law.
Represented by the top of a red strip along the PFD speed scale, in normal law.

VSW : Stall warning speed.
Represented by a red and black strip along the speed scale when the flight control normal law is inoperative.

VMAX : Represented by the bottom of a red and black strip along the speed scale.
Determined by the FAC according to the aircraft configuration.
Is equal to VMO (or speed corresponding to MMO), VLE or VFE.

LIMIT SPEEDS

R VA : Maximum design maneuvering speed. This corresponds to the
R maximum structural speed permitted for full control deflection, if
R alternate or direct law is active.

VMCG : Minimum speed, on the ground during takeoff, at which the aircraft can be controlled by only using the primary flight controls, after a sudden failure of the critical engine, the other engine remaining at takeoff power.

VMCA : Minimum control speed in flight at which the aircraft can be controlled with a maximum bank of 5°, if one engine fails, the other engine remaining at takeoff power (takeoff flap setting, gear retracted).

VMCL : Minimum control speed in flight, at which the aircraft can be controlled with a maximum bank of 5°, if one engine fails, the other engine remaining at takeoff power (approach flap setting).

VFE : Maximum speed for each flap configuration.

VLE : Maximum speed with landing gear extended.

VLO : Maximum speed for landing gear operation.

VMO : Maximum speed.

VFE NEXT : Maximum speed for the next (further extended) flap lever position.

OTHER SPEEDS

V1 : The highest speed, during takeoff, at which the flight crew has a choice between continuing the takeoff or stopping the aircraft.
Represented by "1" on the airspeed scale (or the V1 value when it is off the airspeed scale).
Inserted manually through the MCDU by the crew.
Displayed on the MCDU TAKEOFF page.

VR : The speed at which the pilot rotates in order to reach V2 at an altitude of 35 feet at the latest after an engine failure.
Inserted manually through the MCDU by the crew.
Displayed on the MCDU TAKEOFF page.

V2 : Takeoff safety speed that the aircraft attains at the latest at an altitude of 35 feet with one engine failed and maintains during the second segment of the takeoff.
Represented by the SPEED SELECT symbol on the speed scale.
Minimum value equal to 1.13 VS for the corresponding configuration.
Inserted manually through the MCDU by the crew.
Displayed on the MCDU TAKEOFF page.

VREF : Reference speed used for normal final approach.
Equal to 1.23 × VS of configuration FULL.
Displayed on the MCDU APPR page if landing is planned in CONF FULL (VLS CONF FULL).

VAPP : Final approach speed.
Displayed on MCDU APPR page.
Calculated by the FMGCs.
Represents : VAPP = VLS + wind correction.
The wind correction is limited to a minimum of 5 knots and a maximum of 15 knots.
The flight crew may modify VAPP through the MCDU.
- During autoland or when A/THR is on or in case of ice accretion or gusty crosswind greater than 20 knots, VAPP must not be lower than VLS + 5 knots.
  For landing in configuration 3 with ice accretion VAPP must not be lower than VLS + 10 knots.

VAPP TARGET : Represented by a magenta triangle.
Calculated by the FMGCs
Gives efficient speed guidance in approach during various windy conditions.
Represents :
VAPP TARGET = GS mini + actual headwind (measured by ADIRS)
GS mini = VAPP – TOWER WIND (headwind component along runway axis calculated by FMGC from tower wind entered on MCDU).

PROTECTION SPEEDS

Vα PROT, Vα MAX and VSW are computed by the FAC, based on aerodynamic data. They are only used for display on the PFD, and not for flight control protection (the activation of the protections is computed by the ELAC).

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Represented by the top of a black and amber strip along the PFD speed scale, in normal law.

Vα MAX : Maximum angle of attack speed.
Corresponds to the maximum angle of attack that may be reached in pitch normal law.
Represented by the top of a red strip along the PFD speed scale, in normal law.

VSW : Stall warning speed.
Represented by a red and black strip along the speed scale when the flight control normal law is inoperative.

VMAX : Represented by the bottom of a red and black strip along the speed scale.
Determined by the FAC according to the aircraft configuration.
Is equal to VMO (or speed corresponding to MMO), VLE or VFE.

LIMIT SPEEDS

R VA : Maximum design maneuvering speed. This corresponds to the
R maximum structural speed permitted for full control deflection, if
R alternate or direct law is active.

VMCG : Minimum speed, on the ground during takeoff, at which the aircraft can be controlled by only using the primary flight controls, after a sudden failure of the critical engine, the other engine remaining at takeoff power.

VMCA : Minimum control speed in flight at which the aircraft can be controlled with a maximum bank of 5°, if one engine fails, the other engine remaining at takeoff power (takeoff flap setting, gear retracted).

VMCL : Minimum control speed in flight, at which the aircraft can be controlled with a maximum bank of 5°, if one engine fails, the other engine remaining at takeoff power (approach flap setting).

VFE : Maximum speed for each flap configuration.

VLE : Maximum speed with landing gear extended.

VLO : Maximum speed for landing gear operation.

VMO : Maximum speed.

VFE NEXT : Maximum speed for the next (further extended) flap lever position.

OTHER SPEEDS

V1 : The highest speed, during takeoff, at which the flight crew has a choice between continuing the takeoff or stopping the aircraft.
Represented by "1" on the airspeed scale (or the V1 value when it is off the airspeed scale).
Inserted manually through the MCDU by the crew at the latest.
Displayed on the MCDU TAKEOFF page.

VR : The speed at which the pilot rotates in order to reach V2 at an altitude of 35 feet at the latest after an engine failure.
Inserted manually through the MCDU by the crew.
Displayed on the MCDU TAKEOFF page.

V2 : Takeoff safety speed that the aircraft attains at the latest at an altitude of 35 feet with one engine failed and maintains during the second segment of the takeoff.
Represented by the SPEED SELECT symbol on the speed scale.
Minimum value equal to 1.13 VS for the corresponding configuration.
Inserted manually through the MCDU by the crew.
Displayed on the MCDU TAKEOFF page.

VREF : Reference speed used for normal final approach.
Equal to 1.23 × VS of configuration FULL.
Displayed on the MCDU APPR page if landing is planned in CONF FULL (VLS CONF FULL).

VAPP : Final approach speed.
Displayed on MCDU APPR page.
Calculated by the FMGCs.
Represents : VAPP = VLS + wind correction.
The wind correction is limited to a minimum of 5 knots and a maximum of 15 knots.
The flight crew may modify VAPP through the MCDU.
– During autoland or when A/THR is on or in case of ice accretion or gusty crosswind greater than 20 knots, VAPP must not be lower than VLS + 5 knots.

VAPP TARGET : Represented by a magenta triangle.
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Gives efficient speed guidance in approach during various windy conditions.
Represents :
VAPP TARGET = GS mini + actual headwind (measured by ADIRS)
GS mini = VAPP – TOWER WIND (headwind component along runway axis calculated by FMGC from tower wind entered on MCDU).

AIR CONDITIONING

R An external HP source may be used for air conditioning, provided the air supply is
R confirmed to be free from oil contamination.

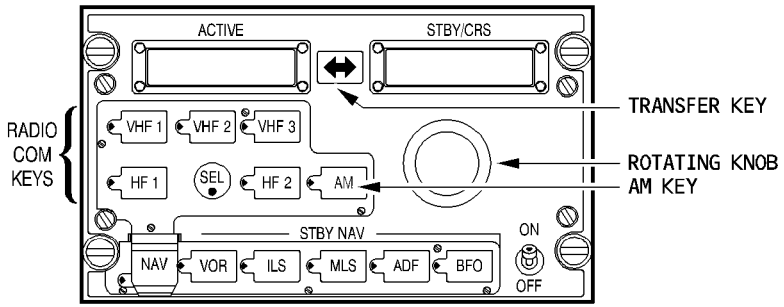
INTENTIONALLY LEFT BLANK

VHF, HF UTILIZATION

R *Note : 1. Reception of some frequencies could be noisy, on one or more VHFs. In such*
R *cases, try selecting an unaffected one.*
2. If two frequencies are closer than 2 MHz (between VHF1 and 2, or between VHF3 and 2), or closer than 6 MHz (between VHF1 and 3), some interference may occur.

TUNING

The pilot should normally use his onside RMP to tune any one of the VHF or HF radios. If the SEL lights come on, when tuning the radio, the pilot should turn them off by selecting the appropriate radio system dedicated to his RMP.



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– **ON/OFF switch . . . . . CHECK ON**

– **VHF or HF key . . . . . PRESS**
The green light comes on.
ACTIVE and STBY/CRS windows display active and preset frequencies, respectively.

Note : When an RMP tunes a transceiver that is normally associated with another RMP, the SEL lights on both RMPs come on.

To change frequency :

– **Rotating knob** . . . . . **TURN**
Make the STBY/CRS window display the new frequency.
Outer knob is for units, inner knob for decimals.

– **Transfer key** . . . . . **PRESS**
This interchanges the ACTIVE and STBY frequencies.
The receiver is now tuned to the new ACTIVE frequency.

– **AM key (if necessary)** . . . . . **PRESS**
Green light comes on.

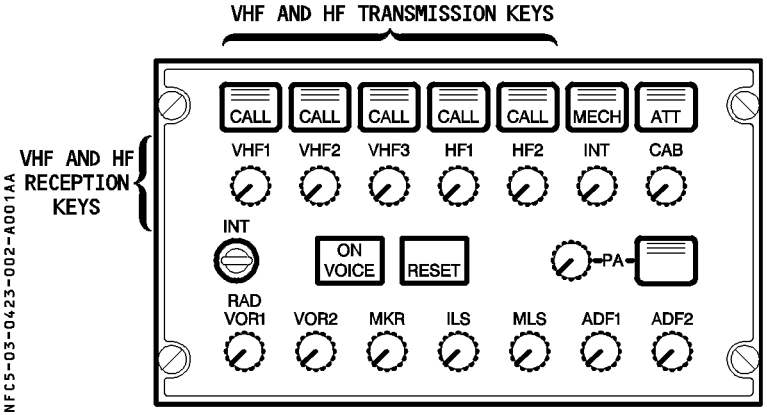
– **SEL lt . . . . . CHECK OFF**
If SEL light is on, select the appropriate radio systems dedicated to the on side RMP.

Failure cases

When an RMP fails :
– The affected RMP no longer controls the selected receiver.
– The frequency displays disappear and the green VHF or HF lights go out.

– **Affected RMP . . . . . SWITCH OFF**
One RMP can control all receivers.

TRANSMISSION AND RECEPTION



– **VHF or HF transmission key . . . . . PRESS**
Green bars on the selected system key light up.
Microphones and PTT command are connected to the selected system.

– **VHF or HF reception key . . . . . PRESS**
The integrated white light comes on.
The receiver brings in the selected system.
To adjust the volume, turn the key.

– **SEL light . . . . . CHECK OFF**
If the SEL light is on, select the appropriate radio systems dedicated to the onside RMP.

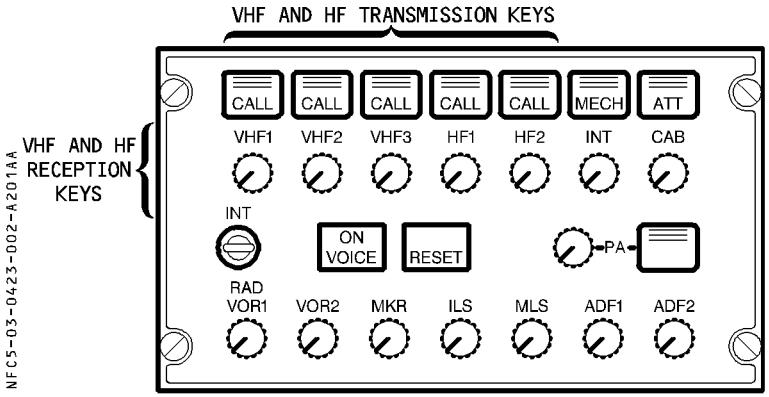
Failure cases :

When an RMP fails :
– The affected RMP no longer controls the selected receiver.
– The frequency displays disappear and the green VHF or HF lights go out.

– **Affected RMP . . . . . SWITCH OFF**
One RMP can control all receivers. If RMP1 fails tune VHF1 through RMP3. If RMP2 fails, tune VHF2 through RMP3. If RMP3 fails, tune HF1 (if installed) through RMP1, HF2 (if installed) through RMP2. If two RMPs fail, tune all receivers through the remaining RMP.

TRANSMISSION AND RECEPTION

Note : If the VHF3 VOICE DIRECTORY page is customized with user frequencies :
– Use it as a pure directory.
– Do not press the key adjacent to the desired frequency for direct turning.
– VHF3 in VOICE mode should either be tuned using the MANUAL FREQ field, or using the RMP.



– **VHF or HF transmission key . . . . . PRESS**
Green bars on the selected system key light up.
Microphones and PTT command are connected to the selected system.

– **VHF or HF reception key . . . . . PRESS**
The integrated white light comes on. The receiver brings in the selected system. To adjust the volume, turn the key.

Note : Do not use VHF 3 for communications with ATC, if ACARS is installed, unless VHF 1 and 2 are inoperative.

CAPT-ATT CALL

PROCEDURE FOR CALLING ATT STATION WHEN PREVIOUS CALL HAS NOT BEEN RESET

If, after a call from cockpit to the attendant's station, the attendant does not press the RESET key on the attendant's panel, the pilot must use the following procedure to call the station :

– **CAB transmission key (on audio control panel) . . . . . PRESS**
Green lines light up.

– **INT/RAD (on ACP) . . . . . MAINTAIN IN RAD POSITION for 2 seconds.**
Wait 60 seconds for automatic cancellation of previous CAPT-ATT calls, then :

– **CAB transmission key . . . . . PRESS**

Note : This procedure will no longer be necessary after the introduction of CIDS Mark II standard, which includes a function to reset the system automatically after 60 seconds if no one has pressed the RESET key.

TRIPPED C/B REENGAGEMENT

R In flight, do not reengage a circuit breaker (C/B) that has tripped by itself, unless the
R Captain judges it necessary to do so for the safe continuation of the flight. This procedure
R should be adopted only as a last resort, and only one reengagement should be attempted.
R On ground, do not reengage the C/B of the fuel pump(s) of any tank. For all other C/Bs, if
R the flight crew coordinates the action with maintenance, the flight crew may reengage a
R tripped C/B, provided that the cause of the tripped C/B is identified.

COMPUTER RESET

The normal purpose of a circuit breaker (C/B) is to protect wiring against short circuits, and to isolate equipment for maintenance.
Another C/B function involves digital computers : The reset function. When a digital computer behaves abnormally due to an electrical transient, for example, the abnormal behavior can be stopped by briefly interrupting the power supply to its processor.
The flight crew can reset most of this aircraft's computers with a normal cockpit control (selector or pushbutton). However, for some systems, the only way to cut off electrical power is to pull the associated C/B.

PROCEDURE

To perform a computer reset :
- Set the related normal cockpit control to OFF, or pull the corresponding reset pushbutton or circuit breaker
- Wait 3 seconds if normal cockpit control is used, or 5 seconds if a circuit breaker is used (unless a different time is indicated)
- Set the related normal cockpit control to ON, or push the corresponding reset pushbutton or circuit breaker
- Wait 3 seconds for the end of the reset.

WARNING

Do not reset more than one computer at the same time, unless instructed to do so.

R *Note : Due to the many customization possibilities of the C/B panel :*
R *Before taking any action on the C/B panel, the flight crew must crosscheck that the*
R *C/B label corresponds to the affected system.*

R **COMPUTER RESET TABLE**

R The computers that are most prone to reset are listed in the table of the next pages with
R the associated reset procedure, or FCOM reference when applicable.
R Specific reset procedures, included in OEB or Temporary revisions, are normally not
R referenced in this table and, when issued, superseed this table.

R *Note : Repetitive resets have to be reported to maintenance.*

R – On ground, almost all computers can be reset, and are not limited to the ones indicated
R in the table.
R Following computers are not allowed to be reset in all circumstances :
R · ECU (Engine Control Unit on CFM engines) or EEC (Electronic Engine Control on IAE
R engines) and EIU (Engine Interface Unit) while the engine is running.
R · BSCU (Brake Steering Control Unit) if the aircraft is not stopped. (Refer to 3.04.32).
R – In flight, as a general rule, the crew must restrict computer resets to those listed in the
R table, or to those in applicable TRs or OEBs. Before taking any action on other computer
R the flight crew must consider and fully understand the consequences.

CAUTION

R Do not pull the following circuit breakers :
R – SFCC (could lead to SLATS/FLAPS locked)
R – ECU or EEC, EIU.

R *Note : In the table's "reset" column, the "if applicable" note signifies that, depending on*
R *the computer standard, the reset procedure may no longer be necessary. If this is*
R *the case, the reset procedure is removed from the applicable FCOM section.*

R

ATA	System malfunction or ECAM warning/caution	Affected system	Reset
21	VENT AVNCS SYS FAULT	AEVC	On ground only : – Pull C/B Y 17 on 122VU. – Wait 1 second before pushing the C/B.
22	AUTO FLT FCU 1(2) FAULT	FCU	In flight: – Pull the C/B B05 on 49VU for FCU1, or M21 on 121VU for FCU2. – Push it after 5 seconds. – CHECK the displayed targets and the barometer reference, and correct them if necessary. On ground: – Pull the C/B B05 on 49VU for FCU1, or M21 on 121VU for FCU2. – Push it after 5 seconds. – If FCU1(2) FAULT disappears, CHECK the displayed targets and barometer reference, and correct them if necessary (RESET successful) – If FCU1(2) FAULT remains, pull both C/B B05 on 49VU and M21 on 121VU – Push them after 7 minutes, with a delay of less than 5 seconds between side 1 and 2 – Wait at least 30 seconds for FCU1 and FCU2 safety tests completion – CHECK the displayed targets and barometer reference, and correct them if necessary (RESET successful)

ATA	System malfunction or ECAM warning/caution	Affected system	Reset
22	AUTO FLT FCU 1 + 2 FAULT	FCU	In flight: – Pull the C/B B05 on 49VU for FCU1, and then pull M21 on 121VU for FCU2. – Push them after 5 seconds. – CHECK the displayed targets and the barometer reference, and correct them if necessary. On ground: – Pull the C/B B05 on 49VU for FCU1, and then pull M21 on 121VU for FCU2. – Push the C/Bs after 5 seconds. – If FCU 1+2 FAULT disappears, CHECK the displayed targets and barometer reference, and correct them if necessary (RESET successful) – If FCU 1+2 FAULT remains, pull again both C/B B05 on 49VU and M21 on 121VU – Push them after 7 minutes, with a delay of less than 5 seconds between side 1 and 2 – Wait at least 30 seconds for FCU1 and FCU2 safety tests completion – CHECK the displayed targets and barometer reference, and correct them if necessary (RESET successful) FCU targets are synchronized on current aircraft values and displayed as selected targets. – RE–ENTER the barometer altimeter setting value, if necessary.

R

ATA	System Malfunction or ECAM Warning/Caution	Affected System	Reset
22	AUTO FLT YAW DAMPER 1(2) FAULT	FAC 1(2)	Refer to the FCOM 3.02.22, if applicable.
	WINDSHEAR DET FAULT or REAC W/S DET FAULT (◁)	FAC 1 + 2	
	One MCDU locked or blank Both MCDU locked or blank FMGC malfunction	MCDU FMGC FMGC	Refer to the FCOM 4.06.20
23	COM CIDS 1+2 FAULT	CIDS	On ground, or in flight : – Pull the C/Bs in the following order : G02 on 49VU, M05 on 121VU. – Wait 10 seconds, then : – Push the C/Bs in the following order : M05, G02. – After CIDS reset, wait approximately 4 minutes, before recovering normal operation.
	Uncommanded EVAC horn actuation	CIDS	On ground, or in flight : Press the EVAC HORN SHUT OFF pushbutton. · IF UNSUCCESSFUL : – Pull the C/Bs in the following order : G02 on 49VU, M05 on 121VU. – Wait 10 seconds, then : – Push the C/Bs in the following order : M05, G02. – After CIDS reset, wait approximately 4 minutes, before recovering normal operation.
	Frozen RMP	RMP	Refer to the FCOM 3.04.23.
	FAP freezing	FAP or Tape reproducer/PRAM	On ground or in flight : – Pull CB M14 (or Q14 ◁) of the FAP in the 121VU. – Wait 10 seconds before pushing the C/B. · IF UNSUCCESSFUL : – Pull the tape reproducer/PRAM C/B F07 on 2000 VU (cabin). – Wait 10 seconds, before pushing the C/B.

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ATA	System Malfunction or ECAM Warning/Caution	Affected System	Reset
22	AUTO FLT YAW DAMPER 1(2) FAULT	FAC 1(2)	Refer to the FCOM 3.02.22, if applicable.
	WINDSHEAR DET FAULT or REAC W/S DET FAULT (◁)	FAC 1 + 2	
	One MCDU locked or blank Both MCDU locked or blank	MCDU FMGC	Refer to the FCOM 4.06.20
	FMGC malfunction	FMGC	
23	COM CIDS 1+2 FAULT	CIDS	On ground, or in flight : – Pull the C/Bs in the following order : G01 on 49VU, M05 on 121VU. G02 on 49VU, M06 on 121VU. – Wait 10 seconds, then : – Push the C/Bs in the following order : M05, M06, G01, G02. – After CIDS reset, wait approximately 4 minutes, before recovering normal operation.
	Uncommanded EVAC horn actuation	CIDS	On ground, or in flight : Press the EVAC HORN SHUT OFF pushbutton. · IF UNSUCCESSFUL : – Pull the C/Bs in the following order : G01 on 49VU, M05 on 121VU. G02 on 49VU, M06 on 121VU. – Wait 10 seconds, then : – Push the C/Bs in the following order : M05, M06, G01, G02. – After CIDS reset, wait approximately 4 minutes, before recovering normal operation.
	Frozen RMP	RMP	Refer to the FCOM 3.04.23.
	FAP freezing	FAP or Tape reproducer/PRAM	On ground or in flight : – Pull C/B M14 (or Q14 ◁) of the FAP in the 121VU. – Wait 10 seconds before pushing the C/B. · IF UNSUCCESSFUL : – Pull the tape reproducer/PRAM C/B F07 on 2000 VU (cabin). – Wait 10 seconds, before pushing the C/B.

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ATA	System Malfunction or ECAM Warning/Caution	Affected system	Reset
22	AUTO FLT YAW DAMPER 1(2) FAULT	FAC 1(2)	Refer to the FCOM 3.02.22, if applicable.
	WINDSHEAR DET FAULT or REAC W/S DET FAULT (◁)	FAC 1 + 2	
	One MCDU locked or blank Both MCDU locked or blank FMGC malfunction	MCDU FMGC FMGC	Refer to the FCOM 4.06.20
23	COM CIDS 1+2 FAULT	CIDS	On ground, or in flight : – Pull the C/Bs in the following order : P13 ◁ and P14 ◁ on 121VU. M05 and M06 on 121VU, G01 and G02 on 49VU. – Wait 10 seconds, then : – Push the C/Bs in the following order : G01, G02, M05, M06. P13 ◁, P14 ◁. – After CIDS reset, wait approximately 4 minutes, before recovering normal operation.
	Uncommanded EVAC horn actuation	CIDS	On ground, or in flight : Press the EVAC HORN SHUT OFF pushbutton. · IF UNSUCCESSFUL : – Pull the C/Bs in the following order : M05 and M06 on 121VU, G01 and G02 on 49VU. – Wait 10 seconds, then : – Push the C/Bs in the following order : G01, G02, M05, M06. – After CIDS reset, wait approximately 4 minutes, before recovering normal operation.
	Frozen RMP	RMP	Refer to the FCOM 3.04.23.
	FAP freezing	FAP	On ground, or in flight : – Pull FAP C/Bs in the following order : H01 on 49VU, Q13 on 121VU. – Wait 10 seconds, then : – Push the C/Bs in the following order : Q13, H01.

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ATA	System Malfunction or ECAM Warning/Caution	Affected System	Reset
22	AUTO FLT YAW DAMPER 1(2) FAULT	FAC 1(2)	Refer to the FCOM 3.02.22, if applicable.
	WINDSHEAR DET FAULT or REAC W/S DET FAULT (◁)	FAC 1 + 2	
	One MCDU locked or blank Both MCDU locked or blank FMGC malfunction	MCDU FMGC FMGC	Refer to the FCOM 4.06.20
23	COM CIDS 1+2 FAULT	CIDS	On ground, or in flight : – Pull the C/Bs in the following order : P13 ◁ and P14 ◁ on 121VU. M05 and M06 on 121VU, G01 and G02 on 49VU. – Wait 10 seconds, then : – Push the C/Bs in the following order : G01, G02, M05, M06. P13 ◁, P14 ◁. – After CIDS reset, wait approximately 4 minutes, before recovering normal operation.
	Uncommanded EVAC horn actuation	CIDS	On ground, or in flight : Press the EVAC HORN SHUT OFF pushbutton. · IF UNSUCCESSFUL : – Pull the C/Bs in the following order : M05 and M06 on 121VU, G01 and G02 on 49VU. – Wait 10 seconds, then : – Push the C/Bs in the following order : G01, G02, M05, M06. – After CIDS reset, wait approximately 4 minutes, before recovering normal operation.
	Frozen RMP	RMP	Refer to the FCOM 3.04.23.
	FAP freezing	FAP	On ground, or in flight : – Pull FAP C/Bs in the following order : H01 on 49VU, Q14 on 121VU. – Wait 10 seconds, then : – Push the C/Bs in the following order : Q14, H01.

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ATA	System malfunction or ECAM warning/caution	Affected system	Reset
26	SMOKE LAV + CRG DET FAULT	SDCU	On ground only : – Pull C/B C06 on 49VU, and C/B T18 on 122VU. – Wait 10 seconds before pushing both C/Bs.
27	F/CTL ELAC 1(2) FAULT F/CTL ALTN LAW F/CTL ELAC 1(2) PITCH FAULT	ELAC	– Refer to the FCOM 3.02.27, if applicable.
	ELAC or SEC malfunction	ELAC or SEC	WARNING : Do not reset more than one computer at a time. · It is possible to reset flight control computers in flight, event if not requested by the ECAM, provided only one reset is performed at a time: For the ELAC only, in case of uncommanded maneuvers during the flight, it is not recommended to reset the ELAC. *Note : When an ELAC reset is performed on ground the crew must check the pitch trim position.*
28	Loss of fuel quantity indication	FQIC	On ground, or in flight : – Pull the C/B of the affected channel : · Channel 1 . . . . . A13 on 49VU · Channel 2 . . . . . M27 on 121VU – Wait 5 seconds, before pushing both C/B. *Note : The fuel quantity indication will be re-established within one minute.*

ATA	System malfunction or ECAM warning/caution	Affected system	Reset
30	ANTI ICE L(R)/WINDSHIELD (WINDOW)	WHC	Refer to the FCOM 3.02.30, if applicable.
31	FWS FWC 1(2) FAULT	FWC	On ground or in flight : Pull, then push, the C/B of the affected FWC : – FWC 1 . . . . . F01 ON 49VU – FWC 2 . . . . . Q7 ON 121VU
32	Braking malfunction	BSCU	Refer to 3.04.32 or OEB 50, if applicable.
	L/G LGCIU 1(2) FAULT	LGCIU 1(2)	On ground only : LGCIU 1 : Pull C/B Q34 on 121 VU then C09 on 49VU. Then push C/B C09 and C/B Q34. LGCIU 2 : Pull then push C/B Q35 on 121 VU.
34	NAV TCAS FAULT	TCAS	On ground only : – Pull C/B K10 on 121VU. – Wait 5 seconds then push the C/B.
38	Failure messages on the CIDS FAP in the cabin	Vacuum System Controller	On ground or in flight – Pull C/B 35 MG on 2001 VU, aft cabin, – Wait 30 seconds, then push the C/B.
70	ENG IGN A+B FAULT	FADEC and EIU	Refer to the FCOM 3.02.70, if applicable.
	ENG 1(2) FADEC A(B) FAULT	FADEC	Refer to the FCOM 3.02.70, if applicable.

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ATA	System malfunction or ECAM warning/caution	Affected system	Reset
26	SMOKE LAV + CRG DET FAULT	SDCU	On ground only : – Pull C/B C06 on 49VU, and C/B T18 on 122VU. – Wait 10 seconds before pushing both C/Bs.
27	F/CTL ELAC 1(2) FAULT F/CTL ALTN LAW F/CTL ELAC 1(2) PITCH FAULT	ELAC	– Refer to the FCOM 3.02.27, if applicable.
	ELAC or SEC malfunction	ELAC or SEC	WARNING : Do not reset more than one computer at a time. · It is possible to reset flight control computers in flight, event if not requested by the ECAM, provided only one reset is performed at a time: For the ELAC only, in case of uncommanded maneuvers during the flight, it is not recommended to reset the ELAC. *Note : When an ELAC reset is performed on ground the crew must check the pitch trim position.*
28	Loss of fuel quantity indication	FQIC	On ground, or in flight : – Pull the C/B of the affected channel : · Channel 1 . . . . . A13 on 49VU · Channel 2 . . . . . M27 on 121VU – Wait 5 seconds, before pushing both C/B. *Note : The fuel quantity indication will be re-established within one minute.*

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ATA	System malfunction or ECAM warning/caution	Affected system	REMARKS
30	ANTI ICE L(R)/WINDSHIELD (WINDOW)	WHC	Refer to the FCOM 3.02.30, if applicable.
31	FWS FWC 1(2) FAULT	FWC	On ground, or in flight : Pull, then push, the C/B of the affected FWC : – FWC 1 . . . . . F01 ON 49VU – FWC 2 . . . . . Q7 ON 121VU
32	Braking malfunction	BSCU	Refer to 3.04.32 or OEB 50, if applicable.
	L/G LGCIU 1(2) FAULT	LGCIU 1(2)	On ground only : LGCIU 1 : Pull C/B Q34 on 121 VU, then C09 on 49VU. Then push C/B C09 and C/B Q34. LGCIU 2 : Pull, then push, C/B Q35 on 121 VU.
34	NAV TCAS FAULT	TCAS	On ground only : – Pull C/B K10 on 121VU. – Wait 5 seconds, then push the C/B.
38	Failure messages on the CIDS FAP in the cabin	Vacuum System Controller	On ground, or in flight : – Pull C/B 35 MG on 2001 VU, aft cabin, – Wait 30 seconds, then push the C/B.
46	ATSU malfunction	ATSU	An ATSU reset should be attempted, if : key selection has no effect on any of the MCDU ATSU DATALINK submenus. On ground, or in flight : – Pull the C/Bs in the following order : L16, L15 on 121VU. – Wait 5 seconds, then : – Push the C/Bs in the following order : L15, L16.
70	ENG IGN A+B FAULT	FADEC and EIU	Refer to the FCOM 3.02.70, if applicable.
	ENG 1(2) FADEC A(B) FAULT	FADEC	Refer to the FCOM 3.02.70, if applicable.

ATA	System malfunction or ECAM warning/caution	Affected system	Reset
24	GPU cannot be connected to the aircraft	GAPCU	On ground only : The GPU cannot be connected to the electrical network of the aircraft (AVAIL light is OFF) : · If at least one power source (IDG 1 or 2, APU GEN or batteries) is connected to the electrical network of the aircraft. – Reset the EXT PWR pushbutton switch on 35VU (Press and release) · If no power source is connected to the electrical network of the aircraft. – Set the BAT 1+2 pushbutton switches to AUTO.
26	SMOKE LAV + CRG DET FAULT	SDCU	On ground only : – Pull C/B C06 on 49VU, and C/B T18 on 122VU. – Wait 10 seconds before pushing both C/Bs.
27	F/CTL ELAC 1(2) FAULT F/CTL ALTN LAW F/CTL ELAC 1(2) PITCH FAULT	ELAC	– Refer to the FCOM 3.02.27, if applicable.
	ELAC or SEC malfunction	ELAC or SEC	WARNING : Do not reset more than one computer at a time. · It is possible to reset flight control computers in flight, event if not requested by the ECAM, provided only one reset is performed at a time: For the ELAC only, in case of uncommanded maneuvers during the flight, it is not recommended to reset the ELAC. *Note : When an ELAC reset is performed on ground the crew must check the pitch trim position.*
28	Loss of fuel quantity indication	FQIC	On ground, or in flight : – Pull the C/B of the affected channel : · Channel 1 . . . . . A13 on 49VU · Channel 2 . . . . . M27 on 121VU – Wait 5 seconds, before pushing both C/B. *Note : The fuel quantity indication will be re-established within one minute.*

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ATA	System malfunction or ECAM warning/caution	Affected system	REMARKS
30	ANTI ICE L(R)/WINDSHIELD (WINDOW)	WHC	Refer to the FCOM 3.02.30, if applicable.
31	FWS FWC 1(2) FAULT	FWC	On ground, or in flight : Pull, then push, the C/B of the affected FWC : – FWC 1 . . . . . F01 ON 49VU – FWC 2 . . . . . Q7 ON 121VU
32	Braking malfunction	BSCU	Refer to 3.04.32 or OEB 50, if applicable.
	L/G LGCIU 1(2) FAULT	LGCIU 1(2)	On ground only : LGCIU 1 : Pull C/B Q34 on 121 VU, then C09 on 49VU. Then push C/B C09 and C/B Q34. LGCIU 2 : Pull, then push, C/B Q35 on 121 VU.
34	NAV TCAS FAULT	TCAS	On ground only : – Pull C/B K10 on 121VU. – Wait 5 seconds, then push the C/B.
38	Failure messages on the CIDS FAP in the cabin	Vacuum System Controller	On ground, or in flight : – Pull C/B 35 MG on 2001 VU, aft cabin, – Wait 30 seconds, then push the C/B.
46	ATSU malfunction	ATSU	An ATSU reset should be attempted, if : key selection has no effect on any of the MCDU ATSU DATALINK submenus. On ground, or in flight : – Pull the C/Bs in the following order : L16, L15 on 121VU. – Wait 5 seconds, then : – Push the C/Bs in the following order : L15, L16.
70	ENG IGN A+B FAULT	FADEC and EIU	Refer to the FCOM 3.02.70, if applicable.
	ENG 1(2) FADEC A(B) FAULT	FADEC	Refer to the FCOM 3.02.70, if applicable.

ATA	System malfunction or ECAM warning/caution	Affected system	Reset
24	GPU cannot be connected to the aircraft	GAPCU	On ground only : The GPU cannot be connected to the electrical network of the aircraft (AVAIL light is OFF) : · If at least one power source (IDG 1 or 2, APU GEN or batteries) is connected to the electrical network of the aircraft. – Reset the EXT PWR pushbutton switch on 35VU (Press and release) · If no power source is connected to the electrical network of the aircraft. – Set the BAT 1+2 pushbutton switches to AUTO.
27	F/CTL ELAC 1(2) FAULT F/CTL ALTN LAW F/CTL ELAC 1(2) PITCH FAULT	ELAC	– Refer to the FCOM 3.02.27, if applicable.
	ELAC or SEC malfunction	ELAC or SEC	WARNING : Do not reset more than one computer at a time. · It is possible to reset flight control computers in flight, even if not requested by the ECAM, provided only one reset is performed at a time: For the ELAC only, in case of uncommanded maneuvers during the flight, it is not recommended to reset the ELAC. *Note : When an ELAC reset is performed on ground the crew must check the pitch trim position.*
28	Loss of fuel quantity indication	FQIC	On ground, or in flight : – Pull the C/B of the affected channel : · Channel 1 . . . . . A13 on 49VU · Channel 2 . . . . . M27 on 121VU – Wait 5 seconds, before pushing both C/B. *Note : The fuel quantity indication will be re-established within one minute.*

ATA	System malfunction or ECAM warning/caution	Affected system	REMARKS
30	ANTI ICE L(R)/WINDSHIELD (WINDOW)	WHC	Refer to the FCOM 3.02.30, if applicable.
31	FWS FWC 1(2) FAULT	FWC	On ground, or in flight : Pull, then push, the C/B of the affected FWC – FWC 1 . . . . . F01 ON 49VU – FWC 2 . . . . . Q7 ON 121VU
32	Braking malfunction	BSCU	Refer to 3.04.32 or OEB 50 if applicable.
	L/G LGCIU 1(2) FAULT	LGCIU 1(2)	On ground only : LGCIU 1 : Pull C/B Q34 on 121VU, then C09 on 49VU. Then push C/B C09 and C/B Q34. LGCIU 2 : Pull, then push, C/B Q35 on 121VU.
34	NAV TCAS FAULT	TCAS	On ground only : – Pull C/B Q34 on 121VU, then C09 on 49VU. – Wait 5 seconds, then push the C/B.
46	ATSU malfunction	ATSU	An ATSU reset should be attempted, if : key selection has no effect on any of the MCDU ATSU DATALINK submenus. On ground, or in flight : – Pull the C/Bs in the following order : L16, L15 on 121VU. – Wait 5 seconds, then : – Push the C/Bs in the following order : L15, L16.
70	ENG IGN A+B FAULT	FADEC and EIU	Refer to the FCOM 3.02.70, if applicable.
	ENG 1(2) FADEC A(B) FAULT	FADEC	Refer to the FCOM 3.02.70, if applicable.

ATA	System malfunction or ECAM warning/caution	Affected system	Reset
24	GPU cannot be connected to the aircraft	GAPCU	On ground only : The GPU cannot be connected to the electrical network of the aircraft (AVAIL light is OFF) : · If at least one power source (IDG 1 or 2, APU GEN or batteries) is connected to the electrical network of the aircraft. – Reset the EXT PWR pushbutton switch on 35VU (Press and release) · If no power source is connected to the electrical network of the aircraft. – Set the BAT 1+2 pushbutton switches to AUTO.
27	F/CTL ELAC 1(2) FAULT F/CTL ALTN LAW F/CTL ELAC 1(2) PITCH FAULT	ELAC	– Refer to the FCOM 3.02.27, if applicable.
	ELAC or SEC malfunction	ELAC or SEC	WARNING : Do not reset more than one computer at a time. · It is possible to reset flight control computers in flight, even if not requested by the ECAM, provided only one reset is performed at a time: For the ELAC only, in case of uncommanded maneuvers during the flight, it is not recommended to reset the ELAC. *Note : When an ELAC reset is performed on ground the crew must check the pitch trim position.*
28	Loss of fuel quantity indication	FQIC	On ground, or in flight : – Pull the C/B of the affected channel : · Channel 1 . . . . . A13 on 49VU · Channel 2 . . . . . M27 on 121VU – Wait 5 seconds, before pushing both C/B. *Note : 1. The fuel quantity indication will be re-established within one minute.* *2. The fuel leak detection function will be lost for the remainder of the flight. The flight crew must monitor the fuel quantity according to FCOM 3.03.15.*

ATA	System malfunction or ECAM warning/caution	Affected system	REMARKS
30	ANTI ICE L(R)/WINDSHIELD (WINDOW)	WHC	Refer to the FCOM 3.02.30, if applicable.
31	FWS FWC 1(2) FAULT	FWC	On ground, or in flight : Pull, then push, the C/B of the affected FWC – FWC 1 . . . . . F01 ON 49VU – FWC 2 . . . . . Q7 ON 121VU
32	Braking malfunction	BSCU	Refer to 3.04.32 or OEB 50 if applicable.
	L/G LGCIU 1(2) FAULT	LGCIU 1(2)	On ground only : LGCIU 1 : Pull C/B Q34 on 121VU, then C09 on 49VU. Then push C/B C09 and C/B Q34. LGCIU 2 : Pull, then push, C/B Q35 on 121VU.
34	NAV TCAS FAULT	TCAS	On ground only : – Pull C/B Q34 on 121VU, then C09 on 49VU. – Wait 5 seconds, then push the C/B.
46	ATSU malfunction	ATSU	An ATSU reset should be attempted, if : key selection has no effect on any of the MCDU ATSU DATALINK submenus. On ground, or in flight : – Pull the C/Bs in the following order : L16, L15 on 121VU. – Wait 5 seconds, then : – Push the C/Bs in the following order : L15, L16.
70	ENG IGN A+B FAULT	FADEC and EIU	Refer to the FCOM 3.02.70, if applicable.
	ENG 1(2) FADEC A(B) FAULT	FADEC	Refer to the FCOM 3.02.70, if applicable.

GENERAL

The secured cockpit door operation is controlled by a toggle switch, located on the COCKPIT DOOR central pedestal.

DOOR OPENING FROM THE COCKPIT

To allow access the cockpit, the COCKPIT DOOR toggle switch has to be pulled and maintained in the UNLOCK position until the door is fully opened (once the door is fully opened it can be released to the NORM position).

DOOR CLOSING

Close the door and check that the OPEN indicator goes off. If the toggle switch is in the NORM position the door is locked and emergency access is possible for the cabin crew. If the toggle switch is in the LOCK position the door is locked and the emergency access, the buzzer and the keypad are inhibited for a preselected time (5 to 20 minutes).

Note : If the OPEN indicator is on with the door closed, the door may be unlocked. Repeat the above opening/closing sequence.

COCKPIT DOOR OPERATION

This procedure should be applied, if local Airworthiness Authorities require that the cockpit door remain closed throughout the entire flight.

BEFORE PUSHBACK OR ENGINE START

– **COCKPIT DOOR . . . . . CLOSE**

AFTER ENGINE START

- **If ROUTINE ACCESS is requested from the cabin :**
  The buzzer sounds in the cockpit for 1 to 9 seconds (3 seconds by default).
  Prior to unlocking the door, the flight crew should identify the person requesting entry.

- **If entry is NOT authorized by the flight crew :**

R — **COCKPIT DOOR toggle switch . . . . . LOCK**

- **If entry is authorized by the flight crew :**

R — **COCKPIT DOOR toggle switch . . . . . UNLOCK**

Note : If the flight crew does not take any action after a routine cabin request, the cabin crew will be able to open the door by using the emergency access procedure.

- **If EMERGENCY ACCESS is initiated from the cabin :**

The buzzer will sound continuously in the cockpit, and the OPEN light flashes on the center pedestal's cockpit door panel.

Note : If the flight crew does not take any action, the door will unlock after a preselected time between 15 and 120 seconds.

R — **COCKPIT DOOR toggle switch . . . . . LOCK**

When the situation in the cockpit permits, the flight crew should identify the person requesting entry, prior to unlocking the door.

- **If entry is authorized by the flight crew :**

R — **COCKPIT DOOR toggle switch . . . . . UNLOCK**

OPENING THE COCKPIT DOOR FROM THE CABIN

– **CABIN CREW ROUTINE ACCESS . . . . . REQUEST ON KEYPAD**

– **CABIN CREW . . . . . PRESS #, or N+#**
"N" represents an Operator-defined figure between 0 and 7 digits.

– **CABIN CREW . . . . . STAND IN COCKPIT DOOR AXIS**
The cabin crew should stand in the axis of the ckpt door. A buzzer sounds in the ckpt.

- **If entry is NOT authorized by the flight crew :**

R – The flight crew locks the door via the COCKPIT DOOR toggle switch (LOCK position).
R – The keypad's red light comes on steady, and indicates that the door is locked.

- **If entry is authorized by the flight crew :**

– The flight crew unlocks the door via the COCKPIT DOOR toggle switch (UNLOCK
R position).
– The keypad's green light comes on steady, and indicates that the door is unlocked.

R – **CABIN CREW . . . . . PUSH DOOR TO OPEN**

- **If there is no reaction from the flight crew :**

– **CABIN CREW SECOND ACCESS . . . . . REQUEST ON KEYPAD**
Repeat the above procedure.

- **If there is no reaction from the flight crew, after a second request :**

– **CABIN CREW . . . . . CALL THE COCKPIT**
To establish contact with the flight crew and request access to the cockpit.

- **If there is no reaction from the flight crew, after a cabin crew interphone call :**

– **CABIN CREW . . APPLY THE FOLLOWING EMERGENCY ACCESS PROCEDURE**

– **EMERGENCY ENTRY CODE . . . . . ENTER and PRESS #**
The emergency entry code is an Operator-defined figure between 2 and 7 digits. A buzzer will sound continuously in the cockpit and the keypad's green light flashes. After a preselected time between 15 and 120 seconds, the keypad's green light comes on steady, and the cabin crew can then push the door open.

– **CABIN CREW . . . . . PUSH DOOR TO OPEN**
The cockpit door unlocks for 5 seconds.
The buzzer stops and indicates that the door is unlocked.

GENERAL

The fly-by-wire system has been designed and certificated to make the new generation of aircraft more cost effective and safer and smoother to fly or ride in than a conventional aircraft.

NORMAL OPERATIONS

The pilot uses the sidestick to fly the aircraft in pitch and roll (and indirectly, through turn coordination, in yaw).
The computers interpret the pilot's inputs and move the control surfaces as necessary.
However, regardless of the pilot's inputs the computers will prevent :

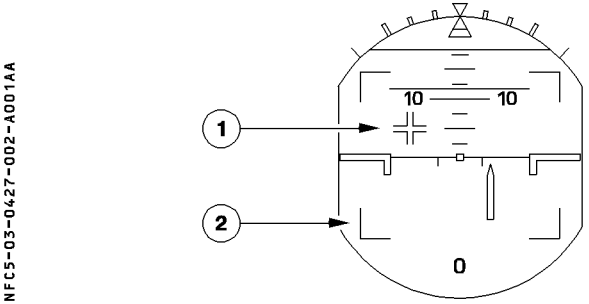
R — excessive load factor
— loss of control leading to excursions outside the safe flight envelope.

AIRCRAFT ON THE GROUND

At ground speeds below 70 knots, the sidesticks have full authority over the controls in pitch and roll to permit control checks.
At ground speeds above 70 knots, the authority in pitch is reduced from 30° up to 20° up.
In this ground mode, movements of the control surfaces in pitch and roll correspond directly to the stick inputs.
With the aircraft in the normal configuration and engines running on the ground :

— when the wheel brakes are released, the aircraft usually rolls with no added thrust.
— nose wheel steering is "fly.by.wire", with no mechanical connection between the nose wheel and the steering tiller. The control forces are light : the flight crew should be careful to move the tiller gently to avoid unnecessarily high-rate turns.

The aircraft can make very tight turns, but the flight crew should resist any tendency to overcontrol. When making tight turns at low ground speed, the crew should hold the selected tiller position, even if the turn radius is shorter than intended, so as to maintain a smooth turn.

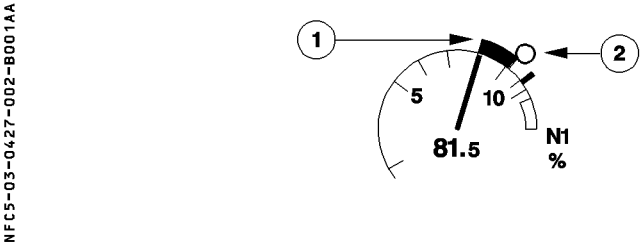


The PFD includes a symbol (1) that is the sum of sidestick positions given to the computers. It permits the PNF to check that the PF is making an appropriate control input
R during takeoff roll.
Small limit marks (2) indicate the limits of stick travel (± 16° in pitch, ± 20° in roll).
They are only displayed with the aircraft on ground. The flight crew must not use this display for control checks, because it does not necessarily indicate the control position in failure cases. The flight crew must use the ECAM flight controls page for making that check.

IN FLIGHT

TAKEOFF MODE

R



Thrust management is very easy. The pilot selects a FLX thrust by stopping the thrust levers in the FLX/MCT detent, and by checking that the resulting N1 (or EPR) (1) is compatible with N1 (or EPR) target (2). For maximum takeoff thrust, the pilot moves the thrust levers fully forward and performs the same thrust check (N1 or EPR).
To counter the nose-up effect of setting engine takeoff thrust, the pilot should apply half forward stick, until the airspeed reaches 80 knots. Then, he should release the stick
R gradually to reach neutral at 100 knots (Refer to SOP 3.03.12 for additional information).

Rotation is conventional. It takes about 1/3 to 1/2 back stick. The pilot continues the rotation to a typical all-engine attitude of about 15°. As the attitude changes and stabilizes, the control laws change to those for the flight mode in pitch, allowing the sidestick to return to the neutral position to maintain 1g at the chosen attitude. Pitch trim can begin to work at 50 feet.

R For crosswind takeoffs, routine use of into wind aileron is not recommended. In strong
R crosswind conditions, some lateral control may be used, but care should be taken to avoid
R using large deflections, resulting in excessive spoiler deployment which increases the
R tendency to turn into wind, reduces lift and increases drag. Spoiler deflection starts to
R become significant with more than one third sidestick deflection. As the aircraft lifts off,
R any lateral control applied will result in a roll rate demand.

FLIGHT MODE

Normally the sidestick is in the neutral position, with the aircraft stable in pitch and roll at the chosen altitude in straight or turning flight within certain limits. As a result, even in turbulence, the aircraft is flown best with little or no stick input.

Hands off, the system maintains 1g in pitch, corrected for pitch and roll attitude, and zero roll rate, within certain limits (+ 30°, – 15° in pitch and ± 33° roll). Hands off, within these limits the aircraft resists disturbance from the atmosphere and rides well even in heavy turbulence.

The system compensates almost 100% for changes of trim due to changes in speed and configuration. Changes of trim due to changes in thrust can be too large for the system to compensate, and the aircraft may respond to them in pitch in the conventional sense and then hold the new attitude at which it has stabilized after the trim change.

The pitch trim wheel moves as the control law compensates for these changes.

The control laws also make turning easier. They protect against overbanking, and at the chosen bank attitude (less than 33° of bank) the system maintains zero roll rate, stick free. Steep turns can be made at up to 67° of bank. This is the steepest bank at which it is possible to maintain level flight at 2.5g.

Beyond 33° of bank, the pitch trim stops working and a lateral stability term is introduced. This term becomes progressively stronger as bank angle increases, so that it equals a full sidestick demand at 67° of bank, hence forming the limiting system.

The lack of pitch trim makes it necessary for the pilot to hold the nose up in a steep turn. If he releases the stick, the nose drops and the aircraft eases its roll angle to less than 33° of bank and stabilizes at the pitch and bank angles it achieves at less than 33° of bank.

During a normal entry into a turn, the pilot must make an intentional initial change to the pitch attitude in order to maintain level flight. Once he has done this, he can release the stick. The system then maintains a level turn.

In climb, cruise, descent, and approach all these basic rules remain in effect.

LANDING MODE

The system's landing mode gives the aircraft a stabilized flight path and makes a conventional flare and touchdown. It carries out the initial approach as this manual described earlier. At 50 feet, the system memorizes the attitude, usually 3° or 4° nose up. From 30 feet down, this value washes out over eight seconds to – 2°. The result is that the pilot has to exert a progressive pull to increase pitch gently in the flare. He should pull the thrust levers back at or above 20 feet, and the landing should occur without a long flare. Touchdown quality is better and more repeatable at fairly flat attitudes. An audible "RETARD" callout reminds the pilot if he has not pulled back the thrust levers when the aircraft has reached 20 feet.

R Crosswind landings are conventional. The preferred technique is to use the rudder to align
R the aircraft with the runway heading, during the flare, while using lateral control to maintain
R the aircraft on the runway centerline (Refer to SOP 3.03.22). The lateral control mode does not change until the wheels are on the ground, so there is no discontinuity in the control laws. The aircraft tends to roll gently in the conventional sense as drift decreases, and the pilot may have to use some normal cross control to maintain roll attitude.

Even during an approach in considerable turbulence, the control system resists the disturbances quite well without pilot inputs. In fact, the pilot should try to limit his control inputs to those necessary to correct the flight path trajectory and leave the task of countering air disturbances to the flight control system.

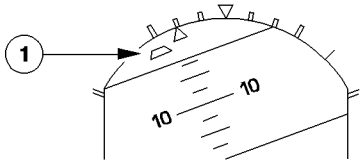
Derotation is conventional. The pilot releases the back pressure he was holding for the flare and the nose wheel comes down nicely.

Pitch trim then resets to zero.

ABNORMAL OPERATIONS

ENGINE FAILURE AT TAKEOFF

NFCS-03-0427-004-A001AA



On the ground the aircraft is conventional. The pilot uses rudder to maintain direction. He should rotate to about 12.5° of pitch and adjust as required. The sideslip indication (1) changes to the engine-out mode (blue). When it is centered, the aircraft is close to the zero aileron position (best drag condition). It is therefore important to zero the slip indication accurately.

Trim the rudder conventionally.

When time permits, the pilot should check the ECAM's FLT CTL page, and refine the rudder trim to give neutral lateral control, and also trim the rudder toward the spoilers that are up or toward the aileron that is farthest up to bring the lateral controls back to neutral.

ENGINE-OUT LANDING

The engine-out landing is basically a conventional landing. The pilot should trim to maintain the slip indication centered. It is yellow, as long as N1 is less than 80%. Between 100 and 50 feet, the pilot he can reset rudder trim to make the landing run easier, and to recover full rudder travel in both directions.

BOUNCE AT LANDING

In case of a light bounce, maintain the current pitch attitude and complete the landing, while maintaining the thrust at idle. In case of a strong bounce, initiate a go-around, initially maintaining the pitch attitude. Retract the flaps one step, and then the landing gear, once the aircraft is properly established on the go-around segment. In all cases, do not attempt to soften the (potential) second touchdown by increasing the pitch attitude.

TRAINING TOUCH-AND-GO

With the nosewheel on ground, pitch trim automatically resets to zero. The pilot should select CONF 2 and add thrust. He must always move the thrust levers to TOGA to bring up the speed reference system (SRS), and then reduce to a lower thrust (not less than CL), if he chooses. Takeoff may be a little out of trim, which may affect the rotation slightly, but once the aircraft is off the ground, the control law holds the "out of trim", then retrims at 50 feet.

STALL WARNING

An aural "STALL", warning continuously sounds at low speeds in ALTN or DIRECT laws. However, spurious stall warning may sound in NORMAL law, if an Angle-Of-Attack (AoA) is damaged. In any case, upon hearing it, the pilot must return to the normal operating speed by taking conventional actions with the controls :

■ **At lift-off :**

THRUST LEVERS . . . . . TOGA
At the same time :
PITCH ATTITUDE . . . . . 12.5°
BANK ANGLE . . . . . ROLL WINGS LEVEL
SPEEDBRAKES . . . . . CHECK RETRACTED

Note : When a safe flight path and speed are achieved and maintained, if stall warning is still activated, consider a spurious stall warning

■ **During any other flight phases after lift-off :**

THRUST LEVERS . . . . . TOGA
At the same time :
PITCH ATTITUDE . . . . . REDUCE
BANK ANGLE . . . . . ROLL WINGS LEVEL
SPEEDBRAKES . . . . . CHECK RETRACTED

CAUTION

If a risk of ground contact exists, reduce pitch attitude no more than necessary to allow airspeed to increase

● **After initial recovery :**

Maintain the speed close to V Stall Warning speed (VSW), until it is safe to accelerate

● **If in clean configuration and below 20 000 feet :**

FLAP 1 . . . . . SELECT

● **When out of stall and if no threat of ground contact :**

LANDING GEAR . . . . . UP

– Recover normal speeds, and select flaps as required
– In case of one engine inoperative, use power and rudder with care

The aural stall warning may also sound at high altitude, where it warns that the aircraft is approaching the angle of attack for the onset of buffet. To recover, the pilot must relax the back pressure on the sidestick and reduce bank angle, if necessary. When the stall warning stops, the pilot can increase back pressure again, if necessary, to return to the planned trajectory.

ABNORMAL CONTROL LAWS - GENERAL

ALTERNATE LAW

Pitch alternate and roll direct is the first level of degraded control law, resulting from some double failures.
The autopilot may be available, depending on the cause and type of failure(s).

DIRECT LAW

The sidestick is directly coupled to the controls via the computers, but without any of the stabilization feedbacks. In effect, this law turns the aircraft into a conventional aircraft, but is compensated for configuration and CG. The pilot must use manual pitch trim, as is signaled on the PFD. The autopilot is not available.

MECHANICAL BACKUP

The pilot can use the pitch trim and rudder to control the aircraft for short periods of total loss of fly-by-wire.

ABNORMAL CONTROL LAWS - IN DETAIL

ALTERNATE LAW

Pitch
Alternate law in pitch is almost the same (for the pilot) as the normal control laws.
However, alternate law does not maintain any of the protections, except for the load factor limitation. As a result, the pilot must fly the aircraft more attentively to avoid inadvertently exceeding the normal limits.
Alternate law reduces VMO to 320 knots to restore a normal aircraft speed margin in case of upset. This is not necessary in the Mach range, because the margin there is, in any case, conventional.

ABNORMAL CONTROL LAWS - GENERAL

ALTERNATE LAW

Pitch alternate and roll direct is the first level of degraded control law, resulting from some double failures.
The autopilot may be available, depending on the cause and type of failure(s).

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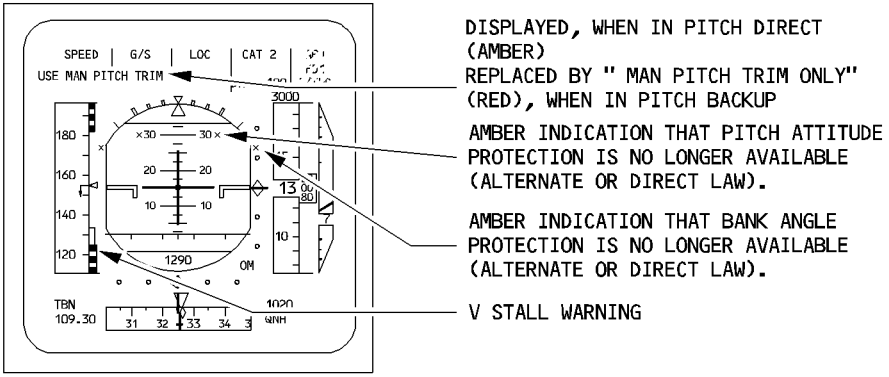
MECHANICAL BACKUP

The pilot can use the pitch trim and rudder to control the aircraft for short periods during a total loss of fly-by-wire.

ABNORMAL CONTROL LAWS - IN DETAIL

ALTERNATE LAW

Pitch
Alternate law in pitch is almost the same for the pilot, as the normal control law.
However, alternate law does not maintain any of the protections, except for the load factor limitation. As a result, the pilot must fly the aircraft more attentively to avoid inadvertently exceeding the normal limits.
Alternate law reduces VMO to 320 knots, MMO to 0.77 and Max FL to FL 350, to restore a normal aircraft speed margin in case of upset.



NFCS-03-0427-007-A001AA

At low speed the change in the speed scale is very noticeable. VLS remains, but Vα PROT and Vα MAX disappear, replaced by a single black and red strip the top of which is stall warning speed. Unlike VLS which is stable, VSW is g sensitive so as to give additional margin in turns.
As mentioned above, ALTERNATE reverts to DIRECT law for landing when the flight crew lowers the landing gear.

Roll

Roll control is direct. The rate of roll is generally higher than with normal law and at first the aircraft appears to be very sensitive.
Bank stability and protections are no longer active and the flight crew should take care to stay within normal limits.

DIRECT LAW

Normally direct law in pitch is transitory, due to undetected failures of, for example, a second IRS. Once the flight crew has isolated the failed system, it can reset the ELACs to acquire alternate law in pitch.
When the system goes into direct law, "USE MAN PITCH TRIM" appears on the PFDs. This message flashes for 5 seconds, then becomes steady.
The pilot should use small control inputs when the aircraft is in direct law at high speed, because the controls are powerful. Good trimming in pitch is required.
The pilot should avoid using large thrust changes or sudden speedbrake movements, particularly if the center of gravity is aft. If the speedbrakes are out and the aircraft has been retrimmed, the pilot should retract the speedbrakes gently, giving time to retrim so as to avoid a large nose-down trim change.
The flight crew must fly the aircraft carefully at all times. Control is precise, but there are no protections.
The aural stall warning for alternate law also serves direct law, and the technique for recovery is the same.
Any tendency to roll stick free can be corrected by conventional use of rudder. Residual rudder forces can be trimmed out by using rudder trim in the direction of the applied force.

After trimming, the sideslip index will be slightly displaced from center. With some failure conditions the asymmetric rolling tendency may be increased. It will always be possible to trim the aircraft to fly straight, hands off. There may then be an asymmetry in roll response, but the roll rate achieved is always adequate.
Landing in direct law is like landing a conventional aircraft. Trim changes to compensate for configuration changes are small, as is the trim change with speed change. Trim change with a large thrust change is quite large, so the pilot should make smooth thrust changes. The flare height for landing is the same (20 feet), and the pilot uses conventional techniques. (The controls remain light and powerful).
Pilots have landed this aircraft in direct law in moderate to heavy turbulence with gusting winds without undue difficulty.
Direct law works with or without the yaw damper. The aircraft is always convergent in dutch roll, so if an oscillation begins it will stop itself if not excited. To stop dutch roll the pilot should use lateral inputs, not rudder.

THE PROTECTION SYSTEMS

GENERAL

The aircraft has a comprehensive flight envelope protection system.
This system increases safety if the pilot has to make an extreme maneuver or the aircraft enters a very violent meteorological situation.
In either of these situations, the pilot can make full sidestick inputs in normal laws at any speed. The rudder is not protected in this way, but is not normally used during symmetrical flight.
The pilot will never see any aspect of this envelope protection take effect as long as he flies the aircraft normally.

Note : The normal flight envelope is not different from that of a conventional aircraft, and is defined as VLS to VMO. Pilots should not deliberately fly at a speed that is lower than VLS except for properly authorized training or testing.

PITCH ATTITUDE PROTECTION

The system limits the aircraft to 67° of bank, which corresponds approximately to the bank angle needed for a level 2.5g turn.
The system limits pitch attitude to + 30° and – 15°. The + 30° limit decreases to 25° at low speed. If the aircraft attitude approaches these limits, the pitch and roll rates start to decrease 5° before the limit so that it will stop at the limit without overshooting.

LOAD FACTOR LIMITATION

The aircraft is structurally designed to the same limits as any other large aircraft. The 2.5g limit (2g with flaps extended) allows the aircraft to make an abrupt maneuver without structural risk if such a maneuver becomes necessary.
When this occurs (after a ground proximity warning, for example), the pilot should quickly apply full control and hold it until the flight path is safe. Response time is a vital factor in avoidance : the system allows maneuvers that the pilot would not normally be able to perform safely at any altitude, low or high.

EXCEEDING VMO/MMO

During climb, cruise or descent the aircraft may slightly exceed VMO/MMO with the autopilot (AP) engaged. This may occur when adverse conditions are encountered.
Using the following procedure prevents such an exceedance :

1. In case of turbulence, adapt speed or Mach target. If severe turbulence is known, or forecasted, consider the use of turbulence speed.
2. The current speed is close to the VMO (maximum operating speed) :
   - Monitor the speed trend symbol on the PFD :
     - If the speed trend reaches, or slightly exceeds, the VMO limit :
       - Use the FCU immediately to select a lower speed target.
     - If the speed trend significantly exceeds the VMO red band, without high speed protection activation :
       - Select a lower target speed on the FCU and, if the aircraft continues to accelerate, consider disconnecting the AP.
       - Before re-engaging the AP, smoothly establish a shallower pitch attitude.
3. If the aircraft accelerates above VMO with the AP engaged :
   The AP will disengage on reaching the high speed protection. The high speed protection will apply a nose-up order up to 1.75 g, in addition to pilot input during VMO recovery. Therefore :
   - Make a smooth pitch correction, to recover proper speed.

In all events :

R - Speedbrakes may be used if the aircraft exceeds VMO/MMO. However, use
R speedbrakes with caution when close to the ceiling.
- Check the AP engagement status and re-engage it when appropriate. It may have tripped, if VMO/MMO was significantly exceeded. The associated aural warning may have been superseded by the overspeed aural warning.

HIGH SPEED PROTECTION

The aircraft automatically recovers following a high speed upset. Depending on the flight conditions (high acceleration, low pitch attitude) the high speed protection is activated at/or above VMO/MMO.
When it is activated, the pitch trim is frozen, spiral static stability is introduced to 0° bank angle (instead of 33° in normal law), and the bank angle limit is reduced from 67° to 45°.

As the speed increases above VMO/MMO, the sidestick nose-down authority is progressively reduced, and a permanent nose-up order is applied to aid recovery to normal flight conditions.
The High Speed Protection is deactivated when the aircraft speed decreases below VMO/MMO, where the usual normal control laws are recovered.
The flight crew should never deliberately fly the aircraft beyond VMO/MMO, unless absolutely necessary for operational reasons, such as avoiding another aircraft.
The pilot should, as soon as possible, reduce resistance to the High Speed Protection and allow the aircraft to return to a speed below VMO/MMO, by smoothly relaxing the forward stick force to attain a comfortable nose-up pitch rate. It is not usually necessary to apply a pull force to recover. If a quicker recovery is required for operational reasons, the pilot should pull back smoothly and progressively, monitoring the g indication on the ECAM".

HIGH ANGLE OF ATTACK PROTECTION

The aircraft resists attempts by either a pilot or the atmosphere to stall it. If a pilot attempts a stall, he feels the aircraft trying to pitch down as speed approaches the amber and black strip. The pilot can resist this tendency until speed reaches the red band (alpha maximum), and then further nose-up control is not available. Between these two points, αfloor automatically sets go around thrust. The pilot can hold full back stick, if it is needed (see windshear), and the aircraft stabilizes at an angle of attack close to but short of the 1g stall.
WHEN FLYING AT αmax, THE PILOT CAN MAKE GENTLE TURNS, IF NECESSARY.
As the aircraft enters protection at the amber and black strip. (αprot), the system inhibits further nose-up trim beyond the point already reached. Nose-down trim remains available if the pilot pushes the stick forward.
The pilot should not deliberately fly the aircraft in αprot except for brief periods when maximum maneuvering is required. If the pilot enters αprot inadvertently, he should get out of it as quickly as possible by easing forward on the sidestick to reduce the angle of attack while simultaneously adding power (if αfloor has not already been activated or has been cancelled). The system will regain the normal load factor law if the stick is pushed forward of neutral, but it will re-enter αprot if the stick is released with the angle of attack still greater than the value set for αprot. Thus to exit αprot properly, the pilot should reduce angle attack to a value less than the value set for αprot.
The PFD shows this clearly, because the indicated speed is above the black and amber strip.
The pilot should now increase speed above VLS (clear of the amber strip) as soon as other considerations (ground clearance, for example) allow him to do so.
αfloor will usually be triggered just after αprot is entered, and go around thrust will automatically be applied. Thus, if the sidestick is held aft, either inadvertently or deliberately, the aircraft will start to climb at a relatively constant low airspeed. To recover to a normal flight condition, αprot should be exited by easing forward on the sidestick, as described above, and the αfloor should be cancelled by using the disconnect pushbutton on either thrust lever as soon as a safe speed is regained.

LOAD FACTOR LIMITATION

The aircraft is structurally designed according to the same limits as any other large aircraft. The 2.5g limit (2g with flaps extended) enables the aircraft to make an abrupt maneuver without structural risk, if such a maneuver becomes necessary.
When this occurs (after a ground proximity warning, for example), the pilot should quickly apply full control and hold it until the flight path is safe. Response time is a vital avoidance factor : The system allows maneuvers that the pilot would not normally be able to safely perform at any altitude, low or high.

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During climb, cruise or descent, the aircraft may slightly exceed VMO/MMO with the autopilot engaged. This may occur, when adverse conditions are encountered.
Using the following procedure prevents such an exceedance :

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2. The current speed is close to VMO (maximum operating speed) :
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The High Speed Protection is deactivated when the aircraft speed decreases below VMO/MMO, where the usual normal control laws are recovered.
The flight crew should never deliberately fly the aircraft beyond VMO/MMO, unless absolutely necessary for operational reasons, such as avoiding another aircraft.
The pilot should, as soon as possible, reduce resistance to the High Speed Protection and allow the aircraft to return to a speed below VMO/MMO, by smoothly relaxing the forward stick force to attain a comfortable nose-up pitch rate. It is not usually necessary to apply a pull force to recover. If a quicker recovery is required for operational reasons, the pilot should pull back smoothly and progressively, monitoring the g indication on the ECAM".

HIGH ANGLE OF ATTACK PROTECTION

The aircraft resists attempts by either a pilot or the atmosphere to stall it. If a pilot attempts a stall, he feels the aircraft trying to pitch down as speed approaches the amber and black strip. The pilot can resist this tendency until speed reaches the red band (alpha maximum), and then further nose-up control is not available. Between these two points, αfloor automatically sets go around thrust. The pilot can hold full back stick, if it is needed (see windshear), and the aircraft stabilizes at an angle of attack close to but short of the 1g stall.
WHEN FLYING AT αmax, THE PILOT CAN MAKE GENTLE TURNS, IF NECESSARY.
As the aircraft enters protection at the amber and black strip. (αprot), the system inhibits further nose-up trim beyond the point already reached. Nose-down trim remains available if the pilot pushes the stick forward.
The pilot should not deliberately fly the aircraft in αprot except for brief periods when maximum maneuvering is required. If the pilot enters αprot inadvertently, he should get out of it as quickly as possible by easing forward on the sidestick to reduce the angle of attack while simultaneously adding power (if αfloor has not already been activated or has been cancelled). The system will regain the normal load factor law if the stick is pushed forward of neutral, but it will re-enter αprot if the stick is released with the angle of attack still greater than the value set for αprot. Thus to exit αprot properly, the pilot should reduce angle attack to a value less than the value set for αprot.
The PFD shows this clearly, because the indicated speed is above the black and amber strip.
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αfloor will usually be triggered just after αprot is entered, and go around thrust will automatically be applied. Thus, if the sidestick is held aft, either inadvertently or deliberately, the aircraft will start to climb at a relatively constant low airspeed. To recover to a normal flight condition, αprot should be exited by easing forward on the sidestick, as described above, and the αfloor should be cancelled by using the disconnect pushbutton on either thrust lever as soon as a safe speed is regained.

R The aircraft can also enter αprot at a high level, where it protects the aircraft from the buffet boundary. As at low speed or low level, if the sidestick is merely released to neutral, the aircraft maintains the alpha for αprot. (However, this value of alpha is not the same as the value used at low speed : Alpha for αprot is reduced as a function of Mach, so that a typical cruise value is about 3.5° for the A318 and A321 aircraft, or 4.5° for the A319 and A320 aircraft). Therefore, the aircraft may climb, with the sidestick free, when leaving a turn after entering αprot. If the pilot has flown into αprot, he should leave it as soon as other considerations allow, by easing forward on the sidestick to reduce alpha below the value of αprot, while simultaneously increasing thrust or speed as appropriate.

WINDSHEAR

Most of the recommended techniques for flight in windshear also apply to the A320 aircraft family. But for these aircraft, the techniques are somewhat simpler.

The aircraft can only survive windshear, if it has enough energy to carry it through the loss-of-performance field. The aircraft can sustain this energy level in the following three ways :

— Carry extra speed. The aircraft does this automatically in some cases.
— Add maximum thrust. The aircraft does this automatically.
— Trade height energy for speed. Any aircraft can do this.

Proper pilot technique helps in this survival process. The pilot must follow orders from the Speed Reference System (SRS) or, if the FD is not available or is switched OFF for a visual approach, maintain 17.5° of pitch, even if he has to use full backstick in order to do so. At this stage, maintain full backstick until the shear is passed. The aircraft will automatically hold close to the maximum Angle-Of-Attack. The speed should stay near to the beginning of the red strip. However, in turbulence, the speed can be temporarily below the red strip without significant effect. As speed begins to recover, the pilot can reduce backstick, while still following SRS orders until well clear of the shear.

ABNORMAL CONFIGURATIONS

In some flight control failure cases, such as loss of control of both elevators, or loss of flaps or slats, the landing configuration is Configuration 3.

With the horizontal stabilizer jammed, control is much easier than it is on a conventional aircraft, because the integrator holds the elevator required to maintain the 1g flight path. The control laws remain normal to touchdown.

AIRCRAFT TRIMMING

When the aircraft is :
- In normal cruise range (around M.77),
- In straight flight,
- With the autopilot engaged,
- With symmetrical engine thrust, and
- With fuel in the wing tanks distributed symmetrically,

the rudder trim should stay between 1° right and 2.3° left.

Note : This indication corresponds to a true rudder deflection within ± 1.5°, taking into account the permanent offset of rudder trim indication, when the aircraft is in cruise conditions. (average 0.5° right, 0.8° left).
An indicated, rudder trim above 1° right or 2.3° left is acceptable, if maintenance personnel establishes that the corresponding real rudder position is within 1.5° left, and 1.5° right.

FQI IN DEGRADED MODE

If, on upper ECAM display the FOB indication is displayed with two dashes across the two least significant digits, the FQI is in degraded mode.
In this case, the ECAM FUEL page must be called on ECAM lower display to determine which tank is affected.
The loss of accuracy resulting from the loss of FQI normal mode is as follows :
wing outer cell affected : + 20 kg (+ 45 lb), – 200 kg (– 440 lb)
wing inner cell affected : ± 110 kg (240 lb).
center tank affected : ± 130 kg (290 lb).
all tanks affected : + 390 kg (+ 860 lb), – 750 kg (– 1660 lb).

ICING CONDITIONS

Icing conditions may be expected when the OAT (on ground and for takeoff), or when the TAT (in flight) is at or below 10°C, and there is visible moisture in the air (such as clouds, fog with low visibility of one mile or less, rain, snow, sleet, ice crystals) or standing water, slush, ice or snow is present on the taxiways or runways.

WARNING

Pilots must turn on the engine anti-ice system, when temperature and visible moisture meet these criteria, and should not wait until they see ice building up.

OPERATIONS IN ICING CONDITIONS

Flight in icing conditions

- **Engine anti-ice**

  ENGINE ANTI ICE must be ON during all ground and flight operations, when icing conditions exist, or are anticipated, except during climb and cruise when the SAT is below – 40° C.

  ENGINE ANTI ICE must be ON before and during a descent in icing conditions, even if the SAT is below – 40° C.

- **Wing anti-ice**

  WING ANTI ICE may either be used to prevent ice formation, or to remove ice accumulation from the wing leading edges.

  WING ANTI ICE should be selected ON, whenever there is an indication that airframe icing exists. This can be evidenced by ice accumulation on the visual ice indicator (located between the two cockpit windshields), or on the windshield wipers.

CAUTION

1. Extended flight, in icing conditions with the slats extended, should be avoided.
2. If there is evidence of significant ice accretion and to take into account ice formation on non heated structure, the minimum speed should be :
   - In configuration full, VLS + 5 knots, and the landing distance must be multiplied by 1.1.
   - In configuration lower than FULL, VLS + 10 knots, and the landing distance in CONF 3 must be multiplied by 1.15.

R 3. If there is evidence of ice accretion on de-iced parts (WING ANTI ICE inoperative)
R of the airframe, the minimum speeds should be :
R – In clean configuration, VLS + 15 knots.
R – In CONF 1, 2, 3, FULL, VLS + 10 knots, refer to QRH part 2 or FCOM 3.02.80
R for landing distance determination.

R **RAIN REPELLENT** ◁

R If the rain repellent is operative, the flight crew should only use the rain repellent in
R moderate to heavy rain.

GROUND OPERATIONS IN HEAVY RAIN

When the aircraft is parked on the ground during heavy rain, it can take rainwater into the avionics ventilation system via the open skin air inlet valve.
To prevent this, the following procedure must be applied :

- **After landing :**

  – **EXTRACT . . . . . OVRD**
  This closes the avionics ventilation system, preventing rainwater from entering.

  – **PACKS 1 and 2 . . . . . CHECK ON**
  This adds air from the air conditioning system to ventilation air. If bleed air is not available, the arrangement can function for a limited time, as follows :
  · OAT ≤ 39°C : no limit
  · 39°C ≤ OAT ≤ 45°C : 3 hours
  · OAT ≥ 45°C : 30 minutes

- **After takeoff :**

  – **EXTRACT . . . . . AUTO**

ICING CONDITIONS

Icing conditions may be expected when the OAT (on ground and for takeoff), or when TAT (in flight) is at or below 10°C, and there is visible moisture in the air (such as clouds, fog with low visibility of one mile or less, rain, snow, sleet, ice crystals) or standing water, slush, ice or snow is present on the taxiways or runways.

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  WING ANTI ICE may either be used to prevent ice formation, or to remove ice accumulation from the wing leading edges.

  WING ANTI ICE should be selected ON, whenever there is an indication that airframe icing exists. This can be evidenced by ice accumulation on the visual ice indicator (located between the two cockpit windshields) or on the windshield wipers.

CAUTION

1. Extended flight, in icing conditions with the slats extended, should be avoided.
2. If there is evidence of significant ice accretion and to take into account ice formation on non heated structure, the minimum speed should be :
   - In configuration full, VLS + 5 knots, and the landing distance must be multiplied by 1.2
   - In configuration lower than FULL, VLS + 10 knots, and the landing distance in CONF 3 must be multiplied by 1.35.

R 3. If there is evidence of ice accretion on de-iced parts (WING ANTI ICE inoperative)
R of the airframe, the minimum speeds should be :
R – In clean configuration, VLS + 15 knots.
R – In CONF 1, 2, 3, FULL, VLS + 10 knots, refer to QRH part 2 or FCOM 3.02.80
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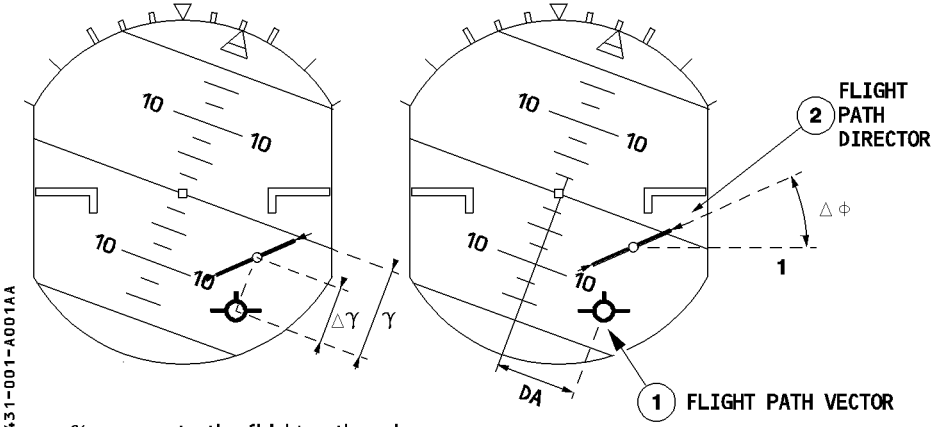
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  This closes the avionics ventilation system, preventing rainwater from entering.

  – **PACKS 1 and 2 . . . . . CHECK ON**
  This adds air from the air conditioning system to ventilation air. If bleed air is not available, the arrangement can function for a limited time, as follows :
  · OAT ≤ 39°C : no limit
  · 39°C ≤ OAT ≤ 45°C : 3 hours
  · OAT ≥ 45°C : 30 minutes

- **After takeoff :**

  – **EXTRACT . . . . . AUTO**

USE OF FLIGHT PATH VECTOR



NFC5-03-0431-001-A001AA

γ represents the flight path angle
DA represents the drift angle
△γ represents the difference between the ordered flight path angle and the actual one
△Φ represents the difference between the ordered roll angle and the actual one

The flight path vector (FPV) indicates performance and does not direct or command. Because there is always a slight lag between an attitude change and the change in flight path that results from it, when the pilot uses the FPV he should make an attitude change first, then use the FPV to check the resulting flight path.

Vertically the FPV indicates the aircraft's flight path angle.

The FPV is particularly useful when the aircraft is doing visual circuits. For example, when the aircraft is flying downwind the pilot simply adjusts the aircraft attitude to put the FPV symbol on the horizon. This establishes the aircraft in level flight. On the final approach, the pilot puts the FPV three degrees below the horizon to establish the aircraft at a normal angle of descent. If this results in the aircraft going below the chosen approach path (undershooting the touchdown point), the pilot can reduce the angle of descent by raising the FPV. As soon as the aircraft regains the correct descent path, he should bring the FPV back to –3°.

Laterally, the FPV indicates the aircraft's track and its drift angle. It has the same displacement as the drift diamond on the heading scale and thus appears directly above it. It shows on the PFD the drift the aircraft is experiencing.

The pilot must take care when making a go-around with the FPV selected. There is inevitably some lag between the pilot's raising the nose to commence the go-around and the aircraft's responding by changing its trajectory. For the same reason the pilot does not use the FPV on takeoff: the primary parameter for rotation, either on takeoff or on go-around, is attitude.

The TRK-FPA Flight Director is particularly useful for guiding the aircraft during non-precision approaches, although it can also be used at other times. When using this mode of the FD, the pilot places the FPV symbol in the center of the flight path director (FPD) symbol. This is similar to using the FD in HDG-V/S, when the pilot puts the center of the fixed aircraft symbol at the center of the crossed bars of the FD. If the FCU is set on the correct track and flight path angle, and if the FPV and the FPD are aligned, they will guide the aircraft along a trajectory that is stabilized with respect to the ground, whereas when the pilot is using HDG-V/S the trajectory is stabilized with respect to the air. However, if the aircraft is disturbed from this ideal trajectory, merely following the FPD will result in its following a trajectory that is parallel to the intended trajectory. Thus, when the aircraft is disturbed from the original trajectory, the pilot must adjust either its track or its flight path angle or both in order to obtain guidance back to the original trajectory. Likewise, when the pilot uses the FPA to create a synthetic glide path, it will be positioned correctly only if it commences at the right point in space.

BSCU RESET

R A reset of the BSCU is only authorized :
R – On ground for :
R BRAKES SYS 1(2) FAULT or BRAKES BSCU CH 1(2) FAULT
R WHEEL N.W.STEER FAULT or WHEEL N/W STRG FAULT in order to go back to the gate
R for troubleshooting. Taxi with care, at a taxi speed of 10 kt.
R The BSCU reset should be performed on ground with aircraft stopped and parking brake
R applied, by switching the A/SKID&N/W STRG selector OFF then ON.
R After any BSCU reset on ground, check the braking efficiency of the normal braking
R system, as soon as the aircraft starts moving again (the aircraft must slow down when
R pressing the brake pedals).

R *Note : If a BRAKES BSCU CH 1(2) FAULT or SYS 1(2) FAULT cannot be cleared by using*
R *the A/SKID&N/W STRG selector, a further reset may be attempted by using the*
R *BSCU circuit breakers to clear the fault.*

R – In flight for :
R BRAKES SYS 1(2) FAULT or BRAKES BSCU CH 1(2) FAULT
R The BSCU reset should be performed with landing gear retracted, by switching the
R A/SKID&N/W STRG selector OFF then ON.
R If required, rearm the autobrake.
R After any BSCU reset, a record in the logbook is mandatory to ensure that troubleshooting
R is systematically done, in order to investigate the failure before the next flight.

BRAKING IN ALTERNATE MODE

Apply brakes with care, because initial pedal force or displacement produces more braking action in alternate mode than in normal mode. If antiskid is lost, modulate brake pressure at, or below, 1000 psi. If the nosewheel steering is lost, steer the aircraft with differential braking.

BRAKE TEMPERATURE LIMITATIONS REQUIRING MAINTENANCE ACTIONS

Maintenance action is required in the following cases :

- The temperature difference between the 2 brakes on the same gear is greater than 150°C, and the temperature of either one of the brakes is higher than or equal to 600°C, or
- The temperature difference between the 2 brakes on the same gear is greater than 150°C, and the temperature of one brake is lower than or equal to 60°C, or
- R R The difference between the average temperature of the left gear brakes and the average temperature of the right gear brakes is 200°C or more, or
- A fuse plug has melted, or
- One brake's temperature exceeds 900°C.

OPERATION WITH NOSEWHEEL STEERING OFFSET

GENERAL

During taxi, the crew may notice an aircraft veering tendency. This can be due to some external conditions (crosswind, slope....), or it can be due to the nosewheel steering system itself. The latter case is identifiable due to flight crews' consecutive reports of permanent aircraft veering tendency. Such reports enable maintenance to determine when corrective action or troubleshooting is required.
A veering aircraft may still be operated before corrective action is taken, provided nosewheel steering deviation is within the values specified in the following table.

NWS OFFSET OPERATIONAL LIMITATION

R

NWS Offset	Offset ≤ 0.5°	0.5° < Offset ≤ 1.5°	Offset > 1.5°
Rudder trim to taxi straight	Trim ≤ 3°	3° < Trim ≤ 8.8°	Trim > 8.8°
Dispatch	YES	YES	NO
Procedures	No operational limitation	Apply the following procedure : Autoland : – MAX X WIND 10KT	Immediate maintenance action is due

CAUTION

R The tolerance required by maintenance guidelines (± 0.5° NWS offset, corresponding to the ± 3° rudder trim necessary to taxi straight) remains valid. Operating the aircraft outside the maintenance tolerance is possible by using the applicable procedure. However, in such cases, the flight crew must accurately and systematically make logbook entries (indicating the rudder trim input value to taxi straight) to ensure that maintenance can take corrective action within the applicable timeframe.
When using rudder trim to taxi straight for NWS offset identification, takeoff must only be performed after a rudder trim reset.

TIRE PRESSURE

These charts present the various nominal tire pressures, depending on maximum taxi weight, tire type, and landing gear configuration (shock absorbers extended, or compressed).

	PRESSURE				PRESSURE			
	Unloaded		Loaded		Unloaded		Loaded	
	bar	psi	bar	psi	bar	psi	bar	psi

	DIMENSIONS							
MAXIMUM TAKEOFF WEIGHT	30 × 8.8 R 15 30 × 8.8 - 15				46 × 17 R 20 46 × 16 - 20			
67000 KG / 147708 LB 68000 KG / 149913 LB 70000 KG / 154322 LB	11.0	160	11.4	165	12.3	178	12.8	186
73500 KG / 162038 LB 75500 KG / 166447 LB	11.8	171	12.3	178	13.3	193	13.8	200
77000 KG / 169754 LB	11.8	171	12.3	178	13.8	200	14.4	209

	DIMENSIONS							
MAXIMUM TAKEOFF WEIGHT	49 × 17 - 20				49 × 19 - 20			
67000 KG / 147708 LB 68000 KG / 149913 LB 70000 KG / 154322 LB	10.2	148	10.6	154	9.2	133	9.6	139
73500 KG / 162038 LB 75500 KG / 166447 LB	11.0	160	11.4	165	9.9	144	10.3	149
77000 KG / 169754 LB	11.5	167	12.0	174	10.3	149	10.7	155

	DIMENSIONS							
MAXIMUM TAKEOFF WEIGHT	1270 × 455 R 22				915 × 300 R 16 36 × 11 - 16			
67000 KG / 147708 LB 68000 KG / 149913 LB 70000 KG / 154322 LB	10.5	152	10.9	158	-	-	-	-
73500 KG / 162038 LB	11.3	164	11.8	171	11.7	170	12.2	177
75500 KG / 166447 LB	11.3	164	11.8	171	-	-	-	-
77000 KG / 169754 LB	11.8	171	12.3	178	-	-	-	-

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Rudder trim to taxi straight	Trim ≤ 3°	3° < Trim ≤ 8.8°	Trim > 8.8°
Dispatch	YES	YES	NO
Procedures	No operational limitation	Apply the following procedure : Autoland : – MAX X WIND 10KT	Immediate maintenance action is due

CAUTION

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When using rudder trim to taxi straight for NWS offset identification, takeoff must only be performed after a rudder trim reset.

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These charts present the various nominal tire pressures, depending on maximum taxi weight, tire type, and landing gear configuration (shock absorbers extended, or compressed).

A319	DIMENSIONS							
	30 × 8.8 R 15 30 × 8.8 - 15				46 × 17 R 20 46 × 16 - 20			
	PRESSURE				PRESSURE			
	Unloaded		Loaded		Unloaded		Loaded	
MAXIMUM TAKEOFF WEIGHT	bar	psi	bar	psi	bar	psi	bar	psi
64000 KG / 141094 LB	11.0	160	11.4	165	11.4	165	11.9	173
68000 KG / 149913 LB	11.6	168	12.1	175	12.0	174	12.5	181
70000 KG / 154322 LB	12.0	174	12.5	181	12.4	180	12.9	187
74000 KG / 163140 LB	12.7	184	13.2	191	13.3	193	13.8	200
75500 KG / 166447 LB								

A319 CJ	DIMENSIONS							
	30 × 8.8 R 15 30 × 8.8 - 15				46 × 17 R 20 46 × 16 - 20			
	PRESSURE				PRESSURE			
	Unloaded		Loaded		Unloaded		Loaded	
MAXIMUM TAKEOFF WEIGHT	bar	psi	bar	psi	bar	psi	bar	psi
75500 KG / 166447 LB	13.4	194	13.9	202	13.3	193	13.8	200

OPERATION WITH NOSEWHEEL STEERING OFFSET

GENERAL

During taxi, the crew may notice an aircraft veering tendency. This can be due to some external conditions (crosswind, slope....), or it can be due to the nosewheel steering system itself. The latter case is identifiable due to flight crews' consecutive reports of permanent aircraft veering tendency. Such reports enable maintenance to determine when corrective action or troubleshooting is required.
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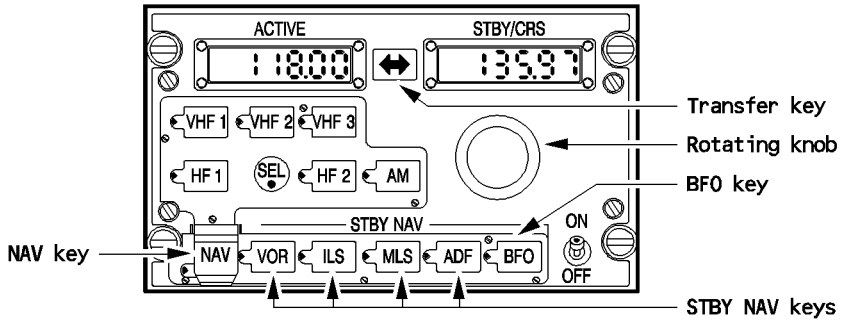
These charts present the different tire nominal pressures, depending on maximum takeoff weight, tire type, and landing gear configuration (shock absorbers extended, or compressed).

	DIMENSIONS							
	30 × 8.8 R 15 30 × 8.8 - 15				46 × 17 R 20 46 × 16 - 20			
	PRESSURE				PRESSURE			
	Unloaded		Loaded		Unloaded		Loaded	
MAXIMUM TAKEOFF WEIGHT	bar	psi	bar	psi	bar	psi	bar	psi
56000 KG / 123458 LB	11.8	171	12.3	178	9.8	142	10.2	148
59000 KG / 130071 LB 61000 KG / 134481 LB 61500 KG / 135583 LB 63000 KG / 138890 LB	12.3	178	12.8	186	11.0	160	11.4	165
64000 KG / 141094 LB 64500 KG / 142197 LB 66000 KG / 145504 LB 68000 KG / 149913 LB	13.0	189	13.5	196	11.9	173	12.4	180

PROCEDURES FOR TUNING STANDBY NAVIGATION RADIOS

CAUTION

R Pilots should use these procedures only when both FMGCs or both MCDUs are
R inoperative. When at least one FMGC is operative, the use of NAV key on RMP while
R the LOC update is active, may freeze the FM position during approach and must be
R avoided.
In this case they must press both RMP NAV keys (lighting the green lights).



FOR BOTH RMPs

– **ON/OFF Switch** . . . . . **CHECK ON**

– **NAV key (guarded)** . . . . . **PRESS**
Green light comes on.
A lighted STBY NAV key shows which system had been selected earlier in the radio-nav standby mode, and the windows show which frequencies had been used.

ON THE RMP ASSOCIATED WITH THE RECEIVER TO BE TUNED

Select a STBY NAV system :

- **ADF tuning :**

  – **ADF key** . . . . . **PRESS**
  The green light comes on.
  The windows show the previously selected frequencies.

  – **Rotating knob** . . . . . **TURN**
  Watch the STBY/CRS window to set a frequency.
  The outer knob changes units, inner knob decimals.

– **Transfer key** . . . . . **PRESS**
This interchanges the ACTIVE and STBY frequencies. The ADF receiver is now tuned to the new ACTIVE frequency.

– **BFO key (if necessary)** . . . . . **PRESS**
Green light comes on.

● **VOR (or ILS) tuning :**

– **VOR (or ILS) key** . . . . . **PRESS**
Green light comes on.
Both windows display previously selected frequencies.

– **Rotating knob** . . . . . **TURN**
Set the frequency in the STBY/CRS window.

– **Transfer key** . . . . . **PRESS**
The ACTIVE window displays the selected frequency.
The STBY/CRS window displays the frequency that had been displayed in the ACTIVE window.

– **Rotating knob** . . . . . **TURN**
Set the course in the STBY/CRS window.
The receiver is now tuned to the frequency of the new station, and the course is selected.
To select another station, press the transfer key (making both windows display the previously selected frequency) before retuning the VOR (or ILS).

Note : When the radio-nav standby mode is active (NAV key ON) and VHF or HF tuning is required, select the VHF key or the HF key on the RMP (normal radio communications use). The NAV key, which has no effect on the selection of a radio communication frequency, must remain in the ON position in order to
R *prevent radio navigation aid tuning from changing NAV receiver frequencies.*

AUTOMATIC IDENTIFICATION OF ADF/VOR/ILS

Although the navigation display automatically identifies the tuned ADF, VOR, or ILS station (auto ident decoded), the flight crew must, in the following cases, confirm the correct tuning of the desired station via the audio system :

- A station has either been autotuned or tuned manually by a crew member's entering the associated ident on the MCDU RAD NAV page, and the decoded ident appearing on the ND is the wrong one.
- A crew member has tuned the station manually on an RMP or by entering the frequency on the MCDU RAD NAV page.

WEATHER RADAR

INTRODUCTION

Airborne weather radar gives the flight crew an efficient tool for detecting bad weather during flight. The digital weather radar with its multicolor navigation display allows the crew to follow the best route to avoid weather problems.
To this end, some operational advice, based upon a general knowledge of the radar capabilities, is given in this chapter.

GENERAL

The radar is nothing more than a precipitation detector. How much weather it detects depends upon the raindrops, their size, composition and number.
The radar does not detect :
· clouds, fog or wind (too small droplets or no precipitation at all)
· clear air turbulence (no precipitation)
· windshear (no precipitation except in microburst)
· lightning.
The radar does detect :
· rainfall
· wet hail and wet turbulence
· ice crystals, dry hail and dry snow (above 30 000 feet) will only give small reflections.

OPERATIONAL FUNCTIONS

TILT, RANGE AND GAIN

The three things that the flight crew must understand in order to take full advantage of the weather radar are :
- antenna tilt, which causes the center of the radar beam to scan above or below the attitude reference plane
- range control which, in coordination with tilt governs the range of the navigation display
- gain control, which adjusts the sensitivity of the receiver (and should normally be set to AUTO). The sensitivity of the receiver may vary from one type of radar system to another.

COLOR CODE

A color code distinguishes areas according to their precipitation intensity :
- Black, for the lowest intensity (nothing appears on the ND)
- Green, amber, and red for progressively higher intensities.
- Magenta, for saturated areas, in the weather and turbulence mode (WX + T)

GROUND MAPPING AND GCS

Some radars have two additional modes :
- Ground mapping mode permits the radar to produce more returns from less reflective targets on the ground. The associated color codes are : Black for standing water (no returns), green for the ground, amber or red for cities and mountains (strong returns).
- Ground Clutter Suppression (GCS) erases up to 85 % of ground clutter return. The flight crew should only use this mode at shallow tilt angles (0 to 5°) and for short intervals, since it may incorrectly identify stationary weather targets. Steep tilt angles can make it difficult to distinguish between ground and weather targets.

OPERATIONAL USE

CAUTION

Before selecting WX, WX/T or MAP mode on the control unit, make certain that :
- No one is within a distance less than 5 meters from the antenna in movement, within an arc of plus or minus 135° on either side of the aircraft centerline.
- The aircraft is not directed towards any large metallic obstacle, such as a hangar, which is within 5 meters in an arc of plus or minus 90° on either side of the aircraft centerline.

R

DETECTION AND INTERPRETATION

General

1. The flight crew should monitor the weather at long range, as well as at shorter ranges, in order to be able to efficiently plan course changes, and to avoid weather-defined blind alleys and box canyons.
2. Ground returns usually appear smaller, sharper, more packed, better-defined, and more angular than weather targets, whereas the latter usually appear larger, have less definite shapes, and tend to remain relatively unchanged.
3. The line-of-sight distance to the horizon is :
   $D(NM) = 1{,}23 \sqrt{\text{(aircraft altitude (feet))}}$.

Red and magenta areas : thunderstorms, tornadoes, hail

The steeper the gradient of rainfall rate, the stronger the turbulence (magenta color) and the possibility of hail.

- To use the radar effectively for avoiding thunderstorms, the flight crew should select the following ranges on the NDs (if possible) :
  - 160 NM on the Pilot Non-Flying (PNF) ND
  - 80 NM on the Pilot Flying (PF) ND
- To avoid a large storm, the flight crew must make decisions while still 40 NM from it. Therefore the flight crew should :
  - Avoid magenta (WX+T mode) and red areas and fringes by at least 20 NM above the FL230 and by 5 to 10 NM below FL230.
  - Avoid single magenta areas of turbulence (not associated with heavy precipitation) by at least 5 NM.
- Flight crew should readjust the tilt frequently in order to monitor storm development and to get the best cell echo.
- Failure to tilt the antenna down periodically may cause a target to disappear.
- The following formula calculates the vertical distance between the top of the cell and the aircraft flight level :

$$\triangle h \text{ (feet)} \sim d(NM) \times \text{Tilt (degrees)} \times 100.$$

Example :
Cell at 40 NM disappearing at less than 3 degrees downtilt
$\triangle h \sim 40 \times 3 \times 100 = 12\,000$ feet.

- The pilot should not attempt to penetrate a cell or clear its top by less than 5000 vertical feet, because otherwise the aircraft may encounter severe turbulence.

R If the top of cell is at or above 25000 feet, overflying should be avoided due to the
R possibility of encountering turbulence stronger than expected.
In the same way, the pilot should avoid flying under a thunderstorm because of possible windshear, microbursts, severe turbulence, or hail.

Turbulence mode :

- The turbulence detection mode is most effective when the ND is set on 40 NM and the antenna is tilted to avoid ground return.
- When examining areas of heavy rainfall in WX+T mode, the flight crew should adjust antenna tilt frequently, because turbulence areas vary with the altitude.
- Closely spaced (or thin lines between) color gradations are usually associated with severe turbulence.

FLIGHT INSTRUMENT TOLERANCES

The values given below apply to aircraft in symmetrical flight (no sideslip), in clean configuration, and in straight and level flight.

ALTITUDE TOLERANCES

R – PFD 1 or 2 at ground check : ± 25 feet (8 m)
R – standby altimeter at ground check : ± 300 feet (91 m)

Note : On ground, as the standby altimeter's vibrator is off, the standby altimeter's tolerance value is high. In flight, the vibrator is on and the value is lower.

MAXIMUM DIFFERENCES BETWEEN ALTITUDE INDICATIONS

R

FL/SPEED	ALTITUDE (ft) COMPARISON BETWEEN		
	ADR 1 and ADR 2 (on PFD)	ADR 3 and ADR 1 or ADR 3 and ADR 2 (on PFD)	STBY ALTI and any ADR 1 or 2 or 3
GND CHECK	20 (6 m)	20 (6 m)	*
FL50/250 kt	50 (15 m)	80 (24 m)	130 (40 m)
FL100/250 kt	55 (17 m)	80 (24 m)	185 (56 m)
FL200/300 kt	90 (27 m)	145 (44 m)	295 (90 m)
FL300/.78	130 (40 m)	355 (108 m)	390 (119 m)
FL390/.78	130 (40 m)	365 (111 m)	445 (136 m)

* On ground, the check is meaningless because the standby altimeter's vibrator is off.

AIRSPEED/MACH TOLERANCES

Maximum differences between Speed/Mach indications :

FL/SPEED	SPEED (kt) MACH COMPARISON BETWEEN					
	ADR 1 and ADR 2 (on PFD)		ADR 3 and ADR 1 or ADR 3 and ADR 2		STBY ASI and any ADR 1 or 2 or 3	
	SPEED	MACH	SPEED	MACH	SPEED	MACH
GND CHECK	6	0.008	6	0.008	6	–
FL50/250 kt	4	0.005	5	0.011	7	–
FL100/250 kt	4	0.005	4	0.011	8	–
FL200/300 kt	3	0.007	4	0.008	9	–
FL300/0.78	3	0.010	7	0.017	9	–
FL390/0.78	3	0.010	6	0.019	8	–

Red and magenta areas : thunderstorms, tornadoes, hail

The steeper the gradient of rainfall rate, the stronger the turbulence (magenta color) and the possibility of hail.

- To use the radar effectively for avoiding thunderstorms, the flight crew should select the following ranges on the NDs (if possible) :
  - 160 NM on the Pilot Non-Flying (PNF) ND
  - 80 NM on the Pilot Flying (PF) ND
- To avoid a large storm, the flight crew must make decisions while still 40 NM from it. Therefore the flight crew should :
  - Avoid magenta (WX+T mode) and red areas and fringes by at least 20 NM above the FL230 and by 5 to 10 NM below FL230.
  - Avoid single magenta areas of turbulence (not associated with heavy precipitation) by at least 5 NM.
- Flight crew should readjust the tilt frequently in order to monitor storm development and to get the best cell echo.
- Failure to tilt the antenna down periodically may cause a target to disappear.
- The following formula calculates the vertical distance between the top of the cell and the aircraft flight level :

$$\triangle h \text{ (feet)} \sim d(NM) \times \text{Tilt (degrees)} \times 100.$$

Example :
Cell at 40 NM disappearing at less than 3 degrees downtilt
$\triangle h \sim 40 \times 3 \times 100 = 12\,000$ feet.

- The pilot should not attempt to penetrate a cell or clear its top by less than 5000 vertical feet, because otherwise the aircraft may encounter severe turbulence.

R If the top of cell is at or above 25000 feet, overflying should be avoided due to the
R possibility of encountering turbulence stronger than expected.
In the same way, the pilot should avoid flying under a thunderstorm because of possible windshear, microbursts, severe turbulence, or hail.

Turbulence mode :

- The turbulence detection mode is most effective when the ND is set on 40 NM and the antenna is tilted to avoid ground return.
- When examining areas of heavy rainfall in WX+T mode, the flight crew should adjust antenna tilt frequently, because turbulence areas vary with the altitude.
- Closely spaced (or thin lines between) color gradations are usually associated with severe turbulence.

FLIGHT INSTRUMENT TOLERANCES

The values below apply to aircraft in symmetrical flight (no sideslip), in clean configuration, and in straight and level flight.

ALTITUDE TOLERANCES

– PFD 1 or 2 at ground check : ± 25 feet (8 m)
– Standby altimeter at ground check : ± 300 feet (91 m)

Note : On ground, as the standby altimeter's vibrator is off, the standby altimeter's tolerance value is high. In flight, the vibrator is on and the value is lower.

MAXIMUM DIFFERENCES BETWEEN ALTITUDE INDICATIONS

FL/SPEED	ALTITUDE (ft) COMPARISON BETWEEN		
	ADR 1 and ADR 2 (on PFD)	ADR 3 and ADR 1 or ADR 3 and ADR 2 (on PFD)	STBY ALTI and any ADR 1 or 2 or 3
GND CHECK	20 (6 m)	20 (6 m)	*
FL50/250 kt	50 (15 m)	65 (20 m)	130 (40 m)
FL100/250 kt	55 (17 m)	80 (24 m)	185 (56 m)
FL200/300 kt	90 (27 m)	135 (41 m)	295 (90 m)
FL300/.78	130 (40 m)	195 (59 m)	390 (119 m)
FL390/.78	130 (40 m)	195 (59 m)	445 (136 m)

* On ground, the check is meaningless because the standby altimeter's vibrator is off.

AIRSPEED/MACH TOLERANCES

Maximum differences between Speed/Mach indications :

FL/SPEED	SPEED (kt) MACH COMPARISON BETWEEN					
	ADR 1 and ADR 2 (on PFD)		ADR 3 and ADR 1 or ADR 3 and ADR 2		STBY ASI and any ADR 1 or 2 or 3	
	SPEED	MACH	SPEED	MACH	SPEED	MACH
GND CHECK	6	0.008	6	0.008	6	–
FL50/250 kt	4	0.005	4	0.007	7	–
FL100/250 kt	4	0.005	5	0.008	8	–
FL200/300 kt	3	0.007	5	0.011	9	–
FL300/0.78	3	0.010	5	0.014	9	–
FL390/0.78	3	0.010	4	0.014	8	–

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- Flight crew should readjust the tilt frequently in order to monitor storm development and to get the best cell echo.
- Failure to tilt the antenna down periodically may cause a target to disappear.
- The following formula calculates the vertical distance between the top of the cell and the aircraft flight level :

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- Closely spaced (or thin lines between) color gradations are usually associated with severe turbulence.

FLIGHT INSTRUMENT TOLERANCES

The values below apply to aircraft in symmetrical flight (no sideslip), in clean configuration, and in straight and level flight.

ALTITUDE TOLERANCES

– PFD 1 or 2 at ground check : plus or minus 25 feet (8 meters)

MAXIMUM DIFFERENCES BETWEEN ALTITUDE INDICATIONS

FL/SPEED	ALTITUDE (ft) COMPARISON BETWEEN		
	ADR 1 and ADR 2 (on PFD)	ADR 3 and ADR 1, or ADR 3 and ADR 2 (on PFD)	ISIS and any ADR 1, or 2, or 3
GND CHECK	20 (6 m)	20 (6 m)	100 (30 m)
FL50/250 kt	50 (15 m)	65 (20 m)	130 (40 m)
FL100/250 kt	55 (17 m)	80 (24 m)	185 (56 m)
FL200/300 kt	90 (27 m)	135 (41 m)	295 (90 m)
FL300/.78	130 (40 m)	195 (59 m)	390 (119 m)
FL390/.78	130 (40 m)	195 (59 m)	445 (136 m)

MAXIMUM DIFFERENCES BETWEEN SPEED/MACH INDICATIONS

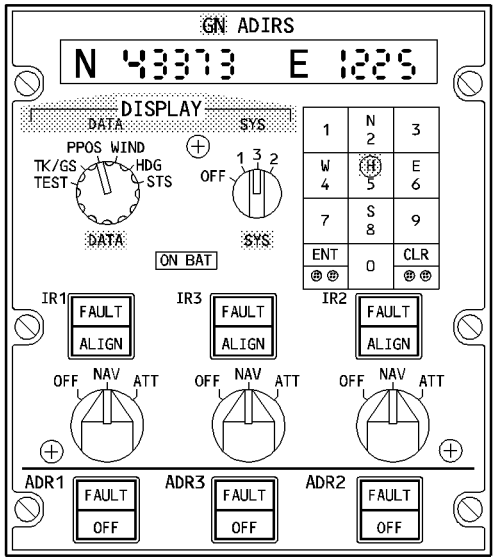
FL/SPEED	SPEED (kt) MACH COMPARISON BETWEEN					
	ADR 1 and ADR 2 (on PFD)		ADR 3 and ADR 1, or ADR 3 and ADR 2		ISIS and any ADR 1, or 2, or 3	
	SPEED	MACH	SPEED	MACH	SPEED	MACH
GND CHECK	6	0.008	6	0.008	6	–
FL50/250 kt	4	0.005	4	0.007	7	–
FL100/250 kt	4	0.005	5	0.008	8	0.032
FL200/300 kt	3	0.007	5	0.011	9	0.033
FL300/0.78	3	0.010	5	0.014	9	0.025
FL390/0.78	3	0.010	4	0.014	8	0.025

Mach values lower than M0.50 in climb, and M0.45 in descent, are not displayed on ISIS.

HEADING TOLERANCES

Maximum differences between magnetic heading indications on the NDs : 4 degrees.

R ADIRS OPERATION



NFCS-03-0434-007-A001AA

R The ADIRS must be aligned : This allows them to operate in NAV mode, to continuously
R provide the aircraft's position. To complete the alignment, the ADIRS must be initialized to
R a navigation starting point, from which the ADIRS determine subsequent aircraft positions
R during flight.
R The pilot may check the ADIRS status, and the ADIRS drift, at any moment on the MCDU
R POSITION MONITOR page.

R COMPLETE OR FAST ALIGNMENT

R For alignment, the aircraft must be stationary on ground. Any aircraft motion will
R automatically restart the alignment. Avoid alignment during an engine start, or while the
R engines are running.
R The pilot may choose to perform a complete alignment (this takes about 10 minutes) or a
R fast alignment (this takes about 30 seconds). In both cases, the ADIRS must be initialized
R to a navigation starting point.
R During a complete alignment, the ADIRS uses gravity to determine the aircraft attitude. It
R then determines true heading, and estimates the present latitude.
R During a fast alignment, the ADIRS resets the ground speed to 0. Therefore, the ADIRS will
R start the position computation with an accurate initial speed. The ADIRS does not estimate
R the latitude.

R The procedure for ADIRS complete or fast alignment is the following :

R – **All 3 ADIRS Control Panel mode selectors . . . . . OFF**
R The ALIGN light remains OFF.

R – **All 3 ADIRS Control Panel mode selectors . . . . . NAV**
R If the mode selectors are set back to NAV within 5 seconds, the ADIRS perform a fast alignment.
R Otherwise, the ON BAT light comes ON for five seconds, and the ADIRS then start a complete alignment.
R The ALIGN light comes ON, and remains steady until the alignment is complete.

R **POSITION INITIALIZATION**

R The alignment phase is completed, when the ADIRS is initialized to an appropriate position.
R Perform this initialization as soon as possible, to prevent delays if an alignment error occurs.

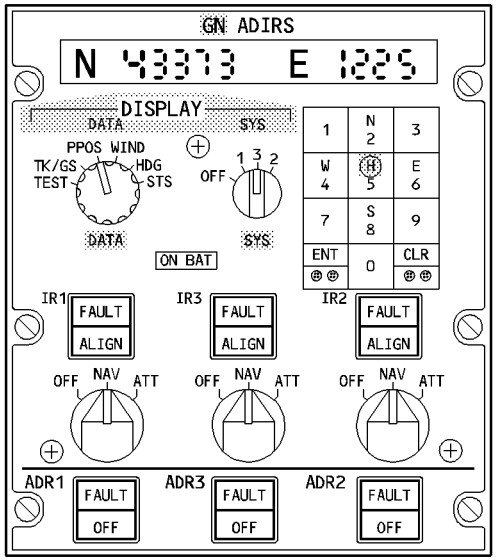
R – **MCDU coordinates . . . . . CHECK/MODIFY**
R When the pilot enters or modifies the origin airport (FROM) or the CO RTE, the MCDU INIT coordinates are reset to the airport reference point (extracted from the FMS database). The pilot may also manually modify these coordinates.
R If the MCDU coordinates change, when the ADIRS are already in NAV mode, the RESET IRS TO NAV message is triggered on the MCDU : Crosscheck the MCDU INIT coordinates against the IRS position on the MCDU POSITION MONITOR page.
R When the GPS is available, or for flights in good radio navigation coverage airspace, initialize the ADIRS to the airport reference point extracted from the FMS database. This reduces the risk of entering incorrect values.
R If the GPS is not available, and long segments in poor radio navaid coverage airspace are expected, initialize the ADIRS to the gate coordinates. This increases the accuracy of the ADIRS position computation.
R If the airport reference point is not stored in the FMS database, and the gate coordinates are not available, use the airport reference point coordinates from the airport chart.

R – **ALIGN IRS prompt . . . . . PRESS**
R The MCDU INIT page coordinates are sent to the ADIRS, and their navigation starting point is set.

HEADING TOLERANCES

Maximum differences between magnetic heading indications on the NDs : 4 degrees.

R ADIRS OPERATION



NFCS-03-0434-007-A001AA

R The ADIRS must be aligned : This allows them to operate in NAV mode, to continuously
R provide the aircraft's position. To complete the alignment, the ADIRS must be initialized to
R a navigation starting point, from which the ADIRS determine subsequent aircraft positions
R during flight.
R The pilot may check the ADIRS status, and the ADIRS drift, at any moment on the MCDU
R POSITION MONITOR page.

R COMPLETE OR FAST ALIGNMENT

R For alignment, the aircraft must be stationary on ground. Any aircraft motion will
R automatically restart the alignment. Avoid alignment during an engine start, or while the
R engines are running.
R The pilot may choose to perform a complete alignment (this takes about 10 minutes) or a
R fast alignment (this takes about 30 seconds). In both cases, the ADIRS must be initialized
R to a navigation starting point.
R During a complete alignment, the ADIRS uses gravity to determine the aircraft attitude. It
R then determines true heading, and estimates the present latitude.
R During a fast alignment, the ADIRS resets the ground speed to 0. Therefore, the ADIRS will
R start the position computation with an accurate initial speed. The ADIRS does not estimate
R the latitude.

R The procedure for ADIRS complete or fast alignment is the following :

R – **All 3 ADIRS Control Panel mode selectors . . . . . OFF**
R The ALIGN light remains OFF.

R – **All 3 ADIRS Control Panel mode selectors . . . . . NAV**
R If the mode selectors are set back to NAV within 5 seconds, the ADIRS perform a fast alignment.
R Otherwise, the ON BAT light comes ON for five seconds, and the ADIRS then start a complete alignment.
R The ALIGN light comes ON, and remains steady until the alignment is complete.

R **POSITION INITIALIZATION**

R The alignment phase is completed, when the ADIRS is initialized to an appropriate position.
R If the GPS is available, initialization is automatic, using the GPS position. Pilot intervention is not necessary.
R However, automatic initialization may be manually overriden by pilot entry, at any moment during the alignment phase. In this case, perform the following procedure as soon as possible, to prevent delays if an alignment error occurs :

R – **MCDU coordinates . . . . . CHECK/MODIFY**
R When the pilot enters or modifies the origin airport (FROM) or the CO RTE, the MCDU INIT coordinates are reset to the airport reference point (extracted from the FMS database). The pilot may also manually modify these coordinates.
R If the MCDU coordinates change, when the ADIRS are already in NAV mode, the RESET IRS TO NAV message is triggered on the MCDU : Crosscheck the MCDU INIT coordinates against the IRS position on the MCDU POSITION MONITOR page.
R When the GPS is available, or for flights in good radio navigation coverage airspace, initialize the ADIRS to the airport reference point extracted from the FMS database. This reduces the risk of entering incorrect values.
R If the GPS is not available, and long segments in poor radio navaid coverage airspace are expected, initialize the ADIRS to the gate coordinates. This increases the accuracy of the ADIRS position computation.
R If the airport reference point is not stored in the FMS database, and the gate coordinates are not available, use the airport reference point coordinates from the airport chart.

– **ALIGN IRS prompt . . . . . PRESS**
The MCDU INIT page coordinates are sent to the ADIRS and their navigation starting point is set.

R **ALIGNMENT/INITIALIZATION ERROR**

R The ADIRS keeps a record of the last position it had the last time it was in NAV mode. It
R is also able to estimate the present latitude after a complete alignment. The ADIRS may use
R this information to detect coarse initialization errors.
R If the ADIRS alignment or initialization is not correct, the ALIGN light will flash. If any of the
R 3 ADIRS indicates an alignment error, the prompt REALIGN IRS appears on the INIT page
R (instead of ALIGN IRS).

R ● **If the IR FAULT light flashes, the affected ADIRS can only be used in ATT**
R **mode.**

R ● **If the ALIGN light flashes before the alignment phase is completed :**

R – **DISPLAY DATA switch . . . . . STS**
R If the CDU does not display any message, the position sent to the ADIRS disagrees
R with the last memorized position, or with the ADIRS estimated latitude. Check the
R initialization position, and reenter it.
R If the CDU displays a message, take the appropriate action.

R ● **If the ALIGN light flashes at the end of the alignment phase :**
R – Check the ALIGN IRS prompt on the MCDU. If it is present, press it to initialize the
R ADIRS.

● **If the REALIGN IRS prompt is present :**
The position sent to the ADIRS disagrees with the last memorized position, or with the ADIRS estimated latitude.

R – **ADIRS . . . . . PERFORM FAST ALIGNMENT**
R
R – **POSITION INITIALIZATION . . . . . CHECK & ENTER AGAIN**
R If the ALIGN light still flashes, perform a complete alignment of the affected
R ADIRS.

R **SHUTDOWN**

R – **Mode selectors . . . . . OFF**
R Pull and turn the 3 mode selectors to OFF.
R The message screen displays REALN DESN 5 SEC (realign decision) for 5 seconds, then
R a 5 seconds countdown to off (OFF TIME 5 SEC displayed). Flight crew must not pull
R the circuit breakers until the final countdown is completed.

STATUS MESSAGES

Status messages appear, when the DISPLAY DATA switch is set to STS. If there is more than one condition calling for a message, the display scrolls to the next message every 2 seconds.

MESSAGE	DESCRIPTION
STS IR FAULT	Hard failure. Select ATT (if corresponding message is displayed) or refer to MMEL or remove ADIRU for maintenance.
STS-DELAY MAINT	Failure not affecting IR functioning. Service ADIRU when convenient.
STS-ENTER PPOS	Enter present position or check entered position is correct. Note : The confirmation of an erroneous longitude at the present position entry will create a wrong position of the aircraft symbol on the NDs.
STS-SELECT ATT	Hard IRU failure, select ATT mode.
STS-EXCESS MOTION	Excess motion detected during alignment. ADIRU will automatically restart alignment. Ensure aircraft is not moving.
STS-SWITCH ADR	ADR invalid.
STS-CHECK CK/BK	Check circuit breakers *
STS-CDU FAULT	Remove CDU for maintenance.
STS-ENT MAG HDG	Enter magnetic heading.

* If a corresponding FAULT light comes on, check BAT 1 load.

R **ALIGNMENT/INITIALIZATION ERROR**

R The ADIRS keeps a record of the last position it had the last time it was in NAV mode. It
R is also able to estimate the present latitude after a complete alignment. The ADIRS may use
R this information to detect coarse initialization errors.
R If the pilot manually initializes the ADIRS, and a GPS position is available, the GPS position
R is used to crosscheck the pilot entry.
R If the ADIRS alignment or initialization is not correct, the ALIGN light will flash. If any of the
R 3 ADIRS indicates an alignment error, the prompt REALIGN IRS appears on the INIT page
R (instead of ALIGN IRS).

R ● **If the IR FAULT light flashes, the affected ADIRS can only be used in ATT**
R **mode.**

R ● **If the ALIGN light flashes before the alignment phase is completed :**

R – **DISPLAY DATA switch . . . . . STS**
R If the CDU does not display any message, the position sent to the ADIRS disagrees
R with the last memorized position, with the ADIRS estimated latitude or with the GPS
R position. Check the initialization position, and reenter it.
R If the CDU displays a message, take the appropriate action.

R ● **If the ALIGN light flashes at the end of the alignment phase :**
R – Check the ALIGN IRS prompt on the MCDU. If it is present, press it to initialize the
R ADIRS.

● **If the REALIGN IRS prompt is present :**
The position sent to the ADIRS disagrees with the last memorized position, with the ADIRS estimated latitude, or with the GPS position.

R – **ADIRS . . . . . PERFORM FAST ALIGNMENT**

R – **POSITION INITIALIZATION . . . . . CHECK & ENTER AGAIN**
R If the ALIGN light still flashes, perform a complete alignment of the affected
R ADIRS.

R **SHUTDOWN**

R – **Mode selectors . . . . . OFF**
R Pull and turn the 3 mode selectors to OFF.
R The message screen displays REALN DESN 5 SEC (realign decision) for 5 seconds, then
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R the circuit breakers until the final countdown is completed.

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Status messages appear, when the DISPLAY DATA switch is set to STS. If there is more than one condition calling for a message, the display scrolls to the next message every 2 seconds.

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STS IR FAULT	Hard failure. Select ATT (if corresponding message is displayed) or refer to MMEL or remove ADIRU for maintenance.
STS-DELAY MAINT	Failure not affecting IR functioning. Service ADIRU when convenient.
STS-ENTER PPOS	Enter present position or check entered position is correct. Note : The confirmation of an erroneous longitude at the present position entry will create a wrong position of the aircraft symbol on the NDs.
STS-SELECT ATT	Hard IRU failure, select ATT mode.
STS-EXCESS MOTION	Excess motion detected during alignment. ADIRU will automatically restart alignment. Ensure aircraft is not moving.
STS-SWITCH ADR	ADR invalid.
STS-CHECK CK/BK	Check circuit breakers *
STS-CDU FAULT	Remove CDU for maintenance.
STS-ENT MAG HDG	Enter magnetic heading.

* If a corresponding FAULT light comes on, check BAT 1 load.

TCAS

For System Description, refer to 1. 34.
For Operational Procedures, refer to 3.02

CONFLICT RESOLUTION PRINCIPLES

– **Traffic Advisory (TA)**
If an intruder represents a potential collision threat, a visual and aural Traffic Advisory will be given. This advisory helps the crew to visually situate the intruder. It also prepares the crew for a possible Resolution Advisory. However, not every RA is preceded by a TA.

– **Resolution Advisory (RA)**
If the intruder is considered to be a real collision threat, an aural and visual Resolution Advisory is given.
TCAS determines the optimum vertical maneuver that ensures effective separation, with a minimum change in vertical speed.
Depending on each situation, TCAS generates a :
· Preventive Advisory (i.e. the actual vertical speed may be maintained). It displays the vertical speed range to be avoided.
· Corrective Advisory i.e. the actual vertical speed is within the range to be avoided and a recommended vertical speed (fly to) range is displayed.
· Modified Corrective Advisory, which changes already displayed RA (i.e if the intruder changes their vertical speed).

R **OPERATIONAL RECOMMENDATIONS**

● **Avoidance generalities :**

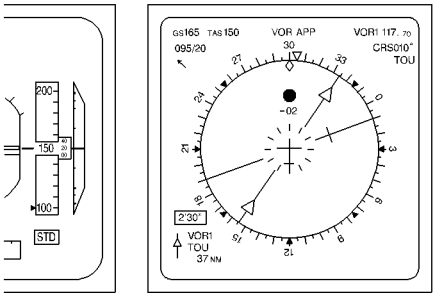
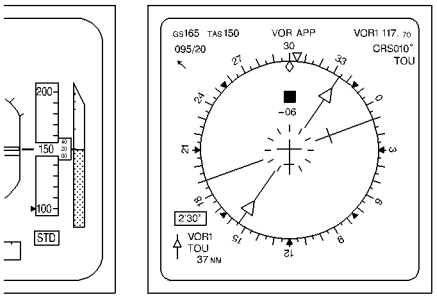
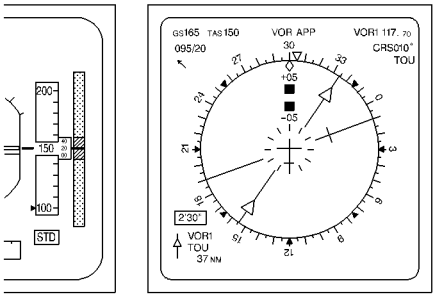
R Always follow the RAs orders, even if they lead to cross the altitude of the intruders,
R as they ensure the best global separation.

CAUTION

R If a pilot does not follow a RA, he should be aware that the intruder may be TCAS
R equipped and may be maneuvering toward his aircraft in response to a
R coordinated RA. This could compromize safe seperation.

Pilots should comply with the vertical speed limitations during the last 2000 feet of climb or descent. In particular, pilots should limit vertical speeds to 1500 feet/min during the last 2000 feet of a climb or descent, especially when they are aware of traffic that is converging in altitude and intending to level off 1000 feet above or below the pilot's assigned altitude.

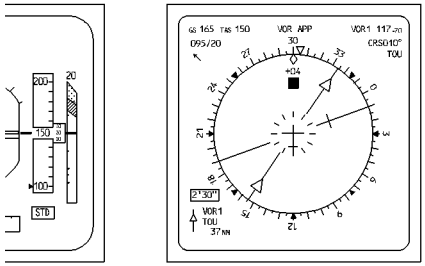
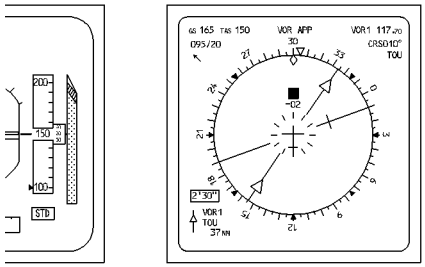
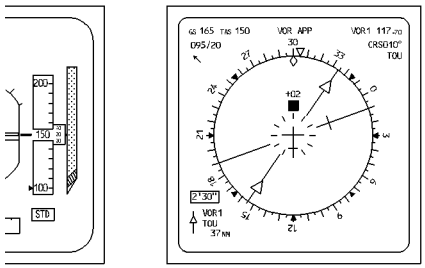
- **Select TA only mode in the following cases :**
  - Engine failure
  - Dispatch with landing gear down (if applicable)
  - In case of known nearby traffic which is in visual contact.
  - At particular airports and during particular procedures identified by an operator as having a significant potential for unwanted a inappropriate RAs (closely spaced parallel runways, converging runways, low terrain along the final approach...)

SCENARIO	AURAL WARNING and TYPICAL DISPLAY PFD | ND	CREW RESPONSE
TRAFFIC ADVISORY - one intruder is ahead at 12:00 o'clock beyond 6 NM, 200 ft below your altitude	"TRAFFIC, TRAFFIC" 	- Do not maneuver on the traffic advisory symbol. - Attempt to visually acquire the intruder. - Be prepared to maneuver if the TA changes to an RA
RESOLUTION ADVISORY (PREVENTIVE) - One intruder is ahead at 12:00 o'clock, 600 ft below your altitude	"MONITOR VERTICAL SPEED" 	- Do not descend
RESOLUTION ADVISORY (CORRECTIVE) - Two intruders are ahead at 12:00 o'clock . one, at 500 ft above your altitude . the other, at 500 ft below your altitude	MAINTAIN VERTICAL SPEED MAINTAIN 	- Remain in level flight - Do not climb or descend

V/S scale color legend: : green : red

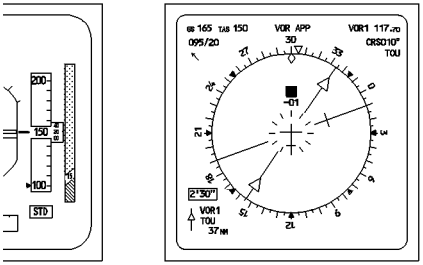
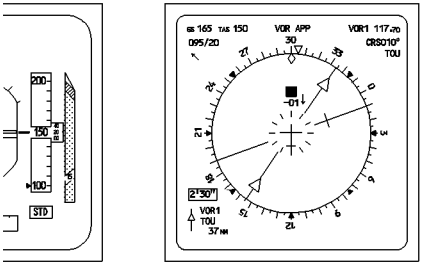
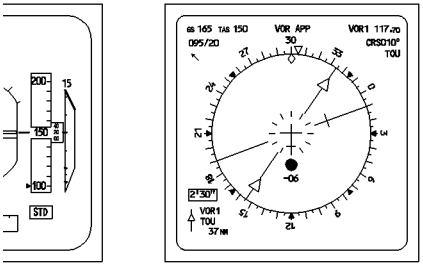
NFC5-03-0434-013-A105AA

R

SCENARIO	AURAL WARNING and TYPICAL DISPLAY PFD / ND	CREW RESPONSE
RESOLUTION ADVISORY (CORRECTIVE) - The intruder is ahead at 12:00 o'clock, 400 ft above your altitude - You are already climbing at 2000 ft/mn	"ADJUST VERTICAL SPEED ADJUST" 	- Adjust vertical speed so as to be in the green area of the PFD's speed scale by reducing climb vertical speed as appropriate
- The intruder is ahead at 12:00 o'clock, 200 ft below your altitude	"CLIMB, CLIMB" 	- Promptly (within 5 seconds) smoothly establish a climb rate of 1 500 ft/mn
- The intruder is ahead at 12:00 o'clock, 200 ft above your altitude	"DESCEND, DESCEND" 	- Promptly (within 5 seconds) and smoothly establish a descent rate of 1 500 ft/mn

V/S scale color legend: : green : red

NF65-03-0434-014-A105AA

SCENARIO	AURAL WARNING and TYPICAL DISPLAY PFD | ND	CREW RESPONSE
RESOLUTION ADVISORY (ADDITIONAL CORRECTIVE) - The intruder ahead has stopped its climb - It is now 100 ft below your altitude	"INCREASE DESCEND INCREASE DESCEND" 	- Immediately (within 2.5 seconds) and smoothly increase your descent rate to 2 500 ft/mn
- The intruder has changed from level flight to a rapid descent after TCAS issued a DESCEND RA - TCAS is now changing that to a CLIMB RA	"CLIMB, CLIMB, NOW CLIMB, CLIMB, NOW" 	- Initiate a change from a descent to a climb maneuver, within 2.5 seconds.
RA CLEARED - The intruder has passed behind and is now 600 ft below your altitude - It is no longer a threat	"CLEAR OF CONFLICT" 	- Return promptly to the previous ATC clearance.

V/S scale color legend: : green : red

NFC5-03-0434-015-A120AA

APPROACH ON PAPI

Eye to wheel height on approach is 25 feet and minimum recommended wheel clearance over the threshold is 20 feet. Do not follow Precision Approach Path Indicator (PAPI) guidance below 200 feet when PAPI Minimum Eye Height over Threshold (MEHT) is less than 45 feet.

QNH USE FOR TO/APPR/LDG ON QFE/QNH PIN-PROGRAMMED AIRCRAFT

The QNH option is the basic reference on the aircraft.
For Operators using QFE reference, switching from "QNH only" to QNH/QFE can be done by activating a specific pin program on the three following computers : FMGC, GPWC, FCU.
For various reasons, some Operators may use QNH reference for approach and landing on QNH/QFE pin programmed aircraft. The flight crew should be aware of the following consequences and should use the following procedures.

CONSEQUENCES

When the pin program is the QNH/QFE option, the 2R field of the MCDU PERF APPR page is named "MDH" independently of the baro setting reference selected by the flight crew.

PROCEDURES

No specific procedures are necessary for takeoff, climb, cruise, descent and go around phases.

Procedure for precision approaches (CAT 2 and CAT 3) :

· Insert the DH into the DH field of the PERF APPR page as usual.

Procedure for ILS approach (CAT 1) :

· Insert the DA into the MDH field of the PERF APPR page.

Procedure for Non-Precision Approaches (NPA) :

· Insert the MDA value into the MDH field of the PERF APPR page.

Note : If the MDA is greater than 5 000 feet, the value is not accepted and the message OUT OF RANGE is displayed on the MCDU. In such a case, the MDH field remains blank and the PNF should announce the callouts.

R · Do not use FINAL APP mode.
R · For NPAs other than LOC and LOC B/C :
R Use TRK/FPA or NAV/FPA modes, until visual references are met.
R · For LOC (or LOC B/C) approaches :
R Use LOC/FPA (or LOC B/C / FPA) modes, until visual references are met.
· At the correct altitude the color on the PFD altitude scale changes from green to amber.

QFE USE FOR TO/APPR/LDG ON AIRCRAFT WITH QNH ONLY PIN PROGRAMMING

The crew should not use QFE on aircraft with a "QNH only" pin programming (incorrect profile computation of the managed vertical modes CLB, DES and FINAL APPR, possible false GPWS warnings in mountainous areas).

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ENHANCED GROUND PROXIMITY WARNING SYSTEM (EGPWS)

The Flight Management System (FMS) provides aircraft position inputs to the EGPWS for enhanced function processing purpose.

The TERR pushbutton located on the overhead panel enables the activation or de-activation of the enhanced functions of the EGPWS.

During all flight phases, when the check of the navigation accuracy performed by the pilots (as described in volumes 3.03 and 4.05) is positive, the enhanced functions should be switched ON.

During climb, descent, approach, and go around phases, when GPS PRIMARY is not available (or not installed) and the FMS navigation accuracy check prevents the crew from using the NAV mode in a phase of flight, the TERR pushbutton must be switched OFF. When the TERR pushbutton is switched OFF, the ECAM message "NAV GPWS TERR DET FAULT" is displayed only the basic GPWS modes 1 to 5 remain operative.

If the TERR ON ND is not selected, and a terrain alert is generated, the terrain is automatically displayed on the ND.

The brightness of the terrain indication on the ND is controlled via the weather radar brightness control knob. If the weather radar brightness was set to low (due to bad weather) and a terrain alert occurs, then the terrain display brightness will also be low. Thus when a terrain alert occurs, the ND weather/terrain image brightness may need to be adjusted.

ENHANCED GROUND PROXIMITY WARNING SYSTEM (EGPWS)

The Flight Management System (FMS) provides aircraft position inputs to the EGPWS for enhanced function processing purpose.
The TERR pushbutton located on the overhead panel enables the activation or de-activation of the enhanced functions of the EGPWS.
If the TERR ON ND is not selected, and a terrain alert is generated, the terrain is automatically displayed on the ND.
The brightness of the terrain indication on the ND is controlled via the weather radar brightness control knob. If the weather radar brightness was set to low (due to bad weather) and a terrain alert occurs, then the terrain display brightness will also be low. Thus when a terrain alert occurs, the ND weather/terrain image brightness may need to be adjusted.

ATSU INITIALIZATION

ATSU is automatically initialized provided a list of Service Providers has been scanned and provided the 2 following parameters have been received and validated by the ATSU :

– Aircraft Registration Number (ARN)
– Airline Identity code (A/L ID).

If one of these 3 above conditions is not fulfilled then the ATSU is not available :

– the ECAM displays ACARS STBY
and
– the MCDU scratchpad displays a message to request a crew action.

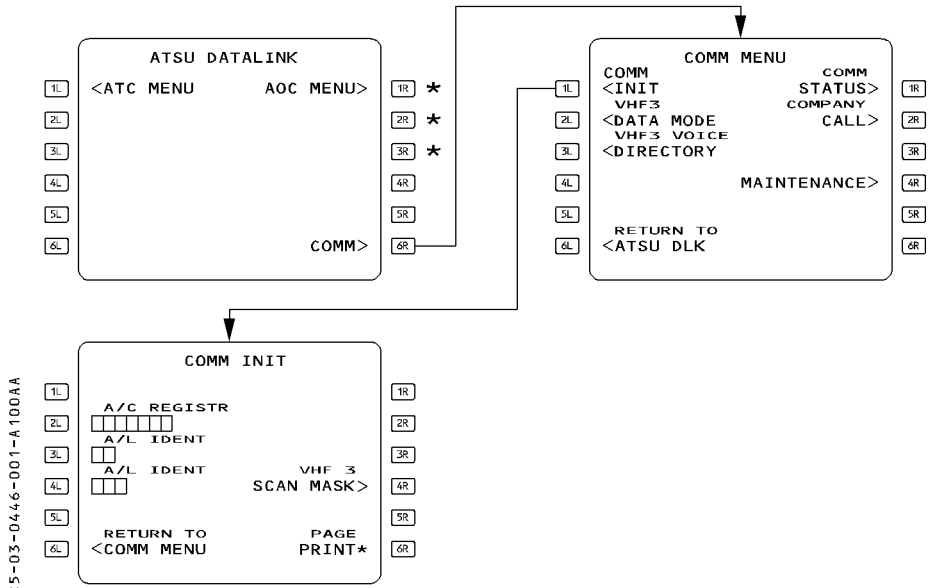
A manual entry of the missing parameter reinitializes the ATSU and clears the ECAM and MCDU message.

If ARN is not valid

The MCDU scratchpad displays "ENTER A/C REGISTER" message.
After having cleared the scratchpad the crew writes the ARN on the scratchpad. Pressing the 2L key on the COMM INIT page enters the ARN in the 2L field.

If A/L ID is not valid

The MCDU scratchpad displays "ENTER A/L IDENT" message.
After having cleared the scratchpad the crew writes the two-character A/L ID code on the scratchpad. Pressing the 3L key enters the A/L ID code on the 3L field. The crew should repeat the same operation for the three character A/L ID code using the 4L key instead of 3L key.



* THESE FIELDS ARE CUSTOMIZED ACCORDING TO THE AOC PROGRAMMING

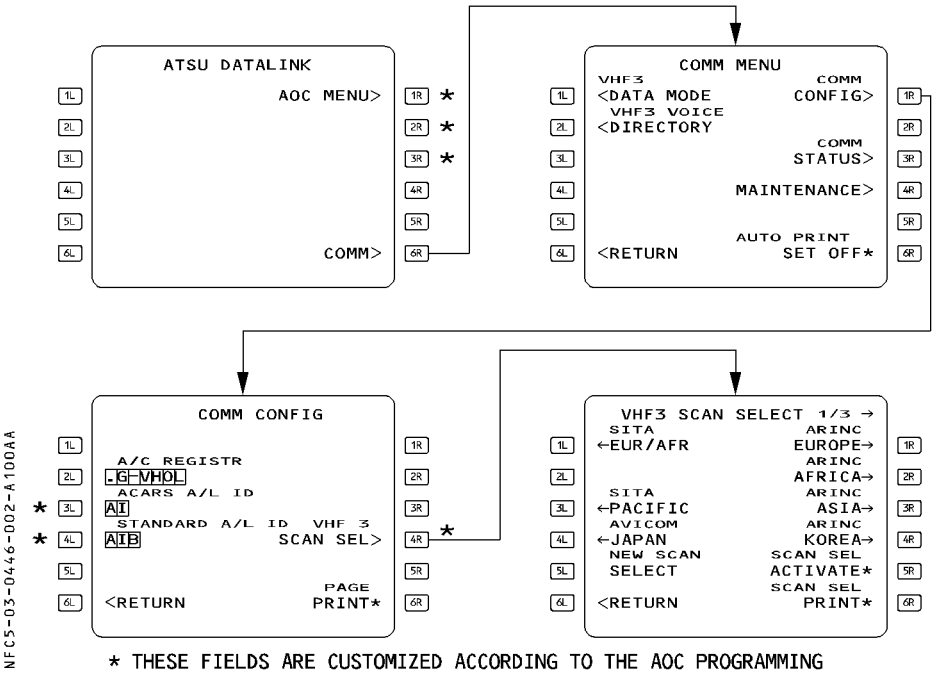
If no VHF Service Providers has been selected :

The MCDU scratchpad displays "ENTER VHF3 SCAN MASK" message.

On the VHF3 SCAN MASK page the crew selects a service providers list in the airline priority order and activates the VHF SCAN MASK function.

Example : selection of the service providers SITA 725 and ARINC.

1. Press 5L key : the star adjacent to ERASE indication goes out of view then comes into view
2. Press 1L key to select SITA 725 : SELECT indication goes out and the priority number of selection # 1 comes into view
3. Press 1R key to select ARINC : SELECT indication goes out and the priority number of selection # 2 comes into view
4. Press 5R key to activate the VHF SCAN MASK function : the star adjacent to the SCAN MASK LOAD indication goes out of view then comes into view.



* THESE FIELDS ARE CUSTOMIZED ACCORDING TO THE AOC PROGRAMMING

R R R *Note : Modification of the SCAN MASK setting may result in the loss of air-ground VHF datalink communication. Therefore, the SCAN MASK setting should not be modified by the crew, unless they have been instructed to do so.*

ATSU INITIALIZATION

ATSU is automatically initialized, provided a list of Service Providers has been scanned and following three parameters have been received and validated by the ATSU :

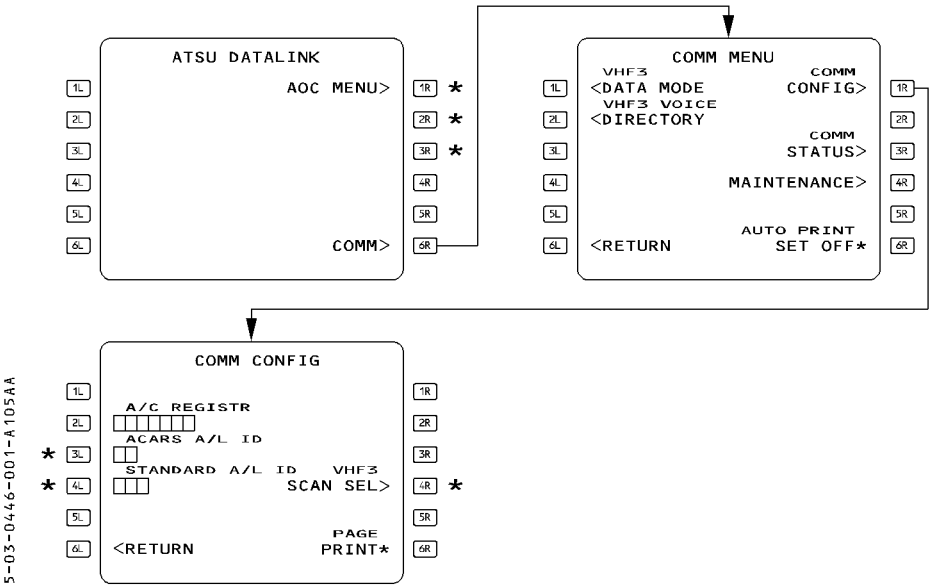
- Aircraft Registration Number (ARN)
- ACARS Airline Identity code (ACARS A/L ID)
- Standard Airline Identity code (STANDARD A/L ID)

If one of the above four conditions is not fulfilled, then ATSU is unavailable and :

- The ECAM displays ACARS STBY, and
- The MCDU scratchpad displays a message requesting flight crew action.

A manual entry of the missing parameter reinitializes the ATSU, and clears the ECAM and MCDU message.

R



* THESE FIELDS ARE CUSTOMIZED ACCORDING TO THE AOC PROGRAMMING

R **If ARN is not valid :**

R The MCDU scratchpad displays the "ENTER A/C REGISTER" message. After clearing the R scratchpad, the crew writes the ARN on the scratchpad. Pressing the 2L key on the COMM R CONFIG page enters the ARN in the 2L field. The flight crew has to press the 1R key to R activate it.

R **If the A/L ID is not valid :**

R The MCDU scratchpad displays the "ENTER A/L IDENT" message. After clearing the R scratchpad, enter the two-letter A/L ID code on the scratchpad. Press the 3L key to enter R the A/L ID code in the 3L field. Repeat the same operation for the three-letter A/L ID code, R by using the 4L key instead of the 3L key. The flight crew has to press the 1R key to R activate it.

If the VHF3 SCAN SELECT menu can be accessed, and if no VHF Service Providers have been selected :

The MCDU scratchpad displays the "ENTER VHF3 SCAN SELECT" message.

On the VHF3 SCAN SELECT page, select a Service Providers' list, in the airline priority order, and activate the VHF SCAN SELECT function.

Example : To select Service Providers SITA 725 and ARINC :

1. Press the 5L key : The star next to the ERASE indication disappears, then reappears.
2. Press the 1L key to select SITA 725 : The SELECT indication goes off, and the priority number of selection # 1 appears.
3. Press the 1R key to select ARINC : The SELECT indication goes off, and the priority number of selection # 2 appears.
4. Press the 5R key to activate the VHF SCAN SELECT function : The star next to the SCAN R SELECT LOAD indication disappears, then reappears.

ATSU INITIALIZATION

ATSU is automatically initialized, provided a list of Service Providers has been scanned and the following three parameters have been received and validated by the ATSU :

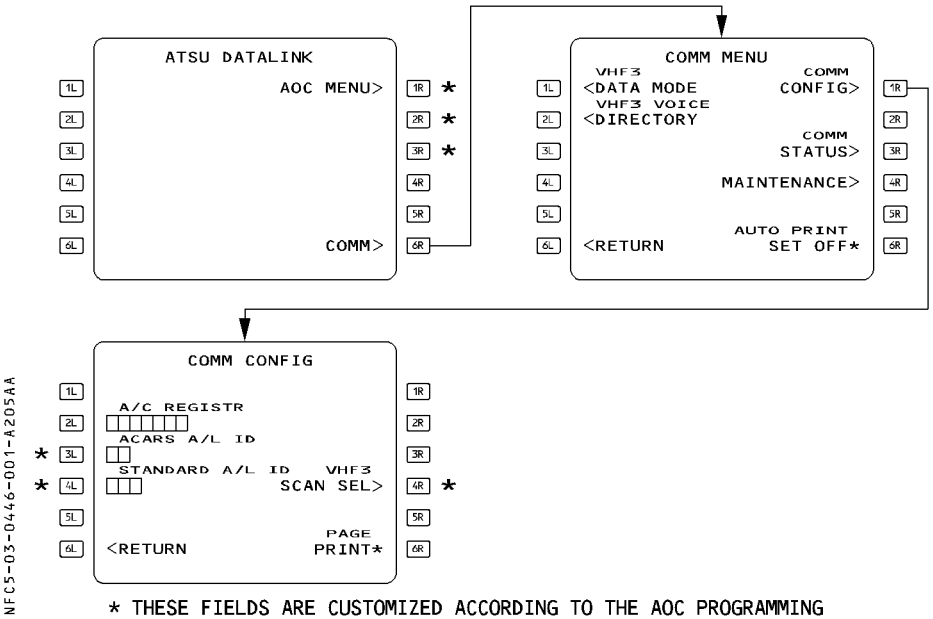
- Aircraft Registration Number (ARN)
- ACARS Airline Identity code (ACARS A/L ID)
- Standard Airline Identity code (STANDARD A/L ID)

If one of the above four conditions is not fulfilled, then ATSU is unavailable and :

- The ECAM displays "ATSU FAULT", and
- The MCDU scratchpad displays a message requesting flight crew action.

A manual entry of the missing parameter reinitializes the ATSU, and clears the ECAM and MCDU message.

R



* THESE FIELDS ARE CUSTOMIZED ACCORDING TO THE AOC PROGRAMMING

R **If ARN is not valid :**

R The MCDU scratchpad displays the "ENTER A/C REGISTER" message. After clearing the R scratchpad, the crew writes the ARN on the scratchpad. Pressing the 2L key on the COMM R CONFIG page enters the ARN in the 2L field. The flight crew has to press the 1R key to R activate it.

R **If the A/L ID is not valid :**

R The MCDU scratchpad displays the "ENTER A/L IDENT" message. After clearing the R scratchpad, enter the two-letter A/L ID code on the scratchpad. Press the 3L key to enter R the A/L ID code in the 3L field. Repeat the same operation for the three-letter A/L ID code, R by using the 4L key instead of the 3L key. The flight crew has to press the 1R key to R activate it.

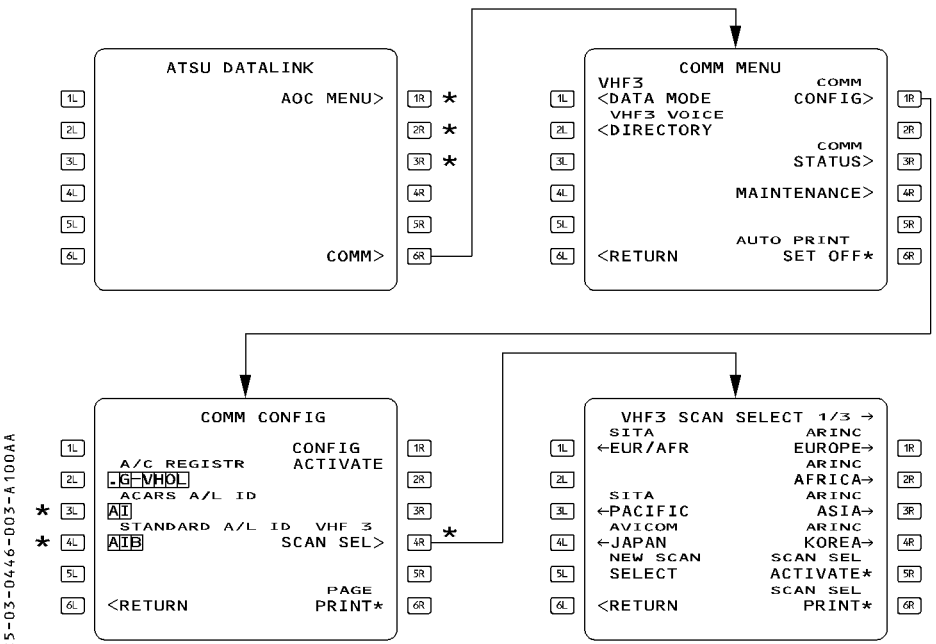
If the VHF3 SCAN SELECT menu can be accessed, and if no VHF Service Providers have been selected :

The MCDU scratchpad displays the "ENTER VHF3 SCAN SELECT" message.

On the VHF3 SCAN SELECT page, select a Service Providers' list, in the airline priority order, and activate the VHF SCAN SELECT function.

Example : To select Service Providers SITA 725 and ARINC :

1. Press the 5L key : The star next to the ERASE indication disappears, then reappears.
2. Press the 1L key to select SITA 725 : The SELECT indication goes off, and the priority number of selection # 1 appears.
3. Press the 1R key to select ARINC : The SELECT indication goes off, and the priority number of selection # 2 appears.
4. Press the 5R key to activate the VHF SCAN SELECT function : The star next to the SCAN R SELECT LOAD indication disappears, then reappears.



* THESE FIELDS ARE CUSTOMIZED ACCORDING TO THE AOC PROGRAMMING/ATSU CONFIGURATION

Note : Modification of the SCAN SELECT setting may result in the loss of air-ground VHF datalink communication. Therefore, the SCAN SELECT setting should not be modified by the flight crew, unless they have been instructed to do so.

THRUST CONTROL

GENERAL

The flight crew uses console-mounted levers to control engine thrust. Each lever sends electrical signals to the FADEC of the engine it controls. The FADEC responds to the thrust lever position or an autothrust command by setting the engine thrust.
The thrust lever quadrant is the equivalent of a thrust rating panel. For each lever it has five detents. Moving the thrust lever to the forward stop of the quadrant always gives maximum takeoff or go-around thrust, as appropriate, and signals the AP/FD to go to takeoff or go-around, as appropriate. The FMA (Flight Mode Annunciator) in the left window of each PFD displays the status of the thrust system to the pilot.
The engine instrument display gives a read-out of the engine thrust mode (CL, MCT, etc.) and the appropriate engine limit. It displays the actual limit set, thrust lever position, FADEC command, and maximum engine rating limit continually.

MANUAL THRUST CONTROL

With A/THR disconnected, thrust control between full reverse (on the ground only) and maximum takeoff or go-around thrust is entirely conventional.
TLA (Thrust Lever Angle) determines the thrust demanded.
The rating limit selected by the pilot and the actual engine limit appear on the engine instrument display.
With the thrust lever short of the CL position on the quadrant, the engine instrument display shows CL continually. If one or both thrust levers are above CL, it shows MCT/FLEX. If one or both thrust levers are beyond the MCT detent, it shows TOGA. With the thrust levers positioned in a detent, the detent setting controls the engines to that limiting parameter.

AUTOTHRUST

When active A/THR controls either speed, thrust or retard as appropriate. The engine limit corresponds to the thrust lever position. If the thrust lever is below the CL detent then the TLA determines the engine power limit.
With the thrust lever above the CL detent, autothrust reverts to arm (A/THR blue on FMA) except if alpha-floor is active. CLB (or LVR CLB) flashes on the FMA.
If the thrust levers are not aligned, an asymmetric message (ASYM or LVR ASYM) appears on the FMA. If so, each engine is limited to its appropriate TLA.
This allows the use of autothrust to continue if one engine has to have its maximum RPM limited for some operational reasons such as excessive vibration.

Autothrust disconnection

Autothrust disconnection occurs when :

- The A/THR fails, or
- The FCU's A/THR pushbutton is pressed, or
- The thrust lever(s)' instinctive disconnect button is pressed, or
- Both thrust levers are set to IDLE.

R
- When the radio altitude is below 100 ft and :

R
- · Both thrust levers above CL detent or

R
- · One thrust lever above MCT detent.

1. Disconnection, due to a failure or to the use of the FCU A/THR pushbutton.
   If the thrust levers are in the CL detent (both engines operating), or one thrust lever in the MCT (one engine operative), the thrust is locked at its actual value. The FMA displays "THR LK". A single chime sounds, and an amber ECAM caution appears, as long as thrust is locked. (For more details, refer to FCOM 1.22.30).
   Movement of the thrust lever(s) unlocks the thrust, and the engine then responds to TLA at the normal rate.
2. Disconnection, due to the use of instinctive disconnect button.
   When a pilot presses the instinctive disconnect button, the engines immediately develop thrust corresponding to the position of their thrust levers, whatever that might be.

Instinctive Disconnection procedure

To avoid any confusion for those pilots flying the A318/A319/A320/A321 with different modifications (with, and without, energy management), Airbus recommends that pilots use one procedure for disconnecting with the instinctive disconnect button.

- Set the thrust levers to the current thrust setting by adjusting the levers until the N1 (or EPR) TLA white circle is adjacent to the actual N1 (or EPR).
- Use the instinctive button to disconnect the A/THR.
- Check that "AUTO FLT A/THR" OFF is displayed on the, and that there is no annunciator in the first column of the FMA.
- Set the thrust manually.

Use of autothrust in approach

The pilot should use autothrust for approaches. On final approach, it usually gives more accurate speed control, although in turbulent conditions the actual airspeed may vary from the target speed, by as much as five knots. Although the changeover between auto and manual thrust is easy to make with a little practice, the pilot should, when using autothrust for the final approach, keep it engaged until he retards the thrust levers to idle for touchdown. If the pilot is going to make the landing using manual thrust, he should disconnect the A/THR by the time he has reached 1000 feet on the final approach.
If he makes a shallow flare, with A/THR engaged, it will increase thrust to maintain the approach speed until he pulls the thrust levers back to idle. Therefore he should avoid making a shallow flare, or should retard the thrust levers as soon as it is no longer necessary to carry thrust, and if necessary before he receives the "retard" reminder.

When using autothrust, the pilot can always change thrust by moving the thrust levers above the CL detent. The thrust then increases to what corresponds to the thrust lever position. However, autothrust stays armed, and immediately takes effect when the thrust levers are returned to the CL detent. Therefore, the pilot should normally put the thrust levers back to CL, as soon as the aircraft has made the change for which he increased thrust. This feature gives the pilot a means of advancing phase on the autothrust in very difficult environmental conditions. But, it should only be needed in exceptional circumstances.

Note : When below 100 feet, moving thrust levers above the CL detent, will result in A/THR disconnection.

Although use of the autothrust is recommended for the entire approach, this does not absolve the pilot from his responsibility to monitor its performance, and to disconnect it if it fails to maintain speed at the selected value. Such monitoring should include checking on whether or not the managed speed, calculated by the FMGC, is reasonable.
For more information concerning aircraft handling during final approach, refer to the FCOM
R Bulletin "Aircraft handling in final approach".

Engine failure

The pilot can continue to use autothrust after an engine failure, but some pilots feel that directional control is more difficult, when autothrust changes the thrust instead of the pilot making the thrust changes manually. The choice between using, or not using, autothrust after engine failure is a personal one. As far as speed control is concerned, autothrust is usually more accurate than a pilot.

MANUAL ENGINE START

Pilots normally use automatic starting to start an engine.
However, manual starting is recommended in the following cases :

- **After aborting a start, because of :**
  - Engine stall
  - Engine EGT overlimit
  - Low start air pressure

- **When expecting a start abort, because of :**
  - Degraded bleed performance, due to hot conditions, or at a high-altitude airfields.
  - An engine with a reduced EGT margin, in hot conditions, or at a high-altitude airfields.
  - Marginal performance of the external pneumatic power group.

MANUAL ENGINE START PROCEDURE

– **THR LEVERS** . . . . . **IDLE**

CAUTION

The engine will start, regardless of the thrust lever position, and will rapidly accelerate to generate the thrust demanded by the TLA, causing a hazardous situation, if the thrust levers are not at idle.

– **ENG MODE selector** . . . . . **NORM THEN IGN**

The lower ECAM displays the engine page.

– **ENG MAN START** . . . . . **ON**

· Do not set the MAN START pushbutton to ON, before all amber crosses have disappeared on engine parameters (upper ECAM display).
· On the ECAM lower display, check that the START VALVE is inline
· On the ECAM displays, check that the OIL PRESS increases, and N2 increases.

R ● **When N2 reaches the maximum motoring speed :**

The maximum motoring speed is defined as the speed at which N2 acceleration is less than 1 % in approximately 5 seconds.

● **If N2 does not get up to 15 %, check that the pack valve autoclosure is functioning. If the autoclosure is functioning, shed APU loads as follows.**

– **GALLEY** . . . . . **OFF**

If needed, shed also :

– **BLUE ELEC PUMP (ground only)** . . . . . **OFF**

– **FUEL X FEED** . . . . . **ON**

– **FUEL PUMPS except R TK PUMP 2** . . . . . **OFF**

– **BLOWER** . . . . . **OVRD**

– **CAB FANS** . . . . . **OFF**

R ● **When N2 gets above 15 % :**

– **MASTER switch** . . . . . **ON**

The PNF starts the timing for monitoring the light-up delay.

When using autothrust on an approach (or during any other phase of flight), the pilot can always change thrust by moving the thrust levers above the CL detent. The thrust then increases to what corresponds to the thrust lever position. However, autothrust stays armed, and immediately takes effect when the thrust levers are returned to the CL detent. Therefore, the pilot should normally put the thrust levers back to CL, as soon as the aircraft has made the change for which he increased thrust. This feature gives the pilot a means of advancing phase on the autothrust in very difficult environmental conditions. But, it should only be needed in exceptional circumstances.

Note : When below 100 feet, moving thrust levers above the CL detent, will result in A/THR disconnection.

Although use of the autothrust is recommended for the entire approach, this does not absolve the pilot from his responsibility to monitor its performance, and to disconnect it if it fails to maintain speed at the selected value. Such monitoring should include checking on whether or not the managed speed calculated by the FMGC, is reasonable. For more information concerning aircraft handling during final approach, refer to FCOM Bulletin
R "Aircraft handling in final approach".

Engine failure

The pilot can continue to use autothrust after an engine failure, but some pilots feel that directional control is more difficult, when autothrust changes the thrust instead of the pilot making the thrust changes manually. The choice between using, or not using, autothrust after engine failure is a personal one. As far as speed control is concerned, autothrust is usually more accurate than a pilot.

MANUAL ENGINE START

Pilots normally use automatic starting to start an engine.
However, manual starting is recommended in the following cases :

- **After aborting a start, because of :**
  - Engine stall, or Engine EGT overlimit, or LO START AIR PRESS, or No N1 rotation, or Hung start.

- **When expecting a start abort, because of :**
  - Degraded bleed performance, due to hot conditions, or at a high-altitude airfields.
  - An engine with a reduced EGT margin, in hot conditions, or at a high-altitude airfields.
  - Marginal performance of the external pneumatic power group.
  - Tailwind greater than 10 knots.
    Starting in tailwind may fail due to N1 counterrotation, hot gas black flow. Fuel should be set to ON at N2 max motoring speed, provided N1 has stopped, and turn clockwise. (confirmation by the ground crew).

MANUAL ENGINE START PROCEDURE

– **THR LEVERS** . . . . . **IDLE**

CAUTION

The engine will start, regardless of the thrust lever position, and will rapidly accelerate to generate the thrust demanded by the TLA, causing a hazardous situation, if the thrust levers are not at idle.

– **ENG MODE selector** . . . . . **NORM THEN IGN**

The lower ECAM displays the engine page.

– **ENG MAN START** . . . . . **ON**

· Do not set the MAN START pushbutton to ON, before all amber crosses, except on N1 and N2, have disappeared on engine parameters (upper ECAM display).
· The N1 and N2 indications show amber crosses, until the actual N1 and N2 reach, respectively, about 3.5 % and 6 %.
· On the ECAM lower display, check that the START VALVE is inline
· On the ECAM displays, check that the OIL PRESS increases, and N2 increases.

● **When N2 reaches the maximum motoring speed (minimum 15 %) :**

The maximum motoring speed is defined as the speed at which a significant decrease in N2 acceleration is observed.

● **If N2 does not get up to 15 %, check that the pack valve autoclosure is functioning. If the autoclosure is functioning, shed APU loads as follows.**

– **GALLEY** . . . . . **OFF**

If needed, shed also :

– **BLUE ELEC PUMP (ground only)** . . . . . **OFF**

– **FUEL X FEED** . . . . . **ON**

– **FUEL PUMPS except R TK PUMP 2** . . . . . **OFF**

– **BLOWER** . . . . . **OVRD**

– **CAB FANS** . . . . . **OFF**

If additional shedding is required, engine pump may be switched OFF (it should be ON for second engine start for PTU auto test).

● **30 seconds after selection of the MAN START pushbutton :**

– **MASTER switch** . . . . . **ON**

R The PNF starts the timing for monitoring the light up delay.

– **ECAM displays** . . . . . **CHECK**
Check : Indication of igniters A and B.
Fuel flow increase.
EGT and N1 increase 20 seconds (maximum) after the fuel is on.
In case the electrical power supply is interrupted during the start sequence (indicated by loss of ECAM CRTs), abort the start by switching OFF the MASTER switch. Then perform a 30–second dry crank.

● **Between 52.6 % and 56.5 % N2 :**

– **ECAM displays** . . . . . **CHECK**
Check : START VALVE crossline.
Igniter indication off.

– **MAIN AND SECONDARY ENG. IDLE PARAMETERS** . . . . . **CHECK NORMAL**
Grey background on N2 indication disappears.

– **MAN START** . . . . . **OFF**

– **ENG MODE SELECTOR** . . . . . **NORM**

– **ECAM displays** . . . . . **CHECK**

Check : – Indication of igniters A and B
– Fuel flow increase (with current EEC std, FF indication spiking occurs at fuel on)
– EGT increases 20 seconds (max) after fuel is on
– N1 increases before 34 % N2.

If the electrical power supply is interrupted during the start sequence (indicated by loss of ECAM CRT's), abort the start by setting the MASTER switch to OFF. Then perform a 30 seconds dry crank.

● **When N2 reaches 43 %**

– **ECAM displays** . . . . . **CHECK**

R Check : – Igniter indication off (at 43 % N2)
R – START VALVE crossline (N2 slightly above 43 %)
– Main and secondary engine idle parameters normal.

Gray background on N2 indication disappears.

– **MAN START** . . . . . **OFF**

– **ENG MODE selector** . . . . . **NORM**

ENGINE START WITH EXTERNAL PNEUMATIC POWER

- **Before connecting external pneumatic power :**

  – **PACKS 1 and 2 . . . . . OFF**
  (To prevent pack contamination).

- **Before start :**

  – **APU BLEED . . . . . OFF**

  – **ENG BLEED (both engines) . . . . . OFF**

  – **X BLEED . . . . . OPEN**

- **Cleared to start :**

  – **Start Engine 2 first.**

  Note : As necessary, Engine 1 can also be started by using external pneumatic power. If Engine 1 is started first, check the brake accu pressure prior to engine start.

  – **Use the normal engine start procedure.**
  The minimum recommended starter air supply pressure is 25 psi, when the start valve is open.
  Two external pneumatic power units may be used in parallel, if the pressure/flow relation is expected to be marginal.

- **After Engine 2 is started :**

R ■ **If external pneumatic power is used to start Engine 1 :**

R – **Start Engine 1**

R – **Request the removal of external pneumatic power unit.**

R – **ENG BLEED (Both engines) . . . . . ON**

R – **PACKS 1 and 2 . . . . . ON**

INTENTIONALLY LEFT BLANK

R ■ **If the crossbleed engine start procedure is used for Engine 1 :**

– **Request the removal of external pneumatic power unit**

R – **PACKS 1 and 2 . . . . . ON**

– **CROSSBLEED ENGINE START PROC for Engine 1 . . . . . APPLY**

CROSSBLEED ENGINE START

CAUTION

The use of engine bleed supply and external pneumatic power supply simultaneously is prohibited.

- **Before start :**

– **APU BLEED . . . . . OFF**
The BLEED valve of the running engine reopens and the cross bleed valve closes.

– **ENG BLEED (running engine) . . . . . check ON**

– **ENG BLEED (receiving engine) . . . . . OFF**
The bleed valve of engine to be started is closed to eliminate reverse flow leakage.

– **X BLEED . . . . . OPEN**

- **Cleared to start :**

– **Confirm area is clear of obstacles.**
Ensure increased power jet wake does not constitute any hazard to people or installation behind the aircraft.
Adjust thrust of supplying engine to obtain 30 psi at start air valve before start initiation and at least 25 psi during start.
Do not exceed 75 % N2 to limit jet wake.
Apply the normal engine start procedure.

- **After start :**

– **THRUST LEVER (supplying engine) . . . . . IDLE**

– **X BLEED . . . . . AUTO**

– **ENG BLEED (receiving engine) . . . . . ON**

– **PACKS . . . . . Check ON**

START VALVE MANUAL OPERATION

Advise ground crew to prepare for manual start valve operation.

– **AUDIO CONTROL PANEL . . . . . CAB**

● **When ground crew member is ready, order "START 1 or 2"**

– **ENG MODE SEL . . . . . IGN**

– **ENG MASTER . . . . . ON**

– **START VALVE . . . . . "ORDER OPEN AND KEEP OPEN"**
If not maintained in OPEN position by the ground crew member, the start valve closes.

● **When N2 at 43 %**

– **START VALVE . . . . . "ORDER CLOSE"**
Continue with normal procedure.

ENGINE START USING AIR SUPPLIED BY ANOTHER A320

R This procedure allows the engine to be started by using air supplied by another A320 aircraft.
A special tool is required to override the non-return valve, fitted on the HP ground connector of the supplying aircraft.
The aircraft should be positioned so that the HP bleed hose does not run through engine hazard areas.

A/C supplying HP Bleed	A/C receiving
– ENG 2 . . . . . START *ENG 2 must be started before connecting HP bleed hose.*	
– APU BLEED . . . . . OFF	– APU BLEED . . . . . OFF
– ENG 1 & 2 BLEED . . . . . OFF	– ENG 1 & 2 BLEED . . . . . OFF
– HP BLEED HOSE . . . . . CONNECT	– HP BLEED HOSE . . . . . CONNECT
CAUTION : Hose must not run through engine hazard areas.	
Note : A special tool is needed to override the non–return, valve fitted on the HP ground connector.	
• WHEN CLEARED TO START	
– PACKS 1 & 2 . . . . . OFF	
– X BLEED . . . . . OPEN	– X BLEED . . . . . OPEN
– ENG 2 BLEED . . . . . ON	
Note : ENG 2 thrust lever may be advanced up to CL notch, if required, to provide at least 20 psi start air pressure on the receiving engine.	
	– ENG 2 . . . . . START *START air pressure must be at least 20 psi. ENG 2 is started first as HP ground connector is close to ENG 1.*
• AFTER ENG start	
– ENG 2 THR LEVER . . . . . IDLE	
– ENG 2 MASTER . . . . . OFF	
– HP BLEED HOSE . . . . . REMOVE	– HP BLEED HOSE . . . . . REMOVE
– SPECIAL TOOL . . . . . REMOVE	
– X BLEED . . . . . AUTO	
	– ENG 2 BLEED . . . . . ON
	– X BLEED ENG START PROCEDURE . . APPLY

INTENTIONALLY LEFT BLANK

ENGINE START USING AIR SUPPLIED BY ANOTHER A320

R This procedure allows the engine to be started by using air supplied by another A320 aircraft.
A special tool is required to override the non-return valve, fitted on the HP ground connector of the supplying aircraft.
The aircraft should be positioned so that the HP bleed hose does not run through engine hazard areas.

A/C supplying HP Bleed	A/C receiving
– ENG 2 . . . . . START *ENG 2 must be started before connecting HP bleed hose.*	
– APU BLEED . . . . . OFF	– APU BLEED . . . . . OFF
– ENG 1 & 2 BLEED . . . . . OFF	– ENG 1 & 2 BLEED . . . . . OFF
– HP BLEED HOSE . . . . . CONNECT	– HP BLEED HOSE . . . . . CONNECT
CAUTION : Hose must not run through engine hazard areas.	
Note : A special tool is needed to override the non–return, valve fitted on the HP ground connector.	
• WHEN CLEARED TO START	
– PACKS 1 & 2 . . . . . OFF	
– X BLEED . . . . . OPEN	– X BLEED . . . . . OPEN
– ENG 2 BLEED . . . . . ON	
Note : ENG 2 thrust lever may be advanced up to CL notch, if required, to provide at least 20 psi start air pressure on the receiving engine.	
	– ENG 2 . . . . . START *START air pressure must be at least 20 psi. ENG 2 is started first as HP ground connector is close to ENG 1.*
• AFTER ENG start	
– ENG 2 THR LEVER . . . . . IDLE	
– ENG 2 MASTER . . . . . OFF	
– HP BLEED HOSE . . . . . REMOVE	– HP BLEED HOSE . . . . . REMOVE
– SPECIAL TOOL . . . . . REMOVE	
– X BLEED . . . . . AUTO	
	– ENG 2 BLEED . . . . . ON
	– X BLEED ENG START PROCEDURE . . APPLY

DETECTION OF HANDLING BLEED VALVE MALFUNCTION

· Should any evidence supporting the probability of malfunction of one or more handling bleed valve(s) be observed by the flight crew, a log book entry should be performed and a maintenance determination (and corrective action, as required) be conducted upon return to the main base or at the next out station capable of conducting such a maintenance determination/action.

Handling bleed valve(s) malfunction may be evidenced on ground or in flight by :

– Starting difficulties :
  · Hung start,
  · Sub-idle stall/roll back,
  · Start EGT exceedance.
– Takeoff EGT being unexpectedly high (considering typical engine-to-engine variation and typical engine EGT margin),
– Fuel flow shift in the order + 3 % in typical cruise conditions and/or + 6 % in typical climb/alternate/diversion conditions (cross-wing comparison).
– Climb/Cruise EGT shift in the order of + 20° C to + 50° C, depending on flight phase (cross-wing comparison).

R *Note : EGT increase due to engine deterioration is associated with N2 decrease. EGT*
R *increase due to handling bleed malfunction is associated with N2 increase.*

– Engine stall (surge) upon engine transient (acceleration or deceleration), in this particular case a maintenance action is due prior to the next flight.

· In case of starting difficulties (hung start or start stall) being experienced during ground or air start, proceed with a second or third start attempt in manual start.

Proceeding with successive start attempts has proven to be effective in achieving a successful ground or air start.

· In case of detected Fuel Flow shift, and should one or more flight leg(s) be flown under this condition, consider adding extra fuel accordingly.

PUSHBACK WITH POWER PUSH UNIT VIA THE MAIN LANDING GEAR

GENERAL

At several airports, the pushback is performed using a Power Push Unit (PPU), which pushes the aircraft via the main landing gear, while the flight crew provides steering via the green hydraulic system. Steering guidance will be given by ground personnel via interphone communication.
This section provides the flight crew with Airbus operational recommendations in performing such a pushback, and replaces the "BEFORE PUSHBACK or START" standard operating procedure.

PREPARATION

– **LOADSHEET . . . . . CHECK**
The Captain should thoroughly check the load and trim sheet, particularly for gross errors, and ensure that the loadsheet data is correct : Correct flight, correct aircraft, dry operating index, configuration, fuel onboard, etc.
Compare ZFW/ZFCG with the previously-entered data and adjust, if necessary.

– **TAKEOFF DATA . . . . . PREPARE and CHECK/REVISE**
Once the loadsheet is checked :
  – The PNF checks or recomputes the takeoff speeds and flexible temperature, using the RTOW charts.
  – The PF independently calculates the takeoff speeds and flexible temperature, as a crosscheck.
  Particular care should be taken to determine the takeoff configuration (refer to 2.02.20).
  Confirm any takeoff weight limitation.

R – The PF checks (or revises) the takeoff data on the MCDU's INIT B and PERF pages.

– **SEATS, SEAT BELTS, HARNESSES, RUDDER PEDALS, ARMRESTS . . . . ADJUST**
The seat is correctly adjusted when the pilot's eyes are in line with the red and white balls.

– **MCDU . . . . . IN TAKEOFF CONFIGURATION**
It is recommended that the crew display F-PLN on the PNF side, and PERF TAKEOFF on the PF Side.

– **EXT PWR . . . . . CHECK OFF**
Request that external power be removed.

– **BEFORE START CHECKLIST down to the line . . . . . COMPLETE**

– **TOWING LEVER . . . . . NORMAL POSITION**
To be confirmed by ground personnel, and no NW STRG DISC indication on the ECAM.

– **PUSHBACK/START UP CLEARANCE . . . . . OBTAIN**
Obtain ATC pushback/start up clearance.
Obtain clearance from ground personnel. Due to the face-to-face position of the flight crew and ground personnel, it is necessary that the flight crew ensure they have clearly and correctly understood the ground personnel's directional phraseology.

– **WINDOWS and DOORS . . . . . CHECK CLOSED**
  – Check that the cockpit windows are closed and locked (red circle on handle fully visible). Check, on the ECAM's lower display, that all doors are closed.
  – When required by local Airworthines Authorities, check that the cockpit door is closed and locked (no cockpit door open/fault indication). If entry is requested, identify the person requesting entry before unlocking the door. With the cockpit door selector on NORM, the cockpit door is closed and locked. If entry is requested from the cabin, and if no further action is performed by the pilot, the cabin crew will be able to unlock the door by using the emergency access procedure. Except for crew entry/exit, the cockpit door should remain closed until engine shutdown.

– **BEACON . . . . . ON**

– **THR LEVERS . . . . . IDLE**

CAUTION

Engine will start, regardless of the thrust lever position; thrust will rapidly increase to the corresponding thrust lever position, causing a hazardous situation, if thrust levers are not in idle.

– **ENG 2 . . . . . START**
Engine 2 is usually started first, to pressurize the yellow hydraulic system to maintain parking brake pressure. Engine 1 must be started after the pushback is completed, to ensure that the Power Push Unit is able to push the aircraft.

CAUTION

If, during engine start with the parking brake ON, the aircraft starts to move due to a parking brake failure, immediately release the PARKING BRK handle to restore braking by pedals.

– **PTU . . . . . CHECK AUTO**
The green hydraulic system must be pressurized, via the PTU, to ensure that nosewheel steering is available.

PUSHBACK WITH POWER PUSH UNIT VIA THE MAIN LANDING GEAR

GENERAL

At several airports, the pushback is performed using a Power Push Unit (PPU), which pushes the aircraft via the main landing gear, while the flight crew provides steering via the yellow hydraulic system. Steering guidance will be given by ground personnel via interphone communication.
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– **TAKEOFF DATA . . . . . PREPARE and CHECK/REVISE**
Once the loadsheet is checked :
  – The PNF checks or recomputes the takeoff speeds and flexible temperature, using the RTOW charts.
  – The PF independently calculates the takeoff speeds and flexible temperature, as a crosscheck.
    Particular care should be taken to determine the takeoff configuration (refer to 2.02.20).
    Confirm any takeoff weight limitation.
  – The PF checks (or revises) the takeoff data on the MCDU's INIT B and PERF pages.

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The seat is correctly adjusted when the pilot's eyes are in line with the red and white balls.

– **MCDU . . . . . IN TAKEOFF CONFIGURATION**
It is recommended that the crew display F-PLN on the PNF side, and PERF TAKEOFF on the PF Side.

– **EXT PWR . . . . . CHECK OFF**
Request that external power be removed.

– **BEFORE START CHECKLIST down to the line . . . . . COMPLETE**

– **TOWING LEVER . . . . . NORMAL POSITION**
To be confirmed by ground personnel, and no NW STRG DISC indication on the ECAM.

– **PUSHBACK/START UP CLEARANCE . . . . . OBTAIN**
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Obtain clearance from ground personnel. Due to the face-to-face position of the flight crew and ground personnel, it is necessary that the flight crew ensure they have clearly and correctly understood the ground personnel's directional phraseology.

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  – When required by local Airworthines Authorities, check that the cockpit door is closed and locked (no cockpit door open/fault indication).
    If entry is requested, identify the person requesting entry before unlocking the door. With the cockpit door selector on NORM, the cockpit door is closed and locked. If entry is requested from the cabin, and if no further action is performed by the pilot, the cabin crew will be able to unlock the door by using the emergency access procedure. Except for crew entry/exit, the cockpit door should remain closed until engine shutdown.

– **BEACON . . . . . ON**

– **THR LEVERS . . . . . IDLE**

CAUTION
Engine will start regardless of the thrust lever position; thrust will rapidly increase to the corresponding thrust lever position, causing a hazardous situation, if thrust levers are not in idle.

– **ENG 2 . . . . . START**
Engine 2 is usually started first, to pressurize the yellow hydraulic system to power the nosewheel steering and maintain parking brake pressure. Engine 1 must be started after the pushback is completed, to ensure that the Power Push Unit is able to push the aircraft.

CAUTION
If, during engine start with the parking brake ON, the aircraft starts to move due to a parking brake failure, immediately release the PARKING BRK handle to restore braking by pedals.

PUSHBACK

– **PARKING BRK** . . . . . **OFF**
Advise the ground personnel that the parking brake is OFF and that pushback can be started.

CAUTION
Do not use brakes during pushback unless required, due to an emergency.

R In case of an emergency, advise the ground personnel that the PPU should be removed
R and moved out of the evacuation area.

– **NW STRG** . . . . . **AS RQRD**
Steer the aircraft following guidance from the ground personnel.

– **PARKING BRK** . . . . . **ON**
After pushback is completed, set the PARKING BRK to ON and inform the ground personnel that the power-push unit can be removed.

– **ENG 1** . . . . . **START**

GENERAL

Except in some operational conditions, such as uphill slopes, slippery taxiways, or high gross weight, it may be advisable to taxi on one engine. The flight crew must exercise caution when taxiing on one engine to avoid generating excessive jet blast.

DEPARTURE

The flight crew should use the following procedures for taxiing out, if company policy and regulations permit.

– **BRAKE ACCU PRESS . . . . . CHECK**
If necessary, use the Y ELEC PUMP to pressurize the brake accumulator.

– **ENGINE 1 . . . . . START**
· After a shutdown period of more than two hours, to avoid thermal shock, the flight crew should operate the engine at or near idle for at least five minutes before advancing the thrust lever to high power. Taxi time may be included in the warm-up period.
· Use Engine 1 for taxiing because it pressurizes the green hydraulic system (nosewheel steering + normal braking), without using the PTU.

– **X BLEED . . . . . OPEN**
This supplies both packs from Engine 1.

– **Apply the normal "AFTER START" procedures, but :**
– Keep the APU running to avoid additional electrical transients and to allow the galley operation.
APU BLEED should be switched off to avoid ingestion of engine exhaust gases in the air conditioning system.
R – After both engines have been started, perform the ECAM STATUS check, and then
R select and set the engine anti-icing and/or wing anti-icing as required.

• **Before releasing the parking brake :**

– **Y ELEC PUMP . . . . . ON**
This pressurizes the yellow hydraulic system.

– **Apply the normal "TAXI" procedures, but :**
· Perform the Flight Controls checks after both engines have been started.
· Do not arm the Auto Brake system before the Flight Controls checks have been completed.

- **Before ENG 2 start :**

  – **Y ELEC PUMP . . . . . OFF**
  Correct operation of the PTU will be checked during Engine 2 start.

  – **APU BLEED . . . . . ON**

- **No less than 5 minutes before takeoff (no minimum time required, if the engine has been shutdown for 2 hours or less) :**

  – **ENGINE 2 . . . . . START**

  Note : During engine start, a slight jerk forward may occur, if brakes are applied while the aircraft is moving.

  – **APU . . . . . AS RQRD**

  – **X BLEED . . . . . AUTO**

  – **Continue with the "AFTER START" procedures :**
R After both engines have been started, perform the ECAM STATUS check, and then
R select and set the engine anti-icing and/or wing anti-icing as required.

  – **Proceed with the "AFTER START" checklist.**

  – **FLIGHT CONTROLS . . . . . CHECK**

  – **AUTO BRK . . . . . MAX**

GENERAL

Except in some operational conditions, such as uphill slopes, slippery taxiways, or high gross weight, it may be advisable to taxi on one engine. The flight crew must exercise caution when taxiing on one engine to avoid generating excessive jet blast.

DEPARTURE

The flight crew should use the following procedures for taxiing out, if company policy and regulations permit.

– **BRAKE ACCU PRESS . . . . . CHECK**
If necessary, use the Y ELEC PUMP to pressurize the brake accumulator.

– **ENGINE 1 . . . . . START**
· After a shutdown period of more than two hours, to avoid thermal shock, the flight crew should operate the engine at or near idle for at least five minutes before advancing the thrust lever to high power. Taxi time may be included in the warm-up period.
· Use Engine 1 for taxiing because it pressurizes the green hydraulic system (normal braking).

– **X BLEED . . . . . OPEN**
This supplies both packs from Engine 1.

– **Apply the normal "AFTER START" procedures, but :**
– Keep the APU running to avoid additional electrical transients and to allow the galley operation.
APU BLEED should be switched off to avoid ingestion of engine exhaust gases in the air conditioning system.
R – After both engines have been started, perform the ECAM STATUS check, and then
R select and set the engine anti-icing and/or wing anti-icing as required.

• **Before releasing the parking brake :**

– **Y ELEC PUMP . . . . . ON**
This pressurizes the yellow hydraulic system (nosewheel steering) without using the PTU.

– **Apply the normal "TAXI" procedures, but :**
· Perform the Flight Controls checks after both engines have been started.
· Do not arm the Auto Brake system before the Flight Controls checks have been completed.

- **Before ENG 2 start :**

  – **Y ELEC PUMP . . . . . OFF**
  Correct operation of the PTU will be checked during Engine 2 start.

  – **APU BLEED . . . . . ON**

- **No less than 5 minutes before takeoff (no minimum time required, if the engine has been shutdown for 2 hours or less) :**

  – **ENGINE 2 . . . . . START**

  Note : During engine start, a slight jerk forward may occur, if brakes are applied while the aircraft is moving.

  – **APU . . . . . AS RQRD**

  – **X BLEED . . . . . AUTO**

  – **Continue with the "AFTER START" procedures :**
R After both engines have been started, perform the ECAM STATUS check, and then
R select and set the engine anti-icing and/or wing anti-icing as required.

  – **Proceed with the "AFTER START" checklist.**

  – **FLIGHT CONTROLS . . . . . CHECK**

  – **AUTO BRK . . . . . MAX**

ARRIVAL

The flight crew may use the following procedure to taxi in :

– **APU . . . . . START**
Start the APU before shutting down the engine, in order to avoid additional electrical transient.

- **No less than 3 minutes after high thrust operations, and when taxiing in a straight line :**

R – **ENG 2 . . . . . SHUT DOWN**

R – **Y ELEC PUMP . . . . . ON**
R This avoids running the PTU.

- **At parking :**

– **Y ELEC PUMP . . . . . OFF**

– **ENG 1 . . . . . SHUT DOWN**

SEVERE TURBULENCE

GENERAL

Whenever possible, avoid areas with known or forecasted severe turbulence. If turbulence is unavoidable, aim to keep the speed in the region of the target speed given in this section, so as to provide the best protection against the effect of gust on the structural limits, whilst maintaining an adequate margin above VLS.
Consider requesting a lower flight level to increase margin to buffet onset.
Sufficient buffet margin exists at optimum altitude.

R Severe turbulence is defined as turbulence that causes large, abrupt changes in altitude
R and/or attitude. It usually causes large variations in airspeed. Occupants are forced
R violently against their seat belts and loose objects will move around the aircraft.
R If severe turbulence occurs during a flight, the flight crew must make a logbook entry in
R order to initiate maintenance action.

R *Note : Recommendations for severe turbulence are also applicable to extreme turbulence.*

SIGNS

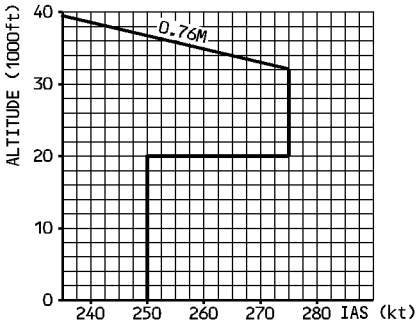
Before entering an area of known turbulence, the flight crew and the cabin crew must secure all loose equipment and switch the cabin SIGNS to ON.

AUTOPILOT/AUTOTHRUST

- **Keep the autopilot ON.**
- **When thrust changes become excessive : Disconnect Autothrust.**
- **For approach : Use A/THR for managed speed.**

THRUST AND AIRSPEED

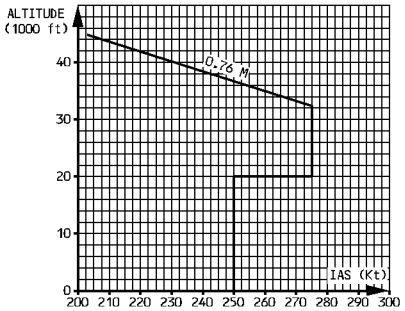
Set the thrust to give the recommended speed (see table on next page). This thrust setting attempts to obtain, in stabilized conditions, the speed for turbulence penetration given in the graph below.
Only change thrust in case of an extreme variation in airspeed, and do not chase your Mach or airspeed.
A transient increase is preferable to a loss of speed, that decreases buffet margins and is difficult to recover.



NFCS-03-0491-001AA100AA

THRUST AND AIRSPEED

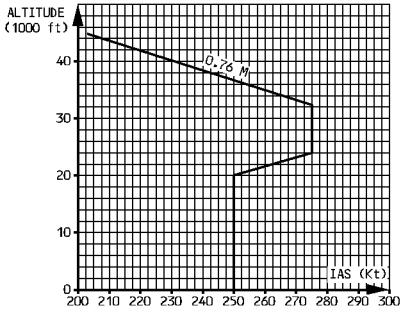
Set the thrust to give the recommended speed (see table on next page). This thrust setting attempts to obtain, in stabilized conditions, the speed for turbulence penetration given in the graph below.
Only change thrust in case of an extreme variation in airspeed, and do not chase your Mach or airspeed.
A transient increase is preferable to a loss of speed, that decreases buffet margins and is difficult to recover.



NFC5-03-0491-001AA110AA

THRUST AND AIRSPEED

Set the thrust to give the recommended speed (see table on next page). This thrust setting attempts to obtain, in stabilized conditions, the speed for turbulence penetration given in the graph below.
Only change thrust in case of an extreme variation in airspeed, and do not chase your Mach or airspeed.
A transient increase is preferable to a loss of speed, that decreases buffet margins and is difficult to recover.



NFC5-03-0491-001AA300AA

THRUST SETTING (N1) FOR RECOMMENDED SPEED

R

SEVERE TURBULENCE

SPEED AND THRUST SETTING FOR RECOMMENDED TURBULENCE SPEED

FL	SPD or Mach	GROSS WEIGHT (1000 kg)									
		40	44	48	52	56	60	64	68	72	76
		N1 %									
410	0.76	75.7	76.8	78.0	79.6	–	–	–	–	–	–
390	0.76	74.7	75.6	76.5	77.6	79.0	–	–	–	–	–
370	0.76	74.0	74.6	75.4	76.2	77.1	78.3	79.6	–	–	–
350	0.76	73.9	74.2	74.8	75.5	76.2	77.1	78.0	79.2	80.4	–
330	0.76	74.2	74.4	74.7	75.2	75.9	76.6	77.3	78.1	79.1	80.2
310	275	73.8	74.0	74.3	74.6	75.1	75.7	76.3	77.0	77.8	78.7
290	275	72.6	72.8	73.1	73.4	73.9	74.4	75.0	75.7	76.4	77.2
270	275	71.3	71.5	71.8	72.2	72.6	73.2	73.8	74.5	75.1	75.9
250	275	70.1	70.3	70.6	70.9	71.3	71.9	72.5	73.1	73.8	74.6
200	275	66.4	66.6	66.9	67.3	67.7	68.2	68.9	69.7	70.3	70.9
150	250	60.3	60.6	60.9	61.4	62.0	62.7	63.4	64.3	65.2	66.2
100	250	56.9	57.2	57.6	58.0	58.6	59.2	59.9	60.7	61.6	62.6
50	250	54.0	54.3	54.7	55.2	55.8	56.4	57.1	57.9	58.7	59.6

ALTITUDE

If the crew flies the aircraft manually :
– Expect large variations in altitude, but do not chase altitude.
– Maintain attitude and allow altitude to vary.

SPEEDBRAKES

Whenever speedbrakes are applied, keep a hand on the speedbrake handle, except while performing some other specific cockpit function (changing power, resetting altimeter, etc.).

LANDING

Configuration FULL, or 3, can be used.
However, Configuration 3 provides more energy and less drag.

THRUST SETTING (N1) FOR RECOMMENDED SPEED

SEVERE TURBULENCE

SPEED AND THRUST SETTING FOR RECOMMENDED TURBULENCE SPEED

FL	SPD or Mach	GROSS WEIGHT (1000 kg)								
		44	48	52	56	60	64	68	72	76
		N1 %								
390	0.76	75.7	76.6	77.7	79.0	–	–	–	–	–
370	0.76	74.7	75.5	76.3	77.2	78.4	79.7	–	–	–
350	0.76	74.3	74.8	75.6	76.3	77.1	78.1	79.3	80.5	–
330	0.76	74.5	74.8	75.3	76.0	76.6	77.4	78.2	79.2	80.2
310	275	74.1	74.3	74.7	75.2	75.8	76.4	77.1	77.9	78.8
290	275	72.9	73.2	73.5	73.9	74.5	75.1	75.8	76.5	77.3
270	275	71.7	71.9	72.3	72.7	73.3	73.9	74.5	75.2	76.0
250	275	70.4	70.7	71.0	71.4	71.9	72.6	73.2	73.9	74.7
200	275	66.8	67.1	67.4	67.9	68.4	69.0	69.8	70.4	71.1
150	250	59.9	60.4	61.0	61.7	62.5	63.5	64.5	65.5	66.5
100	250	56.3	56.7	57.2	57.8	58.5	59.3	60.3	61.4	62.5
50	250	52.7	53.4	53.8	54.4	54.9	55.7	56.5	57.4	58.4

ALTITUDE

If the crew flies the aircraft manually :
– Expect large variations in altitude, but do not chase altitude.
– Maintain attitude and allow altitude to vary.

SPEEDBRAKES

Whenever speedbrakes are applied, keep a hand on the speedbrake handle, except while performing some other specific cockpit function (changing power, resetting altimeter, etc.).

LANDING

Configuration FULL, or 3, can be used.
However, Configuration 3 provides more energy and less drag.

OPERATIONS IN WINDSHEAR OR DOWNBURST CONDITIONS

PRECAUTIONS FOR SUSPECTED WINDSHEAR

- **Before TAKEOFF**

  - **Delay takeoff until conditions improve.**

  - **Evaluate takeoff conditions :**
    · Using observations and experience.
    · Checking weather conditions.

  - **Select the most favorable runway (considering location of the likely windshear).**

  - **Use the weather radar or the predictive windshear system (◁) before commencing takeoff to ensure that the flight path clears any potential problem areas.**

  - **Select TOGA thrust.**

  - **Monitor closely airspeed and airspeed trend during the takeoff run for early signs of windshear.**

- **During APPROACH**

  - **Delay landing or divert to another airport until conditions are more favorable.**

  - **Evaluate condition for a safe landing by :**
    · Using observations and experience.
    · Checking weather conditions.

  - **Use the weather radar.**

  - **Select the most favorable runway, considering also which has the most appropriate approach aid.**

  - **Select FLAPS 3.**

  - **Use managed speed in the approach phase.**

  - **Check both FDs engaged in ILS, FPA or V/S.**

– **Engage the autopilot, for a more accurate approach and earlier recognition of deviation from the beam, when ILS is available.**

Note : – When it is using the GS mini-function, associated with managed speed, the system will carry extra speed in strong wind conditions.

R *– If gusty wind is expected, increase the Vapp that is displayed on the*
R *MCDU to a maximum of VLS + 15 knots.*

RECOVERY TECHNIQUE AT TAKEOFF

- **Before V1 :**

The takeoff should only be rejected if unacceptable airspeed variations occur below the indicated V1, and the pilot decides that there is sufficient runway remaining to stop the aircraft.

- **After V1 :**

– **Set thrust levers to TOGA**

– **Rotate normally.**

– **Follow SRS orders.**

- **During initial climb :**

– **Set or maintain TOGA.**

– **If the autopilot is engaged, use it ; but, be aware that automatic disengagement may occur, if $\alpha > \alpha$ prot.**

– **Follow SRS orders (including use of full backstick, if demanded).**

Note : If SRS is not available, use pitch attitude up to 17.5°, with full backstick, if necessary.

– **Do not change configuration (gear, flaps), until out of shear.**

– **Closely monitor the flight path and speed.**

– **Recover smoothly to a normal climb, when out of shear.**

RECOVERY TECHNIQUE AT LANDING

– **Set thrust levers to TOGA.**

– **If the autopilot is engaged, use it ; but, be aware that automatic disengagement may occur, if $\alpha > \alpha$ prot.**

– **Follow SRS orders.**

R *Note : If FD bars are unavailable, use an initial pitch attitude up to 17.5 degrees with*
R *full backstick, if necessary. If needed, to minimize the loss of height, increase this*
R *pitch attitude.*

– **Do not change configuration.**

– **Closely monitor the flight path and speed.**

– **Recover smoothly to a normal climb, when out of shear.**

COLD WEATHER

For flight operations in icing conditions, see the Ice and Rain Protection Chapter (3.04.30).
For ground operations on contaminated runways, see the FCOM Volume 2 (2.04.10).
The preparation and ground operation of the aircraft, after it has been sitting idle in very low temperatures, may present particular problems. In such cases, the flight crew should use the following procedures, which complement the normal operating procedures.
Ice accumulates on the aircraft when the air temperature approaches, or falls below, freezing (0°C) and there is precipitation or condensation. Ice may also build up when the aircraft is exposed to any form of moisture, after the surfaces have been cold-soaked during previous cruise flight at high altitudes, after the aircraft has been refueled with cold fuel, or after it has been exposed to low overnight air temperatures.

EXTERIOR INSPECTION

– **PRELIMINARY COCKPIT PREPARATION (normal procedures) . . . . COMPLETED**
APU is started and air conditioning is on.

– **PROBE/WINDOW HEAT . . . . . ON**

– **SURFACES . . . . . CHECKED FREE OF FROST, ICE AND SNOW**
All surfaces of the aircraft (critical surfaces : leading edges and upper surfaces of wings, vertical and horizontal stabilizers, all control surfaces, slats and flaps) must be clear of snow, frost and ice for takeoff.
Thin hoarfrost is acceptable on the upper surface of the fuselage.

Note : Thin hoarfrost is typically a white crystalline deposit which usually develops uniformly on exposed surfaces on cold and cloudless nights ; it is so thin that a person can distinguish surface features (lines or markings) beneath it.

On the underside of the wing tank area, a maximum layer of 3 mm (1/8 inch) of frost will not penalize takeoff performance.

– **FOLLOWING EQUIPMENT . . . . . CHECKED FREE OF FROST, ICE AND SNOW**
  – Landing gear assemblies (lever locks) and tires, landing gear doors.
  – Engine inlets, inlet lips, fans (check for rotation), spinners, fan exhaust ducts, reverser assemblies.
  – Drains, bleeds, probes (pitots, static ports, TAT sensors, angle of attack sensors).
  – Fuel tank ventilation.
  – Radome.
  – Verify that the commercial water supplies are not frozen and have been refilled (these should have been emptied prior to the cold soak).

R ● **After first engine start**

R – **PROBE/WINDOW HEAT . . . . . AUTO**
R Heating will continue to operate but under automatic control.

DEICING/ANTI-ICING PROCEDURE ON GROUND

R In all situations, it is the Captain's responsibility to decide if the ground crew must
R deice/anti-ice the aircraft, and/or if additional deicing/anti-icing treatment is required.
R Before starting the deicing/anti-icing procedure, the flight crew must establish
R communication with the ground crew that will be applying the procedure.

CAUTION

R – Make sure that the low or high-pressure ground connectors do not supply any
R external air to the aircraft.
R – If it is necessary for the ground grew to repeatedly anti-ice the aircraft, they must
R deice the surfaces with a hot fluid mixture before applying a new layer of anti-icing
R fluid.

R Make sure that the ground crew uses the correct de-icing/anti-icing fluids, in accordance
R with the applicable operator requirements and Aircraft Maintenance Manual (AMM)
R instructions.
R The aircraft can be deiced or anti-iced when the APU and engines are either stopped or
R running. However, do not start the engines when the ground crew is spraying fluid on the
R aircraft.

CAUTION

R – The ground crew should take care when spraying deicing fluid, and make sure that
R the engine and APU do not ingest any fluid.
R – Do not move flaps, slats, ailerons, spoilers, or elevators, if they are not free of ice.
R – Always ensure that both the left and right sides of the aircraft receive the same,
R complete, and symmetrical deicing/anti-icing treatment.

BEFORE SPRAYING FLUID :

– **CAB PRESS MODE SEL . . . . . CHECK AUTO**

– **ENG BLEED 1 + 2 . . . . . OFF**

– **APU BLEED . . . . . OFF**

– **DITCHING pushbutton . . . . . ON**
Outflow valve, pack valves, and avionic ventilation inlet and extract valves close.

This prevents de-icing fluid from entering the aircraft. Avionic ventilation is in a closed circuit with both fans running. In view of the low OAT, there is no time limit for this configuration.

Note : If the "VENT AVNCS SYS FAULT" warning appears, reset the AEVC circuit breaker at the end of the aircraft de-icing procedure.
AIR COND/AVNCS VENT/CTL D06 on 49VU.
AIR COND/AVNCS/VENT/MONG Y17 on 122 VU.

– **THRUST LEVERS . . . . . CHECK IDLE**

– **"AIRCRAFT PREPARED FOR SPRAYING" . . . . . INFORM GROUND CREW**

UPON COMPLETION OF THE SPRAYING OPERATION :

– **DITCHING pushbutton . . . . . OFF**

R – **OUTFLOW VALVE . . . . . CHECK OPEN**
R On the ECAM PRESS page, confirm that the outflow valve indication reaches the open
R green position to avoid any unexpected aircraft pressurization.

– **ENG BLEED 1 + 2 . . . . . ON**

• **At least 60 seconds after APU start, or on completion of spraying operation :**

– **APU BLEED . . . . . ON**

– **PITOTS and STATICS (ground crew) . . . . . CHECK**

– **GROUND EQUIPMENT . . . . . REMOVE**

– **DE-ICING/ANTI-ICING REPORT . . . . . RECEIVED**
The information from ground personnel, who performed the de-icing and post-application check, must include (ANTI-ICING CODE) :
· Type of fluid used
· The mix ratio of fluid to water (for example 75/25)
· When the holdover time began.

– **NORMAL PROCEDURE . . . . . RESUME**
Apply appropriate normal procedures. Pay special attention to the flight control check. In freezing precipitation, perform the appropriate checks to evaluate aircraft icing. Base the decision on whether to takeoff, or to re-protect the aircraft, on the amount of ice that has built up on the critical surfaces since the last de-icing, as revealed by a personal inspection from the inside and outside of the aircraft. Make this inspection before the holdover time expires, or just before takeoff.

Note : If the fuselage has been sprayed, there is a risk of de-icing fluid ingestion by the APU air intake, resulting in specific odors, or SMOKE warnings. Thus, consider APU BLEED OFF during takeoff.

R **SECURING THE AIRCRAFT FOR COLD SOAK**

R ● **After switching off all bleeds, and before switching off AC power :**

R – **DITCHING pushbutton . . . . . ON**
R This closes the outflow valve, the pack valves, and the avionic ventilation inlet and
R extract valves.

R – **PARKING BRAKE . . . . . OFF**
R Check chocks in place, and release the parking brake to prevent brakes from freezing.

R ● **After switching off the batteries :**

R – **DITCHING pushbutton . . . . . OFF**

R – **PROTECTIVE COVERS . . . . . INSTALL**
R Install protective covers and plugs to protect the aircraft and engines from snow and
R ice.

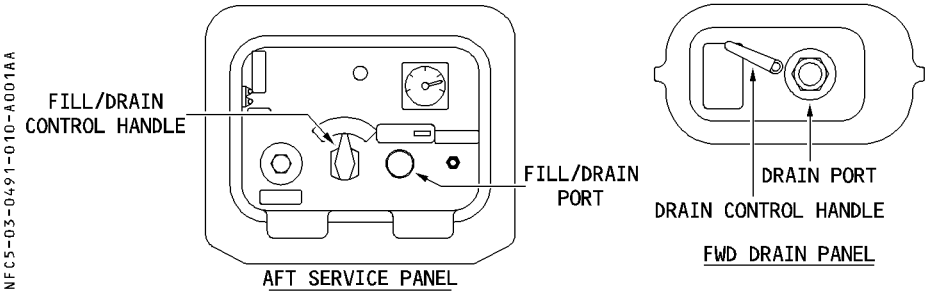
WATER SYSTEM DRAINING

Drain the water system, if the OAT requires it, as shown below :

Configuration			Exposure time	Water tank drain
Air Conditioning	Cabin temperature	Outside Air Temperature		
ON	Above 10° C (50° F)	Between 0° C and – 15° C (32° and 5° F)	None	Not required
		Below – 15° C (5° F)	1 h 15 min	Required
OFF		Between 0° C and – 7° C (32° and 19.4° F)	1 h 30 min	
		Between – 7° C and – 15° C (19.4° and 5° F)	0 h 30 min	
		Below – 15° C (5° F)	Any	

R **FOR DRAINING WATER PROCEDURE**

R This procedure uses electrical power.
R



R – **ACCESS PLATFORM(S) . . . . . PUT IN POSITION**

R – **SHUTOFF VALVE IN GALLEYS/TOILETS . . . . . CHECK OPEN**

R – **FWD/AFT ACCESS PANEL DOORS . . . . . OPEN**

R – **DRAIN PORT CAPS . . . . . REMOVE**
R Remove drain port caps on forward drain and aft service panels.

R – **DRAIN HOSES . . . . . CONNECT**
R Connect drain hoses to :
R · the drain port on the forward drain panel.
R · the full/drain port on the aft service panel.

R ■ **On the forward drain panel**

R – **DRAIN CONTROL HANDLE . . . . . TURN LEFT**
R Turn the control handle to drain.

R ■ **On the aft service panel**

R – **FILL/DRAIN CONTROL HANDLE . . . . . TURN TO "DRAIN" AND PULL**
R Turn the handle to the "DRAIN" position and pull it out to its mechanical stop to drain.
R The indicator light comes on.

R ■ **When the water system is drained**
R In freezing conditions, the drain valves must stay open to prevent damage to the
R system. Do not put on the caps and leave the access door open.

R – **DRAIN HOSES . . . . . DISCONNECT**

R – **PANELS . . . . . CLEAN AND DRY**

R — **ACCESS PLATFORM(S)** . . . . . **REMOVE**

R **OPERATIONS IN VOLCANIC ASH**

R The following procedures are recommended for operators who fly routes that could take
R their aircraft through the material emerging from active volcanoes.
R Because volcanic ash is composed of very abrasive particles it can do serious damage to
R aircraft parts and impair the operation of aircraft systems significantly.
R Operators should avoid airports with volcanic ash deposits if possible. If operations at such
R airports are unavoidable, operators should heed the following recommendations.

R **GROUND OPERATIONS ON AIRPORTS COVERED WITH ASH OR DUST**

R **Preparation of the cockpit**

R — **APU** . . . . . **DO NOT USE**
R Use the APU only to start the engines, and then only if ground power is not available.
R Request ground supply for air conditioning and for electricity.

R — **WINDSHIELD WIPERS** . . . . . **DO NOT USE**
R Do not use windshield wipers to remove ash, or for anything else.

R **Exterior inspection**

R — **SURFACES AND EQUIPMENT** . . . . . **CHECK FREE OF ASH DEPOSITS**
R Ground maintenance should remove ash that has settled on exposed lubricated surfaces
R and could penetrate seals or enter the engine gas path, air conditioning system, air data
R probes, and other orifices on the aircraft.

R — **ENGINE INLETS** . . . . . **CHECK FREE OF ASH DEPOSITS**
R Inspect the inlets and order them cleaned of any volcanic ash. Have the area within 25
R feet of the engine inlet cleaned of volcanic ash (as much as practical).

R **Engine start**

R Use external pneumatic supply for starting the engines, if it is available. (Refer 3.04.70).

R — **ENGINE** . . . . . **CRANK**
R Before starting the engines, ventilate them by dry cranking at maximum motoring speed
R for two minutes. This will blow out any ash that may have entered the booster area.

R **Taxi**

R After releasing the brakes :

R – **THRUST LEVERS .. ADVANCE SMOOTHLY THEN MOVE TO IDLE WHEN ROLLING**
R Advance the levers smoothly to the minimum required for breakaway.
R Avoid making sharp or high-speed turns.

R – **ENG 1, ENG 2 BLEED . . . . . OFF**
R Keep bleed valves closed for taxiing.

R **Takeoff**

R – **Allow ash and dust (if present) to settle on runway before starting the takeoff roll.**

R – **Use the rolling takeoff technique if possible.**

R – **Adjust progressively engine power as for normal takeoff procedures.**

R **Landing**

R – **REVERSERS . . . . . USE AS LIGHTLY AS FEASIBLE**
R If it appears that maximum reverse thrust will be needed, apply reverse thrust when the
R main landing gear touches down. Limit the use of reverse thrust as much as possible,
R because reverse flow may throw up ash and impair visibility.

R *Note : The abrasive effect of volcanic ash on windshields and landing lights may reduce*
R *the pilot's visibility for approach and landing significantly. Consider diverting to*
R *an airfield where it is possible to use AUTOLAND.*

R – **BRAKE PERFORMANCE . . . . . CONSIDER PENALTY**
R A layer of ash on the runway may degrade braking efficiency. Treat landing performance
R as if it is similar to that on a wet runway (dry ash) or on slush (wet ash).

R **Securing the aircraft**

R If the aircraft is to be parked at an airport contaminated with volcanic ash, install engine
R inlet covers and other protective covers and plugs.
R In addition,

R ● **After switching off all bleeds and before switching off AC power :**

R – **DITCHING pushbutton . . . . . ON**
R This closes the outflow valve, pack valves and avionic ventilation inlet and extract
R valves.

R ● **After switching off the batteries :**

R – **DITCHING pushbutton . . . . . OFF**

R **FLIGHT OPERATIONS**

R Avoid flight into areas of known volcanic activity.
R If a volcanic eruption is reported while the aircraft is in flight, reroute the flight to remain
R well clear of the affected area (volcanic dust may spread over several hundred miles). If
R possible, stay on the upwind side of the volcano (at least 20 NM upwind of it if it is
R erupting).
R In hours of darkness or in meteorological conditions that obscure volcanic dust, one or
R several of the following phenomena indicate that the aircraft may be flying into ash cloud:
R · smoke or dust in the cockpit,
R · acrid odor similar to that of electrical smoke,
R · at night, the appearance of St. Elmo's fire and static discharges around the windshield,
R · bright white or orange glow appearing in the engine inlets,
R · sharp, distinct beams from the landing lights,
R · multiple engine malfunctions, such as rising EGT, decreasing power, stall, or flame out.

R ● **If the aircraft enters a volcanic ash cloud :**

R – **ESCAPE MANEUVER (terrain permitting) . . . . . INITIATE**
R Because the lateral dimensions of ash cloud are not known, the pilot should if
R possible turn 180°.

R – **ATC . . . . . NOTIFY**

R – **A/THR . . . . . OFF**
R This will prevent thrust variations.

R – **THRUST (terrain permitting) . . . . . DECREASE**
R This helps to maintain the engine stall margin by reducing the amount of ash
R ingestion and limiting the EGT. It also holds the accumulation of molten volcanic ash
R on turbine vanes to a minimum. Do not climb, since this increases EGT.

– **CREW OXYGEN** . . . . . **ON/100 %**

– **CABIN CREW** . . . . . **NOTIFY**

– **PASSENGER OXYGEN** . . . . . **AS RQRD**
Depending on contamination.

– **ENG ANTI ICE** . . . . . **ON**

– **WING ANTI ICE** . . . . . **ON**

– **PACK FLOW** . . . . . **HI**
Maximum airbleed gives the engines additional stall margin.

Note : If the aircraft has a cargo ventilation system, switch off the CARGO ISOL valves to prevent a cargo smoke warning from being triggered.

– **APU (if available)** . . . . . **START**
This prepares the aircraft for a starter-assisted engine relight.

– **ENGINE PARAMETERS** . . . . . **MONITOR**
Monitor the EGT carefully to see that it does not go over its limit.

Note : To prevent the engines from exceeding EGT limits it may become necessary to use a precautionary engine shut-down.
- *Restart when clear of the volcanic ash cloud.*
- *Upon restart, the engine may accelerate very slowly. Do not misinterpret this as a failure to start.*
- *Consider that the compressor and turbine blades have been eroded and avoid sudden changes in thrust. Fuel flow and EGT may increase.*

– **AIRSPEED INDICATIONS** . . . . . **MONITOR**
Volcanic ash may clog the pitot probes. If the airspeed indication is lost or becomes unreliable, see the abnormal procedure "UNRELIABLE SPEED INDICATION/ADR CHECK PROC" (Refer to 3.02.34).

Note : Electrostatic conditions may cause communication problems.

R **Reporting**

R · Whenever operating in areas affected by volcanic activity, flight crews should be aware
R of volcanic reporting procedures and be familiar with the use of the ICAO Special Air
R Report of Volcanic Activity (Model VAR).
R · If the aircraft encounters a volcanic ash cloud, the flight crew should report the location,
R altitude, and direction of drift for the ash cloud to ATC, flight conditions and crew duties
R permitting.

INTRODUCTION

The Less Paper Cockpit (LPC) concept consists of a complete set of software tools, designed to :

- Improve access to pilot's operational information, and simplify some of their tasks.
- Reduce the quantity of paper documents in the cockpit, and replace them with electronic ones, enabling quicker and easier updates, while improving information retrieval.

The applicable areas include Performance and Weight and Balance computations, in addition to technical operational documentation (FCOM, MEL, Operations Policy Manual..). This section addresses the procedures corresponding to the modules which are already available.

The various modules are linked via F.O.V.E. (Flight Operations Versatile Environment), which is designed to provide an interface between the various modules by enabling :

- Inter-module communication
- Software compatibility management
- Software version management
- Integrity control between data and the software versions
- Update management
- Context management

Each airline may choose to install one or several modules, each of which is able to work independently.

GENERAL

LPC PROGRAM AND REFERENCE VERSION NUMBER UPDATING

Each pilot should check that the version of F.O.V.E, installed on their PC, corresponds to the latest updated version provided by their airline's Flight Operations.

POWER SUPPLY

Check that each available PC is electrically-supplied.

PC STOWAGE DURING TAKEOFF AND LANDING

R Pilot PCs should be unplugged and stowed during takeoff and landing.

LPC TAKEOFF MODULE

The takeoff module is designed to provide aircraft takeoff performance, based on actual daily environmental conditions, just prior to flight. It allows straightforward computations, and provides the best takeoff performance for the given conditions.

TAKEOFF PERFORMANCE TASKSHARING

The tasksharing policy for data computation, and introduction in the MCDU is consistent with the currently applicable policy, as per the SOP :
One pilot performs the computation, then introduces the resulting data in the MCDU.
The other pilot checks the :
– Computation by using the PC to verify that the entered data is correct.
– Data entered in the MCDU.
Data entry and computation are generally done by the PF, and checked by the PNF. These tasks can be swapped, as per company policy, or as circumstances dictate. For instance, during taxi, data entry and computation should be done by the PNF, since the PF is busy taxiing the aircraft.
The PF will then have to perform the check, by stopping the aircraft or, if a stop is not possible, by transferring command to the other pilot.

COCKPIT PREPARATION

TAKEOFF DATA COMPUTATION

R The PF checks that the version of F.O.V.E, available on the PC, is the applicable one. (The applicable version is indicated on the computerized F-PLN, or other document, as per airline policy).
The PF enters the data, then shows the screen to the PNF for data confirmation.

R ● **If the Weight and Balance module is to be used :**

– **Use the pilot's PC to compute the ZFCG and ZFW :**
The computed values will be automatically fed to the takeoff performance module.

– **Use the pilot's PC to compute takeoff data :**
Any NOTAM affecting airport data should be considered at this stage, and taken into account in the "Modify runway" frame of the pilot interface. When the computation has been performed, a summary of the results is available in the "REMINDER", which is equivalent to the MCDU PERF page. Only the values to be addressed are indicated.

FMGS DATA INSERTION (no change compared to current SOP)

The PF enters the data computed on the PC into the MCDU.

GROSS WEIGHT INSERTION (INIT B page)

– **ZFCG/ZFW . . . . . INSERT**

– **BLOCK FUEL . . . . . INSERT**

TAKEOFF DATA INSERTION (PERF TO page)

– **V1, VR, V2 . . . . . INSERT**

– **FLEX TO TEMP/DERATE . . . . . INSERT**

FMGS DATA CONFIRMATION

– **GROSS WEIGHT INSERTION . . . . . CHECK**
The PNF checks FMGS data.
· If the Aircraft Loading module is used :
– Check on pilot PC that entered data are correct.
– Check that computed data have been correctly introduced in the MCDU.

– **TO DATA . . . . . CALCULATE/CHECK**
The PNF checks on pilot PC that entered data are correct.
He checks that computed data have been correctly introduced in the MCDU.

R – **LPC/MCDU GREEN DOT . . . . . COMPARE**
R The PNF compares Green Dot speed computed by the FMGS and Green Dot speed
R computed by the LPC. A discrepancy indicates a difference in the TOW used in both
R systems (LPC/FMGS).

BEFORE PUSHBACK or START

– **LOADING . . . . . CHECK**

– **TAKEOFF DATA . . . . . PREPARE and CHECK/REVISE**
Once the loading is checked :
– Check or re-enter the data entered on the takeoff module performance.
– Check or revise the takeoff data on the MCDU's INIT B and PERF pages.
Data to be crosschecked by the other pilot.

BEFORE TAKEOFF

R – **PILOT PC . . . . . UNPLUGGED and STOWED**

ILS (or NON PRECISION) APPROACH

● **When the landing gear is down :**

R – **PILOT PC . . . . . UNPLUGGED and STOWED**

LPC WEIGHT AND BALANCE MODULE

The Weight and Balance (W & B) module provides a computerized loadsheet and trim sheet. This facilitates computation of the ZFW/ZFCG and TOW/TOCG, and enables last-minute changes to the passenger/cargo/fuel distribution.
The following procedure applies to operators only using the W&B module. Operators using both the W&B module and the Takeoff module should refer to the LPC TAKEOFF MODULE section.

WEIGHT & BALANCE TASKSHARING

The tasksharing policy for data computation and introduction in the MCDU is consistent with the currently applicable policy, as per the SOP :
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The other pilot checks the :
– Computation by using the PC to verify that the entered data is correct.
– Data entered in the MCDU.
Data entry and computation are generally done by the PF, and checked by the PNF. These tasks can be swapped, as per company policy, or as circumstances dictate.

COCKPIT PREPARATION

TAKEOFF DATA COMPUTATION

The PF checks that the version of F.O.V.E., available on the PC, is the applicable one. (The applicable version is indicated on the computerized F-PLN, or other document, as per airline policy).
The PF enters the data, then shows the screen to the PNF for data confirmation.

– **Use the pilot's PC to compute the ZFCG and ZFW.**

– **Use RTOW to compute takeoff data.**

FMGS DATA INSERTION (no change compared to current SOP).

The PF enters the data, computed on the PC, into the MCDU.

GROSS WEIGHT INSERTION (INIT B page)

– **ZFCG/ZFW . . . . . INSERT**

– **BLOCK FUEL . . . . . INSERT**

TAKEOFF DATA INSERTION (PERF TO page)

– **V1, VR, V2 . . . . . INSERT**

– **FLEX TO TEMP/DERATE . . . . . INSERT**

FMGS DATA CONFIRMATION

– **GROSS WEIGHT INSERTION . . . . . CHECK**
The PNF checks FMGS data.
– Check on the pilot's PC, that the entered data is correct.
– Check that the computed data has been correctly introduced in the MCDU.

– **TO DATA . . . . . CALCULATE/CHECK**
The PNF calculates and checks the takeoff data.

BEFORE PUSHBACK or START

– **LOADING . . . . . CHECK**

– **TAKEOFF DATA . . . . . PREPARE and CHECK/REVISE**
Once the loading is checked :
– Check or recompute the takeoff speeds and the flexible temperature, using the RTOW charts.
– Check or revise the takeoff data on the MCDU's INIT B and PERF pages.
Data to be crosschecked by the other pilot.

BEFORE TAKEOFF

R – **PILOT PC . . . . . UNPLUGGED and STOWED**

ILS (or NON PRECISION) APPROACH

● **When the landing gear is down :**

R – **PILOT PC . . . . . UNPLUGGED and STOWED**

LPC MEL MODULE

TBD

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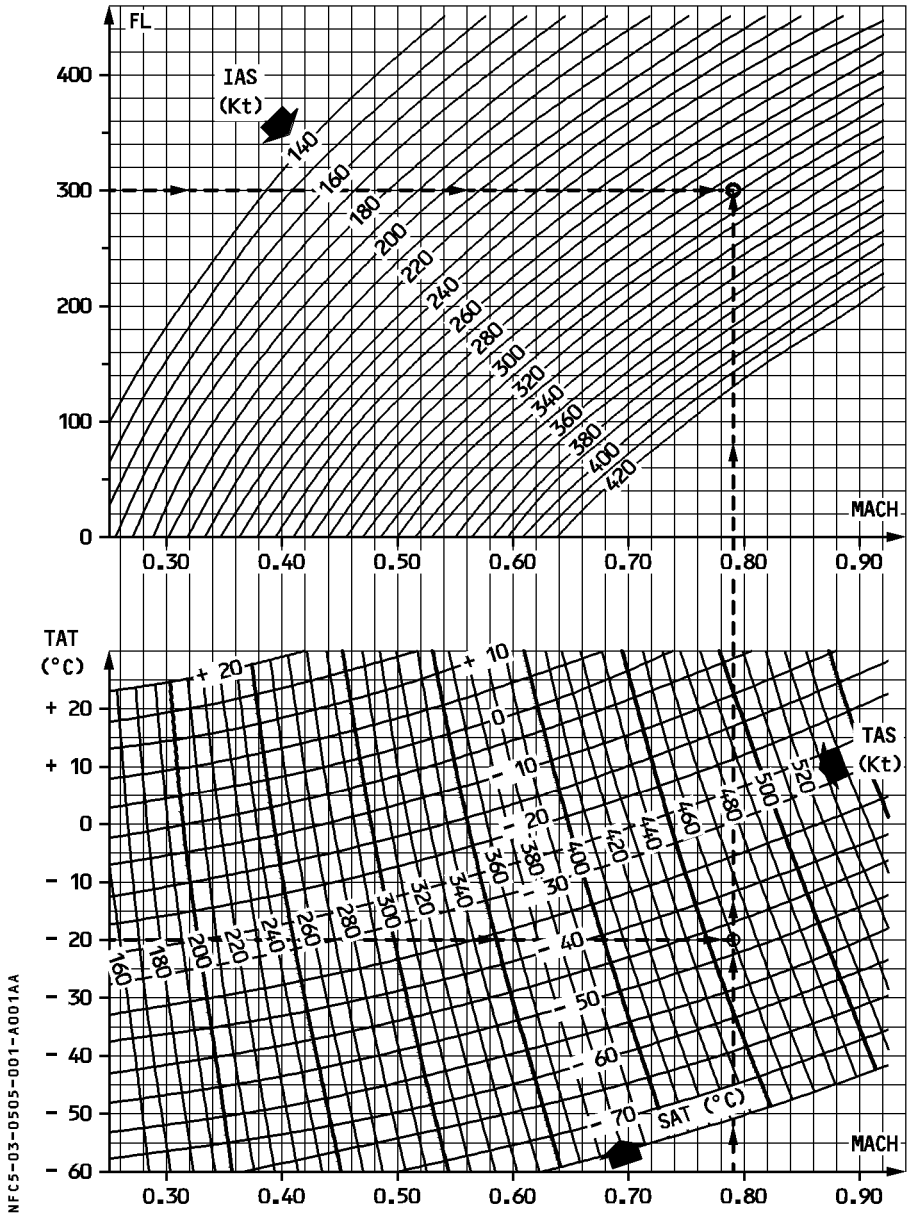
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05.35 GO AROUND

05.40 ALTERNATE

05.50 GROUND DISTANCE/AIR DISTANCE CONVERSION

CONVERSIONS – IAS . MACH – TAS . MACH – SAT . TAT

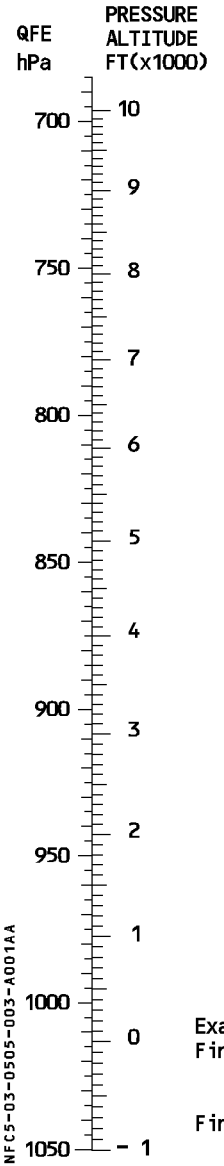


INTERNATIONAL STANDARD ATMOSPHERE (ISA)

R

ALTITUDE (Feet)	TEMP. (°C)	PRESSURE			PRESSURE RATIO $\delta = P / Po$	DENSITY $\sigma = \rho / \rho o$	SPEED OF SOUND (a) (kt)	ALTITUDE (meters)
		hPa	P.S.I.	in. Hg.				
40,000	– 56.5	188	2.72	5.54	0.1851	0.2462	573	12.192
39,000	– 56.5	197	2.85	5.81	0.1942	0.2583	573	11.887
38,000	– 56.5	206	2.99	6.10	0.2038	0.2710	573	11.582
37,000	– 56.5	217	3.14	6.40	0.2138	0.2844	573	11.278
36,000	– 56.3	227	3.30	6.71	0.2243	0.2981	573	10.973
35,000	– 54.3	238	3.46	7.04	0.2353	0.3099	576	10.668
34,000	– 52.4	250	3.63	7.38	0.2467	0.3220	579	10.363
33,000	– 50.4	262	3.80	7.74	0.2586	0.3345	581	10.058
32,000	– 48.4	274	3.98	8.11	0.2709	0.3473	584	9.754
31,000	– 46.4	287	4.17	8.49	0.2837	0.3605	586	9.449
30,000	– 44.4	301	4.36	8.89	0.2970	0.3741	589	9.144
29,000	– 42.5	315	4.57	9.30	0.3107	0.3881	591	8.839
28,000	– 40.5	329	4.78	9.73	0.3250	0.4025	594	8.534
27,000	– 38.5	344	4.99	10.17	0.3398	0.4173	597	8.230
26,000	– 36.5	360	5.22	10.63	0.3552	0.4325	599	7.925
25,000	– 34.5	376	5.45	11.10	0.3711	0.4481	602	7.620
24,000	– 32.5	393	5.70	11.60	0.3876	0.4642	604	7.315
23,000	– 30.6	410	5.95	12.11	0.4046	0.4806	607	7.010
22,000	– 28.6	428	6.21	12.64	0.4223	0.4976	609	6.706
21,000	– 26.6	446	6.47	13.18	0.4406	0.5150	611	6.401
20,000	– 24.6	466	6.75	13.75	0.4595	0.5328	614	6.096
19,000	– 22.6	485	7.04	14.34	0.4791	0.5511	616	5.791
18,000	– 20.7	506	7.34	14.94	0.4994	0.5699	619	5.406
17,000	– 18.7	527	7.65	15.57	0.5203	0.5892	621	5.182
16,000	– 16.7	549	7.97	16.22	0.5420	0.6090	624	4.877
15,000	– 14.7	572	8.29	16.89	0.5643	0.6292	626	4.572
14,000	– 12.7	595	8.63	17.58	0.5875	0.6500	628	4.267
13,000	– 10.8	619	8.99	18.29	0.6113	0.6713	631	3.962
12,000	– 8.8	644	9.35	19.03	0.6360	0.6932	633	3.658
11,000	– 6.8	670	9.72	19.79	0.6614	0.7156	636	3.353
10,000	– 4.8	697	10.10	20.58	0.6877	0.7385	638	3.048
9,000	– 2.8	724	10.51	21.39	0.7148	0.7620	640	2.743
8,000	– 0.8	753	10.92	22.22	0.7428	0.7860	643	2.438
7,000	+ 1.1	782	11.34	23.09	0.7716	0.8106	645	2.134
6,000	+ 3.1	812	11.78	23.98	0.8014	0.8359	647	1.829
5,000	+ 5.1	843	12.23	24.90	0.8320	0.8617	650	1.524
4,000	+ 7.1	875	12.69	25.84	0.8637	0.8881	652	1.219
3,000	+ 9.1	908	13.17	26.82	0.8962	0.9151	654	914
2,000	+ 11.0	942	13.67	27.82	0.9298	0.9428	656	610
1,000	+ 13.0	977	14.17	28.86	0.9644	0.9711	659	305
0	+ 15.0	1013	14.70	29.92	1.0000	1.0000	661	0
– 1.000	+ 17.0	1050	15.23	31.02	1.0366	1.0295	664	– 305

CONVERSIONS - QNH - QFE - PRESSURE ALTITUDE



QNH (hPa)	CORRECTION (ft)	QNH (in Hg)
949 – 951	+ 1900	28.01 – 28.10
952 – 955	+ 1800	28.11 – 28.20
956 – 958	+ 1700	28.21 – 28.30
959 – 961	+ 1600	28.31 – 28.40
962 – 964	+ 1500	28.41 – 28.45
965 – 968	+ 1400	28.46 – 28.56
969 – 971	+ 1300	28.57 – 28.66
972 – 974	+ 1200	28.68 – 28.77
975 – 978	+ 1100	28.78 – 28.86
979 – 981	+ 1000	28.87 – 28.95
982 – 984	+ 900	28.96 – 29.05
985 – 988	+ 800	29.06 – 29.15
989 – 991	+ 700	29.16 – 29.25
992 – 994	+ 600	29.26 – 29.35
995 – 997	+ 500	29.36 – 29.45
998 – 1001	+ 400	29.46 – 29.54
1002 – 1004	+ 300	29.55 – 29.64
1005 – 1007	+ 200	29.65 – 29.74
1008 – 1011	+ 100	29.75 – 29.84
1012 – 1014	0	29.85 – 29.94
1015 – 1018	– 100	29.95 – 30.04
1019 – 1021	– 200	30.05 – 30.14
1022 – 1025	– 300	30.15 – 30.24
1026 – 1028	– 400	30.25 – 30.34
1029 – 1031	– 500	30.35 – 30.44
1032 – 1035	– 600	30.45 – 30.54
1036 – 1038	– 700	30.55 – 30.65
1039 – 1042	– 800	30.66 – 30.75
1043 – 1045	– 900	30.76 – 30.85
1046 – 1050	–1000	30.86 – 30.95

Examples : 1) Elevation: 2500 ft QNH = 1020 hPa
Find : correction: -200 ft
Pressure altitude = 2300 ft QFE = 933 hPa
2) Elevation: 1500 ft QFE = 980 hPa
Find : Pressure altitude: 920 ft
Correction = - 580 ft QNH = 1032 hPa

CONVERSIONS QFE hPa – in. Hg – ft

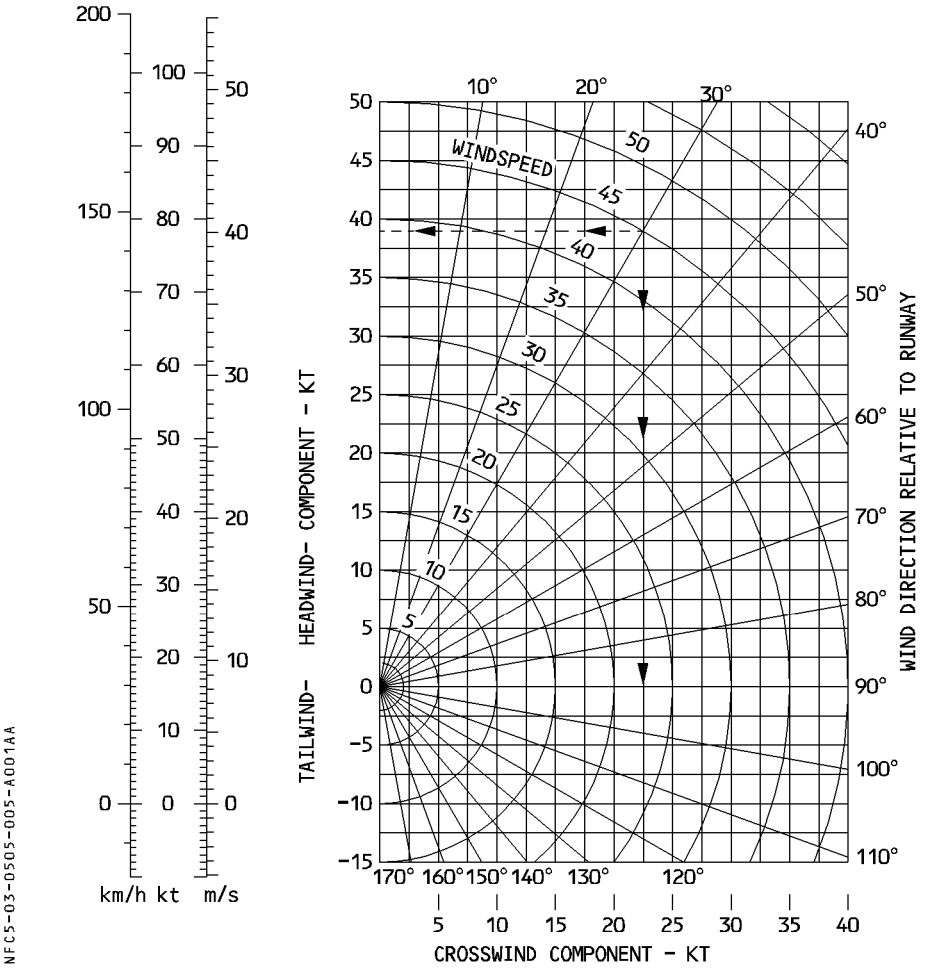
QFE hPa	in. Hg	PRESS. ALT. ft	QFE hPa	in. Hg	PRESS. ALT. ft	QFE hPa	in. Hg	PRESS. ALT. ft
1050	31.01	– 989	960	28.35	1486	870	25.69	4157
1048	30.95	– 936	958	28.29	1543	868	25.63	4219
1046	30.89	– 883	956	28.23	1601	866	25.57	4281
1044	30.83	– 830	954	28.17	1658	864	25.51	4343
1042	30.77	– 776	952	28.11	1715	862	25.45	4405
1040	30.71	– 723	950	28.05	1773	860	25.40	4468
1038	30.65	– 669	948	27.99	1831	858	25.34	4531
1036	30.59	– 615	946	27.94	1889	856	25.28	4593
1034	30.53	– 562	944	27.88	1947	854	25.22	4656
1032	30.47	– 508	942	27.82	2005	852	25.16	4718
1030	30.42	– 454	940	27.76	2062	850	25.10	4781
1028	30.36	– 400	938	27.70	2120	848	25.04	4844
1026	30.30	– 346	936	27.64	2178	846	24.98	4907
1024	30.24	– 292	934	27.58	2236	844	24.92	4970
1022	30.18	– 238	932	27.52	2294	842	24.86	5033
1020	30.12	– 184	930	27.46	2353	840	24.81	5097
1018	30.06	– 129	928	27.40	2412	838	24.75	5161
1016	30.00	– 74	926	27.34	2471	836	24.69	5225
1014	29.94	– 20	924	27.29	2530	834	24.63	5289
1012	29.88	34	922	27.23	2589	832	24.57	5353
1010	29.83	89	920	27.17	2647	830	24.51	5417
1008	29.77	144	918	27.11	2707	828	24.45	5481
1006	29.71	199	916	27.05	2767	826	24.39	5545
1004	29.65	254	914	26.99	2826	824	24.33	5610
1002	29.59	309	912	26.93	2885	822	24.27	5675
1000	29.53	364	910	26.87	2944	820	24.21	5740
998	29.47	419	908	26.81	3004	818	24.16	5805
996	29.41	475	906	26.75	3064	816	24.10	5870
994	29.35	530	904	26.70	3124	814	24.04	5935
992	29.29	586	902	26.64	3183	812	23.98	6000
990	29.23	641	900	26.58	3243	810	23.92	6065
988	29.18	697	898	26.52	3303	808	23.86	6131
986	29.12	753	896	26.46	3363	806	23.80	6197
984	29.06	809	894	26.40	3424	804	23.74	6263
982	29.00	865	892	26.34	3484	802	23.68	6329
980	28.94	921	890	26.28	3545	800	23.62	6394
978	28.88	977	888	26.22	3606	798	23.56	6461
976	28.82	1033	886	26.16	3667	796	23.51	6528
974	28.76	1089	884	26.10	3728	794	23.45	6595
972	28.70	1145	882	26.05	3789	792	23.39	6661
970	28.64	1202	880	25.99	3850	790	23.33	6727
968	28.59	1259	878	25.93	3911	788	23.27	6794
966	28.53	1316	876	25.87	3973	786	23.21	6861
964	28.47	1373	874	25.81	4034	784	23.15	6928
962	28.41	1430	872	25.75	4096	782	23.09	6995

WIND COMPONENTS (FOR TAKEOFF AND LANDING)

R

MULTIPLY	BY	TO GET
kt	1.852	km/h
kt	0.5144	m/s
m/s	3.6	km/h
m/s	1.9438	kt
km/h	0.5396	kt
km/h	0.2778	m/s

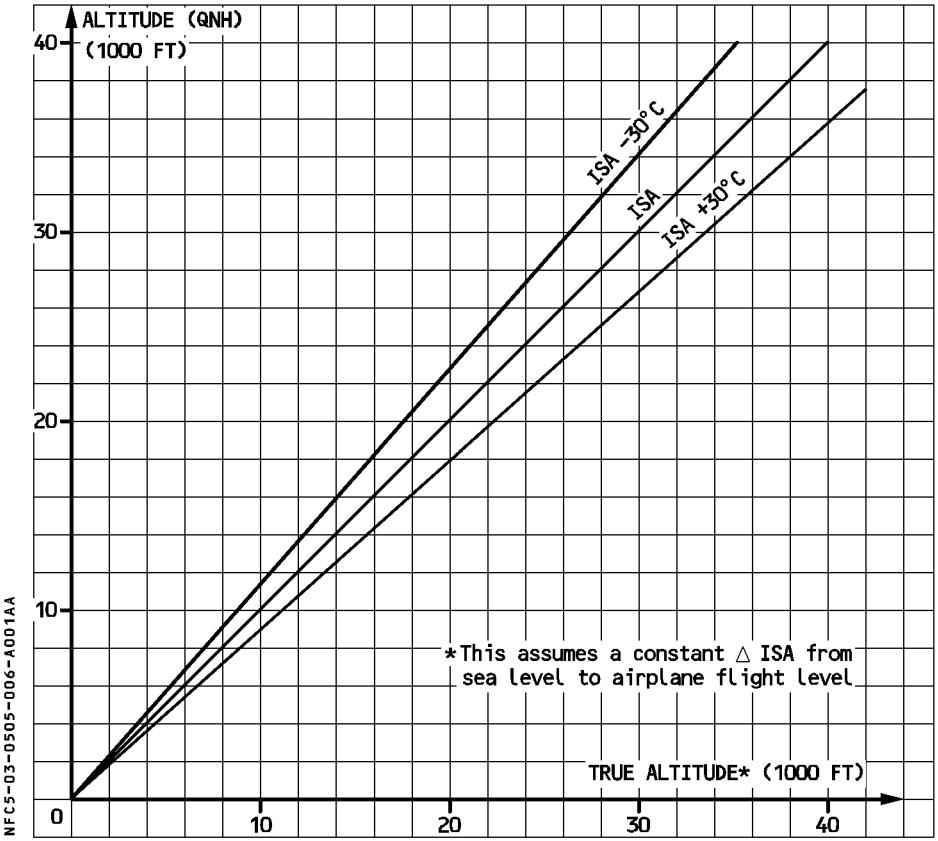
GIVEN	FIND
WIND DIRECTION RELATIVE TO RUNWAY HEADING=30 DEG WIND SPEED=45 KT	CROSS WIND COMPONENT=22.5 KT HEAD WIND COMPONENT=39.0 KT



NFC5-03-0505-005-A001AA

ALTITUDE TEMPERATURE CORRECTION

FOR HIGH ALTITUDE USE



FOR LOW ALTITUDE USE

R Values to be added by the pilot to minimum promulgated heights/altitude (ft)

R

Airport Temperature °C	Height above the elevation of the altimeter setting source (feet)								
	200	300	400	500	1000	2000	3000	4000	5000
0	20	20	30	30	60	120	170	230	280
– 10	20	30	40	50	100	200	290	390	490
– 20	30	50	60	70	140	280	420	570	710
– 30	40	60	80	100	190	380	570	760	950
– 40	50	80	100	120	240	480	720	970	1210
– 50	60	90	120	150	300	590	890	1190	1500

THRUST RATINGS

The thrust rating charts have been established for :

- **Maximum takeoff**
  It is the maximum thrust certified for takeoff and is normally limited to five minutes. This time is extended to ten minutes for engine out contingency, as authorized by the approved AFM.

- **Maximum go around**
  It is the maximum permissible thrust during go-around.

- **Flexible takeoff**
  It is a reduced takeoff thrust as compared to the maximum permissible. The related EPR is calculated as a function of the flexible temperature entered in the FMGS MCDU. The flexible temperature is a function of the aircraft weight and environmental conditions. It guarantees that the regular performance requirements are met.

- **Maximum continuous**
  It is the maximum thrust certified for continuous use. This rating should be used, at the pilot's discretion, only when required to ensure safe flight (engine failure).

- **Maximum climb**
  It is the maximum thrust approved for normal climb.

- **Maximum cruise**
  It is the maximum thrust approved for normal cruise.
  There is no thrust lever position corresponding to this thrust rating.
  It is not displayed to the pilot, and the EPR limit which is displayed in cruise is the maximum climb EPR.
  The FMGS uses the maximum cruise EPR to compute the aircraft maximum speed.
  In manual thrust setting, in cruise, the pilot should limit EPR to the maximum cruise EPR that is equal to the displayed maximum climb EPR minus 0.07.

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THRUST RATINGS

The thrust rating charts have been established for :

- **Maximum takeoff**
  It is the maximum thrust certified for takeoff and is normally limited to five minutes. This time is extended to ten minutes for engine out contingency, as authorized by the approved AFM.

- **Derated takeoff**
  It is a reduced maximum thrust certified for takeoff. (Refer to FCOM 2.02.27).

- **Maximum go around**
  It is the maximum permissible thrust during go-around.

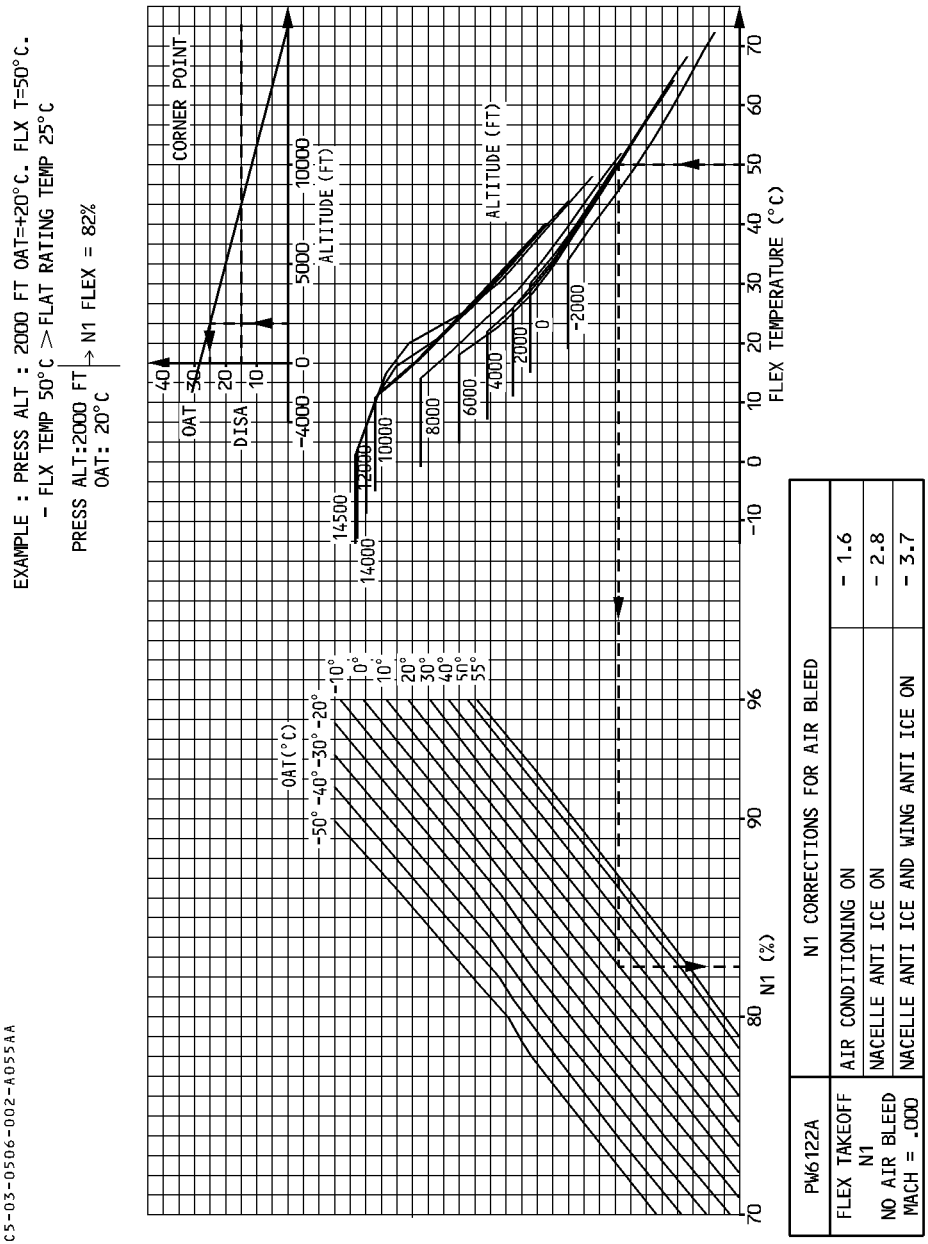
- **Flexible takeoff**
  It is a reduced takeoff thrust as compared to the maximum permissible. The related N1 is calculated as a function of the flexible temperature entered in the FMGS MCDU. The flexible temperature is a function of the aircraft weight and environmental conditions. It guarantees that the regular performance requirements are met.

- **Maximum continuous**
  It is the maximum thrust certified for continuous use. This rating should be used, at the pilot's discretion, only when required to ensure safe flight (engine failure).

- **Maximum climb**
  It is the maximum thrust approved for normal climb.

- **Maximum cruise**
  It is the maximum thrust approved for normal cruise.
  There is no thrust lever position corresponding to this thrust rating.
  It is not displayed to the pilot, and the N1 limit which is displayed in cruise is the maximum climb N1.
  The FMGS uses the maximum cruise N1 to compute the aircraft maximum speed.
  In manual thrust setting, in cruise, the pilot should limit N1 to the maximum cruise N1 that is equal to the displayed maximum climb N1 minus 0.6 % up to 20 000 ft, minus 1 % between 20 000 ft and 31 000 ft and minus 1.2 % until 40 000 ft.

FLEXIBLE TAKEOFF N1



PW6122A	N1 CORRECTIONS FOR AIR BLEED	
FLEX TAKEOFF N1 NO AIR BLEED MACH = .000	AIR CONDITIONING ON	- 1.6
	NACELLE ANTI ICE ON	- 2.8
	NACELLE ANTI ICE AND WING ANTI ICE ON	- 3.7

TAKEOFF

V2524-A5	TAKE-OFF EPR	NO AIR BLEED	MACH=.000

CORRECTIONS FOR AIR BLEED

AIR CONDITIONING ON	SUBTRACT .007 FROM EPR
ENGINE ANTI ICE ON	READ AT ACTUAL OAT +5 (°C)
ENGINE ANTI ICE AND WING ANTI ICE ON	READ AT ACTUAL OAT +5 (°C) AND SUBTRACT .006 FROM EPR

OAT (°C)	PRESSURE ALTITUDE (FT)									
	–2000.	–1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.
–60.0	1.354	1.373	1.393	1.405	1.417	1.433	1.449	1.464	1.477	1.490
0.0	1.354	1.373	1.393	1.405	1.417	1.433	1.449	1.464	1.477	1.490
30.0	1.354	1.373	1.393	1.405	1.417	1.433	1.449	1.464	1.477	1.490
31.0	1.354	1.373	1.393	1.405	1.417	1.433	1.449	1.464	1.477	1.490
33.0	1.354	1.373	1.393	1.405	1.417	1.433	1.449	1.464	1.477	1.483
35.0	1.354	1.373	1.393	1.405	1.417	1.433	1.449	1.464	1.471	1.474
37.0	1.354	1.373	1.393	1.405	1.417	1.433	1.449	1.459	1.463	1.465
39.0	1.354	1.373	1.393	1.405	1.417	1.433	1.449	1.453	1.455	1.455
41.0	1.354	1.373	1.393	1.405	1.417	1.433	1.443	1.446	1.446	1.446
43.0	1.354	1.373	1.393	1.405	1.417	1.433	1.437	1.436	1.436	*1.436*
45.0	1.354	1.373	1.393	1.405	1.417	1.427	1.428	1.427	*1.427*	*1.426*
47.0	1.354	1.373	1.393	1.405	1.417	1.420	1.419	*1.418*	*1.417*	*1.416*
49.0	1.354	1.373	1.393	1.405	1.411	1.412	*1.410*	*1.408*	*1.407*	*1.406*
51.0	1.354	1.373	1.393	1.405	1.404	*1.402*	*1.400*	*1.399*	*1.397*	*1.396*
53.0	1.354	1.373	1.393	1.399	*1.394*	*1.392*	*1.390*	*1.389*	*1.388*	*1.386*
54.0	1.354	1.373	1.393	*1.394*	*1.389*	*1.387*	*1.385*	*1.384*	*1.383*	*1.381*
56.0	1.354	1.373	*1.389*	*1.384*	*1.379*	*1.377*	*1.376*	*1.375*	*1.373*	*1.371*
58.0	1.354	*1.369*	*1.378*	*1.373*	*1.369*	*1.367*	*1.366*	*1.365*	*1.363*	*1.361*
60.0	*1.350*	*1.359*	*1.368*	*1.363*	*1.359*	*1.357*	*1.356*	*1.355*	*1.354*	*1.351*
62.0	*1.341*	*1.350*	*1.357*	*1.353*	*1.349*	*1.347*	*1.346*	*1.346*	*1.344*	*1.341*
64.0	*1.331*	*1.340*	*1.347*	*1.342*	*1.339*	*1.338*	*1.337*	*1.336*	*1.334*	*1.332*
66.0	*1.322*	*1.330*	*1.336*	*1.332*	*1.329*	*1.328*	*1.327*	*1.327*	*1.324*	*1.322*
68.0	*1.313*	*1.320*	*1.325*	*1.322*	*1.319*	*1.318*	*1.317*	*1.317*	*1.315*	
70.0	*1.303*	*1.310*	*1.315*	*1.311*	*1.308*	*1.308*	*1.307*	*1.307*		
72.0	*1.294*	*1.300*	*1.304*	*1.301*	*1.298*	*1.298*	*1.298*			
74.0	*1.285*	*1.290*	*1.294*	*1.291*	*1.288*	*1.288*				
76.0	*1.275*	*1.280*	*1.283*	*1.280*	*1.278*					
78.0	*1.266*	*1.270*	*1.273*	*1.270*						
80.0	*1.257*	*1.260*	*1.262*							
81.0	*1.252*	*1.255*								
83.0	*1.243*									

DATA GIVEN ABOVE ISA+40 ARE TO BE USED FOR FLEX TAKEOFF ONLY

TAKEOFF

V2524-A5	TAKE-OFF EPR	NO AIR BLEED	MACH=.000
CORRECTIONS FOR AIR BLEED			
AIR CONDITIONING ON	SUBTRACT .012 FROM EPR		
ENGINE ANTI ICE ON	READ AT ACTUAL OAT +5 (°C)		
ENGINE ANTI ICE AND WING ANTI ICE ON	READ AT ACTUAL OAT +5 (°C) AND SUBTRACT .009 FROM EPR		

OAT (°C)	PRESSURE ALTITUDE (FT)									
	6000.	7000.	8000.	9000.	10000.	11000.	12000.	13000.	14000.	14500.
–60.0	1.477	1.490	1.503	1.522	1.540	1.558	1.577	1.581	1.585	1.587
0.0	1.477	1.490	1.503	1.522	1.540	1.558	1.577	1.581	1.585	1.587
16.0	1.477	1.490	1.503	1.522	1.540	1.558	1.577	1.581	1.585	1.587
17.0	1.477	1.490	1.503	1.522	1.540	1.558	1.577	1.581	1.585	1.581
19.0	1.477	1.490	1.503	1.522	1.540	1.558	1.577	1.581	1.567	1.558
21.0	1.477	1.490	1.503	1.522	1.540	1.558	1.577	1.561	1.544	1.536
23.0	1.477	1.490	1.503	1.522	1.540	1.558	1.556	1.537	1.524	1.522
25.0	1.477	1.490	1.503	1.522	1.540	1.540	1.529	1.516	1.512	1.510
27.0	1.477	1.490	1.503	1.522	1.525	1.518	1.508	1.504	1.500	*1.498*
29.0	1.477	1.490	1.503	1.510	1.507	1.499	1.496	1.492	*1.490*	*1.488*
31.0	1.477	1.490	1.495	1.496	1.491	1.488	1.484	*1.482*	*1.480*	*1.478*
33.0	1.477	1.483	1.485	1.483	1.480	1.477	*1.475*	*1.473*	*1.470*	*1.468*
34.0	1.474	1.478	1.480	1.478	1.475	*1.472*	*1.470*	*1.468*	*1.465*	*1.463*
36.0	1.467	1.470	1.470	1.467	*1.464*	*1.463*	*1.461*	*1.459*	*1.455*	*1.453*
38.0	1.460	1.460	1.460	*1.457*	*1.455*	*1.453*	*1.452*	*1.449*	*1.445*	*1.443*
40.0	1.451	1.450	*1.450*	*1.447*	*1.445*	*1.444*	*1.443*	*1.440*	*1.436*	*1.433*
42.0	1.441	*1.441*	*1.440*	*1.437*	*1.436*	*1.435*	*1.435*	*1.431*	*1.426*	*1.423*
44.0	*1.432*	*1.431*	*1.429*	*1.428*	*1.426*	*1.426*	*1.426*	*1.421*	*1.416*	*1.413*
46.0	*1.422*	*1.421*	*1.419*	*1.418*	*1.417*	*1.416*	*1.417*	*1.412*	*1.406*	*1.403*
48.0	*1.412*	*1.411*	*1.409*	*1.408*	*1.407*	*1.407*	*1.408*	*1.403*	*1.397*	*1.393*
50.0	*1.402*	*1.401*	*1.399*	*1.398*	*1.398*	*1.398*	*1.399*	*1.393*	*1.387*	*1.383*
52.0	*1.393*	*1.391*	*1.389*	*1.389*	*1.388*	*1.389*	*1.390*	*1.384*	*1.377*	
54.0	*1.383*	*1.381*	*1.379*	*1.379*	*1.379*	*1.380*	*1.381*	*1.374*		
56.0	*1.373*	*1.371*	*1.369*	*1.369*	*1.369*	*1.370*	*1.372*			
58.0	*1.363*	*1.361*	*1.359*	*1.359*	*1.360*	*1.361*				
60.0	*1.354*	*1.351*	*1.349*	*1.349*	*1.350*					
62.0	1.344	1.341	1.339	1.340						
64.0	1.334	1.332	1.329							
66.0	1.324	1.322								
68.0	1.315									
	DATA GIVEN ABOVE ISA+40 ARE TO BE USED FOR FLEX TAKEOFF ONLY									

TAKEOFF

V2527–A5	TAKEOFF EPR	NO AIR BLEED	MACH=.000
CORRECTIONS FOR AIR BLEED			
AIR CONDITIONING ON	SUBTRACT .010 FROM EPR		
ENGINE ANTI ICE ON	READ AT ACTUAL OAT + 5(°C)		
ENGINE ANTI ICE AND WING ANTI ICE ON	READ AT ACTUAL OAT + 5(°C) AND SUBTRACT .007 FROM EPR		

OAT (°C)	PRESSURE ALTITUDE (FT)										
	–1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.	8000.	8500.
–60.0	1.378	1.397	1.413	1.430	1.455	1.479	1.504	1.514	1.524	1.534	1.537
–40.0	1.378	1.397	1.413	1.430	1.455	1.479	1.504	1.514	1.524	1.534	1.537
–20.0	1.378	1.397	1.413	1.430	1.455	1.479	1.504	1.514	1.524	1.534	1.537
0.0	1.378	1.397	1.413	1.430	1.455	1.479	1.504	1.514	1.524	1.534	1.537
10.0	1.378	1.397	1.413	1.430	1.455	1.479	1.504	1.514	1.524	1.534	1.537
20.0	1.378	1.397	1.413	1.430	1.455	1.479	1.504	1.514	1.524	1.534	1.537
22.0	1.378	1.397	1.413	1.430	1.455	1.479	1.504	1.514	1.524	1.534	1.537
24.0	1.378	1.397	1.413	1.430	1.455	1.479	1.504	1.514	1.524	1.534	1.533
26.0	1.378	1.397	1.413	1.430	1.455	1.479	1.504	1.514	1.524	1.525	1.523
28.0	1.378	1.397	1.413	1.430	1.455	1.479	1.504	1.514	1.515	1.513	1.512
30.0	1.378	1.397	1.413	1.430	1.455	1.479	1.504	1.505	1.504	1.503	1.501
32.0	1.378	1.397	1.413	1.430	1.455	1.479	1.495	1.494	1.493	1.492	1.491
34.0	1.378	1.397	1.413	1.430	1.455	1.476	1.485	1.484	1.483	1.482	1.480
36.0	1.378	1.397	1.413	1.430	1.455	1.466	1.474	1.474	1.473	1.471	1.469
38.0	1.378	1.397	1.413	1.430	1.448	1.456	1.464	1.464	1.462	1.460	1.459
40.0	1.378	1.397	1.413	1.429	1.438	1.446	1.454	1.453	1.451	*1.450*	*1.448*
42.0	1.378	1.397	1.413	1.419	1.428	1.436	1.444	1.442	*1.441*	*1.440*	*1.438*
44.0	1.378	1.397	1.409	1.409	1.418	1.426	1.433	*1.432*	*1.431*	*1.429*	*1.428*
46.0	1.378	1.397	1.400	1.399	1.408	1.415	*1.423*	*1.422*	*1.421*	*1.419*	*1.418*
48.0	1.378	1.390	1.391	1.390	1.398	*1.405*	*1.413*	*1.412*	*1.411*	*1.409*	*1.408*
50.0	1.378	1.383	1.381	1.380	*1.388*	*1.396*	*1.403*	*1.402*	*1.401*	*1.399*	*1.398*
52.0	1.374	1.373	1.372	*1.371*	*1.379*	*1.386*	*1.393*	*1.392*	*1.391*	*1.389*	*1.388*
54.0	1.364	1.364	*1.363*	*1.362*	*1.369*	*1.377*	*1.383*	*1.382*	*1.381*	*1.379*	
56.0	1.355	*1.355*	*1.354*	*1.352*	*1.360*	*1.367*	*1.374*	*1.372*	*1.371*		
58.0	*1.346*	*1.346*	*1.345*	*1.343*	*1.351*	*1.358*	*1.364*	*1.363*			
60.0	*1.337*	*1.337*	*1.336*	*1.334*	*1.341*	*1.348*	*1.354*				
62.0	*1.329*	*1.329*	*1.327*	*1.325*	*1.332*	*1.339*					
64.0	*1.320*	*1.320*	*1.318*	*1.316*	*1.323*						
66.0	*1.312*	*1.311*	*1.310*	*1.307*							
68.0	*1.303*	*1.303*	*1.301*								
70.0	*1.295*	*1.294*									
72.0											
74.0											
76.0											
78.0	*DATA GIVEN ABOVE ISA + 40 ARE TO BE USED FOR FLEX TAKEOFF ONLY*										

TAKEOFF

V2527-A5	TAKEOFF EPR	NO AIR BLEED	MACH=.000
CORRECTIONS FOR AIR BLEED			
AIR CONDITIONING ON		SUBTRACT .015 FROM EPR	
ENGINE ANTI-ICE ON		READ AT ACTUAL OAT +5(°C)	
ENGINE ANTI-ICE AND WING ANTI-ICE ON		READ AT ACTUAL OAT +5(°C) AND SUBTRACT .010 FROM EPR	

OAT (°C)	PRESSURE ALTITUDE (FT)										
	5000.	6000.	7000.	8000.	9000.	10000.	11000.	12000.	13000.	14000.	14500.
–60.0	1.504	1.514	1.524	1.534	1.540	1.545	1.551	1.556	1.562	1.567	1.570
–40.0	1.504	1.514	1.524	1.534	1.540	1.545	1.551	1.556	1.562	1.567	1.570
–20.0	1.504	1.514	1.524	1.534	1.540	1.545	1.551	1.556	1.562	1.567	1.570
0.0	1.504	1.514	1.524	1.534	1.540	1.545	1.551	1.556	1.562	1.567	1.570
5.0	1.504	1.514	1.524	1.534	1.540	1.545	1.551	1.556	1.562	1.567	1.570
10.0	1.504	1.514	1.524	1.534	1.540	1.545	1.551	1.556	1.562	1.567	1.570
12.0	1.504	1.514	1.524	1.534	1.540	1.545	1.551	1.556	1.562	1.567	1.569
14.0	1.504	1.514	1.524	1.534	1.540	1.545	1.551	1.556	1.562	1.564	1.565
16.0	1.504	1.514	1.524	1.534	1.540	1.545	1.551	1.556	1.557	1.559	1.561
18.0	1.504	1.514	1.524	1.534	1.540	1.545	1.551	1.551	1.552	1.553	1.551
20.0	1.504	1.514	1.524	1.534	1.540	1.545	1.544	1.544	1.544	1.541	1.539
22.0	1.504	1.514	1.524	1.534	1.540	1.538	1.536	1.536	1.533	*1.530*	*1.528*
24.0	1.504	1.514	1.524	1.534	1.531	1.529	1.528	1.525	*1.522*	*1.518*	*1.516*
26.0	1.504	1.514	1.524	1.525	1.521	1.519	1.517	*1.514*	*1.510*	*1.506*	*1.504*
28.0	1.504	1.514	1.515	1.513	1.511	1.508	*1.506*	*1.502*	*1.498*	*1.494*	*1.493*
30.0	1.504	1.505	1.504	1.503	1.500	*1.498*	*1.494*	*1.491*	*1.487*	*1.484*	*1.582*
32.0	1.495	1.494	1.493	1.492	*1.490*	*1.487*	*1.483*	*1.479*	*1.476*	*1.473*	*1.471*
34.0	1.485	1.484	1.483	*1.482*	*1.479*	*1.475*	*1.472*	*1.469*	*1.466*	*1.463*	*1.461*
36.0	1.474	1.474	*1.473*	*1.471*	*1.468*	*1.465*	*1.462*	*1.459*	*1.455*	*1.452*	*1.450*
38.0	1.464	*1.464*	*1.462*	*1.460*	*1.457*	*1.454*	*1.451*	*1.448*	*1.445*	*1.441*	*1.440*
40.0	*1.454*	*1.453*	*1.451*	*1.450*	*1.447*	*1.444*	*1.441*	*1.438*	*1.434*	*1.431*	*1.429*
42.0	*1.444*	*1.442*	*1.441*	*1.440*	*1.437*	*1.434*	*1.431*	*1.427*	*1.424*	*1.420*	
44.0	*1.433*	*1.432*	*1.431*	*1.429*	*1.427*	*1.424*	*1.420*	*1.417*	*1.413*		
46.0	*1.423*	*1.422*	*1.421*	*1.419*	*1.416*	*1.413*	*1.410*	*1.406*			
48.0	*1.413*	*1.412*	*1.411*	*1.409*	*1.406*	*1.403*	*1.400*				
50.0	*1.403*	*1.402*	*1.401*	*1.399*	*1.396*	*1.393*					
52.0	*1.393*	*1.392*	1.391	1.389	1.386						
54.0	*1.383*	*1.382*	*1.381*	*1.379*							
56.0	*1.374*	*1.372*	*1.371*								
58.0	*1.364*	*1.363*	*DATA GIVEN ABOVE ISA+40 ARE TO BE USED FOR FLEX TAKEOFF ONLY*								

TAKEOFF

V2527E-A5	TAKEOFF EPR	NO AIR BLEED	MACH=.000
CORRECTIONS FOR AIR BLEED			
AIR CONDITIONING ON	SUBTRACT .010 FROM EPR		
ENGINE ANTI ICE ON	READ AT ACTUAL OAT +5.(°C)		
ENGINE ANTI ICE AND WING ANTI ICE ON	READ AT ACTUAL OAT +5.(°C) AND SUBTRACT .007 FROM EPR		

OAT (°C)	PRESSURE ALTITUDE (FT)										
	–1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.	8000.	8500.
–40.0	1.378	1.397	1.418	1.441	1.469	1.496	1.527	1.560	1.583	1.607	1.606
–20.0	1.378	1.397	1.418	1.441	1.469	1.496	1.527	1.560	1.583	1.607	1.606
0.0	1.378	1.397	1.418	1.441	1.469	1.496	1.527	1.560	1.583	1.607	1.606
12.0	1.378	1.397	1.418	1.441	1.469	1.496	1.527	1.560	1.583	1.607	1.606
14.0	1.378	1.397	1.418	1.441	1.469	1.496	1.527	1.560	1.583	1.604	1.604
15.0	1.378	1.397	1.418	1.441	1.469	1.496	1.527	1.560	1.583	1.602	1.602
18.0	1.378	1.397	1.418	1.441	1.469	1.496	1.527	1.560	1.578	1.591	1.589
20.0	1.378	1.397	1.418	1.441	1.469	1.496	1.527	1.556	1.571	1.581	1.579
22.0	1.378	1.397	1.418	1.441	1.469	1.496	1.527	1.552	1.564	1.571	1.569
24.0	1.378	1.397	1.418	1.441	1.469	1.496	1.525	1.548	1.557	1.560	1.558
27.0	1.378	1.397	1.418	1.441	1.469	1.496	1.521	1.542	1.544	1.541	1.540
30.0	1.378	1.397	1.418	1.441	1.469	1.495	1.518	1.529	1.526	1.523	1.522
32.0	1.378	1.397	1.418	1.441	1.469	1.493	1.507	1.518	1.514	1.510	1.509
34.0	1.378	1.397	1.418	1.441	1.468	1.484	1.493	1.505	1.501	1.497	1.496
37.0	1.378	1.397	1.418	1.441	1.458	1.468	1.474	1.485	1.481	1.477	1.476
40.0	1.378	1.397	1.418	1.434	1.445	1.450	1.455	1.465	1.462	*1.458*	*1.459*
41.0	1.378	1.397	1.418	1.429	1.436	1.441	1.446	1.456	*1.452*	*1.450*	*1.451*
44.0	1.378	1.397	1.412	1.415	1.421	1.427	1.433	*1.441*	*1.439*	*1.437*	*1.438*
46.0	1.378	1.397	1.403	1.404	1.410	1.416	*1.423*	*1.431*	*1.428*	*1.426*	*1.427*
48.0	1.378	1.390	1.394	1.394	1.400	*1.406*	*1.413*	*1.420*	*1.418*	*1.416*	*1.417*
50.0	1.378	1.382	1.383	1.382	*1.389*	*1.396*	*1.402*	*1.408*	*1.406*	*1.405*	*1.405*
52.0	1.374	1.373	1.374	*1.374*	*1.381*	*1.387*	*1.393*	*1.398*	*1.397*	*1.395*	*1.396*
54.0	1.364	1.364	*1.364*	*1.365*	*1.371*	*1.378*	*1.383*	*1.388*	*1.386*	*1.385*	*1.385*
56.0	1.355	*1.355*	*1.355*	*1.355*	*1.362*	*1.368*	*1.374*	*1.377*	*1.376*	*1.374*	*1.375*
58.0	*1.346*	*1.346*	*1.346*	*1.346*	*1.353*	*1.359*	*1.364*	*1.366*	*1.365*	*1.364*	*1.364*
60.0	*1.337*	*1.337*	*1.338*	*1.337*	*1.343*	*1.349*	*1.354*	*1.356*	*1.354*	*1.354*	*1.353*
62.0	*1.329*	*1.329*	*1.329*	*1.328*	*1.334*	*1.340*	*1.344*	*1.345*	*1.344*	*1.343*	
64.0	*1.320*	*1.320*	*1.320*	*1.319*	*1.325*	*1.330*	*1.335*	*1.334*	*1.333*		
66.0	*1.312*	*1.311*	*1.311*	*1.310*	*1.316*	*1.321*	*1.325*	*1.323*			
68.0	*1.303*	*1.303*	*1.302*	*1.301*	*1.306*	*1.311*	*1.315*				
70.0	*1.295*	*1.294*	*1.293*	*1.292*	*1.297*	*1.302*					
72.0	*1.286*	*1.285*	*1.285*	*1.283*	*1.288*						
74.0	*1.278*	*1.277*	*1.276*	*1.274*							
76.0	*1.269*	*1.268*	*1.267*								
78.0	*1.261*	*1.260*	*DATA GIVEN ABOVE ISA+40 ARE TO BE USED FOR FLEX TAKEOFF ONLY*								

TAKEOFF

V2527E-A5	TAKE-OFF EPR	NO AIR BLEED	MACH=.000
CORRECTIONS FOR AIR BLEED			
AIR CONDITIONING ON		SUBTRACT -.015 FROM EPR	
NACELLE ANTI-ICE ON		READ AT ACTUAL OAT +5.(°C)	
NACELLE ANTI-ICE AND WING ANTI-ICE ON		READ AT ACTUAL OAT +5.(°C) AND SUBTRACT -.010 FROM EPR	

OAT (°C)	PRESSURE ALTITUDE (FT)										
	5000.	6000.	7000.	8000.	9000.	10000.	11000.	12000.	13000.	14000.	14500.
–40.0	1.527	1.560	1.583	1.607	1.606	1.605	1.607	1.605	1.604	1.606	1.607
–20.0	1.527	1.560	1.583	1.607	1.606	1.605	1.607	1.605	1.604	1.606	1.607
0.0	1.527	1.560	1.583	1.607	1.606	1.605	1.607	1.605	1.604	1.606	1.607
10.0	1.527	1.560	1.583	1.607	1.606	1.605	1.607	1.605	1.604	1.606	1.607
11.0	1.527	1.560	1.583	1.607	1.606	1.605	1.607	1.605	1.604	1.606	1.607
12.0	1.527	1.560	1.583	1.607	1.606	1.605	1.607	1.605	1.604	1.606	1.607
12.0	1.527	1.560	1.583	1.607	1.606	1.605	1.606	1.605	1.604	1.606	1.607
12.0	1.527	1.560	1.583	1.607	1.606	1.605	1.606	1.604	1.604	1.606	1.607
15.0	1.527	1.560	1.583	1.602	1.601	1.598	1.596	1.595	1.596	1.599	1.601
18.0	1.527	1.560	1.578	1.591	1.588	1.585	1.584	1.584	1.586	1.589	1.589
20.0	1.527	1.556	1.571	1.581	1.578	1.576	1.575	1.576	1.578	1.578	1.578
22.0	1.527	1.552	1.564	1.571	1.568	1.566	1.566	1.567	1.567	1.567	1.568
24.0	1.525	1.548	1.557	1.560	1.557	1.555	1.556	1.555	1.556	1.556	1.557
26.0	1.522	1.544	1.550	1.548	1.545	1.545	1.544	1.544	1.544	1.545	1.545
28.0	1.520	1.540	1.538	1.535	1.534	1.533	1.532	1.532	1.532	*1.533*	*1.534*
30.0	1.518	1.529	1.526	1.523	1.521	1.521	1.520	1.520	*1.521*	*1.522*	*1.522*
32.0	1.507	1.518	1.514	1.510	1.509	1.508	1.507	*1.508*	*1.509*	*1.510*	*1.510*
34.0	1.493	1.505	1.501	1.497	1.496	1.495	*1.495*	*1.497*	*1.498*	*1.498*	*1.498*
36.0	1.480	1.492	1.488	1.484	1.483	*1.483*	*1.484*	*1.485*	*1.486*	*1.486*	*1.486*
38.0	1.468	1.478	1.475	1.470	*1.470*	*1.472*	*1.473*	*1.474*	*1.474*	*1.474*	*1.474*
40.0	1.455	1.465	1.462	*1.458*	*1.460*	*1.461*	*1.462*	*1.463*	*1.463*	*1.463*	*1.462*
42.0	1.444	1.453	*1.449*	*1.447*	*1.449*	*1.450*	*1.451*	*1.451*	*1.451*	*1.451*	*1.450*
44.0	1.433	*1.441*	*1.439*	*1.437*	*1.438*	*1.439*	*1.440*	*1.440*	*1.440*	*1.439*	*1.438*
46.0	*1.423*	*1.431*	*1.428*	*1.426*	*1.428*	*1.428*	*1.429*	*1.429*	*1.428*	*1.427*	*1.427*
48.0	*1.413*	*1.420*	*1.418*	*1.416*	*1.417*	*1.418*	*1.418*	*1.417*	*1.417*	*1.415*	*1.415*
50.0	*1.403*	*1.409*	*1.407*	*1.406*	*1.406*	*1.407*	*1.407*	*1.406*	*1.405*	*1.404*	
52.0	*1.393*	*1.398*	*1.397*	*1.395*	*1.396*	*1.396*	*1.396*	*1.395*	*1.394*		
54.0	*1.383*	*1.388*	*1.386*	*1.385*	*1.385*	*1.385*	*1.384*	*1.383*			
56.0	*1.374*	*1.377*	*1.376*	*1.374*	*1.375*	*1.374*	*1.373*				
58.0	*1.364*	*1.366*	*1.365*	*1.364*	*1.364*	*1.363*					
60.0	*1.354*	*1.356*	*1.354*	*1.354*	*1.353*						
62.0	*1.344*	*1.345*	*1.344*	*1.343*							
64.0	*1.335*	*1.334*	*1.333*								
66.0	*1.325*	*1.323*									
68.0	*1.315*										
	DATA GIVEN ABOVE ISA+40 ARE TO BE USED FOR FLEX TAKEOFF ONLY										

TAKEOFF

PW6122A	TAKE OFF N1	NO AIR BLEED	MACH=.000
N1 CORRECTIONS FOR AIR BLEED		OAT<ISA+15	OAT≥ISA+15
AIR CONDITIONING ON		–1.60	–1.60
NACELLE ANTI ICE ON		0.00	–2.80
NACELLE AND WING ANTI ICE ON		0.00	–3.70

OAT (°C)	PRESSURE ALTITUDE (FT)									
	–2000.	–1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.
–54.0	75.0	76.2	77.4	78.0	78.7	79.7	80.6	81.3	82.2	83.1
–50.0	75.6	76.8	78.1	78.6	79.3	80.3	81.2	81.9	82.8	83.7
–46.0	76.3	77.5	78.7	79.3	79.9	80.9	81.8	82.5	83.4	84.3
–42.0	76.9	78.1	79.3	79.9	80.5	81.5	82.4	83.1	84.0	85.0
–38.0	77.5	78.7	79.9	80.5	81.1	82.1	83.0	83.7	84.7	85.6
–34.0	78.1	79.3	80.5	81.1	81.7	82.7	83.6	84.3	85.2	86.2
–30.0	78.7	79.9	81.1	81.7	82.3	83.3	84.1	84.9	85.8	86.8
–26.0	79.3	80.5	81.7	82.3	82.9	83.8	84.7	85.5	86.4	87.4
–22.0	79.9	81.1	82.3	82.9	83.5	84.4	85.3	86.1	87.0	87.9
–18.0	80.4	81.6	82.9	83.4	84.0	85.0	85.8	86.6	87.6	88.5
–14.0	81.0	82.2	83.4	84.0	84.6	85.5	86.4	87.2	88.1	89.1
–10.0	81.6	82.8	84.0	84.6	85.2	86.1	86.9	87.7	88.7	89.7
–6.0	82.2	83.4	84.6	85.1	85.7	86.6	87.5	88.3	89.3	90.2
–2.0	82.7	83.9	85.1	85.7	86.3	87.2	88.0	88.8	89.8	90.8
2.0	83.3	84.5	85.7	86.3	86.9	87.7	88.6	89.4	90.4	91.3
6.0	83.8	85.0	86.2	86.8	87.4	88.3	89.1	89.9	90.9	91.9
10.0	84.4	85.6	86.8	87.4	88.0	88.8	89.6	90.4	91.4	92.4
14.0	84.9	86.1	87.3	87.9	88.5	89.3	90.1	91.0	92.0	93.0
18.0	85.5	86.7	87.9	88.5	89.0	89.8	90.7	91.5	92.5	*92.7*
22.0	86.0	87.2	88.4	89.0	89.6	90.4	91.2	*91.4*	*91.2*	*91.0*
26.0	86.6	87.7	88.9	89.5	90.1	*90.4*	*90.2*	*90.0*	*89.9*	*89.7*
30.0	87.1	88.3	89.5	*89.6*	*89.5*	*89.4*	*89.3*	*89.1*	*89.0*	*88.9*
34.0	*87.6*	*88.4*	*88.9*	*88.8*	*88.7*	*88.6*	*88.6*	*88.5*	*88.4*	*88.3*
38.0	*87.2*	*87.8*	*88.3*	*88.2*	*88.1*	*88.1*	*88.0*	*88.0*	*87.9*	*87.9*
42.0	*86.6*	*87.1*	*87.7*	*87.7*	*87.6*	*87.6*	*87.5*	*87.5*	*87.4*	
46.0	*86.0*	*86.6*	*87.2*	*87.2*	*87.1*	*87.1*	*87.1*			
50.0	*85.4*	*86.0*	*86.7*	*86.7*	*86.6*					
54.0	*84.8*	*85.5*	*86.2*			OAT<ISA+15				
58.0	*84.4*									
62.0						OAT≥ISA+15				

TAKEOFF

PW6122A	TAKE OFF N1	NO AIR BLEED	MACH=.000
N1 CORRECTIONS FOR AIR BLEED		OAT<ISA+15	OAT≥ISA+15
AIR CONDITIONING ON		–1.60	–1.60
NACELLE ANTI ICE ON		0.00	–2.80
NACELLE AND WING ANTI ICE ON		0.00	–3.70

OAT (°C)	PRESSURE ALTITUDE (FT)								
	7000.	8000.	9000.	10000.	11000.	12000.	13000.	14000.	14500.
–54.0	83.1	84.4	85.7	87.0	87.2	87.5	87.7	88.0	88.4
–50.0	83.7	85.0	86.3	87.6	87.9	88.1	88.4	88.6	89.0
–46.0	84.3	85.7	87.0	88.3	88.5	88.8	89.0	89.3	89.7
–42.0	85.0	86.3	87.6	88.9	89.2	89.4	89.7	90.0	90.3
–38.0	85.6	86.9	88.2	89.5	89.8	90.1	90.3	90.6	91.0
–34.0	86.2	87.5	88.8	90.2	90.4	90.7	91.0	91.2	91.6
–30.0	86.8	88.1	89.5	90.8	91.1	91.3	91.6	91.9	92.3
–26.0	87.4	88.7	90.1	91.4	91.7	92.0	92.2	92.5	92.9
–22.0	87.9	89.3	90.7	92.0	92.3	92.6	92.8	93.1	93.5
–18.0	88.5	89.9	91.3	92.6	92.9	93.2	93.4	93.7	94.1
–14.0	89.1	90.5	91.8	93.2	93.5	93.8	94.1	94.3	94.7
–10.0	89.7	91.0	92.4	93.8	94.1	94.4	94.7	94.9	95.3
–6.0	90.2	91.6	93.0	94.4	94.7	95.0	95.2	95.5	95.9
–2.0	90.8	92.2	93.6	95.0	95.3	95.6	95.8	96.1	96.3
2.0	91.3	92.7	94.2	95.6	95.9	96.1	96.4	96.7	*96.8*
6.0	91.9	93.3	94.7	96.1	96.4	96.7	*96.8*	*96.8*	*96.8*
10.0	92.4	93.9	95.3	96.7	*96.8*	*96.8*	*96.8*	*96.8*	*96.8*
14.0	93.0	94.4	*95.5*	*96.8*	96.8	96.6	*96.6*	*96.3*	*96.1*
18.0	*92.7*	*93.5*	*94.9*	*96.5*	96.3	95.8	*95.3*	*95.0*	*95.0*
22.0	*91.0*	*92.4*	*94.0*	*95.3*	94.6	94.1	*94.0*	*94.1*	*94.1*
26.0	*89.7*	*91.2*	*92.4*	*93.1*	93.0	92.9	*93.0*	*93.1*	*93.2*
30.0	*88.9*	*90.1*	*91.1*	*91.8*	91.8	92.0			
34.0	*88.3*	*89.3*	*90.2*	*90.9*					
38.0	*87.9*	*88.7*							
42.0									
46.0					OAT<ISA+15				
50.0									
54.0								OAT≥ISA+15	

TAKEOFF

V2527E-A5	TAKEOFF EPR	NO AIR BLEED	MACH=.000
CORRECTIONS FOR AIR BLEED			
AIR CONDITIONING ON	SUBTRACT .010 FROM EPR		
ENGINE ANTI-ICE ON	READ AT ACTUAL OAT +5. (°C)		
ENGINE ANTI-ICE AND WING ANTI-ICE ON	READ AT ACTUAL OAT +5. (°C) AND SUBTRACT .007 FROM EPR		

OAT (C)	PRESSURE ALTITUDE (FT)										
	–1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.	8000.	8500.
–40.0	1.378	1.397	1.418	1.441	1.469	1.496	1.527	1.560	1.583	1.607	1.606
–20.0	1.378	1.397	1.418	1.441	1.469	1.496	1.527	1.560	1.583	1.607	1.606
0.0	1.378	1.397	1.418	1.441	1.469	1.496	1.527	1.560	1.583	1.607	1.606
10.0	1.378	1.397	1.418	1.441	1.469	1.496	1.527	1.560	1.583	1.597	1.597
13.0	1.378	1.397	1.418	1.441	1.469	1.496	1.527	1.560	1.583	1.591	1.591
15.0	1.378	1.397	1.418	1.441	1.469	1.496	1.527	1.560	1.583	1.587	1.587
17.0	1.378	1.397	1.418	1.441	1.469	1.496	1.527	1.560	1.581	1.583	1.583
20.0	1.378	1.397	1.418	1.441	1.469	1.496	1.527	1.556	1.571	1.577	1.577
22.0	1.378	1.397	1.418	1.441	1.469	1.496	1.527	1.552	1.564	1.571	1.569
24.0	1.378	1.397	1.418	1.441	1.469	1.496	1.525	1.548	1.557	1.560	1.558
26.0	1.378	1.397	1.418	1.441	1.469	1.496	1.522	1.544	1.550	1.548	1.546
28.0	1.378	1.397	1.418	1.441	1.469	1.496	1.520	1.540	1.538	1.535	1.534
30.0	1.378	1.397	1.418	1.441	1.469	1.495	1.518	1.529	1.526	1.523	1.522
31.0	1.378	1.397	1.418	1.441	1.469	1.494	1.513	1.523	1.520	1.516	1.516
33.0	1.378	1.397	1.418	1.441	1.468	1.489	1.500	1.512	1.507	1.504	1.503
35.0	1.378	1.397	1.418	1.441	1.465	1.479	1.487	1.498	1.494	1.490	1.490
38.0	1.378	1.397	1.418	1.439	1.454	1.462	1.468	1.478	1.475	1.470	1.470
40.0	1.378	1.397	1.418	1.434	1.445	1.450	1.455	1.465	1.462	*1.458*	*1.459*
42.0	1.378	1.397	1.417	1.427	1.433	1.438	1.444	1.453	*1.449*	*1.447*	*1.448*
44.0	1.378	1.397	1.412	1.415	1.421	1.427	1.433	*1.441*	*1.439*	*1.437*	*1.438*
46.0	1.378	1.397	1.403	1.404	1.410	1.416	*1.423*	*1.431*	*1.428*	*1.426*	*1.427*
48.0	1.378	1.390	1.394	1.394	1.400	*1.406*	*1.413*	*1.420*	*1.418*	*1.416*	*1.417*
50.0	1.378	1.383	1.384	1.383	*1.390*	*1.397*	*1.403*	*1.409*	*1.407*	*1.406*	*1.406*
52.0	1.374	1.373	1.374	*1.374*	*1.381*	*1.387*	*1.393*	*1.398*	*1.397*	*1.395*	*1.396*
54.0	1.364	1.364	*1.364*	*1.365*	*1.371*	*1.378*	*1.383*	*1.388*	*1.386*	*1.385*	
56.0	1.355	*1.355*	*1.355*	*1.355*	*1.362*	*1.368*	*1.374*	*1.377*	*1.376*		
58.0	*1.346*	*1.346*	*1.346*	*1.346*	*1.353*	*1.359*	*1.364*	*1.366*			
60.0	*1.337*	*1.337*	*1.338*	*1.337*	*1.343*	*1.349*	*1.354*				
62.0	*1.329*	*1.329*	*1.329*	*1.328*	*1.334*	*1.340*					
64.0	*1.320*	*1.320*	*1.320*	*1.319*	*1.325*						
66.0	*1.312*	*1.311*	*1.311*	*1.310*							
68.0	*1.303*	*1.303*	*1.302*								
70.0	*1.295*										
72.0			*DATA GIVEN ABOVE ISA+40 (C) ARE TO BE USED FOR FLEX TAKEOFF ONLY*								

TAKEOFF

V2527E-A5	TAKEOFF EPR	NO AIR BLEED	MACH=.000
CORRECTIONS FOR AIR BLEED			
AIR CONDITIONING ON	SUBTRACT .015 FROM EPR		
ENGINE ANTI-ICE ON	READ AT ACTUAL OAT +5. (°C)		
ENGINE ANTI-ICE AND WING ANTI-ICE ON	READ AT ACTUAL OAT +5. (°C) AND SUBTRACT .010 FROM EPR		

OAT (C)	PRESSURE ALTITUDE (FT)										
	5000.	6000.	7000.	8000.	9000.	10000.	11000.	12000.	13000.	14000.	14500.
–40.0	1.527	1.560	1.583	1.607	1.606	1.605	1.607	1.605	1.604	1.606	1.607
–20.0	1.527	1.560	1.583	1.607	1.606	1.605	1.607	1.605	1.604	1.606	1.607
0.0	1.527	1.560	1.583	1.607	1.606	1.605	1.607	1.605	1.604	1.606	1.607
10.0	1.527	1.560	1.583	1.597	1.597	1.597	1.597	1.597	1.597	1.597	1.597
13.0	1.527	1.560	1.583	1.591	1.591	1.591	1.591	1.591	1.591	1.591	1.591
15.0	1.527	1.560	1.583	1.587	1.587	1.587	1.587	1.587	1.587	1.587	1.587
17.0	1.527	1.560	1.581	1.583	1.583	1.583	1.583	1.583	1.583	1.583	1.583
18.0	1.527	1.560	1.578	1.581	1.581	1.581	1.581	1.581	1.581	1.581	1.581
19.0	1.527	1.558	1.575	1.579	1.579	1.579	1.579	1.579	1.579	1.579	1.579
20.0	1.527	1.556	1.571	1.577	1.577	1.576	1.575	1.576	1.577	1.577	1.577
22.0	1.527	1.552	1.564	1.571	1.568	1.566	1.566	1.567	1.567	1.567	1.568
24.0	1.525	1.548	1.557	1.560	1.557	1.555	1.556	1.555	1.556	1.556	1.557
26.0	1.522	1.544	1.550	1.548	1.545	1.545	1.544	1.544	1.544	1.545	1.545
28.0	1.520	1.540	1.538	1.535	1.534	1.533	1.532	1.532	1.532	*1.533*	*1.534*
30.0	1.518	1.529	1.526	1.523	1.521	1.521	1.520	1.520	*1.521*	*1.522*	*1.522*
32.0	1.507	1.518	1.514	1.510	1.509	1.508	1.507	*1.508*	*1.509*	*1.510*	*1.510*
34.0	1.493	1.505	1.501	1.497	1.496	1.495	*1.495*	*1.497*	*1.498*	*1.498*	*1.498*
36.0	1.480	1.492	1.488	1.484	1.483	*1.483*	*1.484*	*1.485*	*1.486*	*1.486*	*1.486*
38.0	1.468	1.478	1.475	1.470	*1.470*	*1.472*	*1.473*	*1.474*	*1.474*	*1.474*	*1.474*
40.0	1.455	1.465	1.462	*1.458*	*1.460*	*1.461*	*1.462*	*1.463*	*1.463*	*1.463*	*1.462*
42.0	1.444	1.453	*1.449*	*1.447*	*1.449*	*1.450*	*1.451*	*1.451*	*1.451*	*1.451*	
44.0	1.433	*1.441*	*1.439*	*1.437*	*1.438*	*1.439*	*1.440*	*1.440*	*1.440*		
46.0	*1.423*	*1.431*	*1.428*	*1.426*	*1.428*	*1.428*	*1.429*	*1.429*			
48.0	*1.413*	*1.420*	*1.418*	*1.416*	*1.417*	*1.418*	*1.418*				
50.0	*1.403*	*1.409*	*1.407*	*1.406*	*1.406*	*1.407*					
52.0	*1.393*	*1.398*	*1.397*	*1.395*	*1.396*						
54.0	*1.383*	*1.388*	*1.386*	*1.385*							
56.0	*1.374*	*1.377*	*1.376*								
58.0	*1.364*	*1.366*									
60.0	*1.354*		*DATA GIVEN ABOVE ISA+40 (C) ARE TO BE USED FOR FLEX TAKEOFF ONLY*								

GO AROUND

R

V2527-A5	GO-AROUND EPR	AIR COND ON	MACH=.225
CORRECTIONS FOR AIR BLEED			
AIR CONDITIONING OFF		ADD .010 TO EPR	
ENGINE ANTI ICE ON		READ AT TAT +5.(°C)	
ENGINE ANTI ICE AND WING ANTI ICE ON		READ AT TAT +5.(°C) AND SUBTRACT .007 FROM EPR	

TAT	PRESSURE ALTITUDE (FT)										
(°C)	–1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.	8000.	8500.
–60.0	1.391	1.411	1.428	1.446	1.457	1.466	1.475	1.485	1.496	1.507	1.509
–40.0	1.391	1.411	1.428	1.446	1.457	1.466	1.475	1.485	1.496	1.507	1.509
–20.0	1.391	1.411	1.428	1.446	1.457	1.466	1.475	1.485	1.496	1.507	1.509
0.0	1.391	1.411	1.428	1.446	1.457	1.466	1.475	1.485	1.496	1.507	1.509
10.0	1.391	1.411	1.428	1.446	1.457	1.466	1.475	1.485	1.496	1.507	1.509
20.0	1.391	1.411	1.428	1.446	1.457	1.466	1.475	1.485	1.496	1.507	1.509
22.0	1.391	1.411	1.428	1.446	1.457	1.466	1.475	1.485	1.496	1.507	1.509
24.0	1.391	1.411	1.428	1.446	1.457	1.466	1.475	1.485	1.496	1.507	1.509
26.0	1.391	1.411	1.428	1.446	1.457	1.466	1.475	1.485	1.496	1.507	1.509
28.0	1.391	1.411	1.428	1.446	1.457	1.466	1.475	1.485	1.496	1.502	1.500
30.0	1.391	1.411	1.428	1.446	1.457	1.466	1.475	1.485	1.492	1.492	1.491
32.0	1.391	1.411	1.428	1.446	1.457	1.466	1.475	1.482	1.482	1.482	1.480
34.0	1.391	1.411	1.428	1.446	1.457	1.466	1.471	1.472	1.472	1.471	1.470
36.0	1.391	1.411	1.428	1.446	1.457	1.466	1.462	1.463	1.462	1.460	1.459
38.0	1.391	1.411	1.428	1.446	1.457	1.458	1.453	1.452	1.451	1.450	1.448
40.0	1.391	1.411	1.428	1.446	1.455	1.449	1.443	1.442	1.440	1.439	1.438
42.0	1.391	1.411	1.428	1.446	1.444	1.438	1.433	1.431	1.430	1.429	
44.0	1.391	1.411	1.428	1.439	1.433	1.427	1.422	1.421	1.420		
46.0	1.391	1.411	1.428	1.428	1.422	1.416	1.411	1.410			
48.0	1.391	1.411	1.417	1.416	1.411	1.406	1.401				
50.0	1.391	1.407	1.406	1.405	1.400	1.395					
52.0	1.391	1.396	1.396	1.395	1.390						
54.0	1.388	1.386	1.386	1.385							
56.0	1.377	1.377	1.376								
58.0	1.368	1.367									
60.0	1.359										

GO AROUND

R

V2527-A5	GO-AROUND EPR	AIR COND ON	MACH=.225
CORRECTIONS FOR AIR BLEED			
AIR CONDITIONING OFF		ADD .015 TO EPR	
ENGINE ANTI ICE ON		READ AT TAT +5.(°C)	
ENGINE ANTI ICE AND WING ANTI ICE ON		READ AT TAT +5.(°C) AND SUBSTRACT .010 FROM EPR	

TAT (°C)	PRESSURE ALTITUDE (FT)										
	5000.	6000.	7000.	8000.	9000.	10000.	11000.	12000.	13000.	14000.	14500.
–60.0	1.475	1.485	1.496	1.507	1.512	1.518	1.523	1.529	1.534	1.539	1.542
–40.0	1.475	1.485	1.496	1.507	1.512	1.518	1.523	1.529	1.534	1.539	1.542
–20.0	1.475	1.485	1.496	1.507	1.512	1.518	1.523	1.529	1.534	1.539	1.542
0.0	1.475	1.485	1.496	1.507	1.512	1.518	1.523	1.529	1.534	1.539	1.542
5.0	1.475	1.485	1.496	1.507	1.512	1.518	1.523	1.529	1.534	1.539	1.542
10.0	1.475	1.485	1.496	1.507	1.512	1.518	1.523	1.529	1.534	1.539	1.542
12.0	1.475	1.485	1.496	1.507	1.512	1.518	1.523	1.529	1.534	1.539	1.542
14.0	1.475	1.485	1.496	1.507	1.512	1.518	1.523	1.529	1.534	1.539	1.542
16.0	1.475	1.485	1.496	1.507	1.512	1.518	1.523	1.529	1.534	1.537	1.538
18.0	1.475	1.485	1.496	1.507	1.512	1.518	1.523	1.529	1.532	1.533	1.534
20.0	1.475	1.485	1.496	1.507	1.512	1.518	1.523	1.526	1.526	1.529	1.528
22.0	1.475	1.485	1.496	1.507	1.512	1.518	1.520	1.520	1.521	1.518	1.516
24.0	1.475	1.485	1.496	1.507	1.512	1.515	1.513	1.513	1.510	1.506	1.504
26.0	1.475	1.485	1.496	1.507	1.509	1.506	1.506	1.502	1.499	1.494	1.492
28.0	1.475	1.485	1.496	1.502	1.499	1.498	1.495	1.491	1.487	1.483	1.480
30.0	1.475	1.485	1.492	1.492	1.490	1.487	1.484	1.480	1.476	1.471	
32.0	1.475	1.482	1.482	1.482	1.479	1.476	1.473	1.469	1.464		
34.0	1.471	1.472	1.472	1.471	1.468	1.465	1.462	1.458			
36.0	1.462	1.463	1.462	1.460	1.457	1.455	1.451				
38.0	1.453	1.452	1.451	1.450	1.447	1.444					
40.0	1.443	1.442	1.440	1.439	1.437						
42.0	1.433	1.431	1.430	1.429							
44.0	1.422	1.421	1.420								
46.0	1.411	1.410									
48.0	1.401										

GO AROUND

PW6122A	GO AROUND N1	AIR COND ON	MACH=.225
N1 CORRECTIONS FOR AIR BLEED		OAT<ISA+15	OAT≥ISA+15
AIR CONDITIONING OFF		1.60	1.60
NACELLE ANTI ICE ON		0.00	–2.50
NACELLE AND WING ANTI ICE ON		0.00	–3.60

TAT (°C)	PRESSURE ALTITUDE (FT)									
	–2000.	–1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.
–54.0	73.5	74.6	75.8	76.3	76.8	77.3	77.9	78.4	79.7	80.7
–50.0	74.2	75.3	76.4	76.9	77.4	78.0	78.5	79.0	80.3	81.3
–46.0	74.8	75.9	77.0	77.5	78.1	78.6	79.1	79.7	80.9	81.9
–42.0	75.4	76.5	77.6	78.2	78.7	79.2	79.7	80.3	81.5	82.5
–38.0	76.0	77.1	78.3	78.8	79.3	79.8	80.3	80.9	82.1	83.1
–34.0	76.6	77.7	78.8	79.3	79.9	80.4	80.9	81.5	82.7	83.7
–30.0	77.2	78.3	79.4	80.0	80.5	81.0	81.5	82.1	83.2	84.3
–26.0	77.8	78.9	80.1	80.6	81.1	81.6	82.1	82.7	83.8	84.9
–22.0	78.4	79.5	80.6	81.1	81.7	82.2	82.7	83.2	84.4	85.4
–18.0	79.0	80.1	81.2	81.7	82.2	82.8	83.3	83.8	84.9	86.0
–14.0	79.5	80.7	81.8	82.3	82.8	83.3	83.9	84.4	85.5	86.5
–10.0	80.1	81.2	82.4	82.9	83.4	83.9	84.4	85.0	86.1	87.1
–6.0	80.7	81.8	82.9	83.4	84.0	84.5	85.0	85.5	86.6	87.6
–2.0	81.2	82.4	83.5	84.0	84.5	85.0	85.6	86.1	87.2	88.2
2.0	81.8	82.9	84.1	84.6	85.1	85.6	86.1	86.6	87.7	88.7
6.0	82.3	83.5	84.6	85.1	85.6	86.1	86.7	87.2	88.2	89.3
10.0	82.9	84.0	85.2	85.7	86.2	86.7	87.2	87.7	88.8	89.8
14.0	83.4	84.6	85.7	86.2	86.7	87.2	87.8	88.3	89.3	90.3
18.0	84.0	85.1	86.3	86.8	87.3	87.8	88.3	88.8	89.8	90.8
22.0	84.5	85.7	86.8	87.3	87.8	88.3	88.8	89.4	*89.9*	*89.9*
26.0	85.0	86.2	87.3	87.8	88.3	88.8	*89.0*	*88.6*	*88.6*	*88.7*
30.0	85.6	86.7	87.9	88.4	*88.6*	*88.3*	*87.9*	*87.6*	*87.7*	*87.8*
34.0	86.1	87.2	*88.1*	*88.0*	*87.8*	*87.6*	*87.2*	*86.9*	*87.1*	*87.2*
38.0	*86.4*	*86.9*	*87.4*	*87.3*	*87.2*	*86.9*	*86.7*	*86.4*	*86.5*	*86.7*
42.0	*85.8*	*86.3*	*86.9*	*86.8*	*86.7*	*86.4*	*86.2*	*85.9*	*86.1*	*86.3*
46.0	*85.2*	*85.8*	*86.4*	*86.3*	*86.2*	*86.0*	*85.7*	*85.5*	*85.7*	
50.0	*84.6*	*85.2*	*85.9*	*85.8*	*85.7*	*85.5*	*85.3*			
54.0	*84.0*	*84.7*	*85.3*	*85.3*	*85.2*					
58.0	*83.6*	*84.3*	*84.9*			OAT<ISA+15				
62.0	*83.2*								OAT≥ISA+15	
66.0										

GO AROUND

PW6122A	GO AROUND N1	AIR COND ON	MACH=.225
N1 CORRECTIONS FOR AIR BLEED		OAT<ISA+15	OAT≥ISA+15
AIR CONDITIONING OFF		1.60	1.60
NACELLE ANTI ICE ON		0.00	–2.50
NACELLE AND WING ANTI ICE ON		0.00	–3.60

TAT (°C)	PRESSURE ALTITUDE (FT)								
	7000.	8000.	9000.	10000.	11000.	12000.	13000.	14000.	14500.
–54.0	80.7	82.4	84.1	85.7	86.1	86.5	86.8	87.1	87.2
–50.0	81.3	83.0	84.7	86.4	86.8	87.2	87.4	87.7	87.8
–46.0	81.9	83.6	85.3	87.0	87.4	87.8	88.1	88.4	88.5
–42.0	82.5	84.2	86.0	87.7	88.1	88.5	88.7	89.0	89.1
–38.0	83.1	84.8	86.6	88.3	88.7	89.1	89.4	89.6	89.8
–34.0	83.7	85.4	87.2	88.9	89.3	89.7	90.0	90.3	90.4
–30.0	84.3	86.0	87.8	89.5	89.9	90.3	90.6	90.9	91.0
–26.0	84.9	86.6	88.4	90.1	90.5	90.9	91.2	91.5	91.7
–22.0	85.4	87.2	89.0	90.7	91.1	91.6	91.8	92.1	92.3
–18.0	86.0	87.8	89.5	91.3	91.7	92.2	92.4	92.7	92.9
–14.0	86.5	88.3	90.1	91.9	92.3	92.8	93.0	93.3	93.5
–10.0	87.1	88.9	90.7	92.5	92.9	93.3	93.6	93.9	94.1
–6.0	87.6	89.5	91.3	93.1	93.5	93.9	94.2	94.5	94.7
–2.0	88.2	90.0	91.8	93.7	94.1	94.5	94.8	95.1	95.2
2.0	88.7	90.6	92.4	94.2	94.7	95.1	95.4	95.7	95.8
6.0	89.3	91.1	93.0	94.8	95.2	95.7	96.0	*96.1*	*96.1*
10.0	89.8	91.6	93.5	95.4	95.8	*96.1*	*96.1*	*96.1*	*96.1*
14.0	90.3	92.2	94.1	*95.8*	*95.9*	*96.1*	*95.9*	*96.0*	*96.1*
18.0	90.8	*92.4*	*93.8*	*95.8*	*95.6*	*95.6*	*95.2*	*94.5*	*94.2*
22.0	*89.9*	*91.4*	*93.1*	*94.9*	*94.5*	*93.7*	*93.0*	*92.8*	*92.7*
26.0	*88.7*	*90.4*	*91.9*	*92.6*	*91.8*	*91.6*	*91.5*	*91.4*	*91.3*
30.0	*87.8*	*89.2*	*89.9*	*90.3*	*90.2*	*90.2*	*90.2*	*89.9*	
34.0	*87.2*	*88.1*	*88.6*	*88.8*	*89.0*	*89.1*			
38.0	*86.7*	*87.3*	*87.7*	*87.9*					
42.0	*86.3*	*86.7*							
46.0					OAT<ISA+15				
50.0									
54.0								OAT≥ISA+15	

GO AROUND

R

V2527E-A5	GO-AROUND EPR	AIR COND ON	MACH=.225
CORRECTIONS FOR AIR BLEED			
AIR CONDITIONING OFF		ADD .010 TO EPR	
ENGINE ANTI ICE ON		READ AT TAT +5.(°C)	
ENGINE ANTI ICE AND WING ANTI ICE ON		READ AT TAT +5.(°C) AND SUBTRACT .007 FROM EPR	

TAT	PRESSURE ALTITUDE (FT)										
(°C)	–1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.	8000.	8500.
–60.0	1.391	1.411	1.431	1.454	1.476	1.503	1.531	1.553	1.561	1.570	1.569
–40.0	1.391	1.411	1.431	1.454	1.476	1.503	1.531	1.553	1.561	1.570	1.569
–20.0	1.391	1.411	1.431	1.454	1.476	1.503	1.531	1.553	1.561	1.570	1.569
0.0	1.391	1.411	1.431	1.454	1.476	1.503	1.531	1.553	1.561	1.570	1.569
10.0	1.391	1.411	1.431	1.454	1.476	1.503	1.531	1.553	1.561	1.570	1.569
16.0	1.391	1.411	1.431	1.454	1.476	1.503	1.531	1.553	1.561	1.570	1.569
18.0	1.391	1.411	1.431	1.454	1.476	1.503	1.531	1.553	1.561	1.565	1.562
20.0	1.391	1.411	1.431	1.454	1.476	1.503	1.531	1.553	1.556	1.553	1.551
22.0	1.391	1.411	1.431	1.454	1.476	1.503	1.531	1.548	1.545	1.541	1.540
24.0	1.391	1.411	1.431	1.454	1.476	1.503	1.531	1.537	1.533	1.530	1.529
26.0	1.391	1.411	1.431	1.454	1.476	1.503	1.527	1.526	1.522	1.519	1.518
28.0	1.391	1.411	1.431	1.454	1.476	1.503	1.518	1.515	1.511	1.509	1.508
30.0	1.391	1.411	1.431	1.454	1.476	1.503	1.507	1.503	1.500	1.497	1.497
32.0	1.391	1.411	1.431	1.454	1.476	1.494	1.495	1.492	1.489	1.486	1.485
34.0	1.391	1.411	1.431	1.454	1.476	1.484	1.483	1.480	1.477	1.475	1.474
36.0	1.391	1.411	1.431	1.454	1.473	1.474	1.471	1.468	1.466	1.463	1.462
38.0	1.391	1.411	1.431	1.454	1.464	1.463	1.460	1.457	1.454	1.452	1.451
40.0	1.391	1.411	1.431	1.454	1.456	1.453	1.449	1.446	1.443	1.441	1.441
42.0	1.391	1.411	1.431	1.448	1.447	1.442	1.438	1.435	1.432	1.430	
44.0	1.391	1.411	1.431	1.440	1.436	1.431	1.426	1.423	1.421		
46.0	1.391	1.411	1.428	1.429	1.424	1.420	1.415	1.412			
48.0	1.391	1.411	1.418	1.418	1.413	1.409	1.403				
50.0	1.391	1.407	1.407	1.407	1.403	1.398					
52.0	1.391	1.396	1.397	1.396	1.392						
54.0	1.388	1.386	1.387	1.386							
56.0	1.377	1.377	1.377								
58.0	1.368	1.367									
60.0	1.359										

GO AROUND

R

V2527E-A5	GO-AROUND EPR	AIR COND ON	MACH=.225
CORRECTIONS FOR AIR BLEED			
AIR CONDITIONING OFF		ADD .015 TO EPR	
ENGINE ANTI ICE ON		READ AT TAT +5.(°C)	
ENGINE ANTI ICE AND WING ANTI ICE ON		READ AT TAT +5.(°C) AND SUBTRACT .010 FROM EPR	

TAT (°C)	PRESSURE ALTITUDE (FT)										
	5000.	6000.	7000.	8000.	9000.	10000.	11000.	12000.	13000.	14000.	14500.
–60.0	1.531	1.553	1.561	1.570	1.568	1.567	1.569	1.566	1.565	1.564	1.563
–40.0	1.531	1.553	1.561	1.570	1.568	1.567	1.569	1.566	1.565	1.564	1.563
–20.0	1.531	1.553	1.561	1.570	1.568	1.567	1.569	1.566	1.565	1.564	1.563
0.0	1.531	1.553	1.561	1.570	1.568	1.567	1.569	1.566	1.565	1.564	1.563
10.0	1.531	1.553	1.561	1.570	1.568	1.567	1.569	1.566	1.565	1.564	1.563
14.0	1.531	1.553	1.561	1.570	1.568	1.567	1.569	1.566	1.565	1.564	1.563
16.0	1.531	1.553	1.561	1.570	1.568	1.567	1.564	1.562	1.561	1.560	1.560
18.0	1.531	1.553	1.561	1.565	1.560	1.557	1.554	1.553	1.552	1.551	1.551
20.0	1.531	1.553	1.556	1.553	1.549	1.547	1.545	1.543	1.542	1.542	1.541
22.0	1.531	1.548	1.545	1.541	1.538	1.537	1.535	1.533	1.533	1.531	1.531
24.0	1.531	1.537	1.533	1.530	1.528	1.526	1.525	1.524	1.522	1.521	1.521
26.0	1.527	1.526	1.522	1.519	1.517	1.516	1.514	1.513	1.512	1.511	1.510
28.0	1.518	1.515	1.511	1.509	1.507	1.505	1.504	1.502	1.501	1.499	1.498
30.0	1.507	1.503	1.500	1.497	1.496	1.494	1.493	1.491	1.490	1.488	
32.0	1.495	1.492	1.489	1.486	1.485	1.483	1.482	1.480	1.478		
34.0	1.483	1.480	1.477	1.475	1.473	1.472	1.471	1.469			
36.0	1.471	1.468	1.466	1.463	1.462	1.461	1.459				
38.0	1.460	1.457	1.454	1.452	1.451	1.450					
40.0	1.449	1.446	1.443	1.441	1.440						
42.0	1.438	1.435	1.432	1.430							
44.0	1.426	1.423	1.421								
46.0	1.415	1.412									
48.0	1.403										

GO AROUND

V2524-A5	GO-AROUND EPR	AIR COND ON	MACH=.225
CORRECTIONS FOR AIR BLEED			
AIR CONDITIONING OFF		ADD .007 TO EPR	
ENGINE ANTI ICE ON		READ AT ACTUAL TAT +5 (°C)	
ENGINE ANTI ICE AND WING ANTI ICE ON		READ AT ACTUAL TAT +5 (°C) AND SUBTRACT .006 FROM EPR	

TAT (°C)	PRESSURE ALTITUDE (FT)									
	–2000.	–1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.
–60.0	1.327	1.344	1.361	1.373	1.387	1.402	1.416	1.430	1.442	1.454
0.0	1.327	1.344	1.361	1.373	1.387	1.402	1.416	1.430	1.442	1.454
30.0	1.327	1.344	1.361	1.373	1.387	1.402	1.416	1.430	1.442	1.454
32.0	1.327	1.344	1.361	1.373	1.387	1.402	1.416	1.430	1.442	1.454
34.0	1.327	1.344	1.361	1.373	1.387	1.402	1.416	1.430	1.442	1.454
36.0	1.327	1.344	1.361	1.373	1.387	1.402	1.416	1.430	1.442	1.451
38.0	1.327	1.344	1.361	1.373	1.387	1.402	1.416	1.430	1.439	1.447
40.0	1.327	1.344	1.361	1.373	1.387	1.402	1.416	1.427	1.436	1.441
42.0	1.327	1.344	1.361	1.373	1.387	1.402	1.416	1.424	1.430	1.430
44.0	1.327	1.344	1.361	1.373	1.387	1.402	1.414	1.419	1.420	1.420
46.0	1.327	1.344	1.361	1.373	1.387	1.402	1.409	1.410	1.410	
48.0	1.327	1.344	1.361	1.373	1.387	1.398	1.400	1.400		
50.0	1.327	1.344	1.361	1.373	1.387	1.391	1.392			
52.0	1.327	1.344	1.361	1.373	1.381	1.383				
54.0	1.327	1.344	1.361	1.373	1.374					
56.0	1.327	1.344	1.361	1.368						
58.0	1.327	1.344	1.361							
60.0	1.327	1.344								
62.0	1.327									

GO AROUND

V2524-A5	GO-AROUND EPR	AIR COND ON	MACH=.225
CORRECTIONS FOR AIR BLEED			
AIR CONDITIONING OFF	ADD .012 TO EPR		
ENGINE ANTI ICE ON	READ AT ACTUAL TAT +5 (°C)		
ENGINE ANTI ICE AND WING ANTI ICE ON	READ AT ACTUAL TAT +5 (°C) AND SUBTRACT .008 FROM EPR		

TAT (°C)	PRESSURE ALTITUDE (FT)									
	6000.	7000.	8000.	9000.	10000.	11000.	12000.	13000.	14000.	14500.
–60.0	1.442	1.454	1.466	1.478	1.491	1.502	1.514	1.522	1.529	1.533
0.0	1.442	1.454	1.466	1.478	1.491	1.502	1.514	1.522	1.529	1.533
19.0	1.442	1.454	1.466	1.478	1.491	1.502	1.514	1.522	1.529	1.533
20.0	1.442	1.454	1.466	1.478	1.491	1.502	1.514	1.522	1.529	1.529
22.0	1.442	1.454	1.466	1.478	1.491	1.502	1.514	1.522	1.519	1.516
24.0	1.442	1.454	1.466	1.478	1.491	1.502	1.514	1.511	1.506	1.504
26.0	1.442	1.454	1.466	1.478	1.491	1.502	1.503	1.499	1.494	1.492
28.0	1.442	1.454	1.466	1.478	1.491	1.493	1.491	1.487	1.483	1.480
30.0	1.442	1.454	1.466	1.478	1.483	1.483	1.480	1.475	1.471	
32.0	1.442	1.454	1.466	1.473	1.475	1.473	1.468	1.464		
34.0	1.442	1.454	1.462	1.467	1.466	1.461	1.457			
36.0	1.442	1.451	1.458	1.459	1.455	1.450				
38.0	1.439	1.447	1.451	1.447	1.444					
40.0	1.436	1.441	1.440	1.436						
42.0	1.430	1.430	1.429							
44.0	1.420	1.420								
46.0	1.410									

MAXIMUM CONTINUOUS

V2522/24	MAXIMUM CONTINUOUS EPR	AIR COND ON *	IAS=230 KT
CORRECTIONS FOR AIR BLEED			
AIR CONDITIONING OFF			.017
ENGINE ANTI ICE ON			–.017
ENGINE ANTI ICE AND WING ANTI ICE ON			–.037

TAT	PRESSURE ALTITUDE (FT)										
(°C)	0.	2000.	5000.	8000.	12000.	17000.	20000.	25000.	31000.	35000.	39000.
–60.0	1.265	1.284	1.313	1.343	1.426	1.485	1.453	1.454	1.492	1.505	1.494
–23.0	1.265	1.284	1.313	1.343	1.426	1.485	1.453	1.454	1.492	1.505	1.494
–21.0	1.265	1.284	1.313	1.343	1.426	1.485	1.453	1.454	1.492	1.497	1.493
–20.0	1.265	1.284	1.313	1.343	1.426	1.485	1.453	1.454	1.492	1.492	1.488
–19.0	1.265	1.284	1.313	1.343	1.426	1.485	1.453	1.454	1.492	1.487	1.482
–18.0	1.265	1.284	1.313	1.343	1.426	1.485	1.453	1.454	1.492	1.482	1.477
–16.0	1.265	1.284	1.313	1.343	1.426	1.485	1.453	1.454	1.483	1.472	1.466
–9.0	1.265	1.284	1.313	1.343	1.426	1.485	1.453	1.453	1.442	1.434	1.427
–8.0	1.265	1.284	1.313	1.343	1.426	1.485	1.453	1.447	1.437	1.427	1.420
–2.0	1.265	1.284	1.313	1.343	1.426	1.485	1.453	1.410	1.397	1.393	1.385
1.0	1.265	1.284	1.313	1.343	1.426	1.485	1.439	1.391	1.380	1.376	1.368
3.0	1.265	1.284	1.313	1.343	1.426	1.485	1.427	1.378	1.369	1.365	1.356
5.0	1.265	1.284	1.313	1.343	1.426	1.475	1.415	1.365	1.358	1.353	1.345
7.0	1.265	1.284	1.313	1.343	1.426	1.463	1.403	1.352	1.347	1.342	1.334
9.0	1.265	1.284	1.313	1.343	1.426	1.452	1.392	1.342	1.336	1.331	1.323
11.0	1.265	1.284	1.313	1.343	1.426	1.440	1.379	1.331	1.325		1.311
12.0	1.265	1.284	1.313	1.343	1.424	1.434	1.373	1.326	1.319		1.306
16.0	1.265	1.284	1.313	1.343	1.405	1.410	1.350	1.304			
18.0	1.265	1.284	1.313	1.343	1.396	1.398	1.339	1.293			
19.0	1.265	1.284	1.313	1.339	1.391	1.392	1.334	1.288			
20.0	1.265	1.284	1.313	1.334	1.387	1.387	1.329	1.283			
23.0	1.265	1.284	1.313	1.319	1.372	1.372	1.312				
25.0	1.265	1.284	1.306	1.310	1.361	1.361	1.302				
29.0	1.265	1.283	1.288	1.291	1.341	1.340	1.280				
30.0	1.265	1.278	1.283	1.288	1.336	1.335	1.275				
32.0	1.265	1.270	1.274	1.283	1.327	1.325					
34.0	1.257	1.261	1.265	1.277	1.318	1.314					
35.0	1.253	1.257	1.260	1.274	1.314						
40.0	1.238	1.239	1.248	1.257	1.291						
45.0	1.224	1.226	1.235	1.241							
50.0	1.211	1.213	1.222								
55.0	1.198	1.199									
60.0	1.185										
64.0											

* One engine inoperative – 1 pack operative on remaining engine.

MAXIMUM CLIMB

V2522/24	MAXIMUM CLIMB EPR	AIR COND ON	250/300/.78
CORRECTIONS FOR AIR BLEED			
AIR CONDITIONING OFF			.022
ENGINE ANTI ICE ON			–.019
ENGINE ANTI ICE AND WING ANTI ICE ON			–.033

TAT (°C)	PRESSURE ALTITUDE (FT)										
	0.	2000.	5000.	8000.	12000.	17000.	20000.	25000.	31000.	35000.	39000.
–60.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.491
–23.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.491
–21.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.491
–20.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.491
–19.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.491
–18.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.485
–16.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.479	1.473
–9.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.437	1.432
–8.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.431	1.426
–2.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.403	1.394	1.389
1.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.385	1.376	1.372
3.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.383	1.372	1.365	1.361
5.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.371	1.360	1.354	1.350
7.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.359	1.347	1.343	1.338
9.0	1.269	1.289	1.313	1.333	1.326	1.357	1.369	1.347	1.335	1.332	1.327
11.0	1.269	1.289	1.313	1.333	1.326	1.357	1.357	1.335	1.324	1.321	1.316
12.0	1.269	1.289	1.313	1.333	1.326	1.353	1.352	1.329	1.319	1.315	1.310
16.0	1.269	1.289	1.313	1.333	1.326	1.331	1.329	1.306	1.298	1.293	
18.0	1.269	1.289	1.313	1.333	1.326	1.320	1.317	1.295	1.287		
19.0	1.269	1.289	1.313	1.333	1.324	1.315	1.312	1.290	1.282		
20.0	1.269	1.289	1.313	1.333	1.319	1.309	1.307	1.285	1.277		
23.0	1.269	1.289	1.313	1.318	1.303	1.293	1.290	1.270	1.261		
25.0	1.269	1.289	1.313	1.308	1.293	1.282	1.280	1.260	1.250		
29.0	1.269	1.289	1.294	1.288	1.272	1.263	1.261	1.239			
30.0	1.269	1.289	1.290	1.283	1.267	1.258	1.257	1.234			
32.0	1.269	1.281	1.280	1.274	1.257	1.250	1.247	1.224			
34.0	1.267	1.272	1.271	1.265	1.248	1.241	1.238	1.214			
35.0	1.263	1.268	1.267	1.261	1.243	1.236	1.233				
40.0	1.243	1.246	1.246	1.242	1.223	1.214					
45.0	1.223	1.227	1.228	1.223	1.203						
50.0	1.205	1.210	1.210	1.204	1.183						
55.0	1.189	1.194	1.193								
60.0	1.173	1.177									
64.0	1.161										

MAXIMUM CONTINUOUS

PW6122A	MAXIMUM CONTINUOUS N1	AIR COND ON	IAS=230KT
N1 CORRECTIONS FOR AIR BLEED		OAT<ISA+10	OAT≥ISA+10
AIR CONDITIONING OFF		2.80	2.80
NACELLE ANTI ICE ON		0.00	–1.80
NACELLE AND WING ANTI ICE ON*		0.00	–3.10

TAT (°C)	PRESSURE ALTITUDE (FT)										
	–1000.	3000.	7000.	11000.	15000.	19000.	23000.	27000.	31000.	35000.	39000.
–54.0	71.5	73.5	76.9	81.0	83.4	86.1	83.9	82.0	82.7	83.9	86.5
–50.0	72.2	74.1	77.5	81.6	84.0	86.7	84.5	82.6	83.4	84.5	87.2
–46.0	72.8	74.7	78.1	82.2	84.6	87.4	85.2	83.2	84.0	85.1	87.8
–42.0	73.4	75.3	78.8	82.8	85.2	88.0	85.8	83.8	84.6	85.7	88.4
–38.0	74.0	75.9	79.4	83.4	85.8	88.6	86.4	84.4	85.2	86.3	89.1
–34.0	74.6	76.5	80.0	84.0	86.4	89.3	87.0	85.0	85.8	86.9	89.7
–30.0	75.2	77.1	80.6	84.6	87.0	89.9	87.6	85.6	86.4	87.6	90.3
–26.0	75.8	77.7	81.2	85.1	87.6	90.5	88.2	86.2	87.0	88.1	90.9
–22.0	76.4	78.3	81.7	85.7	88.2	91.1	88.8	86.8	87.6	*88.4*	91.5
–18.0	76.9	78.9	82.3	86.3	88.8	91.7	89.4	87.3	88.1	*87.1*	*90.9*
–14.0	77.5	79.5	82.9	86.8	89.4	92.3	90.0	87.9	*87.0*	*85.7*	*89.7*
–10.0	78.1	80.0	83.5	87.4	89.9	92.9	90.5	*87.6*	*85.5*	*84.3*	*88.3*
–6.0	78.6	80.6	84.0	87.9	90.5	93.4	*91.1*	*86.2*	*84.2*	*83.1*	*86.8*
–2.0	79.2	81.2	84.6	88.5	91.1	94.0	*89.9*	*84.9*	*83.3*	*82.4*	*85.5*
2.0	79.8	81.7	85.2	89.0	91.6	*93.7*	*88.5*	*84.0*	*82.6*	*81.8*	*84.5*
6.0	80.3	82.3	85.7	89.6	92.2	*92.3*	*86.9*	*83.2*	*82.0*	*81.3*	*83.9*
10.0	80.9	82.8	86.3	90.1	*91.1*	*90.5*	*85.6*	*82.5*	*81.5*	*80.8*	*83.3*
14.0	81.4	83.4	86.8	*90.2*	*89.7*	*89.0*	*84.4*	*82.0*	*81.0*		
18.0	81.9	83.9	87.4	*88.7*	*88.4*	*87.7*	*83.6*	*81.5*			
22.0	82.5	84.5	*87.1*	*87.7*	*87.6*	*86.6*	*83.0*				
26.0	83.0	85.0	*86.1*	*87.0*	*87.0*	*85.9*					
30.0	83.5	*84.5*	*85.5*	*86.5*	*86.5*	*85.2*					
34.0	*84.1*	*83.8*	*84.9*	*86.0*	*86.1*						
38.0	*83.3*	*83.2*	*84.4*	*85.6*							
42.0	*82.7*	*82.6*	*83.9*	*85.2*							
46.0	*82.1*	*82.2*	*83.5*				OAT<ISA+10				
50.0	*81.6*	*81.7*	*83.0*								
54.0	*81.1*	*81.3*									OAT≥ISA+10
58.0	*80.7*										

* One pack operative on the remaining engine.

MAXIMUM CLIMB

PW6122A	MAXIMUM CLIMB N1	AIR COND ON	250/300/.78
N1 CORRECTIONS FOR AIR BLEED		OAT<ISA+10	OAT≥ISA+10
AIR CONDITIONING OFF		1.90	1.90
NACELLE ANTI ICE ON		0.00	–1.60
NACELLE AND WING ANTI ICE ON		0.00	–2.50

TAT (°C)	PRESSURE ALTITUDE (FT)										
	–1000.	3000.	7000.	11000.	15000.	19000.	23000.	27000.	31000.	35000.	39000.
–54.0	69.8	71.0	72.6	73.0	74.4	75.8	76.6	77.6	79.1	81.9	86.5
–50.0	70.4	71.7	73.2	73.6	75.0	76.4	77.3	78.2	79.8	82.6	87.1
–46.0	71.0	72.3	73.8	74.2	75.6	77.1	77.9	78.8	80.4	83.2	87.8
–42.0	71.6	72.9	74.4	74.8	76.2	77.7	78.5	79.4	81.0	83.8	88.4
–38.0	72.2	73.5	75.0	75.4	76.8	78.3	79.1	80.1	81.6	84.4	89.0
–34.0	72.8	74.1	75.6	76.0	77.4	78.9	79.7	80.7	82.2	85.0	89.6
–30.0	73.4	74.7	76.2	76.6	78.0	79.5	80.3	81.3	82.7	85.6	90.3
–26.0	74.0	75.3	76.8	77.2	78.6	80.1	80.9	81.8	83.3	86.1	90.9
–22.0	74.6	75.8	77.4	77.8	79.2	80.7	81.5	82.4	83.9	86.7	91.5
–18.0	75.1	76.4	78.0	78.4	79.8	81.3	82.1	83.0	84.5	87.3	*91.7*
–14.0	75.7	77.0	78.5	78.9	80.4	81.8	82.6	83.6	85.0	*86.7*	*90.5*
–10.0	76.3	77.6	79.1	79.5	80.9	82.4	83.2	84.2	85.6	*85.3*	*89.1*
–6.0	76.8	78.1	79.7	80.1	81.5	83.0	83.8	84.7	*85.5*	*84.1*	*87.7*
–2.0	77.4	78.7	80.2	80.6	82.1	83.5	84.3	85.3	*84.5*	*83.3*	*86.2*
2.0	78.0	79.2	80.8	81.2	82.6	84.1	84.9	*84.7*	*83.8*	*82.7*	*85.2*
6.0	78.5	79.8	81.3	81.8	83.2	84.6	*84.7*	*84.0*	*83.2*	*82.3*	*84.6*
10.0	79.1	80.3	81.9	82.3	83.7	*84.8*	*84.1*	*83.5*	*82.7*	*81.8*	*84.1*
14.0	79.6	80.9	82.4	82.9	84.3	*84.3*	*83.6*	*83.0*	*82.3*	*81.3*	*83.5*
18.0	80.1	81.4	83.0	83.4	*83.8*	*83.8*	*83.2*	*82.5*	*81.8*		
22.0	80.7	82.0	*83.4*	*83.4*	*83.4*	*83.3*	*82.7*	*82.1*	*81.4*		
26.0	81.2	82.5	*82.9*	*83.0*	*82.9*	*82.8*	*82.3*	*81.7*	*80.9*		
30.0	81.7	*82.6*	*82.3*	*82.5*	*82.3*	*82.3*	*82.0*	*81.3*			
34.0	82.2	*82.0*	*81.8*	*82.0*	*81.8*	*82.0*	*81.6*				
38.0	*82.0*	*81.5*	*81.3*	*81.6*	*81.4*	*81.6*					
42.0	*81.5*	*80.9*	*80.8*	*81.2*	*81.1*						
46.0	*81.0*	*80.4*	*80.4*	*80.9*	*80.7*						
50.0	*80.4*	*80.0*	*80.0*	*80.5*							
54.0	*80.0*	*79.6*									
58.0	*79.5*	*79.2*									
62.0	*79.2*										
66.0	*78.8*										

OAT<ISA+10

OAT≥ISA+10

MAXIMUM CONTINUOUS

V2527/27E	MAXIMUM CONTINUOUS EPR	AIR COND ON*	IAS=230 KT
CORRECTIONS FOR AIR BLEED			
AIR CONDITIONING OFF			.017
ENGINE ANTI-ICE ON			–.017
ENGINE ANTI-ICE AND WING ANTI-ICE ON			–.037

TAT (C)	PRESSURE ALTITUDE (FT)										
	0.	2000.	5000.	8000.	12000.	17000.	20000.	25000.	31000.	35000.	39000.
–50.0	1.285	1.298	1.335	1.442	1.490	1.554	1.588	1.591	1.492	1.505	1.494
–46.0	1.285	1.298	1.335	1.442	1.490	1.554	1.588	1.591	1.492	1.505	1.494
–42.0	1.285	1.298	1.335	1.442	1.490	1.554	1.588	1.591	1.492	1.505	1.494
–38.0	1.285	1.298	1.335	1.442	1.490	1.554	1.588	1.591	1.492	1.505	1.494
–34.0	1.285	1.298	1.335	1.442	1.490	1.554	1.588	1.591	1.492	1.505	1.494
–30.0	1.285	1.298	1.335	1.442	1.490	1.554	1.588	1.591	1.492	1.505	1.494
–26.0	1.285	1.298	1.335	1.442	1.490	1.554	1.588	1.591	1.492	1.505	1.494
–22.0	1.285	1.298	1.335	1.442	1.490	1.554	1.588	1.591	1.492	1.502	1.494
–18.0	1.285	1.298	1.335	1.442	1.490	1.554	1.588	1.591	1.492	1.482	1.477
–14.0	1.285	1.298	1.335	1.442	1.490	1.554	1.588	1.591	1.471	1.462	1.455
–10.0	1.285	1.298	1.335	1.442	1.490	1.554	1.588	1.591	1.448	1.440	1.433
–6.0	1.285	1.298	1.335	1.442	1.490	1.554	1.588	1.575	1.424	1.415	1.408
–2.0	1.285	1.298	1.335	1.442	1.490	1.554	1.588	1.553	1.397	1.393	1.385
2.0	1.285	1.298	1.335	1.442	1.490	1.554	1.569	1.532	1.375	1.370	1.362
6.0	1.285	1.298	1.335	1.442	1.490	1.538	1.548	1.508	1.352	1.348	1.340
10.0	1.285	1.298	1.335	1.442	1.490	1.513	1.526	1.483	1.330	1.325	1.317
14.0	1.285	1.298	1.335	1.442	1.474	1.488	1.503	1.458	1.308		
18.0	1.285	1.298	1.335	1.442	1.449	1.463	1.478	1.432			
22.0	1.285	1.298	1.335	1.418	1.424	1.438	1.453	1.407			
26.0	1.285	1.298	1.327	1.393	1.399	1.413	1.428				
30.0	1.285	1.294	1.316	1.368	1.375	1.388	1.403				
34.0	1.279	1.282	1.305	1.345	1.352	1.362					
38.0	1.265	1.269	1.296	1.325	1.329						
42.0	1.251	1.259	1.285	1.306	1.306						
46.0	1.239	1.249	1.274	1.287							
50.0	1.229	1.239	1.263								
54.0	1.220	1.229	1.252								
58.0	1.211	1.219									
62.0	1.201										
66.0											

* One engine inoperative – 1 pack operative on remaining engine.

MAXIMUM CLIMB

V2527-27E	MAXIMUM CLIMB EPR	AIR COND ON	250/300/.78
CORRECTIONS FOR AIR BLEED			
AIR CONDITIONING OFF			.018
ENGINE ANTI ICE ON			–.018
ENGINE ANTI ICE AND WING ANTI ICE ON			–.030

TAT (°C)	PRESSURE ALTITUDE (FT)										
	0.	2000.	5000.	8000.	12000.	17000.	20000.	25000.	31000.	35000.	39000.
–50.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.491
–46.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.491
–42.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.491
–38.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.491
–34.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.491
–30.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.491
–26.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.491
–22.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.491
–18.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.485
–14.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.467	1.462
–10.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.443	1.438
–6.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.428	1.419	1.414
–2.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.403	1.394	1.389
2.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.389	1.378	1.370	1.366
6.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.365	1.354	1.348	1.344
10.0	1.269	1.289	1.313	1.333	1.326	1.357	1.363	1.341	1.329	1.326	
14.0	1.269	1.289	1.313	1.333	1.326	1.342	1.340	1.317	1.308		
18.0	1.269	1.289	1.313	1.333	1.326	1.320	1.317	1.295	1.287		
22.0	1.269	1.289	1.313	1.323	1.308	1.298	1.296	1.275			
26.0	1.269	1.289	1.308	1.303	1.287	1.277	1.276	1.254			
30.0	1.269	1.289	1.290	1.283	1.267	1.258	1.257				
34.0	1.267	1.272	1.271	1.265	1.248	1.241	1.238				
38.0	1.251	1.255	1.254	1.249	1.231	1.223					
42.0	1.234	1.238	1.238	1.234	1.215						
46.0	1.219	1.223	1.224								
50.0	1.205	1.210	1.210								
54.0	1.192	1.197									
58.0	1.180										
62.0											
66.0											

MAXIMUM CONTINUOUS

R

V2527/27E	MAXIMUM CONTINUOUS EPR	AIR COND ON *	IAS=230KT
CORRECTIONS FOR AIR BLEED			
AIR CONDITIONING OFF			.017
ENGINE ANTI ICE ON			–.017
ENGINE ANTI ICE AND WING ANTI ICE ON			–.037

TAT	PRESSURE ALTITUDE (FT)										
(°C)	0.	2000.	5000.	8000.	12000.	17000.	20000.	25000.	31000.	35000.	39000.
–50.0	1.285	1.298	1.335	1.442	1.479	1.525	1.546	1.550	1.492	1.505	1.494
–46.0	1.285	1.298	1.335	1.442	1.479	1.525	1.546	1.550	1.492	1.505	1.494
–42.0	1.285	1.298	1.335	1.442	1.479	1.525	1.546	1.550	1.492	1.505	1.494
–38.0	1.285	1.298	1.335	1.442	1.479	1.525	1.546	1.550	1.492	1.505	1.494
–34.0	1.285	1.298	1.335	1.442	1.479	1.525	1.546	1.550	1.492	1.505	1.494
–30.0	1.285	1.298	1.335	1.442	1.479	1.525	1.546	1.550	1.492	1.505	1.494
–26.0	1.285	1.298	1.335	1.442	1.479	1.525	1.546	1.550	1.492	1.505	1.494
–22.0	1.285	1.298	1.335	1.442	1.479	1.525	1.546	1.550	1.492	1.502	1.494
–18.0	1.285	1.298	1.335	1.442	1.479	1.525	1.546	1.550	1.492	1.482	1.477
–14.0	1.285	1.298	1.335	1.442	1.479	1.525	1.546	1.550	1.471	1.462	1.455
–10.0	1.285	1.298	1.335	1.442	1.479	1.525	1.546	1.550	1.448	1.440	1.433
–6.0	1.285	1.298	1.335	1.442	1.479	1.525	1.546	1.535	1.424	1.415	1.408
–2.0	1.285	1.298	1.335	1.442	1.479	1.525	1.546	1.515	1.397	1.393	1.385
2.0	1.285	1.298	1.335	1.442	1.479	1.525	1.529	1.495	1.375	1.370	1.362
6.0	1.285	1.298	1.335	1.442	1.479	1.509	1.509	1.472	1.352	1.348	1.340
10.0	1.285	1.298	1.335	1.442	1.479	1.485	1.489	1.449	1.330	1.325	1.317
14.0	1.285	1.298	1.335	1.442	1.464	1.461	1.467	1.425	1.308		
18.0	1.285	1.298	1.335	1.442	1.439	1.438	1.443	1.401			
22.0	1.285	1.298	1.335	1.418	1.415	1.414	1.419	1.377			
26.0	1.285	1.298	1.327	1.393	1.390	1.389	1.395				
30.0	1.285	1.294	1.316	1.368	1.367	1.365	1.372				
34.0	1.279	1.282	1.305	1.345	1.344	1.341					
38.0	1.265	1.269	1.296	1.325	1.321						
42.0	1.251	1.259	1.285	1.306	1.298						
46.0	1.239	1.249	1.274	1.287							
50.0	1.229	1.239	1.263								
54.0	1.220	1.229	1.252								
58.0	1.211	1.219									
62.0	1.201										
66.0											

* One engine inoperative – 1 pack operative on remaining engine.

MAXIMUM CLIMB

V2527-27E	MAXIMUM CLIMB EPR	AIR COND ON	250/300/.78
CORRECTIONS FOR AIR BLEED			
AIR CONDITIONING OFF			.018
ENGINE ANTI ICE ON			–.018
ENGINE ANTI ICE AND WING ANTI ICE ON			–.030

TAT (°C)	PRESSURE ALTITUDE (FT)										
	0.	2000.	5000.	8000.	12000.	17000.	20000.	25000.	31000.	35000.	39000.
–50.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.491
–46.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.491
–42.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.491
–38.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.491
–34.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.491
–30.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.491
–26.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.491
–22.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.491
–18.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.482	1.485
–14.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.467	1.462
–10.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.438	1.443	1.438
–6.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.428	1.419	1.414
–2.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.395	1.403	1.394	1.389
2.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.389	1.378	1.370	1.366
6.0	1.269	1.289	1.313	1.333	1.326	1.357	1.378	1.365	1.354	1.348	1.344
10.0	1.269	1.289	1.313	1.333	1.326	1.357	1.363	1.341	1.329	1.326	
14.0	1.269	1.289	1.313	1.333	1.326	1.342	1.340	1.317	1.308		
18.0	1.269	1.289	1.313	1.333	1.326	1.320	1.317	1.295	1.287		
22.0	1.269	1.289	1.313	1.323	1.308	1.298	1.296	1.275			
26.0	1.269	1.289	1.308	1.303	1.287	1.277	1.276	1.254			
30.0	1.269	1.289	1.290	1.283	1.267	1.258	1.257				
34.0	1.267	1.272	1.271	1.265	1.248	1.241	1.238				
38.0	1.251	1.255	1.254	1.249	1.231	1.223					
42.0	1.234	1.238	1.238	1.234	1.215						
46.0	1.219	1.223	1.224								
50.0	1.205	1.210	1.210								
54.0	1.192	1.197									
58.0	1.180										
62.0											
66.0											

MAXIMUM CRUISE

V2522/24	MAXIMUM CRUISE EPR	AIR COND ON	250/300/.78
CORRECTIONS FOR AIR BLEED			
AIR CONDITIONING OFF			.022
ENGINE ANTI ICE ON			–.019
ENGINE ANTI ICE AND WING ANTI ICE ON			–.033

TAT	PRESSURE ALTITUDE (FT)										
(°C)	0.	2000.	5000.	8000.	12000.	17000.	20000.	25000.	31000.	35000.	39000.
–60.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.368	1.412	1.421
–23.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.368	1.412	1.421
–21.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.368	1.412	1.421
–20.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.368	1.412	1.421
–19.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.368	1.412	1.421
–18.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.368	1.412	1.415
–16.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.368	1.409	1.403
–9.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.368	1.367	1.362
–8.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.368	1.361	1.356
–2.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.333	1.324	1.319
1.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.315	1.306	1.302
3.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.313	1.302	1.295	1.291
5.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.301	1.290	1.284	1.280
7.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.289	1.277	1.273	1.268
9.0	1.199	1.219	1.243	1.263	1.256	1.287	1.299	1.277	1.265	1.262	1.257
11.0	1.199	1.219	1.243	1.263	1.256	1.287	1.287	1.265	1.254	1.251	1.246
12.0	1.199	1.219	1.243	1.263	1.256	1.283	1.282	1.259	1.249	1.245	1.240
16.0	1.199	1.219	1.243	1.263	1.256	1.261	1.259	1.236	1.228	1.223	
18.0	1.199	1.219	1.243	1.263	1.256	1.250	1.247	1.225	1.217		
19.0	1.199	1.219	1.243	1.263	1.254	1.245	1.242	1.220	1.212		
20.0	1.199	1.219	1.243	1.263	1.249	1.239	1.237	1.215	1.207		
23.0	1.199	1.219	1.243	1.248	1.233	1.223	1.220	1.200	1.191		
25.0	1.199	1.219	1.243	1.238	1.223	1.212	1.210	1.190	1.180		
29.0	1.199	1.219	1.224	1.218	1.202	1.193	1.191	1.169			
30.0	1.199	1.219	1.220	1.213	1.197	1.188	1.187	1.164			
32.0	1.199	1.211	1.210	1.204	1.187	1.180	1.177	1.154			
34.0	1.197	1.202	1.201	1.195	1.178	1.171	1.168	1.144			
35.0	1.193	1.198	1.197	1.191	1.173	1.166	1.163				
40.0	1.173	1.176	1.176	1.172	1.153	1.144					
45.0	1.153	1.157	1.158	1.153	1.133						
50.0	1.135	1.140	1.140	1.134	1.113						
55.0	1.119	1.124	1.123								
60.0	1.103	1.107									
64.0	1.091										

N1 MODE THRUST CONTROL

In case of no EPR available, the thrust control automatically reverts to N1 mode (rated or unrated).
See 3.02.70 ENG EPR MODE FAULT abnormal procedure.
If the N1 rated mode is lost on both engines, refer to the power management tables given on the following pages.
The herebelow table gives the N1 to be set in cruise to maintain M.78.

	FLIGHT LEVEL					
WEIGHT (1000 KG)	**290**	**310**	**330**	**350**	**370**	**390**
44	76.1	75.7	75.3	75.0	75.3	76.3
46	76.1	75.8	75.4	75.2	76.1	76.7
48	76.2	75.9	75.6	75.5	76.1	77.2
50	76.3	76.0	75.8	75.8	76.5	77.6
52	76.4	76.1	76.0	76.1	76.9	78.0
54	76.5	76.3	76.3	76.5	77.3	78.7
56	76.6	76.5	76.6	76.8	77.6	79.4
58	76.7	76.7	76.9	77.2	78.1	80.1
60	76.9	77.0	77.2	77.6	78.7	81.0
62	77.1	77.2	77.5	78.0	79.4	82.0
64	77.3	77.5	77.8	78.4	80.0	
66	77.5	77.8	78.2	79.0	80.9	
68	77.8	78.0	78.6	79.6	81.7	
70	78.0	78.4	79.0	80.1	82.7	

Drift Down ceilings and go around performance are affected as follows :
Drift down ceiling :

R

Actual weight (1000 kg)	**40**	**50**	**60**	**70**	**75.5**
Ceiling penalty (ft)	3900	3900	2400	12000	11000

Go around weight :

R

Normal go around Weight (1000 kg)	**50**	**52**	**54**	**56**	**58**	**60**	**62**	**64**	**66**	**68**	**70**
Weight Penalty (1000 kg)	6.5	6.8	7.1	7.3	7.6	7.8	8.1	8.4	8.6	8.9	9.1

MAXIMUM CRUISE

V2527-27E	MAXIMUM CRUISE EPR	AIR COND ON	250/300/.78
CORRECTIONS FOR AIR BLEED			
AIR CONDITIONING OFF			.018
ENGINE ANTI ICE ON			–.018
ENGINE ANTI ICE AND WING ANTI ICE ON			–.030

TAT	PRESSURE ALTITUDE (FT)										
(°C)	0.	2000.	5000.	8000.	12000.	17000.	20000.	25000.	31000.	35000.	39000.
–50.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.368	1.412	1.421
–46.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.368	1.412	1.421
–42.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.368	1.412	1.421
–38.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.368	1.412	1.421
–34.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.368	1.412	1.421
–30.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.368	1.412	1.421
–26.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.368	1.412	1.421
–22.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.368	1.412	1.421
–18.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.368	1.412	1.415
–14.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.368	1.397	1.392
–10.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.368	1.373	1.368
–6.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.358	1.349	1.344
–2.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.325	1.333	1.324	1.319
2.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.319	1.308	1.300	1.296
6.0	1.199	1.219	1.243	1.263	1.256	1.287	1.308	1.295	1.284	1.278	1.274
10.0	1.199	1.219	1.243	1.263	1.256	1.287	1.293	1.271	1.259	1.256	
14.0	1.199	1.219	1.243	1.263	1.256	1.272	1.270	1.247	1.238		
18.0	1.199	1.219	1.243	1.263	1.256	1.250	1.247	1.225	1.217		
22.0	1.199	1.219	1.243	1.253	1.238	1.228	1.226	1.205			
26.0	1.199	1.219	1.238	1.233	1.217	1.207	1.206	1.184			
30.0	1.199	1.219	1.220	1.213	1.197	1.188	1.187				
34.0	1.197	1.202	1.201	1.195	1.178	1.171	1.168				
38.0	1.181	1.185	1.184	1.179	1.161	1.153					
42.0	1.164	1.168	1.168	1.164	1.145						
46.0	1.149	1.153	1.154								
50.0	1.135	1.140	1.140								
54.0	1.122	1.127									
58.0	1.110										
62.0											
66.0											

N1 MODE THRUST CONTROL

In case of no EPR available, the thrust control automatically reverts to N1 mode (rated or unrated).
See 3.02.70 ENG EPR MODE FAULT abnormal procedure.
If the N1 rated mode is lost on both engines, refer to the power management tables given on the following pages.
The herebelow table gives the N1 to be set in cruise to maintain M.78.

	FLIGHT LEVEL					
WEIGHT (1000 KG)	**290**	**310**	**330**	**350**	**370**	**390**
50	75.4	75.5	75.7	76.0	76.8	78.0
52	75.7	75.8	76.0	76.4	77.2	78.6
54	75.9	76.1	76.4	76.8	77.6	79.1
56	76.2	76.4	76.8	77.2	78.1	79.7
58	76.4	76.7	77.1	77.6	78.6	80.4
60	76.7	77.1	77.5	78.0	79.2	81.2
62	77.1	77.4	77.9	78.5	79.7	81.9
64	77.3	77.7	78.3	79.0	80.3	
66	77.7	78.1	78.6	79.5	81.0	
68	78.0	78.5	79.1	80.0	81.7	
70	78.3	78.8	79.5	80.5	82.5	
72	78.6	79.2	80.0	81.1		
74	79.0	79.5	80.4	81.7		
76	79.3	80.0	80.9	82.4		N1 (%)

Drift Down ceilings and go around performance are affected as follows :
Drift down ceiling :

Actual Weight (1000 kg)	**40**	**50**	**60**	**70**
Ceiling Penalty (ft)	4000	4700	5300	6000

Go around weight :

Normal go around Weight (1000 kg)	**40**	**45**	**50**	**55**	**60**	**65**	**70**	**75**	**80**	**85**
Weight Penalty (1000 kg)	5.2	5.9	6.5	7.2	7.8	8.5	9.1	9.8	10.4	11

MAXIMUM CRUISE

PW6122A	MAXIMUM CRUISE N1	AIR COND ON	250/300/.78
N1 CORRECTIONS FOR AIR BLEED		OAT<ISA+10	OAT≥ISA+10
AIR CONDITIONING OFF		1.90	1.90
NACELLE ANTI ICE ON		0.00	–1.60
NACELLE AND WING ANTI ICE ON		0.00	–2.50

TAT (°C)	PRESSURE ALTITUDE (FT)										
	–1000.	3000.	7000.	11000.	15000.	19000.	23000.	27000.	31000.	35000.	39000.
–54.0	69.2	70.5	72.0	72.4	73.8	75.3	75.9	76.6	78.0	80.8	85.3
–50.0	69.9	71.1	72.6	73.0	74.4	75.9	76.5	77.3	78.6	81.4	85.9
–46.0	70.5	71.7	73.2	73.7	75.1	76.5	77.2	77.9	79.2	82.0	86.6
–42.0	71.1	72.3	73.9	74.3	75.7	77.1	77.8	78.5	79.8	82.6	87.2
–38.0	71.7	72.9	74.5	74.9	76.3	77.7	78.4	79.1	80.4	83.2	87.9
–34.0	72.3	73.5	75.1	75.5	76.9	78.3	79.0	79.7	81.0	83.8	88.5
–30.0	72.9	74.1	75.7	76.1	77.5	78.9	79.6	80.3	81.6	84.4	89.1
–26.0	73.4	74.7	76.3	76.7	78.1	79.5	80.2	80.9	82.2	85.0	89.7
–22.0	74.0	75.3	76.8	77.2	78.7	80.1	80.8	81.5	82.7	85.5	90.3
–18.0	74.6	75.9	77.4	77.8	79.2	80.7	81.3	82.1	83.3	86.1	*90.5*
–14.0	75.2	76.4	78.0	78.4	79.8	81.3	81.9	82.6	83.9	*85.5*	*89.3*
–10.0	75.7	77.0	78.6	79.0	80.4	81.9	82.5	83.2	84.4	*84.1*	*87.9*
–6.0	76.3	77.6	79.1	79.5	81.0	82.4	83.1	83.8	*84.3*	*83.0*	*86.5*
–2.0	76.9	78.1	79.7	80.1	81.5	83.0	83.6	84.3	*83.3*	*82.2*	*85.0*
2.0	77.4	78.7	80.2	80.7	82.1	83.5	84.2	*83.8*	*82.6*	*81.6*	*84.1*
6.0	78.0	79.2	80.8	81.2	82.6	84.1	*84.0*	*83.1*	*82.1*	*81.1*	*83.4*
10.0	78.5	79.8	81.3	81.8	83.2	*84.3*	*83.4*	*82.5*	*81.6*	*80.6*	*82.9*
14.0	79.0	80.3	81.9	82.3	83.7	*83.7*	*82.9*	*82.1*	*81.1*	*80.1*	*82.4*
18.0	79.6	80.9	82.4	82.8	*83.3*	*83.2*	*82.4*	*81.6*	*80.7*		
22.0	80.1	81.4	*82.9*	*82.9*	*82.8*	*82.7*	*82.0*	*81.2*	*80.2*		
26.0	80.6	81.9	*82.3*	*82.4*	*82.3*	*82.3*	*81.6*	*80.8*	*79.8*		
30.0	81.2	*82.0*	*81.8*	*81.9*	*81.8*	*81.8*	*81.3*	*80.4*			
34.0	81.7	*81.5*	*81.2*	*81.5*	*81.3*	*81.4*	*80.9*				
38.0	*81.5*	*80.9*	*80.7*	*81.0*	*80.9*	*81.1*					
42.0	*81.0*	*80.4*	*80.2*	*80.6*	*80.5*						
46.0	*80.4*	*79.9*	*79.8*	*80.3*	*80.2*						
50.0	*79.9*	*79.4*	*79.4*	*80.0*							
54.0	*79.4*	*79.0*									
58.0	*79.0*	*78.6*									
62.0	*78.6*										
66.0	*78.2*										

OAT<ISA+10

OAT≥ISA+10

TAKEOFF

R

V2524-A5	TAKE-OFF N1	NO AIR BLEED	MACH=.000

CORRECTIONS FOR AIR BLEED

AIR CONDITIONING ON	SUBTRACT .4 FROM N1
ENGINE ANTI ICE ON	SUBTRACT 1.4 FROM N1 ABOVE CORNER POINT
ENGINE ANTI ICE AND WING ANTI ICE ON	SUBTRACT .4 FROM N1 BELOW CORNER POINT AND 1.8 ABOVE CORNER POINT

OAT	PRESSURE ALTITUDE (FT)									
(°C)	–2000.	–1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.
–60.0	71.7	72.6	73.4	73.9	74.5	75.2	75.8	76.4	76.9	77.5
–50.0	73.3	74.2	75.1	75.6	76.2	76.9	77.5	78.1	78.7	79.3
–40.0	74.9	75.9	76.8	77.3	77.9	78.6	79.3	79.9	80.4	81.1
–30.0	76.5	77.5	78.4	78.9	79.6	80.3	80.9	81.6	82.1	82.8
–28.0	76.8	77.8	78.7	79.3	79.9	80.6	81.3	81.9	82.5	83.1
–24.0	77.5	78.5	79.4	79.9	80.6	81.3	81.9	82.6	83.2	83.8
–20.0	78.1	79.1	80.0	80.6	81.2	81.9	82.6	83.2	83.8	84.5
–16.0	78.7	79.7	80.6	81.2	81.8	82.6	83.2	83.9	84.5	85.1
–12.0	79.3	80.3	81.2	81.8	82.5	83.2	83.9	84.5	85.1	85.8
–8.0	79.9	80.9	81.9	82.4	83.1	83.9	84.5	85.2	85.8	86.5
–4.0	80.5	81.5	82.5	83.1	83.7	84.5	85.2	85.8	86.4	87.1
0.0	81.1	82.1	83.1	83.7	84.3	85.1	85.8	86.5	87.1	87.8
4.0	81.7	82.7	83.7	84.3	85.0	85.7	86.4	87.1	87.7	88.4
8.0	82.3	83.3	84.3	84.9	85.6	86.3	87.0	87.7	88.3	89.0
12.0	82.9	83.9	84.9	85.5	86.2	87.0	87.6	88.3	89.0	89.7
16.0	83.5	84.5	85.5	86.1	86.8	87.6	88.3	89.0	89.6	90.3
20.0	84.0	85.1	86.1	86.7	87.4	88.2	88.9	89.6	90.2	90.9
24.0	84.6	85.7	86.7	87.3	88.0	88.8	89.5	90.2	90.8	91.5
28.0	85.2	86.3	87.2	87.9	88.6	89.4	90.1	90.8	91.4	92.1
32.0	85.7	86.8	87.8	88.4	89.2	90.0	90.7	91.4	92.0	92.7
36.0	86.3	87.4	88.4	89.0	89.7	90.5	91.3	92.0	*92.6*	*93.0*
40.0	86.9	88.0	89.0	89.6	90.3	91.1	91.9	*92.4*	*92.8*	*92.9*
41.0	87.0	88.1	89.1	89.7	90.5	91.3	92.0	*92.4*	*92.8*	*92.8*
43.0	87.3	88.4	89.4	90.0	90.7	91.6	*92.2*	*92.5*	*92.6*	
45.0	87.5	88.7	89.7	90.3	91.0	91.9	*92.3*	*92.3*		
47.0	87.8	88.9	90.0	90.6	91.3	*92.0*	*92.1*			
49.0	88.1	89.2	90.2	90.9	91.6	*91.9*				
51.0	88.4	89.5	90.5	91.2	*91.6*					
53.0	88.6	89.8	90.8	91.4						
55.0	88.9	90.0	91.1			BELOW CORNER POINT				
56.0	89.0	90.2				*ABOVE CORNER POINT*				
57.0	89.2									

TAKEOFF

R

V2524-A5	TAKE-OFF N1	NO AIR BLEED	MACH=.000

CORRECTIONS FOR AIR BLEED

AIR CONDITIONING ON	SUBTRACT .6 FROM N1
ENGINE ANTI ICE ON	SUBTRACT .7 FROM N1 ABOVE CORNER POINT
ENGINE ANTI ICE AND WING ANTI ICE ON	SUBTRACT .5 FROM N1 BELOW CORNER POINT AND 1.2 ABOVE CORNER POINT

OAT (°C)	PRESSURE ALTITUDE (FT)									
	6000.	7000.	8000.	9000.	10000.	11000.	12000.	13000.	14000.	14500.
–60.0	76.9	77.5	78.1	78.7	79.4	80.0	80.6	81.0	81.5	81.8
–50.0	78.7	79.3	79.9	80.6	81.2	81.8	82.5	82.9	83.4	83.7
–40.0	80.4	81.1	81.7	82.4	83.0	83.7	84.3	84.8	85.3	85.5
–30.0	82.1	82.8	83.4	84.1	84.8	85.4	86.1	86.5	87.1	87.3
–20.0	83.8	84.5	85.1	85.8	86.5	87.2	87.9	88.3	88.8	89.1
–18.0	84.1	84.8	85.5	86.2	86.8	87.5	88.2	88.7	89.2	89.5
–16.0	84.5	85.1	85.8	86.5	87.2	87.9	88.5	89.0	89.5	89.8
–12.0	85.1	85.8	86.5	87.2	87.9	88.5	89.2	89.7	90.2	90.5
–8.0	85.8	86.5	87.1	87.8	88.5	89.2	89.9	90.4	90.9	91.2
–4.0	86.4	87.1	87.8	88.5	89.2	89.9	90.6	91.1	91.6	91.9
0.0	87.1	87.8	88.4	89.1	89.8	90.6	91.3	91.7	92.3	92.6
2.0	87.4	88.1	88.8	89.5	90.2	90.9	91.6	92.1	92.6	92.9
4.0	87.7	88.4	89.1	89.8	90.5	91.2	91.9	92.4	92.9	93.2
6.0	88.0	88.7	89.4	90.1	90.8	91.5	92.3	92.7	93.3	93.6
8.0	88.3	89.0	89.7	90.4	91.2	91.9	92.6	93.1	93.6	93.9
10.0	88.6	89.3	90.0	90.8	91.5	92.2	92.9	93.4	93.9	94.2
12.0	89.0	89.7	90.4	91.1	91.8	92.5	93.2	93.7	94.3	94.6
14.0	89.3	90.0	90.7	91.4	92.1	92.8	93.6	94.1	94.6	94.9
16.0	89.6	90.3	91.0	91.7	92.4	93.2	93.9	94.4	94.9	95.2
19.0	90.0	90.8	91.5	92.2	92.9	93.6	94.4	94.9	95.4	*95.5*
20.0	90.2	90.9	91.6	92.3	93.1	93.8	94.5	95.0	*95.4*	*95.3*
23.0	90.7	91.4	92.1	92.8	93.6	94.3	95.0	*95.0*	*94.7*	*94.6*
25.0	91.0	91.7	92.4	93.1	93.9	94.6	*94.8*	*94.6*	*94.3*	*94.2*
28.0	91.4	92.1	92.9	93.6	*94.2*	*94.3*	*94.2*	*94.0*		
31.0	91.9	92.6	93.3	*93.8*	*93.9*	*93.8*	*93.6*			
34.0	92.3	*93.0*	*93.4*	*93.6*	*93.5*					
36.0	*92.6*	*93.0*	*93.4*	*93.4*						
39.0	*92.7*	*93.0*	*93.1*							
41.0	*92.8*	*92.8*								
43.0	*92.6*									

BELOW CORNER POINT

ABOVE CORNER POINT

TAKEOFF

R

V2527-A5	TAKEOFF N1	NO AIR BLEED MACH=.000
CORRECTIONS FOR AIR BLEED		
AIR CONDITIONING ON		SUBTRACT .400 FROM N1
ENGINE ANTI ICE ON		SUBTRACT 1.3 FROM N1 ABOVE CORNER POINT
ENGINE ANTI ICE AND WING ANTI ICE ON		SUBTRACT .3 FROM N1 BELOW CORNER POINT AND 1.6 ABOVE CORNER POINT

OAT (°C)	PRESSURE ALTITUDE (FT)								
	–1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.
–60.0	74.6	75.4	76.2	76.9	77.5	78.0	78.4	78.9	79.5
–40.0	78.0	78.9	79.6	80.5	81.0	81.5	82.0	82.6	83.1
–20.0	81.3	82.2	83.0	83.8	84.4	85.0	85.5	86.0	86.6
0.0	84.4	85.4	86.2	87.1	87.7	88.3	88.8	89.4	90.0
10.0	86.0	86.9	87.8	88.7	89.3	89.9	90.4	91.0	91.6
20.0	87.5	88.4	89.3	90.2	90.9	91.4	92.0	92.6	93.2
22.0	87.8	88.7	89.6	90.5	91.2	91.8	92.3	92.9	93.5
24.0	88.1	89.0	89.9	90.8	91.5	92.1	92.6	93.2	93.8
26.0	88.3	89.3	90.2	91.1	91.8	92.4	92.9	93.5	94.1
28.0	88.6	89.6	90.5	91.4	92.1	92.7	93.2	93.8	94.5
30.0	88.9	89.9	90.8	91.7	92.4	93.0	93.5	94.1	*94.4*
32.0	89.2	90.2	91.1	92.1	92.7	93.3	93.8	*94.1*	*94.1*
34.0	89.5	90.5	91.4	92.4	93.0	93.6	*93.8*	*93.8*	*93.8*
36.0	89.8	90.8	91.7	92.7	93.3	*93.8*	*93.6*	*93.6*	*93.5*
38.0	90.1	91.1	92.0	93.0	93.6	*93.6*	*93.3*	*93.3*	*93.2*
40.0	90.4	91.4	92.3	93.2	*93.6*	*93.3*	*93.1*	*93.0*	*93.0*
42.0	90.7	91.7	92.6	93.5	*93.3*	*93.1*	*92.8*	*92.8*	
44.0	91.0	92.0	92.9	*93.3*	*93.0*	*92.8*	*92.6*		
46.0	91.3	92.3	*93.0*	*93.0*	*92.8*	*92.6*			
48.0	91.5	92.6	*92.7*	*92.7*	*92.5*				
50.0	91.8	*92.5*	*92.5*	*92.5*					
52.0	92.1	*92.2*	*92.2*						
54.0	*92.0*	*92.0*							
56.0	*91.8*								
58.0									

BELOW CORNER POINT
ABOVE CORNER POINT

TAKEOFF

R

V2527-A5	TAKE-OFF N1	NO AIR BLEED	MACH=.000

CORRECTIONS FOR AIR BLEED

AIR CONDITIONING ON	SUBTRACT .700 FROM N1
ENGINE ANTI ICE ON	SUBTRACT 1.7 FROM N1 ABOVE CORNER POINT
ENGINE ANTI ICE AND WING ANTI ICE ON	SUBTRACT .5 FROM N1 BELOW CORNER POINT AND 2.2 ABOVE CORNER POINT

OAT (°C)	PRESSURE ALTITUDE (FT)									
	6000.	7000.	8000.	9000.	10000.	11000.	12000.	13000.	14000.	14500.
–60.0	78.9	79.5	80.0	80.3	80.6	80.9	81.2	81.5	81.9	82.0
–40.0	82.6	83.1	83.7	84.0	84.3	84.6	84.9	85.3	85.6	85.8
–20.0	86.0	86.6	87.2	87.5	87.8	88.1	88.5	88.8	89.2	89.4
0.0	89.4	90.0	90.6	90.9	91.2	91.6	91.9	92.3	92.7	92.9
5.0	90.2	90.8	91.4	91.7	92.0	92.4	92.7	93.1	93.5	93.7
10.0	91.0	91.6	92.2	92.5	92.9	93.2	93.6	94.0	94.4	94.6
12.0	91.3	91.9	92.5	92.9	93.2	93.5	93.9	94.3	94.7	94.9
14.0	91.6	92.2	92.8	93.2	93.5	93.9	94.2	94.6	95.0	*95.2*
16.0	91.9	92.6	93.2	93.5	93.9	94.2	94.5	95.0	*95.1*	*95.2*
18.0	92.3	92.9	93.5	93.8	94.2	94.5	94.9	*95.0*	*95.2*	*95.3*
20.0	92.6	93.2	93.8	94.2	94.5	94.8	*94.9*	*95.0*	*95.1*	*95.0*
22.0	92.9	93.5	94.1	94.5	94.8	*94.9*	*94.9*	*95.0*	*94.8*	*94.7*
24.0	93.2	93.8	94.4	94.8	*94.8*	*94.8*	*94.8*	*94.6*	*94.5*	*94.4*
26.0	93.5	94.1	94.8	*94.7*	*94.6*	*94.6*	*94.5*	*94.3*	*94.1*	*94.0*
28.0	94.7	94.5	*94.5*	*94.3*	*94.2*	*94.0*				
30.0	94.1	*94.4*	*94.4*	*94.3*	*94.1*	*94.0*	*93.8*			
32.0	*94.1*	*94.1*	*94.1*	*94.0*	*93.8*	*93.7*				
34.0	*93.8*	*93.8*	*93.8*	*93.7*	*93.5*					
36.0	*93.6*	*93.5*	*93.5*	*93.4*						
38.0	*93.3*	*93.2*	*93.2*							
40.0	*93.0*	*93.0*								
42.0	*92.8*									
44.0						BELOW CORNER POINT				
46.0						*ABOVE CORNER POINT*				
48.0										

TAKEOFF

R

V2527E-A5	TAKE-OFF N1	NO AIR BLEED MACH=.000

CORRECTIONS FOR AIR BLEED

AIR CONDITIONING ON	SUBTRACT .400 FROM N1
ENGINE ANTI ICE ON	SUBTRACT 1.3 FROM N1 ABOVE CORNER POINT
ENGINE ANTI ICE AND WING ANTI ICE ON	SUBTRACT 0.3 FROM N1 BELOW CORNER POINT AND 1.6 ABOVE CORNER POINT

OAT (°C)	PRESSURE ALTITUDE (FT)								
	–1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.
–60.0	74.6	75.4	76.3	77.4	78.5	79.8	81.2	82.4	82.9
–56.0	75.3	76.1	77.0	78.1	79.2	80.5	82.0	83.2	83.7
–52.0	76.0	76.8	77.7	78.8	79.9	81.3	82.7	83.9	84.4
–48.0	76.6	77.5	78.4	79.5	80.6	82.0	83.5	84.7	85.2
–44.0	77.3	78.2	79.1	80.2	81.3	82.7	84.2	85.4	86.0
–40.0	78.0	78.9	79.8	80.9	82.1	83.5	84.9	86.2	86.7
–36.0	78.7	79.5	80.5	81.6	82.8	84.2	85.7	86.9	87.4
–32.0	79.3	80.2	81.1	82.3	83.5	84.9	86.4	87.6	88.2
–28.0	80.0	80.9	81.8	83.0	84.1	85.6	87.1	88.4	88.9
–24.0	80.6	81.5	82.5	83.6	84.8	86.3	87.8	89.1	89.6
–20.0	81.3	82.2	83.1	84.3	85.5	87.0	88.5	89.8	90.3
–16.0	81.9	82.8	83.8	85.0	86.2	87.6	89.2	90.5	91.0
–12.0	82.5	83.5	84.4	85.6	86.8	88.3	89.9	91.2	91.8
–8.0	83.2	84.1	85.1	86.3	87.5	89.0	90.6	91.9	92.5
–4.0	83.8	84.7	85.7	86.9	88.2	89.7	91.3	92.6	93.1
0.0	84.4	85.4	86.4	87.6	88.8	90.3	91.9	93.3	93.8
4.0	85.0	86.0	87.0	88.2	89.5	91.0	92.6	93.9	94.5
8.0	85.6	86.6	87.6	88.9	90.1	91.6	93.3	94.6	95.2
12.0	86.3	87.2	88.2	89.5	90.7	92.3	93.9	95.3	95.9
16.0	86.9	87.8	88.9	90.1	91.4	92.9	94.6	96.0	96.5
20.0	87.5	88.4	89.5	90.7	92.0	93.6	95.2	96.6	*96.7*
24.0	88.1	89.0	90.1	91.3	92.6	94.2	95.9	*96.1*	*95.9*
28.0	88.6	89.6	90.7	92.0	93.3	94.9	*95.6*	*95.4*	*95.2*
32.0	89.2	90.2	91.3	92.6	93.9	*94.8*	*94.9*	*94.7*	*94.5*
36.0	89.8	90.8	91.9	93.2	*94.2*	*94.2*	*94.1*	*94.0*	*93.8*
40.0	90.4	91.4	92.5	*93.7*	*93.7*	*93.6*	*93.4*	*93.3*	*93.1*
44.0	91.0	92.0	93.1	*93.4*	*93.2*	*93.0*	*92.8*		
48.0	91.5	92.6	*92.8*	*92.8*	*92.7*				
52.0	92.1	*92.2*	*92.3*						
56.0	*91.8*								

BELOW CORNER POINT

ABOVE CORNER POINT

TAKEOFF

V2527E-A5	TAKE-OFF N1	NO AIR BLEED	MACH=.000
CORRECTIONS FOR AIR BLEED			
AIR CONDITIONING ON		SUBTRACT .700 FROM N1	
ENGINE ANTI ICE ON		SUBTRACT 1.1 FROM N1 ABOVE CORNER POINT	
ENGINE ANTI ICE AND WING ANTI ICE ON		SUBTRACT .5 FROM N1 BELOW CORNER POINT AND 1.6 ABOVE CORNER POINT	

OAT (°C)	PRESSURE ALTITUDE (FT)									
	6000.	7000.	8000.	9000.	10000.	11000.	12000.	13000.	14000.	14500.
–60.0	82.4	82.9	83.4	83.3	83.3	83.4	83.3	83.3	83.3	83.3
–56.0	83.2	83.7	84.2	84.1	84.1	84.2	84.1	84.1	84.1	84.1
–52.0	83.9	84.4	85.0	84.9	84.8	85.0	84.9	84.9	84.9	84.9
–48.0	84.7	85.2	85.7	85.6	85.6	85.7	85.7	85.6	85.6	85.6
–44.0	85.4	86.0	86.5	86.4	86.3	86.5	86.4	86.4	86.4	86.4
–40.0	86.2	86.7	87.2	87.1	87.1	87.2	87.2	87.1	87.1	87.1
–36.0	86.9	87.4	88.0	87.9	87.8	88.0	87.9	87.9	87.9	87.9
–32.0	87.6	88.2	88.7	88.6	88.6	88.7	88.7	88.6	88.6	88.6
–28.0	88.4	88.9	89.4	89.3	89.3	89.4	89.4	89.3	89.4	89.4
–24.0	89.1	89.6	90.2	90.1	90.0	90.2	90.1	90.1	90.1	90.1
–20.0	89.8	90.3	90.9	90.8	90.8	90.9	90.8	90.8	90.8	90.8
–16.0	90.5	91.0	91.6	91.5	91.5	91.6	91.5	91.5	91.5	91.5
–12.0	91.2	91.8	92.3	92.2	92.2	92.3	92.3	92.2	92.2	92.2
–8.0	91.9	92.5	93.0	92.9	92.9	93.0	93.0	92.9	92.9	92.9
–4.0	92.6	93.1	93.7	93.6	93.6	93.7	93.7	93.6	93.6	93.6
0.0	93.3	93.8	94.4	94.3	94.3	94.4	94.3	94.3	94.3	94.3
4.0	93.9	94.5	95.1	95.0	95.0	95.1	95.0	95.0	95.0	95.0
8.0	94.6	95.2	95.8	95.7	95.6	95.8	95.7	95.7	95.7	95.7
12.0	95.3	95.9	96.5	96.4	96.3	96.5	96.4	96.4	96.4	96.4
16.0	96.0	96.5	*96.8*	*96.8*	*96.8*	*96.7*	*96.6*	*96.6*	*96.6*	*96.6*
20.0	96.6	*96.7*	*96.5*	*96.3*	*96.1*	*96.1*	*96.0*	*96.0*	*96.1*	*96.1*
24.0	*96.1*	*95.9*	*95.7*	*95.6*	*95.5*	*95.5*	*95.5*	*95.4*	*95.5*	*95.5*
28.0	*95.4*	*95.2*	*95.1*	*95.0*	*94.9*	*94.9*	*94.9*	*94.9*		
32.0	*94.7*	*94.5*	*94.4*	*94.3*	*94.3*	*94.3*				
36.0	*94.0*	*93.8*	*93.7*	*93.6*						
40.0	*93.3*	*93.1*								
44.0										
48.0										
52.0										
56.0										

BELOW CORNER POINT

ABOVE CORNER POINT

GO AROUND

R

V2527-A5	GO-AROUND N1	AIR COND ON
CORRECTIONS FOR AIR BLEED		
AIR CONDITIONING OFF		ADD .400 TO N1
NACELLE ANTI ICE ON		SUBTRACT 1.3 FROM N1 ABOVE CORNER POINT
NACELLE ANTI ICE AND WING ANTI ICE ON		SUBTRACT .3 FROM N1 BELOW CORNER POINT AND 1.6 ABOVE CORNER POINT

TAT (°C)	PRESSURE ALTITUDE (FT)								
	–1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.
–60.0	74.3	75.1	75.8	76.6	77.0	77.5	77.9	78.4	78.9
–40.0	77.7	78.5	79.3	80.1	80.6	81.1	81.5	82.0	82.5
–20.0	80.9	81.8	82.6	83.4	84.0	84.5	84.9	85.5	86.0
0.0	84.1	85.0	85.8	86.7	87.2	87.7	88.2	88.8	89.3
10.0	85.6	86.6	87.4	88.3	88.8	89.3	89.8	90.4	91.0
20.0	87.1	88.1	88.9	89.8	90.3	90.9	91.4	92.0	92.5
22.0	87.4	88.4	89.2	90.1	90.7	91.2	91.7	92.3	92.9
24.0	87.7	88.7	89.5	90.4	91.0	91.5	92.0	92.6	93.2
26.0	88.0	89.0	89.8	90.7	91.3	91.8	92.3	92.9	93.5
28.0	88.3	89.3	90.1	91.0	91.6	92.1	92.6	93.2	93.8
30.0	88.6	89.6	90.4	91.3	91.9	92.4	92.9	93.5	*93.7*
32.0	88.9	89.9	90.7	91.6	92.2	92.7	93.2	*93.4*	*93.5*
34.0	89.2	90.1	91.0	91.9	92.5	93.0	*93.2*	*93.2*	*93.2*
36.0	89.4	90.4	91.3	92.2	92.8	*93.3*	*93.0*	*93.0*	*92.9*
38.0	89.7	90.7	91.6	92.5	93.1	*93.0*	*92.8*	*92.7*	*92.6*
40.0	90.0	91.0	91.9	92.8	*93.1*	*92.8*	*92.5*	*92.5*	*92.4*
42.0	90.3	91.3	92.2	93.1	*92.8*	*92.6*	*92.3*	*92.2*	*92.2*
44.0	90.6	91.6	92.5	*92.9*	*92.6*	*92.3*	*92.1*	*92.0*	*91.9*
46.0	90.9	91.9	*92.6*	*92.6*	*92.3*	*92.1*	*91.8*	*91.7*	
48.0	91.2	92.2	*92.3*	*92.3*	*92.0*	*91.8*	*91.5*		
50.0	91.4	*92.1*	*92.1*	*92.0*	*91.8*	*91.5*			
52.0	91.7	*91.8*	*91.8*	*91.8*	*91.5*				
54.0	*91.7*	*91.6*	*91.6*	*91.6*					
56.0	*91.4*	*91.4*	*91.4*						
58.0	*91.2*	*91.2*							

BELOW CORNER POINT

ABOVE CORNER POINT

Note : This table is valid for all aircraft speeds.

GO AROUND

R

V2527-A5	GO-AROUND N1	AIR COND ON
CORRECTIONS FOR AIR BLEED		
AIR CONDITIONING OFF		ADD .700 TO N1
ENGINE ANTI ICE ON		READ AT TAT +5. (°C)
ENGINE ANTI ICE AND WING ANTI ICE ON		READ AT TAT +5. (°C) AND SUBTRACT 0.500 FROM N1

TAT (°C)	PRESSURE ALTITUDE (FT)									
	6000.	7000.	8000.	9000.	10000.	11000.	12000.	13000.	14000.	14500.
–60.0	78.4	78.9	79.4	79.7	80.0	80.2	80.4	80.7	80.9	81.1
–40.0	82.0	82.5	83.1	83.3	83.6	83.9	84.1	84.4	84.6	84.8
–20.0	85.5	86.0	86.5	86.8	87.1	87.4	87.7	87.9	88.2	88.3
0.0	88.8	89.3	89.9	90.2	90.5	90.8	91.1	91.3	91.6	91.8
5.0	89.6	90.1	90.7	91.0	91.3	91.6	91.9	92.2	92.5	92.6
10.0	90.4	91.0	91.5	91.8	92.2	92.4	92.7	93.0	93.3	93.4
12.0	90.7	91.3	91.9	92.2	92.5	92.8	93.0	93.3	93.6	93.8
14.0	91.0	91.6	92.2	92.5	92.8	93.1	93.4	93.7	93.9	*94.0*
16.0	91.3	91.9	92.5	92.8	93.1	93.4	93.7	94.0	*94.1*	*94.1*
18.0	91.6	92.2	92.8	93.1	93.4	93.7	94.0	*94.1*	*94.2*	*94.2*
20.0	92.0	92.5	93.1	93.5	93.8	94.1	*94.1*	*94.1*	*94.2*	*94.0*
22.0	92.3	92.9	93.5	93.8	94.1	*94.1*	*94.0*	*94.1*	*93.8*	*93.7*
24.0	92.6	93.2	93.8	94.1	*94.1*	*94.0*	*93.9*	*93.7*	*93.5*	*93.4*
26.0	92.9	93.5	94.1	*94.0*	*93.9*	*93.8*	*93.6*	*93.4*	*93.2*	*93.0*
28.0	93.2	93.8	*94.0*	*93.8*	*93.7*	*93.5*	*93.3*	*93.1*	*92.8*	*92.7*
30.0	93.5	*93.7*	*93.7*	*93.6*	*93.4*	*93.2*	*93.0*	*92.7*	*92.5*	
32.0	*93.4*	*93.5*	*93.4*	*93.3*	*93.1*	*92.9*	*92.6*	*92.4*		
34.0	*93.2*	*93.2*	*93.1*	*92.9*	*92.8*	*92.6*	*92.3*			
36.0	*93.0*	*92.9*	*92.8*	*92.6*	*92.5*	*92.3*				
38.0	*92.7*	*92.6*	*92.5*	*92.4*	*92.3*					
40.0	*92.5*	*92.4*	*92.3*	*92.2*						
42.0	*92.2*	*92.2*	*92.1*							
44.0	*92.0*	*91.9*								
46.0	*91.7*									
48.0										

BELOW CORNER POINT

ABOVE CORNER POINT

R *Note : This table is valid for all aircraft speeds.*

GO AROUND

R

V2524-A5	GO-AROUND N1	AIR COND ON
CORRECTIONS FOR AIR BLEED		
AIR CONDITIONING OFF		ADD .4 FROM N1
ENGINE ANTI ICE ON		SUBTRACT 1.4 FROM N1 ABOVE CORNER POINT
ENGINE ANTI ICE AND WING ANTI ICE ON		SUBTRACT .4 FROM N1 BELOW CORNER POINT AND 1.8 ABOVE CORNER POINT

TAT (°C)	PRESSURE ALTITUDE (FT)									
	–2000.	–1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.
–60.0	71.3	72.2	73.1	73.6	74.2	74.8	75.4	75.9	76.5	77.0
–50.0	72.9	73.8	74.8	75.3	75.9	76.5	77.1	77.7	78.2	78.8
–40.0	74.5	75.5	76.4	77.0	77.6	78.2	78.8	79.4	80.0	80.5
–30.0	76.1	77.1	78.1	78.6	79.2	79.9	80.5	81.1	81.7	82.2
–20.0	77.7	78.7	79.6	80.2	80.8	81.5	82.1	82.8	83.3	83.9
–10.0	79.2	80.2	81.2	81.8	82.4	83.1	83.7	84.4	84.9	85.5
–5.0	79.9	81.0	82.0	82.5	83.2	83.9	84.5	85.2	85.7	86.3
0.0	80.7	81.7	82.7	83.3	83.9	84.7	85.3	86.0	86.5	87.1
4.0	81.3	82.3	83.3	83.9	84.6	85.3	85.9	86.6	87.2	87.8
8.0	81.8	82.9	83.9	84.5	85.2	85.9	86.6	87.2	87.8	88.4
12.0	82.4	83.5	84.5	85.1	85.8	86.5	87.2	87.8	88.4	89.0
16.0	83.0	84.1	85.1	85.7	86.4	87.1	87.8	88.4	89.0	89.6
20.0	83.6	84.6	85.7	86.3	87.0	87.7	88.4	89.1	89.7	90.3
24.0	84.1	85.2	86.3	86.9	87.6	88.3	89.0	89.7	90.3	90.9
28.0	84.7	85.8	86.9	87.5	88.1	88.9	89.6	90.3	90.9	91.5
30.0	85.0	86.1	87.2	87.8	88.4	89.2	89.9	90.6	91.2	91.8
32.0	85.3	86.4	87.4	88.0	88.7	89.5	90.2	90.9	91.5	92.1
34.0	85.6	86.6	87.7	88.3	89.0	89.8	90.5	91.2	91.8	*92.3*
36.0	85.8	86.9	88.0	88.6	89.3	90.1	90.8	91.5	*92.0*	*92.4*
38.0	86.1	87.2	88.3	88.9	89.6	90.4	91.1	*91.7*	*92.1*	*92.5*
40.0	86.4	87.5	88.6	89.2	89.9	90.7	91.4	*91.9*	*92.2*	*92.4*
42.0	86.7	87.8	88.9	89.5	90.2	91.0	*91.6*	*92.0*	*92.1*	*92.1*
44.0	86.9	88.0	89.1	89.8	90.5	91.2	*91.7*	*91.9*	*91.9*	*91.9*
46.0	87.2	88.3	89.4	90.0	90.7	*91.5*	*91.7*	*91.7*	*91.7*	
48.0	87.5	88.6	89.7	90.3	91.0	*91.5*	*91.5*	*91.5*		
50.0	87.8	88.9	90.0	90.6	*91.2*	*91.4*	*91.4*			
52.0	88.0	89.1	90.3	90.9	*91.2*	*91.2*				
54.0	88.3	89.4	90.5	*91.1*	*91.1*					
56.0	88.6	89.7	90.8	*91.1*						
58.0	88.8	90.0	*91.0*			*BELOW CORNER POINT*				
60.0	89.1	*90.1*				*ABOVE CORNER POINT*				
62.0	*89.3*									

R *Note : This table is valid for all aircraft speeds, but the corner point temperature is given*
R *for MACH = .225.*

GO AROUND

R

V2524-A5	GO-AROUND N1	AIR COND ON
CORRECTIONS FOR AIR BLEED		
AIR CONDITIONING OFF		ADD .65 TO N1
ENGINE ANTI ICE ON		SUBTRACT .7 FROM N1 ABOVE CORNER POINT
ENGINE ANTI ICE AND WING ANTI ICE ON		SUBTRACT .5 FROM N1 BELOW CORNER POINT AND 1.2 ABOVE CORNER POINT

TAT (°C)	PRESSURE ALTITUDE (FT)									
	6000.	7000.	8000.	9000.	10000.	11000.	12000.	13000.	14000.	14500.
–60.0	76.5	77.0	77.6	78.1	78.7	79.3	79.9	80.3	80.6	80.8
–50.0	78.2	78.8	79.3	80.0	80.6	81.2	81.7	82.1	82.5	82.7
–40.0	80.0	80.5	81.1	81.7	82.4	83.0	83.6	83.9	84.3	84.5
–30.0	81.7	82.2	82.8	83.5	84.1	84.7	85.3	85.7	86.1	86.3
–20.0	83.3	83.9	84.5	85.2	85.8	86.4	87.1	87.5	87.9	88.1
–10.0	84.9	85.5	86.2	86.8	87.5	88.1	88.8	89.2	89.6	89.8
–5.0	85.7	86.3	87.0	87.7	88.3	89.0	89.6	90.0	90.4	90.6
0.0	86.5	87.1	87.8	88.5	89.1	89.8	90.4	90.9	91.3	91.5
2.0	86.9	87.5	88.1	88.8	89.5	90.1	90.8	91.2	91.6	91.8
4.0	87.2	87.8	88.4	89.1	89.8	90.4	91.1	91.5	91.9	92.2
6.0	87.5	88.1	88.7	89.4	90.1	90.8	91.4	91.9	92.3	92.5
8.0	87.8	88.4	89.1	89.8	90.4	91.1	91.8	92.2	92.6	92.8
10.0	88.1	88.7	89.4	90.1	90.8	91.4	92.1	92.5	92.9	93.1
12.0	88.4	89.0	89.7	90.4	91.1	91.7	92.4	92.8	93.3	93.5
14.0	88.7	89.3	90.0	90.7	91.4	92.1	92.7	93.2	93.6	93.8
16.0	89.0	89.6	90.3	91.0	91.7	92.4	93.0	93.5	93.9	94.1
18.0	89.3	90.0	90.6	91.3	92.0	92.7	93.4	93.8	94.2	94.5
19.0	89.5	90.1	90.8	91.5	92.2	92.9	93.5	94.0	94.4	*94.5*
20.0	89.7	90.3	90.9	91.6	92.3	93.0	93.7	94.1	*94.4*	*94.3*
22.0	90.0	90.6	91.3	92.0	92.7	93.3	94.0	*94.3*	*94.0*	*93.8*
24.0	90.3	90.9	91.6	92.3	93.0	93.7	*94.2*	*93.9*	*93.5*	*93.4*
26.0	90.6	91.2	91.9	92.6	93.3	*93.8*	*93.8*	*93.4*	*93.2*	*93.0*
28.0	90.9	91.5	92.2	92.9	*93.5*	*93.5*	*93.3*	*93.1*	*92.8*	*92.7*
30.0	91.2	91.8	92.5	*93.1*	*93.3*	*93.2*	*92.9*	*92.7*	*92.4*	
32.0	91.5	92.1	*92.7*	*93.0*	*93.1*	*92.9*	*92.6*	*92.4*		
34.0	91.8	*92.3*	*92.7*	*92.9*	*92.8*	*92.5*	*92.3*			
36.0	*92.0*	*92.4*	*92.7*	*92.7*	*92.5*	*92.2*				
38.0	*92.1*	*92.5*	*92.6*	*92.4*	*92.2*					
40.0	*92.2*	*92.4*	*92.4*	*92.2*						
42.0	*92.1*	*92.1*	*92.1*							
44.0	*91.9*	*91.9*								
46.0	*91.7*									

BELOW CORNER POINT

ABOVE CORNER POINT

R *Note : This table is valid for all aircraft speeds, but the corner point temperature is given*
R *for MACH = .225.*

GO AROUND

R

V2527E-A5	GO-AROUND N1	AIR COND ON
CORRECTIONS FOR AIR BLEED		
AIR CONDITIONING OFF		SUBTRACT .400 FROM N1
ENGINE ANTI ICE ON		SUBTRACT 1.3 FROM N1 ABOVE CORNER POINT
ENGINE ANTI ICE AND WING ANTI ICE ON		SUBTRACT 0.3 FROM N1 BELOW CORNER POINT AND 1.6 ABOVE CORNER POINT

TAT (°C)	PRESSURE ALTITUDE (FT)								
	–1000.	0.	1000.	2000.	3000.	4000.	5000.	6000.	7000.
–60.0	74.3	75.1	76.0	77.0	78.0	79.3	80.7	81.8	82.2
–56.0	75.0	75.8	76.7	77.7	78.7	80.1	81.5	82.5	83.0
–52.0	75.7	76.5	77.4	78.4	79.5	80.8	82.2	83.3	83.8
–48.0	76.3	77.2	78.1	79.1	80.2	81.5	82.9	84.0	84.5
–44.0	77.0	77.9	78.8	79.8	80.9	82.3	83.7	84.8	85.3
–4.0	77.7	78.5	79.4	80.5	81.6	83.0	84.4	85.5	86.0
–36	78.3	79.2	80.1	81.2	82.3	83.7	85.1	86.2	86.8
–32	79.0	79.9	80.8	81.9	83.0	84.4	85.8	87.0	87.5
–28	79.6	80.5	81.5	82.5	83.7	85.1	86.5	87.7	88.2
–24	80.3	81.2	82.1	83.2	84.4	85.8	87.2	88.4	88.9
–20.0	80.9	81.8	82.8	83.9	85.0	86.5	87.9	89.1	89.6
–16	81.6	82.5	83.4	84.5	85.7	87.1	88.6	89.8	90.3
–12.0	82.2	83.1	84.1	85.2	86.4	87.8	89.3	90.5	91.0
–8.0	82.8	83.8	84.7	85.8	87.0	88.5	90.0	91.2	91.7
–4.0	83.5	84.4	85.4	86.5	87.7	89.1	90.7	91.9	92.4
0.0	84.1	85.0	86.0	87.1	88.3	89.8	91.4	92.6	93.1
4.0	84.7	85.6	86.6	87.8	89.0	90.5	92.0	93.2	93.8
8.0	85.3	86.2	87.2	88.4	89.6	91.1	92.7	93.9	94.5
12.0	85.9	86.9	87.9	89.0	90.2	91.8	93.3	94.6	95.1
16.0	86.5	87.5	88.5	89.6	90.9	92.4	94.0	95.2	95.8
20.0	87.1	88.1	89.1	90.3	91.5	93.0	94.6	95.9	*95.9*
24.0	87.7	88.7	89.7	90.9	92.1	93.7	95.3	*95.4*	*95.2*
28.0	88.3	89.3	90.3	91.5	92.7	94.3	*95.0*	*94.8*	*94.6*
32.0	88.9	89.9	90.9	92.1	93.4	*94.2*	*94.3*	*94.1*	*93.9*
36.0	89.4	90.4	91.5	92.7	*93.6*	*93.7*	*93.5*	*93.3*	*93.2*
4.0.	90.0	91.0	92.1	*93.2*	*93.2*	*93.1*	*92.9*	*92.7*	*92.5*
44.0	90.6	91.6	92.7	*93.0*	*92.8*	*92.5*	*92.3*	*92.1*	*92.0*
48.0	91.2	92.2	*92.4*	*92.4*	*92.2*	*92.0*	*91.7*		
52.0	91.7	*91.8*	*91.9*	*91.9*	*91.7*				
56.0	*91.4*	*91.4*	*91.4*						

BELOW CORNER POINT
ABOVE CORNER POINT

Note : This table is valid for all aircraft speeds.

GO AROUND

V2527E-A5	GO-AROUND N1	AIR COND ON
CORRECTIONS FOR AIR BLEED		
AIR CONDITIONING OFF		SUBTRACT .700 TO N1
ENGINE ANTI ICE ON		READ AT TAT +5. (°C)
ENGINE ANTI ICE AND WING ANTI ICE ON		READ AT TAT +5. (°C) AND SUBTRACT 0.500 FROM N1

TAT (°C)	PRESSURE ALTITUDE (FT)									
	6000.	7000.	8000.	9000.	10000.	11000.	12000.	13000.	14000.	14500.
–60.0	81.8	82.2	82.7	82.6	82.5	82.6	82.5	82.4	82.3	82.3
–56.0	82.5	83.0	83.5	83.4	83.3	83.4	83.3	83.2	83.1	83.1
–52.0	83.3	83.8	84.3	84.1	84.1	84.2	84.0	83.9	83.9	83.9
–48.0	84.0	84.5	85.0	84.9	84.8	84.9	84.8	84.7	84.6	84.6
–44.0	84.8	85.3	85.8	85.7	85.6	85.7	85.5	85.4	85.4	85.4
–40.0	85.5	86.0	86.5	86.4	86.3	86.4	86.3	86.2	86.1	86.1
–36.0	86.2	86.8	87.3	87.1	87.1	87.2	87.0	86.9	86.9	86.8
–32.0	87.0	87.5	88.0	87.9	87.8	87.9	87.7	87.6	87.6	87.6
–28.0	87.7	88.2	88.7	88.6	88.5	88.6	88.5	88.4	88.3	88.3
–24.0	88.4	88.9	89.4	89.3	89.2	89.3	89.2	89.1	89.0	89.0
–20.0	89.1	89.6	90.2	90.0	89.9	90.0	89.9	89.8	89.7	89.7
–16.0	89.8	90.3	90.9	90.7	90.7	90.8	90.6	90.5	90.4	90.4
–12.0	90.5	91.0	91.6	91.4	91.4	91.5	91.3	91.2	91.1	91.1
–8.0	91.2	91.7	92.3	92.1	92.1	92.2	92.0	91.9	91.8	91.8
–4.0	91.9	92.4	93.0	92.8	92.7	92.9	92.7	92.6	92.5	92.5
0.0	92.6	93.1	93.6	93.5	93.4	93.5	93.4	93.3	93.2	93.2
4.0	93.2	93.8	94.3	94.2	94.1	94.2	94.1	94.0	93.9	93.9
8.0	93.9	94.5	95.0	94.9	94.8	94.9	94.7	94.6	94.6	94.5
12.0	94.6	95.1	95.7	95.5	95.5	95.6	95.4	95.3	95.2	95.2
16.0	95.2	95.8	*96.4*	*96.2*	*96.0*	*95.8*	*95.6*	*95.5*	*95.5*	*95.5*
20.0	95.9	*95.9*	*95.7*	*95.4*	*95.3*	*95.1*	*95.1*	*95.0*	*95.0*	*95.0*
24.0	*95.4*	*95.2*	*95.0*	*94.9*	*94.8*	*94.7*	*94.6*	*94.5*	*94.5*	*94.5*
28.0	*94.8*	*94.6*	*94.4*	*94.3*	*94.2*	*94.1*	*94.0*	*93.9*	*93.8*	*93.8*
32.0	*94.1*	*93.9*	*93.7*	*93.6*	*93.5*	*93.5*	*93.4*	*93.3*		
36.0	*93.3*	*93.2*	*93.0*	*92.9*	*92.9*	*92.8*				
40.0	*92.7*	*92.5*	*92.4*	*92.4*						
44.0	*92.1*	*92.0*								
48.0						BELOW CORNER POINT				
52.0						*ABOVE CORNER POINT*				
56.0										

R *Note : This table is valid for all aircraft speeds.*

MAXIMUM CONTINUOUS

R

V2522/24	MAXIMUM CONTINUOUS N1	AIR COND ON *
CORRECTIONS FOR AIR BLEED		
AIR CONDITIONING OFF		.9
ENGINE ANTI ICE ON		–.9
ENGINE ANTI ICE AND WING ANTI ICE ON		–1.8

TAT (C)	PRESSURE ALTITUDE (FT)										
	0.	2000.	5000.	8000.	12000.	17000.	20000.	25000.	31000.	35000.	39000.
–60.0	69.6	70.4	71.5	73.1	76.9	79.7	78.1	76.4	78.2	80.1	80.5
–23.0	75.4	76.2	77.4	79.2	83.3	86.3	84.6	82.8	84.8	86.8	87.2
–21.0	75.7	76.5	77.7	79.5	83.6	86.6	84.9	83.1	85.1	87.1	87.6
–20.0	75.9	76.7	77.9	79.7	83.8	86.8	85.1	83.3	85.3	87.3	87.6
–19.0	76.0	76.8	78.0	79.8	83.9	87.0	85.3	83.4	85.4	87.5	87.5
–18.0	76.2	77.0	78.2	80.0	84.1	87.2	85.4	83.6	85.6	87.7	87.4
–16.0	76.5	77.3	78.5	80.3	84.4	87.5	85.8	83.9	85.9	87.4	87.1
–9.0	77.5	78.3	79.6	81.4	85.6	88.7	86.9	85.1	87.0	86.6	86.4
–8.0	77.7	78.5	79.7	81.5	85.7	88.9	87.1	85.2	86.9	86.5	86.3
–2.0	78.5	79.4	80.6	82.4	86.7	89.9	87.7	86.2	86.3	85.9	85.6
1.0	79.0	79.8	81.0	82.9	87.2	90.3	87.4	86.0	85.9	85.6	85.4
3.0	79.3	80.1	81.3	83.2	87.5	90.2	87.3	85.8	85.7	85.4	85.2
5.0	79.5	80.4	81.6	83.5	87.8	89.9	87.1	85.6	85.5	85.2	85.0
7.0	79.8	80.7	81.9	83.8	88.1	89.6	86.9	85.4	85.2	85.1	84.9
9.0	80.1	81.0	82.2	84.1	88.4	89.3	86.7	85.2	85.1	84.9	84.7
11.0	80.4	81.3	82.5	84.4	88.6	89.1	86.5	85.0	84.9		84.5
12.0	80.5	81.4	82.7	84.5	88.6	89.0	86.4	84.9	84.8		84.4
16.0	81.1	82.0	83.2	85.1	88.5	88.6	86.0	84.4			
18.0	81.4	82.3	83.5	85.2	88.4	88.5	85.7	84.2			
19.0	81.5	82.4	83.7	85.2	88.4	88.4	85.6	84.1			
20.0	81.7	82.5	83.8	85.2	88.4	88.3	85.5	84.0			
23.0	82.1	83.0	84.1	85.1	88.1	88.1	85.1				
25.0	82.4	83.2	84.4	85.0	87.9	87.9	84.9				
29.0	82.9	83.8	84.6	84.8	87.6	87.5	84.5				
30.0	83.0	83.9	84.5	84.8	87.5	87.3	84.7				
32.0	83.3	84.2	84.2	84.7	87.3	87.1					
34.0	83.6	84.1	83.9	84.6	87.1	87.2					
35.0	83.7	83.9	83.8	84.5	87.0						
40.0	83.2	83.1	83.0	84.0	86.4						
45.0	82.4	82.4	82.6	83.3							
50.0	81.6	81.7	82.1								
55.0	81.2	81.3									
60.0	80.3										
64.0											

* One engine inoperative – 1 pack operative on remaining engine.

Note : This table is valid for all aircraft speeds.

MAXIMUM CLIMB

V2522/24	MAXIMUM CLIMB N1					AIR COND ON					
CORRECTIONS FOR AIR BLEED											
AIR CONDITIONING OFF											1.1
ENGINE ANTI ICE ON											–.8
ENGINE ANTI ICE AND WING ANTI ICE ON											1.4
TAT (°C)	PRESSURE ALTITUDE (FT)										
	0.	2000.	5000.	8000.	12000.	17000.	20000.	25000.	31000.	35000.	39000.
–60.0	69.7	70.4	71.4	72.3	73.4	74.8	75.7	76.5	78.4	80.4	80.8
–23.0	75.5	76.3	77.4	78.3	79.5	81.0	82.0	82.9	84.9	87.1	87.5
–21.0	75.8	76.6	77.7	78.7	79.8	81.4	82.3	83.3	85.3	87.4	87.9
–20.0	76.0	76.8	77.9	78.8	80.0	81.5	82.5	83.4	85.5	87.6	87.9
–19.0	76.1	76.9	78.0	79.0	80.2	81.7	82.6	83.6	85.6	87.8	87.8
–18.0	76.3	77.1	78.2	79.1	80.3	81.8	82.8	83.7	85.8	87.9	87.7
–16.0	76.6	77.4	78.5	79.4	80.6	82.2	83.1	84.1	86.1	87.7	87.4
–9.0	77.6	78.4	79.5	80.5	81.7	83.3	84.2	85.2	87.2	86.8	86.6
–8.0	77.7	78.6	79.7	80.7	81.9	83.4	84.4	85.4	87.1	86.7	86.5
–2.0	78.6	79.5	80.6	81.6	82.8	84.4	85.3	86.3	86.5	86.1	85.9
1.0	79.0	79.9	81.0	82.0	83.3	84.8	85.8	86.2	86.1	85.8	85.6
3.0	79.3	80.2	81.3	82.3	83.6	85.1	86.1	86.0	85.9	85.6	85.5
5.0	79.6	80.5	81.6	82.6	83.9	85.5	86.4	85.8	85.7	85.5	85.3
7.0	79.9	80.8	81.9	82.9	84.2	85.8	86.3	85.6	85.4	85.3	85.1
9.0	80.2	81.0	82.2	83.2	84.5	86.0	86.1	85.3	85.3	85.1	84.9
11.0	80.5	81.3	82.5	83.5	84.8	85.8	85.9	85.1	85.1	85.0	84.8
12.0	80.6	81.5	82.6	83.6	84.9	85.7	85.8	85.0	85.0	84.9	84.7
16.0	81.2	82.0	83.2	84.2	85.5	85.3	85.3	84.6	84.7	84.6	
18.0	81.5	82.3	83.5	84.5	85.4	85.1	85.1	84.4	84.4		
19.0	81.6	82.5	83.6	84.7	85.3	85.0	85.0	84.3	84.3		
20.0	81.7	82.6	83.8	84.8	85.2	84.9	84.9	84.2	84.2		
23.0	82.2	83.0	84.2	85.2	84.9	84.5	84.6	83.8	83.8		
25.0	82.4	83.3	84.5	85.0	84.6	84.3	84.4	83.6	83.8		
29.0	83.0	83.9	84.7	84.5	84.1	83.9	84.0	83.1			
30.0	83.1	84.0	84.6	84.4	84.0	83.8	83.8	82.9			
32.0	83.4	84.3	84.3	84.1	83.7	83.6	83.6	82.9			
34.0	83.7	84.2	84.0	83.8	83.5	83.3	83.4	83.1			
35.0	83.8	84.0	83.9	83.7	83.4	83.2	83.3				
40.0	83.2	83.2	83.1	83.1	82.9	82.7					
45.0	82.4	82.5	82.5	82.6	82.4						
50.0	81.7	81.8	82.0	82.1	82.3						
55.0	81.3	81.4	81.4								
60.0	80.4	80.5									
64.0	79.7										

Note : This table is valid for all aircraft speeds.

MAXIMUM CONTINUOUS

V2527/27E	MAXIMUM CONTINUOUS N1	AIR COND ON *
CORRECTIONS FOR AIR BLEED		
AIR CONDITIONING OFF		.8
NACELLE ANTI-ICE ON		–.8
ENGINE ANTI-ICE AND WING ANTI-ICE ON		–1.7

TAT (C)	PRESSURE ALTITUDE (FT)										
	0.	2000.	5000.	8000.	12000.	17000.	20000.	25000.	31000.	35000.	39000.
–50.0	71.9	72.7	74.7	79.3	81.0	83.7	85.4	86.6	80.1	82.0	82.4
–46.0	72.5	73.4	75.4	80.0	81.7	84.4	86.1	87.4	80.8	82.7	83.1
–42.0	73.1	74.0	76.1	80.7	82.5	85.1	86.9	88.1	81.5	83.4	83.8
–38.0	73.8	74.6	76.7	81.4	83.2	85.9	87.6	88.9	82.2	84.2	84.5
–34.0	74.4	75.3	77.4	82.1	83.9	86.6	88.4	89.7	82.9	84.9	85.3
–30.0	75.0	75.9	78.0	82.7	84.6	87.3	89.1	90.4	83.6	85.6	86.0
–26.0	75.6	76.5	78.7	83.4	85.3	88.0	89.8	91.1	84.3	86.3	86.7
–22.0	76.2	77.1	79.3	84.1	85.9	88.7	90.6	91.9	84.9	87.0	87.4
–18.0	76.8	77.8	79.9	84.8	86.6	89.5	91.3	92.6	85.6	87.7	87.4
–14.0	77.4	78.4	80.6	85.4	87.3	90.2	92.0	93.3	86.3	87.1	86.8
–10.0	78.0	79.0	81.2	86.1	88.0	90.8	92.7	93.7	86.9	86.7	86.5
–6.0	78.6	79.6	81.8	86.7	88.6	91.5	93.4	93.1	86.7	86.3	86.0
–2.0	79.2	80.2	82.4	87.4	89.3	92.2	93.7	92.5	86.3	85.9	85.6
2.0	79.8	80.7	83.0	88.0	90.0	92.7	93.1	92.1	85.8	85.5	85.3
6.0	80.4	81.3	83.6	88.6	90.6	92.1	92.7	91.5	85.4	85.2	85.0
10.0	80.9	81.9	84.2	89.3	91.2	91.5	92.2	90.9	85.0	84.8	84.6
14.0	81.5	82.5	84.8	89.9	90.6	90.9	91.6	90.3	84.7		
18.0	82.1	83.1	85.4	90.2	90.0	90.3	91.0	89.9			
22.0	82.6	83.6	86.0	89.8	89.6	89.9	90.6	89.8			
26.0	83.2	84.2	85.9	89.3	89.2	89.5	90.2				
30.0	83.8	84.3	85.9	88.8	88.8	89.0	90.2				
34.0	83.6	84.1	85.8	88.4	88.3	88.8					
38.0	83.5	83.8	85.9	87.8	87.6						
42.0	82.8	83.5	85.7	87.3	87.3						
46.0	82.2	83.3	85.5	86.6							
50.0	82.0	83.0	85.3								
54.0	81.7	82.6	85.1								
58.0	81.4	82.3									
62.0	81.1										
66.0											

* One engine inoperative – 1 pack operative on remaining engine.

Note : This table is valid for all aircraft speeds.

MAXIMUM CLIMB

R

V2527E-A5	MAXIMUM CLIMB N1	AIR COND ON
CORRECTIONS FOR AIR BLEED		
AIR CONDITIONING OFF		.800
ENGINE ANTI ICE ON		–.800
ENGINE ANTI ICE AND WING ANTI ICE ON		–1.300

TAT (°C)	PRESSURE ALTITUDE (FT)										
	0.	2000.	5000.	8000.	12000.	17000.	20000.	25000.	31000.	35000.	39000.
–50.0	71.3	72.1	73.1	74.0	75.1	76.5	77.4	78.3	80.2	82.2	82.7
–46.0	72.0	72.7	73.8	74.7	75.8	77.2	78.1	79.0	80.9	83.0	83.4
–42.0	72.6	73.4	74.4	75.3	76.5	77.9	78.8	79.7	81.7	83.7	84.1
–38.0	73.2	74.0	75.0	76.0	77.1	78.6	79.5	80.4	82.4	84.4	84.9
–34.0	73.8	74.6	75.7	76.6	77.8	79.2	80.1	81.1	83.1	85.1	85.6
–30.0	74.4	75.2	76.3	77.2	78.4	79.9	80.8	81.8	83.8	85.8	86.3
–26.0	75.1	75.9	76.9	77.9	79.1	80.6	81.5	82.4	84.4	86.6	87.0
–22.0	75.7	76.5	77.5	78.5	79.7	81.2	82.1	83.1	85.1	87.3	87.7
–18.0	76.3	77.1	78.2	79.1	80.3	81.8	82.8	83.7	85.8	87.9	87.7
–14.0	76.9	77.7	78.8	79.7	80.9	82.5	83.4	84.4	86.5	87.4	87.1
–10.0	77.4	78.3	79.4	80.4	81.6	83.1	84.1	85.0	87.1	86.9	86.7
–6.0	78.0	78.9	80.0	81.0	82.2	83.7	84.7	85.7	86.9	86.5	86.3
–2.0	78.6	79.5	80.6	81.6	82.8	84.4	85.3	86.3	86.5	86.1	85.9
2.0	79.2	80.0	81.2	82.2	83.4	85.0	86.0	86.1	86.0	85.7	85.5
6.0	79.8	80.6	81.8	82.8	84.0	85.6	86.3	85.7	85.5	85.4	85.2
10.0	80.3	81.2	82.3	83.4	84.6	86.0	86.0	85.2	85.2	85.1	84.9
14.0	80.9	81.8	82.9	83.9	85.2	85.5	85.6	84.8	84.9	84.7	84.7
18.0	81.5	82.3	83.5	84.5	85.4	85.1	85.1	84.4	84.4		
22.0	82.0	82.9	84.1	85.1	85.0	84.7	84.7	83.9	83.9		
26.0	82.6	83.5	84.6	84.9	84.5	84.2	84.3	83.4	83.9		
30.0	83.1	84.0	84.6	84.4	84.0	83.8	83.8	82.9			
34.0	83.7	84.2	84.0	83.8	83.5	83.3	83.4	83.1			
38.0	83.6	83.5	83.4	83.3	83.1	82.9	83.1				
42.0	82.9	82.9	82.9	82.9	82.7	82.7					
46.0	82.3	82.3	82.4	82.5	82.3						
50.0	81.7	81.8	82.0	82.1	82.3						
54.0	81.3	81.5	81.6								
58.0	80.7	80.8									
62.0	80.0										
66.0											

Note : This table is valid for all aircraft speeds.

MAXIMUM CONTINUOUS

R

V2527/27E	MAXIMUM CONTINUOUS N1	AIR COND ON *
CORRECTIONS FOR AIR BLEED		
AIR CONDITIONING OFF		.8
ENGINE ANTI ICE ON		–.8
ENGINE ANTI ICE AND WING ANTI ICE ON		–1.7

TAT (°C)	PRESSURE ALTITUDE (FT)										
	0.	2000.	5000.	8000.	12000.	17000.	20000.	25000.	31000.	35000.	39000.
–50.0	71.9	72.7	74.7	79.3	81.0	82.9	83.8	84.3	80.1	82.0	82.4
–46.0	72.5	73.4	75.4	80.0	81.7	83.7	84.5	85.1	80.8	82.7	83.1
–42.0	73.1	74.0	76.1	80.7	82.5	84.4	85.3	85.8	81.5	83.4	83.8
–38.0	73.8	74.6	76.7	81.4	83.2	85.1	86.0	86.6	82.2	84.2	84.5
–34.0	74.4	75.3	77.4	82.1	83.9	85.8	86.8	87.3	82.9	84.9	85.3
–30.0	75.0	75.9	78.0	82.7	84.6	86.6	87.5	88.0	83.6	85.6	86.0
–26.0	75.6	76.5	78.7	83.4	85.3	87.3	88.2	88.8	84.3	86.3	86.7
–22.0	76.2	77.1	79.3	84.1	85.9	88.0	88.9	89.5	84.9	87.0	87.4
–18.0	76.8	77.8	79.9	84.8	86.6	88.7	89.6	90.2	85.6	87.7	87.4
–14.0	77.4	78.4	80.6	85.4	87.3	89.4	90.3	90.9	86.3	87.1	86.8
–10.0	78.0	79.0	81.2	86.1	88.0	90.0	91.0	91.2	86.9	86.7	86.5
–6.0	78.6	79.6	81.8	86.7	88.6	90.7	91.7	90.9	86.7	86.3	86.0
–2.0	79.2	80.2	82.4	87.4	89.3	91.4	92.0	90.6	86.3	85.9	85.6
2.0	79.8	80.7	83.0	88.0	90.0	91.9	91.7	90.2	85.8	85.5	85.3
6.0	80.4	81.3	83.6	88.6	90.6	91.3	91.3	89.7	85.4	85.2	85.0
10.0	80.9	81.9	84.2	89.3	91.2	90.8	90.9	89.2	85.0	84.8	84.6
14.0	81.5	82.5	84.8	89.9	90.6	90.2	90.3	88.9	84.7		
18.0	82.1	83.1	85.4	90.2	90.0	89.8	90.0	88.5			
22.0	82.6	83.6	86.0	89.8	89.6	89.4	89.6	88.5			
26.0	83.2	84.2	85.9	89.3	89.2	89.0	89.2				
30.0	83.8	84.3	85.9	88.8	88.8	88.5	89.3				
34.0	83.6	84.1	85.8	88.4	88.3	88.2					
38.0	83.5	83.8	85.9	87.8	87.6						
42.0	82.8	83.5	85.7	87.3	87.3						
46.0	82.2	83.3	85.5	86.6							
50.0	82.0	83.0	85.3								
54.0	81.7	82.6	85.1								
58.0	81.4	82.3									
62.0	81.1										
66.0											

* One engine inoperative – 1 pack operative on remaining engine.

Note : This table is valid for all aircraft speeds.

MAXIMUM CLIMB

R

V2527E-A5	MAXIMUM CLIMB N1	AIR COND ON
CORRECTIONS FOR AIR BLEED		
AIR CONDITIONING OFF		.800
ENGINE ANTI ICE ON		–.800
ENGINE ANTI ICE AND WING ANTI ICE ON		–1.300

TAT (°C)	PRESSURE ALTITUDE (FT)										
	0.	2000.	5000.	8000.	12000.	17000.	20000.	25000.	31000.	35000.	39000.
–50.0	71.3	72.1	73.1	74.0	75.1	76.5	77.4	78.3	80.2	82.2	82.7
–46.0	72.0	72.7	73.8	74.7	75.8	77.2	78.1	79.0	80.9	83.0	83.4
–42.0	72.6	73.4	74.4	75.3	76.5	77.9	78.8	79.7	81.7	83.7	84.1
–38.0	73.2	74.0	75.0	76.0	77.1	78.6	79.5	80.4	82.4	84.4	84.9
–34.0	73.8	74.6	75.7	76.6	77.8	79.2	80.1	81.1	83.1	85.1	85.6
–30.0	74.4	75.2	76.3	77.2	78.4	79.9	80.8	81.8	83.8	85.8	86.3
–26.0	75.1	75.9	76.9	77.9	79.1	80.6	81.5	82.4	84.4	86.6	87.0
–22.0	75.7	76.5	77.5	78.5	79.7	81.2	82.1	83.1	85.1	87.3	87.7
–18.0	76.3	77.1	78.2	79.1	80.3	81.8	82.8	83.7	85.8	87.9	87.7
–14.0	76.9	77.7	78.8	79.7	80.9	82.5	83.4	84.4	86.5	87.4	87.1
–10.0	77.4	78.3	79.4	80.4	81.6	83.1	84.1	85.0	87.1	86.9	86.7
–6.0	78.0	78.9	80.0	81.0	82.2	83.7	84.7	85.7	86.9	86.5	86.3
–2.0	78.6	79.5	80.6	81.6	82.8	84.4	85.3	86.3	86.5	86.1	85.9
2.0	79.2	80.0	81.2	82.2	83.4	85.0	86.0	86.1	86.0	85.7	85.5
6.0	79.8	80.6	81.8	82.8	84.0	85.6	86.3	85.7	85.5	85.4	85.2
10.0	80.3	81.2	82.3	83.4	84.6	86.0	86.0	85.2	85.2	85.1	84.9
14.0	80.9	81.8	82.9	83.9	85.2	85.5	85.6	84.8	84.9	84.7	84.7
18.0	81.5	82.3	83.5	84.5	85.4	85.1	85.1	84.4	84.4		
22.0	82.0	82.9	84.1	85.1	85.0	84.7	84.7	83.9	83.9		
26.0	82.6	83.5	84.6	84.9	84.5	84.2	84.3	83.4	83.9		
30.0	83.1	84.0	84.6	84.4	84.0	83.8	83.8	82.9			
34.0	83.7	84.2	84.0	83.8	83.5	83.3	83.4	83.1			
38.0	83.6	83.5	83.4	83.3	83.1	82.9	83.1				
42.0	82.9	82.9	82.9	82.9	82.7	82.7					
46.0	82.3	82.3	82.4	82.5	82.3						
50.0	81.7	81.8	82.0	82.1	82.3						
54.0	81.3	81.5	81.6								
58.0	80.7	80.8									
62.0	80.0										
66.0											

Note : This table is valid for all aircraft speeds.

MAXIMUM CRUISE

V2522/24	MAXIMUM CRUISE N1	AIR COND ON
CORRECTIONS FOR AIR BLEED		
AIR CONDITIONING OFF		1.1
ENGINE ANTI ICE ON		–.8
ENGINE ANTI ICE AND WING ANTI ICE ON		1.4

TAT	PRESSURE ALTITUDE (FT)										
(°C)	0.	2000.	5000.	8000.	12000.	17000.	20000.	25000.	31000.	35000.	39000.
–60.0	65.6	66.5	67.8	69.1	70.5	72.1	73.0	74.0	75.7	77.3	77.6
–23.0	71.1	72.0	73.5	74.8	76.3	78.1	79.1	80.1	82.0	83.7	84.1
–21.0	71.4	72.3	73.8	75.1	76.6	78.4	79.4	80.5	82.3	84.0	84.4
–20.0	71.5	72.5	73.9	75.3	76.8	78.5	79.6	80.6	82.5	84.2	84.5
–19.0	71.7	72.6	74.1	75.4	76.9	78.7	79.7	80.8	82.6	84.4	84.4
–18.0	71.8	72.8	74.2	75.6	77.1	78.8	79.9	80.9	82.8	84.5	84.3
–16.0	72.1	73.1	74.5	75.9	77.4	79.2	80.2	81.3	83.1	84.4	84.2
–9.0	73.0	74.0	75.5	76.9	78.4	80.2	81.3	82.4	84.2	83.8	83.6
–8.0	73.2	74.2	75.7	77.0	78.6	80.4	81.5	82.5	84.1	83.7	83.5
–2.0	74.0	75.0	76.5	77.9	79.5	81.3	82.4	83.4	83.5	83.1	82.9
1.0	74.4	75.4	76.9	78.3	79.9	81.7	82.8	83.2	83.2	82.9	82.7
3.0	74.7	75.7	77.2	78.6	80.2	82.0	83.1	83.0	83.0	82.7	82.5
5.0	75.0	76.0	77.5	78.9	80.5	82.3	83.4	82.8	82.6	82.4	82.2
7.0	75.2	76.2	77.8	79.2	80.8	82.6	83.2	82.5	82.3	82.2	81.9
9.0	75.5	76.5	78.1	79.5	81.1	82.9	83.0	82.1	82.0	81.9	81.7
11.0	75.8	76.8	78.3	79.8	81.4	82.6	82.7	81.8	81.8	81.6	81.4
12.0	75.9	76.9	78.5	79.9	81.5	82.5	82.6	81.7	81.7	81.5	81.2
16.0	76.4	77.5	79.0	80.5	82.1	81.9	81.9	81.1	81.1	81.0	
18.0	76.7	77.7	79.3	80.7	81.9	81.6	81.7	80.9	80.9		
19.0	76.8	77.9	79.4	80.9	81.7	81.4	81.5	80.7	80.7		
20.0	77.0	78.0	79.6	81.0	81.5	81.2	81.4	80.6	80.6		
23.0	77.3	78.4	80.0	81.4	81.1	80.8	81.0	80.2	80.2		
25.0	77.6	78.7	80.2	81.1	80.7	80.5	80.7	80.0	80.2		
29.0	78.1	79.2	80.4	80.4	80.1	80.1	80.3	79.5			
30.0	78.3	79.3	80.2	80.3	80.0	80.0	80.2	79.4			
32.0	78.5	79.6	79.9	79.9	79.7	79.7	79.9	79.3			
34.0	78.8	79.4	79.6	79.7	79.4	79.4	79.6	79.6			
35.0	78.9	79.3	79.5	79.4	79.2	79.3	79.5				
40.0	78.0	78.2	78.3	78.4	78.4	78.5					
45.0	76.7	76.9	77.2	77.6	77.6						
50.0	75.5	75.9	76.4	76.8	77.4						
55.0	74.5	75.0	75.5								
60.0	73.6	74.0									
64.0	72.6										

Note : This table is valid for all aircraft speeds.

MAXIMUM CRUISE

R

V2527/27E	MAXIMUM CRUISE N1	AIR COND ON
CORRECTIONS FOR AIR BLEED		
AIR CONDITIONING OFF		.800
ENGINE ANTI ICE ON		–.800
ENGINE ANTI ICE AND WING ANTI ICE ON		–1.300

TAT	PRESSURE ALTITUDE (FT)										
(°C)	0.	2000.	5000.	8000.	12000.	17000.	20000.	25000.	31000.	35000.	39000.
–50.0	67.1	68.1	69.4	70.7	72.1	73.7	74.7	75.7	77.4	79.1	79.4
–46.0	67.7	68.7	70.0	71.3	72.7	74.4	75.4	76.4	78.1	79.8	80.1
–42.0	68.3	69.3	70.6	71.9	73.4	75.0	76.1	77.0	78.8	80.5	80.8
–38.0	68.9	69.9	71.3	72.6	74.0	75.7	76.7	77.7	79.5	81.1	81.5
–34.0	69.5	70.4	71.9	73.2	74.6	76.3	77.4	78.4	80.2	81.8	82.2
–30.0	70.1	71.0	72.5	73.8	75.3	77.0	78.0	79.0	80.8	82.5	82.9
–26.0	70.7	71.6	73.1	74.4	75.9	77.6	78.6	79.7	81.5	83.2	83.5
–22.0	71.2	72.2	73.6	75.0	76.5	78.2	79.3	80.3	82.1	83.9	84.2
–18.0	71.8	72.8	74.2	75.6	77.1	78.8	79.9	80.9	82.8	84.5	84.3
–14.0	72.4	73.3	74.8	76.2	77.7	79.5	80.5	81.6	83.4	84.2	84.0
–10.0	72.9	73.9	75.4	76.8	78.3	80.1	81.1	82.2	84.1	83.9	83.7
–6.0	73.5	74.5	75.9	77.3	78.9	80.7	81.8	82.8	83.9	83.5	83.3
–2.0	74.0	75.0	76.5	77.9	79.5	81.3	82.4	83.4	83.5	83.1	82.9
2.0	74.6	75.6	77.1	78.5	80.1	81.9	83.0	83.1	83.1	82.8	82.6
6.0	75.1	76.1	77.6	79.1	80.6	82.5	83.3	82.6	82.5	82.3	82.1
10.0	75.6	76.7	78.2	79.6	81.2	82.8	82.8	82.0	81.9	81.7	81.5
14.0	76.2	77.2	78.7	80.2	81.8	82.2	82.3	81.4	81.4	81.2	81.2
18.0	76.7	77.7	79.3	80.7	81.9	81.6	81.7	80.9	80.9		
22.0	77.2	78.3	79.8	81.3	81.2	80.9	81.1	80.4	80.3		
26.0	77.7	78.8	80.4	80.9	80.6	80.4	80.6	79.9	80.3		
30.0	78.3	79.3	80.2	80.3	80.0	80.0	80.2	79.4			
34.0	78.8	79.4	79.6	79.7	79.4	79.4	79.6	79.6			
38.0	78.5	78.7	78.7	78.8	78.8	78.8	79.3				
42.0	77.5	77.6	77.8	78.1	78.1	78.5					
46.0	76.5	76.7	77.1	77.5	77.5						
50.0	75.5	75.9	76.4	76.8	77.4						
54.0	74.7	75.1	75.6								
58.0	74.0	74.4									
62.0	73.2										
66.0											

Note : This table is valid for all aircraft speeds.

GENERAL

R Climb tables are established at MAX CLIMB THRUST with air conditioning in normal mode
R and anti ice OFF.
R The climb speed profile is :
R – 250 kt from 1500 ft up to FL100
R – acceleration from 250 kt to 300 kt
R – climb at 300 kt then M.78 up to selected altitude.
R All charts are established with a center of gravity corresponding to 33%.

CLIMB - 250KT/300KT/M.78 - ALL ENGINES

MAX. CLIMB THRUST
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

FROM BRAKE RELEASE
TIME (MIN) **FUEL (KG)**
DISTANCE (NM) **TAS (KT)**

FL	WEIGHT AT BRAKE RELEASE (1000KG)													
	42		**44**		**46**		**48**		**50**		**52**		**54**	
390	18 119	1209 390	19 127	1285 391	21 135	1364 392	22 144	1449 393	24 155	1539 394	25 166	1637 395	27 178	1744 397
370	17 108	1145 385	18 115	1214 386	19 122	1286 387	20 130	1364 388	21 139	1444 389	23 148	1531 390	24 158	1624 391
350	15 98	1082 379	16 104	1146 380	17 110	1212 381	18 117	1283 382	19 124	1356 383	21 132	1433 384	22 140	1516 385
330	14 88	1021 373	15 93	1080 374	16 99	1142 374	17 105	1206 375	18 111	1273 376	19 118	1343 377	20 125	1417 378
310	13 79	958 365	14 84	1013 366	14 88	1070 367	15 94	1129 367	16 99	1190 368	17 105	1254 369	18 111	1321 370
290	12 69	888 354	12 73	938 355	13 77	989 356	14 81	1043 357	14 86	1098 357	15 91	1156 358	16 96	1216 359
270	10 58	806 340	11 61	850 341	11 65	896 342	12 68	944 343	13 72	992 344	13 76	1043 344	14 80	1095 345
250	9 49	734 328	9 52	774 328	10 55	815 329	11 58	858 330	11 61	901 331	12 64	946 331	12 67	993 332
240	8 45	701 321	9 48	739 322	9 51	778 323	10 53	819 324	10 56	859 324	11 59	902 325	11 62	946 325
220	8 39	639 309	8 41	673 310	8 43	708 311	9 45	745 311	9 48	781 312	10 50	819 312	10 53	858 313
200	7 33	582 297	7 35	612 298	7 37	644 298	8 39	677 299	8 41	709 300	9 43	743 300	9 45	778 300
180	6 28	528 284	6 30	555 285	7 31	583 286	7 33	613 287	7 34	642 287	8 36	672 288	8 38	704 288
160	5 24	476 271	5 25	500 272	6 26	526 273	6 28	552 274	6 29	578 274	7 30	605 275	7 32	633 275
140	5 20	425 257	5 21	447 258	5 22	470 259	5 23	493 260	6 24	516 260	6 25	540 261	6 26	565 261
120	4 16	376 242	4 17	395 243	4 18	415 244	5 19	435 244	5 20	456 245	5 20	477 246	5 21	499 246
100	3 11	296 213	3 11	311 215	3 12	326 215	4 13	342 216	4 13	358 217	4 14	374 217	4 15	392 218
50	2 5	187 174	2 6	196 176	2 6	206 176	2 6	215 177	2 7	225 178	2 7	235 179	2 7	245 179
15	1 2	111 118	1 2	116 118	1 2	121 119	1 2	127 119	1 3	132 119	1 3	138 120	1 3	144 120

CORRECTIONS	AC HI	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 6 %	+ 2.5 %	+ 6 %

GENERAL

R Climb tables are established at MAX CLIMB THRUST with air conditioning in normal mode
R and anti ice OFF.
R The climb speed profile is :
R – 250 kt from 1500 ft up to FL100
R – acceleration from 250 kt to 300 kt
R – climb at 300 kt then M.78 up to selected altitude.
R All charts are established with a center of gravity corresponding to 33%.

CLIMB - 250KT/300KT/M.78

MAX. CLIMB THRUST
NORMAL AIR CONDITIONING
ANTI-ICING OFF
ISA
CG=33.0%
FROM BRAKE RELEASE
TIME (MIN) FUEL (KG)
DISTANCE (NM) TAS (KT)

FL	WEIGHT AT BRAKE RELEASE (1000KG)													
	52		54		56		58		60		62		64	
390	17	1285	18	1351	19	1420	21	1495	22	1576	23	1667	25	1772
	112	384	118	385	125	386	133	387	141	388	151	389	163	391
370	16	1210	17	1268	17	1329	18	1393	19	1461	20	1533	21	1610
	99	377	105	378	110	379	116	379	122	380	129	381	136	382
350	15	1146	15	1199	16	1255	17	1313	17	1373	18	1436	19	1504
	90	371	94	371	99	372	104	373	109	373	114	374	120	374
330	13	1087	14	1136	15	1187	15	1240	16	1295	17	1353	18	1413
	81	364	85	365	89	365	93	366	98	366	102	366	107	367
310	12	1028	13	1074	14	1121	14	1170	15	1220	15	1273	16	1328
	74	357	77	357	80	357	84	358	88	358	92	358	96	359
290	11	964	12	1007	12	1051	13	1096	13	1142	14	1191	15	1241
	66	347	69	348	72	348	75	348	78	348	81	349	85	349
270	10	885	11	924	11	964	11	1005	12	1047	12	1091	13	1136
	56	334	59	335	61	335	64	335	67	335	70	336	72	336
250	9	813	9	849	10	885	10	923	11	961	11	1000	12	1041
	48	322	51	322	53	323	55	323	57	323	60	323	62	323
240	9	779	9	813	9	848	10	883	10	920	10	957	11	996
	45	316	47	316	49	316	51	317	53	317	55	317	58	317
220	8	713	8	744	8	776	9	808	9	841	9	876	10	911
	38	303	40	304	42	304	44	304	45	304	47	304	49	304
200	7	651	7	679	7	708	8	738	8	768	8	799	9	831
	33	291	34	291	36	291	37	292	39	292	40	292	42	292
180	6	592	6	618	7	644	7	671	7	699	7	727	8	756
	28	278	29	279	30	279	32	279	33	279	34	279	36	279
160	5	535	6	558	6	582	6	607	6	632	7	657	7	683
	24	265	25	265	26	266	27	266	28	266	29	266	30	266
140	5	480	5	501	5	522	5	544	6	567	6	590	6	613
	20	251	20	251	21	251	22	252	23	252	24	252	25	252
120	4	427	4	445	4	464	5	484	5	504	5	524	5	546
	16	235	17	235	18	236	18	236	19	236	20	236	21	236
100	3	340	3	355	3	370	4	386	4	402	4	419	4	436
	11	206	11	207	12	207	13	207	13	208	14	208	14	208
50	2	221	2	231	2	241	2	251	2	262	3	273	3	284
	6	168	6	169	6	169	7	169	7	170	7	170	7	170
15	1	138	1	144	1	150	2	156	2	163	2	170	2	177
	3	120	3	120	3	120	3	120	3	121	3	121	3	121

LOW AIR CONDITIONING	HIGH AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.1 %	△FUEL = + 0.1 %	△FUEL = + 4.5 %	△FUEL = + 8 %

10E -08F0A319-131 IAE V2522-A5 21100000C5KG330 0 018590 0 0 2 1.0 500.0 300.00 1 03250.000300.000 .780 0 FCOM-N0-03-05-10-002-135

GENERAL

R Climb tables are established at MAX CLIMB THRUST with air conditioning in normal mode
R and anti ice OFF.
R The climb speed profile is :
R – 250 kt from 1500 ft up to FL100
R – acceleration from 250 kt to 300 kt
R – climb at 300 kt then M.78 up to selected altitude.
R All charts are established with a center of gravity corresponding to 33%.

CLIMB - 250KT/300KT/M.78

MAX. CLIMB THRUST
NORMAL AIR CONDITIONING
ANTI-ICING OFF
ISA
CG=33.0%
FROM BRAKE RELEASE
TIME (MIN) FUEL (KG)
DISTANCE (NM) TAS (KT)

FL	WEIGHT AT BRAKE RELEASE (1000KG)													
	52		54		56		58		60		62		64	
390	18	1306	19	1373	20	1443	21	1519	22	1601	24	1693	25	1798
	113	383	120	384	127	385	134	386	143	387	153	389	165	391
370	16	1230	17	1289	18	1351	19	1416	20	1484	21	1557	22	1636
	101	377	106	377	111	378	117	379	123	379	130	380	138	381
350	15	1166	15	1220	16	1276	17	1335	18	1396	19	1460	20	1529
	91	370	95	371	100	371	105	372	110	373	116	373	122	374
330	14	1106	14	1156	15	1208	16	1261	16	1317	17	1376	18	1437
	83	364	86	364	90	365	95	365	99	365	104	366	109	367
310	13	1047	13	1093	14	1141	14	1191	15	1242	16	1295	16	1352
	75	356	78	357	82	357	85	357	89	357	93	358	97	358
290	12	982	12	1026	13	1070	13	1116	14	1163	14	1212	15	1263
	67	347	70	347	73	347	76	348	79	348	82	348	86	348
270	10	903	11	942	11	983	12	1025	12	1067	13	1111	13	1157
	57	334	60	334	62	335	65	335	68	335	71	335	74	335
250	9	830	10	866	10	903	10	941	11	980	11	1020	12	1062
	49	322	51	322	54	322	56	322	58	323	61	323	63	323
240	9	795	9	830	9	865	10	902	10	939	11	977	11	1017
	46	316	48	316	50	316	52	316	54	316	56	317	59	317
220	8	729	8	761	8	793	9	826	9	860	9	895	10	931
	39	303	41	304	43	304	44	304	46	304	48	304	50	304
200	7	667	7	695	8	725	8	755	8	786	8	818	9	850
	34	291	35	291	37	292	38	292	40	292	41	292	43	292
180	6	607	6	634	7	661	7	688	7	716	8	745	8	775
	29	279	30	279	31	279	33	279	34	279	35	279	37	280
160	5	550	6	574	6	598	6	623	6	649	7	675	7	702
	24	266	25	266	26	266	28	266	29	267	30	267	31	267
140	5	495	5	516	5	538	5	561	6	584	6	607	6	632
	20	252	21	252	22	252	23	253	24	253	25	253	26	253
120	4	440	4	459	5	479	5	499	5	520	5	541	5	563
	17	237	17	237	18	237	19	237	20	238	21	238	21	238
100	3	352	3	367	4	383	4	399	4	416	4	433	4	451
	12	209	12	209	13	209	13	210	14	210	14	210	15	210
50	2	227	2	237	2	247	2	257	2	268	3	279	3	290
	6	170	6	171	7	171	7	172	7	172	7	172	8	172
15	1	138	1	144	1	150	2	156	2	163	2	170	2	177
	3	120	3	120	3	120	3	120	3	121	3	121	3	121

LOW AIR CONDITIONING	HIGH AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.4 %	△FUEL = + 0.4 %	△FUEL = + 6 %	△FUEL = + 11 %

10F -08FA320-232 IAE V2527--A5 21100000C5KG330 0 018590 0 0 2 1.0 500.0 300.00 1 03250.000300.000 .780 0 FCOM-N0-03-05-10-002-140

CLIMB - 250KT/300KT/M.78 - ALL ENGINES

MAX. CLIMB THRUST
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

FROM BRAKE RELEASE
TIME (MIN) **FUEL (KG)**
DISTANCE (NM) **TAS (KT)**

FL	WEIGHT AT BRAKE RELEASE (1000KG)													
	56		**58**		**60**		**62**		**64**		**66**		**68**	
390	29 192	1864 398	31 209	2002 400	34 230	2164 402								
370	26 169	1725 392	28 182	1836 394	30 196	1962 395	32 213	2104 397	35 235	2274 400				
350	23 149	1604 386	25 159	1699 387	26 170	1803 388	28 183	1917 390	30 197	2043 392	33 213	2188 394	35 233	2356 396
330	21 132	1496 379	22 141	1580 380	24 150	1670 381	25 159	1767 382	27 170	1872 384	28 182	1988 385	30 196	2115 387
310	19 117	1392 371	20 124	1467 372	21 131	1546 373	22 139	1631 374	24 148	1722 375	25 157	1820 376	27 168	1926 378
290	17 101	1278 360	18 107	1344 360	19 113	1414 361	20 119	1487 362	21 126	1565 363	22 133	1648 364	23 141	1736 365
270	15 84	1150 345	15 88	1207 346	16 93	1267 347	17 98	1330 347	18 103	1395 348	19 109	1464 349	20 115	1537 350
250	13 71	1041 332	13 74	1091 333	14 78	1143 333	15 82	1198 334	15 86	1255 334	16 90	1314 335	17 95	1376 336
230	11 60	944 319	12 63	988 320	12 66	1034 320	13 69	1082 321	14 72	1131 321	14 76	1183 322	15 79	1237 322
220	11 55	898 313	11 58	940 314	12 60	983 314	12 63	1029 314	13 66	1075 315	13 69	1123 315	14 73	1174 316
200	9 47	814 301	10 49	851 301	10 51	890 301	11 54	930 302	11 56	971 302	12 58	1014 303	12 61	1058 303
180	8 40	736 288	9 41	769 289	9 43	804 289	9 45	839 289	10 47	876 289	10 49	914 290	11 51	953 290
160	7 33	662 276	8 35	692 276	8 36	722 276	8 38	754 276	9 40	787 276	9 41	820 277	9 43	855 277
140	6 27	591 262	7 29	617 262	7 30	644 262	7 31	672 262	7 33	701 263	8 34	731 263	8 36	762 263
120	5 22	521 246	6 23	544 247	6 24	568 247	6 26	593 247	6 27	618 247	7 28	645 248	7 29	672 248
100	4 15	409 218	4 16	427 219	5 17	446 219	5 17	465 219	5 18	485 219	5 19	506 220	5 20	527 221
50	3 7	256 179	3 8	267 180	3 8	279 180	3 9	291 180	3 9	303 180	3 9	315 181	3 10	328 182
15	1 3	150 120	2 3	156 120	2 3	163 121	2 3	170 121	2 3	177 121	2 4	184 122	2 4	191 122

CORRECTIONS	AC HI	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 6 %	+ 2.5 %	+ 6 %

CLIMB - 250KT/300KT/M.78 - ALL ENGINES

MAX. CLIMB THRUST
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA+10
CG=33.0%

FROM BRAKE RELEASE
TIME (MIN) FUEL (KG)
DISTANCE (NM) TAS (KT)

FL	WEIGHT AT BRAKE RELEASE (1000KG)													
	42		44		46		48		50		52		54	
390	19 125	1270 399	20 133	1350 400	21 142	1434 401	23 152	1523 402	24 163	1619 403	26 175	1723 405	28 188	1836 406
370	17 113	1202 394	18 121	1275 395	20 129	1352 396	21 137	1433 397	22 146	1519 398	23 156	1610 399	25 166	1709 400
350	16 103	1135 388	17 109	1203 389	18 116	1273 390	19 123	1347 391	20 131	1425 392	21 139	1507 393	23 148	1594 394
330	15 92	1070 381	15 98	1133 382	16 104	1198 383	17 110	1266 384	18 117	1336 385	19 124	1410 386	20 131	1489 387
310	13 83	1004 373	14 88	1062 374	15 93	1121 375	16 98	1184 376	17 104	1249 377	17 110	1316 378	18 116	1387 379
290	12 72	929 363	13 76	982 364	13 81	1036 364	14 85	1093 365	15 90	1151 366	16 95	1211 367	16 101	1274 367
270	10 61	842 348	11 64	889 349	12 68	937 350	12 72	987 351	13 75	1039 352	14 80	1092 352	14 84	1147 353
250	9 52	767 335	10 54	809 336	10 57	852 337	11 61	897 338	11 64	942 338	12 67	990 339	12 71	1038 340
240	9 48	732 329	9 50	772 330	10 53	813 331	10 56	855 331	11 59	898 332	11 62	943 333	12 65	989 333
220	8 41	667 316	8 43	702 317	9 45	739 318	9 47	777 319	9 50	816 319	10 52	855 320	10 55	897 320
200	7 35	606 304	7 36	638 305	8 38	671 306	8 40	705 306	8 42	740 307	9 45	776 307	9 47	812 308
180	6 29	549 291	6 31	578 292	7 33	608 293	7 34	638 294	7 36	670 294	8 38	701 295	8 39	734 295
160	5 25	495 278	6 26	521 279	6 27	547 280	6 29	575 281	6 30	602 281	7 32	631 282	7 33	660 282
140	5 21	442 264	5 22	465 265	5 23	488 266	5 24	513 267	6 25	537 267	6 26	563 268	6 27	589 268
120	4 17	390 249	4 18	411 250	4 19	431 251	5 19	452 251	5 20	474 252	5 21	496 253	5 22	519 253
100	3 11	307 220	3 12	322 221	3 13	338 222	4 13	355 223	4 14	372 224	4 15	389 224	4 15	407 225
50	2 6	193 181	2 6	203 183	2 6	212 184	2 7	222 185	2 7	233 185	2 7	243 186	2 8	254 187
15	1 2	114 125	1 2	119 126	1 3	125 126	1 3	130 127	1 3	136 128	1 3	142 128	1 3	148 128

CORRECTIONS	AC HI	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 8 %	+ 25 %	+ 45 %

CLIMB - 250KT/300KT/M.78

MAX. CLIMB THRUST
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG=33.0%

FROM BRAKE RELEASE
TIME (MIN) **FUEL (KG)**
DISTANCE (NM) **TAS (KT)**

FL	WEIGHT AT BRAKE RELEASE (1000KG)													
	66		**68**		**70**		**72**		**74**		**76**		**78**	
390														
370	23 144	1695 383	24 154	1788 385	26 165	1894 387	27 178	2016 389						
350	20 126	1575 375	21 133	1651 377	22 141	1733 378	24 149	1822 379	25 158	1920 381	27 169	2030 383	28 183	2157 386
330	18 112	1477 368	19 118	1544 369	20 124	1615 370	21 130	1691 371	22 137	1771 372	23 145	1858 374	25 154	1952 375
310	17 100	1386 359	17 105	1447 360	18 110	1510 361	19 115	1577 362	20 121	1648 363	21 127	1723 364	22 134	1803 366
290	15 89	1293 349	16 92	1348 350	17 97	1405 351	17 101	1465 352	18 106	1528 353	19 111	1594 354	20 116	1664 355
270	13 76	1182 336	14 79	1231 337	15 82	1281 337	15 86	1333 338	16 89	1388 339	16 93	1446 340	17 98	1506 341
250	12 65	1083 324	12 67	1126 324	13 70	1171 325	13 73	1218 325	14 76	1266 326	15 79	1317 327	15 83	1370 328
240	11 60	1036 317	12 62	1077 318	12 65	1120 318	13 67	1164 319	13 70	1210 320	14 73	1257 320	14 76	1307 321
220	10 51	947 305	10 53	984 305	11 55	1022 306	11 57	1061 306	12 60	1102 307	12 62	1144 307	13 64	1188 308
200	9 44	864 292	9 45	897 293	10 47	931 293	10 49	967 294	10 51	1003 294	11 53	1041 295	11 55	1080 295
180	8 37	785 280	8 39	815 280	9 40	846 280	9 42	878 281	9 43	911 281	10 45	945 282	10 46	980 283
160	7 31	710 266	7 33	737 267	8 34	765 267	8 35	794 268	8 36	823 268	8 38	854 269	9 39	885 270
140	6 26	637 252	6 27	662 253	7 28	687 253	7 29	713 254	7 30	739 254	7 31	766 255	8 33	794 256
120	5 21	567 237	6 22	589 237	6 23	611 238	6 24	634 238	6 25	658 239	6 26	682 240	7 27	707 241
100	4 15	453 209	4 15	471 209	5 16	489 210	5 17	507 211	5 17	526 211	5 18	546 212	5 19	566 213
50	3 8	295 171	3 8	306 171	3 8	318 172	3 9	329 173	3 9	341 174	3 9	354 175	3 10	366 176
15	2 4	184 122	2 4	191 122	2 4	198 123	2 4	205 124	2 4	212 125	2 4	219 126	2 4	227 127

LOW AIR CONDITIONING	HIGH AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.1 %	△FUEL = + 0.1 %	△FUEL = + 4.5 %	△FUEL = + 8 %

10E -08F0A319-131 IAE V2522-A5 21100000C5KG330 0 018590 0 0 2 1.0 500.0 300.00 1 03250.000300.000 .780 0 FCOM-N0-03-05-10-003-135

CLIMB - 250KT/300KT/M.78

MAX. CLIMB THRUST
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+10
CG=33.0%

FROM BRAKE RELEASE
TIME (MIN) **FUEL (KG)**
DISTANCE (NM) **TAS (KT)**

FL	WEIGHT AT BRAKE RELEASE (1000KG)													
	52		**54**		**56**		**58**		**60**		**62**		**64**	
390	18	1349	19	1418	20	1491	21	1570	22	1655	24	1751	26	1862
	117	393	124	394	131	395	139	396	148	397	159	399	171	401
370	16	1269	17	1330	18	1395	19	1462	20	1533	21	1609	22	1690
	104	386	110	387	116	388	122	388	128	389	135	390	143	391
350	15	1201	16	1257	16	1315	17	1376	18	1439	19	1506	20	1577
	94	380	99	380	104	381	109	382	114	382	120	383	126	384
330	14	1138	14	1190	15	1244	16	1299	16	1357	17	1418	18	1481
	85	373	89	374	94	374	98	374	102	375	107	375	112	376
310	13	1076	13	1124	14	1174	14	1225	15	1278	16	1333	16	1391
	77	365	81	366	84	366	88	366	92	367	96	367	100	368
290	12	1008	12	1053	13	1099	13	1147	14	1195	14	1246	15	1298
	69	356	72	356	75	356	78	357	82	357	85	357	89	357
270	10	925	11	966	11	1008	12	1051	12	1095	13	1140	13	1187
	59	343	61	343	64	343	67	343	70	344	73	344	76	344
250	9	849	10	886	10	924	10	963	11	1003	11	1045	12	1087
	51	330	53	330	55	331	57	331	60	331	62	331	65	331
240	9	813	9	848	9	885	10	922	10	960	11	1000	11	1040
	47	324	49	324	51	324	53	325	55	325	58	325	60	325
220	8	743	8	776	8	809	9	843	9	878	9	913	10	950
	40	311	42	311	44	312	45	312	47	312	49	312	51	312
200	7	678	7	708	7	738	8	769	8	800	8	833	9	866
	34	298	36	299	37	299	39	299	40	299	42	299	44	300
180	6	616	6	643	7	671	7	699	7	728	7	757	8	787
	29	286	30	286	32	286	33	287	34	287	36	287	37	287
160	5	557	6	581	6	606	6	631	6	657	7	684	7	711
	25	272	26	273	27	273	28	273	29	273	30	273	31	273
140	5	499	5	521	5	543	5	566	6	590	6	614	6	638
	20	258	21	258	22	259	23	259	24	259	25	259	26	259
120	4	443	4	462	5	482	5	503	5	524	5	545	5	567
	17	242	18	243	18	243	19	243	20	243	21	243	22	244
100	3	352	3	368	4	384	4	400	4	417	4	435	4	453
	11	213	12	214	13	214	13	215	14	215	14	215	15	215
50	2	229	2	239	2	250	2	260	2	271	3	283	3	294
	6	176	6	176	7	177	7	177	7	178	8	178	8	178
15	1	142	1	148	1	155	2	161	2	168	2	175	2	183
	3	128	3	128	3	129	3	129	3	130	4	130	4	130

LOW AIR CONDITIONING	HIGH AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.1 %	△FUEL = + 0.1 %	△FUEL = + 4.5 %	△FUEL = + 8 %

10E -08F0A319-131 IAE V2522-A5 21100000C5KG330 0 018590 0 0 2 1.0 500.0 300.00 1 03250.000300.000 .780 10 FCOM-N0-03-05-10-004-135

CLIMB - 250KT/300KT/M.78

MAX. CLIMB THRUST
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG=33.0%

FROM BRAKE RELEASE
TIME (MIN) **FUEL (KG)**
DISTANCE (NM) **TAS (KT)**

FL	WEIGHT AT BRAKE RELEASE (1000KG)													
	66		**68**		**70**		**72**		**74**		**76**		**78**	
390														
370	23 146	1722 383	24 156	1817 384	26 167	1924 386	28 180	2047 389						
350	20 128	1601 375	22 135	1679 376	23 143	1762 377	24 151	1853 379	25 161	1953 381	27 172	2064 383	29 185	2193 385
330	19 114	1503 367	19 120	1571 368	20 126	1644 369	21 132	1721 370	23 139	1803 372	24 147	1892 373	25 156	1988 375
310	17 102	1411 359	18 107	1472 360	19 112	1538 361	19 117	1606 362	20 123	1679 363	21 129	1755 364	22 136	1837 365
290	15 90	1317 349	16 94	1373 350	17 98	1431 350	18 103	1492 351	18 107	1557 352	19 113	1625 353	20 118	1696 354
270	14 77	1205 336	14 80	1255 336	15 83	1306 337	15 87	1360 338	16 91	1416 338	17 95	1475 339	17 99	1537 340
250	12 66	1105 323	13 69	1149 324	13 71	1196 324	14 74	1243 325	14 77	1293 326	15 81	1345 326	15 84	1399 327
240	12 61	1058 317	12 63	1100 318	12 66	1144 318	13 69	1189 319	13 72	1236 319	14 75	1285 320	15 78	1336 321
220	10 52	968 305	11 54	1006 305	11 56	1045 305	11 59	1086 306	12 61	1127 307	12 63	1171 307	13 66	1216 308
200	9 45	884 292	9 46	918 293	10 48	954 293	10 50	990 293	11 52	1028 294	11 54	1067 295	11 56	1107 295
180	8 38	805 280	8 40	837 280	9 41	869 281	9 43	902 281	9 44	935 282	10 46	971 282	10 48	1007 283
160	7 32	730 267	8 33	758 267	8 35	787 268	8 36	817 268	8 37	847 269	9 39	879 270	9 40	911 270
140	6 27	656 253	7 28	682 254	7 29	708 254	7 30	735 255	7 31	762 255	8 33	791 256	8 34	820 257
120	6 22	585 238	6 23	608 239	6 24	632 239	6 25	656 240	6 26	680 241	7 27	705 241	7 28	732 242
100	4 15	469 211	5 16	487 211	5 17	506 212	5 17	526 213	5 18	545 214	5 19	566 215	5 19	587 215
50	3 8	302 173	3 8	314 173	3 9	325 174	3 9	337 175	3 9	350 176	3 10	362 177	3 10	375 178
15	2 4	184 122	2 4	191 122	2 4	198 123	2 4	205 124	2 4	212 125	2 4	219 126	2 4	227 127

LOW AIR CONDITIONING △FUEL = − 0.4 %
HIGH AIR CONDITIONING △FUEL = + 0.4 %
ENGINE ANTI ICE ON △FUEL = + 6 %
TOTAL ANTI ICE ON △FUEL = + 11 %

10F -08FA320-232 V2527-A5 21100000C5KG330 0 018590 0 0 2 1.0 500.0 300.0 1 03250.000300.000 .780 0 FCOM-N0-03-05-10-003-140

CLIMB - 250KT/300KT/M.78

MAX. CLIMB THRUST
NORMAL AIR CONDITIONING
ANTI-ICING OFF
ISA+10
CG=33.0%
FROM BRAKE RELEASE
TIME (MIN) FUEL (KG)
DISTANCE (NM) TAS (KT)

	WEIGHT AT BRAKE RELEASE (1000KG)													
FL	52		54		56		58		60		62		64	
390	18	1370	19	1440	20	1515	21	1594	23	1681	24	1778	26	1889
	119	393	126	394	133	394	141	396	150	397	160	398	173	400
370	16	1290	17	1352	18	1417	19	1486	20	1557	21	1634	22	1717
	106	386	111	387	117	387	123	388	130	389	137	390	145	391
350	15	1222	16	1278	17	1338	17	1399	18	1463	19	1531	20	1603
	95	379	100	380	105	381	110	381	116	382	121	382	128	383
330	14	1158	15	1211	15	1265	16	1322	17	1380	17	1442	18	1506
	87	373	91	373	95	373	99	374	104	374	109	375	114	375
310	13	1095	13	1144	14	1195	15	1247	15	1300	16	1356	17	1415
	78	365	82	365	86	366	89	366	93	366	97	367	102	367
290	12	1027	12	1073	13	1120	13	1168	14	1217	15	1268	15	1322
	70	355	73	356	76	356	79	356	83	356	86	357	90	357
270	10	943	11	985	11	1027	12	1071	12	1115	13	1162	13	1210
	60	342	62	343	65	343	68	343	71	343	74	343	77	344
250	9	866	10	904	10	943	11	983	11	1024	12	1066	12	1109
	51	330	54	330	56	330	58	330	61	331	63	331	66	331
240	9	830	9	866	10	903	10	941	10	980	11	1020	11	1062
	48	324	50	324	52	324	54	324	56	324	59	324	61	325
220	8	760	8	793	9	827	9	862	9	897	10	933	10	971
	41	311	43	311	45	312	46	312	48	312	50	312	52	312
200	7	694	7	725	8	756	8	787	8	819	9	852	9	887
	35	299	37	299	38	299	40	299	41	299	43	299	45	300
180	6	632	7	660	7	688	7	717	7	746	8	776	8	807
	30	286	31	286	33	287	34	287	35	287	37	287	38	287
160	6	572	6	597	6	623	6	649	7	676	7	703	7	731
	25	273	26	273	28	274	29	274	30	274	31	274	32	274
140	5	514	5	537	5	560	6	583	6	607	6	632	6	657
	21	259	22	259	23	260	24	260	25	260	26	260	27	260
120	4	457	4	477	5	498	5	519	5	541	5	563	5	585
	17	244	18	244	19	244	20	245	21	245	21	245	22	245
100	3	365	3	381	4	397	4	414	4	432	4	450	4	468
	12	215	13	216	13	216	14	217	14	217	15	217	15	218
50	2	235	2	245	2	256	2	267	2	278	3	289	3	301
	6	178	7	179	7	179	7	179	7	180	8	180	8	180
15	1	142	1	148	1	155	2	161	2	168	2	175	2	183
	3	128	3	128	3	129	3	129	3	130	4	130	4	130

LOW AIR CONDITIONING	HIGH AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.4 %	△FUEL = + 0.4 %	△FUEL = + 6 %	△FUEL = + 11 %

10F -08F0A320-232 IAE V2527-A5 21100000C5KG330 0 018590 0 0 2 1.0 500.0 300.0 1 03250.000300.000 .780 10 FCOM-N0-03-05-10-004-140

CLIMB - 250KT/300KT/M.78 - ALL ENGINES

MAX. CLIMB THRUST
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA+10
CG=33.0%

FROM BRAKE RELEASE
TIME (MIN) **FUEL (KG)**
DISTANCE (NM) **TAS (KT)**

FL	WEIGHT AT BRAKE RELEASE (1000KG)													
	56		**58**		**60**		**62**		**64**		**66**		**68**	
390	30 203	1963 408	32 221	2109 409	35 243	2281 412								
370	27 178	1816 401	29 192	1934 403	31 207	2067 405	33 225	2218 407	36 248	2399 409				
350	24 157	1687 395	25 168	1788 396	27 180	1897 398	29 193	2018 399	31 208	2152 401	34 225	2306 403		
330	22 139	1572 388	23 148	1660 389	24 158	1756 390	26 168	1858 391	27 179	1970 393	29 192	2092 394	31 206	2228 396
310	19 123	1461 379	21 130	1540 380	22 138	1624 381	23 147	1714 382	24 156	1810 384	26 166	1913 385	27 177	2026 386
290	17 106	1341 368	18 112	1410 369	19 118	1484 370	20 125	1561 370	21 132	1643 371	23 140	1730 372	24 148	1823 374
270	15 88	1204 354	16 93	1264 354	17 98	1328 355	17 103	1394 355	18 108	1463 356	19 114	1535 357	20 120	1612 358
250	13 74	1089 340	14 78	1142 341	14 82	1197 341	15 86	1254 342	16 90	1314 342	17 95	1376 343	17 100	1442 344
230	11 63	986 327	12 66	1033 328	13 69	1081 328	13 72	1132 328	14 76	1184 329	14 79	1238 329	15 83	1294 330
220	11 58	939 321	11 60	983 321	12 63	1028 322	12 66	1075 322	13 69	1124 322	14 73	1175 323	14 76	1228 323
200	10 49	850 308	10 51	889 309	10 54	930 309	11 56	972 309	11 59	1015 310	12 61	1060 310	12 64	1107 311
180	8 41	768 296	9 43	803 296	9 45	839 296	10 47	876 297	10 49	915 297	10 52	955 297	11 54	996 298
160	7 35	690 283	8 36	721 283	8 38	754 283	8 40	787 283	9 41	821 284	9 43	856 284	10 45	893 285
140	6 29	616 269	7 30	643 269	7 31	671 269	7 33	701 269	8 34	731 270	8 36	763 270	8 37	795 271
120	6 23	542 253	6 25	567 254	6 26	592 254	6 27	617 254	7 28	644 254	7 29	672 255	7 30	700 256
100	4 16	425 225	4 17	444 226	5 17	464 226	5 18	484 226	5 19	505 227	5 20	526 227	5 21	549 228
50	3 8	265 187	3 8	277 187	3 9	289 188	3 9	301 188	3 9	314 188	3 10	327 189	3 10	340 190
15	1 3	155 129	2 3	161 129	2 3	168 130	2 4	175 130	2 4	183 130	2 4	190 131	2 4	198 132

CORRECTIONS	**AC HI**	**ENGINE ANTI ICE ON**	**TOTAL ANTI ICE ON**
FUEL	+ 8 %	+ 25 %	+ 45 %

CLIMB - 250KT/300KT/M.78 - ALL ENGINES

MAX. CLIMB THRUST
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA+15
CG=33.0%

FROM BRAKE RELEASE
TIME (MIN) FUEL (KG)
DISTANCE (NM) TAS (KT)

FL	WEIGHT AT BRAKE RELEASE (1000KG)													
	42		44		46		48		50		52		54	
390	23 155	1435 409	24 166	1531 410	26 178	1634 412	28 192	1746 413	30 207	1868 414	32 225	2002 416	35 245	2155 418
370	21 141	1356 405	22 150	1444 406	24 161	1537 407	25 173	1638 408	27 185	1747 409	29 200	1864 411	31 216	1994 412
350	19 127	1277 399	20 135	1358 400	22 145	1443 401	23 155	1533 402	25 165	1631 403	26 177	1734 405	28 190	1848 406
330	17 113	1195 392	18 121	1269 393	20 128	1346 394	21 137	1427 395	22 146	1514 396	23 156	1605 397	25 166	1703 399
310	16 99	1109 383	16 106	1176 384	17 112	1245 385	19 119	1318 386	20 127	1394 387	21 135	1475 388	22 143	1560 389
290	14 85	1013 371	15 90	1072 372	15 95	1133 373	16 101	1198 374	17 107	1264 374	18 114	1334 375	19 120	1408 376
270	12 70	907 356	12 74	959 357	13 78	1012 357	14 83	1068 358	15 88	1125 359	15 93	1185 359	16 98	1247 360
250	10 59	820 342	11 62	866 343	11 66	913 343	12 69	962 344	13 73	1012 345	13 77	1064 345	14 81	1119 346
240	10 54	781 335	10 57	824 336	11 60	868 337	11 64	914 337	12 67	962 338	13 71	1011 339	13 74	1061 339
220	9 46	708 323	9 48	746 323	9 51	786 324	10 54	827 324	10 57	869 325	11 60	912 326	12 63	957 326
200	8 39	641 310	8 41	676 311	8 43	712 311	9 46	748 312	9 48	786 312	10 50	824 313	10 53	864 313
180	7 33	579 297	7 35	610 298	7 37	642 299	8 39	675 299	8 40	708 300	8 42	743 300	9 45	778 301
160	6 28	520 284	6 29	548 285	6 31	576 285	7 32	605 286	7 34	635 286	7 36	665 287	8 37	697 287
140	5 23	463 269	5 24	487 270	6 25	512 271	6 27	538 271	6 28	564 272	6 29	591 272	7 31	619 273
120	4 19	407 254	5 20	429 254	5 21	450 255	5 22	473 256	5 23	496 256	6 24	520 257	6 25	544 257
100	3 12	318 224	3 13	334 225	4 14	351 226	4 15	369 227	4 15	386 227	4 16	405 228	4 17	423 228
50	2 6	199 185	2 6	209 186	2 7	219 187	2 7	230 188	2 7	240 188	2 8	251 189	3 8	263 189
15	1 2	116 126	1 3	122 126	1 3	127 126	1 3	133 127	1 3	139 127	1 3	146 128	1 3	152 128

CORRECTIONS	AC HI	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 9 %	+ 27 %	+ 50 %

CLIMB - 250KT/300KT/M.78

MAX. CLIMB THRUST — ISA+10 — **FROM BRAKE RELEASE**

NORMAL AIR CONDITIONING — CG=33.0% — **TIME (MIN)** — **FUEL (KG)**

ANTI-ICING OFF — **DISTANCE (NM)** — **TAS (KT)**

	WEIGHT AT BRAKE RELEASE (1000KG)													
FL	66		68		70		72		74		76		78	
390														
370	23	1780	25	1878	26	1990	28	2119						
	152	393	162	394	173	396	188	399						
350	21	1652	22	1732	23	1819	24	1913	26	2017	27	2134	29	2268
	133	385	140	386	148	387	157	389	167	390	178	393	192	395
330	19	1548	20	1619	21	1694	22	1774	23	1859	24	1951	25	2050
	118	377	124	378	130	379	137	380	144	381	152	383	161	384
310	17	1452	18	1516	19	1583	20	1653	20	1728	21	1807	22	1891
	105	368	110	369	115	370	121	371	127	372	133	373	140	375
290	16	1353	16	1411	17	1471	18	1534	18	1600	19	1670	20	1744
	93	358	97	359	101	359	106	360	111	361	116	362	122	363
270	14	1236	14	1287	15	1340	16	1395	16	1453	17	1514	18	1577
	79	345	82	345	86	346	90	347	94	347	98	348	102	349
250	12	1132	13	1177	13	1224	14	1273	14	1324	15	1378	15	1433
	68	332	70	332	73	333	76	334	80	334	83	335	87	336
240	12	1082	12	1125	12	1170	13	1216	13	1264	14	1315	15	1367
	63	325	65	326	68	326	71	327	73	328	76	329	80	329
220	10	988	11	1027	11	1067	11	1108	12	1151	12	1196	13	1242
	53	313	55	313	58	314	60	314	62	315	65	316	67	316
200	9	900	9	936	10	972	10	1009	11	1047	11	1087	11	1128
	46	300	47	300	49	301	51	301	53	302	55	303	57	303
180	8	818	8	850	9	883	9	916	9	951	10	986	10	1023
	39	287	40	288	42	288	43	289	45	289	47	290	49	291
160	7	739	7	768	8	797	8	828	8	859	9	891	9	924
	33	274	34	274	35	275	37	275	38	276	39	277	41	278
140	6	663	7	689	7	716	7	743	7	770	8	799	8	829
	27	260	28	260	29	261	31	261	32	262	33	263	34	264
120	6	590	6	613	6	636	6	661	6	686	7	711	7	738
	22	244	23	245	24	245	25	246	26	247	27	248	28	249
100	4	471	4	489	5	508	5	528	5	548	5	569	5	590
	15	216	16	217	17	218	17	218	18	219	19	220	19	222
50	3	306	3	318	3	330	3	343	3	355	3	368	3	382
	8	179	8	180	9	181	9	182	10	183	10	184	10	186
15	2	190	2	198	2	205	2	213	2	221	2	229	2	237
	4	131	4	132	4	133	4	134	4	136	5	137	5	139

LOW AIR CONDITIONING	HIGH AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.1 %	△FUEL = + 0.1 %	△FUEL = + 4.5 %	△FUEL = + 8 %

10E -08F0A319-131 IAE V2522-A5 21100000C5KG330 0 018590 0 0 2 1.0 500.0 300.00 1 03250.000300.000 .780 10 FCOM-N0-03-05-10-005-135

CLIMB - 250KT/300KT/M.78

MAX. CLIMB THRUST
NORMAL AIR CONDITIONING
ANTI-ICING OFF
ISA+15
CG=33.0%
FROM BRAKE RELEASE
TIME (MIN) FUEL (KG)
DISTANCE (NM) TAS (KT)

FL	WEIGHT AT BRAKE RELEASE (1000KG)													
	52		54		56		58		60		62		64	
390	21	1470	22	1549	23	1633	24	1725	26	1828	28	1947		
	137	401	146	402	155	403	165	404	177	406	191	408		
370	19	1379	19	1448	20	1520	22	1597	23	1679	24	1767	26	1864
	122	394	128	395	135	396	143	397	151	398	160	399	170	400
350	17	1302	18	1364	19	1430	20	1498	21	1571	22	1647	23	1730
	110	388	115	389	121	389	127	390	134	391	141	391	149	392
330	16	1231	16	1288	17	1348	18	1410	19	1475	20	1544	21	1617
	99	381	104	382	109	382	114	383	120	383	126	384	132	385
310	14	1160	15	1213	16	1267	16	1324	17	1383	18	1445	19	1510
	89	373	93	374	98	374	102	374	107	375	112	375	117	376
290	13	1081	14	1130	14	1181	15	1232	15	1286	16	1342	17	1400
	79	363	82	363	86	364	90	364	94	364	98	365	103	365
270	11	986	12	1030	13	1075	13	1122	14	1170	14	1219	15	1271
	67	349	70	350	73	350	76	350	80	350	83	351	87	351
250	10	900	11	940	11	981	12	1023	12	1066	13	1111	13	1157
	57	336	60	336	62	337	65	337	68	337	71	337	74	338
240	10	859	10	897	10	937	11	977	11	1018	12	1060	12	1104
	53	330	55	330	57	330	60	330	62	331	65	331	68	331
220	8	783	9	817	9	853	10	889	10	926	10	964	11	1004
	45	317	47	317	49	317	51	317	53	317	55	318	57	318
200	8	712	8	743	8	775	9	808	9	842	9	876	10	912
	38	304	40	304	41	304	43	304	45	304	47	304	49	305
180	7	645	7	674	7	703	8	733	8	763	8	794	8	827
	32	290	34	291	35	291	37	291	38	291	40	291	41	292
160	6	582	6	607	6	633	7	660	7	688	7	716	7	745
	27	277	28	277	29	277	31	277	32	278	33	278	35	278
140	5	520	5	543	6	566	6	590	6	615	6	641	7	667
	22	262	23	262	24	263	25	263	27	263	28	263	29	263
120	4	460	5	481	5	501	5	523	5	545	5	568	6	591
	18	246	19	246	20	246	21	247	22	247	23	247	24	247
100	3	364	4	380	4	397	4	414	4	432	4	450	4	469
	12	216	13	216	14	217	14	217	15	217	15	218	16	218
50	2	236	2	246	2	257	2	268	3	280	3	291	3	304
	6	177	7	178	7	178	7	179	8	179	8	180	8	180
15	1	146	1	152	2	159	2	166	2	173	2	180	2	188
	3	128	3	128	3	128	3	129	4	129	4	130	4	130

LOW AIR CONDITIONING	HIGH AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.1 %	△FUEL = + 0.1 %	△FUEL = + 4.5 %	△FUEL = + 8 %

10E -08F0A319-131 IAE V2522-A5 21100000C5KG330 0 018590 0 0 2 1.0 500.0 300.00 1 03250.000300.000 .780 15 FCOM-N0-03-05-10-006-X135

CLIMB - 250KT/300KT/M.78

MAX. CLIMB THRUST
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+10
CG=33.0%

FROM BRAKE RELEASE
TIME (MIN) **FUEL (KG)**
DISTANCE (NM) **TAS (KT)**

FL	WEIGHT AT BRAKE RELEASE (1000KG)													
	66		**68**		**70**		**72**		**74**		**76**		**78**	
390														
370	24 154	1808 392	25 164	1908 394	27 175	2021 396	29 190	2152 398						
350	21 134	1680 384	22 142	1762 385	23 150	1850 387	25 159	1946 388	26 169	2051 390	28 180	2169 392	30 194	2305 394
330	19 120	1575 376	20 126	1647 377	21 132	1724 378	22 139	1805 379	23 146	1892 381	24 155	1986 382	26 164	2087 384
310	17 107	1478 368	18 112	1543 369	19 117	1611 369	20 123	1684 370	21 129	1760 372	22 135	1841 373	23 142	1927 374
290	16 94	1378 357	16 98	1437 358	17 103	1498 359	18 108	1563 360	19 113	1631 361	20 118	1702 362	20 124	1777 363
270	14 80	1260 344	15 84	1312 345	15 87	1366 345	16 91	1423 346	16 95	1482 347	17 99	1544 348	18 104	1609 349
250	12 69	1154 331	13 72	1201 332	13 75	1250 332	14 78	1300 333	15 81	1352 334	15 84	1407 335	16 88	1464 335
240	12 64	1105 325	12 66	1149 326	13 69	1195 326	13 72	1242 327	14 75	1292 327	14 78	1344 328	15 81	1397 329
220	10 54	1010 312	11 57	1050 313	11 59	1091 313	12 61	1134 314	12 64	1178 315	13 66	1224 315	13 69	1271 316
200	9 47	922 300	10 48	958 300	10 50	995 301	10 52	1034 301	11 54	1073 302	11 56	1114 303	12 59	1157 303
180	8 40	839 287	9 41	872 288	9 43	906 288	9 45	940 289	10 46	976 290	10 48	1013 290	10 50	1051 291
160	7 34	760 274	8 35	790 275	8 36	820 275	8 38	852 276	8 39	884 277	9 41	917 277	9 42	951 278
140	6 28	683 261	7 29	710 261	7 30	738 262	7 32	766 262	7 33	795 263	8 34	825 264	8 35	856 265
120	6 23	609 246	6 24	633 246	6 25	658 247	6 26	683 247	7 27	709 248	7 28	736 249	7 29	763 250
100	4 16	487 218	5 17	507 219	5 17	527 220	5 18	547 221	5 19	568 222	5 20	590 223	5 20	612 224
50	3 8	313 181	3 9	326 182	3 9	338 183	3 10	351 184	3 10	364 185	3 10	378 186	3 11	391 188
15	2 4	190 131	2 4	198 132	2 4	205 133	2 4	213 134	2 4	221 136	2 5	229 137	2 5	237 139

LOW AIR CONDITIONING	HIGH AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = − 0.4 %	△FUEL = + 0.4 %	△FUEL = + 6 %	△FUEL = + 11 %

10F -08FA320-232 V2527-A5 21100000C5KG330 0 018590 0 0 2 1.0 500.0 300.0 1 03250.000300.000 .780 10 FCOM-N0-03-05-10-005-140

CLIMB - 250KT/300KT/M.78

MAX. CLIMB THRUST
NORMAL AIR CONDITIONING
ANTI-ICING OFF
ISA+15
CG=33.0%
FROM BRAKE RELEASE
TIME (MIN) FUEL (KG)
DISTANCE (NM) TAS (KT)

FL	WEIGHT AT BRAKE RELEASE (1000KG)													
	52		54		56		58		60		62		64	
390	21	1496	22	1576	23	1662	25	1755	26	1860	28	1979		
	139	401	148	402	157	403	167	404	179	405	193	407		
370	19	1404	20	1474	21	1548	22	1626	23	1709	24	1799	26	1897
	123	394	130	395	137	395	145	396	153	397	162	398	172	399
350	17	1327	18	1390	19	1457	20	1526	21	1599	22	1678	23	1761
	111	387	117	388	123	389	129	389	136	390	143	391	151	392
330	16	1255	17	1313	17	1374	18	1437	19	1503	20	1573	21	1647
	101	381	105	381	110	382	116	382	121	383	128	383	134	384
310	15	1183	15	1237	16	1293	17	1350	17	1410	18	1473	19	1540
	90	373	95	373	99	373	104	374	108	374	114	375	119	375
290	13	1104	14	1153	14	1205	15	1257	16	1312	16	1368	17	1428
	80	363	84	363	87	363	91	363	95	364	100	364	104	364
270	12	1007	12	1052	13	1098	13	1146	14	1194	14	1245	15	1298
	68	349	71	349	74	349	78	350	81	350	84	350	88	350
250	10	920	11	961	11	1003	12	1046	12	1090	13	1136	13	1183
	58	336	61	336	63	336	66	337	69	337	72	337	75	337
240	10	880	10	918	11	958	11	999	12	1041	12	1084	13	1129
	54	329	56	330	59	330	61	330	64	330	66	330	69	331
220	9	802	9	838	9	874	10	911	10	949	11	988	11	1029
	46	316	48	317	50	317	52	317	54	317	56	317	59	317
200	8	731	8	763	8	796	9	830	9	864	9	899	10	936
	39	304	41	304	42	304	44	304	46	304	48	304	50	305
180	7	664	7	693	7	723	8	753	8	785	8	817	9	850
	33	291	35	291	36	291	38	291	39	292	41	292	42	292
160	6	600	6	626	7	653	7	681	7	709	7	738	8	768
	28	277	29	278	30	278	32	278	33	278	34	278	36	278
140	5	537	6	561	6	585	6	610	6	636	7	662	7	689
	23	263	24	263	25	264	26	264	28	264	29	264	30	264
120	5	477	5	498	5	520	5	542	5	565	6	588	6	612
	19	247	20	248	21	248	22	248	23	248	24	248	24	249
100	4	378	4	395	4	413	4	431	4	449	4	468	5	487
	13	218	14	219	14	219	15	220	15	220	16	220	17	220
50	2	243	2	253	2	264	3	276	3	288	3	300	3	312
	7	180	7	180	7	181	8	181	8	182	8	182	9	182
15	1	146	1	152	2	159	2	166	2	173	2	180	2	188
	3	128	3	128	3	128	3	129	4	129	4	130	4	130

LOW AIR CONDITIONING
△FUEL = – 0.4 %

HIGH AIR CONDITIONING
△FUEL = + 0.4 %

ENGINE ANTI ICE ON
△FUEL = + 6 %

TOTAL ANTI ICE ON
△FUEL = + 11 %

10F -08FA320-232 IAE V2527-A5 21100000C5KG330 0 018590 0 0 2 1.0 500.0 300.0 1 03250.000300.000 .780 15 FCOM-N0-03-05-10-006-140

CLIMB - 250KT/300KT/M.78 - ALL ENGINES

MAX. CLIMB THRUST
NORMAL AIR CONDITIONING
ANTI ICE OFF
ISA+15
CG=33.0%
FROM BRAKE RELEASE
TIME (MIN) FUEL (KG)
DISTANCE (NM) TAS (KT)

FL	WEIGHT AT BRAKE RELEASE (1000KG)													
	56		58		60		62		64		66		68	
390	38 269	2334 420	43 299	2549 422										
370	34 234	2140 414	37 256	2308 416	41 283	2507 418								
350	30 205	1973 408	33 222	2113 410	35 242	2272 412	38 265	2456 414						
330	27 178	1810 400	29 191	1928 402	31 206	2058 403	33 223	2203 405	36 243	2369 407				
310	23 153	1652 390	25 163	1751 392	27 174	1859 393	28 187	1977 395	30 201	2107 396				
290	20 127	1485 377	21 135	1568 378	23 144	1657 379	24 153	1751 380	26 162	1852 382	27 173	1963 383		
270	17 103	1312 361	18 109	1381 362	19 115	1454 362	20 122	1531 363	21 129	1612 364	22 136	1698 365	24 144	1790 366
250	15 86	1175 346	16 90	1234 347	16 95	1296 348	17 100	1361 348	18 105	1429 349	19 111	1501 350	20 117	1577 351
230	13 72	1057 333	14 75	1108 333	14 79	1162 334	15 83	1218 334	16 87	1277 335	16 92	1338 336	17 96	1402 336
220	12 66	1004 326	13 69	1052 327	13 72	1102 327	14 76	1154 328	15 80	1209 328	15 84	1266 329	16 88	1325 329
200	11 55	906 314	11 58	948 314	12 61	992 314	12 64	1038 315	13 67	1086 315	13 70	1136 316	14 73	1188 316
180	9 47	815 301	10 49	853 301	10 51	892 302	11 54	933 302	11 56	975 302	12 59	1019 303	12 61	1065 303
160	8 39	730 288	9 41	763 288	9 43	798 288	9 45	834 288	10 47	871 289	10 49	910 289	11 51	950 290
140	7 32	648 273	7 34	677 273	8 35	708 274	8 37	739 274	8 38	772 274	9 40	806 275	9 42	842 275
120	6 26	569 257	6 27	595 258	7 29	622 258	7 30	649 258	7 31	678 259	8 33	708 259	8 34	739 260
100	5 18	443 229	5 18	463 229	5 19	484 229	5 20	505 230	5 21	527 230	6 22	550 231	6 23	575 231
50	3 9	275 190	3 9	287 190	3 9	299 191	3 10	312 191	3 10	326 191	3 11	340 192	3 11	354 193
15	2 3	159 128	2 3	166 129	2 4	173 129	2 4	180 130	2 4	188 130	2 4	195 131	2 4	203 132

CORRECTIONS	AC HI	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 9 %	+ 27 %	+ 50 %

CLIMB - 250KT/300KT/M.78 - ALL ENGINES

MAX. CLIMB THRUST
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA+20
CG=33.0%

FROM BRAKE RELEASE
TIME (MIN) FUEL (KG)
DISTANCE (NM) TAS (KT)

FL	WEIGHT AT BRAKE RELEASE (1000KG)													
	42		44		46		48		50		52		54	
390	29 201	1686 420	31 217	1812 422	34 236	1950 423	36 258	2105 425	40 283	2281 426	44 313	2485 428	49 350	2731 431
370	26 182	1590 416	28 197	1705 417	31 213	1829 419	33 232	1968 420	36 253	2123 422	39 277	2300 424	43 307	2507 426
350	24 162	1484 411	25 175	1587 412	27 188	1697 413	29 203	1818 414	32 220	1952 416	34 240	2101 418	38 263	2271 420
330	21 142	1371 403	23 152	1462 404	24 163	1559 405	26 175	1663 406	28 189	1776 408	30 204	1900 409	32 220	2036 411
310	19 123	1256 393	20 131	1336 394	21 140	1420 395	23 150	1511 397	24 160	1607 398	26 172	1711 399	28 184	1822 401
290	16 102	1127 380	17 109	1197 381	18 116	1269 382	19 123	1345 382	21 131	1425 383	22 140	1510 384	23 149	1600 386
270	14 82	994 363	14 87	1052 364	15 93	1113 364	16 98	1177 365	17 104	1243 366	18 110	1312 367	19 117	1385 367
250	12 68	890 348	12 72	941 349	13 77	994 350	14 81	1049 350	15 86	1106 351	15 90	1165 351	16 96	1227 352
240	11 63	844 341	12 66	893 342	12 70	942 343	13 74	993 343	14 78	1046 344	14 82	1101 344	15 87	1159 345
220	10 53	760 328	10 56	803 329	11 59	847 329	11 62	892 330	12 65	939 330	12 69	987 330	13 72	1037 331
200	8 44	686 315	9 47	724 316	9 49	763 316	10 52	803 316	10 55	844 317	11 58	887 317	11 61	931 318
180	7 37	616 302	8 39	650 302	8 42	684 303	9 44	720 303	9 46	757 304	10 48	794 304	10 51	833 304
160	6 31	551 288	7 33	581 289	7 35	611 289	8 36	643 289	8 38	675 290	8 40	708 290	9 42	743 290
140	6 26	488 273	6 27	514 274	6 28	541 274	7 30	569 275	7 31	597 275	7 33	627 275	8 35	657 276
120	5 21	428 257	5 22	450 257	5 23	474 258	6 24	498 258	6 25	523 259	6 27	548 259	6 28	574 259
100	4 14	331 227	4 14	348 227	4 15	366 227	4 16	385 228	4 17	404 228	5 18	423 229	5 18	443 229
50	2 7	206 186	2 7	217 186	2 7	227 187	2 8	239 187	3 8	250 187	3 9	262 188	3 9	274 188
15	1 3	120 123	1 3	125 123	1 3	131 123	1 3	137 123	1 3	144 123	2 3	150 123	2 3	157 124

CORRECTIONS	AC HI	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 12 %	+ 30 %	+ 30 %

CLIMB - 250KT/300KT/M.78

MAX. CLIMB THRUST — ISA+15 — **FROM BRAKE RELEASE**

NORMAL AIR CONDITIONING — CG=33.0% — **TIME (MIN)** — **FUEL (KG)**

ANTI-ICING OFF — **DISTANCE (NM)** — **TAS (KT)**

FL	WEIGHT AT BRAKE RELEASE (1000KG)													
	66		**68**		**70**		**72**		**74**		**76**		**78**	
390														
370	27 182	1973 402	29 195	2095 404										
350	24 157	1818 393	25 167	1913 395	27 177	2019 396	29 189	2136 398	31 204	2268 400	33 221	2424 403		
330	22 139	1695 386	23 147	1777 387	24 155	1866 388	25 164	1962 389	27 174	2065 391	28 185	2180 393	30 197	2307 395
310	20 123	1580 377	21 129	1653 378	22 136	1731 379	23 143	1814 380	24 151	1903 381	25 159	1998 382	26 169	2100 384
290	18 107	1462 366	18 112	1527 366	19 118	1595 367	20 124	1668 368	21 130	1744 369	22 136	1826 370	23 144	1913 372
270	15 90	1325 351	16 94	1382 352	17 99	1441 353	18 103	1503 354	18 108	1568 354	19 113	1637 355	20 118	1710 356
250	14 77	1205 338	14 80	1255 339	15 83	1307 339	15 87	1362 340	16 91	1419 341	17 95	1479 341	17 99	1541 342
240	13 71	1150 331	13 74	1197 332	14 77	1246 332	14 80	1297 333	15 83	1350 334	16 87	1406 334	16 91	1464 335
220	11 60	1045 318	12 62	1087 318	12 65	1130 319	13 67	1175 320	13 70	1222 320	14 73	1271 321	14 76	1323 322
200	10 51	949 305	10 53	987 305	11 55	1025 306	11 57	1066 306	12 59	1107 307	12 62	1151 308	12 64	1196 308
180	9 43	860 292	9 45	894 292	10 46	929 293	10 48	965 293	10 50	1002 294	11 52	1041 294	11 54	1081 295
160	8 36	775 278	8 38	806 279	8 39	837 279	9 41	869 280	9 42	903 280	9 44	937 281	10 45	973 282
140	7 30	693 264	7 31	721 264	7 32	749 265	8 34	778 265	8 35	808 266	8 36	839 266	8 38	871 267
120	6 24	615 248	6 25	639 248	6 26	664 249	7 28	690 249	7 29	717 250	7 30	744 251	7 31	773 252
100	5 17	488 219	5 17	508 219	5 18	528 220	5 19	549 221	5 20	570 222	5 20	592 223	6 21	615 224
50	3 9	316 181	3 9	329 181	3 9	342 182	3 10	355 183	3 10	368 184	3 11	382 186	4 11	396 187
15	2 4	195 131	2 4	203 132	2 4	211 133	2 5	219 134	2 5	228 135	2 5	236 137	2 5	245 138

LOW AIR CONDITIONING	HIGH AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.1 %	△FUEL = + 0.1 %	△FUEL = + 4.5 %	△FUEL = + 8 %

10E -08F0A319-131 IAE V2522-A5 21100000C5KG330 0 018590 0 0 2 1.0 500.0 300.00 1 03250.000300.000 .780 15 FCOM-N0-03-05-10-007-135

CLIMB - 250KT/300KT/M.78

MAX. CLIMB THRUST
NORMAL AIR CONDITIONING
ANTI-ICING OFF
ISA+20
CG=33.0%
FROM BRAKE RELEASE
TIME (MIN) FUEL (KG)
DISTANCE (NM) TAS (KT)

	WEIGHT AT BRAKE RELEASE (1000KG)													
FL	52		54		56		58		60		62		64	
390	24	1634	26	1728	27	1830	29	1944	32	2076				
	165	409	176	410	188	411	202	413	219	415				
370	22	1525	23	1605	24	1691	26	1782	27	1881	29	1989	31	2112
	145	402	154	403	163	404	173	405	183	406	196	407	210	409
350	20	1436	21	1508	22	1584	23	1664	24	1749	26	1842	27	1942
	131	396	138	397	145	397	153	398	162	399	171	400	182	401
330	18	1353	19	1418	20	1487	21	1558	22	1634	23	1715	24	1802
	118	389	124	389	130	390	136	391	144	391	151	392	160	393
310	17	1269	17	1328	18	1390	19	1455	20	1522	21	1594	22	1670
	105	381	110	381	116	382	121	382	127	383	133	383	140	384
290	15	1174	16	1228	16	1285	17	1343	18	1403	19	1466	19	1533
	92	370	96	370	101	370	105	371	110	371	115	372	121	372
270	13	1061	14	1110	14	1160	15	1211	15	1264	16	1319	17	1377
	77	355	81	355	84	356	88	356	92	356	96	357	100	357
250	11	963	12	1006	12	1051	13	1097	14	1145	14	1194	15	1245
	65	341	68	341	71	342	74	342	77	342	81	342	84	343
240	11	917	11	958	12	1001	12	1045	13	1090	13	1136	14	1184
	60	334	62	335	65	335	68	335	71	335	74	335	77	336
220	9	832	10	869	10	907	11	946	11	987	12	1028	12	1071
	50	321	53	321	55	321	57	321	60	321	62	322	65	322
200	8	754	9	787	9	822	9	857	10	893	10	931	11	969
	43	307	45	307	46	307	48	308	51	308	53	308	55	308
180	7	681	8	711	8	743	8	774	9	807	9	841	9	875
	36	294	38	294	39	294	41	294	43	294	44	294	46	295
160	6	612	7	639	7	667	7	696	8	725	8	755	8	786
	30	279	31	279	33	280	34	280	36	280	37	280	39	280
140	6	545	6	569	6	594	6	620	7	646	7	673	7	701
	25	264	26	264	27	264	28	264	29	265	31	265	32	265
120	5	481	5	502	5	524	6	547	6	571	6	595	6	619
	20	247	21	247	22	247	23	248	24	248	25	248	26	248
100	4	378	4	395	4	413	4	431	4	450	5	469	5	489
	13	216	14	216	15	216	15	217	16	217	17	218	17	218
50	2	244	2	255	3	267	3	279	3	291	3	303	3	316
	7	176	7	176	8	176	8	177	8	177	9	178	9	178
15	2	150	2	157	2	164	2	172	2	179	2	187	2	195
	3	123	3	124	3	124	4	124	4	125	4	125	4	126

LOW AIR CONDITIONING	HIGH AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.1 %	△FUEL = + 0.1 %	△FUEL = + 4.5 %	△FUEL = + 8 %

10E -08F0A319-131 IAE V2522-A5 21100000C5KG330 0 018590 0 0 2 1.0 500.0 300.00 1 03250.000300.000 .780 20 FCOM-N0-03-05-10-008-135

CLIMB - 250KT/300KT/M.78

MAX. CLIMB THRUST
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+15
CG=33.0%

FROM BRAKE RELEASE
TIME (MIN) **FUEL (KG)**
DISTANCE (NM) **TAS (KT)**

FL	WEIGHT AT BRAKE RELEASE (1000KG)													
	66		**68**		**70**		**72**		**74**		**76**		**78**	
390														
370	28 184	2008 401	29 198	2132 403										
350	24 160	1852 393	26 169	1949 394	27 180	2057 396	29 192	2176 398	31 207	2311 400	33 224	2469 402		
330	22 141	1727 385	23 149	1811 386	24 157	1902 387	26 166	2000 389	27 176	2107 390	29 188	2224 392	31 201	2353 394
310	20 125	1611 376	21 131	1686 377	22 138	1766 378	23 145	1851 379	24 153	1942 380	25 162	2040 382	27 171	2145 383
290	18 109	1491 365	19 114	1558 366	20 120	1628 367	21 126	1703 368	21 132	1781 369	23 139	1865 370	24 146	1954 371
270	16 92	1353 351	16 96	1411 352	17 100	1472 352	18 105	1536 353	19 110	1603 354	19 115	1674 355	20 121	1748 356
250	14 78	1233 338	14 81	1284 338	15 85	1337 339	16 89	1393 339	16 93	1452 340	17 97	1513 341	18 101	1578 342
240	13 72	1176 331	14 75	1225 331	14 78	1275 332	15 82	1328 333	15 85	1383 333	16 89	1440 334	17 93	1500 335
220	12 61	1071 318	12 64	1114 318	12 66	1159 319	13 69	1205 319	13 72	1254 320	14 75	1304 320	15 78	1357 321
200	10 52	974 305	11 54	1013 305	11 56	1053 306	11 58	1095 306	12 61	1138 307	12 63	1183 307	13 66	1230 308
180	9 44	884 292	9 46	920 292	10 48	956 293	10 50	993 293	11 52	1032 294	11 54	1072 295	11 56	1114 295
160	8 37	799 279	8 39	831 279	9 40	864 280	9 42	897 280	9 43	932 281	10 45	968 281	10 47	1006 282
140	7 31	717 265	7 32	745 265	8 34	775 266	8 35	805 266	8 36	837 267	8 38	869 267	9 39	902 268
120	6 25	637 249	6 27	663 250	7 28	689 250	7 29	716 251	7 30	744 252	7 31	773 252	8 32	803 253
100	5 18	507 221	5 18	528 222	5 19	549 222	5 20	571 223	6 21	594 224	6 21	617 225	6 22	641 226
50	3 9	325 183	3 9	338 184	3 10	351 185	3 10	365 186	3 11	379 187	4 11	393 188	4 12	408 189
15	2 4	195 131	2 4	203 132	2 4	211 133	2 5	219 134	2 5	228 135	2 5	236 137	2 5	245 138

LOW AIR CONDITIONING	HIGH AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.4 %	△FUEL = + 0.4 %	△FUEL = + 6 %	△FUEL = + 11 %

10F -08F0A320-232 IAE V2527-A5 21100000C5KG330 0 018590 0 0 2 1.0 500.0 300.0 1 03250.000300.000 .780 15 FCOM-N0-03-05-10-007-140

CLIMB - 250KT/300KT/M.78

MAX. CLIMB THRUST
NORMAL AIR CONDITIONING
ANTI-ICING OFF
ISA+20
CG=33.0%
FROM BRAKE RELEASE
TIME (MIN) FUEL (KG)
DISTANCE (NM) TAS (KT)

FL	WEIGHT AT BRAKE RELEASE (1000KG)													
	52		54		56		58		60		62		64	
390	25	1667	26	1762	28	1866	30	1983	32	2116				
	168	409	179	410	191	411	205	412	222	414				
370	22	1557	23	1639	25	1726	26	1818	28	1919	29	2030	31	2155
	148	402	156	402	165	403	175	404	186	406	199	407	213	409
350	20	1467	21	1540	22	1617	23	1699	25	1786	26	1880	28	1983
	133	395	140	396	147	397	155	397	164	398	174	400	185	401
330	18	1383	19	1450	20	1519	21	1592	22	1669	24	1752	25	1841
	120	388	126	389	132	389	139	390	146	391	154	392	163	393
310	17	1298	18	1358	19	1422	19	1487	20	1556	21	1629	22	1707
	107	380	112	381	118	381	123	381	129	382	136	383	143	383
290	15	1202	16	1257	17	1315	17	1374	18	1435	19	1499	20	1568
	94	369	98	370	103	370	107	370	112	371	117	371	123	372
270	13	1087	14	1137	15	1188	15	1240	16	1294	17	1351	17	1410
	78	355	82	355	86	355	90	355	94	356	98	356	102	356
250	12	988	12	1032	13	1078	13	1125	14	1174	14	1224	15	1276
	66	341	69	341	73	341	76	341	79	342	82	342	86	342
240	11	942	11	984	12	1028	12	1072	13	1118	14	1165	14	1215
	61	334	64	334	67	334	70	335	73	335	76	335	79	335
220	10	855	10	893	11	933	11	973	11	1014	12	1057	12	1101
	52	320	54	321	56	321	59	321	61	321	64	321	67	322
200	9	776	9	811	9	847	10	883	10	920	11	958	11	998
	44	307	46	307	48	307	50	308	52	308	54	308	56	308
180	8	703	8	735	8	767	9	800	9	833	9	868	10	904
	37	294	39	294	40	294	42	294	44	294	46	295	48	295
160	7	634	7	662	7	691	8	720	8	751	8	782	9	814
	31	280	33	280	34	280	35	280	37	281	38	281	40	281
140	6	566	6	591	6	617	7	644	7	671	7	699	7	728
	26	265	27	265	28	265	29	266	31	266	32	266	33	266
120	5	501	5	523	6	546	6	570	6	594	6	619	6	645
	21	249	22	249	23	249	24	249	25	250	26	250	27	250
100	4	395	4	413	4	432	4	451	5	470	5	490	5	511
	14	219	15	219	16	219	16	220	17	220	18	220	18	221
50	2	252	3	264	3	275	3	287	3	300	3	312	3	326
	7	178	8	179	8	179	8	179	9	180	9	180	9	181
15	2	150	2	157	2	164	2	172	2	179	2	187	2	195
	3	123	3	124	3	124	4	124	4	125	4	125	4	126

LOW AIR CONDITIONING	HIGH AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.4 %	△FUEL = + 0.4 %	△FUEL = + 6 %	△FUEL = + 11 %

10F 08F0A320-232 IAE V2527-A5 21100000C5KG330 0 018590 0 0 2 1.0 500.0 300.0 1 03250.000300.000 .780 20 FCOM-N0-03-05-10-008-142

CLIMB - 250KT/300KT/M.78 - ALL ENGINES

MAX. CLIMB THRUST
NORMAL AIR CONDITIONING
ANTI ICE OFF
ISA+20
CG=33.0%
FROM BRAKE RELEASE
TIME (MIN) FUEL (KG)
DISTANCE (NM) TAS (KT)

FL	WEIGHT AT BRAKE RELEASE (1000KG)													
	56		58		60		62		64		66		68	
390														
370														
350														
330	35 240	2192 413												
310	30 198	1947 402												
290	25 159	1698 387	26 170	1803 388										
270	20 124	1464 368	21 132	1546 369	23 140	1633 370	24 149	1727 371	25 158	1828 373	27 169	1937 374	29 180	2056 375
250	17 101	1293 353	18 107	1361 353	19 113	1433 354	20 119	1509 355	21 126	1590 356	22 133	1676 357	24 141	1768 358
230	15 83	1152 338	16 88	1210 339	16 92	1271 339	17 97	1336 340	18 103	1403 341	19 108	1474 341	20 114	1549 342
220	14 76	1089 331	14 80	1143 332	15 84	1200 332	16 89	1260 333	17 93	1322 334	18 98	1388 334	18 103	1456 335
200	12 64	976 318	13 67	1024 318	13 70	1073 319	14 74	1125 319	15 77	1179 320	15 81	1236 320	16 85	1294 321
180	10 53	874 305	11 56	915 305	12 59	958 305	12 61	1004 306	13 64	1051 306	13 67	1100 307	14 71	1152 307
160	9 44	778 291	10 46	815 291	10 49	853 292	10 51	892 292	11 53	934 292	11 56	977 293	12 58	1022 293
140	8 36	688 276	8 38	720 276	9 40	753 277	9 42	788 277	9 44	824 277	10 46	861 278	10 48	901 278
120	7 29	601 260	7 31	629 260	7 32	658 260	8 33	688 261	8 35	719 261	8 37	752 262	9 38	786 262
100	5 19	464 229	5 20	485 230	6 21	508 230	6 22	531 231	6 23	554 231	6 24	580 232	7 25	606 232
50	3 9	287 189	3 10	299 189	3 10	313 190	3 11	327 190	4 11	341 191	4 12	356 191	4 12	371 192
15	2 3	164 124	2 4	172 124	2 4	179 125	2 4	187 125	2 4	195 126	2 4	203 127	2 4	211 127

CORRECTIONS	AC HI	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 12 %	+ 30 %	+ 30 %

CLIMB - 250KT/300KT/M.78

MAX. CLIMB THRUST
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+20
CG=33.0%

FROM BRAKE RELEASE
TIME (MIN) **FUEL (KG)**
DISTANCE (NM) **TAS (KT)**

FL	WEIGHT AT BRAKE RELEASE (1000KG)													
	66		**68**		**70**		**72**		**74**		**76**		**78**	
390														
370	33 227	2253 411												
350	29 193	2052 403	31 207	2174 404	33 222	2312 406	35 241	2472 409						
330	26 169	1897 395	27 179	1999 396	29 191	2111 397	31 204	2235 399	33 219	2373 401	35 236	2530 404		
310	23 148	1753 385	24 156	1841 386	26 165	1936 387	27 175	2040 389	29 186	2152 390	30 198	2276 392	32 212	2412 394
290	20 127	1604 373	21 133	1680 374	22 140	1761 375	24 148	1847 376	25 156	1940 377	26 165	2041 379	28 175	2149 380
270	18 105	1438 358	18 110	1502 358	19 115	1570 359	20 121	1641 360	21 127	1718 361	22 134	1799 362	23 141	1885 363
250	15 88	1298 343	16 92	1354 344	17 96	1413 344	17 101	1474 345	18 105	1539 346	19 110	1608 346	20 116	1680 347
240	14 81	1234 336	15 84	1287 337	16 88	1341 337	16 92	1399 338	17 96	1459 338	18 100	1522 339	19 105	1589 340
220	13 68	1116 322	13 71	1162 322	14 74	1210 323	14 77	1260 323	15 80	1312 324	15 84	1367 324	16 87	1425 325
200	11 57	1009 308	12 59	1050 309	12 62	1093 309	12 64	1137 309	13 67	1183 310	14 70	1231 310	14 73	1282 311
180	10 48	911 295	10 50	948 295	11 52	986 295	11 54	1026 296	11 56	1067 296	12 59	1109 297	12 61	1154 297
160	9 40	819 281	9 42	852 281	9 44	886 281	10 45	921 282	10 47	957 282	10 49	996 283	11 51	1035 283
140	8 33	730 265	8 35	759 266	8 36	790 266	8 37	821 267	9 39	854 267	9 40	888 267	9 42	923 268
120	7 27	645 249	7 28	671 249	7 29	698 250	7 30	726 250	8 32	755 251	8 33	785 251	8 34	816 252
100	5 18	509 218	5 19	531 219	5 20	552 220	6 21	575 220	6 21	598 221	6 22	622 222	6 23	646 222
50	3 9	329 179	3 10	343 179	3 10	356 180	4 11	371 181	4 11	385 182	4 12	400 182	4 12	416 183
15	2 4	203 127	2 4	211 127	2 5	220 128	2 5	229 129	2 5	238 130	2 5	247 131	2 5	257 132

LOW AIR CONDITIONING	HIGH AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.1 %	△FUEL = + 0.1 %	△FUEL = + 4.5 %	△FUEL = + 8 %

10E -08FOA319-131 IAE V2522-A5 21100000C5KG330 0 018590 0 0 2 1.0 500.0 300.00 1 03250.000300.000 .780 20 FCOM-N0-03-05-10-009-135

CLIMB - 250KT/300KT/M.78

MAX. CLIMB THRUST
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+20
CG=33.0%

FROM BRAKE RELEASE
TIME (MIN) **FUEL (KG)**
DISTANCE (NM) **TAS (KT)**

FL	WEIGHT AT BRAKE RELEASE (1000KG)													
	66		**68**		**70**		**72**		**74**		**76**		**78**	
390														
370	34 230	2299 411												
350	29 197	2096 402	31 210	2221 404	33 226	2363 406	36 245	2526 408						
330	26 172	1938 394	28 183	2043 395	29 194	2159 397	31 208	2286 399	33 223	2428 401	36 241	2590 403		
310	23 150	1792 384	25 159	1882 386	26 168	1980 387	28 178	2087 388	29 190	2203 390	31 202	2330 392	33 216	2471 394
290	21 129	1641 372	22 136	1719 373	23 143	1802 374	24 151	1891 375	25 159	1987 377	27 169	2091 378	28 179	2202 379
270	18 107	1473 357	19 112	1539 358	20 118	1608 358	21 123	1682 359	22 130	1761 360	23 136	1845 361	24 143	1934 362
250	16 90	1331 343	16 94	1389 343	17 98	1449 344	18 103	1513 344	19 107	1580 345	20 113	1651 346	20 118	1725 347
240	15 82	1267 336	15 86	1321 336	16 90	1377 337	17 94	1437 337	17 98	1499 338	18 103	1564 339	19 107	1633 339
220	13 69	1147 322	13 72	1195 322	14 75	1245 323	15 79	1297 323	15 82	1351 323	16 86	1408 324	17 89	1467 325
200	11 59	1040 308	12 61	1082 309	12 64	1127 309	13 66	1173 309	13 69	1220 310	14 72	1271 310	14 75	1323 311
180	10 50	941 295	10 52	980 295	11 54	1019 296	11 56	1061 296	12 58	1103 296	12 61	1148 297	13 63	1195 297
160	9 42	848 281	9 43	883 282	10 45	918 282	10 47	955 282	10 49	993 283	11 51	1033 283	11 53	1075 284
140	8 35	758 266	8 36	789 267	8 37	822 267	9 39	855 268	9 41	889 268	9 42	924 269	10 44	961 269
120	7 28	672 250	7 29	700 251	7 31	728 251	8 32	758 252	8 33	788 252	8 35	820 253	9 36	853 253
100	5 19	533 221	5 20	555 222	6 21	578 222	6 22	602 223	6 23	626 224	6 24	651 224	7 25	678 225
50	3 10	339 181	3 10	353 182	4 11	368 183	4 11	382 184	4 12	398 184	4 12	413 185	4 13	429 186
15	2 4	203 127	2 4	211 127	2 5	220 128	2 5	229 129	2 5	238 130	2 5	247 131	2 5	257 132

LOW AIR CONDITIONING	HIGH AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = − 0.4 %	△FUEL = + 0.4 %	△FUEL = + 6 %	△FUEL = + 11 %

10F -08FA320-232 IAE V2527-A5 21100000C5KG330 0 018590 0 0 2 1.0 500.0 300.0 1 03250.000300.000 .780 20 FCOM-N0-03-05-10-009-140

GENERAL

Cruise tables are established :
- for ISA, ISA + 10, ISA + 15 and ISA + 20
- with normal air conditioning and anti ice OFF
- from FL290 to FL390 at M.78
- from FL100 to FL390 at long range speed
- with a 33 % center of gravity.

OPTIMUM MACH NUMBER

Seven tables give the optimum Mach number versus cost index, altitude and wind as calculated by the FMGC.

COST INDEX = 0 (MAXIMUM RANGE)

		FLIGHT LEVEL					
WEIGHT/WIND							
1000kg	kt	290	310	330	350	370	390
50	100.	.588	.616	.641	.665	.689	.712
	50.	.602	.628	.652	.676	.698	.720
	0.	.620	.644	.667	.688	.709	.730
	– 50.	.641	.663	.684	.703	.722	.740
	– 100.	.668	.686	.704	.722	.738	.753
55	100.	.617	.642	.665	.689	.712	.735
	50.	.629	.653	.676	.698	.720	.742
	0.	.645	.667	.689	.709	.729	.749
	– 50.	.664	.684	.703	.722	.740	.758
	– 100.	.687	.704	.721	.738	.753	.766
60	100.	.641	.664	.687	.710	.733	.752
	50.	.652	.675	.696	.718	.740	.757
	0.	.666	.687	.708	.728	.748	.763
	– 50.	.683	.702	.721	.739	.756	.769
	– 100.	.703	.720	.736	.751	.765	.773
65	100.	.662	.684	.706	.730	.750	
	50.	.672	.694	.715	.737	.756	
	0.	.685	.705	.725	.745	.762	
	– 50.	.700	.718	.736	.753	.768	
	– 100.	.718	.734	.749	.763	.773	
70	100.	.681	.702	.725	.747	.757	
	50.	.690	.711	.732	.753	.762	
	0.	.702	.721	.740	.759	.767	
	– 50.	.715	.732	.750	.766	.771	
	– 100.	.731	.746	.760	.772	.774	
75	100.	.697	.719	.741	.755		
	50.	.705	.726	.747	.760		
	0.	.716	.735	.754	.765		
	– 50.	.728	.745	.761	.770		
	– 100.	.742	.756	.769	.774		

COST INDEX = 10 kg/min								COST INDEX = 20 kg/min							
		FLIGHT LEVEL								FLIGHT LEVEL					
WEIGHT/WIND								WEIGHT/WIND							
1000kg	kt	290	310	330	350	370	390	1000kg	kt	290	310	330	350	370	390
50	100.	.627	.652	.674	.696	.717	.737	50	100.	.661	.683	.704	.723	.741	.756
	50.	.644	.667	.688	.709	.728	.745		50.	.680	.699	.718	.735	.751	.765
	0.	.664	.684	.704	.723	.740	.755		0.	.699	.717	.734	.750	.763	.774
	– 50.	.686	.704	.721	.738	.753	.765		– 50.	.723	.737	.751	.764	.775	.783
	– 100.	.713	.728	.743	.756	.767	.777		– 100.	.747	.759	.769	.779	.787	.791
55	100.	.650	.672	.694	.714	.734	.754	55	100.	.679	.699	.719	.737	.753	.767
	50.	.664	.686	.706	.725	.743	.760		50.	.695	.713	.731	.747	.761	.773
	0.	.682	.701	.720	.737	.753	.767		0.	.711	.729	.745	.759	.771	.778
	– 50.	.701	.718	.735	.750	.763	.774		– 50.	.732	.746	.759	.771	.780	.784
	– 100.	.724	.739	.753	.765	.775	.781		– 100.	.753	.765	.775	.784	.789	.788
60	100.	.669	.690	.711	.731	.750	.765	60	100.	.694	.713	.732	.749	.764	.773
	50.	.682	.702	.721	.740	.757	.769		50.	.708	.726	.742	.757	.770	.776
	0.	.697	.716	.733	.750	.764	.773		0.	.723	.739	.754	.767	.776	.779
	– 50.	.715	.731	.746	.760	.772	.777		– 50.	.741	.755	.767	.777	.783	.781
	– 100.	.735	.749	.762	.772	.779	.780		– 100.	.760	.771	.780	.787	.788	.782
65	100.	.686	.707	.726	.746	.763		65	100.	.708	.726	.744	.760	.772	
	50.	.698	.717	.735	.754	.768			50.	.720	.737	.752	.766	.775	
	0.	.711	.729	.746	.761	.772			0.	.734	.749	.762	.774	.779	
	– 50.	.727	.742	.757	.769	.777			– 50.	.750	.762	.773	.780	.781	
	– 100.	.745	.758	.769	.778	.780			– 100.	.766	.777	.784	.787	.783	
70	100.	.702	.721	.741	.760	.767		70	100.	.720	.738	.754	.769	.773	
	50.	.712	.730	.748	.765	.771			50.	.732	.747	.762	.773	.774	
	0.	.724	.741	.757	.771	.773			0.	.743	.757	.769	.778	.775	
	– 50.	.738	.752	.765	.775	.775			– 50.	.758	.769	.777	.781	.776	
	– 100.	.754	.766	.775	.780	.776			– 100.	.772	.781	.785	.785	.776	
75	100.	.715	.735	.754	.765			75	100.	.731	.748	.764	.771		
	50.	.724	.743	.760	.769				50.	.741	.756	.769	.774		
	0.	.735	.751	.766	.773				0.	.751	.764	.775	.776		
	– 50.	.747	.761	.772	.775				– 50.	.764	.774	.780	.777		
	– 100.	.761	.772	.779	.777				– 100.	.776	.783	.784	.778		

GENERAL

Cruise tables are established :
- for ISA, ISA + 10, ISA + 15 and ISA + 20
- with normal air conditioning and anti ice OFF
- from FL310 to FL410 at M.78
- from FL100 to FL410 at long range speed.
- with a 33 % center of gravity.

OPTIMUM MACH NUMBER

Seven tables give the optimum Mach number versus cost index, altitude and wind, as calculated by the FMGC.

COST INDEX = 0 (MAXIMUM RANGE)

		FLIGHT LEVEL					
WEIGHT/WIND							
1000kg	kt	290	310	330	350	370	390
45	100	.542	.567	.593	.620	.650	.680
	50	.555	.580	.607	.634	.661	.691
	0	.573	.598	.625	.650	.676	.705
	–50	.599	.622	.645	.669	.694	.725
	–100	.631	.653	.675	.700	.726	.749
50	100	.571	.597	.624	.653	.684	.714
	50	.584	.611	.637	.664	.694	.723
	0	.602	.629	.653	.678	.707	.733
	–50	.626	.649	.671	.697	.728	.757
	–100	.655	.677	.702	.728	.751	.770
55	100	.598	.625	.653	.683	.714	.733
	50	.613	.638	.665	.694	.722	.740
	0	.631	.654	.679	.707	.733	.748
	–50	.649	.671	.697	.728	.757	.767
	–100	.678	.702	.728	.751	.770	.774
60	100	.624	.652	.681	.712	.731	
	50	.637	.663	.692	.721	.738	
	0	.653	.677	.705	.731	.747	
	–50	.670	.695	.725	.756	.767	
	–100	.700	.725	.749	.769	.774	
65	100	.649	.677	.707	.729		
	50	.660	.688	.716	.736		
	0	.674	.701	.727	.745		
	–50	.691	.721	.751	.766		
	–100	.722	.745	.766	.774		
70	100	.672	.701	.726			
	50	.682	.711	.733			
	0	.696	.722	.742			
	–50	.715	.745	.765			
	–100	.741	.762	.773			

COST INDEX = 10 kg/min								COST INDEX = 20 kg/min							
		FLIGHT LEVEL								FLIGHT LEVEL					
WEIGHT/WIND		290	310	330	350	370	390	WEIGHT/WIND		290	310	330	350	370	390
1000kg	kt							1000kg	kt						
45	100	.584	.610	.636	.661	.688	.719	45	100	.627	.651	.677	.705	.732	.755
	50	.606	.630	.653	.678	.706	.736		50	.648	.674	.702	.727	.747	.764
	0	.628	.652	.676	.703	.730	.752		0	.679	.704	.726	.744	.759	.772
	–50	.657	.682	.707	.731	.748	.765		–50	.713	.729	.743	.756	.769	.779
	–100	.698	.719	.736	.749	.762	.774		–100	.736	.749	.759	.768	.777	.786
50	100	.609	.636	.661	.687	.718	.746	50	100	.647	.672	.699	.728	.752	.771
	50	.628	.652	.675	.703	.735	.762		50	.668	.694	.721	.744	.762	.777
	0	.650	.674	.700	.728	.752	.770		0	.698	.721	.740	.757	.771	.781
	–50	.679	.703	.727	.747	.764	.777		–50	.726	.740	.753	.766	.778	.785
	–100	.715	.733	.748	.761	.774	.783		–100	.744	.756	.766	.775	.785	.789
55	100	.635	.658	.684	.714	.742	.756	55	100	.666	.691	.720	.747	.769	.774
	50	.650	.673	.699	.731	.760	.769		50	.687	.714	.738	.759	.775	.777
	0	.670	.695	.723	.749	.769	.774		0	.715	.735	.752	.768	.780	.780
	–50	.698	.722	.744	.762	.776	.778		–50	.737	.750	.763	.776	.784	.783
	–100	.730	.746	.759	.772	.782	.782		–100	.752	.764	.773	.783	.788	.786
60	100	.655	.680	.709	.737	.751		60	100	.683	.711	.740	.765	.772	
	50	.669	.694	.725	.756	.767			50	.706	.732	.754	.772	.776	
	0	.690	.716	.743	.767	.773			0	.729	.748	.764	.778	.780	
	–50	.717	.739	.759	.775	.778			–50	.747	.760	.773	.783	.783	
	–100	.742	.757	.770	.781	.781			–100	.760	.771	.780	.787	.786	
65	100	.674	.702	.729	.747			65	100	.701	.731	.758	.770		
	50	.688	.718	.748	.765				50	.724	.747	.767	.775		
	0	.709	.737	.762	.772				0	.742	.760	.775	.779		
	–50	.734	.754	.771	.777				–50	.756	.769	.780	.782		
	–100	.753	.767	.779	.781				–100	.767	.778	.785	.785		
70	100	.695	.722	.742				70	100	.721	.750	.768			
	50	.710	.739	.760					50	.739	.762	.773			
	0	.729	.755	.770					0	.754	.770	.778			
	–50	.748	.767	.776					–50	.765	.777	.782			
	–100	.763	.776	.781					–100	.774	.783	.785			

GENERAL

Cruise tables are established :
- for ISA, ISA + 10, ISA + 15 and ISA + 20
- with normal air conditioning and anti ice OFF
- from FL290 to FL390 at M.78
- from FL100 to FL390 at long range speed
- with a 33 % center of gravity.

OPTIMUM MACH NUMBER

Seven tables give the optimum Mach number versus cost index, altitude and wind as calculated by the FMGC.

COST INDEX = 0 (MAXIMUM RANGE)

		FLIGHT LEVEL					
WEIGHT/WIND							
1000kg	kt	290	310	330	350	370	390
50	100	.587	.613	.637	.662	.688	.713
	50	.598	.622	.648	.673	.698	.722
	0	.611	.634	.661	.686	.711	.733
	–50	.630	.652	.678	.704	.731	.751
	–100	.662	.680	.703	.726	.748	.762
55	100	.614	.638	.662	.688	.712	.735
	50	.623	.649	.673	.698	.721	.742
	0	.636	.662	.687	.711	.733	.751
	–50	.653	.678	.705	.731	.751	.762
	–100	.681	.703	.726	.747	.762	.772
60	100	.637	.661	.686	.710	.733	.751
	50	.648	.672	.697	.719	.740	.756
	0	.661	.685	.709	.731	.750	.758
	–50	.677	.703	.729	.749	.761	.766
	–100	.701	.724	.746	.760	.772	.778
65	100	.658	.683	.706	.729	.747	
	50	.669	.694	.716	.737	.753	
	0	.682	.706	.727	.747	.757	
	–50	.700	.726	.746	.760	.765	
	–100	.721	.744	.758	.770	.777	
70	100	.678	.702	.725	.744	.751	
	50	.689	.711	.733	.750	.751	
	0	.702	.723	.743	.755	.751	
	–50	.721	.741	.757	.764	.751	
	–100	.739	.755	.767	.776	.751	
75	100	.696	.719	.739	.753		
	50	.706	.728	.746	.757		
	0	.718	.739	.753	.759		
	–50	.737	.755	.763	.769		
	–100	.752	.765	.774	.773		

COST INDEX = 10 kg/min								COST INDEX = 20 kg/min							
		FLIGHT LEVEL								FLIGHT LEVEL					
WEIGHT/WIND								WEIGHT/WIND							
1000kg	kt	290	310	330	350	370	390	1000kg	kt	290	310	330	350	370	390
50	100	.618	.642	.669	.696	.723	.745	50	100	.654	.677	.703	.728	.750	.766
	50	.633	.656	.683	.711	.737	.756		50	.680	.699	.720	.740	.758	.773
	0	.657	.678	.703	.727	.749	.764		0	.710	.724	.740	.757	.770	.778
	–50	.689	.706	.725	.743	.760	.773		–50	.733	.744	.757	.770	.780	.783
	–100	.723	.736	.750	.762	.773	.779		–100	.752	.762	.773	.781	.787	.788
55	100	.640	.667	.693	.719	.742	.756	55	100	.670	.697	.723	.747	.763	.774
	50	.654	.680	.708	.735	.754	.765		50	.692	.714	.735	.754	.771	.779
	0	.674	.699	.724	.747	.762	.773		0	.717	.734	.751	.767	.777	.780
	–50	.702	.721	.739	.757	.772	.779		–50	.740	.753	.766	.776	.781	.781
	–100	.731	.747	.760	.771	.778	.780		–100	.757	.770	.779	.785	.787	.785
60	100	.663	.689	.714	.736	.754	.761	60	100	.690	.716	.742	.758	.770	.777
	50	.676	.703	.731	.751	.763	.769		50	.708	.730	.751	.767	.779	.778
	0	.694	.719	.743	.759	.771	.777		0	.727	.744	.761	.774	.780	.779
	–50	.716	.735	.753	.769	.779	.779		–50	.749	.761	.773	.779	.781	.779
	–100	.742	.757	.768	.777	.780	.779		–100	.765	.776	.783	.785	.784	.780
65	100	.684	.709	.731	.750	.759		65	100	.709	.736	.753	.766	.776	
	50	.697	.724	.745	.760	.766			50	.724	.746	.761	.775	.778	
	0	.713	.739	.755	.767	.776			0	.738	.755	.770	.779	.779	
	–50	.731	.750	.765	.778	.779			–50	.757	.769	.777	.780	.780	
	–100	.751	.765	.775	.780	.779			–100	.772	.781	.783	.784	.781	
70	100	.702	.724	.744	.756	.751		70	100	.728	.748	.762	.771	.751	
	50	.717	.739	.756	.763	.751			50	.740	.756	.770	.777	.751	
	0	.732	.750	.764	.773	.751			0	.749	.765	.777	.779	.751	
	–50	.745	.761	.775	.779	.751			–50	.764	.774	.780	.780	.751	
	–100	.761	.772	.779	.779	.751			–100	.777	.782	.783	.781	.751	
75	100	.717	.738	.753	.759			75	100	.741	.758	.767	.773		
	50	.731	.751	.761	.767				50	.751	.765	.774	.773		
	0	.745	.760	.769	.773				0	.759	.774	.779	.773		
	–50	.756	.770	.779	.773				–50	.770	.778	.780	.773		
	–100	.768	.778	.780	.773				–100	.779	.782	.781	.773		

GENERAL

Cruise tables are established :
- for ISA, ISA + 10, ISA + 15 and ISA + 20
- with normal air conditioning and anti ice OFF
- from FL290 to FL390 at M.78
- from FL100 to FL390 at long range speed
- with a 33 % center of gravity.

OPTIMUM MACH NUMBER

Seven tables give the optimum Mach number versus cost index, altitude and wind as calculated by the FMGC.

COST INDEX = 0 (MAXIMUM RANGE)

		FLIGHT LEVEL					
WEIGHT/WIND							
1000kg	kt	290	310	330	350	370	390
50	100	.585	.600	.619	.646	.680	.717
	50	.590	.605	.626	.655	.690	.727
	0	.597	.611	.637	.669	.704	.740
	–50	.610	.631	.661	.692	.723	.752
	–100	.642	.669	.698	.718	.742	.764
55	100	.601	.619	.646	.680	.716	.746
	50	.606	.627	.656	.690	.726	.751
	0	.612	.638	.669	.704	.739	.757
	–50	.632	.662	.692	.722	.752	.766
	–100	.670	.698	.717	.741	.764	.774
60	100	.618	.644	.677	.713	.745	.757
	50	.626	.654	.687	.723	.750	.758
	0	.636	.667	.701	.736	.757	.762
	–50	.660	.690	.720	.749	.765	.770
	–100	.696	.716	.739	.762	.773	.778
65	100	.641	.673	.708	.740	.756	
	50	.650	.683	.718	.746	.757	
	0	.663	.697	.731	.754	.761	
	–50	.687	.716	.745	.763	.769	
	–100	.714	.734	.759	.772	.777	
70	100	.666	.701	.733	.753	.760	
	50	.676	.711	.741	.755	.760	
	0	.690	.724	.750	.760	.763	
	–50	.710	.739	.760	.768	.771	
	–100	.729	.755	.770	.776	.779	
75	100	.693	.726	.749	.759		
	50	.703	.735	.753	.759		
	0	.716	.746	.758	.762		
	–50	.732	.757	.767	.770		
	–100	.750	.767	.775	.778		

COST INDEX = 10 kg/min								COST INDEX = 20 kg/min							
		FLIGHT LEVEL								FLIGHT LEVEL					
WEIGHT/WIND								WEIGHT/WIND							
1000kg	kt	290	310	330	350	370	390	1000kg	kt	290	310	330	350	370	390
50	100	.602	.621	.650	.683	.716	.748	50	100	.634	.666	.700	.721	.746	.768
	50	.613	.637	.670	.702	.730	.758		50	.661	.691	.714	.733	.758	.774
	0	.637	.667	.699	.720	.744	.766		0	.683	.710	.728	.750	.769	.778
	–50	.668	.696	.716	.735	.759	.774		–50	.710	.730	.748	.766	.778	.781
	–100	.698	.720	.737	.756	.772	.779		–100	.738	.756	.770	.778	.782	.783
55	100	.618	.646	.679	.713	.746	.762	55	100	.657	.691	.715	.741	.765	.775
	50	.634	.666	.698	.727	.755	.768		50	.686	.711	.728	.753	.772	.779
	0	.661	.693	.716	.741	.765	.774		0	.705	.723	.743	.766	.777	.780
	–50	.693	.714	.731	.756	.773	.779		–50	.725	.742	.761	.775	.781	.780
	–100	.717	.733	.752	.770	.778	.780		–100	.749	.767	.776	.781	.782	.781
60	100	.641	.673	.707	.740	.760	.764	60	100	.681	.708	.734	.760	.773	.777
	50	.661	.692	.722	.751	.767	.771		50	.706	.723	.747	.768	.777	.780
	0	.686	.711	.736	.761	.773	.777		0	.718	.737	.760	.775	.780	.780
	–50	.711	.728	.751	.770	.778	.780		–50	.736	.755	.771	.779	.780	.780
	–100	.729	.748	.767	.777	.780	.780		–100	.759	.774	.780	.782	.781	.781
65	100	.666	.700	.733	.756	.763		65	100	.701	.726	.754	.769	.775	
	50	.685	.715	.745	.764	.770			50	.719	.739	.763	.775	.779	
	0	.705	.729	.756	.771	.776			0	.730	.753	.771	.779	.780	
	–50	.724	.745	.767	.777	.780			–50	.748	.767	.777	.780	.780	
	–100	.742	.763	.775	.780	.780			–100	.768	.778	.781	.781	.780	
70	100	.691	.725	.751	.761	.763		70	100	.718	.746	.765	.772	.775	
	50	.707	.737	.759	.768	.770			50	.730	.757	.772	.777	.780	
	0	.722	.750	.767	.774	.777			0	.745	.767	.777	.780	.780	
	–50	.738	.762	.774	.779	.780			–50	.761	.775	.780	.780	.780	
	–100	.757	.773	.779	.780	.780			–100	.775	.781	.781	.780	.780	
75	100	.716	.746	.758	.762			75	100	.737	.761	.770	.773		
	50	.728	.755	.765	.769				50	.750	.768	.775	.778		
	0	.742	.763	.772	.776				0	.761	.774	.779	.780		
	–50	.756	.771	.778	.780				–50	.771	.778	.780	.780		
	–100	.769	.778	.780	.780				–100	.779	.781	.780	.780		

COST INDEX = 40 kg/min								COST INDEX = 60 kg/min							
		FLIGHT LEVEL								FLIGHT LEVEL					
WEIGHT/WIND								WEIGHT/WIND							
1000kg	kt	290	310	330	350	370	390	1000kg	kt	290	310	330	350	370	390
50	100.	.717	.734	.749	.763	.776	.783	50	100.	.757	.768	.779	.789	.795	.796
	50.	.734	.748	.763	.775	.784	.790		50.	.770	.780	.788	.796	.799	.799
	0.	.753	.764	.775	.786	.792	.795		0.	.783	.790	.796	.800	.800	.799
	– 50.	.770	.780	.787	.795	.799	.798		– 50.	.794	.797	.800	.800	.800	.798
	– 100.	.786	.792	.797	.800	.800	.799		– 100.	.799	.798	.800	.799	.797	.796
55	100.	.726	.743	.757	.770	.780	.784	55	100.	.761	.772	.783	.791	.794	.791
	50.	.741	.755	.769	.779	.786	.787		50.	.772	.783	.791	.797	.797	.792
	0.	.758	.769	.780	.789	.792	.790		0.	.784	.792	.798	.800	.799	.793
	– 50.	.773	.783	.790	.796	.797	.792		– 50.	.794	.799	.800	.800	.799	.793
	– 100.	.787	.794	.799	.800	.799	.793		– 100.	.798	.800	.800	.799	.796	.795
60	100.	.735	.751	.764	.775	.782	.780	60	100.	.766	.776	.786	.791	.790	.783
	50.	.748	.762	.774	.783	.786	.781		50.	.776	.786	.793	.796	.792	.784
	0.	.763	.774	.784	.790	.789	.782		0.	.787	.794	.799	.799	.793	.787
	– 50.	.777	.786	.793	.796	.792	.784		– 50.	.796	.800	.800	.799	.794	.790
	– 100.	.790	.796	.800	.799	.793	.787		– 100.	.800	.800	.800	.798	.794	.794
65	100.	.743	.758	.770	.779	.781		65	100.	.770	.780	.787	.789	.784	
	50.	.755	.768	.778	.784	.782			50.	.780	.789	.793	.792	.785	
	0.	.768	.779	.786	.789	.784			0.	.789	.796	.798	.794	.786	
	– 50.	.781	.789	.793	.792	.785			– 50.	.797	.800	.800	.795	.789	
	– 100.	.792	.798	.799	.794	.787			– 100.	.800	.800	.800	.795	.792	
70	100.	.751	.764	.775	.780	.776		70	100.	.774	.783	.787	.785	.776	
	50.	.762	.773	.781	.783	.776			50.	.783	.790	.791	.787	.777	
	0.	.773	.782	.786	.785	.776			0.	.792	.796	.794	.788	.781	
	– 50.	.784	.791	.791	.787	.777			– 50.	.799	.800	.796	.789	.783	
	– 100.	.794	.797	.795	.788	.783			– 100.	.800	.800	.796	.791	.783	
75	100.	.758	.770	.778	.777			75	100.	.778	.784	.785	.778		
	50.	.767	.776	.782	.778				50.	.785	.789	.787	.779		
	0.	.777	.784	.785	.778				0.	.792	.794	.789	.780		
	– 50.	.786	.790	.788	.779				– 50.	.798	.797	.790	.785		
	– 100.	.795	.795	.790	.782				– 100.	.800	.797	.792	.790		

COST INDEX = 80 kg/min								COST INDEX = 100 kg/min							
		FLIGHT LEVEL								FLIGHT LEVEL					
WEIGHT/WIND								WEIGHT/WIND							
1000kg	kt	290	310	330	350	370	390	1000kg	kt	290	310	330	350	370	390
50	100.	.782	.788	.795	.800	.800	.799	50	100.	.795	.798	.800	.800	.800	.787
	50.	.791	.795	.800	.800	.800	.798		50.	.799	.798	.800	.799	.797	.796
	0.	.798	.798	.800	.800	.799	.796		0.	.798	.798	.796	.794	.798	.800
	– 50.	.798	.798	.798	.796	.796	.798		– 50.	.795	.792	.793	.799	.800	.800
	– 100.	.797	.794	.791	.797	.800	.800		– 100.	.788	.795	.800	.800	.800	.800
55	100.	.782	.791	.797	.800	.799	.793	55	100.	.795	.800	.800	.800	.798	.794
	50.	.791	.797	.800	.800	.799	.793		50.	.798	.800	.800	.800	.796	.795
	0.	.797	.800	.800	.800	.797	.794		0.	.798	.800	.798	.795	.797	.798
	– 50.	.798	.800	.799	.797	.796	.797		– 50.	.796	.794	.795	.799	.800	.800
	– 100.	.797	.795	.794	.798	.800	.800		– 100.	.790	.796	.800	.800	.800	.800
60	100.	.785	.793	.798	.799	.793	.786	60	100.	.796	.800	.800	.799	.794	.791
	50.	.793	.798	.800	.799	.794	.789		50.	.800	.800	.800	.798	.794	.794
	0.	.799	.800	.800	.799	.794	.792		0.	.800	.800	.798	.795	.796	.797
	– 50.	.800	.800	.800	.797	.795	.796		– 50.	.797	.796	.796	.799	.800	.800
	– 100.	.798	.797	.795	.798	.799	.800		– 100.	.792	.798	.800	.800	.800	.800
65	100.	.788	.794	.797	.794	.786		65	100.	.798	.800	.800	.795	.789	
	50.	.795	.799	.800	.795	.788			50.	.800	.800	.800	.795	.792	
	0.	.800	.800	.800	.795	.791			0.	.800	.800	.798	.794	.795	
	– 50.	.800	.800	.799	.794	.794			– 50.	.799	.797	.797	.797	.798	
	– 100.	.800	.798	.796	.797	.798			– 100.	.794	.798	.800	.800	.800	
70	100.	.790	.794	.794	.787	.780		70	100.	.799	.800	.796	.789	.783	
	50.	.796	.798	.796	.788	.783			50.	.800	.800	.796	.791	.783	
	0.	.800	.800	.796	.790	.783			0.	.800	.800	.795	.793	.783	
	– 50.	.800	.800	.796	.792	.783			– 50.	.800	.797	.795	.796	.783	
	– 100.	.800	.797	.795	.796	.783			– 100.	.795	.799	.800	.800	.783	
75	100.	.791	.793	.789	.780			75	100.	.798	.797	.791	.785		
	50.	.796	.796	.790	.783				50.	.800	.797	.791	.789		
	0.	.800	.797	.791	.788				0.	.800	.797	.793	.790		
	– 50.	.800	.797	.792	.790				– 50.	.799	.795	.794	.790		
	– 100.	.800	.796	.794	.790				– 100.	.796	.798	.799	.790		

COST INDEX = 40 kg/min								COST INDEX = 60 kg/min							
FLIGHT LEVEL								FLIGHT LEVEL							
WEIGHT/WIND		290	310	330	350	370	390	WEIGHT/WIND		290	310	330	350	370	390
1000kg	kt							1000kg	kt						
45	100	.704	.726	.742	.756	.769	.780	45	100	.745	.756	.766	.775	.783	.790
	50	.724	.739	.754	.765	.775	.785		50	.755	.765	.772	.780	.787	.794
	0	.742	.753	.763	.773	.781	.788		0	.765	.772	.779	.786	.791	.796
	–50	.755	.765	.772	.779	.786	.793		–50	.774	.780	.786	.790	.795	.799
	–100	.767	.773	.780	.787	.792	.796		–100	.783	.787	.791	.796	.800	.800
50	100	.718	.737	.752	.765	.778	.785	50	100	.751	.762	.771	.780	.788	.791
	50	.734	.748	.761	.772	.783	.788		50	.760	.769	.777	.785	.792	.793
	0	.749	.760	.769	.779	.787	.790		0	.768	.775	.783	.790	.795	.794
	–50	.760	.769	.777	.784	.791	.792		–50	.776	.783	.788	.793	.798	.796
	–100	.770	.777	.784	.790	.795	.794		–100	.784	.789	.793	.798	.800	.797
55	100	.730	.747	.761	.774	.784	.783	55	100	.757	.767	.777	.786	.790	.787
	50	.743	.756	.769	.780	.787	.785		50	.765	.774	.782	.790	.792	.789
	0	.755	.766	.776	.785	.789	.787		0	.772	.779	.787	.794	.793	.790
	–50	.765	.774	.782	.789	.791	.789		–50	.779	.786	.791	.796	.795	.791
	–100	.774	.781	.788	.794	.794	.790		–100	.786	.791	.796	.799	.797	.793
60	100	.740	.757	.770	.782	.782		60	100	.763	.773	.783	.789	.787	
	50	.751	.764	.777	.785	.784			50	.770	.779	.787	.791	.788	
	0	.762	.772	.782	.788	.786			0	.776	.783	.791	.793	.790	
	–50	.770	.779	.787	.791	.788			–50	.782	.789	.795	.794	.791	
	–100	.778	.785	.792	.793	.790			–100	.789	.793	.798	.796	.793	
65	100	.750	.766	.778	.781			65	100	.769	.779	.787	.786		
	50	.759	.772	.783	.784				50	.775	.784	.789	.788		
	0	.768	.779	.786	.786				0	.780	.788	.792	.790		
	–50	.776	.784	.789	.788				–50	.786	.793	.794	.791		
	–100	.782	.789	.792	.790				–100	.791	.796	.796	.793		
70	100	.759	.774	.780				70	100	.775	.784	.786			
	50	.767	.779	.783					50	.780	.787	.787			
	0	.775	.784	.785					0	.785	.790	.789			
	–50	.781	.788	.788					–50	.789	.793	.791			
	–100	.786	.791	.790					–100	.794	.795	.792			

COST INDEX = 80 kg/min								COST INDEX = 100 kg/min							
FLIGHT LEVEL								FLIGHT LEVEL							
WEIGHT/WIND		290	310	330	350	370	390	WEIGHT/WIND		290	310	330	350	370	390
1000kg	kt							1000kg	kt						
45	100	.764	.771	.778	.785	.791	.796	45	100	.775	.782	.787	.792	.797	.800
	50	.771	.777	.784	.789	.794	.799		50	.782	.786	.791	.796	.800	.800
	0	.779	.784	.788	.793	.798	.800		0	.787	.791	.796	.800	.800	.800
	–50	.785	.789	.794	.798	.800	.800		–50	.793	.798	.800	.800	.800	.800
	–100	.792	.796	.800	.800	.800	.800		–100	.800	.800	.800	.800	.800	.800
50	100	.767	.774	.782	.789	.795	.794	50	100	.777	.784	.789	.794	.799	.796
	50	.773	.780	.787	.792	.797	.795		50	.783	.788	.793	.798	.800	.797
	0	.781	.786	.791	.796	.800	.797		0	.788	.792	.797	.800	.800	.799
	–50	.786	.791	.795	.800	.800	.798		–50	.794	.798	.800	.800	.800	.800
	–100	.793	.797	.800	.800	.800	.800		–100	.800	.800	.800	.800	.800	.800
55	100	.771	.778	.786	.793	.793	.790	55	100	.780	.787	.792	.797	.795	.792
	50	.776	.783	.790	.796	.794	.791		50	.785	.790	.795	.799	.796	.793
	0	.783	.788	.793	.798	.796	.792		0	.789	.794	.799	.800	.798	.794
	–50	.788	.793	.797	.800	.797	.794		–50	.794	.799	.800	.800	.799	.796
	–100	.794	.798	.800	.800	.799	.796		–100	.800	.800	.800	.800	.800	.798
60	100	.775	.782	.790	.793	.789		60	100	.783	.790	.795	.795	.791	
	50	.780	.787	.794	.794	.791			50	.788	.793	.797	.796	.793	
	0	.786	.791	.796	.795	.792			0	.791	.796	.800	.797	.794	
	–50	.790	.795	.799	.797	.793			–50	.796	.800	.800	.799	.795	
	–100	.795	.799	.800	.798	.795			–100	.800	.800	.800	.800	.797	
65	100	.779	.787	.791	.789			65	100	.786	.793	.794	.791		
	50	.783	.791	.793	.790				50	.790	.795	.795	.792		
	0	.788	.794	.795	.792				0	.793	.798	.797	.794		
	–50	.792	.797	.796	.793				–50	.797	.800	.799	.795		
	–100	.797	.800	.799	.795				–100	.800	.800	.800	.797		
70	100	.784	.789	.789				70	100	.789	.793	.791			
	50	.787	.792	.790					50	.793	.795	.792			
	0	.792	.794	.792					0	.796	.797	.793			
	–50	.795	.796	.793					–50	.799	.799	.795			
	–100	.798	.798	.795					–100	.800	.800	.797			

COST INDEX = 40 kg/min								COST INDEX = 60 kg/min							
		FLIGHT LEVEL								FLIGHT LEVEL					
WEIGHT/WIND								WEIGHT/WIND							
1000kg	kt	290	310	330	350	370	390	1000kg	kt	290	310	330	350	370	390
50	100	.727	.741	.756	.770	.780	.783	50	100	.760	.769	.780	.787	.790	.790
	50	.742	.754	.768	.778	.785	.787		50	.769	.778	.784	.790	.793	.793
	0	.758	.767	.777	.785	.789	.789		0	.776	.782	.789	.794	.795	.796
	–50	.768	.777	.784	.789	.792	.792		–50	.782	.787	.794	.797	.798	.799
	–100	.777	.783	.790	.795	.795	.796		–100	.788	.792	.798	.800	.800	.800
55	100	.733	.750	.764	.775	.781	.781	55	100	.764	.775	.784	.789	.789	.787
	50	.747	.762	.774	.782	.785	.784		50	.773	.782	.788	.791	.791	.790
	0	.762	.773	.782	.788	.788	.786		0	.779	.786	.792	.794	.794	.793
	–50	.773	.782	.787	.791	.791	.789		–50	.784	.792	.795	.796	.797	.797
	–100	.781	.788	.793	.794	.794	.793		–100	.790	.796	.799	.800	.800	.800
60	100	.741	.758	.770	.778	.781	.779	60	100	.770	.779	.787	.788	.786	.781
	50	.755	.768	.779	.783	.783	.780		50	.777	.785	.790	.790	.789	.782
	0	.768	.778	.785	.787	.785	.781		0	.784	.789	.792	.793	.792	.786
	–50	.778	.785	.790	.790	.789	.782		–50	.789	.794	.795	.795	.796	.791
	–100	.785	.790	.793	.793	.792	.787		–100	.794	.797	.798	.799	.800	.796
65	100	.750	.765	.775	.780	.779		65	100	.775	.783	.786	.785	.781	
	50	.762	.774	.780	.782	.780			50	.781	.788	.789	.788	.782	
	0	.774	.782	.785	.785	.781			0	.787	.791	.791	.791	.785	
	–50	.782	.788	.789	.788	.782			–50	.791	.794	.794	.794	.790	
	–100	.788	.791	.792	.791	.786			–100	.796	.797	.797	.798	.796	
70	100	.758	.771	.779	.779	.751		70	100	.779	.783	.784	.782	.751	
	50	.768	.777	.781	.780	.751			50	.784	.788	.787	.783	.751	
	0	.778	.783	.784	.782	.751			0	.789	.790	.789	.785	.751	
	–50	.785	.788	.787	.783	.751			–50	.792	.793	.793	.789	.751	
	–100	.790	.791	.790	.786	.751			–100	.795	.796	.797	.794	.751	
75	100	.765	.777	.779	.773			75	100	.780	.783	.782	.773		
	50	.773	.779	.780	.773				50	.785	.786	.784	.773		
	0	.780	.783	.782	.773				0	.789	.789	.786	.773		
	–50	.786	.787	.784	.773				–50	.792	.792	.789	.773		
	–100	.790	.790	.787	.773				–100	.795	.795	.794	.773		

COST INDEX = 80 kg/min								COST INDEX = 100 kg/min							
		FLIGHT LEVEL								FLIGHT LEVEL					
WEIGHT/WIND								WEIGHT/WIND							
1000kg	kt	290	310	330	350	370	390	1000kg	kt	290	310	330	350	370	390
50	100	.775	.781	.789	.794	.795	.796	50	100	.783	.788	.795	.798	.799	.800
	50	.779	.785	.793	.796	.797	.798		50	.787	.792	.798	.800	.800	.800
	0	.785	.790	.796	.799	.800	.800		0	.791	.796	.800	.800	.800	.800
	–50	.790	.794	.799	.800	.800	.800		–50	.796	.800	.800	.800	.800	.800
	–100	.795	.800	.800	.800	.800	.800		–100	.800	.800	.800	.800	.800	.800
55	100	.779	.786	.791	.794	.794	.793	55	100	.785	.793	.796	.797	.798	.799
	50	.783	.790	.795	.796	.796	.796		50	.789	.795	.798	.799	.800	.800
	0	.787	.794	.797	.798	.799	.800		0	.793	.798	.800	.800	.800	.800
	–50	.792	.797	.800	.800	.800	.800		–50	.798	.800	.800	.800	.800	.800
	–100	.797	.800	.800	.800	.800	.800		–100	.800	.800	.800	.800	.800	.800
60	100	.783	.788	.792	.792	.791	.786	60	100	.789	.795	.795	.796	.797	.792
	50	.787	.792	.794	.795	.795	.790		50	.793	.797	.798	.799	.800	.796
	0	.792	.796	.796	.797	.798	.794		0	.796	.799	.800	.800	.800	.796
	–50	.795	.798	.799	.800	.800	.796		–50	.800	.800	.800	.800	.800	.796
	–100	.799	.800	.800	.800	.800	.796		–100	.800	.800	.800	.800	.800	.796
65	100	.786	.790	.791	.790	.785		65	100	.792	.794	.794	.795	.791	
	50	.789	.793	.793	.793	.788			50	.795	.796	.797	.798	.795	
	0	.794	.795	.796	.796	.793			0	.797	.798	.800	.800	.797	
	–50	.797	.798	.799	.800	.797			–50	.800	.800	.800	.800	.797	
	–100	.800	.800	.800	.800	.797			–100	.800	.800	.800	.800	.797	
70	100	.788	.789	.789	.785	.751		70	100	.792	.793	.793	.790	.751	
	50	.791	.792	.791	.787	.751			50	.795	.795	.796	.793	.751	
	0	.794	.794	.794	.791	.751			0	.797	.798	.799	.798	.751	
	–50	.796	.797	.798	.796	.751			–50	.800	.800	.800	.800	.751	
	–100	.799	.800	.800	.799	.751			–100	.800	.800	.800	.800	.751	
75	100	.788	.788	.785	.773			75	100	.792	.792	.789	.773		
	50	.790	.790	.787	.773				50	.794	.794	.792	.773		
	0	.793	.793	.791	.773				0	.796	.797	.796	.773		
	–50	.796	.796	.795	.773				–50	.799	.800	.800	.773		
	–100	.799	.800	.800	.773				–100	.800	.800	.800	.773		

COST INDEX = 40 kg/min								COST INDEX = 60 kg/min							
		FLIGHT LEVEL								FLIGHT LEVEL					
WEIGHT/WIND								WEIGHT/WIND							
1000kg	kt	290	310	330	350	370	390	1000kg	kt	290	310	330	350	370	390
50	100	.703	.727	.747	.766	.779	.781	50	100	.750	.766	.778	.783	.786	.786
	50	.723	.745	.765	.776	.781	.782		50	.766	.778	.783	.787	.789	.788
	0	.746	.763	.775	.782	.784	.785		0	.779	.783	.788	.791	.791	.791
	–50	.766	.778	.783	.786	.788	.788		–50	.786	.790	.792	.794	.794	.793
	–100	.780	.785	.789	.791	.791	.791		–100	.793	.795	.796	.797	.796	.794
55	100	.719	.738	.758	.774	.781	.780	55	100	.759	.773	.781	.784	.784	.784
	50	.736	.755	.772	.780	.782	.781		50	.771	.781	.784	.787	.787	.786
	0	.756	.770	.779	.783	.783	.783		0	.780	.785	.788	.790	.789	.788
	–50	.771	.780	.784	.786	.786	.786		–50	.787	.790	.792	.793	.792	.790
	–100	.782	.786	.789	.790	.790	.788		–100	.793	.794	.795	.795	.793	.791
60	100	.730	.751	.769	.779	.780	.780	60	100	.767	.777	.782	.783	.782	.782
	50	.745	.764	.777	.781	.781	.780		50	.775	.782	.785	.785	.785	.784
	0	.765	.776	.781	.782	.782	.782		0	.782	.786	.788	.788	.787	.786
	–50	.776	.782	.785	.785	.785	.783		–50	.787	.790	.791	.791	.790	.788
	–100	.784	.787	.789	.789	.788	.786		–100	.793	.794	.794	.793	.791	.789
65	100	.741	.763	.776	.780	.780		65	100	.773	.780	.782	.781	.781	
	50	.755	.772	.780	.781	.780			50	.779	.783	.784	.784	.783	
	0	.772	.779	.782	.781	.781			0	.784	.786	.787	.786	.785	
	–50	.779	.783	.784	.784	.783			–50	.788	.790	.790	.789	.788	
	–100	.785	.787	.787	.787	.786			–100	.792	.793	.793	.791	.789	
70	100	.754	.773	.779	.780	.780		70	100	.777	.781	.781	.781	.781	
	50	.765	.777	.780	.780	.780			50	.781	.783	.783	.782	.781	
	0	.776	.781	.781	.780	.781			0	.784	.785	.785	.784	.783	
	–50	.781	.783	.783	.782	.782			–50	.788	.789	.788	.787	.785	
	–100	.785	.786	.786	.785	.784			–100	.792	.792	.791	.789	.785	
75	100	.767	.777	.780	.780			75	100	.780	.781	.780	.780		
	50	.774	.779	.780	.780				50	.782	.782	.782	.781		
	0	.780	.781	.780	.780				0	.784	.784	.784	.783		
	–50	.782	.782	.782	.781				–50	.787	.787	.786	.785		
	–100	.785	.785	.785	.783				–100	.791	.790	.789	.787		

COST INDEX = 80 kg/min								COST INDEX = 100 kg/min							
		FLIGHT LEVEL								FLIGHT LEVEL					
WEIGHT/WIND								WEIGHT/WIND							
1000kg	kt	290	310	330	350	370	390	1000kg	kt	290	310	330	350	370	390
50	100	.777	.783	.787	.791	.791	.791	50	100	.787	.791	.793	.795	.795	.793
	50	.783	.788	.792	.793	.793	.792		50	.792	.794	.796	.797	.796	.794
	0	.790	.793	.794	.796	.795	.794		0	.796	.798	.798	.799	.798	.796
	–50	.794	.796	.798	.798	.797	.795		–50	.799	.800	.800	.800	.800	.797
	–100	.799	.800	.800	.800	.799	.797		–100	.800	.800	.800	.800	.800	.800
55	100	.779	.784	.788	.790	.789	.788	55	100	.788	.791	.793	.793	.792	.790
	50	.784	.789	.791	.792	.791	.790		50	.792	.794	.795	.795	.793	.791
	0	.790	.793	.794	.794	.793	.791		0	.795	.797	.797	.796	.795	.793
	–50	.794	.796	.796	.796	.794	.792		–50	.799	.799	.799	.798	.796	.794
	–100	.798	.799	.799	.798	.796	.794		–100	.800	.800	.800	.800	.798	.796
60	100	.781	.785	.787	.788	.787	.786	60	100	.788	.791	.792	.791	.790	.788
	50	.786	.789	.790	.790	.789	.787		50	.792	.793	.794	.793	.791	.789
	0	.791	.792	.793	.792	.790	.789		0	.795	.796	.796	.794	.792	.790
	–50	.794	.795	.795	.794	.792	.790		–50	.798	.798	.797	.795	.793	.792
	–100	.797	.798	.797	.795	.793	.792		–100	.800	.800	.799	.797	.795	.794
65	100	.783	.785	.786	.786	.785		65	100	.788	.790	.790	.789	.788	
	50	.786	.788	.789	.788	.787			50	.792	.792	.792	.791	.789	
	0	.790	.791	.791	.790	.788			0	.794	.795	.794	.792	.790	
	–50	.793	.794	.793	.791	.790			–50	.797	.796	.795	.793	.791	
	–100	.796	.796	.795	.793	.791			–100	.799	.798	.797	.795	.793	
70	100	.784	.785	.785	.784	.783		70	100	.788	.789	.788	.787	.785	
	50	.786	.787	.787	.786	.785			50	.791	.791	.790	.789	.785	
	0	.790	.790	.789	.788	.785			0	.793	.793	.792	.790	.785	
	–50	.793	.793	.791	.789	.785			–50	.796	.795	.793	.791	.785	
	–100	.795	.794	.793	.791	.785			–100	.798	.796	.794	.793	.785	
75	100	.783	.784	.783	.782			75	100	.787	.787	.786	.785		
	50	.786	.786	.785	.784				50	.790	.789	.788	.787		
	0	.789	.788	.787	.786				0	.792	.791	.790	.788		
	–50	.792	.791	.789	.788				–50	.794	.793	.791	.788		
	–100	.794	.792	.791	.788				–100	.796	.794	.792	.788		

OPTIMUM AND MAXIMUM ALTITUDES

DEFINITIONS

- Optimum altitude : the altitude at which the airplane covers the maximum distance per kilogram (pound) of fuel (best specific range). It depends on the actual weight and the deviation from ISA.
- Maximum altitude is defined as the lower of :
  - maximum altitude at maximum cruise thrust in level flight and
  - maximum altitude at maximum climb thrust with 300 feet/minute vertical speed.

Note : Definition of the maximum altitude in the FMGC is different (Refer to FCOM 4).

CRUISE LEVEL CHARTS

These charts have been established for a center of gravity at 33 % MAC.
Maximum and optimum altitudes are given for different temperatures at long range speed and M.78.

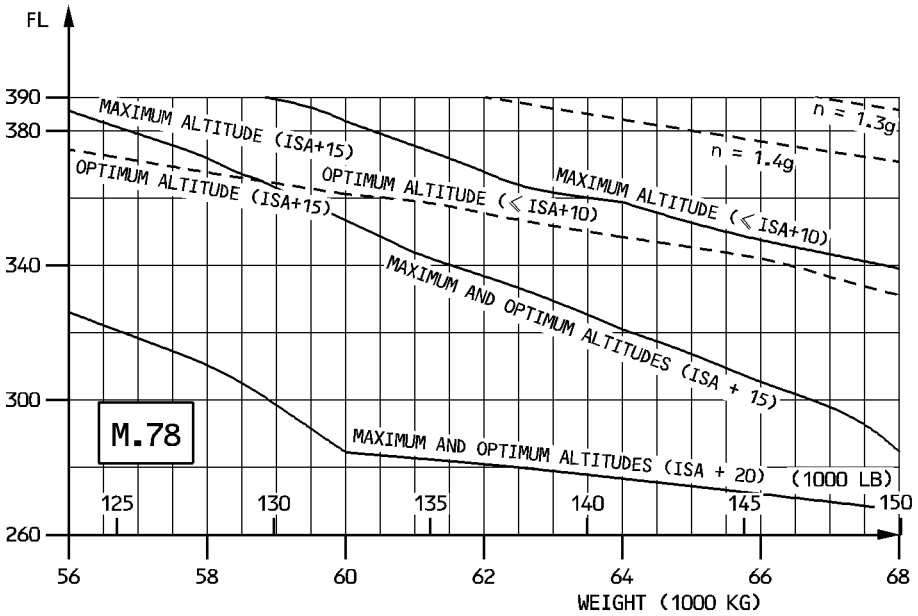
Note : The n = 1.3 g (n = 1.4 g) curve indicates the buffet margin.

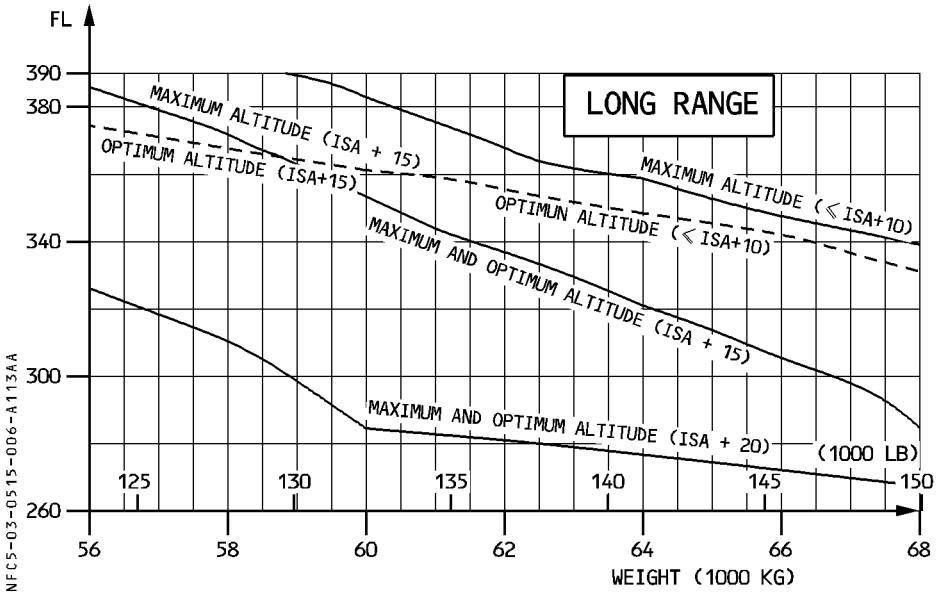
OPTIMUM WEIGHT FOR 4000 FEET STEP CLIMB

STEP CLIMB FROM/TO	WEIGHT (1000 kg/1000 lb)					
	≤ ISA + 10		ISA + 15		ISA + 20	
	LR	M.78	LR	M.78	LR	M.78
310/350	65/144	65/144	60/133	60/133	55/121	53/116
330/370	61/135	62/136	58/128	58/128	54/119	53/117
350/390	57/126	58/129	55/121	55/122	52/114	52/115

BLEED CORRECTIONS

	ENGINE ANTI ICE	TOTAL ANTI ICE
ISA	Max Alt. : – 100 ft Opt Alt. : – 100 ft	Max Alt. : – 400 ft Opt Alt. : – 100 ft
ISA + 10	Max Alt. : – 3500 ft Opt Alt. : – 300 ft	Max Alt. : – 9200 ft Opt Alt. : – 3900 ft
ISA + 15	Max Alt. : – 6200 ft Opt Alt. : – 4300 ft	Max. Alt. : – 7800 ft Opt Alt. – 9100 ft
ISA + 20	Max Alt. : – 3100 ft Opt Alt. : – 4800 ft	Max Alt. : – 4700 ft Opt Alt. : – 4600 ft


FL
390
380
340
300
260
MAXIMUM ALTITUDE (ISA+15)
OPTIMUM ALTITUDE (ISA+15)
OPTIMUM ALTITUDE (≤ ISA+10)
MAXIMUM ALTITUDE (≤ ISA+10)
n = 1.3g
n = 1.4g
MAXIMUM AND OPTIMUM ALTITUDES (ISA + 15)
M.78
MAXIMUM AND OPTIMUM ALTITUDES (ISA + 20)
(1000 LB)
125
130
135
140
145
150
56
58
60
62
64
66
68
WEIGHT (1000 KG)


FL
390
380
340
300
260
LONG RANGE
MAXIMUM ALTITUDE (ISA + 15)
OPTIMUM ALTITUDE (ISA+15)
MAXIMUM ALTITUDE (≤ ISA+10)
OPTIMUN ALTITUDE (≤ ISA+10)
MAXIMUM AND OPTIMUM ALTITUDE (ISA + 15)
MAXIMUM AND OPTIMUM ALTITUDE (ISA + 20)
(1000 LB)
125
130
135
140
145
150
56
58
60
62
64
66
68
WEIGHT (1000 KG)
NFC5-03-0515-006-A113AA

OPTIMUM AND MAXIMUM ALTITUDES

DEFINITIONS

- Optimum altitude : the altitude at which the airplane covers the maximum distance per kilogram (pound) of fuel (best specific range). It depends on the actual weight and deviation from ISA.
- Maximum altitude is defined as the lower of :
  - maximum altitude at maximum cruise thrust in level flight and
  - maximum altitude at maximum climb thrust with 300 feet/minute vertical speed.

Note : Definition of the maximum altitude in the FMGC is different (Refer to FCOM 4).

CRUISE LEVEL CHARTS

These charts have been established for a center of gravity at 33 % MAC.
Maximum and optimum altitudes are given for different temperatures at long range speed and M.78

Note : The n = 1.3 g (1.4 g) curve indicates the buffet margin.

R OPTIMUM WEIGHT FOR 4000 FEET STEP CLIMB

R

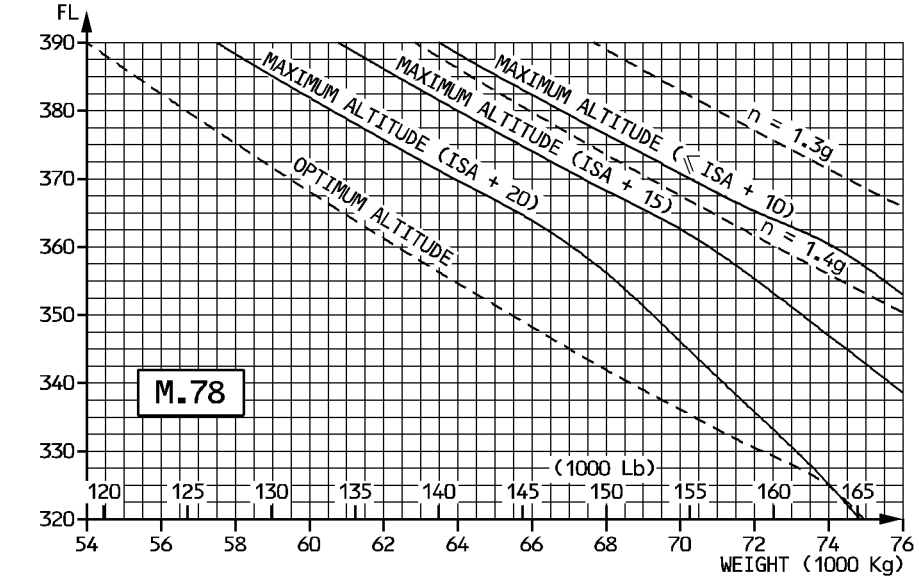
STEP CLIMB FROM/TO	WEIGHT (1000 kg/1000 lb)					
	≤ ISA + 10		ISA + 15		ISA + 20	
	LR	M.78	LR	M.78	LR	M.78
310/350	75/165	75/165	74/163	73/160	72/158	69/152
330/370	68/149	68/149	68/149	67/147	66/145	64/141
350/390	61/134	62/136	61/134	61/134	60/132	58/127

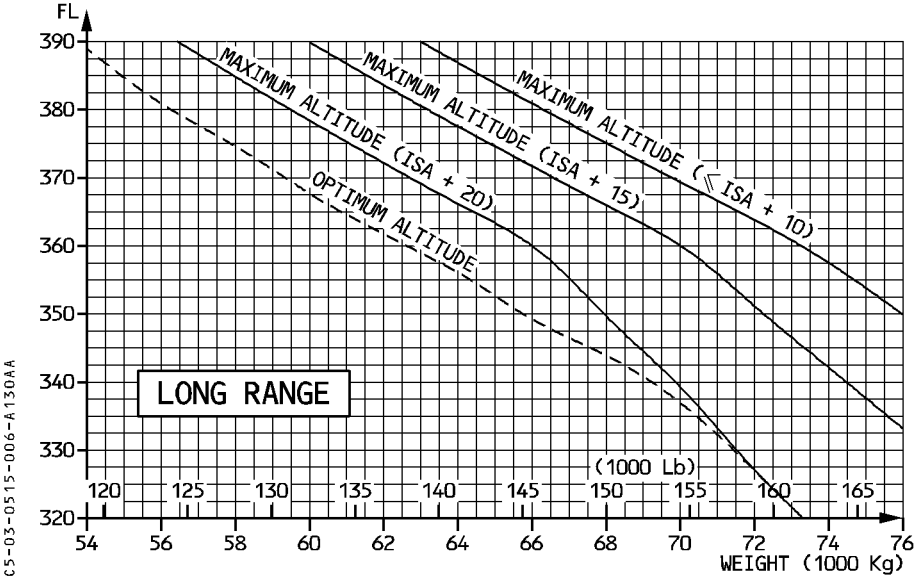
BLEED CORRECTIONS

R

	ENGINE ANTI ICE	TOTAL ANTI ICE
ISA	Max Alt. : – 900 ft Opt Alt. : No corr.	Max Alt. : – 1500 ft Opt Alt. : No corr.
ISA + 10	Max Alt. : – 900 ft Opt Alt. : No corr.	Max Alt. : – 1600 ft Opt Alt. : No corr.
ISA + 15	Max Alt. : – 900 ft Opt Alt. : No corr.	Max Alt. : – 1700 ft Opt Alt. : No corr.
ISA + 20	Max Alt. : – 1700 ft Opt Alt. : – 1500 ft	Max Alt. : – 2900 ft Opt Alt. : – 2900 ft

R





NFC5-03-0515-006-A130AA

OPTIMUM AND MAXIMUM ALTITUDES

DEFINITIONS

- Optimum altitude : the altitude at which the airplane covers the maximum distance per kilogram (pound) of fuel (best specific range). It depends on the actual weight and the deviation from ISA.
- Maximum altitude is defined as the lower of :
  - maximum altitude at maximum cruise thrust in level flight and
  - maximum altitude at maximum climb thrust with 300 feet/minute vertical speed.

Note : Definition of the maximum altitude in the FMGC is different (Refer to FCOM 4).

CRUISE LEVEL CHARTS

These charts have been established for a center of gravity at 33 % MAC.
Maximum and optimum altitudes are given for different temperatures at long range speed and M.78

Note : The n = 1.3 g (n = 1.4 g) curve indicates the buffet margin.

R OPTIMUM WEIGHT FOR 4000 FEET STEP CLIMB

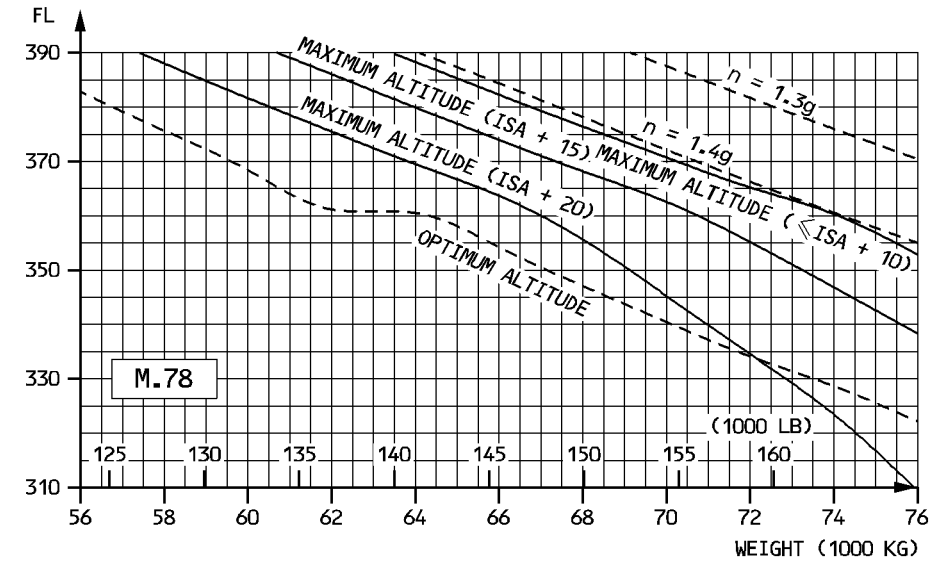
R

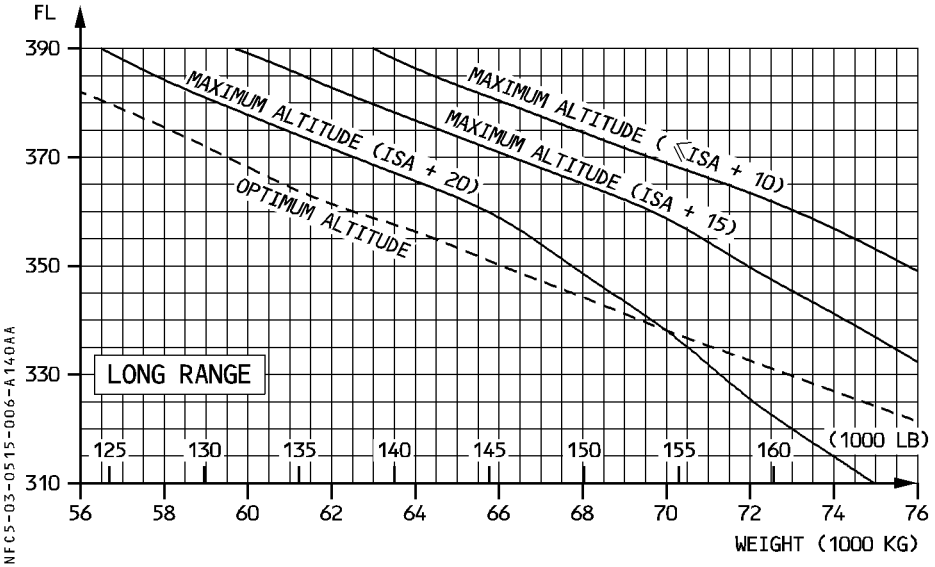
STEP CLIMB FROM/TO	WEIGHT (1000 kg/1000 lb)					
	≤ ISA + 10		ISA + 15		ISA + 20	
	LR	M.78	LR	M.78	LR	M.78
310/350	75/165	75/165	74/163	73/160	70/154	69/152
330/370	68/149	69/152	68/149	67/147	64/141	64/141
350/390	61/134	62/136	61/134	61/134	58/127	57/125

BLEED CORRECTIONS

	ENGINE ANTI ICE	TOTAL ANTI ICE
≤ ISA + 10	Max Alt. : – 900 ft Opt Alt. : No corr.	Max Alt. : – 1700 ft Opt Alt. : No corr.
ISA + 15	Max Alt. : – 1400 ft Opt Alt. : No corr.	Max Alt. : – 2800 ft Opt Alt. : – 1400 ft
ISA + 20	Max Alt. : – 1700 ft Opt Alt. : – 1500 ft	Max Alt. : – 2800 ft Opt Alt. : – 2000 ft

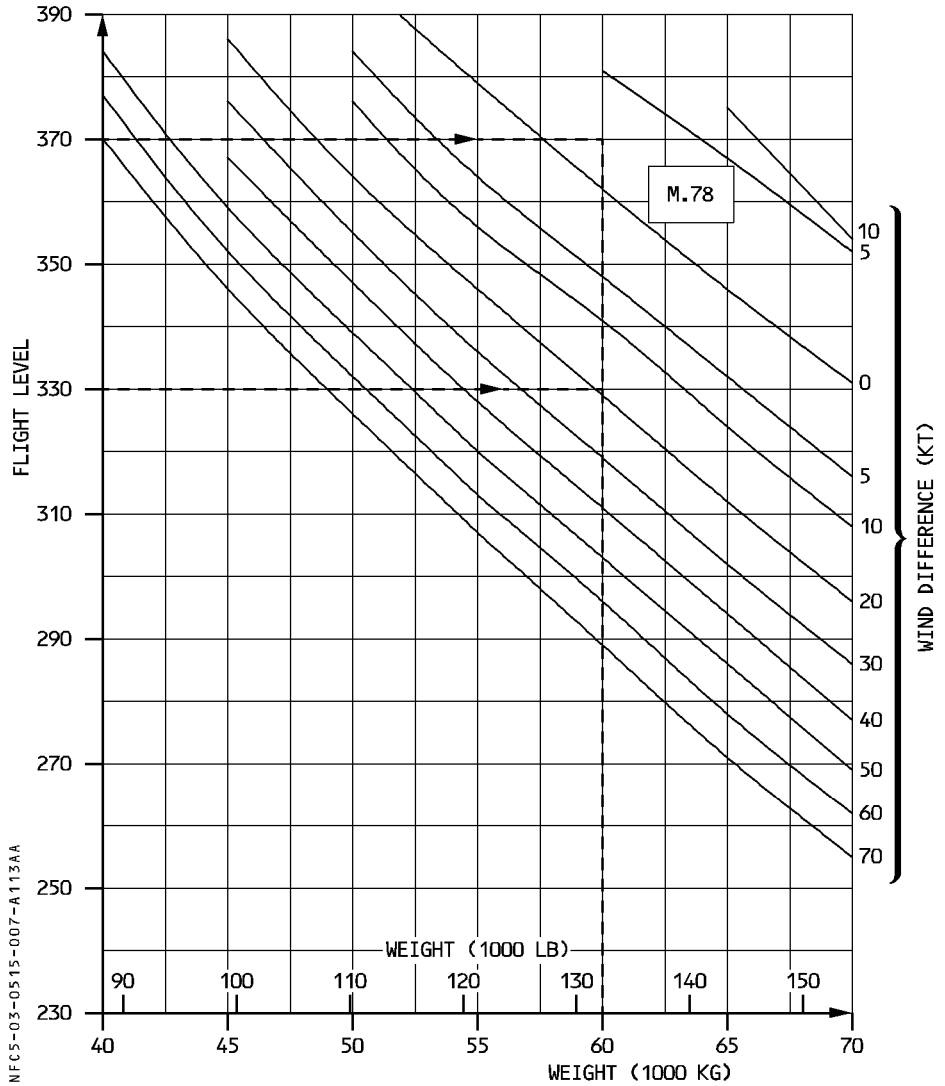
R





NFC5-03-0515-006-A140AA

WIND ALTITUDE TRADE FOR CONSTANT SPECIFIC RANGE



GIVEN : Weight : 60000 kg (132 300 lb)
Wind at FL370 : 10 kt head

FIND : Minimum wind difference to descend to FL330 : (18 + 2) = 20 kt

RESULTS : Descent to FL330 may be considered provided the tail wind at this altitude is more than (20 – 10) = 10 kt.

OPTIMUM ALTITUDE ON SHORT STAGE

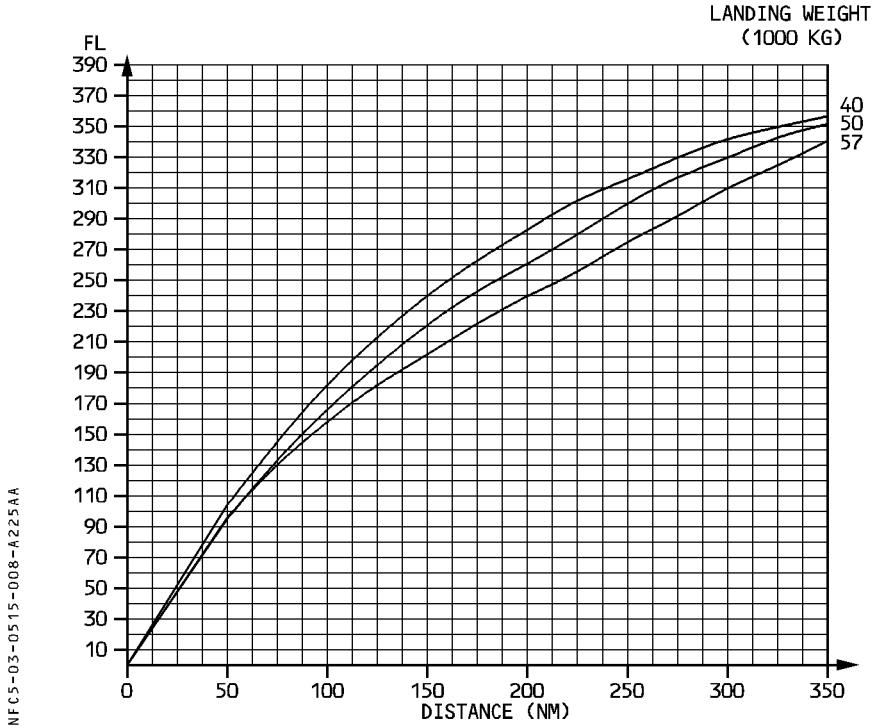
According to the air distance (from brake release point to landing), the cruise flight level is limited by the distance required to perform climb and descent. The graph determines the optimum altitude.

It includes the following profiles:

- Takeoff
- Climb: 250kt/300kt/M.78
- Long range cruise (during at least 5 minutes)
- Descent: M.78/300kt/250kt
- Approach and landing

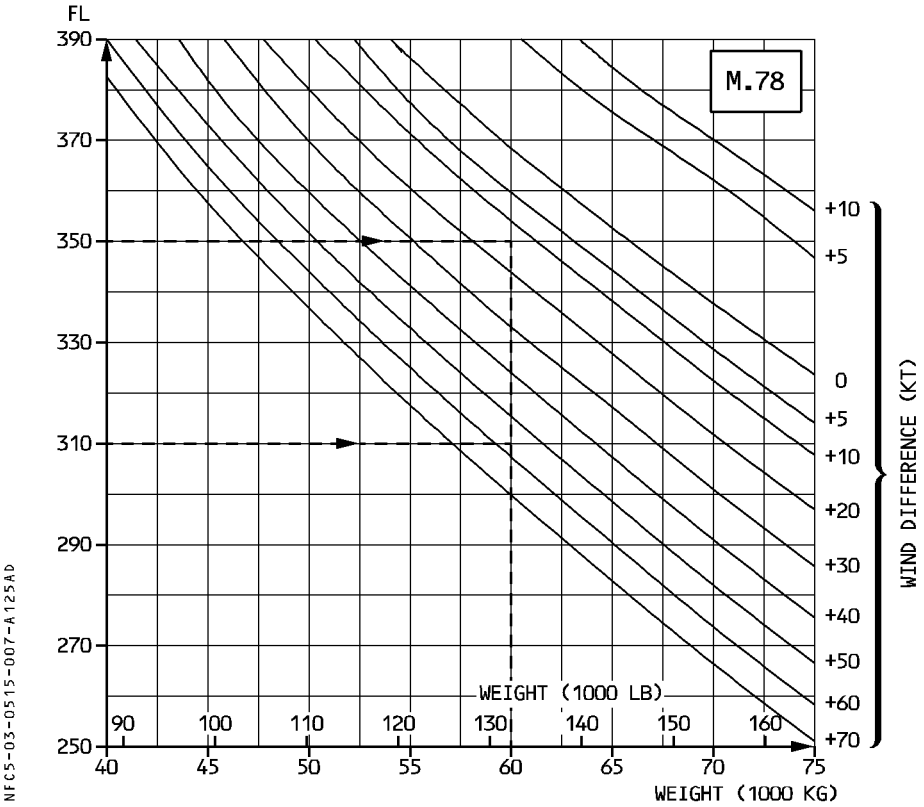
and it is established for:

- ISA
- CG = 33 %
- Normal air conditioning
- Anti ice OFF



R

WIND ALTITUDE TRADE FOR CONSTANT SPECIFIC RANGE



GIVEN : Weight : 60000 kg (132 300 lb)
Wind at FL350 : 10 kt head

FIND : Minimum wind difference to descend to FL310 : (57 – 14) = 43 kt

RESULTS : Descent to FL310 may be considered provided the tail wind at this altitude is more than (43 – 10) = 33 kt.

OPTIMUM ALTITUDE ON SHORT STAGE

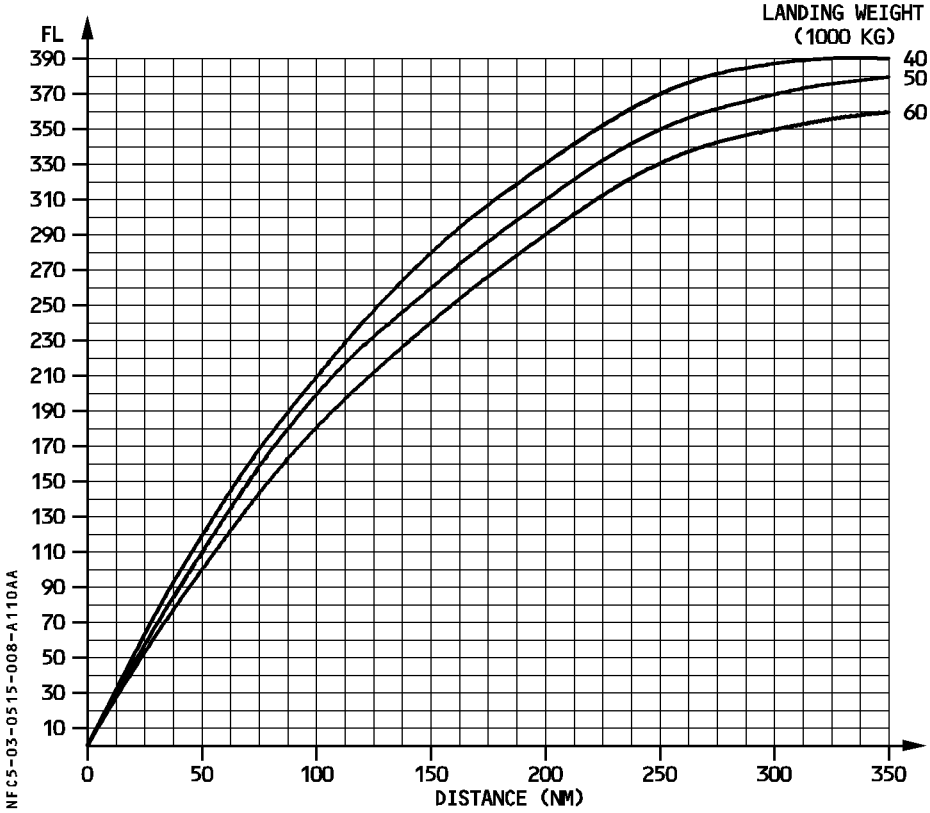
According to the air distance (from brake release point to landing), the cruise flight level is limited by the distance required to perform climb and descent. The graph determines the optimum altitude.

It includes the following profiles:

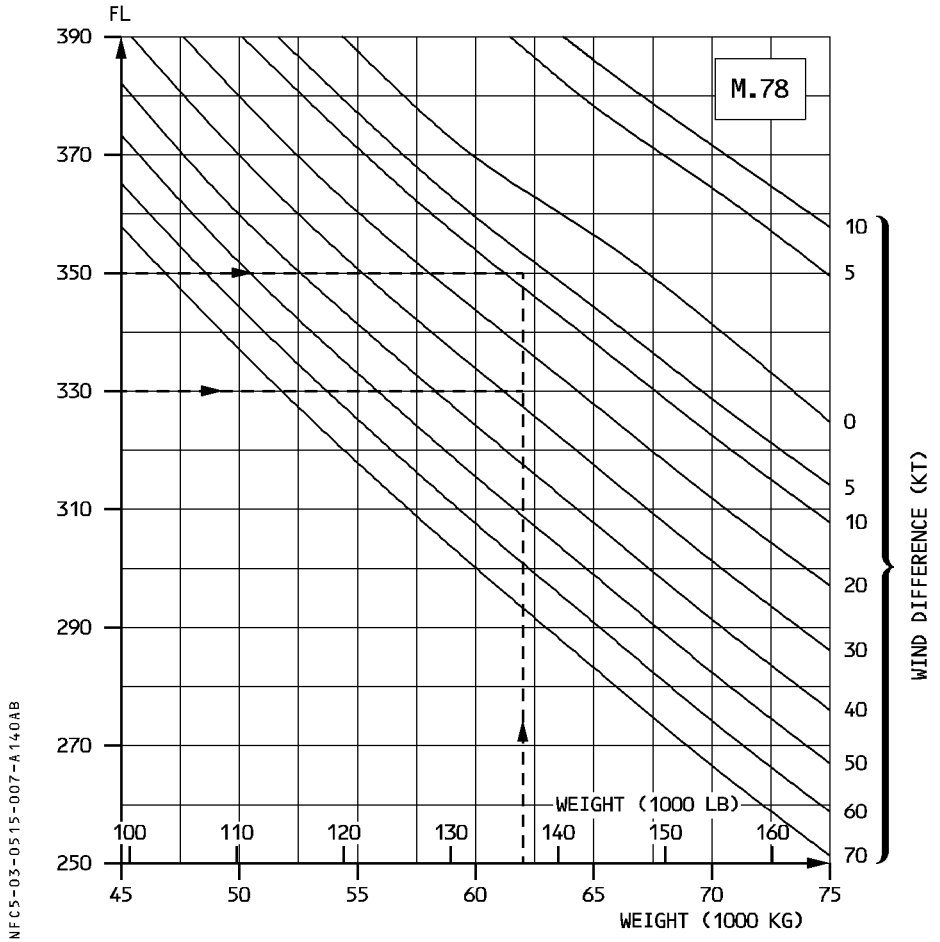
- Takeoff
- Climb: 250KT/300KT/M.78
- Long range cruise (during at least 5 minutes)
- Descent: M.78/300KT/250KT
- Approach and landing

and it is established for:

- ISA
- CG = 33 %
- Normal air conditioning
- Anti ice OFF



WIND ALTITUDE TRADE FOR CONSTANT SPECIFIC RANGE



GIVEN : Weight : 62000 kg (136 700 lb)
Wind at FL350 : 10 kt head

FIND : Minimum wind difference to descend to FL330 : (27 – 7) = 20 kt

RESULTS : Descent to FL330 may be considered provided the tail wind at this altitude is more than (20 – 10) = 10 kt.

OPTIMUM ALTITUDE ON SHORT STAGE

According to the air distance (from brake release point to landing), the cruise flight level is limited by the distance required to perform climb and descent. The graph determines the optimum altitude.

It includes the following profiles:

- Takeoff
- Climb: 250kt/300kt/M.78
- Long range cruise (during at least 5 minutes)
- Descent: M.78/300kt/250kt
- Approach and landing

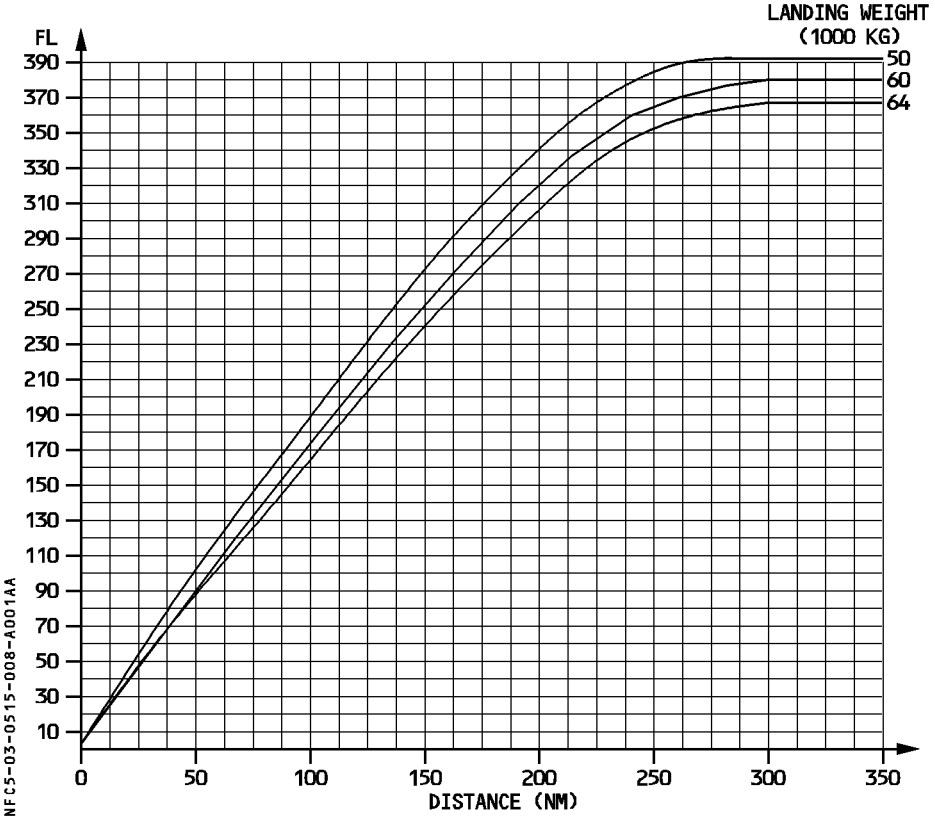
and it is established for:

- ISA
- CG = 33 %

R - Normal air conditioning

- Anti ice OFF

R



CRUISE - M.78

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG=33.0%

EPR
KG/H/ENG
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
50	1.215	.780	1.221	.780	1.231	.780	1.245	.780	1.264	.780	1.291	.780
	1275	302	1173	289	1083	277	1015	264	966	252	927	241
	181.1	462	195.2	458	209.5	454	221.4	450	231.6	447	241.4	447
52	1.217	.780	1.224	.780	1.235	.780	1.251	.780	1.272	.780	1.303	.780
	1279	302	1179	289	1094	277	1031	264	984	252	946	241
	180.5	462	194.1	458	207.3	454	217.9	450	227.4	447	236.4	447
54	1.219	.780	1.227	.780	1.240	.780	1.258	.780	1.282	.780	1.318	.780
	1285	302	1186	289	1110	277	1049	264	1001	252	970	241
	179.7	462	193.0	458	204.4	454	214.3	450	223.4	447	230.6	447
56	1.221	.780	1.231	.780	1.246	.780	1.265	.780	1.293	.780	1.336	.780
	1291	302	1196	289	1126	277	1068	264	1020	252	1004	241
	178.8	462	191.4	458	201.4	454	210.5	450	219.3	447	222.9	447
58	1.223	.780	1.235	.780	1.252	.780	1.273	.780	1.305	.780	1.355	.780
	1297	302	1209	289	1143	277	1086	264	1041	252	1040	241
	177.9	462	189.2	458	198.5	454	207.0	450	215.0	447	215.2	447
60	1.226	.780	1.240	.780	1.258	.780	1.282	.780	1.319	.780	1.376	.780
	1306	302	1225	289	1161	277	1104	264	1066	252	1078	241
	176.8	462	186.8	458	195.3	454	203.6	450	209.8	447	207.5	447
62	1.230	.780	1.245	.780	1.265	.780	1.292	.780	1.336	.780	1.399	.780
	1316	302	1242	289	1180	277	1123	264	1100	252	1119	241
	175.4	462	184.3	458	192.2	454	200.2	450	203.3	447	199.9	447
64	1.235	.780	1.251	.780	1.272	.780	1.303	.780	1.353	.780		
	1330	302	1259	289	1199	277	1144	264	1136	252		
	173.5	462	181.8	458	189.2	454	196.5	450	196.9	447		
66	1.239	.780	1.257	.780	1.280	.780	1.316	.780	1.372	.780		
	1346	302	1277	289	1217	277	1169	264	1175	252		
	171.5	462	179.1	458	186.3	454	192.4	450	190.4	447		
68	1.244	.780	1.262	.780	1.289	.780	1.331	.780	1.393	.780		
	1363	302	1296	289	1236	277	1203	264	1216	252		
	169.4	462	176.5	458	183.5	454	186.9	450	184.0	447		
70	1.249	.780	1.269	.780	1.299	.780	1.347	.780	1.415	.780		
	1380	302	1316	289	1257	277	1239	264	1260	252		
	167.2	462	173.9	458	180.4	454	181.5	450	177.5	447		
72	1.254	.780	1.276	.780	1.310	.780	1.364	.780				
	1399	302	1335	289	1280	277	1278	264				
	165.0	462	171.4	458	177.2	454	176.0	450				
74	1.259	.780	1.284	.780	1.324	.780	1.382	.780				
	1418	302	1354	289	1312	277	1317	264				
	162.8	462	169.1	458	172.9	454	170.7	450				
76	1.265	.780	1.293	.780	1.338	.780	1.401	.780				
	1437	302	1374	289	1348	277	1360	264				
	160.6	462	166.6	458	168.3	454	165.3	450				

LOW AIR CONDITIONING
△FUEL = − 0.4 %

ENGINE ANTI ICE ON
△FUEL = + 3 %

TOTAL ANTI ICE ON
△FUEL = + 5.5 %

10E -08F0A319-131 IAE V2522-A5 12100000C5KG330 0 018590 0 0 1 1.0 .0 .00 0 01 .780 .000 .000 0 FCOM-N0-03-05-15-009-125

CRUISE - M.78

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+10
CG=33.0%

EPR
KG/H/ENG
NM/1000KG
MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
50	1.217	.780	1.223	.780	1.232	.780	1.247	.780	1.265	.780	1.293	.780
	1311	302	1206	289	1114	277	1046	264	995	252	955	241
	179.9	472	193.8	468	208.1	464	219.7	460	229.9	458	239.6	458
52	1.218	.780	1.226	.780	1.237	.780	1.253	.780	1.274	.780	1.306	.780
	1315	302	1213	289	1127	277	1063	264	1014	252	975	241
	179.3	472	192.8	468	205.7	464	216.3	460	225.7	458	234.7	458
54	1.220	.780	1.228	.780	1.242	.780	1.259	.780	1.284	.780	1.320	.780
	1321	302	1220	289	1143	277	1081	264	1032	252	1000	241
	178.5	472	191.7	468	202.9	464	212.6	460	221.8	458	228.8	458
56	1.222	.780	1.233	.780	1.247	.780	1.267	.780	1.295	.780	1.338	.780
	1327	302	1230	289	1160	277	1100	264	1051	252	1035	241
	177.6	472	190.0	468	200.0	464	208.9	460	217.8	458	221.1	458
58	1.225	.780	1.237	.780	1.253	.780	1.275	.780	1.307	.780	1.357	.780
	1334	302	1245	289	1177	277	1119	264	1072	252	1072	241
	176.8	472	187.8	468	197.0	464	205.5	460	213.4	458	213.5	458
60	1.228	.780	1.242	.780	1.260	.780	1.284	.780	1.321	.780	1.378	.780
	1343	302	1261	289	1196	277	1137	264	1099	252	1111	241
	175.6	472	185.4	468	193.9	464	202.2	460	208.2	458	206.0	458
62	1.232	.780	1.247	.780	1.266	.780	1.294	.780	1.338	.780	1.401	.780
	1353	302	1278	289	1215	277	1156	264	1134	252	1153	241
	174.2	472	182.9	468	190.8	464	198.8	460	201.7	458	198.4	458
64	1.236	.780	1.252	.780	1.274	.780	1.305	.780	1.355	.780		
	1369	302	1296	289	1234	277	1178	264	1171	252		
	172.3	472	180.4	468	187.9	464	195.1	460	195.4	458		
66	1.241	.780	1.258	.780	1.282	.780	1.318	.780	1.374	.780		
	1385	302	1315	289	1253	277	1204	264	1211	252		
	170.2	472	177.8	468	185.1	464	190.9	460	189.0	458		
68	1.245	.780	1.264	.780	1.291	.780	1.333	.780	1.395	.780		
	1402	302	1335	289	1272	277	1239	264	1253	252		
	168.2	472	175.2	468	182.3	464	185.5	460	182.6	458		
70	1.250	.780	1.270	.780	1.301	.780	1.349	.780	1.417	.780		
	1420	302	1355	289	1294	277	1276	264	1299	252		
	166.0	472	172.6	468	179.2	464	180.1	460	176.2	458		
72	1.256	.780	1.278	.780	1.312	.780	1.366	.780				
	1439	302	1373	289	1318	277	1316	264				
	163.8	472	170.3	468	176.0	464	174.7	460				
74	1.261	.780	1.286	.780	1.326	.780	1.384	.780				
	1459	302	1393	289	1351	277	1357	264				
	161.6	472	167.9	468	171.6	464	169.4	460				
76	1.266	.780	1.295	.780	1.340	.780	1.403	.780				
	1479	302	1413	289	1388	277	1401	264				
	159.4	472	165.5	468	167.1	464	164.1	460				

LOW AIR CONDITIONING
△FUEL = – 0.4 %

ENGINE ANTI ICE ON
△FUEL = + 3 %

TOTAL ANTI ICE ON
△FUEL = + 5.5 %

10E -08F0A319-131 IAE V2522-A5 12100000C5KG330 0 018590 0 0 1 1.0 .0 .00 0 01 .780 .000 .000 10 FCOM-N0-03-05-15-010-125

CRUISE - M.78 - ALL ENGINES

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

N1 (%)
KG/H/ENG
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
42	76.6 1265 182.5	.780 302 462	76.4 1168 196.0	.780 289 458	76.2 1080 210.0	.780 277 454	76.1 1001 224.6	.780 264 450	76.5 939 238.2	.780 252 447	77.5 893 250.4	.780 241 447
44	76.8 1273 181.4	.780 302 462	76.5 1177 194.5	.780 289 458	76.4 1091 208.0	.780 277 454	76.4 1014 221.6	.780 264 450	76.9 954 234.4	.780 252 447	78.0 911 245.5	.780 241 447
46	76.9 1281 180.2	.780 302 462	76.7 1187 192.9	.780 289 458	76.6 1102 205.9	.780 277 454	76.7 1028 218.6	.780 264 450	77.3 971 230.3	.780 252 447	78.6 931 240.1	.780 241 447
48	77.0 1290 178.9	.780 302 462	76.9 1197 191.2	.780 289 458	76.9 1115 203.4	.780 277 454	77.0 1043 215.5	.780 264 450	77.7 989 226.2	.780 252 447	79.3 955 234.3	.780 241 447
50	77.2 1300 177.5	.780 302 462	77.1 1208 189.4	.780 289 458	77.1 1129 200.9	.780 277 454	77.4 1060 212.1	.780 264 450	78.2 1008 221.9	.780 252 447	80.2 981 228.1	.780 241 447
52	77.4 1311 176.1	.780 302 462	77.3 1221 187.4	.780 289 458	77.4 1143 198.4	.780 277 454	77.8 1077 208.7	.780 264 450	78.8 1030 217.1	.780 252 447	81.1 1010 221.4	.780 241 447
54	77.5 1322 174.7	.780 302 462	77.6 1235 185.3	.780 289 458	77.8 1160 195.6	.780 277 454	78.2 1096 205.2	.780 264 450	79.5 1055 212.1	.780 252 447	82.2 1047 213.7	.780 241 447
56	77.7 1334 173.1	.780 302 462	77.8 1249 183.2	.780 289 458	78.1 1177 192.8	.780 277 454	78.7 1116 201.4	.780 264 450	80.4 1083 206.6	.780 252 447	83.3 1086 205.9	.780 241 447
58	78.0 1347 171.4	.780 302 462	78.1 1265 181.0	.780 289 458	78.5 1194 189.9	.780 277 454	79.2 1139 197.4	.780 264 450	81.3 1114 200.8	.780 252 447	84.6 1130 197.9	.780 241 447
60	78.2 1361 169.6	.780 302 462	78.4 1281 178.6	.780 289 458	78.9 1214 186.9	.780 277 454	79.9 1164 193.1	.780 264 450	82.2 1151 194.3	.780 252 447	86.2 1176 190.1	.780 241 447
62	78.4 1376 167.8	.780 302 462	78.7 1298 176.2	.780 289 458	79.3 1235 183.7	.780 277 454	80.7 1193 188.5	.780 264 450	83.3 1191 187.8	.780 252 447	87.9 1228 182.2	.780 241 447
64	78.7 1392 165.8	.780 302 462	79.1 1317 173.8	.780 289 458	79.8 1258 180.3	.780 277 454	81.5 1224 183.6	.780 264 450	84.4 1235 181.1	.780 252 447		
66	79.0 1409 163.8	.780 302 462	79.4 1336 171.3	.780 289 458	80.5 1284 176.7	.780 277 454	82.4 1262 178.2	.780 264 450	85.9 1281 174.7	.780 252 447		
68	79.3 1426 161.9	.780 302 462	79.8 1358 168.5	.780 289 458	81.2 1312 172.8	.780 277 454	83.4 1301 172.7	.780 264 450				

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2 %	+ 7 %

CRUISE - M.78 - ALL ENGINES

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA+10
CG=33.0%

N1 (%) **MACH**
KG/H/ENG **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
42	78.3	.780	78.1	.780	77.9	.780	77.8	.780	78.2	.780	79.3	.780
	1304	302	1204	289	1115	277	1034	264	970	252	923	241
	180.8	472	194.1	468	208.0	464	222.3	460	235.8	458	248.0	458
44	78.4	.780	78.2	.780	78.1	.780	78.1	.780	78.6	.780	79.8	.780
	1312	302	1214	289	1126	277	1048	264	986	252	941	241
	179.7	472	192.7	468	206.0	464	219.4	460	232.1	458	243.1	458
46	78.6	.780	78.4	.780	78.3	.780	78.4	.780	79.0	.780	80.3	.780
	1321	302	1224	289	1137	277	1062	264	1003	252	962	241
	178.6	472	191.1	468	203.9	464	216.5	460	228.1	458	237.9	458
48	78.7	.780	78.6	.780	78.6	.780	78.8	.780	79.5	.780	81.1	.780
	1330	302	1235	289	1150	277	1077	264	1021	252	986	241
	177.3	472	189.4	468	201.5	464	213.4	460	224.1	458	232.1	458
50	78.9	.780	78.8	.780	78.9	.780	79.1	.780	80.0	.780	81.9	.780
	1340	302	1246	289	1165	277	1094	264	1041	252	1012	241
	176.0	472	187.7	468	199.1	464	210.1	460	219.8	458	226.1	458
52	79.1	.780	79.0	.780	79.1	.780	79.5	.780	80.6	.780	82.9	.780
	1351	302	1259	289	1179	277	1112	264	1064	252	1043	241
	174.6	472	185.7	468	196.6	464	206.8	460	215.1	458	219.4	458
54	79.2	.780	79.3	.780	79.5	.780	79.9	.780	81.3	.780	83.9	.780
	1362	302	1273	289	1196	277	1131	264	1089	252	1080	241
	173.1	472	183.7	468	193.9	464	203.3	460	210.1	458	211.9	458
56	79.4	.780	79.5	.780	79.8	.780	80.4	.780	82.1	.780	85.0	.780
	1374	302	1288	289	1213	277	1152	264	1117	252	1120	241
	171.6	472	181.5	468	191.1	464	199.6	460	204.8	458	204.2	458
58	79.7	.780	79.8	.780	80.2	.780	81.0	.780	83.0	.780	86.3	.780
	1388	302	1304	289	1232	277	1175	264	1149	252	1166	241
	169.9	472	179.3	468	188.3	464	195.6	460	199.1	458	196.3	458
60	79.9	.780	80.1	.780	80.6	.780	81.7	.780	83.9	.780	88.1	.780
	1402	302	1321	289	1251	277	1201	264	1187	252	1213	241
	168.1	472	177.0	468	185.3	464	191.4	460	192.7	458	188.7	458
62	80.1	.780	80.5	.780	81.0	.780	82.5	.780	85.0	.780	89.7	.780
	1417	302	1338	289	1273	277	1230	264	1228	252	1266	241
	166.4	472	174.7	468	182.1	464	186.9	460	186.3	458	180.8	458
64	80.4	.780	80.8	.780	81.6	.780	83.3	.780	86.2	.780		
	1434	302	1357	289	1297	277	1263	264	1273	252		
	164.5	472	172.3	468	178.8	464	182.1	460	179.7	458		
66	80.7	.780	81.2	.780	82.2	.780	84.1	.780	87.7	.780		
	1451	302	1377	289	1323	277	1301	264	1320	252		
	162.5	472	169.8	468	175.3	464	176.7	460	173.3	458		
68	81.0	.780	81.6	.780	82.9	.780	85.0	.780				
	1468	302	1399	289	1352	277	1341	264				
	160.6	472	167.2	468	171.5	464	171.4	460				

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2 %	+ 7 %

CRUISE - M.78

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0%

EPR
KG/H/ENG
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
50	1.217	.780	1.223	.780	1.232	.780	1.246	.780	1.265	.780	1.293	.780
	1280	302	1177	289	1087	277	1019	264	969	252	930	241
	180.3	462	194.4	458	208.7	454	220.5	450	230.7	447	240.5	447
52	1.219	.780	1.226	.780	1.237	.780	1.253	.780	1.274	.780	1.305	.780
	1284	302	1183	289	1099	277	1036	264	987	252	949	241
	179.7	462	193.4	458	206.3	454	217.1	450	226.6	447	235.7	447
54	1.221	.780	1.229	.780	1.242	.780	1.259	.780	1.284	.780	1.320	.780
	1290	302	1190	289	1115	277	1053	264	1005	252	973	241
	178.9	462	192.2	458	203.5	454	213.4	450	222.6	447	229.8	447
56	1.223	.780	1.233	.780	1.248	.780	1.266	.780	1.295	.780	1.337	.780
	1296	302	1200	289	1131	277	1072	264	1023	252	1006	241
	178.1	462	190.6	458	200.6	454	209.7	450	218.6	447	222.3	447
58	1.225	.780	1.237	.780	1.253	.780	1.275	.780	1.307	.780	1.355	.780
	1302	302	1215	289	1148	277	1090	264	1044	252	1041	241
	177.2	462	188.4	458	197.6	454	206.3	450	214.3	447	214.9	447
60	1.228	.780	1.242	.780	1.260	.780	1.284	.780	1.321	.780	1.376	.780
	1311	302	1230	289	1166	277	1108	264	1070	252	1078	241
	176.1	462	186.0	458	194.6	454	202.9	450	209.1	447	207.4	447
62	1.232	.780	1.247	.780	1.266	.780	1.294	.780	1.337	.780	1.399	.780
	1321	302	1247	289	1185	277	1127	264	1103	252	1120	241
	174.7	462	183.5	458	191.5	454	199.5	450	202.9	447	199.8	447
64	1.236	.780	1.252	.780	1.274	.780	1.305	.780	1.354	.780		
	1336	302	1264	289	1203	277	1148	264	1138	252		
	172.8	462	181.0	458	188.5	454	195.9	450	196.6	447		
66	1.241	.780	1.258	.780	1.282	.780	1.318	.780	1.372	.780		
	1352	302	1283	289	1221	277	1173	264	1176	252		
	170.7	462	178.4	458	185.7	454	191.7	450	190.3	447		
68	1.245	.780	1.264	.780	1.291	.780	1.332	.780	1.393	.780		
	1369	302	1302	289	1240	277	1206	264	1216	252		
	168.7	462	175.8	458	182.9	454	186.5	450	183.9	447		
70	1.250	.780	1.270	.780	1.301	.780	1.347	.780	1.415	.780		
	1386	302	1321	289	1261	277	1240	264	1261	252		
	166.5	462	173.2	458	179.9	454	181.2	450	177.4	447		
72	1.256	.780	1.278	.780	1.312	.780	1.364	.780				
	1405	302	1339	289	1284	277	1278	264				
	164.3	462	170.9	458	176.6	454	175.8	450				
74	1.261	.780	1.286	.780	1.325	.780	1.382	.780				
	1424	302	1358	289	1316	277	1318	264				
	162.1	462	168.5	458	172.4	454	170.6	450				
76	1.267	.780	1.295	.780	1.339	.780	1.402	.780				
	1443	302	1378	289	1350	277	1360	264				
	159.9	462	166.1	458	168.0	454	165.3	450				

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = − 0.4 %	△FUEL = + 3 %	△FUEL = + 5.5 %

10F -08F0A320-232 IAE V2527-A5 12100000C5KG330 0 018590 0 0 1 1.0 .0 .0 0 01 .780 .000 .000 0 FCOM-N0-03-05-15-007-140

CRUISE - M.78

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+10
CG=33.0%

EPR
KG/H/ENG
NM/1000KG
MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
50	1.219	.780	1.225	.780	1.234	.780	1.248	.780	1.267	.780	1.295	.780
	1316	302	1211	289	1119	277	1051	264	999	252	958	241
	179.1	472	193.0	468	207.2	464	218.8	460	229.0	458	238.8	458
52	1.220	.780	1.228	.780	1.238	.780	1.254	.780	1.276	.780	1.308	.780
	1321	302	1218	289	1132	277	1067	264	1017	252	978	241
	178.5	472	192.0	468	204.8	464	215.4	460	225.0	458	234.0	458
54	1.222	.780	1.230	.780	1.244	.780	1.261	.780	1.286	.780	1.322	.780
	1327	302	1225	289	1148	277	1086	264	1035	252	1004	241
	177.7	472	190.9	468	202.0	464	211.8	460	221.0	458	228.0	458
56	1.224	.780	1.234	.780	1.249	.780	1.268	.780	1.297	.780	1.339	.780
	1333	302	1236	289	1164	277	1105	264	1054	252	1037	241
	176.9	472	189.2	468	199.1	464	208.1	460	217.1	458	220.6	458
58	1.227	.780	1.239	.780	1.255	.780	1.277	.780	1.309	.780	1.358	.780
	1339	302	1251	289	1182	277	1122	264	1075	252	1073	241
	176.1	472	187.0	468	196.2	464	204.8	460	212.8	458	213.2	458
60	1.230	.780	1.244	.780	1.261	.780	1.286	.780	1.323	.780	1.378	.780
	1348	302	1267	289	1201	277	1141	264	1103	252	1111	241
	174.9	472	184.6	468	193.1	464	201.5	460	207.5	458	205.9	458
62	1.233	.780	1.249	.780	1.268	.780	1.296	.780	1.339	.780	1.401	.780
	1359	302	1284	289	1220	277	1160	264	1137	252	1154	241
	173.5	472	182.2	468	190.1	464	198.1	460	201.3	458	198.3	458
64	1.238	.780	1.254	.780	1.276	.780	1.307	.780	1.356	.780		
	1375	302	1302	289	1238	277	1182	264	1173	252		
	171.5	472	179.7	468	187.2	464	194.5	460	195.1	458		
66	1.242	.780	1.260	.780	1.284	.780	1.320	.780	1.374	.780		
	1391	302	1320	289	1257	277	1209	264	1211	252		
	169.5	472	177.1	468	184.5	464	190.2	460	188.9	458		
68	1.247	.780	1.266	.780	1.293	.780	1.334	.780	1.395	.780		
	1408	302	1340	289	1276	277	1242	264	1253	252		
	167.5	472	174.5	468	181.7	464	185.0	460	182.5	458		
70	1.252	.780	1.272	.780	1.303	.780	1.349	.780	1.417	.780		
	1426	302	1359	289	1298	277	1278	264	1299	252		
	165.4	472	172.0	468	178.6	464	179.9	460	176.1	458		
72	1.257	.780	1.280	.780	1.314	.780	1.366	.780				
	1445	302	1378	289	1322	277	1317	264				
	163.2	472	169.7	468	175.4	464	174.6	460				
74	1.263	.780	1.288	.780	1.327	.780	1.384	.780				
	1465	302	1397	289	1355	277	1357	264				
	161.0	472	167.3	468	171.1	464	169.4	460				
76	1.268	.780	1.297	.780	1.341	.780	1.404	.780				
	1485	302	1418	289	1390	277	1401	264				
	158.8	472	164.9	468	166.8	464	164.1	460				

LOW AIR CONDITIONING
△FUEL = – 0.4 %

ENGINE ANTI ICE ON
△FUEL = + 3 %

TOTAL ANTI ICE ON
△FUEL = + 5.5 %

10F -08F0A1A320-232 IAE V2527–A5 12100000C5KG330 0 018590 0 0 1 1.0 .0 .0 0 01 .780 .000 .000 10 FCOM-N0-03-05-15-008-142

CRUISE - M.78 - ALL ENGINES

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA+15
CG=33.0%

N1 (%) **MACH**
KG/H/ENG **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
42	79.1	.780	78.9	.780	78.7	.780	78.7	.780	79.1	.780	80.1	.780
	1323	302	1223	289	1132	277	1050	264	985	252	937	241
	180.1	476	193.3	473	207.1	469	221.3	465	234.8	463	246.9	463
44	79.3	.780	79.1	.780	78.9	.780	79.0	.780	79.5	.780	80.6	.780
	1331	302	1232	289	1143	277	1064	264	1001	252	956	241
	179.0	476	191.8	473	205.1	469	218.4	465	231.0	463	242.0	463
46	79.4	.780	79.2	.780	79.2	.780	79.3	.780	79.9	.780	81.2	.780
	1340	302	1242	289	1154	277	1078	264	1018	252	977	241
	177.8	476	190.2	473	203.1	469	215.5	465	227.1	463	236.9	463
48	79.5	.780	79.4	.780	79.4	.780	79.6	.780	80.3	.780	82.0	.780
	1349	302	1253	289	1168	277	1094	264	1037	252	1001	241
	176.6	476	188.5	473	200.7	469	212.5	465	223.1	463	231.1	463
50	79.7	.780	79.6	.780	79.7	.780	80.0	.780	80.8	.780	82.8	.780
	1359	302	1265	289	1182	277	1111	264	1057	252	1027	241
	175.2	476	186.8	473	198.2	469	209.2	465	218.9	463	225.1	463
52	79.9	.780	79.9	.780	80.0	.780	80.4	.780	81.4	.780	83.7	.780
	1370	302	1278	289	1197	277	1129	264	1080	252	1059	241
	173.9	476	184.9	473	195.8	469	205.9	465	214.2	463	218.5	463
54	80.1	.780	80.1	.780	80.3	.780	80.8	.780	82.2	.780	84.7	.780
	1382	302	1292	289	1214	277	1148	264	1105	252	1096	241
	172.4	476	182.9	473	193.1	469	202.4	465	209.3	463	211.0	463
56	80.3	.780	80.4	.780	80.7	.780	81.3	.780	83.0	.780	85.8	.780
	1394	302	1307	289	1231	277	1169	264	1134	252	1137	241
	170.9	476	180.8	473	190.3	469	198.8	465	204.0	463	203.4	463
58	80.5	.780	80.7	.780	81.0	.780	81.9	.780	83.9	.780	87.2	.780
	1408	302	1323	289	1250	277	1193	264	1167	252	1183	241
	169.2	476	178.6	473	187.5	469	194.8	465	198.3	463	195.6	463
60	80.7	.780	81.0	.780	81.4	.780	82.5	.780	84.8	.780	88.9	.780
	1423	302	1340	289	1270	277	1219	264	1205	252	1230	241
	167.5	476	176.3	473	184.6	469	190.6	465	192.0	463	188.0	463
62	81.0	.780	81.3	.780	81.9	.780	83.3	.780	85.8	.780		
	1437	302	1358	289	1292	277	1248	264	1246	252		
	165.7	476	174.0	473	181.4	469	186.1	465	185.6	463		
64	81.2	.780	81.6	.780	82.4	.780	84.1	.780				
	1454	302	1377	289	1316	277	1281	264				
	163.8	476	171.7	473	178.1	469	181.3	465				
66	81.5	.780	82.0	.780	83.1	.780						
	1471	302	1397	289	1342	277						
	161.9	476	169.2	473	174.6	469						
68	81.8	.780	82.4	.780	83.8	.780						
	1489	302	1419	289	1371	277						
	160.0	476	166.5	473	170.9	469						

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2 %	+ 7 %

CRUISE - M.78 - ALL ENGINES

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA+20
CG=33.0%

N1 (%) **MACH**
KG/H/ENG **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
42	80.0 1342 179.3	.780 302 481	79.7 1240 192.5	.780 289 477	79.6 1148 206.2	.780 277 474	79.5 1066 220.3	.780 264 470	79.9 1000 233.8	.780 252 468	81.0 951 245.8	.780 241 468
44	80.1 1350 178.2	.780 302 481	79.9 1250 191.0	.780 289 477	79.8 1159 204.2	.780 277 474	79.8 1080 217.4	.780 264 470	80.3 1016 230.1	.780 252 468	81.5 970 241.0	.780 241 468
46	80.2 1359 177.1	.780 302 481	80.1 1260 189.4	.780 289 477	80.0 1171 202.2	.780 277 474	80.1 1094 214.6	.780 264 470	80.7 1033 226.2	.780 252 468	82.1 991 235.9	.780 241 468
48	80.4 1368 175.9	.780 302 481	80.2 1271 187.8	.780 289 477	80.3 1185 199.8	.780 277 474	80.5 1110 211.6	.780 264 470	81.2 1052 222.3	.780 252 468	82.8 1016 230.2	.780 241 468
50	80.5 1379 174.5	.780 302 481	80.5 1283 186.1	.780 289 477	80.5 1199 197.4	.780 277 474	80.8 1127 208.3	.780 264 470	81.7 1072 218.1	.780 252 468	83.7 1042 224.3	.780 241 468
52	80.7 1389 173.2	.780 302 481	80.7 1296 184.2	.780 289 477	80.8 1214 195.0	.780 277 474	81.2 1145 205.1	.780 264 470	82.3 1095 213.4	.780 252 468	84.6 1074 217.7	.780 241 468
54	80.9 1401 171.8	.780 302 481	80.9 1311 182.1	.780 289 477	81.2 1231 192.3	.780 277 474	81.7 1165 201.6	.780 264 470	83.0 1121 208.5	.780 252 468	85.5 1112 210.2	.780 241 468
56	81.1 1413 170.2	.780 302 481	81.2 1325 180.1	.780 289 477	81.5 1249 189.6	.780 277 474	82.1 1186 198.0	.780 264 470	83.9 1150 203.3	.780 252 468	86.6 1153 202.7	.780 241 468
58	81.3 1428 168.6	.780 302 481	81.5 1341 178.0	.780 289 477	81.9 1268 186.8	.780 277 474	82.7 1210 194.0	.780 264 470	84.7 1183 197.6	.780 252 468		
60	81.5 1442 166.8	.780 302 481	81.8 1359 175.7	.780 289 477	82.3 1288 183.9	.780 277 474						
62	81.8 1457 165.1	.780 302 481	82.1 1377 173.4	.780 289 477								
64	82.1 1474 163.2	.780 302 481										
66	82.3 1492 161.3	.780 302 481										
68												

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2 %	+ 7 %

CRUISE - M.78

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+15
CG=33.0%

EPR
KG/H/ENG
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
50	1.217	.780	1.224	.780	1.233	.780	1.247	.780	1.266	.780	1.294	.780
	1329	302	1223	289	1130	277	1062	264	1010	252	969	241
	179.3	476	193.2	473	207.4	469	218.9	465	229.0	463	238.8	463
52	1.219	.780	1.226	.780	1.237	.780	1.254	.780	1.275	.780	1.307	.780
	1333	302	1230	289	1143	277	1079	264	1028	252	989	241
	178.7	476	192.2	473	205.0	469	215.4	465	225.0	463	233.9	463
54	1.221	.780	1.229	.780	1.243	.780	1.260	.780	1.285	.780	1.321	.780
	1339	302	1237	289	1159	277	1097	264	1046	252	1015	241
	177.9	476	191.0	473	202.1	469	211.8	465	221.0	463	227.9	463
56	1.223	.780	1.233	.780	1.248	.780	1.267	.780	1.296	.780	1.339	.780
	1345	302	1248	289	1176	277	1116	264	1066	252	1050	241
	177.1	476	189.3	473	199.2	469	208.1	465	217.0	463	220.3	463
58	1.226	.780	1.238	.780	1.254	.780	1.276	.780	1.308	.780	1.358	.780
	1352	302	1263	289	1194	277	1135	264	1087	252	1088	241
	176.2	476	187.1	473	196.3	469	204.8	465	212.7	463	212.7	463
60	1.229	.780	1.243	.780	1.260	.780	1.285	.780	1.322	.780	1.379	.780
	1361	302	1279	289	1213	277	1154	264	1115	252	1127	241
	175.0	476	184.7	473	193.2	469	201.5	465	207.4	463	205.2	463
62	1.233	.780	1.248	.780	1.267	.780	1.295	.780	1.339	.780		
	1372	302	1296	289	1232	277	1173	264	1151	252		
	173.7	476	182.3	473	190.1	469	198.1	465	201.0	463		
64	1.237	.780	1.253	.780	1.274	.780	1.306	.780	1.356	.780		
	1388	302	1315	289	1251	277	1195	264	1188	252		
	171.7	476	179.7	473	187.3	469	194.4	465	194.6	463		
66	1.241	.780	1.259	.780	1.283	.780	1.319	.780	1.375	.780		
	1404	302	1334	289	1270	277	1222	264	1228	252		
	169.6	476	177.2	473	184.5	469	190.1	465	188.3	463		
68	1.246	.780	1.265	.780	1.292	.780	1.334	.780				
	1422	302	1354	289	1290	277	1258	264				
	167.6	476	174.6	473	181.7	469	184.8	465				
70	1.251	.780	1.271	.780	1.302	.780	1.350	.780				
	1440	302	1374	289	1312	277	1295	264				
	165.5	476	172.0	473	178.6	469	179.4	465				
72	1.256	.780	1.279	.780	1.313	.780	1.367	.780				
	1459	302	1392	289	1336	277	1335	264				
	163.3	476	169.7	473	175.4	469	174.0	465				
74	1.262	.780	1.287	.780	1.327	.780						
	1479	302	1412	289	1371	277						
	161.1	476	167.3	473	171.0	469						
76	1.267	.780	1.296	.780	1.340	.780						
	1499	302	1433	289	1408	277						
	158.9	476	164.9	473	166.5	469						

LOW AIR CONDITIONING
△FUEL = − 0.4 %

ENGINE ANTI ICE ON
△FUEL = + 3 %

TOTAL ANTI ICE ON
△FUEL = + 5.5 %

10E -08F0A319-131 IAE V2522-A5 12100000C5KG330 0 018590 0 0 1 1.0 .0 .00 0 01 .780 .000 .000 15 FCOM-N0-03-05-15-011-135

CRUISE - M.78

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+20
CG=33.0%

EPR
KG/H/ENG
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
50	1.218	.780	1.225	.780	1.234	.780	1.248	.780	1.267	.780	1.295	.780
	1346	302	1240	289	1146	277	1077	264	1024	252	983	241
	178.7	481	192.6	477	206.6	474	218.1	470	228.2	468	237.9	468
52	1.220	.780	1.227	.780	1.238	.780	1.254	.780	1.276	.780	1.308	.780
	1351	302	1246	289	1159	277	1094	264	1043	252	1003	241
	178.1	481	191.5	477	204.2	474	214.6	470	224.2	468	233.1	468
54	1.222	.780	1.230	.780	1.243	.780	1.261	.780	1.286	.780	1.322	.780
	1357	302	1254	289	1176	277	1113	264	1061	252	1030	241
	177.3	481	190.4	477	201.4	474	211.0	470	220.3	468	227.1	468
56	1.224	.780	1.234	.780	1.249	.780	1.268	.780	1.297	.780	1.340	.780
	1363	302	1265	289	1193	277	1133	264	1081	252	1065	241
	176.5	481	188.7	477	198.5	474	207.4	470	216.3	468	219.4	468
58	1.226	.780	1.238	.780	1.255	.780	1.277	.780	1.309	.780		
	1370	302	1280	289	1211	277	1151	264	1103	252		
	175.6	481	186.5	477	195.6	474	204.1	470	212.0	468		
60	1.230	.780	1.243	.780	1.261	.780	1.286	.780	1.323	.780		
	1379	302	1297	289	1230	277	1170	264	1131	252		
	174.5	481	184.0	477	192.5	474	200.8	470	206.7	468		
62	1.233	.780	1.249	.780	1.268	.780	1.296	.780	1.340	.780		
	1391	302	1314	289	1250	277	1190	264	1167	252		
	173.0	481	181.6	477	189.5	474	197.4	470	200.3	468		
64	1.238	.780	1.254	.780	1.275	.780	1.307	.780				
	1407	302	1333	289	1269	277	1212	264				
	171.1	481	179.1	477	186.6	474	193.8	470				
66	1.242	.780	1.260	.780	1.284	.780	1.320	.780				
	1424	302	1352	289	1288	277	1240	264				
	169.0	481	176.5	477	183.9	474	189.4	470				
68	1.247	.780	1.266	.780	1.293	.780	1.335	.780				
	1441	302	1372	289	1308	277	1276	264				
	167.0	481	174.0	477	181.1	474	184.1	470				
70	1.252	.780	1.272	.780	1.303	.780						
	1460	302	1392	289	1330	277						
	164.9	481	171.5	477	178.0	474						
72	1.257	.780	1.280	.780	1.314	.780						
	1479	302	1411	289	1355	277						
	162.7	481	169.1	477	174.8	474						
74	1.262	.780	1.288	.780								
	1499	302	1431	289								
	160.5	481	166.8	477								
76	1.268	.780	1.297	.780								
	1520	302	1452	289								
	158.3	481	164.4	477								

LOW AIR CONDITIONING
△FUEL = – 0.4 %

ENGINE ANTI ICE ON
△FUEL = + 3 %

TOTAL ANTI ICE ON
△FUEL = + 5.5 %

10E -08F0A319-131 IAE V2522-A5 12100000C5KG330 0 018590 0 0 1 1.0 .0 .00 0 01 .780 .000 .000 20 FCOM-N0-03-05-15-012-135

CRUISE - M.78

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+15
CG=33.0%

EPR
KG/H/ENG
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
50	1.219	.780	1.226	.780	1.235	.780	1.249	.780	1.268	.780	1.296	.780
	1334	302	1228	289	1135	277	1066	264	1014	252	972	241
	178.6	476	192.4	473	206.4	469	218.0	465	228.1	463	238.0	463
52	1.221	.780	1.228	.780	1.239	.780	1.255	.780	1.277	.780	1.309	.780
	1339	302	1235	289	1148	277	1083	264	1032	252	992	241
	178.0	476	191.4	473	204.1	469	214.6	465	224.2	463	233.1	463
54	1.223	.780	1.231	.780	1.244	.780	1.262	.780	1.287	.780	1.323	.780
	1345	302	1242	289	1164	277	1102	264	1050	252	1019	241
	177.2	476	190.3	473	201.3	469	211.0	465	220.3	463	227.1	463
56	1.225	.780	1.235	.780	1.250	.780	1.269	.780	1.298	.780	1.340	.780
	1351	302	1254	289	1181	277	1121	264	1069	252	1053	241
	176.4	476	188.5	473	198.4	469	207.3	465	216.3	463	219.7	463
58	1.227	.780	1.239	.780	1.256	.780	1.278	.780	1.310	.780	1.359	.780
	1357	302	1268	289	1199	277	1139	264	1091	252	1089	241
	175.5	476	186.3	473	195.5	469	204.1	465	212.1	463	212.4	463
60	1.231	.780	1.244	.780	1.262	.780	1.287	.780	1.324	.780	1.379	.780
	1366	302	1285	289	1218	277	1157	264	1119	252	1128	241
	174.4	476	183.9	473	192.4	469	200.8	465	206.7	463	205.1	463
62	1.234	.780	1.249	.780	1.268	.780	1.297	.780	1.340	.780		
	1378	302	1302	289	1237	277	1177	264	1153	252		
	172.9	476	181.5	473	189.4	469	197.5	465	200.6	463		
64	1.239	.780	1.255	.780	1.276	.780	1.308	.780	1.357	.780		
	1394	302	1320	289	1256	277	1199	264	1190	252		
	170.9	476	179.0	473	186.6	469	193.8	465	194.4	463		
66	1.243	.780	1.261	.780	1.285	.780	1.321	.780	1.375	.780		
	1410	302	1339	289	1275	277	1226	264	1229	252		
	168.9	476	176.4	473	183.9	469	189.5	465	188.2	463		
68	1.248	.780	1.267	.780	1.294	.780	1.335	.780				
	1428	302	1359	289	1294	277	1261	264				
	166.9	476	173.9	473	181.1	469	184.3	465				
70	1.253	.780	1.273	.780	1.304	.780	1.350	.780				
	1446	302	1378	289	1316	277	1297	264				
	164.8	476	171.4	473	178.1	469	179.2	465				
72	1.258	.780	1.281	.780	1.315	.780	1.367	.780				
	1465	302	1397	289	1340	277	1336	264				
	162.6	476	169.1	473	174.8	469	173.9	465				
74	1.263	.780	1.289	.780	1.328	.780						
	1485	302	1417	289	1374	277						
	160.4	476	166.8	473	170.5	469						
76	1.269	.780	1.298	.780	1.341	.780						
	1505	302	1438	289	1410	277						
	158.3	476	164.4	473	166.2	469						

LOW AIR CONDITIONING
△FUEL = − 0.4 %

ENGINE ANTI ICE ON
△FUEL = + 3 %

TOTAL ANTI ICE ON
△FUEL = + 5.5 %

10F -08F0A320-232 IAE V2527-A5 12100000C5KG330 0 018590 0 0 1 1.0 .0 .0 0 01 .780 .000 .000 15 FCOM-N0-03-05-15-009-140

CRUISE - M.78

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+20
CG=33.0%

EPR
KG/H/ENG
NM/1000KG
MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
50	1.220	.780	1.227	.780	1.235	.780	1.250	.780	1.269	.780	1.297	.780
	1352	302	1245	289	1151	277	1081	264	1028	252	986	241
	178.0	481	191.8	477	205.7	474	217.2	470	227.3	468	237.1	468
52	1.222	.780	1.229	.780	1.240	.780	1.256	.780	1.278	.780	1.310	.780
	1357	302	1251	289	1165	277	1099	264	1046	252	1006	241
	177.4	481	190.8	477	203.3	474	213.8	470	223.5	468	232.3	468
54	1.224	.780	1.232	.780	1.245	.780	1.263	.780	1.288	.780	1.324	.780
	1363	302	1259	289	1181	277	1117	264	1065	252	1033	241
	176.6	481	189.7	477	200.5	474	210.2	470	219.6	468	226.2	468
56	1.226	.780	1.236	.780	1.251	.780	1.270	.780	1.299	.780	1.341	.780
	1369	302	1271	289	1198	277	1137	264	1084	252	1068	241
	175.8	481	187.8	477	197.7	474	206.6	470	215.6	468	218.9	468
58	1.228	.780	1.240	.780	1.256	.780	1.279	.780	1.311	.780		
	1375	302	1286	289	1216	277	1155	264	1106	252		
	174.9	481	185.6	477	194.8	474	203.4	470	211.4	468		
60	1.231	.780	1.245	.780	1.263	.780	1.288	.780	1.325	.780		
	1385	302	1303	289	1235	277	1174	264	1135	252		
	173.8	481	183.3	477	191.7	474	200.1	470	206.0	468		
62	1.235	.780	1.250	.780	1.269	.780	1.298	.780	1.341	.780		
	1397	302	1320	289	1255	277	1193	264	1170	252		
	172.3	481	180.9	477	188.7	474	196.8	470	199.8	468		
64	1.239	.780	1.256	.780	1.277	.780	1.309	.780				
	1413	302	1338	289	1273	277	1216	264				
	170.3	481	178.4	477	186.0	474	193.2	470				
66	1.244	.780	1.261	.780	1.286	.780	1.322	.780				
	1430	302	1358	289	1292	277	1244	264				
	168.3	481	175.8	477	183.2	474	188.8	470				
68	1.248	.780	1.267	.780	1.295	.780	1.336	.780				
	1447	302	1378	289	1312	277	1279	264				
	166.3	481	173.3	477	180.5	474	183.7	470				
70	1.253	.780	1.274	.780	1.305	.780						
	1466	302	1397	289	1334	277						
	164.2	481	170.9	477	177.5	474						
72	1.259	.780	1.282	.780	1.316	.780						
	1485	302	1416	289	1359	277						
	162.0	481	168.6	477	174.2	474						
74	1.264	.780	1.290	.780								
	1505	302	1436	289								
	159.9	481	166.2	477								
76	1.270	.780										
	1526	302										
	157.7	481										

LOW AIR CONDITIONING
△FUEL = – 0.4 %

ENGINE ANTI ICE ON
△FUEL = + 3 %

TOTAL ANTI ICE ON
△FUEL = + 5.5 %

10F -08F0A320-232 IAE V2527-A5 12100000C5KG330 0 018590 0 0 1 1.0 .0 .0 0 01 .780 .000 .000 20 FCOM-N0-03-05-15-010-140

CRUISE - LONG RANGE - ALL ENGINES

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

N1 (%)
KG/H/ENG
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL200		FL230		FL250		FL270	
42	55.3 892 145.7	.407 225 260	59.4 885 164.2	.464 233 291	65.3 935 182.7	.556 254 342	65.9 860 197.9	.561 241 340	66.0 807 208.8	.560 231 337	66.4 768 218.3	.562 222 335
44	55.9 913 143.5	.410 227 262	59.8 902 161.7	.466 234 292	65.9 958 179.9	.561 257 345	66.3 872 195.4	.562 242 341	66.3 816 205.7	.558 230 336	67.0 792 213.4	.566 224 338
46	57.3 960 141.2	.425 235 271	60.3 921 159.3	.468 235 293	66.2 968 178.0	.561 257 345	66.5 882 192.8	.560 241 340	66.9 839 201.4	.561 232 338	67.7 819 208.4	.572 226 341
48	59.9 1059 139.9	.464 257 296	61.0 947 156.6	.474 238 297	66.5 979 176.1	.561 257 345	66.8 891 190.1	.558 240 339	67.4 862 197.2	.565 233 340	68.8 859 203.0	.584 231 349
50	60.2 1073 138.3	.465 257 297	61.6 973 154.0	.479 241 300	66.9 991 174.0	.562 257 345	67.3 912 186.5	.561 241 340	68.1 888 193.0	.570 235 343	70.0 902 197.9	.598 237 357
52	60.7 1092 136.7	.468 259 298	62.2 999 151.5	.483 243 303	67.2 1003 171.9	.561 257 345	67.8 937 182.9	.565 243 343	69.0 925 188.4	.579 239 349	70.8 943 193.3	.611 243 365
54	61.0 1110 135.0	.469 260 300	66.9 1176 149.3	.561 283 351	67.4 1012 169.8	.559 256 344	68.4 961 179.3	.568 245 345	70.0 970 183.8	.592 245 357	71.7 998 188.4	.630 251 376
56	61.4 1126 133.4	.471 260 300	67.2 1187 148.0	.561 283 351	67.7 1026 167.4	.559 256 344	69.1 995 175.5	.575 248 349	70.8 1006 179.7	.601 249 362	72.5 1046 184.0	.645 257 385
58	61.8 1147 131.7	.473 262 302	67.4 1197 146.6	.561 283 351	68.2 1050 164.4	.562 257 345	70.1 1039 171.4	.587 253 356	71.8 1064 175.5	.620 257 373	73.1 1085 180.1	.655 261 391
60	62.3 1170 129.9	.476 264 304	67.7 1210 145.2	.561 283 351	68.7 1074 161.5	.565 259 347	70.8 1075 167.8	.594 256 361	72.6 1122 171.4	.639 266 385	73.7 1122 176.4	.663 265 396
62	62.8 1195 128.1	.480 265 306	68.1 1224 143.8	.562 284 352	69.2 1101 158.6	.569 260 349	71.7 1125 164.0	.608 263 369	73.3 1165 168.0	.650 270 391	74.3 1160 172.9	.672 268 401
64	67.3 1399 126.3	.554 307 353	68.4 1237 142.3	.562 284 352	69.9 1137 155.5	.576 264 354	72.6 1189 160.4	.628 272 381	73.8 1202 164.8	.658 274 396	75.0 1198 169.5	.680 272 406
66	67.9 1437 124.5	.561 311 358	68.6 1247 140.8	.561 283 351	70.6 1176 152.3	.583 267 358	73.4 1242 157.1	.643 278 390	74.4 1240 161.7	.666 277 401	75.6 1237 166.2	.689 276 411
68	68.2 1448 123.6	.560 311 358	68.8 1257 139.3	.559 282 350	71.4 1219 149.2	.592 272 364	73.9 1283 154.3	.652 283 396	75.0 1277 158.7	.673 281 405	76.2 1275 162.9	.696 279 415

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2.5 %	+ 4 %

CRUISE - LONG RANGE - ALL ENGINES

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

N1 (%) **MACH**
KG/H/ENG **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
42	67.3	.572	69.3	.605	70.7	.642	71.7	.664	73.3	.687	75.9	.735
	749	217	764	220	778	224	772	222	773	220	813	226
	226.1	338	232.4	355	239.8	373	248.0	383	254.8	394	259.3	422
44	68.4	.585	70.3	.626	71.4	.652	72.6	.675	74.3	.701	77.2	.760
	788	222	813	228	812	228	808	226	816	225	871	234
	219.8	346	226.1	368	233.6	379	240.8	389	246.6	402	250.2	436
46	69.7	.604	71.1	.639	72.2	.664	73.5	.686	75.7	.733	78.1	.767
	835	229	850	233	850	232	846	230	880	236	907	237
	213.9	357	220.3	375	227.2	386	234.0	396	238.8	420	242.8	440
48	70.6	.620	71.9	.652	73.0	.675	74.3	.698	76.8	.755	79.0	.772
	880	236	891	238	887	236	886	234	936	244	939	238
	208.6	367	214.7	382	221.2	392	227.1	402	231.3	433	235.7	443
50	71.4	.636	72.6	.663	73.8	.685	75.5	.720	77.7	.766	80.1	.777
	925	242	928	242	924	240	941	242	978	248	976	240
	203.2	376	209.4	389	215.6	398	220.5	415	224.6	439	228.5	446
52	72.2	.649	73.3	.672	74.6	.695	76.7	.750	78.4	.771	81.2	.781
	968	248	965	246	963	244	1009	253	1011	249	1013	241
	198.4	384	204.3	394	209.9	404	214.2	432	218.7	442	221.1	448
54	72.9	.658	74.1	.681	75.6	.713	77.6	.764	79.4	.776	82.3	.782
	1005	252	1002	250	1015	251	1058	259	1046	251	1053	242
	193.9	390	199.5	400	204.3	415	208.2	441	212.7	445	213.1	449
56	73.5	.668	74.8	.691	76.8	.743	78.2	.768	80.4	.779	83.5	.784
	1043	256	1040	253	1086	262	1089	260	1081	252	1098	242
	189.5	395	194.8	405	199.0	432	203.4	443	206.7	447	204.8	450
58	74.2	.677	75.5	.701	77.6	.757	79.0	.773	81.3	.781	84.8	.784
	1081	259	1081	257	1136	268	1123	262	1118	253	1141	242
	185.4	401	190.1	411	193.9	440	198.4	446	200.5	448	197.0	449
60	74.9	.686	76.6	.726	78.3	.766	79.8	.776	82.4	.783	86.4	.782
	1119	263	1148	268	1176	271	1156	263	1160	254	1185	242
	181.4	406	185.6	426	189.3	445	193.5	448	193.6	449	189.4	449
62	75.6	.694	77.6	.748	78.9	.769	80.7	.780	83.5	.785	88.0	.781
	1157	266	1212	276	1208	273	1192	264	1205	254	1232	241
	177.5	411	181.2	439	185.2	447	188.5	450	186.7	450	181.8	448
64	76.4	.708	78.3	.761	79.6	.774	81.6	.782	84.7	.784	89.1	.774
	1207	272	1262	282	1242	274	1230	265	1248	254	1274	239
	173.6	419	177.0	447	181.1	450	183.2	451	180.2	450	174.1	444
66	77.5	.739	78.9	.766	80.4	.777	82.6	.783	86.2	.783		
	1287	285	1297	284	1276	276	1272	266	1291	254		
	169.8	437	173.3	450	177.0	452	177.5	451	173.9	449		
68	78.2	.751	79.5	.770	81.2	.780	83.6	.784	87.0	.761		
	1337	290	1330	285	1312	277	1316	266	1290	246		
	166.1	444	169.9	452	172.9	454	171.8	452	169.2	436		

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 3 %	+ 6 %

LONG RANGE CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0%

EPR
KG/H/ENG
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL200		FL23 0		FL250		FL270	
50	1.020	.463	1.031	.490	1.050	.570	1.074	.608	1.090	.618	1.103	.620
	1126	256	1036	247	1058	261	1028	262	979	256	918	246
	131.3	296	148.1	307	165.6	350	179.4	369	190.2	372	201.5	370
52	1.021	.467	1.033	.499	1.055	.584	1.080	.613	1.096	.623	1.109	.621
	1148	258	1071	251	1097	267	1048	265	996	258	934	247
	129.9	298	145.8	312	163.4	359	177.5	372	188.1	375	198.5	371
54	1.023	.472	1.036	.522	1.064	.601	1.086	.617	1.101	.622	1.116	.624
	1172	261	1138	263	1144	276	1065	267	1006	258	954	248
	128.4	301	143.6	327	161.4	369	175.8	375	186.1	375	195.3	373
56	1.025	.476	1.040	.539	1.069	.606	1.092	.621	1.106	.621	1.123	.630
	1197	263	1194	272	1165	278	1083	269	1016	258	980	251
	126.9	304	141.5	338	159.8	372	174.1	377	183.9	374	191.8	376
58	1.027	.481	1.043	.555	1.075	.611	1.099	.625	1.112	.623	1.132	.638
	1225	266	1246	280	1185	280	1100	270	1035	259	1012	254
	125.4	307	139.4	348	158.3	375	172.4	379	181.2	375	188.1	381
60	1.029	.488	1.046	.565	1.080	.615	1.102	.622	1.118	.628	1.141	.647
	1257	270	1285	286	1205	283	1106	269	1059	260	1047	258
	123.9	311	137.8	354	156.9	378	170.7	377	178.4	378	184.4	386
62	1.031	.495	1.049	.574	1.086	.619	1.107	.622	1.125	.634	1.155	.665
	1293	274	1320	290	1222	284	1119	269	1088	263	1098	265
	122.3	316	136.3	360	155.5	380	168.6	377	175.3	382	180.8	397
64	1.033	.508	1.052	.583	1.091	.622	1.112	.625	1.133	.642	1.168	.680
	1344	281	1354	295	1239	286	1140	270	1122	267	1143	272
	120.7	324	134.9	365	154.2	382	166.3	379	172.2	386	177.5	406
66	1.035	.525	1.058	.598	1.097	.625	1.119	.629	1.142	.649	1.179	.691
	1406	291	1403	303	1256	287	1166	272	1156	270	1182	277
	119.2	335	133.4	374	152.9	384	163.8	382	169.1	391	174.5	412
68	1.038	.540	1.064	.605	1.101	.624	1.125	.636	1.155	.667	1.189	.699
	1463	299	1434	306	1266	287	1196	275	1210	278	1215	280
	117.8	345	132.2	379	151.5	384	161.2	386	166.0	402	171.8	417
70	1.041	.552	1.068	.609	1.104	.622	1.133	.643	1.167	.681	1.197	.704
	1515	306	1454	308	1273	286	1231	279	1254	284	1242	282
	116.4	353	131.2	381	150.1	382	158.5	390	163.3	410	169.1	420
72	1.043	.563	1.073	.612	1.109	.625	1.141	.650	1.177	.691	1.205	.713
	1559	312	1473	310	1294	287	1266	282	1293	288	1280	286
	115.2	359	130.2	384	148.3	384	155.9	395	160.8	416	166.2	426
74	1.045	.570	1.077	.616	1.114	.628	1.153	.666	1.186	.699	1.215	.725
	1593	316	1492	312	1318	289	1318	289	1327	292	1328	291
	114.2	364	129.2	386	146.4	386	153.3	404	158.5	421	163.1	433
76	1.047	.577	1.082	.618	1.120	.633	1.164	.680	1.194	.705	1.224	.737
	1627	320	1509	313	1345	291	1367	296	1358	295	1373	296
	113.2	368	128.3	387	144.4	389	151.0	413	156.2	424	160.2	440

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = − 0.4 %	△FUEL = + 3 %	△FUEL = + 5.5 %

10E -08F0A319--131 IAE V2522-A5 12200000C5KG330 0 018590 0 0 1 1.0 .0 .00 0 01 .990 .000 .000 0 FCOM-N0-03-05-15-013-135

LONG RANGE CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0%

EPR
KG/H/ENG
NM/1000KG
MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
50	1.120	.626	1.144	.646	1.182	.687	1.213	.713	1.245	.744	1.290	.777
	878	238	867	236	884	241	881	240	894	240	922	240
	211.0	371	218.5	379	226.1	400	233.5	411	238.6	427	241.8	446
52	1.128	.633	1.160	.667	1.194	.697	1.227	.731	1.259	.755	1.308	.784
	906	241	917	244	915	245	927	246	935	244	956	242
	206.8	375	213.5	391	221.3	405	227.4	422	231.5	433	235.0	450
54	1.138	.642	1.175	.682	1.205	.706	1.237	.739	1.276	.770	1.324	.785
	939	245	958	250	948	248	960	249	982	249	986	243
	202.4	380	209.0	400	216.4	410	221.8	426	224.8	442	228.4	450
56	1.151	.657	1.188	.694	1.218	.723	1.249	.749	1.295	.781	1.343	.786
	982	251	994	255	996	255	1001	253	1024	253	1023	243
	198.1	389	205.0	407	211.1	420	215.7	432	218.9	448	220.5	451
58	1.166	.675	1.197	.699	1.230	.737	1.262	.760	1.311	.785	1.362	.786
	1029	258	1019	257	1039	260	1043	257	1056	254	1059	243
	194.1	399	201.2	410	206.2	428	209.9	438	213.3	450	212.8	451
60	1.178	.688	1.208	.711	1.239	.742	1.279	.774	1.326	.786	1.383	.785
	1069	264	1060	262	1070	262	1092	262	1085	255	1095	243
	190.4	407	196.8	417	201.5	431	204.3	446	207.6	451	205.6	450
62	1.190	.698	1.220	.727	1.249	.751	1.295	.782	1.343	.787	1.405	.785
	1104	268	1107	268	1112	265	1130	265	1122	255	1135	243
	187.1	413	192.5	426	196.5	437	199.5	451	201.1	451	198.3	450
64	1.198	.702	1.230	.739	1.261	.761	1.309	.785	1.360	.786		
	1129	269	1151	273	1154	269	1161	266	1158	255		
	184.0	415	188.4	434	191.7	442	194.9	453	194.7	451		
66	1.208	.714	1.238	.743	1.277	.774	1.323	.786	1.379	.786		
	1172	275	1181	274	1203	274	1190	267	1195	255		
	180.3	423	184.5	436	187.0	450	190.3	453	188.5	451		
68	1.219	.728	1.248	.752	1.292	.782	1.338	.787	1.399	.785		
	1220	280	1223	278	1244	277	1227	267	1233	254		
	176.6	431	180.4	441	182.9	455	184.8	453	182.5	450		
70	1.229	.740	1.259	.760	1.305	.785	1.354	.787	1.422	.784		
	1264	285	1265	281	1276	279	1263	267	1279	254		
	173.2	438	176.4	446	179.0	457	179.4	453	175.9	450		
72	1.236	.742	1.271	.770	1.318	.786	1.371	.786				
	1291	286	1310	285	1306	279	1300	267				
	170.2	439	172.4	452	175.2	457	174.3	453				
74	1.244	.750	1.286	.781	1.331	.786	1.388	.785				
	1331	289	1358	290	1338	279	1337	266				
	166.6	444	168.7	458	170.9	457	169.2	453				
76	1.254	.758	1.298	.784	1.345	.787	1.408	.785				
	1373	293	1391	291	1375	279	1381	266				
	163.2	448	165.5	460	166.4	458	163.8	452				

LOW AIR CONDITIONING
△FUEL = – 0.4 %

ENGINE ANTI ICE ON
△FUEL = + 3 %

TOTAL ANTI ICE ON
△FUEL = + 5.5 %

10E -08F0A319-131 IAE V2522-A5 12200000C5KG330 0 018590 0 0 1 1.0.0 .00 .0 01 .990 .000 .000 0 FCOM-N0-03-05-15-014-135

LONG RANGE CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0%

EPR
KG/H/ENG
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL200		FL230		FL250		FL270	
50	1.013	.439	1.027	.480	1.052	.573	1.079	.615	1.092	.619	1.105	.620
	1011	243	991	241	1073	262	1049	266	983	257	921	246
	138.7	280	151.6	300	164.0	352	177.9	373	189.5	373	200.8	370
52	1.015	.447	1.030	.489	1.063	.603	1.084	.616	1.098	.623	1.111	.622
	1048	247	1032	246	1147	277	1059	266	999	258	939	247
	136.2	286	148.4	306	161.4	370	176.6	374	187.6	375	197.7	371
54	1.017	.455	1.033	.497	1.070	.609	1.089	.618	1.102	.621	1.118	.627
	1087	252	1072	250	1172	280	1071	267	1007	258	964	249
	133.8	291	145.4	312	159.7	374	175.2	375	185.6	374	194.3	374
56	1.019	.463	1.037	.514	1.075	.614	1.094	.621	1.107	.621	1.126	.634
	1124	256	1131	259	1191	282	1087	269	1020	258	992	252
	131.5	296	142.5	322	158.3	377	173.5	377	183.2	374	190.7	378
58	1.022	.471	1.042	.536	1.079	.616	1.100	.623	1.114	.625	1.135	.641
	1162	260	1201	270	1202	283	1100	270	1044	259	1023	255
	129.3	300	139.8	336	157.3	378	171.9	378	180.3	376	187.0	383
60	1.024	.478	1.046	.558	1.083	.617	1.103	.621	1.120	.631	1.144	.650
	1200	264	1275	282	1213	283	1107	268	1071	262	1058	259
	127.1	305	137.1	350	156.2	379	170.1	377	177.4	380	183.4	388
62	1.026	.485	1.051	.575	1.088	.619	1.109	.623	1.128	.638	1.158	.669
	1237	268	1333	291	1227	285	1126	269	1101	265	1110	267
	125.0	309	135.1	360	155.0	380	167.9	378	174.3	384	179.9	399
64	1.029	.492	1.059	.600	1.093	.622	1.115	.627	1.136	.645	1.171	.682
	1279	273	1410	304	1243	286	1151	271	1133	268	1152	273
	122.9	314	133.4	376	153.7	382	165.4	381	171.2	388	176.8	407
66	1.032	.499	1.064	.607	1.098	.625	1.121	.633	1.145	.654	1.181	.692
	1318	276	1441	308	1259	287	1179	274	1170	272	1188	277
	120.9	319	132.0	380	152.4	384	162.9	384	168.2	394	173.9	413
68	1.035	.514	1.069	.612	1.102	.623	1.128	.639	1.159	.671	1.191	.700
	1381	285	1462	310	1267	286	1209	277	1222	280	1220	280
	118.9	328	131.0	383	151.1	383	160.3	388	165.3	404	171.2	418
70	1.038	.531	1.073	.615	1.106	.623	1.135	.646	1.170	.683	1.198	.703
	1448	294	1479	311	1279	286	1243	280	1264	285	1244	282
	117.0	339	130.1	385	149.5	383	157.7	392	162.6	411	168.6	419
72	1.042	.547	1.076	.616	1.111	.627	1.144	.654	1.179	.692	1.207	.714
	1515	303	1490	312	1304	288	1280	284	1300	289	1287	286
	115.2	349	129.4	386	147.6	385	155.1	397	160.2	417	165.5	426
74	1.046	.564	1.080	.617	1.116	.631	1.156	.671	1.188	.699	1.217	.726
	1586	313	1501	313	1332	290	1334	291	1333	292	1334	292
	113.6	360	128.7	386	145.6	388	152.6	407	157.9	421	162.4	433
76	1.049	.577	1.084	.619	1.122	.636	1.167	.682	1.195	.704	1.226	.737
	1641	321	1515	314	1361	293	1377	297	1361	294	1378	296
	112.3	369	127.9	388	143.6	391	150.3	414	155.7	424	159.6	440

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = − 0.3 %	△FUEL = + 2 %	△FUEL = + 5 %

10F -08F0A320-232 IAE V2527-A5 12200000C5KG330 0 018590 0 0 1 1.0 .0 .0 0 01 .990 .000 .000 0 FCOM-N0-03-05-15-011-140

LONG RANGE CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG=33.0%

EPR
KG/H/ENG
NM/1000KG
MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
50	1.122	.629	1.147	.650	1.184	.689	1.215	.714	1.247	.743	1.291	.777
	887	240	877	237	889	242	885	240	897	239	925	240
	209.9	372	217.4	381	225.2	401	232.6	412	237.6	426	241.0	446
52	1.131	.636	1.163	.670	1.195	.696	1.229	.732	1.260	.755	1.310	.784
	916	243	925	245	917	244	931	246	939	244	960	242
	205.6	377	212.6	393	220.6	405	226.5	422	230.5	433	234.3	450
54	1.141	.645	1.177	.684	1.207	.707	1.239	.738	1.279	.771	1.326	.785
	948	246	964	251	954	249	964	249	988	249	989	243
	201.3	382	208.2	401	215.5	411	220.8	426	223.8	442	227.6	450
56	1.155	.662	1.189	.694	1.220	.723	1.250	.749	1.297	.782	1.344	.787
	993	253	997	255	1000	255	1005	253	1028	253	1026	243
	197.1	392	204.3	407	210.3	421	214.8	432	218.1	448	219.9	451
58	1.169	.677	1.198	.698	1.231	.735	1.263	.760	1.313	.785	1.363	.787
	1037	259	1021	256	1041	259	1047	257	1059	254	1063	243
	193.2	401	200.5	410	205.4	428	209.0	438	212.7	451	212.4	452
60	1.181	.689	1.210	.712	1.241	.742	1.281	.775	1.327	.786	1.384	.787
	1075	264	1066	262	1075	262	1097	262	1089	255	1101	244
	189.7	408	196.0	418	200.7	431	203.5	447	207.0	451	205.1	452
62	1.191	.698	1.221	.727	1.251	.751	1.297	.782	1.344	.787	1.407	.786
	1108	268	1112	268	1116	265	1134	265	1126	255	1140	243
	186.5	413	191.7	427	195.7	437	198.8	451	200.5	451	197.8	451
64	1.199	.701	1.232	.738	1.263	.761	1.311	.786	1.361	.787		
	1132	269	1153	272	1158	269	1165	267	1161	255		
	183.3	415	187.7	433	190.9	442	194.3	453	194.4	451		
66	1.210	.715	1.240	.743	1.279	.775	1.324	.786	1.381	.788		
	1179	275	1186	274	1210	275	1194	267	1201	255		
	179.5	423	183.8	436	186.3	451	189.7	453	188.1	452		
68	1.220	.728	1.250	.752	1.294	.782	1.340	.787	1.401	.787		
	1225	280	1228	278	1248	278	1230	267	1239	255		
	175.9	431	179.6	441	182.3	455	184.4	454	182.1	451		
70	1.230	.739	1.260	.760	1.307	.786	1.355	.787	1.422	.785		
	1268	285	1270	281	1280	279	1267	267	1279	254		
	172.6	438	175.6	446	178.5	457	179.1	454	176.0	450		
72	1.237	.742	1.273	.771	1.320	.786	1.372	.788				
	1296	286	1317	286	1309	279	1306	267				
	169.5	439	171.7	452	174.7	457	173.9	454				
74	1.245	.750	1.288	.781	1.332	.787	1.390	.787				
	1337	289	1363	290	1342	279	1344	267				
	165.9	444	168.1	458	170.5	458	168.8	454				
76	1.255	.758	1.300	.785	1.346	.788	1.410	.786				
	1379	293	1396	291	1379	280	1386	267				
	162.6	448	164.9	460	166.1	458	163.5	453				

LOW AIR CONDITIONING
△FUEL = – 0.3 %

ENGINE ANTI ICE ON
△FUEL = + 2 %

TOTAL ANTI ICE ON
△FUEL = + 5 %

10F -08F0A320-232 IAE V2527-A5 12200000C5KG330 0 018590 0 0 1 1.0 .0 .0 0 01 .990 .000 .000 0 FCOM-N0-03-05-15-01 2-140

CRUISE - LONG RANGE - ALL ENGINES

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA+10
CG=33.0%

N1 (%) **MACH**
KG/H/ENG **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL100		FL150		FL200		FL230		FL250		FL270	
42	56.5	.408	60.7	.466	66.2	.550	67.2	.560	67.4	.559	67.8	.560
	914	225	907	234	941	252	876	241	823	231	783	221
	145.3	265	164.1	298	183.2	345	197.7	347	208.6	343	218.0	341
44	57.2	.412	61.2	.468	67.2	.560	67.6	.560	67.7	.557	68.4	.565
	936	228	924	235	976	256	889	241	834	230	808	223
	143.2	268	161.8	299	179.7	351	195.1	347	205.3	342	213.0	344
46	61.0	.466	61.6	.470	67.5	.560	67.9	.559	68.3	.561	69.2	.570
	1073	258	940	236	987	256	900	241	857	231	836	226
	141.2	303	159.5	300	177.7	351	192.4	346	200.9	344	207.9	347
48	61.1	.464	62.2	.473	67.9	.560	68.1	.557	68.9	.564	70.1	.580
	1077	257	961	238	998	256	909	240	882	233	873	230
	140.0	302	157.0	302	175.7	351	189.7	345	196.6	347	202.5	354
50	61.4	.465	62.7	.476	68.3	.560	68.6	.560	69.5	.569	71.1	.589
	1091	257	985	240	1012	256	932	241	909	235	911	234
	138.5	302	154.4	304	173.5	351	186.0	347	192.3	350	197.1	359
52	61.8	.467	63.4	.481	68.6	.560	69.2	.564	70.3	.577	72.2	.607
	1109	258	1013	242	1023	256	958	243	944	238	965	241
	136.8	304	151.7	307	171.4	351	182.3	349	187.7	354	191.7	370
54	62.1	.468	64.1	.487	68.8	.558	69.8	.567	71.2	.585	73.3	.631
	1125	259	1043	245	1033	255	982	244	982	242	1030	251
	135.2	304	149.0	311	169.2	350	178.6	351	183.0	359	186.6	384
56	62.5	.469	68.4	.559	69.1	.558	70.4	.572	72.3	.598	74.1	.645
	1141	259	1211	282	1049	255	1013	246	1031	248	1078	257
	133.6	305	147.5	357	166.7	350	174.7	354	178.3	368	182.3	393
58	63.0	.472	68.7	.559	69.6	.562	71.3	.581	73.3	.620	74.7	.655
	1163	261	1222	282	1075	257	1054	250	1096	257	1118	261
	131.8	307	146.1	357	163.7	352	170.5	360	173.9	381	178.5	399
60	63.4	.474	69.0	.560	70.1	.564	72.3	.592	74.2	.639	75.3	.664
	1186	262	1236	283	1100	258	1102	256	1156	265	1157	265
	130.0	308	144.6	357	160.7	354	166.4	367	169.9	393	174.9	405
62	63.9	.478	69.4	.560	70.6	.567	73.3	.609	74.9	.650	76.0	.672
	1212	264	1250	283	1126	259	1160	263	1200	270	1196	269
	128.2	311	143.1	358	157.8	355	162.6	377	166.5	400	171.4	410
64	64.5	.482	69.7	.560	71.2	.572	74.2	.629	75.4	.658	76.6	.680
	1242	267	1263	283	1160	262	1226	272	1238	274	1234	272
	126.2	313	141.6	358	154.6	359	159.0	390	163.3	405	168.0	415
66	69.0	.556	69.9	.559	72.1	.582	74.9	.643	76.0	.667	77.2	.689
	1454	308	1274	282	1207	267	1279	279	1277	278	1274	275
	124.3	361	140.1	357	151.2	365	155.8	398	160.3	410	164.7	420
68	69.4	.559	70.1	.558	72.9	.592	75.5	.652	76.6	.675	77.8	.696
	1477	310	1286	282	1254	272	1320	283	1317	281	1313	279
	123.0	363	138.6	356	147.9	371	153.0	404	157.4	415	161.5	424

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2.5 %	+ 4 %

CRUISE - LONG RANGE - ALL ENGINES

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA+10
CG=33.0%

N1 (%) **MACH**
KG/H/ENG **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
42	68.7	.570	70.5	.596	72.2	.638	73.4	.665	75.0	.687	77.6	.732
	763	216	770	216	798	223	798	222	799	220	836	225
	225.8	345	231.9	357	237.8	380	245.3	392	252.2	403	256.8	430
44	69.8	.582	71.5	.614	73.0	.652	74.3	.676	76.0	.701	78.9	.760
	801	221	819	224	839	228	837	226	843	225	899	234
	219.5	352	225.0	368	231.2	388	238.3	399	244.1	411	247.8	446
46	70.8	.593	72.7	.638	73.8	.663	75.2	.687	77.4	.734	79.8	.768
	840	225	877	233	877	232	874	230	911	236	936	237
	213.3	358	218.2	383	225.0	394	231.6	405	236.4	431	240.4	450
48	71.9	.612	73.5	.652	74.7	.674	76.0	.698	78.6	.756	80.8	.772
	893	233	919	238	915	236	915	234	968	244	970	238
	207.1	370	212.6	391	219.1	401	224.9	412	229.0	444	233.5	453
50	73.0	.636	74.2	.662	75.5	.684	77.1	.719	79.4	.766	81.9	.778
	955	242	957	242	952	240	970	242	1010	247	1008	240
	201.3	385	207.4	397	213.5	407	218.4	424	222.5	449	226.3	456
52	73.8	.650	75.0	.672	76.3	.695	78.4	.749	80.2	.771	82.9	.781
	1000	248	995	246	994	244	1040	253	1043	249	1045	241
	196.5	393	202.4	403	207.9	413	212.3	441	216.7	452	219.2	458
54	74.5	.660	75.7	.681	77.3	.713	79.3	.764	81.1	.776	84.0	.782
	1038	252	1033	250	1048	251	1092	259	1079	251	1087	242
	192.0	399	197.7	409	202.4	424	206.2	451	210.8	455	211.2	459
56	75.2	.669	76.5	.691	78.5	.744	80.0	.768	82.1	.779	85.2	.784
	1076	256	1073	253	1122	263	1124	260	1115	252	1133	243
	187.8	404	193.0	414	197.1	442	201.5	453	204.9	457	203.1	460
58	75.9	.677	77.3	.704	79.3	.758	80.7	.773	83.1	.781	86.6	.784
	1114	259	1120	259	1173	268	1158	262	1152	253	1177	242
	183.7	409	188.4	422	192.2	451	196.6	455	198.8	458	195.4	460
60	76.6	.686	78.3	.729	80.1	.766	81.6	.777	84.1	.783	88.3	.783
	1152	263	1188	269	1213	271	1194	263	1197	254	1222	242
	179.9	415	183.9	437	187.6	455	191.8	458	191.9	459	187.9	459
62	77.2	.694	79.3	.749	80.7	.770	82.5	.780	85.2	.785	89.8	.781
	1192	266	1250	276	1246	273	1231	264	1242	254	1270	241
	176.0	419	179.6	449	183.7	458	186.8	460	185.2	460	180.4	458
64	78.0	.708	80.0	.761	81.3	.773	83.4	.782	86.5	.784	90.9	.771
	1244	272	1300	282	1280	274	1268	265	1286	254	1305	238
	172.1	428	175.5	456	179.6	460	181.6	461	178.8	460	173.2	452
66	79.1	.738	80.6	.767	82.1	.777	84.3	.784	88.0	.783		
	1325	284	1337	284	1316	276	1312	266	1330	253		
	168.4	446	171.8	460	175.6	462	176.0	462	172.6	459		
68	79.9	.751	81.2	.770	82.9	.780	85.3	.785	88.7	.757		
	1377	290	1370	285	1352	277	1358	266	1321	244		
	164.8	454	168.5	462	171.5	464	170.4	463	168.0	444		

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 3 %	+ 6 %

LONG RANGE CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+10
CG=33.0%

EPR
KG/H/ENG
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL200		FL230		FL250		FL270	
50	1.020	.463	1.031	.490	1.050	.570	1.075	.608	1.091	.618	1.105	.620
	1153	256	1061	246	1086	261	1055	262	1004	256	942	246
	130.5	301	147.3	313	164.6	357	178.4	376	189.2	380	200.4	378
52	1.022	.467	1.034	.499	1.056	.585	1.082	.613	1.098	.623	1.110	.621
	1177	258	1098	251	1128	268	1075	265	1022	258	959	247
	129.1	304	145.0	318	162.5	366	176.6	380	187.1	383	197.3	379
54	1.024	.472	1.037	.521	1.065	.601	1.088	.617	1.102	.621	1.117	.624
	1201	261	1165	262	1174	276	1094	267	1031	258	980	248
	127.7	307	142.8	333	160.4	377	174.8	382	185.1	382	194.1	380
56	1.025	.476	1.040	.539	1.071	.606	1.094	.622	1.107	.620	1.124	.630
	1226	263	1223	272	1194	278	1112	269	1043	257	1006	250
	126.2	310	140.7	344	158.9	380	173.1	385	182.8	381	190.7	384
58	1.027	.481	1.044	.554	1.076	.610	1.099	.624	1.113	.623	1.133	.638
	1255	266	1277	280	1215	280	1127	270	1062	258	1039	254
	124.7	313	138.6	354	157.5	383	171.4	386	180.1	383	187.0	389
60	1.029	.488	1.047	.565	1.082	.615	1.103	.621	1.119	.627	1.142	.646
	1287	270	1318	286	1234	282	1133	269	1086	260	1074	257
	123.2	317	137.0	361	156.1	385	169.7	385	177.3	385	183.3	394
62	1.031	.495	1.049	.574	1.087	.619	1.108	.622	1.126	.633	1.156	.665
	1324	274	1352	290	1253	284	1149	269	1116	263	1127	265
	121.6	322	135.5	366	154.7	388	167.6	385	174.3	389	179.7	405
64	1.033	.507	1.053	.583	1.093	.622	1.114	.625	1.135	.641	1.169	.679
	1374	281	1389	295	1271	286	1170	270	1150	266	1172	271
	120.0	330	134.1	373	153.3	390	165.3	387	171.2	394	176.5	414
66	1.036	.525	1.060	.599	1.098	.625	1.120	.629	1.143	.649	1.180	.690
	1438	291	1440	303	1289	287	1196	272	1186	270	1212	276
	118.6	341	132.7	382	152.0	392	162.9	390	168.1	399	173.5	421
68	1.038	.539	1.065	.605	1.101	.623	1.127	.635	1.157	.668	1.190	.699
	1497	299	1468	306	1295	286	1228	275	1243	278	1247	280
	117.1	351	131.5	386	150.7	390	160.3	394	165.1	410	170.8	426
70	1.041	.552	1.070	.609	1.105	.622	1.134	.643	1.168	.681	1.197	.702
	1550	306	1489	308	1305	286	1263	278	1288	284	1272	281
	115.7	359	130.5	389	149.2	390	157.6	398	162.4	418	168.2	428
72	1.044	.562	1.074	.612	1.110	.624	1.142	.650	1.179	.691	1.207	.713
	1597	312	1509	310	1326	287	1298	282	1327	288	1316	286
	114.5	366	129.5	391	147.4	391	155.0	402	159.9	424	165.1	435
74	1.046	.569	1.079	.616	1.115	.628	1.154	.666	1.188	.699	1.217	.726
	1630	316	1529	312	1351	289	1353	289	1362	292	1364	291
	113.5	370	128.5	393	145.5	393	152.5	413	157.6	429	162.1	442
76	1.048	.576	1.083	.619	1.121	.632	1.165	.679	1.195	.703	1.226	.737
	1665	320	1547	313	1379	291	1401	295	1391	294	1411	296
	112.5	375	127.7	395	143.6	396	150.1	421	155.4	432	159.2	449

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.4 %	△FUEL = + 3 %	△FUEL = + 5.5 %

10E -08F0A319-131 IAE V2522-A5 12200000C5KG330 0 018590 0 0 1 1.0 .0 .00 0 01 .990 .000 .000 10 FCOM-N0-03-05-15-015-135

LONG RANGE CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+10
CG=33.0%

EPR
KG/H/ENG
NM/1000KG
MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
50	1.121	.626	1.145	.646	1.183	.686	1.215	.713	1.247	.744	1.292	.777
	902	238	891	236	908	241	905	240	921	240	950	240
	209.7	378	217.2	387	224.8	408	232.0	420	236.8	436	240.0	456
52	1.130	.633	1.162	.666	1.195	.695	1.228	.730	1.260	.755	1.310	.784
	931	241	941	244	938	244	952	246	963	243	985	242
	205.6	383	212.2	400	220.1	413	226.0	430	229.8	443	233.3	460
54	1.139	.642	1.176	.682	1.207	.705	1.239	.738	1.279	.770	1.326	.785
	965	245	984	250	975	248	987	249	1013	249	1016	243
	201.1	388	207.8	409	215.0	419	220.2	435	223.1	452	226.6	460
56	1.153	.658	1.189	.694	1.220	.722	1.250	.749	1.297	.781	1.345	.786
	1011	252	1021	255	1024	254	1031	253	1054	253	1054	243
	196.8	398	203.7	416	209.7	430	214.1	441	217.3	458	218.7	461
58	1.167	.675	1.198	.698	1.231	.735	1.263	.759	1.313	.785	1.364	.786
	1058	258	1046	256	1067	259	1074	257	1087	254	1092	243
	192.9	408	200.0	419	204.9	437	208.4	447	211.8	461	211.2	461
60	1.180	.688	1.209	.712	1.241	.742	1.281	.774	1.328	.786	1.385	.785
	1098	263	1091	262	1103	262	1125	262	1118	254	1129	243
	189.3	416	195.6	427	200.1	441	202.9	457	206.1	461	204.1	461
62	1.191	.697	1.221	.726	1.251	.752	1.297	.782	1.345	.786	1.407	.785
	1132	267	1139	268	1145	266	1164	265	1156	255	1169	243
	186.1	421	191.2	436	195.1	447	198.1	461	199.5	461	196.8	460
64	1.198	.700	1.231	.737	1.263	.761	1.312	.785	1.362	.786		
	1156	269	1181	272	1188	269	1196	266	1193	255		
	182.9	423	187.2	442	190.4	452	193.5	463	193.2	461		
66	1.209	.713	1.240	.743	1.279	.774	1.325	.786	1.381	.785		
	1204	274	1215	274	1240	274	1226	267	1231	254		
	179.2	431	183.3	445	185.7	460	188.8	463	187.2	461		
68	1.220	.727	1.249	.751	1.293	.782	1.340	.787	1.401	.784		
	1252	280	1257	278	1279	277	1264	267	1270	254		
	175.5	440	179.1	450	181.7	465	183.4	464	181.2	460		
70	1.230	.739	1.260	.760	1.307	.785	1.356	.787	1.422	.783		
	1297	285	1300	281	1312	279	1302	267	1313	254		
	172.1	447	175.1	455	177.9	467	178.1	464	175.0	459		
72	1.237	.742	1.273	.770	1.320	.786	1.373	.786				
	1327	286	1349	285	1343	279	1340	267				
	169.0	449	171.2	462	174.0	467	173.0	463				
74	1.245	.750	1.288	.781	1.333	.786	1.390	.785				
	1370	289	1397	290	1377	279	1378	266				
	165.5	453	167.6	468	169.7	467	167.9	463				
76	1.255	.758	1.300	.784	1.347	.787	1.410	.785				
	1413	293	1430	291	1416	279	1422	266				
	162.1	458	164.4	470	165.2	468	162.6	463				

LOW AIR CONDITIONING
△FUEL = – 0.4 %

ENGINE ANTI ICE ON
△FUEL = + 3 %

TOTAL ANTI ICE ON
△FUEL = + 5.5 %

10E -08F0A319-131 IAE V2522-A5 12200000C5KG330 0 018590 0 0 1 1.0 .0 .00 0 01 .990 .000 .000 10 FCOM-N0-03-05-15-016-135

LONG RANGE CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+10
CG=33.0%

EPR
KG/H/ENG
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL200		FL230		FL250		FL270	
50	1.013	.439	1.027	.479	1.054	.575	1.081	.615	1.093	.619	1.106	.619
	1035	242	1015	241	1105	263	1077	266	1009	257	946	246
	137.8	285	150.6	306	162.9	360	176.9	381	188.5	380	199.6	378
52	1.015	.447	1.030	.489	1.065	.603	1.085	.616	1.099	.622	1.112	.622
	1073	247	1058	246	1178	277	1087	266	1024	258	964	247
	135.4	290	147.4	312	160.5	378	175.6	382	186.6	382	196.5	379
54	1.017	.455	1.034	.497	1.071	.610	1.090	.618	1.103	.620	1.119	.627
	1111	251	1099	250	1202	280	1099	267	1031	257	989	249
	133.0	295	144.5	317	158.8	382	174.2	383	184.6	381	193.1	382
56	1.020	.463	1.038	.514	1.076	.614	1.096	.622	1.108	.621	1.127	.633
	1150	256	1158	259	1222	282	1115	269	1047	257	1018	252
	130.7	301	141.6	328	157.4	385	172.6	385	182.1	381	189.6	386
58	1.022	.470	1.042	.536	1.080	.616	1.101	.622	1.115	.625	1.136	.641
	1190	260	1231	270	1233	283	1128	269	1071	259	1050	255
	128.5	306	138.9	342	156.4	386	170.9	385	179.3	384	186.0	390
60	1.024	.478	1.047	.558	1.084	.617	1.104	.620	1.122	.630	1.145	.650
	1229	264	1309	282	1244	283	1136	268	1098	262	1086	259
	126.4	311	136.2	356	155.4	386	169.2	384	176.3	387	182.4	396
62	1.027	.485	1.051	.577	1.089	.619	1.110	.623	1.129	.637	1.160	.668
	1269	268	1372	292	1258	284	1155	269	1129	264	1138	267
	124.2	315	134.2	368	154.2	388	166.9	386	173.3	391	178.9	407
64	1.030	.492	1.060	.601	1.094	.622	1.116	.627	1.137	.644	1.172	.681
	1310	272	1449	304	1275	286	1181	271	1162	268	1181	272
	122.1	320	132.5	384	152.9	390	164.5	388	170.3	396	175.8	415
66	1.032	.499	1.066	.608	1.099	.624	1.122	.633	1.147	.654	1.183	.691
	1350	276	1478	308	1290	287	1210	274	1202	272	1219	277
	120.1	324	131.3	388	151.6	391	161.9	392	167.3	402	172.9	421
68	1.035	.513	1.071	.612	1.103	.622	1.129	.639	1.160	.671	1.192	.699
	1412	284	1500	310	1296	286	1241	277	1255	280	1251	280
	118.2	334	130.3	391	150.3	390	159.4	396	164.3	412	170.2	426
70	1.039	.531	1.074	.615	1.107	.622	1.137	.645	1.171	.683	1.199	.701
	1483	294	1517	312	1312	286	1275	280	1297	285	1275	281
	116.3	345	129.4	393	148.6	390	156.8	400	161.7	419	167.6	428
72	1.043	.547	1.078	.616	1.112	.626	1.145	.654	1.181	.692	1.209	.714
	1553	303	1528	312	1338	288	1313	284	1334	289	1323	286
	114.5	356	128.7	393	146.7	392	154.2	405	159.3	425	164.5	435
74	1.047	.565	1.081	.617	1.118	.631	1.158	.670	1.190	.699	1.218	.726
	1627	313	1538	313	1366	290	1368	291	1367	292	1371	292
	112.8	367	128.1	394	144.7	395	151.7	415	157.1	429	161.4	443
76	1.050	.577	1.085	.619	1.123	.636	1.168	.681	1.196	.702	1.228	.737
	1682	321	1553	314	1396	293	1411	296	1394	294	1416	296
	111.6	375	127.2	395	142.8	399	149.5	422	154.9	432	158.6	449

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.3 %	△FUEL = + 2 %	△FUEL = + 5 %

10F -08F0A320-232 IAE V2527-A5 12200000C5KG330 0 018590 0 0 1 1.0 .0 .0 0 01 .990 .000 .000 10 FCOM-N0-03-05-15-013-140

LONG RANGE CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+10
CG=33.0%

EPR
KG/H/ENG
NM/1000KG
MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
50	1.123	.629	1.148	.650	1.186	.688	1.216	.714	1.248	.744	1.293	.777
	911	239	902	237	913	241	910	240	925	239	953	240
	208.6	380	216.1	390	223.9	409	231.1	421	235.8	436	239.3	456
52	1.132	.636	1.165	.669	1.196	.694	1.230	.730	1.262	.755	1.312	.784
	941	243	950	245	941	244	956	246	967	243	989	242
	204.4	385	211.3	401	219.3	413	225.1	430	228.9	443	232.6	460
54	1.142	.645	1.179	.684	1.209	.706	1.240	.737	1.281	.771	1.328	.785
	974	246	991	251	980	248	991	249	1017	249	1019	243
	200.1	390	207.0	410	214.1	420	219.3	435	222.3	452	225.9	460
56	1.156	.663	1.191	.694	1.222	.723	1.252	.749	1.299	.781	1.346	.787
	1023	253	1025	255	1029	255	1035	253	1058	253	1058	243
	195.9	401	203.1	416	208.9	430	213.2	441	216.6	458	218.2	462
58	1.170	.677	1.199	.698	1.233	.734	1.265	.759	1.315	.785	1.366	.787
	1066	259	1050	256	1069	259	1078	257	1091	254	1096	244
	192.1	410	199.3	418	204.1	437	207.5	448	211.2	461	210.7	462
60	1.182	.689	1.211	.713	1.242	.742	1.283	.774	1.329	.786	1.387	.787
	1104	264	1097	262	1107	262	1129	262	1122	255	1134	244
	188.6	416	194.8	427	199.2	441	202.1	457	205.4	461	203.6	462
62	1.192	.696	1.223	.727	1.253	.752	1.299	.782	1.346	.787	1.409	.786
	1135	267	1144	268	1150	266	1168	265	1160	255	1175	243
	185.4	421	190.5	436	194.3	447	197.5	461	199.0	462	196.3	461
64	1.200	.700	1.233	.736	1.264	.761	1.313	.786	1.363	.787		
	1160	268	1183	272	1193	269	1200	267	1197	255		
	182.3	423	186.5	441	189.6	452	192.9	463	192.9	462		
66	1.211	.714	1.241	.743	1.281	.775	1.326	.786	1.383	.787		
	1210	275	1220	274	1245	275	1230	267	1236	255		
	178.5	432	182.5	445	185.0	461	188.3	463	186.8	462		
68	1.222	.728	1.251	.751	1.296	.782	1.342	.787	1.403	.787		
	1258	280	1263	278	1284	277	1268	267	1276	255		
	174.9	440	178.4	450	181.1	465	182.9	464	180.8	461		
70	1.231	.738	1.262	.760	1.309	.785	1.357	.787	1.422	.783		
	1300	284	1306	281	1317	279	1305	267	1313	254		
	171.5	446	174.4	456	177.3	467	177.8	464	175.0	460		
72	1.238	.742	1.275	.771	1.321	.786	1.375	.788				
	1333	286	1356	286	1346	279	1346	267				
	168.3	449	170.5	462	173.6	467	172.6	464				
74	1.247	.750	1.290	.781	1.334	.787	1.392	.787				
	1375	289	1402	290	1382	279	1384	267				
	164.8	453	167.0	468	169.2	468	167.6	464				
76	1.257	.758	1.302	.784	1.348	.788	1.410	.785				
	1419	293	1435	291	1420	280	1422	266				
	161.4	458	163.8	470	164.9	468	162.7	463				

LOW AIR CONDITIONING
△FUEL = – 0.3 %

ENGINE ANTI ICE ON
△FUEL = + 2 %

TOTAL ANTI ICE ON
△FUEL = + 5 %

10F -08F0A320-232 IAE V2527-A5 12200000C5KG330 0 018590 0 0 1 1.0 .0 .0 0 01 .990 .000 .000 10 FCOM-N0-03-05-15-014-140

CRUISE - LONG RANGE - ALL ENGINES

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA+15
CG=33.0%

N1 (%) **MACH**
KG/H/ENG **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL100		FL150		FL200		FL230		FL250		FL270	
42	57.1	.409	61.3	.466	62.9	.480	67.9	.559	68.1	.558	68.5	.560
	924	226	914	234	827	218	885	241	832	230	792	221
	145.2	268	164.2	300	183.3	303	197.5	350	208.3	346	217.7	345
44	57.8	.414	61.7	.467	67.8	.559	68.3	.560	68.4	.556	69.1	.564
	948	228	930	235	985	256	898	241	842	230	817	223
	143.1	271	161.9	301	179.4	354	194.8	350	205.0	345	212.6	347
46	61.5	.465	62.2	.469	68.1	.559	68.5	.558	68.9	.560	69.8	.569
	1079	257	946	236	996	256	909	240	867	231	844	225
	141.3	305	159.6	302	177.4	353	192.1	349	200.5	348	207.4	350
48	61.6	.463	62.7	.472	68.5	.559	68.8	.557	69.6	.564	70.7	.577
	1084	256	968	237	1008	256	919	239	892	233	879	228
	140.1	304	157.0	304	175.3	354	189.3	348	196.1	350	202.0	355
50	61.9	.464	63.3	.475	68.9	.560	69.3	.559	70.2	.568	71.8	.589
	1098	257	992	239	1022	256	943	241	918	234	924	233
	138.6	304	154.4	306	173.2	354	185.6	350	191.8	352	196.2	363
52	62.3	.466	64.0	.480	69.2	.559	69.9	.563	70.9	.574	72.9	.607
	1117	258	1020	242	1034	256	969	242	951	237	980	241
	136.9	306	151.7	309	171.0	354	181.8	352	187.2	356	190.8	374
54	62.7	.467	64.6	.485	69.4	.557	70.4	.565	72.0	.586	74.1	.631
	1133	258	1050	244	1045	255	992	243	998	242	1046	251
	135.2	306	148.9	313	168.8	353	178.1	353	182.2	364	185.8	389
56	63.1	.468	69.1	.559	69.8	.558	71.1	.571	73.0	.599	74.9	.645
	1149	259	1223	282	1061	255	1025	246	1046	248	1094	257
	133.6	307	147.1	360	166.3	353	174.1	357	177.5	371	181.5	397
58	63.5	.471	69.4	.559	70.3	.561	72.0	.581	74.1	.621	75.5	.655
	1171	260	1235	282	1087	257	1069	250	1113	258	1134	261
	131.8	309	145.7	360	163.2	355	169.8	363	173.2	385	177.8	403
60	64.0	.473	69.7	.559	70.7	.563	73.0	.593	75.0	.639	76.1	.664
	1195	262	1249	282	1112	258	1118	256	1172	265	1173	265
	130.0	311	144.2	360	160.2	356	165.7	371	169.2	396	174.2	409
62	64.5	.477	70.0	.560	71.3	.567	74.0	.609	75.7	.650	76.8	.672
	1221	264	1264	283	1141	259	1176	263	1216	270	1212	268
	128.1	313	142.7	361	157.1	358	161.9	381	165.8	403	170.7	414
64	65.1	.481	70.3	.560	71.9	.572	75.0	.629	76.2	.658	77.4	.680
	1252	266	1278	283	1176	262	1243	272	1256	274	1251	272
	126.1	316	141.2	361	153.9	362	158.3	394	162.7	409	167.4	419
66	69.5	.553	70.5	.559	72.8	.582	75.7	.644	76.8	.666	78.0	.688
	1462	307	1289	282	1224	267	1297	279	1295	278	1291	275
	124.1	363	139.6	360	150.5	368	155.2	403	159.7	414	164.1	424
68	70.0	.558	70.8	.558	73.7	.593	76.3	.653	77.4	.674	78.6	.695
	1494	310	1301	282	1273	272	1339	283	1334	281	1330	278
	122.5	366	138.1	359	147.3	375	152.4	408	156.8	418	160.9	428

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2.5 %	+ 4 %

CRUISE - LONG RANGE - ALL ENGINES

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA+15
CG=33.0%

N1 (%) **MACH**
KG/H/ENG **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
42	69.4	.570	71.1	.591	73.0	.639	74.2	.664	75.8	.687	78.4	.729
	772	216	774	215	811	223	810	222	811	220	845	224
	225.4	348	231.4	358	236.7	384	244.2	396	251.0	407	255.8	432
44	70.4	.579	72.3	.615	73.9	.653	75.1	.676	76.9	.701	79.8	.759
	807	219	832	224	852	228	849	226	856	225	913	234
	219.1	354	223.9	373	230.1	392	237.2	403	242.9	416	246.8	450
46	71.5	.591	73.5	.638	74.7	.664	76.0	.686	78.3	.734	80.7	.768
	849	224	890	233	891	232	887	230	925	236	951	237
	212.5	361	217.2	387	223.9	399	230.6	409	235.3	435	239.4	455
48	72.7	.612	74.3	.652	75.5	.674	76.9	.699	79.4	.757	81.6	.772
	906	233	933	238	928	236	931	235	984	244	985	238
	206.2	374	211.6	395	218.1	405	223.8	417	228.0	449	232.5	458
50	73.8	.636	75.0	.662	76.3	.684	78.0	.722	80.3	.766	82.7	.778
	969	242	972	242	966	240	989	243	1026	248	1023	240
	200.4	388	206.4	401	212.6	411	217.4	430	221.5	454	225.4	461
52	74.6	.650	75.8	.672	77.1	.695	79.2	.749	81.1	.771	83.8	.781
	1014	248	1011	246	1009	244	1056	253	1059	249	1060	241
	195.6	397	201.5	407	207.0	418	211.3	447	215.8	457	218.3	463
54	75.3	.660	76.6	.682	78.1	.713	80.2	.764	82.0	.776	84.8	.782
	1054	252	1050	250	1063	251	1109	259	1096	251	1103	242
	191.2	403	196.8	413	201.5	428	205.4	455	210.0	460	210.3	464
56	76.0	.669	77.3	.690	79.3	.743	80.8	.769	83.0	.779	86.0	.784
	1093	256	1088	253	1138	262	1141	260	1132	252	1150	243
	187.0	409	192.2	418	196.3	447	200.6	458	204.1	462	202.3	465
58	76.7	.678	78.1	.703	80.2	.758	81.6	.773	83.9	.781	87.5	.784
	1131	260	1135	258	1190	268	1175	262	1170	253	1194	242
	183.0	414	187.6	426	191.3	456	195.8	460	198.0	463	194.7	465
60	77.4	.686	79.2	.730	80.9	.766	82.4	.777	84.9	.783	89.1	.782
	1170	263	1208	269	1232	271	1213	263	1214	254	1236	242
	179.1	419	183.1	442	186.8	460	191.0	463	191.2	464	187.6	464
62	78.0	.694	80.1	.749	81.5	.770	83.3	.780	86.0	.784	89.8	.742
	1209	266	1268	276	1265	273	1249	264	1261	254	1215	228
	175.3	424	178.9	453	182.9	463	186.1	465	184.6	465	181.0	440
64	78.8	.708	80.9	.761	82.2	.774	84.2	.782	86.8	.771		
	1261	272	1320	282	1300	274	1287	265	1275	249		
	171.4	432	174.7	461	178.9	465	181.0	466	179.5	457		
66	79.9	.737	81.5	.766	83.0	.777	84.6	.769	87.8	.716		
	1342	284	1356	284	1336	276	1296	260	1241	230		
	167.7	450	171.2	464	174.9	467	176.7	458	171.1	425		
68	80.7	.750	82.0	.770	83.8	.780	85.3	.739				
	1396	289	1389	285	1372	277	1293	249				
	164.2	458	167.9	466	170.8	469	170.2	440				

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 3 %	+ 6 %

LONG RANGE CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+15
CG=33.0%

EPR
KG/H/ENG
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL200		FL230		FL250		FL270	
50	1.020	.463	1.032	.489	1.051	.570	1.076	.608	1.092	.618	1.105	.619
	1167	256	1073	246	1098	261	1068	262	1016	256	955	246
	130.2	304	146.9	315	164.1	360	177.9	380	188.7	383	199.8	381
52	1.022	.467	1.034	.499	1.057	.586	1.082	.613	1.098	.622	1.111	.621
	1190	258	1111	251	1144	269	1088	265	1035	258	972	247
	128.7	306	144.6	321	162.0	371	176.1	383	186.6	386	196.7	382
54	1.024	.471	1.037	.521	1.066	.601	1.088	.617	1.102	.620	1.118	.624
	1215	261	1178	262	1189	276	1107	267	1042	257	993	248
	127.3	309	142.4	335	160.0	380	174.4	386	184.7	385	193.6	384
56	1.025	.476	1.040	.539	1.071	.606	1.095	.621	1.107	.620	1.125	.630
	1240	263	1237	272	1209	278	1126	269	1056	257	1020	251
	125.8	312	140.3	347	158.5	383	172.6	389	182.3	385	190.1	388
58	1.027	.481	1.044	.554	1.077	.611	1.100	.623	1.113	.623	1.134	.638
	1269	266	1291	280	1230	280	1140	270	1076	258	1053	254
	124.4	316	138.2	357	157.0	386	170.9	390	179.6	386	186.4	393
60	1.029	.488	1.047	.565	1.082	.615	1.104	.620	1.120	.627	1.143	.646
	1302	270	1333	286	1250	282	1146	268	1100	260	1088	257
	122.8	320	136.6	364	155.6	389	169.3	388	176.8	389	182.8	398
62	1.031	.495	1.050	.574	1.088	.619	1.109	.622	1.127	.633	1.157	.665
	1339	274	1368	290	1268	284	1164	269	1130	263	1142	265
	121.2	325	135.1	370	154.3	391	167.1	389	173.8	393	179.2	409
64	1.034	.507	1.054	.584	1.093	.622	1.114	.624	1.135	.641	1.169	.678
	1390	281	1408	295	1287	286	1184	270	1165	266	1186	271
	119.7	333	133.6	376	152.9	394	164.8	390	170.7	398	176.1	418
66	1.036	.524	1.060	.599	1.098	.625	1.120	.629	1.144	.649	1.181	.690
	1454	290	1460	303	1304	287	1211	272	1201	270	1227	276
	118.2	344	132.3	386	151.6	395	162.4	393	167.6	403	173.1	425
68	1.039	.539	1.066	.605	1.102	.623	1.127	.635	1.158	.668	1.191	.698
	1514	299	1486	306	1310	286	1243	275	1259	278	1262	280
	116.8	353	131.1	390	150.3	394	159.8	397	164.6	414	170.3	430
70	1.041	.551	1.070	.609	1.106	.622	1.135	.643	1.169	.681	1.198	.701
	1567	306	1507	308	1321	286	1279	278	1304	284	1287	281
	115.4	362	130.1	392	148.8	393	157.1	402	162.0	422	167.7	432
72	1.044	.562	1.075	.612	1.110	.624	1.142	.650	1.179	.691	1.207	.713
	1616	312	1527	310	1342	287	1315	282	1344	288	1333	286
	114.2	369	129.2	394	147.0	395	154.6	406	159.5	429	164.7	439
74	1.046	.569	1.079	.616	1.116	.628	1.155	.667	1.188	.699	1.217	.726
	1650	316	1547	312	1368	289	1371	289	1379	292	1382	291
	113.2	373	128.2	397	145.1	397	152.0	417	157.2	434	161.6	447
76	1.048	.576	1.083	.619	1.121	.632	1.166	.679	1.196	.703	1.227	.737
	1685	320	1565	313	1396	291	1419	295	1408	294	1430	296
	112.2	378	127.3	399	143.2	400	149.7	425	154.9	436	158.7	454

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.4 %	△FUEL = + 3 %	△FUEL = + 5.5 %

10E –08F0A319-131 IAE V2522-A5 12200000C5KG330 0 018590 0 0 1 1.0 .0 .00 0 01 .990 .000 .000 15 FCOM-N0-03-05-15-017-135

LONG RANGE CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+15
CG=33.0%

EPR
KG/H/ENG
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
50	1.121	.625	1.146	.646	1.184	.686	1.215	.713	1.248	.744	1.292	.777
	913	238	903	236	920	241	919	240	935	240	963	240
	209.1	382	216.6	391	224.1	412	231.2	425	235.9	441	239.2	461
52	1.130	.632	1.162	.666	1.195	.694	1.229	.730	1.261	.755	1.311	.784
	942	241	953	244	950	244	966	246	978	244	1000	242
	205.0	386	211.7	403	219.5	417	225.2	435	229.0	448	232.5	465
54	1.140	.642	1.177	.682	1.207	.705	1.239	.737	1.280	.771	1.327	.785
	977	245	997	250	987	248	1001	248	1028	249	1031	243
	200.6	392	207.2	413	214.4	423	219.5	439	222.4	457	225.7	465
56	1.154	.658	1.190	.694	1.220	.722	1.251	.748	1.298	.781	1.346	.786
	1025	252	1034	255	1037	254	1045	253	1069	253	1070	243
	196.2	402	203.2	420	209.1	434	213.4	446	216.7	463	217.9	466
58	1.168	.675	1.198	.697	1.232	.735	1.264	.759	1.314	.785	1.365	.786
	1072	258	1059	256	1081	259	1089	257	1103	254	1109	243
	192.4	412	199.4	422	204.2	441	207.6	452	211.1	466	210.4	466
60	1.181	.688	1.210	.712	1.241	.742	1.282	.774	1.328	.785	1.386	.785
	1112	264	1106	262	1118	262	1141	262	1134	254	1145	243
	188.8	420	194.9	431	199.4	446	202.2	461	205.4	466	203.4	466
62	1.191	.697	1.222	.727	1.252	.751	1.298	.782	1.346	.786		
	1147	267	1155	268	1161	266	1180	265	1173	255		
	185.5	426	190.6	440	194.4	451	197.5	466	198.8	466		
64	1.199	.699	1.232	.737	1.264	.761	1.312	.785	1.363	.786		
	1171	268	1197	272	1205	269	1213	266	1211	255		
	182.4	427	186.6	447	189.7	457	192.9	468	192.5	466		
66	1.210	.713	1.240	.743	1.280	.775	1.326	.786	1.382	.785		
	1219	274	1232	274	1258	275	1244	267	1248	254		
	178.6	436	182.7	450	185.0	466	188.1	468	186.6	466		
68	1.220	.727	1.250	.751	1.294	.782	1.341	.786	1.393	.771		
	1268	280	1274	277	1297	277	1282	267	1255	249		
	175.0	444	178.5	455	181.1	470	182.7	469	182.1	457		
70	1.230	.738	1.260	.760	1.308	.785	1.357	.786				
	1314	285	1318	281	1331	279	1321	267				
	171.6	451	174.6	460	177.3	472	177.4	469				
72	1.237	.742	1.274	.771	1.320	.786	1.374	.786				
	1345	286	1368	285	1361	279	1359	267				
	168.5	453	170.7	467	173.5	472	172.3	468				
74	1.246	.750	1.288	.781	1.334	.786	1.382	.770				
	1388	289	1415	290	1397	279	1358	261				
	164.9	458	167.1	473	169.1	473	168.8	459				
76	1.256	.757	1.301	.784	1.348	.787						
	1432	292	1450	291	1437	279						
	161.6	463	163.9	475	164.6	473						

LOW AIR CONDITIONING
△FUEL = – 0.4 %

ENGINE ANTI ICE ON
△FUEL = + 3 %

TOTAL ANTI ICE ON
△FUEL = + 5.5 %

10E -08F0A319-131 IAE V2522-A5 12200000C5KG330 0 018590 0 0 1 1.0 .0 .00 0 01 .990 .000 .000 15 FCOM-N0-03-05-15-018--135

LONG RANGE CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+15
CG=33.0%

EPR
KG/H/ENG
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL200		FL230		FL250		FL270	
50	1.013	.439	1.027	.478	1.054	.575	1.081	.615	1.094	.619	1.106	.619
	1047	242	1027	241	1120	263	1090	266	1022	257	958	246
	137.4	288	150.1	308	162.4	364	176.4	385	188.0	384	199.0	381
52	1.015	.447	1.031	.488	1.066	.604	1.086	.616	1.100	.621	1.113	.622
	1085	247	1070	246	1193	277	1100	266	1036	258	977	247
	134.9	293	147.0	315	160.0	382	175.1	385	186.1	386	195.9	383
54	1.018	.454	1.034	.497	1.072	.610	1.091	.618	1.104	.619	1.120	.627
	1124	251	1111	250	1218	280	1113	267	1044	257	1003	249
	132.6	298	144.0	320	158.3	386	173.7	387	184.1	384	192.5	386
56	1.020	.462	1.038	.514	1.077	.614	1.097	.622	1.109	.620	1.128	.633
	1163	256	1172	259	1237	282	1129	269	1060	257	1032	252
	130.3	303	141.1	331	157.0	389	172.1	389	181.6	385	189.0	390
58	1.022	.470	1.042	.536	1.081	.616	1.101	.622	1.115	.625	1.136	.641
	1203	260	1246	270	1248	283	1141	269	1084	259	1064	255
	128.1	308	138.4	345	156.0	389	170.4	389	178.8	388	185.4	395
60	1.025	.477	1.047	.558	1.085	.617	1.105	.620	1.122	.630	1.146	.650
	1243	264	1324	282	1259	283	1150	268	1112	261	1101	259
	126.0	313	135.8	360	155.0	390	168.7	388	175.8	391	181.8	401
62	1.027	.485	1.052	.578	1.090	.619	1.110	.622	1.129	.636	1.160	.668
	1285	268	1392	292	1274	285	1170	269	1142	264	1153	267
	123.8	318	133.8	373	153.8	392	166.4	389	172.8	395	178.4	411
64	1.030	.492	1.061	.602	1.095	.622	1.116	.627	1.138	.643	1.172	.681
	1326	272	1468	305	1290	286	1196	271	1176	267	1195	272
	121.7	323	132.1	388	152.5	394	164.0	392	169.8	399	175.3	419
66	1.032	.499	1.067	.608	1.100	.624	1.123	.632	1.148	.654	1.183	.691
	1366	276	1496	308	1304	287	1225	274	1217	272	1234	277
	119.7	327	130.9	392	151.2	394	161.4	396	166.8	406	172.4	425
68	1.036	.513	1.071	.612	1.103	.621	1.130	.639	1.161	.671	1.192	.698
	1429	284	1518	310	1311	286	1257	277	1270	279	1265	279
	117.8	337	129.9	394	149.9	393	158.9	399	163.9	416	169.8	430
70	1.039	.531	1.075	.615	1.107	.622	1.137	.645	1.172	.683	1.199	.701
	1501	294	1535	312	1328	286	1291	280	1313	285	1291	281
	116.0	348	129.1	396	148.2	394	156.3	404	161.3	424	167.2	432
72	1.043	.547	1.078	.616	1.112	.626	1.146	.655	1.181	.692	1.209	.714
	1571	303	1546	312	1354	288	1331	284	1351	289	1340	286
	114.1	359	128.4	397	146.3	396	153.8	409	158.9	429	164.0	439
74	1.047	.565	1.082	.617	1.118	.631	1.158	.671	1.190	.699	1.219	.726
	1648	314	1557	313	1382	290	1386	291	1384	292	1388	292
	112.5	371	127.7	398	144.3	399	151.3	419	156.6	434	161.0	447
76	1.050	.578	1.085	.619	1.124	.636	1.168	.681	1.197	.702	1.228	.737
	1704	321	1572	314	1413	292	1429	296	1411	293	1435	296
	111.2	379	126.9	399	142.4	402	149.1	426	154.4	436	158.1	454

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = − 0.3 %	△FUEL = + 2 %	△FUEL = + 5 %

10F -08F0A320-232 IAE V2527-A5 12200000C5KG330 0 018590 0 0 1 1.0 .0 .0 0 01 .990 .000 .000 15 FCOM-N0-03-05-15-015-140

LONG RANGE CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+15
CG=33.0%

EPR
KG/H/ENG
NM/1000KG
MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
50	1.124	.628	1.149	.650	1.186	.687	1.217	.714	1.249	.744	1.294	.777
	923	239	913	237	925	241	924	240	938	240	966	240
	208.0	384	215.5	394	223.3	413	230.3	426	235.0	441	238.5	461
52	1.133	.636	1.165	.669	1.197	.693	1.231	.729	1.262	.755	1.313	.784
	953	242	962	245	952	243	969	246	982	244	1003	242
	203.8	388	210.7	405	218.8	417	224.3	435	228.0	448	231.8	465
54	1.142	.644	1.179	.683	1.209	.706	1.241	.737	1.282	.771	1.329	.785
	986	246	1003	251	993	248	1005	248	1031	249	1034	243
	199.5	394	206.4	414	213.5	424	218.6	439	221.6	457	225.0	466
56	1.157	.663	1.191	.694	1.222	.723	1.253	.748	1.299	.781	1.348	.787
	1036	253	1038	255	1042	255	1049	253	1073	253	1073	243
	195.3	405	202.5	420	208.3	434	212.5	446	215.9	463	217.3	467
58	1.171	.678	1.200	.697	1.233	.733	1.265	.759	1.316	.785	1.367	.787
	1080	259	1063	256	1083	259	1094	257	1106	254	1112	244
	191.6	414	198.7	422	203.5	441	206.8	452	210.5	466	210.0	467
60	1.183	.689	1.212	.713	1.243	.742	1.284	.774	1.330	.785	1.385	.785
	1119	264	1112	262	1123	262	1145	262	1138	254	1145	243
	188.1	421	194.1	432	198.5	446	201.5	461	204.7	466	203.4	466
62	1.193	.696	1.224	.727	1.253	.751	1.300	.782	1.347	.787		
	1150	267	1160	268	1166	265	1184	265	1177	255		
	184.9	425	189.9	441	193.6	451	196.8	466	198.3	467		
64	1.201	.700	1.233	.736	1.265	.761	1.314	.786	1.364	.787		
	1177	269	1199	271	1210	269	1217	267	1215	255		
	181.7	428	185.9	446	188.9	457	192.3	468	192.2	467		
66	1.212	.714	1.242	.743	1.282	.775	1.327	.786	1.384	.787		
	1226	275	1237	274	1263	275	1248	267	1254	255		
	177.9	436	181.9	450	184.4	466	187.6	468	186.1	467		
68	1.222	.727	1.251	.751	1.296	.782	1.343	.787	1.394	.770		
	1274	280	1279	277	1302	277	1286	267	1255	249		
	174.4	444	177.8	455	180.5	470	182.3	469	181.9	456		
70	1.232	.737	1.262	.760	1.310	.785	1.358	.787				
	1316	284	1324	281	1335	279	1324	267				
	171.0	450	173.8	460	176.7	472	177.1	469				
72	1.239	.742	1.276	.771	1.322	.786	1.375	.788				
	1350	286	1375	286	1364	279	1364	267				
	167.7	453	170.0	467	173.0	472	172.0	469				
74	1.248	.750	1.290	.781	1.335	.787	1.383	.768				
	1394	289	1421	290	1401	279	1358	260				
	164.2	458	166.5	473	168.6	473	168.6	458				
76	1.257	.757	1.303	.784	1.349	.788						
	1438	292	1455	291	1440	280						
	160.9	463	163.3	475	164.3	473						

LOW AIR CONDITIONING
△FUEL = – 0.3 %

ENGINE ANTI ICE ON
△FUEL = + 2 %

TOTAL ANTI ICE ON
△FUEL = + 5 %

10F -08F0A320-232 IAE V2527-A5 12200000C5KG330 0 018590 0 0 1 1.0 .0 .0 0 01 .990 .000 .000 15 FCOM-N0-03-05-15-016-140

CRUISE - LONG RANGE - ALL ENGINES

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA+20
CG=33.0%

N1 (%) **MACH**
KG/H/ENG **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL100		FL150		FL200		FL230		FL250		FL270	
42	57.7	.410	61.9	.465	63.5	.478	68.5	.558	68.7	.557	69.1	.559
	934	226	921	234	833	218	894	240	840	230	800	221
	145.1	271	164.3	303	183.4	306	197.1	353	207.9	349	217.3	348
44	58.5	.415	62.3	.467	68.3	.556	68.9	.559	69.0	.556	69.8	.564
	960	229	937	235	990	254	908	241	851	229	827	223
	143.1	275	162.0	303	179.4	355	194.4	353	204.6	348	212.1	351
46	62.0	.464	62.7	.468	68.8	.558	69.2	.558	69.6	.559	70.5	.567
	1086	257	952	235	1006	255	919	240	876	231	852	224
	141.4	307	159.6	304	177.1	356	191.6	352	200.0	351	206.9	353
48	62.1	.462	63.3	.471	69.2	.558	69.5	.556	70.2	.563	71.4	.575
	1091	256	974	237	1019	255	930	239	902	232	889	228
	140.1	306	157.1	306	174.9	356	188.8	351	195.6	353	201.2	358
50	62.5	.463	63.9	.474	69.6	.559	70.0	.559	70.8	.566	72.6	.589
	1105	256	998	238	1033	256	954	241	928	234	938	234
	138.6	306	154.4	308	172.7	357	185.0	353	191.1	355	195.4	366
52	62.9	.465	64.5	.479	69.8	.558	70.5	.562	71.7	.574	73.7	.607
	1125	257	1027	241	1045	255	980	242	964	237	994	241
	136.8	308	151.6	312	170.5	356	181.2	355	186.3	359	190.0	378
54	63.2	.466	65.2	.484	70.1	.557	71.1	.565	72.7	.586	74.8	.631
	1141	258	1058	244	1056	255	1006	243	1013	242	1061	251
	135.2	309	148.8	315	168.3	355	177.4	357	181.3	367	185.0	393
56	63.6	.467	69.7	.558	70.4	.557	71.8	.571	73.8	.599	75.7	.646
	1158	258	1236	282	1073	255	1039	246	1063	248	1111	257
	133.5	309	146.7	363	165.7	356	173.4	360	176.7	376	180.8	402
58	64.1	.470	70.0	.558	70.9	.560	72.7	.581	74.9	.622	76.3	.655
	1180	260	1248	282	1100	256	1085	250	1131	258	1151	261
	131.7	311	145.2	363	162.6	358	169.1	367	172.4	390	177.1	408
60	64.5	.472	70.3	.559	71.4	.563	73.8	.593	75.8	.639	76.9	.664
	1204	261	1264	282	1127	258	1134	256	1189	266	1190	265
	129.8	313	143.7	363	159.5	360	165.1	374	168.5	401	173.5	413
62	65.1	.476	70.7	.559	72.0	.567	74.8	.609	76.4	.650	77.6	.672
	1230	263	1279	282	1156	259	1192	263	1233	270	1229	268
	127.9	315	142.2	364	156.5	362	161.3	385	165.2	407	170.1	418
64	65.6	.480	71.0	.559	72.6	.572	75.7	.630	77.0	.658	78.2	.680
	1261	266	1293	282	1192	262	1260	272	1273	274	1268	272
	125.9	318	140.7	364	153.3	366	157.7	398	162.1	413	166.8	423
66	69.9	.551	71.2	.558	73.5	.583	76.5	.644	77.6	.666	78.8	.688
	1470	305	1305	282	1240	267	1314	279	1312	278	1308	275
	123.9	364	139.1	363	149.9	372	154.6	406	159.1	418	163.6	428
68	70.7	.558	71.4	.557	74.4	.593	77.1	.653	78.2	.674	79.4	.696
	1513	310	1317	281	1290	272	1357	283	1352	281	1349	278
	122.1	369	137.6	362	146.8	379	151.9	412	156.2	422	160.3	432

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2.5 %	+ 4 %

CRUISE - LONG RANGE - ALL ENGINES

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA+20
CG=33.0%

N1 (%) **MACH**
KG/H/ENG **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
42	70.1	.568	71.8	.591	73.8	.639	75.0	.664	76.7	.686	79.2	.728
	780	215	785	215	823	223	823	222	822	219	857	223
	224.9	351	230.3	362	235.5	388	243.0	400	250.0	411	254.7	437
44	71.0	.577	73.1	.616	74.7	.653	76.0	.676	77.7	.702	80.6	.759
	815	219	846	224	866	228	863	226	869	225	926	234
	218.4	356	222.8	377	229.0	397	236.1	407	241.9	421	245.8	455
46	72.3	.591	74.3	.639	75.5	.665	76.8	.686	79.1	.734	81.5	.768
	862	224	904	233	905	233	900	230	939	236	965	237
	211.5	365	216.2	391	222.9	404	229.5	413	234.3	440	238.4	460
48	73.4	.612	75.1	.652	76.3	.675	77.7	.699	80.3	.757	82.5	.772
	920	233	946	238	943	236	945	235	999	244	999	238
	205.3	378	210.8	399	217.2	410	222.8	421	227.0	454	231.6	463
50	74.6	.636	75.9	.662	77.1	.684	79.0	.726	81.2	.767	83.6	.778
	983	242	986	242	981	240	1010	244	1042	248	1039	240
	199.5	392	205.6	405	211.7	415	216.4	437	220.6	460	224.5	466
52	75.4	.649	76.6	.672	77.9	.695	80.1	.750	81.9	.771	84.6	.781
	1029	248	1025	246	1023	244	1072	253	1075	249	1076	241
	194.8	401	200.7	411	206.1	422	210.4	451	214.9	462	217.5	468
54	76.1	.659	77.4	.682	78.9	.712	81.0	.764	82.9	.776	85.7	.783
	1068	252	1064	250	1078	251	1125	259	1112	251	1120	242
	190.4	407	196.0	417	200.7	433	204.5	460	209.1	465	209.5	469
56	76.8	.669	78.1	.690	80.1	.743	81.7	.768	83.9	.780	86.8	.784
	1108	256	1103	253	1153	262	1158	260	1149	252	1166	243
	186.2	413	191.5	422	195.6	451	199.9	463	203.3	467	201.6	470
58	77.5	.678	78.9	.703	81.0	.758	82.4	.773	84.7	.781	87.5	.759
	1147	259	1151	258	1207	268	1192	262	1186	253	1161	234
	182.3	418	186.8	430	190.6	460	195.1	465	197.4	468	196.0	455
60	78.2	.686	80.0	.730	81.7	.766	83.0	.768	85.1	.761		
	1187	263	1225	269	1250	271	1208	260	1186	246		
	178.4	423	182.4	447	186.1	465	191.3	462	192.4	456		
62	78.9	.695	80.9	.749	82.4	.770	83.3	.743	85.9	.719		
	1227	266	1286	277	1283	273	1201	251	1178	231		
	174.6	429	178.2	458	182.2	467	186.4	448	182.9	431		
64	79.7	.709	81.7	.762	82.7	.766	83.9	.704				
	1280	272	1339	282	1298	271	1194	236				
	170.8	437	174.1	466	179.2	465	177.5	424				
66	80.7	.737	82.3	.766	82.9	.746						
	1361	284	1375	284	1289	263						
	167.1	455	170.6	469	175.6	453						
68	81.5	.750	82.5	.760	83.4	.709						
	1415	289	1381	281	1276	249						
	163.6	463	168.5	465	168.7	431						

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 3 %	+ 6 %

LONG RANGE CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+20
CG=33.0%

EPR
KG/H/ENG
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL200		FL230		FL250		FL270	
50	1.021	.463	1.032	.489	1.051	.569	1.076	.607	1.092	.618	1.106	.619
	1180	256	1085	246	1111	261	1080	262	1030	256	967	246
	129.8	306	146.5	318	163.6	364	177.5	383	188.1	387	199.2	385
52	1.022	.467	1.034	.498	1.058	.586	1.083	.613	1.099	.622	1.112	.621
	1204	258	1123	251	1159	269	1102	265	1048	258	984	247
	128.4	309	144.2	324	161.5	374	175.6	387	186.1	390	196.1	386
54	1.024	.471	1.037	.520	1.066	.601	1.089	.617	1.103	.620	1.118	.624
	1228	261	1192	262	1203	276	1121	267	1055	257	1005	248
	126.9	312	142.0	338	159.6	384	173.9	390	184.2	388	193.0	388
56	1.026	.476	1.041	.538	1.072	.606	1.095	.621	1.108	.620	1.126	.629
	1254	263	1251	271	1224	278	1140	269	1069	257	1032	250
	125.5	315	139.9	350	158.1	387	172.2	392	181.8	389	189.6	391
58	1.027	.481	1.044	.554	1.078	.611	1.100	.623	1.114	.623	1.134	.638
	1283	266	1306	279	1245	280	1153	269	1089	258	1067	254
	124.0	318	137.8	360	156.6	390	170.5	393	179.1	390	185.9	397
60	1.029	.487	1.047	.565	1.083	.615	1.104	.620	1.120	.627	1.144	.647
	1316	270	1350	286	1265	282	1160	268	1114	260	1103	258
	122.5	322	136.2	368	155.2	393	168.8	392	176.3	393	182.3	402
62	1.031	.495	1.050	.574	1.088	.619	1.109	.622	1.127	.633	1.158	.665
	1355	274	1385	290	1283	284	1178	269	1143	263	1157	266
	120.9	328	134.7	373	153.9	395	166.6	392	173.3	396	178.7	414
64	1.034	.507	1.054	.584	1.094	.622	1.115	.624	1.136	.640	1.170	.679
	1405	281	1425	295	1302	286	1199	270	1179	266	1202	271
	119.4	335	133.3	380	152.6	397	164.3	394	170.2	401	175.6	422
66	1.036	.524	1.061	.599	1.099	.625	1.121	.629	1.144	.649	1.181	.690
	1470	290	1477	303	1318	287	1226	272	1217	270	1242	276
	117.9	347	131.9	390	151.2	399	161.9	397	167.2	407	172.6	429
68	1.039	.539	1.066	.605	1.102	.622	1.128	.635	1.158	.667	1.191	.698
	1530	299	1504	306	1324	286	1258	275	1274	278	1277	279
	116.4	356	130.8	393	149.9	397	159.3	401	164.2	418	169.9	434
70	1.041	.551	1.071	.609	1.106	.621	1.135	.642	1.170	.680	1.198	.700
	1585	306	1525	308	1337	286	1294	278	1320	284	1302	281
	115.1	365	129.8	396	148.4	397	156.7	406	161.5	426	167.3	436
72	1.044	.562	1.075	.612	1.111	.624	1.143	.649	1.180	.690	1.208	.712
	1634	312	1545	310	1358	287	1330	281	1360	288	1349	286
	113.8	372	128.8	398	146.6	398	154.1	410	159.0	433	164.2	443
74	1.046	.569	1.080	.616	1.116	.627	1.156	.667	1.189	.698	1.218	.725
	1669	316	1565	312	1384	288	1389	290	1396	292	1399	291
	112.8	377	127.9	400	144.7	401	151.6	421	156.7	438	161.1	451
76	1.049	.576	1.084	.618	1.122	.632	1.166	.679	1.196	.702	1.227	.737
	1705	320	1583	313	1412	291	1436	295	1424	293	1448	296
	111.8	381	127.0	402	142.8	403	149.3	429	154.5	440	158.2	458

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.4 %	△FUEL = + 3 %	△FUEL = + 5.5 %

10E -08F0A319-131 IAE V2522-A5 12200000C5KG330 0 018590 0 0 1 1.0 .0 .00 0 01 .990 .000 .000 20 FCOM-N0-03-05-15-019-135

LONG RANGE CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+20
CG=33.0%

EPR
KG/H/ENG
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
50	1.122	.625	1.147	.646	1.185	.686	1.216	.714	1.248	.743	1.293	.776
	925	238	916	236	932	241	932	240	948	239	976	240
	208.5	386	215.9	395	223.5	417	230.5	430	235.1	446	238.4	465
52	1.131	.632	1.163	.666	1.196	.693	1.230	.730	1.262	.755	1.312	.784
	954	241	965	244	962	243	979	246	992	244	1014	242
	204.4	390	211.1	407	218.8	421	224.5	440	228.1	453	231.7	470
54	1.140	.641	1.178	.681	1.208	.704	1.240	.738	1.281	.771	1.328	.785
	989	245	1009	250	1000	247	1016	249	1043	249	1046	243
	200.0	396	206.7	417	213.7	428	218.7	444	221.6	462	224.9	470
56	1.154	.658	1.190	.693	1.221	.722	1.252	.748	1.299	.781	1.347	.786
	1038	251	1047	254	1051	254	1059	253	1085	253	1085	243
	195.7	406	202.6	424	208.5	438	212.6	451	215.9	468	217.1	471
58	1.169	.675	1.199	.696	1.232	.734	1.264	.759	1.315	.785	1.358	.772
	1085	258	1072	256	1094	259	1104	256	1118	254	1094	238
	191.8	416	198.9	426	203.6	445	206.9	457	210.4	471	211.7	463
60	1.181	.688	1.211	.711	1.242	.742	1.283	.774	1.329	.785		
	1127	264	1120	262	1133	262	1157	262	1151	254		
	188.3	424	194.3	435	198.7	450	201.5	466	204.6	471		
62	1.192	.696	1.223	.727	1.252	.751	1.299	.782	1.347	.786		
	1161	267	1170	268	1177	265	1196	265	1190	255		
	185.0	430	190.0	445	193.7	456	196.8	471	198.1	471		
64	1.200	.699	1.233	.737	1.264	.761	1.313	.785	1.357	.779		
	1186	268	1212	272	1222	269	1230	266	1204	252		
	181.9	432	186.0	451	189.0	462	192.2	473	193.9	467		
66	1.211	.714	1.241	.743	1.281	.775	1.327	.785				
	1236	274	1249	274	1276	275	1261	266				
	178.1	440	182.1	455	184.4	471	187.5	473				
68	1.221	.727	1.250	.751	1.295	.782	1.342	.786				
	1285	280	1292	278	1315	277	1299	267				
	174.5	448	177.9	460	180.5	475	182.2	473				
70	1.231	.737	1.261	.759	1.309	.785	1.349	.771				
	1329	284	1336	281	1349	279	1299	261				
	171.1	455	174.0	465	176.7	477	178.6	464				
72	1.238	.742	1.275	.771	1.319	.784						
	1362	286	1387	285	1374	278						
	167.9	458	170.1	472	173.3	476						
74	1.247	.749	1.289	.781	1.326	.771						
	1406	289	1434	290	1374	273						
	164.4	462	166.6	478	170.4	468						
76	1.256	.757	1.298	.781	1.335	.751						
	1451	292	1456	290	1376	265						
	161.0	467	164.2	478	165.7	456						

LOW AIR CONDITIONING
△FUEL = – 0.4 %

ENGINE ANTI ICE ON
△FUEL = + 3 %

TOTAL ANTI ICE ON
△FUEL = + 5.5 %

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LONG RANGE CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+20
CG=33.0%

EPR
KG/H/ENG
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL200		FL230		FL250		FL270	
50	1.013	.438	1.028	.478	1.055	.576	1.082	.615	1.095	.619	1.107	.619
	1059	242	1038	240	1135	264	1104	266	1034	257	971	246
	137.0	290	149.7	311	161.9	368	175.9	388	187.5	388	198.4	385
52	1.016	.446	1.031	.488	1.067	.604	1.086	.616	1.100	.621	1.113	.622
	1098	247	1083	245	1209	277	1114	266	1049	258	989	247
	134.6	295	146.5	317	159.5	386	174.7	389	185.6	389	195.4	387
54	1.018	.454	1.034	.496	1.073	.610	1.091	.618	1.104	.619	1.120	.627
	1137	251	1124	250	1234	280	1126	267	1057	257	1015	249
	132.2	301	143.6	323	157.9	390	173.3	390	183.6	388	192.0	390
56	1.020	.462	1.038	.514	1.078	.614	1.097	.622	1.109	.620	1.128	.633
	1176	255	1187	259	1253	282	1143	269	1073	257	1044	252
	129.9	306	140.7	334	156.6	392	171.6	392	181.1	389	188.5	394
58	1.022	.470	1.043	.536	1.082	.616	1.101	.621	1.116	.624	1.137	.641
	1216	260	1262	270	1263	283	1153	269	1098	259	1077	255
	127.7	311	138.0	348	155.6	393	170.0	392	178.3	391	184.9	398
60	1.025	.477	1.048	.558	1.086	.617	1.105	.620	1.123	.630	1.147	.651
	1257	264	1341	282	1274	283	1164	268	1125	261	1116	259
	125.6	316	135.4	363	154.6	394	168.2	392	175.3	395	181.3	405
62	1.027	.485	1.053	.578	1.090	.619	1.111	.622	1.130	.636	1.161	.668
	1299	268	1410	292	1289	284	1184	269	1156	264	1168	267
	123.4	321	133.4	376	153.4	395	165.9	393	172.4	399	177.9	416
64	1.030	.492	1.062	.602	1.096	.622	1.117	.627	1.138	.643	1.173	.681
	1341	272	1487	305	1305	286	1210	271	1190	267	1211	272
	121.4	325	131.7	392	152.1	397	163.5	396	169.3	403	174.8	423
66	1.033	.499	1.067	.608	1.100	.623	1.123	.632	1.148	.654	1.184	.691
	1382	276	1515	308	1319	286	1239	274	1232	272	1249	276
	119.4	330	130.5	395	150.8	398	161.0	399	166.3	410	172.0	429
68	1.036	.513	1.072	.612	1.103	.621	1.130	.638	1.161	.670	1.193	.697
	1446	284	1537	310	1326	285	1272	276	1285	279	1280	279
	117.4	340	129.6	398	149.5	396	158.4	403	163.4	420	169.3	434
70	1.040	.531	1.076	.615	1.108	.622	1.138	.645	1.172	.682	1.200	.700
	1519	294	1553	312	1344	286	1306	279	1329	285	1305	280
	115.6	351	128.7	400	147.8	397	155.9	407	160.9	427	166.7	435
72	1.043	.547	1.079	.616	1.113	.626	1.147	.655	1.182	.692	1.210	.713
	1590	303	1564	312	1370	288	1348	284	1368	289	1357	286
	113.8	362	128.1	401	145.9	400	153.4	414	158.4	433	163.5	444
74	1.047	.565	1.082	.617	1.118	.630	1.159	.671	1.191	.699	1.220	.725
	1668	314	1575	313	1398	290	1403	291	1402	292	1405	291
	112.1	374	127.4	401	143.9	403	150.9	423	156.2	438	160.5	451
76	1.050	.578	1.086	.619	1.124	.635	1.169	.681	1.197	.701	1.229	.736
	1725	321	1590	314	1429	292	1447	296	1427	293	1453	296
	110.9	383	126.6	402	142.0	406	148.7	430	154.0	440	157.6	458

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = − 0.3 %	△FUEL = + 2 %	△FUEL = + 5 %

10F -08F0A320-232 IAE V2527-A5 12200000C5KG330 0 018590 0 0 1 1.0 .0 .0 0 01 .990 .000 .000 15 FCOM-N0-03-05-15-017-140

LONG RANGE CRUISE

MAX. CRUISE THRUST LIMITS
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA+20
CG=33.0%

EPR
KG/H/ENG
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL290		FL310		FL330		FL350		FL370		FL390	
50	1.124 934 207.4	.628 239 388	1.150 926 214.8	.650 237 398	1.187 937 222.6	.687 241 417	1.218 937 229.6	.714 240 430	1.250 952 234.1	.743 239 446	1.295 979 237.7	.776 240 465
52	1.133 965 203.2	.635 242 392	1.166 974 210.2	.669 245 409	1.197 964 218.1	.693 243 421	1.231 982 223.6	.729 246 439	1.263 996 227.2	.755 243 452	1.314 1017 231.0	.784 242 470
54	1.143 999 198.9	.644 246 397	1.180 1016 205.8	.683 250 418	1.210 1006 212.9	.706 248 428	1.242 1020 217.8	.737 249 444	1.283 1047 220.8	.771 249 462	1.330 1049 224.2	.785 243 470
56	1.158 1049 194.8	.662 253 409	1.192 1050 201.9	.693 254 424	1.223 1056 207.7	.722 254 439	1.253 1064 211.8	.748 253 451	1.300 1088 215.2	.781 253 468	1.348 1089 216.5	.787 243 471
58	1.171 1094 191.0	.677 259 418	1.200 1076 198.1	.697 256 427	1.234 1096 202.8	.733 258 445	1.266 1109 206.1	.759 257 457	1.316 1122 209.8	.785 254 471		
60	1.184 1133 187.6	.689 264 425	1.213 1126 193.6	.712 262 436	1.244 1138 197.8	.741 262 450	1.285 1160 200.8	.774 262 466	1.331 1154 204.0	.786 254 471		
62	1.193 1165 184.4	.696 267 429	1.224 1175 189.3	.727 268 445	1.254 1182 192.9	.751 265 456	1.300 1200 196.2	.782 265 471	1.348 1194 197.6	.787 255 472		
64	1.202 1193 181.1	.701 269 432	1.234 1215 185.3	.736 271 450	1.266 1227 188.2	.761 269 462	1.315 1234 191.6	.785 266 473				
66	1.213 1243 177.4	.715 275 441	1.243 1254 181.3	.743 274 455	1.283 1280 183.8	.775 275 470	1.328 1265 186.9	.786 266 473				
68	1.223 1291 173.8	.727 280 449	1.252 1297 177.2	.751 278 460	1.297 1320 179.9	.782 278 475	1.342 1299 182.0	.785 266 473				
70	1.232 1332 170.5	.736 284 454	1.263 1342 173.3	.760 281 465	1.311 1354 176.1	.785 279 477						
72	1.240 1368 167.2	.741 286 457	1.277 1394 169.4	.772 286 472	1.320 1374 173.1	.783 278 476						
74	1.248 1412 163.7	.749 289 462	1.291 1439 166.0	.781 290 478								
76	1.258 1457 160.3	.757 292 467	1.299 1456 163.9	.780 289 477								

LOW AIR CONDITIONING
△FUEL = – 0.3 %

ENGINE ANTI ICE ON
△FUEL = + 2 %

TOTAL ANTI ICE ON
△FUEL = + 5 %

10F -08F0A320-232 IAE V2527-A5 12200000C5KG330 0 018590 0 0 1 1.0 .0 .0 0 01 .990 .000 .000 20 FCOM-N0-03-05-15-020-140

GENERAL

The following in cruise quick check tables allow the flight crew to determine the fuel consumption and the time required to cover a given air distance from any moment in cruise to land.

These tables are established for :

- Cruise Mach number : M.78/LR
- Descent profile : M.78/300KT/250KT
- Approach and landing : 120 kg or 270 lb – 6 minute IMC
- ISA
- CG = 33 %
- Normal air conditioning
- Anti ice OFF

Note : 1. In the tables, the asterisk "" means that a step climb of 4000 feet has been made to reach the corresponding flight level.*

2. The flight level shown on the top of each column is the final flight level.

R *3. For each degree celsius above ISA apply a fuel correction of*

R *0.005 (kg/°C/NM) × △ISA (°C) × Air Distance (NM)*

R *or 0.011 (lb/°C/NM) × △ISA (°C) × Air Distance (NM)*

CORRECTION FOR DEVIATION FROM REFERENCE WEIGHT

The in cruise quick check tables are based on a reference initial weight.

The fuel consumption must be corrected when the actual weight is different from the reference initial weight.

If it is lower (or greater) than the reference weight, subtract (or add) the value given in the correction part of the table per 1000 kg or 1000 lb below (or above) the reference weight.

EXAMPLE

In-cruise quick check with cruise at M.78
FL370
Actual cruise weight : 55000 kg
Remaining ground distance : 800 NM
ISA + 10
Average wind during flight : – 40 kt (head wind)

– Evaluation of air distance to be covered
  · Using the "Ground Distance/Air Distance" conversion table (see 3.05.50 P2), the corresponding air distance is : 880 NM
– Determination of the fuel consumption and time for the reference initial weight in cruise.
  · Enter table on 3.05.20 page 4 with an air distance of 880 NM and FL370 for ISA.

R Fuel consumption : 3941 kg
Time needed : 2 h 08 min

– Correction due to real in cruise weight of 55000 kg

R △ fuel consumption : – 50 kg per 1000 kg below reference
R △ fuel : $-50 \times (60 - 55) = -250$ kg

– Temperature correction :

R △ fuel consumption : + 0.005 kg per 1° above ISA and 1 NM Air distance
R △ fuel : $+ 0.005 \times 10 \times 880 = 44$ kg

Result :

R Fuel : $3941 - 250 + 44 = 3735$ kg
R Time : 2 h 08 min

GENERAL

The following in cruise quick check tables allow the flight crew to determine the fuel consumption and the time required to cover a given air distance from any moment in cruise to land.

These tables are established for :

- Cruise Mach number : M.78/LR
- Descent profile : M.78/300KT/250KT
- Approach and landing : 110 kg or 240 lb – 6 minute IMC
- ISA
- CG = 33 %
- Normal air conditioning
- Anti ice OFF

Note : 1. In the tables, the asterisk "" means that a step climb of 4000 feet has been made to reach the corresponding flight level.*

2. The flight level shown on the top of each column is the final flight level.

R *3. For each degree celsius above ISA apply a fuel correction of*

R *0.005 (kg/°C/NM) × △ISA (°C) × Air Distance (NM)*

R *or 0.011 (lb/°C/NM) × △ISA (°C) × Air Distance (NM)*

CORRECTION FOR DEVIATION FROM REFERENCE WEIGHT

The in cruise quick check tables are based on a reference initial weight.

The fuel consumption must be corrected when the actual weight is different from the reference initial weight.

If it is lower (or greater) than the reference weight, subtract (or add) the value given in the correction part of the table per 1000 kg or 1000 lb below (or above) the reference weight.

EXAMPLE

In-cruise quick check with cruise at M.78
FL370
Actual cruise weight : 52000 kg
Remaining ground distance : 500 NM
ISA + 10
Average wind during flight : – 40 kt (head wind)

– Evaluation of air distance to be covered
  · Using the "Ground Distance/Air Distance" conversion table (see 3.05.50 P2), the corresponding air distance is : 550 NM
– Determination of the fuel consumption and time for the reference initial weight in cruise.
  · Enter table on 3.05.20 page 3 with an air distance of 550 NM and FL370 for ISA.
  Fuel consumption : 2387 kg
  Time needed : 1 h 23 min
– Correction due to real in cruise weight of 52000 kg
  △ fuel consumption : – 27 kg per 1000 kg below reference
  △ fuel : $-27 \times (55 - 52) = -81$ kg
– Temperature correction :
  △ fuel consumption : + 0.005 kg per 1° above ISA and per 1 NM Air distance
  △ fuel : $+ 0.005 \times 10 \times 550 = 28$ kg

Result :
Fuel : $2387 - 81 + 28 = 2334$ kg
Time : 1 h 23 min

GENERAL

The following in cruise quick check tables allow the flight crew to determine the fuel consumption and the time required to cover a given air distance from any moment in cruise to land.

These tables are established for :

- Cruise Mach number : M.78/LR
- Descent profile : M.78/300KT/250KT
- Approach and landing : 110 kg or 240 lb – 6 minute IMC
- ISA
- CG = 33 %
- Normal air conditioning
- Anti ice OFF

Note : 1. In the tables, the asterisk "" means that a step climb of 4000 feet has been made to reach the corresponding flight level.*

2. The flight level shown on the top of each column is the final flight level.

R *3. For each degree celsius above ISA apply a fuel correction of*

R *0.005 (kg/°C/NM) × △ISA (°C) × Air Distance (NM)*

R *or 0.011 (lb/°C/NM) × △ISA (°C) × Air Distance (NM)*

CORRECTION FOR DEVIATION FROM REFERENCE WEIGHT

The in cruise quick check tables are based on a reference initial weight.

The fuel consumption must be corrected when the actual weight is different from the reference initial weight.

If it is lower (or greater) than the reference weight, subtract (or add) the value given in the correction part of the table per 1000 kg or 1000 lb below (or above) the reference weight.

EXAMPLE

In-cruise quick check with cruise at M.78
FL370
Actual cruise weight : 55000 kg
Remaining ground distance : 800 NM
ISA + 10
Average wind during flight : – 40 kt (head wind)

– Evaluation of air distance to be covered
  · Using the "Ground Distance/Air Distance" conversion table (see 3.05.50 P2), the corresponding air distance is : 880 NM
– Determination of the fuel consumption and time for the reference initial weight in cruise.
  · Enter table on 3.05.20 page 4 with an air distance of 880 NM and FL370 for ISA.
  Fuel consumption : 3924 kg
  Time needed : 2 h 08 min
– Correction due to real in cruise weight of 55000 kg
  △ fuel consumption : – 42 kg per 1000 kg below reference
  △ fuel : $-42 \times (60 - 55) = -210$ kg
– Temperature correction :
  △ fuel consumption : + 0.005 kg per 1° above ISA and per 1 NM Air distance
  △ fuel : $+ 0.005 \times 10 \times 880 = 44$ kg

Result :
Fuel : $3924 - 210 + 44 = 3758$ kg
Time : 2 h 08 min

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - ALL ENGINES
CRUISE : M.78 - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6 MIN)

REF. INITIAL WEIGHT = 55000 KG
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
100	343 0.23	320 0.23	298 0.23	278 0.23			0	0	
125	488 0.26	456 0.26	427 0.26	401 0.26	377 0.26	355 0.26	0	0	0
150	632 0.29	592 0.29	556 0.30	524 0.30	497 0.30	474 0.30	0	0	0
175	776 0.33	728 0.33	685 0.33	647 0.33	616 0.33	594 0.33	0	0	1
200	920 0.36	864 0.36	814 0.36	771 0.36	735 0.36	712 0.36	0	0	3
225	1064 0.39	1000 0.39	943 0.39	893 0.40	855 0.40	831 0.40	0	2	5
250	1208 0.42	1135 0.43	1072 0.43	1016 0.43	974 0.43	949 0.43	1	3	7
275	1352 0.46	1271 0.46	1200 0.46	1139 0.46	1092 0.46	1067 0.46	1	4	9
300	1495 0.49	1406 0.49	1328 0.49	1261 0.50	1211 0.50	1185 0.50	2	5	10
325	1639 0.52	1542 0.52	1457 0.53	1383 0.53	1329 0.53	1303 0.53	3	6	12
350	1782 0.55	1677 0.56	1585 0.56	1506 0.56	1448 0.56	1420 0.56	3	7	14
375	1926 0.59	1812 0.59	1713 0.59	1628 1.00	1566 1.00	1537 1.00	4	8	16
400	2069 1.02	1947 1.02	1841 1.03	1750 1.03	1683 1.03	1654 1.03	5	8	17
425	2212 1.05	2082 1.05	1968 1.06	1871 1.06	1801 1.06	1771 1.06	5	9	19
450	2355 1.08	2217 1.09	2096 1.09	1993 1.10	1919 1.10	1887 1.10	6	10	21
475	2499 1.12	2351 1.12	2224 1.12	2115 1.13	2036 1.13	2003 1.13	7	11	22
500	2641 1.15	2486 1.15	2351 1.16	2236 1.16	2153 1.16	2119 1.16	7	12	24
525	2784 1.18	2620 1.19	2478 1.19	2357 1.20	2270 1.20	2235 1.20	8	13	26
550	2927 1.21	2755 1.22	2606 1.22	2478 1.23	2387 1.23	2350 1.23	9	14	27
575	3070 1.25	2889 1.25	2733 1.26	2599 1.26	2504 1.27	2465 1.27	9	15	29
600	3213 1.28	3023 1.28	2860 1.29	2720 1.30	2620 1.30	2580 1.30	10	16	31
625	3355 1.31	3157 1.32	2986 1.32	2841 1.33	2737 1.33	2695 1.33	11	17	32
650	3498 1.34	3291 1.35	3113 1.36	2962 1.36	2853 1.37	2809 1.37	11	18	34
675	3640 1.37	3425 1.38	3240 1.39	3082 1.40	2969 1.40	2923 1.40	12	19	35
700	3782 1.41	3559 1.41	3366 1.42	3203 1.43	3085 1.43	3037 1.43	13	20	37
725	3924 1.44	3693 1.45	3493 1.45	3323 1.46	3201 1.47	3151 1.47	13	21	38

CORRECTIONS	ENGINE AI ON	TOTAL AI ON
FUEL	+ 5 %	+ 8 %

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - ALL ENGINES
CRUISE : M.78 - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6 MIN)

REF. INITIAL WEIGHT = 55000 KG
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
725	3924 1.44	3693 1.45	3493 1.45	3323 1.46	3201 1.47	3151 1.47	13	21	38
750	4067 1.47	3826 1.48	3619 1.49	3443 1.50	3317 1.50	3265 1.50	14	22	40
775	4209 1.50	3960 1.51	3745 1.52	3563 1.53	3432 1.53	3378 1.53	14	23	41
800	4351 1.54	4093 1.55	3871 1.55	3683 1.56	3547 1.57	3491 1.57	15	23	43
825	4493 1.57	4226 1.58	3997 1.59	3803 2.00	3663 2.00	3604 2.00	16	24	44
850	4634 2.00	4360 2.01	4123 2.02	3922 2.03	3777 2.03	3716 2.03	16	25	46
875	4776 2.03	4493 2.04	4249 2.05	4042 2.06	3892 2.07	3829 2.07	17	26	47
900	4918 2.07	4626 2.08	4374 2.09	4161 2.10	4007 2.10	3941 2.10	17	27	49
925	5059 2.10	4759 2.11	4500 2.12	4280 2.13	4122 2.13	4053 2.13	18	28	50
950	5201 2.13	4892 2.14	4626 2.15	4399 2.16	4236 2.17	4165 2.17	19	29	52
975	5342 2.16	5024 2.17	4751 2.18	4519 2.20	4350 2.20	4276 2.20	19	30	53
1000	5484 2.20	5157 2.21	4876 2.22	4637 2.23	4464 2.23	4387 2.23	20	30	54
1025	5625 2.23	5290 2.24	5001 2.25	4756 2.26	4578 2.27	4499 2.27	20	31	56
1050	5766 2.26	5422 2.27	5126 2.28	4875 2.30	4692 2.30	4609 2.30	21	32	57
1075	5907 2.29	5554 2.31	5251 2.32	4994 2.33	4806 2.34	4720 2.34	22	33	59
1100	6048 2.33	5687 2.34	5376 2.35	5112 2.36	4919 2.37	4831 2.37	22	34	60
1125	6189 2.36	5819 2.37	5501 2.38	5230 2.40	5033 2.40	4941 2.40	23	35	61
1150	6330 2.39	5951 2.40	5626 2.42	5349 2.43	5146 2.44	5051 2.44	23	35	63
1175	6471 2.42	6083 2.44	5750 2.45	5467 2.46	5259 2.47	5161 2.47	24	36	64
1200	6612 2.46	6215 2.47	5875 2.48	5585 2.50	5372 2.50	5271 2.50	24	37	65
1225	6752 2.49	6347 2.50	5999 2.51	5703 2.53	5485 2.54	5381 2.54	25	38	66
1250	6893 2.52	6478 2.53	6123 2.55	5821 2.56	5598 2.57	5490 2.57	25	39	68
1275	7033 2.55	6610 2.57	6247 2.58	5939 3.00	5710 3.00	5600 3.00	26	40	69
1300	7174 2.59	6742 3.00	6371 3.01	6056 3.03	5823 3.04	5709 3.04	26	40	70
1325	7314 3.02	6873 3.03	6495 3.05	6174 3.06	5935 3.07	5818 3.07	27	41	71
1350	7454 3.05	7004 3.06	6619 3.08	6291 3.09	6048 3.10	5927 3.10	28	42	73

CORRECTIONS	**ENGINE AI ON**	**TOTAL AI ON**
FUEL	+ 5 %	+ 8 %

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : M.78 - DdescENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
100	359 0.23	335 0.23	314 0.23	293 0.23			0	0	
125	501 0.26	470 0.26	442 0.26	416 0.26	392 0.26	371 0.26	0	0	0
150	643 0.29	604 0.29	570 0.29	539 0.29	512 0.29	492 0.29	0	0	0
175	785 0.32	738 0.33	698 0.33	662 0.33	631 0.33	612 0.33	0	1	1
200	926 0.36	872 0.36	826 0.36	785 0.36	750 0.36	732 0.36	1	1	3
225	1068 0.39	1005 0.39	954 0.39	907 0.39	869 0.40	852 0.40	2	2	5
250	1210 0.42	1139 0.42	1082 0.43	1030 0.43	988 0.43	972 0.43	1	3	6
275	1351 0.45	1273 0.46	1209 0.46	1152 0.46	1107 0.46	1091 0.46	1	4	8
300	1493 0.49	1406 0.49	1337 0.49	1275 0.49	1225 0.50	1210 0.50	2	5	9
325	1634 0.52	1539 0.52	1464 0.52	1397 0.53	1343 0.53	1329 0.53	3	6	11
350	1775 0.55	1672 0.55	1591 0.56	1519 0.56	1461 0.56	1447 0.56	3	8	12
375	1917 0.58	1805 0.59	1718 0.59	1641 0.59	1579 1.00	1565 1.00	4	9	14
400	2058 1.02	1938 1.02	1845 1.02	1763 1.03	1697 1.03	1683 1.03	4	10	16
425	2199 1.05	2071 1.05	1972 1.06	1884 1.06	1814 1.06	1801 1.06	5	11	17
450	2340 1.08	2204 1.09	2099 1.09	2006 1.09	1932 1.10	1918 1.10	6	12	19
475	2481 1.11	2337 1.12	2225 1.12	2127 1.13	2049 1.13	2036 1.13	6	13	20
500	2622 1.15	2469 1.15	2352 1.16	2249 1.16	2166 1.16	2153 1.16	7	14	21
525	2763 1.18	2601 1.18	2478 1.19	2370 1.19	2283 1.20	2269 1.20	7	15	23
550	2904 1.21	2734 1.22	2604 1.22	2491 1.23	2399 1.23	2386 1.23	8	16	24
575	3044 1.24	2866 1.25	2730 1.25	2612 1.26	2516 1.26	2502 1.26	9	17	26
600	3185 1.28	2998 1.28	2856 1.29	2733 1.29	2632 1.30	2618 1.30	9	17	27
625	3326 1.31	3130 1.31	2982 1.32	2853 1.33	2748 1.33	2734 1.33	10	18	29
650	3466 1.34	3261 1.35	3108 1.35	2974 1.36	2864 1.36	2849 1.36	10	19	30
675	3607 1.37	3393 1.38	3233 1.39	3094 1.39	2980 1.40	2965 1.40	11	20	31
700	3747 1.41	3525 1.41	3358 1.42	3215 1.43	3096 1.43	3080 1.43	11	21	33
725	3887 1.44	3656 1.45	3484 1.45	3335 1.46	3211 1.46	3195 1.46	12	22	34

LOW AIR CONDITIONNING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.4 %	△FUEL = + 3 %	△FUEL = + 5.5 %

PROGRAM : FLIP23C 17.07.97 ; AERO : A319–131 07/02/97 ; MOTO : A319–131 07/02/97 ; GENE : A319–131 26/02/97 END OF FLIP

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : M.78 - DESCENT ; M.78/300KT/250KT
IMC PROCEDURE ; 110 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
725	3887 1.44	3656 1.45	3484 1.45	3335 1.46	3211 1.46	3195 1.46	12	22	34
750	4028 1.47	3788 1.48	3609 1.49	3455 1.49	3326 1.50	3309 1.50	12	23	35
775	4168 1.50	3919 1.51	3734 1.52	3575 1.53	3442 1.53	3424 1.53	13	24	37
800	4308 1.54	4050 1.54	3859 1.55	3695 1.56	3557 1.57	3538 1.57	13	25	38
825	4448 1.57	4181 1.58	3984 1.59	3815 1.59	3671 2.00	3652 2.00	14	26	39
850	4588 2.00	4312 2.01	4109 2.02	3935 2.03	3786 2.03	3766 2.03	14	27	41
875	4729 2.03	4443 2.04	4233 2.05	4054 2.06	3901 2.07	3879 2.07	15	28	42
900	4869 2.07	4574 2.07	4358 2.08	4174 2.09	4015 2.10	3993 2.10	15	29	43
925	5009 2.10	4705 2.11	4482 2.12	4293 2.13	4129 2.13	4106 2.13	16	29	45
950	5149 2.13	4836 2.14	4607 2.15	4413 2.16	4243 2.17	4219 2.17	16	30	46
975	5289 2.16	4967 2.17	4731 2.18	4532 2.19	4357 2.20	4331 2.20	17	31	47
1000	5429 2.19	5097 2.21	4855 2.22	4651 2.23	4471 2.23	4444 2.23	17	32	48
1025	5569 2.23	5228 2.24	4979 2.25	4770 2.26	4584 2.27	4556 2.27	18	33	49
1050	5709 2.26	5359 2.27	5103 2.28	4888 2.29	4698 2.30	4668 2.30	18	34	51
1075	5849 2.29	5489 2.30	5227 2.32	5007 2.33	4812 2.33	4780 2.33	19	35	52
1100	5989 2.32	5620 2.34	5350 2.35	5125 2.36	4926 2.37	4891 2.37	19	35	53
1125	6129 2.36	5750 2.37	5474 2.38	5243 2.39	5039 2.40	5003 2.40	20	36	54
1150	6269 2.39	5880 2.40	5597 2.41	5362 2.43	5153 2.43	5114 2.43	20	37	55
1175	6408 2.42	6011 2.43	5721 2.45	5480 2.46	5267 2.47	5225 2.47	20	38	57
1200	6548 2.45	6141 2.47	5844 2.48	5598 2.49	5380 2.50	5336 2.50	21	39	58
1225	6688 2.49	6271 2.50	5967 2.51	5715 2.53	5493 2.53	5446 2.53	21	40	59
1250	6827 2.52	6401 2.53	6090 2.55	5833 2.56	5606 2.57	5556 2.57	22	40	60
1275	6967 2.55	6531 2.57	6213 2.58	5951 2.59	5719 3.00	5666 3.00	22	41	61
1300	7106 2.58	6660 3.00	6336 3.01	6068 3.03	5832 3.04	5776 3.04	23	42	68
1325	7246 3.02	6790 3.03	6459 3.05	6185 3.06	5945 3.07	5886 3.07	23	43	69
1350	7385 3.05	6920 3.06	6581 3.08	6303 3.09	6057 3.10	5995 3.10	23	44	71

LOW AIR CONDITIONNING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.4 %	△FUEL = + 3 %	△FUEL = + 5.5 %

PROGRAM : FLIP23C 17.07.97 ; AERO : A319–131 07/02/97 ; MOTO : A319–131 07/02/97 ; GENE : A319–131 26/02/97 END OF FLIP

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : M.78 - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 120 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
100	364 0.23	340 0.23	319 0.23	299 0.23			0	0	
125	506 0.26	475 0.26	448 0.26	422 0.26	398 0.26	377 0.26	0	0	0
150	649 0.29	610 0.29	577 0.30	546 0.30	518 0.30	498 0.30	0	0	0
175	791 0.33	745 0.33	705 0.33	669 0.33	638 0.33	619 0.33	0	0	1
200	933 0.36	879 0.36	834 0.36	792 0.36	757 0.36	739 0.36	1	1	3
225	1075 0.39	1014 0.39	962 0.39	916 0.40	876 0.40	859 0.40	2	2	5
250	1218 0.42	1148 0.43	1091 0.43	1039 0.43	995 0.43	979 0.43	1	3	7
275	1360 0.46	1282 0.46	1219 0.46	1162 0.46	1114 0.46	1098 0.46	1	4	8
300	1502 0.49	1416 0.49	1347 0.49	1284 0.50	1232 0.50	1217 0.50	2	5	10
325	1644 0.52	1550 0.52	1475 0.53	1407 0.53	1351 0.53	1336 0.53	3	6	12
350	1785 0.55	1684 0.56	1603 0.56	1529 0.56	1469 0.56	1455 0.56	3	7	16
375	1927 0.59	1818 0.59	1730 0.59	1652 1.00	1587 1.00	1573 1.00	4	8	18
400	2069 1.02	1951 1.02	1858 1.03	1774 1.03	1704 1.03	1692 1.03	5	9	20
425	2211 1.05	2085 1.05	1985 1.06	1896 1.06	1822 1.06	1809 1.06	5	10	21
450	2353 1.08	2218 1.09	2112 1.09	2018 1.10	1940 1.10	1927 1.10	6	11	23
475	2494 1.12	2351 1.12	2240 1.12	2140 1.13	2057 1.13	2045 1.13	6	12	25
500	2636 1.15	2485 1.15	2367 1.16	2262 1.16	2174 1.16	2162 1.16	7	13	26
525	2777 1.18	2618 1.19	2493 1.19	2384 1.20	2292 1.20	2279 1.20	7	14	28
550	2919 1.21	2751 1.22	2620 1.22	2505 1.23	2409 1.23	2396 1.23	8	15	30
575	3060 1.24	2883 1.25	2747 1.26	2627 1.26	2526 1.27	2512 1.27	9	16	31
600	3202 1.28	3016 1.28	2873 1.29	2748 1.30	2642 1.30	2628 1.30	9	17	33
625	3343 1.31	3149 1.32	3000 1.32	2869 1.33	2759 1.33	2744 1.33	10	18	35
650	3484 1.34	3281 1.35	3126 1.36	2990 1.36	2876 1.37	2860 1.37	10	19	36
675	3625 1.37	3413 1.38	3252 1.39	3111 1.40	2992 1.40	2976 1.40	11	20	38
700	3767 1.41	3546 1.41	3378 1.42	3232 1.43	3108 1.43	3091 1.43	11	20	39
725	3908 1.44	3678 1.45	3504 1.45	3353 1.46	3224 1.47	3206 1.47	12	21	41

LOW AIR CONDITIONING
△FUEL = – 0.4 %

ENGINE ANTI ICE ON
△FUEL = + 3 %

TOTAL ANTI ICE ON
△FUEL = + 5.5 %

FLIP23C A320-232 IAE V2527-A5 3610 03301.000011 0250300 .7800 .000200 120 0300350 60 0 100 20 20 20 18590 FCOM-N0–03–05–20–003–140

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : M.78 - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 120 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
725	3908 1.44	3678 1.45	3504 1.45	3353 1.46	3224 1.47	3206 1.47	12	21	41
750	4049 1.47	3810 1.48	3630 1.49	3473 1.50	3340 1.50	3321 1.50	12	22	42
775	4190 1.50	3942 1.51	3756 1.52	3594 1.53	3456 1.53	3436 1.53	13	23	44
800	4331 1.54	4074 1.55	3881 1.55	3714 1.56	3572 1.57	3550 1.57	13	24	45
825	4472 1.57	4205 1.58	4007 1.59	3834 2.00	3687 2.00	3664 2.00	14	25	47
850	4612 2.00	4337 2.01	4132 2.02	3955 2.03	3803 2.03	3778 2.03	14	26	48
875	4753 2.03	4468 2.04	4257 2.05	4075 2.06	3918 2.07	3892 2.07	14	27	50
900	4894 2.07	4600 2.08	4382 2.09	4194 2.10	4033 2.10	4006 2.10	15	28	51
925	5035 2.10	4731 2.11	4507 2.12	4314 2.13	4148 2.13	4119 2.13	15	29	53
950	5175 2.13	4862 2.14	4632 2.15	4434 2.16	4263 2.17	4232 2.17	16	30	54
975	5316 2.16	4993 2.17	4757 2.18	4553 2.20	4377 2.20	4345 2.20	16	31	55
1000	5456 2.20	5124 2.21	4881 2.22	4673 2.23	4492 2.23	4458 2.23	17	32	57
1025	5597 2.23	5255 2.24	5006 2.25	4792 2.26	4606 2.27	4570 2.27	17	33	58
1050	5737 2.26	5386 2.27	5130 2.28	4911 2.30	4721 2.30	4682 2.30	18	33	59
1075	5878 2.29	5516 2.31	5254 2.32	5031 2.33	4835 2.34	4795 2.34	18	34	61
1100	6018 2.33	5647 2.34	5378 2.35	5150 2.36	4949 2.37	4906 2.37	18	35	62
1125	6158 2.36	5777 2.37	5502 2.38	5268 2.40	5063 2.40	5018 2.40	19	36	63
1150	6298 2.39	5907 2.40	5626 2.42	5387 2.43	5176 2.44	5129 2.44	19	37	65
1175	6438 2.42	6038 2.44	5750 2.45	5506 2.46	5290 2.47	5241 2.47	19	38	66
1200	6579 2.46	6168 2.47	5874 2.48	5624 2.50	5403 2.50	5352 2.50	20	39	67
1225	6719 2.49	6298 2.50	5997 2.51	5743 2.53	5517 2.54	5462 2.54	20	40	69
1250	6859 2.52	6427 2.53	6121 2.55	5861 2.56	5630 2.57	5573 2.57	21	41	70
1275	6999 2.55	6557 2.57	6244 2.58	5979 3.00	5743 3.00	5683 3.00	21	42	71
1300	7139 2.59	6687 3.00	6367 3.01	6097 3.03	5856 3.04	5794 3.04	21	42	72
1325	7279 3.02	6816 3.03	6490 3.05	6215 3.06	5969 3.07	5904 3.07	22	43	74
1350	7419 3.05	6946 3.07	6613 3.08	6333 3.10	6081 3.10	6013 3.10	22	44	75

LOW AIR CONDITIONING
△FUEL = – 0.4 %

ENGINE ANTI ICE ON
△FUEL = + 3 %

TOTAL ANTI ICE ON
△FUEL = + 5.5 %

FLIP23C A320-232 IAE V2527-A5 3610 03301.000011 0250300 .7800 .000200 120 0300350 60 0 100 20 20 20 18590 FCOM-N0–03–05–20–004–140

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - ALL ENGINES
CRUISE : M.78 - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6 MIN)

REF. INITIAL WEIGHT = 55000 KG
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
1350	7454 3.05	7004 3.06	6619 3.08	6291 3.09	6048 3.10	5927 3.10	28	42	73
1375	7595 3.08	7136 3.10	6743 3.11	6408 3.13	6160 3.14	6036 3.14	28	43	74
1400	7735 3.12	7267 3.13	6867 3.15	6526 3.16	6272 3.17	6145 3.17	29	44	75
1425	7875 3.15	7398 3.16	6990 3.18	6643 3.19	6383 3.20	6253 3.20	29	44	76
1450	8015 3.18	7529 3.20	7114 3.21	6760 3.23	6495 3.24	6361 3.24	30	45	78
1475	8155 3.21	7660 3.23	7237 3.24	6877 3.26	6607 3.27	6469 3.27	30	46	79
1500	8295 3.24	7790 3.26	7360 3.28	6993 3.29	6718 3.30	6577 3.30	31	47	80
1525	8434 3.28	7921 3.29	7483 3.31	7110 3.33	6829 3.34	6685 3.34	31	47	81
1550	8574 3.31	8052 3.33	7607 3.34	7226 3.36	6940 3.37	6792 3.37	32	48	82
1575	8714 3.34	8183 3.36	7729 3.38	7343 3.39	7051 3.40	6899 3.40	32	49	83
1600	8853 3.37	8313 3.39	7852 3.41	7459 3.43	7162 3.44	7006 3.44	33	50	85
1625	8993 3.41	8444 3.42	7975 3.44	7575 3.46	7273 3.47	7113 3.47	33	50	86
1650	9132 3.44	8574 3.46	8098 3.48	7691 3.49	7383 3.51	7220 3.51	34	51	87
1675	9272 3.47	8705 3.49	8221 3.51	7807 3.53	7494 3.54	7327 3.54	34	52	88
1700	9411 3.50	8835 3.52	8344 3.54	7923 3.56	7604 3.57	7433 3.57	35	53	89
1725	9550 3.54	8965 3.56	8466 3.57	8039 3.59	7714 4.01	7539 4.01	35	53	90
1750	9689 3.57	9096 3.59	8589 4.01	8155 4.03	7825 4.04	7645 4.04	36	54	91
1775	9828 4.00	9226 4.02	8711 4.04	8271 4.06	7935 4.07	7751 4.07	36	55	92
1800	9967 4.03	9356 4.05	8833 4.07	8386 4.09	8045 4.11	7857 4.11	37	55	93
1825	10106 4.07	9486 4.09	8956 4.11	8502 4.13	8155 4.14	7963 4.14	37	56	94
1850	10245 4.10	9615 4.12	9078 4.14	8617 4.16	8264 4.17	8069 4.17	38	57	95
1875	10383 4.13	9745 4.15	9200 4.17	8732 4.19	8374 4.21	8175 4.21	38	58	96
1900	10522 4.16	9875 4.18	9322 4.21	8848 4.23	8484 4.24	8280 4.24	39	58	98
1925	10661 4.20	10004 4.22	9444 4.24	8963 4.26	8593 4.27	8386 4.27	39	59	99
1950	10799 4.23	10134 4.25	9565 4.27	9078 4.29	8702 4.31	8491 4.31	40	60	100
1975	10938 4.26	10263 4.28	9687 4.31	9192 4.33	8812 4.34	8596 4.34	40	60	101

CORRECTIONS	**ENGINE AI ON**	**TOTAL AI ON**
FUEL	+ 5 %	+ 8 %

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - ALL ENGINES
CRUISE : M.78 - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6 MIN)

REF. INITIAL WEIGHT = 55000 KG
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
1975	10938 4.26	10263 4.28	9687 4.31	9192 4.33	8812 4.34	8596 4.34	40	60	101
2000	11076 4.29	10392 4.32	9809 4.34	9307 4.36	8921 4.37	8701 4.37	41	61	102
2025	11215 4.33	10522 4.35	9930 4.37	9422 4.39	9030 4.41	8806 4.41	41	62	103
2050	11353 4.36	10651 4.38	10052 4.40	9536 4.43	9138 4.44	8910 4.44	42	62	104
2075	11491 4.39	10780 4.41	10173 4.44	9651 4.46	9247 4.47	9015 4.47	42	63	105
2100	11629 4.42	10910 4.45	10294 4.47	9765 4.49	9356 4.51	9119 4.51	42	64	106
2125	11767 4.46	11039 4.48	10415 4.50	9879 4.53	9464 4.54	9223 4.54	43	64	106
2150	11905 4.49	11168 4.51	10536 4.54	9994 4.56	9573 4.57	9327 4.57	45	65	107
2175	12043 4.52	11297 4.54	10657 4.57	10108 4.59	9681 5.01	9431 5.01	46	66	108
2200	12181 4.55	11426 4.58	10778 5.00	10222 5.03	9789 5.04	9535 5.04	46	66	109
2225	12319 4.59	11555 5.01	10899 5.04	10335 5.06	9897 5.08	9639 5.08	47	67	110
2250	12457 5.02	11684 5.04	11020 5.07	10449 5.09	10005 5.11	9742 5.11	47	68	111
2275	12594 5.05	11812 5.08	11140 5.10	10563 5.13	10112 5.14	9845 5.14	47	68	112
2300	12732 5.08	11941 5.11	11261 5.13	10676 5.16	10220 5.18	9949 5.18	51	69	113
2325	12870 5.11	12070 5.14	11381 5.17	10790 5.19	10328 5.21	10052 5.21	51	69	114
2350	13007 5.15	12198 5.17	11502 5.20	10903 5.23	10435 5.24	10155 5.24	52	70	115
2375	13144 5.18	12327 5.21	11622 5.23	11016 5.26	10542 5.28	10257 5.28	52	71	116
2400	13282 5.21	12455 5.24	11742 5.27	11130 5.29	10650 5.31	10360 5.31	53	71	116
2425	13419 5.24	12583 5.27	11862 5.30	11243 5.33	10757 5.34	10462 5.34	53	72	117
2450	13557 5.28	12712 5.30	11982 5.33	11356 5.36	10865 5.38	10565 5.38	54	76	118
2475	13694 5.31	12840 5.34	12102 5.37	11468 5.39	10972 5.41	10667 5.41	54	76	119
2500	13831 5.34	12968 5.37	12222 5.40	11581 5.43	11079 5.44	10770 5.44	54	77	120
2525	13968 5.37	13096 5.40	12342 5.43	11694 5.46	11186 5.48	10872 5.48	55	78	121
2550	14105 5.41	13224 5.44	12462 5.46	11807 5.49	11293 5.51	10974 5.51	55	78	122
2575	14242 5.44	13352 5.47	12581 5.50	11919 5.53	11399 5.54	11076 5.54	56	79	122
2600	14379 5.47	13480 5.50	12701 5.53	12032 5.56	11506 5.58	11178 5.58	56	79	123

CORRECTIONS	**ENGINE AI ON**	**TOTAL AI ON**
FUEL	+ 5 %	+ 8 %

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : M.78 - DdescENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
1350	7385 3.05	6920 3.06	6581 3.08	6303 3.09	6057 3.10	5995 3.10	23	44	71
1375	7524 3.08	7049 3.10	6704 3.11	6420 3.13	6170 3.14	6105 3.14	24	44	72
1400	7664 3.11	7179 3.13	6826 3.14	6537 3.16	6282 3.17	6214 3.17	24	45	73
1425	7803 3.15	7308 3.16	6949 3.18	6654 3.19	6395 3.20	6323 3.20	25	46	75
1450	7942 3.18	7437 3.19	7071 3.21	6770 3.23	6507 3.24	6431 3.24	25	47	76
1475	8081 3.21	7566 3.23	7193 3.24	6887 3.26	6619 3.27	6540 3.27	25	47	77
1500	8220 3.24	7696 3.26	7315 3.28	7003 3.29	6731 3.30	6648 3.30	26	48	78
1525	8359 3.28	7825 3.29	7437 3.31	7120 3.33	6842 3.34	6756 3.34	26	49	80
1550	8498 3.31	7954 3.33	7558 3.34	7236 3.36	6954 3.37	6864 3.37	27	50	81
1575	8637 3.34	8082 3.36	7680 3.38	7352 3.39	7066 3.40	6972 3.40	27	51	82
1600	8776 3.37	8211 3.39	7801 3.41	7468 3.43	7177 3.44	7079 3.44	27	51	83
1625	8915 3.41	8340 3.42	7923 3.44	7584 3.46	7288 3.47	7187 3.47	28	52	85
1650	9054 3.44	8469 3.46	8044 3.47	7700 3.49	7400 3.50	7294 3.50	28	53	86
1675	9193 3.47	8597 3.49	8165 3.51	7816 3.53	7511 3.54	7401 3.54	28	54	87
1700	9331 3.50	8725 3.52	8287 3.54	7931 3.56	7622 3.57	7507 3.57	29	54	88
1725	9470 3.54	8854 3.55	8408 3.57	8047 3.59	7732 4.00	7614 4.00	29	55	89
1750	9609 3.57	8982 3.59	8528 4.01	8162 4.03	7843 4.04	7720 4.04	29	56	91
1775	9747 4.00	9110 4.02	8649 4.04	8277 4.06	7954 4.07	7827 4.07	30	57	92
1800	9886 4.03	9239 4.05	8770 4.07	8393 4.09	8064 4.10	7933 4.10	30	57	93
1825	10024 4.07	9367 4.09	8890 4.11	8508 4.13	8175 4.14	8038 4.14	30	58	94
1850	10163 4.10	9495 4.12	9011 4.14	8623 4.16	8285 4.17	8144 4.17	31	59	95
1875	10301 4.13	9622 4.15	9131 4.17	8737 4.19	8395 4.21	8249 4.21	31	59	96
1900	10440 4.16	9750 4.18	9252 4.20	8852 4.23	8505 4.24	8355 4.24	31	60	97
1925	10578 4.20	9878 4.22	9372 4.24	8967 4.26	8615 4.27	8460 4.27	31	61	99
1950	10716 4.23	10006 4.25	9492 4.27	9081 4.29	8725 4.31	8565 4.31	32	61	100
1975	10855 4.26	10133 4.28	9612 4.30	9196 4.33	8835 4.34	8669 4.34	32	62	101

LOW AIR CONDITIONNING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.4 %	△FUEL = + 3 %	△FUEL = + 5.5 %

PROGRAM : FLIP23C 17.07.97 ; AERO : A319–131 07/02/97 ; MOTO : A319–131 07/02/97 ; GENE : A319–131 26/02/97 END OF FLIP

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : M.78 - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
1975	10855 4.26	10133 4.28	9612 4.30	9196 4.33	8835 4.34	8669 4.34	32	62	101
2000	10993 4.29	10261 4.31	9732 4.34	9310 4.36	8944 4.37	8774 4.37	32	63	102
2025	11131 4.32	10388 4.35	9851 4.37	9424 4.39	9054 4.41	8878 4.41	33	63	103
2050	11270 4.36	10517 4.38	9971 4.40	9538 4.43	9163 4.44	8983 4.44	33	64	104
2075	11408 4.39	10645 4.41	10091 4.44	9652 4.46	9272 4.47	9087 4.47	33	65	105
2100	11546 4.42	10773 4.45	10210 4.47	9766 4.49	9382 4.51	9190 4.51	33	65	106
2125	11684 4.45	10901 4.48	10329 4.50	9879 4.53	9491 4.54	9294 4.54	34	66	107
2150	11822 4.49	11030 4.51	10449 4.54	9993 4.56	9600 4.57	9398 4.57	34	67	108
2175	11960 4.52	11158 4.54	10568 4.57	10107 4.59	9708 5.01	9501 5.01	34	67	109
2200	12098 4.55	11286 4.58	10687 5.00	10220 5.03	9817 5.04	9604 5.04	34	68	110
2225	12236 4.58	11414 5.01	10806 5.03	10333 5.06	9926 5.07	9707 5.07	35	69	111
2250	12374 5.02	11542 5.04	10925 5.07	10446 5.09	10034 5.11	9810 5.11	35	69	112
2275	12512 5.05	11670 5.07	11044 5.10	10559 5.13	10143 5.14	9913 5.14	35	70	113
2300	12650 5.08	11797 5.11	11162 5.13	10672 5.16	10251 5.17	10015 5.17	35	71	114
2325	12788 5.11	11925 5.14	11281 5.17	10785 5.19	10359 5.21	10118 5.21	35	71	115
2350	12926 5.15	12053 5.17	11400 5.20	10898 5.23	10467 5.24	10220 5.24	36	72	116
2375	13063 5.18	12181 5.21	11518 5.23	11010 5.26	10576 5.28	10322 5.28	36	72	117
2400	13201 5.21	12308 5.24	11637 5.27	11123 5.29	10684 5.31	10424 5.31	36	73	118
2425	13339 5.24	12436 5.27	11755 5.30	11235 5.33	10792 5.34	10527 5.34	36	74	119
2450	13476 5.28	12564 5.30	11873 5.33	11347 5.36	10900 5.38	10630 5.38	37	74	120
2475	13614 5.31	12691 5.34	11991 5.36	11460 5.39	11007 5.41	10733 5.41	37	75	121
2500	13751 5.34	12818 5.37	12109 5.40	11572 5.43	11115 5.44	10835 5.44	37	75	122
2525	13889 5.37	12946 5.40	12227 5.43	11684 5.46	11223 5.48	10938 5.48	37	76	123
2550	14026 5.41	13073 5.43	12345 5.46	11796 5.49	11330 5.51	11040 5.51	38	76	124
2575	14164 5.44	13200 5.47	12463 5.50	11907 5.53	11438 5.54	11142 5.54	38	77	125
2600	14301 5.47	13328 5.50	12580 5.53	12019 5.56	11545 5.58	11244 5.58	38	78	126

LOW AIR CONDITIONNING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.4 %	△FUEL = + 3 %	△FUEL = + 5.5 %

PROGRAM : FLIP23C 17.07.97 ; AERO : A319–131 07/02/97 ; MOTO : A319–131 07/02/97 ; GENE : A319–131 26/02/97 END OF FLIP

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : M.78 - DdescENT : M.78/300KT/250KT
IMC PROCEDURE : 120 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
1350	7419 3.05	6946 3.07	6613 3.08	6333 3.10	6081 3.10	6013 3.10	22	44	75
1375	7559 3.08	7076 3.10	6736 3.11	6451 3.13	6194 3.14	6123 3.14	23	45	76
1400	7699 3.12	7206 3.13	6859 3.15	6569 3.16	6306 3.17	6232 3.17	23	46	77
1425	7839 3.15	7336 3.16	6982 3.18	6686 3.20	6418 3.20	6342 3.20	23	47	79
1450	7979 3.18	7466 3.20	7104 3.21	6804 3.23	6531 3.24	6451 3.24	24	48	80
1475	8118 3.21	7596 3.23	7227 3.25	6921 3.26	6643 3.27	6559 3.27	24	49	81
1500	8258 3.25	7726 3.26	7349 3.28	7038 3.30	6755 3.30	6668 3.30	24	49	82
1525	8398 3.28	7856 3.29	7472 3.31	7155 3.33	6866 3.34	6776 3.34	25	50	83
1550	8538 3.31	7986 3.33	7594 3.34	7271 3.36	6978 3.37	6885 3.37	25	51	84
1575	8677 3.34	8115 3.36	7716 3.38	7388 3.39	7090 3.40	6993 3.40	25	52	86
1600	8817 3.37	8245 3.39	7838 3.41	7505 3.43	7202 3.44	7101 3.44	26	53	87
1625	8956 3.41	8374 3.42	7960 3.44	7621 3.46	7314 3.47	7208 3.47	26	54	88
1650	9096 3.44	8504 3.46	8082 3.48	7737 3.49	7425 3.51	7316 3.51	26	54	89
1675	9235 3.47	8633 3.49	8204 3.51	7853 3.53	7537 3.54	7423 3.54	26	55	90
1700	9375 3.50	8762 3.52	8326 3.54	7969 3.56	7649 3.57	7530 3.57	27	56	91
1725	9514 3.54	8892 3.56	8447 3.58	8085 3.59	7760 4.01	7637 4.01	27	57	92
1750	9653 3.57	9021 3.59	8569 4.01	8201 4.03	7871 4.04	7744 4.04	27	58	93
1775	9793 4.00	9150 4.02	8690 4.04	8317 4.06	7982 4.07	7851 4.07	28	58	94
1800	9932 4.03	9279 4.05	8812 4.07	8432 4.09	8093 4.11	7957 4.11	28	59	95
1825	10071 4.07	9408 4.09	8933 4.11	8548 4.13	8204 4.14	8064 4.14	28	60	96
1850	10210 4.10	9536 4.12	9054 4.14	8663 4.16	8315 4.17	8170 4.17	28	61	97
1875	10349 4.13	9665 4.15	9175 4.17	8778 4.19	8426 4.21	8276 4.21	29	62	98
1900	10489 4.16	9794 4.18	9296 4.21	8894 4.23	8536 4.24	8381 4.24	29	62	99
1925	10628 4.20	9922 4.22	9416 4.24	9009 4.26	8647 4.27	8487 4.27	29	63	100
1950	10767 4.23	10051 4.25	9537 4.27	9123 4.29	8757 4.31	8592 4.31	29	64	101
1975	10905 4.26	10179 4.28	9658 4.31	9238 4.33	8867 4.34	8697 4.34	29	65	102

LOW AIR CONDITIONING
△FUEL = − 0.4 %

ENGINE ANTI ICE ON
△FUEL = + 3 %

TOTAL ANTI ICE ON
△FUEL = + 5.5 %

FLIP23C A320-232 IAE V2527-A5 3610 03301.000011 0250300 .7800 .000200 120 0300350 60 0 100 20 20 20 18590 FCOM-N0–03–05–20–005–140

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : M.78 - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 120 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
1975	10905 4.26	10179 4.28	9658 4.31	9238 4.33	8867 4.34	8697 4.34	29	65	102
2000	11044 4.29	10308 4.32	9778 4.34	9353 4.36	8978 4.37	8803 4.37	30	65	103
2025	11183 4.33	10436 4.35	9898 4.37	9467 4.39	9088 4.41	8907 4.41	30	66	104
2050	11322 4.36	10564 4.38	10019 4.40	9582 4.43	9198 4.44	9012 4.44	30	67	105
2075	11461 4.39	10693 4.41	10139 4.44	9696 4.46	9307 4.47	9117 4.47	30	68	106
2100	11599 4.42	10821 4.45	10259 4.47	9810 4.49	9417 4.51	9221 4.51	30	68	107
2125	11738 4.46	10949 4.48	10379 4.50	9925 4.53	9527 4.54	9325 4.54	31	69	107
2150	11877 4.49	11077 4.51	10499 4.54	10039 4.56	9636 4.57	9429 4.58	31	70	108
2175	12015 4.52	11205 4.54	10618 4.57	10152 4.59	9746 5.01	9533 5.01	31	71	109
2200	12154 4.55	11332 4.58	10738 5.00	10266 5.03	9855 5.04	9637 5.04	31	71	110
2225	12292 4.59	11460 5.01	10858 5.04	10380 5.06	9964 5.08	9740 5.08	31	72	111
2250	12431 5.02	11588 5.04	10977 5.07	10493 5.09	10073 5.11	9844 5.11	32	73	112
2275	12570 5.05	11715 5.08	11096 5.10	10607 5.13	10182 5.14	9947 5.14	32	73	113
2300	12708 5.08	11843 5.11	11216 5.13	10720 5.16	10291 5.18	10050 5.18	32	74	113
2325	12846 5.11	11970 5.14	11335 5.17	10834 5.19	10400 5.21	10153 5.21	32	75	114
2350	12985 5.15	12098 5.17	11454 5.20	10947 5.23	10509 5.24	10256 5.24	32	76	115
2375	13123 5.18	12227 5.21	11573 5.23	11060 5.26	10617 5.28	10358 5.28	33	76	116
2400	13262 5.21	12355 5.24	11692 5.27	11173 5.29	10726 5.31	10460 5.31	33	77	117
2425	13400 5.24	12483 5.27	11810 5.30	11285 5.33	10834 5.34	10563 5.34	33	78	117
2450	13538 5.28	12612 5.30	11929 5.33	11398 5.36	10942 5.38	10665 5.38	33	78	118
2475	13676 5.31	12740 5.34	12048 5.37	11511 5.39	11050 5.41	10767 5.41	33	79	119
2500	13814 5.34	12868 5.37	12166 5.40	11623 5.43	11159 5.44	10868 5.44	33	80	120
2525	13952 5.37	12996 5.40	12285 5.43	11736 5.46	11266 5.48	10970 5.48	34	80	120
2550	14090 5.41	13124 5.44	12403 5.46	11848 5.49	11374 5.51	11071 5.51	34	81	121
2575	14228 5.44	13252 5.47	12521 5.50	11960 5.53	11482 5.54	11173 5.54	34	82	122
2600	14367 5.47	13380 5.50	12640 5.53	12072 5.56	11590 5.58	11274 5.58	34	83	123

LOW AIR CONDITIONING
△FUEL = – 0.4 %

ENGINE ANTI ICE ON
△FUEL = + 3 %

TOTAL ANTI ICE ON
△FUEL = + 5.5 %

FLIP23C A320-232 IAE V2527-A5 3610 03301.000011 0250300 .7800 .000200 120 0300350 60 0 100 20 20 20 18590 FCOM-N0–03–05–20–006–140

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - ALL ENGINES
CRUISE : M.78 - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6 MIN)

REF. INITIAL WEIGHT = 55000 KG
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
2600	14379 5.47	13480 5.50	12701 5.53	12032 5.56	11506 5.58	11177 5.58	51	76	123
2625	14516 5.50	13607 5.53	12820 5.56	12144 5.59	11612 6.01	11279 6.01	51	77	124
2650	14653 5.54	13735 5.57	12939 6.00	12256 6.03	11719 6.04	11381 6.04	52	77	125
2675	14790 5.57	13863 6.00	13059 6.03	12369 6.06	11825 6.08	11482 6.08	52	78	126
2700	14926 6.00	13990 6.03	13178 6.06	12481 6.09	11932 6.11	11584 6.11	52	79	126
2725	15063 6.03	14118 6.06	13297 6.10	12592 6.13	12038 6.14	11685 6.15	53	79	127
2750	15200 6.07	14245 6.10	13416 6.13	12704 6.16	12144 6.18	11786 6.18	53	80	128
2775	15336 6.10	14372 6.13	13535 6.16	12816 6.19	12250 6.21	11887 6.21	54	80	129
2800	15473 6.13	14500 6.16	13654 6.19	12928 6.23	12356 6.25	11988 6.25	54	81	129
2825	15609 6.16	14627 6.19	13772 6.23	13039 6.26	12461 6.28	12089 6.28	54	81	130
2850	15746 6.20	14754 6.23	13891 6.26	13151 6.29	12567 6.31	12190 6.31	57	82	131
2875	15882 6.23	14882 6.26	14010 6.29	13262 6.33	12673 6.35	12291 6.35	58	82	132
2900	16018 6.26	15009 6.29	14128 6.33	13373 6.36	12778 6.38	12391 6.38	58	83	132
2925	16154 6.29	15136 6.33	14247 6.36	13484 6.39	12884 6.41	12491 6.41	58	84	133
2950	16290 6.33	15263 6.36	14365 6.39	13596 6.43	12989 6.45	12592 6.45	59	84	134
2975	16426 6.36	15390 6.39	14483 6.43	13707 6.46	13094 6.48	12692 6.48	59	85	135
3000	16562 6.39	15516 6.42	14602 6.46	13817 6.49	13199 6.51	12792 6.51	59	85	135
3025	16698 6.42	15643 6.46	14720 6.49	13928 6.53	13304 6.55	12892 6.55	60	86	136
3050	16834 6.45	15770 6.49	14838 6.52	14039 6.56	13409 6.58	12991 6.58	60	86	137
3075	16970 6.49	15896 6.52	14956 6.56	14150 6.59	13514 7.01	13091 7.01	64	87	137
3100	17106 6.52	16023 6.55	15074 6.59	14260 7.03	13618 7.05	13190 7.05	64	87	138

CORRECTIONS	ENGINE AI ON	TOTAL AI ON
FUEL	+ 5 %	+ 8 %

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - ALL ENGINES
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6 MIN)

REF. INITIAL WEIGHT = 55000 KG NORMAL AIR CONDITIONING ANTI ICE OFF	ISA CG=33.0%	**FUEL CONSUMED (KG)** **TIME (H.MIN)**

AIR DIST. (NM)	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
	100	**150**	**200**	**230**	**250**	**270**	**FL100 FL150**	**FL200 FL230**	**FL250 FL270**
100	735 0.26	578 0.24	472 0.24	422 0.24	393 0.24	365 0.23	1	0	0
125	921 0.31	746 0.29	620 0.29	563 0.28	531 0.28	499 0.27	2	0	0
150	1107 0.36	914 0.33	768 0.33	704 0.33	668 0.32	634 0.31	3	2	2
175	1292 0.41	1082 0.37	916 0.38	845 0.37	806 0.36	768 0.35	4	3	3
200	1477 0.46	1250 0.42	1064 0.42	985 0.41	943 0.41	901 0.39	5	4	5
225	1662 0.51	1418 0.46	1212 0.46	1125 0.46	1080 0.45	1035 0.43	6	6	6
250	1847 0.56	1585 0.50	1359 0.51	1265 0.50	1216 0.49	1168 0.47	7	7	8
275	2031 1.01	1752 0.54	1507 0.55	1404 0.55	1353 0.53	1301 0.51	8	8	9
300	2216 1.06	1920 0.59	1654 0.59	1544 0.59	1489 0.57	1434 0.55	9	9	11
325	2400 1.11	2087 1.03	1801 1.04	1683 1.03	1625 1.02	1567 0.59	10	10	13
350	2584 1.16	2254 1.07	1948 1.08	1822 1.08	1760 1.06	1700 1.03	11	12	14
375	2768 1.21	2421 1.11	2095 1.12	1961 1.12	1896 1.10	1832 1.07	12	13	16
400	2951 1.26	2588 1.16	2242 1.17	2100 1.16	2031 1.14	1964 1.11	13	14	17
425	3134 1.31	2754 1.20	2388 1.21	2239 1.21	2166 1.18	2096 1.15	14	15	19
450	3317 1.36	2921 1.24	2535 1.25	2377 1.25	2301 1.23	2227 1.19	15	16	20
475	3500 1.41	3087 1.29	2681 1.30	2515 1.29	2436 1.27	2358 1.23	16	18	22
500	3683 1.46	3253 1.33	2828 1.34	2653 1.34	2570 1.31	2490 1.28	18	19	23
525	3866 1.51	3420 1.37	2974 1.39	2791 1.38	2704 1.35	2620 1.32	19	20	25
550	4048 1.56	3586 1.41	3120 1.43	2929 1.43	2838 1.40	2751 1.36	20	21	26
575	4230 2.01	3752 1.46	3266 1.47	3066 1.47	2972 1.44	2881 1.40	21	22	28
600	4412 2.06	3917 1.50	3411 1.52	3203 1.51	3105 1.48	3011 1.44	22	23	29
625	4593 2.11	4083 1.54	3557 1.56	3340 1.56	3239 1.53	3141 1.48	23	25	31
650	4775 2.16	4248 1.58	3703 2.00	3477 2.00	3372 1.57	3271 1.52	25	26	32
675	4956 2.21	4414 2.03	3848 2.05	3614 2.04	3505 2.01	3401 1.56	26	27	34
700	5138 2.26	4579 2.07	3993 2.09	3750 2.09	3637 2.06	3530 2.01	27	28	35
725	5319 2.31	4744 2.11	4138 2.13	3887 2.13	3770 2.10	3659 2.05	28	29	37

CORRECTIONS	**ENGINE AI ON**	**TOTAL AI ON**
FUEL	+ 3 %	+ 5 %

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : M.78 - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
2600	14301 5.47	13328 5.50	12580 5.53	12019 5.56	11545 5.58	11244 5.58	38	78	126
2625	14438 5.50	13455 5.53	12698 5.56	12131 5.59	11652 6.01	11346 6.01	38	78	127
2650	14575 5.54	13582 5.56	12815 6.00	12242 6.03	11760 6.04	11448 6.04	38	79	128
2675	14713 5.57	13709 6.00	12932 6.03	12354 6.06	11867 6.08	11549 6.08	39	79	129
2700	14850 6.00	13836 6.03	13050 6.06	12465 6.09	11974 6.11	11651 6.11	39	80	129
2725	14987 6.03	13963 6.06	13167 6.09	12576 6.13	12081 6.14	11752 6.14	39	80	130
2750	15124 6.06	14090 6.10	13284 6.13	12687 6.16	12187 6.18	11854 6.18	39	81	131
2775	15261 6.10	14217 6.13	13401 6.16	12798 6.19	12294 6.21	11955 6.21	39	81	132
2800	15398 6.13	14343 6.16	13518 6.19	12909 6.23	12401 6.24	12056 6.24	40	82	133
2825	15535 6.16	14470 6.19	13634 6.23	13020 6.26	12507 6.28	12157 6.28	40	83	134
2850	15672 6.19	14597 6.23	13751 6.26	13130 6.29	12614 6.31	12258 6.31	40	83	135
2875	15809 6.23	14724 6.26	13868 6.29	13241 6.33	12720 6.34	12358 6.34	40	84	135
2900	15946 6.26	14850 6.29	13984 6.33	13351 6.36	12826 6.38	12459 6.38	40	84	136
2925	16083 6.29	14977 6.32	14101 6.36	13462 6.39	12932 6.41	12559 6.41	40	85	137
2950	16220 6.32	15103 6.36	14217 6.39	13572 6.43	13038 6.45	12659 6.45	41	85	138
2975	16358 6.36	15230 6.39	14333 6.42	13682 6.46	13144 6.48	12759 6.48	41	86	139
3000	16495 6.39	15356 6.42	14449 6.46	13792 6.49	13250 6.51	12859 6.51	41	86	140
3025	16632 6.42	15482 6.46	14565 6.49	13902 6.53	13356 6.55	12959 6.55	41	87	140
3050	16770 6.45	15608 6.49	14681 6.52	14012 6.56	13461 6.58	13059 6.58	41	87	141
3075	16907 6.49	15735 6.52	14797 6.56	14122 6.59	13567 7.01	13158 7.01	41	88	142
3100	17044 6.52	15861 6.55	14913 6.59	14232 7.03	13672 7.05	13258 7.05	41	88	143

LOW AIR CONDITIONNING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = − 0.4 %	△FUEL = + 3 %	△FUEL = + 5.5 %

PROGRAM : FLIP23C 17.07.97 ; AERO : A319−131 07/02/97 ; MOTO : A319−131 07/02/97 ; GENE : A319−131 26/02/97 END OF FLIP

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	150	200	230	250	270	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL150	FL200 FL230	FL250 FL270
100	793 0.25	618 0.24	503 0.24	443 0.24	410 0.24	381 0.23	1	0	0
125	995 0.30	799 0.29	662 0.28	590 0.28	550 0.27	516 0.27	2	0	0
150	1195 0.35	980 0.33	822 0.32	736 0.32	690 0.31	652 0.31	4	0	1
175	1396 0.40	1161 0.37	981 0.36	883 0.36	830 0.35	787 0.35	5	1	2
200	1596 0.45	1341 0.42	1140 0.40	1029 0.40	970 0.39	923 0.39	6	2	3
225	1796 0.49	1522 0.46	1299 0.44	1175 0.43	1110 0.43	1058 0.43	7	3	4
250	1996 0.54	1702 0.50	1458 0.48	1321 0.47	1249 0.47	1192 0.47	8	4	5
275	2196 0.59	1882 0.54	1617 0.52	1467 0.51	1389 0.51	1327 0.51	9	5	6
300	2395 1.04	2062 0.59	1775 0.56	1613 0.55	1528 0.55	1461 0.54	11	5	7
325	2594 1.09	2241 1.03	1934 1.00	1759 0.59	1667 0.59	1596 0.58	12	6	8
350	2793 1.14	2421 1.07	2092 1.04	1905 1.03	1806 1.03	1730 1.02	13	7	9
375	2991 1.19	2600 1.12	2251 1.08	2050 1.07	1945 1.07	1864 1.06	14	8	10
400	3190 1.24	2779 1.16	2409 1.12	2196 1.11	2083 1.11	1997 1.10	15	9	12
425	3388 1.29	2958 1.20	2567 1.16	2341 1.15	2222 1.15	2131 1.14	16	9	13
450	3585 1.34	3136 1.25	2725 1.20	2486 1.19	2360 1.19	2264 1.18	18	10	14
475	3783 1.39	3315 1.29	2883 1.24	2631 1.23	2498 1.23	2398 1.22	19	11	15
500	3980 1.44	3493 1.34	3041 1.28	2777 1.27	2636 1.27	2531 1.26	20	12	16
525	4177 1.49	3671 1.38	3199 1.32	2921 1.31	2774 1.31	2663 1.30	21	13	17
550	4374 1.54	3849 1.42	3356 1.36	3066 1.35	2912 1.35	2796 1.34	22	14	18
575	4571 1.59	4027 1.47	3514 1.40	3211 1.39	3049 1.39	2929 1.38	23	14	19
600	4767 2.03	4205 1.51	3671 1.44	3356 1.43	3187 1.43	3061 1.42	24	15	20
625	4964 2.08	4382 1.56	3828 1.48	3500 1.47	3324 1.47	3193 1.46	26	16	21
650	5160 2.13	4559 2.00	3985 1.52	3644 1.51	3461 1.51	3325 1.50	27	17	22
675	5356 2.18	4736 2.04	4143 1.56	3789 1.55	3598 1.55	3457 1.54	28	18	23
700	5552 2.23	4912 2.09	4300 2.00	3933 1.59	3735 1.59	3588 1.58	29	19	24
725	5747 2.28	5088 2.13	4456 2.04	4077 2.03	3871 2.03	3720 2.02	30	19	25

LOW AIR CONDITIONNING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.4 %	△FUEL = + 3 %	△FUEL = + 5.5 %

PROGRAM : FLIP23C 17.07.97 ; AERO : A319–131 07/02/97 ; MOTO : A319–131 07/02/97 ; GENE : A319–131 26/02/97 END OF FLIP

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : M.78 - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 120 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
2600	14367 5.47	13380 5.50	12640 5.53	12072 5.56	11590 5.58	11274 5.58	34	83	123
2625	14505 5.50	13508 5.53	12758 5.56	12184 5.59	11697 6.01	11375 6.01	34	83	124
2650	14642 5.54	13636 5.57	12876 6.00	12296 6.03	11805 6.04	11476 6.04	34	84	125
2675	14780 5.57	13764 6.00	12994 6.03	12408 6.06	11912 6.08	11576 6.08	34	84	125
2700	14918 6.00	13892 6.03	13112 6.06	12520 6.09	12019 6.11	11677 6.11	35	85	126
2725	15056 6.03	14020 6.06	13229 6.10	12632 6.13	12127 6.15	11777 6.15	35	86	127
2750	15194 6.07	14147 6.10	13347 6.13	12743 6.16	12234 6.18	11878 6.18	35	86	128
2775	15332 6.10	14275 6.13	13465 6.16	12855 6.19	12341 6.21	11978 6.21	35	87	129
2800	15469 6.13	14403 6.16	13582 6.19	12966 6.23	12448 6.25	12078 6.25	35	87	130
2825	15607 6.16	14530 6.20	13699 6.23	13077 6.26	12555 6.28	12179 6.28	35	88	130
2850	15745 6.20	14658 6.23	13817 6.26	13188 6.29	12661 6.31	12281 6.31	35	88	131
2875	15882 6.23	14785 6.26	13934 6.29	13299 6.33	12768 6.35	12382 6.35	35	89	132
2900	16020 6.26	14913 6.29	14051 6.33	13410 6.36	12875 6.38	12484 6.38	35	90	133
2925	16157 6.29	15040 6.33	14168 6.36	13521 6.39	12981 6.41	12585 6.41	35	90	133
2950	16295 6.33	15168 6.36	14285 6.39	13632 6.43	13087 6.45	12686 6.45	35	91	134
2975	16432 6.36	15295 6.39	14402 6.43	13743 6.46	13194 6.48	12787 6.48	36	91	135
3000	16570 6.39	15422 6.42	14519 6.46	13853 6.49	13300 6.51	12888 6.51	36	92	136
3025	16707 6.42	15550 6.46	14635 6.49	13964 6.53	13406 6.55	12989 6.55	36	92	136
3050	16844 6.45	15677 6.49	14752 6.52	14074 6.56	13512 6.58	13090 6.58	36	93	137
3075	16981 6.49	15804 6.52	14869 6.56	14184 6.59	13618 7.01	13190 7.01	36	93	138
3100	17119 6.52	15931 6.55	14985 6.59	14294 7.03	13724 7.05	13291 7.05	36	94	139

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = − 0.4 %	△FUEL = + 3 %	△FUEL = + 5.5 %

FLIP23C A320-232 IAE V2527-A5 3610 03301.000011 0250300 .7800 .000200 120 0300350 60 0 100 20 20 20 18590 FCOM-N0–03–05–20–007–140

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 120 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	150	200	230	250	270	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL150	FL200 FL230	FL250 FL270
100	779 0.25	620 0.25	507 0.24	448 0.24	415 0.24	386 0.23	2	0	0
125	975 0.30	802 0.29	667 0.28	595 0.28	556 0.28	523 0.27	4	0	0
150	1170 0.35	984 0.33	827 0.32	742 0.32	697 0.32	659 0.31	5	0	1
175	1366 0.40	1165 0.38	987 0.36	889 0.36	838 0.35	795 0.35	7	1	2
200	1560 0.45	1346 0.42	1147 0.40	1036 0.40	979 0.39	931 0.39	9	1	3
225	1755 0.50	1527 0.47	1307 0.44	1182 0.44	1119 0.43	1067 0.43	10	2	4
250	1949 0.55	1707 0.51	1467 0.48	1329 0.48	1259 0.47	1203 0.47	12	3	5
275	2143 1.00	1887 0.55	1627 0.52	1475 0.52	1399 0.51	1338 0.50	13	3	7
300	2337 1.05	2067 1.00	1787 0.55	1621 0.56	1539 0.55	1474 0.54	15	4	8
325	2530 1.10	2246 1.04	1947 0.59	1768 1.00	1679 0.59	1609 0.58	17	5	9
350	2723 1.15	2425 1.09	2106 1.03	1914 1.04	1819 1.03	1744 1.02	18	6	10
375	2916 1.20	2604 1.13	2266 1.07	2060 1.08	1958 1.07	1879 1.06	20	6	11
400	3108 1.25	2782 1.18	2425 1.11	2206 1.11	2097 1.11	2014 1.10	21	7	13
425	3300 1.30	2960 1.22	2584 1.15	2352 1.15	2237 1.15	2148 1.14	23	8	14
450	3492 1.35	3138 1.27	2744 1.19	2497 1.19	2376 1.19	2282 1.18	25	8	15
475	3683 1.41	3316 1.31	2903 1.23	2643 1.23	2514 1.23	2416 1.22	26	9	16
500	3874 1.46	3493 1.36	3062 1.27	2789 1.27	2653 1.27	2550 1.26	28	10	17
525	4065 1.51	3670 1.41	3221 1.31	2934 1.31	2792 1.31	2684 1.30	29	10	18
550	4255 1.56	3846 1.45	3380 1.35	3079 1.35	2930 1.35	2817 1.33	31	11	19
575	4445 2.01	4022 1.50	3539 1.39	3225 1.39	3068 1.39	2951 1.37	33	12	21
600	4635 2.06	4198 1.54	3697 1.43	3370 1.43	3206 1.43	3084 1.41	34	12	22
625	4825 2.11	4374 1.59	3856 1.47	3515 1.47	3344 1.47	3217 1.45	36	13	23
650	5014 2.16	4549 2.04	4015 1.51	3660 1.51	3482 1.51	3349 1.49	37	14	24
675	5203 2.21	4724 2.08	4173 1.55	3805 1.55	3619 1.55	3482 1.53	39	14	25
700	5392 2.26	4899 2.13	4332 1.59	3949 1.59	3757 1.59	3615 1.57	41	15	26
725	5580 2.32	5074 2.18	4490 2.03	4094 2.03	3894 2.03	3747 2.01	42	16	27

LOW AIR CONDITIONING
△FUEL = – 0.3 %

ENGINE ANTI ICE ON
△FUEL = + 2 %

TOTAL ANTI ICE ON
△FUEL = + 5 %

FLIP23C A320-232 IAE V2527-A5 3610 03301.000011 0250300 .7801 .000200 120 0300350 60 0 *100 20 20 20 18590 FCOM-N0–03–05–20–008–140

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - ALL ENGINES
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6 MIN)

REF. INITIAL WEIGHT = 55000 KG
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	150	200	230	250	270	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL150	FL200 FL230	FL250 FL270
725	5319 2.31	4744 2.11	4138 2.13	3887 2.13	3770 2.10	3659 2.05	28	29	37
750	5499 2.36	4909 2.16	4283 2.18	4023 2.18	3902 2.14	3788 2.09	29	30	38
775	5680 2.41	5074 2.20	4428 2.22	4159 2.22	4034 2.19	3916 2.13	30	31	40
800	5860 2.47	5239 2.24	4573 2.26	4295 2.26	4166 2.23	4045 2.17	31	32	41
825	6041 2.52	5404 2.28	4718 2.31	4430 2.31	4297 2.27	4173 2.22	32	33	43
850	6221 2.57	5568 2.33	4862 2.35	4566 2.35	4429 2.32	4301 2.26	33	34	44
875	6401 3.02	5733 2.37	5006 2.39	4701 2.40	4560 2.36	4429 2.30	34	35	46
900	6580 3.07	5897 2.41	5151 2.44	4836 2.44	4691 2.40	4556 2.34	35	36	47
925	6760 3.12	6061 2.45	5295 2.48	4971 2.48	4822 2.45	4684 2.38	36	37	49
950	6939 3.17	6225 2.50	5439 2.52	5106 2.53	4952 2.49	4811 2.43	37	38	50
975	7118 3.22	6389 2.54	5583 2.57	5240 2.57	5082 2.53	4938 2.47	38	39	52
1000	7297 3.27	6553 2.58	5726 3.01	5375 3.02	5212 2.58	5065 2.51	39	40	53
1025	7476 3.32	6717 3.03	5870 3.05	5509 3.06	5342 3.02	5192 2.55	40	41	55
1050	7655 3.37	6881 3.07	6013 3.10	5643 3.10	5471 3.07	5319 3.00	42	42	56
1075	7833 3.42	7044 3.11	6157 3.14	5777 3.15	5601 3.11	5445 3.04	43	43	57
1100	8011 3.47	7208 3.15	6300 3.18	5911 3.19	5730 3.15	5572 3.08	44	44	59
1125	8189 3.52	7371 3.20	6443 3.23	6045 3.24	5859 3.20	5698 3.12	45	45	60
1150	8367 3.58	7534 3.24	6586 3.27	6178 3.28	5987 3.24	5824 3.16	46	46	62
1175	8544 4.03	7697 3.28	6729 3.31	6311 3.32	6116 3.29	5950 3.21	47	47	63
1200	8721 4.08	7860 3.33	6872 3.36	6444 3.37	6244 3.33	6075 3.25	49	48	65
1225	8898 4.13	8023 3.37	7015 3.40	6577 3.41	6372 3.38	6201 3.29	50	48	66
1250	9075 4.18	8186 3.41	7157 3.44	6710 3.46	6500 3.42	6326 3.33	51	49	68
1275	9252 4.23	8349 3.45	7300 3.49	6843 3.50	6628 3.47	6451 3.38	52	50	69
1300	9428 4.28	8511 3.50	7442 3.53	6975 3.55	6755 3.51	6576 3.42	53	51	71
1325	9604 4.33	8674 3.54	7584 3.57	7108 3.59	6882 3.56	6701 3.46	55	52	72
1350	9780 4.39	8836 3.58	7726 4.02	7240 4.03	7009 4.00	6826 3.51	56	52	73

CORRECTIONS	**ENGINE AI ON**	**TOTAL AI ON**
FUEL	+ 3 %	+ 5 %

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - ALL ENGINES
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6 MIN)

REF. INITIAL WEIGHT = 55000 KG
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	150	200	230	250	270	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL150	FL200 FL230	FL250 FL270
1350	9780 4.39	8836 3.58	7726 4.02	7240 4.03	7009 4.00	6826 3.51	56	52	73
1375	9956 4.44	8998 4.02	7868 4.06	7372 4.08	7136 4.05	6950 3.55	57	53	75
1400	10132 4.49	9161 4.07	8010 4.10	7504 4.12	7263 4.09	7074 3.59	58	53	76
1425	10307 4.54	9323 4.11	8151 4.15	7635 4.17	7389 4.14	7199 4.03	60	54	78
1450	10483 4.59	9485 4.15	8293 4.19	7767 4.21	7516 4.18	7322 4.08	61	55	79
1475	10658 5.04	9646 4.20	8434 4.23	7898 4.25	7642 4.23	7446 4.12	62	55	81
1500	10833 5.09	9808 4.24	8576 4.28	8029 4.30	7767 4.27	7570 4.16	63	56	82
1525	11007 5.15	9970 4.28	8717 4.32	8160 4.34	7893 4.32	7693 4.21	64	56	83
1550	11183 5.20	10131 4.32	8858 4.36	8291 4.39	8019 4.36	7816 4.25	66	57	85
1575	11358 5.25	10293 4.37	8999 4.41	8421 4.43	8145 4.41	7939 4.29	67	57	86
1600	11534 5.30	10454 4.41	9139 4.45	8552 4.48	8271 4.45	8062 4.34	68	58	88
1625	11709 5.35	10615 4.45	9280 4.50	8682 4.52	8396 4.50	8185 4.38	69	59	89
1650	11884 5.40	10776 4.50	9420 4.54	8812 4.57	8522 4.54	8307 4.42	71	59	90
1675	12058 5.45	10937 4.54	9561 4.58	8942 5.01	8647 4.58	8430 4.47	72	60	92
1700	12233 5.50	11094 4.59	9701 5.03	9071 5.06	8772 5.03	8552 4.51	73	60	93
1725	12408 5.55	11244 5.05	9841 5.07	9201 5.10	8897 5.07	8674 4.55	74	61	94
1750	12582 6.00	11393 5.12	9981 5.11	9330 5.14	9022 5.12	8795 5.00	76	61	96
1775	12756 6.05	11541 5.19	10121 5.16	9460 5.19	9146 5.16	8917 5.04	77	62	97
1800	12930 6.10	11689 5.25	10261 5.20	9589 5.23	9271 5.21	9038 5.08	78	62	98
1825	13104 6.15	11837 5.32	10401 5.24	9718 5.28	9395 5.25	9160 5.13	80	63	100
1850	13278 6.20	11985 5.39	10541 5.29	9846 5.32	9519 5.30	9281 5.17	81	63	101
1875	13451 6.26	12132 5.46	10680 5.33	9975 5.37	9643 5.34	9402 5.21	82	64	102
1900	13625 6.31	12279 5.53	10819 5.37	10103 5.41	9767 5.39	9522 5.26	83	65	104
1925	13798 6.36	12425 6.00	10959 5.42	10232 5.46	9890 5.43	9643 5.30	85	66	105
1950	13971 6.41	12571 6.08	11098 5.46	10360 5.50	10014 5.48	9763 5.34	86	66	106
1975	14144 6.46	12717 6.15	11237 5.51	10488 5.55	10137 5.52	9884 5.39	87	67	107

CORRECTIONS	**ENGINE AI ON**	**TOTAL AI ON**
FUEL	+ 3 %	+ 5 %

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	150	200	230	250	270	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL150	FL200 FL230	FL250 FL270
725	5747 2.28	5088 2.13	4456 2.04	4077 2.03	3871 2.03	3720 2.02	30	19	25
750	5943 2.33	5264 2.18	4613 2.08	4221 2.07	4008 2.07	3851 2.06	31	20	26
775	6138 2.38	5440 2.22	4770 2.12	4365 2.11	4144 2.11	3983 2.10	32	21	27
800	6333 2.43	5615 2.27	4926 2.16	4509 2.15	4281 2.16	4114 2.13	34	22	28
825	6527 2.48	5790 2.32	5083 2.20	4653 2.18	4417 2.20	4244 2.17	35	23	29
850	6722 2.53	5965 2.36	5239 2.24	4797 2.22	4553 2.24	4375 2.21	36	23	30
875	6916 2.58	6140 2.41	5395 2.28	4940 2.26	4689 2.28	4506 2.25	37	24	31
900	7110 3.03	6315 2.45	5551 2.32	5084 2.30	4825 2.32	4636 2.29	38	25	32
925	7304 3.08	6489 2.50	5707 2.36	5227 2.34	4960 2.36	4766 2.33	39	26	33
950	7498 3.13	6663 2.54	5863 2.40	5370 2.38	5096 2.40	4896 2.37	40	27	34
975	7691 3.18	6837 2.59	6018 2.44	5513 2.42	5232 2.44	5026 2.41	42	28	35
1000	7885 3.23	7010 3.04	6174 2.48	5656 2.46	5367 2.48	5156 2.45	43	28	36
1025	8078 3.28	7184 3.08	6329 2.52	5799 2.50	5502 2.52	5286 2.49	44	29	37
1050	8271 3.33	7357 3.13	6485 2.56	5942 2.54	5637 2.56	5415 2.53	45	30	38
1075	8463 3.38	7530 3.18	6640 3.00	6085 2.58	5772 3.00	5544 2.58	46	31	39
1100	8656 3.43	7703 3.22	6795 3.04	6228 3.02	5907 3.04	5674 3.02	47	32	40
1125	8848 3.48	7876 3.27	6950 3.09	6370 3.06	6042 3.08	5803 3.06	48	32	41
1150	9040 3.54	8048 3.32	7105 3.13	6513 3.10	6177 3.12	5931 3.10	50	33	42
1175	9232 3.59	8220 3.36	7260 3.17	6655 3.14	6311 3.16	6060 3.14	51	34	43
1200	9424 4.04	8392 3.41	7414 3.21	6797 3.18	6445 3.20	6189 3.18	52	35	44
1225	9615 4.09	8564 3.46	7569 3.25	6940 3.23	6580 3.24	6317 3.22	53	36	45
1250	9806 4.14	8735 3.50	7723 3.29	7082 3.27	6714 3.28	6445 3.26	54	36	46
1275	9997 4.19	8907 3.55	7878 3.33	7224 3.31	6848 3.32	6573 3.30	55	37	47
1300	10188 4.24	9078 4.00	8032 3.37	7365 3.35	6982 3.36	6701 3.34	56	38	48
1325	10379 4.29	9249 4.05	8186 3.41	7507 3.39	7115 3.40	6829 3.38	57	39	48
1350	10569 4.34	9419 4.10	8340 3.45	7649 3.43	7249 3.44	6956 3.42	59	40	49

LOW AIR CONDITIONNING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.4 %	△FUEL = + 3 %	△FUEL = + 5.5 %

PROGRAM : FLIP23C 17.07.97 ; AERO : A319–131 07/02/97 ; MOTO : A319–131 07/02/97 ; GENE : A319–131 26/02/97 END OF FLIP

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	150	200	230	250	270	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL150	FL200 FL230	FL250 FL270
1350	10569 4.34	9419 4.10	8340 3.45	7649 3.43	7249 3.44	6956 3.42	59	40	49
1375	10759 4.39	9590 4.14	8494 3.49	7791 3.47	7383 3.48	7084 3.46	60	41	50
1400	10949 4.44	9760 4.19	8648 3.53	7932 3.51	7516 3.52	7211 3.50	61	41	51
1425	11139 4.49	9930 4.24	8801 3.58	8073 3.55	7649 3.56	7338 3.54	62	42	52
1450	11329 4.54	10100 4.29	8955 4.02	8215 3.59	7782 4.00	7465 3.58	63	43	53
1475	11518 4.59	10270 4.34	9108 4.06	8356 4.03	7915 4.04	7592 4.02	64	44	54
1500	11707 5.05	10439 4.39	9262 4.10	8497 4.07	8048 4.08	7719 4.06	65	45	55
1525	11896 5.10	10608 4.44	9415 4.14	8638 4.11	8181 4.12	7845 4.10	66	46	56
1550	12085 5.15	10777 4.48	9568 4.18	8779 4.15	8314 4.16	7972 4.14	68	47	56
1575	12273 5.20	10946 4.53	9721 4.22	8920 4.19	8446 4.20	8098 4.18	69	47	57
1600	12462 5.25	11114 4.59	9874 4.26	9060 4.23	8578 4.24	8224 4.22	70	48	58
1625	12650 5.30	11283 5.04	10027 4.30	9201 4.27	8711 4.28	8350 4.27	71	49	59
1650	12838 5.35	11451 5.09	10179 4.35	9342 4.31	8843 4.32	8476 4.31	72	50	60
1675	13026 5.40	11619 5.14	10332 4.39	9482 4.35	8975 4.37	8602 4.35	73	51	61
1700	13214 5.46	11786 5.19	10483 4.43	9622 4.39	9107 4.41	8727 4.39	74	52	62
1725	13401 5.51	11954 5.24	10635 4.47	9763 4.43	9238 4.45	8852 4.43	75	53	63
1750	13588 5.56	12121 5.29	10786 4.51	9903 4.47	9370 4.49	8978 4.47	76	54	63
1775	13775 6.01	12288 5.34	10937 4.56	10043 4.51	9502 4.53	9103 4.51	77	54	64
1800	13962 6.06	12455 5.39	11088 5.00	10183 4.55	9633 4.57	9228 4.55	79	55	65
1825	14149 6.11	12622 5.44	11239 5.04	10323 4.59	9764 5.01	9352 4.59	80	56	66
1850	14335 6.16	12788 5.50	11390 5.09	10463 5.03	9896 5.05	9477 5.03	81	57	67
1875	14522 6.22	12955 5.55	11541 5.13	10602 5.07	10027 5.09	9602 5.07	82	58	68
1900	14708 6.27	13121 6.00	11691 5.17	10742 5.11	10158 5.13	9726 5.12	83	59	68
1925	14894 6.32	13287 6.05	11842 5.22	10881 5.16	10288 5.17	9850 5.16	84	60	69
1950	15079 6.37	13453 6.11	11992 5.26	11021 5.20	10420 5.21	9974 5.20	85	60	70
1975	15265 6.42	13618 6.16	12142 5.30	11160 5.24	10552 5.25	10098 5.24	86	61	71

LOW AIR CONDITIONNING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.4 %	△FUEL = + 3 %	△FUEL = + 5.5 %

PROGRAM : FLIP23C 17.07.97 ; AERO : A319–131 07/02/97 ; MOTO : A319–131 07/02/97 ; GENE : A319–131 26/02/97 END OF FLIP

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 120 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	150	200	230	250	270	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL150	FL200 FL230	FL250 FL270
725	5580 2.32	5074 2.18	4490 2.03	4094 2.03	3894 2.03	3747 2.01	42	16	27
750	5768 2.37	5248 2.23	4648 2.07	4239 2.07	4031 2.07	3879 2.05	44	16	28
775	5956 2.42	5422 2.27	4806 2.11	4383 2.11	4168 2.11	4011 2.09	46	17	29
800	6144 2.47	5595 2.32	4964 2.15	4527 2.15	4305 2.15	4143 2.13	47	18	30
825	6331 2.52	5769 2.37	5123 2.19	4672 2.19	4442 2.19	4274 2.17	49	18	31
850	6518 2.57	5942 2.42	5280 2.23	4816 2.23	4578 2.23	4405 2.21	50	19	32
875	6705 3.03	6114 2.46	5438 2.27	4960 2.27	4715 2.27	4537 2.25	52	20	33
900	6891 3.08	6287 2.51	5596 2.31	5104 2.31	4851 2.31	4668 2.29	54	20	34
925	7077 3.13	6459 2.56	5754 2.35	5248 2.35	4987 2.35	4799 2.33	55	21	35
950	7262 3.18	6631 3.01	5911 2.39	5391 2.39	5123 2.39	4929 2.37	57	21	36
975	7447 3.23	6803 3.06	6069 2.43	5535 2.43	5259 2.43	5060 2.41	59	22	37
1000	7632 3.29	6974 3.11	6226 2.47	5679 2.47	5394 2.47	5190 2.45	60	23	39
1025	7817 3.34	7145 3.16	6384 2.51	5822 2.51	5530 2.52	5320 2.49	62	23	40
1050	8001 3.39	7316 3.20	6541 2.55	5965 2.55	5665 2.56	5451 2.53	63	24	41
1075	8185 3.44	7486 3.25	6698 2.59	6109 2.59	5800 3.00	5580 2.57	65	25	42
1100	8369 3.50	7657 3.30	6856 3.03	6252 3.03	5936 3.04	5710 3.01	67	25	43
1125	8553 3.55	7827 3.35	7012 3.07	6395 3.07	6070 3.08	5840 3.05	68	26	44
1150	8736 4.00	7997 3.40	7169 3.11	6538 3.11	6205 3.12	5969 3.09	70	27	45
1175	8919 4.05	8166 3.45	7325 3.15	6681 3.14	6340 3.16	6098 3.13	72	27	46
1200	9101 4.11	8335 3.50	7481 3.19	6824 3.18	6474 3.20	6227 3.17	73	28	46
1225	9284 4.16	8504 3.55	7637 3.23	6966 3.22	6609 3.24	6356 3.21	75	29	47
1250	9466 4.21	8673 4.00	7794 3.27	7109 3.26	6743 3.28	6485 3.25	76	29	48
1275	9648 4.27	8841 4.05	7950 3.31	7251 3.30	6877 3.32	6614 3.29	78	30	49
1300	9829 4.32	9010 4.10	8105 3.35	7394 3.34	7011 3.36	6742 3.33	80	31	50
1325	10010 4.37	9177 4.15	8261 3.39	7536 3.38	7146 3.40	6870 3.37	81	32	51
1350	10191 4.43	9345 4.20	8417 3.43	7678 3.42	7280 3.44	6998 3.41	83	32	52

LOW AIR CONDITIONING
△FUEL = – 0.3 %

ENGINE ANTI ICE ON
△FUEL = + 2 %

TOTAL ANTI ICE ON
△FUEL = + 5 %

FLIP23C A320-232 IAE V2527-A5 3610 03301.000011 0250300 .7801 .000200 120 0300350 60 0 100 20 20 20 18590 FCOM-N0–03–05–20–009–140

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 120 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	150	200	230	250	270	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL150	FL200 FL230	FL250 FL270
1350	10191 4.43	9345 4.20	8417 3.43	7678 3.42	7280 3.44	6998 3.41	83	32	52
1375	10372 4.48	9512 4.25	8573 3.47	7820 3.47	7414 3.48	7127 3.45	85	33	53
1400	10553 4.53	9680 4.30	8728 3.51	7962 3.51	7548 3.52	7255 3.49	86	34	54
1425	10733 4.59	9846 4.36	8884 3.55	8104 3.55	7682 3.56	7382 3.53	88	35	55
1450	10913 5.04	10013 4.41	9039 3.59	8246 3.59	7815 4.00	7510 3.57	89	35	56
1475	11092 5.10	10179 4.46	9194 4.03	8388 4.03	7949 4.04	7638 4.01	91	36	57
1500	11272 5.15	10346 4.51	9349 4.07	8529 4.07	8082 4.08	7765 4.05	93	37	58
1525	11451 5.20	10511 4.56	9504 4.11	8671 4.11	8216 4.12	7892 4.09	94	38	59
1550	11630 5.26	10677 5.01	9659 4.15	8812 4.15	8349 4.16	8019 4.13	96	38	59
1575	11808 5.31	10842 5.07	9814 4.19	8953 4.19	8482 4.20	8146 4.17	97	39	60
1600	11986 5.37	11007 5.12	9969 4.23	9095 4.23	8615 4.24	8273 4.21	99	40	61
1625	12164 5.42	11172 5.17	10123 4.27	9236 4.27	8748 4.28	8400 4.25	101	41	62
1650	12341 5.48	11337 5.22	10278 4.31	9377 4.31	8881 4.32	8526 4.29	102	41	63
1675	12518 5.53	11501 5.27	10432 4.35	9518 4.35	9013 4.37	8653 4.34	104	42	64
1700	12695 5.59	11665 5.33	10586 4.39	9659 4.39	9146 4.41	8779 4.38	105	43	65
1725	12872 6.04	11829 5.38	10741 4.43	9799 4.43	9278 4.45	8905 4.42	107	44	65
1750	13048 6.09	11993 5.43	10895 4.48	9940 4.47	9410 4.49	9031 4.46	108	44	66
1775	13224 6.15	12155 5.48	11049 4.52	10081 4.51	9543 4.53	9157 4.50	110	45	67
1800	13400 6.20	12317 5.54	11203 4.56	10221 4.55	9675 4.57	9282 4.54	111	46	68
1825	13575 6.26	12479 5.59	11356 5.00	10361 4.59	9806 5.01	9408 4.58	113	47	69
1850	13751 6.32	12640 6.04	11510 5.04	10502 5.03	9938 5.05	9533 5.02	114	47	69
1875	13926 6.37	12802 6.09	11664 5.08	10642 5.07	10070 5.09	9658 5.06	115	48	70
1900	14100 6.43	12962 6.14	11817 5.12	10782 5.11	10201 5.13	9783 5.10	117	49	71
1925	14275 6.48	13123 6.19	11971 5.16	10922 5.15	10333 5.17	9908 5.14	118	50	72
1950	14449 6.54	13284 6.24	12123 5.20	11062 5.19	10464 5.21	10033 5.18	120	51	73
1975	14623 6.59	13444 6.29	12275 5.24	11202 5.23	10595 5.25	10158 5.22	121	51	73

LOW AIR CONDITIONING
△FUEL = – 0.3 %

ENGINE ANTI ICE ON
△FUEL = + 2 %

TOTAL ANTI ICE ON
△FUEL = + 5 %

FLIP23C A320-232 IAE V25217–A5 3610 03301.000011 0250300 .7801 .000200 120 0300350 60 0 100 20 20 20 18590 FCOM-N0–03–05–20–010–120

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - ALL ENGINES
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6 MIN)

REF. INITIAL WEIGHT = 55000 KG
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	150	200	230	250	270	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL150	FL200 FL230	FL250 FL270
1975	14144 6.46	12717 6.15	11237 5.51	10488 5.55	10137 5.52	9884 5.39	87	67	107
2000	14318 6.51	12862 6.23	11376 5.55	10616 5.59	10260 5.57	10004 5.43	89	68	109
2025	14493 6.56	13007 6.31	11515 5.59	10743 6.04	10383 6.01	10124 5.47	90	69	110
2050	14667 7.01	13152 6.38	11654 6.04	10871 6.08	10506 6.06	10244 5.52	91	70	111
2075	14840 7.06	13296 6.46	11793 6.08	10998 6.13	10628 6.10	10363 5.56	93	71	113
2100	15014 7.10	13440 6.54	11931 6.12	11125 6.17	10751 6.15	10483 6.00	94	72	114
2125	15188 7.15	13584 7.03	12070 6.17	11253 6.21	10873 6.19	10602 6.05	95	72	115
2150	15361 7.20	13728 7.11	12208 6.21	11380 6.26	10995 6.24	10721 6.09	97	73	116
2175	15535 7.25	13871 7.19	12347 6.25	11507 6.30	11118 6.28	10840 6.14	98	74	117
2200	15708 7.30	14013 7.28	12485 6.30	11634 6.35	11240 6.33	10959 6.18	99	75	119
2225	15881 7.35	14156 7.36	12623 6.34	11761 6.39	11362 6.37	11078 6.22	101	76	120
2250	16054 7.40	14307 7.42	12761 6.39	11887 6.44	11484 6.42	11196 6.27	96	77	121
2275	16227 7.45	14458 7.47	12899 6.43	12014 6.48	11605 6.46	11313 6.31	97	78	122
2300	16400 7.50	14609 7.52	13037 6.47	12140 6.53	11727 6.50	11431 6.36	97	79	123
2325	16573 7.55	14759 7.57	13174 6.52	12266 6.57	11848 6.55	11548 6.40	98	80	124
2350	16745 8.00	14909 8.03	13312 6.56	12392 7.02	11969 6.59	11665 6.45	99	81	125
2375	16918 8.05	15060 8.08	13449 7.00	12518 7.06	12090 7.04	11782 6.49	100	81	126
2400	17090 8.10	15209 8.13	13587 7.05	12644 7.11	12211 7.08	11899 6.54	101	82	127
2425	17261 8.16	15359 8.18	13724 7.09	12769 7.15	12332 7.13	12015 6.58	102	83	128
2450	17427 8.24	15509 8.24	13861 7.14	12895 7.20	12453 7.17	12131 7.03	104	84	130
2475	17594 8.32	15658 8.29	13998 7.18	13020 7.24	12573 7.22	12248 7.08	105	85	131
2500	17760 8.40	15807 8.34	14135 7.22	13145 7.29	12694 7.26	12364 7.12	106	86	132
2525	17926 8.48	15956 8.40	14272 7.27	13270 7.33	12814 7.31	12480 7.17	108	87	133
2550	18092 8.57	16105 8.45	14409 7.31	13395 7.38	12934 7.35	12595 7.21	118	88	134
2575	18258 9.05	16254 8.50	14545 7.35	13520 7.42	13054 7.40	12711 7.26	119	89	135
2600	18423 9.14	16402 8.56	14682 7.40	13644 7.46	13174 7.44	12826 7.30	121	90	136

CORRECTIONS	**ENGINE AI ON**	**TOTAL AI ON**
FUEL	+ 3 %	+ 5 %

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - ALL ENGINES
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6 MIN)

REF. INITIAL WEIGHT = 55000 KG
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
	100	**150**	**200**	**230**	**250**	**270**	**FL100 FL150**	**FL200 FL230**	**FL250 FL270**
2600	18423 9.14	16402 8.56	14682 7.40	13644 7.46	13174 7.44	12826 7.30	121	90	136
2625	18588 9.23	16550 9.01	14819 7.44	13769 7.51	13293 7.49	12942 7.35	123	91	137
2650		16699 9.06	14955 7.48	13893 7.55	13413 7.53	13057 7.39	125	92	138
2675		16847 9.12	15091 7.53	14017 8.00	13532 7.58	13172 7.44	127	92	139
2700		16994 9.17	15228 7.57	14142 8.04	13651 8.02	13286 7.49	129	93	140
2725		17142 9.22	15364 8.02	14267 8.09	13770 8.07	13401 7.53	162	94	141
2750		17290 9.27	15500 8.06	14393 8.13	13889 8.11	13516 7.58	164	95	142
2775		17438 9.33	15636 8.10	14518 8.18	14008 8.16	13630 8.02	166	96	143
2800		17586 9.38	15772 8.15	14644 8.22	14127 8.20	13744 8.07	169	97	144
2825		17734 9.43	15907 8.19	14769 8.26	14245 8.25	13858 8.12	171	98	144
2850		17882 9.48	16043 8.23	14895 8.31	14364 8.29	13972 8.16	173	99	145
2875		18029 9.54	16179 8.28	15020 8.35	14482 8.34	14086 8.21	176	100	146
2900		18177 9.59	16314 8.32	15145 8.39	14601 8.38	14199 8.26	178	101	147
2925		18324 10.04	16449 8.36	15270 8.44	14719 8.43	14312 8.30	180	101	148
2950		18471 10.09	16585 8.41	15395 8.48	14837 8.47	14424 8.35	182	102	149
2975		18618 10.15	16720 8.45	15520 8.52	14955 8.52	14537 8.40	185	103	150
3000			16855 8.49	15645 8.57	15073 8.56	14649 8.44		103	151
3025			16990 8.54	15769 9.01	15190 9.01	14761 8.49		103	151
3050			17125 8.58	15894 9.06	15308 9.05	14873 8.54		103	152
3075			17259 9.03	16018 9.10	15425 9.10	14985 8.58		104	153
3100			17403 9.06	16143 9.14	15542 9.14	15096 9.03		104	154

CORRECTIONS	**ENGINE AI ON**	**TOTAL AI ON**
FUEL	+ 3 %	+ 5 %

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	150	200	230	250	270	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL150	FL200 FL230	FL250 FL270
1975	15265 6.42	13618 6.16	12142 5.30	11160 5.24	10552 5.25	10098 5.24	86	61	71
2000	15450 6.48	13784 6.21	12292 5.35	11299 5.28	10683 5.29	10222 5.28	87	62	72
2025	15635 6.53	13949 6.26	12442 5.39	11439 5.32	10815 5.33	10346 5.32	88	63	72
2050	15820 6.58	14114 6.32	12592 5.43	11578 5.36	10946 5.37	10470 5.36	89	64	73
2075	16005 7.03	14279 6.37	12742 5.48	11717 5.40	11078 5.41	10594 5.40	90	65	74
2100	16190 7.08	14443 6.42	12891 5.52	11856 5.44	11209 5.45	10718 5.44	91	66	75
2125	16374 7.14	14608 6.48	13041 5.56	11995 5.48	11340 5.49	10841 5.48	93	67	76
2150	16558 7.19	14772 6.53	13190 6.01	12133 5.52	11471 5.53	10965 5.53	94	67	76
2175	16743 7.24	14936 6.59	13339 6.05	12272 5.56	11602 5.57	11088 5.57	95	68	77
2200	16926 7.29	15100 7.04	13488 6.10	12411 6.00	11733 6.01	11211 6.01	96	69	78
2225	17110 7.34	15263 7.10	13637 6.14	12549 6.04	11864 6.05	11335 6.05	97	70	79
2250	17294 7.40	15427 7.15	13786 6.18	12687 6.08	11995 6.09	11458 6.09	98	71	79
2275	17477 7.45	15590 7.20	13935 6.23	12826 6.13	12125 6.13	11581 6.13	99	72	80
2300	17660 7.50	15753 7.26	14083 6.27	12964 6.17	12256 6.17	11703 6.17	100	73	81
2325	17843 7.55	15916 7.31	14232 6.32	13102 6.21	12387 6.21	11826 6.21	101	74	82
2350	18026 8.01	16078 7.37	14380 6.36	13240 6.25	12517 6.25	11949 6.25	102	75	83
2375	18208 8.06	16239 7.42	14528 6.41	13378 6.29	12647 6.29	12071 6.29	103	76	83
2400	18391 8.11	16400 7.47	14676 6.45	13516 6.33	12778 6.33	12194 6.33	104	76	84
2425	18573 8.16	16561 7.52	14824 6.49	13654 6.37	12908 6.37	12316 6.38	105	77	85
2450	18755 8.22	16722 7.57	14972 6.54	13791 6.41	13038 6.41	12438 6.42	106	78	85
2475	18937 8.27	16883 8.03	15120 6.58	13929 6.45	13168 6.45	12560 6.46	107	79	86
2500	19119 8.32	17043 8.08	15267 7.03	14067 6.49	13298 6.49	12682 6.50	109	80	87
2525	19300 8.37	17203 8.13	15415 7.07	14204 6.54	13427 6.53	12804 6.54	110	81	88
2550	19482 8.43	17363 8.18	15562 7.12	14341 6.58	13557 6.56	12925 6.58	111	82	88
2575	19663 8.48	17522 8.24	15709 7.16	14479 7.02	13687 7.00	13047 7.02	112	83	89
2600	19844 8.53	17682 8.29	15857 7.21	14616 7.06	13816 7.04	13168 7.06	113	84	90

LOW AIR CONDITIONNING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = − 0.4 %	△FUEL = + 3 %	△FUEL = + 5.5 %

PROGRAM : FLIP23C 17.07.97 ; AERO : A319−131 07/02/97 ; MOTO : A319−131 07/02/97 ; GENE : A319−131 26/02/97 END OF FLIP

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	150	200	230	250	270	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL150	FL200 FL230	FL250 FL270
2600	19844 8.53	17682 8.29	15857 7.21	14616 7.06	13816 7.04	13168 7.06	113	84	90
2625	20025 8.58	17841 8.34	16003 7.25	14753 7.10	13946 7.08	13289 7.10	114	85	91
2650	20206 9.04	18000 8.39	16149 7.30	14890 7.14	14075 7.12	13411 7.14	115	86	91
2675	20386 9.09	18159 8.45	16295 7.35	15027 7.18	14205 7.16	13532 7.19	116	87	92
2700	20566 9.14	18318 8.50	16440 7.39	15163 7.22	14334 7.20	13652 7.23	117	88	93
2725	20747 9.20	18477 8.55	16585 7.44	15300 7.26	14463 7.24	13773 7.27	118	89	93
2750	20927 9.25	18635 9.00	16730 7.48	15437 7.30	14592 7.28	13894 7.31	119	90	94
2775	21106 9.30	18793 9.06	16875 7.53	15573 7.35	14721 7.32	14014 7.35	120	91	95
2800	21286 9.36	18951 9.11	17020 7.57	15710 7.39	14850 7.36	14135 7.39	121	92	96
2825	21466 9.41	19109 9.16	17165 8.02	15846 7.43	14978 7.40	14255 7.43	122	93	96
2850	21645 9.46	19266 9.22	17310 8.07	15982 7.47	15107 7.44	14375 7.47	123	94	97
2875	21823 9.52	19424 9.27	17454 8.11	16118 7.51	15236 7.48	14496 7.52	124	95	98
2900	22002 9.57	19581 9.32	17598 8.16	16254 7.55	15364 7.52	14616 7.56	125	96	98
2925	22180 10.02	19738 9.38	17742 8.20	16390 7.59	15493 7.56	14735 8.00	126	97	99
2950	22358 10.08	19895 9.43	17886 8.25	16525 8.04	15621 8.00	14855 8.04	127	98	100
2975	22536 10.13	20052 9.48	18030 8.30	16660 8.08	15749 8.04	14975 8.08	128	99	101
3000	22714 10.18	20208 9.54	18174 8.34	16796 8.12	15877 8.08	15094 8.12	129	100	101
3025	22891 10.24	20364 9.59	18318 8.39	16931 8.16	16006 8.12	15214 8.16	130	101	102
3050	23068 10.29	20520 10.04	18461 8.44	17066 8.20	16133 8.16	15333 8.20	131	102	103
3075	23246 10.35	20676 10.10	18605 8.48	17201 8.24	16261 8.20	15452 8.25	132	103	103
3100	23423 10.40	20832 10.15	18748 8.53	17336 8.29	16389 8.24	15571 8.29	133	104	104

LOW AIR CONDITIONNING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.4 %	△FUEL = + 3 %	△FUEL = + 5.5 %

PROGRAM : FLIP23C 17.07.97 ; AERO : A319–131 07/02/97 ; MOTO : A319–131 07/02/97 ; GENE : A319–131 26/02/97 END OF FLIP

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 120 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	150	200	230	250	270	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL150	FL200 FL230	FL250 FL270
1975	14623 6.59	13444 6.29	12275 5.24	11202 5.23	10595 5.25	10158 5.22	121	51	73
2000	14797 7.05	13604 6.34	12427 5.28	11342 5.28	10727 5.29	10282 5.27	123	52	74
2025	14970 7.10	13763 6.40	12578 5.33	11481 5.32	10858 5.33	10407 5.31	124	53	75
2050	15144 7.16	13923 6.45	12730 5.37	11621 5.36	10988 5.37	10531 5.35	126	54	76
2075	15317 7.22	14082 6.50	12881 5.41	11760 5.40	11119 5.41	10655 5.39	127	55	76
2100	15489 7.27	14241 6.55	13033 5.45	11899 5.44	11250 5.45	10779 5.43	129	56	77
2125	15662 7.33	14399 7.00	13184 5.49	12039 5.48	11380 5.49	10903 5.47	130	57	78
2150	15834 7.38	14558 7.06	13335 5.53	12179 5.52	11511 5.53	11026 5.51	132	58	79
2175	16006 7.44	14716 7.11	13486 5.58	12319 5.56	11641 5.57	11150 5.55	133	59	79
2200	16178 7.50	14874 7.16	13637 6.02	12458 6.00	11771 6.01	11273 5.59	135	60	80
2225	16349 7.55	15032 7.21	13787 6.06	12598 6.04	11901 6.05	11397 6.04	136	61	81
2250	16520 8.01	15189 7.26	13938 6.10	12738 6.08	12031 6.09	11520 6.08	137	62	81
2275	16691 8.07	15346 7.32	14088 6.14	12877 6.12	12162 6.13	11643 6.12	139	63	82
2300	16862 8.12	15503 7.37	14238 6.18	13017 6.16	12293 6.17	11765 6.16	140	65	83
2325	17033 8.18	15660 7.42	14389 6.23	13156 6.20	12424 6.21	11888 6.20	142	66	83
2350	17202 8.24	15817 7.47	14539 6.27	13296 6.24	12555 6.25	12011 6.24	143	67	84
2375	17372 8.29	15973 7.53	14689 6.31	13435 6.28	12686 6.29	12133 6.28	144	68	85
2400	17541 8.35	16129 7.58	14839 6.35	13574 6.32	12817 6.33	12256 6.32	146	69	85
2425	17710 8.41	16285 8.03	14988 6.40	13713 6.36	12947 6.37	12379 6.36	147	70	86
2450	17878 8.47	16440 8.08	15138 6.44	13852 6.40	13078 6.41	12501 6.41	149	72	87
2475	18047 8.52	16596 8.14	15288 6.48	13991 6.44	13208 6.45	12623 6.45	150	73	87
2500	18215 8.58	16751 8.19	15437 6.52	14130 6.48	13338 6.49	12745 6.49	151	74	88
2525	18383 9.04	16905 8.24	15586 6.56	14269 6.52	13469 6.53	12867 6.53	153	75	88
2550	18550 9.09	17060 8.30	15735 7.01	14408 6.56	13599 6.57	12989 6.57	154	76	89
2575	18718 9.15	17214 8.35	15884 7.05	14547 7.00	13729 7.01	13111 7.01	155	78	89
2600	18885 9.21	17369 8.40	16033 7.09	14685 7.05	13859 7.05	13232 7.05	157	79	90

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.3 %	△FUEL = + 2 %	△FUEL = + 5 %

FLIP23C A320-232 IAE V2527-A5 3610 03301.000011 025300 .7801 .000200 120 0300350 60 0 100 20 20 20 18590 FCOM-N0-03-05-20-011-140

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 120 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	150	200	230	250	270	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL150	FL200 FL230	FL250 FL270
2600	18885 9.21	17369 8.40	16033 7.09	14685 7.05	13859 7.05	13232 7.05	157	79	90
2625	19052 9.27	17522 8.46	16182 7.13	14824 7.09	13989 7.09	13354 7.09	158	80	90
2650	19219 9.33	17676 8.51	16331 7.18	14962 7.13	14118 7.13	13475 7.14	159	81	91
2675	19385 9.38	17829 8.56	16479 7.22	15101 7.17	14248 7.17	13596 7.18	161	83	91
2700	19551 9.44	17983 9.01	16628 7.26	15239 7.21	14378 7.21	13718 7.22	162	84	92
2725	19717 9.50	18135 9.07	16776 7.30	15378 7.25	14507 7.25	13839 7.26	163	85	92
2750	19883 9.56	18288 9.12	16924 7.35	15516 7.29	14637 7.29	13959 7.30	164	86	93
2775	20048 10.02	18441 9.17	17072 7.39	15654 7.33	14766 7.33	14080 7.34	166	87	93
2800	20214 10.07	18593 9.23	17219 7.43	15792 7.37	14896 7.37	14201 7.38	167	89	93
2825	20379 10.13	18745 9.28	17363 7.48	15930 7.41	15025 7.41	14321 7.42	168	90	94
2850	20544 10.19	18897 9.33	17507 7.53	16068 7.45	15154 7.45	14442 7.47	170	91	94
2875	20708 10.25	19048 9.39	17652 7.58	16206 7.49	15283 7.49	14562 7.51	171	92	95
2900	20873 10.31	19200 9.44	17795 8.03	16344 7.53	15412 7.53	14682 7.55	172	94	95
2925	21037 10.37	19351 9.49	17939 8.08	16482 7.57	15541 7.57	14802 7.59	174	95	95
2950	21201 10.43	19502 9.55	18083 8.13	16619 8.01	15670 8.01	14922 8.03	175	96	96
2975	21364 10.48	19653 10.00	18226 8.18	16757 8.05	15799 8.05	15042 8.07	176	97	96
3000	21528 10.54	19803 10.05	18369 8.23	16894 8.09	15927 8.09	15162 8.11	178	99	97
3025	21691 11.00	19953 10.11	18512 8.28	17032 8.13	16056 8.13	15281 8.16	179	100	97
3050	21854 11.06	20104 10.16	18655 8.33	17169 8.17	16185 8.17	15401 8.20	180	101	97
3075	22017 11.12	20253 10.22	18798 8.38	17307 8.21	16313 8.21	15520 8.24	181	102	98
3100	22179 11.18	20403 10.27	18941 8.43	17444 8.25	16441 8.25	15639 8.28	183	104	98

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.3 %	△FUEL = + 2 %	△FUEL = + 5 %

FLIP23C A320-232 IAE V2527-A5 3610 03301.000011 025300 .7801 .000200 120 0300350 60 0 100 20 20 20 18590 FCOM-N0–03–05–20–012–140

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - ALL ENGINES
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6 MIN)

REF. INITIAL WEIGHT = 55000 KG
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
100	337 0.23	317 0.23	297 0.23	278 0.23			0	0	
125	468 0.27	444 0.27	422 0.26	400 0.26	377 0.26	355 0.26	0	0	0
150	599 0.31	571 0.31	546 0.30	521 0.30	496 0.30	475 0.30	0	0	0
175	729 0.35	697 0.34	670 0.34	643 0.33	615 0.33	595 0.33	2	1	2
200	859 0.38	824 0.38	793 0.37	764 0.36	734 0.36	714 0.36	3	3	4
225	989 0.42	950 0.42	917 0.41	885 0.40	853 0.40	833 0.40	5	5	6
250	1119 0.46	1076 0.45	1040 0.44	1006 0.43	972 0.43	952 0.43	6	6	8
275	1248 0.50	1202 0.49	1163 0.48	1127 0.47	1090 0.46	1070 0.46	8	8	10
300	1378 0.54	1328 0.53	1286 0.52	1248 0.50	1208 0.50	1188 0.50	9	9	11
325	1507 0.58	1454 0.57	1409 0.55	1368 0.53	1326 0.53	1306 0.53	11	11	13
350	1636 1.02	1579 1.00	1531 0.59	1489 0.57	1444 0.57	1424 0.56	12	13	15
375	1765 1.05	1704 1.04	1653 1.02	1609 1.00	1562 1.00	1541 1.00	14	14	17
400	1893 1.09	1829 1.08	1776 1.06	1729 1.04	1679 1.03	1658 1.03	15	16	19
425	2022 1.13	1954 1.12	1897 1.10	1849 1.07	1796 1.07	1775 1.06	17	17	21
450	2150 1.17	2079 1.16	2019 1.13	1968 1.11	1914 1.10	1892 1.10	18	19	23
475	2278 1.21	2203 1.19	2140 1.17	2088 1.14	2030 1.13	2008 1.13	20	20	25
500	2406 1.25	2327 1.23	2262 1.21	2207 1.17	2147 1.17	2124 1.16	21	22	26
525	2534 1.29	2452 1.27	2383 1.25	2326 1.21	2263 1.20	2240 1.20	23	24	28
550	2661 1.33	2575 1.31	2504 1.28	2445 1.24	2380 1.24	2355 1.23	24	25	30
575	2788 1.36	2699 1.34	2624 1.32	2564 1.28	2496 1.27	2471 1.26	26	27	32
600	2915 1.40	2822 1.38	2745 1.36	2682 1.31	2612 1.30	2586 1.30	27	28	34
625	3042 1.44	2946 1.42	2865 1.39	2800 1.34	2727 1.34	2701 1.33	29	30	36
650	3169 1.48	3069 1.46	2985 1.43	2918 1.38	2843 1.37	2815 1.36	30	31	37
675	3295 1.52	3192 1.50	3105 1.47	3035 1.41	2958 1.40	2930 1.40	31	33	39
700	3422 1.56	3314 1.53	3225 1.50	3153 1.45	3074 1.44	3044 1.43	33	34	41
725	3548 2.00	3437 1.57	3345 1.54	3270 1.48	3189 1.47	3158 1.46	34	36	43

CORRECTIONS	ENGINE AI ON	TOTAL AI ON
FUEL	+ 4 %	+ 6 %

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - ALL ENGINES
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6 MIN)

REF. INITIAL WEIGHT = 55000 KG
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
725	3548 2.00	3437 1.57	3345 1.54	3270 1.48	3189 1.47	3158 1.46	34	36	43
750	3674 2.04	3559 2.01	3464 1.58	3387 1.52	3303 1.51	3272 1.50	36	37	44
775	3800 2.08	3682 2.05	3583 2.02	3504 1.55	3418 1.54	3385 1.53	37	39	46
800	3925 2.12	3804 2.09	3702 2.05	3620 1.59	3532 1.57	3498 1.56	39	41	48
825	4051 2.16	3925 2.13	3821 2.09	3736 2.02	3647 2.01	3611 2.00	40	42	50
850	4176 2.19	4047 2.16	3940 2.13	3853 2.06	3761 2.04	3724 2.03	42	44	51
875	4301 2.23	4169 2.20	4058 2.17	3969 2.09	3875 2.08	3837 2.06	43	45	53
900	4426 2.27	4290 2.24	4177 2.20	4084 2.13	3989 2.11	3949 2.10	45	47	55
925	4550 2.31	4411 2.28	4295 2.24	4200 2.16	4102 2.14	4061 2.13	46	48	56
950	4675 2.35	4532 2.32	4413 2.28	4315 2.20	4216 2.18	4173 2.17	47	50	58
975	4799 2.39	4653 2.36	4531 2.32	4431 2.23	4329 2.21	4285 2.20	49	51	60
1000	4924 2.43	4773 2.40	4648 2.35	4546 2.27	4442 2.25	4396 2.23	50	53	61
1025	5048 2.47	4894 2.43	4766 2.39	4660 2.30	4555 2.28	4507 2.27	52	54	63
1050	5171 2.51	5014 2.47	4883 2.43	4775 2.34	4668 2.31	4618 2.30	53	56	65
1075	5295 2.55	5134 2.51	5000 2.47	4890 2.37	4780 2.35	4729 2.33	54	57	66
1100	5419 2.59	5254 2.55	5117 2.51	5004 2.41	4893 2.38	4840 2.37	56	59	68
1125	5542 3.03	5374 2.59	5234 2.54	5118 2.44	5005 2.42	4950 2.40	57	60	69
1150	5665 3.07	5494 3.03	5350 2.58	5232 2.48	5117 2.45	5060 2.43	59	62	71
1175	5788 3.11	5614 3.06	5467 3.02	5346 2.51	5229 2.48	5170 2.47	60	63	73
1200	5911 3.15	5733 3.10	5583 3.06	5460 2.55	5341 2.52	5280 2.50	61	65	74
1225	6033 3.19	5852 3.14	5699 3.09	5573 2.58	5452 2.55	5389 2.53	63	66	76
1250	6156 3.23	5971 3.18	5815 3.13	5687 3.02	5564 2.59	5499 2.57	64	68	77
1275	6278 3.27	6090 3.22	5930 3.17	5800 3.06	5675 3.02	5608 3.00	65	69	79
1300	6400 3.31	6209 3.26	6046 3.21	5913 3.09	5786 3.05	5716 3.03	67	71	80
1325	6522 3.35	6328 3.30	6161 3.25	6026 3.13	5897 3.09	5825 3.07	68	72	82
1350	6644 3.39	6446 3.34	6276 3.28	6139 3.16	6008 3.12	5933 3.10	70	74	83

CORRECTIONS	ENGINE AI ON	TOTAL AI ON
FUEL	+ 4 %	+ 6 %

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
100	353 0.23	332 0.23	312 0.23	293 0.23			0	0	
125	484 0.27	459 0.26	437 0.26	415 0.26	393 0.26	372 0.26	0	0	0
150	616 0.30	586 0.30	561 0.30	538 0.29	514 0.29	494 0.29	0	0	2
175	747 0.34	713 0.34	685 0.33	660 0.33	634 0.33	616 0.33	2	2	3
200	878 0.38	840 0.37	809 0.37	782 0.36	755 0.36	738 0.36	3	3	5
225	1008 0.42	966 0.41	932 0.40	904 0.40	875 0.39	859 0.39	4	5	7
250	1139 0.45	1093 0.45	1056 0.44	1026 0.43	994 0.43	980 0.43	6	6	9
275	1269 0.49	1219 0.48	1179 0.47	1147 0.46	1114 0.46	1100 0.46	7	8	11
300	1400 0.53	1345 0.52	1302 0.51	1268 0.50	1234 0.49	1220 0.49	8	9	12
325	1530 0.56	1471 0.55	1425 0.54	1389 0.53	1353 0.53	1341 0.53	10	11	14
350	1660 1.00	1597 0.59	1548 0.58	1510 0.57	1472 0.56	1460 0.56	11	12	16
375	1790 1.04	1722 1.03	1670 1.01	1631 1.00	1591 0.59	1580 0.59	12	14	18
400	1919 1.08	1847 1.06	1793 1.05	1751 1.03	1709 1.03	1699 1.03	13	15	19
425	2049 1.11	1973 1.10	1915 1.08	1871 1.07	1828 1.06	1818 1.06	15	17	21
450	2178 1.15	2098 1.14	2037 1.12	1991 1.10	1946 1.09	1937 1.09	16	18	23
475	2307 1.19	2222 1.17	2159 1.15	2111 1.14	2064 1.13	2055 1.13	17	20	25
500	2436 1.23	2347 1.21	2281 1.19	2231 1.17	2182 1.16	2174 1.16	19	21	26
525	2565 1.27	2472 1.25	2402 1.22	2350 1.20	2299 1.19	2292 1.19	20	23	28
550	2694 1.30	2596 1.28	2523 1.26	2469 1.24	2417 1.23	2409 1.23	21	24	30
575	2822 1.34	2720 1.32	2645 1.29	2588 1.27	2534 1.26	2527 1.26	22	26	31
600	2951 1.38	2844 1.35	2766 1.33	2707 1.31	2651 1.29	2644 1.29	24	27	33
625	3079 1.42	2968 1.39	2887 1.36	2826 1.34	2768 1.33	2761 1.33	25	28	35
650	3207 1.45	3092 1.43	3007 1.40	2945 1.38	2885 1.36	2878 1.36	26	30	36
675	3335 1.49	3215 1.47	3128 1.43	3063 1.41	3001 1.39	2994 1.39	27	31	38
700	3463 1.53	3339 1.50	3248 1.47	3181 1.44	3118 1.43	3111 1.42	29	33	40
725	3590 1.57	3462 1.54	3368 1.50	3299 1.48	3234 1.46	3227 1.46	30	34	41

LOW AIR CONDITIONNING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.4 %	△FUEL = + 3 %	△FUEL = + 5.5 %

PROGRAM : FLIP23C 17.07.97 ; AERO : A319–131 07/02/97 ; MOTO : A319–131 07/02/97 ; GENE : A319–131 26/02/97 END OF FLIP

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
725	3590 1.57	3462 1.54	3368 1.50	3299 1.48	3234 1.46	3227 1.46	30	34	41
750	3718 2.01	3585 1.58	3488 1.54	3417 1.51	3350 1.49	3343 1.49	31	36	43
775	3845 2.05	3708 2.01	3608 1.57	3534 1.55	3466 1.53	3458 1.52	32	37	45
800	3972 2.08	3831 2.05	3728 2.01	3652 1.58	3581 1.56	3573 1.56	34	38	46
825	4099 2.12	3953 2.09	3848 2.04	3769 2.02	3697 1.59	3688 1.59	35	40	48
850	4226 2.16	4076 2.12	3967 2.08	3886 2.05	3812 2.03	3803 2.02	36	41	49
875	4353 2.20	4198 2.16	4086 2.11	4003 2.09	3927 2.06	3918 2.06	37	43	51
900	4480 2.24	4320 2.20	4205 2.15	4120 2.12	4042 2.09	4033 2.09	38	44	53
925	4606 2.28	4442 2.24	4324 2.18	4237 2.16	4157 2.13	4147 2.12	40	45	54
950	4732 2.31	4564 2.27	4443 2.22	4353 2.19	4271 2.16	4261 2.16	41	47	56
975	4858 2.35	4686 2.31	4562 2.25	4469 2.23	4386 2.19	4375 2.19	42	48	57
1000	4984 2.39	4808 2.35	4680 2.29	4585 2.26	4500 2.23	4488 2.22	43	50	59
1025	5110 2.43	4929 2.38	4799 2.33	4701 2.30	4614 2.26	4602 2.26	44	51	60
1050	5235 2.47	5051 2.42	4916 2.36	4817 2.33	4728 2.29	4715 2.29	46	52	62
1075	5360 2.51	5172 2.46	5034 2.40	4932 2.37	4842 2.33	4828 2.32	47	54	63
1100	5486 2.55	5294 2.49	5152 2.43	5047 2.40	4956 2.36	4940 2.36	48	55	65
1125	5611 2.59	5415 2.53	5269 2.47	5162 2.44	5070 2.39	5053 2.39	49	56	66
1150	5736 3.03	5536 2.57	5387 2.51	5277 2.47	5183 2.43	5165 2.42	50	58	68
1175	5860 3.07	5657 3.01	5504 2.54	5392 2.51	5296 2.46	5277 2.46	52	59	69
1200	5985 3.11	5777 3.04	5621 2.58	5506 2.54	5410 2.49	5389 2.49	53	60	71
1225	6109 3.14	5898 3.08	5738 3.01	5621 2.58	5523 2.53	5500 2.52	54	62	72
1250	6233 3.18	6018 3.12	5854 3.05	5735 3.01	5635 2.56	5611 2.56	55	63	74
1275	6358 3.22	6138 3.16	5971 3.09	5849 3.05	5748 2.59	5722 2.59	56	64	75
1300	6482 3.26	6259 3.19	6087 3.12	5962 3.08	5861 3.03	5833 3.02	58	66	77
1325	6605 3.30	6379 3.23	6203 3.16	6076 3.12	5973 3.06	5944 3.06	59	67	78
1350	6729 3.34	6498 3.27	6319 3.20	6189 3.15	6085 3.10	6055 3.09	60	68	82

LOW AIR CONDITIONNING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.4 %	△FUEL = + 3 %	△FUEL = + 5.5 %

PROGRAM : FLIP23C 17.07.97 ; AERO : A319–131 07/02/97 ; MOTO : A319–131 07/02/97 ; GENE : A319–131 26/02/97 END OF FLIP

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 120 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
100	358 0.23	337 0.23	318 0.23	299 0.23			0	0	
125	490 0.27	465 0.27	443 0.26	422 0.26	399 0.26	378 0.26	0	0	0
150	622 0.31	593 0.30	567 0.30	545 0.30	520 0.30	500 0.30	0	0	0
175	754 0.34	720 0.34	692 0.33	667 0.33	641 0.33	622 0.33	1	2	2
200	885 0.38	847 0.37	816 0.37	790 0.36	762 0.36	744 0.36	3	3	4
225	1017 0.42	974 0.41	940 0.40	912 0.40	882 0.40	865 0.40	4	5	6
250	1148 0.45	1101 0.45	1064 0.44	1034 0.43	1002 0.43	986 0.43	5	6	7
275	1279 0.49	1228 0.48	1188 0.47	1157 0.47	1122 0.46	1107 0.46	6	8	9
300	1410 0.53	1354 0.52	1311 0.51	1278 0.50	1242 0.50	1228 0.49	8	9	11
325	1541 0.56	1481 0.56	1434 0.54	1400 0.53	1361 0.53	1348 0.53	9	11	13
350	1671 1.00	1607 0.59	1558 0.58	1522 0.57	1480 0.56	1468 0.56	10	12	15
375	1802 1.04	1733 1.03	1680 1.01	1643 1.00	1600 0.59	1588 0.59	11	14	17
400	1932 1.08	1859 1.07	1803 1.05	1764 1.03	1718 1.03	1707 1.03	13	15	18
425	2062 1.11	1984 1.10	1926 1.08	1885 1.07	1837 1.06	1827 1.06	14	17	22
450	2192 1.15	2110 1.14	2048 1.12	2005 1.10	1956 1.09	1946 1.09	15	18	24
475	2322 1.19	2235 1.17	2171 1.15	2126 1.14	2074 1.13	2065 1.13	16	20	26
500	2451 1.23	2360 1.21	2293 1.19	2246 1.17	2192 1.16	2183 1.16	17	21	28
525	2581 1.26	2486 1.25	2415 1.22	2366 1.21	2310 1.19	2301 1.19	19	23	29
550	2710 1.30	2610 1.28	2537 1.26	2486 1.24	2428 1.23	2419 1.23	20	24	31
575	2839 1.34	2735 1.32	2658 1.30	2606 1.27	2546 1.26	2537 1.26	21	26	33
600	2968 1.38	2860 1.36	2780 1.33	2725 1.31	2663 1.29	2655 1.29	22	27	35
625	3097 1.41	2984 1.39	2901 1.37	2844 1.34	2781 1.33	2772 1.33	24	28	36
650	3225 1.45	3109 1.43	3022 1.40	2963 1.38	2898 1.36	2889 1.36	25	30	38
675	3354 1.49	3233 1.47	3143 1.44	3082 1.41	3015 1.39	3006 1.39	26	31	40
700	3482 1.53	3357 1.50	3264 1.47	3201 1.45	3132 1.43	3123 1.42	27	33	42
725	3610 1.57	3480 1.54	3384 1.51	3319 1.48	3248 1.46	3239 1.46	29	34	43

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.3 %	△FUEL = + 2 %	△FUEL = + 5 %

FLIP23C A320-232 V2527-A5 3610 03301.000011 025300 .7801 .000200 120 0300350 60 0 100 20 20 20 18590 FCOM-N0–03–05–20–013–140

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 120 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
725	3610 1.57	3480 1.54	3384 1.51	3319 1.48	3248 1.46	3239 1.46	29	34	43
750	3738 2.00	3604 1.58	3505 1.54	3438 1.51	3365 1.49	3355 1.49	30	36	45
775	3866 2.04	3728 2.01	3625 1.58	3556 1.55	3481 1.53	3471 1.52	31	37	47
800	3994 2.08	3851 2.05	3745 2.01	3674 1.58	3597 1.56	3587 1.56	32	38	48
825	4121 2.12	3974 2.09	3865 2.05	3791 2.02	3713 1.59	3702 1.59	33	40	50
850	4249 2.16	4097 2.12	3985 2.08	3909 2.05	3829 2.03	3817 2.02	35	41	52
875	4376 2.20	4220 2.16	4105 2.12	4026 2.09	3944 2.06	3932 2.06	36	43	53
900	4503 2.23	4343 2.20	4224 2.16	4144 2.12	4060 2.10	4047 2.09	37	44	55
925	4630 2.27	4466 2.23	4344 2.19	4261 2.16	4175 2.13	4162 2.12	38	46	57
950	4757 2.31	4588 2.27	4463 2.23	4377 2.19	4290 2.16	4276 2.16	40	47	58
975	4883 2.35	4710 2.31	4582 2.26	4494 2.23	4405 2.20	4390 2.19	41	48	60
1000	5010 2.39	4833 2.34	4701 2.30	4610 2.26	4520 2.23	4504 2.22	42	50	62
1025	5136 2.43	4955 2.38	4820 2.33	4727 2.30	4634 2.26	4617 2.26	43	51	63
1050	5262 2.47	5077 2.42	4938 2.37	4843 2.33	4749 2.30	4731 2.29	44	52	65
1075	5388 2.50	5198 2.46	5057 2.40	4959 2.37	4863 2.33	4844 2.32	46	54	67
1100	5514 2.54	5320 2.49	5175 2.44	5075 2.40	4977 2.36	4957 2.36	47	55	68
1125	5640 2.58	5441 2.53	5293 2.48	5190 2.44	5091 2.40	5070 2.39	48	57	70
1150	5765 3.02	5563 2.57	5411 2.51	5306 2.47	5204 2.43	5182 2.42	49	58	71
1175	5891 3.06	5684 3.00	5529 2.55	5421 2.51	5318 2.46	5295 2.46	50	59	73
1200	6016 3.10	5805 3.04	5647 2.58	5536 2.54	5431 2.50	5407 2.49	52	61	74
1225	6141 3.14	5926 3.08	5764 3.02	5651 2.58	5545 2.53	5519 2.52	53	62	76
1250	6266 3.18	6046 3.12	5881 3.05	5766 3.01	5658 2.56	5630 2.56	54	64	78
1275	6391 3.22	6167 3.15	5999 3.09	5880 3.05	5771 3.00	5742 2.59	55	65	79
1300	6516 3.25	6287 3.19	6116 3.13	5995 3.08	5883 3.03	5853 3.02	56	66	81
1325	6640 3.29	6408 3.23	6233 3.16	6109 3.12	5996 3.06	5964 3.05	58	68	82
1350	6764 3.33	6528 3.26	6349 3.20	6223 3.15	6109 3.10	6075 3.09	59	69	84

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.3 %	△FUEL = + 2 %	△FUEL = + 5 %

FLIP23C A320-232 IAE V2527-A5 3610 03301.000011 0250300 .7801 .000200 120 0300350 60 0 100 20 20 20 18590 FCOM-N0-03–05–20–014–120

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - ALL ENGINES
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6 MIN)

REF. INITIAL WEIGHT = 55000 KG
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
1350	6644 3.39	6446 3.34	6276 3.28	6139 3.16	6008 3.12	5933 3.10	70	74	83
1375	6765 3.43	6565 3.37	6391 3.32	6251 3.20	6118 3.16	6042 3.14	71	75	85
1400	6887 3.47	6683 3.41	6506 3.36	6364 3.23	6229 3.19	6150 3.17	72	77	86
1425	7008 3.51	6801 3.45	6620 3.40	6476 3.27	6339 3.23	6257 3.20	74	78	88
1450	7129 3.55	6919 3.49	6735 3.43	6588 3.30	6449 3.26	6365 3.24	75	80	89
1475	7250 3.59	7037 3.53	6849 3.47	6700 3.34	6559 3.29	6472 3.27	77	81	91
1500	7371 4.03	7154 3.57	6963 3.51	6812 3.38	6669 3.33	6579 3.30	78	83	92
1525	7491 4.07	7272 4.01	7077 3.55	6923 3.41	6778 3.36	6686 3.34	79	84	94
1550	7612 4.11	7389 4.05	7191 3.59	7035 3.45	6888 3.40	6793 3.37	81	86	95
1575	7732 4.15	7506 4.08	7304 4.03	7146 3.48	6997 3.43	6899 3.41	82	87	97
1600	7852 4.19	7623 4.12	7418 4.06	7257 3.52	7106 3.47	7006 3.44	84	88	98
1625	7972 4.24	7740 4.16	7531 4.10	7368 3.56	7215 3.50	7112 3.47	85	90	100
1650	8091 4.28	7856 4.20	7644 4.14	7479 3.59	7324 3.53	7218 3.51	86	91	101
1675	8210 4.32	7972 4.24	7757 4.18	7590 4.03	7433 3.57	7324 3.54	88	93	103
1700	8329 4.36	8088 4.28	7870 4.22	7700 4.06	7541 4.00	7429 3.58	89	94	104
1725	8448 4.40	8204 4.32	7982 4.25	7810 4.10	7650 4.04	7535 4.01	90	96	106
1750	8566 4.44	8320 4.36	8095 4.29	7920 4.14	7758 4.07	7640 4.04	92	97	107
1775	8685 4.48	8435 4.40	8207 4.33	8030 4.18	7866 4.11	7745 4.08	93	98	109
1800	8803 4.52	8550 4.44	8319 4.37	8139 4.21	7974 4.14	7850 4.11	95	100	110
1825	8921 4.57	8665 4.48	8430 4.41	8248 4.25	8082 4.17	7955 4.15	96	101	111
1850	9039 5.01	8780 4.52	8542 4.45	8357 4.29	8189 4.21	8060 4.18	97	103	113
1875	9157 5.05	8895 4.56	8653 4.49	8465 4.33	8297 4.24	8166 4.21	99	104	114
1900	9274 5.09	9010 5.00	8765 4.52	8574 4.37	8404 4.28	8271 4.25	100	106	116
1925	9391 5.13	9124 5.04	8876 4.56	8682 4.41	8512 4.31	8376 4.28	102	107	117
1950	9509 5.17	9239 5.08	8987 5.00	8791 4.45	8619 4.35	8481 4.31	103	108	119
1975	9626 5.22	9353 5.11	9097 5.04	8899 4.49	8726 4.38	8585 4.35	104	110	120

CORRECTIONS	**ENGINE AI ON**	**TOTAL AI ON**
FUEL	+ 4 %	+ 6 %

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - ALL ENGINES
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6 MIN)

REF. INITIAL WEIGHT = 55000 KG
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
1975	9626 5.22	9353 5.11	9097 5.04	8899 4.49	8726 4.38	8585 4.35	104	110	120
2000	9743 5.26	9467 5.15	9208 5.08	9007 4.53	8833 4.42	8690 4.38	106	111	121
2025	9859 5.30	9581 5.19	9318 5.12	9114 4.57	8939 4.45	8794 4.42	107	113	123
2050	9976 5.34	9694 5.23	9429 5.16	9222 5.01	9046 4.48	8898 4.45	108	114	124
2075	10092 5.38	9808 5.27	9539 5.20	9329 5.05	9152 4.52	9002 4.48	110	116	125
2100	10209 5.43	9921 5.31	9649 5.24	9436 5.09	9259 4.55	9106 4.52	111	117	127
2125	10325 5.47	10035 5.35	9759 5.27	9544 5.13	9365 4.59	9210 4.55	112	118	128
2150	10441 5.51	10148 5.39	9868 5.31	9650 5.17	9471 5.02	9313 4.58	114	120	129
2175	10556 5.55	10261 5.43	9978 5.35	9757 5.21	9577 5.06	9417 5.02	115	121	131
2200	10671 6.00	10374 5.47	10087 5.39	9864 5.25	9682 5.09	9520 5.05	117	123	132
2225	10787 6.04	10486 5.51	10196 5.43	9970 5.29	9788 5.13	9623 5.09	118	124	133
2250	10901 6.08	10599 5.55	10305 5.47	10077 5.33	9893 5.16	9726 5.12	119	125	135
2275	11016 6.12	10711 5.59	10414 5.51	10183 5.37	9998 5.20	9829 5.15	121	127	136
2300	11131 6.17	10823 6.03	10523 5.55	10289 5.41	10104 5.23	9932 5.19	122	128	137
2325	11245 6.21	10935 6.07	10632 5.59	10394 5.45	10209 5.26	10034 5.22	123	130	139
2350	11359 6.25	11046 6.12	10740 6.03	10500 5.49	10313 5.30	10136 5.26	125	131	140
2375	11474 6.29	11158 6.16	10848 6.07	10606 5.53	10418 5.33	10239 5.29	126	132	141
2400	11587 6.34	11269 6.20	10957 6.11	10711 5.57	10523 5.37	10341 5.32	127	134	143
2425	11701 6.38	11381 6.24	11065 6.14	10816 6.01	10627 5.40	10442 5.36	129	135	144
2450	11815 6.42	11492 6.28	11172 6.18	10921 6.05	10730 5.44	10544 5.39	130	137	145
2475	11928 6.47	11603 6.32	11280 6.22	11026 6.09	10834 5.47	10646 5.43	131	138	146
2500	12042 6.51	11714 6.36	11388 6.26	11131 6.13	10937 5.51	10747 5.46	133	139	148
2525	12155 6.55	11824 6.40	11495 6.30	11236 6.17	11040 5.54	10848 5.49	134	141	149
2550	12268 7.00	11935 6.44	11602 6.34	11341 6.21	11143 5.58	10949 5.53	135	142	150
2575	12381 7.04	12045 6.48	11709 6.38	11445 6.25	11246 6.01	11050 5.56	136	143	152
2600	12493 7.08	12156 6.52	11816 6.42	11549 6.29	11349 6.05	11150 6.00	137	145	153

CORRECTIONS	**ENGINE AI ON**	**TOTAL AI ON**
FUEL	+ 4 %	+ 6 %

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
1350	6729 3.34	6498 3.27	6319 3.20	6189 3.15	6085 3.10	6055 3.09	60	68	82
1375	6852 3.38	6618 3.30	6435 3.23	6303 3.19	6198 3.13	6165 3.12	61	70	84
1400	6976 3.42	6738 3.34	6551 3.27	6416 3.22	6309 3.16	6275 3.16	62	71	85
1425	7099 3.46	6857 3.38	6666 3.31	6529 3.26	6421 3.20	6385 3.19	63	72	87
1450	7222 3.50	6977 3.42	6782 3.34	6641 3.29	6533 3.23	6494 3.22	64	74	88
1475	7345 3.54	7096 3.45	6897 3.38	6754 3.33	6644 3.26	6604 3.26	66	75	90
1500	7468 3.58	7215 3.49	7012 3.42	6867 3.36	6756 3.30	6713 3.29	67	76	92
1525	7590 4.02	7334 3.53	7127 3.45	6979 3.40	6867 3.33	6822 3.32	68	78	93
1550	7713 4.06	7453 3.57	7242 3.49	7091 3.43	6978 3.36	6931 3.35	69	79	95
1575	7835 4.10	7571 4.00	7356 3.53	7203 3.47	7089 3.40	7040 3.39	70	80	96
1600	7957 4.14	7690 4.04	7471 3.56	7315 3.50	7200 3.43	7148 3.42	71	81	98
1625	8079 4.18	7808 4.08	7585 4.00	7426 3.54	7310 3.47	7256 3.45	72	83	99
1650	8201 4.22	7926 4.12	7699 4.04	7538 3.57	7421 3.50	7364 3.49	74	84	101
1675	8323 4.26	8045 4.16	7813 4.07	7649 4.01	7531 3.53	7472 3.52	75	85	102
1700	8445 4.30	8163 4.19	7927 4.11	7760 4.05	7641 3.57	7580 3.55	76	86	104
1725	8566 4.35	8280 4.23	8041 4.15	7871 4.08	7751 4.00	7687 3.59	77	88	105
1750	8687 4.39	8398 4.27	8154 4.18	7982 4.12	7861 4.03	7795 4.02	78	89	107
1775	8809 4.43	8516 4.31	8268 4.22	8092 4.15	7971 4.07	7902 4.05	79	90	108
1800	8930 4.47	8633 4.34	8381 4.26	8203 4.19	8080 4.10	8009 4.09	80	92	110
1825	9050 4.51	8751 4.38	8494 4.30	8313 4.22	8190 4.14	8115 4.12	81	93	111
1850	9171 4.55	8868 4.42	8607 4.33	8423 4.26	8299 4.17	8222 4.15	82	94	113
1875	9292 4.59	8985 4.46	8720 4.37	8533 4.30	8408 4.20	8328 4.19	83	95	114
1900	9412 5.03	9102 4.50	8833 4.41	8643 4.33	8517 4.24	8434 4.22	85	97	116
1925	9533 5.07	9219 4.53	8945 4.45	8753 4.37	8626 4.27	8540 4.25	86	98	117
1950	9653 5.11	9336 4.57	9058 4.48	8862 4.40	8735 4.31	8646 4.29	87	99	118
1975	9773 5.16	9452 5.01	9170 4.52	8972 4.44	8843 4.34	8752 4.32	88	100	120

LOW AIR CONDITIONNING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.4 %	△FUEL = + 3 %	△FUEL = + 5.5 %

PROGRAM : FLIP23C 17.07.97 ; AERO : A319–131 07/02/97 ; MOTO : A319–131 07/02/97 ; GENE : A319–131 26/02/97 END OF FLIP

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
1975	9773 5.16	9452 5.01	9170 4.52	8972 4.44	8843 4.34	8752 4.32	88	100	120
2000	9893 5.20	9569 5.05	9282 4.56	9081 4.47	8952 4.37	8857 4.35	89	102	121
2025	10013 5.24	9685 5.09	9394 5.00	9190 4.51	9060 4.41	8962 4.39	90	103	123
2050	10132 5.28	9801 5.12	9506 5.03	9299 4.55	9168 4.44	9067 4.42	91	104	124
2075	10252 5.32	9918 5.16	9617 5.07	9408 4.58	9276 4.48	9172 4.45	92	105	126
2100	10371 5.36	10034 5.20	9729 5.11	9516 5.02	9384 4.51	9277 4.49	93	106	127
2125	10489 5.40	10149 5.24	9840 5.15	9625 5.05	9492 4.54	9381 4.52	94	108	129
2150	10608 5.44	10265 5.28	9952 5.18	9733 5.09	9599 4.58	9486 4.55	95	109	130
2175	10726 5.48	10381 5.31	10063 5.22	9841 5.13	9707 5.01	9590 4.59	96	110	131
2200	10844 5.52	10495 5.35	10174 5.26	9949 5.16	9814 5.04	9694 5.02	97	111	133
2225	10962 5.57	10610 5.39	10284 5.30	10057 5.20	9921 5.08	9798 5.05	98	113	134
2250	11079 6.01	10725 5.43	10395 5.34	10165 5.23	10028 5.11	9901 5.09	99	114	136
2275	11197 6.05	10839 5.47	10506 5.37	10272 5.27	10135 5.15	10005 5.12	100	115	137
2300	11314 6.09	10953 5.51	10616 5.41	10380 5.31	10242 5.18	10108 5.15	101	116	138
2325	11432 6.13	11067 5.55	10726 5.45	10487 5.34	10349 5.21	10211 5.19	102	117	140
2350	11549 6.17	11181 5.59	10836 5.49	10594 5.38	10454 5.25	10314 5.22	103	119	141
2375	11666 6.21	11295 6.03	10946 5.52	10701 5.41	10559 5.29	10417 5.25	104	120	143
2400	11782 6.25	11409 6.07	11056 5.56	10808 5.45	10664 5.32	10520 5.29	105	121	144
2425	11899 6.29	11523 6.11	11166 6.00	10915 5.49	10769 5.36	10624 5.32	106	122	145
2450	12016 6.33	11636 6.15	11276 6.04	11021 5.52	10873 5.39	10726 5.35	107	123	147
2475	12132 6.37	11750 6.19	11385 6.08	11128 5.56	10977 5.43	10829 5.39	108	125	148
2500	12248 6.42	11863 6.23	11494 6.11	11234 5.59	11082 5.46	10932 5.42	109	126	149
2525	12365 6.46	11976 6.27	11604 6.15	11340 6.03	11186 5.50	11034 5.45	110	127	151
2550	12481 6.50	12089 6.31	11713 6.19	11446 6.07	11290 5.53	11137 5.49	111	128	152
2575	12596 6.54	12202 6.35	11822 6.23	11552 6.10	11393 5.57	11239 5.52	112	129	153
2600	12712 6.58	12315 6.39	11931 6.27	11658 6.14	11497 6.00	11341 5.55	113	130	155

LOW AIR CONDITIONNING
△FUEL = – 0.4 %

ENGINE ANTI ICE ON
△FUEL = + 3 %

TOTAL ANTI ICE ON
△FUEL = + 5.5 %

PROGRAM : FLIP23C 17.07.97 ; AERO : A319–131 07/02/97 ; MOTO : A319–131 07/02/97 ; GENE : A319–131 26/02/97 END OF FLIP

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 120 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
1350	6764 3.33	6528 3.26	6349 3.20	6223 3.15	6109 3.10	6075 3.09	59	69	84
1375	6889 3.37	6648 3.30	6466 3.23	6337 3.19	6221 3.13	6186 3.12	60	70	85
1400	7013 3.41	6768 3.34	6582 3.27	6451 3.22	6333 3.16	6296 3.15	61	72	87
1425	7136 3.45	6888 3.38	6699 3.31	6564 3.26	6445 3.20	6407 3.19	62	73	88
1450	7260 3.49	7007 3.41	6815 3.34	6677 3.29	6557 3.23	6517 3.22	64	74	90
1475	7383 3.53	7127 3.45	6931 3.38	6791 3.33	6668 3.26	6627 3.25	65	76	91
1500	7507 3.57	7246 3.49	7046 3.41	6904 3.36	6780 3.30	6736 3.29	66	77	93
1525	7630 4.01	7365 3.53	7161 3.45	7016 3.40	6891 3.33	6846 3.32	67	78	94
1550	7753 4.05	7485 3.56	7277 3.49	7129 3.43	7002 3.37	6955 3.35	68	79	96
1575	7876 4.09	7604 4.00	7391 3.52	7241 3.47	7114 3.40	7064 3.39	69	81	97
1600	7998 4.13	7723 4.04	7506 3.56	7353 3.51	7224 3.43	7173 3.42	71	82	98
1625	8121 4.17	7841 4.08	7621 4.00	7465 3.54	7335 3.47	7281 3.45	72	83	100
1650	8244 4.21	7960 4.11	7735 4.04	7577 3.58	7446 3.50	7390 3.49	73	85	101
1675	8366 4.25	8079 4.15	7850 4.07	7688 4.01	7556 3.54	7498 3.52	74	86	103
1700	8488 4.29	8197 4.19	7964 4.11	7799 4.05	7667 3.57	7606 3.55	75	87	104
1725	8610 4.33	8315 4.23	8078 4.15	7911 4.08	7777 4.00	7714 3.59	76	88	106
1750	8732 4.37	8433 4.27	8192 4.18	8022 4.12	7887 4.04	7821 4.02	77	90	107
1775	8854 4.41	8551 4.30	8306 4.22	8133 4.15	7997 4.07	7929 4.05	79	91	108
1800	8975 4.45	8669 4.34	8419 4.26	8243 4.19	8107 4.11	8036 4.09	80	92	110
1825	9097 4.49	8787 4.38	8532 4.30	8354 4.23	8216 4.14	8143 4.12	81	93	111
1850	9218 4.53	8904 4.42	8646 4.33	8464 4.26	8326 4.17	8250 4.15	82	95	113
1875	9339 4.57	9022 4.46	8759 4.37	8575 4.30	8435 4.21	8357 4.19	83	96	114
1900	9460 5.01	9139 4.49	8872 4.41	8685 4.33	8544 4.24	8463 4.22	84	97	115
1925	9581 5.05	9256 4.53	8985 4.45	8795 4.37	8653 4.28	8569 4.25	86	99	117
1950	9702 5.09	9373 4.57	9097 4.48	8904 4.40	8762 4.31	8676 4.29	87	100	118
1975	9822 5.13	9490 5.01	9210 4.52	9014 4.44	8871 4.35	8782 4.32	88	101	119

LOW AIR CONDITIONING
△FUEL = – 0.3 %

ENGINE ANTI ICE ON
△FUEL = + 2 %

TOTAL ANTI ICE ON
△FUEL = + 5 %

FLIP23C A320-232 IAE V2527-A5 3610 03301.000011 0250300 .7801 .000200 120 0300350 60 0 100 20 20 20 18590 FCOM-N0-03–05–20–015–140

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 120 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
1975	9822 5.13	9490 5.01	9210 4.52	9014 4.44	8871 4.35	8782 4.32	88	101	119
2000	9943 5.18	9607 5.05	9322 4.56	9123 4.48	8979 4.38	8887 4.35	89	102	121
2025	10063 5.22	9724 5.08	9434 5.00	9233 4.51	9088 4.41	8993 4.39	90	104	122
2050	10183 5.26	9840 5.12	9546 5.03	9342 4.55	9196 4.45	9098 4.42	91	105	123
2075	10303 5.30	9957 5.16	9658 5.07	9451 4.58	9304 4.48	9204 4.45	92	106	125
2100	10423 5.34	10073 5.20	9770 5.11	9559 5.02	9412 4.52	9309 4.49	93	107	126
2125	10543 5.38	10189 5.24	9882 5.15	9668 5.06	9520 4.55	9413 4.52	95	108	128
2150	10663 5.42	10305 5.28	9993 5.18	9777 5.09	9628 4.59	9518 4.55	96	110	129
2175	10782 5.46	10421 5.31	10105 5.22	9885 5.13	9736 5.02	9623 4.59	97	111	130
2200	10901 5.50	10537 5.35	10216 5.26	9993 5.16	9843 5.06	9727 5.02	98	112	131
2225	11021 5.54	10653 5.39	10327 5.30	10101 5.20	9950 5.09	9831 5.05	99	113	133
2250	11140 5.59	10768 5.43	10438 5.34	10209 5.24	10058 5.12	9935 5.09	100	115	134
2275	11259 6.03	10884 5.47	10548 5.37	10317 5.27	10165 5.16	10039 5.12	101	116	135
2300	11378 6.07	10999 5.51	10659 5.41	10424 5.31	10271 5.19	10143 5.15	102	117	137
2325	11496 6.11	11114 5.55	10770 5.45	10532 5.35	10378 5.23	10246 5.19	103	118	138
2350	11615 6.15	11229 5.58	10880 5.49	10639 5.38	10485 5.26	10350 5.22	105	119	139
2375	11733 6.19	11344 6.02	10990 5.53	10746 5.42	10591 5.30	10453 5.25	106	121	140
2400	11852 6.23	11459 6.06	11100 5.57	10853 5.45	10698 5.33	10556 5.29	107	122	142
2425	11970 6.28	11574 6.10	11210 6.00	10960 5.49	10804 5.37	10659 5.32	108	123	143
2450	12087 6.32	11689 6.14	11320 6.04	11066 5.53	10910 5.40	10761 5.35	109	124	144
2475	12205 6.36	11803 6.18	11430 6.08	11173 5.56	11016 5.44	10864 5.39	110	125	145
2500	12322 6.40	11917 6.22	11539 6.12	11279 6.00	11122 5.47	10966 5.42	111	127	146
2525	12438 6.44	12032 6.26	11648 6.16	11385 6.04	11228 5.51	11068 5.45	112	128	148
2550	12555 6.48	12145 6.29	11758 6.20	11492 6.07	11333 5.54	11170 5.49	113	129	149
2575	12672 6.52	12258 6.33	11867 6.24	11598 6.11	11439 5.58	11272 5.52	114	130	150
2600	12788 6.56	12371 6.37	11976 6.27	11703 6.15	11544 6.01	11374 5.55	116	131	152

LOW AIR CONDITIONING
△FUEL = – 0.3 %

ENGINE ANTI ICE ON
△FUEL = + 2 %

TOTAL ANTI ICE ON
△FUEL = + 5 %

FLIP23C A320-232 IAEV2527-A5 3610 03301.000011 0250300 .7801 .000200 120 0300350 60 0 100 20 20 20 18590 FCOM-N0-03–05–20–016–140

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - ALL ENGINES
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6 MIN)

REF. INITIAL WEIGHT = 55000 KG NORMAL AIR CONDITIONING ANTI ICE OFF	ISA CG=33.0%	**FUEL CONSUMED (KG)** **TIME (H.MIN)**

AIR DIST. (NM)	FLIGHT LEVEL						CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
	290	**310**	**330**	**350**	**370**	**390**	**FL290 FL310**	**FL330 FL350**	**FL370 FL390**
2600	12493 7.08	12156 6.52	11816 6.42	11549 6.29	11349 6.05	11150 6.00	137	145	153
2625	12606 7.13	12266 6.56	11923 6.46	11653 6.33	11451 6.08	11251 6.03	139	146	154
2650	12718 7.17	12376 7.00	12030 6.50	11757 6.36	11554 6.12	11351 6.06	140	147	155
2675	12831 7.21	12486 7.04	12136 6.54	11861 6.40	11656 6.16	11451 6.10	141	149	156
2700	12943 7.26	12595 7.08	12243 6.58	11965 6.44	11758 6.19	11552 6.13	143	150	158
2725	13055 7.30	12705 7.12	12349 7.02	12068 6.48	11860 6.23	11651 6.17	144	151	159
2750	13166 7.34	12814 7.16	12455 7.06	12172 6.52	11962 6.26	11751 6.20	145	155	160
2775	13278 7.39	12924 7.21	12561 7.10	12275 6.56	12064 6.30	11851 6.23	147	156	161
2800	13390 7.43	13033 7.25	12667 7.14	12378 7.00	12165 6.33	11950 6.27	148	157	163
2825	13501 7.48	13142 7.29	12773 7.18	12481 7.04	12267 6.37	12050 6.30	149	160	164
2850	13613 7.52	13251 7.33	12878 7.22	12584 7.08	12368 6.40	12149 6.34	151	161	165
2875	13724 7.56	13359 7.37	12984 7.26	12687 7.12	12470 6.44	12248 6.37	152	162	166
2900	13835 8.01	13467 7.41	13089 7.30	12789 7.16	12571 6.47	12347 6.41	153	164	164
2925	13946 8.05	13575 7.45	13194 7.34	12892 7.20	12672 6.51	12446 6.44	154	165	174
2950	14056 8.09	13683 7.49	13299 7.38	12994 7.24	12772 6.54	12545 6.47	156	166	175
2975	14167 8.14	13791 7.54	13404 7.42	13096 7.28	12873 6.58	12643 6.51	157	167	176
3000	14277 8.18	13899 7.58	13509 7.46	13198 7.32	12974 7.01	12742 6.54	158	169	177
3025	14388 8.23	14006 8.02	13613 7.50	13300 7.36	13074 7.05	12840 6.58	160	170	178
3050	14498 8.27	14114 8.06	13718 7.54	13401 7.40	13174 7.09	12938 7.01	161	171	180
3075	14608 8.31	14221 8.10	13822 7.58	13503 7.44	13274 7.12	13036 7.05	162	172	181
3100	14718 8.36	14328 8.14	13926 8.02	13604 7.48	13373 7.16	13134 7.08	164	174	182

CORRECTIONS	**ENGINE AI ON**	**TOTAL AI ON**
FUEL	+ 4 %	+ 6 %

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
2600	12712 6.58	12315 6.39	11931 6.27	11658 6.14	11497 6.00	11341 5.55	113	130	155
2625	12828 7.02	12427 6.43	12039 6.30	11763 6.18	11601 6.04	11443 5.59	114	132	156
2650	12943 7.06	12540 6.47	12148 6.34	11869 6.21	11704 6.08	11544 6.02	115	133	157
2675	13058 7.11	12652 6.51	12256 6.38	11974 6.25	11807 6.11	11646 6.05	116	134	159
2700	13174 7.15	12764 6.55	12365 6.42	12079 6.28	11910 6.15	11747 6.09	117	135	160
2725	13289 7.19	12876 6.59	12473 6.46	12184 6.32	12013 6.18	11849 6.12	118	136	161
2750	13403 7.23	12988 7.03	12581 6.49	12289 6.36	12116 6.22	11950 6.15	119	137	162
2775	13518 7.27	13100 7.07	12689 6.53	12394 6.39	12219 6.25	12051 6.19	120	138	164
2800	13633 7.31	13212 7.11	12797 6.57	12499 6.43	12321 6.29	12152 6.22	121	140	165
2825	13747 7.35	13324 7.15	12904 7.01	12603 6.47	12424 6.33	12252 6.25	122	141	166
2850	13862 7.40	13435 7.19	13012 7.05	12708 6.50	12526 6.36	12353 6.29	123	142	167
2875	13976 7.44	13546 7.23	13119 7.09	12812 6.54	12628 6.40	12453 6.32	124	143	169
2900	14090 7.48	13658 7.27	13227 7.12	12916 6.58	12730 6.43	12554 6.35	125	144	170
2925	14204 7.52	13769 7.31	13334 7.16	13020 7.01	12832 6.47	12654 6.39	126	145	171
2950	14317 7.56	13880 7.35	13441 7.20	13124 7.05	12934 6.51	12754 6.42	127	147	172
2975	14431 8.00	13991 7.39	13548 7.24	13228 7.09	13035 6.54	12854 6.45	128	148	174
3000	14545 8.05	14101 7.43	13654 7.28	13331 7.12	13137 6.58	12954 6.49	129	149	175
3025	14658 8.09	14212 7.47	13761 7.32	13435 7.16	13238 7.01	13053 6.52	130	150	176
3050	14771 8.13	14323 7.51	13868 7.36	13538 7.20	13339 7.05	13153 6.56	131	151	177
3075	14884 8.17	14433 7.56	13974 7.39	13641 7.23	13440 7.09	13252 6.59	132	152	178
3100	14997 8.21	14543 8.00	14080 7.43	13745 7.27	13541 7.12	13351 7.02	133	153	180

PROGRAM : FLIP23C 17.07.97 ; AERO : A319–131 07/02/97 ; MOTO : A319–131 07/02/97 ; GENE : A319–131 26/02/97 END OF FLIP

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 120 KG (6MIN)

REF. INITIAL WEIGHT = 60000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)
TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 290	310	330	350	370	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL290 FL310	FL330 FL350	FL370 FL390
2600	12788 6.56	12371 6.37	11976 6.27	11703 6.15	11544 6.01	11374 5.55	116	131	152
2625	12904 7.00	12484 6.41	12085 6.31	11809 6.18	11649 6.04	11475 5.59	117	132	153
2650	13020 7.04	12597 6.45	12194 6.35	11914 6.22	11754 6.08	11577 6.02	118	133	154
2675	13136 7.09	12710 6.49	12303 6.39	12020 6.26	11859 6.11	11678 6.05	119	135	155
2700	13252 7.13	12823 6.53	12411 6.43	12125 6.29	11964 6.15	11779 6.09	120	136	157
2725	13368 7.17	12935 6.57	12520 6.46	12231 6.33	12069 6.18	11880 6.12	121	137	158
2750	13483 7.21	13048 7.01	12629 6.50	12336 6.37	12172 6.22	11981 6.16	122	138	159
2775	13599 7.25	13160 7.05	12737 6.54	12441 6.40	12275 6.26	12081 6.19	123	139	160
2800	13714 7.29	13272 7.09	12845 6.58	12546 6.44	12377 6.29	12183 6.22	124	140	161
2825	13829 7.33	13384 7.14	12954 7.02	12651 6.48	12480 6.33	12284 6.26	125	141	163
2850	13944 7.37	13496 7.18	13062 7.05	12756 6.51	12583 6.36	12385 6.29	126	142	164
2875	14059 7.41	13607 7.22	13170 7.09	12861 6.55	12685 6.40	12486 6.32	127	144	165
2900	14174 7.46	13719 7.26	13277 7.13	12965 6.58	12787 6.43	12587 6.36	128	145	166
2925	14289 7.50	13831 7.30	13385 7.17	13070 7.02	12889 6.47	12688 6.39	130	146	168
2950	14403 7.54	13942 7.34	13493 7.21	13174 7.06	12991 6.51	12788 6.42	131	147	169
2975	14518 7.58	14053 7.38	13600 7.24	13278 7.09	13093 6.54	12889 6.46	132	148	170
3000	14632 8.02	14164 7.42	13707 7.28	13382 7.13	13194 6.58	12989 6.49	133	149	171
3025	14746 8.06	14275 7.46	13814 7.32	13486 7.17	13296 7.01	13089 6.52	134	150	172
3050	14860 8.10	14386 7.50	13922 7.36	13590 7.20	13397 7.05	13189 6.56	135	152	174
3075	14974 8.15	14497 7.54	14028 7.40	13694 7.24	13498 7.09	13289 6.59	136	153	175
3100	15088 8.19	14608 7.58	14135 7.44	13797 7.28	13600 7.12	13389 7.02	137	154	176

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 0.3 %	△FUEL = + 2 %	△FUEL = + 5 %

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GENERAL

Holding tables contain information about the total fuel flow that allows the flight crew to plan holding and reserve fuel requirements.
They are established for flight in a race track holding pattern for two different configurations:
· clean configuration at 210 knots and green dot speed
· configuration 1 at 170 knots and S speed.
Green dot speed in clean configuration and S in CONF 1 are speeds between the minimum fuel speed and the minimum drag speed.
These charts are established with air conditioning in normal mode and the center of gravity at 33 %.

R

RACE TRACK HOLDING PATTERN - GREEN DOT SPEED

MAX. CRUISE THRUST LIMITS
CLEAN CONFIGURATION
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG=33.0%

EPR
FF (KG/H/ENG)

WEIGHT (1000KG)	FL 15	FL 50	FL100	FL140	FL180	FL200	FL220	FL250
44	1.020 924	1.023 892	1.029 848	1.036 818	1.046 791	1.053 780	1.061 771	1.074 760
46	1.021 956	1.024 924	1.030 880	1.038 849	1.049 823	1.057 811	1.066 802	1.080 792
48	1.022 989	1.025 957	1.032 911	1.040 880	1.053 854	1.062 841	1.071 834	1.086 824
50	1.022 1023	1.026 988	1.034 942	1.043 911	1.056 885	1.066 874	1.076 867	1.092 857
52	1.023 1056	1.027 1020	1.035 973	1.045 943	1.060 916	1.070 906	1.080 900	1.098 890
54	1.024 1090	1.028 1052	1.037 1005	1.047 975	1.064 949	1.075 939	1.085 933	1.104 923
56	1.025 1122	1.029 1084	1.039 1037	1.050 1007	1.068 981	1.079 972	1.090 966	1.109 958
58	1.026 1154	1.031 1115	1.041 1069	1.053 1039	1.072 1014	1.084 1006	1.095 999	1.115 993
60	1.027 1187	1.032 1146	1.043 1101	1.056 1071	1.076 1047	1.088 1039	1.100 1031	1.122 1025
62	1.027 1218	1.033 1178	1.045 1133	1.059 1103	1.080 1080	1.093 1072	1.105 1066	1.129 1056
64	1.028 1249	1.034 1210	1.047 1166	1.062 1136	1.083 1113	1.097 1105	1.110 1101	1.135 1087
66	1.029 1281	1.036 1243	1.049 1199	1.065 1168	1.087 1146	1.101 1138	1.114 1136	1.142 1118
68	1.030 1313	1.037 1276	1.051 1232	1.068 1200	1.091 1179	1.105 1173	1.120 1167	1.150 1150
70	1.031 1345	1.038 1309	1.053 1266	1.070 1233	1.095 1212	1.109 1208	1.126 1199	1.158 1184
72	1.032 1378	1.040 1342	1.055 1298	1.073 1266	1.098 1246	1.114 1242	1.131 1230	1.167 1221
74	1.033 1412	1.041 1376	1.057 1331	1.076 1299	1.102 1279	1.119 1274	1.137 1260	1.176 1258
76	1.034 1445	1.043 1410	1.059 1363	1.078 1332	1.106 1314	1.124 1305	1.143 1291	1.184 1295

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1° ABOVE ISA	STRAIGHT LINE
△FF = – 0.2 %	△FF = + 3 %	△FF = + 5 %	△FF = + 0.25 %	△FF = – 5 %

GENERAL

Holding tables contain information about the total fuel flow that allows the flight crew to plan holding and reserve fuel requirements.
They are established for flight in a race track holding pattern for two different configurations:
· clean configuration at 210 knots and green dot speed
· configuration 1 at 170 knots and S speed.
Green dot speed in clean configuration and S in CONF 1 are speeds between the minimum fuel speed and the minimum drag speed.
These charts are established with air conditioning in normal mode and the center of gravity at 33 %.

RACE TRACK HOLDING PATTERN - GREEN DOT SPEED - ALL ENGINES

MAX. CRUISE THRUST LIMITS
CLEAN CONFIGURATION
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

N1 (%)
FF (KG/H/ENG)

WEIGHT (1000KG)	FL15	FL50	FL100	FL140	FL180	FL200	FL220	FL250
42	45.8 839	48.6 815	52.6 789	55.5 772	58.3 763	59.7 761	61.2 760	63.5 730
44	47.0 871	49.8 847	53.7 823	56.5 805	59.3 798	60.7 798	62.3 788	64.6 755
46	48.2 903	51.0 881	54.7 856	57.4 840	60.3 834	61.7 833	63.3 813	65.6 785
48	49.3 936	52.1 915	55.7 888	58.4 875	61.2 871	62.7 861	64.3 838	66.6 816
50	50.4 970	53.1 949	56.6 921	59.3 909	62.2 905	63.7 887	65.2 863	67.6 849
52	51.5 1003	54.0 983	57.5 955	60.2 945	63.1 932	64.6 911	66.1 888	68.4 883
54	52.4 1038	54.9 1016	58.3 989	61.1 981	64.0 959	65.5 937	67.0 920	69.3 919
56	53.4 1072	55.8 1047	59.1 1023	61.9 1017	64.9 983	66.3 962	67.9 953	70.0 956
58	54.2 1106	56.6 1079	59.9 1057	62.7 1051	65.7 1008	67.2 990	68.7 987	70.8 995
60	55.0 1138	57.3 1111	60.7 1092	63.5 1079	66.5 1034	68.0 1022	69.5 1023	71.6 1034
62	55.8 1169	58.1 1143	61.5 1129	64.3 1106	67.3 1061	68.8 1057	70.2 1060	72.3 1076
64	56.6 1200	58.8 1177	62.2 1165	65.1 1132	68.0 1094	69.5 1093	70.9 1098	72.9 1118
66	57.3 1232	59.5 1212	62.9 1200	65.8 1156	68.8 1128	70.2 1129	71.6 1136	73.6 1161
68	57.9 1264	60.2 1246	63.6 1230	66.5 1180	69.5 1164	70.9 1167	72.2 1177	74.4 1201

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1 DEG C DISA	STRAIGHT LINE
FUEL	+ 2 %	+ 7 %	+ 0.3 %	- 5 %

GENERAL

Holding tables contain information about the total fuel flow that allows the flight crew to plan holding and reserve fuel requirements.

They are established for flight in a race track holding pattern for two different configurations:

R · clean configuration at 210 knots and green dot speed + 20 knots

· configuration 1 at 170 knots and S speed.

Green dot speed in clean configuration and S in CONF 1 are speeds between the minimum fuel speed and the minimum drag speed.

These charts are established with air conditioning in normal mode and the center of gravity at 33 %.

RACE TRACK HOLDING PATTERN - GREEN DOT SPEED + 20 KNOTS

MAX. CRUISE THRUST LIMITS
CLEAN CONFIGURATION
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG=33.0%

EPR
FF (KG/H/ENG)

WEIGHT (1000KG)	FL 15	FL 50	FL100	FL140	FL180	FL200	FL220	FL250
46	1.011 919	1.015 885	1.022 844	1.031 827	1.046 822	1.055 821	1.065 826	1.083 835
48	1.012 949	1.016 914	1.024 876	1.034 861	1.050 858	1.060 858	1.071 863	1.091 868
50	1.013 979	1.017 944	1.026 909	1.038 897	1.054 895	1.065 896	1.077 901	1.098 899
52	1.014 1009	1.018 973	1.028 942	1.041 933	1.059 932	1.070 933	1.083 940	1.106 923
54	1.015 1038	1.020 1003	1.031 976	1.044 970	1.063 970	1.075 971	1.089 975	1.114 948
56	1.016 1068	1.021 1035	1.033 1011	1.048 1008	1.068 1008	1.081 1010	1.095 1007	1.123 973
58	1.017 1098	1.023 1068	1.036 1047	1.052 1045	1.073 1047	1.086 1048	1.101 1039	1.131 1000
60	1.018 1129	1.024 1102	1.038 1084	1.055 1084	1.078 1086	1.092 1081	1.108 1065	1.140 1030
62	1.019 1160	1.026 1136	1.041 1122	1.059 1122	1.083 1126	1.098 1114	1.115 1090	1.148 1059
64	1.020 1192	1.028 1170	1.044 1161	1.062 1161	1.088 1163	1.104 1146	1.123 1115	1.157 1089
66	1.022 1226	1.030 1206	1.047 1199	1.066 1201	1.093 1196	1.110 1171	1.130 1143	1.166 1119
68	1.023 1260	1.031 1242	1.050 1238	1.070 1241	1.098 1229	1.117 1197	1.138 1173	1.175 1151
70	1.024 1294	1.033 1278	1.053 1277	1.074 1281	1.103 1257	1.123 1222	1.145 1203	1.184 1185
72	1.026 1330	1.035 1317	1.056 1317	1.078 1322	1.109 1282	1.130 1250	1.153 1233	1.194 1220
74	1.027 1365	1.038 1357	1.059 1357	1.082 1363	1.115 1308	1.137 1280	1.160 1263	1.203 1261
76	1.029 1402	1.040 1397	1.062 1398	1.086 1403	1.121 1335	1.143 1311	1.168 1294	1.213 1302
78	1.030 1439	1.042 1437	1.065 1440	1.090 1438	1.127 1361	1.150 1340	1.176 1326	1.223 1343

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1° ABOVE ISA	STRAIGHT LINE
△FF = –0.2 %	△FF = +3.5 %	△FF = +5.5 %	△FF = +0.3 %	△FF = –5 %

R

RACE TRACK HOLDING PATTERN - 210KT

MAX. CRUISE THRUST LIMITS
CLEAN CONFIGURATION
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG=33.0%

EPR
FF (KG/H/ENG)

WEIGHT (1000KG)	FL 15	FL 50	FL100	FL140	FL180	FL200	FL220	FL250
44	1.011 1034	1.013 986	1.018 928	1.024 891	1.031 852	1.037 838	1.043 827	1.055 807
46	1.012 1051	1.015 1004	1.020 948	1.027 911	1.035 873	1.040 859	1.048 847	1.062 825
48	1.014 1070	1.017 1023	1.023 969	1.030 933	1.039 895	1.045 880	1.052 869	1.069 845
50	1.016 1089	1.019 1043	1.026 990	1.034 957	1.043 918	1.049 904	1.058 891	1.076 869
52	1.017 1109	1.021 1064	1.028 1012	1.037 980	1.047 943	1.054 928	1.064 915	1.084 895
54	1.019 1129	1.023 1085	1.031 1036	1.041 1004	1.052 969	1.061 954	1.072 942	1.093 924
56	1.021 1151	1.025 1108	1.034 1060	1.045 1028	1.058 995	1.067 980	1.080 970	1.103 954
58	1.023 1173	1.028 1131	1.038 1084	1.049 1054	1.064 1021	1.075 1010	1.088 1000	1.112 988
60	1.025 1196	1.030 1155	1.041 1109	1.053 1079	1.071 1050	1.083 1040	1.097 1032	1.122 1025
62	1.027 1220	1.033 1180	1.044 1135	1.059 1105	1.079 1081	1.091 1072	1.106 1066	1.133 1062
64	1.029 1244	1.035 1205	1.048 1162	1.064 1132	1.086 1112	1.100 1105	1.115 1103	1.144 1099
66	1.032 1270	1.038 1232	1.052 1189	1.069 1160	1.093 1144	1.108 1140	1.124 1142	1.156 1139
68	1.034 1296	1.041 1260	1.056 1216	1.075 1190	1.101 1177	1.116 1178	1.133 1181	1.170 1182
70	1.036 1323	1.044 1288	1.061 1245	1.081 1221	1.108 1213	1.124 1216	1.143 1219	1.184 1227
72	1.039 1352	1.047 1317	1.065 1274	1.087 1253	1.115 1251	1.132 1256	1.154 1260	1.198 1273
74	1.041 1382	1.050 1347	1.070 1304	1.093 1286	1.123 1290	1.141 1296	1.166 1302	1.213 1320
76	1.044 1412	1.054 1378	1.075 1337	1.099 1320	1.131 1330	1.151 1337	1.178 1346	1.220 1354

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1° ABOVE ISA	STRAIGHT LINE
△FF = – 0.2 %	△FF = + 3 %	△FF = + 5 %	△FF = + 0.25 %	△FF = – 5 %

R

RACE TRACK HOLDING PATTERN - S SPEED

MAX. CRUISE THRUST LIMITS
CONFIGURATION 1
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG=33.0%

EPR
FF (KG/H/ENG)

WEIGHT (1000KG)	FL 15	FL 50	FL100	FL120	FL140	FL160	FL180	FL200
44	1.028 932	1.032 901	1.039 862	1.043 849	1.048 837	1.055 826	1.063 815	1.072 803
46	1.030 966	1.033 935	1.041 897	1.046 883	1.051 871	1.059 861	1.067 848	1.077 836
48	1.031 999	1.035 968	1.044 931	1.048 917	1.055 906	1.063 894	1.072 881	1.083 869
50	1.032 1034	1.037 1003	1.046 965	1.052 952	1.059 941	1.068 927	1.077 914	1.088 903
52	1.033 1068	1.038 1037	1.048 1000	1.055 988	1.063 974	1.072 960	1.082 947	1.094 937
54	1.035 1102	1.040 1071	1.051 1035	1.059 1022	1.067 1007	1.077 993	1.087 981	1.100 971
56	1.036 1137	1.042 1107	1.055 1070	1.063 1055	1.071 1040	1.081 1027	1.093 1015	1.105 1006
58	1.037 1171	1.043 1142	1.058 1104	1.066 1088	1.075 1073	1.086 1061	1.098 1049	1.111 1040
60	1.039 1206	1.045 1177	1.062 1138	1.070 1122	1.080 1107	1.091 1095	1.103 1084	1.116 1075
62	1.040 1241	1.047 1212	1.065 1171	1.074 1155	1.084 1141	1.096 1129	1.108 1119	1.122 1111
64	1.042 1277	1.050 1247	1.068 1205	1.078 1189	1.088 1175	1.100 1163	1.113 1154	1.128 1146
66	1.043 1312	1.052 1282	1.072 1238	1.082 1223	1.093 1210	1.105 1199	1.119 1189	1.134 1182
68	1.045 1348	1.055 1316	1.076 1271	1.086 1257	1.097 1244	1.110 1234	1.124 1225	1.140 1218
70	1.047 1383	1.058 1351	1.079 1306	1.090 1292	1.102 1279	1.115 1269	1.129 1261	1.146 1254
72	1.049 1419	1.061 1385	1.083 1340	1.094 1326	1.106 1315	1.119 1305	1.135 1297	1.153 1290
74	1.051 1453	1.063 1418	1.087 1375	1.098 1361	1.110 1350	1.124 1341	1.140 1333	1.160 1326
76	1.053 1488	1.066 1452	1.090 1410	1.102 1396	1.115 1386	1.129 1377	1.146 1369	1.167 1362

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1° ABOVE ISA	STRAIGHT LINE
△FF = – 0.2 %	△FF = + 3 %	△FF = + 5 %	△FF = + 0.25 %	△FF = – 5 %

R

RACE TRACK HOLDING PATTERN - 210KT

MAX. CRUISE THRUST LIMITS
CLEAN CONFIGURATION
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG=33.0%

EPR
FF (KG/H/ENG)

WEIGHT (1000KG)	FL 15	FL 50	FL100	FL140	FL180	FL200	FL220	FL250
46	1.004 968	1.006 927	1.011 883	1.019 866	1.031 864	1.039 865	1.048 865	1.065 858
48	1.006 986	1.008 946	1.014 904	1.022 891	1.036 891	1.044 891	1.054 893	1.072 884
50	1.007 1004	1.010 966	1.017 928	1.026 918	1.040 917	1.050 919	1.060 921	1.080 904
52	1.009 1023	1.012 986	1.019 954	1.030 946	1.045 945	1.055 947	1.067 949	1.087 924
54	1.011 1043	1.014 1008	1.022 980	1.034 974	1.051 975	1.061 976	1.073 975	1.096 946
56	1.012 1063	1.016 1032	1.026 1007	1.038 1004	1.056 1004	1.067 1006	1.080 997	1.105 966
58	1.014 1085	1.019 1057	1.029 1037	1.043 1034	1.062 1034	1.074 1032	1.088 1020	1.114 993
60	1.016 1108	1.021 1084	1.033 1068	1.047 1065	1.068 1065	1.080 1056	1.095 1043	1.123 1021
62	1.018 1134	1.024 1111	1.037 1099	1.052 1098	1.074 1093	1.087 1080	1.103 1065	1.133 1049
64	1.020 1161	1.026 1141	1.041 1132	1.057 1130	1.080 1119	1.094 1106	1.111 1094	1.143 1076
66	1.022 1189	1.030 1172	1.045 1165	1.063 1164	1.086 1145	1.101 1131	1.119 1125	1.153 1108
68	1.025 1217	1.033 1205	1.049 1200	1.068 1198	1.093 1173	1.109 1163	1.128 1158	1.164 1145
70	1.027 1249	1.036 1240	1.054 1236	1.074 1228	1.100 1201	1.117 1198	1.137 1190	1.176 1190
72	1.030 1283	1.040 1276	1.059 1273	1.080 1259	1.107 1237	1.125 1234	1.146 1216	1.188 1238
74	1.033 1318	1.043 1313	1.063 1311	1.086 1291	1.115 1276	1.134 1271	1.156 1254	1.200 1279
76	1.036 1355	1.047 1351	1.069 1347	1.092 1324	1.123 1316	1.143 1299	1.166 1298	1.214 1320
78	1.039 1393	1.051 1390	1.074 1382	1.098 1358	1.131 1358	1.152 1337	1.177 1349	1.223 1361

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1° ABOVE ISA	STRAIGHT LINE
△FF = – 0.2 %	△FF = + 3 %	△FF = + 5 %	△FF = + 0.3 %	△FF = – 5 %

R

RACE TRACK HOLDING PATTERN - S SPEED

MAX. CRUISE THRUST LIMITS
CONFIGURATION 1
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG=33.0%

EPR
FF (KG/H/ENG)

WEIGHT (1000KG)	FL 15	FL 50	FL100	FL120	FL140	FL160	FL180	FL200
46	1.022 896	1.026 880	1.036 868	1.041 869	1.048 870	1.056 874	1.065 876	1.076 871
48	1.023 932	1.028 918	1.039 909	1.045 910	1.052 913	1.060 917	1.070 914	1.081 907
50	1.025 968	1.030 956	1.042 951	1.048 952	1.056 956	1.065 957	1.075 951	1.087 943
52	1.026 1005	1.032 994	1.045 993	1.052 995	1.060 998	1.070 996	1.081 988	1.093 979
54	1.028 1043	1.034 1033	1.048 1035	1.055 1039	1.064 1039	1.075 1033	1.086 1025	1.099 1014
56	1.029 1081	1.036 1073	1.051 1078	1.059 1080	1.069 1078	1.080 1070	1.092 1061	1.106 1054
58	1.031 1120	1.038 1115	1.055 1121	1.063 1121	1.073 1116	1.085 1107	1.097 1096	1.113 1096
60	1.033 1159	1.041 1157	1.058 1162	1.067 1161	1.078 1153	1.090 1143	1.103 1133	1.119 1137
62	1.035 1198	1.043 1200	1.062 1203	1.072 1199	1.083 1190	1.095 1179	1.109 1176	1.126 1177
64	1.036 1239	1.046 1242	1.066 1244	1.076 1237	1.087 1227	1.100 1214	1.116 1218	1.133 1216
66	1.038 1281	1.048 1286	1.070 1283	1.080 1274	1.092 1263	1.106 1255	1.122 1258	1.140 1248
68	1.040 1324	1.051 1328	1.073 1321	1.084 1311	1.097 1299	1.111 1298	1.128 1298	1.147 1279
70	1.043 1367	1.054 1369	1.077 1359	1.089 1347	1.101 1334	1.117 1339	1.134 1337	1.154 1315
72	1.045 1411	1.057 1411	1.081 1396	1.093 1384	1.107 1377	1.123 1380	1.140 1367	1.161 1351
74	1.047 1454	1.060 1452	1.085 1433	1.097 1420	1.112 1419	1.128 1419	1.147 1399	1.168 1390
76	1.049 1495	1.063 1494	1.089 1470	1.102 1456	1.117 1461	1.134 1459	1.153 1435	1.175 1432
78	1.052 1536	1.066 1535	1.093 1506	1.107 1499	1.122 1502	1.140 1490	1.160 1472	1.183 1474

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1° ABOVE ISA	STRAIGHT LINE
△FF = – 0.2 %	△FF = + 3 %	△FF = + 5 %	△FF = + 0.3 %	△FF = – 5 %

RACE TRACK HOLDING PATTERN - 210 KT - ALL ENGINES

MAX. CRUISE THRUST LIMITS
CLEAN CONFIGURATION
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

N1 (%)
FF (KG/H/ENG)

WEIGHT (1000KG)	FL15	FL50	FL100	FL140	FL180	FL200	FL220	FL250
42	48.4 929	51.0 907	54.4 857	57.2 833	59.8 807	61.2 798	62.6 792	64.8 767
44	49.1 950	51.6 924	55.1 876	57.8 855	60.5 827	61.8 818	63.3 809	65.6 787
46	49.8 970	52.3 942	55.7 898	58.5 878	61.2 849	62.6 838	64.1 828	66.3 809
48	50.6 993	53.1 962	56.4 921	59.2 903	61.9 872	63.4 860	64.9 849	67.1 834
50	51.3 1016	53.8 984	57.1 946	59.9 930	62.6 896	64.1 882	65.6 874	67.8 862
52	52.1 1039	54.5 1007	57.8 973	60.6 958	63.4 921	64.9 906	66.4 899	68.6 890
54	52.8 1062	55.2 1031	58.5 1002	61.3 988	64.2 946	65.7 934	67.2 926	69.3 924
56	53.6 1086	56.0 1057	59.3 1031	62.0 1017	65.0 973	66.4 962	68.0 955	70.1 959
58	54.3 1111	56.7 1083	60.0 1060	62.8 1048	65.7 1002	67.2 992	68.7 988	70.8 994
60	55.0 1138	57.3 1111	60.7 1092	63.5 1079	66.5 1034	68.0 1022	69.5 1023	71.6 1031
62	55.7 1165	58.1 1140	61.4 1126	64.3 1111	67.2 1066	68.8 1057	70.2 1061	72.4 1073
64	56.5 1193	58.7 1173	62.2 1161	65.0 1145	68.0 1099	69.5 1095	70.9 1100	73.1 1116
66	57.2 1223	59.4 1206	62.9 1196	65.8 1180	68.8 1135	70.3 1135	71.7 1140	73.9 1157
68	57.8 1254	60.1 1240	63.6 1232	66.5 1215	69.6 1175	71.0 1176	72.5 1183	74.7 1200

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1 DEG C DISA	STRAIGHT LINE
FUEL	+ 2 %	+ 7 %	+ 0.3 %	- 5 %

RACE TRACK HOLDING PATTERN - S SPEED - ALL ENGINES								
MAX. CRUISE THRUST LIMITS CONFIGURATION 1 NORMAL AIR CONDITIONING ANTI ICE OFF				ISA CG=33.0%		N1 (%) FF (KG/H/ENG)		
WEIGHT (1000KG)	FL15	FL50	FL100	FL120	FL140	FL160	FL180	FL200
42	45.8 836	48.5 810	52.5 787	54.1 779	55.6 772	57.1 773	58.7 774	60.3 777
44	46.9 867	49.7 844	53.7 822	55.3 814	56.7 811	58.2 813	59.9 815	61.4 816
46	48.1 899	50.9 879	54.8 857	56.3 850	57.8 851	59.4 852	60.9 854	62.4 853
48	49.2 933	52.1 915	55.9 891	57.3 890	58.9 890	60.5 892	61.9 892	63.5 889
50	50.3 968	53.1 950	56.9 929	58.3 929	60.0 929	61.4 931	62.9 929	64.5 925
52	51.4 1003	54.1 985	57.8 968	59.4 968	60.9 969	62.4 969	63.9 965	65.4 961
54	52.4 1038	55.1 1019	58.8 1007	60.4 1007	61.8 1008	63.3 1006	64.8 1002	66.3 997
56	53.4 1073	56.1 1053	59.7 1046	61.2 1046	62.7 1046	64.2 1042	65.7 1038	67.3 1033
58	54.3 1108	57.0 1088	60.7 1085	62.1 1085	63.5 1083	65.1 1079	66.5 1074	68.2 1069
60	55.2 1143	57.8 1125	61.5 1123	62.9 1123	64.4 1119	65.9 1115	67.4 1111	69.0 1100
62	56.1 1177	58.6 1164	62.2 1162	63.7 1160	65.2 1157	66.7 1152	68.3 1149	69.8 1132
64	57.0 1210	59.4 1203	63.0 1200	64.5 1197	66.0 1194	67.5 1189	69.1 1181	70.5 1166
66	57.7 1245	60.2 1242	63.7 1237	65.3 1235	66.7 1231	68.3 1227	69.8 1213	71.3 1201
68	58.5 1281	61.0 1280	64.5 1275	66.0 1272	67.5 1268	69.1 1264	70.5 1246	72.1 1238
CORRECTIONS		ENGINE ANTI ICE ON		TOTAL ANTI ICE ON		PER 1 DEG C DISA		STRAIGHT LINE
FUEL		+ 2 %		+ 7 %		+ 0.3 %		- 5 %

R

RACE TRACK HOLDING PATTERN - 170KT

MAX. CRUISE THRUST LIMITS
CONFIGURATION 1
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG=33.0%

EPR
FF (KG/H/ENG)

WEIGHT (1000KG)	FL 15	FL 50	FL100	FL120	FL140	FL160	FL180	FL200
44	1.027 971	1.031 938	1.039 896	1.043 881	1.047 868	1.054 854	1.062 841	1.072 828
46	1.029 989	1.033 957	1.041 916	1.045 902	1.051 890	1.058 876	1.067 863	1.077 850
48	1.030 1009	1.035 977	1.043 938	1.048 925	1.055 913	1.063 899	1.072 886	1.082 874
50	1.032 1030	1.037 999	1.046 962	1.052 949	1.059 938	1.068 924	1.078 912	1.089 901
52	1.034 1052	1.039 1021	1.049 988	1.056 977	1.064 967	1.073 953	1.083 942	1.095 932
54	1.036 1076	1.042 1048	1.053 1018	1.061 1008	1.069 998	1.079 986	1.089 975	1.102 965
56	1.038 1103	1.044 1078	1.058 1050	1.066 1039	1.074 1031	1.084 1020	1.096 1009	1.108 1001
58	1.040 1132	1.047 1108	1.062 1083	1.070 1072	1.080 1066	1.090 1055	1.102 1045	1.115 1038
60	1.043 1164	1.050 1142	1.067 1119	1.076 1111	1.086 1105	1.098 1095	1.110 1087	1.124 1081
62	1.046 1200	1.055 1181	1.073 1159	1.083 1152	1.093 1147	1.105 1138	1.118 1132	1.133 1126
64	1.049 1237	1.060 1220	1.079 1201	1.089 1195	1.101 1191	1.113 1184	1.127 1178	1.142 1173
66	1.053 1278	1.065 1261	1.086 1246	1.096 1240	1.108 1239	1.121 1232	1.135 1227	1.153 1223
68	1.058 1320	1.070 1304	1.092 1292	1.103 1288	1.115 1288	1.129 1282	1.145 1278	1.164 1275
70	1.063 1364	1.075 1350	1.099 1341	1.111 1339	1.124 1340	1.138 1335	1.155 1332	1.175 1325
72	1.067 1410	1.081 1399	1.106 1393	1.118 1393	1.132 1395	1.148 1391	1.166 1386	1.187 1377
74	1.073 1458	1.087 1449	1.113 1447	1.126 1448	1.141 1452	1.158 1448	1.178 1440	1.198 1438
76	1.078 1509	1.093 1502	1.121 1505	1.135 1506	1.150 1512	1.169 1506	1.190 1499	1.209 1503

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1° ABOVE ISA	STRAIGHT LINE
△FF = – 0.2 %	△FF = + 3 %	△FF = + 5 %	△FF = + 0.25 %	△FF = – 5 %

R

RACE TRACK HOLDING PATTERN - 170KT

MAX. CRUISE THRUST LIMITS
CONFIGURATION 1
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG=33.0%

EPR
FF (KG/H/ENG)

WEIGHT (1000KG)	FL 15	FL 50	FL100	FL120	FL140	FL160	FL180	FL200
46	1.020 909	1.023 891	1.032 876	1.037 874	1.044 876	1.051 874	1.060 873	1.070 870
48	1.022 939	1.026 922	1.037 912	1.042 913	1.049 915	1.057 914	1.067 913	1.078 906
50	1.024 969	1.030 957	1.041 951	1.047 953	1.055 956	1.064 956	1.075 951	1.087 943
52	1.027 1003	1.033 993	1.046 992	1.053 996	1.062 1001	1.072 998	1.083 991	1.095 982
54	1.031 1040	1.037 1032	1.051 1037	1.059 1042	1.069 1047	1.079 1040	1.091 1032	1.105 1027
56	1.034 1079	1.041 1075	1.057 1084	1.066 1091	1.076 1091	1.087 1084	1.100 1076	1.115 1079
58	1.038 1119	1.046 1121	1.063 1135	1.073 1138	1.083 1138	1.095 1130	1.109 1129	1.126 1134
60	1.041 1166	1.050 1169	1.070 1187	1.080 1187	1.091 1187	1.104 1183	1.120 1185	1.137 1183
62	1.045 1215	1.056 1223	1.077 1238	1.087 1239	1.099 1239	1.114 1239	1.130 1242	1.149 1234
64	1.049 1265	1.061 1278	1.084 1291	1.095 1292	1.109 1295	1.124 1297	1.141 1292	1.161 1298
66	1.054 1321	1.067 1335	1.091 1347	1.104 1348	1.118 1355	1.135 1354	1.153 1353	1.174 1364
68	1.060 1379	1.073 1393	1.099 1404	1.113 1407	1.128 1416	1.146 1413	1.166 1421	1.188 1430
70	1.065 1440	1.080 1451	1.108 1462	1.122 1467	1.139 1475	1.157 1480	1.178 1486	1.202 1485
72	1.071 1502	1.086 1509	1.117 1522	1.132 1528	1.150 1540	1.169 1546	1.191 1549	1.217 1544
74	1.077 1561	1.093 1569	1.126 1583	1.142 1593	1.161 1615	1.181 1613	1.205 1611	1.232 1613
76	1.083 1621	1.100 1629	1.136 1648	1.153 1667	1.172 1680	1.194 1679	1.219 1677	1.248 1681
78	1.089 1684	1.108 1691	1.146 1721	1.164 1744	1.184 1746	1.208 1744	1.234 1748	1.265 1748

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1° ABOVE ISA	STRAIGHT LINE
△FF = – 0.2 %	△FF = + 3 %	△FF = + 5 %	△FF = + 0.3 %	△FF = – 5 %

RACE TRACK HOLDING PATTERN - 170 KT - ALL ENGINES

MAX. CRUISE THRUST LIMITS
CONFIGURATION 1
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

N1 (%)
FF (KG/H/ENG)

WEIGHT (1000KG)	FL15	FL50	FL100	FL120	FL140	FL160	FL180	FL200
42	45.4 827	48.1 802	52.2 776	53.6 768	55.1 761	56.5 756	57.9 752	59.4 750
44	46.6 858	49.3 835	53.3 810	54.9 803	56.3 799	57.7 796	59.2 792	60.6 791
46	47.8 892	50.6 870	54.5 846	56.0 840	57.4 840	58.9 837	60.4 835	61.8 834
48	49.0 928	51.9 908	55.7 885	57.1 882	58.6 883	60.1 880	61.5 879	63.1 877
50	50.2 966	53.1 948	56.8 927	58.3 927	59.9 927	61.3 928	62.8 926	64.4 922
52	51.5 1007	54.2 990	58.0 973	59.5 973	61.1 976	62.6 976	64.1 973	65.6 968
54	52.7 1051	55.4 1034	59.1 1020	60.7 1021	62.3 1026	63.8 1025	65.3 1020	66.9 1015
56	53.9 1097	56.6 1080	60.3 1068	61.9 1073	63.5 1077	65.1 1075	66.6 1069	68.2 1065
58	55.0 1145	57.7 1129	61.5 1121	63.0 1125	64.8 1129	66.2 1126	67.8 1121	69.4 1117
60	56.2 1194	58.7 1180	62.6 1175	64.2 1178	65.9 1182	67.5 1178	69.1 1176	70.6 1171
62	57.3 1245	59.8 1232	63.8 1229	65.5 1233	67.1 1237	68.7 1235	70.2 1231	71.8 1227
64	58.3 1298	60.9 1286	64.9 1285	66.6 1289	68.3 1294	69.9 1293	71.4 1289	73.1 1288
66	59.3 1353	62.0 1343	66.1 1343	67.7 1347	69.5 1353	71.0 1352	72.6 1349	74.3 1353
68	60.3 1409	63.1 1400	67.2 1402	68.8 1407	70.6 1415	72.1 1413	73.8 1414	75.4 1421

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1 DEG C DISA	STRAIGHT LINE
FUEL	+ 2 %	+ 7 %	+ 0.3 %	- 5 %

GENERAL

Descent tables are established for normal descent speed M.78/300kt/250kt and emergency descent at MMO/VMO with airbrakes extended, down to 1500 feet with :

- Normal air conditioning
- CG = 33 %
- Anti ice OFF

R For normal descent, cabin vertical speed is limited to 350 feet/minute.

DESCENT - M.78/300KT/250KT - ALL ENGINES

IDLE THRUST
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

MAXIMUM CABIN RATE OF DESCENT 350FT/MIN

FL	WEIGHT (1000KG)									
	45					**65**				
	TIME (MIN)	FUEL (KG)	DIST. (NM)	N1 (%)	IAS (KT)	TIME (MIN)	FUEL (KG)	DIST. (NM)	N1 (%)	IAS (KT)
390	16.3	160	98	IDLE	241					
370	15.6	154	92	IDLE	252	19.3	190	115	IDLE	252
350	14.9	149	87	IDLE	264	18.5	184	109	IDLE	264
330	14.4	145	83	IDLE	277	17.9	179	104	IDLE	277
310	13.8	141	79	IDLE	289	17.2	174	99	IDLE	289
290	13.3	137	75	IDLE	300	16.6	169	94	IDLE	300
270	12.7	132	70	IDLE	300	15.7	163	88	IDLE	300
250	12.0	127	65	IDLE	300	14.8	156	81	IDLE	300
240	11.6	124	63	IDLE	300	14.4	153	78	IDLE	300
220	10.9	118	58	IDLE	300	13.5	145	72	IDLE	300
200	10.2	112	53	IDLE	300	12.5	137	66	IDLE	300
180	9.4	105	48	IDLE	300	11.6	128	59	IDLE	300
160	8.7	98	43	IDLE	300	10.6	119	53	IDLE	300
140	7.9	90	38	IDLE	300	9.5	109	47	IDLE	300
120	7.1	82	34	IDLE	300	8.5	98	40	IDLE	300
100	6.3	74	29	IDLE	300	7.5	87	34	IDLE	300
50	2.4	31	10	IDLE	250	2.8	36	12	IDLE	250
15	0.0	0	0	IDLE	250	0.0	0	0	IDLE	250

CORRECTIONS	**ENGINE ANTI ICE ON**	**TOTAL ANTI ICE ON**	**PER 1 DEG C DISA**
FUEL	+ 50 %	+ 60 %	+ 0.4 %
TIME	+ 10 %	+ 10 %	+ 0.2 %
DISTANCE	+ 11 %	+ 11 %	+ 0.5 %

GENERAL

Descent tables are established for normal descent speed M.78/300kt/250kt and emergency descent at MMO/VMO with airbrakes extended, down to 1500 feet with :

- Normal air conditioning
- CG = 33 %
- Anti ice OFF

R For normal descent, cabin vertical speed is limited to 350 feet/minute.

R

DESCENT - M.78/300KT/250KT

IDLE THRUST
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG=33.0%

MAXIMUM CABIN RATE OF DESCENT 350 FT/MIN

WEIGHT (1000KG)	45				65				
FL	TIME (MIN)	FUEL (KG)	DIST. (NM)	EPR	TIME (MIN)	FUEL (KG)	DIST. (NM)	EPR	IAS (KT)
390	14.7	151	88	1.045	18.6	188	112	IDLE	241
370	13.9	142	82	IDLE	17.8	180	106	IDLE	252
350	13.3	135	77	IDLE	17.1	173	101	IDLE	264
330	12.7	130	73	IDLE	16.4	167	96	IDLE	277
310	12.2	126	69	IDLE	15.8	161	91	IDLE	289
290	11.7	122	66	IDLE	15.1	156	86	IDLE	300
270	11.1	116	61	IDLE	14.3	149	80	IDLE	300
250	10.5	111	57	IDLE	13.5	142	74	IDLE	300
240	10.2	109	55	IDLE	13.1	138	71	IDLE	300
220	9.6	104	51	IDLE	12.3	131	65	IDLE	300
200	9.0	99	47	IDLE	11.4	125	60	IDLE	300
180	8.4	93	42	IDLE	10.6	117	54	IDLE	300
160	7.7	88	38	IDLE	9.7	110	48	IDLE	300
140	7.1	82	34	IDLE	8.8	101	43	IDLE	300
120	6.4	75	30	IDLE	7.9	92	37	IDLE	300
100	5.7	68	26	IDLE	7.0	83	32	IDLE	300
50	2.2	27	9	IDLE	2.6	32	11	IDLE	250
15	.0	0	0	IDLE	.0	0	0	IDLE	250

CORRECTIONS	LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1° ABOVE ISA
TIME	–	+ 5 %	+ 30 %	–
FUEL	– 1 %	+ 20 %	+ 100 %	+ 0.5 %
DISTANCE	–	+ 5 %	+ 30 %	+ 0.5 %

GENERAL

Descent tables are established for normal descent speed M.78/300kt/250kt and emergency descent at MMO/VMO with airbrakes extended, down to 1500 feet with :

- Normal air conditioning
- CG = 33 %
- Anti ice OFF

R For normal descent, cabin vertical speed is limited to 350 feet/minute.

DESCENT - M.78/300KT/250KT

IDLE THRUST
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG=33.0%

MAXIMUM CABIN RATE OF DESCENT 350FT/MIN

WEIGHT (1000KG)	45				65				
FL	TIME (MIN)	FUEL (KG)	DIST. (NM)	EPR	TIME (MIN)	FUEL (KG)	DIST. (NM)	EPR	IAS (KT)
390	16.1	188	98	1.047	19.0	192	114	IDLE	241
370	14.6	158	87	1.066	18.2	185	108	IDLE	252
350	13.5	139	78	IDLE	17.5	178	102	IDLE	264
330	12.9	134	74	IDLE	16.8	171	97	IDLE	277
310	12.4	129	71	IDLE	16.1	166	93	IDLE	289
290	12.0	125	67	IDLE	15.5	160	88	IDLE	300
270	11.4	120	63	IDLE	14.7	153	82	IDLE	300
250	10.8	115	58	IDLE	13.9	146	76	IDLE	300
240	10.5	112	56	IDLE	13.5	143	73	IDLE	300
220	9.9	107	52	IDLE	12.7	136	67	IDLE	300
200	9.3	102	48	IDLE	11.8	129	62	IDLE	300
180	8.7	97	44	IDLE	11.0	122	56	IDLE	300
160	8.0	91	40	IDLE	10.1	114	50	IDLE	300
140	7.4	85	36	IDLE	9.2	106	45	IDLE	300
120	6.7	79	32	IDLE	8.3	97	39	IDLE	300
100	6.0	72	28	IDLE	7.4	88	34	IDLE	300
50	2.2	28	10	IDLE	2.7	34	12	IDLE	250
15	.0	0	0	IDLE	.0	0	0	IDLE	250

CORRECTIONS	LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1° ABOVE ISA
TIME	–	+ 4 %	+ 18 %	+ 0.3 %
FUEL	– 1 %	+ 17 %	+ 85 %	+ 0.4 %
DISTANCE	–	+ 4 %	+ 18 %	+ 0.4 %

10F –08F0A320–232 IAE V2527–A5 23100000C5KG330 0 018590 0 0–1–350.0 15.0 .00 0 03 .780300.000250.000 0 FCOM-N0-03-05-30-002-140

EMERGENCY DESCENT - M.82/350KT - ALL ENGINES

IDLE THRUST
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

AIRBRAKES EXTENDED

FL	WEIGHT (1000KG)									
	45					**65**				
	TIME (MIN)	FUEL (KG)	DIST. (NM)	N1 (%)	IAS (KT)	TIME (MIN)	FUEL (KG)	DIST. (NM)	N1 (%)	IAS (KT)
390	6.6	68	48	IDLE	255	8.8	90	63	IDLE	255
370	6.2	64	45	IDLE	267	8.3	86	60	IDLE	267
350	5.9	61	42	IDLE	279	7.9	83	56	IDLE	279
330	5.6	59	39	IDLE	292	7.5	80	53	IDLE	292
310	5.3	57	37	IDLE	306	7.2	77	50	IDLE	306
290	5.0	54	35	IDLE	319	6.8	75	48	IDLE	319
270	4.7	52	33	IDLE	333	6.5	72	45	IDLE	333
250	4.5	51	31	IDLE	347	6.2	70	43	IDLE	347
240	4.4	50	30	IDLE	350	6.0	68	41	IDLE	350
220	4.1	47	27	IDLE	350	5.6	65	38	IDLE	350
200	3.7	44	25	IDLE	350	5.1	61	34	IDLE	350
180	3.4	41	22	IDLE	350	4.7	57	31	IDLE	350
160	3.0	38	20	IDLE	350	4.2	52	27	IDLE	350
140	2.7	34	17	IDLE	350	3.7	46	24	IDLE	350
120	2.3	29	15	IDLE	350	3.2	41	20	IDLE	350
100	1.9	25	12	IDLE	350	2.7	35	17	IDLE	350
50	1.0	14	6	IDLE	350	1.4	19	8	IDLE	350
0	0.0	0	0	IDLE	350	0.0	0	0	IDLE	350

EMERGENCY DESCENT - M.82/350KT

IDLE THRUST
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG=33.0%

AIRBRAKES EXTENDED

WEIGHT (1000KG)	45				65				
FL	TIME (MIN)	FUEL (KG)	DIST. (NM)	EPR	TIME (MIN)	FUEL (KG)	DIST. (NM)	EPR	IAS (KT)
390	5.8	52	42	IDLE	7.8	69	56	IDLE	255
370	5.4	48	39	IDLE	7.3	66	53	IDLE	267
350	5.0	45	36	IDLE	7.0	62	50	IDLE	279
330	4.7	42	33	IDLE	6.6	59	47	IDLE	292
310	4.4	40	31	IDLE	6.2	56	44	IDLE	306
290	4.2	37	29	IDLE	5.9	53	41	IDLE	319
270	4.0	35	27	IDLE	5.6	50	39	IDLE	333
250	3.8	33	26	IDLE	5.3	48	37	IDLE	347
240	3.6	32	25	IDLE	5.2	46	35	IDLE	350
220	3.3	30	22	IDLE	4.8	43	32	IDLE	350
200	3.1	28	20	IDLE	4.4	40	29	IDLE	350
180	2.8	26	18	IDLE	4.0	37	26	IDLE	350
160	2.5	23	16	IDLE	3.6	33	23	IDLE	350
140	2.2	21	14	IDLE	3.1	30	20	IDLE	350
120	1.9	19	12	IDLE	2.7	27	17	IDLE	350
100	1.6	16	10	IDLE	2.3	24	14	IDLE	350
50	.8	9	5	IDLE	1.2	13	7	IDLE	350
0	.0	0	0	IDLE	.0	0	0	IDLE	350

10E -08F0A319-131 IAE V2522-A5 23310000C5KG330 0 018590 0 0-1 .0 .0 .00 0 02 .820350.000 0 FCOM-N0-03-05-30-003-135

EMERGENCY DESCENT - M.82/350KT

IDLE THRUST
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG=33.0%

AIRBRAKES EXTENDED

WEIGHT (1000KG)	45				65				
FL	TIME (MIN)	FUEL (KG)	DIST. (NM)	EPR	TIME (MIN)	FUEL (KG)	DIST. (NM)	EPR	IAS (KT)
390	4.8	42	34	IDLE	6.5	57	47	IDLE	255
370	4.5	39	32	IDLE	6.2	54	44	IDLE	267
350	4.2	37	30	IDLE	5.9	51	42	IDLE	279
330	4.0	35	28	IDLE	5.6	48	39	IDLE	292
310	3.8	33	26	IDLE	5.3	46	37	IDLE	306
290	3.6	31	25	IDLE	5.1	44	35	IDLE	319
270	3.4	29	23	IDLE	4.8	41	33	IDLE	333
250	3.2	28	22	IDLE	4.6	39	31	IDLE	347
240	3.1	27	21	IDLE	4.4	38	30	IDLE	350
220	2.9	25	19	IDLE	4.1	35	28	IDLE	350
200	2.6	23	17	IDLE	3.8	33	25	IDLE	350
180	2.4	21	16	IDLE	3.4	30	22	IDLE	350
160	2.2	19	14	IDLE	3.1	27	20	IDLE	350
140	1.9	17	12	IDLE	2.7	25	17	IDLE	350
120	1.7	15	10	IDLE	2.4	22	15	IDLE	350
100	1.4	13	9	IDLE	2.0	19	12	IDLE	350
50	.7	7	4	IDLE	1.0	10	6	IDLE	350
0	.0	0	0	IDLE	.0	0	0	IDLE	350

10F --08F0A320--232 IAE V2527--A5 23310000C5KG330 0 018590 0 0--1 .0 .0 .00 0 02 .820350.000 .000 0 FCOM-N0-03-05-30-003-140

GENERAL

In the go around configuration corresponding to the all engine procedure, the minimum steady gradient one engine inoperative required by the regulations is 2.1 % at a speed not exceeding 1.4 Vs. This requirement is also called approach climb performance by regulations.
The following pages allow to determine the go around limiting weight which satisfies the required gradient with the certified go around configurations 3 and 2.
The required gradient of 2.1 % is considered at the airport reference altitude. The power setting is «GO AROUND» thrust with the air conditioning ON. The speed is 1.23 Vs of the specified configuration. For the occasional cases where approach climb performance is found restrictive, a correction is given for an increased speed up to 1.4 Vs.

Note : Landing climb performance (2 engines running) is never limiting.

PROCEDURE

According to airport pressure altitude and temperature determine if the slats/flaps setting must be restricted as a function of the landing weight, in order to meet the go around gradient requirement of 2.1 %.
Establish the final approach configuration with one more step of flaps. If the approach is interrupted, retract the flaps by one step during the go-around.
In case of category II approach, JAR-OPS requires a regulatory approach climb gradient of 2.5 % to be maintained.
Use the tables for CAT II approach to determine the maximum approach climb limiting weight according to airport pressure altitude and temperature.

Note : 1. If circumstances dictate, landing may be made at a weight corresponding to the maximum structural takeoff weight (refer to overweight landing procedure 3.02).

R *2. When icing conditions are predicted during the flight and TAT is 10°C or below and there is an evidence of significant ice accretion, to take into account ice formation on the non heated structure :*
- *decrease the approach climb limiting weight by 4.5 %.*
- *in CONF FULL, the approach speed must not be lower than VREF + 5 knots and the landing distance must be multiplied by 1.1.*
  or
  in CONF 3, the approach speed must not be lower than VLS + 10 knots and the landing distance must be multiplied by 1.15.

3. In the following tables corrections for anti ice are only valid for OAT lower than 10°C.

APPROACH CLIMB LIMITING WEIGHT (1000 KG) ONE ENGINE OUT ONE ENGINE AT GO AROUND THRUST	Gradient : 2.1 % High Air Conditioning Anti ice OFF V = 1.23 Vs	CONF 2

PRESSURE ALTITUDE (FT)												
OAT (°C)	–1000	0	200	400	600	800	1000	1500	2000	5000	10000	14500
≤ 10	81.3	81.2	81.3	81.3	81.2	81.0	80.9	80.8	80.8	80.1	69.6	57.9
20	81.3	81.2	81.3	81.3	81.2	81.0	80.9	80.8	80.8	80.1	66.5	55.2
22	81.3	81.2	81.3	81.3	81.2	81.0	80.9	80.8	80.8	80.1	65.7	
24	81.3	81.2	81.3	81.3	81.2	81.0	80.9	80.8	80.8	79.2	64.8	
26	81.3	81.2	81.3	81.3	81.2	81.0	80.9	80.8	80.8	78.1	63.8	
28	81.3	81.2	81.3	81.3	81.2	81.0	80.9	80.8	80.8	76.9	62.9	
30	81.3	81.2	81.3	81.3	81.2	81.0	80.9	80.8	80.8	76.0	61.9	
32	81.3	81.2	81.3	81.3	81.2	81.0	80.9	80.8	80.8	74.8	61.0	
34	81.3	81.2	81.3	81.3	81.2	81.0	80.9	80.8	80.8	73.6	59.9	
36	81.3	81.2	81.2	81.3	81.2	81.0	80.9	80.8	80.8	72.4		
38	81.3	81.2	81.2	81.3	81.2	81.0	80.9	80.8	80.4	71.1		
40	81.3	81.2	81.2	81.3	81.2	81.0	80.9	80.5	79.5	69.9		
42	81.3	81.2	81.2	81.3	81.2	81.0	80.8	79.8	78.3	68.6		
44	81.3	81.2	81.2	81.3	80.9	80.4	79.8	78.3	76.9	67.3		
46	81.3	81.2	80.6	80.1	79.5	78.9	78.4	76.9	75.7			
48	81.3	79.7	79.2	78.6	78.0	77.4	76.9	75.7	74.4			
50	81.3	78.2	77.7	77.1	76.7	76.2	75.8	74.4	73.0			
52	79.7	76.9	76.4	76.0	75.5	74.9	74.4	73.0				
54	78.3	75.8	75.2	74.7								
55	77.6	75.1										

AIR CONDITIONING OFF ADD 1000 kg	ENGINE ANTI ICE ON SUBTRACT 900 kg	TOTAL ANTI ICE ON SUBTRACT 2800 kg	SPEED INCREASE PER 0.01 VS ADD 260 kg

GENERAL

In the go around configuration corresponding to the all engine procedure, the minimum steady gradient one engine inoperative required by the regulations is 2.1 % at a speed not exceeding 1.4 Vs. This requirement is also called approach climb performance by regulations.
The following pages allow to determine the go around limiting weight which satisfies the required gradient with the certified go around configurations 3 and 2.
The required gradient of 2.1 % is considered at the airport reference altitude. The power setting is «GO AROUND» thrust with the air conditioning ON. The speed is 1.23 Vs of the specified configuration. For the occasional cases where approach climb performance is found restrictive, a correction is given for an increased speed up to 1.4 Vs.

Note : Landing climb performance (2 engines running) is never limiting.

PROCEDURE

According to airport pressure altitude and temperature determine if the slats/flaps setting must be restricted as a function of the landing weight, in order to meet the go around gradient requirement of 2.1 %.
Establish the final approach configuration with one more step of flaps. If the approach is interrupted, retract the flaps by one step during the go-around.
In case of category II approach, JAR-OPS requires a regulatory approach climb gradient of 2.5 % to be maintained.
Use the tables for CAT II approach to determine the maximum approach climb limiting weight according to airport pressure altitude and temperature.

Note : 1. If circumstances dictate, landing may be made at a weight corresponding to the maximum structural takeoff weight (refer to overweight landing procedure 3.02).

R *2. When icing conditions are predicted during the flight and TAT is 10°C or below and there is an evidence of significant ice accretion, to take into account ice formation on the non heated structure :*
- *decrease the approach climb limiting weight by 4.5 %.*
- *in CONF FULL, the approach speed must not be lower than VREF + 5 knots and the landing distance must be multiplied by 1.1.*
  or
  in CONF 3, the approach speed must not be lower than VLS + 10 knots and the landing distance must be multiplied by 1.15.

3. In the following tables corrections for anti ice are only valid for OAT lower than 10°C.

APPROACH CLIMB LIMITING WEIGHT (1000 KG) ONE ENGINE OUT ONE ENGINE AT GO AROUND THRUST	Gradient : 2.1 % High Air Conditioning Anti ice OFF V = 1.23 Vs	CONF 2

PRESSURE ALTITUDE (FT)												
OAT (°C)	–1000	0	200	400	600	800	1000	1500	2000	5000	10000	14500
≤10	81.3	81.2	81.1	80.9	80.8	80.7	80.5	80.2	79.9	74.8	65.6	56.5
20	81.3	81.2	81.1	80.9	80.8	80.7	80.5	80.2	79.9	74.8	65.5	54.2
22	81.3	81.2	81.1	80.9	80.8	80.7	80.5	80.2	79.9	74.8	64.9	
24	81.3	81.2	81.1	80.9	80.8	80.7	80.5	80.2	79.9	74.8	64.2	
26	81.3	81.2	81.1	80.9	80.8	80.7	80.5	80.2	79.9	74.8	63.3	
28	81.3	81.2	81.1	80.9	80.8	80.7	80.5	80.2	79.9	74.8	62.4	
30	81.3	81.2	81.1	80.9	80.8	80.7	80.5	80.2	79.9	74.8	61.4	
32	81.3	81.2	81.1	80.9	80.8	80.7	80.5	80.2	79.9	73.9	60.4	
34	81.3	81.2	81.1	80.9	80.8	80.7	80.5	80.2	79.9	72.9	59.4	
36	81.3	81.2	81.1	80.9	80.8	80.7	80.5	80.2	79.9	71.9		
38	81.3	81.2	81.1	80.9	80.8	80.7	80.5	80.2	79.9	70.7		
40	81.3	81.2	81.0	80.9	80.8	80.7	80.5	80.2	79.6	69.5		
42	81.3	81.2	81.0	80.9	80.8	80.7	80.5	79.7	78.2	68.3		
44	81.3	81.2	81.0	80.9	80.8	80.3	79.7	78.2	76.8	67.0		
46	81.3	81.2	80.6	80.0	79.5	78.9	78.3	76.8	75.5			
48	81.3	79.7	79.1	78.5	77.9	77.3	76.8	75.6	74.2			
50	81.3	78.2	77.7	77.1	76.6	76.2	75.7	74.2	72.8			
52	79.7	76.9	76.4	76.0	75.4	74.9	74.3	72.9				
54	78.3	75.8	75.2	74.6								
55	77.6	75.1										

AIR CONDITIONING OFF ADD 1000 kg	ENGINE ANTI ICE ON SUBTRACT 500 kg	TOTAL ANTI ICE ON SUBTRACT 2400 kg	SPEED INCREASE PER 0.01 VS ADD 270 kg

GENERAL

In the go around configuration corresponding to the all engine procedure, the minimum steady gradient one engine inoperative required by the regulations is 2.1 % at a speed not exceeding 1.4 Vs. This requirement is also called approach climb performance by regulations.
The following graph allows to determine the go around limiting weight which satisfies the required gradient with the certified go around configurations 3 and 2.
The required gradient of 2.1 % is considered at the airport reference altitude. The power setting is «GO AROUND» thrust with the air conditioning ON. The speed is 1.23 Vs of the specified configuration. For the occasional cases where approach climb performance is found restrictive, a correction is given for an increased speed up to 1.4 Vs.

Note : Landing climb performance (2 engines running) is never limiting.

PROCEDURE

According to airport pressure altitude and temperature determine if the slats/flaps setting must be restricted as a function of the landing weight, in order to meet the go around gradient requirement of 2.1 %.
Establish the final approach configuration with one more step of flaps. If the approach is interrupted, retract the flaps by one step during the go-around.
In case of category II approach, JAR-OPS requires a regulatory approach climb gradient of 2.5 % to be maintained.
Use the tables for CAT II approach to determine the maximum approach climb limiting weight according to airport pressure altitude and temperature.

Note : 1. If circumstances dictate, landing may be made at a weight corresponding to the maximum structural takeoff weight (refer to overweight landing procedure 3.02).

R *2. When icing conditions are predicted during the flight and TAT is 10°C or below and there is an evidence of significant ice accretion, to take into account ice formation on the non heated structure :*
- *decrease the approach climb limiting weight by 7.2 %.*
- *in CONF FULL, the approach speed must not be lower than VREF + 5 knots and the landing distance must be multiplied by 1.1.*
  or
  in CONF 3, the approach speed must not be lower than VLS + 10 knots and the landing distance must be multiplied by 1.15.

3. In the following tables corrections for anti ice are only valid for OAT lower than 10°C.

APPROACH CLIMB LIMITING WEIGHT (1000 KG) ONE ENGINE OUT ONE ENGINE AT GO AROUND THRUST	Gradient : 2.1% High Air Conditioning Anti ice OFF V = 1.23 Vs	CONF 2

PRESSURE ALTITUDE (FT)												
OAT (°C)	–1000	0	200	400	600	800	1000	1500	2000	5000	10000	14500
≤ 10	77.1	76.9	76.7	76.5	76.3	76.1	75.9	75.4	75.0	72.2	65.3	57.7
20	77.1	76.9	76.7	76.5	76.3	76.1	75.9	75.4	75.0	72.2	65.3	56.3
22	77.1	76.9	76.7	76.5	76.3	76.1	75.9	75.4	75.0	72.2	65.3	
24	77.1	76.9	76.7	76.5	76.3	76.1	75.9	75.4	75.0	72.2	65.3	
26	77.1	76.9	76.7	76.5	76.3	76.1	75.9	75.4	75.0	72.2	65.0	
28	77.1	76.9	76.7	76.5	76.3	76.1	75.9	75.4	75.0	72.2	64.3	
30	77.1	76.9	76.7	76.5	76.3	76.1	75.9	75.4	75.0	72.2	63.7	
32	77.1	76.9	76.7	76.5	76.3	76.1	75.9	75.4	75.0	72.2		
34	77.1	76.9	76.7	76.5	76.3	76.1	75.9	75.4	75.0	72.2		
36	77.1	76.9	76.7	76.5	76.3	76.1	75.9	75.4	75.0	72.1		
38	77.1	76.9	76.7	76.5	76.3	76.1	75.9	75.4	75.0	71.7		
40	77.1	76.9	76.7	76.5	76.3	76.1	75.9	75.4	75.0	71.4		
42	77.1	76.9	76.7	76.5	76.3	76.1	75.9	75.4	75.0	70.3		
44	77.1	76.9	76.7	76.5	76.3	76.1	75.9	75.4	75.0	69.1		
46	77.1	76.9	76.7	76.5	76.3	76.1	75.9	75.4	75.0			
48	77.1	76.9	76.7	76.5	76.3	76.1	75.9	75.4	74.5			
50	77.1	76.9	76.7	76.5	76.3	76.1	75.9	75.0	73.6			
52	77.1	76.9	76.7	76.5	76.3	76.0	75.4	74.1				
54	77.1	76.9	76.7	76.2								
55	77.1	76.9										

AIR CONDITIONING OFF ADD 1300 kg	ENGINE ANTI ICE ON SUBTRACT No correction	TOTAL ANTI ICE ON SUBTRACT 1800 kg	SPEED INCREASE PER 0.01 Vs ADD 250 kg

GENERAL

In the go around configuration corresponding to the all engine procedure, the minimum steady gradient one engine inoperative required by the regulations is 2.1 % at a speed not exceeding 1.4 Vs. This requirement is also called approach climb performance by regulations.
The following pages allow to determine the go around limiting weight which satisfies the required gradient with the certified go around configurations 3 and 2.
The required gradient of 2.1 % is considered at the airport reference altitude. The power setting is «GO AROUND» thrust with the air conditioning ON. The speed is 1.23 Vs of the specified configuration. For the occasional cases where approach climb performance is found restrictive, a correction is given for an increased speed up to 1.4 Vs.

Note : Landing climb performance (2 engines running) is never limiting.

PROCEDURE

According to airport pressure altitude and temperature determine if the slats/flaps setting must be restricted as a function of the landing weight, in order to meet the go around gradient requirement of 2.1 %.
Establish the final approach configuration with one more step of flaps. If the approach is interrupted, retract the flaps by one step during the go-around.
In case of category II approach, JAR-OPS requires a regulatory approach climb gradient of 2.5 % to be maintained.
Use the tables for CAT II approach to determine the maximum approach climb limiting weight according to airport pressure altitude and temperature.

Note : 1. If circumstances dictate, landing may be made at a weight corresponding to the maximum structural takeoff weight (refer to overweight landing procedure 3.02).
2. When icing conditions are predicted during the flight and TAT is 10°C or below and there is an evidence of significant ice accretion, to take into account ice formation on the non heated structure :
– decrease the approach climb limiting weight by 3.6 %.
– in CONF FULL, the approach speed must not be lower than VREF + 5 knots and the landing distance must be multiplied by 1.1.
or
in CONF 3, the approach speed must not be lower than VLS + 10 knots and the landing distance must be multiplied by 1.15.
3. In the following tables corrections for anti ice are only valid for OAT lower than 10°C.

APPROACH CLIMB LIMITING WEIGHT (1000 KG) - CONF 2

ONE ENGINE OUT
ONE ENGINE AT GO AROUND THRUST
High Air Conditioning
Anti Ice OFF
Gradient : 2.1 %
V = 1.23 Vs

OAT (°C)	PRESSURE ALTITUDE (FT)											
	-1000	**0**	**200**	**400**	**600**	**800**	**1000**	**1500**	**2000**	**5000**	**8000**	**9200**
≤10	68.4	68.4	68.1	67.8	67.5	67.2	66.8	66.0	65.2	60.1	58.3	57.7
20	68.2	68.2	67.9	67.6	67.3	67.0	66.6	65.8	65.0	60.0	55.7	55.4
22	68.2	68.1	67.9	67.6	67.3	66.9	66.6	65.8	65.0	58.8	54.9	54.5
24	68.1	68.1	67.8	67.5	67.2	66.9	66.5	65.7	64.9	57.5	53.9	53.0
26	68.1	68.1	67.8	67.5	67.2	66.8	66.5	65.7	64.9	56.2	52.7	51.4
28	68.0	68.0	67.7	67.4	67.1	66.8	66.5	65.2	63.9	55.0	51.5	50.0
30	68.0	68.0	67.4	66.9	66.4	65.8	65.3	64.0	62.7	53.9	50.3	48.9
32	67.9	66.7	66.1	65.6	65.1	64.5	64.0	62.7	61.5	53.0	49.2	47.5
34	66.7	65.4	64.8	64.3	63.8	63.3	62.8	61.6	60.3	52.0	48.0	46.5
36	65.4	64.2	63.7	63.2	62.7	62.2	61.7	60.5	59.2	51.1	47.1	45.5
38	64.2	63.1	62.6	62.1	61.6	61.1	60.6	59.4	58.2	50.2	46.2	
40	63.0	62.0	61.5	61.0	60.5	60.0	59.6	58.4	57.2	49.4		
42	61.9	60.9	60.4	60.0	59.5	59.0	58.5	57.3	56.2	48.5		
44	60.7	59.8	59.3	58.9	58.4	57.9	57.5	56.3	55.2	47.6		
46	59.5	58.7	58.2	57.7	57.3	56.8	56.4	55.3	54.2			
48	58.4	57.5	57.1	56.6	56.2	55.7	55.3	54.2	53.1			
50	57.2	56.4	55.9	55.5	55.1	54.6	54.2	53.2	52.1			
52	56.2	55.3	54.9	54.5	54.0	53.6	53.2	52.1				
54	55.2	54.3	53.9	53.5								
55	54.7	53.8										

AIR CONDITIONING OFF ADD	**ENGINE ANTI ICE ON SUBTRACT**	**TOTAL ANTI ICE ON SUBTRACT**	**SPEED INCREASE PER 0.01 Vs ADD**
2100 kg	60 kg up to 6000 ft 1600 kg above 6000 ft	1700 kg up to 4000 ft 5600 kg above 4000 ft	250 kg

APPROACH CLIMB LIMITING WEIGHT (1000 KG) ONE ENGINE OUT ONE ENGINE AT GO AROUND THRUST	Gradient : 2.1% High Air Conditioning Anti ice OFF V = 1.23 Vs	CONF 3

PRESSURE ALTITUDE (FT)												
OAT (°C)	–1000	0	200	400	600	800	1000	1500	2000	5000	10000	14500
≤ 10	75.0	74.8	74.5	74.3	74.1	73.9	73.7	73.2	72.8	70.0	63.3	56.0
20	75.0	74.8	74.5	74.3	74.1	73.9	73.7	73.2	72.8	70.0	63.3	54.6
22	75.0	74.8	74.5	74.3	74.1	73.9	73.7	73.2	72.8	70.0	63.3	
24	75.0	74.8	74.5	74.3	74.1	73.9	73.7	73.2	72.8	70.0	63.3	
26	75.0	74.8	74.5	74.3	74.1	73.9	73.7	73.2	72.8	70.0	63.0	
28	75.0	74.8	74.5	74.3	74.1	73.9	73.7	73.2	72.8	70.0	62.3	
30	75.0	74.8	74.5	74.3	74.1	73.9	73.7	73.2	72.8	70.0	61.7	
32	75.0	74.8	74.5	74.3	74.1	73.9	73.7	73.2	72.8	70.0		
34	75.0	74.8	74.5	74.3	74.1	73.9	73.7	73.2	72.8	70.0		
36	75.0	74.8	74.5	74.3	74.1	73.9	73.7	73.2	72.8	69.9		
38	75.0	74.8	74.5	74.3	74.1	73.9	73.7	73.2	72.8	69.6		
40	75.0	74.8	74.5	74.3	74.1	73.9	73.7	73.2	72.8	69.3		
42	75.0	74.8	74.5	74.3	74.1	73.9	73.7	73.2	72.8	68.2		
44	75.0	74.8	74.5	74.3	74.1	73.9	73.7	73.2	72.8	67.1		
46	75.0	74.8	74.5	74.3	74.1	73.9	73.7	73.2	72.8			
48	75.0	74.8	74.5	74.3	74.1	73.9	73.7	73.2	72.4			
50	75.0	74.8	74.5	74.3	74.1	73.9	73.7	72.8	71.5			
52	75.0	74.8	74.5	74.3	74.1	73.8	73.3	72.0				
54	75.0	74.8	74.5	74.1								
55	75.0	74.8										

AIR CONDITIONING OFF ADD 1300 kg	ENGINE ANTI ICE ON SUBTRACT No correction	TOTAL ANTI ICE ON SUBTRACT 1700 kg	SPEED INCREASE PER 0.01 Vs ADD 200 kg

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APPROACH CLIMB LIMITING WEIGHT (1000 KG) - CONF 3

ONE ENGINE OUT
ONE ENGINE AT GO AROUND THRUST

High Air Conditioning
Anti Ice OFF

Gradient : 2.1 %
V = 1.23 Vs

OAT (°C)	PRESSURE ALTITUDE (FT)											
	-1000	**0**	**200**	**400**	**600**	**800**	**1000**	**1500**	**2000**	**5000**	**8000**	**9200**
≤10	66.9	66.9	66.6	66.3	65.9	65.6	65.3	64.5	63.7	58.7	56.8	56.2
20	66.7	66.6	66.4	66.1	65.7	65.4	65.1	64.3	63.5	58.6	54.4	54.0
22	66.6	66.6	66.3	66.0	65.7	65.4	65.1	64.3	63.5	57.4	53.5	53.2
24	66.6	66.6	66.3	66.0	65.7	65.3	65.0	64.2	63.4	56.1	52.6	51.7
26	66.5	66.5	66.2	66.0	65.6	65.3	65.0	64.2	63.4	54.9	51.5	50.2
28	66.5	66.5	66.2	65.9	65.6	65.3	64.9	63.7	62.4	53.8	50.3	48.9
30	66.5	66.4	65.9	65.4	64.9	64.3	63.8	62.5	61.3	52.7	49.2	47.7
32	66.4	65.2	64.6	64.1	63.6	63.1	62.6	61.3	60.1	51.8	48.1	46.5
34	65.2	63.9	63.4	62.9	62.4	61.9	61.4	60.2	59.0	50.8	47.0	45.5
36	63.9	62.7	62.2	61.7	61.3	60.8	60.3	59.1	57.9	49.9	46.1	44.5
38	62.7	61.6	61.1	60.6	60.1	59.7	59.2	58.0	56.9	49.0	45.2	
40	61.5	60.5	60.0	59.6	59.1	58.6	58.2	57.0	55.8	48.2		
42	60.4	59.5	59.0	58.5	58.1	57.6	57.1	56.0	54.8	47.3		
44	59.3	58.4	57.9	57.5	57.0	56.5	56.1	55.0	53.9	46.5		
46	58.1	57.3	56.8	56.4	55.9	55.5	55.0	53.9	52.9			
48	57.0	56.2	55.7	55.3	54.8	54.4	54.0	52.9	51.9			
50	55.9	55.0	54.6	54.2	53.8	53.3	52.9	51.9	50.9			
52	54.8	54.0	53.6	53.2	52.7	52.3	51.9	50.9				
54	53.9	53.0	52.6	52.2								
55	53.4	52.5										

AIR CONDITIONING OFF ADD	ENGINE ANTI ICE ON SUBTRACT	TOTAL ANTI ICE ON SUBTRACT	SPEED INCREASE PER 0.01 Vs ADD
2100 kg	60 kg up to 6000 ft 1600 kg above 6000 ft	3000 kg up to 5000 ft 5400 kg above 5000 ft	190 kg

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APPROACH CLIMB LIMITING WEIGHT (1000 KG) ONE ENGINE OUT ONE ENGINE AT GO AROUND THRUST	Gradient : 2.1% High Air Conditioning Anti ice OFF V = 1.23 Vs	CONF 3

PRESSURE ALTITUDE (FT)												
OAT (°C)	–1000	0	200	400	600	800	1000	1500	2000	5000	10000	14500
≤ 10	82.0	81.9	81.9	82.0	81.8	81.7	81.6	81.4	81.4	80.7	69.9	58.2
20	82.0	81.9	81.9	82.0	81.8	81.7	81.6	81.4	81.4	80.7	66.9	55.5
22	82.0	81.9	81.9	82.0	81.8	81.7	81.6	81.4	81.4	80.7	66.0	
24	82.0	81.9	81.9	82.0	81.8	81.7	81.6	81.4	81.4	79.8	65.1	
26	82.0	81.9	81.9	82.0	81.8	81.7	81.6	81.4	81.4	78.7	64.2	
28	82.0	81.9	81.9	82.0	81.8	81.7	81.6	81.4	81.4	77.5	63.2	
30	82.0	81.9	81.9	82.0	81.8	81.7	81.6	81.4	81.4	76.4	62.3	
32	82.0	81.9	81.9	82.0	81.8	81.7	81.6	81.4	81.4	75.3	61.3	
34	82.0	81.9	81.9	82.0	81.8	81.7	81.6	81.4	81.4	74.0	60.3	
36	82.0	81.9	81.9	82.0	81.8	81.7	81.6	81.4	81.4	72.8		
38	82.0	81.9	81.9	82.0	81.8	81.7	81.6	81.4	81.0	71.6		
40	82.0	81.9	81.9	82.0	81.8	81.7	81.6	81.2	80.1	70.3		
42	82.0	81.9	81.9	82.0	81.8	81.7	81.5	80.4	79.0	69.1		
44	82.0	81.9	81.9	82.0	81.6	81.0	80.5	79.0	77.5	67.8		
46	82.0	81.9	81.3	80.8	80.2	79.6	79.0	77.5	76.1			
48	82.0	80.4	79.8	79.3	78.7	78.1	77.5	76.2	74.8			
50	82.0	78.9	78.4	77.8	77.2	76.7	76.2	74.9	73.5			
52	80.4	77.5	77.0	76.5	76.0	75.4	74.9	73.5				
54	79.0	76.2	75.7	75.2								
55	78.3	75.6										

AIR CONDITIONING OFF ADD 1200 kg	ENGINE ANTI ICE ON SUBTRACT 900 kg	TOTAL ANTI ICE ON SUBTRACT 2800 kg	SPEED INCREASE PER 0.01 VS ADD 200 kg

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APPROACH CLIMB LIMITING WEIGHT (1000 KG) ONE ENGINE OUT ONE ENGINE AT GO AROUND THRUST	Gradient : 2.1% High Air Conditioning Anti ice OFF V = 1.23 Vs	CONF 3

PRESSURE ALTITUDE (FT)												
OAT (°C)	–1000	0	200	400	600	800	1000	1500	2000	5000	10000	14500
≤ 10	82.0	81.9	81.7	81.6	81.5	81.3	81.2	80.9	80.5	75.3	65.9	56.8
20	82.0	81.9	81.7	81.6	81.5	81.3	81.2	80.9	80.5	75.3	65.9	54.5
22	82.0	81.9	81.7	81.6	81.5	81.3	81.2	80.9	80.5	75.3	65.2	
24	82.0	81.9	81.7	81.6	81.5	81.3	81.2	80.9	80.5	75.3	64.5	
26	82.0	81.9	81.7	81.6	81.5	81.3	81.2	80.9	80.5	75.2	63.7	
28	82.0	81.9	81.7	81.6	81.5	81.3	81.2	80.9	80.5	75.2	62.7	
30	82.0	81.9	81.7	81.6	81.5	81.3	81.2	80.9	80.5	75.2	61.8	
32	82.0	81.9	81.7	81.6	81.5	81.3	81.2	80.9	80.5	74.4	60.8	
34	82.0	81.9	81.7	81.6	81.5	81.3	81.2	80.9	80.5	73.4	59.8	
36	82.0	81.9	81.7	81.6	81.5	81.3	81.2	80.9	80.5	72.3		
38	82.0	81.9	81.7	81.6	81.5	81.3	81.2	80.9	80.5	71.1		
40	82.0	81.9	81.7	81.6	81.5	81.3	81.2	80.9	80.3	69.9		
42	82.0	81.9	81.7	81.6	81.5	81.3	81.2	80.3	78.8	68.7		
44	82.0	81.9	81.7	81.6	81.5	81.0	80.4	78.9	77.3	67.5		
46	82.0	81.9	81.3	80.7	80.1	79.5	78.9	77.4	76.0			
48	82.0	80.4	79.8	79.2	78.6	78.0	77.4	76.1	74.6			
50	82.0	78.9	78.3	77.8	77.2	76.6	76.1	74.7	73.3			
52	80.4	77.5	77.0	76.4	75.9	75.4	74.8	73.4				
54	79.0	76.2	75.7	75.1								
55	78.3	75.6										

AIR CONDITIONING OFF ADD 1200 kg	ENGINE ANTI ICE ON SUBTRACT 500 kg	TOTAL ANTI ICE ON SUBTRACT 2400 kg	SPEED INCREASE PER 0.01 VS ADD 210 kg

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APPROACH CLIMB LIMITING WEIGHT (1000 KG) ONE ENGINE OUT ONE ENGINE AT GO AROUND THRUST	Gradient : 2.5% High Air Conditioning Anti ice OFF	CAT II CONF 2

PRESSURE ALTITUDE (FT)												
OAT (°C)	–1000	0	200	400	600	800	1000	1500	2000	5000	8000	9200
≤ 10	76.7	76.4	76.2	76.0	75.8	75.5	75.4	74.9	74.4	71.7	67.7	65.9
20	76.7	76.4	76.2	76.0	75.8	75.5	75.3	74.9	74.4	71.7	67.7	65.9
22	76.7	76.4	76.2	76.0	75.7	75.5	75.3	74.9	74.4	71.7	67.7	65.9
24	76.7	76.4	76.2	76.0	75.7	75.5	75.3	74.9	74.4	71.7	67.7	65.9
26	76.7	76.4	76.2	76.0	75.7	75.5	75.3	74.9	74.4	71.7	67.7	65.9
28	76.7	76.4	76.2	76.0	75.7	75.5	75.3	74.9	74.4	71.7	67.7	65.6
30	76.7	76.4	76.2	76.0	75.7	75.5	75.3	74.9	74.4	71.7	67.6	65.1
32	76.7	76.4	76.2	76.0	75.7	75.5	75.3	74.9	74.4	71.7	67.2	64.5
34	76.7	76.4	76.2	76.0	75.7	75.5	75.3	74.9	74.4	71.7	66.8	63.4
36	76.6	76.4	76.2	76.0	75.7	75.5	75.3	74.9	74.4	71.5	65.7	62.3
38	76.6	76.4	76.2	76.0	75.7	75.5	75.3	74.9	74.4	71.2	64.5	
40	76.6	76.4	76.2	76.0	75.7	75.5	75.3	74.9	74.4	70.9		
42	76.6	76.4	76.2	76.0	75.7	75.5	75.3	74.9	74.4	69.9		
44	76.6	76.4	76.2	76.0	75.7	75.5	75.3	74.9	74.4	68.7		
46	76.6	76.4	76.2	76.0	75.7	75.5	75.3	74.9	74.4			
48	76.6	76.4	76.2	76.0	75.7	75.5	75.3	74.9	74.0			
50	76.6	76.4	76.2	76.0	75.7	75.5	75.3	74.5	73.1			
52	76.6	76.4	76.2	76.0	75.7	75.5	74.9	73.6				
54	76.6	76.4	76.2	75.7								
55	76.6	76.4										

AIR CONDITIONING OFF ADD 1300 kg	ENGINE ANTI ICE ON No correction	TOTAL ANTI ICE ON SUBTRACT 1900 kg

OCTO 12.0.1 AD132A02 A319-132

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APPROACH CLIMB LIMITING WEIGHT (1000 KG) - CONF 2

ONE ENGINE OUT
ONE ENGINE AT GO AROUND THRUST

High Air Conditioning
Anti Ice OFF

Gradient : 2.5 %
CAT II

OAT (°C)	PRESSURE ALTITUDE (FT)											
	-1000	**0**	**200**	**400**	**600**	**800**	**1000**	**1500**	**2000**	**5000**	**8000**	**9200**
≤10	68.8	68.8	68.5	68.2	67.9	67.6	67.2	66.4	65.6	60.5	58.7	58.2
20	68.6	68.5	68.3	68.0	67.7	67.4	67.0	66.2	65.4	60.3	56.1	55.8
22	68.5	68.5	68.2	67.9	67.6	67.3	67.0	66.2	65.4	59.2	55.3	54.9
24	68.5	68.5	68.2	67.9	67.6	67.3	67.0	66.1	65.3	57.9	54.3	53.4
26	68.5	68.4	68.1	67.8	67.6	67.2	66.9	66.1	65.3	56.6	53.2	51.8
28	68.4	68.4	68.1	67.8	67.5	67.2	66.9	65.6	64.3	55.5	52.0	50.4
30	68.4	68.3	67.8	67.3	66.7	66.2	65.7	64.4	63.1	54.4	50.7	49.3
32	68.3	67.1	66.5	66.0	65.5	64.9	64.4	63.1	61.9	53.4	49.6	47.9
34	67.1	65.8	65.2	64.7	64.2	63.7	63.2	62.0	60.7	52.4	48.5	46.9
36	65.8	64.6	64.1	63.6	63.1	62.6	62.1	60.9	59.6	51.5	47.6	46.0
38	64.6	63.4	62.9	62.5	62.0	61.5	61.0	59.8	58.6	50.6	46.7	
40	63.4	62.3	61.8	61.4	60.9	60.4	59.9	58.8	57.6	49.7		
42	62.2	61.3	60.8	60.3	59.8	59.4	58.9	57.7	56.6	48.9		
44	61.0	60.2	59.7	59.2	58.7	58.3	57.8	56.6	55.5	48.0		
46	59.8	59.0	58.5	58.1	57.6	57.2	56.7	55.6	54.5			
48	58.6	57.9	57.4	56.9	56.5	56.0	55.6	54.5	53.5			
50	57.5	56.7	56.2	55.8	55.4	54.9	54.5	53.5	52.4			
52	56.5	55.6	55.2	54.8	54.3	53.9	53.5	52.4				
54	55.5	54.6	54.2	53.8								
55	55.0	54.1										

AIR CONDITIONING OFF ADD	**ENGINE ANTI ICE ON SUBTRACT**	**TOTAL ANTI ICE ON SUBTRACT**
2100 kg	60 kg up to 6000 ft 1500 kg above 6000 ft	3000 kg up to 5000 ft 5500 kg above 5000 ft

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APPROACH CLIMB LIMITING WEIGHT (1000 KG) ONE ENGINE OUT ONE ENGINE AT GO AROUND THRUST	Gradient : 2.5% High Air Conditioning Anti ice OFF	CAT II CONF 2

PRESSURE ALTITUDE (FT)												
OAT (°C)	–1000	0	200	400	600	800	1000	1500	2000	5000	10000	14500
≤ 10	80.7	80.6	80.7	80.7	80.6	80.4	80.3	80.2	80.1	79.4	69.0	57.6
20	80.7	80.6	80.7	80.7	80.6	80.4	80.3	80.2	80.1	79.3	66.0	55.0
22	80.7	80.6	80.7	80.7	80.6	80.4	80.3	80.2	80.1	79.3	65.2	
24	80.7	80.6	80.7	80.7	80.6	80.4	80.3	80.2	80.1	78.5	64.3	
26	80.7	80.6	80.7	80.7	80.6	80.4	80.3	80.2	80.1	77.5	63.4	
28	80.7	80.6	80.7	80.7	80.6	80.4	80.3	80.2	80.1	76.4	62.5	
30	80.7	80.6	80.7	80.7	80.6	80.4	80.3	80.2	80.1	75.4	61.6	
32	80.7	80.6	80.7	80.7	80.6	80.4	80.3	80.2	80.1	74.2	60.6	
34	80.7	80.6	80.7	80.7	80.6	80.4	80.3	80.2	80.1	73.0	59.6	
36	80.7	80.6	80.7	80.7	80.6	80.4	80.3	80.2	80.1	71.8		
38	80.7	80.6	80.7	80.7	80.6	80.4	80.3	80.2	79.7	70.6		
40	80.7	80.6	80.7	80.7	80.6	80.4	80.3	79.9	78.9	69.4		
42	80.7	80.6	80.7	80.7	80.6	80.4	80.2	79.2	77.8	68.2		
44	80.7	80.6	80.7	80.7	80.3	79.8	79.2	77.8	76.4	66.9		
46	80.7	80.6	80.1	79.5	79.0	78.4	77.8	76.5	75.1			
48	80.7	79.2	78.6	78.0	77.5	76.9	76.4	75.2	73.8			
50	80.7	77.7	77.2	76.7	76.2	75.8	75.2	73.8	72.5			
52	79.2	76.5	76.0	75.5	75.0	74.4	73.9	72.5				
54	77.8	75.2	74.7	74.1								
55	77.2	74.5										

AIR CONDITIONING OFF ADD 1100 kg	ENGINE ANTI ICE ON SUBTRACT 800 kg	TOTAL ANTI ICE ON SUBTRACT 2700 kg

INTENTIONALLY LEFT BLANK

APPROACH CLIMB LIMITING WEIGHT (1000 KG) ONE ENGINE OUT ONE ENGINE AT GO AROUND THRUST	Gradient : 2.5% High Air Conditioning Anti ice OFF	CAT II CONF 2

PRESSURE ALTITUDE (FT)												
OAT (°C)	–1000	0	200	400	600	800	1000	1500	2000	5000	10000	14500
≤ 10	80.7	80.6	80.5	80.4	80.2	80.1	80.0	79.6	79.3	74.3	65.1	56.3
20	80.7	80.6	80.5	80.3	80.2	80.1	80.0	79.6	79.3	74.3	65.1	54.1
22	80.7	80.6	80.5	80.3	80.2	80.1	80.0	79.6	79.3	74.3	64.5	
24	80.7	80.6	80.5	80.3	80.2	80.1	80.0	79.6	79.3	74.3	63.8	
26	80.7	80.6	80.5	80.3	80.2	80.1	80.0	79.6	79.3	74.3	63.0	
28	80.7	80.6	80.5	80.3	80.2	80.1	80.0	79.6	79.3	74.3	62.0	
30	80.7	80.6	80.5	80.3	80.2	80.1	80.0	79.6	79.3	74.3	61.1	
32	80.7	80.6	80.5	80.3	80.2	80.1	80.0	79.6	79.3	73.4	60.2	
34	80.7	80.6	80.5	80.3	80.2	80.1	80.0	79.6	79.3	72.4	59.2	
36	80.7	80.6	80.5	80.3	80.2	80.1	80.0	79.6	79.3	71.3		
38	80.7	80.6	80.5	80.3	80.2	80.1	80.0	79.6	79.3	70.2		
40	80.7	80.6	80.5	80.3	80.2	80.1	79.9	79.6	79.1	69.0		
42	80.7	80.6	80.5	80.3	80.2	80.1	79.9	79.1	77.7	67.9		
44	80.7	80.6	80.5	80.3	80.2	79.7	79.1	77.7	76.3	66.6		
46	80.7	80.6	80.1	79.5	78.9	78.3	77.7	76.4	75.0			
48	80.7	79.2	78.6	78.0	77.4	76.9	76.4	75.1	73.6			
50	80.7	77.7	77.2	76.7	76.2	75.7	75.1	73.7	72.3			
52	79.2	76.5	76.0	75.5	74.9	74.3	73.8	72.4				
54	77.8	75.2	74.7	74.1								
55	77.2	74.5										

AIR CONDITIONING OFF ADD 1100 kg	ENGINE ANTI ICE ON SUBTRACT 500 kg	TOTAL ANTI ICE ON SUBTRACT 2400 kg

INTENTIONALLY LEFT BLANK

APPROACH CLIMB LIMITING WEIGHT (1000 KG) ONE ENGINE OUT ONE ENGINE AT GO AROUND THRUST	Gradient : 2.5% High Air Conditioning Anti ice OFF	CAT II CONF 3

PRESSURE ALTITUDE (FT)												
OAT (°C)	–1000	0	200	400	600	800	1000	1500	2000	5000	8000	9200
≤ 10	71.3	71.1	70.9	70.7	70.5	70.3	70.1	69.6	69.2	66.5	62.8	61.3
20	71.3	71.1	70.9	70.7	70.5	70.3	70.1	69.6	69.2	66.5	62.8	61.3
22	71.3	71.1	70.9	70.7	70.5	70.3	70.1	69.6	69.2	66.5	62.8	61.3
24	71.3	71.1	70.9	70.7	70.5	70.3	70.1	69.6	69.2	66.5	62.8	61.3
26	71.3	71.1	70.9	70.7	70.5	70.3	70.1	69.6	69.2	66.5	62.8	61.3
28	71.3	71.1	70.9	70.7	70.5	70.3	70.1	69.6	69.2	66.5	62.8	60.9
30	71.3	71.1	70.9	70.7	70.5	70.3	70.1	69.6	69.2	66.5	62.6	60.4
32	71.3	71.1	70.9	70.7	70.5	70.3	70.1	69.6	69.2	66.5	62.3	59.8
34	71.3	71.1	70.9	70.7	70.5	70.3	70.1	69.6	69.2	66.5	61.9	58.9
36	71.3	71.1	70.9	70.7	70.5	70.3	70.1	69.6	69.2	66.4	60.9	57.9
38	71.3	71.1	70.9	70.7	70.5	70.3	70.1	69.6	69.2	66.1	59.9	
40	71.3	71.1	70.9	70.7	70.5	70.3	70.1	69.6	69.2	65.8		
42	71.3	71.1	70.9	70.7	70.5	70.3	70.1	69.6	69.2	64.8		
44	71.3	71.1	70.9	70.7	70.5	70.3	70.1	69.6	69.2	63.8		
46	71.3	71.1	70.9	70.7	70.5	70.3	70.1	69.6	69.2			
48	71.3	71.1	70.9	70.7	70.5	70.3	70.1	69.6	68.8			
50	71.3	71.1	70.9	70.7	70.5	70.3	70.1	69.2	68.0			
52	71.3	71.1	70.9	70.7	70.5	70.2	69.7	68.5				
54	71.3	71.1	70.9	70.5								
55	71.3	71.1										

AIR CONDITIONING OFF ADD 1200 kg	ENGINE ANTI ICE ON No correction	TOTAL ANTI ICE ON SUBTRACT 1800 kg

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APPROACH CLIMB LIMITING WEIGHT (1000 KG) - CONF 3

ONE ENGINE OUT
ONE ENGINE AT GO AROUND THRUST

High Air Conditioning
Anti Ice OFF

Gradient : 2.5 %
CAT II

OAT (°C)	PRESSURE ALTITUDE (FT)											
	-1000	**0**	**200**	**400**	**600**	**800**	**1000**	**1500**	**2000**	**5000**	**8000**	**9200**
≤10	65.0	64.9	64.6	64.3	64.0	63.7	63.4	62.6	61.8	57.1	55.2	54.6
20	64.7	64.7	64.4	64.1	63.8	63.5	63.2	62.4	61.6	57.0	52.9	52.5
22	64.7	64.7	64.4	64.1	63.8	63.5	63.2	62.4	61.6	55.8	52.1	51.7
24	64.7	64.6	64.3	64.1	63.7	63.4	63.1	62.3	61.6	54.6	51.2	50.3
26	64.6	64.6	64.3	64.0	63.7	63.4	63.1	62.3	61.5	53.4	50.2	48.9
28	64.6	64.5	64.3	64.0	63.7	63.4	63.0	61.8	60.6	52.4	49.1	47.7
30	64.5	64.5	64.0	63.5	63.0	62.5	62.0	60.8	59.5	51.4	48.0	46.6
32	64.5	63.3	62.8	62.3	61.8	61.3	60.8	59.6	58.4	50.5	46.9	45.5
34	63.3	62.1	61.6	61.1	60.6	60.2	59.7	58.5	57.4	49.6	45.9	44.8
36	62.1	60.9	60.5	60.0	59.6	59.1	58.6	57.5	56.3	48.7	45.2	44.1
38	61.0	59.9	59.4	59.0	58.5	58.0	57.6	56.5	55.4	47.9	44.6	
40	59.9	58.9	58.4	58.0	57.5	57.1	56.6	55.5	54.4	47.1		
42	58.8	57.9	57.4	57.0	56.5	56.1	55.6	54.5	53.4	46.2		
44	57.7	56.8	56.4	55.9	55.5	55.0	54.6	53.5	52.5	45.6		
46	56.6	55.8	55.3	54.9	54.4	54.0	53.6	52.6	51.6			
48	55.5	54.7	54.3	53.8	53.4	53.0	52.6	51.6	50.6			
50	54.4	53.6	53.2	52.8	52.4	52.0	51.6	50.6	49.6			
52	53.4	52.6	52.2	51.8	51.4	51.0	50.6	49.6				
54	52.5	51.7	51.3	50.9								
55	52.1	51.2										

AIR CONDITIONING OFF ADD	**ENGINE ANTI ICE ON SUBTRACT**	**TOTAL ANTI ICE ON SUBTRACT**
1950 kg	60 kg up to 6000 ft 1200 kg above 6000 ft	3000 kg up to 5000 ft 5100 kg above 5000 ft

INTENTIONALLY LEFT BLANK

APPROACH CLIMB LIMITING WEIGHT (1000 KG) ONE ENGINE OUT ONE ENGINE AT GO AROUND THRUST	Gradient : 2.5% High Air Conditioning Anti ice OFF	CAT II CONF 3

PRESSURE ALTITUDE (FT)												
OAT (°C)	–1000	0	200	400	600	800	1000	1500	2000	5000	10000	14500
≤ 10	79.5	79.4	79.5	79.5	79.4	79.2	79.1	79.0	79.0	78.2	67.8	56.6
20	79.5	79.4	79.5	79.5	79.4	79.2	79.1	79.0	79.0	78.2	65.0	54.1
22	79.5	79.4	79.5	79.5	79.4	79.2	79.1	79.0	79.0	78.2	64.1	
24	79.5	79.4	79.5	79.5	79.4	79.2	79.1	79.0	79.0	77.3	63.3	
26	79.5	79.4	79.5	79.5	79.4	79.2	79.1	79.0	79.0	76.4	62.4	
28	79.5	79.4	79.5	79.5	79.4	79.2	79.1	79.0	78.9	75.3	61.5	
30	79.5	79.4	79.5	79.5	79.4	79.2	79.1	79.0	78.9	74.2	60.5	
32	79.5	79.4	79.5	79.5	79.4	79.2	79.1	79.0	78.9	73.0	59.6	
34	79.5	79.4	79.5	79.5	79.4	79.2	79.1	79.0	78.9	71.9	58.7	
36	79.5	79.4	79.5	79.5	79.4	79.2	79.1	79.0	78.9	70.7		
38	79.5	79.4	79.5	79.5	79.4	79.2	79.1	79.0	78.6	69.5		
40	79.5	79.4	79.4	79.5	79.3	79.2	79.1	78.7	77.7	68.3		
42	79.5	79.4	79.4	79.5	79.3	79.2	79.0	78.0	76.7	67.1		
44	79.5	79.4	79.4	79.5	79.1	78.6	78.0	76.7	75.4	65.9		
46	79.5	79.4	78.9	78.3	77.8	77.2	76.7	75.4	73.9			
48	79.5	78.0	77.5	76.9	76.4	75.9	75.4	74.0	72.6			
50	79.5	76.6	76.1	75.7	75.1	74.6	74.0	72.7	71.4			
52	78.0	75.4	74.9	74.3	73.8	73.2	72.7	71.4				
54	76.7	74.1	73.5	73.0								
55	76.2	73.4										

AIR CONDITIONING OFF ADD 1100 kg	ENGINE ANTI ICE ON SUBTRACT 800 kg	TOTAL ANTI ICE ON SUBTRACT 2700 kg

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APPROACH CLIMB LIMITING WEIGHT (1000 KG) ONE ENGINE OUT ONE ENGINE AT GO AROUND THRUST	Gradient : 2.5% High Air Conditioning Anti ice OFF	CAT II CONF 3

PRESSURE ALTITUDE (FT)												
OAT (°C)	–1000	0	200	400	600	800	1000	1500	2000	5000	10000	14500
≤ 10	79.5	79.4	79.3	79.1	79.0	78.9	78.7	78.4	78.1	73.0	64.0	55.3
20	79.5	79.4	79.3	79.1	79.0	78.9	78.7	78.4	78.1	73.0	64.0	53.1
22	79.5	79.4	79.3	79.1	79.0	78.9	78.7	78.4	78.1	73.0	63.4	
24	79.5	79.4	79.3	79.1	79.0	78.9	78.7	78.4	78.1	73.0	62.7	
26	79.5	79.4	79.3	79.1	79.0	78.9	78.7	78.4	78.1	73.0	61.9	
28	79.5	79.4	79.3	79.1	79.0	78.9	78.7	78.4	78.1	73.0	61.0	
30	79.5	79.4	79.3	79.1	79.0	78.9	78.7	78.4	78.1	73.0	60.1	
32	79.5	79.4	79.3	79.1	79.0	78.9	78.7	78.4	78.1	72.2	59.1	
34	79.5	79.4	79.3	79.1	79.0	78.9	78.7	78.4	78.1	71.2	58.2	
36	79.5	79.4	79.3	79.1	79.0	78.9	78.7	78.4	78.1	70.2		
38	79.5	79.4	79.3	79.1	79.0	78.9	78.7	78.4	78.1	69.0		
40	79.5	79.4	79.3	79.1	79.0	78.9	78.7	78.4	77.8	67.9		
42	79.5	79.4	79.3	79.1	79.0	78.9	78.7	77.9	76.5	66.8		
44	79.5	79.4	79.3	79.1	79.0	78.5	77.9	76.6	75.2	65.6		
46	79.5	79.4	78.9	78.3	77.7	77.2	76.6	75.3	73.8			
48	79.5	78.0	77.4	76.9	76.4	75.8	75.3	73.9	72.5			
50	79.5	76.6	76.1	75.6	75.1	74.5	73.9	72.6	71.2			
52	78.0	75.4	74.8	74.3	73.7	73.2	72.6	71.2				
54	76.7	74.1	73.5	73.0								
55	76.2	73.4										

AIR CONDITIONING OFF ADD 1100 kg	ENGINE ANTI ICE ON SUBTRACT 500 kg	TOTAL ANTI ICE ON SUBTRACT 2300 kg

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INTRODUCTION

The alternate planning tables enable the flight crew to determine the fuel consumption and time required to cover a given air distance from go around at destination airport to landing at alternate airport.
These tables are established for :
- Go around : 100 kg or 220 lb
- Climb profile : 250KT/300KT/M.78
- Long range cruise
- Descent profile : M.78/300KT/250KT
- Approach and landing at alternate airport : 80 kg or 180 lb (4 min)
- ISA
- CG : 33 %
- Normal air conditioning
- Anti ice off

Note : 1. In the tables, a "" means that a step climb of 4000 feet has been made to reach the corresponding flight level.*
2. The flight level shown on the top of each column is the final flight level.
3. For each degree Celcius above ISA temperature apply a fuel correction of 0.015 (kg/°C/NM) × △ISA (°C) × Air Distance (NM)
or 0.033 (lb/°C/NM) × △ISA (°C) × Air Distance (NM)

CORRECTION FOR DEVIATION FROM REFERENCE WEIGHT

The alternate planning tables are based on a reference landing weight at destination.
The fuel consumption must be corrected when the landing weight is different from the reference landing weight.
If it is lower (or greater) than the reference weight, subtract (or add) the value given in the correction part of the table per 1000 kg or 1000 lb below (or above) the reference weight.

R

ALTERNATE PLANNING FROM DESTINATION TO ALTERNATE AIRPORT
GO-AROUND : 100 KG - CLIMB : 250KT/300KT/M.78 - CRUISE : LONG RANGE
DESCENT : M.78/300KT/250KT - VMC PROCEDURE : 80 KG (4MIN)

REF. LDG WT AT DEST. = 55000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	120	140	160	180	200	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL120	FL140 FL160	FL180 FL200
50	605 0.14						3		
100	984 0.24	952 0.24	946 0.24	942 0.23	940 0.23	939 0.22	6	6	5
150	1365 0.35	1320 0.34	1302 0.34	1288 0.32	1274 0.31	1256 0.30	9	9	7
200	1747 0.45	1689 0.44	1660 0.43	1635 0.41	1609 0.39	1573 0.38	13	12	9
250	2130 0.55	2059 0.54	2019 0.53	1984 0.50	1944 0.47	1891 0.46	16	16	11
300	2515 1.05	2431 1.04	2380 1.03	2333 0.59	2281 0.55	2210 0.54	20	19	12
350	2901 1.15	2804 1.14	2741 1.12	2684 1.08	2619 1.03	2529 1.02	23	22	14
400	3288 1.25	3178 1.24	3104 1.21	3036 1.17	2956 1.11	2848 1.10	27	26	16
450	3676 1.35	3553 1.34	3468 1.31	3388 1.25	3294 1.19	3167 1.18	30	29	18
500	4065 1.45	3929 1.43	3833 1.40	3742 1.34	3633 1.28	3487 1.26	33	32	19
550	4456 1.55	4307 1.53	4200 1.49	4097 1.42	3972 1.36	3807 1.34	37	35	21
600	4848 2.05	4686 2.03	4567 1.59	4453 1.51	4312 1.44	4127 1.42	40	38	22
650	5241 2.15	5066 2.12	4936 2.08	4810 1.59	4653 1.52	4448 1.50	44	42	24
700	5636 2.25	5448 2.22	5307 2.17	5168 2.08	4994 1.59	4769 1.58	47	45	25
750	6032 2.35	5831 2.32	5678 2.26	5527 2.16	5335 2.07	5090 2.06	51	48	27
800	6429 2.45	6215 2.41	6051 2.35	5887 2.24	5678 2.15	5412 2.14	55	51	28
850	6827 2.54	6600 2.51	6425 2.44	6248 2.33	6020 2.23	5734 2.22	58	54	29
900	7227 3.04	6987 3.01	6800 2.53	6611 2.41	6364 2.31	6056 2.30	62	57	31
950	7629 3.14	7375 3.10	7177 3.02	6974 2.49	6708 2.39	6379 2.38	65	59	32
1000	8031 3.24	7765 3.20	7555 3.10	7339 2.57	7053 2.47	6702 2.46	69	62	33
1050	8435 3.33	8155 3.29	7935 3.19	7705 3.05	7398 2.55	7025 2.54	73	65	34
1100	8839 3.43	8548 3.39	8315 3.28	8072 3.13	7744 3.02	7349 3.02	76	68	35
1150	9245 3.53	8942 3.48	8697 3.36	8439 3.21	8090 3.10	7673 3.10	80	71	37
1200	9653 4.02	9338 3.57	9080 3.45	8805 3.29	8436 3.18	7998 3.18	84	74	38

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 1 %	△FUEL = + 3 %	△FUEL = + 7 %

INTRODUCTION

The alternate planning tables enable the flight crew to determine the fuel consumption and time required to cover a given air distance from go around at destination airport to landing at alternate airport.
These tables are established for :
- Go around : 80 kg or 180 lb
- Climb profile : 250KT/300KT/M.78
- Long range cruise
- Descent profile : M.78/300KT/250KT
- Approach and landing at alternate airport : 60 kg or 140 lb (4 min)
- ISA
- CG : 33 %
- Normal air conditioning
- Anti ice off

Note : 1. In the tables, a "" means that a step climb of 4000 feet has been made to reach the corresponding flight level.*
2. The flight level shown on the top of each column is the final flight level.
3. For each degree Celcius above ISA temperature apply a fuel correction of 0.015 (kg/°C/NM) × △ISA (°C) × Air Distance (NM)
or 0.033 (lb/°C/NM) × △ISA (°C) × Air Distance (NM)

CORRECTION FOR DEVIATION FROM REFERENCE WEIGHT

The alternate planning tables are based on a reference landing weight at destination.
The fuel consumption must be corrected when the landing weight is different from the reference landing weight.
If it is lower (or greater) than the reference weight, subtract (or add) the value given in the correction part of the table per 1000 kg or 1000 lb below (or above) the reference weight.

ALTERNATE PLANNING FROM DESTINATION TO ALTERNATE AIRPORT - ALL ENGINES
CLIMB : 250KT/300KT/M.78 - CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
GO-AROUND : 80 KG - VMC PROCEDURE : 60 KG (4 MIN)

REF. LANDING WEIGHT = 50000 KG
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	120	140	160	180	200	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL120	FL140 FL160	FL180 FL200
50	546 0.14						3		
100	909 0.24	881 0.25	874 0.24	871 0.23	870 0.23	874 0.23	5	6	6
150	1274 0.34	1230 0.35	1208 0.34	1194 0.32	1176 0.31	1164 0.31	7	8	8
200	1639 0.44	1579 0.45	1544 0.44	1517 0.40	1482 0.40	1455 0.40	10	10	9
250	2005 0.54	1930 0.55	1880 0.54	1841 0.49	1789 0.49	1747 0.49	13	13	11
300	2372 1.04	2281 1.05	2217 1.04	2166 0.57	2096 0.57	2039 0.57	15	15	13
350	2740 1.14	2633 1.15	2555 1.14	2490 1.06	2404 1.06	2332 1.06	18	18	15
400	3108 1.25	2986 1.25	2894 1.24	2816 1.14	2713 1.15	2625 1.15	20	20	17
450	3478 1.35	3339 1.35	3234 1.34	3142 1.23	3022 1.23	2919 1.23	23	22	18
500	3848 1.45	3694 1.45	3574 1.44	3468 1.32	3331 1.32	3213 1.32	25	24	20
550	4219 1.55	4049 1.55	3916 1.54	3795 1.40	3641 1.41	3508 1.41	28	27	22
600	4591 2.05	4405 2.05	4258 2.04	4122 1.49	3952 1.49	3804 1.50	30	29	24
650	4964 2.15	4762 2.15	4602 2.14	4450 1.57	4263 1.58	4100 1.58	33	31	26
700	5338 2.25	5120 2.25	4950 2.22	4779 2.06	4575 2.07	4396 2.07	35	33	27
750	5712 2.35	5479 2.35	5301 2.29	5108 2.14	4887 2.15	4693 2.16	38	35	29
800	6087 2.45	5839 2.45	5653 2.35	5437 2.23	5200 2.24	4991 2.24	40	36	32
850	6463 2.55	6200 2.55	6008 2.42	5767 2.32	5513 2.32	5289 2.33	43	38	34
900	6840 3.05	6562 3.05	6364 2.48	6097 2.40	5827 2.41	5588 2.42	45	40	36
950	7217 3.14	6924 3.15	6722 2.54	6428 2.49	6141 2.50	5887 2.51	48	41	38
1000	7596 3.24	7287 3.25	7082 2.59	6759 2.57	6456 2.58	6187 2.59	50	43	40
1050	7975 3.34	7652 3.35	7443 3.05	7091 3.06	6771 3.07	6487 3.08	54	44	42
1100	8355 3.44	8018 3.44	7793 3.13	7424 3.15	7087 3.16	6788 3.17	58	46	44
1150	8736 3.54	8384 3.54	8144 3.22	7757 3.23	7404 3.24	7090 3.26	62	48	47
1200	9118 4.04	8751 4.04	8496 3.30	8090 3.32	7721 3.33	7392 3.34	66	50	49

CORRECTIONS	**ENGINE ANTI ICE ON**	**TOTAL ANTI ICE ON**
FUEL	+ 3 %	+ 5 %

INTRODUCTION

The alternate planning tables enable the flight crew to determine the fuel consumption and time required to cover a given air distance from go around at destination airport to landing at alternate airport.
These tables are established for :
- Go around : 80 kg or 180 lb
- Climb profile : 250KT/300KT/M.78
- Long range cruise
- Descent profile : M.78/300KT/250KT
- Approach and landing at alternate airport : 60 kg or 140 lb (4 min)
- ISA
- CG : 33 %
- Normal air conditioning
- Anti ice off

Note : 1. In the tables, a "" means that a step climb of 4000 feet has been made to reach the corresponding flight level.*
2. The flight level shown on the top of each column is the final flight level.
3. For each degree Celcius above ISA temperature apply a fuel correction of 0.015 (kg/°C/NM) × △ISA (°C) × Air Distance (NM)
or 0.033 (lb/°C/NM) × △ISA (°C) × Air Distance (NM)

CORRECTION FOR DEVIATION FROM REFERENCE WEIGHT

The alternate planning tables are based on a reference landing weight at destination.
The fuel consumption must be corrected when the landing weight is different from the reference landing weight.
If it is lower (or greater) than the reference weight, subtract (or add) the value given in the correction part of the table per 1000 kg or 1000 lb below (or above) the reference weight.

R

ALTERNATE PLANNING FROM DESTINATION TO ALTERNATE AIRPORT
GO-AROUND : 80 KG - CLIMB : 250KT/300KT/M.78 - CRUISE : LONG RANGE
DESCENT : M.78/300KT/250KT - VMC PROCEDURE : 60 KG (4MIN)

REF. LDG WT AT DEST. = 50000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	120	140	160	180	200	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL120	FL140 FL160	FL180 FL200
50	558 0.14	531 0.14					2		
100	940 0.24	895 0.24	882 0.24	874 0.24	870 0.23	868 0.22	5	5	5
150	1323 0.34	1260 0.35	1230 0.34	1207 0.33	1189 0.32	1173 0.31	7	7	7
200	1707 0.44	1626 0.45	1579 0.44	1541 0.43	1509 0.41	1478 0.40	9	10	9
250	2092 0.55	1992 0.55	1929 0.54	1876 0.52	1830 0.49	1784 0.48	11	13	12
300	2478 1.05	2360 1.05	2279 1.04	2212 1.01	2152 0.58	2090 0.57	14	15	14
350	2864 1.15	2728 1.15	2631 1.14	2549 1.11	2475 1.07	2397 1.05	16	18	16
400	3252 1.25	3097 1.24	2983 1.23	2887 1.20	2799 1.16	2705 1.13	18	20	18
450	3640 1.35	3467 1.34	3336 1.33	3225 1.29	3123 1.24	3013 1.22	21	23	20
500	4029 1.45	3838 1.44	3690 1.43	3565 1.38	3449 1.33	3322 1.30	23	26	22
550	4419 1.55	4209 1.54	4045 1.53	3905 1.47	3775 1.41	3632 1.39	26	28	24
600	4809 2.05	4582 2.04	4401 2.02	4247 1.56	4102 1.50	3942 1.47	28	31	26
650	5201 2.15	4955 2.14	4758 2.12	4589 2.05	4430 1.58	4253 1.55	30	34	28
700	5593 2.25	5330 2.24	5117 2.22	4932 2.14	4757 2.07	4564 2.03	33	36	30
750	5986 2.35	5705 2.34	5476 2.31	5276 2.23	5085 2.16	4876 2.12	35	39	32
800	6380 2.45	6081 2.43	5836 2.40	5621 2.32	5413 2.24	5188 2.20	38	41	34
850	6775 2.55	6458 2.53	6198 2.50	5966 2.41	5743 2.33	5501 2.28	40	44	36
900	7170 3.05	6836 3.03	6560 2.59	6313 2.49	6072 2.41	5814 2.36	43	47	38
950	7567 3.15	7214 3.13	6923 3.09	6661 2.58	6403 2.50	6128 2.44	46	49	40
1000	7964 3.25	7594 3.22	7288 3.18	7009 3.07	6734 2.58	6443 2.52	48	52	42
1050	8362 3.34	7975 3.32	7653 3.27	7359 3.15	7065 3.06	6758 3.00	51	55	44
1100	8761 3.44	8356 3.42	8019 3.36	7709 3.24	7398 3.15	7073 3.08	53	57	46
1150	9161 3.54	8739 3.51	8387 3.46	8060 3.32	7731 3.23	7390 3.16	56	60	48
1200	9561 4.04	9122 4.01	8756 3.55	8413 3.40	8064 3.32	7707 3.24	59	62	49

LOW AIR CONDITIONING △FUEL = – 1 %
ENGINE ANTI ICE ON △FUEL = + 3 %
TOTAL ANTI ICE ON △FUEL = + 7 %

ALTERNATE PLANNING FROM DESTINATION TO ALTERNATE AIRPORT - ALL ENGINES
CLIMB : 250KT/300KT/M.78 - CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
GO-AROUND : 80 KG - VMC PROCEDURE : 80 KG (4 MIN)

REF. LANDING WEIGHT = 50000 KG
NORMAL AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL					CORRECTION ON FUEL CONSUMPTION (KG/1000KG)		
	230	**270**	**310**	**350**	**390**	**FL230 FL270**	**FL310 FL350**	**FL390**
150	1183 0.31	1202 0.30				10		
200	1455 0.40	1459 0.38	1480 0.36			13	14	
250	1729 0.48	1718 0.46	1725 0.44	1732 0.43		15	17	
300	2003 0.57	1976 0.55	1969 0.52	1965 0.50	1970 0.50	18	20	21
350	2278 1.06	2236 1.03	2215 0.59	2198 0.57	2195 0.56	21	23	25
400	2553 1.15	2496 1.11	2462 1.07	2433 1.04	2422 1.03	24	26	29
450	2830 1.23	2758 1.20	2709 1.15	2668 1.11	2650 1.10	27	30	33
500	3107 1.32	3020 1.28	2956 1.22	2904 1.18	2878 1.16	30	33	37
550	3384 1.41	3282 1.36	3205 1.30	3141 1.25	3108 1.23	33	36	41
600	3663 1.50	3546 1.44	3454 1.38	3379 1.32	3338 1.30	36	39	45
650	3942 1.58	3811 1.52	3704 1.45	3617 1.39	3569 1.37	40	42	49
700	4222 2.07	4076 2.01	3954 1.53	3857 1.46	3801 1.43	43	46	53
750	4503 2.16	4342 2.09	4206 2.00	4097 1.53	4034 1.50	46	49	58
800	4784 2.25	4609 2.17	4458 2.08	4338 2.00	4268 1.57	49	52	62
850	5066 2.33	4877 2.25	4710 2.16	4581 2.07	4503 2.03	52	55	66
900	5349 2.42	5146 2.33	4964 2.23	4823 2.13	4739 2.10	56	59	71
950	5633 2.51	5416 2.41	5218 2.31	5067 2.20	4976 2.17	59	62	76
1000	5918 2.59	5686 2.49	5473 2.38	5312 2.27	5215 2.23	62	65	80
1050	6203 3.08	5958 2.57	5729 2.46	5558 2.34	5454 2.30	66	69	85
1100	6490 3.17	6231 3.05	5986 2.53	5804 2.40	5694 2.37	69	72	89
1150	6777 3.25	6504 3.12	6244 3.01	6051 2.47	5935 2.43	72	75	93
1200	7064 3.34	6779 3.20	6503 3.08	6299 2.54	6177 2.50	76	79	97

CORRECTIONS	**ENGINE ANTI ICE ON**	**TOTAL ANTI ICE ON**
FUEL	+ 3 %	+ 5 %

R

ALTERNATE PLANNING FROM DESTINATION TO ALTERNATE AIRPORT
GO-AROUND : 80 KG - CLIMB : 250KT/300KT/M.78 - CRUISE : LONG RANGE
DESCENT : M.78/300KT/250KT - VMC PROCEDURE : 60 KG (4MIN)

REF. LDG WT AT DEST. = 50000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 230	270	310	350	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL230 FL270	FL310 FL350	FL390
150	1155 0.30	1151 0.30	1171 0.29			8	9	
200	1437 0.38	1402 0.38	1403 0.37	1409 0.36		9	12	
250	1719 0.46	1654 0.46	1636 0.44	1627 0.43	1633 0.42	11	15	15
300	2001 0.55	1907 0.54	1870 0.52	1846 0.50	1845 0.49	13	17	18
350	2284 1.03	2159 1.02	2104 1.00	2066 0.57	2057 0.56	14	20	21
400	2567 1.11	2413 1.10	2339 1.08	2286 1.05	2270 1.02	16	23	24
450	2851 1.19	2666 1.18	2575 1.16	2507 1.12	2484 1.09	18	25	28
500	3135 1.27	2920 1.27	2811 1.23	2729 1.19	2698 1.16	19	28	31
550	3420 1.35	3175 1.35	3048 1.31	2951 1.26	2913 1.22	21	31	35
600	3705 1.43	3430 1.43	3285 1.39	3174 1.33	3129 1.29	23	34	38
650	3991 1.51	3686 1.51	3524 1.46	3397 1.41	3345 1.36	25	37	41
700	4277 1.59	3942 1.59	3762 1.54	3621 1.48	3562 1.42	27	39	45
750	4563 2.07	4198 2.07	4002 2.02	3846 1.55	3780 1.49	28	42	49
800	4849 2.15	4455 2.15	4242 2.09	4072 2.02	3998 1.56	30	45	52
850	5136 2.23	4713 2.23	4483 2.17	4298 2.09	4217 2.02	32	48	56
900	5424 2.31	4971 2.31	4725 2.24	4525 2.16	4437 2.09	34	51	59
950	5712 2.39	5230 2.40	4966 2.32	4752 2.23	4657 2.16	36	54	63
1000	6000 2.47	5490 2.48	5208 2.39	4980 2.30	4878 2.22	38	57	67
1050	6289 2.55	5750 2.56	5451 2.47	5209 2.37	5100 2.29	40	59	70
1100	6578 3.03	6011 3.04	5694 2.54	5439 2.44	5323 2.36	42	62	74
1150	6867 3.11	6272 3.12	5938 3.02	5669 2.51	5547 2.42	44	65	78
1200	7157 3.19	6534 3.20	6182 3.09	5899 2.58	5771 2.49	46	68	82

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 1 %	△FUEL = + 3 %	△FUEL = + 7 %

R

ALTERNATE PLANNING FROM DESTINATION TO ALTERNATE AIRPORT
GO-AROUND : 100 KG - CLIMB : 250KT/300KT/M.78 - CRUISE: LONG RANGE
DESCENT: M.78/300KT/250KT - VMC PROCEDURE : 80 KG (4MIN)

REF. LDG WT AT DEST. = 55000 KG
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 230	270	310	350	390	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL230 FL270	FL310 FL350	FL390
150	1238 0.30	1243 0.30				8		
200	1528 0.38	1507 0.38	1514 0.36	1523 0.36		10	12	
250	1818 0.46	1771 0.46	1761 0.44	1758 0.43	1762 0.43	12	15	15
300	2109 0.54	2036 0.54	2008 0.51	1993 0.50	1992 0.49	13	18	19
350	2400 1.02	2302 1.02	2256 0.59	2229 0.57	2222 0.56	15	20	23
400	2691 1.10	2568 1.09	2504 1.06	2465 1.04	2453 1.03	17	23	27
450	2983 1.18	2835 1.17	2753 1.13	2703 1.11	2685 1.09	19	26	31
500	3275 1.26	3102 1.25	3003 1.21	2941 1.18	2918 1.16	22	29	35
550	3568 1.34	3370 1.33	3253 1.28	3180 1.25	3152 1.23	24	32	39
600	3861 1.42	3639 1.41	3504 1.35	3420 1.32	3386 1.29	26	35	43
650	4155 1.50	3909 1.49	3756 1.43	3660 1.39	3622 1.36	28	38	47
700	4448 1.58	4179 1.57	4008 1.50	3901 1.45	3859 1.43	30	41	51
750	4743 2.06	4450 2.05	4261 1.58	4143 1.52	4096 1.49	32	44	56
800	5037 2.14	4721 2.13	4514 2.05	4386 1.59	4335 1.56	34	47	60
850	5333 2.22	4994 2.20	4768 2.12	4630 2.06	4575 2.03	37	50	64
900	5628 2.30	5267 2.28	5023 2.19	4874 2.13	4816 2.09	39	53	68
950	5924 2.38	5540 2.36	5278 2.27	5119 2.20	5057 2.16	41	56	72
1000	6220 2.46	5815 2.44	5534 2.34	5365 2.27	5300 2.23	44	59	76
1050	6517 2.54	6090 2.52	5791 2.41	5612 2.33	5544 2.29	46	62	80
1100	6814 3.02	6366 2.59	6048 2.49	5859 2.40	5789 2.36	48	65	84
1150	7112 3.10	6642 3.07	6306 2.56	6108 2.47	6034 2.42	51	68	88
1200	7410 3.18	6919 3.15	6565 3.03	6357 2.54	6281 2.49	53	71	92

LOW AIR CONDITIONING	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
△FUEL = – 1 %	△FUEL = + 3 %	△FUEL = + 7 %

GENERAL

R The ground distance/air distance conversion tables show the air distance for a given
R ground distance due to the influence of the wind.
R Tables are given for :
R – M.78
R – Long range speed.

M.78

R

GROUND DIST. (NM)	AIR DISTANCE (NM)						
	TAIL WIND			WIND COMPONENTS (KT)			HEAD WIND
	+ 150	+ 100	+ 50	0	– 50	– 100	– 150
10	7	8	9	10	11	13	15
20	15	16	18	20	23	26	30
30	22	25	27	30	34	39	45
40	30	33	36	40	45	51	60
50	37	41	45	50	56	64	75
100	75	82	90	100	113	129	150
200	150	164	180	200	225	257	300
300	225	245	270	300	338	386	450
400	300	327	360	400	450	514	600
500	375	409	450	500	563	643	750
1000	750	818	900	1000	1125	1286	1501
1500	1125	1227	1350	1500	1688	1929	2251
2000	1500	1636	1800	2000	2248	2572	3001
2500	1875	2045	2250	2500	2813	3215	3752
3000	2250	2454	2700	3000	3375	3858	4502
3500	2624	2863	3150	3500	3938	4501	5252
4000	2999	3272	3600	4000	4500	5144	6003
4500	3374	3681	4050	4500	5063	5787	6753
5000	3749	4090	4500	5000	5626	6430	7503

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LONG RANGE SPEED UP TO FL270

R

GROUND DIST. (NM)	AIR DISTANCE (NM)						
	TAIL WIND		WIND COMPONENTS (KT)				HEAD WIND
	+150	+100	+ 50	0	–50	–100	–150
10	7	8	9	10	12	14	17
20	14	16	18	20	23	27	33
30	21	24	26	30	35	41	50
40	29	32	35	40	46	55	67
50	36	39	44	50	58	68	83
100	71	79	88	100	115	136	167
200	143	158	176	200	231	273	333
300	214	237	265	300	346	409	500
400	286	316	353	400	462	545	667
500	357	395	441	500	577	682	833
1000	714	789	882	1000	1154	1364	1667
1500	1071	1184	1324	1500	1731	2046	2500
2000	1429	1579	1765	2000	2308	2727	3334
2500	1786	1974	2206	2500	2885	3409	4167
3000	2143	2368	2647	3000	3462	4091	5000
3500	2500	2763	3088	3500	4039	4773	5834
4000	2857	3158	3529	4000	4615	5455	6667
4500	3214	3553	3971	4500	5192	6137	7500
5000	3571	3947	4412	5000	5769	6818	8334

LONG RANGE SPEED ABOVE FL270

GROUND DIST. (NM)	AIR DISTANCE (NM)						
	TAIL WIND			WIND COMPONENTS (KT)			HEAD WIND
	+ 150	+ 100	+ 50	0	– 50	– 100	– 150
10	8	8	9	10	11	13	15
20	15	16	18	20	22	26	30
30	23	25	27	30	34	38	45
40	30	33	36	40	45	51	60
50	38	41	45	50	56	64	75
100	75	82	90	100	112	128	149
200	150	164	180	200	225	256	299
300	226	246	270	300	337	385	448
400	301	328	360	400	449	513	597
500	376	410	450	500	562	641	746
1000	752	820	901	1000	1124	1282	1493
1500	1128	1230	1351	1500	1685	1923	2239
2000	1504	1639	1802	2000	2247	2564	2985
2500	1880	2049	2252	2500	2809	3205	3731
3000	2256	2459	2703	3000	3371	3846	4478
3500	2632	2869	3153	3500	3933	4487	5224
4000	3008	3279	3604	4000	4494	5128	5970
4500	3383	3689	4054	4500	5056	5769	6716
5000	3759	4098	4505	5000	5618	6410	7463

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LONG RANGE SPEED UP TO FL270

R

GROUND DIST. (NM)	AIR DISTANCE (NM)						
	TAIL WIND		WIND COMPONENTS (KT)				HEAD WIND
	+150	+100	+ 50	0	–50	–100	–150
10	7	8	9	10	12	14	17
20	14	16	18	20	23	27	33
30	21	24	26	30	35	41	50
40	29	32	35	40	46	55	67
50	36	39	44	50	58	68	83
100	71	79	88	100	115	136	167
200	143	158	176	200	231	273	334
300	214	237	265	300	346	409	501
400	286	316	353	400	462	546	668
500	357	395	441	500	577	682	835
1000	714	789	882	1000	1154	1365	1669
1500	1071	1184	1323	1500	1731	2047	2504
2000	1428	1578	1764	2000	2309	2730	3339
2500	1784	1973	2205	2500	2886	3412	4174
3000	2141	2367	2646	3000	3463	4095	5008
3500	2498	2762	3087	3500	4040	4777	5843
4000	2855	3156	3528	4000	4617	5459	6678
4500	3212	3551	3969	4500	5194	6142	7512
5000	3569	3945	4410	5000	5771	6824	8347

LONG RANGE SPEED ABOVE FL270

R

GROUND DIST. (NM)	AIR DISTANCE (NM)						
	TAIL WIND		WIND COMPONENTS (KT)				HEAD WIND
	+150	+100	+ 50	0	–50	–100	–150
10	8	8	9	10	11	13	15
20	15	16	18	20	22	26	30
30	23	25	27	30	34	38	45
40	30	33	36	40	45	51	60
50	38	41	45	50	56	64	75
100	75	82	90	100	112	128	149
200	150	164	180	200	225	257	299
300	225	246	270	300	337	385	448
400	301	328	360	400	450	513	598
500	376	410	450	500	562	641	747
1000	751	819	901	1000	1124	1283	1494
1500	1127	1229	1351	1500	1686	1924	2241
2000	1503	1639	1801	2000	2248	2566	2989
2500	1879	2048	2252	2500	2810	3207	3736
3000	2254	2458	2702	3000	3372	3849	4483
3500	2630	2868	3152	3500	3934	4490	5230
4000	3006	3277	3603	4000	4496	5132	5977
4500	3381	3687	4053	4500	5058	5773	6724
5000	3757	4097	4503	5000	5620	6415	7471

LONG RANGE SPEED UP TO FL270

R

GROUND DIST. (NM)	AIR DISTANCE (NM)						
	TAIL WIND		WIND COMPONENTS (KT)				HEAD WIND
	+150	+100	+ 50	0	–50	–100	–150
10	7	8	9	10	11	14	16
20	14	16	18	20	23	27	33
30	22	24	27	30	34	41	49
40	29	32	35	40	46	54	66
50	36	40	44	50	57	68	82
100	72	79	88	100	115	135	164
200	144	159	177	200	230	270	328
300	216	238	265	300	345	405	492
400	288	317	354	400	460	541	656
500	360	397	442	500	575	676	820
1000	719	794	885	1000	1149	1351	1640
1500	1079	1190	1327	1500	1724	2027	2459
2000	1439	1587	1770	2000	2299	2703	3279
2500	1798	1984	2212	2500	2874	3379	4099
3000	2158	2381	2655	3000	3448	4054	4919
3500	2518	2778	3097	3500	4023	4730	5739
4000	2877	3174	3540	4000	4598	5406	6559
4500	3237	3571	3982	4500	5173	6082	7378
5000	3597	3968	4425	5000	5747	6757	8198

LONG RANGE SPEED ABOVE FL270

R

GROUND DIST. (NM)	AIR DISTANCE (NM)						
	TAIL WIND			WIND COMPONENTS (KT)			HEAD WIND
	+150	+100	+ 50	0	–50	–100	–150
10	7	8	9	10	11	13	15
20	15	16	18	20	23	26	30
30	22	25	27	30	34	39	45
40	30	33	36	40	45	51	60
50	37	41	45	50	56	64	75
100	75	82	90	100	113	129	150
200	150	164	180	200	225	257	300
300	225	245	270	300	338	386	450
400	300	327	360	400	450	515	601
500	375	409	450	500	563	643	751
1000	750	818	900	1000	1125	1287	1502
1500	1124	1227	1350	1500	1688	1930	2252
2000	1499	1636	1800	2000	2251	2573	3003
2500	1874	2045	2250	2500	2813	3216	3754
3000	2249	2454	2699	3000	3376	3860	4505
3500	2624	2862	3149	3500	3939	4503	5256
4000	2998	3271	3599	4000	4501	5146	6007
4500	3373	3680	4049	4500	5064	5789	6757
5000	3748	4089	4499	5000	5627	6433	7508

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INTRODUCTION

This chapter provides the single engine performance data to be used for the conduct and monitoring of the flight following an engine failure.
The diversion strategy (descent and cruise speed schedules) shall be selected, and specified in the operator's routes specifications, as a function of the prevailing operational factors (e.g. obstacles clearance requirements and/or ETOPS operation).

FLIGHT PREPARATION

In readiness for a possible engine failure occurring during the flight, any flight shall be planned so as to comply with any of the following requirements, as applicable :
· obstacle clearance,
· oxygen,
· maximum diversion distance (ETOPS operation).
The following FCOM sections provide flight preparation and fuel planning information :
· 2.05.10 thru 2.05.60, for Standard Fuel Planning,
· 2.04.40, for Extended Range Operation (ETOPS) and associated fuel requirements.

STRATEGY

Depending on the prevailing operational constraints, the most appropriate diversion strategy shall be selected, out of the following options :

	STANDARD STRATEGY	OBSTACLE STRATEGY	FIXED SPEED STRATEGIES	
			320 KT	VMO
DESCENT TO CEILING	. M.78/300KT . MCT	. Green Dot Speed . MCT	. M.78/320KT . MCT	. M.80/350KT . MCT
CRUISE	LR ceiling LR speed	– Obstacle not cleared: Maintain Green Dot Speed at MCT – Obstacle cleared : Revert to standard strategy	FL per 2.04.40 MCT/320KT	FL per 2.04.40 MCT/350KT
DESCENT TO LANDING	IDLE/M.78/300KT/250KT			
Approx increase in fuel consumption compared with both engines operative	+ 33 %			

For ETOPS operations, any of the above diversion strategies can be used provided that the selected strategy and speed schedule is used in :

- establishing the area of operation (maximum diversion distance), as described in Section 2.04.40,
- calculating the diversion fuel requirements for the single engine ETOPS critical scenario, as provided in section 2.04.40,
- demonstrating the applicable obstacle clearance requirements (net flight path and net ceiling).

During the diversion, the flight crew is expected to use the planned speed schedule. However, based on the evaluation of the actual situation, the pilot in command has the authority to deviate from this planned one engine inoperative speed.

INTRODUCTION

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	STANDARD STRATEGY	OBSTACLE STRATEGY	FIXED SPEED STRATEGIES	
			320 KT	VMO
DESCENT TO CEILING	. M.78/300KT . MCT	. Green Dot Speed . MCT	. M.78/320KT . MCT	. M.80/350KT . MCT
CRUISE	LR ceiling LR speed	– Obstacle not cleared: Maintain Green Dot Speed at MCT – Obstacle cleared : Revert to standard strategy	FL per 2.04.40 MCT/320KT	FL per 2.04.40 MCT/350KT
DESCENT TO LANDING	IDLE/M.78/300KT/250KT			
Approx increase in fuel consumption compared with both engines operative	+ 20 %			

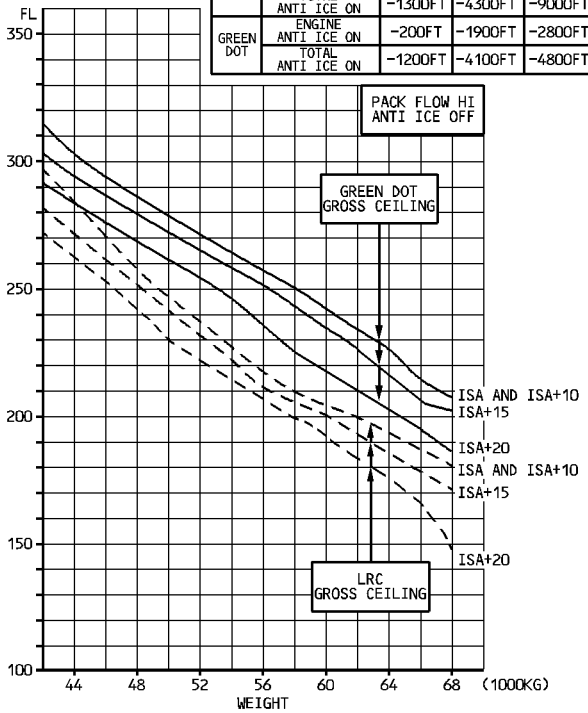
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- demonstrating the applicable obstacle clearance requirements (net flight path and net ceiling).

During the diversion, the flight crew is expected to use the planned speed schedule. However, based on the evaluation of the actual situation, the pilot in command has the authority to deviate from this planned one engine inoperative speed.

GROSS CEILINGS AT LONG RANGE AND GREEN DOT SPEEDS

		ISA	ISA+10	ISA+15	ISA+20
LONG RANGE	ENGINE ANTI ICE ON	-100FT	-1600FT	-2900FT	-3600FT
	TOTAL ANTI ICE ON	-1300FT	-4300FT	-9000FT	-14800FT
GREEN DOT	ENGINE ANTI ICE ON	-200FT	-1900FT	-2800FT	-3000FT
	TOTAL ANTI ICE ON	-1200FT	-4100FT	-4800FT	-4800FT



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Note : If severe icing conditions are encountered, ice formation may build up on non heated structure and therefore the ceiling will be reduced by :

R *· 5000 feet for aircraft weight below or equal to 55000 kg*

R *· 9000 feet for aircraft weight above or equal to 65000 kg*

· linear interpolation must be applied between the two aircraft weights

NET CEILING AT GREEN DOT SPEED

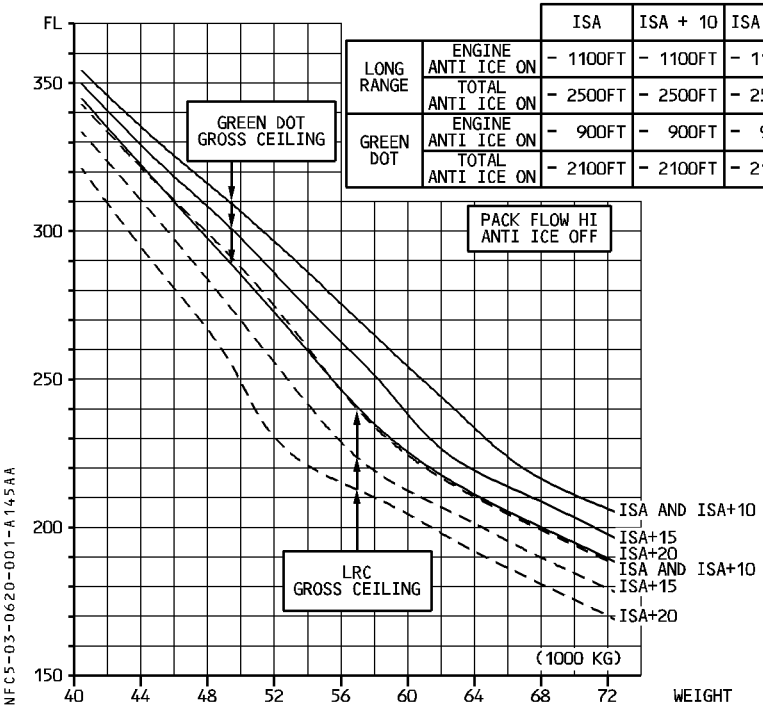
To obtain the net ceiling at green dot speed, apply the following corrections to the gross ceiling at green dot speed :

	WEIGHT (1000 KG)						
	44	48	52	56	60	64	68
≤ISA+10	– 4200 FT	– 4200 FT	– 5200 FT	– 5400 FT	– 5600 FT	– 6200 FT	– 6500 FT
ISA + 20	– 4200 FT	– 5600 FT	– 5400 FT	– 5600 FT	– 6300 FT	– 8700 FT	– 12900 FT

GROSS CEILINGS AT LONG RANGE AND GREEN DOT SPEEDS

R

		ISA	ISA + 10	ISA + 15	ISA + 20
LONG RANGE	ENGINE ANTI ICE ON	- 1100FT	- 1100FT	- 1100FT	- 1400FT
	TOTAL ANTI ICE ON	- 2500FT	- 2500FT	- 2500FT	- 3400FT
GREEN DOT	ENGINE ANTI ICE ON	- 900FT	- 900FT	- 900FT	- 900FT
	TOTAL ANTI ICE ON	- 2100FT	- 2100FT	- 2100FT	- 2200FT



Note : If severe icing conditions are encountered, ice formation may build up on non heated structure and therefore the ceiling will be reduced by :

- *4000 feet for aircraft weight below or equal to 60000 kg*
- *7500 feet for aircraft weight above or equal to 75000 kg*
- *linear interpolation must be applied between the two aircraft weights*

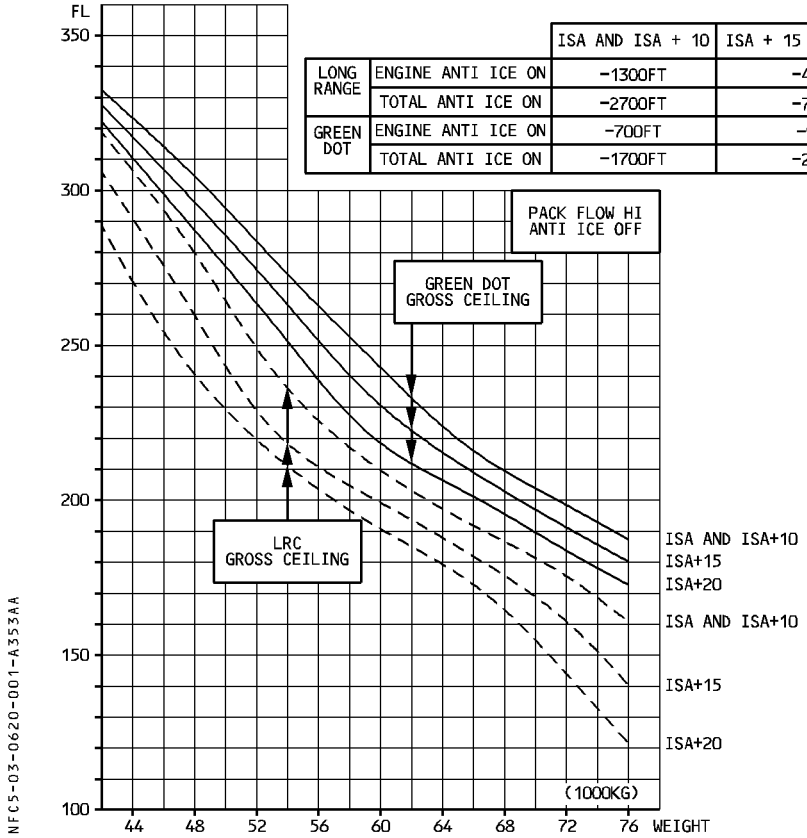
NET CEILING AT GREEN DOT SPEED

To obtain the net ceiling at green dot speed, apply the following corrections to the gross ceiling at green dot speed :

	WEIGHT (1000 KG)							
	44	48	52	56	60	64	68	72
≤ ISA + 10	– 4 700 FT	– 5 400 FT	– 6100 FT	– 6700 FT	– 6 200 FT	– 5700 FT	– 4 800 FT	– 4 500 FT
ISA + 20	– 6700 FT	– 7 800 FT	– 8700 FT	– 8300 FT	– 7700 FT	– 7200 FT	– 6400 FT	– 7200 FT

GROSS CEILINGS AT LONG RANGE AND GREEN DOT SPEEDS

		ISA AND ISA + 10	ISA + 15 AND ISA + 20
LONG RANGE	ENGINE ANTI ICE ON	-1300FT	-4000FT
	TOTAL ANTI ICE ON	-2700FT	-7400FT
GREEN DOT	ENGINE ANTI ICE ON	-700FT	-900FT
	TOTAL ANTI ICE ON	-1700FT	-2100FT



Note : If severe icing conditions are encountered, ice formation may build up on non heated structure and therefore the ceiling will be reduced by 2000 feet.

NET CEILING AT GREEN DOT SPEED

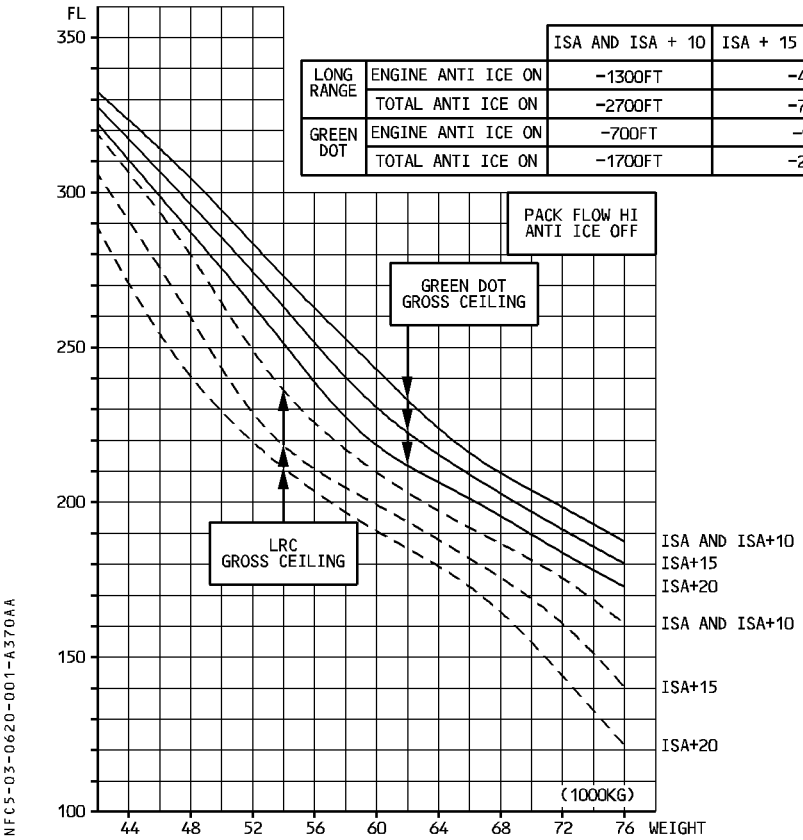
To obtain the net ceiling at green dot speed, apply the following corrections to the gross ceiling at green dot speed :

	WEIGHT (1000 KG)							
	48	52	56	60	64	68	72	76
≤ISA+10	– 4500 FT	– 4700 FT	– 4700 FT	– 4000 FT	– 3300 FT	– 3300 FT	– 3700 FT	– 4600 FT
ISA+20	– 5200 FT	– 4800 FT	– 3800 FT	– 3100 FT	– 3300 FT	– 4000 FT	– 5200 FT	– 6800 FT

GROSS CEILINGS AT LONG RANGE AND GREEN DOT SPEEDS

R

		ISA AND ISA + 10	ISA + 15 AND ISA + 20
LONG RANGE	ENGINE ANTI ICE ON	-1300FT	-4000FT
	TOTAL ANTI ICE ON	-2700FT	-7400FT
GREEN DOT	ENGINE ANTI ICE ON	-700FT	-900FT
	TOTAL ANTI ICE ON	-1700FT	-2100FT



Note : If severe icing conditions are encountered, ice formation may build up on non heated structure and therefore the ceiling will be reduced by 2000 feet.

NET CEILING AT GREEN DOT SPEED

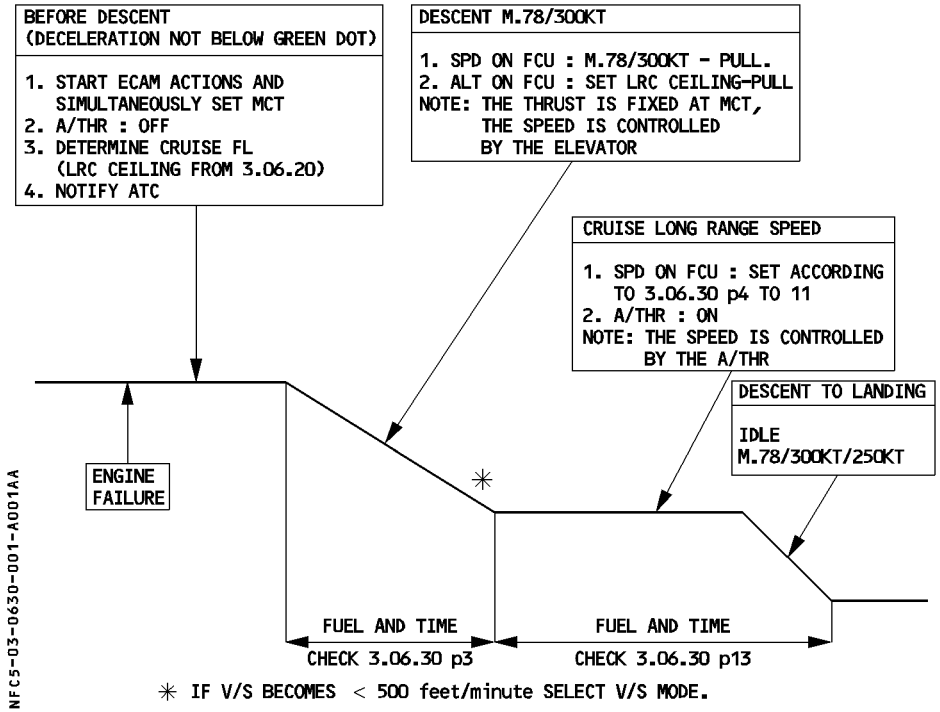
To obtain the net ceiling at green dot speed, apply the following corrections to the gross ceiling at green dot speed :

R

	WEIGHT (1000 KG)							
	48	52	56	60	64	68	72	76
≤ ISA + 10	– 4500 FT	– 4700 FT	– 4700 FT	– 4000 FT	– 3300 FT	– 3300 FT	– 3700 FT	– 4600 FT
ISA + 20	– 5200 FT	– 4800 FT	– 3800 FT	– 3100 FT	– 3300 FT	– 4000 FT	– 5200 FT	– 6800 FT

PROCEDURE

Unless a specific procedure has been established before dispatch (ETOPS, mountainous areas) the recommended procedure is as follows :



EXAMPLE

Given :

GW at engine failure = 65 000 kg
FL at engine failure = 310
Temperature = ISA
Distance to diversion airport = 500 NM
No wind

Find :

LRC ceiling : (see 3.06.20 p1) FL190
Descent to cruise level : (FL180) (see 3.06.30 p3) Distance = 202 – 98 = 104 NM
Fuel = 1089 – 595 = 494 kg
Time = 30.9 – 16.0 = 14.9 min

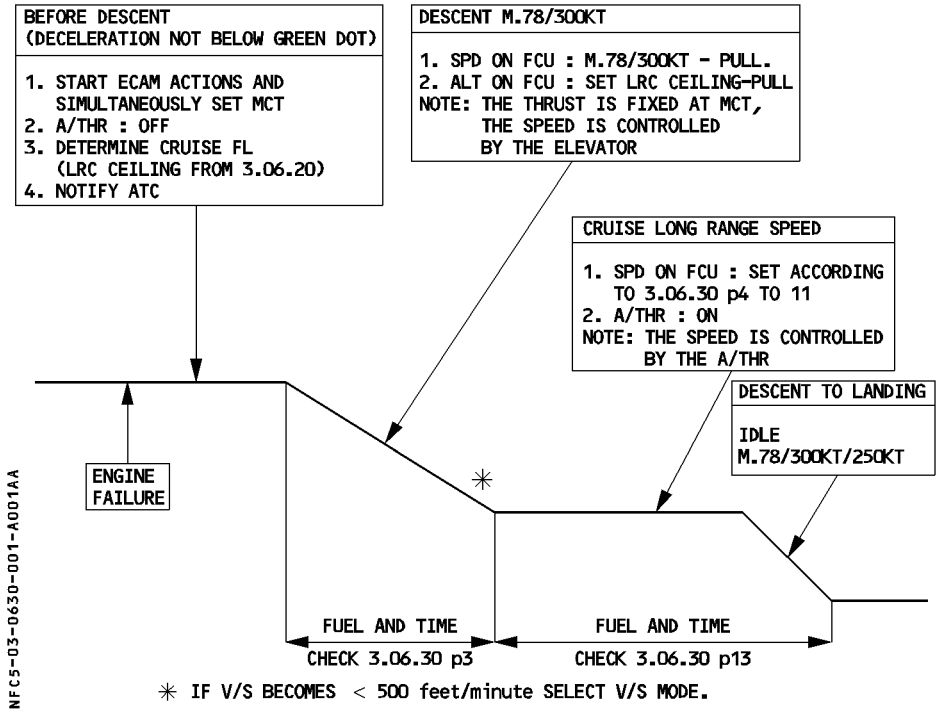
Cruise at long range speed (FL180) to landing
(Weight = 65 000 – 494 = 64 506 kg : Distance = 500 – 104 = 396 NM)
Determine on (3.06.30 p13) time and fuel consumption at ISA conditions and for a reference weight of 55 000 kg. Interpolate the remaining air distance of 396 NM at FL180.
Fuel : 2363 kg
Time : 1 h 21 min
Correction due to actual in-cruise weight
△Fuel = + 26 kg per 1000 kg above reference weight
△Fuel = + 26 kg × (64.5 – 55) = 247 kg

Result :

Total Fuel = 494 + 2365 + 247 = 3106 kg
Time = 1 h 21 min + 15 min = 1 h 36 min

PROCEDURE

Unless a specific procedure has been established before dispatch (ETOPS, mountainous areas) the recommended procedure is as follows :



✳ IF V/S BECOMES < 500 feet/minute SELECT V/S MODE.

EXAMPLE

Given :

GW at engine failure = 70 000 kg
FL at engine failure = 310
Temperature = ISA
Distance to diversion airport = 560 NM
No wind

Find :

LRC ceiling : (see 3.06.20 p1) FL189
Descent to cruise level : (FL180) (see 3.06.30 p3) Distance = 235 – 98 = 137 NM
Fuel = 1248 – 567 = 681 kg
Time = 35.6 – 16.0 = 19.6 min

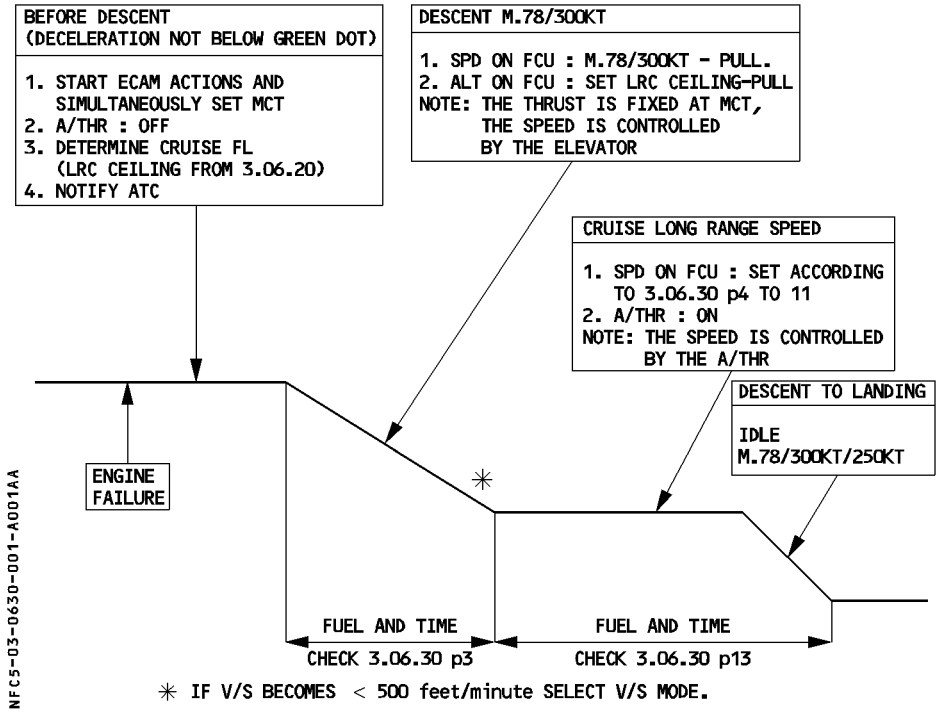
Cruise at long range speed (FL180) to landing.
(Weight = 70 000 – 681 = 69 319 kg : Distance = 560 – 137 = 423 NM)
Determine on (3.06.30 p13) time and fuel consumption at ISA conditions and for a reference weight of 55 000 kg. Interpolate the remaining air distance of 423 NM at FL180.
Fuel : 2447 kg
Time : 1 h 24 min
Correction due to actual in-cruise weight
△Fuel = + 19 kg per 1000 kg above reference weight
△Fuel = + 19 kg × (69.3 – 55) ∼ 280 kg

Result :

Total Fuel = 681 + 2447 + 280 = 3408 kg
Time = 1 h 24 min + 20 min = 1 h 44 min

PROCEDURE

Unless a specific procedure has been established before dispatch (ETOPS, mountainous areas) the recommended procedure is as follows :



✳ IF V/S BECOMES < 500 feet/minute SELECT V/S MODE.

EXAMPLE

Given :

GW at engine failure = 62 000 kg
FL at engine failure = 310
Temperature = ISA
Distance to diversion airport = 560 NM
No wind

Find :

LRC ceiling : (see 3.06.20 p1) FL233
Descent to cruise level : (FL230) (see 3.06.30 p3) Distance = 235 – 164 = 71 NM
Fuel = 1243 – 920 = 323 kg
Time = 35.6 – 25.8 = 9.8 min

Cruise at long range speed (FL230) to landing
(Weight = 60 000 – 323 = 59 677 kg : Distance = 560 – 71 = 489 NM)
Determine on (3.06.30 p13) time and fuel consumption at ISA conditions and for a reference weight of 55 000 kg. Interpolate the remaining air distance of 489 NM at FL230.
Fuel : 2529 kg
Time : 1 h 32 min
Correction due to actual in-cruise weight
△Fuel = + 23 kg per 1000 kg above reference weight
△Fuel = + 23 kg × (59.7 – 55) = 108 kg

Result :

Total Fuel = 323 + 2529 + 108 = 2960 kg
Time = 1 h 32 min + 10 min = 1 h 42 min

DESCENT - M.78/300KT - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS HIGH AIR CONDITIONING ANTI ICE OFF	ISA CG=33.0%	**MINIMUM RATE OF DESCENT 500FT/MIN**

FL	WEIGHT (1000KG)									
	45					**65**				
	TIME (MIN)	FUEL (KG)	DIST. (NM)	MODE	IAS (KT)	TIME (MIN)	FUEL (KG)	DIST. (NM)	MODE	IAS (KT)
390	35.3	1174	235	MCT	241	35.7	1201	238	MCT	241
370	33.8	1140	224	MCT	252	34.5	1174	229	MCT	252
350	32.5	1109	214	MCT	264	33.3	1147	220	MCT	264
330	31.3	1080	205	MCT	277	32.1	1119	211	MCT	277
310	30.2	1052	197	MCT	289	30.9	1089	202	MCT	289
290	29.2	1025	189	MCT	300	29.7	1057	193	MCT	300
270	27.8	984	178	MCT	300	28.0	1010	180	MCT	300
250	26.1	934	166	MCT	300	26.2	956	166	MCT	300
230	24.1	873	152	MCT	300	24.1	891	152	MCT	300
220	23.0	838	144	MCT	300	22.9	854	144	MCT	300
210	21.8	794	136	MCT	300	21.6	810	135	MCT	300
200	20.0	730	124	V/S	300	20.0	750	124	MCT	300
190	18.0	656	111	V/S	300	18.0	672	111	V/S	300
180	16.0	582	98	V/S	300	16.0	595	98	V/S	300
170	14.0	508	85	V/S	300	14.0	520	85	V/S	300
160	12.0	436	72	V/S	300	12.0	445	72	V/S	300
150	10.0	363	60	V/S	300	10.0	370	60	V/S	300
140	8.0	290	47	V/S	300	8.0	296	47	V/S	300
100	0.0	0	0	V/S	300	0.0	0	0	V/S	300

CORRECTIONS	**ENGINE ANTI ICE ON**	**TOTAL ANTI ICE ON**	**PER 1 DEG C ABOVE ISA**
FUEL	+ 2 %	+ 5 %	+ 0.2 %
TIME	- 0.1 %	- 1 %	-
DISTANCE	- 0.1 %	- 1 %	+ 0.2 %

CRUISE - LONG RANGE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

N1 (%) **MACH**
KG/H **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL100		FL120		FL140		FL160		FL180		FL200	
42	72.9	.439	73.5	.445	73.8	.448	74.4	.453	75.4	.463	76.9	.484
	1755	243	1689	237	1621	229	1571	223	1544	219	1561	220
	159.8	280	166.7	282	173.7	282	180.0	283	185.6	287	190.4	297
44	73.6	.444	74.0	.447	74.4	.451	75.2	.459	76.5	.473	78.3	.499
	1806	245	1730	238	1667	231	1631	226	1625	224	1657	228
	156.9	283	163.6	283	170.0	283	175.5	286	180.2	293	185.1	307
46	74.1	.446	74.5	.449	75.1	.455	76.1	.465	77.7	.487	79.2	.507
	1846	247	1770	239	1723	233	1698	229	1718	231	1726	231
	154.2	285	160.6	284	166.1	286	171.0	290	175.3	301	180.4	311
48	74.6	.448	75.0	.452	75.9	.460	77.1	.475	79.0	.501	80.0	.512
	1888	248	1819	240	1785	236	1781	234	1816	238	1786	233
	151.6	286	157.3	286	162.2	290	166.5	297	170.9	310	176.0	314
50	75.1	.450	75.7	.456	76.7	.466	78.3	.488	79.8	.508	80.9	.518
	1928	249	1876	243	1851	239	1874	241	1883	241	1855	236
	148.9	287	154.0	289	158.4	293	162.3	304	166.9	314	171.6	318
52	75.6	.453	76.4	.461	77.6	.475	79.4	.501	80.5	.512	81.8	.523
	1977	250	1939	245	1933	244	1971	247	1941	243	1921	239
	146.1	289	150.7	292	154.6	299	158.5	313	163.3	317	167.3	321
54	76.2	.457	77.2	.467	78.7	.486	80.2	.508	81.3	.518	82.9	.529
	2035	253	2006	249	2025	249	2041	251	2009	246	1996	242
	143.3	292	147.4	296	151.0	306	155.2	317	159.5	321	162.8	325
56	76.9	.461	78.0	.475	79.8	.500	80.9	.511	82.1	.523	84.2	.538
	2096	255	2087	253	2127	256	2099	253	2077	248	2090	246
	140.5	294	144.1	301	147.7	314	152.0	319	155.9	324	158.1	331
58	77.6	.466	79.0	.484	80.6	.507	81.6	.516	83.0	.527	85.3	.546
	2163	258	2178	258	2204	260	2165	255	2143	250	2181	249
	137.7	298	141.0	307	144.7	319	148.9	322	152.2	326	153.7	335
60	78.3	.473	80.0	.497	81.2	.511	82.3	.522	84.1	.535	86.9	.557
	2238	262	2279	265	2263	262	2234	258	2235	254	2291	255
	134.8	302	138.1	315	142.0	321	145.8	326	148.2	331	149.3	342
62	79.1	.481	80.8	.505	81.8	.515	83.1	.526	85.2	.542	89.0	.572
	2323	266	2363	269	2322	264	2303	260	2325	258	2420	262
	132.1	307	135.4	320	139.4	324	142.6	328	144.3	336	145.3	351
64	80.0	.491	81.5	.510	82.5	.520	84.0	.531	86.4	.550	89.4	.568
	2420	272	2429	272	2390	267	2379	263	2425	262	2449	260
	129.5	314	133.1	323	136.7	327	139.3	331	140.5	341	142.4	349
66	81.0	.502	82.0	.513	83.2	.525	85.1	.539	88.2	.564	89.8	.561
	2520	278	2485	274	2462	270	2474	267	2550	269	2476	257
	127.1	320	130.8	325	134.0	330	136.0	336	136.9	349	139.2	345
68	81.7	.509	82.6	.517	84.0	.528	86.1	.545	89.9	.574	90.4	.552
	2598	282	2548	276	2530	271	2561	270	2663	274	2512	252
	125.0	325	128.5	328	131.3	332	132.8	340	133.6	356	134.9	339

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2.5 %	+ 5 %

DESCENT - M.78/300KT - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
PACK FLOW HI
ANTI-ICING OFF

ISA
CG=33.0%

MINIMUM RATE OF DESCENT 500FT/MIN

WEIGHT (1000KG)	50				70				
FL	TIME (MIN)	FUEL (KG)	DIST. (NM)	MODE	TIME (MIN)	FUEL (KG)	DIST. (NM)	MODE	IAS (KT)
390	42.2	1416	285	MCT					241
370	40.3	1375	271	MCT	40.1	1365	269	MCT	252
350	38.4	1330	257	MCT	38.7	1330	259	MCT	264
330	36.7	1284	244	MCT	37.1	1291	247	MCT	277
310	35.1	1238	232	MCT	35.6	1248	235	MCT	289
290	33.6	1191	220	MCT	34.0	1198	223	MCT	300
270	31.5	1123	204	MCT	31.7	1124	206	MCT	300
250	28.9	1037	186	MCT	29.0	1033	186	MCT	300
230	25.8	929	164	MCT	25.8	922	163	MCT	300
220	24.0	863	151	MCT	24.0	857	151	MCT	300
210	22.0	790	137	V/S	22.0	784	137	V/S	300
200	20.0	717	124	V/S	20.0	711	124	V/S	300
190	18.0	645	111	V/S	18.0	639	111	V/S	300
180	16.0	573	98	V/S	16.0	567	98	V/S	300
170	14.0	501	85	V/S	14.0	495	85	V/S	300
160	12.0	430	72	V/S	12.0	424	72	V/S	300
150	10.0	358	60	V/S	10.0	354	60	V/S	300
140	8.0	287	47	V/S	8.0	283	47	V/S	300
100	.0	0	0	V/S	.0	0	0	V/S	300

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1° ABOVE ISA
TIME	– 1 %	– 2 %	–
FUEL	+ 1 %	+ 2 %	+ 0.25 %
DISTANCE	– 1 %	– 2 %	+ 0.25 %

10F -08F0A320-232 IAE V2527-A5 23200010C6KG330 0 018590 0 0 3 .0 .0 500.00 0 02 .780300.000 .000 0 FCOM-N0-03-06-30-003-140

R

LONG RANGE CRUISE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
PACK FLOW HI
ANTI-ICING OFF

ISA
CG=33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL120		FL140		FL160		FL180		FL200	
50	1.151	.430	1.171	.447	1.232	.512	1.240	.510	1.255	.511	1.295	.538
	1811	237	1834	238	2034	263	1904	252	1812	243	1840	246
	151.4	274	154.4	283	158.3	322	167.1	318	174.5	316	179.6	330
52	1.158	.435	1.185	.463	1.236	.512	1.245	.510	1.266	.515	1.315	.550
	1879	240	1950	246	2053	263	1928	252	1868	245	1920	252
	147.8	278	150.4	293	156.8	322	165.0	318	170.8	319	176.0	338
54	1.170	.447	1.230	.512	1.239	.511	1.252	.510	1.287	.532	1.325	.553
	1983	247	2206	273	2072	263	1963	252	1970	253	1962	253
	143.9	285	147.2	325	155.2	322	162.3	319	167.1	329	173.2	340
56	1.183	.461	1.234	.513	1.244	.511	1.262	.514	1.310	.549	1.336	.555
	2098	255	2229	274	2095	262	2018	254	2079	261	2005	254
	140.4	295	145.8	325	153.4	321	159.1	321	163.6	340	170.2	341
58	1.226	.510	1.238	.513	1.249	.510	1.275	.522	1.321	.554	1.351	.563
	2373	283	2248	273	2121	262	2090	258	2129	264	2073	258
	137.2	326	144.4	325	151.3	321	155.9	326	161.1	343	166.8	346
60	1.233	.514	1.241	.512	1.258	.514	1.302	.546	1.330	.556	1.368	.572
	2415	285	2267	273	2173	264	2232	270	2169	265	2152	262
	135.8	328	143.0	324	148.6	323	152.6	341	158.6	344	163.3	352
62	1.236	.514	1.246	.511	1.267	.518	1.316	.554	1.341	.559	1.388	.585
	2434	285	2291	273	2230	266	2299	274	2219	266	2248	268
	134.7	328	141.4	324	146.0	326	150.3	346	156.0	346	160.0	360
64	1.239	.513	1.252	.512	1.286	.533	1.325	.556	1.357	.568	1.404	.594
	2454	284	2329	273	2341	274	2343	275	2298	270	2323	272
	133.5	328	139.3	325	143.2	335	148.1	347	153.0	352	157.0	365
66	1.243	.513	1.261	.516	1.307	.551	1.333	.558	1.373	.578	1.419	.601
	2476	284	2387	275	2465	283	2385	276	2384	275	2395	276
	132.2	327	136.9	327	140.5	346	146.0	348	150.1	358	154.2	369
68	1.247	.512	1.270	.520	1.318	.556	1.344	.562	1.391	.589	1.423	.595
	2499	283	2447	278	2523	286	2441	278	2475	281	2394	273
	130.7	327	134.6	329	138.7	350	143.7	351	147.3	364	152.6	365
70	1.254	.514	1.290	.538	1.326	.558	1.358	.570	1.405	.596	1.426	.584
	2550	285	2579	288	2563	287	2520	282	2547	284	2385	268
	128.8	328	132.3	341	136.9	351	141.1	356	144.8	369	150.4	359
72	1.262	.517	1.309	.553	1.334	.560	1.374	.579	1.419	.602	1.432	.568
	2604	287	2694	296	2607	288	2607	287	2617	287	2371	260
	126.8	330	130.1	350	135.0	352	138.7	361	142.4	373	147.1	349
74	1.270	.521	1.319	.558	1.344	.564	1.390	.589	1.432	.607	1.445	.529
	2666	289	2751	298	2665	290	2699	292	2682	290	2337	242
	124.8	333	128.5	353	133.0	355	136.3	368	140.1	376	139.1	325
76	1.290	.539	1.326	.559	1.357	.571	1.403	.596	1.434	.601		
	2805	299	2791	299	2745	294	2774	296	2678	287		
	122.8	344	126.9	354	130.8	359	134.2	372	138.9	372		
78	1.308	.554	1.334	.561	1.371	.580	1.416	.602	1.438	.590		
	2927	307	2836	300	2831	299	2844	299	2668	282		
	120.8	354	125.4	355	128.7	364	132.1	376	137.0	366		

ENGINE ANTI ICE ON
△FUEL = + 2.5 %

TOTAL ANTI ICE ON
△FUEL = + 6 %

DESCENT - M.78/300KT - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
PACK FLOW HI
ANTI-ICING OFF

ISA
CG=33.0%

MINIMUM RATE OF DESCENT 500FT/MIN

WEIGHT (1000KG)	50				70				
FL	TIME (MIN)	FUEL (KG)	DIST. (NM)	MODE	TIME (MIN)	FUEL (KG)	DIST. (NM)	MODE	IAS (KT)
390	42.4	1416	286	MCT					241
370	40.5	1376	272	MCT	40.2	1363	270	MCT	252
350	38.6	1330	258	MCT	38.8	1329	259	MCT	264
330	36.9	1284	245	MCT	37.2	1290	248	MCT	277
310	35.3	1238	233	MCT	35.7	1246	236	MCT	289
290	33.7	1190	221	MCT	34.1	1197	224	MCT	300
270	31.6	1121	205	MCT	31.7	1122	206	MCT	300
250	29.0	1035	186	MCT	29.0	1030	186	MCT	300
230	25.9	924	164	MCT	25.8	918	164	MCT	300
220	24.0	857	151	MCT	24.0	853	151	MCT	300
210	22.0	785	137	V/S	22.0	780	137	V/S	300
200	20.0	712	124	V/S	20.0	707	124	V/S	300
190	18.0	640	111	V/S	18.0	635	111	V/S	300
180	16.0	568	98	V/S	16.0	563	98	V/S	300
170	14.0	497	85	V/S	14.0	492	85	V/S	300
160	12.0	426	72	V/S	12.0	421	72	V/S	300
150	10.0	355	60	V/S	10.0	350	60	V/S	300
140	8.0	284	47	V/S	8.0	281	47	V/S	300
100	.0	0	0	V/S	.0	0	0	V/S	300

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1° ABOVE ISA
TIME	– 0.6 %	– 1.5 %	–
FUEL	+ 1.2 %	– 2.4 %	+ 0.3 %
DISTANCE	– 0.7 %	– 1.7 %	+ 0.25 %

10E -08F0A319–131 IAE V2522–A5 23200010C6KG330 0 018590 0 0 3 .0 .0 500.00 0 02 .780300.000 .000 0 FCOM-N0–03–06–30–003–145

LONG RANGE CRUISE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
PACK FLOW HI
ANTI-ICING OFF

ISA
CG = 33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL120		FL140		FL160		FL180		FL200	
48	1.156	.455	1.170	.463	1.185	.469	1.205	.482	1.239	.507	1.262	.516
	1901	251	1836	246	1768	240	1730	238	1741	241	1686	235
	152.6	290	159.6	293	166.9	295	173.8	301	180.4	314	187.9	317
50	1.163	.459	1.177	.466	1.192	.472	1.222	.496	1.250	.512	1.277	.525
	1948	254	1879	248	1808	242	1816	245	1789	243	1752	239
	150.4	293	157.3	295	164.2	297	170.4	310	177.2	317	183.9	322
52	1.169	.463	1.184	.470	1.203	.481	1.237	.507	1.260	.516	1.294	.535
	1992	256	1920	250	1873	247	1892	251	1835	245	1826	244
	148.4	296	155.0	298	161.4	302	167.3	317	174.2	320	179.9	329
54	1.175	.466	1.191	.472	1.219	.495	1.248	.513	1.273	.524	1.311	.544
	2034	258	1961	252	1963	254	1945	253	1900	249	1898	249
	146.4	298	152.7	299	158.4	311	164.5	320	170.8	325	176.2	334
56	1.182	.469	1.200	.480	1.235	.508	1.256	.515	1.288	.533	1.326	.552
	2075	260	2023	256	2050	261	1982	254	1970	253	1962	252
	144.4	300	150.2	304	155.7	319	162.1	321	167.4	330	172.7	339
58	1.188	.472	1.214	.492	1.245	.513	1.267	.522	1.303	.541	1.339	.556
	2115	261	2111	262	2105	263	2047	258	2041	258	2019	255
	142.4	301	147.7	312	153.2	323	159.2	326	164.2	335	169.3	342
60	1.196	.477	1.230	.506	1.252	.515	1.281	.530	1.319	.550	1.354	.563
	2172	264	2205	270	2145	265	2114	262	2113	262	2084	258
	140.3	305	145.3	320	151.1	324	156.3	331	161.1	340	165.9	346
62	1.207	.487	1.240	.512	1.262	.520	1.295	.538	1.331	.555	1.370	.570
	2251	270	2266	273	2199	267	2189	266	2172	264	2155	261
	138.1	311	143.2	324	148.7	327	153.5	336	158.2	344	162.4	350
64	1.222	.499	1.248	.516	1.273	.527	1.309	.546	1.344	.559	1.388	.579
	2343	276	2314	275	2266	271	2260	270	2230	266	2237	265
	136.0	319	141.2	327	146.3	331	150.8	341	155.3	346	159.1	356
66	1.235	.510	1.255	.517	1.286	.534	1.323	.553	1.358	.566	1.405	.588
	2430	283	2352	276	2336	275	2328	274	2299	270	2316	269
	134.1	326	139.4	328	143.8	336	148.2	345	152.4	350	155.9	361
68	1.243	.515	1.265	.523	1.298	.541	1.334	.557	1.373	.573	1.422	.595
	2485	285	2415	279	2405	278	2385	276	2373	273	2393	273
	132.3	329	137.3	332	141.5	340	145.8	348	149.5	355	152.8	366
70	1.250	.518	1.276	.530	1.311	.548	1.345	.561	1.390	.582	1.425	.587
	2529	287	2483	283	2477	282	2445	278	2457	277	2388	269
	130.6	330	135.1	336	139.2	345	143.3	350	146.6	360	151.1	361
72	1.257	.520	1.288	.537	1.324	.554	1.358	.567	1.406	.589	1.429	.575
	2573	288	2558	287	2544	285	2513	281	2535	281	2377	264
	129.0	332	133.0	340	137.0	349	140.8	354	143.9	365	148.7	353
74	1.266	.526	1.299	.543	1.334	.558	1.372	.573	1.421	.596	1.435	.557
	2637	291	2625	290	2602	287	2587	284	2611	285	2362	255
	127.2	335	131.1	344	134.9	351	138.3	358	141.4	369	144.8	342

ENGINE ANTI ICE ON
△FUEL = + 2 %

TOTAL ANTI ICE ON
△FUEL = + 4 %

10E -08F0A319--131 IAE V2522--A5 12200010C6KG330 0 018590 0 0 3 1.0 .0 .00 0 01 .990 .000 .000 0 FCOM-N0--03--06--30--004--145

CRUISE - LONG RANGE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

N1 (%) **MACH**
KG/H **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL210		FL220		FL230		FL240		FL250		FL260	
42	77.9 1578 193.0	.498 222 305	78.6 1573 195.9	.506 221 308	79.1 1558 198.9	.510 219 310	79.8 1551 201.5	.517 217 312	80.5 1537 204.0	.521 214 314	81.7 1544 205.4	.529 213 317
44	78.9 1648 187.9	.506 226 310	79.5 1633 190.7	.511 224 311	80.1 1625 193.2	.517 222 314	80.9 1613 195.5	.522 219 315	82.0 1622 196.9	.530 218 319	83.3 1634 197.9	.539 217 323
46	79.8 1709 183.1	.511 229 313	80.4 1700 185.5	.518 227 315	81.1 1688 187.7	.522 224 317	82.3 1698 189.0	.531 223 321	83.5 1711 189.9	.540 222 325	85.1 1740 190.4	.553 223 331
48	80.7 1777 178.3	.518 232 317	81.4 1765 180.4	.522 229 318	82.5 1771 181.7	.530 228 322	83.7 1786 182.6	.540 227 326	85.2 1815 183.1	.552 228 332	87.4 1849 184.0	.567 229 340
50	81.6 1843 173.6	.523 234 320	82.7 1847 174.9	.530 232 323	83.8 1862 175.8	.539 232 327	85.3 1889 176.3	.551 232 333	87.4 1924 177.3	.567 234 341	87.8 1875 179.1	.560 226 336
52	82.8 1922 168.6	.530 237 324	84.0 1938 169.5	.539 236 329	85.4 1963 170.0	.550 236 334	87.3 1996 171.1	.565 238 341	87.9 1952 172.7	.560 231 337	88.5 1910 172.4	.549 222 329
54	84.1 2014 163.6	.539 241 330	85.4 2037 164.2	.549 241 334	87.3 2071 165.1	.563 242 342	87.8 2023 167.0	.559 236 338	88.6 1990 166.7	.551 227 332	89.8 1946 163.1	.530 213 318
56	85.4 2110 158.7	.547 245 335	87.2 2146 159.5	.562 247 342	87.7 2096 161.6	.558 240 339	88.5 2061 161.5	.551 232 333	89.7 2030 159.0	.536 221 323	91.4 2004 150.7	.504 203 302
58	87.3 2232 154.1	.562 252 344	87.6 2172 156.2	.557 244 339	88.4 2133 156.6	.550 237 334	89.6 2102 154.4	.537 226 325	91.2 2084 149.3	.517 213 311		
60	87.6 2252 151.2	.556 249 340	88.2 2205 152.0	.550 241 335	89.4 2174 150.1	.538 231 326	91.0 2152 145.9	.519 218 314				
62	88.1 2279 147.4	.549 246 336	89.2 2246 146.2	.539 236 328	90.7 2224 142.5	.522 224 317						
64	88.9 2306 142.1	.536 240 328	90.4 2295 139.3	.525 230 320	92.3 2294 133.0	.503 215 305						
66	89.9 2345 135.1	.518 232 317	91.9 2358 131.2	.507 222 309								
68	91.0 2384 128.2	.500 223 306										

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2.5 %	+ 5 %

CRUISE - LONG RANGE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA+10
CG=33.0%

N1 (%) **MACH**
KG/H **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL100		FL120		FL140		FL160		FL180		FL200	
42	74.0	.436	74.9	.444	75.3	.447	75.9	.453	76.9	.463	78.6	.485
	1783	241	1735	237	1662	229	1612	223	1589	219	1609	221
	158.9	283	165.4	287	172.3	286	178.6	288	184.0	292	188.8	304
44	75.1	.443	75.4	.447	75.9	.450	76.7	.458	78.0	.473	80.0	.500
	1852	245	1777	238	1711	231	1674	226	1671	224	1707	228
	155.7	288	162.3	288	168.6	288	174.1	292	178.8	299	183.6	313
46	75.6	.445	75.9	.449	76.6	.455	77.6	.465	79.3	.487	80.8	.507
	1892	246	1818	239	1768	233	1743	229	1767	231	1773	231
	153.1	290	159.3	290	164.8	291	169.7	296	174.0	307	179.1	317
48	76.0	.448	76.5	.452	77.4	.460	78.7	.475	80.5	.501	81.6	.512
	1934	247	1868	240	1832	236	1829	234	1865	238	1835	233
	150.5	291	156.1	292	161.0	295	165.2	302	169.6	316	174.8	321
50	76.5	.449	77.2	.456	78.2	.466	79.9	.488	81.4	.507	82.5	.518
	1975	248	1926	243	1901	239	1927	241	1932	241	1905	236
	147.9	292	152.8	294	157.2	299	161.1	311	165.8	320	170.4	325
52	77.1	.452	77.9	.461	79.2	.476	81.0	.502	82.1	.512	83.4	.523
	2027	250	1989	245	1987	244	2027	248	1993	243	1971	238
	145.1	294	149.6	298	153.4	305	157.4	319	162.1	323	166.1	327
54	77.7	.456	78.7	.466	80.3	.487	81.8	.508	82.9	.518	84.5	.529
	2085	252	2057	248	2083	250	2096	251	2064	246	2051	242
	142.3	297	146.3	301	149.9	312	154.1	323	158.4	327	161.6	331
56	78.4	.461	79.6	.474	81.4	.500	82.4	.511	83.7	.523	85.8	.538
	2149	255	2140	253	2184	257	2154	253	2132	248	2145	246
	139.5	300	143.1	306	146.7	320	151.0	325	154.8	330	157.0	337
58	79.1	.466	80.5	.485	82.1	.507	83.2	.517	84.6	.527	86.9	.546
	2217	258	2235	258	2259	260	2222	255	2199	250	2240	249
	136.7	303	140.0	313	143.8	325	147.9	329	151.1	332	152.6	342
60	79.9	.473	81.6	.497	82.7	.511	83.9	.522	85.8	.535	88.6	.558
	2297	262	2340	265	2319	262	2291	258	2297	255	2359	255
	133.9	308	137.1	321	141.1	327	144.8	332	147.1	338	148.3	350
62	80.7	.482	82.4	.506	83.4	.515	84.7	.526	86.8	.542	90.6	.572
	2390	267	2426	270	2382	264	2360	260	2387	258	2483	262
	131.1	313	134.6	327	138.5	330	141.7	334	143.4	342	144.4	358
64	81.6	.492	83.0	.510	84.1	.520	85.6	.531	88.0	.551	91.0	.566
	2487	273	2490	272	2452	267	2440	263	2489	262	2506	259
	128.7	320	132.2	329	135.8	333	138.4	338	139.7	348	141.6	355
66	82.5	.502	83.5	.513	84.8	.524	86.7	.539	89.9	.565	91.4	.560
	2585	278	2546	274	2524	270	2537	267	2621	269	2534	256
	126.4	327	130.0	331	133.2	336	135.1	343	136.1	357	138.4	351
68	83.2	.508	84.2	.517	85.5	.528	87.6	.545	91.5	.574	91.9	.550
	2660	282	2613	276	2593	271	2625	270	2725	273	2571	252
	124.2	331	127.7	334	130.5	338	132.0	346	132.9	362	134.1	345

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2.5 %	+ 5 %

R

LONG RANGE CRUISE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
PACK FLOW HI
ANTI-ICING OFF

ISA
CG = 33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL210		FL220		FL230		FL240		FL250		FL260	
50	1.316	.550	1.328	.552	1.344	.556	1.366	.568	1.393	.584	1.416	.595
	1841	247	1802	242	1777	239	1782	239	1801	241	1798	241
	182.9	337	186.7	336	190.1	338	192.7	343	195.2	352	198.3	357
52	1.327	.553	1.341	.556	1.363	.567	1.389	.583	1.412	.594	1.435	.603
	1881	248	1850	244	1855	244	1875	246	1874	246	1865	244
	179.7	338	183.1	339	185.5	344	188.0	352	190.9	358	193.7	361
54	1.338	.555	1.359	.566	1.385	.581	1.408	.593	1.431	.602	1.449	.605
	1925	249	1928	249	1947	251	1949	251	1942	249	1908	245
	176.5	340	178.9	345	181.2	353	183.9	358	186.6	362	190.0	363
56	1.355	.565	1.380	.579	1.404	.592	1.426	.601	1.440	.600	1.453	.592
	2001	253	2017	255	2024	255	2019	254	1963	248	1899	240
	172.7	345	174.9	353	177.4	359	180.0	363	183.8	361	186.9	355
58	1.374	.576	1.399	.590	1.417	.595	1.430	.592	1.444	.585	1.461	.569
	2086	259	2100	260	2071	257	2014	250	1952	242	1881	230
	168.9	352	171.2	360	174.3	361	177.8	358	180.5	352	181.3	341
60	1.394	.588	1.407	.588	1.420	.585	1.435	.578	1.452	.562		
	2174	264	2123	259	2065	252	2003	244	1935	232		
	165.4	360	168.8	358	172.0	355	174.3	349	174.7	338		
62	1.410	.596	1.411	.578	1.426	.570	1.444	.552				
	2248	268	2117	254	2055	246	1986	233				
	162.3	365	166.5	353	168.4	346	168.1	334				
64	1.418	.595	1.416	.563	1.435	.544						
	2272	267	2108	247	2037	234						
	160.1	364	162.8	343	161.9	330						
66	1.421	.585	1.427	.536								
	2264	263	2090	235								
	158.0	358	156.2	326								
68	1.426	.570										
	2253	256										
	154.8	349										
70	1.436	.543										
	2232	243										
	148.9	332										
72												
74												
76												
78												

ENGINE ANTI ICE ON
△FUEL = + 2.5 %

TOTAL ANTI ICE ON
△FUEL = + 6 %

R

LONG RANGE CRUISE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
PACK FLOW HI
ANTI-ICING OFF

ISA+10
CG=33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL120		FL140		FL160		FL180		FL200	
50	1.151	.428	1.172	.448	1.232	.511	1.241	.509	1.256	.510	1.298	.539
	1850	237	1884	238	2080	262	1950	252	1858	242	1892	246
	150.5	278	153.3	289	157.5	327	166.2	324	173.3	322	178.4	337
52	1.159	.435	1.187	.463	1.236	.511	1.246	.509	1.267	.514	1.315	.549
	1926	240	2002	247	2100	262	1974	251	1914	244	1966	251
	146.8	283	149.4	299	155.9	327	164.0	324	169.7	325	175.0	344
54	1.170	.447	1.231	.512	1.240	.510	1.253	.510	1.290	.534	1.326	.552
	2032	247	2259	273	2120	262	2013	252	2031	254	2009	252
	142.9	290	146.3	331	154.3	327	161.2	325	165.9	337	172.0	346
56	1.184	.461	1.235	.512	1.244	.510	1.263	.514	1.311	.549	1.337	.554
	2151	255	2280	273	2144	262	2069	254	2131	261	2054	253
	139.4	300	145.0	331	152.5	327	158.0	327	162.5	346	169.1	347
58	1.228	.511	1.238	.512	1.249	.509	1.278	.524	1.322	.553	1.353	.563
	2437	283	2300	273	2170	262	2151	259	2179	263	2128	257
	136.3	332	143.6	330	150.4	326	154.9	333	160.1	349	165.6	352
60	1.233	.513	1.242	.511	1.259	.513	1.304	.546	1.331	.554	1.370	.573
	2469	284	2320	273	2227	264	2291	270	2221	264	2214	262
	135.1	334	142.2	330	147.6	329	151.6	347	157.6	350	162.2	359
62	1.237	.513	1.246	.510	1.268	.517	1.316	.553	1.342	.558	1.390	.585
	2489	284	2345	272	2285	266	2354	274	2274	266	2309	268
	133.9	333	140.5	329	145.0	331	149.3	351	154.9	352	158.8	367
64	1.240	.512	1.253	.512	1.288	.535	1.325	.555	1.358	.567	1.405	.593
	2509	284	2389	273	2409	275	2397	275	2355	270	2383	272
	132.7	333	138.4	331	142.2	343	147.2	353	151.9	358	155.9	372
66	1.243	.512	1.262	.516	1.308	.550	1.334	.557	1.375	.577	1.421	.600
	2531	283	2447	275	2525	283	2441	276	2445	275	2456	276
	131.5	333	136.0	333	139.6	353	145.1	354	149.0	364	153.1	376
68	1.248	.511	1.271	.520	1.319	.555	1.346	.562	1.392	.588	1.423	.593
	2557	283	2509	277	2581	286	2504	278	2539	281	2450	272
	129.9	332	133.7	335	137.8	356	142.7	357	146.2	371	151.6	372
70	1.255	.514	1.292	.539	1.327	.556	1.360	.570	1.407	.595	1.427	.582
	2610	285	2648	288	2622	286	2586	282	2614	284	2440	267
	128.0	334	131.4	348	136.0	357	140.2	362	143.8	376	149.3	364
72	1.263	.517	1.310	.552	1.335	.558	1.376	.579	1.420	.602	1.433	.565
	2668	286	2758	295	2666	287	2677	287	2686	287	2426	259
	126.0	336	129.3	356	134.2	358	137.7	369	141.4	380	145.9	354
74	1.271	.521	1.319	.557	1.346	.563	1.391	.589	1.432	.605	1.449	.518
	2733	289	2815	298	2730	290	2769	292	2745	289	2383	236
	124.0	339	127.7	359	132.2	361	135.3	375	139.2	382	136.3	325
76	1.293	.541	1.327	.558	1.359	.570	1.404	.596	1.435	.599		
	2885	300	2855	298	2811	294	2843	296	2740	286		
	121.9	352	126.1	360	130.0	365	133.3	379	138.0	378		
78	1.309	.553	1.334	.560	1.373	.579	1.417	.602	1.439	.588		
	2995	307	2900	299	2902	298	2916	299	2730	281		
	120.1	360	124.6	361	127.8	371	131.2	383	136.0	371		

ENGINE ANTI ICE ON
△FUEL = + 2.5 %

TOTAL ANTI ICE ON
△FUEL = + 6 %

LONG RANGE CRUISE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
PACK FLOW HI
ANTI-ICING OFF

ISA
CG = 33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL210		FL220		FL230		FL240		FL250		FL260	
48	1.278 1678 191.1	.524 234 321	1.297 1680 194.2	.535 235 326	1.317 1678 197.3	.546 234 331	1.335 1664 200.5	.552 233 334	1.354 1656 203.4	.560 231 337	1.378 1658 206.1	.570 230 342
50	1.296 1753 186.8	.535 240 327	1.316 1752 189.8	.546 239 332	1.333 1738 192.9	.552 237 335	1.352 1727 195.7	.559 236 338	1.375 1727 198.3	.569 235 342	1.401 1737 200.7	.581 235 349
52	1.314 1825 182.8	.545 244 334	1.331 1813 185.7	.552 242 337	1.350 1799 188.5	.559 240 339	1.371 1798 190.9	.568 239 343	1.397 1807 193.2	.580 240 349	1.422 1810 195.7	.591 239 354
54	1.329 1888 179.0	.552 247 338	1.347 1872 181.7	.558 245 340	1.367 1869 184.0	.567 244 344	1.393 1880 186.2	.579 244 350	1.418 1883 188.6	.590 244 355	1.444 1887 190.8	.600 243 360
56	1.343 1945 175.3	.557 250 341	1.363 1940 177.6	.566 249 345	1.388 1950 179.7	.577 249 350	1.413 1956 181.9	.589 249 356	1.438 1958 184.1	.599 248 360	1.453 1902 187.5	.595 241 357
58	1.359 2013 171.6	.564 253 345	1.383 2019 173.6	.575 253 351	1.408 2027 175.7	.587 253 356	1.429 2014 178.1	.594 251 359	1.443 1955 181.3	.589 244 354	1.458 1887 183.3	.577 233 346
60	1.376 2087 167.9	.573 257 350	1.402 2099 169.8	.585 257 356	1.419 2066 172.6	.588 253 357	1.433 2006 175.5	.583 246 352	1.449 1942 177.1	.571 236 344		
62	1.395 2168 164.3	.582 261 356	1.410 2119 167.3	.582 256 355	1.423 2059 169.9	.576 248 350	1.440 1994 171.2	.565 238 341				
64	1.413 2245 160.9	.590 265 361	1.414 2112 164.6	.571 251 348	1.430 2048 165.6	.559 240 339						
66	1.420 2266 158.6	.588 264 359	1.420 2102 160.4	.553 243 337								
68	1.424 2258 156.2	.576 259 353										
70	1.430 2245 152.5	.560 251 342										
72												
74												

ENGINE ANTI ICE ON
△FUEL = + 2 %

TOTAL ANTI ICE ON
△FUEL = + 4 %

10E -08F0A319--131 IAE V2522--A5 12200010C6KG330 0 018590 0 0 3 1.0 .0 .00 0 01 .990 .000 .000 0 FCOM-N0--03--06--30--005--145

LONG RANGE CRUISE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
PACK FLOW HI
ANTI-ICING OFF

ISA+10
CG=33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL120		FL140		FL160		FL180		FL200	
48	1.157	.454	1.171	.462	1.186	.469	1.206	.481	1.239	.506	1.262	.515
	1947	251	1881	246	1813	241	1772	237	1780	240	1727	235
	151.7	295	158.7	298	165.9	301	172.8	306	179.4	319	186.8	322
50	1.164	.459	1.178	.466	1.193	.473	1.223	.496	1.250	.511	1.277	.523
	1996	254	1924	248	1857	242	1862	245	1829	242	1793	239
	149.5	298	156.4	301	163.2	303	169.4	315	176.2	322	182.8	328
52	1.170	.463	1.185	.469	1.204	.481	1.238	.507	1.260	.515	1.295	.534
	2041	256	1966	250	1923	247	1938	250	1879	245	1870	244
	147.4	301	154.1	303	160.4	308	166.4	322	173.1	325	178.8	334
54	1.176	.466	1.191	.472	1.220	.494	1.248	.512	1.273	.523	1.312	.544
	2084	258	2007	251	2012	254	1990	253	1945	249	1945	248
	145.5	303	151.8	305	157.5	317	163.6	326	169.8	330	175.1	341
56	1.183	.469	1.201	.480	1.235	.506	1.257	.515	1.289	.532	1.327	.551
	2127	260	2072	256	2095	260	2032	254	2019	253	2011	252
	143.5	305	149.4	310	154.8	324	161.1	327	166.4	336	171.5	345
58	1.189	.472	1.215	.492	1.245	.511	1.268	.522	1.305	.541	1.340	.556
	2168	261	2162	262	2151	263	2097	258	2095	258	2070	254
	141.5	307	146.8	317	152.4	328	158.2	332	163.1	342	168.2	348
60	1.197	.478	1.231	.505	1.252	.514	1.282	.529	1.320	.549	1.356	.562
	2227	264	2257	269	2192	264	2165	262	2166	261	2140	257
	139.5	311	144.5	326	150.2	329	155.4	336	160.1	347	164.7	352
62	1.209	.487	1.241	.511	1.262	.519	1.296	.537	1.332	.554	1.372	.570
	2307	270	2318	273	2250	267	2240	266	2226	264	2214	261
	137.3	317	142.3	330	147.9	333	152.5	342	157.2	350	161.3	357
64	1.223	.499	1.249	.515	1.274	.526	1.310	.545	1.345	.559	1.390	.579
	2400	276	2366	275	2318	270	2315	270	2287	266	2298	265
	135.2	324	140.4	332	145.4	337	149.8	347	154.3	353	157.9	363
66	1.235	.509	1.256	.517	1.287	.534	1.324	.552	1.359	.565	1.407	.587
	2484	282	2409	276	2393	274	2384	273	2357	269	2377	269
	133.3	331	138.5	334	142.9	342	147.3	351	151.3	357	154.8	368
68	1.244	.514	1.266	.523	1.300	.541	1.335	.556	1.374	.572	1.423	.594
	2539	285	2473	279	2466	278	2444	276	2434	273	2451	272
	131.5	334	136.4	337	140.6	347	144.8	354	148.5	361	151.9	372
70	1.250	.516	1.276	.529	1.313	.548	1.347	.561	1.391	.581	1.426	.585
	2584	286	2542	282	2540	282	2507	278	2520	277	2443	268
	129.9	336	134.3	341	138.3	351	142.3	357	145.6	367	150.1	367
72	1.258	.519	1.289	.536	1.325	.554	1.360	.567	1.407	.589	1.430	.573
	2631	288	2617	286	2606	285	2579	281	2600	281	2433	263
	128.2	337	132.2	346	136.2	355	139.8	361	142.9	372	147.6	359
74	1.267	.525	1.300	.542	1.335	.558	1.374	.574	1.422	.596	1.437	.553
	2698	291	2687	290	2665	287	2656	284	2679	284	2417	253
	126.4	341	130.3	350	134.1	357	137.4	365	140.4	376	143.5	347

ENGINE ANTI ICE ON
△FUEL = + 2 %

TOTAL ANTI ICE ON
△FUEL = + 4 %

10E -08F0A319--131 IAE V2522--A5 12200010C6KG330 0 018590 0 0 3 1.0 .0 .00 0 01 .990 .000 .000 10 FCOM-N0--03--06--30--006--145

CRUISE - LONG RANGE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA + 10
CG = 33.0%

N1 (%) **MACH**
KG/H **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL210		FL220		FL230		FL240		FL250		FL260	
42	79.6 1627 191.4	.499 223 311	80.2 1618 194.3	.506 221 314	80.7 1603 197.3	.510 219 316	81.4 1595 199.9	.517 217 319	82.1 1580 202.4	.520 214 320	83.3 1589 203.8	.529 213 324
44	80.5 1696 186.4	.506 226 316	81.1 1681 189.2	.511 224 318	81.8 1673 191.7	.518 222 321	82.5 1658 194.0	.521 219 322	83.7 1668 195.3	.530 218 326	84.9 1681 196.3	.539 217 330
46	81.4 1758 181.7	.512 229 319	82.0 1751 184.1	.518 227 322	82.8 1736 186.2	.522 224 323	83.9 1747 187.5	.531 223 327	85.1 1760 188.4	.540 222 332	86.8 1793 189.0	.554 223 339
48	82.3 1827 177.0	.518 232 324	83.0 1814 179.1	.523 229 325	84.2 1824 180.3	.531 228 329	85.3 1838 181.2	.540 227 333	86.9 1869 181.7	.553 228 340	88.9 1897 182.7	.566 229 347
50	83.2 1891 172.4	.522 234 326	84.3 1900 173.6	.531 233 330	85.5 1915 174.5	.540 232 334	87.0 1947 175.0	.552 233 341	89.0 1973 176.2	.566 234 348	89.4 1923 177.8	.559 226 342
52	84.4 1975 167.4	.530 237 331	85.6 1990 168.3	.539 236 335	87.0 2018 168.8	.550 237 341	88.9 2046 170.1	.564 238 348	89.5 2002 171.6	.559 231 344	90.2 1958 171.0	.547 221 335
54	85.7 2068 162.5	.538 241 336	87.0 2092 163.1	.549 241 341	88.8 2122 164.1	.562 242 348	89.4 2074 165.9	.558 235 344	90.2 2041 165.5	.550 227 338	91.5 1995 161.8	.527 212 323
56	87.0 2167 157.6	.547 245 342	88.7 2199 158.5	.561 246 349	89.3 2148 160.6	.557 240 345	90.1 2113 160.4	.549 231 339	91.4 2081 157.8	.534 220 328	93.2 2055 149.3	.501 202 307
58	88.8 2286 153.2	.561 251 350	89.2 2225 155.3	.556 244 346	90.0 2186 155.5	.549 236 340	91.2 2153 153.3	.535 225 330	92.9 2136 148.1	.515 212 316		
60	89.1 2307 150.3	.555 249 347	89.8 2260 151.0	.549 241 341	91.0 2227 149.2	.536 230 332	92.7 2206 144.7	.517 217 319				
62	89.6 2332 146.5	.548 245 342	90.8 2300 145.2	.537 236 334	92.4 2278 141.4	.520 223 322						
64	90.5 2361 141.1	.534 239 333	92.1 2351 138.3	.523 229 325	94.0 2352 131.8	.501 214 310						
66	91.6 2400 134.2	.516 231 322	93.6 2417 130.1	.506 221 314								
67	92.5 2434 127.9	.499 223 311										

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2.5 %	+ 5 %

CRUISE - LONG RANGE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA+15
CG=33.0%

N1 (%) **MACH**
KG/H **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL100		FL120		FL140		FL160		FL180		FL200	
42	74.7	.435	75.6	.444	76.0	.447	76.7	.453	77.7	.463	79.4	.485
	1803	240	1756	236	1683	229	1634	223	1610	219	1631	221
	158.3	285	164.8	289	171.7	289	177.9	291	183.3	295	188.1	307
44	75.8	.444	76.2	.447	76.6	.450	77.5	.458	78.8	.474	80.8	.501
	1876	245	1799	238	1732	230	1697	226	1695	224	1731	228
	155.1	291	161.7	291	168.0	291	173.5	294	178.1	302	183.0	317
46	76.3	.445	76.7	.448	77.4	.455	78.4	.465	80.1	.488	81.6	.507
	1916	246	1840	239	1790	233	1765	229	1793	231	1797	231
	152.5	292	158.7	292	164.2	294	169.1	298	173.4	311	178.4	321
48	76.8	.448	77.3	.452	78.2	.460	79.4	.475	81.3	.501	82.4	.512
	1958	247	1892	240	1855	236	1852	234	1889	238	1860	234
	149.9	294	155.5	294	160.4	298	164.6	305	169.1	319	174.1	324
50	77.2	.449	78.0	.456	79.0	.466	80.6	.488	82.1	.507	83.3	.518
	1999	248	1951	243	1925	239	1953	241	1957	241	1929	236
	147.3	295	152.3	297	156.7	302	160.6	314	165.2	323	169.9	328
52	77.8	.452	78.7	.461	80.0	.476	81.8	.501	82.9	.512	84.2	.522
	2051	250	2015	245	2013	244	2052	248	2019	243	1995	238
	144.6	297	149.0	300	152.8	308	156.9	322	161.6	326	165.6	330
54	78.4	.456	79.5	.467	81.0	.488	82.6	.508	83.7	.518	85.3	.529
	2110	252	2084	248	2112	250	2122	251	2090	246	2077	242
	141.8	299	145.8	304	149.4	316	153.6	326	157.9	330	161.1	335
56	79.1	.461	80.3	.475	82.1	.500	83.2	.511	84.5	.522	86.5	.537
	2175	255	2168	253	2213	257	2181	253	2158	248	2172	246
	139.0	302	142.6	309	146.2	324	150.5	328	154.3	333	156.5	340
58	79.8	.466	81.3	.485	82.9	.507	84.0	.517	85.4	.527	87.7	.546
	2243	258	2264	258	2288	260	2251	255	2228	250	2269	249
	136.2	306	139.6	316	143.3	328	147.4	332	150.6	336	152.1	345
60	80.6	.473	82.3	.497	83.5	.511	84.7	.522	86.6	.535	89.4	.559
	2324	262	2369	265	2347	262	2321	258	2325	255	2390	256
	133.5	310	136.7	324	140.7	330	144.4	335	146.7	341	147.9	353
62	81.5	.482	83.2	.506	84.1	.515	85.5	.526	87.6	.542	89.9	.555
	2420	267	2455	270	2411	264	2389	260	2417	258	2420	254
	130.7	316	134.2	329	138.1	333	141.2	337	143.0	346	145.1	351
64	82.4	.493	83.8	.510	84.8	.520	86.5	.531	88.8	.551	90.3	.548
	2520	273	2518	272	2481	267	2471	263	2523	262	2443	250
	128.3	323	131.8	332	135.4	336	138.0	341	139.2	351	141.8	347
66	83.3	.503	84.3	.513	85.5	.524	87.5	.539	90.2	.560	91.0	.535
	2617	278	2576	274	2552	269	2567	266	2622	267	2465	244
	126.0	330	129.7	334	132.8	339	134.7	346	136.1	357	137.3	339
68	84.0	.508	84.9	.517	86.3	.528	88.4	.545	90.4	.553	92.0	.517
	2692	282	2646	276	2623	271	2658	270	2637	263	2500	236
	123.9	334	127.4	337	130.1	341	131.6	350	133.8	353	130.9	327

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2.5 %	+ 5 %

R

LONG RANGE CRUISE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
PACK FLOW HI
ANTI-ICING OFF

ISA+10
CG=33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL210		FL220		FL230		FL240		FL250		FL260	
50	1.317 1884 181.8	.549 246 342	1.329 1844 185.5	.550 242 342	1.345 1823 188.8	.556 239 344	1.368 1831 191.3	.568 239 350	1.395 1851 193.8	.584 241 359	1.418 1849 196.8	.595 241 364
52	1.327 1926 178.6	.551 247 344	1.342 1897 181.8	.555 244 345	1.364 1903 184.3	.566 244 351	1.391 1925 186.7	.583 246 359	1.414 1924 189.5	.593 246 365	1.437 1918 192.3	.603 244 369
54	1.339 1973 175.3	.554 248 346	1.361 1978 177.7	.565 248 351	1.386 1998 180.0	.581 250 360	1.410 2000 182.6	.592 250 365	1.433 1994 185.3	.602 249 370	1.450 1956 188.8	.603 245 369
56	1.357 2053 171.5	.564 253 352	1.382 2071 173.7	.578 254 360	1.406 2077 176.1	.591 255 366	1.427 2069 178.9	.600 254 370	1.440 2010 182.6	.597 247 367	1.454 1945 185.5	.590 239 361
58	1.376 2143 167.7	.576 258 359	1.401 2155 170.0	.589 259 366	1.418 2121 173.2	.593 256 367	1.431 2062 176.5	.590 249 364	1.445 1999 179.1	.583 241 358	1.462 1925 179.4	.565 228 346
60	1.396 2233 164.3	.588 264 367	1.408 2174 167.8	.586 258 365	1.421 2114 170.8	.583 251 361	1.436 2051 173.0	.575 243 355	1.454 1980 172.9	.557 230 342		
62	1.412 2308 161.2	.596 268 372	1.412 2167 165.3	.576 253 358	1.427 2104 167.1	.568 244 352	1.445 2032 166.4	.548 231 338				
64	1.419 2326 159.1	.593 266 370	1.417 2158 161.5	.560 246 348	1.437 2084 160.3	.540 232 334						
66	1.422 2317 156.9	.583 262 364	1.429 2137 154.3	.530 232 330								
68	1.427 2305 153.6	.567 254 354										
70	1.437 2282 147.3	.539 241 336										
72												
74												
76												
78												

ENGINE ANTI ICE ON△
FUEL = + 2.5 %

TOTAL ANTI ICE ON
△FUEL = + 6 %

R

LONG RANGE CRUISE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
PACK FLOW HI
ANTI-ICING OFF

ISA+15
CG=33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL120		FL140		FL160		FL180		FL200	
50	1.151	.428	1.173	.448	1.233	.511	1.241	.509	1.256	.510	1.299	.539
	1870	236	1908	238	2103	262	1972	251	1880	242	1916	246
	150.1	281	152.8	292	157.0	330	165.7	327	172.8	325	177.8	341
52	1.159	.435	1.187	.463	1.236	.510	1.246	.509	1.267	.514	1.316	.548
	1950	240	2028	247	2123	262	1998	251	1937	244	1989	251
	146.3	285	148.9	302	155.5	330	163.5	327	169.1	328	174.4	347
54	1.171	.447	1.232	.512	1.240	.510	1.254	.510	1.291	.534	1.326	.551
	2058	247	2285	273	2143	262	2038	252	2058	254	2032	252
	142.4	293	145.9	333	153.9	330	160.7	327	165.3	340	171.5	348
56	1.184	.461	1.235	.512	1.244	.510	1.264	.514	1.311	.548	1.337	.553
	2175	255	2305	273	2167	262	2095	254	2156	261	2076	253
	139.0	302	144.6	333	152.1	330	157.5	330	162.1	349	168.6	350
58	1.229	.511	1.239	.511	1.250	.509	1.280	.525	1.322	.552	1.353	.562
	2469	283	2325	273	2195	261	2185	260	2205	263	2154	257
	135.9	335	143.2	333	149.9	329	154.3	337	159.6	352	165.1	356
60	1.234	.513	1.242	.511	1.259	.513	1.305	.546	1.332	.554	1.371	.572
	2496	284	2347	273	2253	263	2322	270	2248	264	2241	262
	134.7	336	141.7	333	147.2	332	151.0	351	157.1	353	161.6	362
62	1.237	.512	1.247	.510	1.268	.517	1.316	.552	1.343	.558	1.391	.585
	2516	284	2372	272	2312	265	2379	273	2304	266	2340	268
	133.6	336	140.1	332	144.5	334	148.9	354	154.4	356	158.3	370
64	1.240	.512	1.254	.512	1.290	.535	1.325	.554	1.359	.567	1.396	.581
	2536	283	2417	273	2441	275	2423	274	2385	270	2349	266
	132.4	336	137.9	333	141.7	346	146.8	356	151.4	361	156.4	367
66	1.244	.511	1.262	.516	1.309	.550	1.334	.556	1.376	.577	1.399	.572
	2559	283	2477	275	2554	283	2467	275	2476	275	2342	262
	131.1	335	135.6	336	139.2	356	144.6	357	148.5	368	154.4	362
68	1.248	.511	1.272	.520	1.319	.555	1.346	.561	1.393	.587	1.404	.557
	2586	283	2541	277	2611	285	2534	278	2569	280	2333	255
	129.5	335	133.3	339	137.4	359	142.2	360	145.8	374	151.2	353
70	1.255	.513	1.294	.540	1.327	.556	1.361	.569	1.406	.593	1.412	.533
	2640	284	2687	288	2651	286	2617	282	2635	283	2313	244
	127.6	337	130.9	352	135.6	359	139.7	366	143.5	378	145.8	337
72	1.263	.516	1.310	.552	1.335	.558	1.376	.579	1.408	.586		
	2698	286	2788	295	2698	287	2711	287	2630	280		
	125.6	339	128.9	359	133.7	361	137.2	372	142.1	374		
74	1.272	.521	1.320	.556	1.346	.563	1.392	.589	1.412	.577		
	2766	289	2844	297	2765	290	2803	292	2622	275		
	123.6	342	127.3	362	131.7	364	134.9	378	140.2	368		
76	1.294	.541	1.327	.557	1.359	.570	1.403	.593	1.417	.563		
	2922	300	2885	298	2847	294	2859	294	2612	268		
	121.5	355	125.8	363	129.5	369	133.0	380	137.4	359		
78	1.309	.553	1.335	.559	1.374	.579	1.405	.586	1.425	.540		
	3029	307	2934	299	2938	298	2854	291	2593	257		
	119.7	363	124.2	364	127.4	374	131.9	376	132.8	344		

ENGINE ANTI ICE ON
△FUEL = + 2.5 %

TOTAL ANTI ICE ON
△FUEL = + 6 %

LONG RANGE CRUISE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
PACK FLOW HI
ANTI-ICING OFF

ISA+10
CG=33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL210		FL220		FL230		FL240		FL250		FL260	
48	1.279 1720 190.0	.523 234 327	1.299 1724 192.9	.535 235 333	1.319 1724 196.0	.546 234 338	1.337 1710 199.1	.552 232 340	1.356 1702 202.0	.559 231 344	1.380 1705 204.6	.570 230 349
50	1.297 1796 185.7	.534 239 333	1.317 1796 188.6	.545 239 339	1.335 1783 191.6	.552 237 342	1.354 1775 194.3	.559 236 345	1.377 1777 196.8	.569 235 350	1.403 1786 199.2	.581 235 356
52	1.315 1870 181.6	.544 244 340	1.332 1857 184.5	.551 242 343	1.351 1847 187.2	.558 240 346	1.373 1847 189.6	.568 239 350	1.399 1858 191.8	.580 240 357	1.424 1862 194.2	.591 239 362
54	1.330 1934 177.8	.551 247 344	1.348 1920 180.5	.557 245 347	1.369 1917 182.8	.566 244 351	1.395 1930 185.0	.579 244 357	1.420 1934 187.2	.589 244 362	1.446 1940 189.4	.600 243 367
56	1.344 1995 174.2	.557 249 347	1.365 1991 176.4	.565 248 351	1.389 2000 178.5	.577 248 357	1.415 2007 180.7	.588 248 363	1.440 2011 182.8	.598 248 368	1.453 1948 186.2	.593 240 363
58	1.360 2065 170.4	.564 253 352	1.384 2072 172.4	.575 253 357	1.409 2080 174.5	.586 253 363	1.430 2063 177.0	.592 250 365	1.444 2002 180.1	.587 243 361	1.459 1932 181.8	.574 232 351
60	1.378 2143 166.7	.572 257 357	1.403 2154 168.6	.584 257 363	1.420 2115 171.5	.586 253 363	1.434 2055 174.3	.580 245 358	1.450 1988 175.7	.568 235 349		
62	1.397 2227 163.1	.582 261 363	1.410 2169 166.2	.580 255 361	1.424 2108 168.7	.574 247 356	1.440 2042 169.8	.562 237 347				
64	1.415 2306 159.8	.590 265 368	1.415 2162 163.4	.568 250 353	1.431 2096 164.3	.556 239 344						
66	1.421 2320 157.6	.586 263 366	1.421 2152 159.0	.550 242 342								
68	1.425 2311 155.1	.574 258 358										
70	1.431 2297 151.2	.557 250 347										
72												
74												

ENGINE ANTI ICE ON
△FUEL = + 2 %

TOTAL ANTI ICE ON
△FUEL = + 4 %

10E -08F0A319--131 IAE V2522--A5 12200010C6KG330 0 018590 0 0 3 1.0 .0 .00 0 01 .990 .000 .000 10 FCOM-N0--03--06--30--007--145

LONG RANGE CRUISE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
PACK FLOW HI
ANTI-ICING OFF

ISA+15
CG=33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL120		FL140		FL160		FL180		FL200	
48	1.157	.454	1.171	.463	1.186	.469	1.206	.481	1.239	.505	1.263	.515
	1969	251	1905	246	1835	240	1792	237	1798	240	1749	235
	151.3	298	158.2	301	165.4	303	172.3	309	178.9	322	186.2	326
50	1.164	.459	1.178	.466	1.194	.473	1.223	.495	1.250	.510	1.278	.523
	2020	254	1948	248	1879	242	1883	245	1848	242	1816	239
	149.0	301	155.9	304	162.7	306	168.9	318	175.7	325	182.3	331
52	1.170	.463	1.185	.469	1.205	.482	1.238	.506	1.261	.515	1.295	.533
	2065	256	1990	250	1948	247	1959	250	1900	244	1893	244
	147.0	304	153.6	306	159.9	311	165.9	325	172.6	328	178.3	337
54	1.177	.466	1.192	.472	1.221	.495	1.249	.511	1.274	.523	1.312	.543
	2109	258	2032	251	2037	254	2013	253	1968	248	1968	248
	145.0	306	151.3	308	157.0	320	163.1	328	169.3	333	174.5	343
56	1.183	.469	1.202	.480	1.235	.506	1.257	.514	1.290	.532	1.327	.550
	2152	260	2098	256	2120	260	2057	254	2043	253	2035	252
	143.1	308	148.9	312	154.4	327	160.6	330	165.9	339	171.0	348
58	1.190	.472	1.215	.491	1.245	.511	1.269	.521	1.306	.541	1.341	.555
	2193	261	2186	262	2175	262	2122	258	2121	257	2095	254
	141.1	310	146.4	320	151.9	330	157.7	335	162.6	345	167.7	351
60	1.198	.478	1.231	.505	1.253	.513	1.282	.529	1.321	.549	1.356	.562
	2253	264	2283	269	2216	264	2192	261	2193	261	2165	257
	139.1	313	144.1	329	149.8	332	154.9	339	159.6	350	164.2	355
62	1.209	.487	1.241	.510	1.263	.519	1.297	.537	1.333	.554	1.373	.570
	2335	270	2343	272	2276	266	2270	266	2254	264	2242	261
	136.9	320	141.9	332	147.4	335	152.0	345	156.6	353	160.7	360
64	1.223	.499	1.249	.514	1.274	.525	1.311	.545	1.346	.559	1.391	.579
	2426	276	2393	274	2344	270	2343	270	2316	266	2328	265
	134.8	327	139.9	335	145.0	340	149.4	350	153.8	356	157.4	366
66	1.236	.509	1.256	.517	1.287	.533	1.324	.551	1.360	.565	1.397	.576
	2512	282	2436	276	2420	274	2411	273	2386	269	2345	264
	132.9	334	138.1	336	142.5	345	146.8	354	150.9	360	155.3	364
68	1.244	.513	1.266	.523	1.300	.541	1.335	.556	1.375	.572	1.401	.565
	2568	284	2503	279	2496	278	2473	275	2466	273	2338	259
	131.1	337	136.0	340	140.1	350	144.3	357	147.9	365	153.0	358
70	1.251	.516	1.277	.529	1.313	.548	1.347	.561	1.392	.581	1.406	.550
	2611	286	2572	282	2570	282	2537	278	2551	277	2327	252
	129.5	338	133.9	344	137.9	354	141.9	360	145.1	370	149.6	348
72	1.258	.519	1.289	.536	1.325	.553	1.360	.566	1.408	.588		
	2660	287	2649	286	2637	285	2609	281	2631	281		
	127.9	340	131.8	349	135.7	358	139.4	364	142.5	375		
74	1.267	.524	1.301	.542	1.335	.557	1.375	.573	1.410	.581		
	2728	291	2718	289	2696	287	2690	284	2625	277		
	126.0	344	129.9	353	133.6	360	136.9	368	141.0	370		

ENGINE ANTI ICE ON
△FUEL = + 2 %

TOTAL ANTI ICE ON
△FUEL = + 4 %

10E -08F0A319--131 IAE V2522--A5 12200010C6KG330 0 018590 0 0 3 1.0 .0 .00 0 01 .990 .000 .000 15 FCOM-N0--03--06--30--008--145

R

LONG RANGE CRUISE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
PACK FLOW HI
ANTI-ICING OFF

ISA+15
CG=33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL210		FL220		FL230		FL240		FL250		FL260	
50	1.317 1907 181.2	.548 246 346	1.329 1868 184.9	.550 241 345	1.346 1848 188.1	.556 239 348	1.369 1857 190.6	.568 240 354	1.396 1876 193.2	.584 241 362	1.418 1872 196.1	.594 241 367
52	1.328 1947 178.0	.550 246 347	1.343 1922 181.2	.555 244 348	1.365 1928 183.6	.566 244 354	1.392 1952 186.0	.583 246 363	1.410 1926 189.5	.588 243 365	1.423 1869 193.4	.585 237 361
54	1.340 1997 174.7	.554 248 349	1.361 2002 177.1	.565 248 355	1.387 2024 179.3	.580 250 363	1.401 1976 183.1	.581 245 362	1.414 1919 186.7	.577 239 358	1.428 1858 189.0	.568 230 351
56	1.357 2079 170.9	.564 253 355	1.380 2084 173.3	.575 253 361	1.392 2027 177.0	.574 247 359	1.405 1969 180.2	.570 240 355	1.420 1908 182.0	.560 231 347	1.439 1834 180.1	.535 215 330
58	1.377 2169 167.2	.575 258 363	1.383 2079 171.1	.567 249 356	1.396 2021 173.9	.562 242 351	1.412 1958 175.2	.551 232 343	1.435 1878 170.5	.516 212 320		
60	1.391 2229 164.2	.581 261 366	1.387 2072 167.8	.554 243 348	1.403 2008 168.8	.542 233 339	1.428 1926 162.9	.504 211 314				
62	1.394 2224 162.2	.573 257 361	1.395 2059 162.6	.533 234 335	1.420 1980 156.2	.495 212 309						
64	1.398 2216 159.3	.560 251 353	1.411 2038 149.6	.486 212 305								
66	1.405 2201 154.5	.540 242 340										
68	1.422 2171 142.2	.490 219 309										
70												
72												
74												
76												
78												

ENGINE ANTI ICE ON
△FUEL = + 2.5 %

TOTAL ANTI ICE ON
△FUEL = + 6 %

R

LONG RANGE CRUISE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
PACK FLOW HI
ANTI-ICING OFF

ISA+20
CG=33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL120		FL140		FL160		FL180		FL200	
50	1.151	.427	1.173	.447	1.233	.510	1.242	.508	1.257	.509	1.300	.539
	1888	236	1931	238	2127	262	1994	251	1902	242	1944	246
	149.7	283	152.3	294	156.6	333	165.2	329	172.2	328	177.2	344
52	1.160	.435	1.188	.464	1.237	.510	1.247	.508	1.268	.514	1.316	.548
	1975	240	2054	247	2147	262	2020	251	1960	244	2010	250
	145.8	288	148.4	305	155.0	333	163.0	329	168.6	330	173.9	350
54	1.171	.447	1.232	.511	1.240	.509	1.254	.510	1.292	.534	1.326	.550
	2084	247	2309	273	2167	262	2062	252	2085	254	2053	251
	141.9	296	145.5	336	153.4	332	160.1	330	164.8	344	171.0	351
56	1.185	.461	1.235	.511	1.245	.509	1.264	.514	1.312	.548	1.337	.553
	2203	255	2330	273	2192	261	2120	254	2180	261	2100	253
	138.5	305	144.2	336	151.6	332	157.0	333	161.6	352	168.0	353
58	1.230	.511	1.239	.511	1.250	.509	1.281	.526	1.322	.551	1.354	.562
	2497	283	2350	272	2223	261	2217	260	2229	262	2180	257
	135.5	338	142.8	336	149.4	332	153.8	341	159.1	355	164.5	359
60	1.234	.512	1.243	.510	1.260	.513	1.305	.546	1.332	.553	1.368	.568
	2524	284	2373	272	2281	263	2350	270	2274	263	2249	260
	134.3	339	141.3	335	146.7	335	150.6	354	156.6	356	161.4	363
62	1.237	.512	1.247	.510	1.269	.516	1.317	.551	1.344	.558	1.371	.560
	2544	284	2398	272	2340	265	2407	273	2333	266	2245	256
	133.2	339	139.6	335	144.1	337	148.4	357	153.9	359	159.4	358
64	1.240	.511	1.254	.512	1.290	.535	1.325	.553	1.359	.567	1.375	.548
	2563	283	2445	273	2472	275	2449	274	2415	270	2239	251
	132.0	338	137.5	336	141.3	349	146.3	358	150.9	364	156.4	350
66	1.244	.511	1.263	.515	1.309	.549	1.335	.555	1.377	.577	1.382	.530
	2587	283	2504	275	2583	283	2495	275	2508	275	2226	242
	130.7	338	135.2	338	138.8	358	144.2	360	148.0	371	152.0	338
68	1.248	.510	1.272	.520	1.320	.554	1.347	.561	1.382	.574	1.396	.490
	2617	283	2573	278	2638	285	2564	278	2522	273	2207	223
	129.1	338	132.8	342	137.0	361	141.8	364	146.3	369	141.9	313
70	1.256	.513	1.295	.541	1.327	.555	1.361	.569	1.385	.565		
	2670	284	2723	289	2681	286	2647	282	2516	269		
	127.1	340	130.5	355	135.2	362	139.2	369	144.5	364		
72	1.264	.516	1.310	.551	1.336	.557	1.377	.579	1.389	.553		
	2730	286	2819	295	2727	287	2741	287	2509	263		
	125.2	342	128.5	362	133.3	364	136.8	375	141.7	356		
74	1.273	.522	1.320	.555	1.347	.563	1.379	.572	1.396	.533		
	2802	289	2875	297	2798	290	2737	284	2494	254		
	123.2	345	126.9	365	131.3	367	135.5	371	137.6	343		
76	1.295	.541	1.327	.557	1.360	.569	1.382	.564				
	2958	300	2917	298	2877	293	2731	280				
	121.1	358	125.4	366	129.1	372	133.9	366				
78	1.310	.552	1.335	.559	1.362	.564	1.386	.553				
	3062	306	2965	299	2874	290	2724	274				
	119.4	365	123.8	367	127.9	368	131.5	358				

ENGINE ANTI ICE ON
△FUEL = + 2.5 %

TOTAL ANTI ICE ON
△FUEL = + 6 %

CRUISE - LONG RANGE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA+15
CG=33.0%

N1 (%) **MACH**
KG/H **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL210		FL220		FL230		FL240		FL250		FL260	
42	80.4 1649 190.7	.499 223 314	81.0 1639 193.6	.505 221 317	81.5 1624 196.5	.510 219 319	82.2 1617 199.2	.517 217 322	82.9 1601 201.7	.520 214 323	84.1 1610 203.1	.529 213 327
44	81.3 1718 185.7	.506 226 319	81.9 1703 188.5	.511 224 321	82.5 1695 191.0	.518 222 324	83.3 1679 193.3	.521 219 325	84.5 1690 194.6	.530 218 329	85.7 1705 195.6	.539 217 333
46	82.2 1783 181.0	.512 229 323	82.9 1775 183.4	.518 227 326	83.6 1758 185.6	.522 224 326	84.7 1770 186.8	.531 223 331	85.9 1784 187.8	.540 222 335	87.6 1817 188.3	.554 224 342
48	83.1 1853 176.4	.519 232 327	83.8 1837 178.4	.522 229 328	85.0 1849 179.6	.531 228 332	86.1 1862 180.6	.540 227 336	87.7 1896 181.1	.553 228 343	88.4 1857 183.5	.551 222 341
50	84.0 1916 171.8	.522 234 329	85.1 1927 173.0	.531 233 333	86.3 1940 174.0	.540 232 337	87.8 1972 174.4	.552 233 344	88.6 1940 176.6	.552 228 343	89.2 1880 177.4	.540 218 334
52	85.2 2002 166.9	.530 237 334	86.4 2017 167.8	.539 236 338	87.8 2048 168.3	.551 237 345	88.5 2014 170.3	.550 232 343	89.3 1966 171.4	.543 224 337	90.4 1917 168.3	.522 210 323
54	86.5 2094 162.0	.538 241 339	87.8 2120 162.5	.549 241 345	88.5 2088 164.4	.549 236 343	89.3 2039 165.4	.542 228 337	90.4 2006 163.5	.529 218 328		
56	87.8 2194 157.2	.547 245 345	88.5 2164 158.9	.547 240 344	89.2 2113 159.9	.540 232 338	90.3 2077 158.5	.528 222 329	91.9 2056 154.1	.511 210 317		
58	88.3 2229 153.8	.544 244 343	89.1 2188 154.7	.539 237 339	90.2 2149 153.8	.528 227 330	91.7 2126 149.9	.511 215 319				
60	88.9 2248 149.7	.534 239 337	90.0 2220 149.4	.528 232 332	91.5 2197 145.9	.512 220 321						
62	89.7 2272 144.2	.520 233 328	91.2 2268 142.2	.514 225 322								
64	90.8 2308 136.7	.501 224 316										
66												

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2.5 %	+ 5 %

CRUISE - LONG RANGE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA+20
CG=33.0%

N1 (%) **MACH**
KG/H **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL100		FL120		FL140		FL160		FL180		FL200	
42	75.4	.435	76.3	.444	76.7	.447	77.4	.453	78.5	.463	80.2	.485
	1826	240	1777	236	1703	229	1656	223	1630	219	1653	221
	157.8	288	164.2	292	171.1	291	177.2	294	182.7	298	187.4	310
44	76.5	.444	76.9	.446	77.4	.450	78.3	.459	79.6	.474	81.5	.501
	1899	245	1820	238	1753	230	1719	226	1717	224	1754	228
	154.6	294	161.2	293	167.4	294	172.8	297	177.5	305	182.3	320
46	77.0	.445	77.4	.448	78.1	.454	79.2	.465	80.9	.488	82.4	.507
	1939	246	1861	238	1812	233	1789	229	1818	232	1820	231
	152.0	295	158.2	294	163.6	296	168.5	301	172.7	314	177.8	324
48	77.5	.448	78.0	.451	78.9	.460	80.2	.475	82.1	.502	83.2	.512
	1982	247	1914	240	1877	236	1878	234	1915	238	1886	234
	149.4	296	155.0	297	159.9	300	164.1	308	168.5	323	173.5	327
50	78.0	.449	78.7	.456	79.7	.466	81.4	.489	82.9	.507	84.1	.519
	2023	248	1974	243	1949	239	1978	241	1980	241	1956	237
	146.9	297	151.8	300	156.2	304	160.1	317	164.7	326	169.3	331
52	78.5	.452	79.4	.461	80.7	.476	82.6	.502	83.6	.512	85.0	.522
	2076	250	2039	245	2037	244	2078	248	2044	243	2020	238
	144.1	299	148.5	303	152.4	310	156.4	325	161.1	329	165.1	334
54	79.2	.456	80.2	.467	81.8	.488	83.3	.507	84.4	.518	86.1	.529
	2135	252	2111	249	2139	250	2147	251	2115	246	2104	242
	141.3	302	145.4	307	148.9	319	153.1	329	157.4	333	160.6	338
56	79.9	.461	81.1	.475	82.9	.501	84.0	.511	85.3	.522	87.3	.537
	2200	255	2196	253	2241	257	2207	253	2182	248	2198	245
	138.6	305	142.1	312	145.8	327	150.1	331	153.9	336	156.1	343
58	80.6	.466	82.1	.486	83.7	.507	84.7	.517	86.2	.527	88.5	.545
	2270	258	2294	259	2315	260	2279	255	2256	250	2295	249
	135.8	308	139.1	319	142.9	331	147.0	335	150.2	339	151.7	348
60	81.3	.473	83.1	.498	84.3	.511	85.5	.522	87.4	.535	88.8	.537
	2351	262	2398	265	2374	262	2350	258	2354	255	2306	246
	133.1	313	136.3	327	140.3	333	143.9	338	146.3	344	148.8	343
62	82.3	.482	83.9	.506	84.9	.515	86.3	.525	88.4	.542	89.3	.525
	2449	267	2484	270	2440	264	2418	260	2445	258	2322	240
	130.4	319	133.8	332	137.7	336	140.8	340	142.6	349	144.5	335
64	83.2	.493	84.5	.510	85.6	.520	87.3	.532	89.0	.541	90.1	.506
	2552	273	2547	272	2510	267	2503	263	2493	258	2338	231
	127.9	326	131.5	335	135.1	339	137.6	344	139.7	348	138.3	323
66	84.1	.503	85.1	.513	86.3	.524	88.3	.539	89.3	.530		
	2649	279	2605	274	2581	269	2599	267	2495	252		
	125.7	333	129.3	337	132.4	342	134.3	349	136.6	341		
68	84.7	.508	85.7	.517	87.1	.527	88.6	.534	89.7	.511		
	2723	282	2676	276	2651	271	2618	264	2497	243		
	123.6	336	127.0	340	129.8	344	132.2	346	131.7	329		

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2.5 %	+ 5 %

LONG RANGE CRUISE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
PACK FLOW HI
ANTI-ICING OFF

ISA+15
CG=33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL210		FL220		FL230		FL240		FL250		FL260	
48	1.279 1742 189.4	.523 234 330	1.300 1746 192.3	.535 235 336	1.320 1746 195.3	.545 234 341	1.337 1731 198.5	.551 232 344	1.357 1722 201.3	.559 231 347	1.381 1726 203.9	.569 230 352
50	1.298 1820 185.0	.534 239 337	1.318 1820 188.0	.545 239 342	1.335 1806 190.9	.551 237 345	1.355 1797 193.7	.559 235 348	1.378 1800 196.1	.569 235 353	1.404 1809 198.5	.581 235 359
52	1.315 1893 181.1	.544 244 343	1.333 1881 183.9	.551 242 346	1.352 1871 186.6	.558 240 349	1.374 1874 188.9	.568 240 354	1.400 1883 191.2	.580 240 360	1.422 1870 194.0	.587 238 363
54	1.330 1956 177.3	.550 247 347	1.348 1944 179.9	.557 245 350	1.370 1944 182.2	.566 244 354	1.396 1956 184.3	.579 244 360	1.413 1921 187.6	.581 240 360	1.426 1862 190.7	.574 232 355
56	1.345 2019 173.6	.556 249 350	1.365 2016 175.8	.565 248 354	1.390 2027 177.9	.576 248 361	1.403 1972 181.4	.574 242 358	1.417 1913 184.2	.568 234 352	1.433 1848 185.1	.553 223 342
58	1.361 2091 169.8	.563 253 355	1.381 2081 172.2	.571 251 358	1.394 2023 175.4	.568 244 355	1.408 1964 178.0	.561 236 349	1.425 1898 178.2	.545 225 338		
60	1.379 2171 166.1	.572 257 361	1.385 2076 169.8	.561 247 352	1.399 2016 171.9	.554 238 347	1.417 1946 171.1	.535 225 333				
62	1.392 2226 163.1	.576 259 363	1.390 2068 166.2	.547 240 344	1.410 1993 163.6	.521 224 326						
64	1.396 2220 160.9	.567 254 357										
66	1.401 2211 157.6	.553 248 348										
68												
70												
72												
74												

ENGINE ANTI ICE ON
△FUEL = + 2 %

TOTAL ANTI ICE ON
△FUEL = + 4 %

10E -08F0A319--131 IAE V2522--A5 12200010C6KG330 0 018590 0 0 3 1.0 .0 .00 0 01 .990 .000 .000 15 FCOM-N0--03--06--30--009--145

LONG RANGE CRUISE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
PACK FLOW HI
ANTI-ICING OFF

ISA+20
CG=33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL120		FL140		FL160		FL180		FL200	
48	1.158	.454	1.172	.463	1.187	.469	1.207	.481	1.240	.505	1.264	.515
	1993	251	1928	246	1856	240	1814	237	1820	240	1771	235
	150.8	301	157.7	304	164.9	306	171.8	312	178.4	325	185.6	329
50	1.164	.459	1.179	.466	1.194	.473	1.224	.495	1.250	.509	1.278	.523
	2043	254	1972	248	1901	242	1904	244	1869	242	1839	239
	148.6	304	155.4	306	162.3	308	168.5	321	175.2	327	181.7	334
52	1.171	.463	1.186	.470	1.205	.481	1.238	.505	1.261	.514	1.296	.533
	2089	256	2015	250	1969	247	1979	249	1921	244	1916	244
	146.6	306	153.1	309	159.5	314	165.4	327	172.1	331	177.7	340
54	1.177	.466	1.193	.472	1.221	.495	1.249	.511	1.274	.522	1.313	.543
	2133	258	2058	252	2061	254	2034	252	1989	248	1991	248
	144.6	308	150.9	310	156.6	323	162.7	331	168.8	336	174.0	347
56	1.184	.469	1.202	.480	1.236	.505	1.258	.514	1.290	.531	1.328	.550
	2176	260	2124	256	2143	259	2080	254	2066	253	2059	251
	142.7	310	148.5	315	153.9	330	160.1	333	165.4	342	170.5	351
58	1.190	.472	1.216	.492	1.246	.511	1.269	.521	1.306	.541	1.341	.555
	2218	261	2213	262	2200	262	2147	257	2145	257	2120	254
	140.7	312	146.0	323	151.5	333	157.2	338	162.1	348	167.1	354
60	1.198	.477	1.231	.504	1.253	.513	1.283	.529	1.321	.549	1.357	.562
	2278	264	2305	269	2241	263	2218	261	2218	261	2192	257
	138.7	316	143.7	331	149.3	335	154.4	343	159.1	353	163.6	359
62	1.210	.487	1.241	.510	1.263	.518	1.298	.537	1.334	.554	1.369	.565
	2361	270	2367	272	2302	266	2297	266	2280	263	2247	259
	136.5	322	141.5	335	147.0	338	151.5	348	156.1	356	160.6	361
64	1.224	.499	1.249	.513	1.275	.525	1.312	.545	1.346	.559	1.373	.556
	2457	276	2418	274	2371	270	2371	270	2344	266	2242	255
	134.4	330	139.5	337	144.5	343	148.9	353	153.3	359	158.5	355
66	1.236	.509	1.257	.516	1.288	.533	1.324	.551	1.361	.565	1.377	.544
	2539	282	2463	275	2446	274	2440	273	2417	269	2234	248
	132.5	337	137.7	339	142.1	348	146.3	357	150.3	363	155.4	347
68	1.244	.513	1.267	.522	1.301	.540	1.336	.555	1.376	.572	1.387	.516
	2597	284	2531	279	2523	278	2501	275	2497	273	2215	235
	130.7	339	135.6	343	139.7	353	143.9	360	147.4	368	148.7	330
70	1.251	.515	1.277	.528	1.314	.548	1.348	.560	1.383	.570		
	2639	285	2601	282	2600	282	2567	278	2519	272		
	129.1	341	133.5	347	137.5	357	141.4	363	145.5	367		
72	1.258	.518	1.290	.536	1.326	.553	1.361	.566	1.386	.561		
	2689	287	2681	286	2668	285	2640	280	2513	267		
	127.5	343	131.4	352	135.3	361	138.9	367	143.6	361		
74	1.268	.524	1.301	.542	1.336	.557	1.375	.573	1.391	.548		
	2758	290	2752	290	2729	287	2722	284	2505	261		
	125.7	347	129.4	356	133.2	363	136.4	371	140.8	353		

ENGINE ANTI ICE ON
△FUEL = + 2 %

TOTAL ANTI ICE ON
△FUEL = + 4 %

10E -08F0A319--131 IAE V2522--A5 12200010C6KG330 0 018590 0 0 3 1.0 .0 .00 0 01 .990 .000 .000 20 FCOM-N0--03--06--30--010--145

CRUISE - LONG RANGE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA+20
CG=33.0%

N1 (%) **MACH**
KG/H **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL210		FL220		FL230		FL240		FL250		FL260	
42	81.2 1670 190.1	.499 223 317	81.7 1659 193.0	.505 221 320	82.3 1646 195.9	.510 219 322	83.0 1639 198.5	.517 217 325	83.7 1621 201.0	.520 214 326	85.0 1634 202.3	.530 213 331
44	82.1 1739 185.1	.506 226 322	82.7 1725 187.8	.511 224 324	83.3 1717 190.3	.518 222 327	84.1 1700 192.7	.521 219 328	85.3 1713 194.0	.530 218 332	86.5 1727 194.9	.539 217 337
46	83.0 1805 180.4	.512 229 326	83.6 1797 182.8	.518 227 328	84.4 1780 185.0	.521 224 329	85.5 1793 186.2	.531 223 334	86.7 1808 187.1	.540 222 338	87.3 1768 189.4	.536 216 335
48	83.9 1877 175.8	.519 232 330	84.6 1860 177.9	.522 229 331	85.8 1872 179.1	.531 228 335	86.9 1887 180.0	.540 227 340	87.6 1854 182.0	.538 222 337	88.1 1790 182.4	.523 211 327
50	84.8 1942 171.2	.523 234 332	85.9 1951 172.4	.531 233 336	87.1 1965 173.4	.540 232 341	87.6 1920 175.4	.535 225 337	88.3 1879 176.0	.528 217 331	89.2 1819 172.5	.503 202 314
52	86.1 2029 166.3	.530 237 337	87.1 2034 167.4	.537 236 341	87.6 1987 169.3	.533 229 336	88.3 1947 169.6	.525 221 330	89.3 1909 168.0	.512 210 321		
54	87.0 2096 162.0	.534 239 340	87.5 2054 163.6	.530 232 336	88.3 2014 163.7	.522 224 330	89.3 1978 162.0	.509 214 320				
56	87.4 2109 158.3	.525 235 334	88.2 2081 158.2	.520 228 329	89.2 2046 156.5	.507 217 320						
58	88.0 2129 152.6	.511 228 325	89.1 2115 151.4	.505 221 320								
60	88.7 2134 139.4	.468 208 298										
62												

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2.5 %	+ 5 %

IN CRUISE QUICK CHECK AT LONG RANGE SPEED

R The following in cruise quick check tables allow the flight crew to determine the fuel
R consumption and time required to cover a given air distance from any moment in cruise to
R landing, with one engine inoperative.
R These tables are established for :
R – Cruise Mach number : long range
R – Descent profile : M.78/300kt/250kt
R – Approach and landing : 110 kg or 240 lb – 6 minute IMC
R – ISA
R – CG = 33 %
R – Pack Flow HI
R – Anti ice OFF

R *Note : 1. In the tables, the asterisk (*) means that a step climb of 4000 feet must be flown*
R *to reach the corresponding flight level.*
R *2. The flight level shown on top of each column is the final flight level.*
R *3. For each degree Celsius above ISA temperature apply a fuel correction of 0.015*
R *(kg/°C/NM) × △ ISA (°C) × air distance (NM) or 0.033 (lb/°C/NM) × △ ISA (°C)*
R *× air distance (NM).*

CORRECTION FOR DEVIATION FROM REFERENCE WEIGHT

The in cruise quick check tables are based on a reference initial weight.
A correction on the fuel consumption has to be made, when the actual initial weight is different from the reference initial weight.
If it is lower (or greater) than the reference weight, subtract (or add) the value given in the correction part of the table per 1000 kg or 1000 lb below (or above) the reference initial weight (see example 3.06.30 p2).

R

LONG RANGE CRUISE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
PACK FLOW HI
ANTI-ICING OFF

ISA+20
CG=33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL210		FL220		FL230		FL240		FL250		FL260	
50	1.318 1930 180.6	.548 246 349	1.330 1890 184.3	.550 241 348	1.347 1872 187.4	.556 239 351	1.370 1880 190.0	.568 239 357	1.383 1838 193.9	.569 235 356	1.396 1785 197.7	.565 228 353
52	1.328 1971 177.5	.550 246 350	1.344 1947 180.6	.555 244 352	1.363 1939 183.3	.563 242 356	1.375 1886 187.1	.561 236 353	1.388 1831 190.3	.556 229 349	1.403 1775 192.1	.546 220 341
54	1.340 2021 174.2	.553 248 352	1.354 1986 177.4	.556 244 352	1.366 1935 180.6	.554 238 350	1.380 1879 183.2	.547 230 344	1.395 1819 184.2	.535 220 335	1.419 1747 178.5	.499 201 312
56	1.358 2103 170.3	.563 253 358	1.358 1982 174.5	.546 239 346	1.372 1926 176.3	.538 231 340	1.388 1864 176.5	.523 220 329	1.412 1798 168.8	.484 199 303		
58	1.366 2130 167.7	.561 252 357	1.364 1973 169.7	.528 232 335	1.381 1910 168.8	.511 219 322	1.406 1853 158.5	.467 195 294				
60	1.370 2125 165.0	.551 247 351	1.375 1958 160.3	.495 217 314								
62	1.375 2114 160.8	.534 239 340										
64												
66												
68												
70												
72												
74												
76												
78												

ENGINE ANTI ICE ON
△FUEL = + 2.5 %

TOTAL ANTI ICE ON
△FUEL = + 6 %

IN CRUISE QUICK CHECK AT LONG RANGE SPEED

R The following in cruise quick check tables allow the flight crew to determine the fuel
R consumption and time required to cover a given air distance from any moment in cruise to
R landing, with one engine inoperative.
R These tables are established for :
R – Cruise Mach number : long range
R – Descent profile : M.78/300kt/250kt
R – Approach and landing : 120 kg or 270 lb – 6 minute IMC
R – ISA
R – CG = 33 %
R – Pack Flow HI
R – Anti ice OFF

R *Note : 1. In the tables, the asterisk (*) means that a step climb of 4000 feet must be flown*
R *to reach the corresponding flight level.*
R *2. The flight level shown on top of each column is the final flight level.*
R *3. For each degree Celsius above ISA temperature apply a fuel correction of 0.015*
R *(kg/°C/NM) × △ ISA (°C) × air distance (NM) or 0.033 (lb/°C/NM) × △ ISA (°C)*
R *× air distance (NM).*

CORRECTION FOR DEVIATION FROM REFERENCE WEIGHT

The in cruise quick check tables are based on a reference initial weight.
A correction on the fuel consumption has to be made, when the actual initial weight is different from the reference initial weight.
If it is lower (or greater) than the reference weight, subtract (or add) the value given in the correction part of the table per 1000 kg or 1000 lb below (or above) the reference initial weight (see example 3.06.30 p2).

LONG RANGE CRUISE - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
PACK FLOW HI
ANTI-ICING OFF

ISA+20
CG=33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL210		FL220		FL230		FL240		FL250		FL260	
48	1.280 1762 188.8	.523 234 333	1.300 1766 191.7	.534 234 339	1.320 1766 194.7	.545 234 344	1.337 1751 197.8	.551 232 346	1.358 1745 200.6	.559 230 350	1.381 1749 203.2	.569 230 355
50	1.298 1842 184.5	.534 239 340	1.319 1844 187.4	.545 239 345	1.336 1829 190.3	.551 237 348	1.355 1820 193.0	.558 235 351	1.379 1823 195.5	.569 235 356	1.395 1787 199.0	.570 230 356
52	1.316 1918 180.5	.544 244 346	1.334 1905 183.3	.551 242 349	1.353 1896 185.9	.558 240 352	1.373 1888 188.5	.566 238 356	1.386 1834 192.2	.562 232 352	1.399 1780 195.1	.556 225 347
54	1.331 1981 176.7	.550 247 350	1.349 1970 179.3	.557 245 353	1.364 1937 182.3	.559 241 353	1.377 1883 185.6	.555 234 349	1.391 1826 187.9	.548 226 343	1.409 1762 187.0	.528 213 329
56	1.345 2044 173.0	.556 249 354	1.355 1985 176.5	.553 243 350	1.368 1932 179.3	.548 236 346	1.383 1873 181.0	.539 227 339				
58	1.361 2116 169.3	.563 252 358	1.360 1979 173.2	.541 237 343	1.375 1920 174.2	.530 227 335						
60	1.367 2128 166.8	.558 250 355	1.367 1968 167.5	.520 228 330								
62	1.371 2121 163.9	.547 245 348										
64	1.378 2108 158.9	.526 235 335										
66												
68												
70												
72												
74												

ENGINE ANTI ICE ON
△FUEL = + 2 %

TOTAL ANTI ICE ON
△FUEL = + 4 %

10E -08F0A319--131 IAE V2522--A5 12200010C6KG330 0 018590 0 0 3 1.0 .0 .00 0 01 .990 .000 .000 20 FCOM-N0--03--06--30--011--145

IN CRUISE QUICK CHECK AT LONG RANGE SPEED

R The following in cruise quick check tables allow the flight crew to determine the fuel
R consumption and time required to cover a given air distance from any moment in cruise to
R landing, with one engine inoperative.
R These tables are established for :
R – Cruise Mach number : long range
R – Descent profile : M.78/300kt/250kt
R – Approach and landing : 110 kg or 240 lb – 6 minute IMC
R – ISA
R – CG = 33 %
R – Pack Flow HI
R – Anti ice OFF

R *Note : 1. In the tables, the asterisk (*) means that a step climb of 4000 feet must be flown*
R *to reach the corresponding flight level.*
R *2. The flight level shown on top of each column is the final flight level.*
R *3. For each degree Celsius above ISA temperature apply a fuel correction of 0.015*
R *(kg/°C/NM) × △ ISA (°C) × air distance (NM) or 0.033 (lb/°C/NM) × △ ISA (°C)*
R *× air distance (NM).*

CORRECTION FOR DEVIATION FROM REFERENCE WEIGHT

The in cruise quick check tables are based on a reference initial weight.
A correction on the fuel consumption has to be made, when the actual initial weight is different from the reference initial weight.
If it is lower (or greater) than the reference weight, subtract (or add) the value given in the correction part of the table per 1000 kg or 1000 lb below (or above) the reference initial weight (see example 3.06.30 p2).

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - ONE ENGINE FAILURE
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 120 KG (6MIN)

REF. INITIAL WEIGHT = 55000 KG
PACK FLOW HI
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	150	200	220	240	250	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL150	FL200 FL220	FL240 FL250
200	1410 0.47	1187 0.44	1049 0.42	999 0.41	954 0.40	931 0.40	8	5	4
250	1757 0.58	1502 0.54	1338 0.51	1279 0.50	1227 0.49	1201 0.48	12	8	7
300	2101 1.09	1816 1.03	1627 1.00	1559 0.59	1499 0.57	1470 0.57	15	11	10
350	2444 1.19	2129 1.12	1915 1.09	1838 1.08	1771 1.06	1737 1.05	18	14	12
400	2785 1.30	2442 1.22	2203 1.17	2116 1.16	2041 1.14	2004 1.13	21	16	15
450	3125 1.41	2754 1.31	2490 1.26	2393 1.25	2311 1.22	2270 1.22	23	19	18
500	3464 1.52	3066 1.40	2776 1.35	2669 1.34	2581 1.31	2535 1.30	26	22	20
550	3801 2.03	3377 1.50	3061 1.44	2945 1.43	2849 1.39	2799 1.38	29	25	23
600	4136 2.13	3687 1.59	3346 1.53	3219 1.52	3117 1.48	3063 1.47	32	28	26
650	4469 2.24	3997 2.09	3630 2.02	3493 2.00	3384 1.56	3325 1.55	34	30	29
700	4801 2.36	4307 2.18	3913 2.11	3766 2.09	3650 2.05	3587 2.04	37	33	31
750	5132 2.47	4616 2.27	4196 2.20	4038 2.18	3916 2.13	3849 2.12	39	36	34
800	5461 2.58	4925 2.37	4478 2.28	4309 2.27	4180 2.22	4109 2.20	42	39	37
850	5788 3.09	5233 2.46	4760 2.37	4579 2.36	4443 2.31	4369 2.29	44	41	40
900	6115 3.20	5540 2.55	5041 2.46	4849 2.45	4706 2.39	4628 2.37	47	44	43
950	6439 3.31	5847 3.05	5321 2.55	5117 2.54	4968 2.48	4887 2.46	49	47	45
1000	6763 3.43	6154 3.14	5601 3.04	5385 3.03	5229 2.57	5145 2.54	51	49	48
1050	7084 3.54	6460 3.23	5880 3.13	5652 3.12	5490 3.05	5402 3.03	54	52	51
1100	7405 4.05	6766 3.33	6158 3.22	5918 3.21	5749 3.14	5658 3.11	56	55	54
1150	7724 4.16	7071 3.42	6436 3.31	6184 3.30	6008 3.23	5914 3.20	58	57	57
1200	8042 4.28	7376 3.51	6712 3.40	6449 3.39	6266 3.32	6169 3.28	61	60	60
1250	8358 4.39	7680 4.01	6988 3.49	6714 3.48	6524 3.40	6423 3.37	63	62	63
1300	8673 4.51	7984 4.10	7264 3.59	6978 3.57	6780 3.49	6676 3.46	66	65	66
1350	8990 5.02	8287 4.20	7538 4.08	7242 4.06	7036 3.58	6929 3.54	68	68	69
1400	9311 5.13	8590 4.29	7813 4.17	7505 4.15	7291 4.07	7180 4.03	70	71	72

ENGINE ANTI ICE ON
△FUEL = + 3 %

TOTAL ANTI ICE ON
△FUEL = + 6 %

FLIP23C A320-232 IAE V2527-A5 3610 03301.001011 0250300 .7801 .00100 120 0300350 55 0 100100 40100 18590 N0-03-06-30-013-140

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - ONE ENGINE FAILURE
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6MIN)

REF. INITIAL WEIGHT = 55000 KG
PACK FLOW HI
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	150	200	220	240	250	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL150	FL200 FL220	FL240 FL250
200	1377 0.46	1165 0.44	1026 0.42	978 0.42	936 0.41	916 0.41	7	6	5
250	1718 0.56	1476 0.54	1310 0.51	1255 0.51	1206 0.50	1183 0.49	9	9	8
300	2059 1.06	1785 1.03	1594 1.00	1530 0.59	1475 0.58	1448 0.57	11	12	11
350	2398 1.16	2093 1.13	1877 1.09	1805 1.08	1743 1.07	1713 1.06	14	15	14
400	2737 1.26	2401 1.22	2159 1.18	2079 1.17	2010 1.15	1977 1.14	16	18	17
450	3075 1.37	2708 1.32	2440 1.28	2352 1.26	2276 1.24	2240 1.23	19	21	20
500	3413 1.47	3014 1.41	2721 1.37	2624 1.35	2542 1.33	2502 1.31	21	24	23
550	3749 1.57	3320 1.51	3000 1.46	2895 1.44	2806 1.41	2764 1.40	24	26	26
600	4085 2.07	3624 2.01	3279 1.55	3166 1.53	3070 1.50	3024 1.49	26	29	29
650	4420 2.17	3928 2.10	3557 2.04	3436 2.02	3333 1.59	3284 1.57	29	32	32
700	4754 2.28	4231 2.20	3835 2.13	3705 2.11	3595 2.08	3543 2.06	31	35	35
750	5087 2.38	4533 2.30	4111 2.22	3973 2.20	3857 2.16	3801 2.14	33	38	38
800	5420 2.48	4834 2.40	4387 2.32	4240 2.29	4117 2.25	4058 2.23	36	41	41
850	5751 2.58	5135 2.50	4662 2.41	4507 2.38	4377 2.34	4315 2.32	38	44	44
900	6082 3.09	5434 2.59	4936 2.50	4773 2.46	4636 2.43	4570 2.40	41	46	47
950	6412 3.19	5733 3.09	5209 2.59	5038 2.55	4894 2.52	4825 2.49	43	49	50
1000	6741 3.29	6031 3.19	5481 3.09	5302 3.05	5151 3.00	5079 2.58	45	52	54
1050	7069 3.40	6328 3.29	5752 3.18	5566 3.14	5407 3.09	5333 3.07	48	55	57
1100	7397 3.50	6625 3.40	6023 3.27	5829 3.23	5662 3.18	5586 3.15	50	57	60
1150	7724 4.00	6920 3.50	6293 3.37	6091 3.32	5917 3.27	5838 3.24	53	60	63
1200	8051 4.11	7215 4.00	6562 3.46	6353 3.41	6171 3.36	6089 3.33	55	63	66
1250	8378 4.21	7509 4.10	6831 3.56	6614 3.50	6424 3.45	6340 3.42	57	66	69
1300	8703 4.31	7801 4.20	7098 4.05	6874 3.59	6677 3.54	6590 3.51	60	68	72
1350	9028 4.42	8092 4.31	7365 4.15	7133 4.08	6929 4.03	6839 3.59	62	71	75
1400	9353 4.52	8383 4.41	7631 4.24	7392 4.17	7180 4.12	7087 4.08	65	74	78

ENGINE ANTI ICE ON
△FUEL = + 1.5 %

TOTAL ANTI ICE ON
△FUEL = + 2%

FLIP23C A319–131 IAE V2522–A5 3610 03301.001011 0300250 .7801 .00100 110 0300350 55 0 100100 35100 18590 FCOM-N0–03–06–30–013–145

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - 1 ENGINE OUT
CRUISE : LONG RANGE - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6 MIN)

REF. INITIAL WEIGHT = 55000 KG
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	150	200	220	240	250	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL150	FL200 FL220	FL240 FL250
200	1396 0.47	1210 0.45	1084 0.43	1050 0.42	1009 0.42	1000 0.42	10	9	10
250	1744 0.57	1537 0.54	1391 0.52	1356 0.51	1310 0.51	1301 0.51	13	13	15
300	2090 1.07	1863 1.04	1698 1.02	1660 1.00	1609 1.00	1601 1.00	17	17	20
350	2436 1.18	2187 1.13	2003 1.11	1963 1.09	1907 1.09	1898 1.09	20	22	24
400	2780 1.28	2510 1.23	2306 1.20	2264 1.18	2204 1.17	2194 1.18	24	26	29
450	3123 1.38	2833 1.33	2609 1.30	2564 1.27	2499 1.26	2488 1.27	27	30	33
500	3466 1.49	3154 1.43	2910 1.39	2862 1.36	2794 1.35	2781 1.36	30	34	37
550	3807 1.59	3474 1.53	3210 1.48	3159 1.45	3088 1.44	3073 1.45	34	38	42
600	4146 2.10	3792 2.02	3509 1.58	3455 1.55	3381 1.53	3363 1.54	37	42	46
650	4485 2.20	4110 2.12	3807 2.07	3749 2.04	3673 2.01	3651 2.03	41	46	50
700	4823 2.31	4427 2.22	4103 2.16	4042 2.13	3964 2.10	3938 2.12	44	50	54
750	5159 2.41	4743 2.32	4399 2.26	4334 2.22	4254 2.19	4224 2.21	47	54	58
800	5495 2.52	5057 2.42	4693 2.35	4625 2.31	4543 2.28	4508 2.29	50	58	62
850	5829 3.02	5369 2.52	4986 2.45	4914 2.41	4831 2.36	4791 2.38	54	62	65
900	6162 3.13	5681 3.03	5278 2.54	5202 2.50	5118 2.45	5072 2.47	57	66	69
950	6494 3.23	5990 3.13	5570 3.04	5488 2.59	5404 2.54	5355 2.56	60	70	73
1000	6826 3.34	6299 3.23	5860 3.13	5773 3.08	5690 3.03	5636 3.05	63	74	77
1050	7156 3.44	6607 3.34	6149 3.22	6056 3.18	5975 3.11	5916 3.13	67	77	81
1100	7485 3.55	6913 3.44	6437 3.32	6339 3.27	6259 3.20	6195 3.22	70	81	85
1150	7813 4.05	7219 3.54	6725 3.41	6620 3.36	6542 3.29	6473 3.31	73	85	89
1200	8140 4.16	7523 4.05	7011 3.51	6900 3.46	6824 3.38	6750 3.39	76	89	93
1250	8467 4.26	7826 4.15	7296 4.00	7178 3.55	7106 3.46	7026 3.48	79	92	97
1300	8792 4.37	8129 4.26	7580 4.10	7456 4.05	7386 3.55	7301 3.57	82	96	101
1350	9117 4.48	8431 4.36	7863 4.19	7732 4.14	7666 4.04	7575 4.05	85	100	105
1400	9440 4.58	8732 4.46	8146 4.29	8007 4.24	7940 4.13	7848 4.14	89	103	109

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2 %	+ 6 %

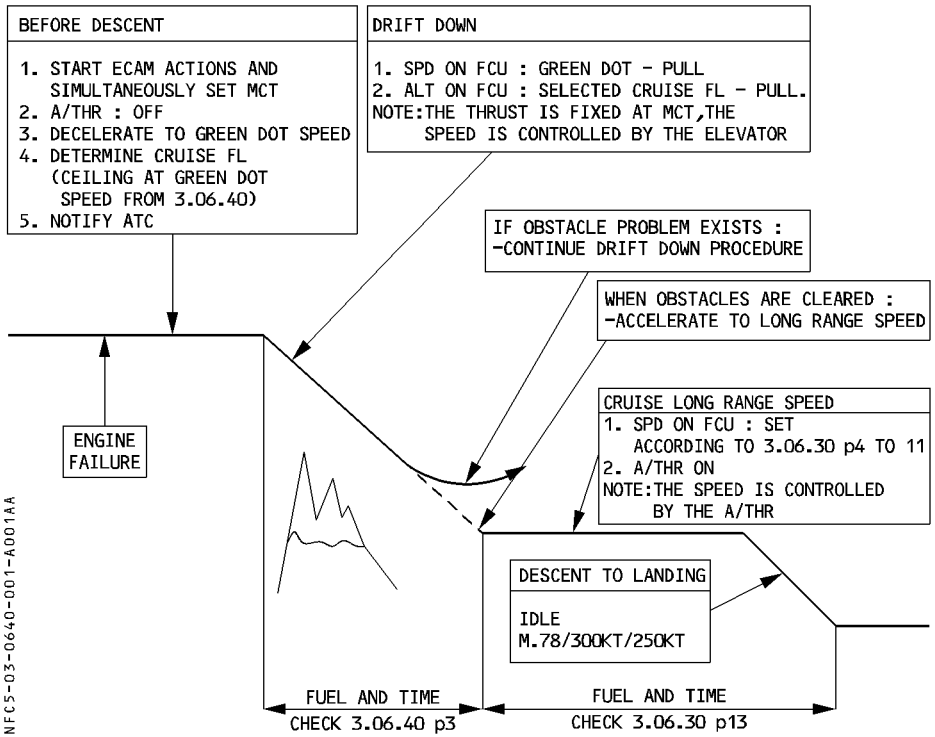
PROCEDURE

In order to maintain the highest possible level, the drift down procedure must be adopted. This requires maximum continuous thrust on the remaining engine at green dot speed.

- If, having reached drift down ceiling altitude, an obstacle problem remains, the drift down procedure must be maintained so as to fly an ascending cruise profile.
- If, after drift down, no obstacle problem remains, the speed should be allowed to increase to long range speed and maintained. The subsequent cruise should be made using either the long range speed by adjusting it as a function of aircraft weight or by maintaining the initial cruise speed.

Note : Due to the fact that the long range speed is higher than the green dot speed, the cruise will be made at an altitude lower than the drift down ceiling.

R



EXAMPLE

Given :

GW at engine failure = 55000 kg
FL at engine failure = 350
Temperature = ISA
Distance to destination airport = 1200 NM
No wind

Find :

Level off (drift down ceiling) : 26550 ft
(see 3.06.40 p3)
Distance : 251 NM
Fuel : 1350 kg
Time : 47 min
LRC ceiling : (see 3.06.20 p1) FL230
Cruise at long range speed (FL230) to landing
(weight = 55000 – 1350 = 53650 kg : Distance = 1200 – 251 = 949 NM)
Determine on (3.06.30 p13) time and fuel consumption at ISA conditions for a reference weight of 55000 kg. Interpolate the remaining air distance of 949 NM at FL230.
Fuel : 5446 kg
Time : 2 h 57 min
Correction due to actual in-cruise weight
$\triangle$Fuel = + 72 kg per 1000 kg above reference weight
$\triangle$Fuel = + 72 kg $\times$ (53.6 – 55) = – 101 kg

Result :

Total Fuel = 5446 – 101 + 1350 = 6797 kg
Time = 2 h 57 min + 47 min = 3 h 44 min

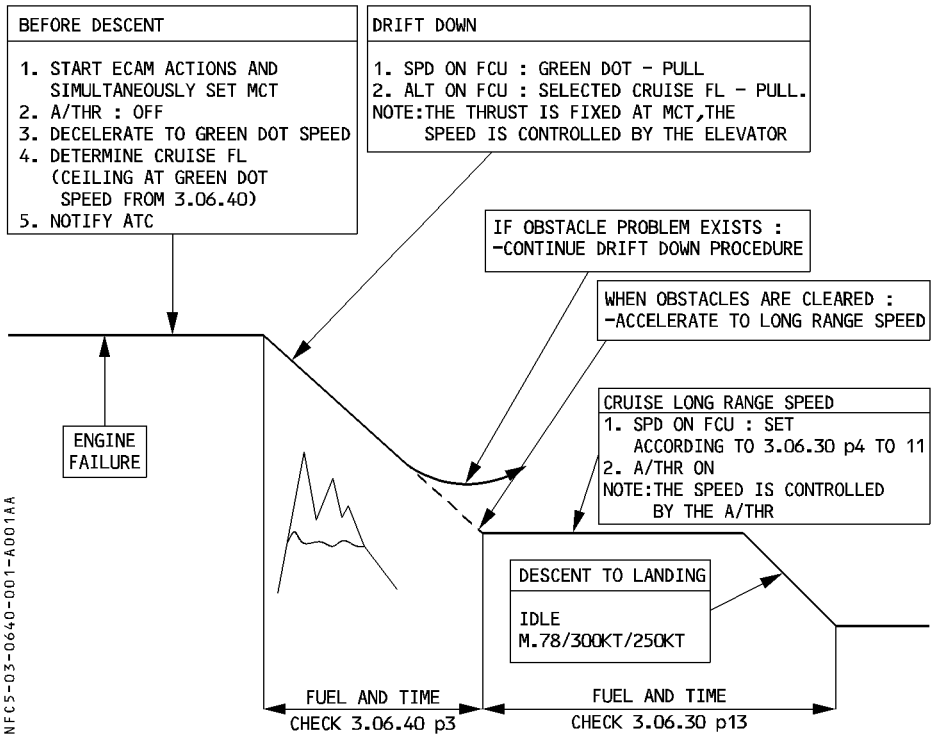
PROCEDURE

In order to maintain the highest possible level, the drift down procedure must be adopted. This requires maximum continuous thrust on the remaining engine at green dot speed.

- If, having reached drift down ceiling altitude, an obstacle problem remains, the drift down procedure must be maintained so as to fly an ascending cruise profile.
- If, after drift down, no obstacle problem remains, the speed should be allowed to increase to long range speed and maintained. The subsequent cruise should be made using either the long range speed by adjusting it as a function of aircraft weight or by maintaining the initial cruise speed.

Note : Due to the fact that the long range speed is higher than the green dot speed, the cruise will be made at an altitude lower than the drift down ceiling.

R



EXAMPLE

Given :

GW at engine failure = 62000 kg
FL at engine failure = 350
Temperature = ISA
Distance to destination airport = 1500 NM
No wind

Find :

R Level off (drift down ceiling) : 24300 ft
(see 3.06.40 p3)
Distance : 338 NM
R Fuel : 1800 kg
R Time : 1 h 04 min
R LRC ceiling : (see 3.06.20 p1) FL202
R Cruise at long range speed (FL200) to landing
R (weight = 62000 – 1800 = 60 200 kg : Distance = 1500 – 338 = 1162 NM)
Determine on (3.06.30 p13) time and fuel consumption at ISA conditions for a reference
R weight of 55000 kg. Interpolate the remaining air distance of 1162 NM at FL200.
R Fuel : 6503 kg
R Time : 3 h 34 min
Correction due to actual in-cruise weight
△Fuel = + 58 kg per 1000 kg above reference weight
R △Fuel = + 58 kg × (60.2 – 55) ∼ 302 kg

Result :

R Total Fuel = 6503 + 302 + 1800 = 8605 kg
R Time = 3 h 34 min + 1 h 04 min = 4 h 38 min

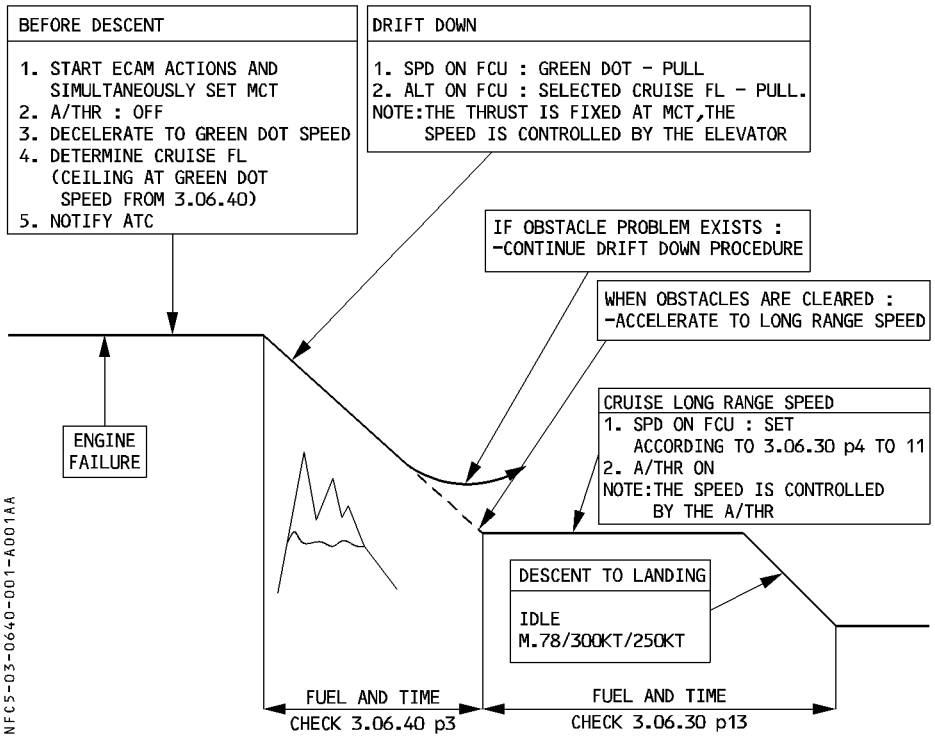
PROCEDURE

In order to maintain the highest possible level, the drift down procedure must be adopted. This requires maximum continuous thrust on the remaining engine at green dot speed.

- If, having reached drift down ceiling altitude, an obstacle problem remains, the drift down procedure must be maintained so as to fly an ascending cruise profile.
- If, after drift down, no obstacle problem remains, the speed should be allowed to increase to long range speed and maintained. The subsequent cruise should be made using either the long range speed by adjusting it as a function of aircraft weight or by maintaining the initial cruise speed.

Note : Due to the fact that the long range speed is higher than the green dot speed, the cruise will be made at an altitude lower than the drift down ceiling.

R



EXAMPLE

Given :

GW at engine failure = 62000 kg
FL at engine failure = 350
Temperature = ISA
Distance to destination airport = 1500 NM
No wind

Find :

Level off (drift down ceiling) : 25600 ft
(see 3.06.40 p3)
Distance : 369 NM
Fuel : 2000 kg
Time : 1 h 07 min

R LRC ceiling : (see 3.06.20 p1) FL216
R Cruise at long range speed (FL210) to landing
(weight = 62000 – 2000 = 60000 kg : Distance = 1500 – 369 = 1131 NM)
Determine on (3.06.30 p13) time and fuel consumption at ISA conditions for a reference
R weight of 55000 kg. Interpolate the remaining air distance of 1131 NM at FL210.
R Fuel : 6091 kg
R Time : 3 h 30 min
Correction due to actual in-cruise weight
R △Fuel = + 59 kg per 1000 kg above reference weight
R △Fuel = + 59 kg × (60 – 55) ~ 295 kg

Result :

R Total Fuel = 6091 + 295 + 2000 = 8386 kg
R Time = 3 h 30 min + 1 h 07 min = 4 h 37 min

GROSS FLIGHT PATH DESCENT AT GREEN DOT SPEED - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

DISTANCE (NM) **TIME (MIN)**
INITIAL SPEED (KT) **FUEL (1000KG)**
LEVEL OFF (FT)

INIT. GW (1000KG)	INITIAL FLIGHT LEVEL 230	250	270	290	310	330	350	370	390
42						162 31 187 0.8 32000	228 44 189 1.0 32100	266 51 191 1.2 32200	296 56 193 1.3 32300
44					105 21 189 0.5 30600	206 40 191 1.0 30900	252 48 193 1.2 31000	283 54 195 1.3 31100	308 58 197 1.4 31100
46					162 32 193 0.8 29700	227 44 195 1.1 29900	268 51 197 1.3 29900	297 56 199 1.4 30000	320 60 201 1.5 30000
48				63 12 195 0.3 28800	177 34 197 0.9 29000	222 43 199 1.1 29100	252 48 201 1.3 29100	277 52 203 1.3 29100	298 56 205 1.4 29200
50				128 25 199 0.7 28100	189 37 201 1.0 28300	224 43 203 1.2 28300	250 47 205 1.3 28400	272 51 207 1.4 28400	292 54 209 1.4 28400
52				153 30 203 0.9 27500	198 38 205 1.1 27500	227 43 207 1.2 27600	251 47 209 1.3 27600	271 50 211 1.4 27600	289 53 213 1.4 27700
54			72 14 205 0.4 26600	168 32 207 1.0 26800	204 39 209 1.2 26800	230 43 211 1.3 26900	251 47 213 1.3 26900	269 50 215 1.4 26900	286 52 217 1.5 26900
56			127 25 209 0.8 26000	178 34 211 1.1 26100	208 39 213 1.2 26100	232 44 215 1.3 26200	251 47 217 1.4 26200	269 49 219 1.4 26200	285 52 221 1.5 26200
58			146 28 213 0.9 25300	186 35 215 1.1 25400	213 40 217 1.3 25500	234 44 219 1.3 25500	252 47 221 1.4 25500	268 49 223 1.5 25500	285 51 225 1.5 25500
60		101 19 215 0.7 24500	168 32 217 1.1 24700	199 38 219 1.2 24700	222 42 221 1.3 24800	240 44 223 1.4 24800	257 47 225 1.5 24800	263 48 227 1.5 24800	287 52 229 1.6 24900
62		139 27 219 1.0 23800	186 35 221 1.2 23900	214 40 223 1.4 24000	235 44 225 1.4 24000	253 47 227 1.5 24000	268 49 229 1.6 24000	284 51 231 1.6 24100	298 53 233 1.7 24100
64	59 11 221 0.4 22800	162 31 223 1.1 23100	200 38 225 1.3 23100	222 42 227 1.4 23200	243 45 229 1.5 23200	261 48 231 1.6 23200	276 50 233 1.6 23300	290 52 235 1.7 23300	304 54 237 1.7 23300
66	121 23 225 0.9 22200	180 34 227 1.3 22300	210 40 229 1.4 22400	232 43 231 1.5 22400	251 46 233 1.6 22500	266 49 235 1.7 22500	281 51 237 1.7 22500	295 53 239 1.8 22500	
68	191 37 229 1.4 21200	235 45 231 1.7 21300	263 50 233 1.8 21400	283 53 235 1.9 21400	300 56 237 2.0 21500	315 58 239 2.0 21500	328 60 241 2.1 21600	340 61 243 2.1 21600	

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 8 %	+ 20 %
TIME	+ 6 %	+ 11 %
DISTANCE	+ 6 %	+ 15 %
LEVEL OFF	- 150 FT	- 1100 FT

GROSS FLIGHT PATH DESCENT AT GREEN DOT SPEED - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA+10
CG=33.0%

DISTANCE (NM) **TIME (MIN)**
INITIAL SPEED (KT) **FUEL (1000KG)**
LEVEL OFF (FT)

INIT. GW (1000KG)	INITIAL FLIGHT LEVEL 230	250	270	290	310	330	350	370	390
42						169 32 187 0.8 31900	236 44 189 1.1 32100	275 51 191 1.2 32200	306 56 193 1.3 32200
44					114 22 189 0.6 30600	213 40 191 1.0 30900	259 49 193 1.2 31000	292 54 195 1.4 31000	319 59 197 1.4 31100
46					166 32 193 0.9 29700	232 44 195 1.2 29800	273 51 197 1.3 29900	305 57 199 1.5 29900	330 61 201 1.5 30000
48				69 13 195 0.4 28700	183 35 197 1.0 28900	228 43 199 1.2 29000	260 48 201 1.3 29100	284 52 203 1.4 29100	307 56 205 1.5 29100
50				96 18 199 0.5 28000	195 37 201 1.1 28200	231 43 203 1.2 28300	258 48 205 1.3 28300	281 52 207 1.4 28300	301 55 209 1.5 28400
52				158 30 203 0.9 27400	204 38 205 1.1 27500	234 44 207 1.3 27600	259 48 209 1.4 27600	279 51 211 1.4 27600	299 54 213 1.5 27600
54			76 14 205 0.5 26500	173 33 207 1.0 26700	210 39 209 1.2 26800	236 44 211 1.3 26800	258 47 213 1.4 26900	279 51 215 1.5 26900	296 53 217 1.5 26900
56			131 25 209 0.8 26000	184 34 211 1.1 26100	215 40 213 1.2 26100	239 44 215 1.3 26100	259 47 217 1.4 26200	277 50 219 1.5 26200	294 52 221 1.5 26200
58			151 28 213 1.0 25300	192 36 215 1.2 25400	219 40 217 1.3 25400	241 44 219 1.4 25500	259 47 221 1.5 25500	277 50 223 1.5 25500	293 52 225 1.6 25500
60		106 20 215 0.7 24500	173 32 217 1.1 24600	206 38 219 1.3 24700	229 42 221 1.4 24700	249 45 223 1.5 24800	266 48 225 1.5 24800	282 50 227 1.6 24800	296 52 229 1.6 24800
62		144 27 219 1.0 23800	192 36 221 1.3 23900	220 41 223 1.4 23900	242 44 225 1.5 24000	261 47 227 1.6 24000	278 50 229 1.6 24000	294 52 231 1.7 24000	308 54 233 1.7 24100
64	64 12 221 0.5 22700	167 31 223 1.2 23000	206 38 225 1.4 23100	231 42 227 1.5 23200	251 46 229 1.6 23200	268 48 231 1.6 23200	285 51 233 1.7 23200	300 53 235 1.8 23300	305 53 237 1.7 23300
66	95 18 225 0.7 22100	184 34 227 1.3 22300	217 40 229 1.5 22400	239 44 231 1.6 22400	258 47 233 1.7 22400	275 49 235 1.7 22500	291 52 237 1.8 22500	305 54 239 1.8 22500	
68	195 37 229 1.4 21100	243 45 231 1.7 21300	271 50 233 1.9 21300	292 53 235 2.0 21400	310 56 237 2.1 21500	325 59 239 2.1 21500	339 61 241 2.2 21500	352 62 243 2.2 21600	

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 8 %	+ 20 %
TIME	+ 6 %	+ 11 %
DISTANCE	+ 6 %	+ 15 %
LEVEL OFF	- 150 FT	- 1100 FT

R

GROSS FLIGHT PATH DESCENT AT GREEN DOT SPEED

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA
CG=33.0%

DISTANCE (NM) **TIME (MIN)**
INITIAL SPEED(KT) **FUEL(1000KG)**
LEVEL OFF (FT)

INIT. GW (1000KG)	INITIAL FLIGHT LEVEL 230	250	270	290	310	330	350	370	390
50					154 30 191 0.8 30000	215 42 193 1.0 30100	250 48 195 1.2 30100	279 53 197 1.3 30200	300 57 199 1.3 30200
52				97 19 193 0.5 28700	209 41 195 1.1 29000	252 49 197 1.2 29100	282 54 199 1.4 29200	306 58 201 1.4 29200	326 62 203 1.5 29300
54				173 34 197 0.9 27900	238 47 199 1.2 28000	275 53 201 1.4 28100	301 58 203 1.5 28200	322 61 205 1.6 28200	342 65 207 1.6 28200
56			103 21 199 0.6 26600	211 42 201 1.1 26900	259 51 203 1.4 27000	291 56 205 1.5 27100	315 61 207 1.6 27200	334 64 209 1.7 27200	353 67 211 1.7 27200
58			165 33 203 0.9 25800	230 45 205 1.3 26000	269 52 207 1.5 26100	298 58 209 1.6 26100	320 61 211 1.7 26200	340 64 213 1.7 26200	356 67 215 1.8 26200
60		98 20 205 0.6 24700	199 39 207 1.2 25000	247 48 209 1.4 25100	281 55 211 1.6 25200	306 59 213 1.7 25200	327 62 215 1.7 25200	345 65 217 1.8 25300	361 68 219 1.8 25300
62		163 33 209 1.0 23900	229 45 211 1.4 24000	268 52 213 1.6 24100	297 58 215 1.7 24200	320 61 217 1.8 24300	338 64 219 1.8 24300	355 67 221 1.9 24300	371 69 223 1.9 24300
64	98 20 211 0.6 22700	201 40 213 1.3 23000	250 49 215 1.5 23100	283 55 217 1.7 23200	309 60 219 1.8 23200	330 63 221 1.9 23300	349 66 223 1.9 23300	365 69 225 2.0 23400	381 71 227 2.0 23400
66	153 31 215 1.0 21900	228 45 217 1.4 22100	266 52 219 1.7 22200	297 58 221 1.8 22200	321 62 223 1.9 22300	340 65 225 2.0 22300	358 68 227 2.0 22400	374 70 229 2.1 22400	388 72 231 2.1 22400
68	153 30 219 1.0 21400	207 41 221 1.3 21500	243 47 223 1.5 21500	272 52 225 1.7 21500	295 56 227 1.8 21600	315 60 229 1.8 21600	332 62 231 1.9 21600	349 65 233 2.0 21600	364 67 235 2.0 21600
70	168 33 223 1.1 20800	211 41 225 1.4 20900	242 47 227 1.5 21000	266 51 229 1.7 21000	288 55 231 1.8 21000	306 58 233 1.8 21000	321 60 235 1.9 21000	336 62 237 1.9 21100	
72	184 36 227 1.3 20300	221 43 229 1.5 20300	248 48 231 1.6 20400	271 52 233 1.7 20400	290 55 235 1.8 20400	307 57 237 1.9 20500	323 60 239 1.9 20500	337 62 241 2.0 20500	
74	196 38 231 1.4 19700	228 44 233 1.5 19800	253 48 235 1.7 19800	275 52 237 1.8 19800	294 55 239 1.8 19800	311 58 241 1.9 19900	327 60 243 2.0 19900	341 62 245 2.0 19900	
76	204 39 235 1.4 19200	232 44 237 1.6 19200	256 48 239 1.7 19200	276 52 241 1.8 19300	294 54 243 1.9 19300	309 57 245 1.9 19300	324 59 247 2.0 19300	338 61 249 2.0 19300	
78	214 41 239 1.5 18600	239 45 241 1.7 18700	260 49 243 1.8 18700	280 52 245 1.9 18700	297 55 247 1.9 18800	313 57 249 2.0 18800	327 59 251 2.0 18800		

CORRECTIONS	DISTANCE	TIME	FUEL	LEVEL OFF
ENGINE ANTI ICE ON	+ 15 %	+ 15 %	+ 20 %	– 800 FT
TOTAL ANTI ICE ON	+ 20 %	+ 25 %	+ 30 %	– 1900 FT

R

GROSS FLIGHT PATH DESCENT AT GREEN DOT SPEED

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA+10
CG=33.0%

DISTANCE (NM) **TIME (MIN)**
INITIAL SPEED(KT) **FUEL(1000KG)**
LEVEL OFF (FT)

INIT. GW (1000KG)	INITIAL FLIGHT LEVEL 230	250	270	290	310	330	350	370	390
50					162 31 191 0.8 29900	221 42 193 1.1 30000	259 49 195 1.2 30100	288 54 197 1.3 30200	310 57 199 1.4 30200
52				106 21 193 0.6 28700	214 41 195 1.1 29000	260 50 197 1.3 29100	291 55 199 1.4 29100	316 59 201 1.5 29200	336 62 203 1.6 29200
54				180 35 197 1.0 27800	245 47 199 1.3 28000	284 54 201 1.4 28100	311 59 203 1.5 28100	334 62 205 1.6 28200	351 65 207 1.7 28200
56			110 22 199 0.6 26600	215 42 201 1.2 26900	264 51 203 1.4 27000	299 57 205 1.6 27100	324 61 207 1.7 27100	346 64 209 1.7 27200	364 67 211 1.8 27200
58			170 33 203 1.0 25800	235 45 205 1.3 26000	277 53 207 1.5 26100	306 58 209 1.6 26100	329 62 211 1.7 26200	348 65 213 1.8 26200	365 67 215 1.8 26200
60		105 21 205 0.6 24600	205 40 207 1.2 24900	254 49 209 1.5 25000	288 55 211 1.6 25100	314 59 213 1.7 25200	337 63 215 1.8 25200	355 66 217 1.9 25200	372 68 219 1.9 25300
62		168 33 209 1.0 23800	235 46 211 1.4 24000	275 53 213 1.6 24100	305 58 215 1.7 24200	329 62 217 1.8 24200	349 65 219 1.9 24300	366 68 221 2.0 24300	381 70 223 2.0 24300
64	106 21 211 0.7 22600	207 40 213 1.3 22900	257 50 215 1.6 23100	292 56 217 1.7 23200	318 60 219 1.9 23200	341 64 221 2.0 23300	359 67 223 2.0 23300	376 69 225 2.1 23300	390 71 227 2.1 23400
66	155 30 215 1.0 21900	233 45 217 1.5 22000	275 53 219 1.7 22100	304 58 221 1.9 22200	330 62 223 2.0 22300	350 66 225 2.0 22300	369 69 227 2.1 22300	384 71 229 2.2 22400	401 73 231 2.2 22400
68	159 31 219 1.1 21300	213 41 221 1.4 21400	250 48 223 1.6 21500	279 53 225 1.7 21500	304 57 227 1.8 21600	323 60 229 1.9 21600	343 63 231 2.0 21600	358 65 233 2.0 21600	375 68 235 2.1 21600
70	174 34 223 1.2 20800	216 41 225 1.4 20900	249 47 227 1.6 20900	275 52 229 1.7 21000	296 55 231 1.8 21000	316 58 233 1.9 21000	333 61 235 1.9 21000	348 63 237 2.0 21000	
72	191 37 227 1.3 20300	227 43 229 1.5 20300	256 48 231 1.7 20400	279 52 233 1.8 20400	300 55 235 1.9 20400	318 58 237 1.9 20400	333 60 239 2.0 20500	349 62 241 2.0 20500	
74	201 38 231 1.4 19700	234 44 233 1.6 19700	261 49 235 1.7 19800	283 52 237 1.8 19800	302 55 239 1.9 19800	321 58 241 2.0 19800	336 61 243 2.0 19900	351 62 245 2.1 19900	
76	209 40 235 1.5 19100	238 45 237 1.6 19200	262 49 239 1.8 19200	284 52 241 1.9 19300	302 55 243 1.9 19300	319 57 245 2.0 19300	334 60 247 2.1 19300	349 62 249 2.1 19300	
78	219 41 239 1.6 18600	246 46 241 1.7 18700	269 49 243 1.8 18700	288 52 245 1.9 18700	305 55 247 2.0 18700	322 57 249 2.1 18800	336 59 251 2.1 18800		

CORRECTIONS	**DISTANCE**	**TIME**	**FUEL**	**LEVEL OFF**
ENGINE ANTI ICE ON	+ 15 %	+ 15 %	+ 20 %	– 800 FT
TOTAL ANTI ICE ON	+ 20 %	+ 25 %	+ 30 %	– 1900 FT

GROSS FLIGHT PATH DESCENT AT GREEN DOT SPEED

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA
CG=33.0%

DISTANCE (NM) **TIME (MIN)**
INITIAL SPEED(KT) **FUEL(1000KG)**
LEVEL OFF (FT)

INIT. GW (1000KG)	INITIAL FLIGHT LEVEL 230	250	270	290	310	330	350	370	390
48						167 31 194 .8 32100	241 45 196 1.1 32300	281 52 198 1.2 32300	311 56 200 1.3 32400
50					40 8 196 .2 30900	207 39 198 1.0 31300	261 48 200 1.2 31400	295 54 202 1.3 31400	320 58 204 1.4 31500
52					152 29 200 .8 30300	233 43 202 1.1 30400	274 50 204 1.3 30500	303 55 206 1.4 30600	326 59 208 1.5 30600
54				40 8 202 .2 28900	213 40 204 1.1 29400	266 49 206 1.3 29600	297 54 208 1.4 29600	323 59 210 1.5 29700	341 61 212 1.6 29700
56				169 32 206 .9 28200	254 48 208 1.3 28400	297 55 210 1.5 28500	326 60 212 1.6 28600	348 63 214 1.7 28600	368 66 216 1.8 28700
58			70 13 208 .4 26800	224 42 210 1.2 27300	282 53 212 1.5 27400	318 59 214 1.7 27500	343 63 216 1.8 27600	366 66 218 1.8 27600	384 69 220 1.9 27600
60			174 33 212 1.0 26100	256 48 214 1.4 26300	302 56 216 1.7 26500	334 62 218 1.8 26500	359 66 220 1.9 26600	378 69 222 1.9 26600	396 71 224 2.0 26600
62		82 16 214 .5 24800	221 42 216 1.3 25200	282 53 218 1.6 25400	319 59 220 1.8 25500	347 64 222 1.9 25500	369 67 224 2.0 25600	388 70 226 2.0 25600	406 73 228 2.1 25700
64		178 34 218 1.1 24100	260 49 220 1.6 24300	307 57 222 1.8 24500	339 63 224 1.9 24500	363 67 226 2.0 24600	384 70 228 2.1 24600	401 73 230 2.2 24700	416 75 232 2.2 24700
66	96 19 220 .6 22800	229 44 222 1.4 23200	289 55 224 1.8 23400	328 61 226 2.0 23500	355 66 228 2.1 23500	379 70 230 2.2 23600	399 73 232 2.3 23600	414 75 234 2.3 23700	430 77 236 2.3 23700
68	184 35 224 1.2 22000	265 50 226 1.7 22300	313 59 228 2.0 22400	346 65 230 2.1 22500	371 69 232 2.2 22600	392 72 234 2.3 22600	412 75 236 2.4 22600	427 77 238 2.4 22700	440 79 240 2.5 22700
70	174 33 228 1.2 21500	242 46 230 1.6 21600	287 54 232 1.8 21600	320 59 234 2.0 21700	346 64 236 2.1 21700	368 67 238 2.2 21700	389 70 240 2.3 21800	406 73 242 2.3 21800	
72	187 36 232 1.3 21000	239 45 234 1.6 21100	275 51 236 1.8 21100	304 56 238 1.9 21200	327 60 240 2.0 21200	345 62 242 2.1 21200	363 65 244 2.1 21200	377 67 246 2.2 21300	
74	205 38 236 1.4 20500	246 46 238 1.6 20600	278 51 240 1.8 20600	303 55 242 1.9 20700	322 58 244 2.0 20700	342 61 246 2.1 20700	358 64 248 2.2 20700	372 66 250 2.2 20700	

CORRECTIONS	DISTANCE	TIME	FUEL	LEVEL OFF
ENGINE ANTI ICE ON	+ 15 %	+ 11.5 %	+ 18 %	– 600 FT
TOTAL ANTI ICE ON	+ 25 %	+ 19.5 %	+ 30 %	– 1600 FT

10E -08F0A319–131 IAE V2522–A5 23500010C6KG330 0 018590 0 0 3 .0 .0 .00 0 02 1.000 1.000 .000 0 FCOM-N0–03–06–40–003–145

GROSS FLIGHT PATH DESCENT AT GREEN DOT SPEED

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA+10
CG=33.0%

DISTANCE (NM) **TIME (MIN)**
INITIAL SPEED(KT) **FUEL(1000KG)**
LEVEL OFF (FT)

INIT. GW (1000KG)	INITIAL FLIGHT LEVEL 230	250	270	290	310	330	350	370	390
48						175 32 194 .8 32100	250 45 196 1.1 32200	293 53 198 1.3 32300	322 57 200 1.4 32300
50					59 11 196 .3 30900	214 39 198 1.0 31200	269 49 200 1.2 31300	304 54 202 1.4 31400	331 59 204 1.5 31400
52					161 30 200 .8 30200	240 44 202 1.2 30400	282 51 204 1.3 30500	313 56 206 1.4 30500	337 59 208 1.5 30500
54				57 11 202 .3 28900	222 41 204 1.1 29400	275 50 206 1.4 29500	310 56 208 1.5 29600	335 60 210 1.6 29600	356 63 212 1.7 29700
56				178 33 206 1.0 28100	263 48 208 1.4 28400	306 56 210 1.6 28500	336 60 212 1.7 28500	360 64 214 1.8 28600	380 67 216 1.8 28600
58			85 16 208 .5 26800	231 43 210 1.3 27200	291 53 212 1.6 27400	328 59 214 1.7 27500	355 64 216 1.8 27500	377 67 218 1.9 27600	396 70 220 2.0 27600
60			182 34 212 1.1 26100	265 49 214 1.5 26300	312 57 216 1.7 26400	345 62 218 1.9 26500	368 66 220 1.9 26500	390 69 222 2.0 26600	408 72 224 2.1 26600
62		95 18 214 .6 24800	229 43 216 1.4 25200	290 53 218 1.7 25400	330 60 220 1.9 25400	357 64 222 2.0 25500	381 68 224 2.1 25600	401 71 226 2.1 25600	418 74 228 2.2 25600
64		187 35 218 1.2 24000	268 50 220 1.6 24300	315 58 222 1.9 24400	349 64 224 2.0 24500	373 67 226 2.1 24500	395 71 228 2.2 24600	413 73 230 2.3 24600	430 76 232 2.3 24600
66	107 20 220 .7 22700	237 44 222 1.5 23100	298 55 224 1.8 23300	338 62 226 2.0 23400	367 67 228 2.2 23500	391 70 230 2.3 23600	410 73 232 2.3 23600	427 76 234 2.4 23600	444 78 236 2.4 23600
68	191 36 224 1.3 22000	273 51 226 1.8 22200	322 60 228 2.0 22400	356 65 230 2.2 22400	383 70 232 2.3 22500	405 73 234 2.4 22600	424 76 236 2.5 22600	441 78 238 2.5 22600	455 80 240 2.6 22600
70	178 33 228 1.2 21500	246 46 230 1.6 21600	294 54 232 1.9 21600	327 60 234 2.0 21700	356 64 236 2.2 21700	379 68 238 2.3 21700	399 71 240 2.4 21700	418 73 242 2.4 21800	
72	193 36 232 1.3 21000	245 45 234 1.6 21100	283 52 236 1.8 21100	312 56 238 2.0 21200	336 60 240 2.1 21200	356 63 242 2.2 21200	375 66 244 2.2 21200	389 68 246 2.3 21200	
74	211 39 236 1.5 20500	254 46 238 1.7 20600	285 52 240 1.9 20600	312 56 242 2.0 20600	334 59 244 2.1 20700	353 62 246 2.2 20700	368 64 248 2.2 20700	385 66 250 2.3 20700	

CORRECTIONS	DISTANCE	TIME	FUEL	LEVEL OFF
ENGINE ANTI ICE ON	+ 15 %	+ 11.5 %	+ 18 %	– 600 FT
TOTAL ANTI ICE ON	+ 25 %	+ 19.5 %	+ 30 %	– 1600 FT

10E -08F0A319–131 IAE V2522–A5 23500010C6KG330 0 018590 0 0 3 .0 .0 .00 0 02 1.000 1.000 .000 10 FCOM-N0–03–06–40–004–145

GROSS FLIGHT PATH DESCENT AT GREEN DOT SPEED - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA+15
CG=33.0%

DISTANCE (NM) **TIME (MIN)**
INITIAL SPEED (KT) **FUEL (1000KG)**
LEVEL OFF (FT)

INIT. GW (1000KG)	INITIAL FLIGHT LEVEL 230	250	270	290	310	330	350	370	390
42					109 21 185 0.5 30600	214 41 187 1.0 30900	263 50 189 1.2 31100	295 55 191 1.3 31100	323 60 193 1.4 31200
44					164 32 189 0.8 29700	233 45 191 1.1 29800	276 52 193 1.3 29900	308 58 195 1.4 29900	338 63 197 1.5 30000
46				64 13 191 0.3 28700	176 34 193 0.9 29000	224 43 195 1.1 29000	255 48 197 1.2 29100	280 52 199 1.3 29100	303 56 201 1.4 29100
48				90 17 195 0.5 28100	187 36 197 1.0 28200	224 42 199 1.1 28300	251 47 201 1.2 28300	273 51 203 1.3 28400	294 54 205 1.4 28400
50				152 29 199 0.8 27500	197 37 201 1.0 27500	226 42 203 1.2 27600	251 47 205 1.3 27600	269 50 207 1.3 27600	290 53 209 1.4 27700
52			88 17 201 0.5 26600	168 32 203 1.0 26800	204 38 205 1.1 26900	230 43 207 1.2 26900	253 47 209 1.3 26900	272 50 211 1.4 26900	289 52 213 1.4 27000
54			87 17 205 0.5 26000	180 34 207 1.0 26100	210 39 209 1.2 26200	234 43 211 1.3 26200	252 46 213 1.3 26200	272 49 215 1.4 26300	289 52 217 1.4 26300
56			147 28 209 0.9 25400	188 35 211 1.1 25500	214 40 213 1.2 25500	236 43 215 1.3 25500	254 46 217 1.4 25600	272 49 219 1.4 25600	288 51 221 1.5 25600
58		83 16 211 0.5 24500	170 32 213 1.1 24700	202 38 215 1.2 24800	223 41 217 1.3 24800	243 44 219 1.4 24900	260 47 221 1.4 24900	275 49 223 1.5 24900	290 51 225 1.5 24900
60		146 28 215 1.0 23800	194 36 217 1.2 23900	222 41 219 1.4 24000	242 44 221 1.5 24000	261 48 223 1.5 24100	277 50 225 1.6 24100	293 52 227 1.6 24100	308 54 229 1.7 24100
62	66 12 217 0.5 22800	171 32 219 1.2 23000	209 39 221 1.4 23100	235 43 223 1.5 23200	254 47 225 1.6 23200	272 49 227 1.6 23200	288 52 229 1.7 23300	302 54 231 1.7 23300	317 56 233 1.8 23300
64	131 25 221 0.9 22100	191 36 223 1.3 22300	223 41 225 1.5 22300	247 45 227 1.6 22400	263 48 229 1.6 22400	280 51 231 1.7 22400	294 53 233 1.7 22500	310 55 235 1.8 22500	
66	230 44 225 1.7 20900	285 54 227 2.0 21000	319 60 229 2.2 21100	341 63 231 2.3 21100	363 67 233 2.4 21200	381 70 235 2.5 21200	396 72 237 2.5 21200	412 74 239 2.6 21300	
68	190 36 229 1.4 20400	231 43 231 1.6 20400	258 48 233 1.8 20400	279 51 235 1.9 20500	297 54 237 1.9 20500	314 57 239 2.0 20500	330 59 241 2.1 20500		

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 8 %	+ 20 %
TIME	+ 6 %	+ 11 %
DISTANCE	+ 6 %	+ 15 %
LEVEL OFF	- 150 FT	- 1100 FT

GROSS FLIGHT PATH DESCENT AT GREEN DOT SPEED - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA+20
CG=33.0%

DISTANCE (NM) **TIME (MIN)**
INITIAL SPEED (KT) **FUEL (1000KG)**
LEVEL OFF (FT)

INIT. GW (1000KG)	INITIAL FLIGHT LEVEL 230	250	270	290	310	330	350	370	390
42					171 34 185 0.8 29400	232 45 187 1.1 29600	272 52 189 1.2 29600	304 58 191 1.3 29700	330 62 193 1.4 29700
44				85 17 187 0.4 28500	188 37 189 0.9 28700	231 45 191 1.1 28800	262 50 193 1.2 28800	288 54 195 1.3 28800	311 58 197 1.4 28900
46				152 30 191 0.8 27900	203 39 193 1.0 27900	238 46 195 1.2 28000	264 50 197 1.2 28000	286 54 199 1.3 28100	307 57 201 1.4 28100
48			43 9 193 0.2 26900	175 34 195 0.9 27200	215 41 197 1.1 27200	244 47 199 1.2 27300	267 50 201 1.3 27300	288 54 203 1.4 27300	308 57 205 1.4 27300
50			127 25 197 0.7 26400	194 37 199 1.1 26500	226 43 201 1.2 26500	250 47 203 1.3 26600	272 51 205 1.4 26600	291 54 207 1.4 26600	308 57 209 1.5 26600
52			161 31 201 0.9 25700	207 40 203 1.2 25800	235 45 205 1.3 25800	258 49 207 1.4 25900	276 52 209 1.4 25900	294 54 211 1.5 25900	312 57 213 1.5 25900
54		80 15 203 0.5 24800	182 35 205 1.1 25100	219 42 207 1.3 25100	243 46 209 1.4 25200	263 49 211 1.4 25200	282 52 213 1.5 25200	297 55 215 1.5 25200	314 57 217 1.6 25200
56		169 33 207 1.1 24100	228 44 209 1.4 24200	257 49 211 1.5 24300	277 52 213 1.6 24400	296 55 215 1.7 24400	312 58 217 1.7 24400	328 60 219 1.8 24400	343 62 221 1.8 24500
58	89 17 209 0.6 22800	214 41 211 1.4 23200	257 49 213 1.6 23300	283 54 215 1.7 23400	303 57 217 1.8 23400	320 60 219 1.9 23400	334 62 221 1.9 23500	350 64 223 1.9 23500	365 66 225 2.0 23500
60	171 33 213 1.2 22000	244 47 215 1.6 22300	279 53 217 1.8 22300	303 57 219 1.9 22400	321 60 221 2.0 22400	337 63 223 2.0 22500	352 65 225 2.1 22500	367 67 227 2.1 22500	381 69 229 2.1 22500
62	231 45 217 1.6 20800	298 58 219 2.0 20900	335 64 221 2.2 21000	361 69 223 2.3 21000	382 72 225 2.4 21100	400 75 227 2.5 21100	417 78 229 2.5 21100	433 80 231 2.6 21200	
64	198 38 221 1.4 20300	243 47 223 1.6 20400	272 52 225 1.8 20400	294 55 227 1.9 20400	313 58 229 2.0 20400	330 61 231 2.0 20400	346 63 233 2.1 20400		
66	177 34 225 1.2 20000	214 40 227 1.5 20000	239 45 229 1.6 20000	258 48 231 1.7 20000	275 51 233 1.7 20000	291 53 235 1.8 20000	306 55 237 1.8 20000		
68	236 45 229 1.7 19300	264 50 231 1.9 19400	283 53 233 1.9 19400	299 55 235 2.0 19400	313 58 237 2.0 19500	327 60 239 2.1 19500			

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 8 %	+ 20 %
TIME	+ 6 %	+ 11 %
DISTANCE	+ 6 %	+ 15 %
LEVEL OFF	- 150 FT	- 1100 FT

GROSS FLIGHT PATH DESCENT AT GREEN DOT SPEED

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA+15
CG=33.0%

DISTANCE (NM) **TIME (MIN)**
INITIAL SPEED(KT) **FUEL(1000KG)**
LEVEL OFF (FT)

INIT. GW (1000KG)	INITIAL FLIGHT LEVEL 230	250	270	290	310	330	350	370	390
48					20 4 192 .1 30900	213 39 194 1.0 31400	273 50 196 1.2 31500	311 56 198 1.4 31600	338 60 200 1.4 31600
50					159 29 196 .8 30300	245 45 198 1.2 30500	290 53 200 1.3 30600	323 58 202 1.4 30600	347 62 204 1.5 30700
52				65 12 198 .3 28900	224 41 200 1.1 29300	279 51 202 1.4 29500	315 57 204 1.5 29600	344 62 206 1.6 29600	365 65 208 1.7 29700
54				184 34 202 1.0 28100	267 49 204 1.4 28300	311 57 206 1.6 28400	343 62 208 1.7 28500	366 66 210 1.7 28500	387 69 212 1.8 28600
56			111 21 204 .6 26700	238 44 206 1.3 27100	296 55 208 1.6 27200	334 61 210 1.7 27300	362 66 212 1.8 27400	385 69 214 1.9 27400	404 72 216 2.0 27500
58			198 37 208 1.1 25800	275 51 210 1.5 26000	321 59 212 1.7 26200	354 65 214 1.9 26200	378 69 216 2.0 26300	399 72 218 2.0 26300	418 74 220 2.1 26400
60		140 27 210 .8 24500	246 46 212 1.4 24900	303 57 214 1.7 25000	341 63 216 1.9 25100	369 67 218 2.0 25200	393 71 220 2.1 25200	412 74 222 2.2 25300	430 77 224 2.2 25300
62	7 1 212 .0 22900	208 40 214 1.3 23600	280 53 216 1.7 23800	328 61 218 1.9 24000	360 66 220 2.0 24100	385 70 222 2.1 24100	407 74 224 2.2 24200	427 77 226 2.3 24200	444 79 228 2.3 24200
64	150 29 216 1.0 22400	247 47 218 1.5 22700	304 57 220 1.8 22800	342 64 222 2.0 22900	372 69 224 2.2 23000	396 72 226 2.3 23100	416 75 228 2.3 23100	434 78 230 2.4 23100	450 80 232 2.4 23200
66	166 32 220 1.1 21700	249 47 222 1.6 21800	305 57 224 1.9 21900	352 65 226 2.1 21900	385 71 228 2.3 22000	404 74 230 2.4 22000	425 77 232 2.4 22100	441 79 234 2.5 22100	458 82 236 2.5 22100
68	178 34 224 1.2 21200	236 44 226 1.5 21300	277 51 228 1.7 21300	309 57 230 1.9 21400	335 61 232 2.0 21400	355 64 234 2.1 21400	374 67 236 2.1 21400	393 70 238 2.2 21500	
70	195 37 228 1.3 20700	242 45 230 1.6 20800	277 51 232 1.8 20800	304 56 234 1.9 20800	327 59 236 2.0 20900	347 62 238 2.1 20900	365 65 240 2.1 20900	381 67 242 2.2 20900	
72	217 41 232 1.5 20200	256 47 234 1.7 20200	287 52 236 1.9 20300	311 56 238 2.0 20300	333 60 240 2.1 20300	350 62 242 2.1 20400	368 65 244 2.2 20400	382 67 246 2.2 20400	
74	226 42 236 1.6 19600	261 48 238 1.7 19700	290 53 240 1.9 19700	313 56 242 2.0 19800	336 60 244 2.1 19800	354 63 246 2.2 19800	369 65 248 2.2 19800	385 67 250 2.3 19800	

CORRECTIONS	DISTANCE	TIME	FUEL	LEVEL OFF
ENGINE ANTI ICE ON	+ 15 %	+ 11.5 %	+ 18 %	– 600 FT
TOTAL ANTI ICE ON	+ 25 %	+ 19.5 %	+ 30 %	– 1600 FT

10E -08F0A319–131 IAE V2522–A5 23500010C6KG330 0 018590 0 0 3 .0 .0 .00 0 02 1.000 1.000 .000 15 FCOM-N0–03–06–40–005–145

GROSS FLIGHT PATH DESCENT AT GREEN DOT SPEED

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA+20
CG=33.0%

DISTANCE (NM) **TIME (MIN)**
INITIAL SPEED(KT) **FUEL(1000KG)**
LEVEL OFF (FT)

INIT. GW (1000KG)	INITIAL FLIGHT LEVEL 230	250	270	290	310	330	350	370	390
48					151 28 192 .7 30400	246 45 194 1.1 30600	296 54 196 1.3 30700	331 60 198 1.4 30800	356 63 200 1.5 30900
50				65 12 194 .3 28900	224 42 196 1.1 29400	284 52 198 1.3 29500	322 59 200 1.5 29600	351 63 202 1.6 29700	373 67 204 1.6 29700
52				190 36 198 1.0 28000	270 50 200 1.3 28200	317 59 202 1.5 28300	349 64 204 1.7 28400	376 68 206 1.8 28500	398 71 208 1.8 28500
54			136 26 200 .7 26500	247 47 202 1.3 26900	305 57 204 1.6 27000	343 63 206 1.7 27100	372 68 208 1.8 27200	395 72 210 1.9 27300	415 75 212 2.0 27300
56		27 5 202 .2 24900	209 40 204 1.2 25500	279 53 206 1.5 25800	326 61 208 1.7 25900	359 66 210 1.9 26000	386 71 212 2.0 26000	407 74 214 2.0 26100	426 77 216 2.1 26100
58		161 31 206 .9 24200	252 48 208 1.4 24500	305 58 210 1.7 24700	344 64 212 1.9 24800	372 69 214 2.0 24800	396 73 216 2.1 24900	416 76 218 2.1 24900	434 78 220 2.2 24900
60	87 17 208 .5 22800	219 42 210 1.3 23200	284 54 212 1.6 23400	327 62 214 1.9 23600	359 67 216 2.0 23600	385 71 218 2.1 23700	407 75 220 2.2 23800	426 78 222 2.2 23800	443 80 224 2.3 23800
62	180 35 212 1.1 22000	258 50 214 1.6 22200	309 59 216 1.8 22400	346 65 218 2.0 22500	374 70 220 2.1 22500	398 74 222 2.2 22600	418 77 224 2.3 22600	435 79 226 2.3 22700	453 82 228 2.4 22700
64	164 32 216 1.0 21400	230 44 218 1.4 21500	276 52 220 1.7 21600	312 59 222 1.8 21600	342 63 224 2.0 21700	366 67 226 2.1 21700	387 70 228 2.1 21700	407 74 230 2.2 21700	424 76 232 2.3 21700
66	179 34 220 1.2 20900	228 43 222 1.4 21000	266 50 224 1.6 21100	297 55 226 1.8 21100	322 59 228 1.9 21100	343 63 230 2.0 21200	362 65 232 2.0 21200	379 68 234 2.1 21200	
68	198 38 224 1.3 20400	239 45 226 1.5 20500	271 51 228 1.7 20500	297 55 230 1.8 20600	321 59 232 1.9 20600	340 62 234 2.0 20600	358 64 236 2.0 20600	374 66 238 2.1 20700	
70	215 41 228 1.4 19900	251 47 230 1.6 19900	284 53 232 1.8 20000	308 57 234 1.9 20000	329 60 236 2.0 20000	347 62 238 2.1 20000	364 65 240 2.1 20100	379 67 242 2.2 20100	
72	218 41 232 1.5 19300	252 47 234 1.7 19400	279 51 236 1.8 19400	303 55 238 1.9 19400	322 58 240 2.0 19500	340 61 242 2.0 19500	356 63 244 2.1 19500		
74	228 42 236 1.6 18800	256 47 238 1.7 18900	282 51 240 1.8 18900	304 55 242 1.9 18900	323 58 244 2.0 19000	340 60 246 2.1 19000	356 62 248 2.1 19000		

CORRECTIONS	**DISTANCE**	**TIME**	**FUEL**	**LEVEL OFF**
ENGINE ANTI ICE ON	+ 15 %	+ 11.5 %	+ 18 %	– 600 FT
TOTAL ANTI ICE ON	+ 25 %	+ 19.5 %	+ 30 %	– 1600 FT

10E -08F0A319–131 IAE V2522–A5 23500010C6KG330 0 018590 0 0 3 .0 .0 .00 0 02 1.000 1.000 .000 20 FCOM-N0–03–06–40–006–145

R

GROSS FLIGHT PATH DESCENT AT GREEN DOT SPEED

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA+15
CG=33.0%

DISTANCE (NM) **TIME (MIN)**
INITIAL SPEED(KT) **FUEL(1000KG)**
LEVEL OFF (FT)

INIT. GW	INITIAL FLIGHT LEVEL								
(1000KG)	230	250	270	290	310	330	350	370	390
50				80 16 189 0.4 28700	208 40 191 1.0 29100	258 50 193 1.2 29200	291 55 195 1.4 29300	317 60 197 1.5 29300	339 63 199 1.5 29400
52				169 33 193 0.9 27900	236 46 195 1.2 28100	276 53 197 1.4 28200	304 58 199 1.5 28200	329 62 201 1.6 28300	348 65 203 1.6 28300
54			106 21 195 0.6 26600	208 41 197 1.1 26900	258 50 199 1.3 27000	291 56 201 1.5 27100	317 60 203 1.6 27200	339 64 205 1.6 27200	358 66 207 1.7 27200
56			171 34 199 1.0 25800	235 46 201 1.3 25900	276 53 203 1.5 26000	305 58 205 1.6 26100	328 62 207 1.7 26100	348 65 209 1.7 26200	367 68 211 1.8 26200
58		115 23 201 0.7 24600	209 41 203 1.2 24800	257 50 205 1.4 25000	291 56 207 1.6 25000	317 60 209 1.7 25100	339 64 211 1.8 25100	358 67 213 1.8 25200	375 69 215 1.9 25200
60		177 35 205 1.1 23700	239 47 207 1.4 23900	278 54 209 1.6 24000	307 59 211 1.7 24000	332 63 213 1.8 24100	351 66 215 1.9 24100	370 69 217 1.9 24100	385 71 219 2.0 24200
62	125 25 207 0.8 22500	214 42 209 1.3 22700	261 51 211 1.6 22900	295 57 213 1.7 23000	322 62 215 1.8 23000	344 65 217 1.9 23100	362 68 219 2.0 23100	380 71 221 2.1 23100	396 73 223 2.1 23200
64	151 30 211 1.0 21700	222 44 213 1.4 21800	271 53 215 1.7 21900	310 60 217 1.9 22000	334 64 219 2.0 22000	355 67 221 2.0 22100	373 70 223 2.1 22100	390 73 225 2.2 22100	405 75 227 2.2 22100
66	160 32 215 1.0 21200	209 41 217 1.3 21300	245 47 219 1.5 21300	271 52 221 1.6 21400	295 56 223 1.7 21400	317 59 225 1.8 21400	334 62 227 1.9 21400	351 65 229 1.9 21500	367 67 231 2.0 21500
68	175 34 219 1.2 20700	215 42 221 1.4 20700	246 47 223 1.5 20800	271 51 225 1.7 20800	291 55 227 1.7 20800	311 58 229 1.8 20900	327 60 231 1.9 20900	344 63 233 1.9 20900	
70	193 38 223 1.3 20100	227 44 225 1.5 20100	254 48 227 1.6 20200	277 52 229 1.7 20200	297 55 231 1.8 20300	315 58 233 1.9 20300	331 60 235 1.9 20300	346 63 237 2.0 20300	
72	201 39 227 1.4 19500	231 44 229 1.5 19600	257 48 231 1.7 19600	279 52 233 1.8 19600	297 55 235 1.8 19700	315 58 237 1.9 19700	331 60 239 2.0 19700	346 62 241 2.0 19700	
74	209 40 231 1.5 19000	235 44 233 1.6 19000	259 49 235 1.7 19100	280 52 237 1.8 19100	299 55 239 1.9 19100	315 57 241 1.9 19100	330 59 243 2.0 19100		
76	216 41 235 1.5 18400	241 45 237 1.7 18500	263 49 239 1.8 18500	283 52 241 1.8 18500	300 54 243 1.9 18600	316 57 245 2.0 18600	331 59 247 2.0 18600		
78	223 42 239 1.6 17900	247 46 241 1.7 18000	269 49 243 1.8 18000	287 52 245 1.9 18000	304 55 247 2.0 18000	319 57 249 2.0 18000	334 59 251 2.1 18000		

CORRECTIONS	DISTANCE	TIME	FUEL	LEVEL OFF
ENGINE ANTI ICE ON	+ 15 %	+ 15 %	+ 20 %	– 800 FT
TOTAL ANTI ICE ON	+ 20 %	+ 25 %	+ 30 %	– 1900 FT

R

GROSS FLIGHT PATH DESCENT AT GREEN DOT SPEED

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA+20
CG=33.0%

DISTANCE (NM) **TIME (MIN)**
INITIAL SPEED(KT) **FUEL(1000KG)**
LEVEL OFF (FT)

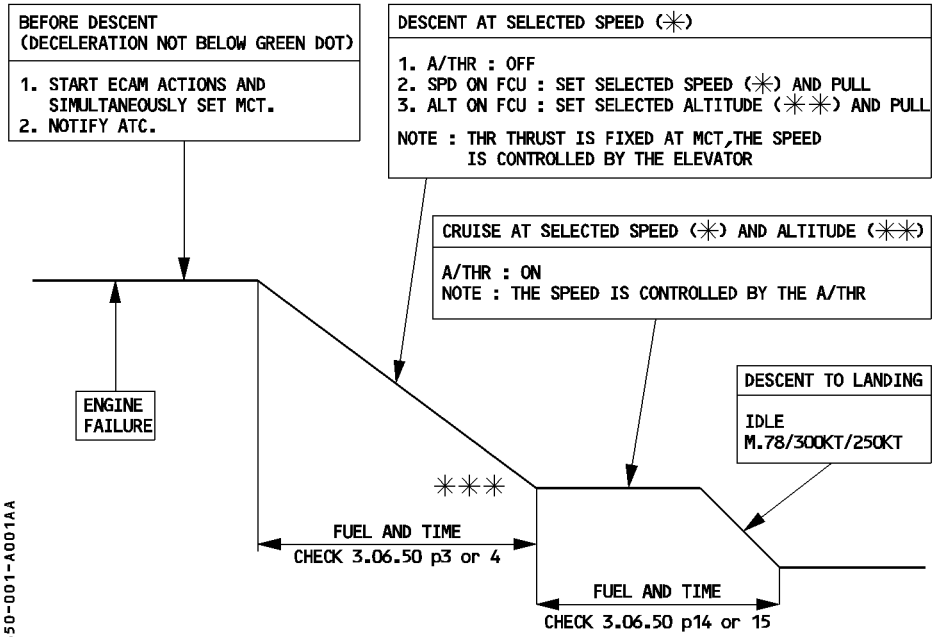
INIT. GW (1000KG)	INITIAL FLIGHT LEVEL 230	250	270	290	310	330	350	370	390
50				160 32 189 0.8 28000	230 45 191 1.1 28200	273 53 193 1.3 28300	304 58 195 1.4 28400	329 62 197 1.5 28400	350 65 199 1.6 28500
52			103 21 191 0.6 26700	208 41 193 1.1 27000	259 50 195 1.3 27100	293 57 197 1.5 27200	320 61 199 1.5 27300	343 65 201 1.6 27300	362 68 203 1.7 27300
54			176 35 195 1.0 25700	239 47 197 1.3 25900	279 54 199 1.5 26000	310 60 201 1.6 26100	334 64 203 1.7 26100	355 67 205 1.7 26200	372 70 207 1.8 26200
56		128 26 197 0.7 24400	216 43 199 1.2 24700	264 52 201 1.4 24800	298 58 203 1.6 24900	324 62 205 1.7 25000	347 66 207 1.8 25000	367 69 209 1.8 25100	383 72 211 1.9 25100
58	23 5 199 0.1 22900	187 38 201 1.1 23500	244 49 203 1.4 23700	284 56 205 1.6 23800	312 61 207 1.7 23800	337 65 209 1.8 23900	357 68 211 1.9 23900	376 71 213 1.9 24000	393 73 215 2.0 24000
60	146 30 203 0.9 22200	225 45 205 1.4 22500	269 53 207 1.6 22600	303 60 209 1.8 22700	329 64 211 1.9 22800	351 68 213 1.9 22800	369 70 215 2.0 22900	388 73 217 2.1 22900	403 75 219 2.1 22900
62	149 30 207 1.0 21600	211 42 209 1.3 21700	253 50 211 1.5 21700	286 56 213 1.7 21800	314 61 215 1.8 21800	338 65 217 1.9 21800	359 68 219 2.0 21800	378 71 221 2.0 21900	395 74 223 2.1 21900
64	160 32 211 1.0 21100	205 41 213 1.3 21100	239 47 215 1.5 21200	266 51 217 1.6 21200	288 55 219 1.7 21200	310 59 221 1.8 21300	328 61 223 1.8 21300	344 64 225 1.9 21300	360 66 227 1.9 21300
66	177 35 215 1.2 20500	214 42 217 1.4 20600	243 47 219 1.5 20600	267 51 221 1.6 20600	288 55 223 1.7 20700	307 58 225 1.8 20700	324 60 227 1.8 20700	340 62 229 1.9 20700	
68	195 38 219 1.3 19900	229 44 221 1.5 20000	255 49 223 1.6 20000	277 53 225 1.7 20000	295 56 227 1.8 20100	313 58 229 1.8 20100	330 61 231 1.9 20100	345 63 233 1.9 20100	
70	201 39 223 1.4 19300	231 45 225 1.5 19400	254 48 227 1.6 19400	276 52 229 1.7 19400	294 55 231 1.8 19500	311 58 233 1.9 19500	328 60 235 1.9 19500	343 62 237 2.0 19500	
72	209 40 227 1.4 18800	235 45 229 1.6 18800	258 49 231 1.7 18900	278 52 233 1.8 18900	296 55 235 1.8 18900	313 57 237 1.9 18900	327 59 239 1.9 18900		
74	217 41 231 1.5 18200	241 46 233 1.6 18300	262 49 235 1.7 18300	282 52 237 1.8 18300	299 55 239 1.9 18300	314 57 241 1.9 18400	329 59 243 2.0 18400		
76	223 42 235 1.6 17700	247 46 237 1.7 17700	267 50 239 1.8 17800	285 52 241 1.9 17800	302 55 243 1.9 17800	315 57 245 2.0 17800	331 59 247 2.0 17800		
78	231 43 239 1.7 17200	252 47 241 1.8 17200	272 50 243 1.8 17200	289 53 245 1.9 17300	305 55 247 2.0 17300	319 57 249 2.0 17300			

CORRECTIONS	DISTANCE	TIME	FUEL	LEVEL OFF
ENGINE ANTI ICE ON	+ 15 %	+ 15 %	+ 20 %	– 800 FT
TOTAL ANTI ICE ON	+ 20 %	+ 25 %	+ 30 %	– 1900 FT

– For LONG RANGE CRUISE table (Refer to 3.06.30 p4 to 11)
– For IN CRUISE QUICK CHECK (Refer to 3.06.30 p12)

PROCEDURE

This section provides single engine performance data for two fixed speed diversion strategies (fixed descent and cruise speed schedules) recommended for ETOPS operation, provided that the requirements set forth in section 3.06.10, GENERAL, are complied with.



✳ USE M.80/350KT OR M.78/320KT AS ESTABLISHED BEFORE DISPATCH.

✳✳ SET 15000 feet OR VALUE ESTABLISHED BEFORE DISPATCH.

✳✳✳ IF V/S BECOMES < 500 feet/minute SELECT V/S MODE.

EXAMPLE

Given :

GW at engine failure = 65000 kg
FL at engine failure = 350
Temperature = ISA
Distance to diversion airport = 500 NM
Speed selected before dispatch = 350 KT
Cruise level for diversion
Selected before dispatch = FL180

Find :

Descent to cruise level : Distance = 156 – 84 = 72 NM
(See 3.06.50 p3) Fuel = 885 – 585 = 300 kg
Time = 21.1 – 11.9 = 9.2 min

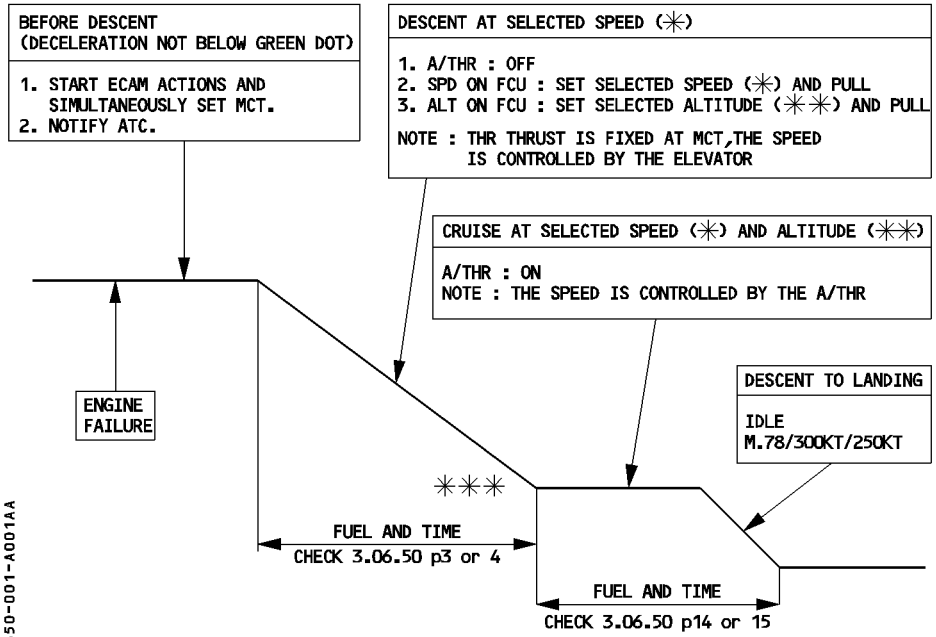
Cruise
Weight = 65000 – 300 = 64700 kg
Distance = 500 – 72 = 428 NM
Determine (3.06.50 p14) time and fuel consumption at ISA conditions for a reference weight of 55000 kg
Interpolate the remaining distance of 428 NM at FL180
Fuel = 2775 kg
Time = 1 h 16 min
Correction due to actual in-cruise weight :
△Fuel = + 4 kg per 1000 kg above reference weight
△Fuel = + 4 kg × (64.7 – 55) = 40 kg

Result :

Total Fuel = 2775 + 40 + 300 = 3115 kg
Time = 1 h 16 min + 10 min = 1 h 26 min

PROCEDURE

This section provides single engine performance data for two fixed speed diversion strategies (fixed descent and cruise speed schedules) recommended for ETOPS operation, provided that the requirements set forth in section 3.06.10, GENERAL, are complied with.



✳ USE M.80/350KT OR M.78/320KT AS ESTABLISHED BEFORE DISPATCH.

✳✳ SET 15000 feet OR VALUE ESTABLISHED BEFORE DISPATCH.

✳✳✳ IF V/S BECOMES < 500 feet/minute SELECT V/S MODE.

EXAMPLE

Given :

GW at engine failure = 70000 kg
FL at engine failure = 350
Temperature = ISA
Distance to diversion airport = 600 NM
Speed selected before dispatch = 350 KT
Cruise level for diversion
Selected before dispatch = FL180

Find :

Descent to cruise level : Distance = 200 – 107 = 93 NM
(See 3.06.50 p3) Fuel = 1191 – 763 = 428 kg
Time = 27.1 – 15.1 = 12 min

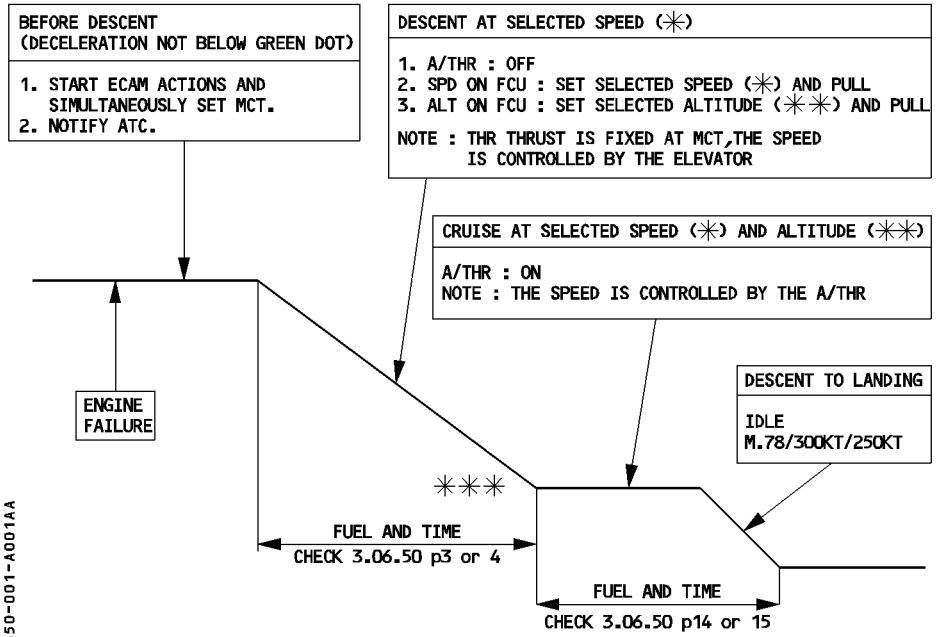
Cruise
Weight = 70000 – 428 = 69572 kg
Distance = 600 – 93 = 507 NM
Determine (3.06.50 p14) time and fuel consumption at ISA conditions for a reference weight of 55000 kg
Interpolate the remaining distance of 507 NM at FL180
Fuel = 3258 kg
Time = 1 h 27 min
Correction due to actual in-cruise weight
$\triangle$Fuel = + 1 kg per 1000 kg above reference weight
$\triangle$Fuel = + 1 kg $\times$ (69.6 – 55) $\sim$ 15 kg

Result :

Total Fuel = 3258 + 15 + 428 = 3701 kg
Time = 1 h 27 min + 12 min = 1 h 39 min

PROCEDURE

This section provides single engine performance data for two fixed speed diversion strategies (fixed descent and cruise speed schedules) recommended for ETOPS operation, provided that the requirements set forth in section 3.06.10, GENERAL, are complied with.



✳ USE M.80/350KT OR M.78/320KT AS ESTABLISHED BEFORE DISPATCH.

✳✳ SET 15000 feet OR VALUE ESTABLISHED BEFORE DISPATCH.

✳✳✳ IF V/S BECOMES < 500 feet/minute SELECT V/S MODE.

EXAMPLE

Given :

GW at engine failure = 70000 kg
FL at engine failure = 350
Temperature = ISA
Distance to diversion airport = 500 NM
Speed selected before dispatch = 350 KT
Cruise level for diversion
Selected before dispatch = FL180

Find :

Descent to cruise level : Distance = 199 – 106 = 93 NM
(See 3.06.50 p3) Fuel = 1186 – 760 = 426 kg
Time = 26.9 – 15.1 = 11.8 min

Cruise
Weight = 70000 – 426 = 69574 kg
Distance = 500 – 93 = 407 NM
Determine (3.06.50 p14) time and fuel consumption at ISA conditions for a reference weight of 55000 kg
Interpolate the remaining distance of 407 NM at FL180
Fuel = 2595 kg
Time = 1 h 12 min
Correction due to actual in-cruise weight : no correction here

Result :

Total Fuel = 2595 + 426 = 3021 kg
Time = 1 h 12 min + 12 min = 1 h 24 min

DESCENT - M.80/350KT - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

MINIMUM RATE OF

FL	WEIGHT (1000KG)									
	45					**65**				
	TIME (MIN)	FUEL (KG)	DIST. (NM)	MODE	IAS (KT)	TIME (MIN)	FUEL (KG)	DIST. (NM)	MODE	IAS (KT)
390	20.6	827	152	MCT	248	23.3	933	172	MCT	248
370	19.3	798	142	MCT	260	22.2	910	164	MCT	260
350	18.2	773	134	MCT	272	21.1	885	156	MCT	272
330	17.2	749	126	MCT	284	20.1	860	148	MCT	284
310	16.4	726	120	MCT	297	19.1	835	140	MCT	297
290	15.6	705	113	MCT	311	18.1	809	133	MCT	311
270	14.9	685	108	MCT	324	17.2	784	125	MCT	324
250	14.3	666	103	MCT	338	16.4	758	119	MCT	338
230	13.7	646	98	MCT	350	15.6	733	113	MCT	350
220	13.3	633	95	MCT	350	15.1	715	108	MCT	350
210	12.8	617	91	MCT	350	14.4	693	103	MCT	350
200	12.2	595	87	MCT	350	13.7	665	98	MCT	350
190	11.6	566	82	MCT	350	12.9	628	91	MCT	350
180	10.8	530	76	MCT	350	11.9	585	84	MCT	350
170	9.8	486	69	MCT	350	10.8	532	75	MCT	350
160	8.8	436	61	MCT	350	9.5	474	66	MCT	350
150	7.7	384	53	MCT	350	8.3	414	57	MCT	350
140	6.5	327	44	MCT	350	6.9	349	48	MCT	350
100	0.0	0	0	V/S	350	0.0	0	0	V/S	350

CORRECTIONS	**ENGINE ANTI ICE ON**	**TOTAL ANTI ICE ON**	**PER 1 DEG C DISA**
FUEL	+ 0.7 %	- 9 %	- 1.25 %
TIME	- 1 %	- 12 %	- 1 %
DISTANCE	- 1 %	- 9 %	- 1 %

DESCENT - M.78/320KT - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

MINIMUM RATE OF DESCENT 500FT/MIN

FL	WEIGHT (1000KG)									
	45					65				
	TIME (MIN)	FUEL (KG)	DIST. (NM)	MODE	IAS (KT)	TIME (MIN)	FUEL (KG)	DIST. (NM)	MODE	IAS (KT)
390	31.0	1143	215	MCT	241	32.0	1181	222	MCT	241
370	29.5	1110	204	MCT	252	30.8	1154	213	MCT	252
350	28.2	1079	194	MCT	264	29.5	1126	204	MCT	264
330	27.0	1050	185	MCT	277	28.3	1098	195	MCT	277
310	25.9	1022	177	MCT	289	27.1	1068	186	MCT	289
290	25.0	996	169	MCT	302	26.0	1038	177	MCT	302
270	24.1	972	163	MCT	315	25.0	1008	169	MCT	315
250	23.1	941	155	MCT	320	23.7	970	159	MCT	320
230	21.8	901	145	MCT	320	22.1	919	147	MCT	320
220	21.0	876	139	MCT	320	21.2	891	141	MCT	320
210	20.2	848	133	MCT	320	20.3	858	134	MCT	320
200	19.2	810	126	MCT	320	19.1	816	126	MCT	320
190	17.8	755	117	MCT	320	17.7	759	116	MCT	320
180	16.0	677	104	V/S	320	16.0	685	104	V/S	320
170	14.0	591	90	V/S	320	14.0	597	90	V/S	320
160	12.0	505	77	V/S	320	12.0	509	77	V/S	320
150	10.0	420	64	V/S	320	10.0	423	64	V/S	320
140	8.0	335	50	V/S	320	8.0	337	50	V/S	320
100	0.0	0	0	V/S	320	0.0	0	0	V/S	320

CORRECTIONS	**ENGINE ANTI ICE ON**	**TOTAL ANTI ICE ON**	**PER 1 DEG C DISA**
FUEL	+ 1.8 %	+ 4.5 %	- 1 %
TIME	–	–	- 1 %
DISTANCE	–	–	- 0.9 %

DESCENT - M.80/350KT - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
PACK FLOW HI
ANTI-ICING OFF

ISA
CG=33.0%

MINIMUM RATE OF DESCENT 500FT/MIN

WEIGHT (1000KG)	50				70				
FL	TIME (MIN)	FUEL (KG)	DIST. (NM)	MODE	TIME (MIN)	FUEL (KG)	DIST. (NM)	MODE	IAS (KT)
390	27.4	1160	202	MCT					248
370	25.8	1126	191	MCT	28.3	1220	209	MCT	260
350	24.3	1089	179	MCT	27.1	1191	200	MCT	272
330	22.9	1052	168	MCT	25.8	1159	191	MCT	284
310	21.7	1016	159	MCT	24.5	1122	181	MCT	297
290	20.6	982	150	MCT	23.3	1084	171	MCT	311
270	19.6	951	143	MCT	22.1	1046	161	MCT	324
250	18.8	921	136	MCT	21.0	1009	153	MCT	338
230	18.0	893	130	MCT	20.0	972	145	MCT	350
220	17.5	874	126	MCT	19.3	946	139	MCT	350
210	16.9	850	121	MCT	18.5	914	133	MCT	350
200	16.2	818	115	MCT	17.5	873	125	MCT	350
190	15.3	779	108	MCT	16.4	823	117	MCT	350
180	14.3	730	101	MCT	15.1	763	107	MCT	350
170	13.0	669	91	MCT	13.6	689	96	MCT	350
160	11.6	596	81	MCT	11.9	603	83	MCT	350
150	9.9	513	69	MCT	10.0	506	69	V/S	350
140	8.0	414	55	V/S	8.0	404	55	V/S	350
100	.0	0	0	V/S	.0	0	0	V/S	350

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1° ABOVE ISA
TIME	– 4 %	– 12 %	–
FUEL	– 4 %	– 11 %	+ 0.3 %
DISTANCE	– 5 %	– 12 %	+ 0.3 %

10E -08F0A319–131 IAE V2522–A5 23200010C6KG330 0 018590 0 0 3 .0 .0 500.00 0 02 .800350.000 .000 0 FCOM-N0–03–06–50–003–130

DESCENT - M.78/320KT - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
PACK FLOW HI
ANTI-ICING OFF

ISA
CG=33.0%

MINIMUM RATE OF DESCENT 500FT/MIN

WEIGHT (1000KG)	50				70				
FL	TIME (MIN)	FUEL (KG)	DIST. (NM)	MODE	TIME (MIN)	FUEL (KG)	DIST. (NM)	MODE	IAS (KT)
390	36.7	1354	257	MCT					241
370	34.8	1313	243	MCT	35.8	1333	250	MCT	252
350	33.0	1268	229	MCT	34.3	1299	239	MCT	264
330	31.2	1221	216	MCT	32.8	1259	228	MCT	277
310	29.6	1175	204	MCT	31.3	1216	216	MCT	289
290	28.2	1131	193	MCT	29.7	1170	205	MCT	302
270	26.9	1090	183	MCT	28.3	1123	193	MCT	315
250	25.5	1040	172	MCT	26.5	1063	180	MCT	320
230	23.7	975	158	MCT	24.3	984	163	MCT	320
220	22.6	938	151	MCT	23.1	939	154	MCT	320
210	21.4	891	142	MCT	21.7	885	144	MCT	320
200	19.9	830	131	MCT	20.0	817	132	MCT	320
190	18.0	749	118	V/S	18.0	734	118	V/S	320
180	16.0	665	104	V/S	16.0	650	104	V/S	320
170	14.0	580	90	V/S	14.0	568	90	V/S	320
160	12.0	497	77	V/S	12.0	486	77	V/S	320
150	10.0	413	64	V/S	10.0	404	64	V/S	320
140	8.0	330	50	V/S	8.0	322	50	V/S	320
100	.0	0	0	V/S	.0	0	0	V/S	320

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1° ABOVE ISA
TIME	– 2 %	– 4 %	–
FUEL	– 1 %	– 2 %	+ 0.3 %
DISTANCE	– 2 %	– 5 %	+ 0.3 %

10E -08F0A319–131 IAE V2522–A5 23200010C6KG330 0 018590 0 0 3 .0 .0 500.00 0 02 .800320.000 .000 0 FCOM-N0–03–06–50–004–130

DESCENT - M.80/350KT - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
PACK FLOW HI
ANTI-ICING OFF

ISA
CG=33.0%

MINIMUM RATE OF DESCENT 500FT/MIN

WEIGHT (1000KG)	50				70				
FL	TIME (MIN)	FUEL (KG)	DIST. (NM)	MODE	TIME (MIN)	FUEL (KG)	DIST. (NM)	MODE	IAS (KT)
390	27.1	1150	200	MCT					248
370	25.6	1116	189	MCT	28.1	1214	208	MCT	260
350	24.0	1079	177	MCT	26.9	1186	199	MCT	272
330	22.7	1043	167	MCT	25.6	1153	189	MCT	284
310	21.5	1007	157	MCT	24.4	1117	179	MCT	297
290	20.4	973	149	MCT	23.1	1079	170	MCT	311
270	19.4	942	141	MCT	21.9	1040	160	MCT	324
250	18.6	913	134	MCT	20.9	1003	152	MCT	338
230	17.8	885	128	MCT	19.9	966	143	MCT	350
220	17.3	866	124	MCT	19.2	941	138	MCT	350
210	16.7	842	119	MCT	18.4	909	132	MCT	350
200	16.0	811	114	MCT	17.4	869	124	MCT	350
190	15.1	772	107	MCT	16.3	819	116	MCT	350
180	14.1	724	99	MCT	15.1	760	106	MCT	350
170	12.9	665	90	MCT	13.6	687	95	MCT	350
160	11.5	593	80	MCT	11.9	602	83	MCT	350
150	9.9	512	68	MCT	10.0	507	69	MCT	350
140	8.0	416	55	V/S	8.0	405	55	V/S	350
100	.0	0	0	V/S	.0	0	0	V/S	350

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1° ABOVE ISA
TIME	– 5 %	– 12 %	–
FUEL	– 5 %	– 12 %	+ 0.2 %
DISTANCE	– 5 %	– 12 %	+ 0.2 %

10F -08F0A320-232 IAE V2527-A5 23200010C6KG330 0 018590 0 0 3 .0 .0 500.00 0 02 .800350.000 .000 0 FCOM-N0-03-06-50-003-140

DESCENT - M.78/320KT - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
PACK FLOW HI
ANTI-ICING OFF

ISA
CG=33.0%

MINIMUM RATE OF DESCENT 500FT/MIN

WEIGHT (1000KG)	50				70				
FL	TIME (MIN)	FUEL (KG)	DIST. (NM)	MODE	TIME (MIN)	FUEL (KG)	DIST. (NM)	MODE	IAS (KT)
390	36.5	1351	256	MCT					241
370	34.6	1311	242	MCT	35.7	1332	249	MCT	252
350	32.8	1266	228	MCT	34.2	1298	239	MCT	264
330	31.1	1219	215	MCT	32.7	1259	227	MCT	277
310	29.5	1173	203	MCT	31.2	1215	215	MCT	289
290	28.0	1130	192	MCT	29.6	1170	204	MCT	302
270	26.8	1089	182	MCT	28.2	1124	193	MCT	315
250	25.4	1040	171	MCT	26.5	1064	179	MCT	320
230	23.6	976	158	MCT	24.2	985	163	MCT	320
220	22.6	939	150	MCT	23.0	940	154	MCT	320
210	21.4	893	142	MCT	21.6	887	144	MCT	320
200	19.9	833	131	MCT	20.0	819	132	MCT	320
190	18.0	753	118	V/S	18.0	737	118	V/S	320
180	16.0	668	104	V/S	16.0	653	104	V/S	320
170	14.0	584	90	V/S	14.0	570	90	V/S	320
160	12.0	500	77	V/S	12.0	488	77	V/S	320
150	10.0	416	64	V/S	10.0	406	64	V/S	320
140	8.0	332	50	V/S	8.0	324	50	V/S	320
100	.0	0	0	V/S	.0	0	0	V/S	320

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1° ABOVE ISA
TIME	– 2 %	– 5 %	–
FUEL	– 1 %	– 2 %	+ 0.3 %
DISTANCE	– 2 %	– 5 %	+ 0.3 %

10F -08F0A320-232 IAE V2527-A5 23200010C6KG330 0 018590 0 0 3 .0 .0 500.00 0 02 .780320.000 .000 0 FCOM-N0-03-06-50-004-140

CRUISE - MCT/VMO - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

N1 (%) **MACH**
KG/H **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
42	86.0	.593	88.0	.617	88.7	.625	88.7	.624	87.4	.609	85.1	.584
	3076	329	2833	312	2822	311	2627	299	2334	280	2012	257
	123.0	379	136.4	386	138.2	390	147.2	387	160.4	374	176.9	356
44	86.0	.592	88.0	.615	88.7	.623	88.8	.622	87.4	.606	85.4	.581
	3079	329	2832	311	2820	310	2625	297	2332	278	2029	256
	122.7	378	136.0	385	137.8	389	146.7	385	159.7	372	174.6	354
46	86.1	.591	88.0	.613	88.8	.621	88.8	.619	87.5	.602	85.7	.579
	3081	328	2832	310	2818	308	2623	296	2330	276	2047	255
	122.4	377	135.5	384	137.4	387	146.1	383	158.9	370	172.3	353
48	86.1	.589	88.1	.611	88.8	.618	88.9	.616	87.6	.599	85.9	.576
	3083	327	2832	309	2816	307	2621	295	2331	275	2065	253
	122.0	376	135.1	382	136.9	386	145.6	382	157.8	368	170.0	351
50	86.1	.588	88.1	.608	88.9	.615	89.0	.613	87.8	.596	86.2	.573
	3086	327	2831	308	2814	306	2619	293	2342	273	2086	252
	121.6	375	134.6	381	136.5	384	144.9	380	156.3	366	167.4	349
52	86.1	.586	88.1	.606	88.9	.613	89.0	.609	88.0	.593	86.5	.570
	3089	326	2831	307	2812	304	2616	291	2353	272	2106	251
	121.1	374	134.0	379	136.0	382	144.3	377	154.8	364	164.9	347
54	86.1	.585	88.2	.603	89.0	.610	89.1	.606	88.2	.589	86.8	.566
	3093	325	2831	305	2810	303	2613	289	2365	270	2124	249
	120.7	373	133.5	378	135.4	380	143.5	375	153.1	362	162.4	345
56	86.1	.583	88.2	.600	89.0	.606	89.2	.601	88.4	.586	87.2	.562
	3097	324	2831	304	2807	301	2610	287	2377	269	2146	247
	120.1	372	132.8	376	134.8	378	142.7	372	151.4	360	159.5	342
58	86.2	.581	88.3	.598	89.1	.603	89.3	.597	88.6	.582	87.6	.557
	3100	323	2836	302	2804	299	2614	285	2392	267	2172	244
	119.6	371	132.0	374	134.2	376	141.5	370	149.4	357	156.2	339
60	86.2	.579	88.4	.595	89.2	.599	89.4	.594	88.8	.578	88.2	.550
	3104	321	2843	301	2803	297	2622	283	2406	265	2205	241
	119.0	370	131.0	373	133.4	374	140.2	368	147.5	355	152.0	335
62	86.2	.577	88.4	.591	89.2	.595	89.5	.590	89.1	.573	89.2	.539
	3108	320	2851	299	2807	296	2630	281	2426	262	2246	236
	118.4	368	130.0	371	132.4	372	138.8	365	145.1	352	146.2	328
64	86.2	.575	88.5	.588	89.3	.592	89.7	.585	89.4	.568	90.4	.525
	3113	319	2858	297	2812	294	2641	279	2449	260	2295	230
	117.8	367	128.9	368	131.3	369	137.2	362	142.4	349	139.3	320
66	86.3	.572	88.6	.584	89.4	.588	89.8	.580	89.8	.561	91.9	.507
	3118	318	2863	295	2818	292	2654	277	2476	257	2358	222
	117.1	365	127.8	366	130.1	367	135.4	359	139.2	345	131.2	309
68	86.3	.570	88.6	.580	89.4	.583	90.0	.575	90.4	.552		
	3123	316	2869	293	2824	289	2667	274	2512	252		
	116.4	364	126.7	363	128.8	364	133.5	356	134.9	339		

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2 %	+ 3 %

CRUISE - MCT/VMO - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA+10
CG=33.0%

N1 (%) **MACH**
KG/H **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
42	87.5	.592	89.4	.615	90.2	.623	90.2	.623	88.9	.608	86.7	.583
	3137	329	2890	312	2878	310	2681	298	2384	279	2064	257
	122.6	385	135.9	393	137.7	396	146.7	393	159.8	381	175.7	363
44	87.5	.590	89.4	.613	90.2	.621	90.3	.620	88.9	.605	86.9	.581
	3140	328	2890	311	2877	309	2679	297	2382	277	2082	256
	122.3	384	135.5	392	137.4	395	146.2	392	159.0	379	173.4	361
46	87.5	.589	89.5	.611	90.2	.619	90.3	.618	89.0	.601	87.2	.578
	3142	327	2890	310	2875	308	2677	295	2379	276	2100	254
	121.9	383	135.1	390	137.0	394	145.6	390	158.2	376	171.1	359
48	87.5	.588	89.5	.609	90.3	.617	90.4	.615	89.1	.598	87.4	.575
	3145	327	2890	308	2873	306	2675	294	2386	274	2119	253
	121.6	382	134.6	389	136.5	392	145.1	388	157.0	375	168.9	358
50	87.5	.586	89.5	.607	90.3	.614	90.4	.611	89.3	.595	87.7	.573
	3148	326	2889	307	2871	305	2672	292	2396	273	2139	252
	121.1	381	134.1	387	136.0	391	144.5	386	155.6	373	166.4	356
52	87.6	.585	89.6	.604	90.4	.611	90.5	.608	89.5	.592	88.0	.569
	3151	325	2889	306	2868	304	2669	290	2407	271	2158	250
	120.7	380	133.5	386	135.5	389	143.8	384	154.0	371	164.0	354
54	87.6	.583	89.6	.602	90.4	.608	90.6	.604	89.7	.588	88.4	.565
	3155	324	2889	305	2866	302	2666	289	2420	270	2177	248
	120.2	379	133.0	384	135.0	387	143.0	381	152.3	369	161.4	351
56	87.6	.581	89.7	.599	90.5	.605	90.7	.600	89.9	.585	88.7	.561
	3158	323	2891	303	2863	300	2663	286	2433	268	2199	246
	119.7	378	132.3	382	134.4	385	142.2	379	150.6	366	158.5	349
58	87.6	.579	89.7	.596	90.6	.601	90.8	.596	90.1	.581	89.2	.556
	3162	322	2898	302	2860	299	2671	285	2447	266	2225	244
	119.1	377	131.4	381	133.8	383	140.9	376	148.7	364	155.3	346
60	87.6	.577	89.8	.593	90.6	.598	90.9	.592	90.4	.577	89.8	.549
	3166	321	2905	300	2862	297	2679	283	2463	264	2260	241
	118.6	375	130.4	379	132.9	380	139.6	374	146.7	361	151.0	341
62	87.7	.575	89.8	.590	90.7	.594	91.0	.588	90.6	.572	90.8	.537
	3170	319	2912	299	2867	295	2688	281	2483	262	2300	236
	118.0	374	129.4	377	131.8	378	138.2	371	144.4	358	145.2	334
64	87.7	.573	89.9	.586	90.8	.590	91.1	.584	91.0	.566	92.1	.523
	3175	318	2918	297	2872	293	2700	278	2506	259	2351	229
	117.3	373	128.3	374	130.7	375	136.5	369	141.6	355	138.3	325
66	87.7	.571	90.0	.583	90.8	.586	91.3	.579	91.4	.560	93.6	.506
	3180	317	2923	295	2877	291	2713	276	2534	256	2417	221
	116.7	371	127.3	372	129.6	373	134.7	365	138.4	351	130.1	314
68	87.7	.568	90.1	.579	90.9	.582	91.5	.574	91.9	.550		
	3186	315	2929	293	2884	288	2725	273	2571	252		
	115.9	369	126.2	370	128.3	370	132.9	362	134.1	345		

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2 %	+ 3 %

CRUISE - MCT/VMO - 1 ENGINE OUT

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA
CG = 33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
48	1.338	.607	1.404	.640	1.413	.644	1.417	.643	1.408	.631	1.396	.616
	3227	337	3016	325	2940	321	2708	308	2417	290	2139	272
	120.1	387	133.0	401	136.7	402	146.9	398	160.4	388	175.6	376
50	1.338	.606	1.404	.639	1.413	.643	1.418	.641	1.409	.630	1.397	.614
	3226	337	3015	324	2939	320	2707	307	2416	290	2138	271
	119.9	387	132.8	401	136.6	401	146.7	397	160.1	387	174.9	374
52	1.338	.605	1.405	.638	1.414	.642	1.418	.640	1.409	.628	1.399	.610
	3226	337	3014	324	2938	320	2706	306	2415	289	2136	269
	119.8	386	132.7	400	136.4	401	146.4	396	159.7	386	174.1	372
54	1.339	.605	1.405	.637	1.414	.641	1.419	.639	1.410	.626	1.400	.607
	3225	336	3013	323	2937	319	2705	306	2414	288	2134	267
	119.7	386	132.5	399	136.2	400	146.2	395	159.2	384	173.2	370
56	1.339	.604	1.405	.636	1.415	.640	1.419	.637	1.411	.623	1.402	.602
	3224	336	3012	323	2936	318	2704	305	2412	286	2132	266
	119.5	385	132.3	399	136.0	399	145.9	394	158.7	383	172.2	367
58	1.339	.603	1.406	.635	1.415	.638	1.420	.635	1.413	.620	1.404	.596
	3224	335	3011	322	2935	318	2702	304	2410	285	2129	263
	119.4	385	132.1	398	135.8	398	145.5	393	158.1	381	170.8	363
60	1.340	.602	1.406	.634	1.416	.637	1.421	.633	1.414	.617	1.407	.590
	3223	335	3010	321	2934	317	2701	303	2408	283	2124	260
	119.2	384	131.9	397	135.5	398	145.2	392	157.3	379	169.2	359
62	1.340	.601	1.407	.632	1.416	.635	1.422	.631	1.416	.613	1.410	.582
	3222	334	3009	321	2932	316	2699	302	2406	281	2119	256
	119.1	384	131.7	396	135.2	397	144.8	391	156.5	376	167.3	355
64	1.340	.600	1.408	.631	1.417	.634	1.423	.628	1.418	.608	1.414	.571
	3221	333	3008	320	2931	315	2697	301	2403	279	2112	251
	118.9	383	131.4	395	134.9	395	144.2	389	155.4	373	164.6	348
66	1.341	.599	1.408	.629	1.418	.632	1.424	.625	1.420	.602	1.420	.553
	3220	333	3006	319	2929	314	2695	299	2399	276	2102	243
	118.7	382	131.1	394	134.6	394	143.6	387	154.2	370	160.4	337
68	1.341	.598	1.409	.627	1.419	.629	1.426	.622	1.422	.596		
	3219	332	3005	318	2927	313	2692	297	2395	273		
	118.5	381	130.8	393	134.2	393	143.0	385	152.8	366		
70	1.341	.596	1.410	.625	1.420	.627	1.427	.618	1.425	.587		
	3218	331	3003	317	2925	312	2689	295	2388	269		
	118.3	381	130.4	392	133.7	391	142.2	382	151.1	361		
72	1.342	.595	1.411	.623	1.421	.624	1.429	.612	1.429	.575		
	3217	331	3001	315	2923	310	2685	293	2377	264		
	118.0	380	130.0	390	133.2	389	141.2	379	148.7	353		
74	1.342	.593	1.412	.620	1.422	.621	1.432	.607	1.435	.557		
	3215	330	2998	314	2920	308	2682	290	2362	255		
	117.8	379	129.5	388	132.6	387	140.1	376	144.8	342		

ENGINE ANTI ICE ON
FUEL = + 1.5 %

TOTAL ANTI ICE ON
△FUEL = + 3 %

10E -08F0A319--131 IAE V2522--A5 12300010C6KG330 0 018590 0 0 3 1.3 .0 .00 0 01100.000 .000 .000 0 FCOM-N0--03--06--50--005--135

CRUISE - MCT/VMO - 1 ENGINE OUT

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA+10
CG=33.0%

EPR
KG/H
NM/1000KG
MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
48	1.338	.606	1.404	.639	1.413	.643	1.418	.641	1.408	.630	1.397	.615
	3299	337	3085	324	3008	320	2772	307	2475	290	2190	271
	119.4	394	132.3	408	136.0	409	146.1	405	159.5	395	174.6	382
50	1.339	.605	1.405	.638	1.414	.642	1.418	.640	1.409	.628	1.398	.612
	3298	336	3084	324	3007	320	2771	306	2474	289	2189	270
	119.3	393	132.1	407	135.8	408	145.9	404	159.2	394	173.9	381
52	1.339	.604	1.405	.637	1.414	.641	1.419	.639	1.410	.626	1.399	.609
	3297	336	3083	323	3006	319	2770	306	2472	288	2187	269
	119.2	393	132.0	407	135.6	408	145.6	403	158.8	392	173.1	379
54	1.339	.604	1.405	.636	1.415	.640	1.419	.637	1.411	.624	1.401	.605
	3297	335	3082	323	3005	318	2768	305	2471	287	2185	267
	119.0	392	131.8	406	135.4	407	145.4	402	158.3	391	172.2	376
56	1.339	.603	1.406	.635	1.415	.639	1.420	.636	1.412	.622	1.402	.601
	3296	335	3082	322	3004	318	2767	304	2469	286	2183	265
	118.9	392	131.6	405	135.2	406	145.1	401	157.8	390	171.2	374
58	1.340	.602	1.406	.634	1.416	.637	1.421	.634	1.413	.619	1.405	.595
	3295	335	3080	322	3003	317	2766	303	2467	284	2179	262
	118.8	391	131.4	405	135.0	405	144.7	400	157.1	388	169.7	370
60	1.340	.601	1.407	.633	1.416	.636	1.421	.632	1.414	.615	1.407	.588
	3295	334	3079	321	3002	316	2764	302	2465	283	2175	259
	118.6	391	131.2	404	134.8	405	144.3	399	156.4	385	168.1	366
62	1.340	.600	1.407	.631	1.417	.634	1.422	.630	1.416	.611	1.410	.580
	3294	333	3078	320	3000	316	2762	301	2463	281	2169	255
	118.4	390	130.9	403	134.5	403	143.9	398	155.5	383	166.2	361
64	1.341	.599	1.408	.630	1.418	.632	1.424	.627	1.418	.606	1.415	.568
	3293	333	3077	319	2999	315	2760	300	2460	278	2162	250
	118.3	389	130.7	402	134.2	402	143.4	396	154.5	380	163.4	353
66	1.341	.598	1.409	.628	1.418	.631	1.425	.624	1.420	.601	1.421	.550
	3292	332	3075	318	2997	314	2758	298	2456	276	2152	242
	118.1	389	130.4	401	133.8	401	142.8	394	153.2	376	159.0	342
68	1.341	.597	1.410	.626	1.419	.628	1.426	.620	1.423	.594		
	3291	331	3074	317	2995	312	2755	297	2451	272		
	117.8	388	130.1	400	133.4	400	142.1	392	151.9	372		
70	1.342	.595	1.410	.624	1.420	.626	1.428	.616	1.426	.585		
	3290	331	3072	316	2993	311	2752	295	2443	268		
	117.6	387	129.7	398	133.0	398	141.3	389	150.1	367		
72	1.342	.594	1.411	.621	1.422	.623	1.430	.611	1.430	.573		
	3288	330	3069	315	2990	310	2748	292	2433	263		
	117.4	386	129.2	397	132.4	396	140.3	386	147.6	359		
74	1.343	.592	1.413	.618	1.423	.619	1.432	.605	1.437	.553		
	3287	329	3067	313	2987	308	2745	289	2417	253		
	117.1	385	128.7	395	131.8	394	139.3	382	143.5	347		

ENGINE ANTI ICE ON
FUEL = + 1.5 %

TOTAL ANTI ICE ON
△FUEL = + 3 %

10E -08F0A319--131 IAE V2522--A5 12300010C6KG330 0 018590 0 0 3 1.3 .0 .00 0 01100.000 .000 .000 10 FCOM-N0--03--06--50--006--135

R

CRUISE - MCT/VMO - 1 ENGINE OUT

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA
CG = 33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
50	1.346	.610	1.405	.638	1.414	.642	1.418	.640	1.409	.629	1.398	.613
	3284	339	3014	324	2938	320	2707	307	2416	289	2138	270
	118.5	389	132.7	400	136.4	401	146.5	397	159.9	386	174.8	374
52	1.346	.609	1.405	.637	1.414	.641	1.419	.639	1.410	.627	1.399	.610
	3284	339	3013	323	2937	319	2706	306	2415	288	2136	269
	118.4	389	132.5	399	136.2	400	146.3	396	159.5	385	174.0	372
54	1.347	.608	1.405	.636	1.415	.640	1.419	.638	1.411	.625	1.400	.606
	3284	338	3013	323	2936	319	2704	305	2413	287	2134	267
	118.2	388	132.3	399	136.0	399	146.0	395	159.1	384	173.1	369
56	1.347	.608	1.406	.635	1.415	.639	1.420	.636	1.412	.623	1.402	.602
	3283	338	3012	322	2935	318	2703	305	2412	286	2132	265
	118.1	388	132.1	398	135.8	399	145.7	394	158.6	382	172.1	367
58	1.347	.607	1.406	.634	1.416	.638	1.421	.634	1.413	.620	1.404	.596
	3283	337	3011	322	2934	317	2702	304	2410	285	2128	262
	118.0	387	132.0	397	135.6	398	145.4	393	157.9	381	170.6	363
60	1.347	.606	1.407	.633	1.416	.636	1.421	.633	1.414	.616	1.407	.588
	3282	337	3010	321	2933	317	2700	303	2408	283	2123	259
	117.8	387	131.7	397	135.4	397	145.0	392	157.2	379	168.8	358
62	1.348	.605	1.407	.632	1.417	.635	1.422	.630	1.416	.612	1.411	.578
	3282	336	3009	320	2932	316	2699	302	2405	281	2117	254
	117.7	386	131.5	396	135.1	396	144.6	390	156.4	376	166.5	353
64	1.348	.604	1.408	.630	1.417	.633	1.423	.628	1.418	.608	1.416	.563
	3281	336	3007	319	2930	315	2697	300	2403	279	2108	247
	117.5	386	131.3	395	134.8	395	144.1	389	155.3	373	162.8	343
66	1.349	.603	1.409	.628	1.418	.631	1.424	.625	1.420	.602	1.427	.536
	3281	335	3006	319	2929	314	2694	299	2400	276	2090	235
	117.3	385	131.0	394	134.5	394	143.5	387	154.1	370	156.2	326
68	1.349	.602	1.409	.627	1.419	.629	1.426	.621	1.423	.595		
	3280	335	3004	318	2927	313	2692	297	2394	273		
	117.1	384	130.7	393	134.1	392	142.9	385	152.6	365		
70	1.350	.601	1.410	.624	1.420	.626	1.427	.617	1.426	.584		
	3279	334	3002	317	2925	311	2689	295	2385	268		
	116.9	383	130.3	391	133.6	391	142.1	382	150.4	359		
72	1.350	.599	1.411	.622	1.421	.623	1.430	.612	1.432	.568		
	3279	333	3000	315	2922	310	2685	292	2371	260		
	116.7	383	129.9	390	133.1	389	141.1	379	147.1	349		
74	1.351	.598	1.412	.619	1.423	.620	1.432	.607	1.445	.529		
	3278	332	2998	314	2920	308	2682	290	2337	242		
	116.4	382	129.4	388	132.5	387	140.1	376	139.1	325		
76	1.351	.596	1.414	.616	1.424	.616	1.434	.601				
	3277	331	2995	312	2917	306	2678	287				
	116.1	381	128.8	386	131.8	385	138.9	372				
78	1.352	.594	1.415	.613	1.426	.612	1.438	.590				
	3276	330	2993	310	2913	304	2668	282				
	115.7	379	128.2	384	131.0	382	137.0	366				

ENGINE ANTI ICE ON
△FUEL = + 2%

TOTAL ANTI ICE ON
△FUEL = + 4%

R

CRUISE - MCT/VMO - 1 ENGINE OUT

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA+10
CG=33.0%

EPR
KG/H
NM/1000KG
MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
50	1.346	.609	1.405	.637	1.414	.641	1.419	.639	1.410	.628	1.398	.612
	3358	338	3084	323	3006	319	2770	306	2473	289	2189	270
	117.9	396	131.9	407	135.6	408	145.7	404	159.0	393	173.8	380
52	1.347	.608	1.405	.636	1.415	.640	1.419	.638	1.410	.626	1.399	.609
	3357	338	3083	323	3005	319	2769	305	2472	288	2187	268
	117.7	395	131.8	406	135.5	407	145.4	403	158.6	392	173.0	378
54	1.347	.607	1.406	.635	1.415	.639	1.420	.637	1.411	.624	1.401	.605
	3357	338	3082	322	3004	318	2768	305	2471	287	2185	267
	117.6	395	131.6	406	135.3	406	145.2	402	158.2	391	172.1	376
56	1.347	.607	1.406	.634	1.416	.638	1.420	.635	1.412	.621	1.403	.601
	3357	337	3081	322	3003	317	2767	304	2469	285	2183	265
	117.5	394	131.4	405	135.1	406	144.9	401	157.6	389	171.1	373
58	1.348	.606	1.407	.633	1.416	.636	1.421	.633	1.413	.618	1.405	.594
	3356	337	3080	321	3002	317	2765	303	2467	284	2179	262
	117.3	394	131.2	404	134.9	405	144.6	400	157.0	387	169.5	369
60	1.348	.605	1.407	.632	1.417	.635	1.422	.631	1.415	.615	1.408	.586
	3356	336	3079	320	3001	316	2764	302	2465	282	2174	258
	117.2	393	131.0	403	134.6	404	144.2	399	156.3	385	167.8	365
62	1.348	.604	1.408	.631	1.417	.634	1.423	.629	1.416	.611	1.412	.576
	3355	336	3078	320	3000	315	2762	301	2463	281	2167	253
	117.0	393	130.8	403	134.3	403	143.8	397	155.5	383	165.3	358
64	1.349	.603	1.408	.629	1.418	.632	1.424	.626	1.418	.606	1.417	.560
	3355	335	3076	319	2998	314	2760	300	2460	278	2158	246
	116.9	392	130.5	402	134.0	402	143.3	395	154.4	380	161.5	348
66	1.349	.602	1.409	.627	1.419	.630	1.425	.623	1.421	.600	1.429	.530
	3354	335	3075	318	2997	313	2758	298	2456	276	2137	232
	116.7	391	130.3	401	133.7	401	142.7	394	153.1	376	154.3	330
68	1.349	.601	1.410	.626	1.420	.628	1.426	.620	1.423	.593		
	3353	334	3073	317	2995	312	2755	296	2450	272		
	116.5	391	130.0	399	133.3	399	142.0	391	151.6	372		
70	1.350	.600	1.411	.623	1.421	.625	1.428	.616	1.427	.582		
	3353	333	3071	316	2992	311	2752	294	2440	267		
	116.3	390	129.6	398	132.9	398	141.2	389	149.3	364		
72	1.350	.598	1.412	.621	1.422	.622	1.430	.611	1.433	.565		
	3352	332	3069	315	2990	309	2748	292	2426	259		
	116.0	389	129.1	396	132.3	396	140.3	386	145.9	354		
74	1.351	.597	1.413	.618	1.423	.619	1.432	.605	1.449	.518		
	3352	332	3067	313	2987	308	2745	289	2383	236		
	115.7	388	128.7	395	131.7	394	139.2	382	136.3	325		
76	1.352	.595	1.414	.615	1.425	.615	1.435	.599				
	3350	331	3064	311	2984	306	2740	286				
	115.5	387	128.1	393	131.1	391	138.0	378				
78	1.352	.593	1.415	.611	1.427	.610	1.439	.588				
	3349	329	3061	310	2981	303	2730	281				
	115.1	385	127.5	390	130.2	388	136.0	371				

ENGINE ANTI ICE ON
△FUEL = + 2%

TOTAL ANTI ICE ON
△FUEL = + 4%

CRUISE - MCT/VMO - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA+15
CG=33.0%

N1 (%) **MACH**
KG/H **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
42	86.9	.579	88.3	.595	88.9	.601	88.9	.601	87.9	.590	86.4	.572
	3043	322	2701	301	2679	299	2510	287	2268	271	2018	252
	124.9	380	141.9	383	144.1	386	152.6	383	164.6	373	178.1	359
44	86.9	.578	88.3	.593	88.9	.599	88.9	.599	88.0	.588	86.6	.570
	3045	321	2706	300	2681	297	2514	286	2280	269	2035	250
	124.6	379	141.2	382	143.5	385	151.8	382	163.1	372	175.7	358
46	86.9	.577	88.3	.591	89.0	.597	89.0	.596	88.2	.585	86.8	.567
	3046	320	2712	299	2686	296	2521	285	2293	268	2053	249
	124.2	378	140.4	381	142.7	383	150.8	380	161.5	370	173.3	356
48	86.9	.576	88.4	.589	89.0	.595	89.1	.594	88.3	.582	87.1	.564
	3049	320	2717	298	2692	295	2529	284	2307	267	2072	248
	123.8	378	139.6	379	141.9	382	149.7	379	159.7	368	170.8	354
50	86.9	.574	88.4	.587	89.1	.593	89.2	.591	88.5	.579	87.4	.560
	3052	319	2723	297	2697	294	2538	282	2322	265	2093	246
	123.4	377	138.8	378	141.0	380	148.5	377	157.9	367	168.1	352
52	86.9	.572	88.4	.584	89.1	.590	89.3	.588	88.7	.576	87.7	.557
	3055	318	2730	295	2704	293	2548	281	2337	264	2114	245
	122.9	375	137.9	377	140.1	379	147.2	375	156.0	365	165.3	350
54	87.0	.570	88.5	.582	89.2	.587	89.4	.585	88.9	.573	88.0	.553
	3058	317	2737	294	2711	291	2558	279	2353	262	2139	243
	122.4	374	137.0	375	139.1	377	145.8	373	154.1	363	162.2	347
56	87.0	.569	88.6	.579	89.2	.584	89.5	.582	89.1	.570	88.5	.547
	3061	316	2744	293	2718	290	2569	277	2369	261	2164	240
	121.8	373	135.9	373	138.0	375	144.3	371	152.1	360	158.9	344
58	87.0	.567	88.6	.576	89.3	.581	89.6	.578	89.3	.565	89.1	.539
	3065	314	2752	291	2726	288	2580	276	2384	259	2188	237
	121.2	372	134.9	371	136.8	373	142.8	369	150.0	358	154.7	339
60	87.0	.564	88.7	.573	89.3	.577	89.7	.574	89.6	.561	90.0	.528
	3069	313	2761	289	2734	286	2590	274	2401	257	2220	232
	120.6	370	133.7	369	135.6	371	141.3	366	147.7	355	149.4	332
62	87.0	.562	88.7	.570	89.4	.574	89.9	.570	89.9	.555	91.2	.514
	3073	312	2769	288	2742	284	2599	272	2420	254	2268	225
	119.9	369	132.5	367	134.4	368	139.8	363	145.1	351	142.2	322
64	87.0	.559	88.8	.566	89.5	.570	90.0	.565	90.3	.548		
	3078	310	2778	286	2751	282	2609	269	2443	250		
	119.2	367	131.3	365	133.0	366	138.1	360	141.8	347		
66	87.1	.557	88.9	.562	89.6	.566	90.2	.560	91.0	.535		
	3083	309	2788	284	2761	280	2622	267	2465	244		
	118.4	365	129.9	362	131.6	363	136.1	357	137.3	339		
68	87.1	.554	88.9	.558	89.7	.561	90.4	.553	92.0	.517		
	3088	307	2798	282	2771	278	2637	263	2500	236		
	117.6	363	128.5	360	130.1	360	133.8	353	130.9	327		

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2 %	+ 3 %

CRUISE - MCT/VMO - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA+20
CG=33.0%

N1 (%) **MACH**
KG/H **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
42	86.3	.566	87.5	.580	88.0	.585	88.0	.585	87.2	.576	85.8	.559
	2940	314	2608	293	2561	290	2397	279	2190	264	1959	245
	127.4	375	144.7	377	148.0	379	156.9	376	167.9	368	180.7	354
44	86.3	.565	87.5	.578	88.0	.583	88.0	.582	87.3	.573	86.0	.555
	2942	314	2611	292	2565	289	2404	278	2200	263	1974	244
	127.1	374	144.0	376	147.2	378	155.8	374	166.4	366	178.4	352
46	86.3	.564	87.5	.576	88.0	.580	88.1	.579	87.5	.570	86.2	.552
	2944	313	2615	291	2569	288	2412	276	2212	261	1990	242
	126.6	373	143.3	375	146.4	376	154.6	373	164.6	364	175.9	350
48	86.3	.562	87.5	.574	88.1	.578	88.2	.577	87.6	.567	86.4	.548
	2947	312	2618	290	2574	287	2419	275	2225	260	2004	240
	126.2	372	142.5	373	145.5	374	153.4	371	162.7	362	173.3	347
50	86.4	.560	87.5	.571	88.1	.575	88.2	.574	87.7	.564	86.7	.543
	2950	311	2623	289	2579	285	2428	273	2238	258	2018	238
	125.7	371	141.7	371	144.5	373	152.0	369	160.8	360	170.6	344
52	86.4	.558	87.6	.569	88.1	.572	88.3	.570	87.9	.560	87.1	.537
	2953	310	2627	287	2584	284	2437	272	2252	256	2034	236
	125.1	369	140.7	370	143.5	371	150.5	367	158.8	358	167.4	341
54	86.4	.556	87.6	.566	88.2	.569	88.4	.567	88.1	.556	87.5	.530
	2956	309	2632	286	2590	282	2447	270	2267	254	2054	232
	124.5	368	139.7	368	142.4	369	149.0	365	156.6	355	163.6	336
56	86.4	.554	87.6	.562	88.2	.566	88.5	.563	88.2	.551	88.2	.520
	2960	308	2638	284	2596	280	2457	268	2283	252	2081	228
	123.9	367	138.6	366	141.1	366	147.4	362	154.2	352	158.2	329
58	86.4	.552	87.7	.559	88.3	.562	88.6	.559	88.5	.545	89.1	.505
	2964	306	2644	282	2603	278	2468	266	2295	249	2115	221
	123.2	365	137.4	363	139.9	364	145.7	359	151.7	348	151.4	320
60	86.4	.550	87.7	.555	88.3	.558	88.7	.554	88.8	.537		
	2967	305	2650	280	2611	276	2480	264	2306	246		
	122.6	364	136.2	361	138.5	362	143.8	357	148.8	343		
62	86.4	.547	87.7	.551	88.4	.554	88.8	.549	89.3	.525		
	2964	303	2657	278	2619	274	2491	261	2322	240		
	122.0	362	134.9	358	137.0	359	141.8	353	144.5	335		
64	86.5	.543	87.8	.546	88.4	.549	89.0	.541	90.1	.506		
	2962	301	2655	275	2626	272	2493	258	2338	231		
	121.4	359	133.7	355	135.4	356	139.7	348	138.3	323		
66	86.5	.540	87.9	.540	88.5	.542	89.3	.530				
	2959	299	2650	272	2623	268	2495	252				
	120.7	357	132.5	351	134.0	351	136.6	341				
68	86.5	.536	87.9	.532	88.6	.534	89.7	.511				
	2956	297	2644	268	2618	264	2497	243				
	120.0	355	130.9	346	132.2	346	131.7	329				

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2 %	+ 3 %

CRUISE - MCT/VMO - 1 ENGINE OUT

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA+15
CG=33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
48	1.320	.594	1.380	.623	1.389	.627	1.393	.625	1.384	.613	1.372	.597
	3187	330	2958	316	2885	312	2658	299	2370	281	2096	263
	122.2	390	135.7	401	139.5	402	149.9	398	163.6	388	178.8	375
50	1.320	.593	1.381	.622	1.390	.626	1.394	.624	1.384	.611	1.373	.593
	3186	329	2958	315	2885	311	2657	298	2369	281	2094	261
	122.1	389	135.5	401	139.3	402	149.6	397	163.1	386	177.9	373
52	1.321	.592	1.381	.621	1.390	.625	1.394	.622	1.385	.609	1.375	.589
	3185	329	2957	315	2884	311	2656	297	2367	279	2091	260
	122.0	388	135.3	400	139.1	401	149.3	396	162.6	385	177.0	370
54	1.321	.591	1.381	.620	1.391	.623	1.395	.620	1.386	.606	1.376	.585
	3184	329	2956	314	2883	310	2654	297	2366	278	2088	257
	121.8	388	135.1	399	138.8	400	149.0	395	162.0	383	175.7	367
56	1.321	.590	1.382	.619	1.391	.622	1.396	.619	1.388	.603	1.379	.578
	3183	328	2955	314	2882	309	2653	296	2364	277	2085	254
	121.7	387	134.9	399	138.6	399	148.6	394	161.3	381	174.1	363
58	1.321	.590	1.382	.617	1.392	.621	1.397	.616	1.389	.599	1.381	.571
	3183	327	2954	313	2881	308	2652	295	2362	275	2081	251
	121.5	387	134.7	398	138.3	398	148.2	393	160.5	379	172.2	358
60	1.322	.589	1.383	.616	1.392	.619	1.398	.614	1.391	.595	1.385	.561
	3182	327	2953	312	2879	308	2650	293	2359	273	2076	247
	121.3	386	134.4	397	138.0	397	147.7	391	159.6	377	169.8	352
62	1.322	.587	1.384	.614	1.393	.617	1.399	.611	1.393	.589	1.390	.547
	3181	326	2952	311	2878	307	2648	292	2355	270	2068	240
	121.1	385	134.1	396	137.6	396	147.1	389	158.3	373	166.2	344
64	1.322	.586	1.384	.612	1.394	.615	1.400	.608	1.395	.583		
	3180	326	2950	310	2876	306	2646	290	2350	267		
	120.9	384	133.8	395	137.3	395	146.4	387	157.0	369		
66	1.323	.585	1.385	.610	1.395	.612	1.401	.604	1.397	.576		
	3179	325	2949	309	2874	304	2643	289	2345	264		
	120.7	384	133.4	393	136.8	393	145.7	385	155.3	364		
68	1.323	.583	1.386	.608	1.396	.610	1.403	.600	1.401	.565		
	3177	324	2947	308	2872	303	2640	286	2338	259		
	120.4	383	132.9	392	136.3	391	144.8	382	153.0	358		
70	1.323	.582	1.387	.605	1.397	.607	1.405	.594	1.406	.550		
	3176	323	2945	306	2870	301	2636	284	2327	252		
	120.2	382	132.4	390	135.7	389	143.7	379	149.6	348		
72	1.324	.580	1.388	.602	1.399	.603	1.408	.588				
	3175	322	2943	305	2868	300	2631	281				
	119.9	381	131.9	388	135.1	387	142.5	375				
74	1.324	.578	1.390	.599	1.400	.599	1.410	.581				
	3173	321	2941	303	2864	297	2625	277				
	119.5	379	131.3	386	134.2	384	141.0	370				

ENGINE ANTI ICE ON
FUEL = + 1.5 %

TOTAL ANTI ICE ON
△FUEL = + 3 %

10E -08F0A319--131 IAE V2522--A5 12300010C6KG330 0 018590 0 0 3 1.3 .0 .00 0 01100.000 .000 .000 15 FCOM-N0--03--06--50--007--130

CRUISE - MCT/VMO - 1 ENGINE OUT

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA+20
CG=33.0%

EPR
KG/H
NM/1000KG
MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
48	1.301	.581	1.356	.607	1.365	.610	1.369	.608	1.359	.595	1.347	.577
	3082	323	2827	307	2762	303	2543	290	2262	273	1993	254
	124.7	384	139.6	395	143.2	396	153.8	391	168.0	380	183.6	366
50	1.301	.580	1.356	.606	1.365	.609	1.369	.607	1.359	.593	1.348	.573
	3081	322	2826	307	2761	303	2542	290	2261	272	1992	252
	124.6	384	139.4	394	143.0	395	153.5	390	167.5	379	182.4	363
52	1.302	.579	1.357	.605	1.366	.608	1.370	.605	1.360	.590	1.350	.568
	3080	322	2826	306	2760	302	2541	289	2259	271	1990	249
	124.4	383	139.1	393	142.7	394	153.1	389	166.8	377	180.8	360
54	1.302	.578	1.357	.603	1.366	.607	1.371	.603	1.362	.587	1.353	.561
	3079	321	2825	305	2760	301	2540	288	2258	269	1988	246
	124.3	383	138.9	392	142.4	393	152.7	388	166.0	375	178.8	355
56	1.302	.577	1.358	.602	1.367	.605	1.372	.601	1.363	.583	1.355	.553
	3078	321	2824	305	2759	300	2539	287	2256	267	1985	243
	124.1	382	138.6	391	142.1	392	152.2	386	165.0	372	176.5	350
58	1.302	.576	1.358	.600	1.368	.603	1.373	.598	1.365	.578	1.360	.541
	3077	320	2824	304	2758	300	2537	286	2254	265	1979	237
	123.9	381	138.3	390	141.8	391	151.6	385	163.8	369	173.2	343
60	1.303	.575	1.359	.599	1.368	.601	1.374	.595	1.367	.572	1.367	.520
	3076	319	2823	303	2756	299	2535	284	2251	262	1968	228
	123.7	381	137.9	389	141.4	390	151.0	383	162.3	365	167.5	330
62	1.303	.574	1.360	.597	1.369	.599	1.375	.592	1.369	.565		
	3074	319	2822	302	2755	297	2533	282	2247	259		
	123.5	380	137.5	388	140.9	388	150.3	381	160.6	361		
64	1.303	.572	1.361	.595	1.370	.597	1.376	.588	1.373	.556		
	3073	318	2821	301	2753	296	2530	280	2242	255		
	123.3	379	137.1	387	140.4	387	149.4	378	158.5	355		
66	1.304	.571	1.361	.592	1.371	.594	1.378	.582	1.377	.544		
	3071	317	2819	300	2751	295	2527	278	2234	248		
	123.0	378	136.6	385	139.8	385	148.3	375	155.4	347		
68	1.304	.569	1.362	.589	1.372	.590	1.380	.577	1.387	.516		
	3069	316	2817	298	2749	293	2523	275	2215	235		
	122.7	377	136.0	383	139.2	383	147.0	371	148.7	330		
70	1.304	.567	1.364	.586	1.374	.586	1.383	.570				
	3067	315	2816	296	2746	291	2519	272				
	122.4	375	135.3	381	138.3	380	145.5	367				
72	1.305	.565	1.365	.582	1.376	.581	1.386	.561				
	3064	313	2813	294	2742	288	2513	267				
	122.0	374	134.5	378	137.3	377	143.6	361				
74	1.306	.562	1.367	.577	1.378	.576	1.391	.548				
	3062	312	2810	292	2738	285	2505	261				
	121.5	372	133.5	375	136.2	373	140.8	353				

ENGINE ANTI ICE ON
FUEL = + 1.5 %

TOTAL ANTI ICE ON
△FUEL = + 3 %

10E -08F0A319--131 IAE V2522--A5 12300010C6KG330 0 018590 0 0 3 1.3 .0 .00 0 01100.000 .000 .000 20 FCOM-N0--03--06--50--008--135

R

CRUISE - MCT/VMO - 1 ENGINE OUT

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA+15
CG=33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
50	1.328	.596	1.381	.621	1.390	.625	1.394	.623	1.385	.610	1.374	.592
	3242	331	2957	315	2884	311	2656	298	2369	280	2093	261
	120.6	391	135.3	400	139.1	401	149.4	397	163.0	386	177.6	372
52	1.328	.595	1.381	.620	1.391	.624	1.395	.621	1.386	.608	1.375	.588
	3241	331	2956	314	2883	310	2655	297	2367	279	2091	259
	120.5	390	135.2	400	138.9	400	149.1	396	162.5	385	176.6	369
54	1.329	.595	1.382	.619	1.391	.623	1.395	.620	1.387	.605	1.377	.582
	3241	330	2955	314	2882	310	2654	296	2366	278	2088	256
	120.3	390	135.0	399	138.7	400	148.8	395	161.9	383	175.2	366
56	1.329	.594	1.382	.618	1.392	.621	1.396	.618	1.388	.602	1.380	.575
	3241	330	2955	313	2881	309	2653	295	2364	276	2084	253
	120.2	389	134.7	398	138.4	399	148.4	394	161.2	381	173.3	361
58	1.329	.593	1.383	.617	1.392	.620	1.397	.616	1.389	.599	1.383	.567
	3240	329	2954	312	2880	308	2651	294	2362	275	2079	249
	120.0	389	134.5	397	138.1	398	148.0	393	160.4	379	171.1	356
60	1.330	.592	1.383	.615	1.393	.618	1.398	.613	1.391	.594	1.387	.554
	3240	329	2953	312	2879	307	2650	293	2359	273	2072	243
	119.8	388	134.2	396	137.9	397	147.5	391	159.4	376	167.8	348
62	1.330	.591	1.384	.614	1.393	.616	1.399	.611	1.393	.588	1.395	.533
	3240	328	2951	311	2878	306	2648	292	2354	270	2059	234
	119.6	387	134.0	395	137.5	396	147.0	389	158.0	372	162.6	335
64	1.330	.590	1.385	.612	1.394	.614	1.400	.608	1.396	.581	1.411	.486
	3239	327	2950	310	2876	305	2646	290	2349	266	2038	212
	119.4	387	133.6	394	137.1	394	146.3	387	156.4	367	149.6	305
66	1.331	.588	1.385	.610	1.395	.612	1.402	.604	1.399	.572		
	3238	327	2949	309	2874	304	2643	288	2342	262		
	119.2	386	133.3	393	136.7	393	145.6	385	154.4	362		
68	1.331	.587	1.386	.607	1.396	.609	1.403	.599	1.404	.557		
	3237	326	2947	308	2872	303	2640	286	2333	255		
	118.9	385	132.8	391	136.2	391	144.7	382	151.2	353		
70	1.332	.585	1.387	.605	1.397	.606	1.406	.593	1.412	.533		
	3237	325	2945	306	2870	301	2635	283	2313	244		
	118.6	384	132.3	390	135.6	389	143.5	378	145.8	337		
72	1.332	.584	1.389	.602	1.399	.603	1.408	.586				
	3236	324	2943	305	2868	299	2630	280				
	118.3	383	131.8	388	135.0	387	142.1	374				
74	1.333	.582	1.390	.599	1.401	.598	1.412	.577				
	3235	323	2941	303	2864	297	2622	275				
	117.9	382	131.2	386	134.1	384	140.2	368				
76	1.334	.580	1.392	.594	1.403	.593	1.417	.563				
	3234	322	2936	300	2859	294	2612	268				
	117.5	380	130.3	383	133.0	380	137.4	359				
78	1.335	.577	1.394	.588	1.405	.586	1.425	.540				
	3233	320	2932	298	2854	291	2593	257				
	117.1	379	129.3	379	131.9	376	132.8	344				

ENGINE ANTI ICE ON
△FUEL = + 2%

TOTAL ANTI ICE ON
△FUEL = + 4%

R

CRUISE - MCT/VMO - 1 ENGINE OUT

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA+20
CG=33.0%

EPR
KG/H
NM/1000KG
MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
50	1.309	.583	1.357	.605	1.366	.608	1.370	.606	1.360	.592	1.349	.570
	3132	324	2826	306	2761	302	2542	289	2261	271	1991	251
	123.1	385	139.2	393	142.8	394	153.3	390	167.1	378	181.5	361
52	1.310	.582	1.357	.604	1.366	.607	1.370	.604	1.361	.589	1.352	.564
	3131	323	2826	306	2760	302	2541	289	2259	270	1989	248
	122.9	385	138.9	393	142.5	393	152.9	389	166.4	376	179.6	357
54	1.310	.581	1.358	.603	1.367	.606	1.371	.602	1.362	.585	1.354	.556
	3131	323	2825	305	2759	301	2540	288	2257	268	1986	244
	122.8	384	138.7	392	142.3	393	152.5	387	165.5	374	177.4	352
56	1.310	.580	1.358	.601	1.367	.604	1.372	.600	1.364	.581	1.358	.546
	3130	322	2824	304	2758	300	2539	287	2255	266	1982	239
	122.6	384	138.4	391	141.9	392	152.1	386	164.5	371	174.5	346
58	1.311	.579	1.359	.600	1.368	.603	1.373	.597	1.366	.575	1.364	.528
	3130	321	2824	304	2757	299	2537	285	2253	263	1973	232
	122.4	383	138.1	390	141.6	391	151.4	384	163.0	367	169.7	335
60	1.311	.578	1.359	.598	1.369	.601	1.374	.594	1.368	.568	1.375	.495
	3129	321	2823	303	2756	298	2535	284	2249	260	1958	217
	122.2	382	137.7	389	141.2	389	150.8	382	161.4	363	160.3	314
62	1.311	.577	1.360	.596	1.370	.598	1.375	.591	1.371	.560		
	3128	320	2822	302	2755	297	2533	282	2245	256		
	122.0	381	137.3	388	140.8	388	150.0	380	159.4	358		
64	1.312	.575	1.361	.593	1.371	.596	1.377	.586	1.375	.548		
	3127	319	2820	300	2753	296	2529	280	2239	251		
	121.7	381	136.8	386	140.2	386	149.0	377	156.4	350		
66	1.312	.574	1.362	.591	1.372	.593	1.379	.580	1.382	.530		
	3127	319	2819	299	2751	294	2526	277	2226	242		
	121.4	380	136.3	384	139.6	384	147.7	373	152.0	338		
68	1.313	.572	1.363	.588	1.373	.589	1.382	.574	1.396	.490		
	3126	318	2817	297	2748	292	2522	273	2207	223		
	121.1	379	135.7	382	138.9	382	146.3	369	141.9	313		
70	1.314	.570	1.364	.584	1.375	.584	1.385	.565				
	3125	317	2815	295	2745	290	2516	269				
	120.8	377	134.9	380	137.9	379	144.5	364				
72	1.314	.568	1.366	.579	1.377	.579	1.389	.553				
	3123	315	2812	293	2741	287	2509	263				
	120.4	376	134.0	377	136.8	375	141.7	356				
74	1.315	.566	1.368	.574	1.379	.572	1.396	.533				
	3122	314	2809	290	2737	284	2494	254				
	119.9	374	132.9	373	135.5	371	137.6	343				
76	1.316	.563	1.370	.568	1.382	.564	1.411	.492				
	3121	313	2805	287	2731	280	2469	233				
	119.4	373	131.6	369	133.9	366	128.1	316				
78	1.317	.560	1.373	.560	1.386	.553						
	3119	311	2800	283	2724	274						
	118.8	371	130.1	364	131.5	358						

ENGINE ANTI ICE ON
△FUEL = + 2%

TOTAL ANTI ICE ON
△FUEL = + 4%

CRUISE - MCT/320KT - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

N1 (%) **MACH**
KG/H **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
42	84.2	.576	88.0	.617	88.7	.625	88.7	.624	87.4	.609	85.1	.584
	2904	320	2833	312	2822	311	2627	299	2334	280	2012	257
	126.7	368	136.4	386	138.2	390	147.2	387	160.4	374	176.9	356
44	84.3	.576	88.0	.615	88.7	.623	88.8	.622	87.4	.606	85.4	.581
	2918	320	2832	311	2820	310	2625	297	2332	278	2029	256
	126.1	368	136.0	385	137.8	389	146.7	385	159.7	372	174.6	354
46	84.5	.576	88.0	.613	88.8	.621	88.8	.619	87.5	.602	85.7	.579
	2932	320	2832	310	2818	308	2623	296	2330	276	2047	255
	125.5	368	135.5	384	137.4	387	146.1	383	158.9	370	172.3	353
48	84.6	.576	88.1	.611	88.8	.618	88.9	.616	87.6	.599	85.9	.576
	2949	320	2832	309	2816	307	2621	295	2331	275	2065	253
	124.7	368	135.1	382	136.9	386	145.6	382	157.8	368	170.0	351
50	84.8	.576	88.1	.608	88.9	.615	89.0	.613	87.8	.596	86.2	.573
	2967	320	2831	308	2814	306	2619	293	2342	273	2086	252
	124.0	368	134.6	381	136.5	384	144.9	380	156.3	366	167.4	349
52	85.0	.576	88.1	.606	88.9	.613	89.0	.609	88.0	.593	86.5	.570
	2988	320	2831	307	2812	304	2616	291	2353	272	2106	251
	123.1	368	134.0	379	136.0	382	144.3	377	154.8	364	164.9	347
54	85.2	.576	88.2	.603	89.0	.610	89.1	.606	88.2	.589	86.8	.566
	3009	320	2831	305	2810	303	2613	289	2365	270	2124	249
	122.3	368	133.5	378	135.4	380	143.5	375	153.1	362	162.4	345
56	85.4	.576	88.2	.600	89.0	.606	89.2	.601	88.4	.586	87.2	.562
	3031	320	2831	304	2807	301	2610	287	2377	269	2146	247
	121.4	368	132.8	376	134.8	378	142.7	372	151.4	360	159.5	342
58	85.7	.576	88.3	.598	89.1	.603	89.3	.597	88.6	.582	87.6	.557
	3054	320	2836	302	2804	299	2614	285	2392	267	2172	244
	120.5	368	132.0	374	134.2	376	141.5	370	149.4	357	156.2	339
60	85.9	.576	88.4	.595	89.2	.599	89.4	.594	88.8	.578	88.2	.550
	3079	320	2843	301	2803	297	2622	283	2406	265	2205	241
	119.5	368	131.0	373	133.4	374	140.2	368	147.5	355	152.0	335
62	86.2	.576	88.4	.591	89.2	.595	89.5	.590	89.1	.573	89.2	.539
	3104	320	2851	299	2807	296	2630	281	2426	262	2246	236
	118.5	368	130.0	371	132.4	372	138.8	365	145.1	352	146.2	328
64	86.2	.575	88.5	.588	89.3	.592	89.7	.585	89.4	.568	90.4	.525
	3113	319	2858	297	2812	294	2641	279	2449	260	2295	230
	117.8	367	128.9	368	131.3	369	137.2	362	142.4	349	139.3	320
66	86.3	.572	88.6	.584	89.4	.588	89.8	.580	89.8	.561	91.9	.507
	3118	318	2863	295	2818	292	2654	277	2476	257	2358	222
	117.1	365	127.8	366	130.1	367	135.4	359	139.2	345	131.2	309
68	86.3	.570	88.6	.580	89.4	.583	90.0	.575	90.4	.552		
	3123	316	2869	293	2824	289	2667	274	2512	252		
	116.4	364	126.7	363	128.8	364	133.5	356	134.9	339		

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2 %	+ 4.5 %

CRUISE - MCT/320KT - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA+10
CG=33.0%

N1 (%) **MACH**
KG/H **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
42	85.8	.576	89.4	.615	90.2	.623	90.2	.623	88.9	.608	86.7	.583
	2976	320	2890	312	2878	310	2681	298	2384	279	2064	257
	125.9	375	135.9	393	137.7	396	146.7	393	159.8	381	175.7	363
44	85.9	.576	89.4	.613	90.2	.621	90.3	.620	88.9	.605	86.9	.581
	2990	320	2890	311	2877	309	2679	297	2382	277	2082	256
	125.3	375	135.5	392	137.4	395	146.2	392	159.0	379	173.4	361
46	86.1	.576	89.5	.611	90.2	.619	90.3	.618	89.0	.601	87.2	.578
	3005	320	2890	310	2875	308	2677	295	2379	276	2100	254
	124.7	375	135.1	390	137.0	394	145.6	390	158.2	376	171.1	359
48	86.2	.576	89.5	.609	90.3	.617	90.4	.615	89.1	.598	87.4	.575
	3022	320	2890	308	2873	306	2675	294	2386	274	2119	253
	124.0	375	134.6	389	136.5	392	145.1	388	157.0	375	168.9	358
50	86.4	.576	89.5	.607	90.3	.614	90.4	.611	89.3	.595	87.7	.573
	3041	320	2889	307	2871	305	2672	292	2396	273	2139	252
	123.2	375	134.1	387	136.0	391	144.5	386	155.6	373	166.4	356
52	86.6	.576	89.6	.604	90.4	.611	90.5	.608	89.5	.592	88.0	.569
	3062	320	2889	306	2868	304	2669	290	2407	271	2158	250
	122.4	375	133.5	386	135.5	389	143.8	384	154.0	371	164.0	354
54	86.8	.576	89.6	.602	90.4	.608	90.6	.604	89.7	.588	88.4	.565
	3084	320	2889	305	2866	302	2666	289	2420	270	2177	248
	121.5	375	133.0	384	135.0	387	143.0	381	152.3	369	161.4	351
56	87.0	.576	89.7	.599	90.5	.605	90.7	.600	89.9	.585	88.7	.561
	3107	320	2891	303	2863	300	2663	286	2433	268	2199	246
	120.6	375	132.3	382	134.4	385	142.2	379	150.6	366	158.5	349
58	87.3	.576	89.7	.596	90.6	.601	90.8	.596	90.1	.581	89.2	.556
	3130	320	2898	302	2860	299	2671	285	2447	266	2225	244
	119.7	375	131.4	381	133.8	383	140.9	376	148.7	364	155.3	346
60	87.5	.576	89.8	.593	90.6	.598	90.9	.592	90.4	.577	89.8	.549
	3154	320	2905	300	2862	297	2679	283	2463	264	2260	241
	118.8	375	130.4	379	132.9	380	139.6	374	146.7	361	151.0	341
62	87.7	.575	89.8	.590	90.7	.594	91.0	.588	90.6	.572	90.8	.537
	3170	319	2912	299	2867	295	2688	281	2483	262	2300	236
	118.0	374	129.4	377	131.8	378	138.2	371	144.4	358	145.2	334
64	87.7	.573	89.9	.586	90.8	.590	91.1	.584	91.0	.566	92.1	.523
	3175	318	2918	297	2872	293	2700	278	2506	259	2351	229
	117.3	373	128.3	374	130.7	375	136.5	369	141.6	355	138.3	325
66	87.7	.571	90.0	.583	90.8	.586	91.3	.579	91.4	.560	93.6	.506
	3180	317	2923	295	2877	291	2713	276	2534	256	2417	221
	116.7	371	127.3	372	129.6	373	134.7	365	138.4	351	130.1	314
68	87.7	.568	90.1	.579	90.9	.582	91.5	.574	91.9	.550		
	3186	315	2929	293	2884	288	2725	273	2571	252		
	115.9	369	126.2	370	128.3	370	132.9	362	134.1	345		

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2 %	+ 4.5 %

CRUISE - MCT/320KT - 1 ENGINE OUT

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA
CG=33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
48	1.291	.576	1.390	.631	1.411	.643	1.417	.643	1.408	.631	1.396	.616
	2886	320	2924	320	2927	320	2708	308	2417	290	2139	272
	127.5	368	135.2	395	137.0	401	146.9	398	160.4	388	175.6	376
50	1.292	.576	1.391	.631	1.413	.643	1.418	.641	1.409	.630	1.397	.614
	2894	320	2932	320	2936	320	2707	307	2416	290	2138	271
	127.1	368	134.8	395	136.6	401	146.7	397	160.1	387	174.9	374
52	1.294	.576	1.393	.631	1.414	.642	1.418	.640	1.409	.628	1.399	.610
	2902	320	2942	320	2938	320	2706	306	2415	289	2136	269
	126.8	368	134.4	395	136.4	401	146.4	396	159.7	386	174.1	372
54	1.295	.576	1.395	.631	1.414	.641	1.419	.639	1.410	.626	1.400	.607
	2910	320	2951	320	2937	319	2705	306	2414	288	2134	267
	126.4	368	134.0	395	136.2	400	146.2	395	159.2	384	173.2	370
56	1.297	.576	1.398	.631	1.415	.640	1.419	.637	1.411	.623	1.402	.602
	2919	320	2961	320	2936	318	2704	305	2412	286	2132	266
	126.0	368	133.5	395	136.0	399	145.9	394	158.7	383	172.2	367
58	1.299	.576	1.400	.631	1.415	.638	1.420	.635	1.413	.620	1.404	.596
	2929	320	2972	320	2935	318	2702	304	2410	285	2129	263
	125.6	368	133.0	395	135.8	398	145.5	393	158.1	381	170.8	363
60	1.301	.576	1.402	.631	1.416	.637	1.421	.633	1.414	.617	1.407	.590
	2939	320	2984	320	2934	317	2701	303	2408	283	2124	260
	125.2	368	132.5	395	135.5	398	145.2	392	157.3	379	169.2	359
62	1.303	.576	1.405	.631	1.416	.635	1.422	.631	1.416	.613	1.410	.582
	2951	320	2996	320	2932	316	2699	302	2406	281	2119	256
	124.7	368	132.0	395	135.2	397	144.8	391	156.5	376	167.3	355
64	1.305	.576	1.408	.631	1.417	.634	1.423	.628	1.418	.608	1.414	.571
	2963	320	3008	320	2931	315	2697	301	2403	279	2112	251
	124.2	368	131.4	395	134.9	395	144.2	389	155.4	373	164.6	348
66	1.308	.576	1.408	.629	1.418	.632	1.424	.625	1.420	.602	1.420	.553
	2975	320	3006	319	2929	314	2695	299	2399	276	2102	243
	123.7	368	131.1	394	134.6	394	143.6	387	154.2	370	160.4	337
68	1.310	.576	1.409	.627	1.419	.629	1.426	.622	1.422	.596		
	2988	320	3005	318	2927	313	2692	297	2395	273		
	123.1	368	130.8	393	134.2	393	143.0	385	152.8	366		
70	1.313	.576	1.410	.625	1.420	.627	1.427	.618	1.425	.587		
	3003	320	3003	317	2925	312	2689	295	2388	269		
	122.5	368	130.4	392	133.7	391	142.2	382	151.1	361		
72	1.316	.576	1.411	.623	1.421	.624	1.429	.612	1.429	.575		
	3019	320	3001	315	2923	310	2685	293	2377	264		
	121.8	368	130.0	390	133.2	389	141.2	379	148.7	353		
74	1.320	.576	1.412	.620	1.422	.621	1.432	.607	1.435	.557		
	3038	320	2998	314	2920	308	2682	290	2362	255		
	121.1	368	129.5	388	132.6	387	140.1	376	144.8	342		

ENGINE ANTI ICE ON
△FUEL = + 2.5 %

TOTAL ANTI ICE ON
△FUEL = + 4 %

10E -08F0A319--131 IAE V2522--A5 12300010C6KG330 0 018590 0 0 3 1.0 .0 .00 0 01100.000 .000 .000 0 FCOM-N0--03--06--50--009--135

CRUISE - MCT/320KT - 1 ENGINE OUT

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA+10
CG=33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
48	1.293	.576	1.392	.631	1.413	.643	1.418	.641	1.408	.630	1.397	.615
	2960	320	3001	320	3006	320	2772	307	2475	290	2190	271
	126.6	375	134.2	403	136.0	409	146.1	405	159.5	395	174.6	382
50	1.294	.576	1.394	.631	1.414	.642	1.418	.640	1.409	.628	1.398	.612
	2968	320	3011	320	3007	320	2771	306	2474	289	2189	270
	126.2	375	133.8	403	135.8	408	145.9	404	159.2	394	173.9	381
52	1.296	.576	1.395	.631	1.414	.641	1.419	.639	1.410	.626	1.399	.609
	2976	320	3020	320	3006	319	2770	306	2472	288	2187	269
	125.9	375	133.4	403	135.6	408	145.6	403	158.8	392	173.1	379
54	1.297	.576	1.398	.631	1.415	.640	1.419	.637	1.411	.624	1.401	.605
	2985	320	3030	320	3005	318	2768	305	2471	287	2185	267
	125.5	375	133.0	403	135.4	407	145.4	402	158.3	391	172.2	376
56	1.299	.576	1.400	.631	1.415	.639	1.420	.636	1.412	.622	1.402	.601
	2994	320	3040	320	3004	318	2767	304	2469	286	2183	265
	125.1	375	132.5	403	135.2	406	145.1	401	157.8	390	171.2	374
58	1.301	.576	1.402	.631	1.416	.637	1.421	.634	1.413	.619	1.405	.595
	3004	320	3051	320	3003	317	2766	303	2467	284	2179	262
	124.7	375	132.1	403	135.0	405	144.7	400	157.1	388	169.7	370
60	1.303	.576	1.404	.631	1.416	.636	1.421	.632	1.414	.615	1.407	.588
	3014	320	3063	320	3002	316	2764	302	2465	283	2175	259
	124.3	375	131.5	403	134.8	405	144.3	399	156.4	385	168.1	366
62	1.305	.576	1.407	.631	1.417	.634	1.422	.630	1.416	.611	1.410	.580
	3026	320	3076	320	3000	316	2762	301	2463	281	2169	255
	123.8	375	131.0	403	134.5	403	143.9	398	155.5	383	166.2	361
64	1.307	.576	1.408	.630	1.418	.632	1.424	.627	1.418	.606	1.415	.568
	3038	320	3077	319	2999	315	2760	300	2460	278	2162	250
	123.3	375	130.7	402	134.2	402	143.4	396	154.5	380	163.4	353
66	1.310	.576	1.409	.628	1.418	.631	1.425	.624	1.420	.601	1.421	.550
	3051	320	3075	318	2997	314	2758	298	2456	276	2152	242
	122.8	375	130.4	401	133.8	401	142.8	394	153.2	376	159.0	342
68	1.312	.576	1.410	.626	1.419	.628	1.426	.620	1.423	.594		
	3065	320	3074	317	2995	312	2755	297	2451	272		
	122.3	375	130.1	400	133.4	400	142.1	392	151.9	372		
70	1.315	.576	1.410	.624	1.420	.626	1.428	.616	1.426	.585		
	3080	320	3072	316	2993	311	2752	295	2443	268		
	121.7	375	129.7	398	133.0	398	141.3	389	150.1	367		
72	1.318	.576	1.411	.621	1.422	.623	1.430	.611	1.430	.573		
	3096	320	3069	315	2990	310	2748	292	2433	263		
	121.0	375	129.2	397	132.4	396	140.3	386	147.6	359		
74	1.322	.576	1.413	.618	1.423	.619	1.432	.605	1.437	.553		
	3117	320	3067	313	2987	308	2745	289	2417	253		
	120.2	375	128.7	395	131.8	394	139.3	382	143.5	347		

ENGINE ANTI ICE ON
△FUEL = + 2.5 %

TOTAL ANTI ICE ON
△FUEL = + 4 %

10E -08F0A319--131 IAE V2522--A5 12300010C6KG330 0 018590 0 0 3 1.0 .0 .00 0 01100.000 .000 .000 10 FCOM-N0--03--06--50--010--135

R

CRUISE - MCT/320KT - 1 ENGINE OUT

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA
CG=33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
50	1.297	.576	1.393	.631	1.414	.642	1.418	.640	1.409	.629	1.398	.613
	2922	320	2942	320	2938	320	2707	307	2416	289	2138	270
	125.9	368	134.4	395	136.4	401	146.5	397	159.9	386	174.8	374
52	1.299	.576	1.395	.631	1.414	.641	1.419	.639	1.410	.627	1.399	.610
	2929	320	2951	320	2937	319	2706	306	2415	288	2136	269
	125.6	368	134.0	395	136.2	400	146.3	396	159.5	385	174.0	372
54	1.300	.576	1.397	.631	1.415	.640	1.419	.638	1.411	.625	1.400	.606
	2937	320	2960	320	2936	319	2704	305	2413	287	2134	267
	125.3	368	133.6	395	136.0	399	146.0	395	159.1	384	173.1	369
56	1.302	.576	1.399	.631	1.415	.639	1.420	.636	1.412	.623	1.402	.602
	2946	320	2970	320	2935	318	2703	305	2412	286	2132	265
	124.9	368	133.1	395	135.8	399	145.7	394	158.6	382	172.1	367
58	1.304	.576	1.402	.631	1.416	.638	1.421	.634	1.413	.620	1.404	.596
	2955	320	2980	320	2934	317	2702	304	2410	285	2128	262
	124.5	368	132.7	395	135.6	398	145.4	393	157.9	381	170.6	363
60	1.306	.576	1.404	.631	1.416	.636	1.421	.633	1.414	.616	1.407	.588
	2965	320	2991	320	2933	317	2700	303	2408	283	2123	259
	124.1	368	132.2	395	135.4	397	145.0	392	157.2	379	168.8	358
62	1.308	.576	1.407	.631	1.417	.635	1.422	.630	1.416	.612	1.411	.578
	2976	320	3003	320	2932	316	2699	302	2405	281	2117	254
	123.6	368	131.6	395	135.1	396	144.6	390	156.4	376	166.5	353
64	1.310	.576	1.408	.630	1.417	.633	1.423	.628	1.418	.608	1.416	.563
	2987	320	3007	319	2930	315	2697	300	2403	279	2108	247
	123.2	368	131.3	395	134.8	395	144.1	389	155.3	373	162.8	343
66	1.312	.576	1.409	.628	1.418	.631	1.424	.625	1.420	.602	1.427	.536
	2998	320	3006	319	2929	314	2694	299	2400	276	2090	235
	122.7	368	131.0	394	134.5	394	143.5	387	154.1	370	156.2	326
68	1.315	.576	1.409	.627	1.419	.629	1.426	.621	1.423	.595		
	3011	320	3004	318	2927	313	2692	297	2394	273		
	122.2	368	130.7	393	134.1	392	142.9	385	152.6	365		
70	1.317	.576	1.410	.624	1.420	.626	1.427	.617	1.426	.584		
	3025	320	3002	317	2925	311	2689	295	2385	268		
	121.6	368	130.3	391	133.6	391	142.1	382	150.4	359		
72	1.321	.576	1.411	.622	1.421	.623	1.430	.612	1.432	.568		
	3043	320	3000	315	2922	310	2685	292	2371	260		
	120.9	368	129.9	390	133.1	389	141.1	379	147.1	349		
74	1.324	.576	1.412	.619	1.423	.620	1.432	.607	1.445	.529		
	3063	320	2998	314	2920	308	2682	290	2337	242		
	120.1	368	129.4	388	132.5	387	140.1	376	139.1	325		
76	1.327	.576	1.414	.616	1.424	.616	1.434	.601				
	3084	320	2995	312	2917	306	2678	287				
	119.3	368	128.8	386	131.8	385	138.9	372				
78	1.331	.576	1.415	.613	1.426	.612	1.438	.590				
	3106	320	2993	310	2913	304	2668	282				
	118.4	368	128.2	384	131.0	382	137.0	366				

ENGINE ANTI ICE ON
△FUEL = + 2.5 %

TOTAL ANTI ICE ON
△FUEL = + 5 %

R

CRUISE - MCT/320KT - 1 ENGINE OUT

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA+10
CG=33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
50	1.299	.576	1.395	.631	1.414	.641	1.419	.639	1.410	.628	1.398	.612
	2996	320	3020	320	3006	319	2770	306	2473	289	2189	270
	125.1	375	133.4	403	135.6	408	145.7	404	159.0	393	173.8	380
52	1.300	.576	1.397	.631	1.415	.640	1.419	.638	1.410	.626	1.399	.609
	3004	320	3029	320	3005	319	2769	305	2472	288	2187	268
	124.7	375	133.0	403	135.5	407	145.4	403	158.6	392	173.0	378
54	1.302	.576	1.399	.631	1.415	.639	1.420	.637	1.411	.624	1.401	.605
	3012	320	3039	320	3004	318	2768	305	2471	287	2185	267
	124.4	375	132.6	403	135.3	406	145.2	402	158.2	391	172.1	376
56	1.304	.576	1.401	.631	1.416	.638	1.420	.635	1.412	.621	1.403	.601
	3021	320	3049	320	3003	317	2767	304	2469	285	2183	265
	124.0	375	132.2	403	135.1	406	144.9	401	157.6	389	171.1	373
58	1.305	.576	1.404	.631	1.416	.636	1.421	.633	1.413	.618	1.405	.594
	3030	320	3059	320	3002	317	2765	303	2467	284	2179	262
	123.7	375	131.7	403	134.9	405	144.6	400	157.0	387	169.5	369
60	1.307	.576	1.406	.631	1.417	.635	1.422	.631	1.415	.615	1.408	.586
	3040	320	3071	320	3001	316	2764	302	2465	282	2174	258
	123.2	375	131.2	403	134.6	404	144.2	399	156.3	385	167.8	365
62	1.310	.576	1.408	.631	1.417	.634	1.423	.629	1.416	.611	1.412	.576
	3051	320	3078	320	3000	315	2762	301	2463	281	2167	253
	122.8	375	130.8	403	134.3	403	143.8	397	155.5	383	165.3	358
64	1.312	.576	1.408	.629	1.418	.632	1.424	.626	1.418	.606	1.417	.560
	3063	320	3076	319	2998	314	2760	300	2460	278	2158	246
	122.3	375	130.5	402	134.0	402	143.3	395	154.4	380	161.5	348
66	1.314	.576	1.409	.627	1.419	.630	1.425	.623	1.421	.600	1.429	.530
	3075	320	3075	318	2997	313	2758	298	2456	276	2137	232
	121.9	375	130.3	401	133.7	401	142.7	394	153.1	376	154.3	330
68	1.316	.576	1.410	.626	1.420	.628	1.426	.620	1.423	.593		
	3088	320	3073	317	2995	312	2755	296	2450	272		
	121.3	375	130.0	399	133.3	399	142.0	391	151.6	372		
70	1.319	.576	1.411	.623	1.421	.625	1.428	.616	1.427	.582		
	3103	320	3071	316	2992	311	2752	294	2440	267		
	120.8	375	129.6	398	132.9	398	141.2	389	149.3	364		
72	1.322	.576	1.412	.621	1.422	.622	1.430	.611	1.433	.565		
	3122	320	3069	315	2990	309	2748	292	2426	259		
	120.0	375	129.1	396	132.3	396	140.3	386	145.9	354		
74	1.326	.576	1.413	.618	1.423	.619	1.432	.605	1.449	.518		
	3142	320	3067	313	2987	308	2745	289	2383	236		
	119.2	375	128.7	395	131.7	394	139.2	382	136.3	325		
76	1.329	.576	1.414	.615	1.425	.615	1.435	.599				
	3164	320	3064	311	2984	306	2740	286				
	118.4	375	128.1	393	131.1	391	138.0	378				
78	1.333	.576	1.415	.611	1.427	.610	1.439	.588				
	3186	320	3061	310	2981	303	2730	281				
	117.6	375	127.5	390	130.2	388	136.0	371				

ENGINE ANTI ICE ON
△FUEL = + 2.5 %

TOTAL ANTI ICE ON
△FUEL = + 5 %

CRUISE - MCT/320KT - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA+15
CG=33.0%

N1 (%) **MACH**
KG/H **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
42	86.6	.576	88.3	.595	88.9	.601	88.9	.601	87.9	.590	86.4	.572
	3011	320	2701	301	2679	299	2510	287	2268	271	2018	252
	125.6	378	141.9	383	144.1	386	152.6	383	164.6	373	178.1	359
44	86.7	.576	88.3	.593	88.9	.599	88.9	.599	88.0	.588	86.6	.570
	3025	320	2706	300	2681	297	2514	286	2280	269	2035	250
	125.0	378	141.2	382	143.5	385	151.8	382	163.1	372	175.7	358
46	86.8	.576	88.3	.591	89.0	.597	89.0	.596	88.2	.585	86.8	.567
	3040	320	2712	299	2686	296	2521	285	2293	268	2053	249
	124.4	378	140.4	381	142.7	383	150.8	380	161.5	370	173.3	356
48	86.9	.576	88.4	.589	89.0	.595	89.1	.594	88.3	.582	87.1	.564
	3049	320	2717	298	2692	295	2529	284	2307	267	2072	248
	123.8	378	139.6	379	141.9	382	149.7	379	159.7	368	170.8	354
50	86.9	.574	88.4	.587	89.1	.593	89.2	.591	88.5	.579	87.4	.560
	3052	319	2723	297	2697	294	2538	282	2322	265	2093	246
	123.4	377	138.8	378	141.0	380	148.5	377	157.9	367	168.1	352
52	86.9	.572	88.4	.584	89.1	.590	89.3	.588	88.7	.576	87.7	.557
	3055	318	2730	295	2704	293	2548	281	2337	264	2114	245
	122.9	375	137.9	377	140.1	379	147.2	375	156.0	365	165.3	350
54	87.0	.570	88.5	.582	89.2	.587	89.4	.585	88.9	.573	88.0	.553
	3058	317	2737	294	2711	291	2558	279	2353	262	2139	243
	122.4	374	137.0	375	139.1	377	145.8	373	154.1	363	162.2	347
56	87.0	.569	88.6	.579	89.2	.584	89.5	.582	89.1	.570	88.5	.547
	3061	316	2744	293	2718	290	2569	277	2369	261	2164	240
	121.8	373	135.9	373	138.0	375	144.3	371	152.1	360	158.9	344
58	87.0	.567	88.6	.576	89.3	.581	89.6	.578	89.3	.565	89.1	.539
	3065	314	2752	291	2726	288	2580	276	2384	259	2188	237
	121.2	372	134.9	371	136.8	373	142.8	369	150.0	358	154.7	339
60	87.0	.564	88.7	.573	89.3	.577	89.7	.574	89.6	.561	90.0	.528
	3069	313	2761	289	2734	286	2590	274	2401	257	2220	232
	120.6	370	133.7	369	135.6	371	141.3	366	147.7	355	149.4	332
62	87.0	.562	88.7	.570	89.4	.574	89.9	.570	89.9	.555	91.2	.514
	3073	312	2769	288	2742	284	2599	272	2420	254	2268	225
	119.9	369	132.5	367	134.4	368	139.8	363	145.1	351	142.2	322
64	87.0	.559	88.8	.566	89.5	.570	90.0	.565	90.3	.548		
	3078	310	2778	286	2751	282	2609	269	2443	250		
	119.2	367	131.3	365	133.0	366	138.1	360	141.8	347		
66	87.1	.557	88.9	.562	89.6	.566	90.2	.560	91.0	.535		
	3083	309	2788	284	2761	280	2622	267	2465	244		
	118.4	365	129.9	362	131.6	363	136.1	357	137.3	339		
68	87.1	.554	88.9	.558	89.7	.561	90.4	.553	92.0	.517		
	3088	307	2798	282	2771	278	2637	263	2500	236		
	117.6	363	128.5	360	130.1	360	133.8	353	130.9	327		

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2 %	+ 4.5 %

CRUISE - MCT/320KT - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA+20
CG=33.0%

N1 (%) **MACH**
KG/H **IAS (KT)**
NM/1000KG **TAS (KT)**

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
42	86.3	.566	87.5	.580	88.0	.585	88.0	.585	87.2	.576	85.8	.559
	2940	314	2608	293	2561	290	2397	279	2190	264	1959	245
	127.4	375	144.7	377	148.0	379	156.9	376	167.9	368	180.7	354
44	86.3	.565	87.5	.578	88.0	.583	88.0	.582	87.3	.573	86.0	.555
	2942	314	2611	292	2565	289	2404	278	2200	263	1974	244
	127.1	374	144.0	376	147.2	378	155.8	374	166.4	366	178.4	352
46	86.3	.564	87.5	.576	88.0	.580	88.1	.579	87.5	.570	86.2	.552
	2944	313	2615	291	2569	288	2412	276	2212	261	1990	242
	126.6	373	143.3	375	146.4	376	154.6	373	164.6	364	175.9	350
48	86.3	.562	87.5	.574	88.1	.578	88.2	.577	87.6	.567	86.4	.548
	2947	312	2618	290	2574	287	2419	275	2225	260	2004	240
	126.2	372	142.5	373	145.5	374	153.4	371	162.7	362	173.3	347
50	86.4	.560	87.5	.571	88.1	.575	88.2	.574	87.7	.564	86.7	.543
	2950	311	2623	289	2579	285	2428	273	2238	258	2018	238
	125.7	371	141.7	371	144.5	373	152.0	369	160.8	360	170.6	344
52	86.4	.558	87.6	.569	88.1	.572	88.3	.570	87.9	.560	87.1	.537
	2953	310	2627	287	2584	284	2437	272	2252	256	2034	236
	125.1	369	140.7	370	143.5	371	150.5	367	158.8	358	167.4	341
54	86.4	.556	87.6	.566	88.2	.569	88.4	.567	88.1	.556	87.5	.530
	2956	309	2632	286	2590	282	2447	270	2267	254	2054	232
	124.5	368	139.7	368	142.4	369	149.0	365	156.6	355	163.6	336
56	86.4	.554	87.6	.562	88.2	.566	88.5	.563	88.2	.551	88.2	.520
	2960	308	2638	284	2596	280	2457	268	2283	252	2081	228
	123.9	367	138.6	366	141.1	366	147.4	362	154.2	352	158.2	329
58	86.4	.552	87.7	.559	88.3	.562	88.6	.559	88.5	.545	89.1	.505
	2964	306	2644	282	2603	278	2468	266	2295	249	2115	221
	123.2	365	137.4	363	139.9	364	145.7	359	151.7	348	151.4	320
60	86.4	.550	87.7	.555	88.3	.558	88.7	.554	88.8	.537		
	2967	305	2650	280	2611	276	2480	264	2306	246		
	122.6	364	136.2	361	138.5	362	143.8	357	148.8	343		
62	86.4	.547	87.7	.551	88.4	.554	88.8	.549	89.3	.525		
	2964	303	2657	278	2619	274	2491	261	2322	240		
	122.0	362	134.9	358	137.0	359	141.8	353	144.5	335		
64	86.5	.543	87.8	.546	88.4	.549	89.0	.541	90.1	.506		
	2962	301	2655	275	2626	272	2493	258	2338	231		
	121.4	359	133.7	355	135.4	356	139.7	348	138.3	323		
66	86.5	.540	87.9	.540	88.5	.542	89.3	.530				
	2959	299	2650	272	2623	268	2495	252				
	120.7	357	132.5	351	134.0	351	136.6	341				
68	86.5	.536	87.9	.532	88.6	.534	89.7	.511				
	2956	297	2644	268	2618	264	2497	243				
	120.0	355	130.9	346	132.2	346	131.7	329				

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2 %	+ 4.5 %

CRUISE - MCT/320KT - 1 ENGINE OUT

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA+15
CG=33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
48	1.293	.576	1.380	.623	1.389	.627	1.393	.625	1.384	.613	1.372	.597
	2996	320	2958	316	2885	312	2658	299	2370	281	2096	263
	126.2	378	135.7	401	139.5	402	149.9	398	163.6	388	178.8	375
50	1.295	.576	1.381	.622	1.390	.626	1.394	.624	1.384	.611	1.373	.593
	3005	320	2958	315	2885	311	2657	298	2369	281	2094	261
	125.8	378	135.5	401	139.3	402	149.6	397	163.1	386	177.9	373
52	1.296	.576	1.381	.621	1.390	.625	1.394	.622	1.385	.609	1.375	.589
	3013	320	2957	315	2884	311	2656	297	2367	279	2091	260
	125.5	378	135.3	400	139.1	401	149.3	396	162.6	385	177.0	370
54	1.298	.576	1.381	.620	1.391	.623	1.395	.620	1.386	.606	1.376	.585
	3022	320	2956	314	2883	310	2654	297	2366	278	2088	257
	125.1	378	135.1	399	138.8	400	149.0	395	162.0	383	175.7	367
56	1.300	.576	1.382	.619	1.391	.622	1.396	.619	1.388	.603	1.379	.578
	3031	320	2955	314	2882	309	2653	296	2364	277	2085	254
	124.7	378	134.9	399	138.6	399	148.6	394	161.3	381	174.1	363
58	1.302	.576	1.382	.617	1.392	.621	1.397	.616	1.389	.599	1.381	.571
	3041	320	2954	313	2881	308	2652	295	2362	275	2081	251
	124.3	378	134.7	398	138.3	398	148.2	393	160.5	379	172.2	358
60	1.304	.576	1.383	.616	1.392	.619	1.398	.614	1.391	.595	1.385	.561
	3052	320	2953	312	2879	308	2650	293	2359	273	2076	247
	123.9	378	134.4	397	138.0	397	147.7	391	159.6	377	169.8	352
62	1.306	.576	1.384	.614	1.393	.617	1.399	.611	1.393	.589	1.390	.547
	3063	320	2952	311	2878	307	2648	292	2355	270	2068	240
	123.4	378	134.1	396	137.6	396	147.1	389	158.3	373	166.2	344
64	1.308	.576	1.384	.612	1.394	.615	1.400	.608	1.395	.583		
	3076	320	2950	310	2876	306	2646	290	2350	267		
	122.9	378	133.8	395	137.3	395	146.4	387	157.0	369		
66	1.310	.576	1.385	.610	1.395	.612	1.401	.604	1.397	.576		
	3089	320	2949	309	2874	304	2643	289	2345	264		
	122.4	378	133.4	393	136.8	393	145.7	385	155.3	364		
68	1.313	.576	1.386	.608	1.396	.610	1.403	.600	1.401	.565		
	3103	320	2947	308	2872	303	2640	286	2338	259		
	121.8	378	132.9	392	136.3	391	144.8	382	153.0	358		
70	1.316	.576	1.387	.605	1.397	.607	1.405	.594	1.406	.550		
	3118	320	2945	306	2870	301	2636	284	2327	252		
	121.3	378	132.4	390	135.7	389	143.7	379	149.6	348		
72	1.319	.576	1.388	.602	1.399	.603	1.408	.588				
	3135	320	2943	305	2868	300	2631	281				
	120.6	378	131.9	388	135.1	387	142.5	375				
74	1.322	.576	1.390	.599	1.400	.599	1.410	.581				
	3156	320	2941	303	2864	297	2625	277				
	119.8	378	131.3	386	134.2	384	141.0	370				

ENGINE ANTI ICE ON
△FUEL = + 2.5 %

TOTAL ANTI ICE ON
△FUEL = + 4 %

10E -08F0A319--131 IAE V2522--A5 12300010C6KG330 0 018590 0 0 3 1.0 .0 .00 0 01100.000 .000 .000 15 FCOM-N0--03--06--50--011--130

CRUISE - MCT/320KT - 1 ENGINE OUT

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA+20
CG=33.0%

EPR
KG/H
NM/1000KG
MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
48	1.294	.576	1.356	.607	1.365	.610	1.369	.608	1.359	.595	1.347	.577
	3033	320	2827	307	2762	303	2543	290	2262	273	1993	254
	125.7	381	139.6	395	143.2	396	153.8	391	168.0	380	183.6	366
50	1.296	.576	1.356	.606	1.365	.609	1.369	.607	1.359	.593	1.348	.573
	3041	320	2826	307	2761	303	2542	290	2261	272	1992	252
	125.4	381	139.4	394	143.0	395	153.5	390	167.5	379	182.4	363
52	1.297	.576	1.357	.605	1.366	.608	1.370	.605	1.360	.590	1.350	.568
	3050	320	2826	306	2760	302	2541	289	2259	271	1990	249
	125.1	381	139.1	393	142.7	394	153.1	389	166.8	377	180.8	360
54	1.299	.576	1.357	.603	1.366	.607	1.371	.603	1.362	.587	1.353	.561
	3058	320	2825	305	2760	301	2540	288	2258	269	1988	246
	124.7	381	138.9	392	142.4	393	152.7	388	166.0	375	178.8	355
56	1.301	.576	1.358	.602	1.367	.605	1.372	.601	1.363	.583	1.355	.553
	3068	320	2824	305	2759	300	2539	287	2256	267	1985	243
	124.3	381	138.6	391	142.1	392	152.2	386	165.0	372	176.5	350
58	1.302	.576	1.358	.600	1.368	.603	1.373	.598	1.365	.578	1.360	.541
	3077	320	2824	304	2758	300	2537	286	2254	265	1979	237
	123.9	381	138.3	390	141.8	391	151.6	385	163.8	369	173.2	343
60	1.303	.575	1.359	.599	1.368	.601	1.374	.595	1.367	.572	1.367	.520
	3076	319	2823	303	2756	299	2535	284	2251	262	1968	228
	123.7	381	137.9	389	141.4	390	151.0	383	162.3	365	167.5	330
62	1.303	.574	1.360	.597	1.369	.599	1.375	.592	1.369	.565		
	3074	319	2822	302	2755	297	2533	282	2247	259		
	123.5	380	137.5	388	140.9	388	150.3	381	160.6	361		
64	1.303	.572	1.361	.595	1.370	.597	1.376	.588	1.373	.556		
	3073	318	2821	301	2753	296	2530	280	2242	255		
	123.3	379	137.1	387	140.4	387	149.4	378	158.5	355		
66	1.304	.571	1.361	.592	1.371	.594	1.378	.582	1.377	.544		
	3071	317	2819	300	2751	295	2527	278	2234	248		
	123.0	378	136.6	385	139.8	385	148.3	375	155.4	347		
68	1.304	.569	1.362	.589	1.372	.590	1.380	.577	1.387	.516		
	3069	316	2817	298	2749	293	2523	275	2215	235		
	122.7	377	136.0	383	139.2	383	147.0	371	148.7	330		
70	1.304	.567	1.364	.586	1.374	.586	1.383	.570				
	3067	315	2816	296	2746	291	2519	272				
	122.4	375	135.3	381	138.3	380	145.5	367				
72	1.305	.565	1.365	.582	1.376	.581	1.386	.561				
	3064	313	2813	294	2742	288	2513	267				
	122.0	374	134.5	378	137.3	377	143.6	361				
74	1.306	.562	1.367	.577	1.378	.576	1.391	.548				
	3062	312	2810	292	2738	285	2505	261				
	121.5	372	133.5	375	136.2	373	140.8	353				

ENGINE ANTI ICE ON
△FUEL = + 2.5 %

TOTAL ANTI ICE ON
△FUEL = + 4 %

10E -08F0A319--131 IAE V2522--A5 12300010C6KG330 0 018590 0 0 3 1.0 .0 .00 0 01100.000 .000 .000 20 FCOM-N0--03--06--50--012--135

R

CRUISE - MCT/320KT - 1 ENGINE OUT

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA+15
CG=33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
50	1.300	.576	1.381	.621	1.390	.625	1.394	.623	1.385	.610	1.374	.592
	3033	320	2957	315	2884	311	2656	298	2369	280	2093	261
	124.6	378	135.3	400	139.1	401	149.4	397	163.0	386	177.6	372
52	1.301	.576	1.381	.620	1.391	.624	1.395	.621	1.386	.608	1.375	.588
	3041	320	2956	314	2883	310	2655	297	2367	279	2091	259
	124.3	378	135.2	400	138.9	400	149.1	396	162.5	385	176.6	369
54	1.303	.576	1.382	.619	1.391	.623	1.395	.620	1.387	.605	1.377	.582
	3049	320	2955	314	2882	310	2654	296	2366	278	2088	256
	124.0	378	135.0	399	138.7	400	148.8	395	161.9	383	175.2	366
56	1.304	.576	1.382	.618	1.392	.621	1.396	.618	1.388	.602	1.380	.575
	3058	320	2955	313	2881	309	2653	295	2364	276	2084	253
	123.6	378	134.7	398	138.4	399	148.4	394	161.2	381	173.3	361
58	1.306	.576	1.383	.617	1.392	.620	1.397	.616	1.389	.599	1.383	.567
	3067	320	2954	312	2880	308	2651	294	2362	275	2079	249
	123.3	378	134.5	397	138.1	398	148.0	393	160.4	379	171.1	356
60	1.308	.576	1.383	.615	1.393	.618	1.398	.613	1.391	.594	1.387	.554
	3078	320	2953	312	2879	307	2650	293	2359	273	2072	243
	122.8	378	134.2	396	137.9	397	147.5	391	159.4	376	167.8	348
62	1.310	.576	1.384	.614	1.393	.616	1.399	.611	1.393	.588	1.395	.533
	3089	320	2951	311	2878	306	2648	292	2354	270	2059	234
	122.4	378	134.0	395	137.5	396	147.0	389	158.0	372	162.6	335
64	1.313	.576	1.385	.612	1.394	.614	1.400	.608	1.396	.581	1.411	.486
	3101	320	2950	310	2876	305	2646	290	2349	266	2038	212
	121.9	378	133.6	394	137.1	394	146.3	387	156.4	367	149.6	305
66	1.315	.576	1.385	.610	1.395	.612	1.402	.604	1.399	.572		
	3113	320	2949	309	2874	304	2643	288	2342	262		
	121.5	378	133.3	393	136.7	393	145.6	385	154.4	362		
68	1.317	.576	1.386	.607	1.396	.609	1.403	.599	1.404	.557		
	3126	320	2947	308	2872	303	2640	286	2333	255		
	120.9	378	132.8	391	136.2	391	144.7	382	151.2	353		
70	1.320	.576	1.387	.605	1.397	.606	1.406	.593	1.412	.533		
	3142	320	2945	306	2870	301	2635	283	2313	244		
	120.3	378	132.3	390	135.6	389	143.5	378	145.8	337		
72	1.323	.576	1.389	.602	1.399	.603	1.408	.586				
	3161	320	2943	305	2868	299	2630	280				
	119.6	378	131.8	388	135.0	387	142.1	374				
74	1.327	.576	1.390	.599	1.401	.598	1.412	.577				
	3182	320	2941	303	2864	297	2622	275				
	118.8	378	131.2	386	134.1	384	140.2	368				
76	1.330	.576	1.392	.594	1.403	.593	1.417	.563				
	3203	320	2936	300	2859	294	2612	268				
	118.0	378	130.3	383	133.0	380	137.4	359				
78	1.334	.576	1.394	.588	1.405	.586	1.425	.540				
	3226	320	2932	298	2854	291	2593	257				
	117.2	378	129.3	379	131.9	376	132.8	344				

ENGINE ANTI ICE ON
△FUEL = + 2.5 %

TOTAL ANTI ICE ON
△FUEL = + 5 %

R

CRUISE - MCT/320KT - 1 ENGINE OUT

MAX. CONTINUOUS THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA+20
CG=33.0%

EPR
KG/H
NM/1000KG

MACH
IAS (KT)
TAS (KT)

WEIGHT (1000KG)	FL100		FL150		FL160		FL180		FL200		FL220	
50	1.301	.576	1.357	.605	1.366	.608	1.370	.606	1.360	.592	1.349	.570
	3070	320	2826	306	2761	302	2542	289	2261	271	1991	251
	124.2	381	139.2	393	142.8	394	153.3	390	167.1	378	181.5	361
52	1.302	.576	1.357	.604	1.366	.607	1.370	.604	1.361	.589	1.352	.564
	3078	320	2826	306	2760	302	2541	289	2259	270	1989	248
	123.9	381	138.9	393	142.5	393	152.9	389	166.4	376	179.6	357
54	1.304	.576	1.358	.603	1.367	.606	1.371	.602	1.362	.585	1.354	.556
	3086	320	2825	305	2759	301	2540	288	2257	268	1986	244
	123.6	381	138.7	392	142.3	393	152.5	387	165.5	374	177.4	352
56	1.305	.576	1.358	.601	1.367	.604	1.372	.600	1.364	.581	1.358	.546
	3095	320	2824	304	2758	300	2539	287	2255	266	1982	239
	123.2	381	138.4	391	141.9	392	152.1	386	164.5	371	174.5	346
58	1.307	.576	1.359	.600	1.368	.603	1.373	.597	1.366	.575	1.364	.528
	3104	320	2824	304	2757	299	2537	285	2253	263	1973	232
	122.9	381	138.1	390	141.6	391	151.4	384	163.0	367	169.7	335
60	1.309	.576	1.359	.598	1.369	.601	1.374	.594	1.368	.568	1.375	.495
	3115	320	2823	303	2756	298	2535	284	2249	260	1958	217
	122.4	381	137.7	389	141.2	389	150.8	382	161.4	363	160.3	314
62	1.311	.576	1.360	.596	1.370	.598	1.375	.591	1.371	.560		
	3126	320	2822	302	2755	297	2533	282	2245	256		
	122.0	381	137.3	388	140.8	388	150.0	380	159.4	358		
64	1.312	.575	1.361	.593	1.371	.596	1.377	.586	1.375	.548		
	3127	319	2820	300	2753	296	2529	280	2239	251		
	121.7	381	136.8	386	140.2	386	149.0	377	156.4	350		
66	1.312	.574	1.362	.591	1.372	.593	1.379	.580	1.382	.530		
	3127	319	2819	299	2751	294	2526	277	2226	242		
	121.4	380	136.3	384	139.6	384	147.7	373	152.0	338		
68	1.313	.572	1.363	.588	1.373	.589	1.382	.574	1.396	.490		
	3126	318	2817	297	2748	292	2522	273	2207	223		
	121.1	379	135.7	382	138.9	382	146.3	369	141.9	313		
70	1.314	.570	1.364	.584	1.375	.584	1.385	.565				
	3125	317	2815	295	2745	290	2516	269				
	120.8	377	134.9	380	137.9	379	144.5	364				
72	1.314	.568	1.366	.579	1.377	.579	1.389	.553				
	3123	315	2812	293	2741	287	2509	263				
	120.4	376	134.0	377	136.8	375	141.7	356				
74	1.315	.566	1.368	.574	1.379	.572	1.396	.533				
	3122	314	2809	290	2737	284	2494	254				
	119.9	374	132.9	373	135.5	371	137.6	343				
76	1.316	.563	1.370	.568	1.382	.564	1.411	.492				
	3121	313	2805	287	2731	280	2469	233				
	119.4	373	131.6	369	133.9	366	128.1	316				
78	1.317	.560	1.373	.560	1.386	.553						
	3119	311	2800	283	2724	274						
	118.8	371	130.1	364	131.5	358						

ENGINE ANTI ICE ON
△FUEL = + 2.5 %

TOTAL ANTI ICE ON
△FUEL = + 5 %

GENERAL

The following in cruise quick check tables allow the flight crew to determine the fuel consumption and the time required to cover a given air distance from any moment in cruise to landing with one engine inoperative.
These tables are established for :
- Cruise speed : MCT/VMO, MCT/320 KT.
- Descent profile : M.78/300KT/250KT
- Approach and landing : 120 kg or 270 lb – 6 minute IMC
- ISA
- CG = 33 %
- Pack flow HI
- Anti ice OFF

Note : 1. In the tables, the asterisk "" means that a step climb of 4000 feet has been made to reach the corresponding flight level.*
2. The flight level shown on the top of each column is the final flight level.
3. For each degree celsius above ISA apply a fuel correction of
0.015 (kg/°C/NM) × △ISA (°C) × Air Distance (NM)
or 0.033 (lb/°C/NM) × △ISA (°C) × Air Distance (NM)

CORRECTION FOR DEVIATION FROM REFERENCE WEIGHT

The in cruise quick check tables are based on a reference initial weight.
The fuel consumption must be corrected when the actual weight is different from the reference initial weight.
If it is lower (or greater) than the reference weight, subtract (or add) the value given in the correction part of the table per 1000 kg or 1000 lb below (or above) the reference weight (see example 3.06.50 p 2).

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - ONE ENGINE FAILURE
CRUISE : MCT/VMO - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 120 KG (6MIN)

REF. INITIAL WEIGHT = 55000 KG
PACK FLOW HI
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	150	160	180	200	220	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL150	FL160 FL180	FL200 FL220
200	1583 0.39	1342 0.39	1294 0.39	1195 0.39	1095 0.39	1002 0.40	0	0	0
250	1986 0.47	1714 0.46	1655 0.46	1533 0.46	1410 0.47	1292 0.48	0	0	0
300	2389 0.55	2086 0.54	2016 0.54	1871 0.54	1724 0.55	1581 0.56	0	0	1
350	2792 1.03	2457 1.02	2377 1.01	2209 1.02	2037 1.03	1871 1.04	0	0	1
400	3195 1.11	2829 1.09	2738 1.09	2547 1.10	2351 1.10	2160 1.12	0	0	1
450	3598 1.19	3200 1.17	3099 1.17	2885 1.17	2665 1.18	2450 1.20	0	0	2
500	4001 1.27	3571 1.24	3459 1.24	3223 1.25	2978 1.26	2738 1.28	0	0	2
550	4403 1.35	3942 1.32	3820 1.32	3560 1.33	3291 1.34	3027 1.37	1	1	3
600	4805 1.43	4313 1.40	4181 1.40	3898 1.40	3604 1.42	3316 1.45	1	1	4
650	5208 1.51	4684 1.47	4541 1.47	4235 1.48	3917 1.50	3604 1.53	1	1	4
700	5610 1.59	5055 1.55	4901 1.55	4573 1.56	4230 1.57	3892 2.01	1	1	5
750	6012 2.07	5426 2.03	5261 2.03	4910 2.03	4543 2.05	4180 2.09	2	2	5
800	6414 2.15	5796 2.10	5621 2.10	5247 2.11	4855 2.13	4468 2.17	2	2	6
850	6815 2.23	6167 2.18	5981 2.18	5583 2.19	5168 2.21	4755 2.25	2	2	6
900	7217 2.32	6537 2.25	6341 2.25	5920 2.26	5480 2.29	5043 2.33	3	3	7
950	7619 2.40	6907 2.33	6700 2.33	6257 2.34	5792 2.36	5330 2.41	3	3	7
1000	8020 2.48	7277 2.41	7060 2.41	6593 2.42	6104 2.44	5617 2.49	3	3	7
1050	8421 2.56	7647 2.48	7419 2.48	6929 2.49	6416 2.52	5904 2.57	4	4	8
1100	8822 3.04	8017 2.56	7778 2.56	7266 2.57	6727 3.00	6190 3.05	4	4	8
1150	9223 3.12	8387 3.04	8137 3.03	7602 3.05	7039 3.08	6476 3.13	4	4	9
1200	9624 3.20	8757 3.11	8496 3.11	7938 3.12	7351 3.15	6763 3.21	4	5	9
1250	10025 3.28	9126 3.19	8855 3.19	8274 3.20	7662 3.23	7049 3.29	5	5	9
1300	10425 3.36	9496 3.26	9214 3.26	8609 3.28	7973 3.31	7335 3.37	5	5	10
1350	10826 3.44	9865 3.34	9573 3.34	8945 3.35	8285 3.39	7621 3.45	5	5	10
1400	11226 3.52	10234 3.42	9932 3.42	9281 3.43	8596 3.46	7907 3.53	6	6	10

ENGINE ANTI ICE ON
△FUEL = + 1.5 %

TOTAL ANTI ICE ON
△FUEL = + 3 %

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GENERAL

The following in cruise quick check tables allow the flight crew to determine the fuel consumption and the time required to cover a given air distance from any moment in cruise to landing with one engine inoperative.
These tables are established for :

- Cruise speed : MCT/VMO, MCT/320 KT.
- Descent profile : M.78/300KT/250KT
- Approach and landing : 110 kg or 240 lb – 6 minute IMC
- ISA
- CG = 33 %
- Pack flow HI
- Anti ice OFF

Note : 1. In the tables, the asterisk "" means that a step climb of 4000 feet has been made to reach the corresponding flight level.*
2. The flight level shown on the top of each column is the final flight level.
3. For each degree celsius above ISA apply a fuel correction of
0.015 (kg/°C/NM) × △ISA (°C) × Air Distance (NM)
or 0.033 (lb/°C/NM) × △ISA (°C) × Air Distance (NM)

CORRECTION FOR DEVIATION FROM REFERENCE WEIGHT

The in cruise quick check tables are based on a reference initial weight.
The fuel consumption must be corrected when the actual weight is different from the reference initial weight.
If it is lower (or greater) than the reference weight, subtract (or add) the value given in the correction part of the table per 1000 kg or 1000 lb below (or above) the reference weight (see example 3.06.50 p 2).

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - 1 ENGINE OUT
CRUISE : MCT/VMO - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6 MIN)

REF. INITIAL WEIGHT = 55000 KG
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	150	160	180	200	220	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL150	FL160 FL180	FL200 FL220
200	1604 0.39	1334 0.39	1300 0.39	1205 0.40	1112 0.40	1033 0.41	0	0	3
250	2019 0.47	1709 0.47	1670 0.47	1555 0.48	1440 0.49	1342 0.50	1	0	5
300	2434 0.55	2085 0.55	2040 0.55	1904 0.56	1767 0.57	1650 0.59	2	1	7
350	2848 1.03	2459 1.03	2410 1.03	2253 1.04	2094 1.05	1958 1.07	3	2	10
400	3262 1.11	2834 1.11	2780 1.11	2601 1.12	2420 1.13	2265 1.16	4	3	12
450	3675 1.19	3209 1.19	3149 1.19	2949 1.19	2745 1.22	2571 1.25	4	4	14
500	4088 1.27	3583 1.27	3518 1.26	3297 1.27	3070 1.30	2876 1.33	5	4	16
550	4501 1.35	3957 1.35	3886 1.34	3645 1.35	3394 1.38	3181 1.42	6	5	18
600	4913 1.43	4330 1.43	4255 1.42	3992 1.43	3718 1.46	3485 1.51	7	6	20
650	5326 1.51	4703 1.51	4623 1.50	4339 1.51	4041 1.55	3788 1.59	7	6	22
700	5737 1.59	5076 1.58	4991 1.58	4686 1.59	4364 2.03	4091 2.08	8	7	24
750	6149 2.07	5449 2.06	5359 2.06	5033 2.07	4686 2.11	4393 2.17	9	8	26
800	6560 2.15	5822 2.14	5726 2.13	5379 2.15	5008 2.19	4694 2.25	9	8	27
850	6971 2.23	6194 2.22	6093 2.21	5725 2.23	5329 2.27	4994 2.34	10	9	29
900	7382 2.31	6566 2.30	6460 2.29	6071 2.31	5650 2.36	5294 2.42	10	10	31
950	7792 2.39	6938 2.38	6827 2.37	6416 2.39	5970 2.44	5594 2.51	11	10	33
1000	8202 2.47	7309 2.46	7193 2.44	6762 2.46	6289 2.52	5893 2.59	12	11	34
1050	8612 2.54	7680 2.53	7560 2.52	7107 2.54	6608 3.00	6191 3.08	12	11	36
1100	9022 3.02	8051 3.01	7926 3.00	7451 3.02	6927 3.08	6488 3.17	13	12	38
1150	9431 3.10	8422 3.09	8292 3.08	7796 3.10	7244 3.16	6785 3.25	13	13	39
1200	9840 3.18	8793 3.17	8657 3.15	8140 3.18	7562 3.25	7081 3.34	14	13	41
1250	10249 3.26	9163 3.25	9023 3.23	8484 3.26	7879 3.33	7377 3.42	15	14	42
1300	10657 3.34	9533 3.32	9388 3.31	8828 3.33	8195 3.41	7672 3.51	15	14	44
1350	11065 3.42	9903 3.40	9753 3.39	9171 3.41	8512 3.49	7966 3.59	16	15	45
1400	11473 3.50	10272 3.48	10118 3.46	9514 3.49	8827 3.57	8259 4.08	16	15	46

CORRECTIONS	**ENGINE ANTI ICE ON**	**TOTAL ANTI ICE ON**
FUEL	+ 2 %	+ 5 %

GENERAL

The following in cruise quick check tables allow the flight crew to determine the fuel consumption and the time required to cover a given air distance from any moment in cruise to landing with one engine inoperative.
These tables are established for :
- Cruise speed : MCT/VMO, MCT/320 KT.
- Descent profile : M.78/300KT/250KT
- Approach and landing : 110 kg or 240 lb – 6 minute IMC
- ISA
- CG = 33 %
- Pack flow HI
- Anti ice OFF

Note : 1. In the tables, the asterisk "" means that a step climb of 4000 feet has been made to reach the corresponding flight level.*
2. The flight level shown on the top of each column is the final flight level.
3. For each degree celsius above ISA apply a fuel correction of
0.015 (kg/°C/NM) × △ISA (°C) × Air Distance (NM)
or 0.033 (lb/°C/NM) × △ISA (°C) × Air Distance (NM)

CORRECTION FOR DEVIATION FROM REFERENCE WEIGHT

The in cruise quick check tables are based on a reference initial weight.
The fuel consumption must be corrected when the actual weight is different from the reference initial weight.
If it is lower (or greater) than the reference weight, subtract (or add) the value given in the correction part of the table per 1000 kg or 1000 lb below (or above) the reference weight (see example 3.06.50 p 2).

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - ONE ENGINE FAILURE
CRUISE : MCT/VMO - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6MIN)

REF. INITIAL WEIGHT = 55000 KG
PACK FLOW HI
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)
TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	150	160	180	200	220	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL150	FL160 FL180	FL200 FL220
200	1565 0.39	1333 0.39	1285 0.39	1185 0.39	1086 0.39	993 0.40	0	0	0
250	1966 0.47	1704 0.46	1645 0.46	1523 0.46	1400 0.47	1283 0.48	0	0	0
300	2367 0.55	2075 0.54	2006 0.54	1861 0.54	1714 0.55	1572 0.56	0	0	1
350	2767 1.03	2446 1.01	2366 1.01	2199 1.02	2027 1.03	1862 1.04	0	0	1
400	3167 1.11	2817 1.09	2726 1.09	2536 1.09	2341 1.10	2151 1.12	0	0	1
450	3567 1.19	3187 1.17	3086 1.17	2873 1.17	2654 1.18	2440 1.20	0	0	2
500	3967 1.27	3558 1.24	3446 1.24	3210 1.25	2967 1.26	2728 1.28	0	1	2
550	4367 1.35	3928 1.32	3806 1.32	3547 1.32	3280 1.34	3017 1.36	1	1	3
600	4767 1.43	4299 1.40	4166 1.40	3884 1.40	3592 1.42	3305 1.45	1	1	4
650	5167 1.51	4669 1.47	4526 1.47	4221 1.48	3905 1.49	3593 1.53	1	1	4
700	5566 1.59	5039 1.55	4885 1.55	4558 1.56	4217 1.57	3881 2.01	2	2	5
750	5966 2.07	5409 2.02	5245 2.02	4894 2.03	4530 2.05	4169 2.09	2	2	5
800	6365 2.15	5778 2.10	5604 2.10	5231 2.11	4842 2.13	4456 2.17	2	2	6
850	6764 2.23	6148 2.18	5963 2.18	5567 2.19	5154 2.21	4744 2.25	2	3	6
900	7163 2.31	6518 2.25	6322 2.25	5903 2.26	5466 2.28	5031 2.33	3	3	7
950	7562 2.39	6887 2.33	6681 2.33	6239 2.34	5777 2.36	5318 2.41	3	3	7
1000	7961 2.47	7256 2.41	7040 2.40	6575 2.41	6089 2.44	5604 2.49	3	4	8
1050	8360 2.55	7626 2.48	7398 2.48	6911 2.49	6400 2.52	5891 2.57	4	4	8
1100	8758 3.04	7995 2.56	7757 2.56	7247 2.57	6712 3.00	6177 3.05	4	4	9
1150	9157 3.12	8364 3.03	8115 3.03	7582 3.04	7023 3.07	6463 3.13	4	5	9
1200	9555 3.20	8733 3.11	8474 3.11	7918 3.12	7334 3.15	6749 3.21	4	5	9
1250	9953 3.28	9102 3.19	8832 3.18	8253 3.20	7645 3.23	7035 3.29	5	5	10
1300	10351 3.36	9470 3.26	9190 3.26	8589 3.27	7956 3.31	7321 3.37	5	6	10
1350	10749 3.44	9838 3.34	9548 3.34	8924 3.35	8267 3.38	7606 3.45	5	6	11
1400	11147 3.52	10207 3.41	9906 3.41	9259 3.43	8577 3.46	7892 3.53	6	6	11

ENGINE ANTI ICE ON
△ FUEL = + 2 %

TOTAL ANTI ICE ON
△ FUEL = + 4 %

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IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - 1 ENGINE OUT
CRUISE : MCT/320.0KT - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6 MIN)

REF. INITIAL WEIGHT = 55000 KG
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	150	160	180	200	220	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL150	FL160 FL180	FL200 FL220
200	1586 0.39	1334 0.39	1300 0.39	1205 0.40	1112 0.40	1033 0.41	1	0	3
250	1995 0.47	1709 0.47	1670 0.47	1555 0.48	1440 0.49	1342 0.50	2	0	5
300	2403 0.55	2085 0.55	2040 0.55	1904 0.56	1767 0.57	1650 0.59	4	1	7
350	2811 1.03	2459 1.03	2410 1.03	2253 1.04	2094 1.05	1958 1.07	5	2	10
400	3218 1.12	2834 1.11	2780 1.11	2601 1.12	2420 1.13	2265 1.16	6	3	12
450	3625 1.20	3209 1.19	3149 1.19	2949 1.19	2745 1.22	2571 1.25	7	4	14
500	4031 1.28	3583 1.27	3518 1.26	3297 1.27	3070 1.30	2876 1.33	8	4	16
550	4436 1.36	3957 1.35	3886 1.34	3645 1.35	3394 1.38	3181 1.42	9	5	18
600	4841 1.44	4330 1.43	4255 1.42	3992 1.43	3718 1.46	3485 1.51	10	6	20
650	5245 1.52	4703 1.51	4623 1.50	4339 1.51	4041 1.55	3788 1.59	11	6	22
700	5649 2.01	5076 1.58	4991 1.58	4686 1.59	4364 2.03	4091 2.08	12	7	24
750	6052 2.09	5449 2.06	5359 2.06	5033 2.07	4686 2.11	4393 2.17	13	8	26
800	6455 2.17	5822 2.14	5726 2.13	5379 2.15	5008 2.19	4694 2.25	14	8	27
850	6857 2.25	6194 2.22	6093 2.21	5725 2.23	5329 2.27	4994 2.34	15	9	29
900	7258 2.33	6566 2.30	6460 2.29	6071 2.31	5650 2.36	5294 2.42	16	10	31
950	7659 2.41	6938 2.38	6827 2.37	6416 2.39	5970 2.44	5594 2.51	16	10	33
1000	8060 2.49	7309 2.46	7193 2.44	6762 2.46	6289 2.52	5893 2.59	17	11	34
1050	8460 2.58	7680 2.53	7560 2.52	7107 2.54	6608 3.00	6191 3.08	18	11	36
1100	8860 3.06	8051 3.01	7926 3.00	7451 3.02	6927 3.08	6488 3.17	19	12	38
1150	9259 3.14	8422 3.09	8292 3.08	7796 3.10	7244 3.16	6785 3.25	20	13	39
1200	9657 3.22	8793 3.17	8657 3.15	8140 3.18	7562 3.25	7081 3.34	21	13	41
1250	10055 3.30	9163 3.25	9023 3.23	8484 3.26	7879 3.33	7377 3.42	21	14	42
1300	10452 3.38	9533 3.32	9388 3.31	8828 3.33	8195 3.41	7672 3.51	22	14	44
1350	10850 3.47	9903 3.40	9753 3.39	9171 3.41	8512 3.49	7966 3.59	23	15	45
1400	11247 3.55	10272 3.48	10118 3.46	9514 3.49	8827 3.57	8259 4.08	24	15	46

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON
FUEL	+ 2 %	+ 5 %

IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - ONE ENGINE FAILURE
CRUISE : MCT/320 - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 110 KG (6MIN)

REF. INITIAL WEIGHT = 55000 KG
PACK FLOW HI
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	150	160	180	200	220	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL150	FL160 FL180	FL200 FL220
200	1550 0.39	1333 0.39	1285 0.39	1185 0.39	1086 0.39	993 0.40	0	0	0
250	1947 0.47	1704 0.46	1645 0.46	1523 0.46	1400 0.47	1283 0.48	0	0	0
300	2343 0.55	2075 0.54	2006 0.54	1861 0.54	1714 0.55	1572 0.56	0	0	1
350	2738 1.03	2446 1.01	2366 1.01	2199 1.02	2027 1.03	1862 1.04	0	0	1
400	3134 1.12	2817 1.09	2726 1.09	2536 1.09	2341 1.10	2151 1.12	1	0	1
450	3529 1.20	3187 1.17	3086 1.17	2873 1.17	2654 1.18	2440 1.20	1	0	2
500	3924 1.28	3558 1.24	3446 1.24	3210 1.25	2967 1.26	2728 1.28	2	1	2
550	4319 1.36	3928 1.32	3806 1.32	3547 1.32	3280 1.34	3017 1.36	2	1	3
600	4714 1.44	4299 1.40	4166 1.40	3884 1.40	3592 1.42	3305 1.45	2	1	4
650	5108 1.52	4669 1.47	4526 1.47	4221 1.48	3905 1.49	3593 1.53	3	1	4
700	5502 2.01	5039 1.55	4885 1.55	4558 1.56	4217 1.57	3881 2.01	3	2	5
750	5896 2.09	5409 2.02	5245 2.02	4894 2.03	4530 2.05	4169 2.09	4	2	5
800	6290 2.17	5778 2.10	5604 2.10	5231 2.11	4842 2.13	4456 2.17	4	2	6
850	6684 2.25	6148 2.18	5963 2.18	5567 2.19	5154 2.21	4744 2.25	5	3	6
900	7077 2.33	6518 2.25	6322 2.25	5903 2.26	5466 2.28	5031 2.33	5	3	7
950	7471 2.41	6887 2.33	6681 2.33	6239 2.34	5777 2.36	5318 2.41	5	3	7
1000	7864 2.49	7256 2.41	7040 2.40	6575 2.41	6089 2.44	5604 2.49	6	4	8
1050	8256 2.58	7626 2.48	7398 2.48	6911 2.49	6400 2.52	5891 2.57	6	4	8
1100	8649 3.06	7995 2.56	7757 2.56	7247 2.57	6712 3.00	6177 3.05	7	4	9
1150	9041 3.14	8364 3.03	8115 3.03	7582 3.04	7023 3.07	6463 3.13	7	5	9
1200	9433 3.22	8733 3.11	8474 3.11	7918 3.12	7334 3.15	6749 3.21	7	5	9
1250	9825 3.30	9102 3.19	8832 3.18	8253 3.20	7645 3.23	7035 3.29	8	5	10
1300	10217 3.38	9470 3.26	9190 3.26	8589 3.27	7956 3.31	7321 3.37	8	6	10
1350	10609 3.46	9838 3.34	9548 3.34	8924 3.35	8267 3.38	7606 3.45	9	6	11
1400	11000 3.55	10207 3.41	9906 3.41	9259 3.43	8577 3.46	7892 3.53	9	6	11

ENGINE ANTI ICE ON
△ FUEL = + 2.5 %

TOTAL ANTI ICE ON
△ FUEL = + 4 %

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IN CRUISE QUICK CHECK FROM ANY MOMENT IN CRUISE TO LANDING - ONE ENGINE FAILURE
CRUISE : MCT/320KT - DESCENT : M.78/300KT/250KT
IMC PROCEDURE : 120 KG (6MIN)

REF. INITIAL WEIGHT = 55000 KG
PACK FLOW HI
ANTI-ICING OFF

ISA
CG = 33.0 %

FUEL CONSUMED (KG)

TIME (H.MIN)

AIR DIST. (NM)	FLIGHT LEVEL 100	150	160	180	200	220	CORRECTION ON FUEL CONSUMPTION (KG/1000KG) FL100 FL150	FL160 FL180	FL200 FL220
200	1572 0.39	1342 0.39	1294 0.39	1195 0.39	1095 0.39	1002 0.40	0	0	0
250	1971 0.47	1714 0.46	1655 0.46	1533 0.46	1410 0.47	1292 0.48	0	0	0
300	2371 0.55	2086 0.54	2016 0.54	1871 0.54	1724 0.55	1581 0.56	0	0	1
350	2770 1.03	2457 1.02	2377 1.01	2209 1.02	2037 1.03	1871 1.04	0	0	1
400	3170 1.12	2829 1.09	2738 1.09	2547 1.10	2351 1.10	2160 1.12	0	0	1
450	3569 1.20	3200 1.17	3099 1.17	2885 1.17	2665 1.18	2450 1.20	1	0	2
500	3967 1.28	3571 1.24	3459 1.24	3223 1.25	2978 1.26	2738 1.28	1	0	2
550	4366 1.36	3942 1.32	3820 1.32	3560 1.33	3291 1.34	3027 1.37	2	1	3
600	4764 1.44	4313 1.40	4181 1.40	3898 1.40	3604 1.42	3316 1.45	2	1	4
650	5163 1.52	4684 1.47	4541 1.47	4235 1.48	3917 1.50	3604 1.53	2	1	4
700	5561 2.01	5055 1.55	4901 1.55	4573 1.56	4230 1.57	3892 2.01	3	1	5
750	5958 2.09	5426 2.03	5261 2.03	4910 2.03	4543 2.05	4180 2.09	3	2	5
800	6356 2.17	5796 2.10	5621 2.10	5247 2.11	4855 2.13	4468 2.17	4	2	6
850	6753 2.25	6167 2.18	5981 2.18	5583 2.19	5168 2.21	4755 2.25	4	2	6
900	7151 2.33	6537 2.25	6341 2.25	5920 2.26	5480 2.29	5043 2.33	4	3	7
950	7548 2.41	6907 2.33	6700 2.33	6257 2.34	5792 2.36	5330 2.41	5	3	7
1000	7945 2.49	7277 2.41	7060 2.41	6593 2.42	6104 2.44	5617 2.49	5	3	7
1050	8341 2.58	7647 2.48	7419 2.48	6929 2.49	6416 2.52	5904 2.57	6	4	8
1100	8738 3.06	8017 2.56	7778 2.56	7266 2.57	6727 3.00	6190 3.05	6	4	8
1150	9134 3.14	8387 3.04	8137 3.03	7602 3.05	7039 3.08	6476 3.13	6	4	9
1200	9530 3.22	8757 3.11	8496 3.11	7938 3.12	7351 3.15	6763 3.21	7	5	9
1250	9926 3.30	9126 3.19	8855 3.19	8274 3.20	7662 3.23	7049 3.29	7	5	9
1300	10322 3.38	9496 3.26	9214 3.26	8609 3.28	7973 3.31	7335 3.37	8	5	10
1350	10717 3.46	9865 3.34	9573 3.34	8945 3.35	8285 3.39	7621 3.45	8	5	10
1400	11112 3.55	10234 3.42	9932 3.42	9281 3.43	8596 3.46	7907 3.53	9	6	10

ENGINE ANTI ICE ON
△FUEL = + 2.5 %

TOTAL ANTI ICE ON
△FUEL = + 5 %

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HOLDING

RACE TRACK HOLDING PATTERN AT GREEN DOT SPEED - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
CLEAN CONFIGURATION
PACK FLOW HI
ANTI-ICING OFF

ISA
CG=33.0%

EPR
FF (KG/H)

WEIGHT (1000KG)	FL 15	FL 50	FL100	FL120	FL140	FL160	FL180	FL200
46	1.080 1543	1.096 1526	1.124 1513	1.138 1510	1.155 1503	1.174 1498	1.194 1491	1.214 1483
48	1.084 1607	1.101 1593	1.131 1581	1.146 1574	1.164 1568	1.184 1564	1.204 1553	1.224 1552
50	1.089 1673	1.107 1660	1.139 1646	1.155 1639	1.174 1634	1.194 1626	1.213 1618	1.237 1620
52	1.094 1740	1.112 1728	1.146 1711	1.164 1705	1.183 1700	1.202 1689	1.222 1688	1.250 1688
54	1.099 1808	1.118 1796	1.154 1776	1.172 1771	1.192 1764	1.211 1753	1.234 1756	1.266 1761
56	1.104 1876	1.124 1864	1.162 1843	1.181 1838	1.200 1827	1.220 1824	1.246 1824	1.284 1835
58	1.108 1944	1.130 1929	1.170 1910	1.189 1903	1.208 1891	1.230 1893	1.260 1895	1.302 1909
60	1.113 2014	1.135 1995	1.178 1977	1.197 1967	1.216 1960	1.241 1961	1.275 1968	1.320 1986
62	1.118 2080	1.141 2060	1.186 2044	1.204 2031	1.225 2031	1.252 2029	1.291 2042	1.337 2063
64	1.123 2146	1.147 2127	1.193 2109	1.211 2096	1.235 2099	1.265 2102	1.307 2116	1.355 2142
66	1.128 2212	1.154 2194	1.200 2174	1.219 2168	1.245 2167	1.279 2175	1.323 2193	1.373 2225
68	1.134 2279	1.160 2263	1.206 2238	1.228 2237	1.255 2235	1.293 2247	1.339 2270	1.392 2310
70	1.139 2346	1.167 2332	1.213 2305	1.237 2305	1.267 2307	1.308 2322	1.355 2350	1.411 2399
72	1.144 2413	1.174 2401	1.221 2377	1.245 2372	1.279 2379	1.322 2399	1.372 2432	1.429 2493
74	1.149 2482	1.180 2471	1.228 2445	1.255 2440	1.292 2452	1.337 2476	1.389 2516	1.445 2588

ENGINE ANTI ICE ON	**TOTAL ANTI ICE ON**	**PER 1° ABOVE ISA**
△FF = + 2 %	△FF = + 5 %	△FF = + 0.3 %

10E -08F0A319--131 IAE V2522--A5 14300010C6KG330 0 018590 0 0 3 1.0 180.0 30.00 0 01 1.000 .000 .000 0 FCOM-N0--03--06--55--001--120

HOLDING

RACE TRACK HOLDING PATTERN - GREEN DOT SPEED - 1 ENGINE OUT

MAX. CONTINUOUS THRUST LIMITS
CLEAN CONFIGURATION
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

N1 (%)
FF (KG/H)

WEIGHT (1000KG)	FL15	FL50	FL100	FL120	FL140	FL160	FL180	FL200
42	60.9 1454	63.6 1442	67.6 1439	69.2 1441	70.8 1439	72.4 1435	74.0 1434	75.6 1438
44	62.1 1519	64.8 1508	68.8 1511	70.5 1511	72.0 1508	73.6 1505	75.1 1508	76.8 1515
46	63.3 1585	66.1 1577	70.1 1584	71.6 1581	73.2 1578	74.7 1577	76.3 1582	78.0 1596
48	64.4 1652	67.2 1650	71.2 1653	72.7 1651	74.3 1647	75.8 1651	77.4 1660	79.2 1677
50	65.6 1721	68.3 1725	72.2 1724	73.7 1721	75.3 1720	76.9 1726	78.5 1740	80.5 1762
52	66.7 1792	69.4 1800	73.2 1795	74.8 1790	76.3 1794	77.9 1803	79.6 1821	81.8 1847
54	67.7 1867	70.4 1873	74.2 1865	75.7 1864	77.3 1869	78.9 1884	80.8 1905	83.1 1935
56	68.7 1943	71.4 1944	75.2 1935	76.7 1938	78.3 1946	79.9 1964	82.0 1990	84.6 2026
58	69.7 2019	72.3 2015	76.1 2008	77.6 2013	79.2 2027	81.0 2048	83.2 2078	86.1 2124
60	70.6 2091	73.2 2087	77.0 2082	78.5 2089	80.1 2107	82.1 2133	84.4 2167	87.7 2223
62	71.5 2164	74.1 2158	77.8 2157	79.4 2169	81.1 2190	83.2 2220	85.8 2262	89.2 2327
64	72.3 2236	74.9 2229	78.7 2233	80.2 2250	82.1 2275	84.3 2309	87.2 2359	
66	73.2 2308	75.8 2300	79.5 2311	81.1 2330	83.1 2360	85.4 2399	88.7 2460	
68	74.0 2381	76.6 2370	80.3 2392	82.0 2415	84.1 2448	86.7 2493		

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1 DEG C ABOVE ISA
FUEL	+ 2 %	+ 5 %	+ 0.3 %

HOLDING

RACE TRACK HOLDING PATTERN AT GREEN DOT SPEED - 1 ENGINE OUT

MAX. CRUISE THRUST LIMITS
CLEAN CONFIGURATION
PACK FLOW HI
ANTI-ICING OFF

ISA
CG=33.0%

EPR
FF (KG/H)

WEIGHT (1000KG)	FL 15	FL 50	FL100	FL120	FL140	FL160	FL180	FL200
48	1.077 1582	1.094 1583	1.128 1578	1.144 1583	1.163 1591	1.184 1601	1.207 1595	1.234 1588
50	1.082 1653	1.100 1654	1.136 1650	1.153 1655	1.172 1663	1.194 1669	1.220 1658	1.248 1660
52	1.086 1723	1.106 1723	1.144 1720	1.162 1728	1.182 1740	1.205 1735	1.232 1727	1.263 1726
54	1.091 1795	1.112 1789	1.152 1793	1.171 1801	1.192 1810	1.217 1798	1.245 1798	1.278 1788
56	1.096 1868	1.119 1859	1.160 1866	1.180 1878	1.202 1876	1.228 1866	1.258 1865	1.293 1848
58	1.101 1938	1.125 1930	1.168 1940	1.189 1953	1.212 1940	1.240 1937	1.271 1927	1.308 1910
60	1.107 2006	1.132 1998	1.176 2015	1.198 2019	1.223 2005	1.251 2003	1.285 1988	1.324 1975
62	1.112 2074	1.138 2067	1.185 2093	1.207 2085	1.234 2076	1.264 2066	1.299 2049	1.340 2041
64	1.118 2142	1.145 2138	1.193 2164	1.217 2149	1.244 2141	1.276 2129	1.313 2112	1.357 2113
66	1.123 2210	1.151 2213	1.201 2232	1.227 2217	1.255 2207	1.289 2190	1.328 2178	
68	1.129 2279	1.158 2287	1.210 2297	1.236 2281	1.267 2270	1.302 2252	1.344 2248	
70	1.135 2348	1.164 2363	1.219 2361	1.246 2345	1.278 2333	1.315 2315		
72	1.140 2419	1.171 2438	1.228 2424	1.256 2411	1.290 2395	1.329 2385		
74	1.146 2496	1.178 2516	1.237 2486	1.267 2476	1.302 2457			
76	1.152 2573	1.185 2598	1.246 2552	1.278 2540				

ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1° ABOVE ISA
△FF = + 2 %	△FF = + 4.5 %	△FF = + 0.3 %

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DESCENT TO LANDING

DESCENT - M.78/300KT/250KT - 1 ENGINE OUT

IDLE THRUST
PACK FLOW HI
ANTI-ICING OFF

ISA
CG=33.0%

WEIGHT (1000KG)	50				70				
FL	TIME (MIN)	FUEL (KG)	DIST. (NM)	EPR	TIME (MIN)	FUEL (KG)	DIST. (NM)	EPR	IAS (KT)
390	15.3	102	92	IDLE					241
370	14.5	98	86	IDLE	17.9	119	107	IDLE	252
350	13.9	93	82	IDLE	17.2	115	102	IDLE	264
330	13.3	90	77	IDLE	16.5	111	97	IDLE	277
310	12.8	86	73	IDLE	15.9	107	92	IDLE	289
290	12.3	83	70	IDLE	15.2	102	87	IDLE	300
270	11.7	79	65	IDLE	14.4	97	81	IDLE	300
250	11.0	75	60	IDLE	13.6	92	75	IDLE	300
240	10.7	73	58	IDLE	13.1	89	72	IDLE	300
220	10.0	69	53	IDLE	12.3	84	66	IDLE	300
200	9.3	65	49	IDLE	11.4	79	60	IDLE	300
180	8.7	61	44	IDLE	10.5	74	54	IDLE	300
160	8.0	57	40	IDLE	9.6	68	48	IDLE	300
140	7.3	52	35	IDLE	8.7	62	43	IDLE	300
120	6.6	48	31	IDLE	7.7	56	37	IDLE	300
100	5.8	43	27	IDLE	6.8	50	31	IDLE	300
50	2.2	16	9	IDLE	2.5	19	11	IDLE	250
15	.0	0	0	IDLE	.0	0	0	IDLE	250

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1° ABOVE ISA
TIME	+ 2.5 %	+ 10 %	+ 0.25 %
FUEL	+ 17 %	+ 77 %	+ 0.5 %
DISTANCE	+ 3 %	+ 10 %	+ 0.5 %

10E -08F0A319-131 IAE V2522-A5 23100010C6KG330 0 018590 0 0-1 .0 .0 .00 0 03 .780300.000250.000 0 FCOM-N0-03-06-60-001-120

DESCENT TO LANDING

DESCENT - M.78/300KT/250KT - 1 ENGINE OUT

IDLE THRUST
HIGH AIR CONDITIONING
ANTI ICE OFF

ISA
CG=33.0%

FL	WEIGHT (1000KG)									
	45					55				
	TIME (MIN)	FUEL (KG)	DIST. (NM)	N1 (%)	IAS (KT)	TIME (MIN)	FUEL (KG)	DIST. (NM)	N1 (%)	IAS (KT)
390	14.5	88	87	IDLE	241	16.6	101	100	IDLE	241
370	13.8	85	82	IDLE	252	15.9	97	94	IDLE	252
350	13.3	82	78	IDLE	264	15.3	94	90	IDLE	264
330	12.7	79	74	IDLE	277	14.7	91	85	IDLE	277
310	12.3	76	70	IDLE	289	14.1	88	81	IDLE	289
290	11.8	74	67	IDLE	300	13.6	84	77	IDLE	300
270	11.2	70	62	IDLE	300	12.9	80	72	IDLE	300
250	10.6	67	58	IDLE	300	12.2	76	67	IDLE	300
240	10.3	65	56	IDLE	300	11.8	74	64	IDLE	300
220	9.7	61	51	IDLE	300	11.1	70	59	IDLE	300
200	9.0	57	47	IDLE	300	10.3	66	54	IDLE	300
180	8.3	54	42	IDLE	300	9.5	61	49	IDLE	300
160	7.7	50	38	IDLE	300	8.8	57	44	IDLE	300
140	7.0	46	34	IDLE	300	8.0	52	39	IDLE	300
120	6.3	41	30	IDLE	300	7.1	47	34	IDLE	300
100	5.6	37	26	IDLE	300	6.3	42	29	IDLE	300
50	2.1	15	9	IDLE	250	2.4	17	10	IDLE	250
15	0.0	0	0	IDLE	250	0.0	0	0	IDLE	250

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1 DEG C ABOVE ISA
FUEL	+ 20 %	+ 75 %	+ 0.5 %
TIME	+ 3 %	+ 9 %	+ 0.3 %
DISTANCE	+ 3.5 %	+ 10 %	+ 0.5 %

DESCENT TO LANDING

DESCENT - M.78/300KT/250KT - 1 ENGINE OUT

IDLE THRUST
NORMAL AIR CONDITIONING
ANTI-ICING OFF

ISA
CG=33.0%

WEIGHT (1000KG)	50				70				
FL	TIME (MIN)	FUEL (KG)	DIST. (NM)	EPR	TIME (MIN)	FUEL (KG)	DIST. (NM)	EPR	IAS (KT)
390	14.7	75	88	IDLE					241
370	14.0	71	83	IDLE	17.4	87	104	IDLE	252
350	13.4	68	79	IDLE	16.7	84	99	IDLE	264
330	12.9	66	75	IDLE	16.1	82	94	IDLE	277
310	12.4	64	71	IDLE	15.5	79	89	IDLE	289
290	11.9	62	67	IDLE	14.9	76	85	IDLE	300
270	11.3	59	63	IDLE	14.1	73	79	IDLE	300
250	10.7	56	58	IDLE	13.3	69	73	IDLE	300
240	10.4	55	56	IDLE	12.9	68	70	IDLE	300
220	9.8	53	52	IDLE	12.0	64	64	IDLE	300
200	9.1	50	47	IDLE	11.2	61	59	IDLE	300
180	8.5	47	43	IDLE	10.4	57	53	IDLE	300
160	7.8	44	39	IDLE	9.5	53	47	IDLE	300
140	7.1	41	35	IDLE	8.6	49	42	IDLE	300
120	6.4	38	30	IDLE	7.7	45	36	IDLE	300
100	5.7	34	26	IDLE	6.7	40	31	IDLE	300
50	2.1	13	9	IDLE	2.5	16	11	IDLE	250
15	.0	0	0	IDLE	.0	0	0	IDLE	250

CORRECTIONS	ENGINE ANTI ICE ON	TOTAL ANTI ICE ON	PER 1° ABOVE ISA
TIME	+ 2 %	+ 8 %	+ 0.2 %
FUEL	+ 15 %	+ 70 %	+ 0.5 %
DISTANCE	+ 2 %	+ 8 %	+ 0.4 %

10 –08F0A320–232 IAE V2527–A5 23100010C5KG330 0 018590 0 0–1 .0 .0 .00 0 03 .780300.000250.000 0 FCOM-N0–03–06–60–001–140

GENERAL

The ground distance/air distance conversion tables are used to calculate the air distance for a given ground distance due to the influence of the wind.
Tables are given for :
– LONG RANGE SPEED
– FIXED SPEEDS

LONG RANGE SPEED

R

GROUND DIST. (NM)	AIR DISTANCE (NM)						
	TAIL WIND			WIND COMPONENTS (KT)			HEAD WIND
	+150	+100	+ 50	0	–50	–100	–150
10	7	8	9	10	11	13	15
20	15	16	18	20	23	26	31
30	22	24	27	30	34	39	46
40	30	32	36	40	45	52	61
50	37	41	45	50	57	65	77
60	44	49	54	60	68	78	92
70	52	57	63	70	79	91	108
80	59	65	72	80	91	104	123
90	67	73	81	90	102	117	138
100	74	81	90	100	113	130	154
200	148	162	179	200	226	261	307
300	222	243	269	300	340	391	461
400	296	324	358	400	453	521	615
500	371	406	448	500	566	652	768
600	445	487	537	600	679	782	922
700	519	568	627	700	792	913	1076
800	593	649	717	800	905	1043	1230
900	667	730	806	900	1019	1173	1383
1000	741	811	896	1000	1132	1304	1537
1100	815	892	985	1100	1245	1434	1691
1200	889	973	1075	1200	1358	1564	1844
1300	963	1054	1164	1300	1471	1695	1998
1400	1038	1136	1254	1400	1585	1825	2152
1500	1112	1217	1344	1500	1698	1955	2305
1600	1186	1298	1433	1600	1811	2086	2459
1700	1260	1379	1523	1700	1924	2216	2613
1800	1334	1460	1612	1800	2037	2346	2766
1900	1408	1541	1702	1900	2150	2477	2920
2000	1482	1622	1791	2000	2264	2607	3074

GENERAL

The ground distance/air distance conversion tables are used to calculate the air distance for a given ground distance due to the influence of the wind.
Tables are given for :
– LONG RANGE SPEED
– FIXED SPEEDS

LONG RANGE SPEED

R

GROUND DIST. (NM)	AIR DISTANCE (NM)						
	TAIL WIND			WIND COMPONENTS (KT)			HEAD WIND
	+150	+100	+ 50	0	–50	–100	–150
10	7	8	9	10	11	13	15
20	15	16	18	20	23	26	31
30	22	24	27	30	34	39	46
40	30	32	36	40	45	52	62
50	37	41	45	50	57	65	77
60	44	49	54	60	68	78	93
70	52	57	63	70	79	91	108
80	59	65	72	80	91	104	123
90	67	73	81	90	102	118	139
100	74	81	90	100	113	131	154
200	148	162	179	200	227	261	308
300	222	243	269	300	340	392	463
400	296	324	358	400	453	522	617
500	370	405	448	500	566	653	771
600	444	486	537	600	680	784	925
700	518	567	627	700	793	914	1080
800	592	648	716	800	906	1045	1234
900	666	729	806	900	1019	1176	1388
1000	740	810	895	1000	1133	1306	1542
1100	814	891	985	1100	1246	1437	1696
1200	888	972	1074	1200	1359	1567	1851
1300	962	1053	1164	1300	1473	1698	2005
1400	1036	1134	1253	1400	1586	1829	2159
1500	1110	1215	1343	1500	1699	1959	2313
1600	1184	1296	1432	1600	1812	2090	2468
1700	1258	1377	1522	1700	1926	2220	2622
1800	1332	1458	1611	1800	2039	2351	2776
1900	1406	1539	1701	1900	2152	2482	2930
2000	1480	1620	1790	2000	2266	2612	3085

GENERAL

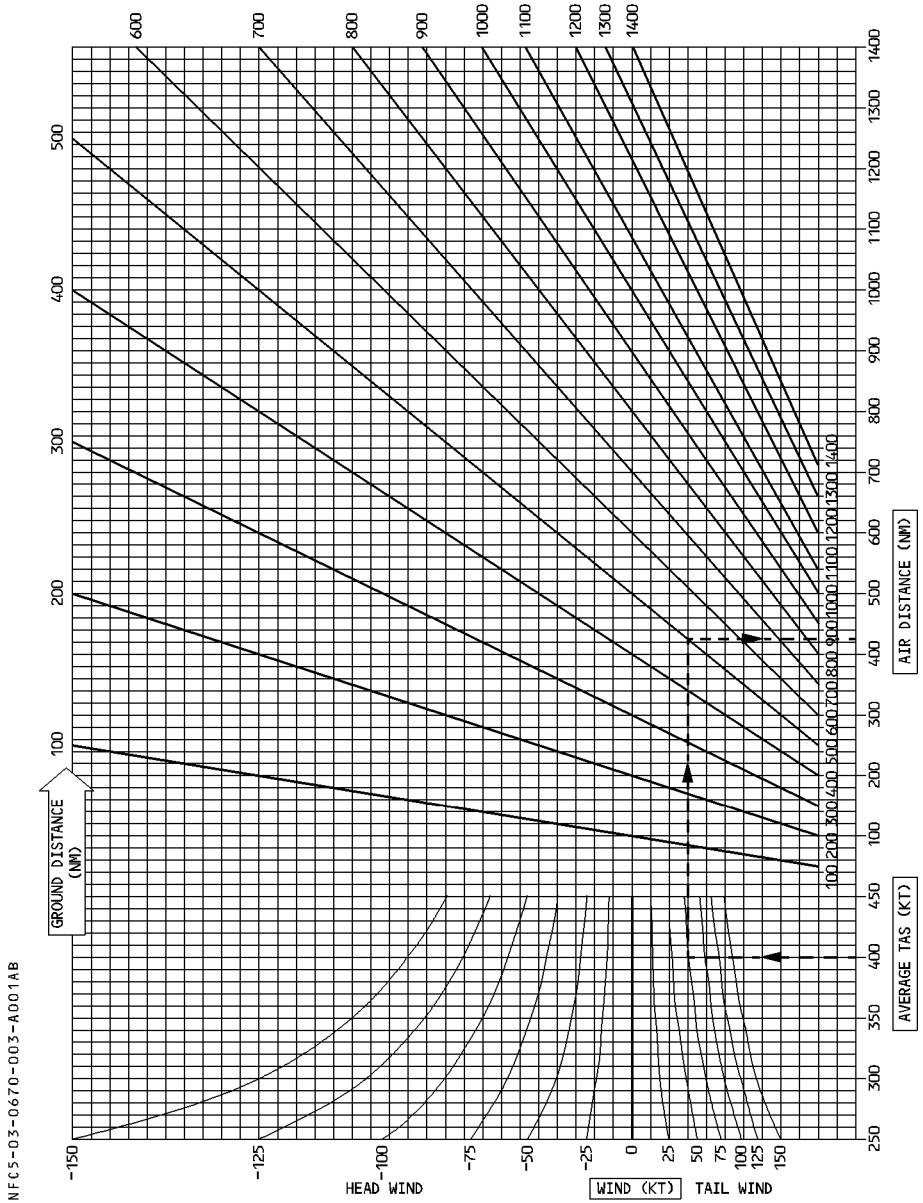
The ground distance/air distance conversion tables are used to calculate the air distance for a given ground distance due to the influence of the wind.
Tables are given for :
– LONG RANGE SPEED
– FIXED SPEEDS

LONG RANGE SPEED

R

GROUND DIST. (NM)	AIR DISTANCE (NM)						
	TAIL WIND			WIND COMPONENTS (KT)			HEAD WIND
	+150	+100	+ 50	0	–50	–100	–150
10	7	8	9	10	11	13	15
20	15	16	18	20	23	26	31
30	22	24	27	30	34	39	46
40	30	32	36	40	45	52	62
50	37	40	45	50	57	65	77
60	44	49	54	60	68	78	93
70	52	57	63	70	79	92	108
80	59	65	72	80	91	105	124
90	67	73	81	90	102	118	139
100	74	81	89	100	113	131	155
200	148	162	179	200	227	262	309
300	222	243	268	300	340	392	464
400	296	324	358	400	453	523	619
500	369	405	447	500	567	654	773
600	443	486	537	600	680	785	928
700	517	567	626	700	793	916	1082
800	591	647	716	800	907	1046	1237
900	665	728	805	900	1020	1177	1392
1000	739	809	895	1000	1133	1308	1546
1100	813	890	984	1100	1247	1439	1701
1200	887	971	1074	1200	1360	1570	1856
1300	961	1052	1163	1300	1474	1701	2010
1400	1035	1133	1253	1400	1587	1831	2165
1500	1108	1214	1342	1500	1700	1962	2319
1600	1182	1295	1431	1600	1814	2093	2474
1700	1256	1376	1521	1700	1927	2224	2629
1800	1330	1457	1610	1800	2040	2355	2783
1900	1404	1538	1700	1900	2154	2485	2938
2000	1478	1619	1789	2000	2267	2616	3093

FIXED SPEEDS



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07.20 LIST OF EFFECTIVE OEB

07.30 STATUS . . . . . 1 to 2

DEFINITION

Operations Engineering Bulletins (OEB) supplement the information and procedures contained in the different sections of the FCOM. OEB's are issued if there is a need for fast transmission of technical and/or procedural information having an operational impact to all flight crews concerned.

They are the result of continuous monitoring of the in-service performance of the aircraft fleet.

If compliance with an OEB has been identified as having a significant impact on aircraft operation, based on all information available at the time of issuance of this OEB, this OEB is printed on orange coloured paper. Associated with this OEB, a temporary revision of the Quick Reference Handbook (QRH) sets forth the correct related procedure.

However, the recommendations contained in all outstanding OEB's should also be reviewed with the highest attention.

Although the OEB's are not approved by the Airworthiness Authorities, the content might be subject to incorporation into the approved Airplane Flight Manual (AFM) or issuance of a Consigne de Navigabilité (CN)/Airworthiness Directive (AD).

DISTRIBUTION

Operating Engineering Bulletins are distributed to all identified holders of a FCOM and to those who need fast information concerning new or revised operational issues. Responsible persons within the operators organization are requested to ensure fast and complete distribution to all flight crews concerned.

R OEB's are filed in numerical order in FCOM chapter 7

This chapter contains a STATUS LIST and a LIST OF APPLICABLE OEB's (PER ATA CHAPTER) which are updated and re-issued with each normal FCOM revision.

COMPLIANCE

Airbus Industrie recommends that all flight crews review on a regular basis all applicable OEB's and strictly adhere to the contained information, procedures and warnings.

N°	TITLE
"To be filled by the operator, if needed"	

N°	TITLE
"To be filled by the operator, if needed"	