

airBaltic

Boeing 737

**AEROPLANE
OPERATING
MATTERS**

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0 ADMINISTRATION AND CONTROL

0.1 ADMINISTRATION AND CONTROL OF OMB B737

0.1.1 Introduction

This **Operations Manual Part B Boeing 737** (henceforth – OMB) has been prepared in accordance with the conditions specified by Latvian Civil Aviation Agency in the Air Operator's Certificate, Manufacturers' Aircraft Operating Manual and with the relevant provisions of Joint Aviation Requirements.

This manual is the property of airBaltic Corporation. All holders of this manual are personally responsible for the revision status of this copy. If a manual is under a department's responsibility, the chief for that department is responsible for assuring correct revision status of this copy.

0.1.2 Applicability

This Operations Manual is intended to serve as guideline for airBaltic pilots operating Boeing 737 (B737) aircraft. It covers company policies, operating procedures and limitations as well as applicable rules and regulations for operations of B737 aircraft.

The manual is applicable to all Flight Crew operating B737 under responsibility of airBaltic.

Relevant Operating personnel is responsible to comply with the procedures and regulations contained in this Operations Manual at all times; in the event of willful or negligent disobedience to those rules and regulations the personnel concerned may become subject to disciplinary, legal or penal action!

However, nothing contained in the Operations Manual shall prevent personnel from exercising their own best judgement during any situation for which the Operations Manual makes no provisions or in an emergency situation.

Commander of the aircraft has the authority and responsibility to declare an emergency situation whenever deemed necessary. He is authorized to deviate from any procedures and regulations and to follow any course of

action deemed necessary in the interests of safety in an emergency situation. *Refer to OMA 1.4.*

0.1.3 Structure of Operations Manual

Refer to OMA 0.1

For brevity the pronoun 'he' is used throughout the manuals. Where appropriate the pronoun 'she' should be inferred or assumed.

0.1.4 The common language

Refer to OMA 0.1

0.1.5 Operations Manuals to be carried

Refer to OMA 0.1

0.1.6 Structure of the Manual

This OM-B consists of twelve numbered and titled sections. These are further divided into numbered subsections and paragraphs.

0.1.7 Amendments and Revisions

The Operations Manual Part B, its amendments, and revisions are published and issued by airBaltic Flight Operations department. The SVP Flight Operations is responsible for its contents, and for keeping the procedures and instructions up-to-date. The SVP Flight Operations will authorize all amendments to this Manual, as required by airBaltic and by the LV CAA.

Minor changes and revisions such as:

- Editorial Changes or;
- Minor changes not affecting the policy or structure of the OMB, can be amended without prior approval from the LV CAA. Nevertheless LV CAA should be notified of these changes and revisions, as soon as practicably possible.

Flight Manuals administrators are responsible for the issuance and insertion of amendments and revisions, when prior approval from SVP Flight Operations has been granted.

In accordance to Distribution List amendments will be issued to copy-holders that will be required to amend designated copies. Amendments should be entered upon receipt and entry made and signed in Revision Index (0.3 of this section). When revisions/amendments are sent by mail

there will be included Certificate of Receipt/Incorporation that shall be filled in and returned to Flight Operations Department, as soon as possible.

Amendments having operational character are named as Temporary Revisions and are confirmed by SVP Flight Operations. When immediate amendments or revisions are required in the interest of safety, they may be published (e.g. via Daily Read File) and applied immediately, provided that any approval required has been applied for.

All temporary revisions are on yellow paper and inserted in front of the instructions, which they are replacing; if location cannot be decided, in front of the section or manual.

Temporary Revisions will be cancelled as soon as they are no longer relevant. Those of long-term character will be incorporated into the manual, when it is next amended, or within six months of their effective date, whichever is sooner.

0.1.8 Revision System

The established revision system shall include:

- Certificate of Receipt/Incorporation (only if revisions are sent by mail);
- Transmittal Letter including reason for changes;
- List of Effective pages.

All revised pages will contain date of issue, number of revision, marked revised/amended portion of the text indicated by vertical marginal line adjacent to the change. Each amendment will be accompanied by a revised List of Effective Pages, with date of issue for each section/page.

In order to keep manual valid, after incorporation of each revision the copy holder is responsible to fill in and sign OMB B737 0.3 Revision Index (of this section).

If OMB B737 9 MEL is revised, make an entry in 9.0.2 Revision Index.

0.1.9 Statement of Approval

By undersigning this manual (B-0.2) SVP Flight Operations assures that this Manual is prepared in accordance to company and regulatory requirements and it is made available to all staff operating airBaltic Boeing 737 aircraft.

0.1.10 The role of Authority

Refer to OMA 0.1

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0.2 LIST OF EFFECTIVE PAGES

CH	PAGE	EFFECTIVE	CH	PAGE	EFFECTIVE
0-TOC	1-2	01.03.2006	2.3	1-62	03.11.2006
0.1	1-4	01.03.2006	2.4	1-20	03.11.2006
0.2	1-2	03.11.2006	2.5.1	1-6	01.03.2006
0.3	1-2	10.11.2003	2.5.2	1-4	03.11.2006
0.4	1-2	01.03.2006	2.5.3	1-6	03.11.2006
0.5	1-8	01.03.2006	2.5.4	1-2	01.03.2006
0.6	1-2	10.11.2003	2.5.5	1-2	01.03.2006
0.7	1-20	01.03.2006	2.5.6	1-4	01.03.2006
0.8	1-4	03.11.2006	2.5.7	1-2	01.03.2006
1-TOC	1-2	03.11.2006	3-TOC	1-2	03.11.2006
1.1	1-2	01.03.2006	3.0	1-2	03.11.2006
1.2	1-4	03.11.2006	3.1	1-4	01.03.2006
1.3	1-6	01.03.2006	3.2	1-10	03.11.2006
1.4	1-2	01.03.2006	3.3	1-10	01.03.2006
1.5	1-2	03.11.2006	3.4	1-4	01.03.2006
1.6	1-2	01.04.2004	3.5	1-4	03.11.2006
1.7	1-4	03.11.2006	3.6	1-8	01.03.2006
2-TOC	1-6	03.11.2006	3.7	1-8	03.11.2006
2.1	1-4	03.11.2006	4-TOC	1-2	03.11.2006
2.2.1	1-6	03.11.2006	4.1	1-4	03.11.2006
2.2.2	1-6	03.11.2006	4.2	1-10	03.11.2006
2.2.3	1-4	03.11.2006	4.3	1-2	20.06.2004
2.2.4	1-4	01.03.2006	4.4	1-2	03.11.2006
2.2.5	1-8	03.11.2006	4.5	1-12	03.11.2006
2.2.6	1-4	01.03.2006	5-TOC	1-2	01.04.2004
2.2.7	1-4	01.03.2006	5.1	1-4	10.11.2003
2.2.8	1-4	03.11.2006	5.2	1-6	01.04.2004
2.2.9	1-24	03.11.2006	5.3	1-4	10.11.2003
2.2.10	1-6	03.11.2006	6-TOC	1-2	03.11.2006
2.2.11	1-6	03.11.2006	6.1	1-2	01.03.2006
2.2.12	1-2	20.06.2004	6.2	1-14	03.11.2006
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6.4	1-2	03.11.2006	10.3	1-4	28.02.2005
7-TOC	1-2	03.11.2006	10.4	1-6	03.11.2006
7	1-4	03.11.2006	10.5	1-16	01.03.2006
8-TOC	1-2	01.03.2006	11-TOC	1-2	03.11.2006
8.1	1-4	20.06.2004	11	1-14	03.11.2006
8.2.1	1-6	01.03.2006	12-TOC	1-4	03.11.2006
8.2.23	1-2	03.11.2006	12.0	1-2	01.04.2004
8.2.30	1-2	20.06.2004	12.1	1-6	03.11.2006
8.2.32	1-4	20.06.2004	12.2	1-10	10.11.2003
8.2.33	1-2	20.06.2004	12.3	1-2	10.11.2003
8.2.38	1-2	20.06.2004	12.4	1-2	10.11.2003
8.2.49	1-2	20.06.2004	12.5	1-4	01.03.2006
8.2.52	1-2	20.06.2004	12.6	1-4	03.11.2006
8.2.53	1-2	20.06.2004	12.7	1-6	03.11.2006
8.2.54	1-2	20.06.2004	12.8	1-2	10.11.2003
8.2.55	1-2	20.06.2004	12.9	1-4	10.11.2003
8.2.57	1-20	03.11.2006	12.10	1-2	03.11.2006
8.2.71	1-2	20.06.2004	12.11	1-6	01.03.2006
8.2.78	1-2	01.03.2006	12.12	1-6	03.11.2006
9	<i>Separate Approval (See Ch 9.0.1)</i>		12.13	1-2	10.11.2003
10-TOC	1-2	01.03.2006	12.14	1-2	03.11.2006
10.1	1-4	28.02.2005	12.15	1-2	10.11.2003
10.2	1-2	28.02.2005			

Approved by airBaltic

Approved by LV CAA

Date: 19.10.2006

Date: 27.10.2006

Pauls Cāltis
SVP Flight operations



Edgars Gindra
Gaisa kuģu
ekspluatācijas daļa

0.3 REVISION INDEX

REVISION	DATE OF REVISION	DATE OF INCORPORATION	SIGNATURE
NEW	10.11.2003	--	--
001	01.04.2004	--	--
002	20.06.2004	--	--
003	28.02.2005	--	--
004	01.03.2006	--	--
005	03.11.2006	--	--
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0.4 DISTRIBUTION LIST

Copy	Post-Holder	Copy	Post-Holder
1	SVP Flight Operations	30	-
2	Flight Operations office library	31	-
3	LV CAA	32	-
4	YL-BBB	33	LAL Maintenance
5	RIX TK	34	YL-BBE
6	RIX TS	35	VNO TS
7	MCC RIX	36	Office Library RIX
8	-	37	Office Library RIX
9	Chief Pilot	38	Office Library RIX
10	Briefing Room RIX	39	Office Library RIX
11	Briefing Room VNO	40	Office Library RIX
12	RIX DJ	41	Office Library RIX
13	Ground Operations	42	Office Library RIX
14	RIX DJ (2nd copy)	43	Office Library RIX
15	Technical Pilot (PIC)	44	Office Library RIX
16	Technical Pilot (FO)	45	Office Library RIX
17	Head of Training	46	Office Library RIX
18	YL-BBA	47	Office Library RIX
19	Line Captain	48	Office Library RIX
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21	-	50	Office Library RIX
22	-	51	-
23	YL-BBD	52	FSB
24	-	53	SAS FA
25	-	54	-
26	-	55	YL-BBF
27	MCC VNO	56	YL-BBG
28	Flight Safety Officer	57	-
29	-	58	YL-BBH

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0.5 AIRCRAFT GENERAL

0.5.1 General Description

The B737-500 is a short to medium range subsonic transport monoplane, powered by two CFM56-3 dual rotor axial flow turbofan engines; pylon mounted, below the wing. The empennage comprises a single vertical stabiliser and a controllable horizontal mounted stabiliser.

The flight deck provides seating for a captain, first officer and two observer seats.

Cabin provides seating for 120 passengers as well as for 4 cabin crewmembers (two in fwd and two in aft vestibules).

Primary electrical power is provided by two engine driven generators, which supply three-phase, 115 volt, 400 Hz AC. Each generator supplies its own bus system in normal operation and can also supply essential loads of the opposite side bus system when one generator is inoperative.

Transformer rectifier (TR) units and battery supply DC power. The battery also provides backup power for the AC and DC standby systems.

The APU operates a generator and can supply power to both AC generator busses on the ground or one AC generator bus in flight.

The airplane has three hydraulic systems: A, B and standby. The standby system is used if system A and/or system B pressure is lost. Both A and B hydraulic systems have an engine-driven pump and AC electric motor-driven pump. The standby system uses a single electric motor-driven pump to power;

- trust reverses,
- rudder,
- leading edge flaps and slats (extend only).

Ice protection is provided for

- the leading edge slats and the engine cowl lips by using bleed air,
- flight deck windows, probe and sensors by using AC electrical power.

The air conditioning and pressurisation system maintain the air in the pressurised compartments at the desired level of pressure and temperature. Bleed air is cooled, conditioned and distributed to the individual compartments and then discharged overboard.

The bleed air system is supplied with bleed air from the main engines and APU compressor or on the ground by external air cart/source.

The following systems rely on the bleed air system for operation:

- air conditioning/pressurization,

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- wing and engine thermal anti-icing,
- engine starting,
- hydraulic reservoirs pressurization,
- aspirated TAT probe.

The primary flight controls consist of ailerons, elevators and rudder. The flight controls are powered by redundant hydraulic sources; system A and B. The ailerons and elevators may be operated manually if required. The rudder may be operated by the standby hydraulic system if system A and B pressure is not available.

The secondary flight controls flight and ground spoilers, high lift devices consisting of trailing edge flaps and leading edge flaps and slats, use hydraulic power for operation. In the event of hydraulic pressure loss the trailing edge flaps can be operated electrically.

The automatic flight system (AFS) consists of the autopilot flight director system (AFDS) and autothrottle (A/T). The AFDS is a dual system consisting of two individual flight control computers (FCCs) and a single mode control panel (MCP). AFS provides control in pitch and roll. For yaw stabilization a yaw damper is installed.

The airplane has hydraulically operated two main landing gear and a single nose gear. Each main gear is a conventional two-wheel landing gear. The nose gear is conventional steerable two-wheel unit. In case of hydraulic power loss manual landing gear extension is available.

The normal brake system is powered by hydraulic system B. The alternate brake system is powered by hydraulic system A. Antiskid protection is provided on both brake systems with the normal brake system only.

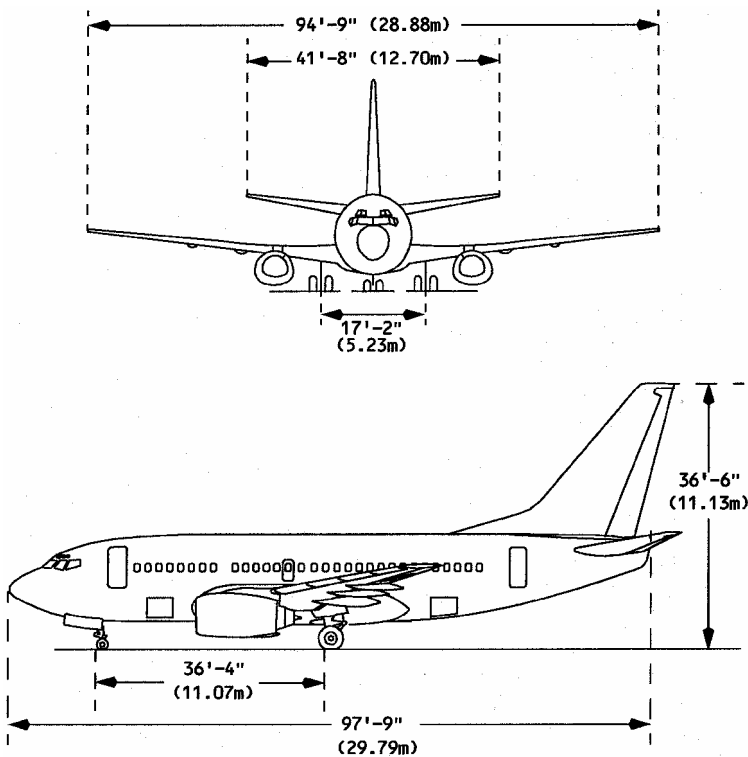
The navigational services include equipment for transmission, reception, and presentation of navigational information required by the flight crew during all phases of flight.

The aircraft communication system includes speech communication, passenger address, interphone system, audio monitoring, and integrating.

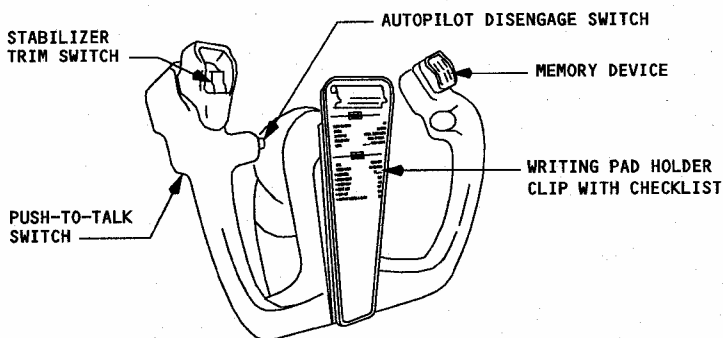
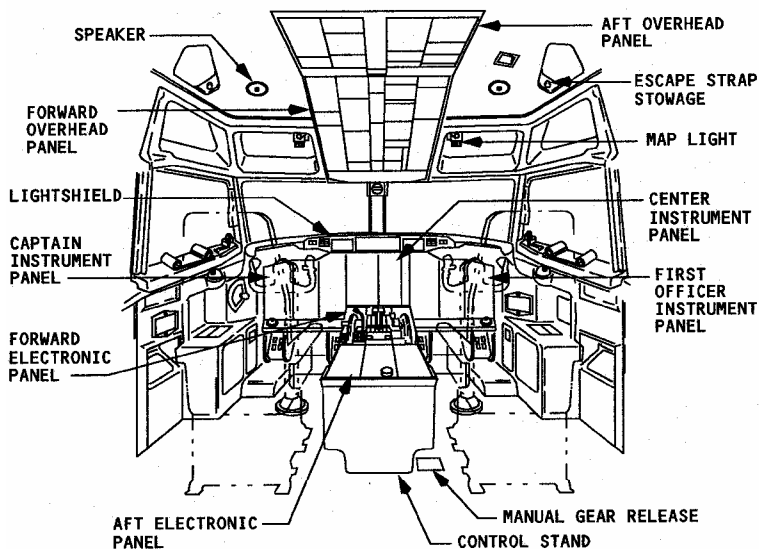
Static dischargers are fitted on each wing and stabilizer trailing edge.

The aircraft is equipped with a water system, a waste disposal system, and a wastewater drainage system.

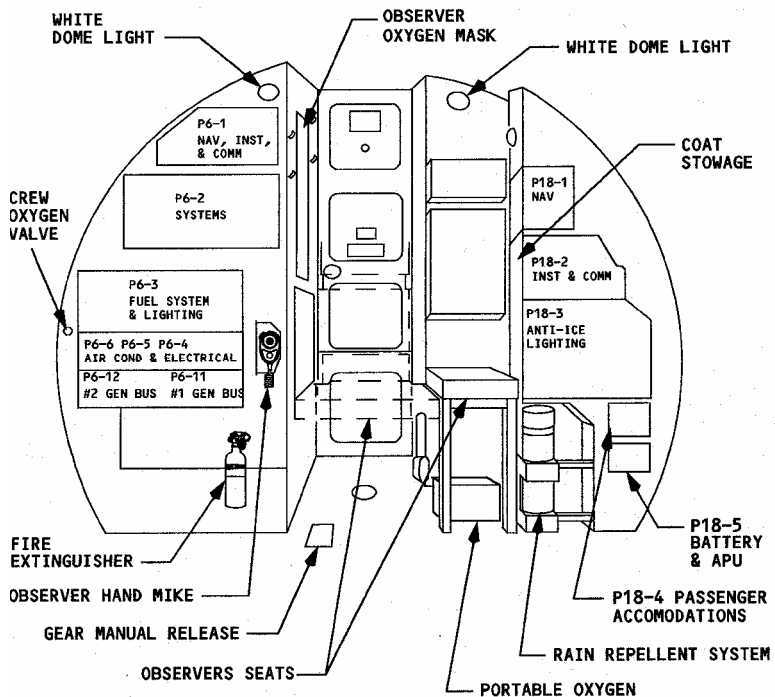
0.5.2 Dimensions



0.5.3 Flight Deck Arrangement



CAPTAIN CONTROL WHEEL DETAIL



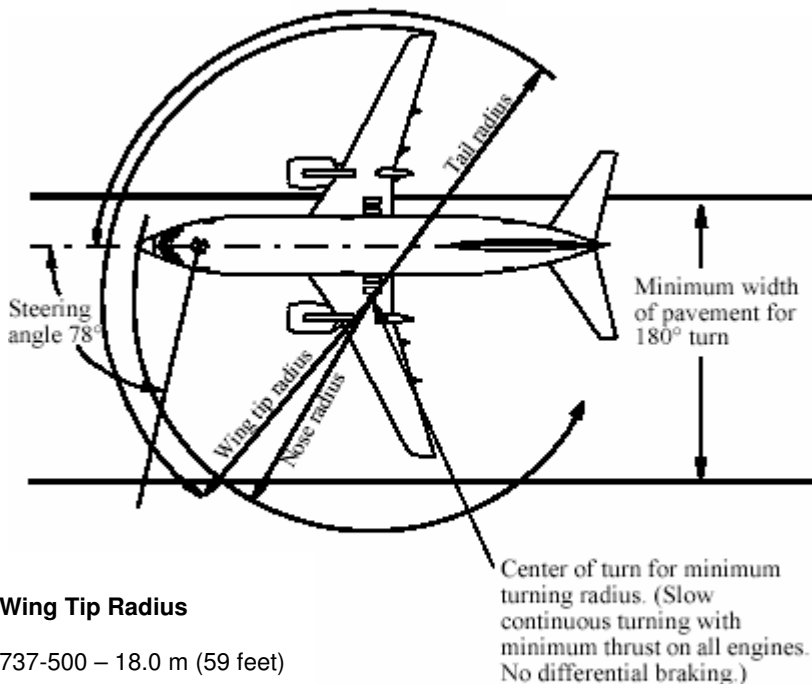
0.5.4 Aircraft turning Radius

Nose Radius

737-500 – 15.2 m (50 feet)

Tail Radius

737-500 – 18.3 m (60 feet)



Wing Tip Radius

737-500 – 18.0 m (59 feet)

- NOTE:**
1. Minimum width of pavement for 180° turn: 737-500 – 18.0 m (59 feet)
 2. Do not attempt to make a turn away from obstacle within 4.6 m of the wing tip or within 7.6 m of the nose.

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0.6 UNITS OF MEASUREMENT

Weights and dimensions are generally given in both U.S. and metric (SI) units.

<i>Weight:</i>	in pounds (lb) and kilograms (kg)
<i>Length:</i>	in feet (ft), inches (in) and metres (m)
<i>Area:</i>	in square feet (ft^2) and square meters (m^2)
<i>Volume:</i>	in cubic feet (ft^3) and cubic meters (m^3)
<i>Liquid:</i>	in liters (L) and U.S. gallons (US gal)
<i>Load:</i>	in pounds per square foot (lb/ft^2) in kilograms per square meter (kg/m^2) in pounds per running foot (lb/ft) in kilograms per running meter (kg/m)
<i>Density:</i>	in kilograms per litre (kg/l) and pounds per U.S. gallon (lb/USgal)

Conversion factors

	<u>Multiply</u>	<u>by</u>	<u>to obtain</u>
<i>Weight</i>	pounds (lb)	0.4536	kilograms
<i>Length</i>	inches (in)	0.0254	meter (m)
	feet (ft)	0.3048	meter (m)
<i>Area</i>	square feet (ft^2)	0.0929	square meters (m^2)
<i>Volume</i>	cubic feet (ft^3)	0.0283	cubic meters (m^3)
	u.s. gallons (US gal)	3.7854	litres (l)
<i>Moment</i>	pounds-inches (lb in)	0.0115	kilogram meters(kg m)
	pounds-inches (lb in)	0.4536	kilogram inches(kg in)
<i>Load</i>	pounds per square foot (lb/ft^2)	4.8826	kilograms per square metre (kg/m^2)
<i>Density</i>	pounds per US gallon (lb/gal)	0.1198	kilograms per liter (kg/l)

Units of measurement and their abbreviations

lb	pounds
kg	kilograms
in	inches
ft	feet
m	meters
ft ²	square feet
m ²	square meters
ft ³	cubic feet
m ³	cubic meters
Usgal	U.S. gallons
l	litre
lb/ft ²	pounds per square foot
lb/ft	pounds per running foot
kg/m ²	kilograms per square meter
kg/m	kilograms per running meter
lb in	pounds-inches
lb in/in	bending strength, pounds-inches per running inch
kg in	kilogram-inches
kpm/m	bending strength, kilopond meter per running meter
lb/USgal	pounds per U.S. gallon
kg/L	kilograms per litre
g	standard acceleration (9.81 m/s ²)

0.7 ABBREVIATIONS AND DEFINITIONS

General abbreviations and definitions may be found in Operations Manual Part A.

This section contains only aircraft type specific abbreviations and definitions used by airBaltic.

AAL	Above Aerodrome Level
AC	Alternating Current
A/C	Aircraft
ACARS	Aircraft Communications Addressing and Reporting System
ACT	Active
ACQ/ALT	Altitude Acquire and hold
AD (CAA)	Airworthiness Division, UK CAA
AD (FAA)	Airworthiness Directive
ADAU	Air Data Acquisition Unit
ADC	Air Data Computer
ADF	Automatic Direction Finder
ADI	Attitude Director Indicator
ADL	Allowable Deficiency List
ADM	Air Data Module
ADR	Advisory Route
AF	Automatic Failed
AF	ARINC Fail
AFDS	Autopilot Flight Director System
AFGS	Automatic Flight Guidance System
AFM	Aircraft Flight Manual
AGL, agl	Above Ground Level
AI	Anti-Ice
AIC	Aeronautical Information Circular
AIL	Aileron
AIP	Aeronautical Information Publication
AIR LO PRESS	Air Low Pressure
AIS	Aeronautical Information Service
Allowable	Permitted technical unserviceability, for which repair can be

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deficiency	deferred
ALN	Align
ALRT	Target Alert function used in Weather Radar
ALT, alt	Altitude
ALT	Altimeter
ALTN	Alternator
ALTN	Alternate
ALT RPTG	Altitude reporting
Amp (s)	Ampere(s)
AMSL	Above Mean Sea Level
ANNUN	Annunciator
ANP	Actual Navigation Performance
ANT	Anti
ANT ICE	Anti ice
AOA	Angle of Attack
AOC	Air Operators Certificate
AOG	Aircraft on Ground (awaiting spares)
AOM	Aerodrome Operating Minima (weather limits)
AP; A/P	Autopilot
APP, APR	Approach
APU	Auxiliary Power Unit
APU AIR	Auxiliary Power Unit Air
AQU	Aquire
ARINC	Aeronautical Radio Incorporated, US agency which produces standards for aviation
ARM	Arming
ARP	Aerodrome Reference Point (altitude and geographical coordinates)
ARPT	Airport
ARR	Arrival
ARTE, a.r.t.e	Above Runway Threshold Elevation
A/S	Airstairs
ASDA	Acceleration/Stop Distance Available
A-SKID	Anti Skid
ASI	Air Speed Indicator
ASP	Audio Select Panel
ASR	Air Surveillance Radar
ASV	Air Supply Valve
AT, A/T	Auto throttle
ATA	Actual Time of Arrival or Air Transport Association of America numbering system for aircraft technical publications

ATC	Air Traffic Control
ATD	Actual time of departure
ATOG/RTOW	Aircraft Take-Off Gross Weight/Regulated Take-Off Weight
ATT	Attitude
AUTO	Automatic
AUTO/MAN	Automatic/Manual
AUX	Auxiliary
AVAIL	Available
AWO	All Weather Operations division, UK CAA
AZ	Azimuth
Bae	British Aerospace Public Limited Company
BARO	Barometric
BAT or BATT	Battery
BCF	Bromo Chloro di-Fluoromethane (fire extinguishant)
B/C	Back Course
BIT	Built in Test
BITE	Built In Test Equipment
BLC	Back Localiser
BKCRS	Back Course
BRG	Bearing
BRK	Brake
BRK ACC	Brake Accumulator
BRT	Bright
BTI	Brake Temperature Indicator
BTL DISCH	Bottle Discharge (fire extinguishers)
BUS	Busbar
C	Centigrade
C	Captain
C	Celsius
C	Center
CA	Civil Aviation
CAA	UK Civil Aviation Authority
CAB	Cabin
CAL	Calibration
CANC/RCL	Cancel/Recall
CAP	Civil Aviation Publication
CAS	Computed Air speed
CAT	Clear Air Turbulence
Cat	Category
CAT 2	Flight Guidance Status for automatic approach only
CAT 3	Flight Guidance Status for automatic approach only
Category I	Category one landing AOM, DH 200 ft and above, RVR 550 metres and above
Category II	Category two AOM, DH 100-200 ft, RVR 300 metres (JAA)

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	and above
Category III	Category three, landing AOM, DH below 100 ft, RVR not less than 200 metres
Category A aerodrome	Simple procedures and no terrain difficulties
Category B aerodrome	Briefing required because of terrain or procedural requirements
Category C aerodrome	Terrain and procedures require a visit and/or a very comprehensive briefing before the commander is allowed to operate there
CAU	Cold Air Unit
CAU	Central Audio Unit
CB, C/B, cb	Circuit breaker
CB	Cumulo Nimbus (thunderstorm cloud)
CC	Cloud Ceiling
CC	Cabin Crew
CDU	Control Display Unit
CG	Centre of Gravity
CHG	Change
CHKD	Checked
CHKL	Checklist
CIS	Confederation of Independent States (Formerly USSR)
CLB	Climb
CLB NORM	Normal Climb
CLG	Ceiling
CLR	Clear
cm	Centimeter
CM	Circling Minima
CMRTR	Comparator
CMRTR	Comparator Master annunciator
MSTR	
C/O	Change Over
COMM	Communication
COND	Condition(ing)
CONFIG	Configuration
CON	Continuous
CONFIG	Configuration
CONT IGN	Continuous Ignition
CO ₂	Carbon Dioxide (fire extinguishant)
C of A	Certificate of Airworthiness
C of G	Centre of Gravity
CP	Critical Point
CRS	Course

CRT	Cathode Ray Tube
CRZ	Cruise
CSI	Combined Speed Indicator
CSP	Central Status Panel
CTL	Control
CTR	Centre
CTRL(s)	Control(s)
CVR	Cockpit Voice Recorder
DA	Decision Altitude. Instrument approach break off height (AMSL)
DBI	Distance and Bearing Indicator
d.c. or DC	Direct Current
DDG	Dispatch Deviations Guide
DDL	Dispatch Deviation List
DEG or deg	Degree
DEL	Delete
DEP	Departure
DEP ARR	Departure Arrival
DERD	Directorate of Engine Research and Developement (British fuel specification)
DES	Descent
DET	Detector
DETECT	Detection
DFDR	Digital Flight Data Recorder
DFGC	Digital Flight Guidance Computer
DFGS	Digital Flight Guidance System
DH	Decision Height. Instrument approach break off height (above runway threshold, touchdown zone or aerodrome datum height)
DIFF	Difference, Differential
DISCH	Discharge
DISC	Disconnect
DIST	Distance to waypoint
DME	Distance Measuring Equipment
DN or Dn	Down
Doppler	Airborne self contained radar navigation system
DP	Dimming Panel or Diffential Pressure
DSPL	Display
Δ P	Differential cabin pressure
DR	Dead Reckoning
DU	Display Unit
E	Prefix to Aircraft Number

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EAS	Equivalent air speed, defined as the IAS value corrected for pitot-static position and compressibility errors
ECAC	European Civil Aviation conference
ECP	EFIS Control Panel
ECS	Environmental control system
ECU	Electronic Control Unit
E/D	End of Descent
EDA	Emergency Distance Available (accelerate/stop at take-off)
EDP	Engine Driven Pump
E/E	Electrical and Electronic
EEC	Electronic Engine Control
EFIS	Electronic Flight Instrument System
e.g. or eg	For example
EGPWC	Enhanced Ground Proximity Warning Computer
EGPWS	Enhanced Ground Proximity Warning System
e. g. t. , EGT	Exhaust Gas Temperature
EIC	Emergency In Cabin
EL	Elevator
ELC	Engine Life Computer
ELECT,	Electrical
ELEC	
ELEV	Elevator
ELT	Emergency Locator Transmitter
ELV	Elevation
EMER,	Emergency
EMERG	
ENG	Engine
ENG AIR	Engine air
ER	Extended Range Operation
ESS	Essential
ESU	Electronic Sequence Unit
ET	Elapsed Time
ETA	Estimated Time of Arrival
ETD	Estimated Time of Departure
ETE	Estimated time to waypoint
EXEC	Execute
EXT	Extend
EXTING	Extinguisher
EXT1,2	Extinguisher No 1 or No 2
EXT AC ON	External AC supply connected
EXT PWR	External Power

F	Fahrenheit
FAA	Federal Aviation Administration
FADEC	Full Authority Digital Engine Control
FAR	Federal Aviation Regulations
FCTL	Flight Control
F/D	Flight Director
FLT DIR	
FDAU	Flight Data Acquisition Unit
F/DECK or FD	Flight Deck
FDR	Flight Data Recorder
FF	Fuel Flow
FGC	Flight Guidance Computer
FGS	Flight Guidance System
Fig	Figure
FL	Flashing
FLR	Flare
FLT	Flight
FLT INSTS	Flight instruments
FM	Flight Manual
FMA	Flight Mode Annunciators
FMC	Flight Management Computer
FMS	Flight Management System
FMS APP	Flight Management System approach (Mode)
FMV	Fuel Metering Valve
F/N	Flight Navigation
F/O	First Officer (co-pilot)
FPA	Flight Path Angle
FPM	Feet Per Minute
FPV	Flight Path Vector
FR	Frame
FREQ	Frequency
ft	Feet
ft/min	Feet per minute
FT	Flight Time
FTC	Flight Trim Compensation
FU	Fuel Used
Fwd	Forward
g	The acceleration due to gravity
G	Green
GA	Go-Around

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Gal	Gallon
GAWS	Windshear Go-Around
GCU	Generator Control Unit
GEAR	Landing gear (under carriage)
GEN	Generator
GMT	Greenwich Mean Time
GNLS	Global Navigation Landing System
GNLU	Global Navigation Landing Unit
GNS	Global Navigation System
GNSS	Global Navigation Satellite System
GNS-X	Global Navigation System variant
G/P, GP	Glide Path
GPS	Global Positioning System
GPSD	Ground Speed
GPWS	Ground Proximity Warning System
GRN	Green
GRD, GRND, grnd	Ground
GRND	Ground Pressurization
PRESSN	
Ground Prox	Ground Proximity
GRP	Ground Reference Point
G/S	Glide Slope
G/W	Galley/Wardrobe
HAT	Height Above (runway) Threshold
HDG	Heading
HDG REF	Heading Reference
HDG SEL	Heading Select
HDG/ROLL	Heading select and heading hold
HF	High Frequency. Short waveband radio communications
Hg	Inches of Mercury
HI	High
HAL	High Intensity Approach Lights
HI or Hld	Hold
HMU	Hydromechanical Unit
HP	High Pressure
hPa	Hectopascal
hr	Hour
HRD	High Rate Discharge
HSI	Horizontal Situation Indicator
HTR (s)	Heater(s)

HUD	Head-Up Display
H/W	Head Wind
HYD	Hydraulic
Hz	Hertz
IAS	Indicated Airspeed
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
I/C	Inter-Communications
IDENT	Identification
IDG	Integrated drive generator
ie or i.e.	that is
IFR	Instrument Flight Rules
I/F	Instrument Flying
IGN	Ignition
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
IMN/IAS	Indicated Mach Number/Indicated Air Speed
Imp Gallon	Imperial Gallon
in	Inches
Ind(s),IND(S)	Indicator(s)
IND LTS	Indicator Lights
In.HG	Inches of Mercury
INBD	Inboard
INHIB	Inhibit
INIT	Initialize
INOP	Inoperative
INS	Inertial Navigation System
INST(S)	Instrument(s)
INV	Inverter
INTC CRS	Intercept Course
I OAT	Indicated Outside Air Temperature is the reading on an outside air temperature indicator on the aeroplane
IRR	Instrument Rating Renewal
IRS	Inertial Reference System
IRU	Inertial Reference Unit
ISA	International Standard Atmosphere
ISLN	Isolation
ISO	International Standard Organisation
JAA	Joint Airworthiness Authority
JAR	Joint Airworthiness Regulations

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JP1	Kerosene
JP4	Wide cut gasolene
K	Knots
KGS	Kilograms
KG, kg	Kilogram
kg/hr	Kilograms per hour
KHz	Kilo Hertz
Kilo	Kilo
kt	Knots
KVA	Kilo-volt-amp
KW	Kilowatt
KW/hr	Kilowatt per hour
L	Left
LA	Landing Attitude
Lb, Lbs, LB	Pounds (avoirdupois weight scale)
lb/hr	Pounds per hour
LBCN	Locator Beacon
LCD	Liquid crystal Display
LCN	Load Classification Number
LCV	Load Control Valve
LDA	Landing Distance Available
LDBI	Left direction and distance bearing indicator
LDG	Landing
LDG ALT	Landing Altitude
LDG GEAR	Landing Gear
LED	Light emitting diode
LEFIS	Left hand EFIS system
LFT SPLRS	Lift Spoilers
LH	Left Hand
LHS	Left Hand Side
LIFT SPLR	Lift Spoiler
LIM	Limit
LLWAS	Low Level Windshear Alert System
LLZ	ILS localiser only. No glidepath
LMTR	Limiter
LNAV or LNV	Lateral Navigation
LOC	ILS Localizer
LOGO	Aircraft logo
LOM	Locator Beacon and Outer Marker
LORAN	Long Range Navigation equipment

LP	Low Pressure
LRD	Low Rate Discharge
LTS	Lights
LVL CNG	Level Change
LWR	Lower
m	Magenta
M	Middle or Metre(s) or Memory Items. Check list action to be initially carried out from memory
MA	Master
MAC	Mean Aerodynamic Cord or Emergency AC
Mach	Mach Number. True airspeed divided by local speed of sound
Mag, MAG	Magnetic
MAN	Manual
MAPS	Missed Approach Procedures
MAX	Maximum
MB	Millibar
mb	Millibar
MCDU	Multi Purpose Control Display Unit
MCP	Mode Control Panel
MCT	Maximum Continuous Thrust
MDA	Minimum Descent Altitude
MDA	Minimum Decision Altitude (altimeter set to QNH)
MDC	Emergency DC
MDH	Minimum Decision Height (altimeter set to QFE)
MEA	Minimum En-route Altitude
MEL	Minimum Equipment List (minimum technical serviceability requirement before flight)
MET VIS	Meteorological Visibility
mHz, MHZ	Mega Hertz
MI	Magnetic Indicator
MIC, mic	Microphone
Min	Minimum
Min	Minute
MISC	Miscellaneous
MMO	Maximum Mach Operating Speed
MKR	Marker
MLI	Magnetic Level Indicator
MLW	Main Landing Wheel
MLWA	Maximum Landing Weight Authorised
mm	Millimetres

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MM	Middle Marker
MMO	Maximum Mach Number permitted in operations
MNPS	Minimum Navigation Performance Specification
MOD	Modify
MOM	Manufacturers Operations Manual
MRK	Mark
MSA	Minimum Safe Altitude
MSF	Minimum Sector Fuel
MSG	Message
MSL	Mean Sea Level
MSP	Mode Select Panel
MSTR	Master
MTC	Minimum Terrain Clearance
MTOW	Maximum Take-Off Weight
MTRS	Meters
MTWA	Maximum Take-Off Weight Authorised
MU	Co-efficient of friction for icy runways
MWP	Master Warning Panel
MWS	Master Warning System
MZFW	Maximum Zero Fuel Weight
N1	Fan rotation speed (% of 7602 rpm)
Niflex	Value of N1 providing appropriate flexible thrust
Niref	Reference value to N1 for take-off and go-around
N2	High pressure shaft rotation speed (% of 20 000 rpm)
NA	Not Applicable
NACA	National Aeronautic Constructors Association
N.AID or N-AID	Navigation aid
NAT	North Atlantic
NATO	North Atlantic Treaty Organisation
NAV	Navigation
NAV RAD	Navigation Radio
ND	Navigation Display
NDB	Non Directional Radio Beacon
NGP	No Glide Path
NICAD	Nickel-Cadmium
NIPS	Not in the position selected
NM, n mile	Nautical Mile
NMS	Navigation Management System
No	Number
NORM	Normal

NOTAM	Notice to Airmen
NRV	Non-return Valve
NTA	Notice to aircrew
NVM	Non-volatile Memory
NXT	Next
N1	Low Pressure Rotor Speed
N2	High Pressure Rotor Speed
OAT	Outside Air Temperature
OCA/H	Obstacle Clearance Altitude/Height CAA
OCL	Obstacle Clearance Limit
O/FLOW	Overflow
OHP	Overhead Panel
OHU	Overhead Unit
O/HT	Overheat
OM	Outer Marker
OMEGA	Very low frequency waveband navigation system
ONS	Omega Navigation System
OPP	Opposite
Ops	Operations
Ops Man	Operations Manual
O/RIDE or	Override
OVRD	
OVHD	Overhead
OVHT	Overheat
OVSPD	Overspeed
OXY	Oxygen
PA	Passenger Address
PAR	Precision Approach Radar
PASS	Passenger
pax	Passengers
PCU	Passenger Control Unit
PDCS	Performance Data Computer System
PDTU	Portable Data Transfer Unit
PED	Primary Engine Display
PERF	Performance
PERF INIT	Performance Initialization
PF	Pilot flying
PFC	Primary Flight Computers
PFD	Primary Flight Display
PI	Pilot

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PIC	Pilot in Command → Commander
PIREPS	Pilots Reports
PLA	Power Lever Angle
PLI	Pitch Limit Indicator
PM	Pilot Monitoring (<i>see also PNF</i>)
PNF	Pilot Not Flying (<i>see also PM</i>)
PNL	Panel
PNR	Point of no Return
POS	Position
POS INIT	Position Initialization
POT	Potentiometer
PRESS	Pressure
PRESSN	Pressurization
PRI	Primary
PROG	Progress
PROT, Prot	Protection
PROX	Proximity
PRV	Previous or Pressure Reducing Valve
PSI	Pounds per square inch
PSIG	Pounds per square inch gauge
PSU	Passenger Service Unit
PTT	Press To Transmit
PTU	Power Transfer Unit
PVC	Poly Vinyl Chloride (Plastic Sheeting)
PWR	Power
PWS	Predictive Windshear System
QAR	Quick Access Recorder
QDM	Q Code: Magnetic Bearing for Aircraft Heading
QDR	Q Code: Reciprical bearing from VOR
Q-FAIL	Q Feel Devise Failure
QFE	Q Code: Barometric Pressure at Aerodrome Surface Level
QNH	Q Code: Barometric Pressure Reduced To Mean Sea Level
QTY	Quantity
R	Red or Right
RA	Radio Altitude or Radio Altimeter
RA(S)	Resolution Advisories
RAC	Rules of the Air and Air Traffic Control
RAD ALT	Radio Altimeter
RCR	Receiver

RCT	React Mode in Weather Radar
RECIRC	Recirculation
REDU	Reduced Thrust
REF, Ref	Reference
REFIS	Right Hand EFIS System
REGIONAL	Lower forecast barometric pressure at sea level for a
QNH	given region
REL	Relative
RET	Retract
REQD	Required
REV	Revision
RF	Refill
RH	Right Hand
RHS	Right Hand Side
RLV	Relief Valve
RLW	Regulated Landing Weight
RMCCB	Remote Control Circuit Breaker
RMI	Radio Magnetic Indicator
RMP	Radio Management Panel
RNG	Range
RNP	Required Navigation Performance
RNP	Radio Navigation Performance
RNAV, R NAV	Area Navigation System
RPM	Revolutions per Minute
RPTG	Reporting
R/T	Radio Telephony
RT	Radio Telephone
RTE	Route
RTO	Rejected Take-off
RTOW	Regulated Take-off Weight
RUD	Rudder
RV	Reducing Value
RVR	Runway Visual Range
RVSM	Reduced Vertical Separation Minimum
R/W or RWY	Runway
RWY Exit	Runway exit
S.APP	Steep Approach
SAT	Static Air Pressure
Sby	Standby
S/C	Step Climb

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S/CL	Spoiler Closed
SCRN	Screen
SE	Single Engine
sec	Second
Sect	Section
SEL	Select
SELCAL	Selective Calling System
SER INT	Service Interphone
SG	Specific Gravity or Symbol Generator
SID	Standard Instrument Departure
SIGMETS	Significant Meteorology Information
SL	Safety Lane
SM	Statute Mile
SMC	Standard mean chord, defined as the relationship of wing area divided by the wing span where the wing area includes that area of the fuselage enclosed by the leading and trailing edges of the wing projected to the centre line of the aeroplane
SMKG	Smoking
SOP	Standard Operating Procedure
SP	Space
SPD	Speed
SPLR	Spoiler
SSA	Sector Safety Altitude
SSR	Secondary Surveillance Radar (transponder)
STA	Station
STA	Scheduled Time of Arrival
STAB	Stabilizer
STAR	Standard Arrival Route
STAT	Status
Stby	Standby
STBY GEN	Standby Generator
STBY INV	Standby Inverter
STD	Standard
STD	Scheduled Time of Departure
Subj	Subject
SYNC	Synchronization
T or TRU	True
T or Tkor TRK	Track
TA	Traffic Advisory
TAF	Terminal Area Forecast (weather)

Target N1	Target value of N1, equal to Niref for full thrust take-off or for go around or equal to Niflex for flexible thrust take-off
TAS	True Air Speed
TAT	Total Air Temperature
TAW	Terrain Awareness and Warning
TCAS	Traffic Alert and Collision Avoidance System
TCF	Terrain Clearance Floor
TCS	Thrust Control System
T/D	Top of Descent
TDZ	Touch Down Zone
TDZE	Touch Down Zone Elevation
Tech Log	Technical Log. Record of technical matters such as the aircraft fuel state, pre-flight checks or technical unserviceability
Temp	Temperature
TFC	Traffic
Tflat	Ambient temperature below which N1 or TGT schedules give constant thrust (deg.C) (flat rating)
Tflex	Ambient temperature greater than true value selected by the pilot for flexible thrust take-off (deg.C)
TFR	Transfer
TGS	Touchdown Groundspeed
TGT	Turbine gas temperature (deg.C), as measured between high pressure and low pressure turbines
THR HOLD	Throttle Hold
TMA	Terminal Manoeuvring Area (controlled airspace)
T/O or TO	Take-Off
TO/GA	Takeoff/Go-Around
TOD	Take-Off Distance
TOGA	Take-off Go Around
TO Mode	Take off mode
TOR	Take-Off Run
TOW	Take-Off Weight
TOWS	Windshear Take-off
TR	Transformer/Rectifier
Tredu	Standard, pre-programmed assumed temperature with TRP selected to REDU
Tref	Value of ambient temperature selected on TMS/CDU by pilot(deg.C) and set either to Tamb or Tflex for take-off
TR	Track

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TRP	Thrust Rating Panel
TRU	Transformer Rectifier Unit
TSI	Thrust Setting Index
TURB	Turbulence
T-VASI	Visual Approach Slope Indicator. Lights arrangement in the shape of a T
T/W	Tail Wind
UNCPLD	Uncoupled
UPR DSPL	Upper Display
UTC	Universal Time Coordinated
V	Volts or Volume
VI	Power failure recognition or decision speed
V2	Take-off safety speed which is the minimum steady flight speed from a height of 35 feet
V4	Initial climb speed, all engines
V5	Fifth segment engine out climb speed
VA	Manoeuvring speed
VAC	Voltage Alternating Current
VASI	Visual Approach Slope Indicator
VDC	Voltage Direct Current
VDF	Very High Frequency radio communication Direction Finder
VDOT	Speed bug setting on TRP
VERT	Vertical
VFE	Maximum speed for extending wing flaps and flights with flaps extended
V _{fgl}	Flap/Gear limit speed
VFR	Visual Flight Rules
VFTO	Final take-off climb speed
VHF	Very High Frequency radio communications
VIB, Vib	Vibration(s)
VIP	Very Important Person
VLE	Maximum speed for flight with landing gear extended
VLO	Maximum speed for landing gear operation
VLV(S)	Valve(s)
VMBE	Maximum brake energy dissipation speed
VMCA	Minimum control speed in the air
VMCG	Minimum control speed on the ground
VMCL	Minimum control speed on landing
V _{min}	Minimum operational speed
V _{mo}	Maximum velocity permitted

VMO	Maximum velocity permitted
VNAV	Vertical Navigation
VOL	Volume
VOLMET	Meteorological Broadcast (aerodrome weather)
VOR	Very High Frequency Omni Directional Range
VORTAC	Combined VOR and TACAN ground station
VR	Rotation speed
VRA	Rough Air speed
VREF	Target velocity at threshold (landing)
VREF	Reference Speed
VREF 24	Reference speed of threshold (Landing) Flaps 24
VREF 33	Reference speed of threshold (Landing) Flaps 33
VS	Minimum Speed in a stall or Stalling Speed or Vertical Speed
V/S	Vertical Speed
VSEL	Selected Speed
VSI	Vertical Speed Indicator
VSTOP	Decision to stop speed on icy or slippery runways
VTH	Target velocity at threshold (landing)
VTK	Vertical Track
VI	VI decision speed
V1	Takeoff Decision Speed
V2	Scheduled Takeoff Target Speed
V2	V2 safety speed during flight
VR	Rotate speed
W	White
WARN	Warning
WAT	Weight, Altitude, Temperature. Climb limitations on RTOW
W/C	Wind Component
WD	Wingdown
Wet VI	Reduced VI, used on wet runways
WINDSHR	Windshear
Wnd	Wind
WPT	Waypoint
Wsmax	Maximum thrust
ws	Windshear
WT	Weight
w/v	Wind Velocity
WX	Weather
WXR	Weather Radar

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X-	Cross -
XFR	Transformer
XTK	Cross Track
XPDR or XPNDR	Transponder
YD	Yaw Damper
YEL	Yellow
Wnd	Wind
WPT	Waypoint
ws	Windshear
WSmax	Maximum thrust
WXR	Weather Radar

%	Percent
0	Degrees
+	Plus
-	Minus
±	Plus/Minus
>	Greater than
<	Less than
0	Phase
&	and

0.8 HIGHLIGHTS OF REVISION

#005 from 03.11.2006

Effective from 03.11.2006, the Operations Manual Part B (B737) has been revised according to the List of Effective Pages, reflected in subsection 0.2 above.

For OMB B737 9 Minimum Equipment List (MEL) highlights of revision *refer to OMB B737 9.0.3 "Highlights of Revision"*.

The main reason for this revision is: New Boeing procedures and Temporary revision incorporation requirement.

Below are listed highlights of the introduced changes.

Sec	Chapter	Remarks
0	0.2	Revised.
	0.8	Revised.
1	1-TOC	Revised.
	1.5.1	Editorial change.
	1.7	Revised.
2	2-TOC	Revised.
	2.1.4	Inserted the NOTE.
	2.2.1.1	Revised Report for duties.
	2.2.1.2	Revised Flight planning.
	2.2.1.4	Revised Crew Co-ordination.
	2.2.2.1	Inserted the NOTE regarding Fuel door.
	2.2.3.2	Supplemented Engine shut down (aborted start-up).
	2.2.5.3	Revised Limitations.
	2.2.5.4	Inserted the NOTE.
	2.2.5.6	Revised NAP.
	2.2.5.7	Revised Crew coordination.
	2.2.8.3	Revised Navigation.
	2.2.9	Terminological change: PNF → PM.
	2.2.9.1	Revised.
	2.2.9.4	Revised callout.
	2.2.9.6	Revised Circling.
	2.2.10.1	Revised the reference.
	2.2.10.3	Inserted Rejected landing.
	2.2.11.1	Revised.
	2.2.11.2	Revised Landing performance.
	2.2.11.3	Revised.
	2.2.11.4	Revised.

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Sec	Chapter	Remarks
	2.2.11.6	Revised.
	2.3	Revised substantially.
	2.4	Revised Certified Aerodromes for CAT 2/3 operations table. Terminological change: PNF → PM.
	2.5.2.3	Revised Take-off Performance
	2.5.2.5	Revised Landing Performance
	2.5.3.5	Revised Approach and Landing.
3	3-TOC	Revised.
	3.0	Terminological change: PNF → PM.
	3.0.1	Added determination that suspected faulty systems should not be used in flight if possible and troubleshooting by crew should be avoided.
	3.2.2.1	Terminological change: PNF → PM.
	3.5.2	Terminological change: PNF → PM.
	3.5.3	Revised Evacuation.
	3.7.4	Revised Recall Items.
4	4-TOC	Revised.
	4.1.1	Revised MTOW.
	4.1.2.1	Revised Methods of calculations.
	4.2.2.4	Supplemented Limitations.
	4.4	Revised.
	4.5	Revised.
6	6-TOC	Revised.
	6.2.4	Updated MLS example.
	6.2.6	Updated MLS description.
	6.4	Revised.
7	7-TOC	Revised.
	7.3	Revised Transportation Of Live Animals.
8	8.2.23	Revised.
	8.2.57	Revised.
10	10.4.4	Deleted ELT due to device's removal from board.
11	11-TOC	Revised.
	11	Revised the General.
	11.3.1	Revised Crew Co-ordination.
	11.3.5	Revised Description of Brace Positions.
	11.3.6	Revised Information of Brace Signal.
	11.8.2	Revised Duties of Co-Pilot (RP)
12	12-TOC	Revised.
	12.1.4	Inserted Oxygen Mask Microphone Test.
	12.6.2	Revised Electrical Power Up.
	12.7.3	Revised High Altitude Airport Start Procedure.
	12.7.4	Revised PMC off Takeoff and Climb.
	12.7.6	Revised APU Start.

Sec	Chapter	Remarks
	12.10.1	Revised Altimeter Difference.
	12.12	Revised Ground Transfer of Fuel.
	12.14	Completely revised.

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1.1 INTRODUCTION AND CERTIFICATION STATUS

1.1.1 Introduction

airBaltic Boeing 737 aircraft may only be operated within the limitations presented in this chapter.

If this chapter does not cover some limitations, refer to Manufacturers Operations Manual.

a) Certification status

For Boeing 737 Civil Aviation Agency of the Latvian Republic has accepted B737-500 aircraft Type Certificate issued by the Federal Aviation Administration.

In accordance to the Chicago Convention of International Civil Aviation Boeing 737 is certified in the Transport category and may be operated only in accordance to the conditions specified in para b) below.

b) Approved types of operations

airBaltic has been authorized to operate this aircraft in accordance under the following approved types of operations:

- Known atmospheric icing conditions;
- Extended over-water operations;
- Day and night VFR flight;
- IFR;
- Following types of Precision Approach and Landing:
 - Category 1:
 - Manual approach with or without flight director;
 - Automatic coupled approach with manual or automatic landing.
 - Category 2, Automatic coupled approach with manual or automatic landing.
 - Category 3, Automatic coupled approach with automatic landing.

1.1.2 Seating configuration

a) Passenger seating configuration

airBaltic Boeing 737 aircraft has one class 120 passenger seat cabin configuration.

The number of seats equipped with safety belts, life-vests, and number of emergency exits limits the maximum number of occupants. Therefore maximum number of adult aircraft occupants is 128.

Additionally up to ten children under the age of two years (infants), might be carried in the arms of passengers, provided appropriate safety measures are applied (refer to OM A chapter 8.2 and CCH 2.17.1 and 2.17.3).

b) Crew composition

For normal operations minimum required crew is two pilots and three cabin crewmembers.

In exceptional cases (charters, training, transit flights, etc) cabin crew may not be required or reduced number of cabin crew may be used.

1.2 MASS AND CENTRE OF GRAVITY

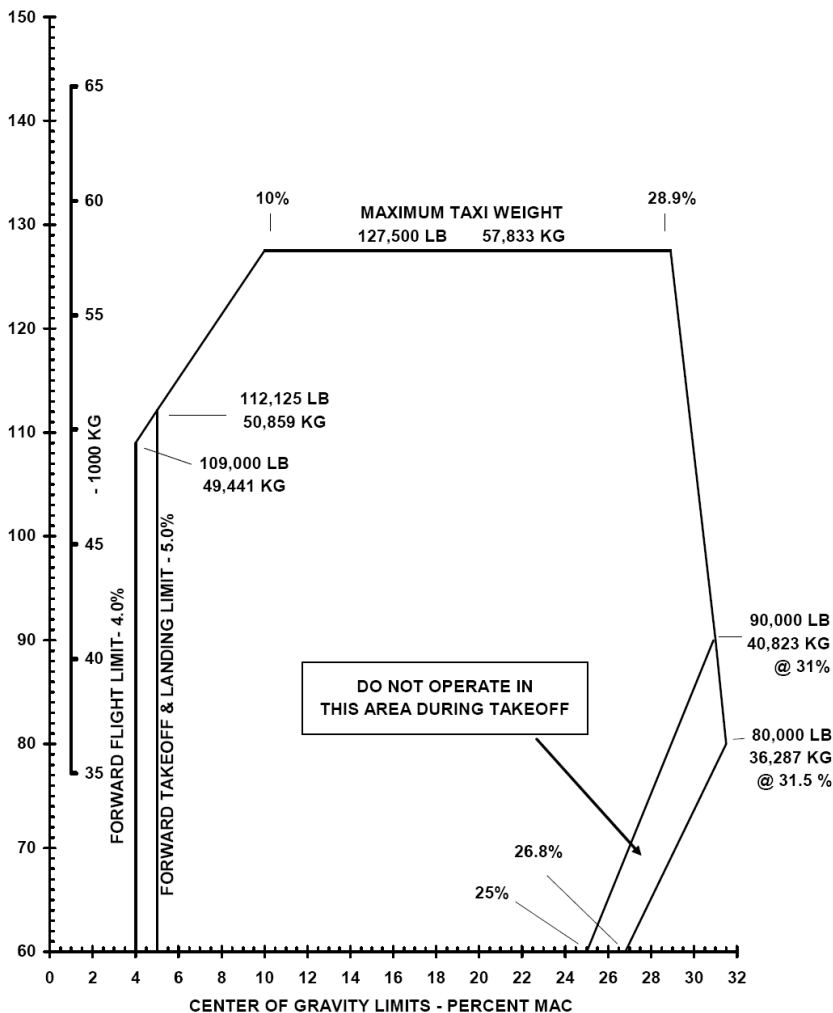
1.2.1 Weight Limitation

KG (lbs) A/C Reg.	Maximum Taxi Weight	Maximum Take-off Weight	Maximum Landing Weight	Maximum Zero Fuel Weight
YL-BBB	53,070 (117,000)	52,843 (116,500)	49,895 (110,000)	46,493 (102,500)
YL-BBA	56,226 (123,959)	56,000 (123,459)		
YL-BBD	57,379 (126,500)	57,152 (126,000)		
YL-BBE	56,472 (124,500)	56,245 (124,000)		
YL-BBF YL-BBG YL-BBH	57,833 (127,500)	57,606 (127,000)		

1.2.2 Centre of Gravity Limits

	YL-BBA	YL-BBB	YL-BBD	YL-BBE
MTaxiW	56226	53070	57379	56472
CG limits	8.8 - 29.1	6.4 - 29.5	9.6 - 29	9.0 - 29.1

YL-BBF, -BBG, -BBH



The centre of gravity limitations are specified in the section 6 of this manual as well as in the Weight and Balance Report, filed in the Company Document Binder of each aircraft.

NOTE: For daily operations Index System is used to ensure accurate weight and balance distribution within above limiting envelope. See Section 6 of this manual for more details.

1.2.3 Compartment Loading

The aircraft must be loaded in accordance with the Aircraft Weight and Balance Manual observing below prescribed compartment and Centre of Gravity limitations.

Maximum Allowable Weights

Compartments	Total Weight Kg	Linear Loading, Kg/m	Floor Loading, Kg/m ²	Usable volume, m ³
YL-BBB				
Forward Cargo Hold	1984			8.13
Cargo compartments				
1A	302	480.3	732	1.16
1B	491	338.5	732	1.84
2	1191	661.4	732	5.13
Aft Cargo Hold	2745			15.15
Cargo compartments				
3	1613	570.8	732	9.03
4	1132	283.4	732	6.12
YL-BBA, YL-BBD, YL-BBE				
Forward Cargo Hold	1902			7.79
Cargo compartments				
1A	220	480.3	732	0.82
1B	491	338.5	732	1.84
2	1191	661.4	732	5.13

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Compartments	Total Weight Kg	Linear Loading, Kg/m	Floor Loading, Kg/m ²	Usable volume, m ³
Aft Cargo Hold	2888			15.15
Cargo compartments				
3	1756	570.8	732	9.03
4	1132	283.4	732	6.12
YL-BBF, YL-BBG, YL-BBH				
Forward Cargo Hold	1572			8.12
Cargo compartments				
1A	220	480.3	732	1.16
1B	483	334.6	732	1.84
2	869	480.3	732	5.12
Aft Cargo Hold	2888			15.14
Cargo compartments				
3	1756	570.8	732	9.03
4+5	1132	283.4	732	1.81+4.30

1.3 OPERATIONAL LIMITATIONS

1.3.1 Speed Limitations

a) Airspeeds

Maximum Operating Speed (V_{MO})	340 knots IAS
Maximum Operating Mach number (MMO)	0.82M
Manoeuvring Speed (V_A) Maximum airspeeds for full control deflection. PA 0 feet PA 10,000 feet PA 20,000 feet PA 30,000 feet PA 37,000 feet	277 knots IAS 283 knots IAS 294 knots IAS 310 knots IAS 0.82 M
Flap Extended Speed (V_{FE}) Maximum permissible airspeeds for extending the wing flaps and flight with flaps extended. Flaps 1 Flaps 2 Flaps 5 Flaps 10 Flaps 15 Flaps 25 Flaps 30 Flaps 40	 230 knots IAS 230 knots IAS 225 knots IAS 210 knots IAS 195 knots IAS 190 knots IAS 185 knots IAS 158 knots IAS
NOTE: Do not exceed 230 knots when flaps are extended by the alternate (standby) system.	

Landing Gear Operation Speeds:			
Retract	V_{LO}		235 knots IAS
Extend	V_{LO} M_{LO}		270 knots IAS 0.82
Extended	V_{LE} M_{LE}		320 knots IAS 0.82
Flap maneuver speed			
Flaps UP			210 knots IAS
Flaps 1			190 knots IAS
Flaps 5			180 knots IAS
Flaps 10			170 knots IAS
Flaps 15			150 knots IAS
Flaps 25			140 knots IAS
Flap 30			$V_{REF\ 30}$
Flap 40			$V_{REF\ 40}$
NOTE: 1. Flap maneuver speeds provide approximately 15 to 20 knots above the minimum maneuvering speed for each flap setting. 2. At and above 53070 kg increase speed by 10 kts.			

b) Company Speed Limitation

Descending below 10 000' ft altitude Max allowed speeds are as follows:

- Indicated speed – 300 Kts;
- Rate of descent – 3 000 ft/min.
- Maximum crosswind for Take-off and Landing (*see next page*).

MAXIMUM CROSSWIND FOR TAKE-OFF AND LANDING

Normative FC (Russian FC)	Statement of Braking Action	Friction coefficient (μ)	Max X-wind (kt) <u>For T/O</u>	Max X-wind (kt) <u>For LDG</u>
0.31 - 0.34 –	Poor	0.20	5	5
0.35 - 0.36 –	Medium Poor	0.25	10	15
0.37 - 0.39 –	Medium	0.30	15	20
0.4 - 0.42	Medium Good	0.35	20	25
>0.42	Good (wet)	0.40	25	30
		0.45	30	35
	Good (dry)	≥ 0.50	35	

NOTE: Use of runways with $\mu < 0.20$ is not applicable for airBaltic.

c) Rough Air Speed

If severe turbulence is encountered unexpectedly, slowly accelerate or decelerate to achieve the rough air speed of 280 kts (0.73M).

If severe turbulence is encountered at altitudes below 15,000 feet and the airplane gross weight is less than the max landing weight, the airplane may be slowed to 250 kts in clean configuration.

d) Window heat inoperative

Airspeed limit maximum 250 knots below 10'000 feet.

1.3.2 Bank angle limitation

Limit bank angle to 15 deg. until reaching $V_2 + 15$ knots.

Maximum bank angle at $V_2 + 15$ knots is 30 deg.

For manual reversion (Hydraulic systems A and B failure), limit bank angle to 20 deg.

1.3.3 Turning Radius during taxi

Minimum width of pavement for 180 deg turns – 18 m. Refer to para. 0.5.4: "Aircraft turning radius".

NOTE: Do not attempt to make a turn away from obstacle within 4.6m of the wing tip or within 7.6m of the nose.

1.3.4 Operating Envelope

Maximum operating altitude for this aircraft is 37,000 feet pressure altitude.

Maximum take-off and landing altitude – 8,400 feet.

Maximum flight operating latitude – 73 degrees North and 60 degrees South.

Environment envelope

Take-off and landing limits:

- maximum ambient temperature up to aerodrome elevations of PA 8400 feet is ISA+39.4 deg C (at PA 0 feet +54.4 deg C);
- minimum ambient temperature up to aerodrome elevations of PA 8400 feet is –54 deg C.

In-flight limits:

- maximum ambient temperature up to PA 8400 feet ISA+39.4 deg C, from PA 8400 feet to PA 36,089 feet ISA+34 deg C;
- minimum ambient temperature is –73 deg C.

1.3.5 Runway Limitations

The aircraft shall not be operated on surfaces other than **hard paved runways** with the minimum **PCN** of **38**.

Company requires that take-off can only be performed from runways / runway intersections for which **performance calculations** (based on aircraft performance data presented in AFM) are available or additionally performed.

Acceptable **runway slope limitation gradient** is **± 2%**.

Maximum take-off and landing altitude – **8,400** feet.

1.3.6 Limitations on Wet and Contaminated runway

The depth of continuous layer of **water, slush, or wet snow shall not exceed 13 mm** (0,5 in) for take-off; **a continuous layer of dry snow must not exceed 60 mm** (2,0 in).

1.3.7 Assumed Temperature Method

Refer to OMB B737 4.2.2.4.

1.3.8 Airframe Contamination

With the exception of the areas defined below, the **aircraft must be clear of snow, ice and frost before take-off.**

Frost is permissible on the fuselage provided the layer is thin enough to distinguish surface features such as paint lines or markings underneath, but all vents, probes and ports must be clear of frost.

1.3.9 Altitude display limit for RVSM operations

Standby altimeters do not meet requirements of RVSM airspace.

The maximum allowable in-flight difference between Captain and First Officer altitude display for RVSM operations is 200 feet.

The maximum allowable on-the-ground altitude display differences for RVSM operations are:

Field elevation	Max Difference between Captain & FO	Max Difference between Captain or FO & Field Elevation
Sea Level	40 feet	75 feet
5,000 feet	45 feet	75 feet
10,000 feet	50 feet	75 feet

1.3.10 Air stair operation

Operation of air stair not recommended in winds exceeding 40 knots.

1.3.11 Crew Oxygen requirements

MINIMUM DISPATCH PRESSURE (PSI) FOR 76 CUBIC FEET BOTTLE			
BOTTLE TEMPERATURE	NUMBER OF CREW USING OXYGEN		
C	2	3	4
-10	600	860	1110
-5	610	875	1130
0	620	890	1155
5	635	905	1175
10	645	920	1200
15	655	940	1220
20	670	955	1240
25	680	970	1260
30	690	990	1280
35	700	1005	1300
40	715	1020	1325
45	725	1035	1345
50	735	1050	1370

1.4 FUEL SYSTEM LIMITATIONS

1.4.1 Fuel Management

The maximums allowable fuel quantity in each main wing tank is 4'539kg (5674,3ltr), and in the integral center wing tank is 7'004kg (8755,7ltr).

1.4.2 Lateral Fuel Imbalance

Lateral fuel imbalance between main wing tanks 1 and 2 must be scheduled to be zero. Random fuel imbalance must not exceed 453 kilograms for taxi, takeoff, flight or landing.

1.4.3 Fuel Loading

Main wing tanks 1 and 2 must be scheduled to be full if the center wing tank contains more than 453 kgs of fuel. With 453 kgs or less in center wing tank fuel, partial main wing tank fuel may be loaded provided the effects of balance have been considered.

1.4.4 Normal Fuel Usage

Use center wing tank fuel to depletion, followed by main wing tank fuel, however, a maximum of 453 kgs may be retained in the center wing tank provided the effects of balance have been considered.

1.4.5 Center Tank Fuel Pumps

For ground operation, center tank fuel pump switches must not be positioned to "ON" unless the center tank fuel quantity exceeds 453 kgs, except when defueling or transferring fuel.

Center tank fuel pump switches must be positioned to "OFF" when both center tank fuel pump low pressure lights illuminate.

NOTE: If a center tank fuel pump LOW PRESSURE light(s) illuminates during takeoff or climb, the center tank pump(s) may remain on until the climb attitude is reduced and the light(s) extinguishes or workload allows for pump(s) to be positioned "OFF".

Center tank fuel pumps must not be "ON" unless personnel are available in the flight deck to monitor low pressure lights.

1.4.6 Fuel Pump Circuit Breaker

Do not reset a tripped fuel pump circuit breaker.

1.4.7 Fuel Temperature

Maximum fuel temperature is $+49^{\circ}\text{C}$.

Minimum fuel temperature is fuel freeze point $+3^{\circ}\text{C}$ or -45°C , whichever is higher.

1.5 ENGINE LIMITATIONS

1.5.1 Engine Thrust

N1 values for trust settings are calculated by FMC.

N1 values for take-off, max climb, go-around, LRC and max continuous thrust ratings are also presented in Performance In-flight Section of QRH.

Registration	S/N	Engine Type	Thrust, lb _f	APU Type
YL-BBA	24646	CFM56-3C-1	18500	GTCP36-280
YL-BBB	24273	CFM56-3C-1	18500	GTCP85-129
YL-BBD	29075	CFM56-3C-1	18500	GTCP85-129
YL-BBE	29073	CFM56-3C-1	18500	GTCP85-129
YL-BBF	24878	CFM56-3B-1	20000	GTCP85-129
YL-BBG	24919	CFM56-3B-1	20000	GTCP85-129
YL-BBH	24968	CFM56-3B-1	20000	GTCP85-129

1.5.2 Engine RPM

The maximum operational limits are:

N1 – Low Pressure Compressor Rotor 106.0%

N2 – High Pressure Compressor Rotor 105.0%

1.5.3 Engine EGT

Operating Condition	Temperature Limits	Time Limit
Takeoff	930 °C	5 minutes
Maximum Continuous	895 °C	Continuous
Starting	725 °C	

1.5.4 Engine Instrument Markings

Maximum limits are marked with a red radial line.

Cautionary range is marked with a yellow arc.

Normal operating range is marked with a green arc.

Minimum limits are marked with a red radial line.

1.5.5 Engine Oil System

Minimum oil pressure is 13 psi. If engine oil pressure is in the yellow band with takeoff thrust set, do not takeoff.

Maximum oil temperature limit for continuous operation is 160°C.

Maximum oil temperature is 165°C. Operation between 160°C and 165°C is limited to 15 minutes.

1.5.6 PMC

Both PMC's must be either OFF or ON for takeoff.

1.5.7 Reverse Thrust

Intentional selection of reverse thrust in flight is prohibited.

1.5.8 Engine start up

Pneumatic pressure (prior to starter engagement): minimum 30 psi at sea level, decreasing ½ psi per 1'000 feet above sea level.

Starter Duty Cycle (normal start):

- first attempt: 2 minutes on, 20 seconds off;
- second and subsequent attempts: 2 minutes on, 3 minutes off.

1.6 WEATHER LIMITATIONS

1.6.1 Engine Operation in Rain, Hail or Sleet

Continuous ignition must be ON (ENGINE START switch in the CONT position) during takeoff and landing and during engine anti-ice operations.

When flight in moderate or heavy rain, hail, or sleet is encountered or anticipated, engine start switches must be set to FLT and a minimum of 45% N1 limit must be maintained except on short final when landing is assured.

1.6.2 Wind Limitations

Maximum tailwind component for take-off and landing is 10 knots.

Maximum crosswind component for:

Take-off	35 knots;
Landing	35 knots.

- Note:**
- 1. For landing crosswind greater than 20-24 knots limits are based on de-crab or combination crab/sideslip technique.
 - 2. For crosswind limitations vs friction coefficient see Normal Checklist.

For ILS coupling and automatic landing apply the following limitations:

Headwind	25 knots;
Crosswind	15 knots;
Tailwind	10 knots.

For wind limitations applicable to runway conditions other than good, refer to section “Operations on Low Friction Runways”.

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1.7 SYSTEM LIMITATIONS

1.7.1 APU Limitations

- 1) GTCP 85–129, EGT indicator has green and red marking:

Maximum start EGT is **760** deg C.

Maximum continuous EGT is **710** deg C.

- 2) GTCP 36-280 (B), indicator is without coloured marking:

Has no stated EGT limits.

For both APU models if there are multiple aborted start attempts:

- 1 minute cooling period is required between the first and second start attempt;
- 5 minutes cooling period is required between the second and third start attempt;
- 1 hour cooling period is required after the third start attempt.

APU start attempts are not recommended above **25'000** feet.

The APU supplies bleed air for one air conditioning pack either on the ground or in flight. Both generator busses can be powered on the ground. In flight only one generator bus can be powered.

Note: Under extremely cold conditions, both packs may be used on the ground for more rapid heating. See **Cold Weather Operations** OM-B 2.5.1.

Do not use APU for both bleed and electrical load above **10'000** feet.

Do not use APU bleed above **17'000** feet.

Do not use APU model GTCP85-129 for electrical load above **35,000** ft.

APU can operate up to **37'000** feet.

APU bleed valve must be closed when:

- ground air connected and isolation valve open;
- engine Nr 1 bleed valve open;
- isolation valve and engine Nr 2 bleed valve open.

APU bleed valve may be open during engine start, but avoid engine power above idle.

Do not start or shut down APU during refueling operations.

1.7.2 Autopilot (A/P) / Autothrottle (A/T) / Flight Director (F/D) System

1. Do not engage the autopilot for takeoff below **1000** feet AGL.
2. In a single channel ILS approach the autopilot may remain engage down to 50 ft AGL.
3. In an approach using V/S mode the autopilot may remain engage down to 300 ft AGL.
4. Use of aileron trim with the autopilot engaged is prohibited.
5. The use of dual autopilots with one engine inoperative is not authorized.
6. The use of auto throttle for an approach with one engine inoperative and for “All flaps up landing” is not recommended.

1.7.3 Traffic Alert and Collision Avoidance System (TCAS)

Pilots are authorized to deviate from their current ATC clearance to the extent necessary to comply with TCAS II resolution advisory.

1.7.4 Electrical power

Maximum generator drive oil temperature: 157⁰ C.

1.7.5 Flight Management, Navigation

During VOR approaches, one pilot must have raw data from the VOR associated with the approach display in the EHSI VOR/ILS mode no later than final approach fix.

Do not operate weather radar during fueling or near fuel spills or people.

1.7.6 Hydraulic Power

Minimum fuel for ground operation of electric hydraulic pumps is 760 kgs in respective main tank.

1.7.7 Landing Gear

Do not apply brakes until after touchdown.

1.7.8 Speed Brakes

In flight, do not extend the SPEED BRAKE lever beyond the FLIGHT DETENT.

Do not deploy speed brakes in flight at radio altitudes less than 1,000 feet.

1.7.9 Flap Operation

Do not extend flaps above 20'000 feet pressure altitude..

1.7.10 Air systems

System Safety Relief Differential Pressure. Maximum is 8.65 psi.

Maximum allowable cabin pressure differential for takeoff and landing is 0.125 psi (236 feet below airport pressure altitude).

With engine bleed air switches ON, do not operate the air conditioning packs in HIGH for takeoff, approach or landing.

1.7.11 Engine Anti-Ice System

The engine anti-ice system must be ON during all ground and flight operations when Icing Conditions exists or are anticipated, except during climb and cruise when the temperature is below -40°C SAT. Engine anti-ice must be on prior to and during descent in all Icing Conditions, including temperatures below -40°C SAT (refer to FMC).

Do not rely on airframe visual icing cues to turn engine anti-ice on. Delaying the use of engine anti-ice until ice build-up is visible from the cockpit may result in severe engine damage.

NOTE: Icing conditions – Icing Conditions exist when the OAT on the ground and for takeoff, or TAT in-flight is 10°C or below, and visible moisture in any form is present (such as clouds, fog with visibility of 1.6 km or less, rain, snow, sleet and ice crystals).

Icing conditions also exist when the OAT on the ground and for takeoff is 10°C or below when operating on ramps, taxiways or runways where surface snow, ice, standing water, or slush may be ingested by the engines or freeze on engines or nacelles.

1.7.12 Wing Thermal Anti-Ice System (Ground Operation).

Do not use wing anti-ice as a substitute for ground de-icing/anti-icing and inspection procedures, which are necessary to comply with operating rules.

Do not operate wing anti-ice on the ground when the OAT is above 10°C.

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2 NORMAL PROCEDURES

2.1 PREAMBLE

2.1.1 General

This section is designed to provide all necessary information for normal flight operations, also referred as Standard Operating Procedures (SOP's), concerning type and version of aircraft in service.

Information is subdivided to provide a possibility for pilots to review certain phases of operations or to get a quick reference for specific stage of flight. Additional summarized information is presented in a way of profile drawings where needed.

Where required, references are made to Manufacturers Operations Manual (MOM), different parts of airBaltic Operations Manual (OM) or other official publications to provide additional information for flight deck personnel on the matter of performing the flight.

2.1.2 Subsection Integration

All sections are located in order of normal flight flow with subdividing when necessary.

Sections "Low visibility procedures", "Adverse weather conditions" contain all requirements for such kinds of operations and divided on flight phases when deemed necessary.

2.1.3 Crew Co-ordination

Standard Operation Procedures (SOPs) presented in this section are based on airBaltic Policy/Philosophy and are the result of direct application of Crew Co-ordination Concept (CCC) principles.

Crew co-ordination is presented in a way of a separate subdivision in an appropriate section or as a reference to CCC (OM, Part A, ch. 8.0) to make it simpler.

The Cabin-Cockpit communication in details is presented below.

2.1.4 Cabin-Cockpit Communication

The following chimes, signals and Passenger Address announcements shall be used by the Commander and Cabin Crewmember #1 (CC#1) to pass signals between the Flight and Cabin Crew.

In situations when the chime signals are inoperative, or deferred by the MEL, the Commander shall brief the Cabin Crewmember #1 on alternate signals/announcements via Passenger Address system that shall be used.

COCKPIT → CABIN

1) Fasten Belt switch cycle (Off-On):

- before takeoff - Cabin Crew to be seated for takeoff;
- before landing - Cabin Crew to be seated for landing;
anticipate landing in 1-2minutes.

If Cabin Crew is unable to be seated before take-off/landing, the Cabin Crewmember #1 shall contact the flight deck immediately.

2) 2 Hi/low chime – Call the flight deck when convenient.

3) 3 Hi/low chimes or "Cabin Crew to cockpit" – Cabin Crewmember #1 shall call the flight deck immediately for instructions.

4) **"Cabin Crew, prepare cabin for Landing"** – Cabin Crew to terminate the service and to prepare/report cabin readiness for landing (normally when passing 10'000ft).

5) **"Doors to manual"** – Cabin Crew to disarm the slides, when the aircraft is parked on the stand or jet-bridge.

6) If moderate or severe turbulence expected during any phase of flight, the Flight Crew shall address the message to cabin **"Cabin Crew take your seats/remain seated due to turbulence"**.

CABIN → COCKPIT

1) **1 Low chime** – Call the cabin when convenient.

2) **3 Low chimes** with the blue light on means
“Urgent situation”- contact the cabin immediately.

NOTE: In case of fire and smoke inside or in the vicinity of Flight Deck, instructions shall be given over the Intercom

3) **“Slides armed, cabin secure”** via intercom system - all pre-take off checks are completed. RP has to confirm Cabin Crewmember #1 report with the **“Cabin secure”** response.

4) **“Cabin secure”** via intercom system - all checks are completed and cabin is ready for landing. PM has to confirm Cabin Crewmember #1 report with the same **“Cabin secure”** response.

5) **“Cabin not ready”** via intercom system – Cabin Crew is unable to complete the cabin checks for take-off or landing in time. RP/PM has to confirm Cabin Crewmember #1 report with the same **“Cabin not ready”** response.

6) Cabin Crew #1 will make the P/A announcement
“Cabin Crew doors to auto, please”

NOTE 1: This PA should be made as soon as there is no access from outside, i.e., gate stairs, service stairs.

NOTE 2: To get access to the Flight Deck the Door Bell may be used. By pressing "1" then "ENT" keys on the emergency access panel, the flight deck chime will sound.

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2.2 NORMAL HANDLING

2.2.1 PRE-FLIGHT (1 hr – 40 min before ETD)

2.2.1.1 Report for duties

Crewmember shall report for the duty to MCC Officer / Crew Dispatcher not later than 1 hour before STD in full proper uniform. The check-in time could be corrected for operational reasons and crewmember(s) shall be informed about it in advance.

If crewmember cannot report for duty on time, he shall inform Crew Dispatcher/MCC as soon as it is possible. In addition appropriate Crew Manager shall be informed in written form afterwards, when total delay of the check-in exceeded 10 minutes.

NOTE: in outstations the Commander directs the check-in time and place for the crew.

2.2.1.2 Flight planning

Flight planning is a process to evaluate the conditions of particular flight and to make all necessary arrangements to complete the flight safely and on time. Both pilots shall be involved into the process but final responsibility lies with the Commander.

During the process the flight crew should evaluate and make decision about usability of the aerodromes, readiness of the crew and aircraft, using the following steps:

- 1) NOTAMs related to the flight;
- 2) Weather related to the flight;
- 3) Alternates selection;
- 4) The aircraft technical status;
- 5) Fuel required
- 6) Payload

After completion of the Decision making all necessary arrangements (fuel, de-icing, operational limitations etc.) shall be reported to Movement Control Center (MCC) or ground handling personnel.

The reason and expected time of delay shall be as soon as possible reported to MCC or ground handling personnel to provide all necessary actions.

1) NOTAMs

NOTAMs will give information about status of ground facilities, services and restrictions in use of airspace for the aerodromes (departure, destination and alternates) and routes to be flown. NOTAMs are received via RODOS system or alternatively from ATS office.

SNOWTAM is the specific NOTAM, which may be delivered in period from October to April and related to runway conditions (snow, ice, etc). For decoding see chapter METEOROLOGY in SAS RM.

2) The Weather

The weather at departure, destination and alternates aerodromes as well as RW and flight conditions should be assessed related to:

- aircraft performance (see chapter 4), and
- aerodrome operating minimum.

Concerning aerodrome operating minimum the weather reports shall be used as follows:

- Departure aerodrome - the latest actual weather;
- Destination / Alternate - weather forecast during period of $ETA \pm 1$ h.

If the weather forecast is not available or is not covering the $ETA \pm 1$ -hour period - the airport shall be considered below the Planning Minima.

Weather reports are normally received via RODOS system or alternatively from ATS. For decoding see chapter METEOROLOGY in SAS RM.

NOTE: General procedure for weather assessment is presented in Part A-8.1.6. "Interpretation of meteorological information".

3) Alternates selection

Alternate is an airport suitable in all respects (weather, runway, and facilities) to complete the flight safely if the landing at the destination cannot be accomplished due to weather or any other reason. Weather forecast at Alternate ($ETA \pm 1$ -hour) shall be equal or above the Planning Minimum for Alternate.

For the planning purposes the special Planning Minima shall be used. They could be found in OM Part A, Ch. 8.1.5.4 and are as follows:

Table 1: **Planning Minima for Destination**

Type of approach	Planning minima
Precision	Visibility at or above the specified RVR/visibility for landing minima
Non-precision	Visibility and ceiling at or above the specified RVR/visibility and DH for landing minimum
Circling	Visibility and ceiling at or above the specified for Circling minimum

Table 2: **Planning Minima for En-Route and Destination Alternate**

Type of approach	Planning minima
CAT II	CAT I
CAT I	Non-precision
Non-precision	Non-precision plus 200 ft / 1000 m.
Circling	Circling

▪ **Take-off Alternate** (OMA, 8.1.7.6.4 .)

If take-off is to be executed in weather conditions below the landing minimum at the aerodrome of departure, take-off alternate shall be selected within one hour flight range (330 NM) with one inoperative engine.

▪ **Destination Alternate** (OMA, 8.1.7.6.1.)

The number of alternates required depends on the weather at Destination.

- If weather at Destination is below Planning Minimum for Destination, **two** Destination Alternates are required.
- If weather at Destination is $\geq$ Planning Minimum for Destination, **one** Destination Alternate is required.

When the payload is limited by the amount of fuel required for the flight, planning without Destination alternate (OMA, 8.1.7.6.2) or with En-route Alternate (OMA, 8.1.7.6.3) should be considered further.

4) The aircraft technical status

Aircraft equipment, necessary for intended flight / operations shall be operative before departure. Preliminary assessment is completed using the Information desk in the Briefing room and final during the PFI.

The conditions causing additional operational limitations shall be evaluated from all aspects and reported to MCC/ ground handling agent ASAP.

5) Fuel Required (OMA, 8.1.7)

In respect to above mentioned assessments the Total amount of the fuel for the flight is determined as the sum of MINIMUM fuel required and EXTRA fuel determined by Commander taking into account AirBaltic operational priorities.

Extra fuel, upon Commander's discretion, shall provide safety, punctuality and economical efficiency of the flight, taking into account the a/c weight limitations, estimated payload with certain reserve for possible LMC, weather conditions, traffic situation, time available, etc.

Round trip fuel carriage should be avoided.

ECONOMY tankage, if determined by RODOS, should be adhered to, but shall not be in conflict with the safety and punctuality of the flight.

6) Payload

If for any reason (Performance limited TOW or LW, required fuel, a/c technical status, etc) the payload for the flight could be limited, MCC or ground handling personnel shall be informed as soon as possible.

2.2.1.3 Pre-Flight Briefing

Prior to the first flight of the day the entire crew shall meet in the briefing room. Pre-flight briefing is to be carried out not later than 50 minutes before STD in full proper uniform. The Commander is responsible to lead the briefing. The briefing should be short and shall at least cover the following:

- Crew introductions;
- Weather and flight conditions;
- Flight times;
- Current irregularities and alternative action/s;
- Discussion regarding the question of the day;
- Flight deck service.

Every crewmember should be prepared to answer the questions on the spot. If the answer is incorrect or insufficient the Commander should lead the team in such a way that the correct answer is clarified using crew common experience and good examples. The question of the day is rather team exercise than individual assessment.

NOTE: For efficient communication, use of common language is obligatory.

2.2.1.4 Crew Co-ordination

	LEFT PILOT	RIGHT PILOT
Blocks minus at least 1 hour	Report to MCC/ Crew Dispatch / Commander	
	Check NOTAMS, weather, ATS and Operational FPLs, select alternate(s)	Print out NOTAMS, weather and Operational Flight Plan and take part in the flight planning process
	Check remarks on the a/c technical status board in MCC	
	Check PAX / Load figures	
	Inform MCC/Agent about operational limitations, if any	
	Order the required fuel	
	Carry out the Pre-flight briefing	Proceed to the aircraft
	Pick up the mobile phone and proceed to the aircraft	

NOTE: Commander has to ensure that all preparations and tasks are complete on time using all available means and crew resources.

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2.2.2 PRE-DEPARTURE (35min to ETD – doors are closed)

Pre-departure preparation consists of the following elements:

- Pre-flight Inspection;
- A/c acceptance;
- Pre-departure Preparation; and
- Take-off briefing.

2.2.2.1 Pre-flight Inspection (PFI)

General contents of Pre-flight Inspection Procedure, responsibilities and division of duties are presented in Part A, ch. 8.2.6

Crewmembers shall complete the following:

Right Pilot in accordance with Flight Deck Setup Checklist (ch.2.3.2):

- check emergency equipment in the cockpit;
- perform systems preparation/testing;
- check engine oil gages reading;
- check hydraulics quantity gages reading;
- check oxygen pressure is sufficient.

Cabin Crewmember N1 - emergency equipment check in the passenger cabin in accordance to procedure described in CCH.

NOTE: Crewmembers shall report to Commander all abnormalities discovered during PFI.

Left Pilot shall complete the following:

- 1) Aeroplane External Check (walk – around inspection) in accordance with Aircraft Exterior Checklist.

NOTE: Commander is personally responsible to visually check that the fuel door is closed.

NOTE: See “Cold weather operations” chapter for additional items of PFI if icing conditions exist/expected during take-off and/or De-icing treatment is required.

- 2) Check fuelling receipt and/or complete the Fueling Record;
- 3) Inspect Tech Log for remarks and deferred defects;

2.2.2.2 Aeroplane acceptance

Upon completion of all checks prescribed by PFI procedure the Commander shall evaluate the aeroplane technical status and readiness for the intended flight.

1) No remarks/defects found

Commander shall sign PFI in the Tech Log (box named "PFI" in the Time log).

2) Any remark/defect found

Commander shall immediately contact MCC/handling agent and fill in the Complaint in the Tech Log with the reference to conducted and signed PFI.

a) If the defect is rectified, relevant "Action" slip for this Complaint shall be completed by Certifying Technician and Commander shall conduct (and sign) new PFI.

b) If the defect is deferred and decision to continue the flight in accordance to MEL/CDL or Special Procedure (see Part A 8.6) is taken, relevant "Action" slip for this Complaint shall be completed by Certifying Technician or Commander, but new PFI is not required.

Commander has the final authority to accept an aeroplane with actual technical status for intended flight by signing Pre Flight Inspection completion.

NOTE: The necessary actions required to ensure that aeroplane is fit for the intended flight may not be completed by the moment when PFI is signed (de/anti-icing procedure, departure check etc). Commander is responsible to ensure that aeroplane technical status and readiness for the intended flight remains valid until the take-off is commenced.

2.2.2.3 Pre-departure Preparation

Before each flight the following preparation tasks shall be carried out, covering:

Flight Deck Setup:

- Adjustments of Seats, Harnesses and Rudder Pedals;
- Adjustments of Flight Deck Lights;
- Preparation of required flight documents (IAL charts, maps, etc).

Flight Documentation:

- ATIS latest report (Operational Flight Plan);
- ATC clearance (Operational Flight Plan);
- Weight and balance calculation / Approval of loadsheet;
- Other documentation, if applicable (NOTOC, General Declaration, etc)

Weight and balance calculation.

Normally prepared by ground staff using PALCO system. As alternate procedure, Manual Loadsheets may be prepared by pilots to avoid delays in case of problems with loadsheet preparation by the ground staff.

Before signing PALCO Loadsheets, the Commander shall check and mark the following Loadsheet entries:

- Flight Number;
- Aeroplane registration;
- Composition of the Flight Crew;
- Total number of passengers (compare with C/C#1 report);
- Dry Operating Weight and Index;
- Take-off fuel and Take-off weight;
- Trim settings for take-off;
- Estimated Airborne time (insert, if not already there);
- Destination alternate (insert, if not already there);
- Actual time of PALCO loadsheet receipt (UTC) from ground handling staff.

NOTE: Last Minute Changes (LMC), if required, shall be entered by Commander according to Section 6.2.7 of this manual.

2.2.2.4 Take-off Briefing

The purpose of the Take-off Briefing is to be well prepared for a normal take-off and to have a plan ready if any malfunction occurs during take-off or climb-out.

The PF should give the take-off briefing, normally prior to engine start when there is a minimum of distractions.

The following items and procedures shall be considered:

- RW in use;
- weather for take-off;
- power and flaps setting,
- bleed air configuration;
- rejected take-off procedure;
- continued take-off with engine failure;
- MSA ;
- expected departure route (SID);
- setting of NAVAIDS;
- any technical items INOP.

The extent of take-off briefing depends on weather conditions, aircraft equipment, condition of ground facilities, SID to be flown and crew experience.

If both pilots are well familiar with the airport, take-off briefing could be limited to the following minimum called as “**Standard briefing**”:

- Power and Flap settings;
- Continued take-off with engine failure;
- MSA.

During taxi any deviation from the standard procedures (weather, RW, SID change, take-off from intersections, etc.) should be clearly pointed out by the Commander. If take-off from intersection is to be executed, the Right Pilot shall check the aircraft performance for appropriate RW segment length in the Route Manual, section GWC.

When the observer's seat is occupied the observer shall be briefed on the requirements of maintaining sterile flight-deck environment during take-off and climb-out up to 10000' as well as operation of jump-seat, oxygen supply and cockpit evacuation procedures, according to “Observer Safety Card” located behind LH seat.

2.2.2.5 Crew Co-ordination

Stage	Left Pilot	Right Pilot
Block – 35 min	1 Perform PFI, Make necessary arrangements, if required	1 Perform Flight Deck Setup
	Receive report from C/C#1 about the readiness for the flight	2 Receive latest ATIS information
	3 Accept the aeroplane for the flight by signing PFI*.	3 Request ATC clearance.
	4 Complete Flight Deck set-up.	
	5 Switch on SEAT BELTS sign when passengers boarding initiates.	
	6 Check and approve loadsheet*.	6. When required, prepare manual loadsheet
	7 Confirm PAX figures with C/C#1 and order to close the doors	7. Enter actual ZFW in FMC. Set speeds for the actual TOW
	8 Call for BEFORE START checklist	9 Action BEFORE START checklist

(*) An aeroplane should be accepted for the flight by the **Commander** regardless which seat he is occupying (see Part A Ch 4).

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2.2.3 START- UP (doors are closed – engines started)

Both Left and Right pilots are engaged in engine start execution and monitoring process.

Normally APU bleed air and AC power is used to start up the engines.

In case of APU failure different sources of high air pressure could be used: an external ground cart, or the other operating engine (see ch.12 for GRND Air and Engine Cross bleed starts).

In case of APU generator failure use an external AC power or accomplish Battery Start using APU bleed or Ground air (see ch 12).

2.2.3.1 Start up sequence

Left Pilot Callouts	Right Pilot Actions and Callouts	Abnormalities Observed and Actions Required
Starting Procedure Start engine, number____ timing	Packs OFF, Start pressure checked 1) Position respective ENGINE START switch to GRD, Starting number____ 2) Start clock Check Bleed air pressure and Start Valve Open light illuminate	If start pressure drops significantly during the start in combination with N2 unable to reach 20% - 1. Check the Packs switches or respective circuit breakers; 2. Increase N2 of operating engine during the cross-start
Rotation, ... N1	Check N 2 rotation starting, then N 1.	If no rotation within 10 sec or N2 speed does not reach 20% - ENGINE START switch to OFF
25 % (N2) or Max motoring (see note) LP moves respective Start Lever into IDLE position.		
Fuel flow	Check respective indicator	If no fuel flow and EGT not rising within 10 sec - shut down the engine ¹⁾ .
Temperature	Check Max EGT during start is 725°C.	Shut down the engine if EGT is:
46 %	Ensure ENG START switch moves to OFF, Check Start Valve Open light extinguishes and Starter cut-out	• Not increasing within 10 sec; • Rapidly approaching or exceeding the start limits of 725°C
	Check respective indicator Oil pressure rising when observed during the start	If no indication of oil pressure by the time the engine is stabilized at idle – shutdown the engine.
Stabilized	Within two minutes of starter operation: N1-22%, N2-60%, EGT is 450°C-650°C, fuel flow –350kg/h, oil pressure.	

NOTE: If 25% of N2 is not achievable position start lever to IDLE at max motoring speed and a minimum of 20% N2. Max motoring occurs when N2 acceleration is less than 1% in approximately 5 seconds.

2.2.3.2 Engine shut down (aborted start-up).

ENGINE START LEVER..... CUTOFF

- 1) If the ENGINE START switch is in GRD:

Motor the engine for 60 seconds.

ENG START SWITCH OFF

- 2) If the ENGINE START switch is in OFF:

After N 2 decreases to below 20%:

ENG START SWITCH..... GRD

Motor the engine for 60 seconds.

ENG START SWITCH..... OFF

For next start attempt wait 20 sec after N2 has returned to zero.

For the subsequent engine start attempts make 3 minutes brake.

2.2.3.3 Motoring

Conducted to ventilate and cool down the engine after unsuccessful start attempt. The following to be observed:

- START LEVER shall be in CUTOFF position;
- ENG START SWITCH shall be set to OFF to finish the motoring;
- Duration shall not exceed 60 seconds within 2 minutes of engine starter duty cycle.

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2.2.4 TAXI-OUT (off chocks – holding point)

Left Pilot should taxi the aircraft.

Right Pilot is responsible for looking out and informing on any obstacles/objects, particularly on the right side of the a/c. Before right turn, entering/crossing taxiway or runway Right Pilot observes and calls out:

“Right side free.”

Both pilots are responsible to verify taxi clearance and actual position of aircraft as well as listening out on a working frequency for situation awareness. An airport diagram should be kept in a location ready available to both pilots during taxi.

If in doubt concerning the taxi clearance, aircraft position or ground obstruction clearance, stop the aeroplane and request required assistance from ATS (confirmation, follow me car, wing-walker, towing track etc.)

2.2.4.1 Pushback and Towing

Anti-collision (Beacon) and navigation lights should be ON at all times during pushback and towing.

When Towing, LP should be ready to apply brakes and stop the aircraft, in case of tow-bar failure/disconnect.

Before starting pushback, LP shall ensure that ground crew clearance has been received. LP may have interphone and shall have visual contact with the ground crew during the entire pushback or towing manoeuvre.

Pushback and tow out is normally accomplished with hydraulic system an unpressurized and the nose wheel steering locked out.

Description of pushback procedure with the nose wheel steering controlled by the pilot (e.g. BRU):

- 1) Clarify with the truck driver whether aircraft steering will be required for the pushback;
- 2) Set Left AC hydraulic PUMP - ON;
- 3) Follow the truck driver commands during the pushback operating the nose wheel steering control wheel;
- 4) Set parking brakes when push back is complete
- 5) Start the engines.

2.2.4.2 Power Management

Power above the idle is necessary to start taxi as well as to keep a certain speed during the taxi. . Airplane response to thrust lever movement is slow, allow time for airplane response before increasing thrust further.

Excess thrust while taxiing may cause foreign object damage of lower aft fuselage, stabilizer or elevator as well as cause danger to aircraft(s), staff or facilities/equipment behind the aircraft.

Runups and taxi operations should only be conducted over well maintained paved surfaces and runways.

Asymmetric power also may be used to turn the aeroplane especially on slippery surfaces.

2.2.4.3 Braking

The rudder pedals should be adjusted so that it is possible to apply maximum braking with full rudder deflection.

The taxiing pilot's heels should be kept on the floor, sliding the feet up on the rudder pedals only when required to apply brakes.

Apply brakes smoothly and steady until required taxi speed is achieved. Avoid prolonged brake application as this cause high brake temperature continuous and partial application of brakes during taxi.

NOTE: Excessive and rough brake application will reduce comfort level for passengers but continuous and partial application of brakes will significantly increase brake temperature and reduce brake life.

2.2.4.4 Maneuvering

Taxi speed should be determined by the LP to avoid collision with any obstacle(s)/object(s) and achieve safe stop, if required.

Normal taxi speed is 20Kts, adjusted for conditions. On long straight taxi routes speed up to 30Kts is acceptable, however at speeds greater than 20Kts use rudder pedal steering only.

To ensure safe maneuvering during turns low speed should established to carry the aeroplane through the turn at idle thrust. On dry surface, use approximately 10Kts. Under normal conditions differential braking and braking while turning should be avoided.

For description of turning radii refer to Section 0.5 of this manual.

2.2.4.5 Altimeter Setting and Checking

Prior to each flight all altimeters should be set and checked for accuracy, see OM Part A Ch. 8.3.3:

- The airfield QNH pressure shall be set on all three altimeters;
- Compare the altitude readouts and the aerodrome (aircraft actual position) elevation within the limit of 75 ft
- Crosscheck a difference between main altimeters readouts is not more than 40 ft;
- Set the altimeter bugs against the arrows.

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2.2.5 TAKE-OFF (holding point – clean configuration)

2.2.5.1 General

Take-off shall never be initiated in conditions beyond any operational limitations presented in respective chapters:

- aeroplane technical status/conditions,
- weather and runway conditions,
- aeroplane take-off performance.

2.2.5.2 Flaps setting

The standard flaps setting for take-off could be 5° or 15°

Optimum flaps setting that gives better take-off performance for every particular runway is presented in the GWC. That flaps setting shall be used for take-off.

If another than determined as an optimum flaps setting is desired for operational reasons, appropriate MTOW calculations shall be requested via MCC or prepared using ToDc computer program.

In most cases flaps 5° is used and standard call-outs presented in this chapter refer to that flaps setting.

Flaps 15° could appear as an optimum on relatively short and contaminated runway. In that case flaps to be retracted to 5° first during after take-off acceleration.

Flaps retraction schedule is the following:

TO flaps		At & below 53070kg	Above 53070 kg
Flaps 15°	5 1 UP	V ₂ + 15 Kts 170 Kts/F 190 Kts/F	V ₂ + 15 Kts 180 Kts/F 200 Kts/F
Flaps 5°	1 UP	V ₂ + 15 Kts 190 Kts/F	V ₂ + 15 Kts 200 Kts/F

NOTE: 1. Symbol **F** on EHSI speed tape display presents a Minimum flap retraction speed for next flap setting.

2.2.5.3 Take-off Thrust

a) General

Thrust for take-off is determined by establishing of **N₁ Target** for:

- actual pressure altitude;
- actual temperature (max thrust), or selected higher assumed temperature (reduced thrust);
- actual engine air bleed status.

N₁ Target calculations provided by FMC shall be checked against appropriate N₁ in "Take off N₁" table in QRH (Normal Checklist) before the flight.

Maximum N1 shall be set manually on PED for the reference and backup in case of FMC failure.

b) Reduced Thrust

If not limited by take-off performance (PTOW) use of reduced thrust is recommended and allows significantly minimize engine maintenance costs and maximize engine life.

Possibility and extent of Take-off thrust reduction shall be determined in accordance with Assumed Temperature (Tass) method/procedure presented in ch. 4.2.2.4.

LIMITATIONS: Do not use reduced thrust for take-off if:

- Runway is contaminated or Low Friction (FC<0,4);
- Potential windshear conditions exist;
- Anti-skid is inoperative;
- Low visibility take-off;
- PMC is OFF.

c) Thrust setting methods

Two methods of take-off thrust setting are used:

Static - when brakes are held until the engines are stabilized at 40% N1 then brakes are released and thrust levers are advanced to take-off thrust.

Rolling - when take-off thrust is set and achieved until appropriate speed (60 Kts) during ground roll. This method shall be used to provide sufficient directional control when:

- crosswind exceeds 20 Kts;
- runway is contaminated, and/or
- friction coefficient is below 0,4.

Rolling is normally used in day-to-day operation to reduce the risk of foreign object damage or engine surge/stall due to a tailwind or crosswind as well as for the passenger comfort.

Change in take-off roll due to the rolling take-off procedure is assumed negligible when compared to a standing take-off.

2.2.5.4 Take-off Methods / Speeds

Two methods are distinguished in general with the different speeds used for take-off with the same take-off weight.

Normal - regular speeds (V_1 , V_R , V_2) from the SPEED BOOK / GWCs;

Improved – increased take-off speeds (V_1 , V_R , V_2) from the GWCs

Climb could significantly increase PTOW

The following take-off methods/Engine bleed configurations are recommended with the following priority sequence:

- 1) Normal / Engine Bleeds ON (Bleeds AUTO);
- 2) Normal / Engine Bleeds OFF;
- 3) Improved Climb / Engine Bleeds ON (Bleeds AUTO);
- 4) Improved Climb / Engine Bleeds OFF.

NOTE: For further EGT reduction the Improved Climb in combination with higher Tass could be consider on DRY runways of 3 000m and longer.

Speeds setting

Determine the speeds for the selected Take-off method and runway conditions in accordance with ch. 4.3

Set V_1 , V_R and V_2 in FMC. In addition V_2 speed as command speed should be set on MCP.

Speed tape on EADI is used as primary source for take-off speeds setting /monitoring. As a backup, set 80kts, V_1 , V_R , take-off flap maneuvering speed (V_{2+15}) and flaps up maneuvering speed on the conventional IAS indicator.

2.2.5.5 Maneuvering

Use of nose wheel steering wheel is not recommended above 20 Kts during take-off run. Rudder becomes effective between 40 and 60 Kts.

No turns below 500' AGL if otherwise not stated in the RM.

After completion the turn, and at or above flap retraction altitude, accelerate and retract flaps while climbing.

Max bank angle at V_2 is 15°. For bank angles of 15-30°, a minimum speed of $V_2 + 15$ Kts is required.

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2.2.5.6 Noise Abatement Procedure (NAP)**General**

Necessity of noise abatement procedure is stated in Aerodrome Special Information and Regulations (RM, appropriate ASIR pages).

Boeing 735 with 18,5K and 20K engines is certified in accordance to the ICAO Annex 16, Volume 1, Chapter 3.

Noise Abatement Departure Procedure (NADP)

Normal take-off profile satisfies the noise abatement requirements in the majority of airports we are operating and shall be used irrespective from the NAP procedure (A, B, etc.) required for the particular airport.

AirBaltic could decide to use "3000' NADP" for particular airport for operational reasons, but this shall be clearly stated in AirBaltic NOTAMs.

AirBaltic 3000' NADP is as follows:

Take-off to 1500 ft/GND:

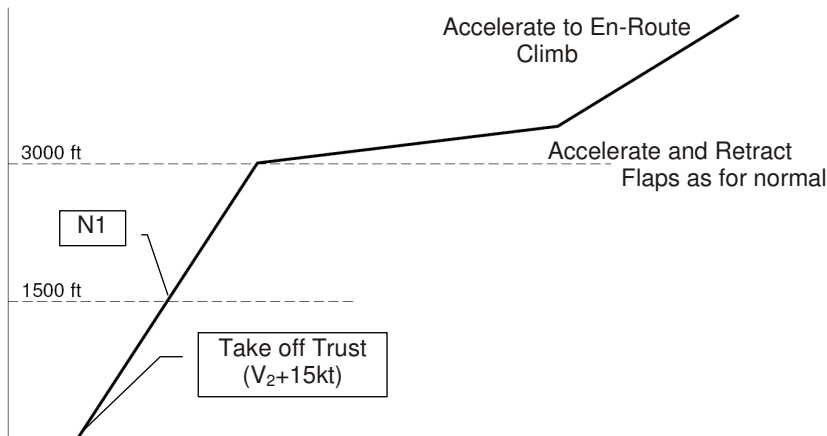
- Take-off Thrust (MAX or REDU);
- Take-off Flaps 5°;
- Climb at V_2+15kt (follow FD).

1) At 1500 ft/GND:

- Reduce power to the Climb Thrust;

2) At 3000 ft/GND:

- Accelerate during climb and retract flaps; as for normal departure;
- Normal transition to en-route climb.



2.2.5.7 Crew Coordination

Line-up

When line-up clearance is received, taxi into take-off position and align the aircraft to the runway centerline. Check compass heading to correspond to runway heading.

Normal Take-off (see Fig.1).

	LP	RP
When cleared for take-off	Advance Thrust Lever to 40%, observe engine instruments stabilized/normal Timing Press TOGA switch to advance the thrust levers to take-off N 1, Set Power, ____% Hold light forward pressure on the control column; maintain directional control with rudder pedals	Take time and check the N1 to reach pre-selected value and EGT within limitations. Verify that A/T THR HLD mode is engaged. Adjust Thrust Levers, if required. Power Set
80 Kts	My /Your/ controls Keep the right hand on the Thrust Levers ready for TO abortion until V ₁	80 Kts * (*) - call actual speed if higher. My controls (if PF)
	PF will take over the controls	
	PF	PM
V ₁	Continue Rotate in about 4 sec to 15° pitch up,	Monitor the engine instruments and speed increase. V₁ Rotate
Airborne	Fly command bar which will result in a speed of V ₂ +20 Insure positive rate Gear up	When a positive rate of climb is established Positive Climb select gear up, checks gear is up Gear Up, no lights

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Init climb	Maintain speed at V_2+20 (+/-5) up to acceleration altitude	Monitor engine instruments and cross-check flight progress
500 ft	HDG Set/Sel and initiate first turn, if required	Adjust heading to keep TO track, then select / verify HDG mode annunciation.
Acceleration Altitude	1500' AGL (if not specified in RM / GWC, but never below 400').	
	Set and /or (*) N1 , Speed 220 Flaps 1** Accelerate in accordance with flaps retraction schedule and at appropriate speed Flaps Up Set and/or (*) Speed,_____ Accelerate to desired climb speed	1500 Select N 1 and speed 220 Kts (*) Ensure climb power is set. Select flaps one and when flaps have been checked to be one Flaps 1** Select flaps up and when flaps have been checked to be up Flaps Up, no lights Set requested speed (*)
Not below 3 000 ft	After Take-off Procedure,... VNAV mode could be used LNAV mode could be selected when conventional SID is completed, aircraft is directed to the point defined as a route waypoint and FMS accuracy is confirmed adequate for further navigation Checklist	Eng Anti-ice/ start switches as req; Bleed/Packs as req; APU-OFF, if not required, Landing gear lever to OFF; AUTO BRAKE to OFF. FMC page - CLIMB on PF side. NAV switches to AUTO when not required for conventional departure. Complete the Checklist

(*) – If Autopilot is not engaged, all settings to be done by PM.

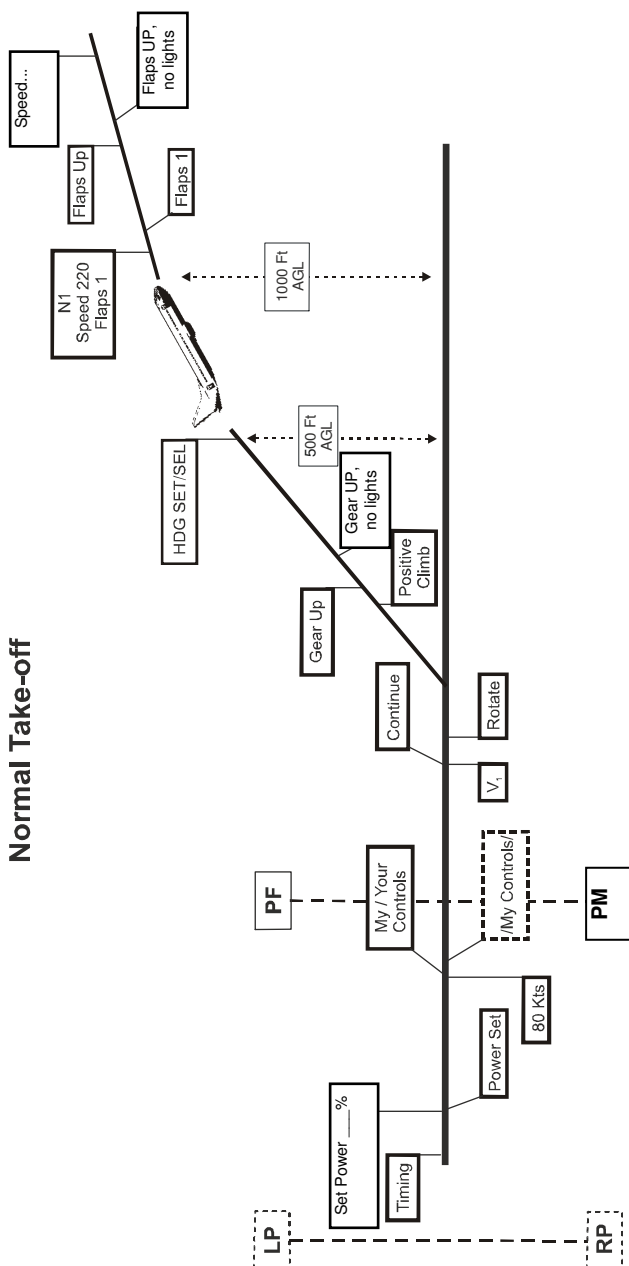
(**) – In case of flaps 15 TO flaps 5 to be set first.

External Lights

Runway Turnoff lights shall be switched ON during take-off at all times.

Landing lights should be used only when required.

Normal Take-off



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2.2.6 CLIMB (clean configuration – FL reaching)

2.2.6.1 Division of Duties

During climb duties of the crewmembers are divided into PF and PM according to the Crew Co-ordination Concept see OM Part A Chapter 8.0.

2.2.6.2 Navigation

a) Lateral - Conventional NAV aids for non-RNAV navigation (VOR, DME, NDB) should be used for navigation in Terminal Area (TMA). Use of LNAV as a primary source for SID execution is not approved.

b) Vertical navigation requirements normally are included in the SID description. Minimum climb gradient (if indicated) shall be maintained. Failure to maintain the gradient shall be reported to controller (ref. Ch. 4). Adherence to published altitude crossing and speeds restrictions is mandatory unless otherwise cleared.

NOTE: Rate of climb should be adjusted in advance, if required, to avoid nuisance TCAS warnings.

The following vertical modes could be used:

- **VNAV** (Vertical NAVigation) is computed by FMC and provide optimum economical results. The FMC applies waypoint-related speed restrictions displayed on the LEGS pages and altitude-related speed restrictions displayed on the CLIMB page.
- **LVL CHG** (Level Change) mode gives you maximum climb gradient with the selected speed and thrust rating.
- **V/S** (Vertical Speed) mode is used when constant rate of climb is desired/required. In this mode pay additional attention to IAS, because with the constant rate of climb the speed will decrease. The minimum vertical speed is 500ft/min. Approaching assigned Altitude/FL (“1 000 to Go”) with V/S (Vertical Speed) mode, the rate of climb should not exceed **1000t/min**.

Approaching assigned Altitude/FL ensure appropriate mode activation to prevent altitude deviation and call: “Altitude capture”.

NOTE: Remember, that the final acceptance of ATC clearance to deviate from published SID lies with the Commander, provided

obstacle clearance criteria, airplane limitations and operational conditions are taken into account.

2.2.6.3 Speeds / Thrust Setting

a) Climb Speeds

Enroute climb speed is automatically computed by FMC and displayed on the CLB and PROGRESS pages. The FMC applies waypoint-related speed restrictions displayed on the LEGS pages and altitude-related speed restrictions displayed on the CLIMB page.

FMC provides climb speed calculations for the following schedules:

- **ECON** – optimum trip economy versus gross weight and cost index.
Approx: **250 Kts** below 10 000' / **280 Kts** to **.74 Mach** above 10 000'
Mode is automatically engaged during VNAV selection.
- **MAX RATE** – high climb rate and minimum time to cruise altitude.
Approx: Flaps up maneuver speed + 50 Kts until .74 Mach
- **MAX ANGLE** – max climb angle speed versus gross weight and provides approx the same gradient as flaps up maneuvering speed.
Is normally used for obstacle clearance or to reach a specified altitude in a minimum distance.

a) Climb Thrust Ratings

Once climb thrust is set, PMCs automatically compensate for changes in environmental conditions during the climb and maintain climb thrust. With PMCs off or inoperative see ch. 12

To safe engines service life use of reduced climb thrust is recommended. The FMC provides two reduced thrust climb modes, which are selected automatically by FMC depending on take-off thrust selected, or could be selected manually on the N1 LIMIT page:

- CLB 1 is approximately a 10% derate of climb thrust
- CLB 2 is approximately a 20% derate of climb thrust

Climb thrust reductions are gradually removed during climb when rate of climb drops below 500 feet per minute and is automatically changed to Maximum Climb Thrust when passing FL 150.

Max climb thrust could be selected manually on N1 LIMIT page at any time during climb if required for operational reasons.

2.2.6.4 Altimeters Setting

Standard pressure (1013.25 HPa) shall be set and cross-checked on both primary pressure altimeters during climb, when cleared to FL but not later than passing Transition Altitude.

The maximum acceptable differences between Primary Altimeters see OM Part A Ch. 8.3.3.

For RVSM Operations Primary Altimeters shall agree within 200 ft.

2.2.6.5 Auto Flight

FD (Flight Director) - shall be used and followed.

A/T (Autothrottle) - shall be used to maintain the selected Climb Thrust rating schedule automatically.

AP (Autopilot) - engagement is highly recommended for the flight in the areas of intensive traffic and for After Take-off Checklist execution.

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2.2.7 CRUISE (FL reaching – FL leaving)

2.2.7.1 Division of Duties

During the cruise, duties of the crewmembers are divided as PF and PM according to the Crew Co-ordination Concept (see OM Part A Chapter 8.0).

2.2.7.2 Navigation

For route flying use FMC LNAV mode and verify the airplane position using other navigation sources such as VOR, DME, NDB along the route. If there is doubt about actual airplane position, do not hesitate to request assistance from ATS.

2.2.7.3 Cruising Altitudes

Maximum

The maximum altitude could be determined from appropriate tables (see ch. 5 for reference) or taken directly from the FMC as the lowest of:

- Maximum certified altitude;
- Thrust limited altitude;
- Maneuver limited altitude.

When at or near the FMC maximum altitude thrust and speed margins are minimal and could cause inadvertent descent during maneuvers or incorrect FMC inputs. VNAV is not available above FMC maximum altitude and fuel predictions may be inaccurate as fuel burn at or above maximum altitude increases.

Flight at this altitude should not be prolonged unnecessarily.

Optimum

Optimum altitude is the cruise altitude for minimum cost when operating in the ECON mode, and for minimum fuel burn when in the LRC speed modes.

ECON mode – is used for normal regular flights. The optimum altitude increases as either aeroplane weight or cost index decreases.

LRC speed mode – is used for max range and diversion to alternate. The optimum altitude increases as either aeroplane weight or speed decreases. The selected cruise altitude should normally be as close to optimum as possible (at least within 2 000' feet).

Step Climb Cruise

As optimum altitude continues to increase as weight decreases during the flight it is recommended to climb initially within 1 000' feet above optimum altitude and then cruising at that flight level until 1 000' feet below optimum with subsequent step of further climb.

The requested/accepted initial cruise altitude above the optimum should be compared to the maximum altitude to ensure thrust and maneuvering margins.

NOTE: The fuel saved at higher altitude does not normally justify a step climb unless the cruise time of the higher altitude is at least 20 minutes.

2.2.7.4 Speeds / Power Setting

Economy speed (ECON) AND Long Range Cruise speed (LRC) are automatically computed by FMC and presented on CRZ and PROGRESS pages. Economy speed is selected by FMC automatically but pilot could also select long range cruise, engine out modes, or overwrite fixed IAS/Mach values on the CRZ page.

ECON speed – is used for normal regular flights. Gives minimum operating cost and is a function of gross weight, cruise altitude, cost index and headwind component.

Headwinds increase the ECON speed, while tailwind decrease it, but not below the zero wind LRC speed.

LRC speed – is used for max range flight and diversion to alternate.

Is a variable speed providing fuel mileage one percent less than the maximum available without wind corrections.

For cruise within 1 000' feet of optimum, LRC is approximately **M.74**.

2.2.7.5 Fuel Management

Actual fuel burn should be compared with the flight plan fuel burn throughout the flight and deviations noted:

- after 1 hour of flight time and thereafter at approx 30 min intervals, and
- during the approach briefing.

The planned fuel burn can increase due to deviation from the expected values of the following parameters (see ch.5 Flight planning):

- Higher Gross Weight or ambient temperatures;
- Lower or higher for more than 1 000' feet from optimum altitudes;
- Higher or lower speeds;
- Wind speed and/or direction;
- Adverse weather conditions, etc.

If the extra fuel burn cannot be explained by one of the items above, a fuel leak should be considered.

2.2.7.6 Auto Flight

A/T - shall be switched ON, if operative

AP (Autopilot) - shall be switched ON, if operative.

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2.2.8 DESCENT (FL leaving – cleared for approach)

2.2.8.1 Division of Duties

During descent duties of the crewmembers are divided as PF and PM according to the Crew Co-ordination Concept (see OM Part A Chapter 8.0). Flight deck workload typically increases as the aeroplane descends into the terminal area. Distractions shall be minimized and non-essential duties completed before descent or postponed until after landing.

2.2.8.2 Approach Briefing

The purpose of the approach briefing is to be well prepared for an approach and landing on the assigned RW. The PF should conduct the briefing in good time before commencing the approach, normally about 5 minutes prior to descent. The following shall be considered:

- Actual weather for destination;
- Weather and Fuel requirements for alternate;
- RW-in-use (IAL Plate);
- Type of approach and Minimum;
- NAV aids frequencies and settings;
- Initial routing and altitude, MSA;
- Missed approach procedure;
- Landing Weight / Speeds;
- Taxi routing to parking;
- Any technical INOP items.

The extent of the approach briefing depends on weather conditions, aircraft equipment and ground facilities available, STAR to be flown and crew experience. Deviation from the SOPs shall be mentioned separately.

If both pilots are well familiar with the airport, approach briefing could be limited to the following minimum called as “**Standard briefing**”:

- RW-in-use and Type of approach;
- Minimum and Missed approach procedure;
- Landing Weight / Speeds;
- MSA;

For any significant changes during approach (weather, RW/ STAR etc.) additional briefing should be conducted.

2.2.8.3 Navigation

a) Lateral

Conventional NAV aids for non-RNAV navigation (VOR, DME, NDB) should be used for navigation in Terminal Area (TMA). Use of FMC as a primary source for STAR execution is not approved till further. When directed to the point, which is associated as RNAV approach point (fly-over or fly-by, such as DL415), Radar Vectors shall be requested instead.

NOTE: Remember, that the final acceptance of ATC clearance to deviate from published STAR lies with the Commander, provided obstacle clearance criteria, airplane limitations and operational conditions are taken into account.

b) Vertical navigation

To determine the Top of Descent consider the following:

- Flight level and airport elevation / initial approach altitude;
- Meteorological conditions during descent (wind, icing, turbulence etc);
- Terminal area procedures and runway in use;
- ATC requirements.

Adherence to published altitude crossing and speeds restrictions is mandatory unless cleared otherwise. The following rules also to be observed:

- 1) Rate of descent should be adjusted well in advance, if required, to avoid nuisance TCAS warnings.
- 2) Descending below 10 000' ft altitude maximum allowed speeds are as follows:
 - Indicated speed - 300 Kts;
 - Rate of descent – 3 000' ft/min.

2.2.8.4 Descent path

Proper descent planning is necessary to arrive at the desired altitude at the proper speed and configuration. The distance required for descent is approximately 3NM / 1 000 feet altitude loss for no wind conditions using ECON speed. Rate of descent is dependent upon thrust, drag, airspeed schedule and gross weight.

Recommended descent profile: 1 000 fpm to approximately FL 300, economy path descent below.

Distance to go and aeroplane altitude shall be continuously compared to ensure that the aeroplane maintains the desired profile.

Vertical modes

The following FMC vertical modes are used for descent. VNAV is used as primary one to provide max efficiency. LVL CHG and V/S are used to satisfy ATC requirements especially on lower altitudes and/or congested areas that require immediate pilots response and constant look out.

VNAV Is a primary mode used for descent. An FMC path descent is the most economical descent method. At least one waypoint-related constraint below cruise altitude on a LEGS page is required to generate a top of descent point (TOD) and a descent guidance path based on idle thrust. The path is based on the descent speed schedule, any entered speed/altitude constraints and wind values entered on the DESCENT FORECAST page.

LVL CHG (Level Change) mode - the rate of descent varies to maintain the speed selected on MCP for the actual thrust (IDLE with A/T engaged). This mode is preferable for considerably big altitude changes in a short time.

V/S (Vertical Speed) mode - the rate of descent (selected on MCP) is constant. Desired indicated airspeed shall be maintained with thrust (automatically if A/T is engaged). This mode is preferable for considerably small altitude changes and/ or when certain vertical speed to be kept or desired. The minimum vertical speed is 500ft/min. Approaching assigned Altitude/FL ("**1 000 to Go**") with V/S (Vertical Speed) mode, the rate of descent should not exceed **1000 ft/min**.

2.2.8.5 Speeds / Thrust Setting

Normally descend with idle thrust and in clean configuration without speedbrakes.

Standard descent speed: maintain economy Mach until 300 Kts then maintain 300 Kts, weather conditions and ATC permitting.

FMC will automatically select ECON speed for descent that could be modified by pilot selecting desired Mach/IAS speeds on the DES page.

The speed schedule is also adjusted to accommodate waypoint speed/altitude constraints displayed on the LEGS pages, and speed/altitude constraints displayed on the DES page.

2.2.8.6 Holding

Plan to arrive at holding fix at or below the maximum holding speed.

Holding speeds in the FMC is optimum for the fuel burn and the speed capability, but in no case are lower than flaps up maneuvering speed.

If the holding speed is not available from the FMC, flaps up maneuvering speed 210 Kts should be used.

NOTE: Above FL 250, use $V_{REF}+100$ Kts to provide adequate margin.

For holding procedures execution see RM (Rules and Regulations Ch.15).

2.2.8.7 Altimeters Setting

QNH (QFE in exceptional cases) should be set on altimeter pressure scales during descent, when cleared to Altitude, but not later than passing Transition Level (TL).

For Altimeters Setting Procedure see OM Part A Ch. 8.3.3.

2.2.8.8 Auto Flight

FD (Flight Director) shall be used and followed.

A/T (Autothrottle) should be used for more precise speed control. It may be disengaged to prevent rapid / abrupt thrust changes.

AP (Autopilot) engagement is highly recommended for the flight in the areas of intensive traffic and during Checklist execution.

NOTE: Reduced level of automation, if operative, shall be used in accordance with principles described in OM, Part A, 8.0.6.9

2.2.9 APPROACH (cleared for approach – DA/DH)

All types of approach are presented in this chapter except Cat2/3 presented in ch. 2.4.4.

2.2.9.1 General

Before commencing an approach to land, the Commander shall satisfy himself that, according to the information available to him, the weather at the aerodrome and the condition of the runway intended to be used should not prevent a safe approach and landing.

All approaches should be flown in strict adherence to Standards specified below if not specified otherwise by local procedure.

If controller requests to keep specific speed/profile due to traffic, remember, that the final acceptance of ATC clearance to deviate from published procedures lies with the Commander, provided obstacle clearance criteria, airplane limitations and operational conditions are taken into account.

a) Approach Ban Rules (Commencement and continuation of approach)

An instrument approach may be commenced regardless of the reported RVR/Visibility*.

If the reported RVR/visibility* is less than the applicable minima, an instrument approach shall not be continued below the altitude when decision to establish final approach configuration/speed shall be made:

- **1 500' Radio Height** for Cat2/3 approach, and
- **1000' to Minimum** for all other instrument approaches.

If the reported RVR/visibility* falls below the applicable minimum after that, when final approach configuration and speed have been established, the approach may be continued **to DA/DH**.

The approach may be continued **below DA/DH** and the landing may be completed provided that the required visual reference is established and maintained.

NOTE: RVR/visibility* - where RVR is not available, RVR values may be derived by converting the reported visibility (OMA, 8.1.5.1)

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c) Stabilized Approach Concept

To decrease flight crew workload and ensure safe transition to visual flight and/or safe landing, aircraft and flight crew readiness should be established and confirmed in advance during approach. Use of 1 000' and 500' Radio Height gates for that purpose is known as Stabilized Approach Concept.

1 000 feet gate is used for Non-precision and Cat 2/3 approaches.

500 feet gate is used for all other approaches.

An approach that is not stabilized or becomes unstabilized **below 500 RA** feet requires an immediate **go-around**.

Criteria

1. The Aircraft is on correct flight path, flown at the desired approach speed in the landing configuration. Only small changes in HDG, Pitch and Thrust/Power are required to maintain these stabilized parameters.

Flight Path	Precision approach	Maximum deviation from localizer and glideslope - one dot
	Non-precision and Visual approach	Along the desired flight path
	Circling	Wings shall be level at/before 300 RH
Configuration	Landing gear	Down and locked
	Flaps	Landing configuration
Speed	Target speed ($V_{ref} + \text{corrections}$) - minus 5 Kts, plus 20 Kts	
Thrust	N1 40% or greater NOTE: short reductions (5 seconds) below this value are acceptable	
Rate of descent	Maximum 1 500 feet/min	

2. The Flight Crew is fully ready for transition to visual flight and/or landing
- all briefings/checklists and other preparations have been completed.

Crew co-ordination

If any of stabilized approach criteria could be marginal or even exceeded due to specific procedure or abnormal conditions (steep approach, late alignment, high speed, etc) it shall be mentioned by PF during approach briefing or pointed out clearly during approach (VR/FSR shall be submitted afterwards upon arrival).

Standard call outs to establish on approach and correct the deviations are mandatory (see OM Part A Ch. 8.0) and shall be used when:

- Deviation are **beyond** the criteria mentioned above;
- There is **no tendency** from PF to correct them.

Call-outs

The call-outs to stabilise an Approach if there is no clear tendency from PF to correct excessive deviation, are as follows:

Deviations	PM Callout	PF Callout
Above/Below Glide Slope more than one dot	“Above/Below Glide Slope”	“Correcting Glide Slope”
Left/right of intended track more than one dote	“Left/Right of track”	“Correcting Track”
Target speed: +20 /-5 Kts	“Speed High/Low”	“Correcting Speed”
Sink rate greater than 1500 ft/min.	“Vertical speed High”	“Correcting Vertical Speed”

d) Transition to visual landing

Transition from instrument approach to visual landing shall be started not later than at 100' to Minimum and shall be accomplished not latter then at Minimum (DA/H).

The approach may be continued **below DA/DH** and the landing may be completed provided that the required visual reference is established and maintained. At least one of the following visual references for the intended runway shall be distinctly visible and identifiable to the pilot:

- Elements of the approach light system;
- The threshold;
- The threshold markings;
- The threshold lights;
- The threshold identification lights;
- The visual glide slope indicator;
- The touchdown zone or touchdown zone markings;
- The touchdown zone lights; or
- Runway edge lights.

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e) Flap Manoeuvring Speed

The flap manoeuvring speeds are based on a fixed speed for each flap setting and provides additional manoeuvre margin to stick shaker at all weights and up to 40° bank for turbulent flight conditions.

Flap position	At or below 53 070 Kg	Above 53 070 Kg
Flaps UP	210 Kts	220 Kts
Flaps 1	190	200
Flaps 5	180	190
Flaps 10	170	180
Flaps 15	150	160
Flaps 25	140	150
Flaps 30/40	VREF 30/40	

NOTE: When require for operational reason, further speed reduction by 10 Kts could be considered by Commander providing the speed is not lower than MIN manoeuvring speed on EADI (top of hollow yellow bar):

Flap retraction: higher speed shall be selected first and flap selected to the next position while accelerating through the recommended speed for the current flap setting.

Flap extension: flap shall be selected to the next position first and speed selected to the appropriate lower value when the movement of the flap has been confirmed.

f) Use of Altimeters

Non-precision + CAT 1 ILS - MINIMUMS are based on QNH and read on the Pressure altimeter while the Radio altimeter will be set on/below Zero feet to avoid all unnecessary warnings.

NOTE: Pressure altimeters shall be corrected for extreme low ambient temperatures (see OMA, 8.3.3)

CAT 2/3 - MINIMUMS are based on Radio altimeter and the Decision Height to be set on it (see Ch 2.4.4).

g) Use of call-outs

Standard call-outs for approach are mandatory and given in respective chapter below for every particular type of approach.

If visual contact has been established by PF earlier during approach and confirmed with call-out “**Contact**”, transition call-outs should be omitted.

h) Noise Abatement Approach (NAA)

Noise Abatement approach, as nowadays requirements, should always be considered against the standard approaches presented in this chapter below. However it is not recommended for the Non-precision instrument approaches and/or when Monitored approach procedure is used in marginal weather conditions and particular concentration on exact standard way of approach execution is required.

For Noise Abatement Approach the only difference with the particular standard approach execution is intermediate approach stage that is flown in the following configuration:

- Speed 170 Kts;
- Flaps 10⁰
- Gear UP

At 1 500' to Minimum;

- Gear DOWN;
- Speed 160 Kts;
- Flaps 15⁰

Complete Landing Checklist and further follow the particular standard approach procedure.

NOTE: Noise Abatement Approach is considered as standard, so the call out “Non standard” is not required, however the use of NAA shall be emphasized by PF.

2.2.9.2 Non-Precision Approach

A standard instrument approach in which no electronic glide slope is provided e.g. LLZ, VOR, ASR or NDB.

Limitations:

- LNAV mode shall not be used for an approach.
- The autopilot may remain engaged down to 300' AGL.

General

For all types of non-precision approaches **Constant Angle Non-Precision Approach (CANPA)** procedure shall be used.

As no electronic glide slope is available – desired Glide Path shall be established for every particular approach by means of a number of crossing altitude check points that normally are given in appropriate tables on IAL chart plates.

To avoid MDA penetration due to altitude loss during go-around Minimum (normally equal to MDA/OCA) is raised by 30' feet.

Execution - Maximum use of automation is recommended.

Desired Glide Path shall be followed permanently by establishing required vertical speed appropriate to Glide Path angle and aircraft ground speed (vertical speed versus ground speed table is also given on IAL chart plates).

Altitude checks shall be made passing crossing altitude check points and vertical speed has to be adjusted respectively.

NOTE: All crossing altitudes and minima shall be corrected for extreme low ambient temperatures to maintain the desired Glide Path and not violate the Minimum.

Transition from instrument approach to visual landing shall be made in the same manner as for precision approach – during constant descent down to the Minimum (DA).

NOTE: The MAPt (specified DME distance or timing from FAF) should be observed however probability to reach the MAPt before the DA using CANPA method is neglectable.

If required visual contact has not been established upon reaching the Minimum (DA), go-around shall be initiated immediately.

As soon as visual contact is established, prompt actions to be taken to correct Glide Path using all available means (PAPI, VASIS etc).

1) DME Available

ALT versus DME table will be depicted in IAL chart.

Briefing

As this type of approach is used very rarely in day-to-day operations, more detailed briefing should be completed covering procedure execution and crew co-ordination.

All available means shall be used to ensure that TRUE Glide Path is maintained and Minimum is not violated:

- All crossing altitudes and minima shall be corrected for extreme low ambient temperatures;
- Approach shall be stabilized not later than passing 1000'RA.
- At 1000'RA pressure altimeters shall be checked for reliability: indication should be 1000' + threshold elevation.

Initial Approach

Should be flown according to IAL chart using all available facilities with particular caution not to violate any Minimum Safe Altitude.

All radio aids used for approach should be identified and set to utilize PFD, ND and DBI in a more efficient manner.

The required QDM as a course on MSP should be set before the final turn.

Plan to establish on final not closer than about 3NM before the desired Glide Path.

Establish speed 180 Kts and flaps 5° configuration.

Descent

Descent on Glide Path using crossing altitude checkpoints shall not be initiated unless not established on final (within +/- 5° on the NDB or ½ scale deflection on VOR/LOC).

Once establish in constant descent, deviations from desired Glide Path passing crossing altitude checkpoints should be noted by PM as:

"...hundred (feet) above/below". PF shall correct vertical speed respectively to return to desired Glide Path.

Transition

Transition from instrument approach to visual landing shall be started not later than at 100' to Minimum and shall be accomplished not later than at Minimum (DA).

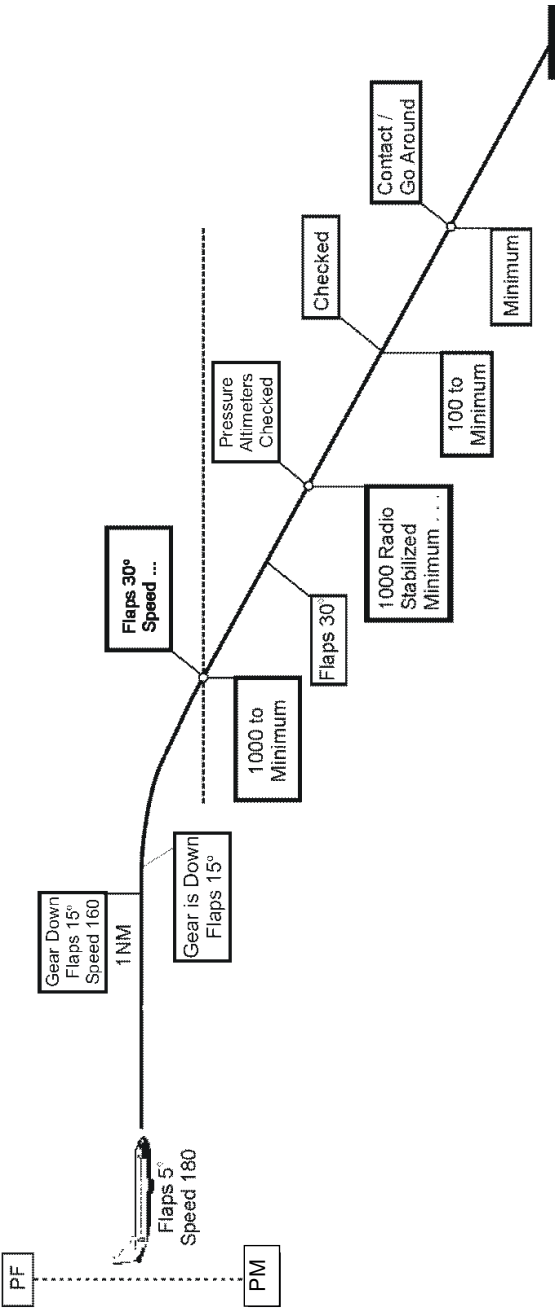
Required visual reference to continue below Minimum (DA) is given in 2.2.9.1 c) above.

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Crew Co-Ordination

Phase	PF	PM
Approaching GP Path 1 NM	Gear down, Flaps 15, Speed 160 Select speed 160 Kts Set APA for higher altitude than actually flown and start descending with the appropriate vertical speed	Select Landing Gear down and when they are checked down: Gear is down Select flaps 15 and when they reached selected position Flaps 15
On GP	Correct the VS to pass advisory distance/altitude points at the published altitudes. Checklist	Help PF to maintain flight profile by using standard call-outs Read Landing checklist
1 000 to Min	Flaps 30, Speed ..., Select final speed Adjust vertical speed to stay on Glide Path with reduced ground speed	1 000' to Minimum Select flaps and when they reached selected position Flaps 30 Complete Landing checklist
1000' RA	Check pressure altimeters (1 000' + threshold elevation) Pressure altimeters Checked	1 000' Radio, Stabilized, Minimum.....
100' to Min	Confirm validity of the PM's call, Checked start to divide the attention between flight monitoring and look out for visual references.	100' to Minimum Brief immediately PF about the deviations or malfunctions
Minimum	if required visual contact for landing has been established and maintained: Contact Perform Go-around if visual contact for landing is not established or aircraft position and/or movement relative to runway cannot guarantee safe landing.	Minimum Perform Go-around if there is no response from PF on your challenge Continue to monitor instruments and PF performance
Visual Glide Slope guidance (e.g. PAPI) to be observed and prompt actions to be taken to correct the GP.		

Non Precision Approach (DME Available)



2) DME Not Available

FAF shall be well defined for which an ALT versus TIME table will be given in IAL chart.

CAUTION: This type approach is considered very complicated and, whenever possible should be avoided.

Briefing

As this type of approach is used very rarely in day-to-day operations, more detailed and comprehensive briefing should be completed covering procedure execution and crew co-ordination.

All available means shall be used to ensure that TRUE Glide Path is maintained and Minimum is not violated:

- All crossing altitudes and minima shall be corrected for extreme low ambient temperatures;
- Approach shall be stabilized not later than passing 1000'RA.
- At 1000'RA pressure altimeters shall be checked for reliability: indication should be 1000' + threshold elevation.

Initial Approach

Should be flown according to IAL chart using all available facilities with particular caution not to violate any Minimum Safe Altitude.

All radio aids used for approach should be identified and set to utilize PFD, ND and DBI in a more efficient manner.

The required QDM as a course on MSP should be set before the final turn. Racetrack procedure to establish on final should be executed on a speed of 180 Kts outbound timing for Category C aircraft should be used.

Initial descent (step down)

Descent to FAF (Outer marker) crossing altitude shall be initiated when established on final (within $\pm 5^\circ$ on the NDB or $\frac{1}{2}$ scale deflection on VOR/LOC).

After leveling off at FAF (Outer marker) crossing altitude final speed and aircraft configuration to be established and Landing checklist has to be completed.

NOTE: Set APA for GA altitude, if not below, once the FAF (Outer marker) crossing altitude is captured.

Final descent (constant rate of descent)

Passing FAF (Outer marker):

- Start timing;
- Establish constant rate of descent profile by adjusting vertical speed according to the ground speed.

Once establish in constant descent, deviations from desired Glide Path passing crossing altitude checkpoints should be noted by PM as:

“ **...hundred** (feet) **above/below**”. PF shall correct vertical speed respectively to return to desired Glide Path.

Transition

Transition from instrument approach to visual landing shall be started not later than at 100' to Minimum and shall be accomplished not latter then at Minimum (DA).

Required visual reference to continue below Minimum (DA) is given in 2.2.9.1 c) above.

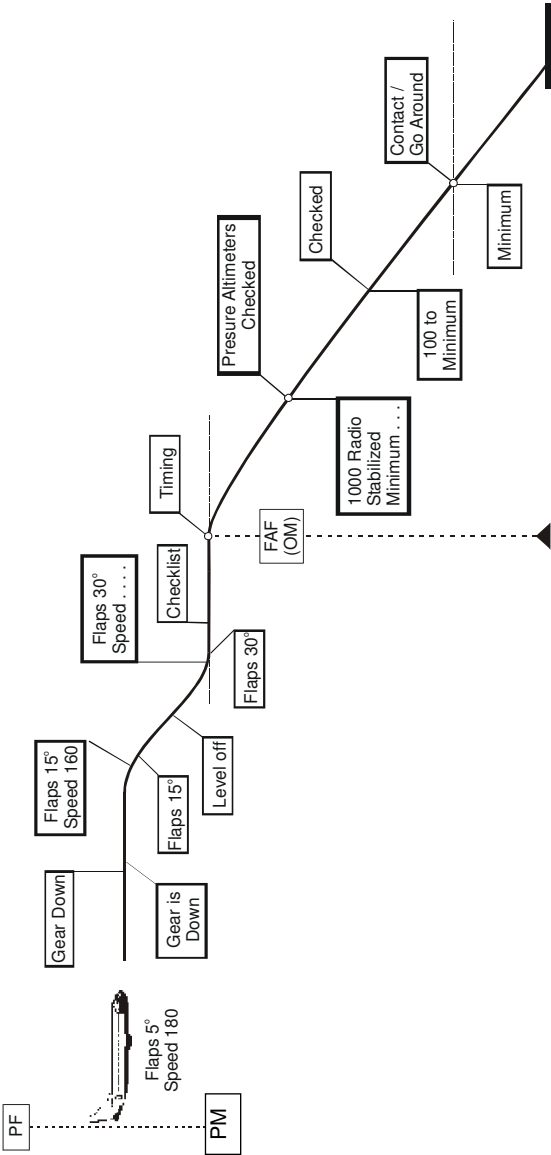
Crew Co-Ordination

	PF	PM
Established on Final	Gear down, Flaps 15, Speed 160 Select speed 160 Kts Set APA for FAF (Outer marker) crossing altitude, select VS mode and start descending with the appropriate vertical speed	Select Landing Gear down and when they are checked down: Gear is down Select flaps 15 and when they reached selected position Flaps 15 Initiate Landing checklist
FAF (Outer marker) crossing altitude	Level-off, Set APA for GA altitude, if not below your altitude Flaps 30, Speed ... Select final speed, Maintain/correct heading to stay on inbound radial (QDM) Checklist	Level -off Select flaps 30 and when they reached selected position Flaps 30 Complete Landing checklist

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FAF (OM)	Timing Set vertical speed appropriate to ground speed to follow the Glide Path	FAF (OM) Start timing
on Glide Path	Adjust vertical speed to stay on GLIDE Path with reduced ground speed	Passing crossing altitude checkpoints call deviations from desired GP ... hundred above/below
1000' RA	Check pressure altimeters (1 000' + threshold elevation) Pressure altimeters Checked	1 000' Radio, Stabilized, Minimum.....
100' to Minimum	Confirm validity of the PM's call, Checked start to divide the attention between flight monitoring and look out for visual references. When sufficient guidance for landing obtained, "Contact".	100' to Minimum Brief immediately PF about the excessive deviations or malfunctions
Minimum	if required visual contact for landing has been established and maintained: Contact Perform Go-around if visual contact for landing is not established or aircraft position and/or movement relative to runway cannot guarantee safe landing.	Minimum Perform Go-around if there is no response from PF on your challenge and required visual contact for landing has been established Continue to monitor instruments and PF performance
Visual Glide Slope guidance (e.g. PAPI) to be observed and prompt actions to be taken to correct GP.		

Non Precision Approach (DME not Available)



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2.2.9.3 Precision Approach – Cat 1 operations

A standard instrument approach in which the electronic glide slope is provided by ILS or other means with a decision height not lower than 200' and with RVR not less than 550 m.

Limitations:

- LNAV mode shall not be used for an approach.
- For manual landing the AP may remain engaged down to 50' AGL.

Initial Approach

Should be flown according to IAL chart using all available facilities with particular caution not to violate any Minimum Safe Altitude.

Before establish on Localizer (as a good rule at 5NM lateral and/or 20 NM longitudinal) set/identify ILS frequency and the final approach course on the MCP. Arm VOR/LOC mode when angle between present and inbound course is less than 90°.

On Final

The approach shall be planned to establish on localizer before intercepting the Glide Slope.

Establish speed 180 Kts and flaps 5⁰ configuration.

Transition

Transition from instrument approach to visual landing shall be started not later than at 100' to Minimum and shall be accomplished not latter then at Minimum (DA).

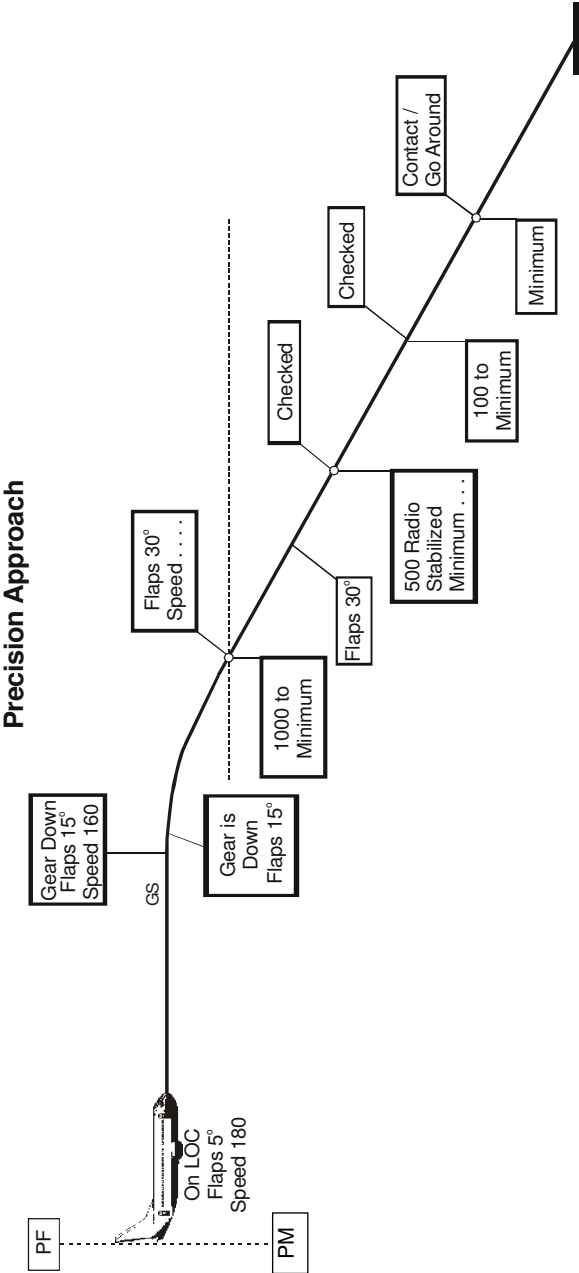
Required visual reference to continue below Minimum (DA) is given in 2.2.9.1 c) above.

Call-outs to establish on LOC/GS:

Phase of Flight	Either Pilot Callout	
Localizer indicator starts moving	“ Localizer coming ”	“ Checked ”
FD and/ or AP captured the LOC	“ Localizer captured ”	“ Checked ”
Glide slope pointer starts moving	“ Glide slope coming ”	“ Checked ”
FD and/or AP captured the GS	“ Glide slope captured ”	“ Checked ”

Crew Co-ordination

	PF	PM
Approaching GS	Gear down, Flaps 15, Speed 160 Select speed 160 Kts	Select Landing Gear down and when they are checked down: Gear is down Select flaps 15 and when they reached selected position Flaps 15
On GS	Checklist	Initiate Landing checklist
1 000 to Min	Flaps 30, Speed ..., Select final speed	1 000' to Minimum Select flaps 30 and when they reach selected position Flaps 30 Complete Landing checklist
500' RA	Checked	500' Radio, Stabilized, Minimum.....
100' to Minimum	Confirm validity of the PM's call, Checked start to divide attention between flight monitoring and look out for visual references.	100' to Minimum Brief immediately PF about the excessive deviations or malfunctions
Minimum	If required visual contact for landing has been established and maintained: Contact Perform Go-around if visual contact for landing is not established or aircraft position and/or movement relative to runway cannot guarantee safe landing.	Minimum Perform Go-around if there is no response from PF on your challenge without required visual contact for landing Continue to monitor instruments and PF performance



2.2.9.4 Monitored Approach

Special procedure, applicable to both Precision and Non-Precision approaches, that is intended to enhance the transition from instrument approach to visual landing in marginal weather conditions by proper re-distribution of the duties between both pilots.

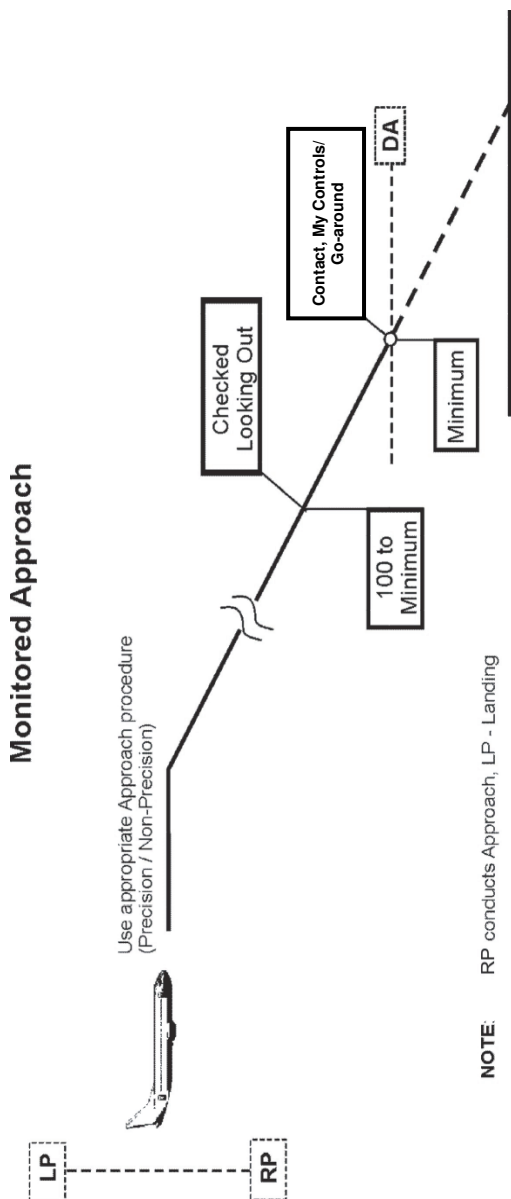
Monitored approach procedure **shall be used** when actual weather (vertical visibility and RVR/visibility) is equal or less than 300'/1000m.

Monitored approach procedure **is recommended** for use when you expect not to be visual at 100' to Minimum altitude.

Crew co-ordination

There are no differences from the any type of normal instrument approach down to the "100' to Minimum" gate.

	LP	RP
General	Will execute transition to visual flight and landing – PF from the Minimum	Will execute the instrument part of the approach – PF down to Minimum
100' to Minimum	Confirm validity of the PM's call Checked, looking out Start look out for visual references. When sufficient guidance for landing has been obtained but not later than at Minimum (DA): Contact, My controls,	100' to Minimum Brief immediately LP about deviations or malfunctions and perform Go-around if there is no response from LP.
Minimum	Go-around if visual contact for landing is not established or aircraft position and/or movement relative to runway can not guarantee safe landing, OR Contact, My controls if required visual contact for landing has been established and maintained. Take controls and perform landing.	Minimum Perform Go-around upon LP request or if there is no response from LP on your challenge Remove your hands from controls only after clear "My controls" from LP. Continue to monitor instruments and brief PF using standard call-outs, if deviation become excessive



2.2.9.5 Visual Approach

IFR flight when either part or all of instrument approach procedure is not completed and the approach is executed in visual reference to terrain.

Limitations:

- LNAV mode shall not be used for an approach.
- Reported RVR/visibility shall not be below 800 m;
- Own separation procedure is prohibited at night.

a) Visual approach clearance and separation:

- Clearance for visual approach could be given when the pilot reports at any time during instrument approach that the meteorological conditions are such that allows visual reference without interruption to complete entire visual approach and landing. Visual contact with the runway could be requested by ATS controller in addition.
- The controller provides separation during approach unless pilot reported the preceding traffic inside and is cleared to maintain own separation.

b) Main rules that shall be followed:

- The entire instrument approach procedure shall be executed unless the clearance for a visual approach is received;
- Descending below MSA aeroplane shall not be flown below 3 degrees prolonged glide path;
- Approach shall be stabilized not later than at 500'RA.

c) Main rules that should be followed:

- Instrument approach facilities (such as an ILS, VOR, DME, NDB etc) as back up for the visual approach should be used, if available;
- It is recommended to switch off the FD/AP/AT and complete the visual approach manually;
- Plan to intercept inbound course not closer than 5NM from threshold (1 500'RA) to be stabilized at 500'RA.

d) Vertical profile (recommended)

- Descent in clean configuration to level of at the MSA in a distance of at least 2NM before the final descent point and speed not above 220Kts;

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- Establish flaps 5/speed 180 Kts configuration before the final descent on desired glide path is initiated (Use speedbrakes and/or early landing gear extension, if required);
- Select Landing gear down not later than 1 500'AGL;
- Select final flaps for landing not later than 1 000'AGL.

Crew co-ordination

Within the limitations/recommendations above the pilots are free to choose the way in which the particular visual approach will be completed.

Concerning the methods and profile to execute particular visual approach:

- It is PF obligation to brief PM about it;
- It is responsibility of the Commander to accept it;
- It is responsibility of PM to assist PF in execution of it.

2.2.9.6 Circling

A special procedure to brake through the clouds using instrument approach facilities for one runway accomplished with the visual phase to bring the aircraft into position for landing on a runway which is not suitably located for strait-in instrument approach.

Limitations:

- LNAV mode shall not be used for an approach.

Briefing

As this type of approach is used very rarely in day-to-day operations, more detailed and comprehensive briefing should be completed covering procedure execution and crew co-ordination. The following shall be taken into account:

- Maximum use of automation is recommended down to the Final turn.
- Both reported Visibility and cloud Ceiling are the criteria for approach initiation and continuation (Approach Ban Rules);
- With a choice of circling directions, in crosswind conditions, circle on the downwind side to reduce radius and ground speed in the Final turn;
- Appointment of the PF for the approach depends on the circling direction, to have the runway in sight during the visual maneuvering circling at all times.
- MDA (H) shall be corrected for extreme low ambient temperatures;

- Approach shall be stabilized at 500' AGL, however with the low MDA (H) for circling (below 1 000' height) the final turn could be completed at an altitude below 500' but the wing shall be level at/not below 300'.

Instrument part of the approach

Should be completed according to appropriate instrument approach procedure with the following exceptions.

1. Precision approach - VS modes should be used instead of APP mode to level off at MDA (H) via ALT HOLD without AP disconnect.
2. Intermediate approach standard Speed/Flaps setting should be used until Base turn:

Two engines - Speed 160 Kts and flaps 15⁰

One engine - Speed 170 Kts and flaps 10⁰

3. At 100' to Minimum the vertical speed should be decreased to level off smoothly at MDA (H) using ALT HOLD mode.

Transition

Visual contact with the runway required for visual circling and landing shall be established not later than reaching the MDA (H).

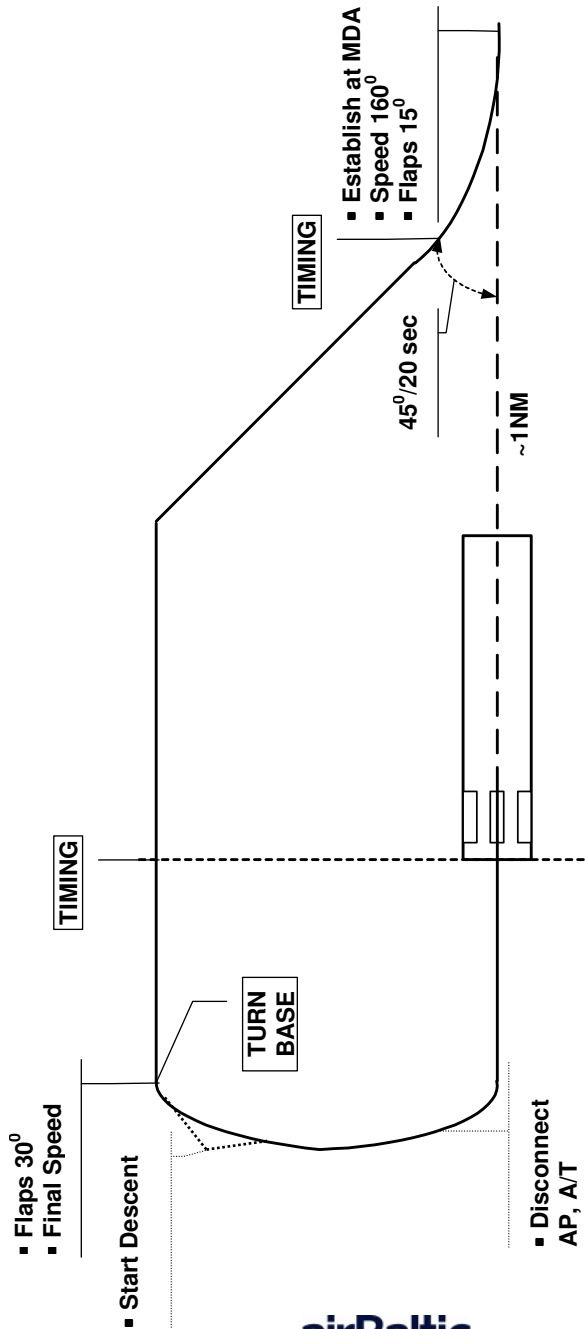
Visual pattern

Visual pattern should be flown in accordance with the diagram below to provide required lateral and longitudinal distances from the threshold to establish aircraft on final in accordance with Stabilise approach concept.

All the maneuvers shall be complete on the circling side within the radius of 4.2 NM from the threshold of intended landing.

Go-around

If the visual contact is lost during visual maneuvering, turn towards the runway to execute the Go-around overhead the runway to accomplish Missed Approach procedure intended for the initial (instrument) part of the approach.



NOTE: For one engine out Speed 170, Flaps 10 with Gear UP till Base Turn.

Crew co-ordination

	PF	PM
1000' to Minimum	Maintain established intermediate approach configuration Two engines - Speed 160 Kts and flaps 15 One engine - Speed 170 Kts and flaps 10	
100' to Min	Reduce vertical speed to level off smoothly at MDA (H)	
At MDA	If required visual contact with the runway is established and maintained: Contact Level of at the MDA use ALT HOLD mode, Set APA for GA altitude.	Minimum
1 NM	Turn by 45° , then start timing and proceed 20 sec to provide the required lateral separation, then fly parallel to the runway of intended landing	
Abeam the threshold	Timing	Start the clocks, and in XX sec* call: Turn Base
Base turn	Flaps 30*, Speed Turn base, Select final speed and, when appropriate, start descent with descent profile about 3° in VS mode	Select flaps 30 and when they reach selected position Flaps 30 Complete Landing checklist
Final turn	Disconnect A/P and F/D and complete final turn to be stabilized not below 500' Radio altitude.	Recycle FD and select HDG for go-around

* Flaps 15 for one engine out

** Timing from abeam the threshold = 3 Times Radio height (hundred feet) minus half tailwind component.

Example: MDH = 800', Tail wind 16 Kts,

Timing = $8 \times 3 - 16/2 = 16 \text{ sec.}$

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2.2.10 Go-Around

2.2.10.1 General

Go-around is the only way to discontinue unsuccessful approach.

Go-around **shall be initiated** whenever pilot is not ensured that continuation of approach and landing is safe. The following shall be considered:

- Approach ban rules, if weather below Minimum;
- A/C is not stabilized at 500' Radio Height;
- Visual contact is not established at DA/DH;
- Visual contact is lost below DA/DH;
- A/C position/movement relative to runway can not guarantee safe landing;
- There are obstacles in the air or on the runway.

Go-around **could be initiated** by any pilot and at any moment during approach and landing.

Go-around initiation after touchdown should be used as absolutely "last escape" option and shall not be considered if the reversers have already been applied (see 2.2.10.3 below).

Maneuvering

No turns below 500' AGL if not otherwise stated in the RM.

Max bank angle at V2 is 15°. For bank angles of 15-30°, increase the speed to V2 + 15 Kts.

2.2.10.2 Crew Co-ordination

Once initiated Go-around **shall be completed** by the PF.

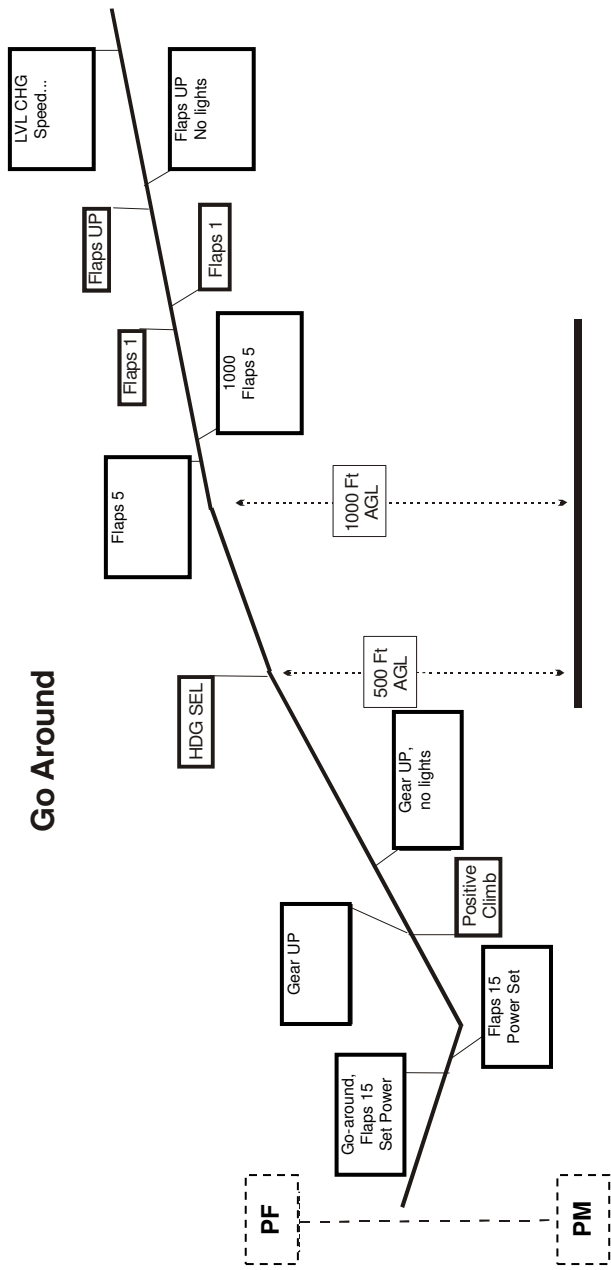
Change of controls should not be made until the aircraft is in clean configuration, unless required for the safety reason.

Phs	PF	PM
General	Both pilots are responsible for it and can initiate the Go-around by proper challenge: Go - around	
	Complete Go-around according to Missed Approach Procedure and profile	Assist PF to complete Go-around making requested selections and using proper call-outs
Initial	Immediately advance the throttle, press TOGA button Go-around, Flaps 15* Set Power Check on EADI that appropriate modes are engaged	Verify that engines accelerate, check that speed is above Vref + 5 and select flaps to 15 When flaps are set and confirmed Flaps 15*, Power set
Positive Climb	Fly command bar Let to PM complete and report GA thrust and flaps setting insure positive rate Gear up Adjust pitch attitude to climb at a speed above appropriate V REF + 5 Kts.	When a positive rate of climb is established Positive climb Select gear up. Check the N1 to reach pre-selected value and EGT within limitations (adjust Thrust Levers, if required). Check gear is up Gear up, no lights
500 ft	HDG Set/Sel and initiate first turn, if required	Adjust heading to keep GA track, then select/verify HDG mode annunciation.

* Select **Flaps 1** if a present flap setting is 15.

Acceleration Altitude	1000' AGL (if not specified in RM, but never below 400').	
	Flaps 5 Note: FD command speed automatically increases to maneuvering speed for the existing flap position. Accelerate in accordance with flaps retraction schedule and at appropriate speed Flaps 1 Flaps Up When IAS approaches flap up maneuvering speed: LVL CHG Speed ... Note: automatic reduction to climb power occurs when LVL CHG mode is engaged. Accelerate to desired climb speed	1000 Select flaps five and when flaps have been checked to be five Flaps 5 Select flaps one and when flaps have been checked to be 1 Flaps 1 Select flaps up and when flaps have been checked to be up Flaps up, no lights Set LVL CHG. Check N1, MCP SPD on EADI. Ensure climb thrust is set. Set requested speed (*) Up on request/confirmation select engine air bleed as required.
Climb	Follow Missed Approach Procedure, Inform passengers when convenient After Take-off Procedure Checklist	Eng Anti-ice and start switches as required; Bleed/Packs as required; Landing gear lever to OFF; NAV switches - as required. Complete the Checklist
	Engagement of Autopilot for Checklist reading is highly recommended.	

or (*) – If Autopilot is not engaged, all settings to be done by PM.



2.2.10.3 Rejected landing

Rejected landing is a go-around initiation below the minimum (DA/DH) when the required visual contact is lost or aircraft can not be landed and stopped within the landing distance available for the safety reason.

Note that aircraft in this case could be in position beyond the missed approach point (MAPt) and though below the trajectory for obstacles clearance calculated acc to PANS-OPS for published missed approach procedure.

This could be critical with one engine approach and additional precautions shall be considered during approach preparation such as informing ATC (declaring priority/emergency), concentration on approach accuracy, considering execution of One engine Climb out procedure instead of published missed approach.

Before touchdown

If a go-around is initiated before touchdown and touchdown occurs, continue with normal Go-around procedures. The F/D Go-around mode will continue to provide guidance commands throughout the maneuver.

After touchdown

This maneuver should be used as absolutely "last escape" option which shall never be executed if the reversers have already been applied.

WARNING: Five seconds are required for a reverser to transition to forward thrust position as well as a possibility exist that a reverser may not stow in the forward thrust position

If a Go-around is initiated after touchdown (but never after the thrust reverser selection) the auto speed brakes retract and autobrakes disarm as thrust levers are advanced. The F/D Go-around mode will not be available until Go-around is selected after becoming airborne.

Crew Co-ordination

Procedure after lift off and call-outs for rejected landing are identical to Go-around procedure but for the Go-around initiation the following shall be observed:

PhS	PF	PM
Initial	Immediately advance the throttle to approx vertical position Go-around, Flaps 15 Once engines has stabilized, press the TOGA button Set Power Maintained direction and hold light forward pressure on the control column to allow re trim the aircraft and avoid early lift off (*).	FLAPS - to 15, SPEEDBRAKES - DOWN detent, TRIM – forward until in GREEN band (*) Adjust N1, check EGT within limits Flaps 15, Power set
Vref	Rotate in about 4 sec to 15° pitch up	When Vref is reached Rotate
Air	Further as for Go-around	

(*) Trim will not respond to inputs if opposite pressure is applied on control column.

Note that Vref speed could be reached in a short time period but configuration warning will persist until the flaps, speedbrakes and elevator trim are not in position for take-off (15deg, down detent, green band).

As far as the flaps have been selected to 15 ° and Speedbrakes to DOWN detent the configuration warning could be disregarded as the trim setting and Vref speed are counted as appropriate for lift off (aircraft being trimmed for landing so additional pitch up forces are expected on rotation and lift off) and configuration warning will stop as soon as aircraft is airborne.

2.2.11 LANDING (DA/DH) – runway vacating)

2.2.11.1 General

In this chapter only DRY and WET runway conditions and manual landing in steady wind conditions are considered. For landing in the other runway and weather conditions see the following:

- Contaminated/Low friction runway ch. 2.5.2;
- Specific in extreme wind conditions ch. 2.5.6;
- Automatic landing ch.2.4.4.5

The following considerations concerning landing on particular runway shall be applied during approach preparation:

- 1) Aeroplane landing performance (see ch. 4. Performance)
- 2) Method and technique to be used (see Landing execution below)

2.2.11.2 Landing performance

Landing performance in particular weather and runway conditions could be limited by Max Landing Weight (MLW), Landing Distance Required (LDR) and/or aircraft system malfunctions according to QRH.

To ensure landing performance limitations are not exceeded, Chapter 4 “Performance” shall be consulted.

Limitations

Landing performance could be limited with the weather and runway conditions and/or aircraft system malfunctions according to QRH.

To ensure directional control during ground roll, Crosswind limitations shall be applied: *Refer to OMB B737 1.3.1.*

2.2.11.3 Landing Execution

The aeroplane may be landed automatically or manually, with or without A/T engaged. For manual landing A/P shall be disengaged not below:

- 300' RA for non-precision approach;
- 50' RA for precision approach.

Flight crew shall plan landings with the correct speed (see below) and touchdown on the touchdown aiming point markings that are located at a distance from the threshold of:

- 300 m with the LDA less than 2200m;
- 400 m with the LDA 2200m and more.

NOTE: When "Long landing" is approved by ATS controller and accepted by Commander for operational reasons the touchdown in any case shall be completed within the touchdown zone (900m from runway threshold).

a) Speeds

The max command (target) speed should not exceed the lower of $V_{REF} + 20$ Kts or maximum landing flap placard speed minus 5 Kts.

The target speed to be set on MCP normally is **$V_{REF} + 5$ knots**.

The aim is to cross threshold at **V_{REF}** and touchdown about 300-400m into the runway at **V_{REF} minus 5 knots**.

If the A/T is disengaged, or is planned to be disengaged prior to landing, add the following to the reference speed V_{REF} to use as command speed:

- $\frac{1}{2}$ of the reported steady headwind component;
- Full gust increment above the steady wind.

The gust correction should be maintained to touchdown while the steady headwind correction should be bled off as the aeroplane approaches touchdown.

b) Automatic landing (see ch.2.4.4.5)

c) Manual landing to all landings including crosswind landings and slippery runway conditions.

Unless an unexpected or sudden event occurs, such as windshear or collision avoidance situation, it is not appropriate to use sudden, violent or abrupt control inputs during landing.

1) Alignment

During the latest stage of the approach, prior to the flare, align the aeroplane longitudinal axis with the runway centreline and the ailerons into-wind to compensate the drift. Hold this attitude during the flare aiming to touchdown on the upwind wheel just before the downwind wheel. Avoid overbanking that could cause the engine nacelle or outbound wing flap to contact the runway.

2) Flare

The threshold to be passed at predetermined speed (see above). Start rotation by increasing pitch attitude 2° - 3° to slow the rate of descent.

Smoothly retard thrust levers to idle and make small pitch attitude adjustments to maintain the desired rate to runway.

Ideally, main gear touchdown should occur simultaneously with thrust levers reaching idle. Hold sufficient backpressure on the control column to keep the pitch attitude constant.

Do not prolong the flare with the aim to make “soft” landing/over-rotate/trim during flare, these could cause tail strike.

NOTE: If runway is flooded with water (severe rain/rain showers), aim for firm touchdown to avoid aquaplaning.

3) Touchdown

Touchdown shall be executed within touchdown zone markings.

On touchdown check/move the speed brake lever to the UP position without delay. Lower the nose wheel onto the runway smoothly by relaxing aft control column pressure. Do not allow the pitch attitude to increase to avoid tail strike, neither allow large down control column movement to avoid nose wheel/forward fuselage damage.

Bounced landing recovery

Bounced landing can occur because higher than idle power is maintained through initial touchdown, disabling the automatic speedbrake deployment even when the speedbrakes are armed.

Hold or re-establish a normal landing attitude and add thrust as necessary to control the rate of descent. Thrust needed to be added for a shallow bounce or skip.

When a high, hard bounce occurs, initiate a go-around according to normal procedure. Do not retract the landing gear until a positive rate of climb is established because a second touchdown may occur during the go-around.

2.2.11.4 Landing roll

When thrust levers are closed and speedbrake lever confirmed/selected in UP position, open reverse levers.

Maintain deceleration rate with constant or increasing brake pressure as required until stopped or desired taxi speed is reached.

Rudder control is effective to approximately 60 Kts. Do not use the nose wheel steering until reaching taxi speed.

1) Speedbrakes

The speedbrakes can be fully raised after touchdown while the nosewheel is lowered to the runway with no adverse pitch effects. Unless speedbrakes are raised after touchdown, braking effectiveness may be reduced initially as much as 60% as well as could cause a bounce.

Speed brakes should be armed for landing and will be extended automatically. In the event auto extension fails, the speedbrakes shall be extended manually without delay.

2) Reverse Thrust

Reverse thrust is most effective at high speeds and always reduces the "brake only" stopping distance, brakes and tires wear. Establish 45% N1 reverse thrust as soon as possible after touchdown (to satisfy the local requirements increased nose level is assumed negligible while the braking efficiency is noticeable).

Increase reverse thrust further if allowed by local regulations and/or if required to stop within the runway length available. Note that safety aspects are always ahead of any local regulations.

Maintain reverse thrust as required, up to max, until the airspeed approaches 60 Kts then start reducing to reverse idle and full down position by taxi speed.

3) Braking

Use an appropriate autobrake setting or manually apply wheel brakes smoothly with steady increasing pedal pressure as required for runway condition and runway length available.

For operation from the long runways when Landing Distance is not a limiting factor, it is recommended to use the brakes as follows:

- Postpone brakes application until aeroplane decelerates down to a lower speed;
- Plan to slow down to a taxi speed by the place when the runway should be vacated with one steady application of brakes;
- Rate of deceleration should be “comfortable” for passengers without skidding effect;

CAUTION: 1. If the runway to be vacated at the very end, brakes effectiveness shall be checked earlier during ground roll.
2. Do not aim to make short landing or to vacate the runway at a high speed if it could be easily done by using just the next runway exit.

2.2.11.5 Runway vacating

The aeroplane has to be decelerated to safe taxi speed before turning off the runway.

CAUTION: Excessive speed could lead to extra load on landing gear, inconvenient skidding effect, automatic disconnection of nose-wheel steering at extreme nose-wheel angles and veering off the runway.

Accomplishment of the items on the After Landing Checklist should wait until the runway is vacated.

2.2.11.6 Crew Co-ordination

	PF	PM
Below Minimum	Control the aeroplane (monitor the AP and A/T performance during the autoland).	Continue to monitor instruments. Call excessive deviations in acc to Stabilized approach criteria
Flare	Initiate flare at approx 20'feet height and appropriately retard Trust levers	
Touchdown.	Lower the nose gear, deploy airbrakes, and apply Reverse 45% N1. Maintain the wing level and the runway direction. Monitor autobrake function or apply brakes	Check and call: • Confirm Thrust levers are closed, • Speedbrakes in UP position, and • Reverse on both engines. Speed Brakes Up, Reverses unlocked NOTE: announce immediately if any of the above conditions has not been established or failure of appropriate system is recognized.
80 kts		80 knots
	LP	RP
Taxi speed	My Control At 60 Kts start to close reverses, decelerate to taxi speed and revert to the nose-wheel steering. Vacate the runway as instructed by ATC.	Take over the handwheel, maintain wings level.

2.2.12 TAXI-IN (runway vacating – on-block)

2.2.12.1 General

Left Pilot should taxi the aircraft.

For power management, maneuvering and braking rules during taxi see Ch 2.2.4.2

Right pilot shall:

- keep airport chart ready to assist to LP during taxi-in;
- complete after landing procedure and appropriate Checklist;
- maintain constant look out and informing on any obstacles / objects, particularly on the right side of the a/c.

Before right turn, entering, crossing taxiway or runway Right Pilot observes and calls out: **“Right side free”**.

2.2.12.2 Parking

The aeroplane is to be parked with assistance of the guide man or mechanical devices such as mirror or light combinations. Do not taxi into an area bordered by safety lines without positive guidance from a marshal or signal device.

NOTE: For main docking system description see SAS RM Legends Ch 2. If you do not recognize a docking system or there are doubts how to use it, do not hesitate to request marshaller.

Before stopping the aeroplane, center the nose wheel and taxi straightforward a short distance to relieve side loads on the nose landing gear.

Do not release Parking brakes before:

- All engines have been shutdown;
- Wheel chocks are set;

and whenever:

- Wind velocity exceeds 40kts;
- Apron is sloped;
- Apron is slippery.

CAUTION: Extreme caution shall be taken whenever combination of the above factors exists.

2.2.12.3 Engine Shutdown Procedure

After landing run engines on low thrust for at least 3 minutes for cooling before shutdown.

It is allowed to shutdown one engine during taxi-in whenever it is convenient and safe and electrical system is connected on APU.

Note: If engine shutdown is carried out during taxi in it shall be completed by RP, with LP confirmation, in accordance with in-flight Engine Shutdown Procedure (ref. 3.2.2.2).

2.2.13 Post-flight

2.2.13.1 Ground Turnaround

The Commander shall ensure departure on schedule.

This should be achieved by appropriate supervision and gathering of information to determine possible causes for delay as well as making necessary contacts and arrangements/decisions to prevent or minimize delay.

Crew co-ordination

LEFT PILOT	RIGHT PILOT
1. Complete Technical Log	1. Complete Operational FPL
2. Complete A/C external Check as a part of PFI ASAP.	2. Check/update FMC/IRS position and insert flight plan for next leg.
3. Check fuelling receipt and complete the Fuel Record.	3. Obtain ATIS and ATC clearances.
4. Commander has to sign PFI in Tech Log, Loadsheets and other documentation relative to the flight.	4. Check/set N1 Ref for the next departure.
	5. Prepare the loadsheet, if required

NOTE: Take-off briefing may be accomplished and, after completion of the load sheet, take-off weight/speeds can be set prior to the BEFORE START checklist execution.

If the aircraft is to be immediately handed over to other crew, it can be left powered, provided EFIS is dimmed for screen saving.

2.2.13.2 Leaving aircraft

Aircraft could be left by crew for Short or Long turnaround/Night stop.

(for long turnaround and overnight parking see OM Part A, 8.2.7).

RP shall complete the Final Stop Checklist.

Commander shall ensure the following:

- 1) Aircraft is completely de-powered, if otherwise is not approved by the technician or ground handling staff.
- 2) No defects are found during post-flight Inspection (PoFI), same as PFI (Not required when a/c is handed over to the next crew or to the BT technician after the last flight of the day).
- 3) Aircraft is handed over to technician or other handling staff responsible to provide security during the absence of the crew.
- 4) Aircraft is properly secured if left unattended (see OM A,10. 4).
- 5) Pins and covers will be installed, if required

2.2.13.3 Post-flight Documentation

All flight documentation shall be submitted to MCC as soon as practicable – immediately after the respective flight duty.

The documentation shall be fixed (stapled) together in the following order:

- 1) Fuel order;
- 2) Fuel receipt;
- 3) Performance calculation, when required;
- 4) Loadsheets;
- 5) Loading instruction/Report form (for Manual loadsheet);
- 6) Operational flight plan.

Flight Safety Report (FSR) shall be submitted to MCC Duty Officer personally.

All other flight documentation such as Security Check Report, Voyage Report, NOTOC, Cat2/3 Report, etc., should be collected and placed in the special dedicated box or the "Flight Crew Reports" box in the MCC office.

2.2.13.4 Post-flight

After the last flight of the day the entire crew must proceed to Briefing room to familiarize themselves with possible changes in their schedule and other operational information.

Commander and Senior Cabin Crew should briefly discuss the crew performance and necessity to conduct the post-flight briefing for the whole crew.

The briefing shall be arranged in case of any irregularities encountered during the flight and/or upon any crewmember's request.

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2.3 NORMAL CHECKLIST

This section contains the expanded and abbreviated normal checklist. Passenger Cabin checklist, as a part of Pre-flight Inspection (**PFI**), is delegated to the Cabin Crew and is included in Cabin Crew Handbook.

2.3.1 Checklist Execution

(see also OM, Part A, 8.0.6.6 Use of checklists)

According to Boeing philosophy the “Flow” method is used for Normal checklist execution. That means that appropriate Procedure is performed first from recall (by memory) and then the checklist is complete to verify that the flight deck is correctly configured for each phase of the flight.

Two main principles are used for the Procedures/Checklist creation.

1) **Areas of responsibility** (See diagrams next pages)

Each pilot, while exercising duties as LP/RP or PF/PM (in acc with Crew Co-ordination Concept), is assigned to a flight deck area where he initiates actions for required procedure, and assures proper system response.

The flight deck panel illustrations describe these areas of responsibility for two main conditions:

- Pre/post flight;
- Flight (a/c is moving under its own power)

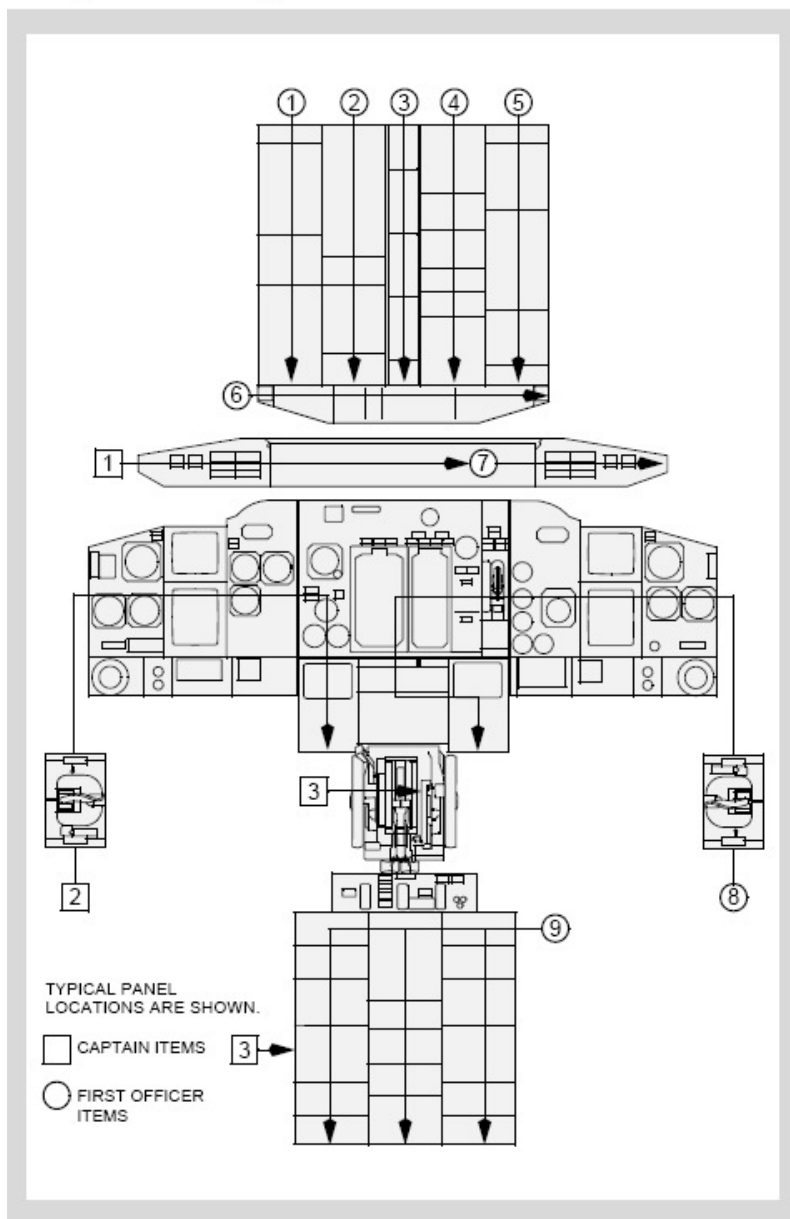
NOTE: As exception the pilot is allowed to handle not assigned to him area(s) when:

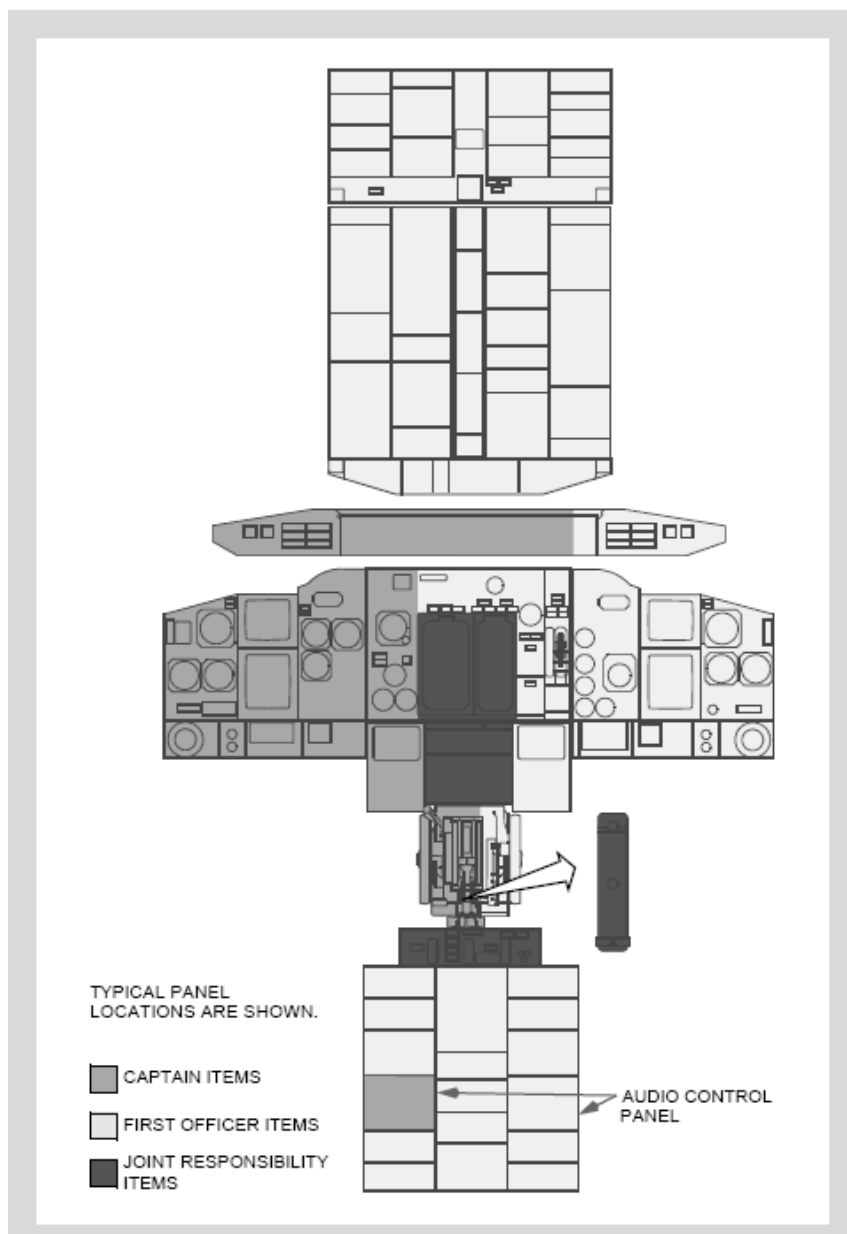
1. Requested by LP/PF for operational reason (PF/PM Concept);
2. Flight Deck Setup in accordance with the checklist (any pilot) or Shutdown checklist completion (LP);
3. PF engages AP after take-off after appropriate trimming;
4. Above 10 000' with AP engaged, as convenient.

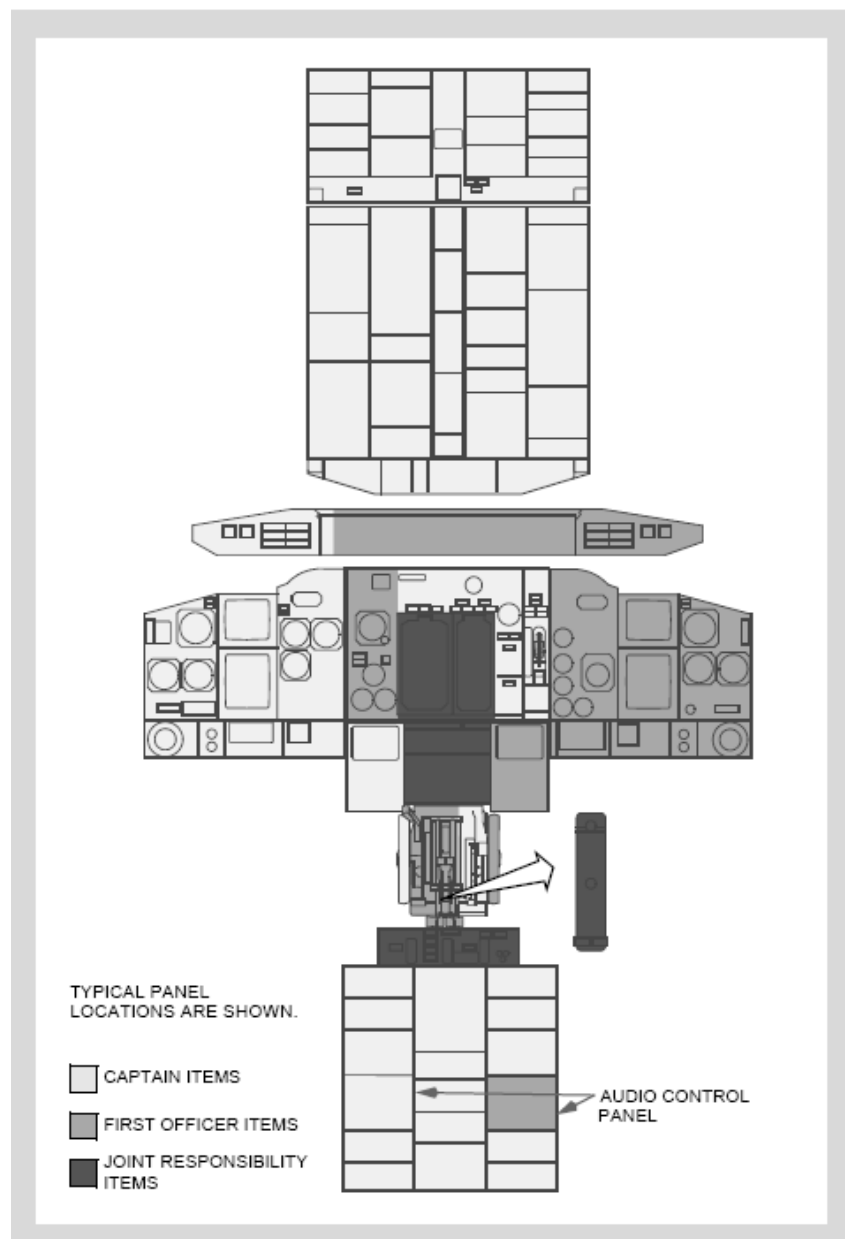
2) **Scan flow** (See diagrams next pages)

The proper sequence should be followed in monitoring and handling the areas of responsibilities and this sequence is called “Normal scan flow”. Certain items could be handled in other, most logical for the progress of the flight sequence. In this case the note to the appropriate Procedure is given normally in the Expanded Normal Checklist.

Preflight and Postflight Scan Flow



Areas of Responsibility - Captain as Pilot Flying or Taxiing

Areas of Responsibility - First Officer as Pilot Flying or Taxiing

2.3.1.1 Procedure

As a direct application of two main principles above the procedures for each stage of the flight are written and presented in the Expanded checklist (2.3)

Procedure is initiated by LP/PF by calling the name of appropriate procedure. Then each pilot initiates appropriate actions in his areas of responsibility.

Note that not all Procedural items are covered with appropriate subsequent checklist and for convenience this particular items are given in small letters in the Expanded checklist.

2.3.1.2 Checklist

Checklist is initiated by LP/PF by calling name of appropriate checklist, however when checklist is initiated right after appropriately announced and completed procedure, the name of the checklist could be omitted.

Reading of the checklist to be done according to method and rules given in OM Part A Chapter 8.0.6.6

When the aeroplane is on the ground, the RP should read the checklist. When the aeroplane is airborne, this is duty of the PM.

Following table shows stage of flight, when the checklist shall be initiated and the crewmember to response for the checklist items.

Checklist	Stage of Flight	Response
PREFLIGHT (turn around)	Well before start-up.	Left Pilot
BEFORE START	Flight documents are on board. Start-up clearance is received.	Left Pilot
BEFORE TAXI	After start before taxiing.	Left Pilot
TAXI	During taxiing in take-off configuration.	The responsible for check pilot is nominated in the third column of the abbreviated checklist
LINE-UP	Line-up clearance is received.	
AFTER TAKE-OFF	Clean configuration, initial FL is received, but not below 3.000 ft.	
DESCENT	Before starting descent.	
APPROACH	Initial altitude is received, normally after passing 10.000 ft.	
LANDING	Gear down, not below 1.000 ft to minimum.	
AFTER LANDING	Runway is vacated.	
SHUTDOWN	On chocks.	Left Pilot
SECURE	Last flight of the day/crew change.	Right Pilot

2.3.2 Abbreviated Normal Checklist

2.3.2.1 Contents and presentation

CAT 2 Summary/Requirements, Crosswind Components and One Engine Drift Down, Landing Distance Required, Autobrake Landing Distances tables are also included in Normal Checklist to make easier for pilots to ensure the aeroplane systems are operable and to solve some frequent non-standard situations which may have place. All this tables and procedures are based on the Manufacturer's documentation.

The expanded checklist contains all main and sub checklist items. The sub items are moved to the right and should be committed to memory.

For day-to-day operations the abbreviated normal checklist is used. It is divided to three columns:

- first column – challenges
- second column – responses expected
- third one (when applied) – crewmember, responsible for the check and response:

L	Left pilot
R	Right pilot
P	Both pilots
PF	Pilot flying
PM	Pilot Monitoring

A broken line in a checklist indicates a sequential condition, which should be met before continuing with the procedure.

2.3.2.2 The Abbreviated Normal Checklist

FLIGHT DECK SETUP

1. Electrical Power UP (RP or LP)

Battery switch on
 Standby Power switch auto
 Alternate Flaps master switch off
 Windshield Wiper selector(s) off
 Electric Hydraulic Pumps switches off
 Landing Gear lever down
 Weather Radar off

If external power is available:

Ground Power switch on

If APU is required:

Overheat Detector switches normal
 Fault/Inop Test check
 Overheat/Fire Test check
 Extinguisher Test check
 APU bleed off
 APU start and on bus
 Wheel Well Fire Warning system check
 APU bleed as required

2. Preliminary Preflight Procedure (RP or LP)

Flight Deck Door Access System Test
 IRS mode selector off, then NAV
 Aircraft library check
 Emergency Equipment check
 Gear Pins check
 Service Interphone switch off
 Engine Panel set
 Oxygen Panel set
 Flight Recorder test
 Mach airspeed warning test
 Stall warning test
 Circuit Breakers (P6) check
 Crew Oxygen Valve open
 Manual Gear Extension Access Door closed
 Circuit Breakers (P18) check
 Parking Brake as required

3. CDU Preflight (RP or LP)

Initial Data set
Navigation Data set
Performance Data set

4. Preflight Right pilot

Flight Control Panel set
Instrument and NAV Transfer switches normal
Fuel Panel set
Electrical Panel set
Overheat and Fire Protection Panel as required
APU switch as required
Equipment cooling switches norm
Emergency Exit lights switch guard closed
Passenger Signs set
Windshield Wiper selector off
Window Heat switches on
Pitot Static switches off
Wing Anti-Ice switches off
Engine Anti-Ice switches off
Hydraulic Panel set
Air Conditioning Panel set
Cabin Pressurization Panel set
Lighting Panel set
Ignition Selector switches L or R
Engine start switches off
Lighting Panel set
NAV Mode selector switch* as required
Mode control panel set
Oxygen test and set
Marker Beacon lights* test
Clock set
Disengage light TEST switch test
Flight Instruments check
Ground Proximity Panel check
Landing Gear Panel set
Antiskid switch guard closed
Auto Brake Selector RTO
Engine instruments chkd
Hydraulic Quantity Indications verify RF not shown
Cargo Fire Panel* check
EFIS Control Panel set

Rev.: 005

VHF Communication Radios..... set
VHF Navigation Radios..... set
Audio Control Panel set
ADF Radios..... set
Weather Radar Panel set
Transponder Panel..... set
Stabilizer Trim Override switch guard closed
Seat..... adjust
Rudder Pedals adjust
Seat Belts and Shoulder Harness adjust

5. Preflight Left pilot (RP may do this procedure if required)

Gear pins..... chkd
Lights..... test
NAV Mode Selector* as required
Mode Control Panel set
Oxygen..... test and set
Marker Beacon lights* test
Marker Beacon switch* as required
Clock set
Nose Wheel Steering switch guard closed
Disengage light TEST switch test
Heading Reference Switch* norm
Flight Instruments check
Standby Instruments check
Brake Temperature System* test
STAB OUT OF TRIM light..... verify extinguished
Fuel quantity indicators test
Speed Brake Lever down detent
Reverse Thrust Lever down
Forward Thrust Lever..... closed
Flap Lever set
Parking Brake set
Engine Start Levers..... cut off
Stabilizer Trim Cut Out switches..... normal
EFIS Control Panel set
VHF Communication Radios..... set
VHF Navigation Radios..... set
Audio Control Panel set
Seat..... adjust
Rudder Pedals adjust
Seat Belts and Shoulder Harness adjust

PREFLIGHT

Oxygen..... Tested, 100%
Instrument transfer switches.....NORMAL
Window heat.....ON
PRESSURIZATION Set, AUTO and GND*
Flight instruments Heading____, Altimeter____
Parking brake.....Set
Engine start levers CUTOFF
FUEL DOOR..... CLOSED
Taxi and take-off briefingComplete

BEFORE START

Flight deck door Closed/Locked
Fuel____KGS, Pumps ON
Passenger signsON
HYDRAULIC PUMPSNORMAL/PUSH BACK
Doors/Windows Closed/Locked
MCP V2____, HDG____, ALT____
Takeoff WEIGHT/Speeds.....____ TONS FOR ____RWY
CDU preflight Complete/Crossload*
Rudder and aileron trimFree and 0
Anti collision lightON

BEFORE TAXI

Generators On
Pitot heat.....ON
Anti-ice AS REQ
HYDRAULIC PUMPSON
PACKS/Isolation valve AUTO
PRESSURIZATION AUTO and FLT*
Engine start switchesCONT
Recall Checked
Autobrake RTO
Engine start levers IDLE detent
Flight controls Checked
TRANSPONDER AS REQ
CLEAR SIGNAL.....RECEIVED

Rev.: 005

TAXI

APU AS REQ L
Flaps ____, green
Stabilizer trim __ Units
TAKEOFF BRIEFING AS REQ PF
CABIN SECURE R

LINE-UP

CABIN SIGNAL GIVEN R
AUTOTHROTTLE ARM L
TRANSPONDER ON
CONFIGURATION CHECKED

AFTER TAKEOFF

AIR COND PACKS AUTO, BLEEDS ON PF
Landing gear UP and OFF
Flaps UP, No lights
ALTIMETERS 1013 SET/X-CHKD P

DESCENT

PRESSURIZATION Elevation __ feet set PF
Recall Checked PM
Autobrake AS REQ PF
FUEL CHECKED
Landing data VREF __, Minimums __
Approach briefing Complete

APPROACH

Altimeters QNH & X-CHKD P
FASTEN BELTS ON PF
APPROACH SETUP COMPLETE
CABIN SECURE PM

LANDING

CABIN SIGNAL GIVEN PM
Engine start switches CONT PF
HDG/ALT FOR GO-AROUND*
Speedbrakes ARMED, green
Landing Gear Down, 3 greens P
Flaps ____, green PF

AFTER LANDING

APU.....	ON	R
ENGINE START SWITCHES.....	OFF	
SPEEDBRAKE.....	DOWN DETENT	
FLAPS.....	UP, NO LIGHTS*	
WEATHER RADAR.....	OFF	
TRANSPONDER.....	AS REQ	
ELECTRICAL.....	ON ____	L

SHUTDOWN (Read and Do checklists)

Parking brake.....	SET
Engine start levers.....	CUTOFF
FASTEN BELTS.....	OFF
PA.....	GIVEN
IRSs.....	OFF
Fuel pumps.....	OFF
Pitot heat.....	OFF
ANTI-ICE.....	OFF
ELEC HYD PUMPS.....	OFF
LIGHTS.....	OFF
Flaps.....	UP, No lights*
TRANSPONDER.....	OFF
MOBILE PHONE.....	AS REQ

SECURE (completed by RP)

GALLEY.....	OFF
Emergency Exit Lights.....	OFF
Window heat.....	OFF
RECIRCULATION FAN.....	OFF
Packs.....	OFF
LIGHTING.....	OFF
STAB TRIM.....	AS REQ

ELECTRICAL POWER DOWN (completed by RP)

APU/GRD POWER.....	OFF
BATTERY.....	OFF

*Optional

GROUND DE-ICING

Before de-icing

- FLAPS UP
- THRUST LEVERS IDLE
- STAB TRIM..... FULL APL NOSE DOWN
- STAB TRIM HANDLES..... STOW
- APU and engine BLEED..... OFF
- APU AS REQ

After de-icing

- WAIT 1 MINUTE
- Engine BLEED SWITCHES..... ON
- Stab Trim__units

ENG 18.5K	Take Off N1% (Bleeds ON, Engine anti-ice ON or OFF)										
	Pressure altitude, ft										
Temp	-1000	-800	-600	-400	-200	0	200	400	600	800	1000
30	89.3	89.6	89.8	90.1	90.3	90.6	90.7	90.8	91.0	91.1	91.2
28	89.0	89.3	89.5	89.8	90.0	90.3	90.4	90.5	90.7	90.8	90.9
26	88.7	89.0	89.2	89.5	89.7	90.0	90.1	90.2	90.4	90.5	90.7
24	88.4	88.7	88.9	89.2	89.4	89.7	89.9	90.0	90.2	90.3	90.4
22	88.1	88.4	88.6	88.9	89.1	89.4	89.6	89.7	89.9	90.0	90.2
20	87.8	88.1	88.3	88.6	88.8	89.1	89.3	89.4	89.6	89.7	89.9
18	87.5	87.8	88.0	88.3	88.5	88.8	89.0	89.1	89.3	89.4	89.6
16	87.2	87.5	87.7	88.0	88.2	88.5	88.7	88.8	89.0	89.1	89.3
14	86.9	87.2	87.4	87.7	87.9	88.2	88.4	88.5	88.7	88.8	89
12	86.6	86.9	87.1	87.4	87.6	87.9	88.1	88.2	88.4	88.5	88.7
10	86.3	86.6	86.8	87.1	87.3	87.6	87.8	87.9	88.1	88.2	88.4
8	86.0	86.3	86.5	86.8	87.0	87.3	87.5	87.6	87.8	87.9	88.1
6	85.7	86.0	86.2	86.5	86.7	87.0	87.2	87.3	87.5	87.6	87.8
4	85.4	85.6	85.9	86.2	86.4	86.6	86.8	86.9	87.1	87.2	87.4
2	85.1	85.3	85.6	85.9	86.1	86.3	86.5	86.6	86.8	86.9	87.1
0	84.8	85.0	85.3	85.6	85.8	86.0	86.2	86.3	86.5	86.6	86.8
-2	84.5	84.7	85.0	85.3	85.5	85.7	85.9	86.0	86.2	86.3	86.5
-4	84.1	84.4	84.7	84.9	85.2	85.4	85.6	85.7	85.9	86.0	86.2
-6	83.8	84.0	84.3	84.6	84.8	85.0	85.2	85.3	85.5	85.6	85.8
-8	83.5	83.7	84.0	84.2	84.5	84.7	84.9	85.0	85.2	85.3	85.5
-10	83.2	83.4	83.7	83.9	84.2	84.4	84.6	84.7	84.9	85.0	85.2
-12	82.9	83.1	83.4	83.6	83.9	84.1	84.3	84.4	84.6	84.7	84.9
-14	82.6	82.8	83.1	83.3	83.6	83.8	84.0	84.1	84.3	84.4	84.6
-16	82.2	82.4	82.7	82.9	83.2	83.4	83.6	83.7	83.9	84.0	84.2
-18	81.9	82.1	82.4	82.6	82.9	83.1	83.3	83.4	83.6	83.7	83.9
-20	81.6	81.8	82.1	82.3	82.6	82.8	83.0	83.1	83.3	83.4	83.6

NOTE: BLEED OFF 0.9%
GO AROUND N1 -0,1%

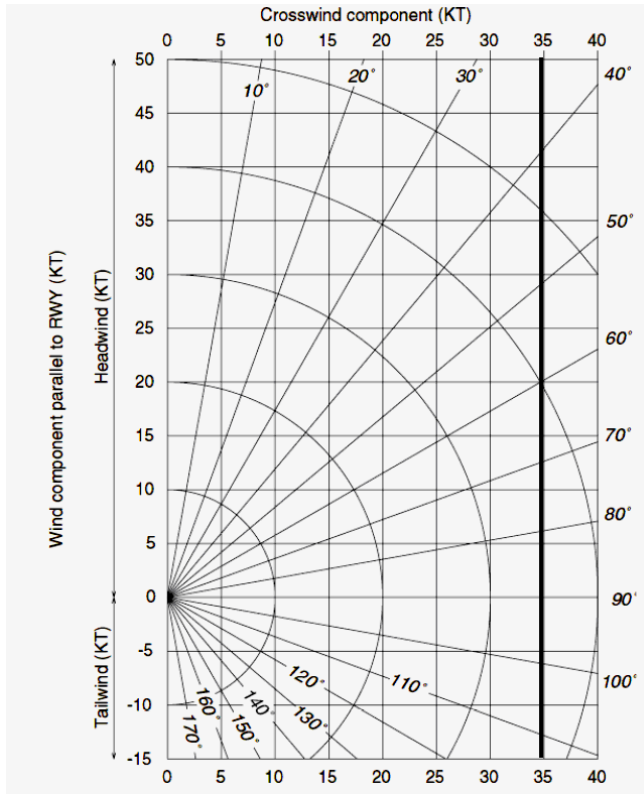
ENG 20 K	Take Off N1% (Bleeds ON, Engine anti-ice ON or OFF)										
	Pressure altitude, ft										
Temp	-1000	-800	-600	-400	-200	0	200	400	600	800	1000
30	91.8	92.0	92.2	92.4	92.6	92.8	92.9	93.0	93.0	93.1	93.2
28	91.5	91.7	91.9	92.1	92.3	92.5	92.6	92.7	92.8	92.9	93.0
26	91.2	91.4	91.6	91.8	92.0	92.2	92.3	92.4	92.6	92.7	92.8
24	90.9	91.1	91.3	91.5	91.7	91.9	92.0	92.1	92.3	92.4	92.5
22	90.6	90.8	91.0	91.2	91.4	91.6	91.7	91.9	92.0	92.2	92.3
20	90.3	90.5	90.7	90.9	91.1	91.3	91.5	91.6	91.8	91.9	92.1
18	90.0	90.2	90.4	90.6	90.8	91.0	91.1	91.3	91.5	91.6	91.8
16	89.7	89.9	90.1	90.3	90.5	90.7	90.8	91.0	91.1	91.3	91.5
14	89.3	89.5	89.7	89.9	90.1	90.3	90.5	90.7	90.8	91.0	91.1
12	89.0	89.2	89.4	89.6	89.8	90.0	90.2	90.3	90.5	90.7	90.8
10	88.7	88.9	89.1	89.3	89.5	89.7	89.9	90.0	90.2	90.3	90.5
8	88.4	88.6	88.8	89.0	89.2	89.4	89.5	89.7	89.9	90.0	90.2
6	88.1	88.3	88.5	88.7	88.9	89.1	89.2	89.4	89.5	89.7	89.9
4	87.7	87.9	88.1	88.3	88.5	88.7	88.9	89.1	89.2	89.4	89.5
2	87.4	87.6	87.8	88.0	88.2	88.4	88.6	88.7	88.9	89.1	89.2
0	87.1	87.3	87.5	87.7	87.9	88.1	88.3	88.4	88.6	88.7	88.9
-2	86.8	87.0	87.2	87.4	87.6	87.8	87.9	88.1	88.2	88.4	88.6
-4	86.5	86.7	86.9	87.1	87.3	87.5	87.6	87.8	87.9	88.1	88.2
-6	86.1	86.3	86.5	86.7	86.9	87.1	87.3	87.4	87.6	87.7	87.9
-8	85.8	86.0	86.2	86.4	86.6	86.8	87.0	87.1	87.3	87.4	87.5
-10	85.5	85.7	85.9	86.1	86.3	86.5	86.6	86.8	86.9	87.1	87.2
-12	85.2	85.4	85.6	85.8	86.0	86.2	86.3	86.4	86.6	86.7	86.9
-14	84.9	85.1	85.2	85.4	85.6	85.8	86.0	86.1	86.3	86.4	86.6
-16	84.5	84.7	84.9	85.1	85.3	85.5	85.6	85.8	85.9	86.1	86.2
-18	84.2	84.4	84.6	84.8	85.0	85.1	85.3	85.5	85.6	85.8	85.9
-20	83.9	84.1	84.3	84.4	84.6	84.8	85.0	85.1	85.3	85.4	85.6

NOTE: BLEED OFF +1.0%
GO AROUND N1 -0.1%

TEMPERATURE CORRECTIONS

Values to be added by the pilot to published altitude (FT)														
AD temp °C	Height above the elevation of the altimeter setting source (FT)													
	200	300	400	500	600	700	800	900	1000	1500	2000	3000	4000	5000
0	20	20	30	30	40	40	50	50	60	90	120	170	230	280
-10	20	30	40	50	60	70	80	90	100	150	200	290	390	490
-20	30	50	60	70	90	100	120	130	140	210	280	420	570	710
-30	40	60	80	100	120	140	150	170	190	280	380	570	760	950
-40	50	80	100	120	150	170	190	220	240	360	480	720	970	1210
-50	60	90	120	150	180	210	240	270	300	450	590	890	1190	1500

NOTE: The table is calculated for a sea level AD. The values are conservative when applied at higher AD.



Maximum crosswind component (Kts)

Normative FC (Russian FC)	Braking Action	FC (μ)	Take-off	Landing
0.31 - 0.34 –	Poor	0.20	5	5
0.35 - 0.36 –	Medium Poor	0.25	10	15
0.37 - 0.39 –	Medium	0.30	15	20
0.4 - 0.42	Medium Good	0.35	20	25
>0.42	Good (wet)	0.40	25	30
		0.45	30	35
	Good (dry)	≥ 0.50	35	

NOTE: Use of runways with $\mu < 0.20$ is not applicable for airBaltic.

2.3.2.3 ADDITIONAL MATERIALS

CAT 2/3 PROCEDURE SUMMARY

PRIOR OR DURING DESCENT

- Weather & NOTAMs (Destination & Alternate)
- Fuel (min for diversion)
- Cat 2/3 Approved Runways table (SAS RM, OPS INFO)
- Aerodrome facility & aircraft status
- Crew qualification
- Cat 2/3 DH set on the RA; Cat 1 DH – on the pressure altimeter bug
- Procedures/Failures during approach and
- Go-around + Missed approach procedure reviewed.

INITIAL APPROACH

- Right pilot is PF, ATC advised about Cat 2/3 approach.
- Check all TRUs for normal operation.

BEFORE INTERCEPT HEADING

- ILS check frequency/final course + identified

Cat 2 with Manual landing

Down to 1'500 there is no differences from Cat 1 precision approach.

	LP	RP
1500' RA	1500 Radio Flaps 30	Flaps 30, Speed
1000' RA	1000 Radio, Stabilized	Checked
500' RA	Stabilized, Minimum ...Radio,	Checked
100' to Min	Checked, Looking out	100 to Minimum
DH	Contact, My Controls, <i>or</i> <i>Go around</i>	Minimum

Cat 2/3 with Automatic landing

Down to 1'500 there is no difference from Cat 1 precision approach.

1500' RA	1500 Radio Flaps 40*	Flaps 40*, Speed
1000' RA	1000 Radio, Stabilized	FLARE armed
500' RA	Stabilized, Minimum ...Radio,	Checked
150' RA	Checked, Looking out	100 to Minimum
60' RA	Contact, My controls or <i>Go-around</i>	Minimum at DH+10'
50' RA	<i>Go-around</i>	Flare green, or <i>Negative flare</i>
27'RA	<i>Continue</i>	Retard, or <i>Negative retard</i>
Touchdown	Autopilot off	Regular call-outs

* - Flaps 30 select first (speed limitations to be observed.)

CAT2/CAT 3 REQUIREMENTS

CAT 1	CAT 2	CAT 3		
200	100	50	MIN DH	M I N
550 (a)	300	200	MIN TDZ RVR (m)	
125 (c)	125 (c)	125 (c)	Mid point RVR (m)	
75 (c)	75 (c)	75 (c)	Stop end RVR (m)	
E			CAT1 ILS	A E R O D R O M E
	E		CAT2 ILS	
		X	CAT3 ILS	
	X	X	BRAKING ACT ≥ 0.3	
30	45	45	RWY WIDTH (m)	
720	420	210	HIALS (m from THR)	
X	X		STBY PWR HIALS	
		X	RWY EDGE LTS - DAY	
X	X	X	RWY EDGE LTS - NIGHT	
		X	RWY CL - DAY	
	X	X	RWY CL - NIGHT	
		X	TDZ LTS - DAY	
	X	X	TDZ LTS - NIGHT	
	30	30	MAX CL SPACING (m)	
(b)	(b)	(b)	ALL ALS & RWY LTS	
	X	X	STBY PWR LTS	
		X	ILS STBY TRANSMITTER	
X	X	X	WIND MEASUREMENT	
	X	2	AUTOPILOT - YD	A I R P L A N E
		X	AUTOTHROTL	
	2	2	FLIGHT DIRECTOR	
	X	X	AUTOPILOT AURAL WARNING	
	2	2	AUTOPILOT DISENGAGE SWITCH	
	X	X	ALL ENGINES	
	2	2	GENERATORS (including APU generator)	
no A.L	no A.L	2	HYDR SYST	
no A.L	no A.L	X	FLAPS 40	
	CAPT	CAPT	WINDSHIELD WIPER	

Continued on next page

CAT2/CAT 3 REQUIREMENTS continued

CAT 1	CAT 2	CAT 3		A I R P L A N E
X	2	2	ILS RECEIVER	
X	X	X	ELECTRIC PITCH TRIM	
	X	X	STBY HORIZON	
	2	2	IRU's in NAV mode	
	2	2	EFIS SGU	
	2	2	EFDI	
	CAPT	2	EHSI	
	CAPT	CAPT	PRESSURE ALTIMETER	
	2	2	RADIO ALT + DISPLAY	
	2	2	DH SETTING + DISPLAY	
PNF	CAPT	2	ADC	
	X	X	STBY ALT/ASI	
no A.L	X	X	MAX HEADWIND 25 kts	W X
no A.L	X	X	MAX CROSSWIND 15 kts	
no A.L	X	X	MAX TAILWIND 10 kts	
	X	X	NO MODERATE OR SEVERE TURBULENCE	
	X	X	NO WINDSHEAR	
	X	X	NO HEAVY PRECIPITATION	

X: Required; E: Either required; A: Advisory; no A.L: No autoland
a: if TDZ RVR not available, MID RVR may substitute TDZ RVR.

b: Max 1/3 may be INOP with pattern unaltered.

c: If reported and relevant (used during high speed phase of landing down to approx 60 Kts) JAR-OPS 1.405(f)

LANDING DISTANCE ACTUAL (un-factored), **m**

To obtain LDR - actual landing distance given in table and corrected appropriately, if required, should be multiplied by coefficient **1,67**

RWY conditions, Braking Action	DRY			BA GOOD (WET)			BA MEDIUM			BA POOR		
FLAPS, deg	15	30	40	15	30	40	15	30	40	15	30	40
MAX MANUAL	808	772	757	1272	1202	1162	1677	1568	1504	2104	1952	1866
MAX AUTO	848	802	784	1272	1202	1162	1677	1568	1504	2104	1952	1866
AUTOBRAKES 3	1016	955	924	1449	1336	1284	1726	1595	1525	2104	1952	1866
AUTOBRAKES 2	1461	1342	1290	1875	1714	1635	2010	1842	1750	2247	2065	1967
AUTOBRAKES 1	1674	1543	1473	2065	1891	1799	2138	1955	1854	2318	2125	2019

NOTE: All Slippery Runway (other than Dry) distances have been factored by 1.15.

Calculations are given for: LW - 45000 kg, sea level, standard day, no wind or slope, VREF approach speeds, 2 engine detent reverse thrust.

For further corrections refer to QRH, Performance In-flight, Advisory information.

ONE ENGINE CLIMB (Max Continuous Thrust)

WEIGHT (1000 KG)	PRESSURE ALTITUDE (Ft)		
	ISA +10°C & BELOW	ISA +15°C	ISA +20°C
64	5200	3000	800
60	11500	6100	5600
56	14400	12200	10000
52	17200	15300	13200
48	18700	17800	16500
44	20800	19500	18500
40	24200	22500	20700
36	27700	26100	24500

For engine anti-ice – subtract 3 700 ft.

For engine and wing anti-ice on - subtract 8 700 ft.

ONE ENGINE DRIFT DOWN (Max Continuous Thrust)

WEIGHT (1000 KG)		OPTIMUM DRIFTDOWN SPEED (KIAS)	LEVEL OFF ALTITUDE (Ft)		
START DRIFTDOWN	LEVEL OFF		ISA +10°C & BELOW	ISA +15°C	ISA +20°C
64	61	235	15500	14200	12800
60	57	228	17300	16400	15100
56	53	220	18800	18000	17200
52	49	212	20600	19600	18800
48	46	204	23100	22100	20900
44	42	196	25800	24800	23700
40	38	187	28500	27600	26600
36	32	177	31100	30500	29600
32	31	167	33700	33400	32600

2.3.2.4 Exterior Inspection

Aircraft Exterior inspection is a part of PFI (2.2.2.1) and shall be completed by the Left Pilot (commander). For day-to-day operations the checklist to be completed as memory items prior to each flight.

Prior to Exterior Inspection the Left Pilot has to:

- 1) Check the A/C Tech Log for the technical status of A/C, particularities and recent malfunctions/completed maintenance;
- 2) Ensure that exterior lights are ON (Navigation-on, Logo-as required);
- 3) Put on the reflecting CREW JACKET;
- 4) Use flashlight for dark time

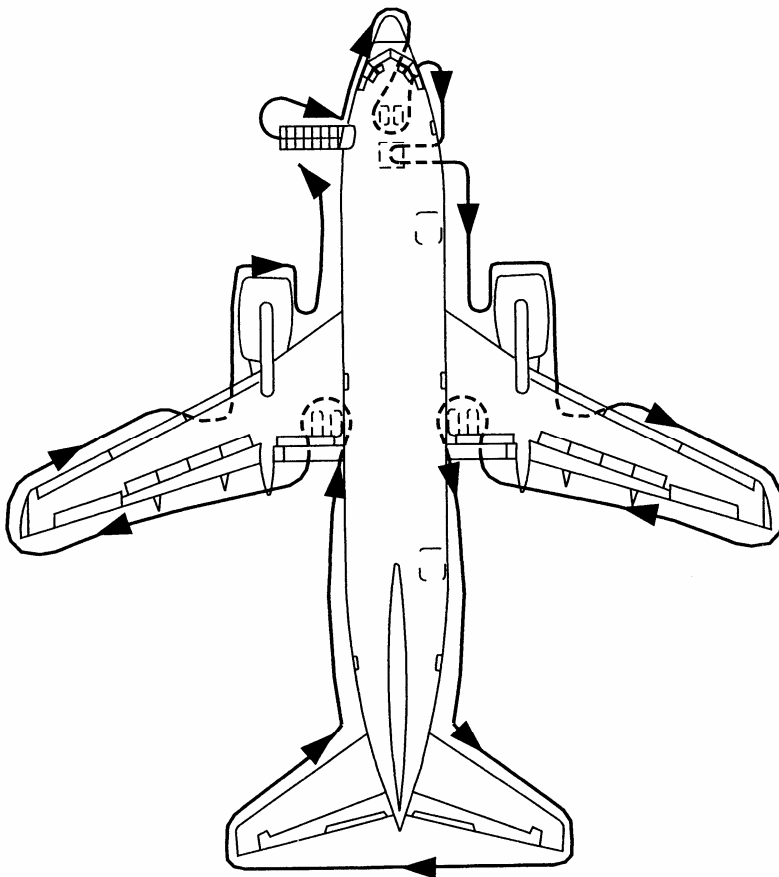
Items at each location may be checked in any sequence.

Use the detailed inspection route below to check that:

- check that control surfaces and landing gear locks, pitot/static covers, restraint devices and engine/aperture blanks have been removed
- the surfaces and structures are clean, not damaged, not missing parts and there are no fluid leaks
- the tires are not too worn, not damaged, and there is no tread separation
- the gear struts are not fully compressed (the chrome is visible on all landing gear shock struts)
- the engine inlets and tailpipes are clear, the access panels are secured, the exterior is not damaged, and the reversers are stowed
- the doors and access panels that are not in use are latched
- the probes, vents, and static ports are clear and not damaged
- the skin area adjacent to the pitot probes and static ports is not wrinkled
- the antennas are not damaged
- the light lenses are clean and not damaged

For cold weather operations see Flight Operations in Adverse Weather Conditions, **Pre-departure** OM B 2.5.1.2.

Inspection route

**Left Forward Fuselage**

Probes, sensors, ports, vents, and drains (as applicable).....Check
Doors and access panels (not used)Latched

Nose

RadomeCheck
Conductor straps – Secure
Forward E and E doorSecure

Nose Wheel Well

Tires and wheels Check
 Verify that the wheel chocks are in place as required
Exterior lights Check
Gear strut and doors Check
Nose wheel steering assembly Check
Nose gear steering locking pin As required
Gear pin Removed
Nose wheel spin brake (snubbers) In place

Right Forward Fuselage

Probes, sensors, ports, vents, and drains (as applicable)..... Check
F/O emergency handle..... In position
Oxygen pressure relief green disc In place
Doors and access panels (not used) Latched
Forward Cargo compartments Check
 No leakage, no damage, no suspect luggage, lights operating normally.
 Check door operating normally.

Right Wing Root, Pack, and Lower Fuselage

Ram air deflector doorExtended
Pack and pneumatic access doors Secure
Probes, sensors, ports, vents, and drains (as applicable)..... Check
Exterior lights Check
Leading edge flaps Check

Number 2 Engine

Access panels Latched
Probes, sensors, ports, vents, and drains Check
Fan blades, probes, and spinner Check
 Intake clear and N1 rotates freely
Thrust reverser Stowed
Exhaust area and tailcone Check
 Exhaust tail plug, exhaust case struts and visible turbine blades and
 4th stage blades on LPT – for obvious damage and evidence of
 metal/oil accumulation

Right Wing and Leading Edge

Access panels Latched
Leading edge flaps and slats Check
Fuel measuring sticks Flush and secure
Wing surfaces Check
Fuel tank vent..... Check

Right Wing and Trailing Edge

Position and strobe lights Check
Static discharge wicks Check
Aileron and trailing edge flaps..... Check

Right Main Gear

Tires, brakes and wheels Check
 Verify that the wheel chocks are in place as required
 If the parking brake is set, the brake wear indicator pins must extend
 out of the guides
Gear strut, actuators, and doors Check
Hydraulic lines Secure
Gear pin Removed

Right Main Wheel Well

APU FIRE CONTROL handle Up
Wheel well Check
 Check Brake accumulator indicator – in conformity with cockpit Brake
 Pressure indicator
 Check Standby hydraulic system reservoir - no leakage
 Check System B hydraulic reservoir - no leakage
 Check System B hydraulic reservoir quantity indicator - RF or above
 Check System A hydraulic reservoir - no leakage
 Check System A hydraulic reservoir quantity indicator - RF or above

Right Aft Fuselage

Aft Cargo compartments Check
 No leakage, no damage, no suspect luggage, lights operating normally.
 Check door operating normally.
Doors and access panels (not in used) Latched
Negative pressure relief door Closed
Outflow valve full open
Probes, sensors, ports, vents, and drains (as applicable) Check
APU fire red and yellow discharge indicators In place
APU air inlet Open

Tail

Vertical stabilizer and rudder Check
Elevator feel probes Check
Horizontal stabilizer and elevator Check
Static discharge wicks Check
Strobe light Check
APU cooling air inlet and exhaust outlet Check

Left Aft Fuselage

Doors and access panels (not in used) Latched
 Probes, sensors, ports, vents, and drains (as applicable)..... Check

Left Main Gear

Tires, brakes and wheels Check
 Verify that the wheel chocks are in place as required
 If the parking brake is set, the brake wear indicator pins must extend
 out of the guides
 Gear strut, actuators, and doors Check
 Hydraulic lines Secure
 Gear pin Removed

Left Main Wheel Well

Wheel well Check
 Engine fire bottle pressure Check

OAT	Mini PSI	Maxi PSI
-20 ⁰ C	510	670
0 ⁰ C	630	760
+20 ⁰ C	740	890
+40 ⁰ C	920	1060

Left Wing and Trailing Edge

Aileron and trailing edge flaps Check
 Static discharge wicks Check
 Position and strobe lights Check

Left Wing and Leading Edge

Fuel tank vent Check
 Wing surfaces Check
 Fuel measuring sticks Flush and secure
 Leading edge flaps and slats Check
 Access panels Latched

Number 1 Engine

Exhaust area and tailcone Check
 Exhaust tail plug, exhaust case struts and visible turbine blades and
 4th stage blades on LPT – for obvious damage and evidence of
 metal/oil accumulation
 Thrust reverser Stowed
 Fan blades, probes, and spinner Check
 Intake clear and N1 rotates freely
 Probes, sensors, ports, vents, and drains (as applicable)..... Check

Access panels Latched

Left Wing Root, Pack, and Lower Fuselage

- Leading edge flaps.....Check
- Probes, sensors, ports, vents, and drains (as applicable)Check
- Exterior lightsCheck
- Pack and pneumatic access doors.....Secure
- Ram air deflector doorExtended

2.3.2.5 Flight Deck Setup Procedure/Checklist

The pilots with low experience may use Flight Deck Setup Procedure as a Read-and-Do checklist.

FLIGHT DECK SETUP

1. Electrical Power UP (RP or LP)

The following procedure is accomplished to permit safe application of electrical power.

BATTERY switch..... ON
STANDBY POWER switchAUTO
ALTERNATE FLAPS master switchOFF
Windshield WIPER selector(s).....OFF
ELECTRIC HYDRAULIC PUMPS switches.....OFF
LANDING GEAR leverDN

Verify that the green landing gear indicator lights are illuminated.

Verify that red landing gear indicator lights are extinguished.

WEATHER RADAROFF

If external power is available:

Verify that the GND POWER AVAILABLE light is illuminated.

GRD POWER switch ON

Verify that the BUS OFF lights are extinguished.

Verify that the TRANSFER BUS OFF lights are extinguished.

Verify that the STANDBY PWR OFF light is extinguished.

If APU power is required:

APU shall be started and used when external AC power is not available or APU bleed air is required for aircraft airconditioning.

NOTE: The check mentioned below is required before the first flight of the day.

Verify that the engine No.1, APU and the engine No.2 fire switches are in.

OVERHEAT DETECTOR switches.....normal

Fault/Inop Test check

Hold TEST switch to FAULT/INOP.

Verify that the MASTER CAUTION lights are illuminated.

Verify that the OVHT/DET annunciator is illuminated.

Verify that the FAULT is illuminated.

If the fault light fails to illuminate, the fault motoring system is inoperative.

Verify that the APU DET INOP light is illuminated.

Do not operate the APU, if APU DET INOP fails to illuminate.

Overheat/Fire Testcheck

Hold TEST switch to OVHT/FIRE.

Verify that the fire warning bell sounds.

Verify that the master FIRE WARN lights are illuminated.

Verify that the MASTER CAUTION lights are illuminated.

Verify that the OVHT/DET annunciator is illuminated.

Master FIRE WARNING light – Push.

Verify that the master FIRE WARN lights are extinguished.

Verify that the fire warning bell cancels.

Verify engine Nr1, APU, and engine Nr2 fire switches stay illuminated.

Verify that the ENG 1 OVERHEAT and ENG 2 OVERHEAT lights stay illuminated.

EXTINGUISHER TEST chkd

TEST switch position to 1 and hold

Verify that the three green extinguisher test lights are illuminated.

TEST switch release

Verify that the three green extinguisher test lights are extinguished.

Repeat for test position 2.

APU BLEED OFF

Ensure that APU bleed air switch is OFF.

APU START AND ON BUS

Monitor APU EGT, if EGT limits are established. See OM-B 1.7.1 “APU Limitations”

When the APU GEN OFF BUS light is illuminated:

APU GENERATOR bus switches ON

Verify that the BUS OFF lights are extinguished.

Verify that the TRANSFER BUS OFF lights are extinguished.

Verify that the APU MAINT light is extinguished.

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Verify that the APU LOW OIL PRESSURE light is extinguished.

Verify that the APU FAULT light is extinguished.

Verify that the APU OVERSPEED light is extinguished.

WHEEL WELL FIRE WARNING SYSTEM..... CHECK

TEST switch..... hold to OVHT/FIRE

Verify that the fire warning bell sounds, master FIRE WARN lights,
MASTER CAUTION lights and OVHT/DET annunciator illuminate.

Fire warning BELL CUTOFF switch push

Verify that the master FIRE WARN lights are extinguished.

Verify that the fire warning bell cancels.

Verify that the WHEEL WELL fire warning light is illuminated.

APU BLEED AS REQ

Warm-up APU for 1 minute after start before selecting APU bleed on
when required for airconditioning.

2. Preliminary Preflight Procedure (RP or LP)

Flight Deck Door Access System..... Test

For the test procedure refer to OM-B, ch12, 12.1.3 "BOEING/C&D
AEROSPACE ENHANCED FLIGHT DECK SECURITY DOOR AUTOMATIC
LOCKING SYSTEM".

IRS mode selector.....off, then NAV

Verify both ON DC lights illuminate momentarily followed by steady
illumination of the ALIGN lights.

Aircraft library check

Emergency Equipment..... check

Gear Pins (behind RP seat) check

Service Interphone switchoff

Engine Panel..... set

Reverser lights are extinguished.

PMC switches are on.

Verify INOP lights extinguished.

Oxygen Panel..... set

CREW OXYGEN pressure indicator – chkd

Check minimum pressure required for dispatch. See OM-B, ch1,
1.3.11 "Crew Oxygen requirements".

PASSENGER OXYGEN switch – Guard closed.

PASS OXY ON light – extinguished.

Flight Recorder test
 OFF light – illuminated.
 Test switch – TEST
 OFF light – extinguished
 Test switch – NORMAL
Mach airspeed warning test
 Verify clacker sounds.
Stall warning test
 Verify control column vibration when each switch is pushed.
Circuit Breakers (P6) check
 Verify CBs are in or collared in compliance with dispatch requirements.
Crew Oxygen Valve open
Manual Gear Extension Access Door closed
Circuit Breakers (P18) check
 Verify CBs are in or collared in compliance with dispatch requirements.
Parking Brake as required
 Set the parking brake if brake wear indicators will be checked during the exterior inspection.

3. CDU Preflight (RP or LP)

Start the CDU Preflight Procedure anytime after the Preliminary Preflight Procedure. The Initial Data and Navigation Data entries must be complete before the flight instrument check during the Preflight Procedure. The Performance Data entries must be completed before the Before Star Checklist.

LP or RP may make CDU entries. The other pilot must verify the entries.

Enter data in all the boxes items on the following CDU pages.

Enter data in the dashed items or modify small font items that are listed in this procedure. Enter or modify other items at pilot's discretion.

Failure to enter enroute winds can result in flight plan and fuel burn errors.

Initial Data set

IDENT page:

 Verify MODEL is correct.

 Verify ENG RATING is correct.

 Verify the navigation data base ACTIVE date range is current.

POS INIT page:

 Verify time UTC is correct.

 Enter the present position on the SET IRS POS line. Use the most accurate latitude and longitude.

Navigation Data.....set

ROUTE page:

Enter route by company route identifier or origin and destination airports, then waypoints and/or runways.

Enter the FLIGHT NUMBER.

Activate and execute the route.

DEPARTURES page:

Select the active runway and departure/transition routing.

Execute the runway and departure/transition routing.

Verify that the ROUTE and LEGS pages are correct.

Performance Dataset

PERF INIT page:

Verify total fuel quantity is displayed on the CDU and that the fuel quantity indicators agree and are adequate for the planned flight.

Enter gross weight or zero fuel weight, fuel reserve and cost index of 28.

NOTE: With the strong headwind the index **33** should be used.

Enter cruise altitude and verify transition altitude. If desired, enter cruise wind and ISA deviation or top-of-climb temperature.

Thrust mode display:

Verify TO is displayed for airplanes with aspirated TAT probes or dashes are displayed for airplanes with standard TAT probes.

TAKEOFF REF page:

Verify pre-flight complete. Check displayed OAT and check against reported value. Enter the correct value, if necessary.

Enter OAT and takeoff speeds.

If reduced thrust takeoff is planned, enter assumed (SEL) temperature and select the desired mode on the N1 limit page.

4. Preflight Right pilot**Flight Control Panel set**

All 5 switches guards – Down

Flight control LOW PRESSURE lights are illuminated.

YAW DAMPER switch – ON.

YAW DAMPER light is extinguished.

Standby hydraulic LOW QUANTITY light is extinguished.

Standby hydraulic LOW PRESSURE light is extinguished.

- ALTERNATE FLAPS position switch – Off
FEEL DIFF PRESS light is extinguished.
SPEED TRIM FAIL light is extinguished.
MACH TRIM FAIL light is extinguished.
AUTO SLAT FAIL light is extinguished.
- Instrument and NAV Transfer switches normal
VHF NAV transfer switch – NORMAL
IRS transfer switch – NORMAL
EFI transfer switch - NORMAL
- Fuel Panel..... set
FUEL VALVE CLOSED light – illuminated dim.
FILTER BYPASS lights – extinguished.
CROSSFEED selector – closed.
VALVE OPEN light – extinguished.
FUEL PUMP switches – OFF.
Center tank fuel pump LOW PRESSURE lights – extinguished.
Main tank fuel pump LOW PRESSURE lights – illuminated.
- Electrical Panel set
BATTERY switch – Guard closed.
GALLEY power switch – On.
STANDBY POWER switch – Guard closed.
STANDBY PWR OFF light – Extinguished.
Generator drive DISCONNECT switches – Guards closed.
LOW OIL PRESSURE lights – Illuminated.
HIGH OIL TEMP lights – Extinguished.
BUS TRANSFER switch – Guard closed.
TRANSFER BUS OFF lights – Extinguished.
BUS OFF lights – Extinguished.
GEN BUS OFF lights – Illuminated.
- Overheat and Fire Protection Panel as required
Do this check if the flight crew did not do it during the Electrical Power Up procedure (Refer to the Electrical Power Up procedure “If APU power is required”). This check is required before the first flight of the day.
- APU switch as required
If APU is required:
APU start and on bus
(Refer to the Electrical Power Up procedure “If APU power is required”)
- Equipment cooling switches norm
OFF lights – extinguished.
- Emergency Exit lights switch guard closed
NOT ARMED light – extinguished.
- Passenger Signs set
NO SMOKING switch – ON

FASTEN BELTS switch – ON or OFF

Windshield Wiper selectoroff
If not stowed, place the selector in PARK, then OFF.

Window Heat switches.....on
Position switches ON at least 10 min before T/O.
OVERHEAT lights – extinguished.
ON lights – illuminated (except at high ambient temp).

Pitot Static switchesoff
All lights are illuminated.

Wing Anti-Ice switches.....off
VALVE OPEN lights – extinguished.

Engine Anti-Ice switchesoff
COWL VALVE OPEN lights – extinguished.

Hydraulic Panel..... set
ENGINE HYDRAULIC PUMPS switches – ON.
LOW PRESSURE lights are illuminated.
ELECTRICAL HYDRAULIC PUMPS switches – OFF.
OVERHEAT lights are extinguished.
LOW PRESSURE lights are illuminated.

Air Conditioning Panel set
AIR TEMPERATURE source selector – as required
DUCT OVERHEAT lights are extinguished
Temperature selectors – as required
RAM DOOR FULL OPEN lights – illuminated
RECIRCULATION FAN switch – AUTO
PACK switches – one switch AUTO or HIGH, one switch OFF.
ISOLATION VALVE switch – AUTO
Engine BLEED air switches – ON
APU BLEED air switch – as required
If APU BLEED is ON, verify that DUAL BLEED light is illuminated.
PACK TRIP OFF lights are extinguished.
WING-BODY OVERHEAT lights are extinguished.
BLEED TRIP OFF lights are extinguished.

Cabin Pressurization Panel..... set
AUTO FAIL light – extinguished
OFF SCHED DESCENT light – extinguished
FLIGHT ALTITUDE indicator – Cruise altitude
LANDING ALTITUDE indicator – Destination field elevation
CABIN RATE selector * – Index
CABIN ALTITUDE indicator * – 200 ft below destination field elevation
FLT/GRD switch * – GRD
Pressurization mode selector – AUTO

Lighting Panel set

LANDING light switches – RETRACT and OFF.

RUNWAY TURNOFF light switches – OFF.

TAXI light switch – OFF.

Ignition Selector switches L or R

Position IGN R for outbound and IGN L for homebound legs.

Engine start switches off

Lighting Panel set

Logo light switch – As required.

Navigation lights – ON.

STROBE lights – OFF.

ANTI-COLLISION light switch – OFF.

WING illumination switch – As required.

WHEEL WELL light switch – As required.

NAV Mode selector switch* as required

Select FMC, ANS-L, ANS-R as required for navigation system to be used for departure.

Mode control panel set

COURSE(S) – Set

Flight Director switch - ON

Move the switch for PF to ON first.

Oxygen test and set

Airplanes with oronasal mask (with the Mask-Boom switch on the ASP)

Crew oxygen pressure - Check

Audio selector panel – Set

Push FLT INT transmitter selector and receiver switch, and adjust volume controls on receiver switch and overhead speaker.

MASK-BOOM switch - MASK.

Oxygen mask – Stowed and doors closed

RESET/TEST switch – Push and hold

Verify that the yellow cross shows momentarily in the flow indicator.

EMERGENCY/TEST selector – Push and hold

Continue to hold the RESET/TEST switch down and push the EMERGENCY/TEST selector for 5 seconds. Verify that the yellow cross shows continuously in the flow indicator.

Verify that the crew oxygen pressure does not decrease more than 100 psig.

If the oxygen cylinder valve is not in the full open position, pressure can:

- decrease rapidly, or
- decrease more than 100 psig, or
- increase slowly back to normal.

Push-to-talk switch – I/C

While holding RESET/TEST slide lever down and pushing the EMERGENCY/TEST selector, simultaneously key microphone and listen for oxygen flow sound through the overhead speaker.
Release the push-to-talk switch, the RESET/TEST switch, and the EMERGENCY/TEST selector.
Verify that the yellow cross does not show in the flow indicator.
Normal/100% selector – 100%
Audio selector panel – Set
MASK-BOOM switch - MASK.
Set audio selector panel as desired.

Airplanes with full face mask (without the Mask-Boom switch on the ASP)

Crew oxygen pressure - Check
Audio selector panel – Set
Push FLT INT transmitter selector and receiver switch, an adjust volume controls on receiver switch and overhead speaker.
Mask – Stowed
Verify that the doors are closed.
Verify that no OXY ON flag is observed.
TEST-RESET switch – Push and hold
Verify that the yellow cross shows momentarily in the flow indicator.
EMERGENCY/TEST selector – Push and hold
Continue to hold the TEST-RESET switch and push the EMERGENCY/TEST selector for 5 seconds. Verify that the yellow cross shows continuously in the flow indicator.
Verify that the crew oxygen pressure does not decrease more than 100 psig.
If the oxygen cylinder valve is not in the full open position, pressure can:
▪ decrease rapidly, or
▪ decrease more than 100 psig, or
▪ increase slowly back to normal.

Push-to-talk switch – I/C
While holding the TEST-RESET switch and pushing the EMERGENCY/TEST selector, simultaneously key microphone and listen for oxygen flow sound through the overhead speaker.
Release the Push-to-talk switch, the TEST-RESET switch and the EMERGENCY/TEST selector.
Verify that the yellow cross does not show in the flow indicator.
Normal/100% selector – 100%
Audio selector panel – Set
Set audio selector panel as desired.

Marker Beacon lights*test
Clockset
Disengage light TEST switchtest

Hold to 1:

- A/P light is illuminated steady amber.
- A/T light is illuminated steady amber.
- FMC light is illuminated steady amber.

Hold to 2:

- A/P light is illuminated steady red.
- A/T light is illuminated steady red.
- FMC light is illuminated steady amber.

Flight Instrumentscheck

Do the Initial Data and Navigation Data steps from the CDU Preflight Procedure and verify that the IRS alignment is complete before checking the flight instruments.

Set altimeter.

Airspeed cursor control – push.

Verify that the flight instrument indications are correct.

Verify that only expected RDMI flags are shown.

Verify that the flight mode annunciations are correct:

- autothrottle mode is blank
- roll mode is blank
- pitch mode is blank
- AFDS status is FD.

Ground Proximity Panelcheck

FLAP INHIBIT switch – Guard closed.

GEAR INHIBIT switch – Guard closed.

INOP light is extinguished.

GPWS test push momentarily

Verify proper operation of the following:

- BELOW G/S and GPWS INOP lights illuminate.
- PULL UP and WINDSHEAR alerts illuminate.
- “GLIDESLOPE”, “PULL UP” and “WINDSHEAR” aural sound.
- Hold the test switch at least 10sec to test the above indications and any additional GPWS aural alert.

Landing Gear Panel set

LANDING GEAR LEVER – DN.

Green landing gear indicator lights are illuminated.

Red landing gear indicator lights are extinguished.

Antiskid switch guard closed

Verify ANTISKID INOP light – extinguished.

Auto Brake Selector RTO

AUTOBRAKE DISARM light – extinguished.

Engine instruments chkd

REVERSER UNLOCKED lights – extinguished.

A/T LIM light – Extinguished.

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- START VALVE OPEN lights – extinguished.
LOW OIL PRESSURE lights – illuminated.
OIL FILTER BYPASS lights – extinguished.
N1 manual set knob – push.
FUEL USED RESET switch – push.
Verify that the primary and secondary engine indications show existing conditions.
Check minimum oil quantity: 75% at home base, 60% at outstation.
Hydraulic Quantity Indications..... verify RF not shown
Check hydraulic quantity above RF level (88%).
Cargo Fire Panel* check
DETECTOR SELECT switches - NORM
TEST switch - push
Verify fire warning bell sounds and master FIRE WARNING lights illuminate
Master FIRE WARN light – push
Verify master FIRE WARN lights and fire warning bell cancel
Verify cargo fire (FWD, AFT) warning lights are illuminated
Verify DETECTOR FAULT light remains extinguished
Verify the green EXTINGUISHER test lights are illuminated
Verify the cargo fire bottle DISCH light is illuminated
EFIS Control Panel set
Decision height selector – “-20”.
Mode selector – MAP.
Range selector – as required.
TRAFFIC switch* - as required.
WEATHER RADAR – OFF.
Verify that weather radar indications are not shown on the MAP.
Map switches – as required.
VHF Communication Radios..... set
VHF Navigation Radios set
Audio Control Panel set
ADF Radios set
Weather Radar Panel set
Verify that weather radar indications are not shown on the MAP.
Transponder Panel..... set
Stabilizer Trim Override switch guard closed
Seat..... adjust
Adjust the seat for optimum eye reference.
Verify a positive horizontal (fore and aft) seat lock.
Rudder Pedals adjust
Adjust the rudder pedals to allow full rudder pedal and brake pedal movement.
Seat Belts and Shoulder Harness adjust

5. Preflight Left pilot (RP may do this procedure if required)

Gear pins chkd

Lights test

Master LIGHTS TEST and DIM switch – TEST.

The fire warning lights are not checked during this test.

Use individual test switches or push to test features to check lights, which do not illuminate during the light test. Use scan flow to check all lights flashing or illuminated. Verify that all systems annunciator panel lights are illuminated.

Master LIGHTS TEST and DIM switch – as required.

NAV Mode Selector* as required

Select FMC, ANS-L, ANS-R as required for navigation system to be used for departure.

Mode Control Panel set

COURSE(S) – Set.

FLIGHT DIRECTOR switch – ON.

Move the switch for PF to ON first.

Bank angle selector – as required.

Autopilot DISENGAGE bar* - UP.

Oxygen..... test and set

Airplanes with oronasal mask (with the Mask-Boom switch on the ASP)

Crew oxygen pressure - Check

Audio selector panel – Set

Push FLT INT transmitter selector and receiver switch, and adjust volume controls on receiver switch and overhead speaker.

MASK-BOOM switch - MASK.

Oxygen mask – Stowed and doors closed

RESET/TEST switch – Push and hold

Verify that the yellow cross shows momentarily in the flow indicator.

EMERGENCY/TEST selector – Push and hold

Continue to hold the RESET/TEST switch down and push the EMERGENCY/TEST selector for 5 seconds. Verify that the yellow cross shows continuously in the flow indicator.

Verify that the crew oxygen pressure does not decrease more than 100 psig.

If the oxygen cylinder valve is not in the full open position, pressure can:

- decrease rapidly, or
- decrease more than 100 psig, or
- increase slowly back to normal.

Push-to-talk switch – I/C

While holding RESET/TEST slide lever down and pushing the EMERGENCY/TEST selector, simultaneously key microphone and listen for oxygen flow sound through the overhead speaker.

Release the push-to-talk switch, the RESET/TEST switch and the EMERGENCY/TEST selector.

Verify that the yellow cross does not show in the flow indicator.

Normal/100% selector – 100%

Audio selector panel – Set

MASK-BOOM switch - MASK.

Set audio selector panel as desired.

Airplanes with full face mask (without the Mask-Boom switch on the ASP)

Crew oxygen pressure - Check

Audio selector panel – Set

Push FLT INT transmitter selector and receiver switch, an adjust volume controls on receiver switch and overhead speaker.

Mask – Stowed

Verify that the doors are closed.

Verify that no OXY ON flag is observed.

TEST-RESET switch – Push and hold

Verify that the yellow cross shows momentarily in the flow indicator.

EMERGENCY/TEST selector – Push and hold

Continue to hold the TEST-RESET switch and push the EMERGENCY/TEST selector for 5 seconds. Verify that the yellow cross shows continuously in the flow indicator.

Verify that the crew oxygen pressure does not decrease more than 100 psig.

If the oxygen cylinder valve is not in the full open position, pressure can:

- decrease rapidly, or
- decrease more than 100 psig, or
- increase slowly back to normal.

Push-to-talk switch – I/C

While holding the TEST-RESET switch and pushing the EMERGENCY/TEST selector, simultaneously key microphone and listen for oxygen flow sound through the overhead speaker.

Release the Push-to-talk switch, the TEST-RESET switch and the EMERGENCY/TEST selector.

Verify that the yellow cross does not show in the flow indicator.

Normal/100% selector – 100%

Audio selector panel – Set

Set audio selector panel as desired.

Marker Beacon lights* test

Marker Beacon switch* as required

Clock set

Nose Wheel Steering switch guard closed

Disengage light TEST switch test

Hold to 1:

A/P light is illuminated steady amber.

A/T light is illuminated steady amber.

FMC light is illuminated steady amber.

Hold to 2:

A/P light is illuminated steady red.

A/T light is illuminated steady red.

FMC light is illuminated steady amber.

Heading Reference Switch*norm

Flight Instrumentscheck

Do the Initial Data and Navigation Data steps from the CDU Preflight

Procedure and verify that the IRS alignment is complete before checking the flight instruments.

Set altimeter.

Airspeed cursor control – push.

Verify that the flight instrument indications are correct.

Verify that only expected RDMI flags are shown.

Verify that the flight mode annunciations are correct:

- autothrottle mode is blank
- roll mode is blank
- pitch mode is blank
- AFDS status is FD.

Standby Instrumentscheck

Standby altimeter – Set.

Verify that the flight instrument indications are correct.

Verify that no flags are shown.

Standby horizon – Set.

Gyro caging control – Pull, then release.

Approach mode selector – as required.

Verify that the flight instrument indications are correct.

Verify that no flags are shown.

Brake Temperature System* test

For the test procedure refer to OM-B, ch12, 12.14.2 “Brake Temperature System Check”.

STAB OUT OF TRIM light verify extinguished

Fuel quantity indicators test

For the test procedure refer to OM-B, ch12, 12.12.8 “Fuel quantity indicator test”.

Speed Brake Leverdown detent

SPEED BRAKE DO NOT ARMED light – extinguished.

SPEED BRAKE ARMED light – extinguished.

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- SPEED BRAKE light – extinguished.
- Reverse Thrust Lever..... down
- Forward Thrust Lever..... closed
- Flap Lever set
- Set the flap lever to agree with the flap position.
- Verify that the FLAP LOAD RELIEF light is extinguished.
- Parking Brake..... set
- Verify that the parking brake warning light is illuminated
- Note:** Do not assume that the parking brake will prevent airplane movement.
- Accumulator pressure can be insufficient
- Engine Start Levers..... cut off
- Stabilizer Trim Cut Out switches.....normal
- EFIS Control Panel set
- Decision height selector – “-20”.
- Mode selector – MAP.
- Range selector – as required.
- TRAFFIC switch* - as required.
- WEATHER RADAR – OFF.
- Verify that weather radar indications are not shown on the MAP.
- Map switches – as required.
- VHF Communication Radios..... set
- VHF Navigation Radios..... set
- Audio Control Panel set
- Seat..... adjust
- Adjust the seat for optimum eye reference.
- Verify a positive horizontal (fore and aft) seat lock.
- Rudder Pedals adjust
- Adjust the rudder pedals to allow full rudder pedal and brake pedal movement.
- Seat Belts and Shoulder Harness adjust

2.3.2.6 Normal Checklist Abbreviated

PREFLIGHT

OXYGENTESTED, 100%

See Preflight Left/Right pilot ("Oxygen – test and set").

INSTRUMENT TRANSFER SWITCHES NORMAL

WINDOW HEATON

Window heat must be ON 10 at least minutes before take-off.

ON lights may be extinguished when high ambient temperature.

PRESSURIZATION Set, AUTO and GRD*

Check:

Cruise altitudeSet

Destination field elevation..... Set

CABIN RATE selector Set to index

CABIN ALTITUDE. is set 200 ft below destination field elevation

FLT/GRD switch GRD*

Pressurization mode selector AUTO

AUTO FAIL light Extinguished.

FLIGHT INSTRUMENTS.....HEADING__, ALTIMETER__

EADI Correct orientation

Standby ATTErect

EHSI Correct orientation

ADF needles.....Maintaining correct bearing

VOR needlesMaintaining correct bearing

Standby compass, RMI Correct course

Altimeters..... Reading within tolerance (OM-A, 8.1)

PARKING BRAKE..... SET

Verify that the parking brake warning light is illuminated

Note: Do not assume that the parking brake will prevent airplane movement. Accumulator pressure can be insufficient

ENGINE START LEVERS..... CUTOFF

FUEL DOOR..... CLOSED

RP check via right hand side window.

TAXI AND TAKEOFF BRIEFINGSComplete

BEFORE START (flight documents are on board)**Procedure**

LP	RP
• CDU PREFLIGHT • MCP • TAKEOFF SPEEDS • DOORS/WINDOWS • Trim	• FLIGHT DECK DOOR • CDU PREFLIGHT • N1 bugs • TAKEOFF SPEEDS • DOORS/WINDOWS When Push Back/Start Up clearance is received. • FUEL • HYDRAULIC PUMPS** • ANTI COLLISION LIGHT

** See Note in appropriate item below

FLIGHT DECK DOOR CLOSED/LOCKED

Verify that the CAB DOOR UNLOCKED/LOCK FAIL light is extinguished

FUEL kgs, Pumps ON

If the center tank fuel quantity exceeds 453 kgs:

LEFT and RIGHT CENTER FUEL PUMPS switches – ON.

Verify that the LOW PRESSURE lights illuminate momentarily and then extinguish.

If the LOW PRESSURE light stays illuminated turn off the CENTER FUEL PUMPS switch.

AFT and FORWARD FUEL PUMPS switches – ON.

Verify that the LOW PRESSURE lights are extinguished.

PASSENGER SIGNS..... ON

NO SMOKING switch – ON

FASTEN BELTS switch – ON

HYDRAULIC PUMPS.....NORMAL/PUSHBACK

Note: Take safety precautions before switching ON the hydraulic pump for system pressurization.

If pushback is required:

System A HYDRAULIC PUMP switches – OFF.

Verify that the system A pump LOW PRESSURE lights are illuminated.

System B electric HYDRAULIC PUMP switch – ON.

Verify that the system B electric pump LOW PRESSURE light is extinguished.

Verify that the brake pressure and the system B pressures are 2,800 psi minimum.

If pushback is not required:

Electric HYDRAULIC PUMP switches – ON.

Verify that the electric pump LOW PRESSURE lights are extinguished.

Verify that the brake pressure and the system A and B pressures are 2,800 psi minimum.

DOORS/WINDOWSCLOSED/LOCKED

Exterior doors Closed

All exterior door annunciator lights – extinguished

Flight deck windows Closed and locked

Windows – closed, lock levers – in forward position.

MCPV2____, HDG____, ALT____

IAS/MACH selector – Set V2

Initial heading – Set

Initial altitude – Set

TAKEOFF WEIGHT/SPEEDS.....____ TONS FOR ____RWY

Verify that the speed bugs are set at V1, VR, V2+15, and flaps up maneuvering speed according to aircraft weight and RWY conditions (DRY, WET, CONTAMINATED).

CDU PREFLIGHT.....COMPLETE/CROSSLOAD*

RP completes the CDU Preflight Procedure – Performance Data steps. Both pilots crossload if installed.

Normally the PF selects the TAKEOFF REF page and PM the LEGs page.

Trim Set

Check each trim for freedom of movement.

Stabilizer trim - ____ UNITS

Set the trim for take off, verify the trim is in green band.

Aileron trim – 0 units.

Rudder trim – 0 units.

RUDDER AND AILERON TRIM FREE AND 0

Ensure that procedural item “Trim” was complete in extend of the rudder and aileron trims.

ANTI COLLISION LIGHT ON

ENGINE START

Procedure	
LP	RP
Start sequence	- PACKS - Start pressure

Air conditioning PACK switchesOFF

Start pressure psi

The minimum start pressure at sea level is 30psi. Allow .5psi reduction for each 1000 feet above sea level.

Start sequence Announce

BEFORE TAXI

Procedure	
LP	RP
- ENGINE START LEVERS - Ground equipment - FLIGHT CONTROLS - RECALL - CLEAR SIGNAL	- GENERATORS - PITOT HEAT - ANTI-ICE - HYDRAULIC PUMPS** - PACKS/ISOLATION VALVE - APU bleed - PRESSURIZATION - Taxi light - ENGINE START SWITCHES - Ground equipment - Flaps** - TRANSPONDER - RECALL

** See Note in appropriate item below

GENERATORSON

Check generators voltage and frequency.
Set GENERATORS 1 and 2 switches to ON.
GEN OFF BUS – extinguished.

PITOT HEATON

All probe heat lights – extinguished.

ANTI-ICE AS REQ

Engine A/I must be ON, when icing conditions exist or is anticipated.
See limitations: Engine anti-ice systems OM-B 1.7.11
Wing anti-ice system OM-B 1.7.12

HYDRAULIC PUMPS ON

NOTE: Take safety precautions before switching ON the hydraulic pump for system pressurization.

If pushback was required:

System A HYDRAULIC PUMP switches – ON.
Verify that the system A pumps LOW PRESSURE lights are extinguished.
Verify that the system A pressure is 2,800 psi minimum.

PACKS/ISOLATION VALVEAUTO

Set PACKS switches to AUTO.
Set ISOLATION VALVE switch to AUTO.

APU bleedAs req

APU BLEED air switch – OFF.
No engines bleed T/O – ON.

PRESSURIZATION AUTO and FLT*

Set FLT/GRD switch* to FLT and/or confirm Pressurization mode selector in AUTO.

Taxi light ON

ENGINE START SWITCHES CONT

RECALL.....CHECKED

RP - recall and review the system annunciator lights.
LP - review the system annunciator lights.

AUTOBRAKE RTO

AUTOBRAKE DISARM light – extinguished.

ENGINE START LEVERS IDLE DETENT

Ground equipment.....Clear

Flaps.....Set takeoff flaps

Note: Request LP confirmation before selecting the flaps
Verify that the LE FLAPS EXT light is illuminated.

FLT CONTROLS..... CHECKED

Displace rudder pedals, control wheel and control column in both directions to full travel. Verify freedom of movement and controls return to center.

Hold nose wheel steering wheel during rudder check to prevent nose wheel movement.

TRANSPONDER AS REQ**CLEAR SIGNALRECEIVED**

Await "all clear signal" and nose wheel gear pin shown by ground crew.

TAXI**Procedure**

LP	RP
• TAKEOFF BRIEFING	• APU • TAKEOFF BRIEFING

APU AS REQ

APU – OFF or DELAY OFF.

APU – ON in case of no engine bleed T/O.

Note: It is recommended that the APU be operated for one full minute with no pneumatic load prior to shut down.

FLAPS GREEN

Flap position indicator and FLAP lever – set for T/O (5⁰ or 15⁰)

LEADING EDGE FLAPS EXTENDED green light – illuminated

During freezing precipitation extend flaps into T/O position shortly before T/O using procedure for not completed checklist.

STABILIZER TRIM UNITS

Ensure that the stabilizer trim is set for TO.

TAKEOFF BRIEFING..... AS REQ

Non-standard, Revised or Amended ATS clearance shall be repeated in addition to ATS clearance limit (altitude/FL to climb) selected on APA.

CABIN..... SECURE

"Slides armed, cabin secure" report received from Cabin crew.

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LINE-UP

Procedure	
LP	RP
AUTOTHROTTLE - TCAS DISPLAY*	CABIN SIGNAL Light/Strobe TRANSPONDER CONFIG - TCAS DISPLAY*

* Optional

CABIN SIGNALGIVEN

Switch OFF then ON FASTEN BELTS sign, thus making cabin crew to be seated for T/O.

AUTOTHROTTLE.....ARM

Verify that atothrottle mode annunciator on ADI – ARM.

Light/Strobe..... ON

When entering the departure RWY set:

- STROBE - ON
- R/W TURNOFF lights – ON

When cleared for takeoff set:

- INBOARD LDG lights – when required
- TAXI light – OFF

TRANSPONDER ON

Activate transponder, when cleared for line up.

NOTE: TCAS DISPLAY (OPTIONAL) – press the right button on TCAS indicator on the Instrument Panel to have the presentation.

CONFIGURATION.....CHKD

Check the following: Flaps for take-off;
 Elevator Trim for take-off
 Speed brakes Down detent

AFTER TAKEOFF

Procedure

PF	PM
ALTIMETERS	- ALTIMETERS - Anti-ice as required - AIR COND - APU as required - Engine start switches - LANDING GEAR - Autobrake - CDU display - VHF NAV - AUTO

- AIR COND** **PACKS AUTO, BLEEDS ON**
Engine bleedsON
Set or verify that the engine bleeds are operating.
Packs..... AUTO
Set or verify that the air conditioning packs are operating.
- Engine start switches**..... **As req**
- LANDING GEAR** **UP and OFF**
Landing gear..... Up, no lights
Set landing gear selector to OFF, after landing gear retraction is complete.
- Autobrake** **Off**
- CDU display**..... **Set**
PM selects the CLIMB page on the PF CDU, keeping the LEGs page on its side.
- FLAPS** **UP, NO LIGHTS**
Flap lever Select UP
Trailing edge flap indicator Flaps ZERO
Leading edge flaps, slats indicator Extinguished

ALTIMETERS 1013* SET/X-CHKD

Set altimeters 1013, when cleared to FLIGHT LEVEL, but not later than passing transition altitude.

NOTE: PF should respond first: “1013 set, (*reading*)”, then PM responds: “1013, Cross checked”

VHF NAV.....Auto

Set VHF NAV to AUTO, when not required for for climb out procedure.

10 000 FEET

Procedure	
PF	PM
	• Lights • Belts • Pressure

10 000 feet procedureLights, Belts, Pressure

LDG, Runway Turnoff, LOGO lights - OFF

FASTEN BELTS OFF, if otherwise not required

PRESSURE: Cabin altitude Appropriate

Cabin Rate of Climb Appropriate

ΔP Increasing

DESCENT

Procedure	
PF	PM
• RECALL • LANDING DATA • FUEL • APPROACH BRIEFING • Seats & Harness	• PRESSURIZATION • RECALL • LANDING DATA • AUTOBRAKE • Seats & Harness

PRESSURIZATION Elevation__feet set

Verify that pressurization is set to landing altitude.

RECALLCHKD

PM - recall and review the system annunciator lights.
PF - review the system annunciator lights.

AUTOBRAKE _____

For autobrake LDG distances, see normal checklist's last page.

FUEL.....CHKD

Check fuel balance and quantity against minimum fuel for diversion.

LANDING DATA..... VREF____, Mininmums____

Set SPEEDBOOK for the Landing weight.
Verify VREF on the APPROACH REF page.
Set double bugs at VREF, single bug at VREF+15, and flaps up maneuvering speed.
Set altimeter minimums as required for approach.
Set or verify the navigation radios and course for approach.

APPROACH BRIEFING COMPLETE

Review the approach briefing.

Seats & Harness..... Secure

Flight Deck Crew Seats locked and harness secure when starting descent but not later that pasing 10 000'.

10 000 FEET

Procedure

PF	PM
	- Lights - Belts - Pressure

10 000 feet procedure..... Lights, Belts, Pressure

Runway Turn-off lightsON

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LOGO lightas required
FASTEN BELTS ON
PRESSURE: Cabin.....Descending
 Cabin Rate of Descent Appropriate
 ΔP.....Decreasing

PM orders “**Cabin crew prepare cabin for landing**”.

APPROACH

Procedure	
PF	PM
• ALTIMETERS	• ALTIMETERS • APPROACH SETUP

ALTIMETERS QNH & X-CHKD

Set altimeters to QNH, when cleared to ALTITUDE, but not later than crossing Transition Level.

NOTE: PF should respond first: “QNH”, then
PM responds: “QNH....., Cross checked”.

FASTEN BELTS ON

Ensure that the FASTEN BELTS switch is ON

APPROACH SETUPCOMPLETE

PM completes Approach setup (minimum 5nm laterally to the RWY extension or 20nm to go to the touchdown):

- VHF-NAV - MANUAL (both sides)
- MCP COURSE INDICATOR – inbound course (both sides)
- STANDBY HORIZON – ILS*
- RMI – VOR/ADF (as required)
- VHF-NAV aids – identified.

CABINSECURE

When “Cabin secure” command is obtained.

LANDING**Procedure**

PF	PM
• HDG/ALT • SPEEDBRAKE (LP)	• CABIN SIGNAL • External lights • ENGINE START SWITCHES

CABIN SIGNAL GIVEN

Switch OFF then ON FASTEN BELTS sign, thus making cabin crew to be seated for LDG.

External lightsas required

TAXY – ON, when landing clearance has been received.

LANDING – when required for landing.

ENGINE START SWITCHESCONT**HDG/ALT FOR GO-AROUND**

Set HDG and missed approach altitude on the MCP after GS captured.

NOTE: For non-precision approach Altitude Preselector and Heading Mode may be still in use.

SPEEDBRAKES..... ARMED, green

Ensure SPEED BRAKE ARMED green light illuminate.

LANDING GEARDOWN, 3 greens

Set Landing Gear lever – Down.

Ensure that landing gear indication - 3 green lights.

FLAPS⁰, green

Flap position indicator and FLAP lever – set for LDG (30⁰ or 40⁰)
LEADING EDGE FLAPS EXTENDED green light – illuminated.

AFTER LANDING

Procedure

Note: For operational reasons the Procedure is executed from the bottom to the top flow order.

LP	RP
SPEEDBRAKE	- TRANSPONDER - WEATHER RADAR - FLAPS - Autobrake - Flight director switches off - Lights - APU - ENGINE START SWITCHES - Strobe - Pressurization - Anti-ice

APU **ON**

Start the APU if not already started.

Anti-ice **AS REQ**

Set Engine and Wing anti-ice as required.

Pressurization **CHKD/GND***

Set FLT/GND switch* to GND

Lights **Taxi**

LANDING lights **OFF**

RWY TURNOFF As required

TAXI Confirm **ON**

ENGINE START SWITCHES **OFF**

Strobe **Steady/OFF***

Autobrake OFF

SPEEDBRAKE..... DOWN DETENT

FLAPS UP, NO LIGHTS

Flap position indicator and FLAP lever – 0°

LEADING EDGE FLAPS EXTENDED green light – extinguished.

NOTE: Retract the flaps to 15°, when there is ice, slush or snow on the wings.

WEATHER RADAR OFF

TRANSPONDER AS REQ

Set transponder to SBY when RW vacated or XPNDR to keep it ON according to local regulations.

ELECTRICAL ON (APU or ENGINES)

Should be confirmed by LP before switched on.

If APU power is required:

Verify that the ARU GENERATOR OFF BUS light is illuminated.

APU GENERATOR bus switch – ON

Verify that the BUS OFF light is extinguished.

SHUTDOWN (read and do checklist)

PARKING BRAKE..... SET

Set BRAKES lever to PARK, brake warning light – ON, brake pressure checked.

Release the Parking brake after wheel chocks are in place.

NOTE: Parking brake shall not be released whenever wind velocity exceeds 30 kts. In addition, the Commander shall ensure that the wheel chocks are in place for both main gears, whenever wind exceeds 40 kts.

ENGINE START LEVERS..... CUTOFF

If possible, operate the engines at idle for 3 minutes prior to shutdown to thermally stabilize the engine hot sections. Operating times at or near idle, such as taxiing before shutdown, are applicable to this 3-minute period. If operational requirements dictate, the engines may be shut down with a 1 minute cooling

period. Routine cool down times of less than 3 minutes before shut down are not recommended.

FASTEN BELTS**OFF**

PA**GIVEN**

Order via PA "Cabin crew, doors to manual".

IRSs**OFF**

Set IRSs mode selectors to OFF.

FUEL PUMPS**OFF**

If APU is left running leave the LH FWD fuel pump ON

CAUTION: Do not operate the center tank fuel pumps with the flight deck unattended.

PITOT HEAT**OFF**

Select Pitot heat switches to OFF.

ANTI-ICE**OFF**

Ensure, that WING ANTI-ICE switch is OFF.

Ensure, that ENGINE ANTI-ICE switches are OFF.

ELEC HYD PUMPS**OFF**

LIGHTS**OFF**

Ensure TAXI, RUNWAY TURNOFF lights are OFF, Wing Tip Position and Logo lights as required.

ANTI COLLISION light - OFF, when N1 < 10%.

FLAPS **AS REQ**

Ensure that flaps are UP or 15⁰ (in case of prolonged operation in icing conditions for subsequent inspection).

TRANSPONDER**OFF**

MOBILE PHONE **AS REQ**

Switch the mobile phone on at outstations.

SECURE (completed by RP)**GALLEY OFF****EMERG EXIT LIGHTS OFF****WINDOW HEAT OFF**

Set Window heat switches to OFF.

RECIRCULATION FAN..... OFF**PACKS OFF**

Set air conditioning pack switches to OFF.

Lighting OFF

Switch off all internal and external lighting except Wing tip lights for turn around in dark time and/or Low Visibility Operations

STAB TRIM AS REQ

Apply electrical nose down for:

Long turaround/Night stop,

Moderate precipitations.

ELECTRICAL POWER DOWN (completed by RP)

The procedure assumes the SECURE procedure is complete.

APU/GRD POWER..... OFF

If APU was operating:

It is recommended that the APU be operated for one full minute with no pneumatic load prior to shut down.

BATTERY OFF

If APU was operating:

Delay approximately 20 seconds after APU shut down for the APU door to close to assure the APU will start on the next flight

If power is required for aircraft service set GRN SERVICE switch to ON.

INTENTIONALLY LEFT BLANK

2.4 LOW VISIBILITY PROCEDURES

2.4.1 General

Low Visibility Procedures (LVP) – procedures applied at an aerodrome for the purpose of ensuring safe operations during Cat 2 and Cat 3 approaches and Low Visibility Take-offs.

LVP is initiated by ATC when the weather deteriorates below established parameters (usually 200'/800m) to provide the following:

- The information to flight crews about the weather and status of the ground facilities;
- The OFZ (Obstacle Free Zone) will be clear of obstacles such as vehicles and aircraft;
- The ILS sensitive area will be clear of all vehicles and aircraft capable of causing reflection and/or refraction of signals;
- Safeguarding actions of maneuvering area (runways, taxiways, apron areas), provide protection of maneuvering areas from uncontrolled traffic;

Increased minimum separation between aircraft during approach.

2.4.2 Taxi

In addition to basic procedures for taxi (see Ch 2.2.4) the following should be considered:

- Use utmost care to taxi according to issued clearance with the airfield map available in the chart holder on the handwheel.
- Do not hesitate to request from ATC the positions of other taxiing aircraft or to ask for a “follow me” car.
- Taxi as slowly as necessary for safety. Bear in mind that poorly lit obstacle such as aircraft tails or wing tips and their navigation lights from certain angles do not show up well.
- Taxi check to be performed with the aircraft stopped at the holding area.
- Always confirm an authorization to cross a red stop-bar when it is lit.

2.4.3 Low Visibility Take-Off

Low Visibility Take-Off (LVTO) – a take-off where the Runway Visual Range (RVR) is less than 400 m, and Low Visibility Procedures are in force.

2.4.3.1 Requirements

Before commencing a LVTO the Commander shall satisfy himself that:

- Appropriate Low Visibility Procedures are in force;
- Both pilots are qualified for LVTO (check CAT 2/3 RATING forms);
- Take-off alternate is selected and reported to ATS;
- The weather is not below the Take-off Minima, which is established to ensure sufficient guidance to control the aircraft in the event of critical engine failure and depends on the runway visual facilities:

Facilities	RVR/Visibility
Nil (day only)	500
RW edge lighting and/or centerline marking	250*
RW edge and centerline lighting	200
RW edge and centerline lighting and multiple RVR	150

* For night operations at least RW edge and RW end lights are required.

Use of multiple RVR

Normally TDZ, Midpoint and Stopend reports should be available.

- Midpoint RVR shall never be below the take-off minima.
- TDZ RVR (initial part of take-off run) - can be replaced by pilot assessment from the line up position.

NOTE: The spacing of CL and RL can be checked by comparing with TDZ lights that are always spaced 30 m. If TDZ lights are not available or in doubts, ask ATC about the spacing of the lights.

- Stop-end RVR may be disregarded provided GWC calculations show that only the first two segments of the runway are needed for take-off.

2.4.3.2 Take-off Execution

LP shall perform LVTO with the FULL take-off thrust.

In addition to normal take-off, Localizer frequency should be selected on NAV 2 with LOC check during line-up for proper indication and subsequent deviation check/call-outs during take-off conducted by RP.

2.4.4 CAT 2/3 Approach

2.4.4.1 General

Cat 2 approach is a single autopilot coupled precision monitored approach completed by manual landing or dual autopilots coupled precision monitored approach completed by automatic landing, with a Decision Height (DH) between 200 and 100 feet, and controlling runway visual range not less than 300m.

LIMITATIONS:

1. For Manual landing the autopilot may remain engaged down to 50' RA;
2. As in table in Appendix 2.

Cat 3 approach is dual autopilots coupled precision monitored approach completed by automatic landing with Decision Height (DH) of 50 feet and controlling runway visual range not less than 200m. .

LIMITATIONS:

1. The second autopilot must be engaged in CMD and the second VHF NAV receiver must be turned to the ILS frequency by 800 feet RA.
2. If FLARE is not armed by 350 feet RA, both A/Ps disengage automatically.
3. If stabilizer is out of trim below 800 feet RA both A/Ps disengage automatically at 50 feet RA.
4. As in table in Appendix 2

2.4.4.2 Approach planning

To execute Cat 2/3 approach the following requirements shall be fulfilled:

- Low Visibility Procedures are in force.
- airBaltic is authorized to use Cat 2/3 Minima for particular country/aerodrome as specified in Appendix 1 of this section .
- Weather and RW conditions are within the limitations for Cat 2/3 Operations (see Appendix 2 of this section).
- Status of the aerodrome facilities is sufficient for Cat 2/3(App 2).
- Status of the aircraft and it's relevant systems is adequate(App 2).
- Pilots are properly qualified (check Cat 2/3 RATING form).

Pilot's qualification

Properly filled CAT2/3 RATING form shall be carried along at all times while on flight duty as a document proving pilot's qualification for particular category of operations.

Pilots are individually responsible to keep once achieved Cat 2/3 qualification by timely completion of required number of Cat 2/3 approaches in acc with Recency requirements stated in para. 3) below.

1) Initial/Recurrent training

Both pilots have completed the Cat 2/3 training (OM Part D, para 4.9).

Line training consists a minimum of three (3) landings using Cat 2/3 simulated approach procedure (see 2.4.4.5 below).

Simulator training and Line training shall be signed of by appropriate Instructor/Line Captain (Cat 2/3 RATING form).

2) Type and command experience

The following additional requirements are applicable to Commanders who are new on the airplane type:

- 50 hours or 20 sectors as the Commander on a/c type before performing any Cat 2/3 operation; and
- During first 100 hours or 40 sectors as the Commander on a/c type: 100 m must be added to the applicable Cat 2 RVR minima unless previously qualified for Cat 2/3 operations.

NOTE: There are no additional requirements for the First Officer new on type. The qualification for him is obtained just after three Cat 2/3 simulated approaches during Line Training.

3) Recency requirements

A minimum of 3 approaches and landings using approved Cat 2/3 procedures during the previous 6-month period. Two approaches and one go-around have to be completed during Proficiency Check as mandatory exercise and at least one approach (real or simulated) shall be conducted in the airplane. All conducted approaches shall be properly documented in CAT2/3 RATING form.

2.4.4.3 Approach Execution General

a) **Approach Ban Rules** (Commencement and continuation of approach)

An Cat2/3 approach may be commenced regardless of the reported RVR/Visibility.

If the reported RVR/visibility is less than the applicable minima, an instrument approach shall not be continued below **1 500' Radio Altitude** when decision to establish final approach configuration and speed shall be made.

If the reported RVR/visibility falls below the applicable minimum after that, when final approach configuration and speed have been established, the approach may be continued **to DH**.

The approach may be continued **below** and the landing may be completed provided that the required visual reference is established and maintained.

NOTE: For minimum values of multiply RVR report see table in Appendix 2

Stabilized Approach Concept (see 2.2.9.1, b)

Cat2/3 Approach shall be stabilized at **1 000'RA**.

b) **Transition to visual landing**

Transition from instrument approach to visual landing shall be started not later than at 100' to Minimum and shall be accomplished not later than at Minimum (DH).

The approach may not be continued **below DH** unless a visual reference containing a segment of at least 3 consecutive lights being the:

- centerline of the approach lights;
- touchdown zone lights;
- runway centerline lights;
- runway edge lights, or

a combination of these is attained and can be maintained.

NOTE: for Cat 2 approach this visual reference must include a lateral element of the ground pattern, i.e. an approach lighting crossbar or the landing threshold or a barrette of the touchdown zone lighting.

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c) Use of Altimeters

Radio Altimeters are primary altimeters for CAT 2/3 approaches.

Cat 2 Minima for particular runway, presented in IAL charts in Route Manual or standard Cat 3 Minimum of 50'feet RA shall be:

- set on both Primary Flight Displays before approach commencement;
- used for Decision Height determination during approach.

Pressure Altimeters are used as secondary but could be used as primary if decision to revert to Cat 1 Approach Procedure is made by Commander during Cat 2/3 Approach taking into account the following:

- Technical deficiencies preclude Cat2/3 approach continuation, but do not require immediate go-around execution;
- Approach Ban Rules for Cat 1 approach are observed;
- Pressure Altimeters bugs are set on Cat 1 Minimum (DA) before approach commencement.

d) Go-around

B737 flight control system is FAIL-PASSIVE e.g. in the event of a failure there is no significant out-of-trim conditions or deviation of flight path or altitude but the landing is not completed automatically. PF shall assume control of the aircraft and perform a Go-around unless already achieved visual references, as stated in c) above, are sufficient for manual landing.

During Cat 2/3 operations the probability of Go-around is very high, therefore the following to be observed:

- Therefore Go-around procedure shall be reviewed during approach briefing and the pilots should be mentally prepared for it with regard to the actions to be executed.
- The Go-around may result in an inadvertent touchdown during the maneuver. There should be no rush in landing gear retraction until the go-around power and flaps are set/reported and positive climb is confirmed.
- For call outs and performance refer to Go-around procedure.

NOTE: In case of dual A/Ps approach with A/T engaged automatic go around is available from 1500 feet RA and below.

e) Use of call-outs

Standard call-outs for approach are mandatory and are also used for early recognition of pilot incapacitation.

If incapacitation is recognized during Cat 2/3 approach, Go-around shall be initiated immediately and "Crew Incapacitation" procedure (3.6.1) shall be followed.

2.4.4.4 Cat 2 Approach with Manual landing

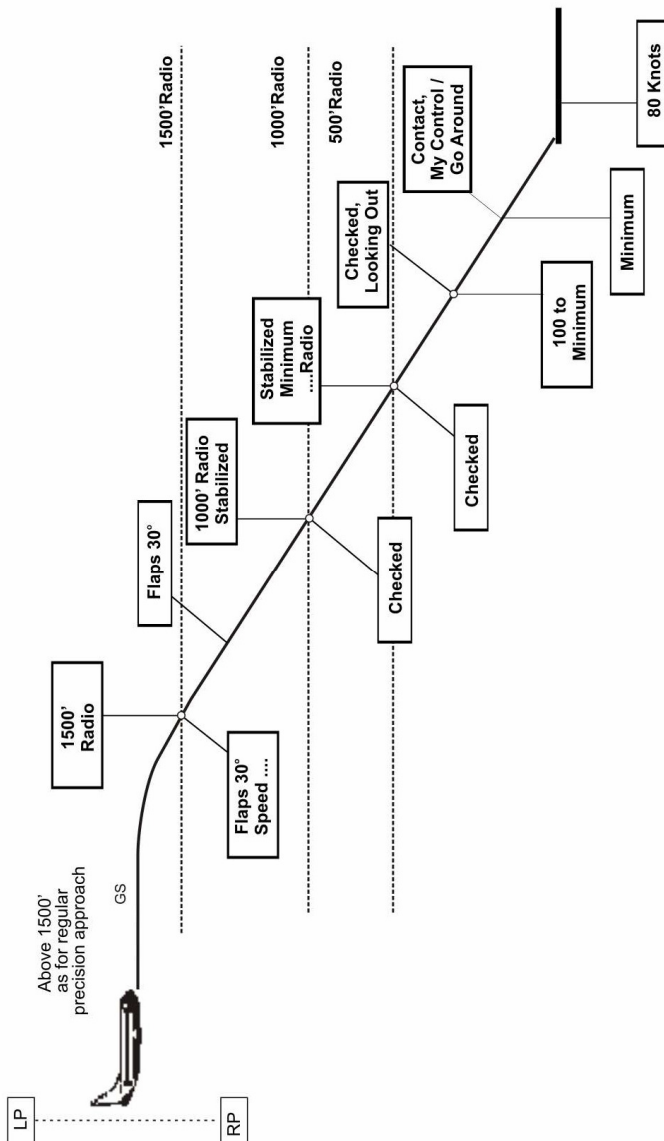
Down to 1'500 there is no difference from Cat 1 precision monitored approach.

Phas	LP	RP
General	Will execute transition to visual flight and landing – PF from the Minimum if visual contact is established	Will execute the instrument part of the approach – PF down to Minimum and for Go-around if required.
1 500' RA	1500 Radio Select flaps 30 and when they reach selected position Flaps 30 Complete Landing checklist “.	Flaps 30, Speed ... , Select final speed
1 000' RA	Cross-check Radio Altimeters, check GS, LOC, no warnings/flags on instruments, 1000' Radio, Stabilized	Cross-check Radio Altimeters, check GS, LOC, no warnings/flags on instruments, Checked
500' Radio	Cross-check Radio Altimeters, check GS, LOC and no warnings/flags on instruments, Stabilized, Minimum ...Radio	Cross-check Radio Altimeters, check GS, LOC and FLARE, no warnings/flags on instruments, Checked
	NOTE: 1) If the Approach should be continued to the CAT 1 Minimum, LP will call: " MinimumPressure ".	
100' To Minimum	Check validity of PF's call and call: Checked, Looking out Start look out for visual references. When sufficient guidance for landing has been obtained (attained): Contact, My controls	Call: 100 To Minimum RP from now is the only pilot who will monitor the instruments. Brief immediately LP about excessive deviations or malfunctions and perform a Go-around if there is no response from him.

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Minimum	Go-around, if visual contact for landing is not established or aircraft position and/or movement relative to runway will not provide a safe landing (see Note 1), or Contact, My controls, if required visual contact for landing is established and maintained, take over controls and perform landing	Minimum at DH+10' (the automatic call will follow your call). Perform Go-around upon LP request or if there is no response from LP on your challenge. Remove your hands from controls only after clear "My controls" from LP. Continue to monitor instruments and brief PF using standard call-outs, if deviations become excessive.
	NOTE: 1) Maximum lateral deviation is such, that aircraft position is within the red approach lights rows on a trajectory towards the centerline.	
Below DH	Follows through the controls and ready to take over for manual Landing or Go-around in case of AP failure/disconnect; Postpone AP disconnect till the 50' RA if AP performance is satisfactory to avoid over-corrective actions, which could be caused by change of attitude illusion at low altitude under poor and variable visibility conditions.	Remains on instruments. Call any abnormality or excessive deviations using standard callouts.
Landing	Disconnect AP and silences A/T disconnect warning then start braking. If the visual reference during landing roll is lost, do not attempt a Go-around, but apply full brakes and use Localizer as reference for directional control.	80 Knots
Taxi	Vacate the runway by following the taxiway centerline lights. Continue as cleared/instructed and apply recommendations for taxiing given in 2.4.2 above.	Report RW vacation when clear of the sensitive area (alternating green and orange taxiway centerline lights changes to green only)

CAT 2 approach with manual landing



2.4.4.5 Cat 2/3 Approach with Automatic Landing

During ILS precision approach both Autopilots (A/P) to be engaged to provide fail passive operation through landing flare and touchdown or an automatic go-around.

For a dual A/P approach, the second VHF NAV receiver shall be turned on ILS frequency and second A/P engaged when established on ILS.

During automatic landing the FGS modes and indications change as follows:

1 500' RA	The FGC begins to assess the autoland status and in about 27 seconds white FLARE is annunciated indicating readiness for autoland and auto go-around.
400' RA	The stabilizer is trimmed an additional amount nose up. If the A/Ps subsequently disengage, forward control column force may be required to hold the desired pitch attitude.
350' RA	If FLARE is not armed, both A/Ps automatically disengages.
50' RA	FLARE engages and F/D command bars retract. The stabilizer trims nose up additionally.
27' RA	RETARD engages and A/T begins retarding thrust so as to reach idle at touchdown.
Touchdown	A/T automatically disengages approx after 2 sec; A/P shall be manually disengaged.

Crew Co-ordination

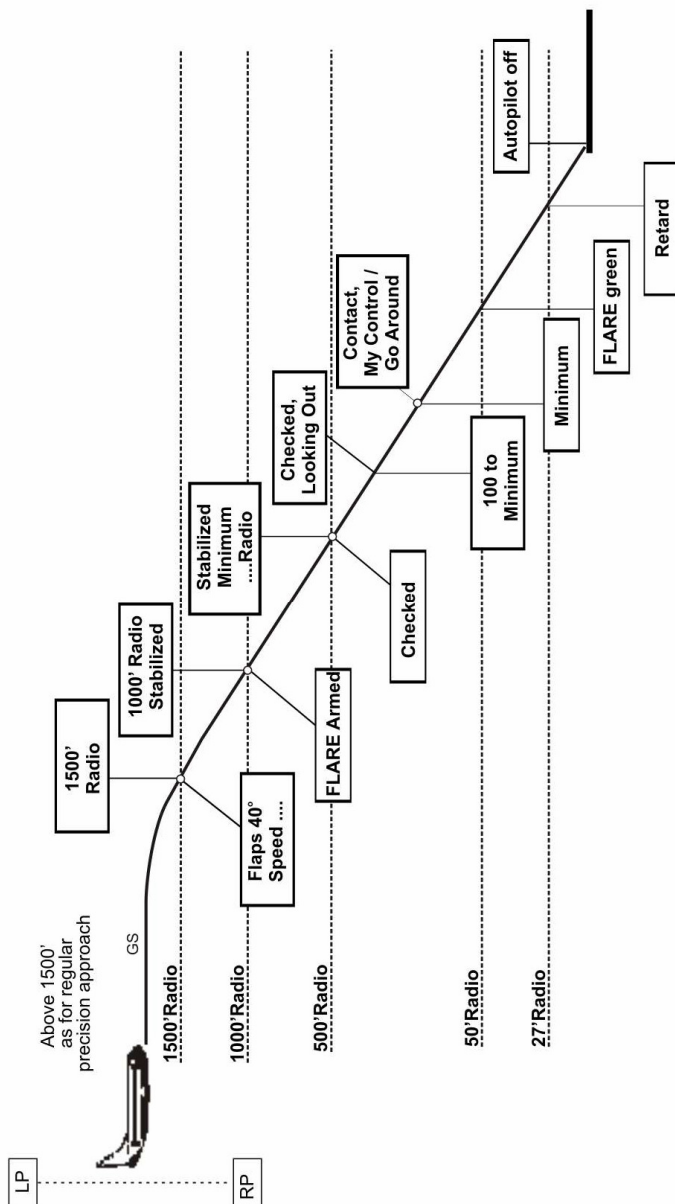
As this is purely automatic approach and landing, both pilots shall concentrate on monitoring of proper FGS mode indications and AP functioning. Any deviation shall be pointed out immediately with subsequent decision and actions stated in 2.4.4.6 below.

For Cat 3 approach in RVR below Cat 2 minimum only automatic landing shall be completed and Go-around shall be performed in case of AP failure/disconnect down to the touchdown.

Down to 1'500 there is no difference from Cat 1 precision monitored approach. In addition to CAT 2 approach with manual landing the following to be observed:

RA	LP	RP
1 500'	Flaps 40 Complete Landing checklist .	Flaps 40, Speed , Select final speed
1 000'	1000' Radio, Stabilized	FLARE armed
500' RA	Stabilized, Minimum ...Radio	Checked
150' RA	Checked, Looking out When contact established, call immediately: Contact, My controls	100 To Minimum
60'	Contact, My controls or Go-around	Minimum at DH+10' (the automatic call will follow your call).
50' RA	Monitor A/P performance <i>Press TOGA button and perform automatic Go-around</i>	Flare green, or Negative flare
27' RA	Monitor A/P performance <i>Retard thrust levers manually to assist automatic landing</i>	Retard, or Negative retard
Touch down	Disengage A/P and continue manual landing rollout,	Monitoring and Call-outs as for manual landing
Taxi	Vacate the runway following the taxiway centerline lights. Taxi in acc to 2.4.2 above.	Report RW vacation when clear of the sensitive area (alternating green/orange taxiway centerline lights changes to green only)

CAT 2/3 approach with automatic landing



2.4.4.6 Failures during CAT 2/3 Approach

The Minimum equipment required for CAT 2/3 Operations shall be serviceable before the CAT 2/3 Approach is initiated (see Normal Checklist).

General

Generally an Approach may be continued if there is enough time clearly identify the malfunction/failure and complete appropriate non-normal /emergency checklist without distraction pilots attention from performing their main duties concerning approach execution.

If there is any uncertainty of real problem or doubt in successful landing, the approach must be terminated and aircraft placed into position to give the crew extra time to complete all actions and preparations required to land aircraft once but safe.

a) Failure above 1 000 RA (Stabilised)

In most cases the relevant procedure/checklist can be completed and the approach may be continued.

After the relevant procedure/checklist completion the PM (LP) shall:

- Check aircraft equipment to be operative for Cat 2/3 automatic approach (Normal Checklist) to revise the weather minima, if required;
- State clearly the Minimum to which the approach to be continued;
- Initiate a go-around, if reported RVR is below the Minimum.

b) Failure below 1 000 RA (Become Unstabilised)

A Go-around shall be initiated when the visual reference is not established and the failure affects instrument approach accuracy:

- Major instruments failure (EFIS, SG, ATT indicator, RA, warning flag on EFIS, excessive deviation, etc);
- Major electrical failure;
- Autopilot disconnected (expect out of trim forces);
- Engine has failed; etc.

When visual reference is established and the failure does not affect safe landing - continue for landing.

NOTE: For Cat 3 approach in RVR below Cat 2 minimum a Go-around shall be initiated:

- 1) FLARE not armed or not captured;
- 2) AP disconnect below DH prior to touchdown (expect out of trim forces).

c) Failure during Go-around

The same principles as for Continued Take-off with Failure to be applied. Memory items for engine shut down shall be initiated not earlier than:

- In clean configuration and above MSA, in case of engine failure;
- 500'AGL, in case of engine fire/severe damage/separation.

2.4.4.7 Simulated Cat 2/3 approach procedure

Is used to gain and retain Cat 2/3 qualification as follows:

- For initial Cat 2/3 qualification the procedure is exercised during line training with a Line Captain.
- For re-qualification purposes the procedure is executed by regular crew.

Conditions

- Weather conditions are above CAT 1 minimum;
- Aircraft technical status as required for Cat 2/3;
- Status and quality of the ground facilities should provide successful automatic approach and landing, as required for exercise

As every Cat 2/3 approach shall be reported and counted for a/c technical reliability statistic to conduct automatic approaches, pilots should refrain from conduct of Simulated Cat 2/3 approaches if technical status of a/c and/or ground facilities precludes successful execution of the approach.

Execution

- Briefing/preparations for the approach shall be completed to full extent;
- Radio Altimeter in this case shall be set and used on CAT 1 minimum with cross-reference to Pressure altimeters that still are used as the primary one.

2.4.4.8 Documentation

After completion of any particular Cat 2 approach:

- Each pilot is responsible for filling his CAT 2/3 RATING forms;
- Commander shall complete CAT 2/3 REPORT form and place in "Flight Crew reports" box in the MCC.

Following criteria to be used for Cat 2 Approach evaluation.

A successful approach is considered to be an approach with no relevant system failure below 500' ft to start of flare and/or no excessive deviations from 300' ft to DH (for more details see OM Part A, para 8.4).

APPENDIX 1

CERTIFIED AERODROMES FOR CAT 2/3 OPERATIONS

Countries	Aerodromes
Austria	Approved CAT2/3 aerodromes
Azerbaijan	Approved CAT2/3 aerodromes
Belarus	Approved CAT2/3 aerodromes
Belgium	Approved CAT2/3 aerodromes
Bulgaria	Approved CAT2/3 aerodromes
Czech Republic	Approved CAT2/3 aerodromes
Denmark	Approved CAT2/3 aerodromes
Finland	Approved CAT2/3 aerodromes
France	Approved CAT2/3 aerodromes
Germany	Approved CAT2/3 aerodromes
Greece	Approved CAT2/3 aerodromes
Hungary	Approved CAT2/3 aerodromes
Ireland	Approved CAT2/3 aerodromes
Italy	Approved CAT2/3 aerodromes
Netherlands	Approved CAT2/3 aerodromes
Norway	Approved CAT2/3 aerodromes
Poland	Approved CAT2/3 aerodromes
Romania	Approved CAT2/3 aerodromes
Russian Federation	Approved CAT2/3 aerodromes
Slovakia	Approved CAT2/3 aerodromes
Spain	Approved CAT2/3 aerodromes
Sweden	Approved CAT2/3 aerodromes
Switzerland	Approved CAT2/3 aerodromes
Ukraine	Approved CAT2/3 aerodromes
United Kingdom	Approved CAT2/3 aerodromes

NOTE: Refer to SAS Route Manual OPS INFO p. 8.11-14 for operational details.

NOTE: This authorization does not include the use of “Special ILS/DME Cat 2/3 Procedure” in certain aerodromes (e.g. Salzburg, Innsbruck).

APPENDIX 2 - Weather, Airport facilities, Aircraft equipment**CAT2/CAT 3 REQUIREMENTS**

CATEGORY 3 REQUIREMENTS				
CAT 1	CAT 2	CAT 3		M I N
200	100	50	MIN DH	
550 (a)	300	200	MIN TDZ RVR (m)	
125 (c)	125 (c)	125 (c)	Mid point RVR (m)	
75 (c)	75 (c)	75 (c)	Stop end RVR (m)	
E			CAT1 ILS	A E R O D R O M E
	E		CAT2 ILS	
		X	CAT3 ILS	
	X	X	BRAKING ACT >= 0.3	
30	45	45	RWY WIDTH (m)	
720	420	210	HIALS (m from THR)	
X	X		STBY PWR HIALS	
		X	RWY EDGE LTS - DAY	
X	X	X	RWY EDGE LTS - NIGHT	
		X	RWY CL - DAY	
	X	X	RWY CL - NIGHT	
		X	TDZ LTS - DAY	
	X	X	TDZ LTS - NIGHT	
	30	30	MAX CL SPACING (m)	
(b)	(b)	(b)	ALL ALS & RWY LTS	
	X	X	STBY PWR LTS	
		X	ILS STBY TRANSMITTER	
X	X	X	WIND MEASUREMENT	
	X	2	AUTOPILOT - YD	A I R P L A N E
		X	AUTOTHROTLE	
	2	2	FLIGHT DIRECTOR	
	X	X	AUTOPILOT AURAL WARNING	
	2	2	AUTOPILOT DISENGAGE SWITCH	
	X	X	ALL ENGINES	
	2	2	GENERATORS (including APU generator)	
no A.L	no A.L	2	HYDR SYST	
no A.L	no A.L	X	FLAPS 40	
	CAPT	CAPT	WINDSHIELD WIPER	

Continued on next page

CAT2/CAT 3 REQUIREMENTS continued

CAT 1	CAT 2	CAT 3		A I R P L A N E
X	2	2	ILS RECEIVER	
X	X	X	ELECTRIC PITCH TRIM	
	X	X	STBY HORIZON	
	2	2	IRU's in NAV mode	
	2	2	EFIS SGU	
	2	2	EFDI	
	CAPT	2	EHSI	
	CAPT	CAPT	PRESSURE ALTIMETER	
	2	2	RADIO ALT + DISPLAY	
	2	2	DH SETTING + DISPLAY	
PNF	CAPT	2	ADC	
	X	X	STBY ALT/ASI	
no A.L	X	X	MAX HEADWIND 25 kts	W X
no A.L	X	X	MAX CROSSWIND 15 kts	
no A.L	X	X	MAX TAILWIND 10 kts	
	X	X	NO MODERATE OR SEVERE TURBULENCE	
	X	X	NO WINDSHEAR	
	X	X	NO HEAVY PRECIPITATION	

X: Required; E: Either required; A: Advisory; no A.L: No autoland
a: if TDZ RVR not available, MID RVR may substitute TDZ RVR.

b: Max 1/3 may be INOP with pattern unaltered.

c: If reported and relevant (used during high speed phase of landing down to approx 60 Kts) JAR-OPS 1.405(f)

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Appendix 3 - CAT 2/3 PROCEDURE SUMMARY**PRIOR OR DURING DESCENT**

- Weather & NOTAMs (Destination & Alternate)
- Fuel (min for diversion)
- Cat 2/3 Approved Runways table (SAS RM, OPS INFO)
- Aerodrome facility & aircraft status
- Crew qualification
- Cat 2/3 DH set on the RA; Cat 1 DH – on the pressure altimeter bug
- Procedures/Failures during approach and
- Go-around + Missed approach procedure reviewed.

INITIAL APPROACH

- Right pilot is PF, ATC advised about Cat 2/3 approach.

BEFORE INTERCEPT HEADING

- ILS check frequency/final course + identified

Cat 2 with Manual landing

Down to 1'500 there is no differences from Cat 1 precision approach.

	LP	RP
1500' RA	1500 Radio Flaps 30	Flaps 30, Speed
1000' RA	1000 Radio, Stabilized	Checked
500' RA	Stabilized, Minimum ...Radio,	Checked
100' to Min	Checked, Looking out	100 to Minimum
DH	Contact, My Controls, <i>or</i> <i>Go around</i>	Minimum

Cat 2/3 with Automatic landing

Down to 1'500 there is no differences from Cat 1 precision approach.

	LP	RP
1500' RA	1500 Radio Flaps 40	Flaps 40, Speed
1000' RA	1000 Radio, Stabilized	FLARE armed
500' RA	Stabilized, Minimum ...Radio,	Checked
150' RA	Checked, Looking out	100 to Minimum
60' RA	Contact, My controls, or <i>Go-around</i>	Minimum at DH+10'
50' RA	 <i>Go-around</i>	Flare green, or <i>Negative flare</i>
27'RA	 <i>Continue</i>	Retard, or <i>Negative retard</i>
Touchdown	Autopilot off	Regular call-outs

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2.5 FLIGHT OPERATIONS IN ADVERSE WEATHER CONDITIONS

2.5.1 Cold Weather Operations

2.5.1.1 General

Winter operations are characterized with following factors, relevant to flight:

- Low ambient temperature;
- Different kinds of precipitation;
- Aircraft and ground surfaces may be covered with ice, snow or slash;
- Icing during flight.

2.5.1.2 Pre-departure

Before departure, in additional to normal External Check, the Commander makes sure, that following critical areas are free from snow, ice and frost:

- The fuselage (see note);
- The wings, stabilizers and leading edges;
- The wing fuel tank areas (see note);
- The slots and gaps between the flight control surfaces;
- The flight control surfaces, gaps, hinge points, shrouds, fairings and seals;
- The engine inlets, nacelles and pylons;
- The nose and main landing gear, bays, doors, latches, micro switches;
- The windshields;
- Antennae, remove excess anti-ice fluid;
- The drains, static vents, pitot heads and angle-of-attack vanes;
- System inlets;
- Fuel tank vents.

Note: Coating of frost or ice up to 3,0 mm (paint schema must be visible) on lower wing surfaces, caused by very cold fuel, and on fuselage is permissible. If upper wing surfaces are de-iced, the under wing frost shall also be removed.

During Flight Deck Preparation, after LEFT PILOT PRESENS additionally accomplish the following items:

PITOT HEATON

All probe heat lights - extinguished.

Flight controlsCheck

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This check should be accomplished whenever the airplane has been exposed to snow, freezing rain or other conditions, which could restrict flight control movement.

Increase in control forces can be expected at low temperatures because of increased resistance in cables and thickened oil in snubbers and bearings.

If any flight control is suspected of binding or restricted movement, maintenance personnel should accomplish the appropriate portion of the flight control checks described in Ch.12, Flight Controls.

2.5.1.3 Using the APU for Heating (on the ground)

Under extremely cold conditions, both packs may be used for more rapid heating.

ISOLATION VALVE switchOPEN

During right pack operation only, under cold conditions, if the left PACK TRIP OFF light illuminates, position the recirculation fan OFF until the cabin temperature stabilizes.

2.5.1.4 Engine Start

In addition to the basic start-up procedure, prescribed in Ch. 2.2.3, the following should be considered in cold weather.

- During the PFI check the engine inlets nacelles and pylons freedom from the contaminant, and engine fan shall be free to rotate.
- If ambient temperature is below -35°C , idle the engine for two minutes before changing thrust lever position.
- Up to three and one-half minutes may be allowed for oil pressure to reach the minimum operating pressure. During this period, the LOW OIL PRESSURE light may remain illuminated, pressure may go above the normal range and the FILTER BYPASS light may illuminate. Operate the engine at idle thrust until oil pressure returns to the normal range.

2.5.1.5 After Start

In addition to normal procedures accomplish the following:

Electrical power Generators ON

Normally the generator drive will stabilize within one minute, although due to cold oil, up to five minutes may be required to produce steady power.

If ambient temperature is below **-18 deg**:

FlapsCheck

Move flaps through full travel to ensure freedom of movement.

NOTE: The flap position indicator and leading edge devices annunciator panel should be closely observed for positive movement. If the flaps should stop, the flap lever should be placed immediately in the same position as indicated.

2.5.1.6 Taxi

Nose wheel steering should be exercised in both directions during taxi to circulate warm hydraulic fluid through steering cylinders and minimize steering lag caused by low temperatures.

If taxi route is through slush or standing water in low temperatures or if precipitation is falling with temperatures below freezing, taxi with flaps up. Taxiing with flaps extended subjects the flaps and flap drives to snow and slush accumulations from the main gear wheels. Leading edge devices are also susceptible to slush accumulations.

2.5.1.7 De / Anti-icing

Engines and the APU may run during de/anti-icing.

If there is choice of using Type II or Type IV anti-icing fluid, Type II shall be selected.

When the aircraft needs repeated de/anti-icing, the previous layer of Type II or IV fluid shall be removed by Type I fluid or hot water before starting new cycle.

The Ground staff shall inform the cockpit when de/anti-icing procedure is started. The Flight Crew sets and checks:

FLAPS UP

TRUST LEVERSIDLE

STABILIZER TRIMFull APL NOSE DOWN

NOTE: To avoid personal injury, ensure that the stabilizer trim wheel handle is stowed prior to using electrical trim.

APU and engine BLEEDOFF

APUAs required

NOTE: With APU operating, ingestion of deicing fluid causes objectionable fumes and odors to enter the airplane. This may also cause erratic operation or damage to the APU.

Wait approximately one minute after completion of deicing to turn engine BLEED air switches ON to ensure all deicing fluid has been cleared from the engine.

Precautions during and after de/anti-icing

- Be careful while walking on places where the fluid have accumulated, due to slippery conditions
- Avoid fluid contact with skin and eyes. If it has occurred, wash the place of contact with clean, running water
- The aircraft shall be treated symmetrically to avoid aerodynamic problems
- All doors and windows shall be closed during de/anti-icing
- De/anti-icing fluid shall not be sprayed directly into the orifices of pitot tubes, static vents/ports, air intakes/outlets, angle of attack airflow sensors
- The cockpit windows shall be clear of fluid and prevented of fluid blow back before Off-chock. Windscreen wipers shall not be used for this purpose.

HOT begins at the start of the final (anti-icing) step. For HOT calculating and using see RM Ch. OPS INFO, p.6.1-2. If there is a doubt, which HOT shall be used, choose a conservative Holdover Time.

For related information see OM Part A, Section 8, Annex 2.

2.5.1.8 Post-flight Procedure

Airplane attended

The following procedure may be used to circulate warm air in the cargo and E/E compartments, thereby reducing the possibility of freezing the battery or water container. If all doors are to be closed during this period, a flight crewmember or qualified technician must remain in attendance inside the airplane to depressurize in the event of inadvertent closure of main outflow valve.

APUON
APU GEN switchesON
One PACK switchAUTO
ISOLATION VALVE switchAUTO
Press mode selectorMAN AC/DC
FLT/GRD switchGRD
Outflow valve switchOPEN

NOTE: The airplane must be parked into the wind when the outflow valve is full open.

APU BLEED switchON

NOTE: With packs operating and all doors closed, inadvertent closure of the main outflow valve could result in unscheduled pressurization of the airplane. With the airplane in this configuration, do not leave the interior unattended.

Airplane unattended

In case of overnight parking at airports where normal support is not available, the flight crew should arrange for or ascertain that the following actions have been accomplished.

Press mode selectorMAN AC/DC
Outflow valveClosed
Wheel chocksCheck in place
Parking brakeOFF
Protective covers and plugsCheck installed
Water storage containersDrained
ToiletsDrained

Battery Removed

NOTE: If the battery will be exposed to temperatures below **−18 deg C**, the battery should be removed and stored in an area warmer than **−18 deg C**, but below **+40 deg C**. Subsequent, installation of the warm battery will ensure the starting capability of the APU.

Doors and sliding windows Closed

2.5.2 Contaminated/Low Friction Runways Operations

2.5.2.1 General

This section is applicable only to operations from a contaminated or low friction runway as defined below. A runway is considered to be:

Wet when the RWY surface is covered with **water, or equivalent**, less or equal than 3mm WED or when there is sufficient moisture on the RWY surface to cause it to appear reflective, but without significant areas of standing water.

Low Friction when the braking action is reduced from that experienced on a wet or dry surface and Friction Coefficient (FC) is **less than 0,4**.

Contaminated when more than 25% of the runway surface area within the required length and width is covered with the surface water, slush or snow with a – Water Equivalent Depth (WED) of **more than 3mm**.

To obtain WED multiply actual depth by the density of particular type of precipitations as follows: Water and Slush – 1,0; Wet snow – 0,4; Dry snow – 0,2.

LIMITATIONS: Use of runways with $FC < 0,2$ is not applicable for airBaltic.

2.5.2.2 Taxi

In addition to basic procedures for taxi (see 2.1.1 above) the following should be considered:

- On slippery surfaces taxi with care and maintain a low forward speed
- Use nosewheel steering for directional control supported by gentle use of asymmetric braking and asymmetric thrust.
- If the nosewheel steering is moved rapidly or selected to large angles, nosewheel skidding can occur. To restore controllability, reduce nosewheel steering deflection.

NOTE: Anti-skid does not operate below about 15 knots.

- Postpone flap extension shortly prior to line up the runway.

2.5.2.3 Take-off Performance

a) Low Friction runway

Stopping capability is primary effected by the lower friction and is degraded proportionally to decrease of Friction Coefficient.

To compensate the reduced stopping capability during aborted take-off the V_1 has to be proportionally reduced (taken from GWC directly).

Take-off weight penalties are caused subsequently by the increased segment of one engine acceleration from the lower V_1 and in general are as follows:

- Rather small on relatively long runways (>2500m);
- Increase significantly on relatively short runways (<2000m) especially if an Obstacle(s) is a limiting factor.

b) Contaminated runway

The increased resistance of precipitations layer effect acceleration and makes the continuation of the take-off more critical. In combination with the stopping capability reduced by low friction it could produce quite significant take-off weight penalties.

To compensate degraded acceleration capabilities the V_1 taken from GWC is increasing together with increase of the layer of precipitations.

2.5.2.4 Take-off Execution

The following restrictions should be observed:

- MAX Thrust shall be used (do not use assumed temperature method);
- Max tailwind is 5 Knots but considered as the last option;
- Engine anti-ice ON (if required by RWY contaminant);
- Speed brakes, anti-skid/wheel brakes shall be serviceable to ensure stopping capability.

a) Low Friction runway

To ensure directional control and minimize yawing moments during the initial take-off roll rolling take-off is recommended.

Release the brakes, increase thrust symmetrically and maintain directional control by small nose wheel steering input until ruder control becomes effective. Avoid large control inputs, which lead to significant lateral accelerations. Maintain the control column slightly forward of neutral to increase nose wheel contact. Commence rotation at the normal VR.

b) Contaminated runway

Power setting and take-off technique is similar to take-off from low friction runway (see above). **Maintain the control column slightly forward of neutral to increase nose wheel contact during initial part of take-off run.** When directional control by radar only is gained (about 80 Kts) control column should be kept neutral or slightly aft of neutral to reduce the additional drag resistance caused by the runway contaminants.

Commence rotation at the normal VR.

After take-off, if climb out performance is not limiting, delay retraction of the landing gear to shake off any accumulated slush.

c) Maximum crosswind

To ensure directional control during ground roll Crosswind limitations shall be applied: *refer to OMB B737 1.3.1.*

NOTE: For crosswind component diagram see Normal Checklist.

2.5.2.5 Landing Performance

The following restrictions should be observed:

- No tailwind;
- Consider Flaps 40° for landing;
- Engine anti-ice ON (if required by RWY contaminant);
- Speed brakes, anti-skid/wheel brakes shall be serviceable to ensure stopping capability.

As a contaminant on the contaminated runway surface creates an additional drag during landing roll the Low Friction Runway **landing distances are used as they give more conservative result.**

2.5.2.6 Landing Execution

Approach down to flare has no differences.

To avoid roll out or veering off the runway, do not prolong the flare especially in a strong crosswind conditions.

Touchdown firmly to ensure the wheels penetrate the contaminant.

Select IDLE thrust, lower the nose gear, ensure the speed brakes are deployed and set reverse thrust.

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Maintain directional control by gentle use of nosewheel steering and rudder, avoid large control deflection.

Allow aeroplane to decelerate below aquaplaning speed of 85 Kts before applying the brakes.

NOTE: If directional control is lost: release the brakes immediately, restore directional control by ruder/nosewheel steering and then apply the brakes again as required.

Do not retract the flaps to less than 15 until the flaps has been checked free of debris by maintenance.

Maximum crosswind

To ensure directional control during ground roll Crosswind limitations shall be applied: *refer to OMB B737 1.3.1.*

2.5.3 Icing

2.5.3.1 General

ENG ANT-ICE must be ON when OAT on the ground and for take-off, or TAT in-flight is $\leq 10^{\circ}\text{C}$ and:

- Visible moisture (clouds, fog, mist with visibility less than 1600 m, rain, snow, sleet, ice crystals, and so on) is presented, or
- The runway is contaminated.

Do not rely on airframe visual icing cues before activating engine anti-ice. Use the temperature and visible moisture criteria.

Avoid prolonged operation in moderate to severe icing conditions.

Airframe ice protection must not be used for take-off and landing.

2.5.3.2 Anti-Ice Operation on the ground

Engine Anti-Ice Operation-On the Ground

Engine anti-ice must be ON during all ground operations when icing conditions exist or are anticipated.

NOTE: Do not rely on airframe visual icing cues before activating engine anti-ice. Use the temperature and visible moisture criteria.

When engine anti-ice is required (on the ground):

ENG ANTI-ICE switches.....ON

COWL VALVE OPEN lights - illuminated dim COWL

ANTI-ICE lights - extinguished

NOTE: If COWL VALVE OPEN lights remain illuminated bright with engines at IDLE, position APU BLEED air switch to OFF and increase thrust slightly (up to a maximum of 30% N1).

Run-up to as high a thrust setting as practical (70% N1 recommended) at 30 minute intervals for approximately 30 seconds duration.

If airport surface conditions and the concentration of aircraft do not permit the engine thrust level to be increased to 70%, then set a thrust level and time at that thrust level as high as practical.

NOTE: When operating in conditions of freezing rain, freezing drizzle, freezing fog or heavy snow, additional momentary run-ups to 70% N1 at intervals of 10 minutes or less should be considered.

Wing Anti-Ice Operation-On the Ground

Wing anti-ice must be ON during all ground operations between engine start and takeoff, when icing conditions exist or are anticipated, unless the airplane is protected by the application of Type II or Type IV fluid in compliance with an approved ground deicing program.

NOTE: 1) The wing anti-ice VALVE OPEN lights may cycle bright/dim due to the control valves cycling closed/open in response to thrust setting and duct temperature logic.

2) Ground use of the wing anti-ice system is intended to complement, and not replace, ground deicing/anti-icing and inspection procedures. Close inspection is still required to ensure that no frost, snow or ice is adhering to the wing, leading edge devices, stabilizer, control surfaces, or other critical airplane components at takeoff.

2.5.3.3 Take-off and Climb-out

If the aircraft has been de-iced, flap selection and therefore BEFORE TAKE-OFF checklist should be delayed until just before take-off in order to prevent ice and snow forming on the flaps during taxi.

During prolonged ground operation, periodic engine run-up should be accomplished to minimize ice build-up. Run-up to as high a thrust setting as practical (70% N1 recommended) at 30 minutes intervals for approximately 30 seconds duration.

Before line-up inspect from the cockpit visible parts of aircraft wings and engines for snow and ice. Do not assume freedom from contamination by observing other aircraft – they may have been treated more recently or more effectively.

Before commencing take-off, the weather shall be analyzed and following decisions made.

If moderate to severe icing conditions are present, takeoff roll must be preceded by a static run-up to 70% N1 and stable engine operation observed prior to break release. If the airplane starts to slide on ice or snow

during engine power check, release brakes and begin takeoff roll. Continue engine check during early part of takeoff roll.

2.5.3.4 Climb and cruise

Engine Anti-Ice Operation in-flight

When operating in areas of possible icing, activate engine anti-ice prior to entering icing conditions. Late selection of engine anti-ice may allow inlet ice buildup and ice shedding into the engine.

NOTE: Do not use engine anti-ice during climb and cruise when SAT is below -40 deg C.

When engine anti-ice is required in-flight:

ENGINE START switchesCONT

ENG ANTI-ICE switchesON

COWL VALVE OPEN lights - illuminated dim

COWL ANTI-ICE lights - extinguished

NOTE: If COWL VALVE OPEN lights remain illuminated bright with engines at IDLE, position APU BLEED air switch to OFF and increase thrust slightly (up to a maximum of 30% N1.)

When flight in moderate or heavy rain, hail, or sleet is encountered or anticipated, engine start switches must be set to FLT and a minimum of 45% N1 must be maintained except on short final when landing is assured.

If flight in moderate to severe icing conditions cannot be avoided accomplish the following, on both engines, one at a time at approximately 15 minute intervals:

THRUST Increase

Increase trust to a minimum of 80% N1 to ensure the fan blades and spinner are clear of ice.

Engine vibration may occur due to fan blade/spinner icing. If engine vibration continues after increasing thrust, accomplish the following on both engines, one engine at a time:

ENGINE START switch FLT

THRUST Adjust

Adjust thrust to 45% N1. After approximately five seconds, increase thrust lever slowly to a minimum 80% N1.

- NOTE:** 1) Engine vibration may reduce to a low level before 80% N1 is reached, however, thrust increase must continue to a minimum of 80% N1 to remove ice from the fan blades.
- 2) Engine vibration may indicate full scale prior to shedding ice; however, this has no adverse effect on the engine.

If vibration does not decrease, accomplish the procedure for HIGH ENGINE VIBRATION “ If not in icing conditions.”

When engine anti-ice is no longer required:

- ENG ANTI-ICE switches.....OFF
- COWL VALVE OPEN lights – extinguished
- ENGINE START switchesOFF

Wing Anti-Ice Operation in-flight

The wing anti-ice system may be used as a deicer or anti-icer in flight. The primary method is to use it as a deicer by allowing ice to accumulate before turning wing anti-ice on. This procedure provides the cleanest airfoil surface, the least possible runback ice formation, and the least thrust and fuel penalty.

The secondary method is to use wing anti-ice prior to ice accumulation. Operate the wing anti-ice system as an anti-icer only during extended operations in moderate or severe icing conditions, such as holding.

Ice accumulation on the flight deck window frames, windshield center post or on the windshield wiper arm may be used as an indication of structural icing conditions and the need to turn on wing anti-ice.

Normally it is not necessary to shed ice periodically unless extended flight through icing conditions is necessary (holding).

2.5.3.5 Approach and Landing

ENG A-ICE and continuous ignition must be ON (ENGINE START switch in the CONT position) when engines are running, if icing conditions are expected during and after landing.

Do not use flaps in case of holding in icing conditions.

If ice formations are observed on the airplane surfaces (wings, windshield wipers, window frames, etc.):

VREF Add 10 knots PF

This becomes the new VREF and ensures maneuvering capability.

NOTE: Airspeed corrections for wind should be made to the new VREF. The combined airspeed corrections for steady wind, gust, and ice formations should not exceed the lower of VREF +20 kts or maximum speed for current flap setting minus 5 kts.

In icing conditions with gusty wind, manual Landing shall be carried out.

2.5.3.6 Taxi-in and Park

If prolonged operation in icing conditions with the leading and trailing edge flaps extended was required:

Flaps 15

Retraction to less than flaps 15 is not recommended until ice has been removed or a ground inspection has been made.

Engine anti-ice As required

If icing conditions exist, engine anti-ice must be ON.

If Taxi-in is delayed and icing condition exists, accomplish the following:

Engine run-up Accomplish as required

Run-up to as high a thrust setting as practical (70% N1 recommended) at 30 minute intervals for approximately 30 seconds duration.

If airport surface conditions and the concentration of aircraft do not permit the engine thrust level to be increased to 70%, then set a thrust level and time at that thrust level as high as practical.

NOTE: When operating in conditions of freezing rain, freezing drizzle, freezing fog or heavy snow, additional momentary run-ups to 70% N1 at intervals of 10 minutes or less should be considered.

After landing in icing conditions:

Stabilizer trimSet 0 to 2 units

Prevents melting snow and ice from running into balance bay areas and prevents the stabilizer limit switch from freezing. With flaps retracted, this requires approximately eight hand wheel turns of manual trim.

NOTE: To avoid personal injury, ensure that the stabilizer trim wheel handle is stowed prior to using electric trim.

2.5.4 TURBULENCE

Turbulence is graded by its intensity as light, moderate and severe. Flight through areas of known severe or moderate turbulence should be avoided.

1. During pre-flight or in-flight planning through the zone of known /expected turbulence the following precautions should be taken:

- Cabin crew to be advised well in advance or as soon as possible to prepare the cabin/carry out appropriate services;
- Passengers should be informed by the Commander.
- FASTEN BELTS switched ON prior the entry turbulence zone.

2. If unexpected turbulence is experienced:

FASTEN BELTS – ON;
PASSENGERS – INFORM;
CABIN CREW - CONSIDER.

NOTE: a) When the cabin crew is required to be seated also, call via PA: "Cabin Crew take your seats/remain seated due to turbulence".

b) As a back up, the cabin crew will inform passengers if after switching on the sign there will be no information from the cockpit within 10 sec.

3. In case of **severe** turbulence encountered, in addition to mentioned above:

AUTOTHROTTLE -OFF
AUTOPILOT -CWS
If sustained trimming occurs, disengage the autopilot.

ENGINE START switches -FLT
THRUST -SET
Change thrust only if required to modify an unacceptable speed trend.

Turbulence penetration airspeeds

Phase of flight	Airspeed
CLIMB	280 KIAS or .73 Mach
CRUISE	Use FMC recommended thrust settings. If the FMC is inoperative, refer to Performance-In-flight section for approximate N1 settings that maintain near optimum penetration airspeed.
DESCENT	.73 Mach/280/250 KIAS. If severe turbulence is encountered at altitudes below 15,000 feet and the airplane gross weight is less than the max landing weight, the airplane may be slowed to 250 kts in clean configuration.

2.5.5 WINDSHEAR

2.5.5.1 General

Windshear is very hazardous threat to aircraft during take-off, approach and landing.

It may be experienced in thunderstorm areas, when penetrating weather fronts, low level jet streams, mountain waves and thermals. Other causes include terrain irregularities and man-made obstructions close to the runway.

Lessons learned from windshear encounters:

- Recognition is difficult and is usually complicated by marginal weather.
- Time available for recognition and recovery is short (as little as 5 sec).
- Flight Crew co-ordination has a vital importance for prompt windshear recognition and recovery.
- Lower than normal airspeed may have to be accepted for recovery (pitch angle may be increased until Pitch Limit Indicator on PFD).

The following guidelines may be used to recognize windshear encounter. Changes in excess of:

- 15 knots IAS
- 500 fpm vertical speed
- 5 deg pitch attitude
- 1 dot displacement from the glidslope
- unusual thrust lever position for a significant period of time.

2.5.5.2 Avoidance and Precautions

A windshear encounter is highly dynamic event. In certain circumstances escape may not be possible. So, the first rule of windshear recovery: **do not entry** in zone of reported windshear (take-off or landing shall be delayed).

Take-off Precautions

- 1) Use maximum TO thrust
- 2) Use takeoff flaps 5° unless limited by obstacle clearance and/or climb gradient.
- 3) Use the longest runway that avoids suspected areas of windshear.

Approach Precautions

- 1) The aeroplane should be stabilized at 1000 Radio altitude.
- 2) Use the longest runway that avoids suspected areas of windshear.
- 3) Use flaps 30° unless limited by landing distance.
- 4) Add an appropriate airspeed correction (correction applied in the same manner as gust), the maximum command speed should not exceed the lower of VREF+20 kts or max speed for current flap setting minus 5 kts.
- 5) Avoid large thrust reductions or trim changes in response to sudden airspeed increase as these may be followed by airspeed decreases.
- 6) Crosscheck FD commands using vertical flight path instruments.
- 7) Crew coordination and awareness are very important. The PM should call out any deviations from normal. Use of the AP and autothrottle for the approach may provide more monitoring and recognition time.

2.5.5.3 Recovery**Take-off**

Prior to V_1 the take-off should be rejected if windshear is encountered and the decision made that sufficient runway is available to stop the aircraft. If windshear should be encountered near the normal rotation speed and the airspeed suddenly decreases, there may not be sufficient runway left to accelerate back to normal takeoff speed. If there is insufficient runway left to stop, initiate a normal rotation at least 2000 feet (about 600 m) before the end of the runway even if airspeed is low.

After V_1 the take-off shall be continued.

- 1) Ensure maximum thrust is set.
- 2) At V_R rotate at normal rate toward 15° pitch attitude.

Note: Higher than normal attitudes may be required to lift off within the remaining runway.

- 3) After lift-off perform the Windshear Escape maneuver found in non-normal maneuvers section in the QRH.

Approach and Landing

Whenever flight path deviations become unacceptable below 1,000 feet AGL or when a "Windshear" warning occurs, immediately accomplish the Windshear Escape maneuver found in non-normal maneuvers section in the QRH. Additionally:

- 1) Do not change configuration and thrust until MSA is reached.
- 2) Report encountered windshear to ATC.

2.5.6 EXTREME WIND CONDITIONS

2.5.6.1 Taxiing, Parking

There are recommendations for taxi and parking in extreme wind conditions:

- The aeroplane will have a tendency to turn into the strong wind during taxi. Use pedals with separate brakes, if required to maintain taxi direction;
- Ailerons and elevator to be in neutral positions during taxi. Do not check control for “full and free” with tail wind component ≥ 10 knots.
- Parking brakes shall not be released whenever wind velocity exceeds 30 Kts. In addition, the Commander shall ensure that wheel chocks are in place for BOTH main gears, whenever wind exceeds 40 Kts.

2.5.6.2 Limitations

The following wind limitations are applicable for take-off and landing:

Tailwind..... 10 knots

Crosswind *refer to OMB B737 1.3.1*

The maximum allowable wind components for an automatic landing and CAT 2 approach are:

- Headwind..... 25 knots
- Crosswind 15 knots
- Tailwind..... 10 knots
- Gusts.....5knots.

2.5.6.3 Take-off

Take-off procedure should be modified as follows:

- 1) Correct V_1 for headwind or tailwind components (see Takeoff Speeds in Performance In-flight section of the QRH).
- 2) Maximum thrust shall be used for takeoff.
- 3) When crosswind exceeds 20 kts **rolling** takeoff must be performed to avoid engine surge.

At takeoff start right pilot should turn the control wheel into wind. Large control wheel inputs can have adverse effect on directional control near V_{MCG} due to the additional drag of the extended spoilers. Maintain takeoff direction with nose wheel steering operating rudder pedals. At a speed of about 80 kts the rudder become effective. During takeoff roll adjust the control wheel to maintain zero wing level. Maintain desired flight path applying appropriate crab angle.

2.5.6.4 Landing

Landing speeds

When using autothrottle, position command speed to **$V_{REF}+5\text{kts}$** . Sufficient wind and gust protection is available with autothrottle engage because the autothrottle adjusts the approach speed upward to account for the wind gusts actually encountered during approach.

If the autothrottle is disengaged, or is planned to be disengaged prior to landing, add one half of the reported steady headwind component plus the full gust increment above the steady wind to V_{REF} .

$V_{REF} + \text{head wind}/2 + \text{gust factor}$

The maximum command speed should not exceed the lower of **$V_{REF}+20$ kts** or maximum speed for current flap setting minus 5 kts.

The gust correction should be maintained to touchdown while the steady headwind correction should be bleed off as the airplane approaches touchdown.

NOTE: Do not apply wind correction for tail wind.

Landing techniques

There are four methods of performing crosswind landing.

1) Sideslip (wing low)

Prior to the flare the airplane centreline is aligned on or parallel to the runway centreline. Downwind rudder is used to align the longitudinal axis to the desired track as ailerons are used to lower the wing into wind to prevent drift. Touchdown is accomplished with the upwind wheels touching first.

Avoid sideslip technique with crosswind in excess of 13 kts at flaps 15, 16 kts at flaps 30, or 18 kts at flaps 40. This ensures adequate ground clearance and is based on maintaining adequate control margin.

2) De-crab during flare

Just prior to touchdown while flaring the airplane, downwind rudder is applied to eliminate the crab and align the airplane with the runway centreline. Hold wings level with simultaneous application of aileron control into wind. Both main gear touching down simultaneously.

3) Touchdown in crab

The airplane can touchdown in crab up to the landing crosswind limits. On very slippery runways this technique reduces drift toward the downwind side at touchdown, permit rapid operation of spoilers and autobrakes, and reduce pilot workload since the airplane does not need to be de-crabbed before touchdown. Proper rudder and aileron must be applied after touchdown to ensure directional control.

4) Combining Crab and Sideslip

Main gear touchdown is made with the upwind wing low and crab angle applied. As the upwind gear touches first, a slight increase in downwind rudder is applied to straighten the nose.

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2.5.7 HOT WEATHER OPERATION

During ground operation the following considerations will help keep the airplane as cool as possible:

- If cooling air is available from an outside source, the supply should be plugged in immediately after engine shutdown and should not be removed until just prior to engine start.
- Keep all doors and windows, including cargo doors, closed as much as possible.
- Electronic components, which contribute to a high temperature level in the flight deck, should be turned off while not needed.
- Open all passenger cabin gasper outlets and close all window shades on the sun-exposed side of the passenger cabin.

For aircraft cooling, use only one air conditioning pack, because of high load on APU.

Brake temperature levels may be reached which can cause the wheel fuse plugs to melt and deflate the tires.

Consider the following actions:

- Be aware of brake temperature buildup when operating a series of short flight sectors. The energy absorbed by the brakes from each landing is accumulative.
- Extending the landing gear early during the approach provides additional cooling for tires and brakes.
- In-flight cooling time can be determined from the "Brake Cooling Schedule" in the Performance-Inflight section.

During flight planning consider the following:

- High temperatures inflict performance penalties, which must be taken into account on the ground before takeoff.
- Alternate takeoff procedures (No Engine Bleed Takeoff, Improved Climb Performance, etc.).

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3.0 PREAMBLE

3.0.1 General

The procedures contained in this section apply if abnormal or emergency situation observed. These procedures supplement and supersede the normal procedures.

Information is subdivided to provide possibility for pilots to review certain situations that may have a place during flight or to get quick reference for other related information/document. Additional summarized information is presented in a way of profile drawing where needed.

Where required references are made to different parts of Aircraft Operations Manual (AOM), airBaltic Operations Manual (OM), or other official publications to provide additional information for flight deck personnel.

Suspected faulty systems should not be used in flight if possible and troubleshooting by crew should be avoided.

3.0.2 Purpose

The purpose of the procedures is to give to the pilots necessary information in a way of guidelines and instructions, with aim to provide acceptable level of safety during and after recovery of an abnormal or emergency situation.

3.0.3 Scope

The procedures are applicable to Flight Crew during the flight, unless specifically stated otherwise.

3.0.4 Definitions

Emergency procedure - procedure requiring immediate flight crew action to protect the aeroplane and its occupants from serious harm.

Abnormal procedure - procedure requiring flight crew action, due to failure of a system or component, to maintain an acceptable level of airworthiness for continued safe flight and landing.

Memory Items - minimal vital actions, which shall be done as soon as the situation permits without reference to the checklist.

Check List - Abnormal or Emergency procedures for which specific Check Lists are developed and could be applied directly upon warning has been received.

Abnormal/Emergency Procedure - Procedure which shall be applied in case of warning has been received. Respective Check List may be incorporated when required by the procedure.

3.0.5 Responsibility

Commander is responsible to:

- Set/Change the priorities;
- Identify/confirm the applicable procedure;
- Co-ordinate the crew actions;
- Follow/direct the procedure.

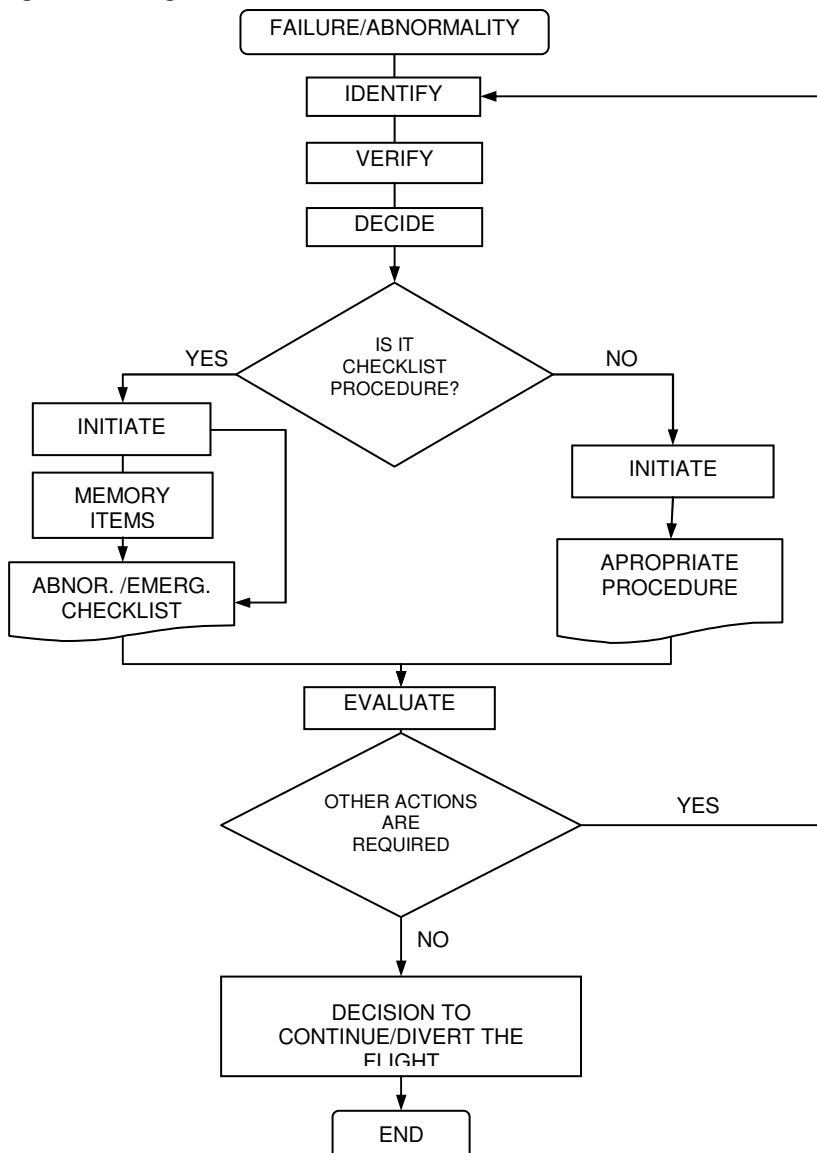
PF is responsible to:

- Control the aeroplane;
- Initiate identified procedure;
- Monitor PM's actions.

PM is responsible to carry out identified procedure/checklist.

3.1 HANDLING of ABNORMAL and EMERGENCY SITUATIONS

3.1.1. Flow



FAILURE/ABNORMALITY

Any crewmember detecting an impending or existing abnormal condition shall immediately inform the other crewmember.

The PF continue to **fly the aeroplane**.

IDENTIFY

One of the pilots (normally PM) shall state the problem.

NOTES: 1. MWS nuisance warning could be cancelled.
2. Cancelled warning shall be stated.

VERIFY

Stated problem shall be verified and confirmed by both pilots. Both pilots analyze the problem by checking indications and parameters, affected system set up, circuit breakers position.

DECIDE

Applicable procedure/checklist shall be identified by the PF. Commander should confirm or may change the course of further action and/or distribution of pilots duties (PF/PM), if required.

INITIATE

The PF, when ready, shall initiate identified procedure/checklist, using proper call-out.

MEMORY ITEMS

Minimal vital actions, which shall be done as soon as the situation permits without reference to the checklist (see 3.1.9 below).

ABNORMAL/EMERGENCY CHECKLIST

Most of the procedures can be found in Abnormal/Emergency Checklist. They shall be accomplished following the principles described in Ch. 3.1.7 below.

APPROPRIATE PROCEDURE

Abnormal/Emergency Procedure relevant to Situation that could be found in this chapter or other available official publications.

An abnormal procedure/checklist should be continued to its definite end.

At the end of a procedure PM shall announce:

“Checklist/Procedure completed”.

EVALUATE

Upon completing of the procedure/checklist, evaluation should be made to clarify:

- The aeroplane/affected system current status;
- Any additional limitation resulted by the procedure or situation;
- Any additional abnormal/emergency procedure or course of actions required for safe conduct of the flight.

**DECISION TO
CONTINUE/DIVERT
THE FLIGHT**

Commander shall analyze the situation and make a decision about possibility to continue the flight to destination (see Ch 3.4).

3.1.2. Multiple failures

While every attempt is made to provide needed non-normal checklists, it is not possible to develop checklists for all conceivable situations, especially those involving multiple failures.

In some unrelated multiple failure situations, the flight crew may combine elements of more than one checklist or exercise judgment to determine the safest course of action.

The Commander shall assess the situation and use good judgment to determine the safest course of action.

3.1.3. Crew Co-ordination

In abnormal/emergency situation crew co-ordination mainly is the same as in normal flight (see Part A Ch. 8.0).

Handling emergency situation the Commander may re-designate the PF, taking into account the following:

- The aeroplane/systems status;
- Experience of flight crewmembers;
- Crew workload, fatigue and stress level;
- Additional tasks/arrangements (re-examination of checklist, cabin crew co-ordination, PA announcement, etc).

However the Commander should refrain from taking over the controls during critical stages of the flight (take-off, landing, go-around) when aeroplane is below MSA.

3.1.4. Circuit breakers reset procedure

Flight crew reset of a tripped fuel pump and fuel pump control circuit breakers is prohibited.

Reset of any other tripped circuit breaker is not recommended, unless if in the judgement of the Commander, the situation resulting from the circuit breaker trip has a significant adverse effect on safety. These other tripped circuit breakers may be reset once after a short cooling period (approximately 2 minutes.).

Flight crew cycling (pull and reset) of circuit breakers to clear non-normal conditions is not recommended unless directed by a non-normal checklist.

A ground reset of a tripped circuit breaker by the flight crew should only be accomplished after Certifying technician has determined it is safe to reset the circuit breaker.

Cabin Crew shall not operate with circuit breakers located in cabin without clear concern of the Commander.

3.2 FAILURE DURING CRITICAL STAGES of the FLIGHT

3.2.1 Rejected Take-off

If continuation is unsafe, take-off could be aborted at any speed below V1 calculated for particular runway and conditions. However, statistics show that take-off abortion from the speeds close to V1 poses higher risk of overrun and aeroplane damage.

To minimize this risk and facilitate decision making during take-off run, two phases are established:

- Speeds below 80 Kts, and
- Speeds above 80 Kts and below V1.

1) Speeds below 80 Kts - Low Energy Abortion

A take-off should be rejected in case of any malfunction/failure or other problem noted by the flight crew. The aeroplane could be easily controlled and stopped without overriding brakes. Very short period may be required to clarify and fix the problem to re-initiate the flight.

2) Speeds above 80 Kts and below V1 - High Energy Abortion

A take-off shall be rejected only if there is:

- loss of thrust;
- loss of control;
- danger of impact,
- major system failure that makes continuation unsafe (fire, loss of instruments, etc);
- Pilot obvious incapacitation.

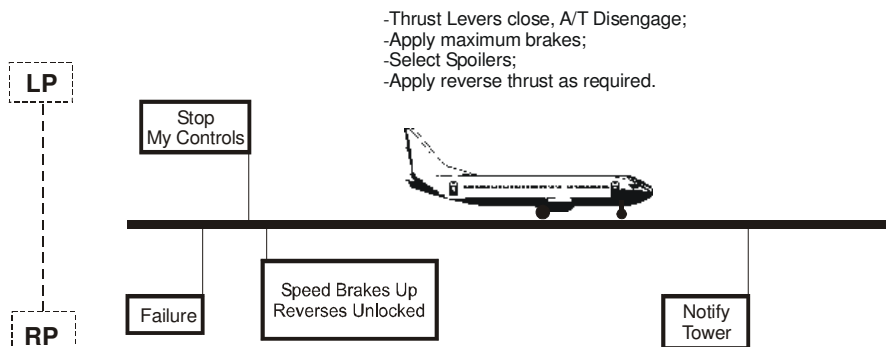
Immediate and prompt actions are required from the flight crew to stop the aircraft within the distance available. Correct call-outs and crew co-ordination is vital.

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Crew Co-ordination

Any pilot may call "Failure" if he recognizes the conditions prescribed above. Left Pilot shall take over the controls and stop the aircraft.

LP	RP
Call: Stop, My Control ▪ Thrust Levers close, A/T Disengage ▪ Apply maximum brakes ▪ Select Spoilers, ▪ Apply reverse thrust as required Stop aircraft and evaluate the situation. Inform via PA "Remain Seated" or, initiate the emergency evacuation immediately, when the aircraft has come to a complete stop and parking brakes set.	Verify and call: Speed Brakes Up, Reverses Unlocked Action: Select Flaps 40 Upon reaching call: 80 Kts Inform ATC



Complete a Non-Normal Checklist, if appropriate.

Review Brake Cooling Schedule in QRH for brake cooling time and precautions to decide whether or not the flight could be continued.

Inform cabin crew/passengers. Call ATC controller/Ground handling for decision made and/or assistance required.

In case of fire

Aeroplane should be stopped in the direction, in which the wind will blow the flames away from the fuselage.

Emergency evacuation shall be initiated immediately when the aircraft has come to a complete stop and parking brakes are set.

3.2.2 Continued Take-off with failure

Take-off shall be continued in case of any problem at a speed **above V_1** .

In case of any other malfunction than engine failure/fire the normal climb out procedure and profile to be followed. No checklists to be initiated until aircraft is in clean configuration and above MSA.

Crew Co-ordination general

Change of controls should not be made until the aircraft is cleaned up and has reached MSA, unless required for the safety of the flight.

PF	PM
Shall concentrate on flying the aircraft according to profile and Climb out Procedure.	Shall assist the PF to complete the initial climb out to a safe altitude by monitoring flight instruments and using proper call-outs
If warning is disturbing, can ask to cancel it at any time by calling out: "Cancel warning"	Canceling warning, state the malfunction which has triggered the warning.
To minimize the risk of inadvertent mistakes made in rush and stress at a low altitude till the moment when landing gear are retracted:	
Shall fly the aircraft relaying on his natural feelings and pilot's skill	Shall refrain from the statement about the malfunction - not to distract PF's attention from normal sequence.

3.2.2.1 Engine failure

The Commander has to determine whether an actual shutdown or operation at reduced thrust is the safest course of action.

There are no non-normal checklists associated with the loss of an engine indication. Operate the engine normally unless a limit is exceeded.

Maneuvering

In case of engine failure, immediately apply the rudder for directional control and use the ailerons to keep wings level.

No turns below 500' AGL, if not stated in Climb out Procedure.

Max bank angle at V_2 is 15° . For bank angles $15-25^\circ$, increase respective speed by 15 Kts.

Obstacle clearance

- 1) For maximum initial climb performance the gear must be retracted as soon as positive rate of climb is established.
- 2) If reduced thrust is used for take-off, consider Max Thrust selection upon PF/Commander discretion (expect increase of yaw moment).
- 3) Accelerate and retract flaps in level flight.
- 4) Climb at Flaps up maneuvering speed if required for max climb performance.
- 5) Follow one engine Climb out Procedure. Note that noise abatement is no longer a requirement.

Crew Co-ordination

	PF	PM
V1	Continue Rotate the aircraft as in normal take-off so as to reach V_2 at 35 feet not later than above the runways end.	Rotate As per normal take-off sequence.
Airborne	Fly command bar, insure positive rate: Gear Up	When positive rate of climb is established: Positive Climb Select gear up and check that gear is up and locked: Gear Up, no lights

Initial climb	Continue the climb at V_2 If eng failure occurs at a speed above V_2 , maintain the speed, but not more than $V_2 + 20$ Kts, When established in climb: Identify	Monitor speed and attitude throughout initial climb. Check and announce kind of alert and suspected problem.
500'	HDG Set/Sel and initiate first turn, if required	Select/verify roll mode and proper mode annunciation. Adjust HDG to keep TO track.
1000' AGL (if not specified in RM, but never below 400' AGL)		
Acceleration altitude	Set and/or (*) Speed 220 Flaps 1** Accelerate in level flight and at appropriate speed Flaps up Accelerate to desired climb speed Set and /or (*) LVL CHG, MCT² NOTE 1,2: Use Max thrust (5min) and/or flaps up maneuvering speed is required for max climb performance to reach MSA	Set speed to 220 Kts (*). Select flaps one and when flaps have been checked to be one Flaps 1 Select flaps up and when flaps have been checked to be up Flaps Up, no lights Set requested speed (*)
Above MSA	When ready, call for Engine Failure/Shutdown Checklist	Complete the Checklists
	Follow Climb out Procedure, call for After Take-off Procedure Checklist	Complete appropriate procedure and checklist checklist

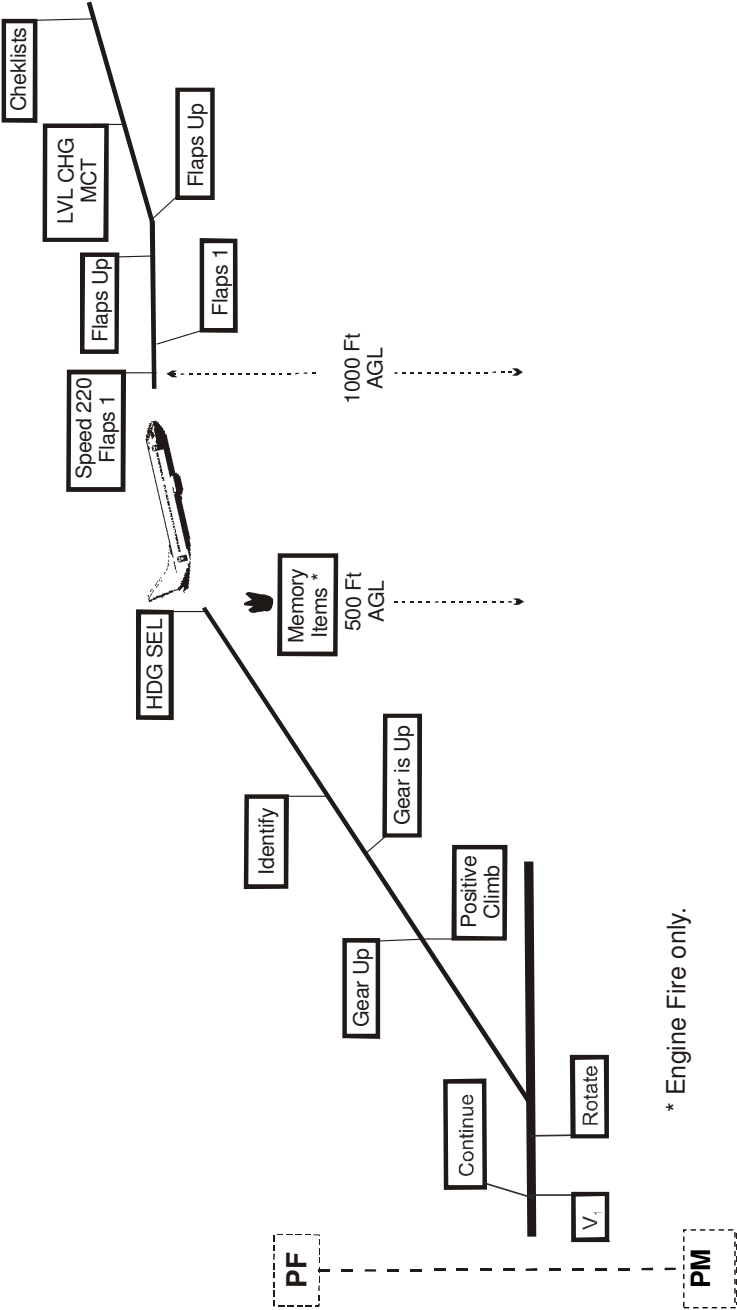
(*) – If Autopilot is not engaged, all settings to be done by PM

** - Flaps 5 to be selected first in case of flaps 15 take-off

Use of Autopilot

It is recommended to engage autopilot above 1000 ft AGL.

Continued Take-off with Failure



3.2.2.2 Engine fire/Severe damage/Separation

All the same as for engine failure procedure, just engine shut down procedure shall be initiated at **500 ft AGL** as follows:

	PF	PM
500 ft AGL	When ready, initiate engine shutdown procedure Check engine instruments and correct Thrust Lever is pointed Number.....Confirmed Check correct Start Lever Number.....Confirmed Check correct Fire Handle Number.....Confirmed	Put your finger on appropriate Thrust Lever Confirm Thrust lever Close Thrust Lever smoothly and put your finger on and call Start Lever Cutoff Start Lever and put your finger on and call Fire Warning Switch Pull Fire Warning Switch and, if ENG OVERHEAT light remains on – ROTATE L or R If after 30 sec Fire Warning Switch or ENG OVERHEAT light remains on – ROTATE OPPOSITE

In addition the following to be observed during engine shut down by:

1) PM:

- Inform PF whether the engine is still producing thrust or not.
- Close Thrust Levers very smoothly to avoid big change in yaw moment.
- When Memory Items have been completed announce clearly is the fire Extinguished OR Not extinguished.

2) PF

- If engine is still producing thrust, expect big change in yaw moment during thrust lever retardation/engine shut down.
- Engine shut down procedure requires additional attention and time and probable will not be completed by acceleration altitude (1 000 ft AGL), concentrate on following the flight profile and Climb out Procedure.

3.2.2.3 Engine Failure Climb out Procedure

Approved Contractor calculates engine Failure Climb out Procedure for every particular runway on basis of aircraft MTOW performance given in Aircraft Operations Manual (AOM). The Procedure is presented in SAS RM or other special layout provided for the pilots before the flight.

The procedure ends up in a navpoint from where you are able to continue to another aerodrome or start the approach for the aerodrome of departure.

The main criteria used when making the ENG FAIL procedure is obstacle clearance, not the traffic flow. Therefore, it is very important that the pilots report the deviation from the ATC clearance caused by ENG FAIL as soon as possible.

Crew Co-ordination

PF shall brief the ENG FAIL PROCEDURE before every departure and, in case of engine failure, follow it strictly till under Radar Vectors and/or instructed otherwise.

PM shall report to the ATC deviation from departure clearance, intentions and assistance required as soon as possible.

3.2.3 Failure during approach

Failures during CAT 2/3 Approach are prescribed in appropriate chapt. 2.4.

General

Generally an Approach **may be continued**, if there is enough time to clearly identify the malfunction/failure and complete appropriate Non-normal checklist without distraction pilots' attention from performing their main duties concerning approach execution.

If approach is continued, it **shall be stabilized** at 500' RA. In addition to stabilized flight parameters both Normal and Abnormal Checklists shall be completed to full extent.

If there is any uncertainty of real problem or doubt in successful landing, or adequate time to complete the abnormal checklist fully and properly, the approach **must be terminated**. Aircraft should be placed into position to give the crew extra time to complete all actions and preparations required to land aircraft once but safe.

Failure above 500' ft AGL

In most cases the relevant procedure can be completed and the approach may be continued. If applicable, apply increased weather minima.

If engine failure/fire occurs at an altitude close to 500' ft, at least Memory Items for appropriate engine shut down shall be completed.

Failure below 500' ft AGL

When visual reference is not established and the failure effects an instrument approach accuracy, initiate a go-around.

When visual reference is established and the failure does not effect safe landing (landing gear, brakes etc) continue for landing.

In case of smoke or fire continue for landing and initiate emergency drills as soon as aeroplane is on ground.

Engine Failure

If an engine fails with flaps in the landing position, the decision to continue approach or execute a go-around should be made immediately. Retract the flaps to 15° and adjust thrust on operating engine to increase the speed by 15 kts over the V_{REF} for flaps 30° or 40°.

Trim the aircraft and make decision to make a go-around or continue the approach.

The airplane is approved for FD or single AP operation to CAT 1 minimums with engine inoperative if airplane is trimmed for the conditions with the following assumptions:

- 1) The use of dual AP is not authorised
- 2) Use of AT is not recommended
- 3) Rudder trim may be set to zero (by passing 500 feet) to facilitate directional control during thrust reduction.

3.2.4 Failure during Go-around

The same principles as for Continued Take-off with Failure to be applied (3.1.2 above).

Memory items for engine shut down shall be initiated not earlier than:

- in clean configuration and above MSA, in case of engine failure;
- 500'AGL, in case of engine fire/severe damage/separation.

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3.3 EMERGENCIES that REQUIRE IMMEDIATE ACTIONS

3.3.1 EGPWS

3.3.2 TCAS

3.3.3 Upset recovery

3.3.4 Emergency Descent

3.3.5 Fire and Smoke Drills

3.3.1 **ENHANCED** GROUND PROXIMITY WARNING

3.3.1.1 **EGPWS** “PULL UP” Warning

QRH, Non-Normal Manoeuvres 1.4:

PULL UP – APPLY POWER IMMEDIATELY

AUTOPILOT	Disconnect
THRUST	Maximum
Call: “Set Power”	
ATTITUDE*	Wings level, Pitch 20°
SPEEDBRAKES	Retract
A/C CONFIGURATION	Do not change

*In all cases the pitch attitude that results in intermittent stick shaker or initial buffet is the upper pitch attitude limit. Flight at intermittent stick shaker may be required to obtain a positive terrain separation. Smooth, steady control will avoid a pitch attitude overshoot and stall.

When the “PULL UP” warning ceases and above the lowest safe altitude, resume normal flight.

3.3.1.2 **Other EGPWS Alerts**

One of the EGPWS functions is to provide alerting of an impending hazardous situation with regard to terrain avoidance, aircraft configuration, attitude. Correct the flight path or the aircraft configuration for any of these aural alerts:

- | | |
|--------------------|-------------------|
| ▪ CAUTION TERRAIN | ▪ TOO LOW GEARS |
| ▪ SINK RATE | ▪ TOO LOW TERRAIN |
| ▪ TERRAIN, TERRAIN | ▪ GLIDESLOPE |
| ▪ DON'T SINK | ▪ BANK ANGLE |
| ▪ TOO LOW FLAPS | |

3.3.2 TCAS WARNING

Main principles of TCAS system are described in OM, Part A, para 8.3.6.

3.3.2.1 Traffic Advisories (TAs)

	PF	PM
TA Active	Continue to fly aeroplane and be prepared to RAs that might follow	Provide updates on the traffic location on display to help visually acquire the intruder
	Both pilots concentrate on visual acquisition and confirmation of intruder.	

If visual contact is attained, right of way rules are used to maintain or attain safe separation. No unnecessary maneuvers should be initiated.

Without visual contact, aircraft should not be maneuvered based solely on the information shown on the TCAS display. No attempt should be made to adjust the current flight path in anticipation of what an RA would advise.

3.3.2.2 Resolution Advisories (RAs)

RA has priority over ATC clearances and shall be responded to immediately unless doing so would jeopardize the safe operation of the aircraft.

	PF	PM
RA Active	Unless visual separation assured: AP and A/T ---- Disconnect; TCAS RA ----- Follow guidance; Thrust ----- Adjust as required	Traffic location ---- Check; PF' response to RA ---- Monitor. ATC ----- Inform

NOTE: Evasive manoeuvring shall be limited to the minimum required to comply with the RAs.

When deviating from ATC clearance (altitude or track) ATC shall be informed as soon as practicable.

3.3.2.3 Clear of conflict

PF shall return the aeroplane to the ATC clearance as soon as possible. The controller's responsibility for providing separation with other traffic resumes when evasive manoeuvre is complete and the crew reverted to previous or assumes the revised ATC clearance.

RA weakens	PF	PM
	TCAS RA ----- Follow guidance When “Clear of Conflict” ----- return to original or revised ATC clearance.	Acknowledge return to original or assume revised ATC clearance

3.3.2.4 RTF Phraseology

The following or similar phraseology to be used when deviating from the ATC clearance due to RAs:

Following TCAS RAs	“TCAS Climb / Descent ”
After “Clear of conflict”	“TCAS Climb / Descent, Returning to ...“
ATC instructions in conflict with RAs	“Unable to comply, TCAS Resolution Advisory”

3.3.3 UPSET RECOVERY

Flight Crew should be aware that various factors could disrupt normal flight and place an aircraft into abnormal attitude. This section will define aircraft upsets, list some of their potential causes, as well as suggest various techniques for safe upset recovery.

Definition: Aircraft upset is defined as aircraft attitude equal to or greater than any of the following:

- Pitch attitude more than 25 degrees nose up;
- Pitch attitude more than 10 degrees nose down;
- Bank angle more than 45 degrees;
- Flight within these parameters at airspeeds inappropriate
- For the conditions.

3.3.3.1 Causes of Aircraft Upsets

Most common causes of aircraft upsets are categorized as:

- a) Environmentally induced;
 - Turbulence, Wake turbulence
 - Mountain wave;
 - Windshear, Microbursts;
 - Airplane Icing.
- b) Systems anomalies induced;
 - Flight Instruments;
 - Autoflight systems;
 - Flight controls and other anomalies.
- c) Pilot induced;
 - Instrument misinterpretation or slow cross-check;
 - Inattention and distraction from primary duties;
 - Vertigo or spatial disorientation;
 - Improper use of airplane automation;
- d) A combination of all of the above.

3.3.3.2 Upset Recovery Techniques

If the aeroplane is stalled, recovery from the stall shall be accomplished first.

1. Stall Recovery

- Disengage autopilot and auto-throttle
- Apply maximum thrust
- Smoothly adjust attitude just below the stalling angle (or as necessary to avoid terrain)
- Level wings
- Retract the speed brakes
- Accelerate to maneuvering speed for flap position
- Stop descent and return to target altitude

2. Nose-high Recovery

- Recognize and confirm the situation
- Disengage autopilot and auto-throttle
- Apply full nose-down elevator
- Apply appropriate nose-down stabilizer trim
- Roll (adjust bank angle) to obtain a nose-down pitch rate
- Complete the recovery:
 - When approaching the horizon, roll to wings level
 - Check airspeed and adjust thrust
 - Establish pitch attitude

3. Nose-low Recovery

- Recognize and confirm the situation
- Disengage the autopilot and auto-throttle
- Recover from stall, if necessary
- Roll in the shortest direction to wings level (unload and roll if bank angle is more than 90 degrees)
- Recover to level flight:
 - Apply nose-up elevator
 - Apply stabilizer trim, if necessary
 - Adjust thrust and drag as necessary

4. Windshear Recovery

PF shall immediately:

WINDSHR

AUTOPILOT	Disconnect
THRUST LEVERS	Advance
TO/GA button(s)	Press
Call “Set Power”	
ATTITUDE*	Wings level, Pitch 15°
SPEEDBRAKES	Retract
FLIGHT DIRECTOR*	Follow, if TO/GA mode is confirmed
A/C CONFIGURATION	Do not change

*In all cases the pitch attitude that results in intermitten stick shaker or initial buffet is the upper pitch attitude limit. Flight at intermitten stick shaker may be required to obtain a positive terrain separation. Smooth, steady control will avoid a pitch attitude overshoot and stall.

PM shall assure:

- Max Thrust (adjust manually, if required);
- Flight path to clear obstacles.

When clear of windshear and at a safe altitude, select appropriate FMC mode and adjust aircraft configuration. Report the encounter to ATC.

3.3.4 Emergency Descent

Emergency (Rapid) descent could be initiated:

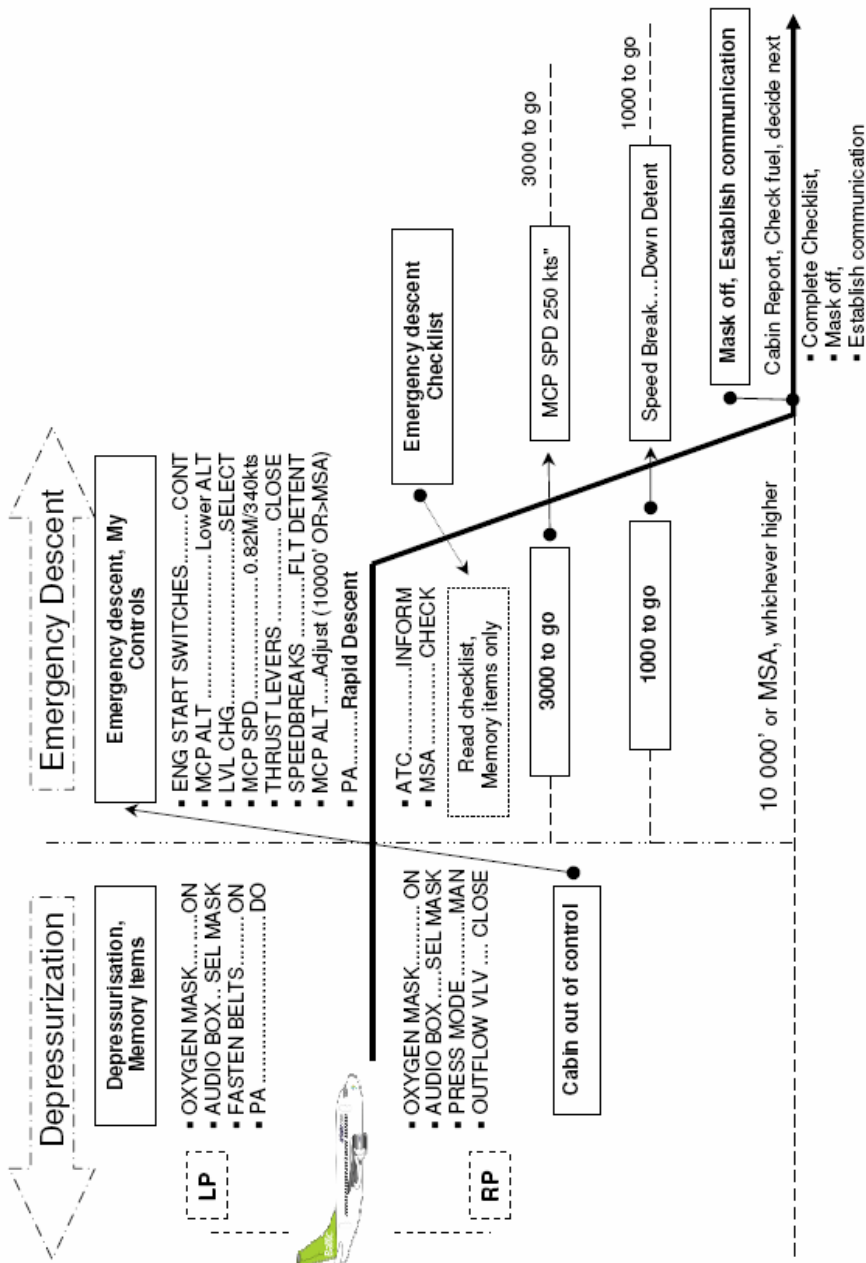
- Cabin pressure is out of control at an altitudes above 14 000'feet;
- Other operational reason.

When the cabin pressurisation problems are encountered all consequent actions acc to ch. 3.6.2 shall be taken to regain cabin pressure control first. Terminated climb and/or preventive normal descent could preclude necessity of Emergency Descent.

Whenever cabin pressure altitude is above 10 000' with or without Cabin altitude/ Configuration horn warning - **OXYGEN MASKS** shall be **ON**.

LP	RP
Emergency Descent, My Controls ENG START SWITCHES CONT MCP ALT Lower ALT LVL CHG SELECT MCP SPD0.82M / 340 Kts* THRUST LEVERS CLOSE SPEEDBRAKES FLIGHT DETENT MCP ALTadjust (10000' or > MSA) PA.....Rapid Descent, If not already done	ATC..... INFORM MSACHECK
Emergency Descent Checklist	Read checklist, memory items only.
MCP SPD250kts SPEED BRAKEDOWN DETENT Mask OFF, Establish communication	3000 to go 1000 to go 10 000 ft Complete checklist

* If structural damage exists or suspected, limit airspeed to current speed or less. Consider LG extension to increase rate of descent, comply with LG speed limits. When aircraft is levelled off at an altitude below 14 000' the Cabin Crew shall be requested to cockpit to report situation in passenger cabin. Make in-flight re-planning according with ch. 3.4, as required.



3.3.5 Fire and Smoke Drills

Fire and Smoke are on of the most dangerous conditions on board.

The Non-normal Checklist covers nine different variants:

- AIR CONDITIONING SMOKE / FUMES
- APU FIRE;
- CARGO FIRE;
- ELECTRICAL SMOKE / FUMES OR FIRE
- **ENGINE FIRE**
- **ENGINE OVERHEAT**
- ENGINE TAIL PIPE FIRE
- LAVATORY SMOKE
- SMOKES / FUMES REMOVAL

Procedures for aborted T/O and Engine fire are given in ch.3.2, however it could be also other cases of external or internal open fire (refuelling, sabotage, hijacking, etc) when Basic judgement shall be used.

Fire fighting algorithm is as follows:

1) Establish and verify the origin (source). The fire normally is determined via appropriate detector / warning or Cabin crew report.
Equipment smoke / fumes in general could be delivered by air conditioning or circulated within the cabin.

2) Initiate and complete appropriate Procedure / Non-normal checklist:
If appropriate procedure / Non-normal checklist is not identified the Course of actions (fighting, maneuvering, evacuation, etc) shall be chosen.

3) Protect yourself and passengers. Use of OXYGEN should always be considered due to very high risk of fumes poisoning.
PAX OXYGEN (mix with cabin air) will not protect passengers against fumes poisoning. SMOKE REMOVAL procedure should be used instead.

4) Inform ATS, Divert for landing. With the very few exceptions landing at nearest suitable airport is absolutely necessary. Initiate diversion in parallel with fire fighting.

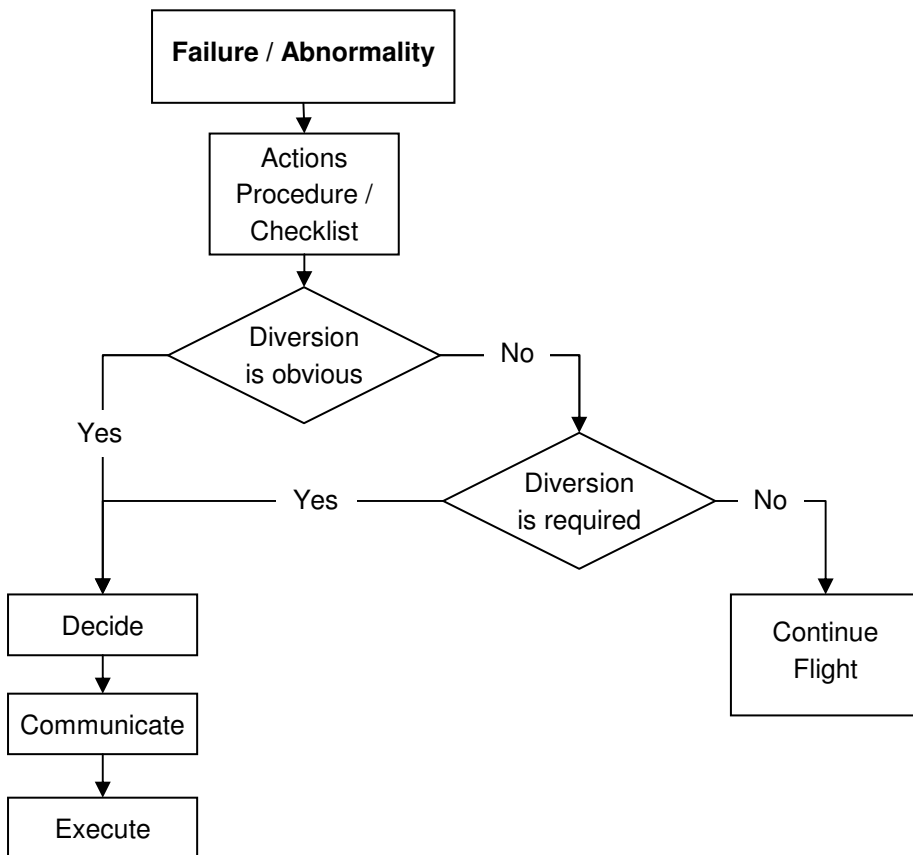
5) Inform Cabin Crew to prepare cabin for landing in acc with ch. 3.5

6) Land and Evacuate. If fire is not extinguished or danger of passenger intoxication exists, emergency evacuation shall be started immediately when aircraft is stopped and parking brakes are set.
Notify ATS, request assistance.

3.4 GUIDANCE FOR DIVERSION

Main principles of in-flight re-planning and diversion policy are described in OMA 8.3.20.

Simplified diversion flow with the type specific items is presented in this chapter.



Failure / Abnormality

Actions
Procedure /
Checklist

Complete appropriate procedure, checklist or course of actions in acc with 3.1.1

Diversion
is obvious

Technical problem - loss or significant reduction of appropriate system redundancy and/or function.

Abnormal situation - deterioration of situation on board to a level assessed as critical as a result of technical, security or health problems (see NOTE below)

Diversion
is required

Additional considerations are required concerning:

Aircraft technical status / performance, in-flight conditions along the route and situation on board.

Decide

Select the aerodrome for diversion taking into account the threat and time available, aerodrome characteristics, and aircraft performance.

Communicate

ATS – to facilitate re-planning, preparation and execution of diversion as well as assistance required after landing.

Crew – to clarify situation on board, decision and co-ordination.

Passengers – situation, intentions and assistance required.

Execute

Prepare IAL charts, complete Approach briefing, request assistance required from ATS controller

NOTE: The following reasons are stated in the QRH as mandatory for diversion:

- Engine failure / shutdown
- Fire
- Cabin Smoke / Fumes
- Jammed/ Restricted Flight controls;
- One main AC power source remains (engine or APU);
- One HYDR system remains (including STBY system);
- Tail strike
- Door annunciator with door handle will not close;
- Volcanic ash.

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3.5 EMERGENCY LANDING/DITCHING

These emergency Instructions explain the actions, which have to be taken during emergency landing and/or emergency evacuation.

3.5.1 Planned emergency landing

The Flight Crew proceeds as follows:

- a) Declare Emergency AND notify ATC about your intentions.
- b) Brief the crew on the following:
 - T - Type of emergency
 - E - Exits to be used for the evacuation
 - S - Signal for BRACE/EVACUATE
 - T - Time to Prepare
 - Repeat information back
 - Synchronize watches
- c) Complete the "Emergency Landing" checklist.
- d) Prior to landing call via PA system:
 - Two minutes (1000') - **Take up emergency landing positions**
(“Seat belts” sign cycle OFF-ON)
 - 30 seconds (200') - **Brace, Brace**
(or flashing “Seat belts” sign repeatedly).
- e) In windy conditions with fire on board consider aligning the aircraft into the wind to keep the flame away from the fuselage.
- f) After full stop:
 - **Evacuate, Evacuate** – via PA system to initiate evacuation
(alternatively "Remain Seated" if evacuation is not necessary)
 - Both pilots shall perform their Memory Items and then Right Pilot shall read the Non-Normal Checklist “Passenger Evacuation”.

NOTE: 1: If one pilot is incapacitated - the Captain's memory items should be actioned first, followed by Co-pilot memory items.
2: If no information from the cockpit - the Cabin Crew will initiate the evacuation.

3.5.2 Unplanned emergency landing

Situation happens during take-off or landing. The crew and cabin crew have no time to coordinate own actions with the Commander.

If such an emergency landing shall be executed:

- PM should give **Brace** command via PA system, if time permits.
- If an evacuation is not necessary - **Remain Seated** via PA system.
- If an evacuation is necessary - **Evacuate, Evacuate** via PA system, then both pilots shall perform their Memory Items, then Right Pilot shall read the Non-Normal Checklist "Passenger Evacuation".

NOTE: 1: If one pilot is incapacitated - the Captain's memory items should be actioned first, followed by Co-pilot memory items.
2: If no response from the cockpit - the Cabin Crew will initiate the evacuation.

3.5.3 Evacuation

Right Pilot:

- a) Proceed to the cabin area,
- b) Bring the flashlight, axe and portable ELT (optional);
- c) Open forward service door if it is not opened by C/C and leave the cabin to assist the passengers in evacuation from the outside;
- d) If main exit is blocked - evacuate through the right cockpit window using escape rope.
- e) Use an axe to open emergency exits from outside if needed;
- f) Direct and assist the passengers in evacuation as condition dictates.

Left Pilot:

- a) Proceed to the cabin area;
- b) Bring the flashlight and fire extinguisher;
- c) Open forward passenger door if it is not opened by C/C;
- d) Check that all passengers have been evacuated;
- e) Leave the cabin through any passenger cabin door.
- f) If exit is blocked - evacuate through left cockpit window using escape rope;
- g) Direct and assist the passengers in evacuation as condition dictates.

3.5.4 Ditching

CAUTION: Do not inflate life vest inside of aircraft!

3.5.4.1 Planned ditching

- a) Prepare as for 3.5.1 "Planned emergency landing".
- b) Complete Non-Normal checklist for "Ditching"

3.5.4.2 Unplanned ditching

- a) Complete "Emergency Evacuation" checklist.
- b) Put on the life vests.
- c) Check that all passengers have been evacuated.
- d) Leave the aircraft.

3.5.4.3 After evacuation

- a) Assemble the passengers at a safe distance from the aircraft (at least 100 meters).
- b) Make a head count of all passengers and crew members.
- c) Render all possible first aid.
- d) Contact air Baltic MCC office as soon as possible and remain available to answer questions.
- f) Make no any comment to the press.
- g) Report of Emergency within 24 hours.

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3.6 OTHER ABNORMAL and EMERGENCY PROCEDURES

3.6.1 Pilot incapacitation

Basic principles of recognition and handling of flight crew incapacitation are presented in OM,A, 4.3.

a) Course of actions

As far as incapacitation is recognised the remaining pilot shall:

- 1) Take over controls, check the position of essential control and switches;
- 2) Declare emergency to ATC and assistance required;
- 3) Request Cabin Crew to:
 - Restrain the incapacitated pilot and slide the seat back, or
 - Remove him from his seat to passenger cabin for further care
- (it should be realized that an unconscious pilot can regain consciousness very suddenly and become a violent and irrational);
 - Provide other assistance require to (asses medical conditions of incapacitated pilot, provide him necessary care, reading of checklists, etc).
- 4) Chose further course of actions and aerodrome for landing taking into account medical conditions of incapacitated pilot.
- 5) Ensure safe completion of the flight and medical assistance available immediately upon landing (stairs, ambulance, etc).

NOTE: As a good airmanship continuous use of SOPs including reading loud the standard call-outs for aircraft re-configuration and completion of appropriate procedures and checklists is highly recommended.

b) Incapacitated pilot care

Cabin crew will take over the responsibility for the incapacitated pilot from the moment they have been requested.

Pilot care include evaluation of physical and mental conditions, medical treatment, restraining on pilots seat or relocation to forward galley as well as assistance from doctor, if available on board, etc

c) Take-off

Take-off is the most critical case when pilot incapacitation requires immediate decision and prompt actions.

Proper crew co-ordination and use of standard call-outs is vital.

Failure of LP timely respond on **“80 Knots”** and **“V₁”** call-outs will require the following immediate actions from RP.

RP		
LP incapacitation	80 Knots	If the LP doesn't respond, repeat the call about the higher speed already reached. If no reply, abort T/O: “Stop, My controls” ▪ Thrust Levers close, A/T disengage; ▪ Apply brakes; ▪ Apply reverse thrust as required; ▪ Keep directional controls with pedals and differential braking, when required; ▪ Stop the aircraft, set parking brakes, and ▪ Inform ATC and request assistance (stairs, etc). Call cabin crew to help Captain. Take the left seat for further taxi, when requested by ATC.
	V ₁	If the LP doesn't respond, take over controls and perform the Take-off: “Continue, My controls” ▪ Retract landing gear on positive climb; ▪ Engage AP at 1 000' feet AGL; ▪ Use standard call-outs for flap retraction; ▪ Follow the SID, inform ATC Follow Course of actions stated in a) above.

3.6.2 Unpressurized and Partially Pressurized Flight

3.6.2.1 General

Unpressurized aircraft must be maintained at 10'000 feet or at the lowest safe altitude, if higher.

Prolonged flight at altitudes above 14 000' shall be avoided and every opportunity is used including re-routing to descent below above mentioned altitudes as soon as practicable.

Flight crew shall use OXYGEN when Cabin altitude is above 10 000'.

The pressurisation problems could have different origin that determines cabin pressure change character:

- Slow cabin pressure change is difficult to recognize. Proper instruments monitoring (especially 10 000' check) is important. When recognised early, the time available gives possibility to fix the technically or operationally even without use of Abnormal procedures.
- Rapid cabin pressure change is easy to recognise but time available to fix the problem is limited, prompt pilots actions are required.

3.6.2.2 Early recognition

The algorithm for the course of actions should as follow:

- 1) **Stop climb** to level/altitude above 10 000' feet(ALT HOLD);
- 2) **Ensure supply** (ENG BLEED, PACKS, CBs),
- 3) **Ensure control** (OUTFLOW VALVE is controlled in STBY / MAN mode)

Complete Appropriate Non-normal checklist

AUTO FAIL / UNSCHEDULE PRESSURISATION CHANGE

Ensure pressurisation system proper function on STBY or MAN mode before decision for cruising altitude is made and further climb is requested.

NOTE: Even with fully open uncontrollable outflow valve it could be possible to keep normal cabin altitude up to FL 280.

3.6.2.3 Cabin altitude warning

In fact the same algorithm to be used, however due to unknown limit of the time available in every particular case the priority is given to “safe the pilots” Recall item of the following Non-normal checklist shall be completed by both pilots immediately.

CABIN ALTITUDE WARNING or RAPID DEPRESSURISATION
--

LP	RP
OXYGEN MASK ON AUDIO BOX..... SELECT MASK FASTEN BELTS ON PA..... DO “Take your seats and fasten the belts”	OXYGEN MASK ON AUDIO BOX SELECT MASK PRESSURIZATIONMAN OUFLOW VALVE..... CLOSE

When Recall items are complete, the main algorithm to be used again:

- 1) **Stop climb** to level/altitude above 10 000’ feet(ALT HOLD);
- 2) **Ensure supply** (ENG BLEED, PACKS, CBs),
- 3) **Ensure control** (OUTFLOW VALVE is controlled in STBY/MAN mode)

The pressurisation problems normally could be fixed without necessity of immediate emergency descent.

However some precautions could be taken right now to facilitate the readiness for further prompt actions.

- LP should take controls and ensure that AP is used;
- LP check aircraft position / around traffic for decent maneuver;
- LP inform cabin crew via PA : “Cabin crew terminate the service, prepare for Rapid Descent”.
- RP concentrate on regaining of cabin pressure control;

Cabin out of control – Emergency descent to be initiated acc to ch. 3.3.4.

Cabin under control – Complete above mentioned Non-normal checklist, ensure proper system function to stabilise the cabin at desired cabin altitude. Inform the cabin crew and passengers. Make in-flight re-planning according with ch. 3.4, as required.

3.6.3 Lighting Strikes

The effects of a lightning strike on an aircraft can be divided into direct and indirect effects.

Direct effects can take form of burning and erosion of the metallic surfaces. The extent of such possible structural damage mainly depends on quantity of transferred energy (electrical discharge). In extreme cases, structural deformation or damage due to disruptive pressure and / or magnetic forces and high-pressure waves that can twist or rip off structures from their fastening devices.

Indirect effects are mainly caused by the electromagnetic fields associated with the strike. This can induce transient voltages into the electrical wiring, causing temporary or permanent malfunction of electrical / electronic equipment.

Procedure

After encountering lighting strikes or significant static discharges, perform the following:

- Make passengers announcement regarding encountered lightning;
- Compare airspeed indication with value derived from power settings, aircraft attitude and altitude;
- Functionally test radios, avionics and flight instruments;
- Compare compass readings;
- Check circuit breaker panel for tripped circuit breakers.
- Upon landing inform technicians and make an entry into Complaint Card of Aeroplane Technical log, describing effects of lightning on specific aircraft systems, if any (e.g. EFIS screen was blinking for 5-10 sec., shortly lights went out, etc.).

3.6.4 Exceeding Cosmic Radiation Limits

Taking into account duration of our flights (time of exposure) as well as maximum operating altitude (intensity of radiation) for Boeing 737, no additional precautions should be taken.

At altitude of 31'000 feet pressure altitude and below, cosmic radiation is considered low and its influence on human health is limited.

3.6.5 Distress Communications and alerting of ATC to Emergencies

Route Manual, section Emergency, Security.

a) Distress Message

- 1) MAYDAY, MAYDAY, MAYDAY;
- 2) Name of station addressed (Stockholm Control);
- 3) Aircraft call-sign (airBaltic 101);
- 4) Nature of distress (Collision with foreign aircraft);
- 5) Intentions (We are flying towards the coastline);
- 6) Current position (FL or altitude, heading).

The Distress message “MAYDAY, MAYDAY, MAYDAY” shall be transmitted whenever any of the following is encountered:

- a) Fire on board;
- b) Emergency descent, Emergency landing
- c) Communication failure;
- d) Hi-jacking;
- e) Loss of control;
- f) Total fuel is less than final reserve fuel;
- g) Significant aggravation of crew member or passenger's health.

b) Distress Transponder Codes

EMERGENCY 7700

COM FAILURE 7600

HIJACKING 7500

c) Public Announcement

Ladies and Gentlemen, this is your captain speaking.

Due to technical reason we are forced to make an emergency landing (on water) in about ... minutes. We are proceeding towards nearest airport (Ship, Coast) and have informed the rescue services.

We are carrying all the necessary survival equipment and we will tell you how to use it.

Please remain seated, keep calm and follow the cabin crew instructions carefully.

3.6.6 Overweight Landing

In abnormal circumstances, when the urgent landing is required for safety reasons (see 3.4.2), the maximum landing weight **may be exceeded**, providing the touchdown is made at vertical speed of 300 ft/min or less.

Execution. To provide the SOFT landing, the following to be considered:

- The longest runway with preferable wind should be chosen;
- Approach / landing speeds to be increased further by 5 Kts so pitch for landing will be slightly less than usually;
- Thrust Levers to be retarded later than usually reaching idle position shortly after touchdown.

After landing

The extent of inspection depends on whether it was SOFT or HARD on discretion of Commander.

- 1) **SOFT** overweight landing (carried by technical staff or may be delegated to Commander on outstation):
 - Main and nose landing gear tires and wheels for signs of damage
 - Upper and lower ends of main and nose landing gear shock strut for signs of leakage
- 2) **HARD** overweight landing (carried by Certifying Technician only):
 - Tires of main and nose landing gear for damage
 - Wheels of main and nose landing gear for cracks
 - Upper and lower ends of the shock strut for leakage
 - Doors, hinges, retraction mechanism for damage
 - Beams, links, outer cylinders for cracks or missing fasteners
 - Attach nuts, support tubes for fluid leakage
 - Wheel well compartments for any damage or paint that has flaked
 - Engine strut panels, doors for bulking, cracks and missing fasteners
 - Leading edge wing-to body fairings for movement or displacement
 - Inboard leading edge flaps for damage
 - Top and lower fuselage skin panels forward / aft of the wing for wrinkles

If damage is found – **special maintenance** is required.

Documentation

Overweight landing shall be reported both via Techlog and FSR.

NOTE: In case of SOFT landing without damage the aircraft could be released for the next flight almost immediately without delay.

3.6.7 System Failures

In-flight

In case of in-flight system failure or any other serious technical failure Handling of Abnormalities principles including problem identification, verification and circuit breakers reset policy to be observed (3.1).

Appropriate Non-normal checklist shall be completed with clarification of final system status as well as influence on other systems and/or conditions of the flight to generate subsequent course of actions and general decision.

If situation and time permits without disturbance to normal sequence of the flight, OMB, MEL, FCOM, AFM, and other appropriate documentation may be consulted for further clarification.

Decision to continue the flight according to ATC Flight Plan shall be made in accordance with instructions given in 3.4 Guidance for Diversion.

Before take-off

If malfunction or improper system function is recognized:

- a) During flight preparation (PFI) – Maintenance shall be requested and aircraft could be released for the flight in acc to Aeroplane acceptance procedure presented in ch.2.2.2.2 above.
- b) Aircraft has departed the gate or the parking area (OFF CHOCKS) for the purpose of takeoff:
 - Illumination of Master Caution annunciator lights or red and amber caution lights require completion of the appropriate non-normal checklist;
 - Unannounced malfunctions – proper system setup and circuit breakers to be checked first. Appropriate Non-normal checklist should be completed next, if exists.

Upon completion of the Non-normal checklist, the Dispatch Deviation Guide (MEL) should be consulted for possibility of SAFE continuation of the flight.

The Commander shall take due time for proper assessment and consideration requesting temporary hold of position from ATC controller, consultation from MCC and/or Technical staff, etc to generate correct and informed decision.

3.7 NON-NORMAL CHECKLISTS

3.7.1 Contents

The checklist contains only those procedures where an action or sequence of actions or prohibition of incorrect action(s), which is not observed, could result in a significant adverse affect on the airworthiness of the aeroplane or the safety of the passengers and crew.

These procedures supplement and supersede the normal procedure. Normal Checklist items are usually not contained in within these procedures and shall be used when applicable.

Action considered to be “Airmanship” may not be included in these procedures; however, in an emergency they should be considered:

- Canceling MWS alert;
- System setup / Circuit breakers / Indicator lights check;
- Establishing crew communication, brief cabin crew
- ATC call, ATC Transponder;
- PA calls / announcement;
- Use of oxygen;
- Reducing landing weight;
- Normal checks, etc.

3.7.2 Presentation

The checklists are grouped in logical sections that match the system description chapter arrangement in Vol. 2. The checklists are arranged in alphabetical order within each section.

Checklists without a visible cue are called unannunciated checklist and are grouped in the first (“0” section) checklist chapter. Some unannunciated checklists also appear in the respective systems section.

Checklists contain:

- | | |
|-----------------------|-------------------------------------|
| ▪ Condition statement | the checklist starts with; |
| ▪ Recall items | placed in a box for identification; |
| ▪ Reference items; | main text; |
| ▪ Notes | Note; |
| ▪ Information items, | [in brackets]. |

The checklist procedures are presented as algorithms that shall be followed strictly. References to other relevant checklist cards are made, where needed. The following symbol shows that the checklist is complete.



3.7.3 Execution

The PF calls for the Non-normal Checklist when:

- The flight path is under control;
- The airplane is not in a critical stage of flight (such as T/O or Landing);
- All Recall items are complete.

NOTE: PF may also direct the procedure to be done by recall if no hazard is created by such action, or if the situation does not allow reference to checklist.

For Non-normal Checklist execution “**Read and Do**” method shall be used, assuming that procedures are performed by PM through reading the checklist. In addition to basic rules for checklist execution prescribed in OM, A, 8.0.6.6 the following to be applied:

- 1) Checklist to be started with the procedure title;
- 2) Recall (memory) items, if exist, to be repeated for verification;
- 3) Non-relevant/non-essential information should be omitted;
Information appearing in brackets does not need to be read aloud.?
- 4) The PF does not need to respond, however selections that are vital and could lead to irreversible changes in aeroplane/system status shall be done after PF's attention (confirmation, if required by procedure) has been assured;
- 5) Action is taken by the crewmember if the control is in the crewmember's area of responsibility. After moving the control, the crewmember taking the action also states the checklist response.
- 6) When checklist procedure has been complicated or can not be completed at the moment due to deferred items, PM should make:
 - short de-briefing on actions completed and established aeroplane/system status;
 - notes on actions/checklists to be completed later and final aeroplane/system status expected for landing.

Following completion of the applicable non-normal checklist items, normal checklists are used to verify that the configuration is correct for each phase of flight.

3.7.4 Recall Items

Recall items are critical steps that must be done from memory and are placed within the box. In addition in the Table of Contents for each non-normal checklist section, the titles of checklists containing recall items are printed in bold type.

If not stated otherwise in applicable procedure, the following principles should be adhered to:

- 1) Recall items are called aloud by the PM ,
- 2) When flying manually and simultaneous actions are required the Recall items should be done by PM first. Then, after change of control, by the other pilot.
- 3) Vital items that could lead to irreversible changes in aeroplane/system status shall be confirmed by both pilots before execution;
- 4) Recall Items to be verified during subsequent checklist reading.

Memory items are presented in Quick Reference Handbook and in this chapter below:

ABORTED ENGINE START (NNC.0.1, 7.1)

ENGINE START LEVER CUTOFF

AIRSPEED UNRELIABLE (NNC.0.3, 10.1)

AIRPLANE ATTITUDE/THRUST ADJUST

Maintain airplane control. Attitude and thrust information is provided in the Performance-Inflight section.

PITOT STATIC HEAT CHECK ON

MACH/AIRSPEED INDICATORS CROSS CHECK
--

LOSS OF THRUST ON BOTH ENGINES (NNC.0.22, 7.18)

ENGINE START SWITCHES FLT
ENGINE START LEVERS CUTOFF

EGT decreasing:

ENGINE START LEVER IDLE DETENT

**WARNING HORN – CABIN ALTITUDE OR CONFIGURATION
(NNC.0.38, 15.2)**

If an intermittent horn sounds in flight:

OXYGEN MASKS and REGULATORS ON, 100%
CREW COMMUNICATION ESTABLISH

Do the **CABIN ALTITUDE WARNING OR RAPID
DEPRESSURIZATION** checklist.

■ ■ ■ ■

If an intermittent horn sounds on the ground:

Assure proper aircraft takeoff configuration.

■ ■ ■ ■

If a steady horn sounds in flight:

Assure proper aircraft landing configuration.

■ ■ ■ ■

**CABIN ALTITUDE WARNING OR RAPID DEPRESSURIZATION
(NNC.0.6, 2.5)**

OXYGEN MASKS and REGULATORS..... ON, 100%
CREW COMMUNICATION..... ESTABLISH
PRESSURIZATION MODE SELECTOR..... MAN
OUTFLOW VALVE SWITCH CLOSE

If pressurization is restored, continue manual operation to maintain proper cabin altitude.

PASSENGER SIGN..... ON
PASSENGER OXYGEN SWITCH (if required) ON

Activate passenger oxygen if cabin altitude exceeds or is expected to exceed 14,000 feet.

EMERGENCY DESCENT (if required)..... INITIATE

Accomplish the EMERGENCY DESCENT checklist if the airplane is above 14,000 feet MSL and control of cabin pressure is not possible, or cabin pressure is lost.

EMERGENCY DESCENT (NNC.0.12, 2.7)

EMERGENCY DESCENT ANNOUNCE

The captain will advise the cabin crew, on the PA system, of impending rapid descent. First officer will advice ATC and obtain the area altimeter setting.

ENGINE START SWITCHES CONT

THRUST LEVERS CLOSE

Reduce thrust to minimum or as required for anti-ice.

SPEED BRAKE FLIGHT DETENT

DESCENT INITIATE

TARGET SPEED Mmo/Vmo

If structural integrity is in doubt, limit speed as much as possible and avoid high maneuvering loads.

LEVEL-OFF ALTITUDE.....LOWEST SAFE ALTITUDE OR
10,000 FT, whichever is higher

UNCOMMANDED RUDDER/YAW OR ROLL (NNC.0.32, 9.24)

AUTOPILOT (if engaged) DISENGAGE

Maintain control of the airplane with all available flight controls. If roll is uncontrollable, immediately reduce pitch/angle of attack and increase airspeed. Do not attempt to maintain altitude until control is recovered.

AUTOTHROTTLE (if engaged) DISENGAGE

Verify thrust is symmetrical.

RUNAWAY STABILIZER (NNC.9.12)

CONTROL COLUMN HOLD FIRMLY

AUTOPILOT (if engaged) DISENGAGE

Do not re-engage the autopilot.

Control airplane pitch attitude manually with control column and main electric trim as required.

If runaway continues:

STABILIZER TRIM CUTOUT
SWITCHES..... CUTOUT

If runaway continues:

STABILIZER TRIM WHEEL GRASP & HOLD

ENGINE FIRE, SEVERE DAMAGE or SEPARATION (7.6, 8.6)

AUTOTHROTTLE (if engaged)	DISENGAGE
THRUST LEVER	CLOSE
ENGINE START LEVER	CUTOFF
ENGINE FIRE WARNING SWITCH	PULL

To manually unlock the engine fire warning switch, press the override and pull.

If the engine fire warning switch or ENG OVERHEAT light remains illuminated:

ENGINE FIRE WARNING SWITCH ROTATE L or R

Rotate to the stop and hold for one second.

If after 30 seconds the engine fire warning switch or ENG OVERHEAT light remains illuminated:

ENGINE FIRE SWITCH	ROTATE TO REMAINING BOTTLE
--------------------	-------------------------------

Rotate to the opposite stop and hold for one second.

ENGINE LIMIT/SURGE/STALL (NNC.7.12)

AUTOTHROTTLE (if engaged)	DISENGAGE
THRUST LEVER	RETARD

Retard until indications remain within appropriate limits or TL closed.

ENGINE OVERHEAT (NNC. 7.15, 8.8)

AUTOTHROTTLE (if engaged)	DISENGAGE
THRUST LEVER	CLOSE

If the ENG OVERHEAT light remains illuminated:

Accomplish the ENGINE FIRE, SEVERE DAMAGE OR SEPARATION checklist.

OVERSPEED (NNC.15.1)

Reduce thrust and, if required, adjust attitude to reduce airspeed to less than Vmo/Mmo.

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4 PERFORMANCE

This chapter presents the Performance data of Boeing 737-500 concerning possibility to execute Take-off, Go-around, En-route climb (drift down) to reach and maintain desired safe altitude as well as possibility to land safely.

4.1 CALCULATION OF TAKE-OFF WEIGHT

Actual take-off weight shall never exceed the Maximum Take-off Weight (MTOW) which shall be calculated before every intended departure and reflected in Loadsheel and Operational FPL.

If take-off weight limitations affect Traffic Load – MCC or Ground handling agent shall be informed in advance.

4.1.1 Maximum Take-off Weight

The Maximum take-off weight (weight at brake release or at start of take-off roll) could be restricted by:

- Maximum Certificated Weight (1.2.1) for:
 - Take-off, or
 - Landing – ($MTOW = MLW + Trip\ fuel$).
- Aircraft performance:
 - Take-off - Performance limited Take-off Weight (PTOW);
 - Route – one engine ceiling vs weight to provide minimum obstacles clearance over MOCA/MORA;
 - Landing – Maximum Landing Weight ($MTOW = MLW + Trip\ fuel$).

MTOW is determined as the lowest of:

- Certificated TOW (1.2.1);
- PTOW (4.1.12), and
- $MLW + Trip\ fuel$

In addition, when runway is Contaminated or Low Friction ($FC < 0.4$) and/or specific corrections required by application of CDL/MEL, the MTOW calculation FORM (see next page) or specific single case calculation using ToDc program (4.1.2.1, 2)) shall be completed and attached to flight documentations set.

B737

airBaltic

MAXIMUM TAKE-OFF WEIGHT CALCULATION
(All weights in KG)

Y Y M M Y Y

BT

Flight Number

Airport

Y L - B B

A/C Reg.

Weather Information:

RWY/Intersect. /

Temp/QNH /

Wind

RWY Condition

Depth/FC /

PTOW Calculations:

GWC (DRY, WET, LF, CONT)

Improved climb: ☐ YES ☒ NO

Temp/Tass /

Limiting factor (O, C, F, P, ...)

Flaps (5, 15)

PTOW Calculations:

Gross Weight (for OAT)

Wind: - +

QNH: - +

Bleeds (Auto/OFF): - +

Anti Ice: Eng A/I - +

Antiskid: Inop. - +

$\pm \Sigma$

a) MAX Certif. TOW

b) MAX LW + Trip Fuel

c) Corrected Gross Weight (PTOW)

MAX TOW (a, b or c)

Prepared

Signature

Commander

Signature

Form : OMB B737 Revision 005 - 2006

4.1.2 Performance limited Take-off Weight (PTOW).

4.1.2.1 Methods of calculations.

- 1) GROSS WEIGHT CHARTS (see. 4.2) – general, conservative calculations used by pilots in day-to-day operations in a way of GWCs books placed in airBaltic briefing room and in each aircraft cockpit.
- 2) ToDc COMPUTER PROGRAM - more accurate calculations used as back up for GWCs, when required (limited payload, missing GWCs, rwy intersection/shortage, desired flaps setting, deficiencies, etc). ToDc program is installed at RIX MCC and pilots' briefing room as well as in VNO MCC.
- 3) AFM graphs - could be used in exceptional cases only (subject of Special Procedure and/or SVP Special Authorization).

4.1.2.2 Associated conditions

PTOW calculations are based on the following assumptions (AFM, sec.4):

Engines	Engines are at take-off power. Failure of the critical engine is recognized at V_1
Airframe	Is clear of snow and ice Light frost is permitted on fuselage and under the wing in fuel tank area;
Engines Air Bleed	AUTO (ON) or OFF;
Wing flaps	Take-off setting 5 or 15 with Leading edge devices in the appropriate position;
Landing Gear	Retraction is selected 3 seconds after lift off;
Runway	Paved runway;
Technique	Take-off power set and then brakes are released; Failure of an engine is recognized at V_1 when either: 1) Take-off is aborted - all thrust levers to idle (closed) - max braking using anti-skid is applied - speed brakes are extended - aeroplane is brought to a stop 2) Take-off is continued - rotation is initiated at speed VR - speed V_2 achieved at 35 feet - land gear is selected up in 3 seconds

4.1.2.3 Take-off Flight Path

1st Segment

Starts at the point when a height of 35ft (15ft for wet/contaminated rwy) is first attained above the rwy surface after lift-off (end of TOD) and ends at the gear-up point.

2nd Segment

Starts at the gear-up point and ends at the acceleration height—with take-off flaps and take-off thrust. The required minimum gross climb gradient is 2,4% in still air (no wind corrections).

Normally the critical obstacles are cleared in this segment.

3rd Segment

Starts at the end of the 2nd segment and ends when flap retraction is complete. The engines are normally operated at take-off thrust and max continuous thrust (MCT) is set at the end of the segment.

4th Segment (Final)

Starts at the end of the 3rd segment and ends at 1 500ft or at the point/altitude where normal obstacle clearance is attained and can be maintained. The required minimum gross climb gradient is 1.2% in still air.

4.1.2.4 Take-off methods

Performance wise two different T/O methods are distinguished:

Normal and Improved Climb

Normal – regular (normal) take-off speeds from the Speed Book or tables in QRH for appropriate flaps setting are used.

Improved Climb - the increased take-off speeds directly from appropriate calculations in the GWC are used. This method should be considered when PTOW is a limiting factor for Normal take-off method.

4.2 GROSS WEIGHT CHARTS (GWC)

4.2.1 General

GWCs present Performance limited Take-off Weight (PTOW) calculations for the Boeing 737-500 with CFM56-3C1/B1 (**18.5k & 20k**) engines operated by airBaltic and covers Dry, Wet, Contaminated and Slippery runway performance.

a. The following colour code is used for different runway conditions:

DRY – white page;

WET / LOW FRICTION – blue page;

CONTAMINATED – pink page.

b. For particular RWY calculations are given from the RWY END or operationally selected INTERSECTION. In addition, calculations from the next shorter intersection (DRY) and runway end (CONT) could be given on a reverse side of the page.

c. It is allowed to interpolate in the wind and the temperature as long as all data is for the same flaps setting.

4.2.1.1 Definitions

AD	Name of the airport. Presented along with City name in page header of all GWC's.
AIP	Aeronautical Information Publication.
ASDA	Accelerate-stop distance available. The length of the take-off run available plus the length of the stopway, if such stopway is declared available by the appropriate Authority and is capable of bearing the mass of the airplane under the prevailing operating conditions. Presented in page header of all GWC's.
Clearway	Obstacle free surface after the end of TORA used for extending the TODA used in case of continued takeoff.
Damp RWY	A RWY is considered damp when the surface is not dry, but when the moisture on it does not give it a shiny appearance. For performance purposes, a damp runway may be considered to be dry.
Dry RWY	A dry RWY is one which is neither wet nor contaminated, and includes those paved RWYs which have been specially prepared with grooves or porous pavement and maintained to retain "effectively dry" braking action even when moisture is present.

Contaminated RWY

A RWY is considered to be contaminated when more than 25% of the RWY surface area (whether in isolated areas or not) within the required length and width being used is covered by the following: Surface water more than 3mm deep, or by slush, or loose snow, equivalent to more than 3mm of water.

Snow, which has been compressed into a solid mass which resists further compression and will hold together or break into lumps if picked up (compacted snow). Ice, including wet ice.

Elev

Airport Reference Point elevation. Is presented in page header of all GWC's.

ICAO

ICAO code of the airport. Presented along with IATA code in page header of all GWC's.

MTOW

Maximum Takeoff Weight (kg).

PTOW

Performance limited Takeoff Weight (kg).

RWY

RWY denomination or Intersection TKOF position this GWC chart is calculated for. Presented in page header of all GWC's.

Slope

RWY slope (max $\pm 2\%$), negative - down, positive - up. Presented in page header of all GMC's.

Stopway

Extension of the runway with limited runway bearing capacity. Used to extent the ASDA in case of a rejected takeoff.

Tass

Assumed temperature used for reduced thrust setting.

TODA

The length of the take-off run available plus the length of the clearway available. Presented in page header of all GMC's.

TORA

Take Off Run Available. The length of a runway which is declared available by the appropriate Authority and suitable for the ground run of an aeroplane taking off. Presented in page header of all GMC's.

WED

Water Equivalent Depth.

Weight

Weight definition have the same meaning as a Mass for the purpose of Takeoff performance

Wet RWY

A RWY is considered wet when the RWY surface is covered with water, or equivalent, less or equal than 3mm WED or when there is sufficient moisture on the RWY surface to cause it to appear reflective, but without significant areas of standing water.

4.2.1.2 Runway Conditions

Use **DRY** runway data at:

- Dry runway
- Damp runway

Use **WET** runway data when:

- Shining wet with 3 mm standing water depth and less
- Friction coefficient (FC) 0.40 and greater

Use **SLIPPERY** runway data when:

- reported FC is below 0.40

Use **CONTAMINATED** runway data when:

- 25% or more of the runway is covered with more than 3 mm of slush, standing water or equivalent (wet snow depth divided by 2 or dry snow depth divided by 5).

4.2.1.3 Airport data

All airport data used in the calculation is the officially declared distances and are presented as TORA, ASDA, TODA and LDA.

The slope is the difference in elevation between the line-up position and the runway end divided by the distance. This is a mean slope used for calculations. Aerodrome elevation is the elevation of the Airport Reference Point. This is used for deciding the general pressure altitude, and is not used for obstacle calculations.

Obstacle data is given as distance from brake release point and height above the runway end, i.e. the end of TORA. When calculating obstacle clearance with TOD shorter than the TODA, the lift-off point will have another altitude than the runway end.

4.2.1.4 Runway alignment penalties

Runway alignment penalties are included. There are three different line-up methods considered:

1) Line-up from behind the take-off position.

This assumes that the nose wheel is behind the takeoff position.

2) Line-up with 90° entry – Penalty: TORA/TODA –9,2m; ASDA -20,27m.

This assumes that the aircraft arrives from a taxiway perpendicular to the runway and makes a 90-degree turn onto the runway. Note that the taxiway markings will take the aircraft too far into the runway.

3) Line-up with 180° turn – Penalty: TORA/TODA –14,78m; ASDA -25,85m.

This assumes that backtrack with a full 180 degree turn is made.

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4.2.1.5 Engine Failure / Climb-Out Procedure (CLP)

The engine failure procedure / CLP is published in the note in the lower part of the Airport Analysis (GWCs).

4.2.1.6 Acceleration Altitude

The standard acceleration altitude of **1 000'** AGL ft is used in airBaltic. If any special considerations are in conflict with the standard acceleration height, a non-standard acceleration altitude will be printed in the note on the GWC.

4.2.1.7 Aircraft configuration

The aircraft configuration is shown in the header of the analysis. This includes information about:

T/O Flaps	5, 15, or OPT (5, 15 used for Optimisation)
A/I	OFF or ON
Packs	AUTO (ON) or OFF
QNH	1013
PMC	ON

5 minutes takeoff thrust limitation

4.2.1.8 PTOW Limiting factors

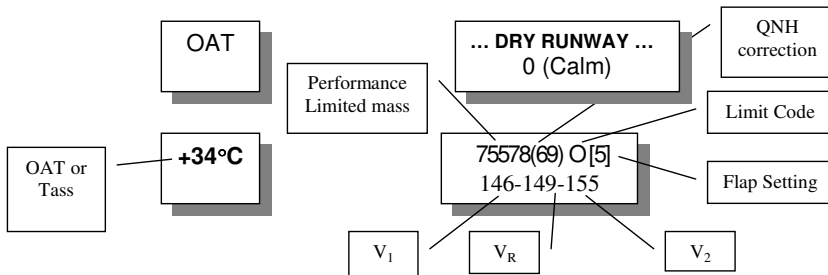
The takeoff weight presented is based on the following limitations:

Limit code	Limiting factor
F	Field length
O	Obstacle limitation
C	Climb limitation
T	Tire Speed
B	Brake energy
V	V _{mcg} limiting
P	5 min of T/O thrust / Acceleration segment limitation
R	V ₂ restriction
**	Improved Climb
-	SCAP Limited

4.2.2 Normal Takeoff, DRY or WET runway

- DRY runway (white colour pages)
- WET runway, FC 0,4 and greater (blue colour pages)

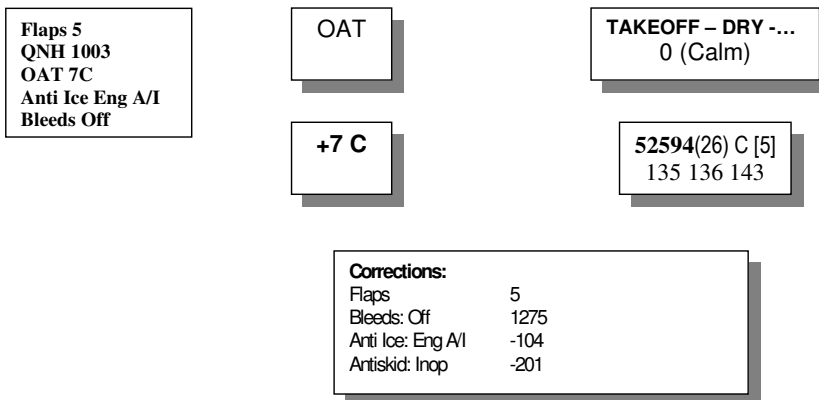
4.2.2.1 Takeoff data presentation



4.2.2.2 Use of corrections

The corrections are calculated for each runway. Anti-Ice corrections are based on OAT of less than 10 °C.

The corrections are tabulated with a column for each flaps setting used in the Airport Analysis.



Example, next page

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Example (see previous page)Performance Limit: **C** (Climb) **52594** (for OAT +7°C)

Corrections:

QNH 10*26	-260
	= 52334
Bleeds OFF	+1275
	= 53609
Eng A/I	-104

PTOW **= 53505**Max Structural Weight **52389**

Select the lowest of the performance and structural limit as a MTOW.

4.2.2.3 Performance limited TOW (PTOW)

a) Enter the GWC at the ambient head or tail wind and OAT. Use interpolation between the given values, if required.

b) Correct for the QNH, if other than 1013:

Subtract the QNH correction from the Takeoff Weight if QNH < 1013.

Add the QNH correction to the Actual Takeoff Weight if QNH > 1013

c) Correct for engine bleed/anti-ice/anti-skid inoperative, if required.

d) Obtain PTOW.

4.2.2.4 Assumed temperature (Tass)

Reduced take-off thrust can be used when the actual takeoff weight is lower than the maximum permissible takeoff mass. The idea behind is that the permissible takeoff weight decreases with increasing temperature and so does the takeoff thrust. When assuming that the temperature is so high that the actual takeoff weight will be the same as the max permissible weight we have found a situation with just enough takeoff thrust to fulfil the performance requirements.

LIMITATIONS: Do not use reduced thrust for take-off if:

- Runway is contaminated or Low Friction (FC<0,4);
- Potential windshear conditions exist;
- Anti-skid is inoperative;
- PMC is OFF;
- Low Visibility take-off.

Procedure

- a) Enter the GWC at the ambient head or tailwind wind and find the highest OAT where the performance limited weight is higher than the actual takeoff mass.

- b) Correct for the QNH, if other than 1013:

Subtract the QNH correction from the Takeoff Weight if QNH < 1013.

Add the QNH correction to the Actual Takeoff Weight if QNH > 1013

- c) Ensure that Actual Weight is below corrected TOW for selected assumed temperature. If not, repeat items a) and b) with appropriate lower assumed temperature.
- d) Select the flaps setting and thrust for Tass.

NOTE: If the Commander deems it necessary to use normal thrust, the only necessary change to the procedure above is to set thrust for OAT.

4.2.3 Normal Takeoff, CONTAMINATED or SLIPPERY

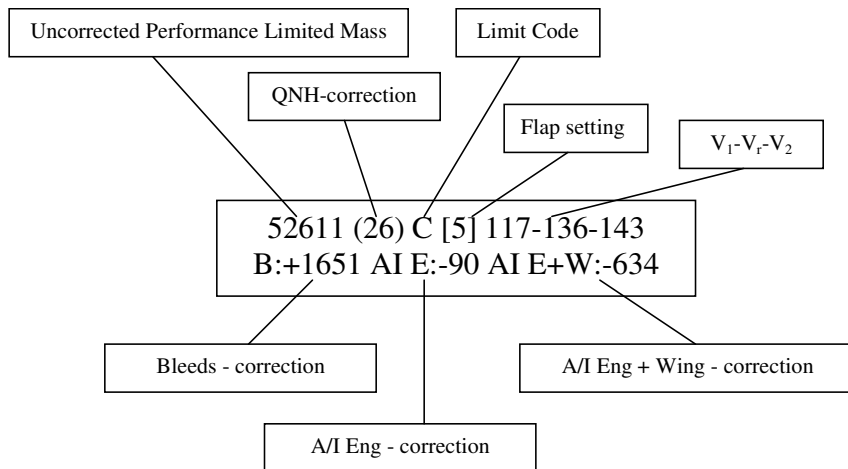
- Contaminated - 4, 8, 12 mm of Standing Water / Slush or equivalent (pink colour pages)
- Slippery or Low Friction - FC 0,39; 0,33; 0,27; 0,20 (yellow colour pages)

4.2.3.1 Limitations

- Takeoff in Slush depth greater than 13 mm is prohibited because of possible aeroplane damage as a result of slush impingement on the aeroplane.
- The use of the Assumed temperature (Tass) method is not allowed on slippery or contaminated runways.

4.2.3.2 Chart presentation

The tables on the Contaminated/Slippery GWC will have the following output format



4.2.3.3 Procedure

- a) Enter the GWC at the ambient head or tail wind and OAT. Use interpolation between the given values, if required.
- b) Correct for the QNH, if other than 1013:
 - Subtract the QNH correction from the Takeoff Weight if QNH < 1013.
 - Add the QNH correction to the Actual Takeoff Weight if QNH > 1013
- c) Correct for engine bleed/anti-ice/anti-skid inoperative, if required.
- d) Obtain PTOW. {tc " Normal Takeoff, Dry or Wet runway."}

**Takeoff Slippery BA – MEDIUM
0 (Calm)**

Example

**Flaps 5
QNH 1003
OAT 0C
Anti Ice Eng A/I
Bleeds Off**

**49217 (59) F [5] 112-131-138
B:+809 AI E:-65 AI E+W:-65**

Performance Limit: F (Field length) **49217** (for OAT 0°C)
Corrections:

QNH 10*59	-590
	= 48627
PACKS OFF	+809
	= 49436
Eng A/I	-65
PTOW	= 49371
Max Certificated Weight	52389

Select the lowest of the performance and certification limit as a MTOW.

4.2.4 Improved Climb

Improved Climb tables are presented as a separate chapter in GWC to allow further increase of PTOW for operational reasons

(Limit code ** in the GWC).

Improved Climb method for the Take-off should be considered when Normal Take-off Weight with either engine bleeds ON or OFF is a limiting factor.

The presentation and use are the same with the exception that the speeds shall be taken from the GWC directly.

4.3 SPEEDS FOR TAKE-OFF

4.3.1 Definitions

V_{MCG}	Ground Minimum Control Speed. The minimum speed on ground at which the takeoff can be continued, utilizing aerodynamic control alone, when one engine suddenly becomes inoperative and the remaining engine is operating at takeoff power.
V_1	The maximum speed in the takeoff at which the pilot must take the first action (e.g. apply brakes, reduce thrust, deploy speed brakes) to stop the airplane within the accelerate-stop distance. V_1 also means the minimum speed in the takeoff, following a failure of the critical engine at VEF, at which the pilot can continue the takeoff and achieve the required height above the takeoff surface within the takeoff distance. $V_{MCG} \leq V_1 \leq V_R$
V_{MCA}	Air Minimum Control Speed. The minimum flight speed at which the airplane is controllable with a maximum 5° bank, when one engine suddenly becomes inoperative with the remaining engine at takeoff power.
V_R	The speed at which the rotation is initiated during takeoff, to attain the takeoff safety speed at or before a height of 35 ft above RWY surface.
V_2	Take-off Safety speed, which is the minimum steady flight speed from a height of about 35 feet;

4.3.2 Normal Take-off, DRY and WET rwy

The takeoff speeds shall be selected for the actual takeoff weight and flaps setting.

Select V_R and V_2 from the **SPEED BOOK** for the next higher weight given in 1 000kg increment.

V_1 is determined as:

- $V_R - 4$ for DRY runway;
- From GWC for WET runway.

NOTE: If the performance limited weight (Max or Tass) is very close to the actual takeoff weight the speeds could be taken from the GWC directly.

4.3.3 Normal Take-off, CONTAMINATED and SLIPERY rwy

- a) If actual takeoff weight is less than 5000 kg lower than PTOW, use the speeds in the GWC.
- b) If actual takeoff weight is more than 5000 kg lower than PTOW:
Select V_R and V_2 from the SPEED BOOK for actual weight;

V_1 is determined as the lowest value between:

- $V_R - 4$ for DRY runway with actual TOW; and
- V_1 for CONT or LF runway with PTOW.

NOTE: If the V_{MCG} is higher than V_1 , use the V_{MCG} as corrected V_1 .

4.3.4 Improved Climb Take-off

All speeds shall be taken from the GWC directly.

4.4 EN-ROUTE PERFORMANCE

To ensure a safe flight over the mountainous terrain, the flight must be planned in such a way, that in case of engine failure, the aircraft can clear the most critical terrain en route with acceptable safety margins.

There is no difference between 18,5K and 20K engines en-route performance because they have the same Max Continuous and Climb Max thrust ratings (same N1).

4.4.1 Climb

There is no problem with all engines operative to reach and maintain the minimum safe altitude with the maximum take-off weight even in the worst ISA + 20 conditions.

For one engine inoperative climb, after flap retraction and all obstructions are cleared, on the FMC ACT ECON CLB page select ENG OUT prompt and the FMC calculates for the actual gross weight:

- N1 for maximum continuous thrust;
- Maximum altitude, and
- Climb speed.

If appropriate FMC page is not available, use V_{CLEAN} or approx 210Kts and check Long Range Cruise Altitude Capability with 100ft/min residual rate of climb (QRH PI.23.7).

ONE ENGINE CLIMB (MAX CONTINUOUS THRUST)

(1000 KG)	PRESSURE ALTITUDE (Ft)		
	ISA +10°C & BELOW	ISA +15°C	ISA +20°C
64	5200	3000	800
60	11500	6100	5600
56	14400	12200	10000
52	17200	15300	13200
48	18700	17800	16500
44	20800	19500	18500
40	24200	22500	20700
36	27700	26100	24500

For engine anti-ice – subtract 3 700 ft.

For engine and wing anti-ice on - subtract 8 700 ft.

NOTE: Planning operations in mounting area on aerodromes/routes where the climb performance is critical, the sec. 4.11 of AFM to be consulted.

4.4.2 Cruise and Descent

If an engine failure occurs during cruise/descent, on FMC CRZ page select ENG OUT prompt and the FMC calculates for the actual gross weight:

- N1 for maximum continuous thrust;
- Maximum altitude, and
- Descent speed.

If appropriate FMC page is not available, use V_{CLEAN} or approx 210Kts and check Drift-down Level off altitudes with 100 ft residual rate of climb table (QRH, PI.23.5)

ONE ENGINE DRIFT DOWN (MAX CONTINUOUS THRUST)

WEIGHT (1000 KG)		OPTIMUM DRIFTDOWN SPEED (KIAS)	LEVEL OFF ALTITUDE (Ft)		
START DRIFTDOWN	LEVEL OFF		ISA +10°C & BELOW	ISA +15°C	ISA +20°C
64	61	235	15500	14200	12800
60	57	228	17300	16400	15100
56	53	220	18800	18000	17200
52	49	212	20600	19600	18800
48	46	204	23100	22100	20900
44	42	196	25800	24800	23700
40	38	187	28500	27600	26600
36	32	177	31100	30500	29600

Includes APU fuel burn

NOTE: For pilots' convenience as easy reference the following DRIFT DOWN table are also given on the last page of the Normal Checklist:

4.5 LANDING PERFORMANCE

4.5.1 General

Maximum Landing Weight (MLW) could be limited either by:

- 1) Maximum certified structural landing weight (1.2.1);
- 2) Aircraft performance
 - Landing weight field limit weight - 4.5.2;
 - Climb limit weight (approach and landing climb, go-around climb for Low Visibility instrument approaches) – 4.5.3.

The most limiting of these requirements defines the maximum allowable landing weight for dispatch.

Presentation

Landing performance is presented in a way of diagrams or tables in AFM, QRH and Appendixes for this chapter.

For the pilots' convenience landing performance could be presented as advisory information in a way of Actual (un-factored) Landing Distance table in APPENDIX 4 of this chapter, QRH and Normal checklists. To obtain LDR - Actual landing distance given in the tables and corrected appropriately, if required, should be multiplied by coefficient 1.67.

For planning purposes the following criteria must be fulfilled:

- Be able to land on the expected runway in expected wind and runway conditions.
- Be able to land on the longest runway in zero wind conditions;
- When gusty winds are forecasted, average wind speed plus 50% of the gust factor shall be used.

4.5.2 Landing field limit weight

General

The Landing field limit weight is the maximum weight for which the landing distance available (LDA) is equal to the landing distance required (LDR).

DRY runway LDR is the flight test demonstrated landing distance plus an additional margin of 67%.

WET runway LDR is a “dry runway LDR” increased further by an additional margin of 15%.

CONT/LOW FRICTION runway – same as wet (see 4.5.4).

The performance is based on the weather/runway conditions and the following assumptions:

Engines	Idle on all engines before touch down
Wing flaps	Landing setting
Landing Gear	Down
Speed brake	Selected After Touchdown
Wheel Brakes	Full Braking with Anti-skid ON
Runway	Paved Runway
Airspeed	V _{REF}
Reverse	Not used

The following considerations do not directly accounted but protected by the margins used to define the LDR:

- a) Runway slope
- b) Non-standard temperature
- c) Approach speed.

Presentation

- a) For Landing Field Limit Weight tables see APPENDIX 1.
- b) For the pilots' convenience landing performance is presented in a way of Actual (un-factored) Landing Distance table in Normal checklist's
- c) For more detailed information refer to
 - 1) FCOM, Performance Dispatch, Landing:
 - CFM 56-3_18.5K PD.12.1, PD.12.3;
 - CFM 56-3_20K PD.22.1, PD.22.3.
 - 2) Flight Planning and Performance Manual, Landing, Landing Field Length Limit 1.3.1.

4.5.3 Climb limit weight

Climb performance limits for landing ensure a minimum climb gradient capability in the certified approach and landing configurations in case of go-around becomes necessary at any point during the landing approach.

Approach and landing climb limit weight accounts for:

- a) Airport temperature
- b) Airport pressure altitude
- c) Engine bleed
- d) Icing conditions

Approach climb requirements:

Minimum gradient in approach configuration shall not be less than 2.1%.

Approach configuration is based on the approach flaps setting 15 deg., landing gear up, one engine inoperative, and the operating engine at go-around thrust.

Normally it is not a limiting factor until aerodrome temperature exceeds 45 deg C and field elevation 3000 ft.

Landing climb requirements:

Minimum gradient in landing configuration shall not be less than 3.2 %.

Landing configuration is based on the landing flaps setting 30 or 40 deg., landing gear down, all engines operative, the engines are at go-around thrust.

For Landing Climb Limit Weight tables see APPENDIX 2

For more detailed information refer to FCOM, Performance Dispatch, Landing: CFM 56-3_18.5K PD.12.5; and CFM 56-3_20K PD.22.5.

LVO go-around climb requirements:

The requirement only applies to low visibility instrument approaches with a decision height of less than 200 feet.

The climb gradient in the go-around configuration is greater of 2.5%, or the published gradient for the specific airport, based on one engine inoperative and landing gear up.

For Go-around Climb Gradient tables see APPENDIX 3.

For more detailed information refer to FCOM, Performance Dispatch, Landing: CFM 56-3_18.5K PD.12.6; and CFM 56-3_20K PD.22.6.

4.5.4 Contaminated/Low Friction RWY

When landing on contaminated/low friction runway the following criteria shall be met:

- No tailwind;
- Landing flap setting 40° shall be used;
- Engine anti-ice on (if required by RWY contaminant);
- Speed brakes, anti-skid/wheel brakes shall be serviceable.

There are no tables for contaminated runway in QRH and Low Friction Runway landing distances having the same friction coefficient are used instead as they give more conservative result (with assumption that a contaminant layer on the contaminated runway surface creates an additional drag during landing roll in comparison with the slippery runway).

For Low Friction/Contaminated Runway actual landing distances without reversers see APPENDIX 4.

To obtain LDR - actual landing distance from the graph/tables shall be multiplied by coefficient 1.67.

4.5.5 Malfunctions

In case of malfunctions that effect landing performance, QRH, Performance In-flight – Advisory information, Non-Normal Configuration Landing Distance Tables (CFM 56-3_18.5K – PI.12.4, CFM 56-3_20K - PI.22.4) shall be used to determine the un-factored (actual) distance for different RWY conditions.

To obtain LDR - actual landing distance given in the tables and corrected appropriately, if required, should be multiplied by coefficient 1.67.

4.5.6 Landing Speeds

VREF for actual landing weight shall be taken directly from Speedbook, FMC or AFM 4.13.

Speed VREF +10 increases landing distance by 110 m.

APPENDIX 1 – Landing field limit weight**Dry Runway****Flaps 40****Anti-skid Operative and Automatic Speedbrakes****Category “A” Brakes****Wind corrected Field Length (m)**

FIELD LENGTH AVAILABLE (M)	WIND COMPONENT (KTS)							
	-15	-10	-5	0	10	20	30	40
1000		860	920	1000	1070	1140	1200	1260
1200	950	1020	1100	1200	1270	1340	1410	1480
1400	1100	1180	1280	1400	1480	1550	1630	1700
1600	1250	1350	1460	1600	1680	1760	1840	1920
1800	1400	1510	1640	1800	1880	1970	2050	2140
2000	1550	1670	1820	2000	2080	2170	2270	2360
2200	1700	1830	2000	2200	2290	2380	2480	2580
2400	1850	2000	2180	2400	2490	2590	2690	2810
2600	2000	2160	2360	2600	2690	2790	2910	3030
2800	2160	2320	2540	2800	2890	3000	3120	3250
3000	2310	2490	2720	3000	3100	3210	3330	
3200	2460	2650	2900	3200	3300			
3400	2610	2810	3070	3400				
3600	2760	2970	3250	3600				

Field Limit Weight (1000 KG)

WIND CORRECTED FIELD LENGTH (M)	AIRPORT PRESSURE ALTITUDE (FT)				
	0	2000	4000	6000	8000
1000	34.0	32.0			
1200	43.1	40.7	38.5	36.3	33.9
1400	52.3	49.4	46.8	44.2	41.4
1600	57.9	56.0	54.1	52.0	49.0
1800	63.0	60.9	58.9	56.9	54.9
2000	67.6	65.3	63.2	61.1	59.0
2200		69.2	66.8	64.5	62.4
2400				67.7	65.4
2600					68.3

Decrease field limit weight by 7720 kg when using manual speedbrakes.

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Wet Runway

Flaps 40

Anti-skid Operative and Automatic Speedbrakes

FIELD LENGTH AVAILABLE (M)	WIND COMPONENT (KTS)							
	-15	-10	-5	0	10	20	30	40
1000			930	1000	1080	1150	1220	1280
1200	950	1030	1110	1200	1280	1360	1430	1500
1400	1100	1190	1290	1400	1490	1570	1650	1720
1600	1250	1350	1470	1600	1690	1770	1860	1940
1800	1410	1520	1650	1800	1890	1980	2070	2170
2000	1560	1680	1820	2000	2090	2190	2290	2390
2200	1710	1840	2000	2200	2300	2400	2500	2610
2400	1860	2000	2180	2400	2500	2600	2710	2830
2600	2010	2170	2360	2600	2700	2810	2930	3050
2800	2160	2330	2540	2800	2900	3020	3140	3270
3000	2310	2490	2720	3000	3110	3220	3350	3490
3200	2460	2650	2900	3200	3310	3430	3560	3710
3400	2610	2820	3080	3400	3510	3640	3780	
3600	2770	2980	3260	3600	3710	3840		
3800	2920	3140	3440	3800				

Field Limit Weight (1000 KG)

WIND CORRECTED FIELD LENGTH (M)	AIRPORT PRESSURE ALTITUDE (FT)				
	0	2000	4000	6000	8000
1200	36.0	33.9	32.1		
1400	43.9	41.4	39.2	37.0	34.6
1600	51.9	49.0	46.4	43.8	41.1
1800	57.0	55.1	53.2	50.7	47.6
2000	61.5	59.5	57.5	55.6	53.6
2200	65.7	63.5	61.4	59.4	57.3
2400	69.5	67.0	64.8	62.6	60.5
2600			67.8	65.5	63.5
2800				68.3	65.9
3000					68.4
3200					

Decrease field limit weight by 7720 kg when using manual speedbrakes.

APPENDIX 2 – Landing Climb Limit Weight

Valid for approach with Flaps 15 and landing with Flaps 40

Based on engine bleed for packs on, APU operating and anti-ice off

CFM 56-3_18.5K engines

AIRPORT OAT (°C)	LANDING CLIMB LIMIT WEIGHT (1000 KG)					
	AIRPORT PRESSURE ALTITUDE (FT)					
	-1000	0	2000	4000	6000	8000
54	45.4	44.9				
52	46.2	45.7				
50	47.1	46.6	45.0			
48	48.0	47.5	46.0			
46	49.0	48.4	46.8	45.1		
44	49.9	49.3	47.6	46.1		
42	50.8	50.2	48.5	47.0	44.0	
40	51.7	51.1	49.3	47.8	44.9	
38	52.4	52.0	50.2	48.6	45.6	41.1
36	53.1	52.8	51.1	49.4	46.4	41.8
34	53.8	53.5	52.0	50.2	47.1	42.5
32	54.5	54.2	52.6	51.0	47.9	43.2
30	54.5	54.9	52.9	51.8	48.7	43.9
28	54.5	54.9	53.3	52.1	49.5	44.5
26	54.6	54.9	53.7	52.1	50.3	45.3
24	54.6	54.9	53.7	52.2	50.5	46.0
22	54.6	54.9	53.7	52.2	50.6	46.7
20	54.6	54.9	53.7	52.2	50.6	47.0
18	54.6	54.9	53.7	52.2	50.6	47.0
16	54.6	54.9	53.7	52.2	50.7	47.0
14	54.6	54.9	53.7	52.2	50.7	47.0
12	54.6	54.9	53.8	52.2	50.7	47.1
10	54.6	55.0	53.8	52.2	50.7	47.1
-40	54.7	55.0	53.8	52.4	50.8	47.2

APPENDIX 2 – Landing Climb Limit Weight

Valid for approach with Flaps 15 and landing with Flaps 40

Based on engine bleed for packs on, APU operating and anti-ice off

CFM 56-3_20K engines

AIRPORT OAT (°C)	LANDING CLIMB LIMIT WEIGHT (1000 KG)					
	AIRPORT PRESSURE ALTITUDE (FT)					
	-1000	0	2000	4000	6000	8000
54	49.4	48.5				
52	50.4	49.3				
50	51.3	50.1	48.2			
48	52.3	51.0	49.0			
46	53.3	51.9	49.8	49.2		
44	54.2	52.9	50.6	50.0		
42	55.2	53.8	51.4	50.7	47.1	
40	56.2	54.7	52.2	51.7	47.8	
38	57.0	55.7	53.0	52.6	48.6	43.9
36	57.8	56.5	53.8	53.6	49.5	44.3
34	58.6	57.4	54.5	54.6	50.3	44.6
32	59.4	58.2	55.2	55.6	51.2	45.5
30	59.5	59.0	56.0	56.6	52.1	46.3
28	59.5	59.1	56.6	57.0	52.9	47.1
26	59.6	59.1	57.3	57.0	53.8	48.0
24	59.6	59.2	57.4	57.1	54.1	48.8
22	59.7	59.2	57.4	57.1	54.2	49.6
20	59.7	59.3	57.5	57.2	54.2	50.0
18	59.8	59.3	57.5	57.2	54.2	50.2
16	59.8	59.4	57.6	57.3	54.3	50.4
14	59.9	59.4	57.6	57.3	54.3	50.5
12	59.9	59.5	57.7	57.4	54.4	50.6
10	59.9	59.5	57.7	57.4	54.4	50.6
-40	60.4	60.0	58.2	58.0	55.0	51.1

With engine bleed for packs off, increase weight by 18.5K/20K - 1210/ 1300 kg.

With engine anti-ice on, decrease weight by 18.5K/20K – 400/450 kg.

With engine and wing anti-ice on, decrease weight by 4900 kg.

When operating in icing conditions during any part of the flight with forecast landing temperature below 8°C, decrease weight by 18.5K/20K – 3970/4670 kg.

For 42 inch tires or 40 inch tires with a 42 inch tire wheel well, decrease weight by 18.5K/20K – 50/60 kg.

APPENDIX 3 – Go-Around Climb Gradient

Go-Around Climb Gradient

Flaps 15

Based on engine bleed for packs on and anti-ice off

CFM 56-3_18.5K engines

Reference Go-Around Gradient (%)

OAT (°C)	PRESSURE ALTITUDE (FT)				
	0	2000	4000	6000	8000
50	1.40	1.03	0.24		
46	1.91	1.47	1.02	0.08	
42	2.40	1.95	1.55	0.79	
38	2.88	2.42	1.99	1.19	
34	3.26	2.88	2.42	1.59	0.34
30	3.62	3.13	2.83	2.01	0.71
26	3.63	3.32	2.92	2.44	1.10
22	3.63	3.32	2.94	2.53	1.49
18	3.63	3.33	2.95	2.55	1.57
14	3.63	3.33	2.95	2.56	1.58
10	3.63	3.33	2.96	2.56	1.59

Gradient Adjustment for Weight (%)

WEIGHT (1000 KG)	REFERENCE GO-AROUND GRADIENT (%)				
	0	1	2	3	4
60	-2.51	-2.77	-3.04	-3.30	-3.56
56	-1.99	-2.20	-2.40	-2.60	-2.80
52	-1.42	-1.56	-1.69	-1.83	-1.96
48	-0.66	-0.72	-0.78	-0.83	-0.89
45.4	0.00	0.00	0.00	0.00	0.00
44	0.34	0.38	0.41	0.45	0.49
40	1.48	1.63	1.79	1.95	2.12
36	2.88	3.17	3.48	3.80	4.15
32	4.68	5.17	5.69	6.26	6.86

Gradient Adjustment for Speed (%)

SPEED (KIAS)	WEIGHT ADJUSTED GO-AROUND GRADIENT (%)											
	0	1	2	3	4	5	6	7	8	9	10	11
VREF	-0.58	-0.60	-0.61	-0.63	-0.64	-0.65	-0.66	-0.67	-0.67	-0.67	-0.67	-0.67
VREF+5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VREF+10	0.33	0.34	0.35	0.35	0.35	0.35	0.34	0.34	0.33	0.32	0.30	0.29
VREF+20	0.69	0.74	0.77	0.79	0.81	0.81	0.81	0.80	0.78	0.75	0.71	0.66
VREF+30	0.89	0.90	0.90	0.89	0.88	0.86	0.83	0.80	0.76	0.71	0.66	0.60

With engine bleed for packs off, increase gradient by 0.3 %.

With engine anti-ice on, decrease gradient by 0.1%.

With engine and wing anti-ice on, decrease gradient by 1.2%.

When operating in icing conditions during any part of the flight with forecast landing temperatures below 8°C, decrease gradient by 0.8%.

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APPENDIX 3 – Go-Around Climb Gradient (continued)

Go-Around Climb Gradient

Flaps 15

Based on engine bleed for packs on and anti-ice off

CFM 56-3_20K engines

Reference Go-Around Gradient (%)

OAT (°C)	PRESSURE ALTITUDE (FT)				
	0	2000	4000	6000	8000
50	2.37	1.86	1.39		
46	2.86	2.30	2.16	0.90	
42	3.34	2.72	2.55	1.57	0.24
38	3.81	3.13	3.05	1.99	0.73
34	4.23	3.52	3.56	2.46	0.91
30	4.64	3.88	4.06	2.92	1.38
26	4.66	4.24	4.17	3.35	1.83
22	4.69	4.26	4.19	3.44	2.28
18	4.71	4.29	4.21	3.46	2.43
14	4.74	4.31	4.23	3.48	2.53
10	4.75	4.33	4.26	3.50	2.55

Gradient Adjustment for Weight (%)

WEIGHT (1000 KG)	REFERENCE GO-AROUND GRADIENT (%)					
	0	1	2	3	4	5
60	-2.48	-2.74	-3.00	-3.25	-3.51	-3.78
56	-2.01	-2.21	-2.41	-2.61	-2.81	-3.02
52	-1.43	-1.56	-1.69	-1.83	-1.97	-2.10
48	-0.64	-0.69	-0.75	-0.81	-0.87	-0.93
45.4	0.00	0.00	0.00	0.00	0.00	0.00
44	0.34	0.38	0.41	0.45	0.49	0.52
40	1.49	1.63	1.78	1.94	2.10	2.26
36	2.89	3.18	3.47	3.79	4.12	4.46
32	4.71	5.18	5.67	6.20	6.77	7.39

Gradient Adjustment for Speed (%)

SPEED (KIAS)	WEIGHT ADJUSTED GO-AROUND GRADIENT (%)													
	0	1	2	3	4	5	6	7	8	9	10	11	12	13
VREF	-0.53	-0.55	-0.57	-0.58	-0.60	-0.62	-0.63	-0.63	-0.63	-0.63	-0.61	-0.59	-0.56	-0.51
VREF+5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VREF+10	0.32	0.33	0.34	0.35	0.35	0.35	0.35	0.35	0.34	0.33	0.32	0.30	0.28	0.25
VREF+20	0.68	0.71	0.73	0.76	0.78	0.79	0.80	0.79	0.77	0.74	0.69	0.62	0.53	0.42
VREF+30	0.87	0.89	0.90	0.90	0.88	0.86	0.83	0.79	0.74	0.69	0.64	0.58	0.53	0.48

With engine bleed for packs off, increase gradient by 0.3 %.

With engine anti-ice on, decrease gradient by 0.1%.

With engine and wing anti-ice on, decrease gradient by 1.3%.

When operating in icing conditions during any part of the flight with forecast landing temperatures below 8°C, decrease gradient by 0.8%.

APP 4 - Actual (un-factored) Landing Distances, Flaps 30**45000 kg, sea level, standard day, no wind or slope,****VREF, 2 engine detent reverse thrust, 305 m of un-factored air distance****Dry Runway**

	LANDING DISTANCE AND ADJUSTMENTS (M)										
	REF DIST	WEIGHT ADJ	ALT ADJ	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		TEMP ADJ PER 10 °C		VREF ADJ	REVERSE THRUST ADJ
BRAKING	45000 KG LAND WEIGHT	PER 5000 KG ABOVE/ BELOW 45 T	PER 1000 FT ABOVE SEA LEVEL	HEAD WIND	TAIL WIND	DWN HILL	UP HILL	ABOV ISA	BELW ISA	PER 10 KTS ABOVE VREF30	ONE REV NO REV
MAX MAN	772	80/-49	19	-28	101	10	-7	16	-13	61	13 37
MAX AUTO	802	77/-55	19	-31	107	7	-4	19	-16	74	7 13
AUTO 3	955	110/-80	28	-43	162	10	-7	28	-25	107	10 19
AUTO 2	1342	150/-129	43	-71	247	10	-13	40	-37	159	4 16
AUTO 1	1543	180/-156	52	-86	305	43	-43	46	-43	144	113 135

Braking Action Good (FC ≥ 0.4)

MAX MAN	1202	98/-92	31	-52	196	28	-22	28	-25	98	55 202
MAX AUTO	1202	98/-92	31	-52	196	28	-22	28	-25	98	55 202
AUTO 3	1336	119/-113	40	-61	220	19	-10	37	-31	141	16 86
AUTO 2	1714	168/-165	52	-86	305	22	-25	49	-46	177	22 22
AUTO 1	1891	208/-193	65	-101	360	55	-52	52	-49	162	183 208

Braking Action Medium (FC = 0.30-0.35)

MAX MAN	1568	144/-138	46	-86	318	65	-49	40	-37	122	150 653
MAX AUTO	1568	144/-138	46	-86	318	65	-49	40	-37	122	150 653
AUTO 3	1595	144/-138	46	-86	321	52	-37	43	-40	150	122 625
AUTO 2	1842	180/-177	55	-98	354	49	-43	49	-46	168	65 406
AUTO 1	1955	211/-196	68	-107	379	74	-61	55	-52	162	208 458

Braking Action Poor (FC = 0.15-0.25)

MAX MAN	1952	199/-186	65	-119	482	141	-92	49	-46	141	302 1875
MAX AUTO	1952	199/-186	65	-119	482	141	-92	49	-46	141	302 1875
AUTO 3	1952	199/-183	65	-119	482	141	-92	49	-46	144	302 1875
AUTO 2	2065	208/-199	65	-125	494	122	-89	52	-49	162	217 1763
AUTO 1	2125	229/-214	71	-132	507	144	-98	55	-52	159	302 1723

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APP 4 - Actual (un-factored) Landing Distances, Flaps 40**45000 kg, sea level, standard day, no wind or slope,****VREF, 2 engine detent reverse thrust, 305 m of un-factored air distance****Dry Runway**

	LANDING DISTANCE AND ADJUSTMENTS (M)											
	REF DIST	WEIGHT ADJ	ALT ADJ	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		TEMP ADJ PER 10 °C		VREF ADJ	REVERSE THRUST ADJ	
BRAKING	45 T LAND WEIGT	PER 5000 KG ABOVE/ BELOW 45 T	PER 1000 FT ABOVE SEA LEVEL	HEAD WIND	TAIL WIND	DWN HILL	UP HILL	ABOV E ISA	BELO W ISA	PER 10 KTS ABOVE VREF30	ONE REV	NO REV
MAX MAN	757	71/-46	16	-28	98	10	-7	16	-13	61	13	34
MAX AUTO	784	65/-52	19	-28	107	7	-4	19	-16	74	7	13
AUTO 3	924	98/-77	28	-43	159	10	-7	25	-22	107	10	19
AUTO 2	1290	138/-119	40	-68	241	10	-13	37	-37	156	4	16
AUTO 1	1473	162/-147	49	-83	296	43	-37	43	-40	138	104	129

Braking Action Good (FC ≥ 0.4)

MAX MAN	1162	95/-86	28	-52	193	28	-22	28	-25	98	52	186
MAX AUTO	1162	95/-86	28	-52	193	28	-22	28	-25	98	52	186
AUTO 3	1284	110/-107	37	-61	214	19	-10	37	-31	138	16	80
AUTO 2	1635	156/-153	49	-86	299	22	-22	46	-43	168	19	19
AUTO 1	1799	193/-177	61	-98	351	52	-49	49	-46	156	162	193

Braking Action Medium (FC = 0.30-0.35)

MAX MAN	1504	138/-129	43	-80	308	61	-46	37	-37	119	138	592
MAX AUTO	1504	138/-129	43	-80	308	61	-46	37	-37	119	138	592
AUTO 3	1525	138/-129	43	-80	311	52	-37	40	-37	144	116	571
AUTO 2	1750	168/-165	52	-95	348	46	-43	49	-46	159	61	372
AUTO 1	1854	196/-183	61	-101	369	71	-52	52	-49	150	183	424

Braking Action Poor (FC = 0.15-0.25)

MAX MAN	1866	186/-177	61	-119	470	135	-89	46	-43	135	266	1677
MAX AUTO	1866	186/-177	61	-119	470	135	-89	46	-43	135	266	1677
AUTO 3	1866	186/-177	61	-119	470	135	-89	46	-43	138	266	1677
AUTO 2	1967	196/-186	61	-122	485	119	-86	49	-49	150	196	1580
AUTO 1	2019	214/-199	68	-125	494	138	-92	52	-55	150	266	1549

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5 FLIGHT PLANNING

5.1 CLIMB, CRUISE and DESCENT DATA for FLIGHT PLANNING

5.1.1 Selection of Cruise levels

Efficient **Cruise level selection** is performed by means of RODOS system, which presents the most suitable level of cruise as a function of weather conditions on route, distance and air temperature. For planning purposes the information provided by FMC and stated in QRH may be used.

Maximum Altitude

Maximum altitude is the highest altitude at which airplane can be operated. The FMC predicted maximum altitude is the lowest of:

- maximum certified altitude - 37,000 ft;
- thrust limited altitude – the altitude at which sufficient thrust is available to provide a specific rate of climb - 100 ft/min;
- maneuver limited altitude – the altitude at which a specific maneuver margin exists prior to buffet onset - 0.3 g. This margin provide 39° of bank angle protection to buffet.

Optimum altitude

Optimum altitude is the cruise altitude for minimum cost when operating in the ECON mode, and for minimum fuel burn when in the Long Range Cruise or pilot-selected speed modes.

For shorter trips, optimum altitude as defined above may not be achievable since the TOD (top of descent) point occurs prior to completing the climb to optimum altitude.

The selected cruise altitude should normally be as close to optimum as possible. As deviation from optimum altitude increases, performance economy deteriorates.

Wind-Altitude Trade

Wind is a factor, which may justify operations considerably below optimum altitude in order to maintain the same range and long range cruise speed.

For Maximum and Optimum Altitudes and Wind-Altitude Trade reference to the Long Range Cruise Maximum Operating Altitude and Wind-Altitude Trade tables in the Performance In-flight chapter of the QRH.

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5.1.2 Speed / Power Setting

The flight shall be planed and all possibilities done to be “On-chocks” at Destination not later, than scheduled. The basic mode is an ECONOMY mode calculated by FMC.

5.1.2.1 Climb

FMC provides ECON (economy) climb mode and ENG OUT (engine out) climb mode. Speeds are also provided for maximum angle of climb (MAX ANGLE) and maximum rate of climb (MAX RATE).

1. **ECON climb** speed is a function of gross weight (predicted weight at top of climb), predicted top of climb wind, predicted top of climb temperature deviation from ISA, and cost index.
If FMC data not available the following figures can be used:
 - 250 knots – below 10,000 feet;
 - 280 knots/.74 Mach – above 10,000 feet.
2. **Engine Inoperative Climb** speed is approximately maximum angle climb speed and varies with gross weight and altitude.
3. **Maximum Rate Climb** speed provides both high climb rates and minimum time to cruise altitude. Maximum rate climb can be approximated using the following:
Flaps up Maneuver Speed + 50 knots until intercepting Mach .74.
4. **Maximum Angle Climb** speed is normally used for obstacle clearance, minimum crossing altitude or to reach a specified altitude in a minimum distance.

5.1.2.2 Cruise

Cruise Speed Determination

Cruise speed is automatically computed by the FMC. The default cruise speed mode is economy (ECON) cruise. The pilot can also select long range cruise, engine out modes, or overwrite fixed Mach or CAS values.

1. **ECON cruise** is a variable speed schedule, that is a function of gross weight, cruise altitude, cost index, and headwind component. It is calculated to provide minimum operating cost for entered cost index. Entry of zero cost index results in maximum range cruise.
2. **LRC** is a variable speed schedule providing fuel mileage one percent less than the maximum available.

For LRC speeds and required power setting reference to the Long Range Cruise Control table in the Performance In-flight chapter of the QRH.

5.1.2.3 Descent

Normally descent schedule is an economy (ECON) descent, which is provided by FMC.

The ECON speed schedule can be modified by entering alternate Mach, Mach/IAS, or IAS values.

If FMC data not available the following figures can be used:

Target speed	Rate of Descent (Typical)	
	Clean	With Speedbrake
M 0.74/280 knots	2100 fpm	3000 fpm
250 knots	1700 fpm	2400 fpm
210 knots	1400 fpm	1900 fpm

Descent profile table

Pressure altitude (1000 FT)	21	23	25	27	29	31	33	35	37
Distance (NM)	67	73	79	85	91	97	104	110	115
Time (min)	15	17	18	19	20	21	21	22	23

Based on .74/250 descent speed

5.1.3 One engine inoperative schedule

For One Engine operations reference to the Engine Inoperative Section in the Performance In-flight chapter of the QRH.

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5.2 FUEL CALCULATION

5.2.1 General

Fuel for the flight is determined as an amount to fulfil the minimum requirements set in JAR-OPS and any extra fuel requested by the Commander.

The flight shall not be started with fuel on board below Minimum Required, which is calculated as sum of Taxi Fuel, Trip Fuel, Contingency Fuel, Alternate or Minimum Additional Fuel (depended on Flight Planning Rule used) and Final Reserve Fuel.

- NOTE:**
1. For explanation of fuel terms see OM Part A Chapter 8.1.7.2.
 2. The crew in case of in-flight re-planning must apply the same system of minimum required fuel calculation.

Extra fuel, upon Commander's discretion, shall provide safety, punctuality and economical efficiency of the flight, taking into account weight limitations, weather, traffic situation, time available, etc.

- NOTE:** Economy tankage (if available) should be adhered to, but shall never be in conflict with the safety and punctuality of the flight.

Pre-flight precise fuel calculations for particular aircraft / weather conditions are presented in RODOS Operational Flight Plan.

5.2.2 Minimum Required Fuel and Trip Time Calculation for planning/re-planning purposes.

The following information is given to make Minimum Required fuel calculation easier for pilots on the planning/re-planning stage. The same procedure can be used when RODOS Flight Plan calculation is not available

1) Taxi Fuel200 kg

2) Trip Fuel:

The table below shows time and fuel needed for sector distances in still air. Select actual route including longest SID and STAR for sector distance calculation. To correct an actual sector distance for wind component use following formula, assuming tail wind positive and head wind negative:

$$\text{Air distance} = \frac{\text{Sector distance} \times \text{TRUE AIR SPEED}}{(\text{TRUE AIR SPEED} + \text{WIND COMPONENT})}$$

Air distance tables are also available in the Performance In-flight chapter of the QRH.

For Trip fuel see "Trip Fuel and Time Required" tables shown below.

3) Contingency Fuel.....5% of Trip Fuel or 5 min at holding fuel consumption, whichever gives the highest result.

4) Alternate Fuel: For rough alternate fuel calculation use the trip fuel table.

5) Final Reserve Fuel: 30 min of flight at holding fuel consumption
For final reserve fuel see Holding Planning Flaps Up table shown below in this chapter.

Trip Fuel and Time

AIR DIST (NM)	PRESSURE ALTITUDE (1000 FT)									
	29		31		33		35		37	
	FUEL (1000 KG)	TIME (HR: MIN)	FUEL (1000 KG)	TIME (HR: MIN)	FUEL (1000 KG)	TIME (HR: MIN)	FUEL (1000 KG)	TIME (HR: MIN)	FUEL (1000 KG)	TIME (HR: MIN)
200	1.5	0:38	1.5	0:38	1.5	0:38	1.4	0:38	1.4	0:38
400	2.5	1:06	2.5	1:06	2.4	1:05	2.4	1:06	2.4	1:06
600	3.6	1:35	3.5	1:34	3.5	1:33	3.4	1:34	3.4	1:34
800	4.7	2:03	4.6	2:02	4.5	2:01	4.4	2:02	4.3	2:02
1000	5.8	2:31	5.6	2:29	5.5	2:29	5.4	2:30	5.3	2:30
1200	6.9	2:59	6.7	2:57	6.6	2:57	6.4	2:58	6.4	2:58
1400	8.1	3:26	7.8	3:24	7.6	3:24	7.5	3:26	7.4	3:27
1600	9.2	3:54	8.9	3:52	8.7	3:52	8.5	3:54	8.5	3:55
1800	10.3	4:22	10.0	4:20	9.8	4:20	9.6	4:22	9.6	4:23
2000	11.5	4:49	11.1	4:47	10.8	4:48	10.6	4:50	10.6	4:51
2200	12.7	5:17	12.3	5:15	12.0	5:15	11.8	5:18		
2400	13.9	5:44	13.5	5:42	13.2	5:43	12.9	5:46		
2600	15.1	6:11	14.7	6:10	14.3	6:11	14.1	6:14		
2800	16.3	6:39	15.8	6:37	15.5	6:39	15.3	6:42		
3000	17.5	7:06	17.0	7:05	16.6	7:07	16.4	7:10		
3200	18.8	7:33	18.3	7:33	17.9	7:34				
3400	20.1	8:01	19.6	8:00	19.2	8:02				
3600	21.4	8:28	20.8	8:28	20.5	8:30				
3800	22.7	8:55	22.1	8:55	21.7	8:58				
4000	24.0	9:23	23.4	9:23	23.0	9:26				
4200	25.4	9:50								

Fuel Required Adjustments (1000 KG)

REFERENCE FUEL REQUIRED (1000 KG)	LANDING WEIGHT (1000 kg)				
	30	40	45	50	60
2	-0.2	-0.1	0.0	0.1	0.4
4	-0.5	-0.2	0.0	0.2	0.8
6	-0.7	-0.3	0.0	0.4	1.2
8	-1.0	-0.3	0.0	0.5	1.7
10	-1.2	-0.4	0.0	0.6	2.2
12	-1.5	-0.5	0.0	0.8	2.8
14	-1.7	-0.6	0.0	0.9	3.4
16	-2.0	-0.7	0.0	1.1	4.0
18	-2.2	-0.7	0.0	1.3	4.6

Note:

1. Based on 280/.74 climb, Long Range Cruise and .74/280/250 descent.
2. In case of in-flight re-planning use "Reference Fuel and Time Required at Check Point" tables in the Performance In-flight chapter of the QRH.

Short Trip Fuel and Time Required

AIR DIST (NM)		LANDING WEIGHT (1000 KG)							TIME (HRS:MIN)
		35	40	45	50	55	60	65	
50	FUEL (1000kg) ALT (FT)	0.5 13000	0.6 11000	0.6 11000	0.6 11000	0.7 9000	0.7 9000	0.7 9000	0:13
100	FUEL (1000kg) ALT (FT)	0.8 23000	0.9 23000	0.9 21000	1.0 19000	1.0 19000	1.1 17000	1.2 17000	0:22
150	FUEL (1000kg) ALT (FT)	1.1 33000	1.1 31000	1.2 27000	1.3 27000	1.4 25000	1.4 25000	1.5 23000	0:30
200	FUEL (1000kg) ALT (FT)	1.3 37000	1.4 35000	1.4 35000	1.5 33000	1.6 31000	1.8 29000	1.9 27000	0:38
250	FUEL (1000kg) ALT (FT)	1.5 37000	1.6 37000	1.7 37000	1.8 35000	1.9 35000	2.1 33000	2.2 31000	0:45
300	FUEL (1000kg) ALT (FT)	1.7 37000	1.8 37000	1.9 37000	2.1 35000	2.2 35000	2.4 33000	2.5 31000	0:52
350	FUEL (1000kg) ALT (FT)	1.9 37000	2.0 37000	2.2 37000	2.3 35000	2.5 35000	2.7 33000	2.9 31000	0:59
400	FUEL (1000kg) ALT (FT)	2.1 37000	2.2 37000	2.4 37000	2.6 35000	2.8 33000	3.0 33000	3.2 31000	1:05
450	FUEL (1000kg) ALT (FT)	2.3 37000	2.4 37000	2.6 37000	2.8 35000	3.1 33000	3.3 33000	3.5 31000	1:12
500	FUEL (1000kg) ALT (FT)	2.5 37000	2.7 37000	2.9 37000	3.1 35000	3.3 33000	3.6 31000	3.9 31000	1:20

Note:

1. Based on 280/.74 climb, Long Range Cruise and .74/280/250 descent.
2. In case of in-flight re-planning use "Reference Fuel and Time Required at Check Point" tables in the Performance In-flight chapter of the QRH.

Holding Planning Flaps Up

WEIGHT (1000 KG)	TOTAL FUEL FLOW (KG/HR)								
	PRESSURE ALTITUDE (FT)								
	1500	5000	10000	15000	20000	25000	30000	35000	41000
70	3120	3070	3020	2980	2950	2940	2980		
65	2910	2870	2820	2770	2740	2730	2730		
60	2720	2660	2620	2570	2530	2520	2500	2640	
55	2530	2470	2420	2370	2330	2320	2290	2330	
50	2340	2280	2230	2170	2130	2110	2090	2080	
45	2160	2100	2040	1980	1940	1920	1880	1880	2030
40	2010	1950	1900	1830	1780	1750	1700	1690	1750
35	1900	1840	1780	1710	1650	1620	1570	1560	1590

Note: This table includes 5% additional fuel for holding in a racetrack pattern.

5.2.3 Evaluation of fuel required for flight.

To evaluate fuel required for flight, follow the below mentioned steps:

Step 1

ZFW + Extra Fuel (if required) → Holding Planning Table → **Min Reserve Fuel**
(Pressure altitude = Pressure altitude of alternate + 1500 ft)

Step 2

$LW_{AT\ ALTERNATE} = ZFW + \text{Min Reserve Fuel} + \text{Extra Fuel}$

$LW_{AT\ ALTERNATE} \rightarrow \text{Trip Fuel and Time Table} \rightarrow \textbf{Alternate Fuel}$

Step 3

$LW_{AT\ DESTINATION} = LW_{AT\ ALTERNATE} + \text{Alternate Fuel} + \text{Contingency Fuel (5 minutes at holding fuel consumption)}$

$LW_{AT\ DESTINATION} \rightarrow \text{Trip and Time Table} \rightarrow \textbf{Trip Fuel}$

Step 4

Contingency Fuel = 5% of Trip Fuel

If 5% of Trip Fuel is more than 5 minutes at holding fuel consumption go to Step 3 and use new Contingency Fuel to determine $LW_{AT\ DESTINATION}$.

Step 5

TO Fuel = Trip + Contingency + Alternate + Min reserve + Extra Fuel

Step 6

Block Fuel = TO Fuel + Taxi Fuel

5.3 OPERATIONAL FLIGHT PLAN

Below is presented example of Operational Flight plan used for airBaltic flight operations:

```

*** RODDS FLIGHTPLAN ***
                                CRUISE ISC

BT131                            FL 300/ELVIX/240    1

14NOV02 RIX-CPH EVRA-EKCH-BTIAN    YLBAL/RJ7B    STD/STA 05.05/06.40

PIC 1  FD .... C/A .... OBS .....

TOW 38.680      LW 35.880      ZFW 33.800/...2..
TRIP TIME/DIST/FUEL 1.20/399/2.964
MAX TOW ...3... POWER ...4... FLAPS ...5...

APPROVED BY COMMANDER .....

ON CHOCKS  ...8... LANDING ..... PAYLOAD 6

OFF CHOCKS ..... AIRBORNE ..... PAX .../.../..

BLOCK TIME ..... FLT TIME ..... CARGO ..... MAIL ..... DG .....

ATIS DEPARTURE .....9..... QNH .....

ATC CLEARANCE .....9..... SQWK .....

FUEL - MIN/ACTUAL  5.044/... ..

AWY      WPT      FREQ      C/S DIST AMT      ET/ETD/ATO      FUEL EST/ACT
OFF      RIGA                                ...10          0.200/... ..
SID      ROGAT                                73           16/.../...   1.207/... ..
          LIEPAJA      D112.3  LIE    31 251    5/.../...   1.376/... ..
UM864    (LASMA)                                29 256    5/.../...   1.529/... ..
UM864    (ADAXA) (EY)                            45 255    7/.../...   1.771/... ..
UM864    (NINTA)                                21 255    4/.../...   1.884/... ..
UM864    (KOLJA)                                51 251    9/.../...   2.164/... ..
UM611    -(ELVIX)                                98 246   17/.../...
Z411     (ALMA)      116.4   ALM    18 267    3/.../...

```

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*** RODOS FLIGHTPLAN ***

BT131 FL 300/ELVIX/240 2/2

AWY	WPT	FREQ	C/S	DIST	AMT	ET/ETO/ATO	FUEL EST/ACT
STAR	KOEBENHAVN			33		14/.../...	2.964/... ..

ALT	7....	DIV FUEL	7.....	FUEL REMAINING	11.. ..
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ATIS ARRIVAL	9.....	GNH	
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NOTES	9.....	
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	FUEL	TIME	AVG WC	-30
TAXI	0.200		ISA DEV	-8
TRIP FUEL	2.764	1.20	CORR	PARAMETRS
CONTINGENCY	0.200 (6%)	0.05	LW	35T FL280
ALTERNATE ESMS	0.680	0.21	LW	36T
FINAL RESERVE	0.900	0.30	LW	35T
EXTRA FUEL	0.300		WC	+20
TOTAL MIN	5.044	2.16	WC	-20
ECONOMY				

ALTERNATES	MIN	BLOCK/TIME	DIV FUEL	DIST/	TIME/	FUEL	FL
MMX/ESMS	5.080	/ 2.16	2.100	66	0.21	0.680	090
AAR/EKAH	5.280	/ 2.23	2.300	90	0.28	0.880	100
RNN/EKRN/R	5.370	/ 2.21	2.400	100	0.26	0.970	110
BLL/EKBI/R	5.670	/ 2.28	2.700	133	0.33	1.270	140
TLL/EETN	7.460	/ 3.33	4.500	580	1.38	3.060	290
RIX/EVRA	6.890	/ 3.16	3.900	434	1.21	2.490	250
AAL/EKYT/R	5.670	/ 2.28	2.700	137	0.33	1.270	140
GOT/ESGG	5.720	/ 2.28	2.800	148	0.33	1.320	160

ATS FPL FILED:

FPL-BTI131-IS

-RJ70/M-SRYW/C

-EVRA0505

-N0383F300 DCT ROGAT UMB69 LIE UMB64 KOLJA UM611

ELVIX/N0402F240 Z411 ALM DCT

-EKCH0120 ESMS

-EET/EYVL 0033 ESAA 0037

REG/YLBAL SEL/NONE DOF/021114)

OPS FPL shall be filled up as follows:

1. Crewmember's and three letter codes shall be inserted as defined in block letter;
2. N/A;
3. Insert predetermined maximum (restricted) TOW, use GWC procedure;
4. Insert N1. In addition insert Assumed Temperature value if Reduced Thrust for take-off is used;
5. Insert flaps setting as discussed during the take-off briefing;
6. Insert actual payload figures;
For passengers enter total number of Passengers;
7. Insert Alternate and minimum fuel for diversion, use calculations at the bottom of the OPS FPL;
8. Fill in the specified times;
9. Note ATIS information and ATC clearance as required;
10. During the flight insert ETO, ATO and fuel checks as necessary;
11. After arrival insert fuel remaining;
12. The Commander checks that all data and names are correctly filled, remaining fuel is not below the minimum diversion fuel and sign the OPS FPL afterwards.

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6.1 WEIGHT AND BALANCE CALCULATION SYSTEM

System definition

The mass and balance calculation system provides the necessary information for loading and operation of aircraft within design weight and balance limitations.

The aircraft weight and balance index system shall be used.

Standard Weights

Please refer to OM-PartA **8.1.8.4**

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6.2 INSTRUCTION FOR COMPLETION OF WEIGHT AND BALANCE DOCUMENTATION

6.2.1 General

Electronic and Manual mass and balance control systems are used to ensure mass and centre of gravity location within approved operating limits. Either Manual or Electronic Loadsheet is used for all flights. Normally, manual loadsheets from home base, but electronic loadsheets from outstation are applied.

Refer to OMA 8.1.8 Mass and Centre of Gravity for general information.

Detailed description of both Loadsheets see below.

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6.2.2 Example of Computer Generated Loadsheets

1 FINAL
LOADSHEET
ALL WEIGHTS IN KILOS

2 ISSUED BY
RIKKH/BAJ

3 APPROVED
EDND
03

4 FROM/TO FLIGHT
RIX CPH BT135/17

5 A/C REG
YLBBB

6 VERSION
7350C

7 CREW
2/4

8 DATE
17DEC03

9 TIME
1427

10 LOAD IN COMPARTMENTS

WEIGHT DISTRIBUTION
1502 1/260 2/774 3/465 4/3

11 PASSENGER/CABIN BAG

4319 51/1/0 TTL 52
CM 17/35
BLKD 11/0

12 TOTAL TRAFFIC LOAD 5821

13 DRY OPERATING WEIGHT 33182

14 ZERO FUEL WEIGHT ACTUAL 39003 MAX 46493 ADJ

15 TAKE OFF FUEL 7610

16 TAKE OFF WEIGHT ACTUAL 46613 MAX 52843 ADJ

17 TRIP FUEL 2700

18 LANDING WEIGHT ACTUAL 43913 MAX 49895 L ADJ

19 BALANCE AND SEATING CONDITIONS

DOI 44.9

LIZFW 31.8

LITOW 27.3

MAC-ZFW 16.1

MAC-TOW 14.9

MAC-LAW 14.4

STAB-TD 4.8

20 LAST MINUTE CHANGES

DEST SPEC CL/CPT + - WEIGHT

21 TRIM BY CABIN AREA - SECTION

OA 01-05 14

OB 06-15 34

OC 16-22 4

22 UNDERLOAD BEFORE LMC 5982 LMC TOTAL

23 LOADMESSAGE AND CAPTAINS INFORMATION BEFORE LMC

-CPH, 51/1/0, T1502, 1/260, 2/774, 3/465, 4/3, PAX/17/35, PAD/0/1
.ICE/4, RIS/4

24 BALANCE LIMITS FWD/AFT 16.7/57.7 AT ZFW BEFORE LMC

FUEL DENSITY 0.81 IN USE

25 SI
SPECIAL CARGO NOTOC

CPH C 78 M 390 B 63/ 1034 O O T O

BOARDING PAX WEIGHTS USED:
-CPH ADULT 84 CHILD 35 INF 00
BOARDING BAG WEIGHTS USED:
-CPH 13/PIECE

6.2.3 Description of the Computer Generated Loadsheet

REF No	Printed Heading	Definition / Description	Remarks
1.	Loadsheet	Document identifier, weight units	Kilogram, Kilo, etc.
2.	Checked	Loadsheet agent's signature	
3.	Approved	Signature of authorized person (PIC)	
4.	From/To/ Flight Nr /Date	Three-letter IATA codes of departure & landing airports, flight number / date	
5.	A/C reg.	Aircraft registration	
6.	Version	A/c version & divider position	Distribution of C & M class
7.	Crew	Number of crew, excluding crew travelling as passengers	Cockpit crew / cabin crew
8.	Date	Date of flight	
9.	Time	Four-digit value of local time when this edition was produced	
10.	Load in compartment	Total weight in baggage compartments and distribution	Compartments no.1 and 4
11.	Passenger / cabin bag	Total weight of passengers and number of passengers divided into specified groups and categories	
12.	Total traffic load	The total weight of passengers, baggage, cargo and mail	
13.	Dry Operating Weight	The 'Basic Weight' plus "Operational Items", e.g. crew, crew baggage, flight equipment and pantry.	
14.	Zero Fuel Weight Actual	Sum of Dry Operating Weight and Total Traffic Load	Maximum Design ZFW is presented
15.	Take Off Fuel	The amount of fuel on board less the fuel consumed before takeoff. Note: If after refuelling actual fuel on board minus expected taxi fuel differs from the take-off fuel presented on the loadsheet the same procedure as for traffic load LMC (B-6.2.7) to be applied	
16.	Take Off Weight Actual	Sum of Ref. 14, 15.	Max Design or Operational TOW is presented
17.	Trip Fuel	The amount of fuel planned to be consumed from take-off to landing	

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REF No	Printed Heading	Definition / Description	Remarks
18.	Landing Weight Actual	Ref No.16 minus No.17	Max Design or Operational LW. Indicator 'L' shows which of the max weights is limiting the allowed traffic load.
19.	Balance and Seating Conditions	Section contains balance information for dry and loaded aircraft. Standard abbreviation are used	
20.	Last Minute Changes	Destination of LMC / Kind of LMC / Class or Compartment / on or off load indicator / weight of LMC. At the bottom of this section the Total LMC weight is presented.	
21.	Trim by Cabin Area	Changes of DOI due to passengers' position. All specified cabin sections are presented.	Depends on aircraft version.
22.	Underload before LMC	Difference between maximum and actual weight indicated by 'L'	
23.	Loadmessage and Captains information before LMC	Summarized loading information	
24.	Balance limits	Forward and Aft balance limitation for actual loading and configuration	'O' indicator – ballast weight
25.	SI	Supplementary Information. Loading description and standard weights	

6.2.4 Example of Manual Loadsheets

airBaltic

Preliminary Allowed Traffic Load Calculation

B737-500

DOW (standard crew)	8	9			Maximum Structural Weights 4 6 4 9 3 Performance Limited Weight → + 10 Allowed Take-off Weight → - 11 Allowed Traffic Load Trip Fuel +	Zero Fuel	Take-off	Landing		
Extra Crew	8a	9a				4	6	4	9	5
DOW (if extra crew)	8b	9b								
Take-off Fuel (Planned)	+	10								
Operating Weight	=	11								

LOADSHEET

B T 1 / / Y L B B 2 7 3 5 3 4 / /

Flight

A/C Reg

Version *

Crew

DATE

ALTN 1 6

ALTN 2 6a

EET 7

Passengers				Deadload	
PAX distribution	Class distribution	Number	Weight	Weight	Distribution Weight
FWD (OA)	19	24	25	Adults	26
MID (OB)	20			Children	27
MID (OC)	21			Infants	28
AFT (OD)	22				29
				TOTAL	29a

Baggage	34				
Cargo	35				
Mail	36				
TOTAL					

Weights Calculation

TOTAL Passengers

TOTAL Deadload

Cabin Baggage

TOTAL Traffic Load

Dry Operating Weight

ZERO FUEL WEIGHT

TAKE-OFF WEIGHT

MAX = kg (lowest of a,b,c)

Trip Fuel

LANDING WEIGHT

33

37

33a

41

9

42

44

45

46

47

Allowed traffic load

Underload Before LMC

Last Minute Changes

Specification

Cpt

Weight

49

50

51

52

53

54

55

56

57

Notes

Prepared by

Approved by

58

59

60

Index Calculation Table

Balance Sheet		Correction	
-	+	-	+
DOI			
Jump seat (1-5)	62a		
Extra Crew	62		
C1	63		
C4	64		
FWD (OA)	65		
MID (OB)	66		
MID (OC)	67		
AFT (OD)	68		
SUM	69	70	
LIZFW	71		
Fuel Index	73		
LITOW	74		

Balance Check

Stabs

5 5.7 5.8 5.5 5.3 5.1 5.0 4.8 4.7 4.5 4.3 4.2 4.0 3.9 3.7 3.6 3.5 3.3 3.1 3.0 2.8

50000

48000

46000

44000

42000

40000

38000

36000

34000

5

10

15

20

25

30

35

40

45

50

55

60

65

MLW=49595kg

MZFW=46493kg

LIZFW, LITOW

75

76

77

cabin Version: 7350 – YLBBA,B; 7351 – YLBBD,E; 7352 – YLBBF,G,H

- LMC corrections.

All weights in Kilograms.

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CHILD	KG	PAX	KG	PAX	KG	PAX	KG
1	35	1	84	40	3360	78	6552
2	70	2	168	80	6720	116	9744
3	105	3	252	41	3444	79	6636
4	140	4	336	42	3528	80	6720
5	175	5	420	43	3612	81	6804
6	210	6	504	44	3696	82	6888
7	245	7	588	45	3780	83	6972
8	280	8	672	46	3864	84	7056
9	315	9	756	47	3948	85	7140
10	350	10	840	48	4032	86	7224
11	385	11	924	49	4116	87	7308
12	420	12	1008	50	4200	88	7392
13	455	13	1092	51	4284	89	7476
14	490	14	1176	52	4368	90	7560
15	525	15	1260	53	4452	91	7644
16	1344	54	4536	92	7728		
17	1428	55	4620	93	7812		
18	1512	56	4704	94	7896		
19	1596	57	4788	95	7980		
20	1680	58	4872	96	8064		
21	1764	59	4956	97	8148		
22	1848	60	5040	98	8232		
23	1932	61	5124	99	8316		
24	2016	62	5208	100	8400		
25	2100	63	5292	101	8484		
26	2184	64	5376	102	8568		
27	2268	65	5460	103	8652		
28	2352	66	5544	104	8736		
29	2436	67	5628	105	8820		
30	2520	68	5712	106	8904		
31	2604	69	5796	107	8988		
32	2688	70	5880	108	9072		
33	2772	71	5964	109	9156		
34	2856	72	6048	110	9240		
35	2940	73	6132	111	9324		
36	3024	74	6216	112	9408		
37	3108	75	6300	113	9492		
38	3192	76	6384	114	9576		
39	3276	77	6468	115	9660		

All weights in kilograms

Standard weights:

- adult 84 kg (regular flights and ad hoc charters)
- adult 76 kg (searial charter flights)
- child 35 kg
- baggage 13 kg
- flight observer index: -1

Weight and Balance Data

Balance Indexes

Cargo compartments

Forward (C1)	INDEX	AFT (C4)	INDEX
0- 55	0	0- 89	0
56-187	-1	90-180	+1
188-278	-2	181-300	+2
279-389	-3	301-420	+3
390-501	-4	421-540	+4
502-612	-5	541-660	+5
613-723	-6	661-780	+6
724-835	-7	781-900	+7
836-946	-8	901-1020	+8
947-1057	-9	1021-1140	+9
1058-1169	-10	1141-1260	+10
1170-1280	-11	1261-1380	+11
1281-1391	-12	1381-1500	+12
1392-1503	-13	1501-1620	+13
1504-1614	-14	1621-1740	+14
1615-1725	-15	1741-1860	+15
1726-1837	-16	1861-1980	+16
1838-1948	-17	1981-2100	+17
1949-1984	-18	2101-2220	+18
		2221-2340	+19
		2341-2460	+20
		2461-2581	+21
		2582-2701	+22
		2702-2820	+23
		2821-2888	+24

Fuel Index for Center Tank

Fuel (kg)	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7448
Index	-1.0	-2.0	-3.3	-3.9	-5.2	-5.8	-7.1	-8.1	-9.0	-10.3	-12.3	-13.0	-14.7	-15.5	

Fuel Index for Wing Tanks (1 and 2)

Fuel (kg)	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	9654
Index	-0.8	-1.6	-2.3	-3.3	-3.7	-4.0	-4.5	-5.0	-5.1	-5.3	-5.4	-5.5	-5.6	-4.7	-3.8	-2.6	-1.1	-0.9	-0.7	

6.2.5 Example of Weight and Balance Data Sheet

6.2.6 Description of MANUAL LOADSHEET

The Loadsheets consist of 3 copies (White - original, Yellow and Pink - copies), and shall always be signed by the Commander.

Loadsheet pages are designated according to the following:

Original shall be kept onboard during flight.

Yellow Copy shall be left in the departing airport, and be filed there for 3 months.

Pink Copy shall be kept on board in the case if a/c is forced to use an alternate airfield and be filed there for 3 months.

Manual Loadsheet shall only be used together with Weigh and Balance Data sheet, representing balance moments for passenger seating and cargo loading reflected in Index Units.

As in Computer Generated Loadsheet, passenger cabin on Manual Loadsheet is presented in four sections forward OA, middle OB, middle OC and aft OD.

OA	Rows 1-5	Max Number of passengers 30
OB	Rows 6-9	Max Number of passengers 22(24*)
OC	Rows 10-16	Max Number of passengers 36
OD	Rows 17-22(21*)	Max Number of passengers 32(30*)

*- YL-BBF, BBG, BBH

Max Total 120

NOTE: there is no Row №13.

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Manual Loadsheets shall be filed according to the following:

Field	Description
1	Flight number and date of origin (GMT) of flight.
2	Registration of aircraft (e.g. YLBAS).
3	Version of aircraft, it may be found in the field (81).
4	Number of Flight and Cabin crew. Figures shall be segregated by slash in Flight crew seated on flight deck and Cabin crew in cabin.
5	Date (e.g. dd.MM.yy).
6	Stipulate the Alternate 1.
6a	Alternate 2 – not mandatory to be filled.
7	EET (Estimated En-route Time).
8	Number of crew for which Dry operating weight (DOW) is indicated. If there is an extra crew, indicate the standard composition of crew here, but the number of extra crew – in field (8a).
9	Respective DOW for crew composition indicated in field (8). DOW may be obtained from: OM B Ch 6.4
8a	Extra crew (applicable if extra crew exists only) – No of crew members that are additional regarding standard crew compositions (e.g. in case 3/5 crew exists, indicate in field (8) “3/4” and in field (8a) “0/1”)
9a	Respective weight for crew complement indicated in field 8a (applicable if extra crew exists only). Standard wt. shall be used from: OM A Ch 8.1.8.4.
8b	The total number of Crew – the same as in field (4) or the sum of fields (8) and (8a).
9b	The corrected DOW (applicable if extra crew exists only). It is the sum of fields (9) and (9a).
10	The planned quantity of Take-off fuel (in KG).
10a	The actual quantity of Take-off fuel (in KG). Actual fuel on board is defined as indicated by instruments, minus taxi fuel.
11	Operating weight: ▪ If no extra crew – the sum of fields (9) and (10). ▪ If extra crew exists – The sum of fields (9b) and (10).
12a	Indicate the Maximum structural wt. for Take-off wt.
12b	Performance limited Take-Off Weight (PTOW). <i>Refer to OM B B737 Ch. 4 and Route Manual (RM) for details.</i>
13	Performance limited Landing weight. <i>Refer to OM B B737 Ch. 4 and RM for details.</i>

Field	Description
14	Trip Fuel - fuel required for take-off, climb, cruise, approach and landing at the destination airport. Cruise fuel shall be calculated for the cruise method used. The fuel shall be based on the least favourable climb out and landing procedure.
15	Allowed Take-Off weight calculated as the sum of MZFW (Maximum Zero Fuel Weight) and Take-off fuel planned.
16	Allowed Take-Off weight is MTOW (Maximum Take-Off Weight) or Performance limited wt., if lower.
17	Allowed Take-Off weight is calculated as the sum of MLW (Maximum Landing Weight) or Performance limited wt., if lower and Trip fuel.
18	The maximum Take-off wt. – it is the lowest of fields (15), (16), and (17).
18a	Allowed Traffic load is Allowed Take of wt. (15) minus Operating wt. (11). NOTE: This field must be filled, if (15) is the lowest among (15), (16), and (17).
18b	Allowed Traffic load is Allowed Take of wt. (16) minus Operating wt. (11). NOTE: This field must be filled, if (16) is the lowest among (15), (16), and (17).
18c	Allowed Traffic load is Allowed Take of wt. (17) minus Operating wt. (11). NOTE: This field must be filled, if (17) is the lowest among (15), (16), and (17).
19	Indicate the number of PAX in Forward (OA).
20	Indicate the number of PAX in Forward (OB).
21	Indicate the number of PAX in Aft (OC).
22	Indicate the number of PAX in Aft (OD).
23	Indicate the Last Minute Changes for number of PAX in all sections.
24	Indicate the number of PAX in Business Class - C.
25	Indicate the number of PAX in Economy Class – M/Y.
26	Indicate the number of Adults in total.
27	Indicate the number of Children in total.
28	Indicate the number of Infants in total.
29	Calculate the sum of fields (26), (27), and (28).
29a	Indicate the Last Minute Changes for field (29)
30	Indicate the respective weight of Adults for field (26) in total. Standard wt. shall be obtained from: OM A Ch 8.1.8.4.

Field	Description
31	Indicate the respective weight of Children (2-12 years old) for field (27) in total. Standard wt. may be obtained from: OM A Ch 8.1.8.4.
32	Indicate the respective weight (OM A Ch 8.1.8.4.) of Infants (0-2 years old) for field (28): ▪ standard wt. 0 KG; ▪ if sitting in their own baby chair – 35 KG each.
33	Calculate the sum of fields (30), (31), and (32).
33a	Indicate the total mass of cabin baggage, if exists (e.g. cellos).
34	Indicate the wt. of Baggage.
35	Indicate the wt. of Cargo.
36	Indicate the wt. of Mail.
37	Calculate the sum of fields (34), (35), and (36).
38	Indicate the distribution of wt. in Dead load compartments (C1 and C4).
39	Total weight of load in compartment C1.
40	Total weight of load in compartment C4.
41	Calculate the total traffic load as a sum of fields (33), (37), and (33a).
42	Calculate Zero Fuel wt. As the sum of fields (41) and (9) or (9b – if DOW is corrected).
43	Last Minute Changes for Zero Fuel wt.
44	Calculate the Take-off wt. as the sum of fields (42) and (10a).
45	Calculate Last Minute changes for the Take-off wt. as the sum of fields (43) and (10a).
46	Indicate the trip fuel – it is the same as in field (14).
47	Calculate the Landing wt. – (44) minus (46).
48	Calculate Last Minute changes for Landing wt. – (45) minus (46).
49	Indicate the Allowed Traffic Load – it is one of the fields (18a), (18b), or (18c) that is filled – refer to description of respective fields (18a), (18b), and (18c).
50	Indicate the Total Traffic load as it is in field (41).
51	Calculate the Under load before LMC – (49) minus (50).
52	Indicate the name of LMC specification: ▪ PAX: AD – Adults, CHD – Children, INF – Infants ▪ B – Baggage ▪ C – Cargo ▪ M – Mail ▪ Other categories to be specified in plain language.
53	Indicate the compartment/seating section for respective LMC specification.

Field	Description
54	Indicate whether the wt. is augmented (+) or decreased (-) for respective LMC specification or item.
55	Indicate the wt. of respective LMC specification or item.
56	Indicate the sign for total change (+) or (-).
57	Calculate the sum of all records in field (55).
58	All notes shall be written there (e.g. calculations; etc.). Information about extra crew (quantity and seating position) and Dangerous goods (Type of DG, quantity and compartment) mandatory must be written in this field!
59	This field is filled by performer. Write the 3-letter code and signature there.
60	This field is filled by commander. Write the 3-letter code and signature.
61	DOI as obtained from: OM B Ch 6.
62	Indicate the index for extra crew (if exists) acc to PAX compartment in which he/she is seated. NOTE: The data can be obtained from "Weight & Balance Data" sheet.
62a	In this field You can indicate index for PAX (ID PAX) in cockpit. (use index -1.5 for 1 PAX on jump seat)
63	Indicate the index for Dead load in C1. NOTE: The data can be obtained from "Weight & Balance Data" sheet.
64	Indicate the index for Dead load in C4. NOTE: The data can be obtained from "Weight & Balance Data" sheet.
65	Indicate the index for PAX in FWD (OA). NOTE: The data can be obtained from "Weight & Balance Data" sheet.
66	Indicate the index for PAX in FWD (OB). NOTE: The data can be obtained from "Weight & Balance Data" sheet. Round index to integer.
67	Indicate the index for PAX in AFT (OC). NOTE: The data can be obtained from "Weight & Balance Data" sheet. Round index to integer.
68	Indicate the index for PAX in AFT (OD). NOTE: The data can be obtained from "Weight & Balance Data" sheet.
69	Calculate the sum of fields (62), (63), (65), and (66).

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Field	Description
70	Calculate the sum of fields (61), (62), (64), (67) and (68).
71	Calculate LIZFW (Load index for Zero Fuel Wt.) – (70) minus (69).
72	Use this table for Index LMC.
73	Indicate the fuel index. It may be obtained from “Weight & Balance Data” sheet.
74	Calculate the sum of LITOW (Load Index Take-off wt.) as the sum of fields (71) and (73).
75	CG (Center of Gravity) limits for regular passenger flights (cabin in four sections). It is indicated as a cross point of two lines: LIZFW, LITOW and ZFW (Zero Fuel Wt.) <i>Refer to Ch 2.3.</i>
76	Area outside CG limits. Please, make adjustments or corrections.
77	CG (Center of Gravity) limits for: ▪ Flights with all passenger seats occupied, or ▪ Empty flights with crew only
78	Fields having yellow fill colour shall be filled mandatory.
79	Fields having striped yellow fill pattern shall be filled if applicable.
80	Fields having light blue fill colour are devoted for LMC corrections.
81	All possible versions of A/C may be found there.
82	Load Message field. It is filled by Ground Staff.

6.2.7 LAST MINUTE CHANGES (LMC)

General

General explanations for LMC are given in OM Part A chapter 8.1.8.6.

- Only one LMC calculation is permitted for traffic load items (passengers, cargo, mail).
- For the Take-off fuel differences the same procedure as for traffic load items LMC to be applied.

New Loadsheets are required whenever DOW/DOI have to be changed.

Limitations

- LMC weight shall not exceed the UNDERLOAD before LMC.
- Cargo Compartment load limitations shall be checked accordingly.

6.2.7.1 Electronic Loadsheets

Depending on the LMC weight and traffic load items number there are two options of the Loadsheets correction.

1) **Only Gross weight to be corrected** whenever the LMC are limited to:

- Max **3 items** of traffic load (pax, baggage, cargo, or mail) or its distribution between the cabin sections/baggage compartments are changed; and
- Max total **LMC weight** is **250kg**.

After completion of the LMC calculation, changed Gross Weight figures shall be recorded next to the ADJ fields.

2) **Gross weight and/or Index to be corrected** whenever the LMC are exceeding the LMC limitations given above. The Balance graphs (from Manual Loadsheets) shall be used in this case.

After completion of the LMC calculation, changed Gross Weight figures shall be recorded next to the ADJ fields. Changed Take-off Index/Trim(Stab) setting be recorded next to appropriate figures accordingly.

6.2.7.2 Manual Loadsheets

For manual Loadsheets there are no limitations on LMC weight and traffic load items number, provided operational limitations (Ref. Section 1 of this manual) are not exceeded and center of gravity is located within approved area.

Filling of LMC fields is mandatory, whenever LMC procedure is applied.

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6.3 Limiting Weights and Center of Gravity

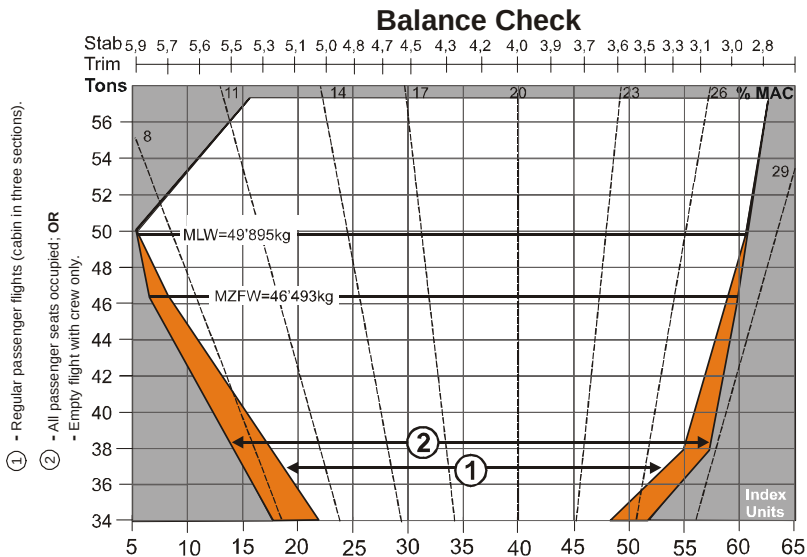
6.3.1 Limiting Weights

The following limiting weights shall never be exceeded:

		Maximum Taxi Weight	Maximum Take-off Weight	Maximum Landing Weight	Maximum Zero Fuel Weight
YL-BBB	Kg (lbs)	53,070 (117,000)	52,843 (116,500)	49.895 (110.000)	46,493 (102,500)
YL-BBA	Kg (lbs)	56,226 (123,959)	56,000 (123,459)		
YL-BBD	Kg (lbs)	57,379 (126,500)	57,152 (126,000)		
YL-BBE	Kg (lbs)	56.472 (124,500)	56.245 (124,000)		
YL-BBF YL-BBG YL-BBH	Kg (lbs)	57.833 (127.500)	57.606 (127.000)		

6.3.2 Limiting Center Of Gravity Envelope

Center of gravity position and limitations for loaded aircraft are given on the loadsheet, prior to each flight.



The following Center of Gravity limitations at Zero Fuel Weight apply:

In order to ensure that balance limits are not exceeded, CG shall be placed within the white area of the graph.

Green area may be used if all passenger seats are occupied or if no passengers are on board (ferry or positioning flight).

6.4 DRY OPERATING WEIGHT AND CORRESPONDING INDEX

For all flights use Pantry Code 11

Registration	Crew	DOW(kg)	DOI	Notes
YL-BBA	2/0	31519.70	35.11	No galley load
	3/0	31604.70	33.70	No galley load
	2/3	32307.70	36.12	2 C/C at frw STA
	2/4	32382.70	37.22	
	3/3	32392.70	34.71	2 C/C at frw STA
	3/4	32467.70	35.81	
	4/3	32477.70	33.28	2 C/C at frw STA
	4/4	32552.70	34.38	
YL-BBB	2/0	31953.80	33.12	No galley load
	3/0	32038.80	31.72	No galley load
	2/3	32741.80	34.13	2 C/C at frw STA
	2/4	32816.80	35.23	
	3/3	32826.80	32.72	2 C/C at frw STA
	3/4	32901.80	33.82	
	4/3	32911.80	31.29	2 C/C at frw STA
	4/4	32986.80	32.39	
YL-BBD	2/0	31643.09	35.84	No galley load
	3/0	31728.09	34.44	No galley load
	2/3	32431.09	36.85	2 C/C at frw STA
	2/4	32506.09	37.95	
	3/3	32516.09	35.44	2 C/C at frw STA
	3/4	32591.09	36.54	
	4/3	32601.09	34.01	2 C/C at frw STA
	4/4	32676.09	35.11	
YL-BBE	2/0	31257.02	34.28	No galley load
	3/0	31342.02	32.87	No galley load
	2/3	32045.02	35.29	2 C/C at frw STA
	2/4	32120.02	36.39	
	3/3	32130.02	33.88	2 C/C at frw STA
	3/4	32205.02	34.98	
	4/3	32215.02	32.45	2 C/C at frw STA
	4/4	32290.02	33.55	
YL-BBF	2/0	32103.00	33.27	No galley load
	3/0	32188.00	31.87	No galley load
	2/3	32891.00	34.28	2 C/C at frw STA
	2/4	32966.00	35.38	

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Registration	Crew	DOW(kg)	DOI	Notes
	3/3	32976.00	32.88	2 C/C at frw STA
	3/4	33051.00	33.98	
	4/3	33061.00	31.45	2 C/C at frw STA
	4/4	33136.00	32.55	
YL-BBG	2/0	31866.86	32.90	No galley load
	3/0	31951.86	31.50	No galley load
	2/3	32654.86	33.91	2 C/C at frw STA
	2/4	32729.86	35.01	
	3/3	32739.86	32.50	2 C/C at frw STA
	3/4	32814.86	33.60	
	4/3	32824.86	31.07	2 C/C at frw STA
	4/4	32899.86	32.17	
YL-BBH	2/0	32150.86	33.30	No galley load
	3/0	32235.86	31.89	No galley load
	2/3	32938.86	34.31	2 C/C at frw STA
	2/4	33013.86	35.41	
	3/3	33023.86	32.90	2 C/C at frw STA
	3/4	33098.86	34.00	
	4/3	33108.86	31.47	2 C/C at frw STA
	4/4	33183.86	32.57	

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7 LOADING

7.1 LOADING INSTRUCTIONS

Loading instruction applies to loadmasters and handling agents who control the weight and distribution of the traffic load (e.g., passengers, cargo, baggage and mail) on all airBaltic B737-500 aircraft.

However, the Commander has the final authority concerning acceptance and placement of the traffic load.

7.1.1 Normal Loading Instruction

Normally the ground handling personnel will decide how to distribute the cargo between the compartments according to their instructions.

- NOTE:**
1. When total planned or actual deadload in the aft part of aircraft (cargo compartments 3&4 and sec. C of passenger cabin) exceeds 3000 kg there is a risk of ground instability and, if aft load figures are increased further, finally also tail tipping. This must be compensated for by the same or exceeding weight in the forward compartments.
 2. Loading must always starts in forward cargo compartments, and off-loading must start in aft compartments.

7.1.2 Designation Of Cargo Compartments

The forward (FWD) cargo hold consists of cargo compartments 1A, 1B and 2.

The aft (AFT) cargo hold consists of cargo compartments 3, 4.

7.1.3 Distribution of Cargo

The cargo shall be distributed evenly among compartments, taking into account weight and distribution of passenger and baggage.

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7.1.4 Limitations

The following weights and volume limitations shall be observed for cargo compartments:

For Maximum Allowable Weights *refer to OMB B737 1.2.2.*

Doors dimensions:

Forward Cargo Hold:	1.22m – 0.89m
Aft Cargo Hold	1.22m – Varies (0.79-0.89m)

7.2 DISTRIBUTION OF PASSENGERS IN THE CABIN

For Distribution of passengers in Cabin *refer to OMB B737 6.2.6.*

7.3 TRANSPORTATION of LIVE ANIMALS

The warmest temperatures will occur in the forward end of the forward compartment, so it is the recommended location for transport of cold-sensitive animals.

This table shows the quantity limits for loading live animals.

Group	Animal, example	Maximum quantity in compartment	
		1 + 2	3 + 4
1	Chimpanzees, gibbons, monkey, apes	125	NA
2	Tropical fish, fish	No limit	NA
3	Shrimps, reptiles, snakes, crabs, frogs, oysters	No limit	
4	Cats, dogs, mice, hamsters, pigs	125	NA
5	Tropical birds, poultry, birds	125	NA
6	Minks, squirrels, weasels	125	NA
7	Chinchillas	125	NA
8	Sea lions	100	NA

NOTE: Maximum weights given are gross weights, except for group 1 and 4, which indicates net weight.

NOTE: NA indicates that no animals from that group can be loaded.

NOTE: If other baggage is presented, reduce the animal load in proportion to the compartment space taken by the luggage.

For example, if 25% of the compartment is filled with luggage, the animal load should be reduced by 25%

7.4 TRANSPORTATION of CHILDREN and DISABLED PERSONS

Transportation requirements for children and disabled persons are given in Cabin Crew Handbook - CCH.

7.5 TRANSPORTATION of ELECTRICALLY DRIVEN WHEELCHAIRS

For transportation of electrically driven wheelchairs refer to Operations Manual Part A, Section 9.

7.6 TRANSPORTATION of WEAPONS

For transportation of weapons refer to Operations Manual Part A, Section 9.

7.7 TRANSPORTATION of RADIOACTIVE MATERIALS

Transportation of Radioactive materials is prohibited.

7.8 TRANSPORTATIONS of LIVE HUMAN ORGANS (LHO)

Live human organs shall be loaded in compartment 2, as close as possible to the door section.

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8.2.54	Nacelles and Pylons	1
8.2.55	Stabilizer	1
8.2.57	Wings	1
8.2.71	Power Plant	1
8.2.78	Exhaust	1

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8 Configuration Deviation List

8.1 CDL instruction

8.1.1 General

This Configuration Deviation List (CDL) contains additional limitations for operations of the B737-500 aircraft without certain secondary airframe and engine part.

The parts not included in this CDL should not be missing.

If an additional part is lost in flight the airplane may not depart the airport at which it landed following this event until it again complies with CDL limitations. This, of course, does not preclude the issuance of a ferry permit to allow the airplane to be flown to a point where the necessary repairs or replacements can be made (Ref. Operations Manual Part A Sec. 8).

No more than one part for any one sub-system in the CDL may be missing unless specifically designated combinations are indicated. Unless otherwise specified, parts from different sub-systems may be missing.

The CDL does not provide information regarding dispatch with missing fasteners. Refer to Structural Repair Manual (SRM) Section 51-10-05 for conditions and limitations, which permit operations with fasteners missing.

The decision of the Commander to have allowable missing items corrected prior to flight will take precedence over the provisions contained in the CDL. The PIC may request requirements above the minimum listed, whenever in his judgment such added equipment is essential to the safety of a particular flight under the special conditions prevailing at the time. However, he shall never accept lower requirements.

This CDL is also found in the AFM and B737 Dispatch Deviations Procedures Guide.

8.1.2 Limitations

Limitations resulting from a missing item, as specified in the Remarks and/or exceptions column, must be observed in addition to the normal Limitations defined in Part B Chapter 1.

The associated limitation(s) must be listed on a Briefing card in the Aeroplane Technical Log.

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Operation with those missing parts requiring a reduction of VMO/MMO is permitted only when the airplane has the appropriate alternate VMO set prior to flight.

8.1.3 Weight Reductions

The performance penalties are cumulative unless specifically designed penalties for combination of missing parts are indicated. Where performance penalties are listed as negligible, no more than three negligible items may be missing without taking further penalty. For each missing item more than three, reduce the takeoff, landing and en-route climb limits by 46 kilograms. Where performance penalties are listed as no penalty, any accumulative number of items listed as no penalty may be missing without further penalty.

8.1.4 En-route diversion speed effect

The en-route climb weight penalties listed are based on operating speeds that approximate the maximum lift-to-drag ratio speed. To account for the difference in level off altitude when operating at other speeds, multiply the en-route climb weight penalty listed by the following appropriate factor:

DIVERSION SPEED	FACTOR
LRC	1.50
280 KIAS	3.90
290 KIAS	4.50
310 KIAS	5.40
320 KIAS	6.40

8.1.5 En-route fuel mileage effect

The drag effects of many 737 CDL items are so small that en-route fuel mileage changes are negligible. For items that have en-route climb weight penalties listed, a fuel mileage decrement of 0.25% per 46 kgs of en-route climb weight penalty (non-factored penalty) may be used to account for the drag increase.

8.1.6 Release to the Flight

The following text should be in the Complaint/Action Log as an answer to a missing item that is deferred in accordance to Air Baltic's CDL:

- Short description of missing item;

- Item No.
- See limitations, if any, in the Briefing Card.

8.1.7 Maintenance Action

Normal Procedure, Technician available

When informed by the maintenance representative that repairs cannot be made in time for departure, but that the aircraft may be dispatched according to the CDL, it is the responsibility of the PIC to:

1. Check CDL for an entry related to the missing item.
2. Check that dispatch is permitted according to "Minimum required" and "Remarks and/or Exceptions"
3. Check that the suspected cause of the fault and a CDL reference has been entered in the Technical Log and that the technician signs CRS (Certificate of Release to Service).
4. If associated limitation(s) is (are) listed in the "Remarks and/or Exceptions" column, check that it is noted on briefing card in the Aeroplane Technical Log.
5. Ensure that all technical and operational aspects are fully understood by involved crewmembers.

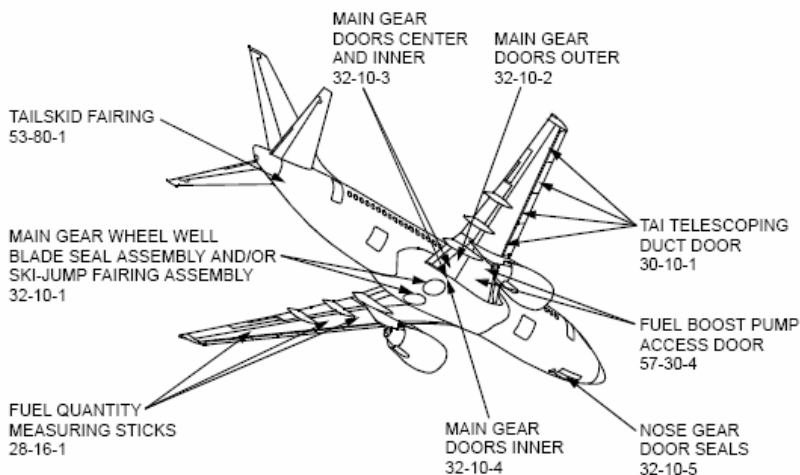
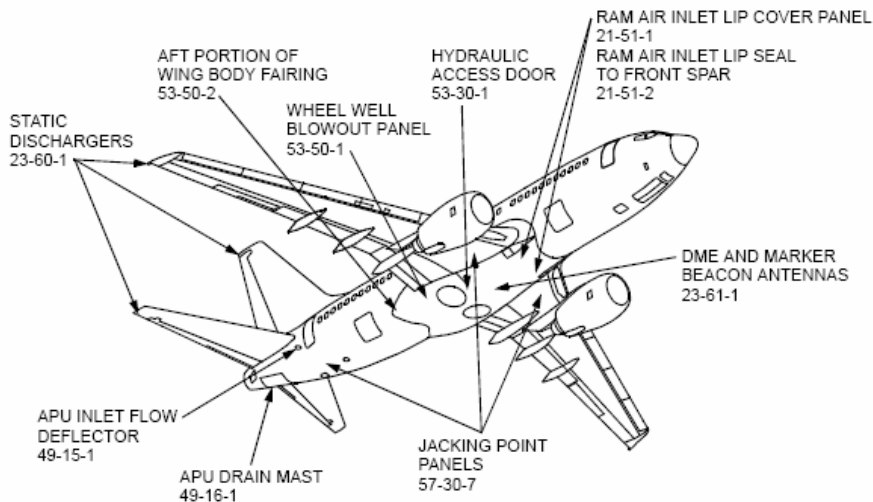
Abnormal Procedure, No Technician Available

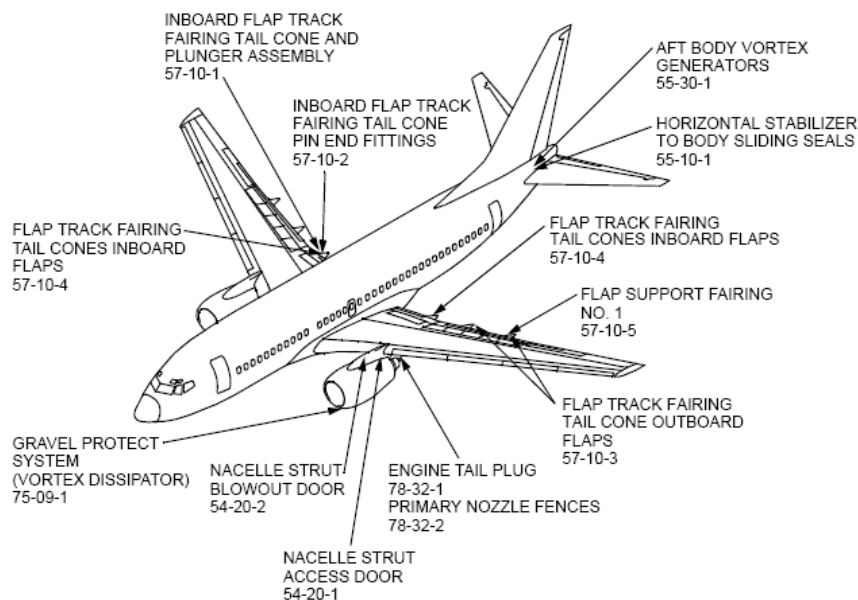
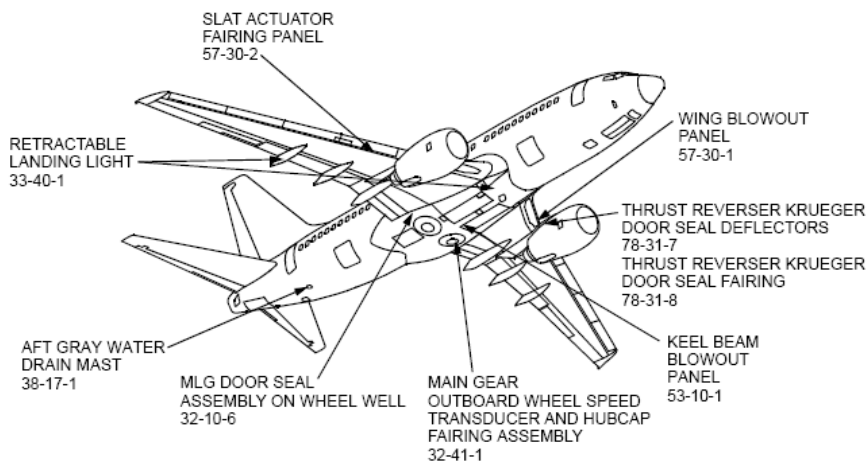
It is the responsibility of the PIC to:

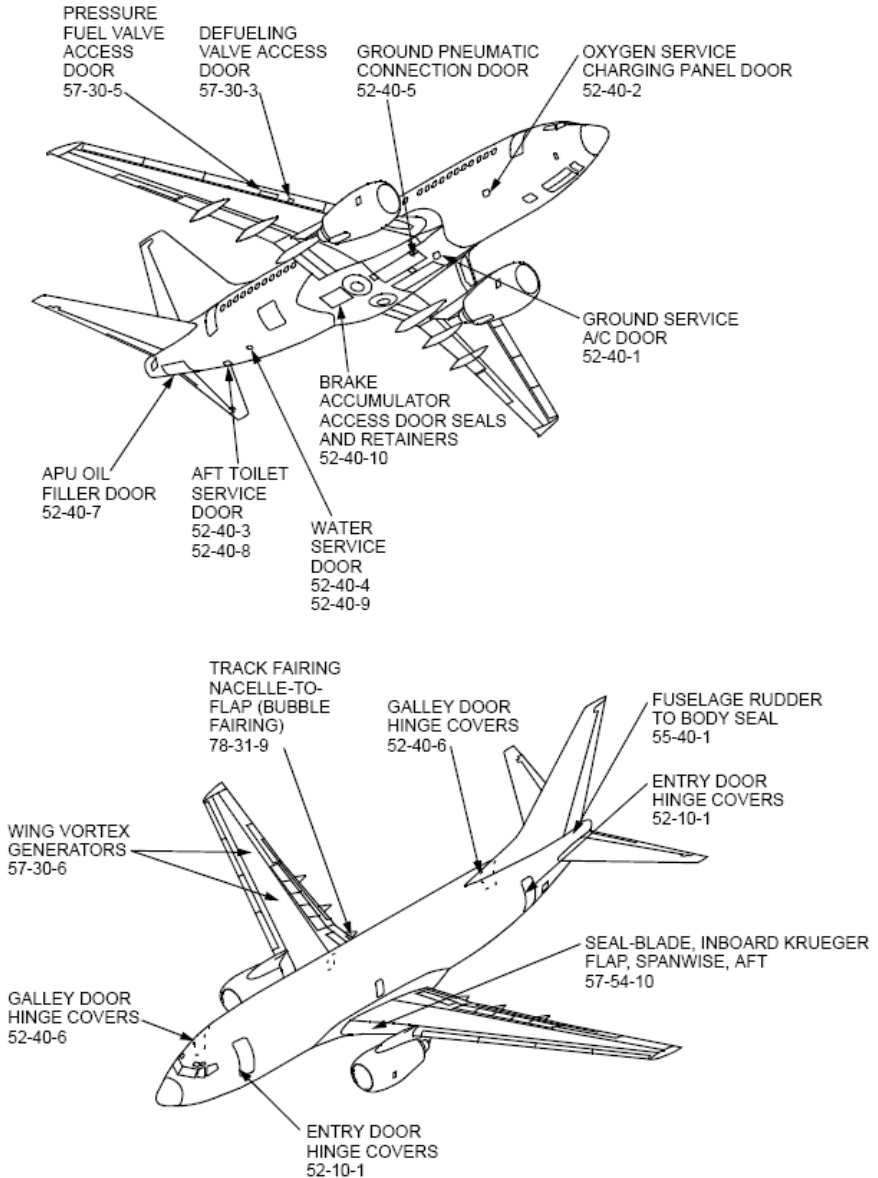
1. Check CDL for an entry related to the missing item.
2. Check that dispatch is permitted according to "Minimum required" and "Remarks and/or Exceptions".
3. Contact technical operations department for advice.
Telex: RIXTKBT
Telephone: + 371 7 207 306, + 371 7 207 206
Fax: + 371 7 207 867, + 371 7 207 069
4. Receive a written or telephoned "CDL Approval Message" from the Technical Department stating that there is "No Technical Objection" for dispatch according to CDL.
5. Make required entries in the Complaint/Action Log regarding missing item. If an "CDL Advice Message" in writing is available place it in the Technical Log. If the message was received by phone, write it down and place it in the Technical Log. If there are any problems in complying with the above requirements, call the Technical Operations Department (ask for acting TDO) for assistance.
6. If associated limitation(s) is (are) listed in the "Remarks and/or Exceptions" column, fill in relevant information in the Briefing Card.
7. Ensure that all technical and operational aspects are fully understood by involved crew members.

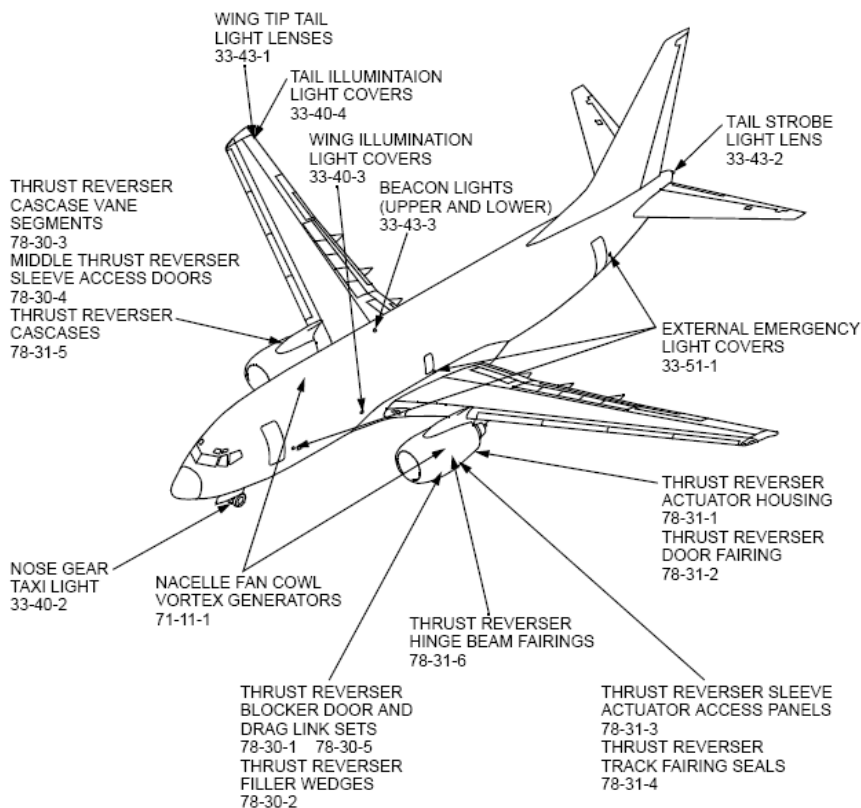
8.2 Configuration Deviation List

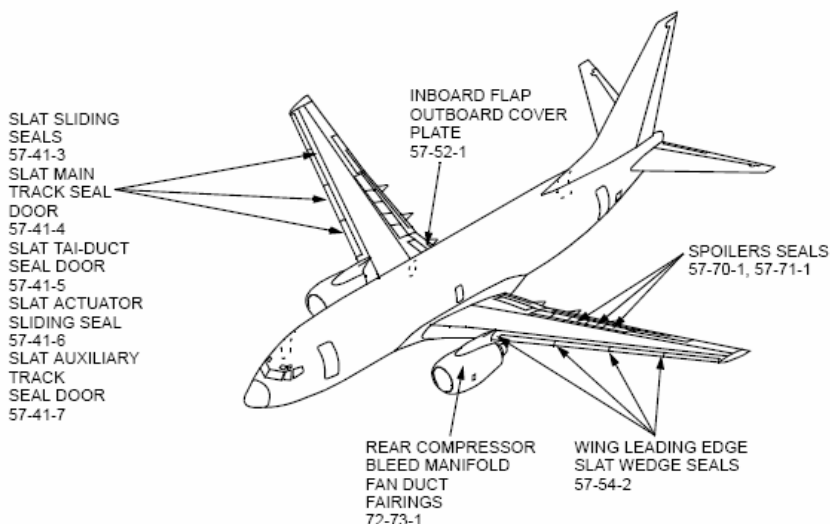
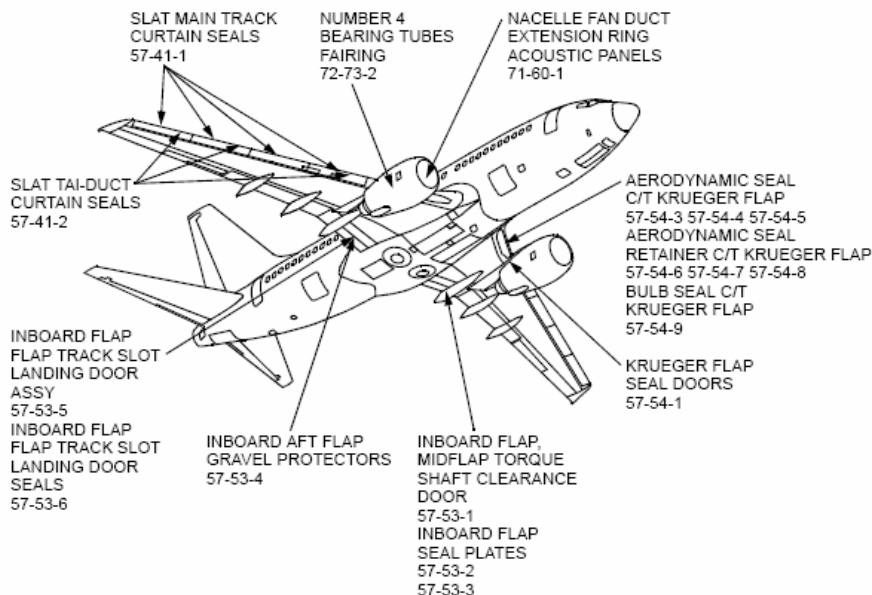
8.2.1 CDL Items general Locations











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23 COMMUNICATIONS		1. NUMBER OF PARTS REQUIRED FOR ALL FLIGHT CONDITIONS EXCEPT AS PROVIDED IN COLUMN 2.
ATA SUB-SYSTEM	PART DESCRIPTION	2. REMARKS AND/OR EXCEPTIONS
23-60-	1. Static Dischargers	18 A maximum of 6 static dischargers may be missing. There is no performance penalty. At least two dischargers are required on each wing and horizontal stabilizer and one is required on the vertical fin. Where there are only two on a given surface, one of the two must be in the tip position or in the outermost trailing position.

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30 ICE AND RAIN PROTECTION		1. NUMBER OF PARTS REQUIRED FOR ALL FLIGHT CONDITIONS EXCEPT AS PROVIDED IN COLUMN 2.
ATA SUB-SYSTEM	PART DESCRIPTION	2. REMARKS AND/OR EXCEPTIONS
30-10-	1. TAI Telescoping Duct Door (Trombone Fairing Panel)	6 Any number of these items may be missing provided performance limited weights are reduced by: Takeoff and Landing: No penalty En-route Climb: 91 kgs

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32 LANDING GEAR		1.	NUMBER OF PARTS REQUIRED FOR ALL FLIGHT CONDITIONS EXCEPT AS PROVIDED IN COLUMN 2.
ATA SUB-SYSTEM	PART DESCRIPTION		2. REMARKS AND/OR EXCEPTIONS
32-10-	1. Main Gear Wheel Well Blade Seal Assembly and/or Main Gear Wheel Well Ski-Jump Fairing Assembly	2	Any combination of parts from one or both assemblies may be missing provided performance limited weights are reduced by the following for each wheel well affected: Takeoff and Landing: 95 kgs En-route Climb: 186 kgs
	2. Main Gear Doors - Outer	2	One or both may be missing provided performance limited weights are reduced by the following for each missing item: Takeoff and Landing: Negligible En-route Climb: 57 kgs

	3. Main Gear Doors - Center and Inner	4	One or both combinations of center and inner doors may be missing provided performance limited weights are reduced by the following for each combination: Takeoff and Landing: 80 kgs En-route Climb: 160 kgs NOTE: For the -300/-400/-500, when the right main gear inner door is removed, apply grease to the fuel crossfeed valve actuator shaft per AMM 28-22-21/201. Remove and reapply grease daily until the door is reinstalled.
	4. Main Gear Doors - Inner	2	One or both may be missing provided performance limited weights are reduced by the following for each missing item: Takeoff and Landing: 45 kgs En-route Climb: 91 kgs NOTE: For the -300/-400/-500, when the right main gear inner door is removed, apply grease to the fuel crossfeed valve actuator shaft per AMM 28-22-21/201. Remove and reapply grease daily until the door is reinstalled.

32-41-	1. Main Gear Outboard Wheel Speed Transducer Cover and Hubcap Fairing Assembly	2	Associated outboard wheel antiskid will be inoperative. Outboard antiskid channel must be deactivated (refer to DDG Item 2-32-2). Antiskid inoperative performance and procedures must be used. One or both may be missing provided antiskid inoperative performance limited weights are reduced by the following for each missing item: Takeoff and Landing: 34 kgs En-route Climb: 68 kgs NOTE: For a speed transducer cover missing, dispatch using this item. With damaged hubcap fairing and a speed transducer cover installed or replaced with an inboard wheel speed transducer cover, dispatch under 32-41-2.
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	2. Main Gear Outboard Wheel Hubcap Fairing Assembly	2	Respective wheel speed transducer covers must be installed. The outboard wheel speed transducer cover may be bonded to the outboard wheel hubcap fairing assembly, and in that case, the outboard wheel speed transducer cover could be salvaged from a damaged assembly or replaced with an interchangeable inboard wheel speed transducer cover. One or both may be missing provided performance limited weights are reduced by the following for each missing item: Takeoff and Landing: 34 kgs En-route Climb: 68 kgs NOTE: With damaged hubcap fairing and a speed transducer cover installed or replaced with an inboard wheel speed transducer cover, dispatch using this item. For a speed transducer cover missing, dispatch using item 32-41-1.
	3. Main Gear Outboard Wheel Hubcap Center Cover Assemblies Cover for 40X14-16, C40X18-17 and H40X14.5-19 Wheels.	2	One or both may be missing provided performance limited weights are reduced by: Takeoff and Landing: 34 kgs En-route Climb: 68 kgs

33 LIGHTS		1. NUMBER OF PARTS REQUIRED FOR ALL FLIGHT CONDITIONS EXCEPT AS PROVIDED IN COLUMN 2.
ATA SUB-SYSTEM	PART DESCRIPTION	2. REMARKS AND/OR EXCEPTIONS
33-40-	1. Retractable Landing Light	2 One or both lenses or bulbs may be missing with negligible penalty for each item. NOTE: Light housing must remain intact. For all 737 models, the retractable landing light(s) may be inoperative in the extended position (Reference MEL Item 33-8). Fuel burn increase is 1.0 percent for each extended light.
	2. Nose Gear Taxi Light	1 May be missing with no penalty. NOTE: For nose gear taxi light inoperative, refer to MEL Item 33-9.
	3. Wing Illumination Light Covers	2 Any number or combination of items 33-40-3, -4 may be missing with negligible penalty for each missing item. NOTE: Refer to MEL Item 33-7 for inoperative wing illumination lights.
	4. Tail Illumination Light Covers (Logo Lights)	2 Any number or combination of items 33-40-3, -4 may be missing with negligible penalty for each missing item. NOTE: Refer to MEL Item 33-20 for inoperative logo lights.

33-43-	1. Wing Tip Tail Light Lenses	2	Any number or combination of items 33-43-1, -2, -3 may be missing with no penalty. NOTE: Refer to MEL Item 33-11 for inoperative wing tip position lights.
	2. Tail Strobe Light Lens	1	Any number or combination of items 33-43-1, -2, -3 may be missing with no penalty. NOTE 1: When the Tail Strobe Light Lens is missing, the flash tube (lamp), if intact, may be damaged during subsequent flights from air forces. NOTE 2: Refer to MEL Item 33-5 for inoperative strobe lights.
	3. Beacon Lights (Upper and Lower)	2	Any number or combination of items 33-43-1, -2, -3 may be missing with no penalty. NOTE 1: When the Beacon Light Lens is missing, the flash tube (lamp), if intact, may be damaged during subsequent flights from air forces. NOTE 2: Refer to MEL Item 33-6 for inoperative anti-collision beacons.
33-51-	1. External Emergency Light Covers	8	Any number may be missing with negligible penalty for each missing item. NOTE: Refer to MEL Item 33-14 for inoperative exterior emergency lights.

38 WATER/WASTE		1. NUMBER OF PARTS REQUIRED FOR ALL FLIGHT CONDITIONS EXCEPT AS PROVIDED IN COLUMN 2.
ATA SUB-SYSTEM	PART DESCRIPTION	2. REMARKS AND/OR EXCEPTIONS
38-17-	1. Aft Gray Water Drain Mast	1 May be missing with no penalty. NOTE: MEL Item 30-19, Drain Mast Heater, may also be affected.

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49. AIRBORNE AUXILIARY POWER		1.	NUMBER OF PARTS REQUIRED FOR ALL FLIGHT CONDITIONS EXCEPT AS PROVIDED IN COLUMN 2.
ATA SUB- SYSTEM	PART DESCRIPTION		2. REMARKS AND/OR EXCEPTIONS
49-15-	1. APU Inlet Flow Deflector	1	May be missing with no penalty. NOTE: Due to degraded in-flight starting and operating capability of the APU at high altitudes, operations predicated on the use of the APU should not be conducted above 25,000 feet.
49-16-	1. APU Drain Mast	1	May be missing with no penalty. NOTE: The APU is to be placarded inoperative (Reference MEL Item 49-1).

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52. DOORS		1.	NUMBER OF PARTS REQUIRED FOR ALL FLIGHT CONDITIONS EXCEPT AS PROVIDED IN COLUMN 2.
ATA SUB-SYSTEM	PART DESCRIPTION		2. REMARKS AND/OR EXCEPTIONS
52-10-	1. Entry Door Hinge Covers	4	Any number of these items may be missing with a negligible penalty for each item.
52-40-	1. Ground Service A/C Door	1	Any number or combination of items 52-40-1, -2, -3, -4, -5 may be missing provided performance limited weights are reduced by: Takeoff and Landing: 68 kgs En-route Climb: 113 kgs
	2. Oxygen Service Charging Panel Door	1	Any number or combination of items 52-40-1, -2, -3, -4, -5 may be missing provided performance limited weights are reduced by: Takeoff and Landing: 68 kgs En-route Climb: 113 kgs
	3. Aft Toilet Service Door	1	Any number or combination of items 52-40-1, -2, -3, -4, -5 may be missing provided performance limited weights are reduced by: Takeoff and Landing: 68 kgs En-route Climb: 113 kgs

	4. Water Service Door	1	Any number or combination of items 52-40-1, -2, -3, -4, -5 may be missing provided performance limited weights are reduced by: Takeoff and Landing: 68 kgs En-route Climb: 113 kgs
	5. Ground Pneumatic Connection Door	1	Any number or combination of items 52-40-1, -2, -3, -4, -5 may be missing provided performance limited weights are reduced by: Takeoff and Landing: 68 kgs En-route Climb: 113 kgs
	6. Galley Door Hinge Covers	4	Any number or combination of items 52-40-6 and -7 may be missing with a negligible penalty for each missing item.
	7. APU Oil Filler Door	1	Any number or combination of items 52-40-6 and -7 may be missing with a negligible penalty for each missing item.

53. FUSELAGE		1. NUMBER OF PARTS REQUIRED FOR ALL FLIGHT CONDITIONS EXCEPT AS PROVIDED IN COLUMN 2.
ATA SUB-SYSTEM	PART DESCRIPTION	2. REMARKS AND/OR EXCEPTIONS
53-10-	1. Keel Beam Blowout Panel	1 Any number or combination of items 53-10-1, 53-30-1 may be missing provided performance limited weights are reduced by: Takeoff and Landing: 68 kgs En-route Climb: 113 kgs
53-30-	1. Hydraulic Access Door	1 Any number or combination of items 53-10-1, 53-30-1 may be missing provided performance limited weights are reduced by: Takeoff and Landing: 68 kgs En-route Climb: 113 kgs

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54. NACELLES AND PYLONS		1. NUMBER OF PARTS REQUIRED FOR ALL FLIGHT CONDITIONS EXCEPT AS PROVIDED IN COLUMN 2.
ATA SUB-SYSTEM	PART DESCRIPTION	2. REMARKS AND/OR EXCEPTIONS
54-20-	1. Nacelle Strut Access Door	16 Any number or combination of items 54-20-1, -2 up to a maximum of 4 items per strut may be missing provided performance limited weights are reduced by the following for each affected nacelle strut: One door missing per nacelle strut: Negligible More than one door missing per nacelle strut: Takeoff and Landing: 306 kgs En-route Climb: 638 kgs
	2. Nacelle Strut Blowout Door	2 Any number or combination of items 54-20-1, -2 up to a maximum of 4 items per strut may be missing provided performance limited weights are reduced by the following for each affected nacelle strut: One door missing per nacelle strut: Negligible More than one door missing per nacelle strut: Takeoff and Landing: 306 kgs En-route Climb: 638 kgs

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55. STABILIZER		1. NUMBER OF PARTS REQUIRED FOR ALL FLIGHT CONDITIONS EXCEPT AS PROVIDED IN COLUMN 2.
ATA SUB-SYSTEM	PART DESCRIPTION	2. REMARKS AND/OR EXCEPTIONS
55-10-	1. Horizontal Stabilizer-to-Body Sliding Seals	4 NOTE: Link assembly associated with missing seal may also be removed. Any number may be missing provided performance limited weights are reduced by: Takeoff and Landing: 68 kgs En-route Climb: 136 kgs
55-30-	1. Aft Body Vortex Generators	8 Any number may be missing with no penalty. NOTE: During cruise flight with one or more vortex generators missing, occasional vertical motions may be felt which appear to be light turbulence. These motions are characteristic of this airplane and should not be construed to be associated with Mach buffet.
55-40-	1. Fuselage Rudder to Body Seal	1 May be missing with negligible penalty.

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57. WINGS		1. NUMBER OF PARTS REQUIRED FOR ALL FLIGHT CONDITIONS EXCEPT AS PROVIDED IN COLUMN 2.
ATA SUB-SYSTEM	PART DESCRIPTION	2. REMARKS AND/OR EXCEPTIONS
57-10-	1. Inboard Flap Track Fairing Tail Cone and Plunger Assembly	2 One or both may be missing provided performance limited weights are reduced by the following for each missing item: Takeoff and Landing: 226 kgs En-route Climb: 408 kgs NOTE: On the outboard trailing edge flaps, the midflap has a plunger assembly, which follows the rub strip on the outboard side of the inboard flap track fairing. When the flap track fairing tail cone is removed or missing the plunger assembly should also be removed.
	2. Inboard Flap Track Fairing Tail Cone Pin End Fittings	2 One or both may be missing with negligible penalty for each missing item.
	3. Flap Track Fairing Tail Cone, Outboard Flaps	4 One or two tail cones may be missing provided performance limited weights are reduced by the following for each tail cone: Takeoff and Landing: 61 kgs En-route Climb: 123 kgs

57-30-	1. Wing Blowout Panel	2	Any number or combination of items 57-30-1, -2, -3, -4, -5 may be missing provided performance limited weights are reduced by: Takeoff and Landing: 159 kgs En-route Climb: 544 kgs
	2. Slat Actuator Fairing Panel	6	Any number or combination of items 57-30-1, -2, -3, -4, -5 may be missing provided performance limited weights are reduced by: Takeoff and Landing: 159 kgs En-route Climb: 544 kgs
	3. De-fueling Valve Access Door	1	Any number or combination of items 57-30-1, -2, -3, -4, -5 may be missing provided performance limited weights are reduced by: Takeoff and Landing: 159 kgs En-route Climb: 544 kgs NOTE: With door missing, de-fueling valve handle must be lockwired CLOSED.

	4. Fuel Boost Pump Access Door	4	Any number or combination of items 57-30-1, -2, -3, -4, -5 may be missing provided performance limited weights are reduced by: Takeoff and Landing: 159 kgs En-route Climb: 544 kgs NOTE: With door(s) missing, the corresponding fuel boost pump inlet valve(s) must be lockwired OPEN prior to takeoff. The two forward fuel boost pump doors are not installed on airplanes that have the leading edge flaps covering the forward pumps.
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	5. Pressure Fuel Valve Access Door	1	Any number or combination of items 57-30-1, -2, -3, -4, -5 may be missing provided performance limited weights are reduced by: Takeoff and Landing: 159 kgs En-route Climb: 544 kgs NOTE: With door missing, all electrical circuits involved in the cavity must be de-energized prior to takeoff. This may be accomplished by opening and collaring the FUELING AND EXT PWR CONTROL circuit breaker on the P6-5 panel. Power may be re-applied after each flight, provided that equipment in the cavity, including the wiring, is inspected for damage before power is re-applied. Power must be removed prior to the next flight if the door is not replaced. Refer to AMM Chapter 11 for details on FAA required placards on missing access door. An alternate means of providing placard information to refueling personnel should be used.
	6. Wing Vortex Generators	34 Inboard, 18 Outboard	A maximum of 2 inboard (non-adjacent) and 1 outboard may be missing (per wing) with no performance penalty.

	7. Jacking Point Panels	3	Any number may be missing with negligible penalty.
57-41-	4. Slat Main Track Seal Door	12 (0)	NUMBER OF ITEM INSTALLED FOR (MODEL): 12 - 2 per slat prior to Line Position 1185 0 - Line Position 1185 & on Any number of symmetrical sets may be missing with no penalty. May be missing in combination with items 57-41-5,-6,-7 as long as those penalties, limitations and notes are honored.

	5. Slat TAI-Duct Seal Door	6 (1 per slat)	NOTE: The following adjustments are only applicable with slats fully extended (flaps 10 or larger). Doors may only be missing in symmetrical sets. Therefore, if one door is missing, the symmetrical door on the opposite wing must also be removed. One or more symmetrical sets may be missing provided performance limited weights are reduced by the following: Takeoff/Landing Climb: 136 kgs per each missing symmetrical set. Any combination of items 57-41-5, -6, -7 up to 9 symmetrical pairs (with a maximum of 3 on any one slat) may be missing. The Takeoff/Landing Climb penalties are additive for each missing set in each item. The following adjustments must also be applied once for any number or combination of Items 57-41-5, -6, -7 missing: Takeoff Field Length or Limit Weight: -600 feet or -3180 kgs Increase VR and V2 1 knot Landing Field Length or Limit Weight: -100 feet or -1360 kgs Increase VREF 1 knot
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	6. Slat Actuator Sliding Seal	6 (1 per slat)	NOTE: The following adjustments are only applicable with slats fully extended (flaps 10 or larger). Seals may only be missing in symmetrical sets. Therefore, if one seal is missing, the symmetrical seal on the opposite wing must also be removed. One or more symmetrical sets may be missing provided performance limited weights are reduced by the following: Takeoff/Landing Climb: 204 kgs per each missing symmetrical set. Any combination of items 57-41-5, -6, -7 up to 9 symmetrical pairs (with a maximum of 3 on any one slat) may be missing. The Takeoff/Landing Climb penalties are additive for each missing set in each item. The following adjustments must also be applied once for any number or combination of Items 57-41-5, -6, -7 missing: Takeoff Field Length or Limit Weight: -600 feet or -3180 kgs Increase VR and V2 1 knot Landing Field Length or Limit Weight: -100 feet or -1360 kgs Increase VREF 1 knot
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	7. Slat Auxiliary Track Seal Door	12 (2 per slat Line Position 1185 and on)	NOTE: The following adjustments are only applicable with slats fully extended (flaps 10 or larger). Doors may only be missing in symmetrical sets. Therefore, if one door is missing, the symmetrical door on the opposite wing must also be removed. One or more symmetrical sets may be missing provided performance limited weights are reduced by the following: Outboard pair of seals on slats No. 1 and 6: No penalty. Seals other than outboard pair of seals on slats No. 1 and 6: Takeoff/Landing Climb: 250 kgs per symmetrical set Any combination of items 57-41-5, -6, -7 up to 9 symmetrical pairs (with a maximum of 3 on any one slat) may be missing. The Takeoff/Landing Climb penalties are additive for each missing set in each item. The following adjustments must also be applied once for any number or combination of Items 57-41-5, -6, -7 missing: Takeoff Field Length or Limit Weight: -600 feet or -3180 kgs Increase VR and V2 1 knot Landing Field Length or Limit Weight: -100 feet or -1360 kgs Increase VREF 1 knot
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57-52-	1. Inboard Flap, Outboard Cover Plates	4	Any number may be missing provided performance limited weights are reduced by the following for each missing item: Takeoff and Landing: No Penalty En-route Climb: Negligible
57-53-	1. Inboard Flap, Midflap Torque Shaft Clearance Door	2	One or both may be missing provided performance limited weights are reduced by: Takeoff and Landing: No Penalty En-route Climb: 34 kgs
	3. Inboard Flap, Inboard Seal Plate	2	One or both may be missing provided performance limited weights are reduced by the following for each missing item: Takeoff and Landing: 147 kgs En-route Climb: 204 kgs NOTE: Penalties applicable for Flaps Up and Flaps 1 operation only. No penalties for operations at Flaps 5 through 40.

57-54-	1. Krueger Flap Seal Doors	2	Symmetrical configuration is required. Therefore, if one door is missing, the other door must be removed. The symmetrical set may be missing provided the following performance adjustments are applied: Takeoff Field Limit -600 feet or - 3180 kgs Increase VR and V2 1 knot Takeoff/Landing 272 kgs En-route Climb Negligible Landing Field Limit -125 feet or - 1360 kgs Increase VREF 1 knot
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	2. Wing Leading Edge Slat Wedge Seals	8 (10)	NUMBER OF ITEM INSTALLED FOR (MODEL): 8 - (4 per wing) 10 - (5 per wing) prior to Line Position 1585 or incorporation of SB 737-57-1148. Any number may be missing provided performance limited weights are reduced by the following: Up to five seals missing on one wing and one missing on other wing: Takeoff and Landing: No Penalty En-route Climb Negligible Two or more seals missing on both wings: Takeoff and Landing: No Penalty En-route Climb: 57 kgs
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	3. Aerodynamic Seal C/T Krueger Flap (Fwd) Inboard Fixed Leading Edge	6	A combination of one or more seals and/or retainers from Items 57-54-3 through 57-54-9 may be missing provided performance limited weights are reduced as indicated below for any number of missing items. Only the seals and/or seal retainers around the inboard Krueger flap cavities (Krueger flaps #2 and #3) are allowed to be missing. Seals that extend partially over the outboard Krueger flap cavities may not be missing. Any seal retainers that support the seals, which extend partially over the outboard Krueger flap cavity may not be missing, even if these seal retainers are located entirely in the inboard Krueger flap cavities. Takeoff and Landing: No Penalty En-route Climb: 635 kgs
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	4. Aerodynamic Seal C/T Krueger Flap (Aft)	6	A combination of one or more seals and/or retainers from Items 57-54-3 through 57-54-9 may be missing provided performance limited weights are reduced as indicated below for any number of missing items. Only the seals and/or seal retainers around the inboard Krueger flap cavities (Krueger flaps #2 and #3) are allowed to be missing. Seals that extend partially over the outboard Krueger flap cavities may not be missing. Any seal retainers that support the seals, which extend partially over the outboard Krueger flap cavity may not be missing, even if these seal retainers are located entirely in the inboard Krueger flap cavities. Takeoff and Landing: No Penalty En-route Climb: 635 kgs
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	5. Aerodynamic Seal C/T Krueger Flap (Inboard Fixed Leading Edge)	2	A combination of one or more seals and/or retainers from Items 57-54-3 through 57-54-9 may be missing provided performance limited weights are reduced as indicated below for any number of missing items. Only the seals and/or seal retainers around the inboard Krueger flap cavities (Krueger flaps #2 and #3) are allowed to be missing. Seals that extend partially over the outboard Krueger flap cavities may not be missing. Any seal retainers that support the seals, which extend partially over the outboard Krueger flap cavity may not be missing, even if these seal retainers are located entirely in the inboard Krueger flap cavities. Takeoff and Landing: No Penalty En-route Climb: 635 kgs
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	6. Aerodynamic Seal Retainer C/T Seal (Krueger Flap - Fwd)	18	A combination of one or more seals and/or retainers from Items 57-54-3 through 57-54-9 may be missing provided performance limited weights are reduced as indicated below for any number of missing items. Only the seals and/or seal retainers around the inboard Krueger flap cavities (Krueger flaps #2 and #3) are allowed to be missing. Seals that extend partially over the outboard Krueger flap cavities may not be missing. Any seal retainers that support the seals, which extend partially over the outboard Krueger flap cavity may not be missing, even if these seal retainers are located entirely in the inboard Krueger flap cavities. Takeoff and Landing: No Penalty En-route Climb: 635 kgs
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	7. Aerodynamic Seal Retainer C/T Seal (Krueger Flap - Aft)	14	A combination of one or more seals and/or retainers from Items 57-54-3 through 57-54-9 may be missing provided performance limited weights are reduced as indicated below for any number of missing items. Only the seals and/or seal retainers around the inboard Krueger flap cavities (Krueger flaps #2 and #3) are allowed to be missing. Seals that extend partially over the outboard Krueger flap cavities may not be missing. Any seal retainers that support the seals, which extend partially over the outboard Krueger flap cavity may not be missing, even if these seal retainers are located entirely in the inboard Krueger flap cavities. Takeoff and Landing: No Penalty En-route Climb: 635 kgs
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	8. Aerodynamic Seal Retainer Assembly C/T Krueger Flap (Aft)	2	A combination of one or more seals and/or retainers from Items 57-54-3 through 57-54-9 may be missing provided performance limited weights are reduced as indicated below for any number of missing items. Only the seals and/or seal retainers around the inboard Krueger flap cavities (Krueger flaps #2 and #3) are allowed to be missing. Seals that extend partially over the outboard Krueger flap cavities may not be missing. Any seal retainers that support the seals, which extend partially over the outboard Krueger flap cavity may not be missing, even if these seal retainers are located entirely in the inboard Krueger flap cavities. Takeoff and Landing: No Penalty En-route Climb: 635 kgs
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	9. Bulb Seal C/T Krueger Flap (Aft)	6	A combination of one or more seals and/or retainers from Items 57-54-3 through 57-54-9 may be missing provided performance limited weights are reduced as indicated below for any number of missing items. Only the seals and/or seal retainers around the inboard Krueger flap cavities (Krueger flaps #2 and #3) are allowed to be missing. Seals that extend partially over the outboard Krueger flap cavities may not be missing. Any seal retainers that support the seals, which extend partially over the outboard Krueger flap cavity may not be missing, even if these seal retainers are located entirely in the inboard Krueger flap cavities. Takeoff and Landing: No Penalty En-route Climb: 635 kgs
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	10. Seal-Blade, Inboard Krueger Flap, Spanwise, Aft	6	One or both of the seals may be missing (inboard Krueger flap #2 and #3 only) providing the following performance penalties are applied: Takeoff and Landing 680 kgs En-route Climb 113 kgs Takeoff and Landing Speeds: Takeoff speeds (VR and V2) and landing speed (VREF) are increased by one knot for either one or both seals missing (applicable to all flap settings).
57-70-	1. Seal-Blade, Spoiler	2 inboard, 8 outboard	Any number may be missing provided performance limited weights are reduced by the following for each missing item: Takeoff and Landing: Inboard Seals - 102 kgs Outboard Seals - 57 kgs En-route Climb: Inboard Seals - 136 kgs Outboard Seals - 76 kgs

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71. POWER PLANT		1. NUMBER OF PARTS REQUIRED FOR ALL FLIGHT CONDITIONS EXCEPT AS PROVIDED IN COLUMN 2.
ATA SUB-SYSTEM	PART DESCRIPTION	2. REMARKS AND/OR EXCEPTIONS
71-11-	1. Nacelle Fan Cowl Vortex Generators	12 (3 per nacelle side) One per nacelle side for a total of four may be missing with negligible penalty for each missing vortex generator.
71-60-	1. Nacelle Fan Duct Extension Ring Acoustic Panels	8 (4 per engine) One panel (1/4 ring segment) per engine may be missing with negligible penalty. NOTE: Fastener holes must be covered to prevent excess air from entering the fan compartment.

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78. EXHAUST		1. NUMBER OF PARTS REQUIRED FOR ALL FLIGHT CONDITIONS EXCEPT AS PROVIDED IN COLUMN 2.
ATA SUB-SYSTEM	PART DESCRIPTION	2. REMARKS AND/OR EXCEPTIONS
78-30-	1. Thrust Reverser Blocker Door and Drag Link Sets	20 (5 per side) One per thrust reverser side for a total of four may be missing provided performance limited weights are reduced by the following for each missing set: NOTE: Removal of blocker doors and drag links must be done as a set. While reverse thrust may still be used no credit for reverse thrust may be taken on the affected side. Takeoff and Landing: 125 kgs En-route Climb: 147 kgs
	2. Thrust Reverser Filler Wedges	16 (4 per side) One per thrust reverser side for a total of four may be missing provided performance limited weights are reduced by the following for each missing item: Takeoff and Landing: 57 kgs En-route Climb: 57 kgs

	3. Thrust Reverser Cascade Vane Segments	32 (8 per side)	One per thrust reverser side for a total of two on one engine may be missing with no penalty provided the affected thrust reverser is deactivated. NOTE 1: The thrust reverser on the other side must operate normally. No credit for reverse thrust may be taken on the affected engine. NOTE 2: Refer to MEL Item 78-1 for inoperative thrust reverser.
78-31-	3. Thrust Reverser Sleeve Actuator Access Panels	12	Any number may be missing provided performance limited weights are reduced by the following for each affected nacelle side: One door missing on nacelle side: Takeoff and Landing: 79 kgs En-route Climb: 159 kgs Two or more doors missing on nacelle side: Takeoff and Landing: 386 kgs En-route Climb: 771 kgs
	9. Track Fairing, Nacelle-to-Flap (Bubble Fairing)	2	One or both may be missing provided performance limited weights are reduced by the following for each missing fairing: Takeoff and Landing 171 kgs En-route Climb Negligible

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9.1.30	Ice & Rain Protection	1
9.1.31	Indicating & Recording	1
9.1.32	Landing Gear	1
9.1.33	Lights	1
9.1.34	Navigation	1
9.1.35	Oxygen	1
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9.1.38	Water/Waste	1
9.1.49	Airborne Auxiliary Power	1
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9 MINIMUM EQUIPMENT LIST

9.0 REVISION STATUS OF MINIMUM EQUIPMENT LIST

9.0.1 List of Effective Pages

CH	PAGE	EFFECTIVE	CH	PAGE	EFFECTIVE
9-TOC	1-2	03.11.2006	9.1.32	1-4	03.11.2006
9.0.1	1-2	03.11.2006	9.1.33	1-8	03.11.2006
9.0.2	1-2	01.08.2005	9.1.34	1-14	03.11.2006
9.0.3	1-6	03.11.2006	9.1.35	1-4	03.11.2006
9.1.1	1-10	03.11.2006	9.1.36	1-4	03.11.2006
9.1.21	1-12	03.11.2006	9.1.38	1-4	03.11.2006
9.1.22	1-8	03.11.2006	9.1.49	1-4	03.11.2006
9.1.23	1-10	03.11.2006	9.1.52	1-8	03.11.2006
9.1.24	1-4	03.11.2006	9.1.73	1-2	03.11.2006
9.1.25	1-10	03.11.2006	9.1.74	1-2	03.11.2006
9.1.26	1-8	03.11.2006	9.1.75	1-2	03.11.2006
9.1.27	1-4	03.11.2006	9.1.77	1-4	03.11.2006
9.1.28	1-8	03.11.2006	9.1.78	1-2	03.11.2006
9.1.29	1-4	03.11.2006	9.1.79	1-4	03.11.2006
9.1.30	1-8	03.11.2006	9.1.80	1-2	03.11.2006
9.1.31	1-4	03.11.2006			

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9.2-TOC	1-2	03.11.2006	9.2.33	1-4	03.11.2006
9.2.21	1-24	03.11.2006	9.2.34	1-6	03.11.2006
9.2.22	1-6	03.11.2006	9.2.35	1-2	03.11.2006
9.2.23	1-4	01.03.2006	9.2.36	1-8	03.11.2006
9.2.24	1-4	03.11.2006	9.2.38	1-2	01.04.2004
9.2.25	1-4	03.11.2006	9.2.49	1-6	03.11.2006
9.2.26	1-8	03.11.2006	9.2.52	1-6	03.11.2006
9.2.27	1-10	03.11.2006	9.2.73	1-2	03.11.2006
9.2.28	1-10	03.11.2006	9.2.74	1-2	01.04.2004
9.2.29	1-4	03.11.2006	9.2.77	1-2	03.11.2006
9.2.30	1-10	03.11.2006	9.2.78	1-2	03.11.2006
9.2.31	1-2	01.04.2004	9.2.80	1-2	03.11.2006
9.2.32	1-8	03.11.2006			

Approved by airBaltic

Date: 19.10.2006

Pauls Cālītis
SVP Flight Operations

Approved by LV CAA

Date: 27.10.2006

Approved by airBaltic Eastern

Date: 19.10.2006

Ārijs Akimovs
NPH Flight OperationsEdgars Gindra
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ekspluatācijas daļa

9.0.2 Revision Status of Minimum Equipment List

This table contains revision number, date effective and the date of incorporation of the latest Master Minimum Equipment List Revisions, reflected in airBaltic MEL.

REVISION	DATE OF REVISION	DATE OF INCORPORATION	SIGNATURE
NEW	10.11.2003	10.11.2003	-
001	01.04.2004	01.04.2004	-
002	20.06.2004	20.06.2004	-
003	28.02.2005	28.02.2005	-
004	01.08.2005	01.08.2005	-
005	01.03.2006	01.03.2006	-
006	21.06.2006	21.06.2006	-
007	03.11.2006	03.11.2006	-
008			
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9.0.3 Highlights of Revision

#007 from 03.11.2006

Effective from 03.11.2006, the MEL (B737) has been revised according to the 9.0.1 List of Effective Pages.

MEL revision is based on:

- the manufacturer's "B737 MASTER MINIMUM EQUIPMENT LIST", MMEL revision 48 (07 Jul 2006);
- B737 DDPG revision 43 (10 Aug 2006); and
- JAR TGL 26 revision 7 (reissued on 01 Feb 06.).

The main reason of this revision is: Boeing requirements and Temporary Revision incorporation.

Below are listed highlights of the introduced changes.

Ch	ITEM	Remarks
9-TOC	-	Revised.
9.0.1	-	Revised.
9.0.3	-	Revised.
9.1.1	-	Revised.
9.1.21		Inserted TOC.
	-1	Revised
	-5	Revised
	-14	Revised
	-26	Revised.
9.1.22		Inserted TOC.
	-1	Revised.
9.1.23		Inserted TOC.
	-2	Revised.
	-3	Revised.
	-4	Revised.
	-5	Revised.
	-7	Revised.
	-8	Revised.
	-15	Deleted.
	-20	Inserted.
	-21	Revised.
9.1.24		Inserted TOC.
	-2	Revised.
	-14	Deleted.

Rev.: 007

Ch	ITEM	Remarks
	-15	Deleted.
	-16	Deleted.
9.1.25		Inserted TOC.
	-2	Revised.
	-3	Revised.
	-4	Revised.
	-6	Revised.
	-7	Revised.
	-8	Deleted.
	-10	Revised.
	-12	Revised.
	-13	Deleted.
	-17	Revised.
	-19	Revised.
	-20	Revised.
	-21	Revised.
	-22	Revised.
	-24	Revised.
	-60	Revised.
9.1.26		Inserted TOC.
	-19	Revised.
	-20	Revised.
9.1.27		Inserted TOC.
9.1.28		Inserted TOC.
		Revised.
9.1.29		Inserted TOC.
9.1.30		Inserted TOC.
	-11	Revised Remarks.
9.1.31		Inserted TOC.
	-1	Revised.
9.1.32		Inserted TOC.
	-6	Revised.
9.1.33		Inserted TOC.
	-1	Revised.
	-2	Revised.
	-3	Revised.
	-7	Revised.
	-9	Revised.
	-10	Revised.
	-12	Deleted.
	-20	Revised.

Ch	ITEM	Remarks
	-25	Revised.
9.1.34		Inserted TOC.
		Revised substantially.
9.1.35		Inserted TOC.
	-4	Revised.
9.1.38		Inserted TOC.
9.1.49		Inserted TOC.
	-1	Revised.
	-9	Revised.
9.1.52		Inserted TOC.
	-5	Revised.
	-6	Revised.
	-8	Deleted.
	-14	Revised.
	-17	Revised.
	-18	Revised.
	-20	Revised.
9.1.73		Inserted TOC.
	-7	Revised reference.
9.1.74		Inserted TOC.
9.1.75		Inserted TOC.
9.1.77		Inserted TOC.
	-2	Revised.
	-3	Revised.
	-6	Revised.
	-10	Revised.
9.1.78		Inserted TOC.
9.1.79		Inserted TOC.
9.1.80		Inserted TOC.
9.2-TOC		Revised.
9.2.21		Revised substantially.
9.2.22	-2	Revised.
	-5	Revised.
	-7	Revised.
	-11	Revised.
	-15	Revised.
9.2.24	-1	Revised.
	-2	Revised.
	-8	Revised.
	-12	Revised.
	-16	Deleted.

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Ch	ITEM	Remarks
	-18	Revised.
9.2.25	-3	Revised.
	-6	Revised.
	-16	Revised.
	-17	Revised.
9.2.26	-2	Revised.
	-4	Revised.
	-19	Revised.
9.2.27	-4	Revised.
	-13	Revised.
9.2.28	-1	Revised.
	-7	Revised.
	-9	Revised.
	-23	Revised.
9.2.29	-3	Revised.
	-4	Revised.
	-5	Revised.
	-9	Revised.
	-11	Revised.
	-13	Revised.
9.2.30	-15	Revised.
9.2.30	-3	Revised.
	-4	Revised.
9.2.32	-3	Revised.
	-4	Revised.
	-6	Revised.
9.2.33	-2	Revised.
	-16	Revised.
9.2.34	-1	Revised.
	-7	Deleted.
	-15	Deleted.
	-17	Inserted.
	-20	Revised.
	-25	Revised. Terminological change: Pilot not flying → Pilot Monitoring.
	-26	Revised.
	-35	Revised.
	-37	Deleted.
	-49	Deleted.
9.2.35	-2	Revised.
9.2.36	-1	Revised.

Ch	ITEM	Remarks
	-2	Revised.
	-3	Revised.
	-4	Revised.
	-5	Revised.
	-8	Revised.
9.2.49	-1	Revised.
	-6	Revised.
	-9	Revised.
9.2.52	-8	Deleted.
	-17	Revised.
9.2.73	-7	Revised.
9.2.77	-2	Deleted.
	-3	Revised.
9.2.78	-1	Revised.
	-2	Revised.
	-7	Revised.
9.2.80	-3	Revised.

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9.1 MINIMUM EQUIPMENT LIST

9.1.1 Minimum Equipment List Procedure

9.1.1.1 General

This Minimum Equipment List (MEL) is developed taking into consideration airBaltic particular aircraft equipment, configuration and operational conditions, kinds of operation and requirements set by the LVCAA.

This Minimum Equipment List (MEL):

Based on the manufacturers Master Minimum Equipment List (CAA). It incorporates all current revisions and will not deviate from the Aeroplane Flight Manual limitations or Emergency Procedures or from any applicable Airworthiness Directive.

NOTE: An operator will have 90 days from the date of receipt of the revision to revise the MEL. Reduced time scales for implementations of safety information related revisions might be required.

Contains only those items, which may be inoperative prior to dispatch, provided limitations and appropriate procedures are observed. If inoperative item is not covered by MEL- see "Procedure" below.

By authorisation of this MEL the LVCAA permits dispatch of the Aeroplane with certain INOP item(s), provided an acceptable level of safety is maintained.

9.1.1.2 Purpose

The purpose of this MEL is to establish acceptable balance between safety and punctuality by permitting continued or uninterrupted operation of the aeroplane with INOP item(s) during Rectification Period.

9.1.1.3 Scope

The provisions of the MEL apply to Certifying Technical staff and flight crew (Commander) until the Aeroplane commences the flight (OFF CHOCKS).

NOTE: If a failure occurs during the taxi phase before the start of the take-off roll, Commander shall refer to the MEL before decision is taken whether to continue the flight or return to parking stand.

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9.1.1.4 Responsibility

Certifying Technical staff is responsible to:

- make every effort to have the aircraft fully serviceable prior to the scheduled departure;
- inform the MCC duty manager about the defect and expected operations under the MEL procedures as soon as possible;
- inform the Commander on possible consequences the defect may have on other related systems, if requested;
- issue MEL advice message, if requested;
- ensure that the defect is positively identified and/or isolated;
- complete MEL Procedure;
- issue the Certificate of Release to Service (CRS)

Commander is responsible to:

- evaluate if aeroplane technical status is adequate for the intended flight/operations;
- report all known or suspected defects;
- complete MEL procedure, if certifying technician is not available;
- accept an aeroplane with known defect(s) for intended flight conditions;
- ensure that all technical and operational consequences are fully understood by all involved crewmembers.

9.1.1.5 Definitions

For the purpose of this MEL the following definitions shall apply:

Term	Explanation
“AIRWORTHINESS Related item(s)”	required for safe operation of the aeroplane
“BOLD” text font style application	If MEL item contains operational limitations such as FL, speed restrictions; RWY conditions; landing minimum; daylight time; flight conditions (rain, icing, VMC) etc, this MEL item is in bold font in the MEL content list. Example: ▪ 33-10 Runway Turn Off Lights no operational limitations exist ▪ 33-11 Wing Tip Position Lights operational limitations exist
“CDL item(s)”	Secondary airframe or engine parts missing, without which operation could be authorised according to Configuration Deviation List (CDL) Procedure.
(-) (Dash)	in column 3 or 4 indicates a variable quantity.
“DAY” operation	is any flight conducted from the point of take-off to landing between 30 minutes before sunrise and 30 minutes after sunset.
“DDG” (Dispatch Deviation Guide)	describes necessary actions that must be taken by pilots or maintenance staff when a MEL is open up.

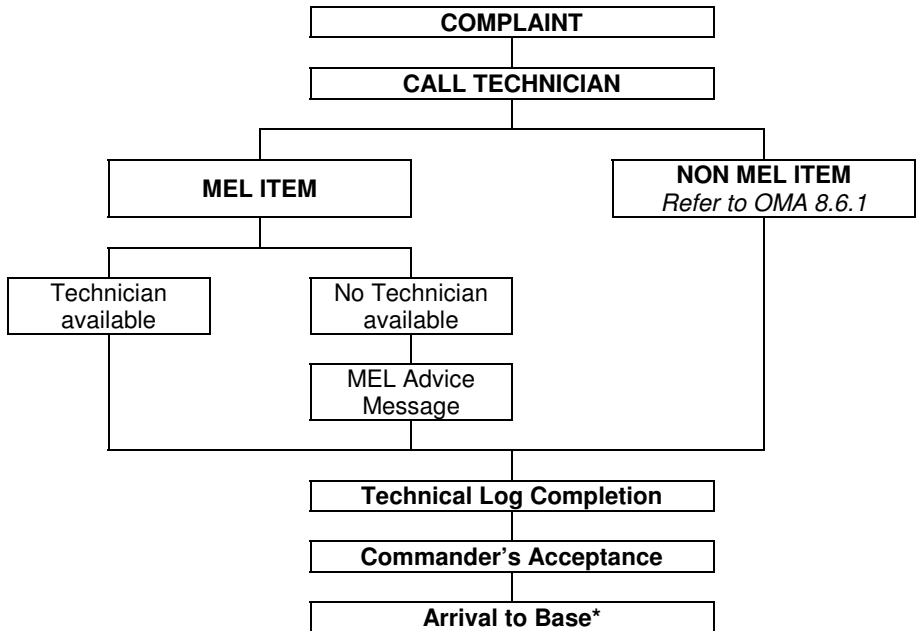
Term	Explanation
"Deactivated" and "Secured"	means that the specified component must be put into an acceptable condition for safe flight.
"Defect"	any confirmed abnormal condition of an item whether or not this could eventually result in a failure.
"Dispatch Note"	is only mentioned in the DDG and is added to clarify the MEL item for dispatch purpose if needed.
ER – Extended Range Operations	are those operations intended to be, or actually conducted, over a route that contains a point of greater than 60 minutes flying time (in still air) at the one-engine inoperative cruise speed from an adequate aerodrome.
"Flight Day"	a 24-hour period (from midnight to midnight) during which at least one flight is scheduled for the affected aeroplane.
"Icing Condition"	outside air temperature (OAT) on the ground and for take-off , or total air temperature on ground, or total air temperature (TAT) in flight, is 10 deg. C or below and visible moisture in any form is present (such as clouds, fog with visibility of 1.6 km or less, rain, snow, sleet and ice crystals).
"INOP"	any time a system and/or component malfunctions to the extent that it does not accomplish its intended purpose and/or is not consistently functioning within its designed operating limit(s) or tolerances.
"Item"	the equipment, system, components or function.
"MEL advice message"	Written or telephoned message from the airBaltic Technical Operation Department stating that there is "No Technical Objections" for dispatch according to MEL.. NOTE: to receive a written "MEL advice message", Commander to provide also written detailed complaint to Certifying technician.
"(M)" symbol	indicates a requirement for a specific maintenance procedure, which must be accomplished prior to departure with the listed INOP item and is published in the DDG. These procedures are accomplished by LVCAA or JAR-145 approved personnel. NOTE: In exceptional cases (M) item(s) which do not require special knowledge, skill, use of tools or test equipment may be accomplished by not certifying personnel (pilot or maintenance staff) provided: a) An acceptance is granted by certifying technician to conduct required actions; and b) The result of these actions is discussed with and accepted by certifying technician by phone or by other means of communication. The satisfactory accomplishment of all maintenance procedures, regardless of who performs them, is the responsibility of the airBaltic.
"Notes"	in column 4 provides additional information for crew member or maintenance consideration. Notes are used

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Term	Explanation
	to identify applicable material which is intended to assist with compliance, but do not relieve the operator of the responsibility for compliance with all applicable requirements. Notes are not a part of the provisos. Different possibilities may be considered for an item. They will be identified by a),b),c). Within one possibility, different conditions may be required. They will be identified by 1),2),3)....
"(O)" symbol	indicates a requirement for a specific operational procedure, which must be accomplished in planning for and/or operating with the listed item INOP. Normally the flight crew accomplishes these procedures. These appropriate procedures are published in the DDG.
"Passenger Convenience Items"	means those items related to passenger comfort or entertainment such as, but not limited to, galley equipment, ashtrays, overhead reading lamps, toilets, water, waste etc.
"Placarded"	each INOP item must be placarded to inform and remind the crewmembers and maintenance personnel of the equipment condition. To the extent practicable, placard should be located adjacent to the control or indicator for the item affected such that it is clear to operating crew that the associated system is inoperative.
"(SP)"	symbol indicates, that it is possible to implement Special Procedures for the particular MEL item.
"Visible Moisture"	means an atmospheric environment containing water in any form that can be seen in natural or artificial light; for example, clouds, fog, rain, sleet, hail or snow.
"VMC"	"VMC" (Visual Meteorological Conditions) means the atmospheric environment is such that would allow a flight to proceed under the Visual Flight Rules applicable to the flight. Vertical distance from clouds 1000ft, horizontal 1500m. Visibility 5 km below 10 000ft, 8 km above. The weather conditions mentioned above shall be forecasted not to be below minimum in time span of +/- 1 hour of time at departure/arrival airports and en-route. Additionally the weather for selected alternate shall be taken into account. This does not preclude operating under Instrument Flight Rules.

9.1.1.6 Procedure

9.1.1.6.1 Flowchart



* - or other airport determined for particular maintenance by DT.

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Procedure description

COMPLAINT	All reasonable efforts shall be performed to repair it. If it is impossible to restore the equipment before departure due to lack of spares, facility, qualified personal or time available further assessment to be completed.
Call Technician	Call technician via MCC to clarify is it MEL item or not and for further actions.
MEL item	Check that dispatch is permitted according to "Number required" and "Remarks or Exceptions". NOTE: See example in Appendix 1.
Technician Available	Only certifying technicians may open MEL item, complete MEL procedure and issue airworthiness release.
No Technician Available	The Commander may open MEL item, complete MEL procedure and signs his decision to continue the flight under MEL (but he cannot sign airworthiness release).
MEL advice message	Call MCC duty manager/Technical Operations Department and receive a written or telephoned "MEL Advice Message" from them stating that there is "No Technical Objections" for dispatch according to MEL. NOTE: To receive a written "MEL advice message", Commander shall provide a written detailed complaint to Certifying technician.
Non MEL Item	Is described in OMA 8.6.1
Technical Log Completion	Complaint to be entered into Complaint/Action card and following to be written in Action field as an answer and a) signed by Certifying Technician: - Short description what is suspected to be faulty; - A/C RELEASED ACC MEL XX XX; - DDG XX-XX COMPLIED WITH; - CAT A/B/C DEFECT b) signed by Commander (Technician not available): - FLIGHT ACC MEL XX XX, - LACK OF XX XX; - "MEL Advice Message" FROM XX XX RECEIVED; - DDG XX-XX COMPLIED WITH. NOTE: See example in Appendix 2 Second (yellow) copy of the Complaint/Action card shall be given to handling agent before departure.
Commander's acceptance	Commander has final authority to accept an a/c with known defect(s) for intended flight by signing Pre Flight

Inspection completion and/or Complaint/Action card.
Commander has to brief all involved crewmembers about all technical and operational consequences.

NOTE: For multiple inoperative items see 6.3 below.

Arrival to
Base*

If the MEL item has been opened by the Commander (no Technician available) in outstation and can not be cleared in Base, whole MEL Procedure to be initiated by airBaltic DT and airworthiness Release to be issued.

9.1.1.6.2 Rectification periods

Repairs are to be accomplished at the earliest opportunity and not later than the Repair Period established by the following letter designators given in the "CATEGORY" column of the MEL.

NOTE: Where a time period is specified it shall start at 00:01 **UTC** on the calendar day following the day of an opening relative MEL INOP item.

Category	Rectification periods
A	Either before next flight or within the time interval specified in the Remarks column (5) of the MEL.
B	Within three (3) consecutive calendar days - 72 hours .
C	Within ten (10) consecutive calendar days - 240 hours .
D	Within one hundred and twenty (120) consecutive calendar days .

9.1.1.6.3 Multiple INOP items

Dispatch of an aeroplane with more than one open MEL INOP item is permitted if emergency procedures related to one of the MEL item shall not affect emergency procedures for another one and vice versa.
Not more than five (5) Cat A, B, C items may be inoperative.

Following to be thoroughly considered by Commander before final decision to accept the aircraft is made:

- interrelationships between those INOP items and the effect on aeroplane operation;
- crew workload;
- flight conditions.

APPENDIX 1

EXAMPLE of Minimum Equipment List item and its description:

1. Systems & Sequence Number	2. Category		
	3. Number Installed		
	4. Number Required For Despatch		
Item			5. Remarks or Exceptions
31 INDICATING/ RECORDING SYSTEMS 20-1 Clocks	C	2	1 (M) (O) One may be inoperative at either pilot or co-pilot station.

Column 1 "ATA SYSTEM AND SEQUENCE NUMBER- ITEM".

The System Numbers are based on the Air Transport Association (ATA) Specification Number 100 and the items are numbered sequentially. The ATA 100 system numbering differs from the AOM system arrangement.

Column 2 "CATEGORY".

Repair category A, B or C, stating when at the latest the item must be repaired (See: Rectification Intervals)

Column 3 "NUMBER INSTALLED"

The number (quantity) of items normally installed in the aircraft.

Column 4 "NUMBER REQUIRED FOR DISPATCH".

The minimum number (quantity) of items required for dispatch, provided the conditions (if any) specified in column 4 are met.

Column 5 "REMARKS AND EXCEPTIONS".

This column includes statements either prohibiting or permitting operation with the subject items inoperative as well as limitations and conditions for such operation, and appropriate notes.

APPENDIX 2

Example of Complaint/Action Card:

Flight N°	DEP STA	A/C REG	D	O	M	M	Y	Y	SEQ N°	ATA SYSTEM (Item N°)	POS	COMP IDENT N°	SERIAL N° IN	SERIAL N° OUT
120	CPH	BAN	1	9	0	6	0	0	0004					
Subject														
52 DOORS														
Complaints														
LOWER DOOR INDICATION														
SYSTEM INOPERATIVE														
(FAULTY INDICATION OF														
"LWR DOOR NOT SHUT")														
Action														
FLIGHT ACC MEL 52-70-2														
MEL ADVICE MESSAGE FROM														
B IGLIN RECEIVED														
DUE 50-70-2 COMPLIED WITH														
AAS														
Sign														
AAS														
Signing of airworthiness release in the "Action STA" line implies the following: "Certifies that the work specified except as otherwise specified was carried out in accordance with LAN-145 and in respect to that work the aircraft is considered ready for release to service".														
JAR 145 Approval														
Complaint (MM Code)														
RP														
Fail Class														
D D M M														
Time														
Sign														

21 AIR CONDITIONING

21-1 Air Conditioning Packs (M)(O)

21-2 Pack Airflow/Shut-Off Valves (M)(O)

21-3 Pack Trip Warning Systems (M)(O)

21-4 Pack Turbofans (M)(O)

21-5 Pack Ram Air Systems (M)(O)

21-6 Pack Turbofan Valves (M)(O)

21-7 RAM DOOR FULL OPEN Indicating Lights

21-8 Air Mix Valves (M)(O)

21-9 Air Mix Valve Position Indicators

21-10 Cabin Rate of Climb Indicator (M)(O)

21-11 Cabin Altitude Warning System

21-12 Cabin Altitude Indicator (M)(O)

21-13 Cabin Differential Pressure Indicator (M)(O)

21-14 Cabin Pressure Control System (M)(O)

21-15 Main Outflow Valve (M)(O)

21-16 Pressure Relief Valves (M)(O)

21-17 Temperature Indicators

21-18 Duct Overheat Warning

21-19 Passenger Cabin Temperature Control System (O)

21-20 Cabin Temperature Indicator

21-21 Flight Deck Temperature Control System (O)

21-22 Forward Outflow Valve (O)

21-24 Gasper Fan

21-25 Water Separator Anti-Icing Systems (M)(O)

21-26 Ground Preconditioned Air Connection Check Valve (M)(O)

21-27 Electrical/Electronic Equipment Cooling Blowers

21-31 Recirculation Fan(s)

21-37 Outflow Valve Heater Gasket

21-38 Outflow Valve Position Indicator (M)(O)

21-40 Equipment Cooling Automatic Flow Control Valve/Overboard Exhaust Valve (M)(O)

21 AIR CONDITIONING

1. Systems & Sequence Number	2. Category			
				3. Number Installed
				4. Number Required For Despatch
Item				5. Remarks or Exceptions
21 AIR CONDITIONING				
1. Air Conditioning Packs	C	2	1	(O) Except for ER operations, one may be inoperative provided flight altitude remains at or below FL250.
	C	2	0	(M)(O) Except for ER operations, both may be inoperative provided: a) Flight is conducted in an un-pressurized configuration, and Procedures are established and use to ensure the lower cargo compartments remain empty, or are verified to contain only empty cargo handling equipment, ballast
2. Pack Airflow / Shut-Off Valves 1) High Flow Mode 2) APU High Flow Mode	C	2	0	(M)(O) May be inoperative deactivated closed.
	C	2	0	
	C	2	0	
3. Pack Trip Warning Systems	C	2	0	(M)(O) May be inoperative provided the associated pack is not used.

21 AIR CONDITIONING

4. Pack Turbofan	C	2	0	(O) May be inoperative provided associated pack(s) is operated only in flight with flaps retracted.
5. Pack Ram Air Systems	C	2	0	(M)(O) May be inoperative in the FLIGHT OPEN position provided: a) Operations are not conducted on runways covered with slush or on gravel runways, and b) Associated pack is not operated during takeoff or landing on wet runways or runways with standing water.
1) Exhaust Louver Assemblies	C	2	0	(M) (O) May be inoperative provided: a) Actuator(s) is disconnected, and b) Louver(s) is secured in the full open position.
6. Pack Turbofan Valves	C	2	0	(M)(O) May be inoperative closed provided associated pack(s) is operated only in flight with flaps retracted.
7. RAM DOOR FULL OPEN Indicating Lights	C	2	0	
8. Air Mix Valves	C	2	0	(M)(O) May be inoperative provided the associated pack is not used.
9. Air Mix Valve Position Indicators	C	2	0	

21 AIR CONDITIONING

10. Cabin Rate of Climb Indicator				
1) Analog Control System	C	1	0	May be inoperative provided AUTO and STBY control modes operate normally.
	C	1	0	(M)(O) May be inoperative provided flight is conducted in an unpressurized configuration.
2) Digital Control System	C	1	0	May be inoperative provided AUTO and ALTN control modes operate normally.
	C	1	0	(M)(O) May be inoperative provided: a) Flight is conducted in an unpressurized configuration, and b) Outflow valve is positioned to the 25% open position.
11. Cabin Altitude Warning System	C	1	0	May be inoperative provided flight altitude remains at or below 10,000 feet MSL.

21 AIR CONDITIONING

13. Cabin Differential Pressure Indicator				
1) Analog Control System	C	1	0	May be inoperative provided: a) Cabin altitude indicator operates normally, and b) A chart is provided to the crew to convert cabin altitude to differential pressure.
	C	1	0	(M)(O) May be inoperative provided flight is conducted in an un-pressurized configuration.
2) Digital Control System	C	1	0	May be inoperative provided: a) Cabin altitude indicator operates normally, and b) A chart is provided to the crew to convert cabin altitude to differential pressure.
	C	1	0	(M)(O) May be inoperative provided: a) Flight is conducted in an un-pressurized configuration, and b) Outflow valve is positioned to the 25% open position.

21 AIR CONDITIONING

15. Main Outflow Valve				
1) Analog Control System Outflow Valve Actuators (AC and/or DC)	C	2	1	One actuator may be inoperative for pressurized cargo-only flight, provided the airplane is depressurized before landing.
	C	2	0	(M)(O)May be inoperative for un-pressurized flight provided: a) Outflow valve is deactivated open or removed, and b) Extended over-water flight is prohibited.
2) Digital Control System Outflow Valve Automatic Mode Actuators	C	2	1	One may be inoperative provided the manual mode actuator operates normally.
	C	2	0	(M)(O)May be inoperative for un-pressurized flight provided: a) Outflow valve is deactivated in the 25% open position or removed, and b) Extended over-water flight is prohibited.
3) Digital Control System Outflow Valve Manual Mode Actuator	C	1	0	(M)(O)May be inoperative for un-pressurized flight provided: a) Outflow valve is deactivated in the 25% open position or removed, and b) Extended over-water flight is prohibited.

21 AIR CONDITIONING

16. Pressure Relief Valves				
1) Analog Control System	C	2	1	(M) One may be inoperative closed for pressurized flight.
	C	2	0	(M)(O) May be inoperative provided flight is conducted in an un-pressurized configuration.
2) Digital Control System	C	2	1	(M) One may be inoperative closed for pressurized flight.
	C	2	0	(M)(O) May be inoperative provided: a) Flight is conducted in an un-pressurized configuration, and b) Outflow valve is positioned to the 25% open position.
17. Temperature Indicators				
1) Supply Duct	C	1	0	May be inoperative provided both duct overheat warning systems operate normally.
3) Pass Cabin	C	1	0	
18. Duct Overheat Warning Lights				
1) Duct Overheat	C	2	0	May be inoperative provided supply duct temperature indicators operate normally.

21 AIR CONDITIONING

19. Passenger Cabin Temperature Control Systems 1) Automatic/ Manual Controls	C	2	1	
	C	2	0	(O) May be inoperative provided the right pack is not used.
20. Cabin Temperature Indicator				Incorporated into item 21-17
21. Flight Deck Temperature Control Systems 1) Automatic / Manual Controls	C	2	1	
	C	2	0	(O) May be inoperative provided the left pack is not used.
22. Forward Outflow Valve	C	1	0	May be inoperative closed.
	C	1	0	May be inoperative open provided both packs operate normally.
	C	1	0	(O) May be inoperative open with one pack operating normally provided flight altitude remains at or below FL 200.
24. Gasper Fan	D	1	0	
25. Water Separator Anti-Icing Systems	C	2	0	(M)(O) May be inoperative provided the associated pack is not used.

21 AIR CONDITIONING

26. Ground Preconditioned Air Connection Check Valve	C	1	0	May be inoperative closed.
1) Analog Control System	C	1	0	(M)(O) May be inoperative open provided the flight is conducted in an un-pressurized configuration.
2) Digital Control System	C	1	0	(M)(O) May be inoperative provided: a) Flight is conducted in an un-pressurized configuration, and b) Outflow valve is positioned to the 25% open position.
27. Electrical / Electronic Equipment Cooling Blowers				
2) EFIS				
a) Supply Fans	C	2	1	Except for ER operations, one may be inoperative.
b) Exhaust Fans	C	2	1	Except for ER operations, one may be inoperative.
31. Recirculation Fan	C	1	0	May be inoperative provided the left pack is operating when OAT is above 38 degrees C.

21 AIR CONDITIONING

37. Outflow Valve Heater Gasket	C	1	0	NOTE: Refer to DDG 21-37 for Operations Note.
38. Outflow Valve Position Indicator	C	1	0	(M)(O) May be inoperative provided valve is verified to be operating normally.
40. Equipment Cooling Automatic Flow Control Valve / Overboard Exhaust Valve				
1) Analog Control System	C	1	0	(M)(O) May be inoperative in the open position provided the flight is conducted in an un-pressurized configuration.
	C	1	0	May be inoperative in the closed position provided both packs and recirculation fan are operated during ground taxi operations.
2) Digital Control System	C	1	0	(M)(O) May be inoperative in the open position provided: a) Flight is conducted in an un-pressurized configuration, and b) Outflow valve is positioned to the 25% open position.
	C	1	0	May be inoperative in the closed position provided both packs and recirculation fan(s) (if installed) are operated during ground taxi operations.

22 AUTO FLIGHT

22-1 Autopilot Systems

22-2 Autopilot Disengaged Warning System (O)

22-3 Yaw Damper (M)(O)

22-4 Autothrottle System

22-5 Mach Trim Systems (M)(O)

22-6 SP-177/SP-300 Flight and Approach Mode Annunciations

**22-7 Dual Angle of Attack Sensors/Stall Warning System
Sensors/Alpha Vanes (M)**

22-8 Autothrottle Disengage

22-9 Speed Trim Fail Light System (M)

22-10 Speed Trim System (O)

22-11 STAB OUT OF TRIM Light (O)

22-14 Mode Control Panel Selectors

22-15 Mode Control Panel Switches/Paddles/Lights (M)(O)

22-16 Mode Control Panel Windows

22-17 Takeoff/Go-Around (TO/GA) Switches

22-18 Mode Control Panel Switch Lights

22-19 Thrust Mode Annunciator/Thrust Mode Display

22-20 Automatic Landing System

22 AUTO FLIGHT

1. Systems & Sequence Number	2. Category			
	3. Number Installed			
	4. Number Required For Despatch			
	5. Remarks or Exceptions			
Item				
22 AUTO FLIGHT				
1. Autopilot Systems	C	2	1	
	B	2	0	Except for ER operations, may be inoperative provided: a) Approach minimums do not require their use, b) En-route operations do not require autopilot use, and c) Number of flight segments and segment duration is acceptable to the flight crew. NOTE 1: Operators should make every effort to repair the autopilot early in the repair interval, as provided by this relief statement, in consideration of such factors as weather, traffic density and the effect of other inoperative systems. NOTE 2: Any mode, which functions normally may be used. NOTE 3: The automatic altitude control system is required to be operative for RVSM operations. NOTE 4: Failures in one or both Flight Control Computers (FCC) may affect the Mach Trim System (MEL 22-5), Speed Trim System (MEL 22-10) and Flight Director System (MEL 34-12). One FCC must operate normally for the Speed Trim System (MEL 22-10) to function.
1) Autopilot Disconnect	C	2	1	One may be inoperative provided the

				autopilot is not utilized at less than initial approach altitude.
2. Autopilot Disengaged Warning System 1) Lights 2) Aural Warning	C C	2 1	1 0	One may be inoperative when autopilot is used in any axis. (O) Except for ER operations, may be inoperative provided autopilots are not used. May be inoperative provided approach minimums do not require its use.
3. Yaw Damper 3) Yaw Damper Indicator	C C C	1 1 1	0 0 0	(M)(O) May be inoperative provided: a) Yaw damper switch remains OFF, and b) Rudder Pressure Reducer System is verified to operate normally. (M)(O) May be inoperative provided yaw damper is deactivated.
4. Autothrottle System	C	1	0	May be inoperative provided approach minimums do not require its use. NOTE: Refer to Maintenance Note in DDG 22-4.
5. Mach Trim Systems	C	2	0	(M)(O) May be inoperative provided: a) AFM limitations are observed, and b) Mach trim actuator is verified to be in the null/uncommanded

	C	2	1	elevator position. (O) One may be inoperative provided: a) Remaining Mach trim system is verified to operate normally, and b) Mach trim fail light operates normally.
6. SP-177 / SP-300 Flight and Approach Mode Annunciations 1) SP-177/SP-300 ANNUNCIATOR PANELS	C	-	0	Individual mode annunciations may be inoperative provided associated system modes are not used. NOTE: Refer to Operations Note in DDG 22-6.
	C	2	1	One may be inoperative provided: a) The engaged system (AP, FD, AT or FMCS) is at the pilot position with the operative mode annunciator, and b) Approach minimums do not require their use.
	C	2	0	May be inoperative provided associated systems are not used. NOTE: FMCS data on CDU may be valid when FMC annunciator is inoperative.
7. Dual Angle of Attack Sensors/ Stall Warning System Sensors/ Alpha Vanes 1) SP-177 2) SP-300	C	2	1	NOTE: Refer to Operations Note in DDG 22-7. (M) Right sensor/vane may be inoperative provided: a) Autopilot B is restricted to CWS, and b) Systems affected by the inoperative sensor/vane are deactivated or turned off, and their MEL provisions observed.

	C	2	1	(M) Left or right sensor/vane may be inoperative provided: a) Associated autopilot channel is restricted to CWS, and b) Systems affected by the inoperative sensor/vane are deactivated or turned off, and their MEL provisions observed.
8. Autothrottle Disengage Lights	C	2	1	NOTE: Refer to Operations Note in DDG 22-8. One may be inoperative when autothrottle is used provided approach minimums do not require their use.
	C	2	0	May be inoperative provided autothrottle is not used.
9. Speed Trim Fail Light System	C	1	0	(M) May be inoperative provided speed trim system is verified to operate normally.
10. Speed Trim System	C	2	1	(O) One may be inoperative provided: a) Remaining speed trim system operates normally, and b) Speed trim fail light operates normally.
11. STAB OUT OF TRIM Light	B	1	0	(O) Except for ER operations, may be inoperative provided autopilots are not used.
14. Mode Control Panel Selectors				
1) V/S Selector (DOWN, UP)	C	1	0	May be inoperative provided procedures do not require its use.
2) Bank Angle Selector (10,15,20,25,30)	C	1	0	
15. Mode Control				NOTE: Refer to Maintenance Note in

Panel Switches/ Paddles/Lights				DDG 22-15. All affected switches must be placarded.
1) A/P CWS Engage Switches	C	2	0	
2) A/P CMD Engage Switches	C	2	1	
	B	2	0	(O) Except for ER operations, may be inoperative provided autopilots are not used.
3) a) Autothrottle Arm Switch	C	1	0	May be inoperative provided approach minimums do not require autothrottle use.
b) Autothrottle Indicator Light	C	1	0	(M) May be inoperative provided autothrottle operates properly. See DDG 22-15.
4) A/T SPEED Switch	C	1	0	May be inoperative provided approach minimums do not require autothrottle use.
5) F/D Switches	C	2	0	May be inoperative provided approach minimums do not require flight director use.
6) IAS/MACH Change Over Switch	C	1	0	
7) APP Switch	C	1	0	May be inoperative provided approach minimums do not require use of autopilot or flight director.
8) N1, LNAV, VNAV, LVL CHG, V/S, HDG SEL, ALT HOLD, and VOR/LOC Switches	C	8	0	May be inoperative provided en-route operations do not require their use.
9) SPD INTV, PDC and ALT INTV Switches	C	3	0	
16. Mode Control Panel Windows				

1) (EFIS)				
a) Airspeed (IAS/MACH)	C	1	0	May be inoperative and associated selector used provided selected airspeed indications operate normally.
b) Heading (HEADING)	C	1	0	May be inoperative and associated selector used provided selected heading indications operate normally.
c) Vertical Speed (VERT SPEED)	C	1	0	May be inoperative provided procedures do not require its use.
f) Course (COURSE)	C	2	0	May be inoperative and associated selector used provided selected course indications operate normally.
g) Window Lighting	B	1	0	May be inoperative provided: a) Selected airspeed indications operate normally, b) Selected heading indications operate normally, c) Selected vertical speed indications operate normally, and d) Selected altitude indications operate normally. e) Selected course indications operate normally.
17. Takeoff/Go-Around (TO/GA) Switches	C	2	1	One may be inoperative provided approach minimums do not require its use.
	C	2	0	May be inoperative provided: a) Both thrust levers are operated manually for takeoff, and b) Autopilot and Flight Director are not used below Minimum Descent Altitude or 500 feet, whichever is higher.

				NOTE: Flight director go-around and windshear guidance are not available with both TO/GA switches inoperative.
18. Mode Control Panel Switch Lights				
1) Autopilot Engage Switch Lights	C	2	1	
a) CWS	C	2	0	
b) CMD	C	2	1	
	B	2	0	Both switch lights may be inoperative provided autopilot CMD engage switches are considered inoperative.
2) Mode Selector Switch Lights	C	-	0	
19. Thrust Mode Annunciator/Thrust Mode Display	C	1	0	May be inoperative provided thrust mode limits are observed.
20. Automatic Landing System				
1) Fail Passive	C	1	0	May be inoperative provided approach minimums do not require its use.

23 COMMUNICATIONS

23-1 Flight Deck Speaker System

23-2 Passenger Address System (O)(SP)

23-3 Communication Systems

23-4 Crewmember Interphone System (O)(SP)

23-5 Cabin Attendant(s) Inter-Cabin Phone System (Incorporated into MEL 23-4)

23-6 Selective Call System (SELCAL)

23-7 Flight Interphone System (Incorporated into MEL 23-4 and MEL 25-11)

23-8 Forward Observer's Audio Selector Panel (Incorporated into MEL 25-11)

23-9 ACARS System

23-10 Cockpit Voice Recorder System (CVR)

23-11 High Frequency (HF) Communication System

23-12 Emergency Locator Transmitter (ELT)

23-13 Flight Crew Audio Selector/Control Panels (O)

23-14 Headsets/Headphones

23-16 Push-To-Talk (PTT) Switches (M)

23-17 Flight Deck Hand Microphones

23-19 Alerting System (Audio/Visual)

23-20 Handset Systems (O)(SP)

23-21 Cockpit Door/Aircraft Cabin Surveillance Systems (O)

23 COMMUNICATIONS

1. Systems & Sequence Number	2. Category			
	3. Number Installed			
	4. Number Required For Despatch			
	5. Remarks or Exceptions			
Item				
23 COMMUNICATIONS				
1. Flight Deck Speaker System	C	1	0	May be inoperative provided: a) Procedures do not require its use, and b) Headset earphones or headphones associated with inoperative speaker(s) are installed and operate normally.
2. Passenger Address System	B	1	0	(O)(SP) May be inoperative provided: a) Alternate, normal and emergency procedures and/or operating restrictions are established and used, and b) Flight attendant Cabin Crew alerting system (audio and visual) MEL 23-19 (b), (c) operates normally, and c) Crewmember Interphone System MEL 23-4 (a), (b) operates normally NOTE: Any station that operates normally may be used.
a) Lavatory Speakers	C	2	0	(O) May be inoperative provided alternate procedures are established and used.
b) Cabin Speakers	C			May be inoperative provided inoperative speakers are not adjacent to each other.

3. Communication Systems (VHF) YL-BBA, BBB, BBD, BBE YL-BBF, BBG, BBH 1) VHF Comm Control Panels a) Frequency Transfer Light b) Frequency Transfer Switch c) Frequency Selector Knob d) Frequency Indication	C	3	2	VHF 1 must be operative. NOTE 1: In case of failure VHF#2, VHF#3 should be used for voice communication, tuned by ACARS. Refer to OM-B 12.5.2 "Use of the ACARS VHF (VHF#3) for communication". NOTE 2: VHF#3 does not have 8.33 kHz channel spacing capability. Only aircraft equipped with at least two sets of 8.33 kHz radios are allowed to operate in the ICAO European Region above FL245. NOTE 3: Refer to DDG 23-3 for Maintenance Note.
	C	2	2	
	C	2	1	One side of the VHF Comm Control Panel tuning function may be inoperative provided: a) Associated transceiver can be tuned from the opposite side of the control panel, and b) Associated transceiver operates normally.
	C	2	0	
	C	2	0	May be inoperative provided associated VHF active frequency can be selected.
	C	4	2	
4. Crewmember Interphone System				

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a) Flight Deck to Cabin, Cabin to Flight Deck	B	2	1	(O)(SP) May be inoperative provided: a) Flight deck to cabin and cabin to flight deck interphone functions operate normally on forward station, and b) PA system MEL 23-2 operates normally, and c) Alternate communication procedures between the affected Cabin Crew station(s) are established and used. NOTE: Any station that operates normally may be used.
b) Cabin to Cabin Station(s)	B	2	0	(O) May be inoperative provided alternate communication procedures between affected Cabin Crew station(s) are established and used. NOTE: Any station function(s) that operate normally may be used.
c) Flight Deck to Ground Function (Includes CALL functions)	C	1	0	(O) May be inoperative provided alternate procedures are established and used.
	D	1	0	May be inoperative provided procedures do not require its use.
5. Cabin Crew Inter-Cabin Phone System				Relief incorporated into MEL 23-4.
6. Selective Call System (SELCAL)	C	1	0	May be inoperative provided alternate procedures are established and used.

1) Channels	D	1	0	May be inoperative provided procedures do not require its use.
	C	-	0	May be inoperative provided alternate procedures are established and used.
	C	-	0	May be inoperative provided procedures do not require its use.
7. Flight Interphone System				
1) Flight Deck Intercom				Relief incorporated into MEL 25-11.
2) Flight Deck to Ground				Relief incorporated into MEL 23-4.
8. Forward Observer's Audio Selector Panel				
				Relief incorporated into MEL 25-11.
9. ACARS System				
	D	1	0	May be inoperative provided procedures do not require its use.
1) ACARS Printer	D	1	0	NOTE: Any portion of the system that operates normally may be used.
2) FMC Interface Function	D	-	0	
				May be inoperative provided procedures do not require its use.
				NOTE: Any portion of the system that operates normally may be used.
10. Cockpit Voice Recorder System (CVR)				
	A	1	0	May be inoperative provided:
				a) It is not reasonably practicable to repair or replace the cockpit voice recorder before the commencement of the flight, and

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				b) The aeroplane does not exceed 8 further consecutive flights with the cockpit voice recorder unserviceable, and c) Not more than 72 hours have elapsed since the cockpit voice recorder was found to be unserviceable, and d) Any flight data recorder required to be carried is operative
11. High Frequency (HF) Communication System	D	1	0	
12. Emergency Locator Transmitter (ELT)	A	-	0	May be inoperative provided repairs are made within 6 further flights or 25 flying hours, whichever occurs first.
13. Flight Crew Audio Selector/ Control Panels	A	2	1	(O) Either the Captain's or the First Officer's audio control panel may be inoperative provided: a) The optional AUDIO transfer switch is installed and operates normally, b) The primary observer's audio control panel is located on the aft electronics panel and operates normally, and c) Repairs are made within two flight days. NOTE: See MEL Item 25-11 for the Primary Observer's Audio Selector/Control Panel.
1) AUDIO Transfer Switch	C	1	0	
14. Headsets/Headphones				
1) Headset Boom Microphones				

a) Cockpit Voice Recorder Equipped to Record Boom Microphone	A	3	0	May be inoperative provided: a) Flight Data Recorder (FDR) operates normally, b) Associated hand microphone is installed and operates normally, and c) Repairs are made within three flight days.
2) Headset Earphones / Headphones	C	3	1	Either Captain's or First Officer's headset earphones/headphones may be inoperative provided associated flight deck speaker operates normally.
16. Push-To-Talk (PTT) Switches				
1) Control Wheel PTT Switches	C	2	1	(M) One may be inoperative provided: a) Associated Audio Selector Panel PTT switch operates normally, and b) Affected switch is deactivated open.
2) Flight Crew Audio Selector Panel PTT Switches	C	2	1	(M) One may be inoperative provided: a) Associated Control Wheel PTT switch operates normally, and b) Affected switch is verified failed open.
3) Glareshield Panel PTT Switch	C	1	0	(M) One may be inoperative provided affected switch is verified failed open or is deactivated.
	D	1	0	(M) May be inoperative provided: a) Affected switch is either verified failed pen or is deactivated, and

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				b) Procedures do not require its use.
17. Flight Deck Hand Microphones	C	4	0	May be inoperative or missing provided associated boom microphone operates normally.
	D	4	2	Any in excess of those required for each person on flight deck duty may be inoperative or missing.
19. Alerting System (Audio/Visual)				
a) Flight Deck Call Visual Alerting System	B	1	0	May be inoperative provided the flight deck audio alerting system operates normally. NOTE: The flight deck audio alerting system must always be operative.
b) Cabin Crew Visual Alerting System	B	1	0	(O) May be inoperative provided: a) PA system operates normally, b) If affected visual alerting system is used for lavatory smoke detector alerting, an alternate lavatory smoke detector alert (visual or audio) is installed and operates normally, and c) Alternate procedures for contacting Cabin Crew are established and used. NOTE 1: Passenger to Cabin Crew Call System is considered a passenger convenience item. NOTE 2: Any visual alerting system function(s) that operates normally may be used.
c) Cabin Crew Audio Alerting System	B	1	0	(O) May be inoperative provided: a) PA system operates normally, b) If affected audio alerting system is used for lavatory

				smoke detector alerting, an alternate lavatory smoke detector alert (audio or visual) is installed and operates normally, and c) Alternate procedures for contacting Cabin Crew are established and used. NOTE 1: Passenger to Cabin Crew Call System is considered a passenger convenience item. NOTE 2: Any audio alerting system function(s) that operates normally may be used.
20. Handset Systems a) Flight Deck b) Cabin	D B	1 2	0 1	(O)(SP) May be inoperative provided: a) The handsets at the forward Flight Attendant station operates normally, and b) PA system MEL 23-2 operates normally, and c) Alternate communication procedures between the affected flight attendant station(s) are established and used. NOTE 1: An operative handset at an inoperative flight attendant seat shall be counted as inop. NOTE 2: Any handsets functions that operate normally may be used.
21. Cockpit Door/Aircraft Cabin Surveillance Systems	C	1	0	(O) May be inoperative provided: a) A cockpit door viewing lens is available and functional, and b) Alternate procedures are established and used for ensuring the security of the

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				area outside the flight crew compartment door. NOTE: Any portion of the system, which operates normally may be used.
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24 ELECTRICAL POWER

- 24-1** Engine Driven Generator Systems (M)(O)
- 24-2** APU Generator System (M)
- 24-3** Engine Driven Generator LOW OIL PRESSURE/DRIVE Lights
- 24-4** Engine Driven Generator Oil Temperature Indication Systems
- 24-5** Engine Driven Generator HIGH OIL TEMP Lights
- 24-7** Frequency Meter
- 24-8** AC Volts Indication (O)
- 24-9** AC Ammeters
- 24-10** Generator System Annunciator Panel
- 24-11** External Power System
- 24-12** GEN OFF BUS Lights
- 24-13** Galley Load Shed Sensor Module
- 24-17** DC Ammeter Indication (O)
- 24-18** DC Volts Indication (O)
- 24-19** APU GEN OFF BUS Light
- 24-20** Cabin Power Switch (Jet Aviation Engineering Services (JAES))

24 ELECTRICAL POWER

1. Systems & Sequence Number	2. Category			
Item	3. Number Installed			5. Remarks or Exceptions
	4. Number Required For Despatch			
24 ELECTRICAL POWER				
1. Engine Driven Generator Systems	B	2	1	(M)(O) Except for ER operations, may be inoperative provided: a) APU generator operates normally and is used throughout the flight, and b) An APU fuel heater is installed (APU fuel heater is installed on all AirBaltic 737s)
	B	2	1	(M)(O) Except for ER operations, may be inoperative provided: a) APU generator operates normally and is used throughout the flight, and b) Fuel temperature is maintained at or above 0 degrees C.
2. APU Generator System	C	1	0	(M) Except for ER operations, may be inoperative.
3. Engine Driven Generator LOW OIL PRESSURE/DRIVE Lights	C	2	0	May be inoperative provided associated HIGH OIL TEMP light and oil temperature indicator operate normally.
4. Engine Driven Generator Oil Temperature Indicator Systems	C	2	0	May be inoperative provided associated LOW OIL PRESSURE light and HIGH OIL TEMP light operate normally.

5. Engine Driven Generator HIGH OIL TEMP Lights	C	2	0	May be inoperative provided associated LOW OIL PRESSURE light and oil temperature indicator operates normally.
7. Frequency Meter	C	1	0	May be inoperative.
8. AC Volts Indication	B	1	0	(O) May be inoperative except in the STBY PWR position provided the Standby Power Test is accomplished.
1) Residual Voltage Function	C	1	0	
9. AC Ammeters	C	3	0	May be inoperative provided associated generator off bus lights operate normally.
10. Generator System Annunciator Panel	C	1	0	
11. External Power System	C	1	0	NOTE: Any portion of the system, which operates normally may be used.
1) DC Receptacle	D	1	0	
12. GEN OFF BUS Lights	C	2	1	One may be inoperative provided associated generator AC ammeter operates normally. NOTE: Refer to Operational Note in DDG 24-12.
13. Galley Load Shed Sensor Module	C	1	0	May be inoperative provided the GALLEY Power Switch remains OFF when the APU is being used to power both generator busses on the ground.

17. DC Ammeter Indication	B	1	0	(O) May be inoperative provided: a) BAT position operates normally, b) Standby Power Test is accomplished, and c) Procedures do not require its use.
18. DC Volts Indication	B	1	0	(O) May be inoperative except in the STBY PWR position provided the Standby Power Test is accomplished.
19. APU GEN OFF BUS Light	C	1	0	May be inoperative provided: a) APU frequency meter operates normally, and b) APU ammeter operates normally. NOTE: Refer to Operational Note in DDG 24-19.
20. Cabin Power Switch (Jet Aviation Engineering Services, (JAES))	B	1	0	May be inoperative provided procedures are established and used to deactivate cabin power.

25 EQUIPMENT/FURNISHINGS

25-1 Megaphones

25-2 Crewmember Shoulder Harness (Flight Deck) (Incorporated into MEL 25-11)

25-3 Flight Attendant Seat Assembly (Single or Dual Position) (M)(O)(SP)

25-4 Cabin Window Shades

25-5 Cargo Compartment Restraint Components (M)

25-6 Passenger Seat(s) (M)(O)

25-7 Second Observer Seat (Moved to MEL 25-11)

25-9 "Fasten Seat Belts While Seated" Signs or Placards

25-10 Passenger Convenience Item(s)

25-11 Observer Seat(s)

25-12 Emergency Flashlight Holders/Flashlights

25-16 Lower Cargo Compartment Lining Panels (M)(O)

25-17 Emergency Medical Equipment (O)(SP)

25-18 Flotation Equipment (Crew and Passengers)

25-19 Underseat Baggage Restraining Bars (Moved to MEL 25-6)

25-20 Exterior Lavatory Door Ashtrays

25-21 Flight Crew Seats (M)

25-22 Galley/Lavatory Waste Receptacle Access Doors/Covers (M)(O)

25-23 Automatic Cargo Loading Systems

25-24 Overhead Storage Bin(s)/Cabin and Galley Storage (M)

25-60 Escape Slides

25-70 Sun Visors

ATA 25 EQUIPMENT / FURNISHINGS

1. Systems & Sequence Number	2. Category		
	3. Number Installed		
	4. Number Required For Dispatch		
	5. Remarks or Exceptions		
Item			
25 EQUIPMENT / FURNISHINGS			
1. Megaphones	D	2	2
			Any in excess of those required may be inoperative or missing provided: a) Inoperative megaphone is removed from passenger cabin, and b) Required distribution is maintained.
2. Crewmember Shoulder Harness (Flight Deck)			
			Relief incorporated into MEL 25-11.
3. Flight Attendant Seat Assembly (Single or Dual Position)			
1) Required Flight Attendant Seats	B	2	1
			(M) (O)(SP) The aft seat assembly (dual position) may be inoperative provided: a) Affected seat or seat assembly is not occupied, b) Flight attendant(s) displaced by inoperative seat(s) occupies either an adjacent flight attendant seat or the passenger seat which is most accessible to the inoperative seat(s), so as to most effectively perform assigned duties, c) Alternate procedures are established and used, d) Folding type seat stows automatically or is secured in

2) Excess Flight Attendant Seat	C	1	0	the retracted position, and e) Passenger seat assigned to flight attendant is placarded "FOR FLIGHT ATTENDANT ONLY". NOTE 1: An automatic folding seat that will not stow automatically is considered inoperative. NOTE 2: A seat position with an inoperative or missing restraint system is considered inoperative. NOTE 3: One seat of the forward flight attendant seat assembly may be inoperative. NOTE 4: If one side of a dual seat assembly is inoperative and a flight attendant is displaced to the adjacent seat, the adjacent seat must operate normally. NOTE 5: An operative handset at an inoperative flight attendant seat shall be counted as inoperative. Refer to dispatch conditions for MEL 23-20. (M) May be inoperative provided the affected seat position is not occupied. NOTE 1: A seat position with an inoperative or missing restraint system is considered inoperative.
4. Cabin Window Shades	D	94	0	NOTE: Passenger Cabin Window Shades in compartments configured for passengers only are considered a passenger convenience item. Refer to dispatch conditions for MEL 25-10.
5. Cargo Compartment Restraint Components	C	-	-	(M) May be inoperative or missing provided acceptable cargo loading limits from an approved source, i.e. an approved Cargo Loading Manual, Cargo Handling Manual, or Weight and Balance Document are observed. C - - May be inoperative or missing provided associated cargo compartment remains empty.

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	C	-	-	May be inoperative or missing provided pallet with inoperative lock(s) is removed.
6. Passenger Seat(s)	C	12 0	-	(M) May be inoperative provided: a) Seat does not block an Emergency Exit, b) Seat does not restrict any passenger from access to the main aircraft aisle, and c) The affected seat(s) are blocked and placarded "DO NOT OCCUPY". NOTE 1: A seat with an inoperative seat belt is considered inoperative. NOTE 2: Inoperative seat(s) does not affect the required number of Flight Attendants. NOTE 3: Affected seat(s) may include the seat(s) behind and/or adjacent outboard seats.
1) Recline Mechanism	C	-	-	(M) May be inoperative and seat occupied provided seat is secured in the up-right position.
2) Arm Rests	C	-	-	(M) May be inoperative or missing and seat occupied provided: a) Arm rest does not block an Emergency Exit, and b) Armrest does not restrict any passenger from access to the main aircraft aisle. c) For an armrest with a recline mechanism, seat is secured in the upright position.
3) Underseat Baggage Restraining Bars	C	-	-	(O) May be inoperative provided: a) Baggage is not stowed under seat with inoperative restraining bar, b) Associated seat is placarded "DO NOT STOW BAGGAGE"

4) Electrical/ Electronic Systems/ Components	C	-	-	UNDER THIS SEAT", and c) Procedures are established to alert Cabin Crew of inoperative restraining bar. (M) May be inoperative and seat occupied provided associated component(s) is deactivated.
7. Second Observer Seat				Moved to MEL 25-11.
9. "Fasten Seat Belts While Seated" Signs or Placards	C	12	-	One or more signs or placards may be illegible or missing provided a legible sign or placard is visible from each occupied passenger seat.
10. Passenger Convenience Item(s)	D	-	0	Passenger convenience items, as expressed in this MEL, are those related to passenger convenience, comfort or entertainment such as, but not limited to, galley equipment, movie equipment, ash trays, stereo equipment, overhead reading lamps, etc. Items addressed elsewhere in this document shall not be included. NOTE: Exterior lavatory door ash trays are not considered convenience items.
11. Observer Seat(s)				1) Primary Observer's Seat (Including Associated Equipment) A 1 0 May be inoperative provided: a) A passenger seat in the passenger cabin is made available to an CAA inspector for the performance of official duties, and b) Repairs are made within two flight days. A 1 0 May be inoperative provided: a) Second observer's seat is

	A	1	0	available to an CAA inspector for performance of official duties, and b) Repairs are made within two flight days.
2) Second Observer's Seat (Including Associated Equipment)	D	1	0	May be inoperative provided: a) Required minimum safety equipment (safety belt and oxygen) is available, b) Seat is acceptable to an CAA inspector for the performance of official duties, and c) Repairs are made within two flight days. NOTE 1: These provisos are intended to provide for occupancy of the above seats by a CAA inspector when the minimum safety equipment (oxygen and safety belt) is functional and the inspector determines the conditions to be acceptable. NOTE 2: The Pilot-in-Command will determine if the minimum safety equipment is functional for other persons authorized to occupy any observer seat(s).
3) Crotch Straps	C	-	0	NOTE: The Pilot-in Command will Determine, if the minimum safety equipment is functional for other persons authorized to occupy any observer seat(s).
12. Emergency Flashlight Holders/ Flashlights				
1) Cabin	C	-	4	May be inoperative or missing provided the crewmember

2) Flight Deck	C	-	2	assigned to the affected position has a normally operating flashlight readily available. May be inoperative or missing provided the crewmember assigned to the affected position has a normally operating flashlight readily available. NOTE: For Emergency Equipment number and location refer to Part B Ch. 10.
16. Lower Cargo Compartment Lining Panels	C	-	-	(M) (O) May be damaged or missing provided procedures are established and used to ensure the associated compartment remains empty, or is verified to contain only empty cargo handling equipment, ballast (ballast may be loaded in ULDs).
17. Emergency Medical Equipment 1) First Aid Kits (FAK)	A	2	1	(O)(SP) Only one of the required FAKs may be incomplete provided: a) FAK is resealed in a manner that will identify it as a unit that can not be mistaken for a fully serviceable unit, and b) Repairs or replacements are made within 3 flight cycles or maximum 2 flight days which occur earlier. NOTE: For Emergency Equipment number and location refer to Part B Ch. 10.
18. Flotation Equipment (Crew and Passengers)	D	-	-	Any in excess of the minimum required may be missing or inoperative, provided: a) Inoperative equipment is placarded inoperative, removed from the installed

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				location and placed out of sight so it cannot be mistaken for a functional unit, and b) Required distribution of serviceable equipment is maintained. NOTE: For Emergency Equipment number and location refer to Part B Ch. 10.
19. Underseat Baggage Restraining Bars				Moved to MEL 25-6.
20. Exterior Lavatory Door Ashtrays 1) Airplanes With More Than One Exterior Lavatory Door Ashtray Installed 2) Airplanes With Only One Exterior Lavatory Door Ashtray Installed	A	-	-	One may be missing provided it is replaced within 10 calendar days.
	A	1	0	May be missing provided it is replaced within 3 calendar days.
21. Flight Crew Seats				
1) Recline Mechanism	A	2	0	(M) May be inoperative provided: a) Seat is secured in a position acceptable to the affected crewmember, and b) Repairs are made within two flight days.
2) Vertical Adjustment	A	2	0	(M) May be inoperative provided: a) Seat is secured in a position acceptable to the affected crewmember, and b) Repairs are made within two flight days.
3) Armrests	B	4	0	(M) May be inoperative in the up position or removed provided seat is acceptable to the affected crewmember.
4) Lumbar/Thigh	C	4	0	May be inoperative provided seat

Supports				is acceptable to the affected crewmember.
5) Headrests	C	2	0	May be inoperative or missing provided seat is acceptable to the affected crewmember.
22. Galley/Lavatory Waste Receptacle Access Doors / Covers				
1) Galley Waste Receptacle Access Doors/Covers	C	4	0	(M)(O) May be inoperative provided: a) Associated container is empty, b) Container access is secured to prevent waste introduction into the compartment, and c) Procedures are established to ensure that sufficient galley/lavatory waste receptacles are available to accommodate all waste that may be generated on the flight.
2) Lavatory Waste Receptacle Access Doors/Covers	C	2	0	(M)(O) May be inoperative provided: a) Associated container is empty, b) Container access is secured to prevent waste introduction into the compartment, c) Lavatory is used only by crewmembers, and d) Associated lavatory entrance door is locked closed and placarded: INOPERATIVE – DO NOT ENTER. NOTE: These provisions are not intended to prohibit lavatory use or inspection by crewmembers.
23 Automatic Cargo Loading Systems	D	1	0	

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24. Overhead Storage Bin(s)/Cabin and Galley Storage	C	-	-	(M) May be inoperative provided: a) Procedures are established to secure compartment CLOSED, b) Any emergency equipment located in affected compartment is considered inoperative, and c) Affected compartment is not used for storage of any item(s) except for those permanently affixed. NOTE: If no partitions are installed, the entire overhead storage compartment is considered one bin.
60 Escape Slides	A	4	3	One may be inoperative provided the associated door/exit is considered inoperative. Refer to dispatch conditions for MEL 52-23.
70 Sun Visors	C	4	1	May be inoperative provided: a) A sun visor is available for the pilot flying, b) Acceptable to flight crew, and c) Affected Sun Visor is removed or stowed.

26 FIRE PROTECTION

- 26-1** Engine and APU Fire Extinguisher Discharge Lights
- 26-2** Engine Overheat and Fire Detection Systems (O)
- 26-3** Portable Fire Extinguishers (M)
- 26-4** Wheel Well Fire Detection System (M) (O)
- 26-5** APU Fire Extinguisher Discharge Discs (M)
- 26-6** APU Fire Shutoff System
- 26-7** APU Fire Extinguisher System
- 26-8** APU Fire Detection System (O)
- 26-9** Engine/APU Fire Extinguisher Test System (M) (O)
- 26-10** Fire Warning Bell
- 26-12 Wing-Body Overheat Detector System (Left) (O)**
- 26-13 Wing-Body Overheat Detector System (Right) (O)**
- 26-15** Lavatory Fire Extinguisher Systems (M) (O)
- 26-16** Lavatory Smoke Detection Systems (M) (O)
- 26-18** Wing-Body Overheat Test System (M)
- 26-19 Lower Cargo Compartment Fire Detection/Suppression Systems (M) (O)**
- 26-20** Lower Cargo Compartment Fire Extinguisher System (Moved to MEL 26-19)

26 FIRE PROTECTION

1. Systems & Sequence Number	2. Category			
	3. Number Installed			
	4. Number Required For Despatch			
	5. Remarks or Exceptions			
Item				
26 FIRE PROTECTION				
1. Engine and APU Fire Extinguisher Discharge Lights	C	3	0	
2. Engine Overheat and Fire Detection Systems				
2) Dual Loop	C	4	2	(O) Except for ER operations beyond 120 minutes, one loop (A or B) per engine may be inoperative.
3. Portable Fire Extinguishers	D	5	4	(M) Any in excess of those required may be inoperative or missing provided: a) The inoperative fire extinguisher is tagged inoperative, removed from the installed location, and placed out of sight so it can not be mistaken for a functional unit, and b) Required distribution is maintained. NOTE: Halon fire extinguisher on the flight deck, two Halon and one water fire extinguishers in the Passenger Compartment must be operative.
4. Wheel Well Fire Detection System	C	1	0	(M) May be inoperative provided brake temperature monitoring system (BTMS) operates normally.
	C	1	0	(M) (O) May be inoperative provided brakes are inspected and are cool to the touch before

				engine start. NOTE: In case of engine failure after V1, performance is the prime consideration, and the landing gear should be retracted normally until performance penalty with gear down is not a problem. Pilots must consider the possibility of ice accumulation on the gear associated with delayed raising of landing gear or lowering landing gear during winter operations.
5. APU Fire Extinguisher Discharge Discs	C	2	0	(M) Discs may be missing provided indicator reading is checked to verify proper charge.
1) HTL Type	C	2	0	(M) Discs may be missing provided bottle integrity is verified by checking the APU fire extinguisher bottle discharge light or weighing bottle once each flight day.
6. APU Fire Shutoff System	C	1	0	May be inoperative provided APU is not used.
7. APU Fire Extinguisher System	C	1	0	May be inoperative provided APU is not used.
8. APU Fire Detection System				NOTE: Refer to Maintenance Note in DDG 26-8.
1) Single Loop	C	1	0	May be inoperative provided APU is not used.
2) APU DET INOP Light	C	1	0	(O) May be inoperative extinguished provided: a) APU fire detection system operates normally, and A fire warning test is performed before each APU start.
4) External Warning Horn /Warning Light	C	1	0	May be inoperative for ground operation provided the flight deck APU Overheat/Fire Protection

				Panel is continuously monitored.
9. Engine/APU Fire Extinguisher Test System (EXT TEST) (Squib Test)	C	3	0	(M) May be inoperative provided: a) Failure is verified to be in the squib test circuit, and b) Squib circuit is verified to operate normally once each flight day.
1) APU Squib Light	C	1	0	(O) May be inoperative provided APU is not used.
10. Fire Warning Bell				
1) Bell Cutout Switch (Overheat/Fire Protection Panel)	C	1	0	May be inoperative provided: a) Bell cutout function of both Master Fire Warning lights operates normally, and b) Fire Warning Bell operates normally.
2) Bell Cutout Function of Master Fire Warning Light	C	2	1	May be inoperative provided: a) Bell cutout switch operates normally, and b) Fire Warning Bell operates normally.
12. Wing-Body Overheat Detector System (Left)	C	1	0	(O) Except for ER operations, may be inoperative provided: a) Right pack and engine bleed is used for pressurization only, b) Use of the APU is prohibited except for engine start, c) Isolation valve and left engine bleed valve remain closed for all operations except engine start, and d) The airplane is not operated in known or forecast icing conditions. NOTE: Refer to Maintenance Note in

			DDG 26-12.
13. Wing-Body Overheat Detector System (Right)	C	1 0	(O) Except for ER operations, may be inoperative provided: a) Left pack and left engine or APU bleed air is used for pressurization only, b) Isolation valve and right engine bleed valve remain closed for all operations except engine start, and c) Airplane is not operated in known or forecast icing conditions. NOTE: Refer to Maintenance Note in DDG 26-13.
15. Lavatory Fire Extinguisher Systems	C	2 0	For each lavatory, the lavatory fire extinguisher system may be inoperative provided lavatory smoke detector system operates normally.
	C	2 0	(M) (O) For each lavatory, the lavatory fire extinguisher system may be inoperative provided: a) Lavatory waste receptacle remains empty, b) Associated lavatory door is locked closed and placarded, "INOPERATIVE - DO NOT ENTER", and c) Lavatory is used only by crewmembers. NOTE: These provisos are not intended to prohibit lavatory use or inspections by crewmembers.
16. Lavatory Smoke Detection System	C	2 0	(M) (O) For each lavatory, the lavatory smoke detection system may be inoperative provided: a) Lavatory waste receptacle remains empty, b) Associated lavatory door is locked closed and placarded,

1) Lavatory Smoke Detector SELF TEST Switch	C	2	0	"INOPERATIVE - DO NOT ENTER", and c) Lavatory is used only by crewmembers. NOTE: These provisos are not intended to prohibit lavatory use or inspections by crewmembers. (M) May be inoperative provided the associated lavatory smoke detector is verified to operate normally.
18. Wing-Body Overheat Test System 1) Flight Deck Test Feature	C	1	0	(M) May be inoperative provided system integrity is verified by an acceptable procedure once each flight day.
19. Lower Cargo Compartment Fire Detection/Suppression Systems 1) Fwd/Aft Detection Loops 2) Extinguisher Bottles 4) DISCH Light 5) Extinguisher Bottle Pressure Switch	C	1	0	(O) May be inoperative provided procedures are established and used to ensure the associated compartment remains empty, or is verified to contain only empty cargo handling equipment, ballast.
	C	4	2	(O) One loop (A or B) in each compartment may be inoperative provided opposite loop is checked to operate normally.
	C	1	0	(O) May be inoperative provided associated cargo compartment remains empty.
	C	1	0	(M) May be inoperative provided associated extinguisher bottle(s) is verified to have an adequate charge once each flight day.
	C	-	0	(M) May be inoperative provided associated extinguisher bottle(s)

6) EXT Lights (FWD and AFT)	C	2	0	is verified to have an adequate charge once each flight day. (M) May be inoperative provided: a) Failure is verified to be in the squib light circuit, and b) Squib circuit is verified to operate normally once each flight day.
20. Lower Cargo Compartment Fire Extinguisher System				Incorporated into MEL 26-19.

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27 FLIGHT CONTROLS

27-4 Leading Edge Flap/Slat Position Light Systems (M)(O)

27-6 Mach Trim System (Moved to MEL 22-5)

27-7 Auto Speed Brake System (M)(O)

27-8 Flap Load Limiter System

27-9 Control Wheel Trim Switches

27-10 FEEL DIFF PRESS Light (M)

27-11 Auto Slat Fail Light System (M)

27-12 Auto Slat Systems (O)

27-13 Stall Warning Systems (M)(O)

27-19 Rudder Pressure Reducer (RPR) System (M)(O)

27-21 STBY RUD ON light (M)(O)

1. Systems & Sequence Number	2. Category			
	Item	3. Number Installed		
		4. Number Required For Despatch		
		5. Remarks or Exceptions		
27 FLIGHT CONTROLS				
4. Leading Edge Flap/ Slat Position Light Systems	C	2	1	(M) Forward panel lights or annunciator panel may be inoperative. If forward panel lights are inoperative, the annunciator panel must be used to verify proper LED position, and a placard must be installed to indicate proper positions for flap configuration in use.
	C	6	5	(M)(O) Indication lights on the forward panel and in addition indication lights for one leading edge slat on overhead annunciator panel may be inoperative provided: a) Normal operation is verified by the flight crew before each takeoff and landing, b) Maximum speed is limited to 300 KIAS at/below FL 200 or .65 Mach above FL 200, c) All remaining indications on the overhead annunciator panel operate normally, and d) Stall warning operation of both systems is verified to operate normally.
6. Mach Trim System				Moved to Item 22-5.

7. Auto Speed Brake System	C	1	0	(M)(O) May be inoperative provided: a) System is deactivated, and b) Operations are conducted in accordance with AFM.
8. Flap Load Limiter System	C	1	0	May be inoperative provided flaps are not extended beyond Flaps 30.
9. Control Wheel Trim Switch Systems	B	2	1	One may be inoperative on the non-flying pilot's side provided stabilizer trim system operates normally on the flying pilot's side.
10. FEEL DIFF PRESS Light	B	1	0	(M) May be inoperative provided: a) Elevator feel system is verified to operate normally, and b) Verification is repeated each flight day.
11. Auto Slat Fail Light System	C	1	0	(M) May be inoperative provided: a) Auto slat systems are verified to operate normally, and b) Verification is repeated every two flight days.
12. Auto Slat Systems	C	2	1	(O) One system may be inoperative provided: a) Remaining auto slat system is checked to operate normally, and b) Auto slat fail light operates normally. NOTE: Refer to Maintenance Note in DDG 27-12.

13. Stall Warning Systems	C	2	1	(M)(O) One may be inoperative provided the remaining system is verified to operate normally before each departure.
19. Rudder Pressure Reducer (RPR) System	C	1	0	(M)(O) May be inoperative provided: a) The RPR system is deactivated, and b) The RPR valve is verified to provide high pressure output.
21. STBY RUD ON Light	C	1	0	(M)(O) May be inoperative provided: a) Rudder is verified to operate normally on hydraulic systems A and B independently, b) Standby hydraulic pump is verified to operate normally, and c) Rudder force fight monitor is deactivated.

28 FUEL

- 28-1** Fuel Boost Pumps (Main Tanks) (O)
- 28-2** Fuel Boost Pumps (Center Tank) (O)
- 28-3** Fuel Boost Pump Low Pressure Warning Light Systems (O)
- 28-4** APU Fuel Valve (M)
- 28-5** Crossfeed VALVE OPEN Light (M)
- 28-6** Flight Deck Fuel Quantity Indicators (Main Tanks) (M)(O)
- 28-7** Flight Deck Fuel Quantity Indicator (Center Tank) (M)(O)
- 28-8** Fuel Temperature Indicator
- 28-9** Fuel Quantity Totalizer
- 28-10** Pressure Fueling System (M)
- 28-11** Fueling Bay Fuel Cap
- 28-12** Refueling Control Panel Quantity Indicators (M)(O)
- 28-16** Fuel Measuring Sticks/Dripsticks (M)
- 28-17** Fuel Scavenge System (O)
- 28-21** Fuel Quantity Test Switches
- 28-22** FUEL/SPAR VALVE CLOSED Lights (M)
- 28-23** Fuel Summation Unit (FSU) (M)(O)

1. Systems & Sequence Number	2. Category			
	3. Number Installed			
	4. Number Required For Despatch			
	5. Remarks or Exceptions			
Item				
28 FUEL				
1. Fuel Boost Pumps (Main Tanks)				
a) Aft Pumps	C	2	1	(O)One may be inoperative provided: a) Both main tank forward pumps operate normally, b) At start of takeoff, fuel quantity in associated tank is not less than 3,402 kg. , and c) A minimum fuel quantity of 1,134 kg. Is maintained in the associated tank.
b) Forward Pumps	C	2	1	(O)One may be inoperative provided: a) Both main tank aft pumps operate normally, b) At start of takeoff, fuel quantity in associated tank is not less than 2,177 kg. , and c) A minimum fuel quantity of 817 kg. Is maintained in the associated tank. NOTE: Refer to Maintenance Note in DDG 28-1.

2. Fuel Boost Pumps (Center Tank)	C	2	1	May be inoperative provided tank remains empty.
	C	2	1	(O) May be inoperative with center tank fueled provided: a) Fuel quantity remaining in main wing tanks is adequate to reach a suitable airport if remaining center pump fails at any time, b) Zero fuel weight calculations are adjusted by the weight of center tank fuel, c) Effect on airplane balance, in the event fuel cannot be used is accounted for, d) LOW PRESSURE light of operating center fuel tank pump operates normally, and e) Center tank quantity indication operates normally.
	C	2	0	May be inoperative provided: a) Center tank quantity indication operates normally, and b) Center tank remains empty, or zero fuel weight calculations are adjusted by the weight of center tank fuel. NOTE: AFM limitations for fuel loading must be observed. NOTE: Refer to Maintenance Note in DDG 28-2.

3. Fuel Boost Pump Low Pressure Warning Lights				
1) Main Tank Pump Lights	C	4	3	One may be inoperative provided a) Both pumps in associated tank operate normally, and b) Associated tank quantity indicator operates normally.
	C	4	3	May be inoperative for an associated inoperative pump.
2) Center Tank Pump Lights	C	2	0	(O) May be inoperative provided center tank quantity indicator operates normally.
	C	2	0	May be inoperative provided: a) Center tank fuel is not required for the flight, and b) Center tank fuel boost pumps are turned off.
				NOTE: Refer to Maintenance Note in DDG 28-3.
4. APU Fuel Valve	C	1	0	(M) Except for ER operations, may be inoperative provided: a) APU is not used, and b) Valve is deactivated closed.
5. Crossfeed VALVE OPEN Light	C	1	0	(M) Except for ER operations, may be inoperative provided: a) Crossfeed valve is verified to operate normally, and b) Fuel quantity indication for both main tanks operates normally.

6. Flight Deck Fuel Quantity Indicators (Main Tanks)	C	2	1	(M)(O) Except for ER operations, one may be inoperative provided: a) All boost pumps in associated tank operate normally, b) Fuel flow meters operate normally, c) Center tank indicator operates normally, d) Flight crew periodically computes fuel remaining, or checks fuel remaining against a precomputed fuel burn chart, and e) Fuel quantity in the associated main tank is verified by an acceptable procedure.
7. Flight Deck Fuel Quantity Indicator (Center Tank)	C	1	0	(M) May be inoperative provided: a) One center tank boost pump operates normally, and b) Center tank remains empty.
	C	1	0	(O) (M) Except for ER operations, may be inoperative provided: a) Both center tank boost pumps operate normally, and b) Fuel quantity in center tank is verified by an acceptable procedure
8. Fuel Temperature Indicator	C	1	0	May be inoperative provided Total Air Temperature or Ram Air Temperature is substituted as an indication of fuel temperature.
9. Fuel Quantity Totalizer	C	1	0	NOTE: Refer to Operations Note in DDG 28-9.

10. Pressure Fueling System	C	1	0	(M) May be inoperative provided alternate procedures are established and used for refueling.
1) Fueling Manifold Check Valves	C	3	0	(M) May be inoperative provided the associated Fueling Shutoff Valve is verified to operate normally.
2) Fueling Shutoff Valves	C	3	0	(M) May be inoperative closed provided: a) Associated Fueling Manifold Check Valve operates normally, and b) Alternate procedures are established and used for refueling.
3) Refuel Panel Fueling Power Control Switch	C	1	0	May be inoperative provided the refuel panel indicator test switch operates normally in the AUX FUELING POWER CONTROL position or FUEL DOOR SWITCH BYPASS position as applicable.
11. Fueling Bay Fuel Cap	D	1	0	
12. Refueling Control Panel Quantity Indicators	C	3	0	(O) (M) May be inoperative provided fuel quantity is verified by an acceptable procedure.
16. Fuel Measuring Sticks/Dripsticks (FIVE IN EACH MAIN TANK)	C	-	0	(M) May be inoperative or broken/missing provided fuel quantity is determined by other acceptable means.
17. Fuel Scavenge System	C	1	0	May be inoperative with fuel scavenge shutoff valve closed
	C	1	0	(O) May be inoperative with fuel scavenge shutoff valve open provided No. 1 main fuel tank forward boost pump remains off.

	C	1	0	May be inoperative with fuel scavenge shutoff valve open provided center tank remains empty.
21. Fuel Quantity Test Switches 1) Digital System	C	1	0	
22. FUEL/SPAR VALVE CLOSED Lights 1) FUEL VALVE CLOSED light	C	2	0	(M) May be inoperative provided: a) Associated valve is verified to operate normally, and b) Crossfeed VALVE OPEN light operates normally.
23. Fuel Summation Unit (FSU) 1) FMCS (Software Update 7.4 and prior)	C	1	0	(M)(O) May be inoperative provided: a) FMCS functions requiring gross weight are not used, and b) AFDS VNAV mode is not used.
2) FMCS (Software Updates 7.5, 8.5 and 10.x)	C	1	0	(M)(O) May be inoperative provided alternate procedures are established and used.

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29 HYDRAULIC POWER

29-2 System B Pumps

29-3 System Pressure Indications (A and B) (O)

29-4 System A Pump Low Pressure Indication Systems (O)

29-5 System B Pump Low Pressure Indication Systems (O)

29-6 Hydraulic Brake Pressure Indicator (Moved to MEL 32-13)

29-7 System A and B Overheat Lights

29-9 Hydraulic Quantity Low Level Light (Standby System) (M)

29-10 System A Pumps

29-11 System A Quantity Indication (Flight Deck) (M)

29-12 Standby System Low Pressure Light (M)

29-13 Hydraulic Reservoir Pressurization System Sources (M)

29-14 System A Overheat Lights (Incorporated into MEL 29-7)

29-15 System B Quantity Indication (Flight Deck) (M)

29-16 Hydraulic Reservoir Air Pressure Indicator (Wheel Well)

29-17 Hydraulic Reservoir Quantity Indicator (Wheel Well)

29-18 Hydraulic Reservoir Fill System (Wheel Well)

29 HYDRAULIC POWER

1. Systems & Sequence Number	2. Category			
	3. Number Installed			5. Remarks or Exceptions
	4. Number Required For Despatch			
Item				
29 HYDRAULIC POWER				
2. System B Pumps				
2) Engine Driven Hydraulic Pump Depressurization Function	C	1	0	NOTE: For -500 airplanes, to avoid damage to steering components or towing equipment when System B hydraulics is used for steering, install nose gear steering lockout pin in steering depressurization valve when airplane is to be pushed back or towed with engines operating.
3. System Pressure Indications (A and B)	C	2	1	(O) One may be inoperative provided: a) System pressure is checked before each departure, and b) All hydraulic low pressure lights operate normally.
4. System A Pump Low Pressure Indication Systems	C	2	1	(O) One may be inoperative provided the output of the associated pump is checked before each departure. NOTE: Refer to DDG 29-4 for Maintenance Note.
5. System B Pump Low Pressure Indication Systems	C	2	1	(O) One may be inoperative provided the output of the associated pump is checked before each departure. NOTE: Refer to DDG 29-5 for Maintenance Note.
6. Hydraulic Brake Pressure Indicator				Moved to item 32-13.

29 HYDRAULIC POWER

7. System A and B Overheat Lights	C	2	0	May be inoperative provided associated Low Pressure light operates normally.
9. Hydraulic Quantity Low Level Light (Standby System)	C	1	0	(M) May be inoperative provided quantity is verified adequate before each departure.
10. System A Pumps 1) Engine Driven Hydraulic Pump Depressurization Function	C	1	0	NOTE: Refer to DDG 29-10 for Maintenance Note.
11. System A Quantity Indication (Flight Deck)	C	1	0	(M) May be inoperative provided: a) Quantity is verified adequate before each departure, b) System pressure indication operates normally, and c) Pump low pressure lights operate normally.
12. Standby System Low Pressure Light	C	1	0	(M) May be inoperative provided: a) Standby system low quantity light operates normally, b) Output of the standby pump is verified before each departure, and c) Both System B pumps operate normally.
13. Hydraulic Reservoir Pressurization System Sources	C	-	1	(M) May be inoperative provided reservoir can be pressurized.
14. System A Overheat Lights				Incorporated into Item 29-7.

29 HYDRAULIC POWER

15. System B Quantity Indicator (Flight Deck)	C	1	0	(M) May be inoperative provided: a) Quantity is verified adequate before each departure, b) System pressure indication operates normally, and c) Pump low pressure lights operate normally.
16. Hydraulic Reservoir Air Pressure Indicator (Wheel Well)	C	-	0	
17. Hydraulic Reservoir Quantity Indicator (Wheel Well)	C	2	0	
18. Hydraulic Reservoir Fill System (Wheel Well)	C	1	0	

30 ICE AND RAIN PROTECTION

30-1 Wing Anti-Ice Valves (M)(O)

30-2 Wing Anti-Ice Valve Position Lights (M)

30-3 Engine and Nose Cowl Anti-Ice Valves (M)(O)

30-4 Engine and Nose Cowl Anti-Ice Valve Position Lights or TAI Indications (O)

30-5 Pitot/Static Probe Heaters

30-6 Vertical Stabilizer Pitot Heaters (Elevator and Rudder Feel Systems)

30-7 Total Air Temperature Probe Heater (O)

30-8 Angle of Attack Sensor Heater(s)/Stall Warning System Sensor Heater(s)/

Alpha Vane Heater(s)

30-9 Pitot, Pitot/Static and Temperature Probe Heater Lights (M)

30-10 Wing Anti-Ice Duct Overheat System

30-11 Electrically Heated Windshields

30-12 De-Fog System

30-13 Windshield Wiper System(s)

30-14 RainBoe Rain Repellent System

30-15 Windshield Perimeter Heater(s)

30-17 COWL ANTI-ICE Lights (M)(O)

30-18 Alpha Vane Heater Light Systems (M)

30-19 Drain Mast Heaters (M)

1. Systems & Sequence Number Item	2. Category			
	3. Number Installed			
	4. Number Required For Despatch			
	5. Remarks or Exceptions			
30 ICE AND RAIN PROTECTION				
1. Wing Anti-Ice Valves	C	2	0	(M)(O) Except for ER operations beyond 120 minutes, may be inoperative closed provided the airplane is not operated in known or forecast icing conditions.
	C	2	1	(M)(O) One may be inoperative open provided: a) Except for engine start, associated manifold is depressurized when outside temperature is above 10 degrees C, b) Associated engine bleed thrust limits are followed when the manifold is pressurized, and c) Air conditioning and pressurization requirements are followed when one manifold is depressurized.
2. Wing Anti-Ice Valve Position Lights	C	2	0	(M) May be inoperative provided valve is verified to operate normally before operating in known or forecast icing conditions.
3. Engine and Nose Cowl Anti-Ice Valves	C	2	1	(M) One may be inoperative closed provided airplane is not operated in known or forecast icing conditions.
	C	2	1	(M)(O) One may be inoperative locked open provided: a) High Stage Valve is locked

				closed, b) Ambient temperature is below 38 degrees C, c) A minimum of 60% N1 is maintained on the associated engine during flight in icing conditions, d) All thrust rating limits on the affected engine, except Takeoff and Go-Around, are reduced by 0.8% N1, e) En-route climb limited weight is reduced by 2,040 kg, f) At temperatures greater than 10 degrees C, Takeoff and Go-Around thrust limits on the associated engine and takeoff and landing performance limited weights are reduced by: <table> <tr> <th>RATING</th> <th>%N1</th> <th>WEIGHT</th> </tr> <tr> <td>18.5 K</td> <td>0.8</td> <td>1670 kg</td> </tr> <tr> <td>20.0 K</td> <td>0.8</td> <td>1770 kg</td> </tr> <tr> <td>22.0 K</td> <td>0.8</td> <td>1770 kg</td> </tr> <tr> <td>23.5 K</td> <td>1.1</td> <td>2110 kg</td> </tr> </table> g) For temperatures at or below 10 degrees C, base performance limited weights on Engine Anti-Ice ON.	RATING	%N1	WEIGHT	18.5 K	0.8	1670 kg	20.0 K	0.8	1770 kg	22.0 K	0.8	1770 kg	23.5 K	1.1	2110 kg
RATING	%N1	WEIGHT																	
18.5 K	0.8	1670 kg																	
20.0 K	0.8	1770 kg																	
22.0 K	0.8	1770 kg																	
23.5 K	1.1	2110 kg																	
4. Engine and Nose Cowl Anti-Ice Valve Position Lights or TAI Indications	C	2	0	(O) May be inoperative provided valve is verified to operate normally before each departure.															
	C	2	0	May be inoperative provided associated valve is considered inoperative.															
5. Pitot/Static Probe Heaters				NOTE: Refer to DDG 30-5 for Operations Note.															
a) No. 1 Aux	B	1	0	May be inoperative provided:															

Pitot/Static Heater (Right Lower Probe)				a) No.2AuxPitot Static heater operates normally, b) RVSM operations are not conducted, and c) Airplane is not operated in known or forecast icing conditions.
b) No. 2 Aux Pitot/Static Heater (Left Lower Probe)	B	1	0	May be inoperative provided: a) No.1AuxPitot Static heater operates normally, b) RVSM operations are not conducted, and c) Airplane is not operated in known or forecast icing conditions.
	B	1	0	May be inoperative provided: a) No. 1 Aux Pitot Static heater operates normally, and b) Dispatch deviations for associated equipment are observed.
c) Pitot/Static Heaters (Upper Probes)	B	2	1	Pilot's or copilot's may be inoperative for day VMC provided the airplane is not operated in visible moisture, or in known or forecast icing conditions.
6. Vertical Stabilizer Pitot Heaters (Elevator and Rudder Feel Systems)	B	2	1	Except for ER operations beyond 120 minutes, one may be inoperative provided airplane is not operated in known or forecast icing conditions.
7. Total Air Temperature Probe Heater	C	1	0	Except for ER operations beyond 120 minutes, may be inoperative provided airplane is not operated in known or forecast icing conditions.
	C	1	0	(O) May be inoperative provided an

				alternate temperature indicator system is installed and operating normally (i.e., Ram Air or Static Air Temperature).
8. Angle of Attack Sensor Heater(s)/ Stall Warning System Sensor Heater(s)/Alpha Vane Heater(s)	C	2	0	Except for ER operations beyond 120 minutes, may be inoperative provided airplane is not operated in known or forecast icing conditions.
9. Pitot, Pitot/Static and Temperature Probe Heater Lights 2) Amber (Heater Off) Lights a) Pitot and Pitot/Static	B	6	0	(M) Except for ER operations beyond 120 minutes, may be inoperative provided: a) Associated heater function is verified to operate normally, and b) Airplane is not operated in known or forecast icing conditions.
b) Temperature	C	1	0	(M) May be inoperative provided associated heater function is verified to operate normally before each departure.
	C	1	0	May be inoperative provided associated heater is inoperative.
10. Wing Anti-Ice Duct Overheat System 1) Ground Test Feature	C	1	0	

11. Electrically Heated Windshields	C	4	3	Except for ER operations, one No. 1 or No. 2 window heater may be inoperative provided: a) Airplane is not operated in known or forecast icing conditions, b) Windshield de-fog system operates normally, and c) Airspeed is limited to 250 KIAS below 10,000 feet MSL.
	C	4	0	No. 4 and No. 5 window heat may be inoperative provided airspeed is limited to 250 KIAS below 10,000 feet MSL.
	D	2	0	NOTE: Refer to DDG 30-11 for Operations Note.
12. De-Fog System	C	1	0	

13. Windshield Wiper System(s)	C	2	0	May be inoperative provided airplane is not operated in precipitation within 5 nautical miles of the airport of takeoff or intended landing.
	C	2	0	May be inoperative for all flight conditions provided the blade(s) could be positioned in a location that will not obstruct forward vision.
	C	2	0	May be inoperative provided both high-speed functions operate normally.
	C	2	1	One may be inoperative provided associated low speed function operates normally.
	C	2	0	May be inoperative provided both low speed functions operate normally and rain intensity is less than moderate. NOTE: Refer to DDG 30-13 for Maintenance Note.
14. RainBoe Rain Repellent System	D	1	0	
15. Windshield Perimeter Heater(s)	C	2	0	
17. COWL ANTI-ICE Lights	C	2	1	Except for ER operations beyond 120 minutes, one may be inoperative provided airplane is not operated in known or forecast icing conditions.
	C	2	1	(M)(O)One may be inoperative provided the associated cowl anti-ice valve is locked open.

18. Alpha Vane Heater Light Systems	C	2	0	(M) May be inoperative provided associated heater function is verified to operate normally before each departure.
	C	2	0	May be inoperative provided associated heater is inoperative.
19. Drain Mast Heaters	C	2	0	(M) May be inoperative provided water supply to associated components is secured off.

31 INDICATING/RECORDING SYSTEMS

31-1 Clocks

31-2 Flight Data Recorder System (FDR) 0

31-5 Cockpit Voice Recorder (CVR) System (Moved to MEL 23-10)

31-6 AIDS Maintenance Recorder

31-7 Aircraft Condition Monitoring System (ACMS)

31-9 Remote Light Sensor System

31-11 Mechanical Timer

1. Systems & Sequence Number Item	2. Category			
	3. Number Installed			
	4. Number Required For Despatch			
	5. Remarks or Exceptions			
31 INDICATING/ RECORDING				
1. Clocks	C	2	1	One may be inoperative at either the pilot or copilot station.
2. Flight Data Recorder System (FDR)	A	1	0	May be inoperative provided: a) Cockpit Voice Recorder (CVR) operates normally, b) Airplane is not dispatched from Base airports unless: 1. The FDR failure occurs after pushback but prior to takeoff, or 2. The FDR repair was attempted but was not successful. c) In those cases where repair is attempted but not successful, the aircraft may be dispatched on a flight or series of flights until the next designated airport where repair must be accomplished prior to dispatch, and d) Repairs are made within three flight days. NOTE: If individual recording parameters required by JARs are inoperative, the FDR shall be considered inoperative. NOTE: For Maintenance Note refer to DDG 31-2.

5. Cockpit Voice Recorder (CVR) System				Moved to MMEL Item 23-10.
6. AIDS Maintenance Recorder.	D	1	0	
7. Aircraft Condition Monitoring System (ACMS)	D	1	0	NOTE: The Quick Access Recorder (QAR) is considered to be an ACMS component.
9. Remote Light Sensor System	C	1	0	May be inoperative provided all manual display brightness controls operate normally.
31-11 Mechanical Timer	D	1	0	

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32 LANDING GEAR

32-2 Antiskid System (O)

32-3 Parking Brake Valve (M) (O)

32-4 Parking Brake Light (M)

32-6 Landing Gear Warning and Indicating System

32-7 Automatic Brake System (M)

32-8 Rudder Pedal Nose Wheel Steering System (M) (O)

32-10 Alternate Antiskid Valves (M)

32-11 Brake Temperature Monitor System (O)

32-12 Nose Wheel Steering Switch (M)

32-13 Hydraulic Brake Pressure Indicator (M)

32-19 Main Landing Gear Uplock Springs (M) (O)

32 LANDING GEAR

1. Systems & Sequence Number Item	2. Category			
	3. Number Installed			
	4. Number Required For Despatch			
	5. Remarks or Exceptions			
32 LANDING GEAR				
2. Antiskid System	C	1	0	(O) May be inoperative provided operations are conducted in compliance with AFM. NOTE: Refer to Maintenance Note In DDG 32-2.
3. Parking Brake Valve	C	1	0	(M) (O) May be inoperative closed provided operations comply with AFM antiskid inoperative decrements.
4. Parking Brake Light 2) Motor Operated Parking Brake Valve	C	1	0	(M) May be inoperative provided the parking brake shutoff valve is verified to operate normally.
6. Landing Gear Warning and Indicating System - YL-BBA, BBB, BBD, BBE - YL-BBH, BBF, BBG	C	2	2	NOTE: Refer to Notes 1&2 in DDPG 32-6 Either of two other indicating systems (overhead panel system or the viewing system) may be inoperative provided center panel indications operate normally.
	C	3	2	

7. Automatic Brake System	C	1	0	(M) May be inoperative provided system is deactivated and secured.
8. Rudder Pedal Nose Wheel Steering System 1) Rotary Actuator	C	1	0	(M) (O) May be inoperative deactivated in the disengage position provided: a) Operation of associated systems are not affected, and b) All takeoffs and landings are made by the pilot with access to an operating tiller.
10. Alternate Antiskid Valves	C	2	0	(M) May be inoperative provided manual braking capability of alternate brake system is verified on the associated wheels.
11. Brake Temperature Monitor System	C	1	0	(O) May be inoperative provided AFM Maximum Quick Turnaround Weight limitations are observed.
	D	1	0	(O) May be inoperative provided: a) AFM Maximum Quick Turnaround Weight limitations are observed, and b) Procedures are not based on its use.
12. Nose Wheel Steering Switch	C	1	0	(M) May be inoperative provided: a) Nose wheel steering is powered by Hydraulic System A, and b) Landing gear transfer valve is verified to operate normally. NOTE: Refer to DDG 32-12 for Operations Note.

13. Hydraulic Brake Pressure Indicator a) Wheel Well Brake Accumulator Gauge b) Flight Deck HYD BRAKE Indicator	C	1	0	May be inoperative provided Flight Deck brake pressure indicator operates normally.
	C	1	0	(M) May be inoperative provided brake accumulator charge is verified normal once each flight day.
19. Main Landing Gear Uplock Springs.	B	4	3	(M) (O) One spring on one main gear Uplock mechanism may be missing provided landing gear lever remains in the UP position for the duration of flight until gear extension is required.

33 LIGHTS

- 33-1** Cockpit/Flight Deck/Flight Compartment and Instrument Lighting System
- 33-2** Cabin Interior Illumination
- 33-3** Passenger Notice System ("NO SMOKING/FASTEN SEAT BELT/ RETURN TO SEAT") Signs (M)(O)
- 33-4** Lower Cargo Compartment Light Systems (Fwd/Aft)
- 33-5** High Intensity or Strobe Lights System
- 33-6** Anti-Collision Beacons
- 33-7** Wing Illumination Lights (O)
- 33-8** Landing Lights (M)
- 33-9** Taxi Light
- 33-10** Runway Turn Off Lights
- 33-11** **Wing Tip Position Lights**
- 33-14** **Exterior Emergency Lighting System**
- 33-15** **Interior Emergency Exit Lighting System**
- 33-16** System Annunciator Lights, Left and Right (Pilot's Light Shield) (O)
- 33-17** Flight Deck Master Lights Test and Individual Light's Press-To-Test Features (O)
- 33-18** Wheel Well Lights
- 33-19** Floor Proximity Emergency Escape Path Marking System
- 33-20** LOGO Light System
- 33-23** Master Dim System
- 33-25** Service Area Light Systems

33 LIGHTS

1. Systems & Sequence Number	2. Category			
	3. Number Installed			
	4. Number Required For Despatch			
	5. Remarks or Exceptions			
Item				
33 LIGHTS				
1. Cockpit/Flight Deck/Flight Compartment and Instrument Lighting System	C	-	0	One or more may be inoperative for daylight operations.
	C	-	-	Individual lights may be inoperative provided remaining lights are: a) Sufficient to clearly illuminate all required instruments, controls, and other devices for which it is provided, b) Positioned so that direct rays are shielded from flight crew's eyes, and c) Lighting configuration and intensity is acceptable to the flight crew.
2. Cabin Interior Illumination				
1) Passenger Configurations Without Photo-luminescent Emergency Escape Path Marking System	C	-	-	Individual lights may be inoperative provided sufficient lighting remains for cabin crew to perform their duties.
2) Passenger Configurations With Photo luminescent Emergency Escape Path Marking Systems	C	-	-	Individual lights may be inoperative provided: a) Sufficient lighting remains for cabin attendants/cargo couriers to perform their duties, and

				b) Remaining lighting is sufficient to charge the Photo luminescent Emergency Escape Path Marking System. NOTE: Refer to DDG 33-2 for Operations Note.
3. Passenger Notice System ("NO SMOKING/FASTEN SEAT BELT/RETURN TO SEAT") Signs	C	-	-	(M)(O) No passenger seat, cabin crew seat or lavatory may be occupied from which a "No Smoking/ Fasten Seat Belt/Return to Seat" sign is not readily legible and that seat or lavatory must be blocked and placarded - DO NOT OCCUPY.
	C	-	-	(O)"No Smoking/Fasten Seat Belt/Return to Seat" signs may be inoperative and the affected passenger seat(s), cabin crew seat(s) or lavatories may be occupied provided: a) The PA system operates normally and can be clearly heard throughout the cabin during flight, and b) An acceptable procedure is used to notify passengers when seat belts must be fastened, smoking is prohibited, and when passengers should return to cabin from lavatories.
	1) Aural Tone System	C	1	0
4. Lower Cargo Compartment Light Systems (Fwd/Aft)	C	-	0	
1) Light Lens	C	-	0	May be broken/missing provided associated light bulb is removed.

5. High Intensity or Strobe Lights System	C	1	0	
6. Anti-Collision Beacons	C	2	0	May be inoperative for night operations provided wing tip and tail strobe lights operate normally.
	C	2	0	May be inoperative for day operations.
7. Wing Illumination Lights	C	2	0	Both may be inoperative for day operations.
	B	2	0	(O)Both may be inoperative for night operations provided an alternate means is operative and used to illuminate ice accretion on another outside surface visible from the flight deck. OR Airplane is not operated in known or forecast icing conditions.
8. Landing Lights 1) Retractable Light Extend/ Retract Motors	B	4	2	One may be inoperative on each side provided one of the two operating lights is in the fixed position: (a) A taxi light is installed and operates normally, and (b) It is not reasonably practical to repair or replace before departure.
	C	4	0	May be inoperative for day operations.
	C	2	0	(M)May be inoperative provided: a) Light is in the extended position, and b) Light illuminates normally.
	C	2	0	May be inoperative provided the associated light is considered

				inoperative. NOTE: The fuel burn is increased by 1.0% for each extended light. NOTE: Refer to DDG 33-8 for Operations Note.
9. Taxi Light	C	1	0	
10. Runway Turn Off Lights	C	2	0	
11. Wing Tip Position Lights	C	4	0	May be inoperative for day operations
	C	4	2	One or both white wing tip position lights may be inoperative for night operations provided wing tip strobe lights operate normally.
14. Exterior Emergency Lighting System	B	1	0	May be inoperative for day operations.
15. Interior Emergency Exit Lighting System				
3) Advance Technology Interior (ATI) (Aisle Light Assemblies)	C	11	5	Light assemblies installed above the aisle (curved edge of the stowage bins) may be inoperative provided no two adjacent (opposite side) light assemblies are inoperative.
4) Flight Deck Exit Light	C	1	0	May be inoperative for day operations.
16. System Annunciator Lights, Left and Right (Pilot's Light Shield)	C	-	-	(O) One light may be inoperative for an operating system.
	C	-	-	May be inoperative for an associated inoperative system.
17. Flight Deck Master Lights Test and Individual Light's	C	-	-	(O) May be inoperative provided the intended function of associated light(s) is verified once each flight

Press-To-Test Features				day.
18. Wheel Well Lights				
1) Dome Lights	C	3	0	
2) Inspection Flood Lights	C	3	1	Main gear lights may be inoperative for day operations only.
	C	3	0	Lights may be inoperative provided a landing gear indicating system other than the viewer system and independent of the center panel is installed (YL-BBF, BBG, BBH) and operates normally.
				NOTE: Refer to NOTE in DDG 33-18.
19. Floor Proximity Emergency Escape Path Marking System				
1) Incandescent Lighting System	B	38	19	NOTE: Refer to Operations Note in DDG 33-19.
2) Photoluminescent lighting System	B	-	-	NOTE: Refer to Operations Note in DDG 33-19.
20. LOGO Light System	D	1	0	
23. Master Dim System	B	1	0	Dim function may be inoperative provided: a) TEST and BRT functions operate normally, b) Except during light test, switch is placed in BRT, and c) Light intensity is acceptable to the flight crew.

25. Service Area Light Systems (Nose, Electrical Equipment, Air Conditioning, Aft Accessory, APU, Tailcone Compartments, and Fueling Panel)	C	-	0	May be inoperative for day operations.
	D	-	0	

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34 NAVIGATION

34-1 Mach/Airspeed Indications (O)(SP)

34-2 Mach/Airspeed Warning Systems

34-3 Altimeter Vibrators

34-4 Static Air Temperature Indication

34-5 Total Air Temperature Indication

34-7 Standby Horizon Indicator

34-11 Non-Stabilized Magnetic Compass (O)

34-12 Flight Director Systems

34-13 Distance Measuring Equipment Systems (SP)

34-14 Marker Beacon Receiver System

34-15 Weather Radar

34-16 Radio Compass Systems (ADF)

34-17 VHF Navigation Systems (VOR/ILS) (O)

34-18 ATC Transponders and Automatic Altitude Reporting Systems

34-19 Instrument Comparator or Warning System

34-20 Radio Altimeter Systems (M)(O)

34-24 Airspeed Indicators

34-25 Altitude Alerting System (O)

34-26 Terrain Awareness and Warning System (TAWS) (O)

34-29 Speed Command (Fast-Slow) Indicators

34-30 ADI Test

34-31 Speed Cursor Remote Drive

34-32 Instrument Transfer Switching System (O)

34-35 Inertial Reference Systems (IRS) (O)

34-36 Flight Management Computer System (FMCS) (O)

34-38 Pitch Limit Indication (PLI)

34-39 EFIS Speed Tape

34-40 Traffic Collision and Avoidance System (M)(O)

34-42 Radio Magnetic Indicators (RMI)

34-43 Radio Height Alert (SP)

34-48 EFIS Control Panel Map Switches

34-49 Right IRS DC Power Supply System (O)

34 NAVIGATION

1. Systems & Sequence Number	2. Category			
	3. Number Installed			
	4. Number Required For Despatch			
	5. Remarks or Exceptions			
Item				
34 NAVIGATION				
1. Mach/Airspeed Indications				
1) Mach Indications	C	2	1	One may be inoperative provided one Mach/Airspeed warning and Mach trim system operates normally.
	C	2	0	May be inoperative provided: a) Airplane remains at or below FL 230, and b) Airspeed remains at or below 320 KIAS.
2) Airspeed Cursor	A	2	1	(O)(SP) One may be inoperative provided: a) EFIS speed tape is operative on the affected side, and b) Repairs are made within three flight days.
3) External Airspeed Markers (Bugs) (5 per one Airspeed indicator)	C	10	0	(O)(SP) May be inoperative or missing provided, EFIS speed tape is operative on the affected side.
4) Digital Airspeed Readout	C	2	0	
2. Mach/Airspeed Warning Systems				
1) Maximum Operating Speed Indication	C	2	1	One may be inoperative provided the clacker warning system operates normally and is independent from the Mach Indicator.

2) Clacker	C	2	1	One may be inoperative.
	B	2	0	Systems may be inoperative provided: a) Both Mach indicators operate normally, b) 330 KIAS/.76 Mach airspeed limitations are observed, and c) If the Overspeed warning occurs earlier than scheduled during flight, speed must remain below the point at which the warning occurs.
	B	2	0	Systems may be inoperative provided: a) Both Mach indicators operate normally, b) 330 KIAS/.76 Mach airspeed limitations are observed, and c) If the Overspeed warning occurs below .76 Mach, the system must be deactivated by pulling the associated circuit breaker and observe speed limits.
3. Altimeter Vibrators				
1) Servo Pneumatic	C	2	1	One may be inoperative provided: a) Associated air data computer operates normally, b) The stand by altimeter operates normally, c) For Cat 2/3 operations main altimeter must be operative on Captain side. NOTE: Both main altimeters are required to be operative for dispatch into RVSM airspace.

5) Standby Altimeter Vibrator (With Electric/Electronic Altimeter)	C	1	0	May be inoperative provided: a) VMC exist at departure and arrival airports, b) Both main altimeters are operative, c) No Cat 2/3 approaches shall be made.
4. Static Air Temperature Indication	D	1	0	
5. Total Air Temperature Indication	C	1	0	May be inoperative provided an alternate air temperature indication (e.g., FMCS, RAT, and SAT) operates normally. NOTE: Refer to Operations Note in DDG 34-5.
7. Standby Horizon Indicator				
1) Standby Attitude Indicator	B	1	0	May be inoperative provided: a) Operations are conducted in Day VMC only, and b) Operations are not conducted into known or forecast VFR-on-top conditions, and c) Both pilots have attitude information on attitude indicators from independent sources (IRS's).
2) ILS Indication	D	1	0	
11. Non-Stabilized Magnetic Compass	B	1	0	(O) May be inoperative provided: a) Any combination of both (IRU) stabilized compass systems are operative, and b) Airplane is operated with dual independent navigation capability and under positive

				radar control by ATC on the enroute portion of the flight.
12. Flight Director Systems	C	2	0	May be inoperative provided no CAT 2/3 approaches shall be made.
13. Distance Measuring Equipment Systems	B	2	1	(SP) NOTE 1: Inoperative DME affects the dispatch conditions with VOR inoperative. Refer to MEL 34-17. NOTE 2: Refer to Maintenance Note in DDPG 34-13.
14. Marker Beacon Receiver System	B	1	0	May be inoperative, provided approach procedures do not require marker fixes.
15. Weather Radar	C	1	0	May be inoperative provided the weather reports or forecasts available to the commander indicate that cumulo-nimbus clouds or other potentially hazardous weather conditions, which could be detected by the system(s) when in working order, are unlikely to be encountered on the intended route or any planned diversion therefrom.
3) Stabilization Function	C	1	0	May be inoperative provided: a) Manual tilt control operates normally, and b) Antenna is verified to scan in a horizontal plane with the tilt at zero degrees.
4) WXR/TERR switch (EFIS control panel)	C	2	1	One shall be operative provided outside Weather Radar Display select switch is operative.
5) Weather Radar Display select switch (Captain/First officer	C	2	1	One shall be operative provided outside WXR/TERR switch is operative.

instrument panel)				
16. Radio Compass Systems (ADF)	B	2	0	One or more may be inoperative provided: a) FMC is operative if the route flown is based upon ADF signals, and b) Operational procedures (SID, STAR, Approach etc.) do not require their use. NOTE: Inoperative ADF affects the dispatch conditions with VOR inoperative. Refer to MEL 34-17.
17. VHF Navigation Systems (VOR/ILS)	C	2	1	VOR#2 may be INOP provided: 1) Both ADF (where required) and both DME are operative, and 2) LP is PF if approach is based upon VOR signals.
	B	2	0	Both ILS may be inoperative provided the approach procedure at departure, destination and alternate airports is not dependent on its use. Note: Both ILS required for CAT 2/3 operations
1) Auto Tune Function	C	2	0	(O) May be inoperative provided: a) En-route or approach procedures do not require its use, and b) Manual tuning operates normally.
2) Equipment Cooling Fan	B	2	0	
18. ATC Transponders and Automatic Altitude Reporting Systems	C	2	1	One may be inoperative
	A	2	0	May be inoperative provided agreement can be obtained from all ATC authorities along the route or any planned diversion, to a

				place where repairs can be made. NOTE 1: This system is required to be operative for RVSM operations. NOTE 2: Altitude reporting, provided by an ATC Transponder, is required for TCAS operation. Refer to MEL 34-40 for flight with TCAS inoperative.
19. Instrument Comparator or Warning System	C	-	0	May be inoperative provided no CAT 2/3 approaches shall be made. NOTE: Refer to Maintenance Note in DDG 34-19.
20. Radio Altimeter Systems 1) Receiver/ Transmitters	C	2	1	(M)(O) One may be inoperative deactivated provided: a) No CAT 2/3 approaches shall be made. b) GPWS operates normally.
	A	2	1	(M)(O) One may be inoperative deactivated provided: a) No CAT 2/3 approaches shall be made. b) Repairs are made within two flight days.
2) Indications	C	2	0	(M)(O) May be inoperative provided: a) Associated receiver/ transmitter is verified to operate normally, and b) No CAT 2/3 approaches shall be made.
24. Airspeed Indicators	C	2	1	One may be inoperative provided: a) EFIS Speed Tape displays are installed and operate normally,

				and b) One Mach/Airspeed warning operates normally
25. Altitude Alerting System	A	1	0	(O) May be inoperative provided: a) Autopilot with altitude hold is operative, b) No RVSM operations are conducted, and c) Repairs are made within three flight days.
26. Terrain Awareness and Warning System (TAWS)				
1) Ground Proximity Warning System (GPWS)	A	1	0	(O) May be inoperative provided repairs or replacements are carried out within 6 further flights or 25 flying hours or 2 calendar days, whichever occurs first. NOTE: If any of the Terrain Avoidance Modes 1-4 or the Test Mode are inoperative, then the GPWS is considered inoperative.
a) Modes 1 thru 4	A	4	0	(O) May be inoperative provided: a) GPWS is considered inoperative, and b) Repairs or replacements are carried out within 6 further flights or 25 flying hours or 2 calendar days, whichever occurs first.
b) Test Mode	A	1	0	(O) May be inoperative provided: a) GPWS is considered inoperative, and b) Repairs or replacements are carried out within 6 further flights or 25 flying hours or 2 calendar days, whichever occurs first.

c) Glideslope Deviation (Mode5)	B	2	0	
	C	2	1	
d) Advisory Callouts	B	-	0	(O) May be inoperative provided alternate procedures are established and used.
e) Windshear Warning and Flight Guidance Mode (Reactive)	B	1	0	(O) May be inoperative provided alternate procedures are established and used.
2) Terrain System – Forward Looking Terrain Avoidance (FLTA) and Premature Descent Alert (PDA) Functions	A	1	0	(O) May be inoperative provided; a) The GPWS functions are operative, and b) Repairs or replacements are carried out within 10 calendar days.
	A	1	0	(O) May be inoperative provided repairs or replacements are carried out within 6 further flights or 25 flying hours or 2 calendar days, whichever occurs first.
3) Terrain Displays Functions	C	2	1	
	B	2	0	
29. Speed Command (Fast-Slow) Indicators	C	2	0	
30. ADI Test	C	2	0	
31. Speed Cursor Remote Drive	C	1	0	
32. Instrument Transfer Switching System	C	1	0	(O) May be inoperative provided: a) Associated instruments operate normally from isolated sources, and b) Inoperative switches are not

				moved during flight.
35. Inertial Reference System(s) (IRS) 1) IRS Data Display (Aft Overhead Panel) 2) IRS Ground Crew Call Horn	B C C	2 1 1 1	1 0 0	(O) Except for ER operations, one may be inoperative provided: a) Remaining IRS operates normally and is used for both Attitude Indications and both HSIs, b) Flight is restricted to day VMC, c) Standby Magnetic Compass operates normally, d) Standby Horizon Indicator operates normally, e) Both Vertical Speed Indications are switched to remaining IRS, if required, and f) Autopilots (any mode) are not used. Note: Both must be operative for CAT 2/3 approaches. May be inoperative provided one FMCS CDU operates normally.
36. Flight Management Computer System (FMS) Consist of: FMC CDU or ANCDU IRS or IRS + ANS EHSI 1) FMC Alert Lights	 C C C	 2 2 2	 1 1 0	(O) Refer to Maintenance Note in DDG 34-36. One may be inoperative provided the FMC is not used for autopilot guidance during the approach. May be inoperative provided the

2) Flight Management Computer FMC YL-BBD, BBE BBG, BBF, BBH	A	1	0	FMC is not used for autopilot guidance.
Computer FMC(*) YL-BBA, BBB	C	1	0	<u>May be inoperative provided:</u> a) The aircraft can make one flight to proceed to a place where repairs can be accomplished, and b) Routing is planned via ground based navigation aids taking into account of promulgated range, and c) Permission has been granted from ATC authorities along the route or any planned diversion. <i>See DDG/ Navigation 9.2.34-36</i>
YL-BBD, BBE BBG, BBF, BBH	C	1	0	<u>May be inoperative provided:</u> a) (*) The aircraft can make <u>flights</u> only for a maximum of 2 hours from the last alignment / position update performed on the ground to the point along the route from which arrival procedure starts based on conventional navigation facilities or radar vectors provided by ATS <i>See DDG/ Navigation 9.2.34-36</i>
	C	1	0	<u>May be inoperative provided:</u> a) Flight is conducted within airspace in which the navigation performance of aircraft not requires an approval for Basic RNAV operations stated in AIP (or their equivalent) along the route or any planned diversion, and b) This navigation performance assumes the necessary coverage provided by ground

				based navigation aids available for intended route to be flown.
3) CDU/MCDU	C	2	1	<u>May be inoperative provided:</u> IRS data display unit (on aft overhead panel) operates normally.
4) Alternate Navigation Control Display Unit (ANCDU) YL-BBA, BBB	C	2	0	May be inoperative provided: IRS data display (on aft overhead panel) operates normally
5) Navigation Databases	C	1	0	(O)May be out of currency provided: a) Current Aeronautical Charts are used to verify Navigation Fixes prior to dispatch, b) Status and suitability of Navigation Facilities used to define route of flight are verified, and c) Approach Navigation Radios are manually tuned and identified.
38. Pitch Limit Indication (PLI)	C	2	0	
39. EFIS Speed Tape	C	2	0	May be inoperative provided airspeed indicators are operating normally at each pilot's station. NOTE: At least three External Airspeed Markers (Bugs) on the affected side shall be operative.
40. Traffic Collision and Avoidance System (TCAS)	A	1	0	(M) May be inoperative provided the system is deactivated and secured, and repairs or replacements are carried out within

1) Combined Traffic Alert (TA) and Resolution Advisory (RA) Dual Display	C	2	1	5 calendar days. May be inoperative on the non-flying pilot side provided: a) TA and RA elements and audio functions are operative on flying pilot side, and b) TA and RA display indications are visible to the non-flying pilot.
2) Resolution Advisory (RA) Display System(s)	C	2	1	One may be inoperative on the non-flying pilot side.
	C	2	0	(O) One or more may be inoperative provided: a) All Traffic Alert (TA) display elements and voice command audio functions are operative, and b) TA only mode is selected by the crew.
3) Traffic Alert (TA) Display System(s)	C	2	0	(O) One or more may be inoperative provided all installed RA display and audio functions are operative.
42. Radio Magnetic Indicators (RMI)	C	2	1	
43. Radio Height Alert	C	2	0	(SP) Note 1: No CAT 2/3 approaches shall be made if Decision Height indication(s) on EADI(s) are inoperative. Note 2: Callout "Minimum" at pre-selected DH is a part of GPWS. Refer to MEL 34-26 (1)(d)
1) Decision Height setting a) Decision Height Reference Indicator on EFIS	C	2	0	May be inoperative provided Decision Height indication on the inside EADI is used

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control panel b) Decision Height selector	C	2	0	to pre-select DH. May be inoperative provided no cat 2/3 approaches are made.
48. EFIS Control Panel Map Switches				
a) VOR/ADF	C	2	1	
b) NAV AID	C	2	1	
c) ARPT	C	2	1	
d) RTE DATA	C	2	1	
e) WPT	C	2	1	
49. Right IRS DC Power Supply System	B	1	0	(O) May be inoperative provided: a) Remaining IRS Mode Selector Unit lights are not illuminated, and b) Autopilot dual channel mode is not used during approach.

35 OXYGEN

35-2 Passenger Service Units (PSUs) (M)(O)

35-3 Oxygen Pressure Indicators (M)(O)

35-4 Portable Oxygen Dispensing Units (Bottle and Mask) (M)

35-5 Passenger Oxygen System (M)(O)

35-6 PBE Smoke Hoods

35 OXYGEN

1. Systems & Sequence Number	2. Category			
	3. Number Installed			
	4. Number Required For Despatch			
	5. Remarks or Exceptions			
Item				
35 OXYGEN				
2. Passenger Service Units PSUs)	B	-	-	(M) May be inoperative provided: a) Associated seats are blocked and placarded to prevent occupancy, and b) Units operate normally for all usable lavatory and flight attendant locations.
1) Automatic Presentation	C	1	0	(M)(O) May be inoperative provided: a) Alternate deployment system is verified to operate normally, and b) Airplane remains at or below FL 300.
2) Door Latches	B	-	-	(M) Automatic opening feature of the door latch(es) may be inoperative unlatched, and taped closed provided: a) PSU oxygen system operates normally, b) Flight remains at or below FL 250, and c) Passenger(s) occupying the seat(s) with the inoperative door latch(es) are briefed on oxygen mask procedure.
3. Oxygen Pressure Indicators				
1) Flight Deck Crew Oxygen Indicator	C	1	0	(M)May be inoperative provided an alternate procedure is used to verify that oxygen supply is above minimum requirements for dispatch.

2) External Service Panel Crew Oxygen Indicator	C	1	0	(M) May be inoperative provided an alternate procedure is used to verify that oxygen supply is above minimum requirements for dispatch.
5) Overpressure Discharge Indication Disk	C	1	0	(O) May be damaged or missing.
4. Portable Oxygen Dispensing Units (Bottle and Mask)	D	5	3	(M) Any in excess of those required may be unserviceable or missing provided: a) Required distribution of serviceable bottles is maintained throughout aircraft, and b) Bottles not properly serviced are replaced, serviced or removed at the next available maintenance facility. Note 1: 120 ltr. and one 310 ltr. oxygen bottles may be inoperative. Note 2: For Emergency Equipment number and location refer to Part B Ch. 10.
5. Passenger Oxygen System	B	1	0	(M)(O) May be inoperative provided: a) Flight is not conducted where the minimum en-route altitude is above 14,000 feet MSL, b) Both air conditioning packs operate normally, c) Remaining components of the pressurization system operate normally, d) Airplane remains at or below FL 250, e) Portable oxygen units are provided for 10% of the passengers, and f) Passengers are appropriately briefed.

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	B	1	0	May be inoperative provided flight is conducted at or below 10,000 feet MSL
6. PBE Smoke Hoods	D	4	4	

36 PNEUMATIC

36-1 Manifold Isolation Shutoff Valve (M)

36-2 Ground Pneumatic Connector Check Valve (M)

36-3 Pre-cooler Control Valves (M) (O)

36-4 Pneumatic Pressure Indication Systems (O)

36-5 Engine Bleed Air Shutoff Valves (PRSOV) (M) (O)

36-6 Dual Bleed Light System (O)

36-8 Engine Bleed Trip Off Lights (O)

36-9 High Stage Valves (M)

1. Systems & Sequence Number Item	2. Category			
	3. Number Installed			
	4. Number Required For Despatch			
	5. Remarks or Exceptions			
36 PNEUMATIC				
1. Manifold Isolation Shutoff Valve	C	1	0	(M)May be inoperative provided: a) Modified Main Engine Controls or production equivalent have been installed, b) Valve remains closed except for engine start, and c) Airplane is not operated in known or forecast icing conditions.
2. Ground Pneumatic Connector Check Valve	C	1	0	(M)Except for ER operations beyond 120 minutes, may be inoperative open provided: a) Right pneumatic manifold remains depressurized after starting the right engine, b) Airplane is not operated in known or forecast icing conditions, and c) Altitude remains at or below FL 250.
	C	1	0	May be inoperative closed. NOTE: Refer to DDG 36-2 for Operations Note.

3. Pre-cooler Control Valves	C	2	0	(O)Except for ER operations beyond 120minutes, may be inoperative in any position provided: a) Associated engine bleed shutoff valve remains closed, and b) Airplane is not operated in known or forecast icing conditions.
	C	2	0	(M)Except for ER operations beyond 120 minutes, may be inoperative full open provided airplane is not operated in known or forecast icing conditions.
4. Pneumatic Pressure Indication Systems	C	2	0	(O)May be inoperative provided alternate procedures are established and used.
5. Engine Bleed Air Shutoff Valves (PRSOV)	C	2	0	(M)(O)Except for ER operations beyond 120 minutes, may be inoperative provided: a) Valve is secured closed before engine start, and b) Airplane is not operated in known or forecast icing conditions.
6. Dual Bleed Light System	C	1	0	(O)May be inoperative provided: a) APU bleed air is not used in flight, and b) APU bleed valve is closed before each departure.
8. Engine Bleed Trip Off Lights	C	2	0	(O)Except for ER operations beyond 120 minutes, may be inoperative provided: a) Associated engine bleed is not used except for engine start, and b) Airplane is not operated in known or forecast icing conditions.

9. High Stage Valves	C	2	1	(M)One may be inoperative locked closed provided a minimum of 60% N1 is maintained on the associated engine during flight in icing conditions.
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38 WATER/WASTE

38-1 Potable Water Systems (M)

38-2 Lavatory Waste Systems (Including Wheelchair Accessible Lavatories)
(M)

1. Systems & Sequence Number	2. Category			
	Item	3. Number Installed		
				4. Number Required For Despatch
				5. Remarks or Exceptions
38 WATER/WASTE				
1. Potable Water Systems	C	1	1	(M)Individual components may be inoperative provided: a) Associated components are deactivated or isolated, and b) Associated system components are verified not to have leaks. NOTE: Any portion of system, which operates normally, may be used.
	C	1	0	(M)May be inoperative provided: a) System is drained, and b) Procedures are established to ensure that the system is not serviced. NOTE: Refer to DDG 38-1 for Operations Note.
	C	2	2	(M)Individual components may be inoperative provided: a) Associated components are deactivated or isolated, and b) Associated system components are verified not to have leaks. NOTE: Any portion of system, which operates normally, may be used.
	C	2	0	(M)Associated lavatory system(s) may be inoperative provided: a) Associated components are deactivated or isolated to prevent leaks, b) The Pilot-in-Command will

				determine if flight duration is acceptable with a forward lavatory unusable, and c) Associated lavatory door(s) is secured closed and placarded "INOPERATIVE – DO NOT ENTER". NOTE: These provisions are not intended to prohibit inspections by crewmembers.
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49 AIRBORNE AUXILIARY POWER

- 49-1** Auxiliary Power Unit (M)(O)
- 49-2** APU Annunciator LOW OIL PRESSURE and OVER SPEED Lights
- 49-3** APU Auto Shutdown System (M)
- 49-4** APU Annunciator LOW OIL Quantity/MAINT Light (M)
- 49-5** APU EGT Indicator (O)
- 49-6** APU Inlet Door (O)
- 49-7** APU Bleed Air System (M)
- 49-8** APU DC Fuel Boost Pump
- 49-9** APU Surge Control System
- 49-10** APU Cockpit Hourmeter
- 49-11** APU Start Counter Meter
- 49-12** APU Annunciator HIGH OIL TEMP/FAULT Light
- 49-13** APU Fuel Heater (M)

49 AIRBORNE AUXILIARY POWER

1. Systems & Sequence Number	2. Category			
	3. Number Installed			
	4. Number Required For Despatch			
	5. Remarks or Exceptions			
Item				
49 AIRBORNE AUXILIARY POWER				
1. Auxiliary Power Unit (APU)	C	1	0	(M) (O) Except for ER operations, may be inoperative provided: a) Procedures do not require its use, and b) Visual confirmation is made that no damage has occurred to the APU exhaust area. NOTE: Refer to DDG 49-1 for Maintenance Note.
2. APU Annunciator LOW OIL PRESSURE and OVER SPEED Lights	C	2	0	May be inoperative provided APU Auto Shutdown System operates normally. NOTE: Refer to DDG 49-2 for Maintenance Note.
3. APU Auto Shutdown System	C	1	0	(M) Except for ER operations, may be inoperative provided: a) APU is not used in flight, b) APU annunciator lights operate normally, and c) APU is monitored continuously.
4. APU Annunciator LOW OIL QUANTITY/ MAINT Light	C	1	0	(M) May be inoperative and APU used provided oil quantity is checked once each flight day.
5. APU EGT Indicator 1) Model GTCP85-129	C	1	0	(O) Except for ER operations, may be inoperative provided: a) All warning and caution lights operate normally,

2) Models GTCP36-280 , APS-2000 and AS 131-9B	C	1	0	b) APU is used to supply electrical power, and for starting one engine only, and c) Passengers are not permitted on board until the APU has been shut down.
6. APU Inlet Door	C	1	0	(O) May be inoperative open.
	C	1	0	May be inoperative in any other position if APU is not used. NOTE: Refer to DDG 49-6 for Maintenance Note.
7. APU Bleed Air System	C	1	0	(M) May be inoperative closed.
	C	1	0	NOTE: APU may be used to provide electrical power. (M) May be inoperative open provided: a) APU bleed air check valve operates normally, and b) APU is not operated.
8. APU DC Fuel Boost Pump	D	1	0	NOTE: Refer to DDG 49-8 for Maintenance Note.
9. APU Surge Control System				
1) Surge Bleed Valve (Models GTCP85-129 and APS-2000)	C	1	0	May be inoperative in the open position provided APU bleed air is not used for engine start on the ground. NOTE: Relief also applies to airplanes modified by STC SA5730NM or ST00131SE provided APU is not operating during approach.
	C	1	0	May be inoperative in the closed

				position provided APU operation is limited to FL 250 or below. NOTE: Relief also applies to airplanes modified by STC SA5730NM or ST00131SE. NOTE: Refer to DDG 49-9 for Maintenance Note.
10. APU Cockpit Hour-meter	D	1	0	
11. APU Start Counter Meter	D	1	0	
12. APU Annunciator HIGH OIL TEMP/ FAULT Light	C	1	0	
13. APU Fuel Heater	C	1	0	(M) May be inoperative provided APU operates normally.

52 DOORS

52-3 Door Warning Light System (M)

52-5 Left Main Cabin Door Pressure Stop Fittings (M) (O)

52-6 Lower Cargo Doors Pressure Stop Fittings (M) (O)

52-7 Entry/Service Door Hold-Open Latch Assemblies

52-9 Lower Cargo Doors Door Balance Mechanism (M)

52-14 Lower Cargo Doors Hold Open Mechanism and/or Hold Open Safety Device (M)

52-17 Boeing/C & D Aerospace Enhanced Flight Deck Security Door Automatic Locking System (14 CFR 25.795 Compliant) (M) (O) (SP)

52-18 Boeing/C & D Aerospace Enhanced Flight Deck Security Door Dead Bolt (14 CFR 25.795 Compliant)

52-20 Flight Deck Door Pressure Relief Panels

52-23 Emergency exits

52 DOORS

1. Systems & Sequence Number Item	2. Category			
			3. Number Installed	
			4. Number Required For Despatch	
			5. Remarks or Exceptions	
52 DOORS				
3. Door Warning Light System 1) Entry/Service/Cargo Equipment/Airstair	C	-	0	(M) May be inoperative provided associated door is verified closed and locked.
5. Left Main Cabin Door Pressure Stop Fittings 1) Aft Airstair Door and Forward Entry Door	B	-	-	(M) (O) One per door may be broken or missing provided: a) There are no visible defects on other fittings for the associated door, b) Pressure differential does not exceed 6.0 psi, and c) Analog cabin pressure control system standby control mode operates normally and STBY is used.
	B	-	-	(M) (O) One per door may be broken or missing provided: a) There are no visible defects on other fittings for the associated door, b) Pressure differential does not exceed 6.0 psi, c) Digital cabin pressure control system AUTO or ALTN control mode

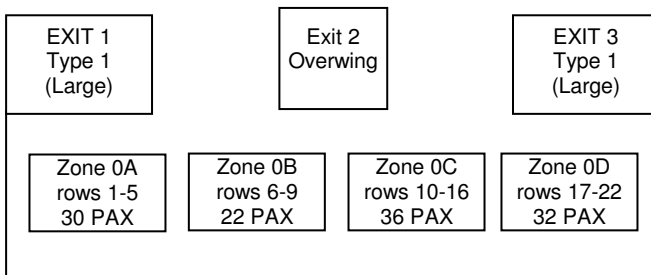
2) Aft Door Without Airstairs	B	-	-	operates normally, and d) Alternate procedures are established and used. (M) (O)One may be broken or missing provided: a) There are no visible defects on other fittings for the associated door, b) Pressure differential does not exceed 3.4 psi, and c) Analog cabin pressure control system standby control mode operates normally and STBY is used.
	B	-	-	(M) (O)One may be broken or missing provided: a) There are no visible defects on other fittings for the associated door, b) Pressure differential does not exceed 3.4 psi, c) Digital cabin pressure control system AUTO or ALTN control mode operates normally, and d) Alternate procedures are established and used.
6. Lower Cargo Doors Pressure Stop Fittings	A	24	22	(M)Any one may be broken or missing on each door or frame provided: a) No defects are visible on the other fittings for the associated door, b) Cabin pressure controller AUTO mode operates normally, c) Adjacent stop fittings are

	C	24	20	inspected within 25 flights, and d) Not more than 50 flights are made before the completion of repairs or replacements. (M) (O) Two may be broken or missing on each door or frame provided the airplane is operated in an un-pressurized configuration only.
7. Entry/Service Door Hold-Open Latch Assemblies 1) Latch Release Lever	C	-	0	NOTE: Refer to DDG 52-7 for Maintenance Note.
9. Lower Cargo Doors Door Balance Mechanism	C	2	0	(M) May be inoperative provided a safety hold open device is used when door is in open position.
14. Lower Cargo Doors Hold Open Mechanism and/or Hold Open Safety Device	C	2	0	(M) May be inoperative provided Door Balance mechanism operates normally.
	C	2	0	(M) May be inoperative provided cargo compartment remains empty.
17. Boeing/C&D Aerospace Enhanced Flight Deck Security Door Automatic Locking System (14 CFR 25.795 Compliant)	A	1	0	(M) (O) (SP) May be inoperative for a maximum of 4 flights provided: a) Automatic locking system is deactivated, b) Door dead bolt operates normally and is used to lock the door, c) Alternate procedures are

1) Flight Deck Access Panel System (Keypad, Door Chime)	C	1	0	established and used for locking and unlocking the door using the dead bolt. (M) (O) May be inoperative provided: a) Keypad is deactivated, and b) Alternate procedures are established and used.
a) LEDs	C	3	0	(O) May be inoperative provided alternate procedures are established and used.
b) Door Bell Mode	C	1	0	(O) May be inoperative provided alternate procedures are established and used.
c) Switch Guard	C	1	0	May be inoperative or missing provided the flight deck door LOCK FAIL light operates normally.
2) Flight Deck Door LOCK FAIL Light	C	1	0	(M) May be inoperative provided automatic lock controls are verified to operate normally.
3) Flight Deck Door AUTO UNLK Light	C	1	0	(M) May be inoperative provided: a) Automatic lock controls are verified to operate normally, and b) Door chime operates normally.
4) Flight Deck Door Lock Control Selector	C	1	0	(M) (O) May be inoperative provided: a) Keypad is deactivated,

5) Flight Deck Door Panel Pressure Relief Latches				b) Automatic lock is verified to operate normally, and c) Alternate procedures are established and used. Item moved to MEL 52-20
18. Boeing/C&D Aerospace Enhanced Flight Deck Security Door Dead Bolt (14 CFR 25.795 Compliant)	C	1	0	May be inoperative provided automatic lock controls operate normally.
20. Flight Deck Door Pressure Relief Panels 2) Boeing/C&D Aerospace Enhanced Flight Deck Security Door (14 CFR 25.795 Compliant)	A	2	0	May be inoperative provided: a) Panels are in the latched position, and b) Repairs are made within two flight days.
22. Flight Deck Door Hold Open Device (e.g. Door Stop, Foot Plunger, etc.)	D	1	0	
23 Emergency Exits	A	6	5	One exit, may be inoperative provided: a) Not more than 72 hours have elapsed since the exit became inoperative, b) The airplane does not exceed 5 further flights with the exit inoperative, and

			c) The number of passengers does not exceed 95 if Entry/Service Door are inoperative. (no limitation if overwing exit inoperative) d) The emergency exit is blocked by a strap or rope and placarded. e) The exit signs for the emergency exit in question are covered. f) Cabin crew are advised that evacuation procedures must not include affected door (Preflight briefing) g) Passengers are advised not to use the affected doors. (Passenger briefing must be revised)
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Exit Type	EXIT1 Type1 (Large)		Exit 2 Overwing		EXIT3 Type1 (Large)	Total
PAX Exit Rating	60		35		60	155
Zones	0A 30Pax	0B 22Pax	0C 36Pax	0D 32Pax		120
Exit 1 Inop.	5 Pax leave by Exit 2	22 Pax leave by Exit 2	8 Pax leave by Exit 2 28 Pax leave by Exit 3	32 Pax leave by Exit 3	95 (35 seats blocked in 0A+0B)	
Exit 2 Inop.	30 pax leave by Exit 1	22 Pax leave by Exit 1	8 Pax leave by Exit 1 28 Pax leave by Exit 3	32 leave by Exit 3	120	
Exit 3 Inop.	30 pax leave by Exit 1	22 Pax leave by Exit 1	8 Pax leave by Exit 1 28 Pax leave by Exit 2	7 Pax leave by Exit 2	95 (35 seats blocked in 0C+0D)	

73 ENGINE FUEL AND CONTROL

73-4 Fuel Filter Differential Pressure Warning Systems (M)

73-5 Fuel Flow Indication Systems

73-6 Fuel Used Indicators

73-7 Power Management Control (PMC) Systems (O)

73-8 Power Management Control (PMC) INOP Lights (O)

1. Systems & Sequence Number	2. Category			
	Item	3. Number Installed		
		4. Number Required For Despatch		5. Remarks or Exceptions
73 ENGINE FUEL & CONTROL				
4. Fuel Filter Differential Pressure Warning Systems	C	2	1	(M) One may be inoperative provided the malfunction is verified to be in the warning system. NOTE: Refer to DDG 73-4 for Operation Note.
5. Fuel Flow Indication Systems	C	2	1	One may be inoperative provided N1, N2 and both main tank fuel quantity indicators operate normally.
6. Fuel Used Indicators	C	2	0	
7. Power Management Control (PMC) Systems	C	2	0	(O)May be inoperative provided: a) Both PMC's remain OFF, and b) QRH (PI 14/24) performance adjustments are applied.
8. Power Management Control (PMC) INOP Lights	C	2	0	(O)May be inoperative provided: a) Both PMC's remain OFF, and b) AFM appendix performance adjustments are applied.

74 IGNITION

74-1 Ignition Systems (O)

1. Systems & Sequence Number	2. Category			
	3. Number Installed			
	4. Number Required For Despatch			
	5. Remarks or Exceptions			
Item				
74 IGNITION				
1. Ignition Systems				
a) Left Ignition Systems	B	2	1	One may be inoperative provided: a) Ignition Select Switch remains in BOTH position, and b) Right ignition systems operate normally.
	C	2	0	(O)Except for ER operations, may be inoperative provided: a) Ignition Select Switch remains in BOTH position, and b) Associated engine right ignition system operates normally.
b) Right Ignition Systems	B	2	1	(M)(O)One may be inoperative provided: a) Ignition Select Switch remains in BOTH position, and b) Left ignition systems operate normally, and c) Associated engine left igniter is connected to the AC Standby Bus by an acceptable configuration.
	C	2	0	(M)(O)Except for ER operations, may be inoperative provided: a) Ignition Select Switch remains in BOTH position, and b) Associated engine left igniter is connected to the AC Standby Bus by an acceptable configuration.

75 BLEED AIR

75-2 High Pressure Turbine Clearance Control (HPTCC) Timer(s) (M)

1. Systems & Sequence Number Item	2. Category			
	3. Number Installed			
	4. Number Required For Despatch			
	5. Remarks or Exceptions			
75 BLEED AIR				
2. High Pressure Turbine Clearance Control (HPTCC) Timer(s)	C	2	0	(M) May be inoperative provided system(s) are deactivated. NOTE: Refer to DDG 75-2 for Operation Note.

77 ENGINE INDICATING

77-2 N1 Tachometers

77-3 N2 Tachometers (O)

77-5 Vibration Indicating Systems

77-6 EGT Indications

77-9 Abnormal Start Indication Systems

77-10 LOW IDLE Light (M)

77 ENGINE INDICATING

1. Systems & Sequence Number Item	2. Category			
	3. Number Installed			
	4. Number Required For Despatch			
	5. Remarks or Exceptions			
77 ENGINE INDICATING				
2. N1 Tachometers				
2)				
b) Bugs	C	2	1	
c) Manual Set Indication	C	2	0	
3) N1 Warning Lights	B	2	0	May be inoperative provided the associated N1 pointer operates normally.
3. N2 Tachometers	B	2	1	(O)One may be inoperative provided: a) N1 and fuel flow indicators for associated engine operate normally, b) An alternate starting procedure is established and used, and c) Engine #1 tach generator operates normally.
4) N2 Warning Lights	B	2	0	May be inoperative provided the associated N2 pointer operates normally.
5. Vibration Indicating Systems	C	2	1	

6. EGT Indications 2) EGT Warning Lights	C	2	0	May be inoperative provided the associated EGT pointer operates normally.
9. Abnormal Start Indication Systems	C	2	0	
10. LOW IDLE Light	B	1	0	(M) May be inoperative provided: a) Engine idle control system is verified to operate normally, and b) Both engines installed are "modified" engines (Boeing SB 737-77-1031 or production equivalent). NOTE: All AirBaltic Boeings have "modified" engines.

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78 EXHAUST

78-1 Thrust Reverser Systems (M) (O)

78-2 REVERSER UNLOCKED Lights (M)

78-7 REVERSER Lights (Aft Overhead Panel) (M)

1. Systems & Sequence Number Item	2. Category			
		3. Number Installed		
			4. Number Required For Despatch	
			5. Remarks or Exceptions	
78 ENGINE EXHAUST				
1. Thrust Reverser Systems	C	2	1	(M)(O)One may be inoperative provided thrust reverser is locked in the forward thrust position.
2. REVERSER UNLOCKED Lights	C	2	1	(M)One may be inoperative provided the reverser is locked in the closed (forward thrust) position. NOTE: Relief also applies to airplanes modified by STC SA5730NM or ST00131SE.
7. REVERSER Lights (Aft Overhead Panel)	C	2	1	(M)One may be inoperative provided the associated reverser is locked in the closed (forward thrust) position. NOTE: Refer to DDG 78-7 for Operations Note.

79 OIL

79-1 Oil Quantity Indication Systems (M)

79-2 Oil Filter Bypass Warning Systems (M)

79-4 Oil Low Pressure Warning Systems

1. Systems & Sequence Number Item	2. Category			
	3. Number Installed			
	4. Number Required For Despatch			
	5. Remarks or Exceptions			
79 ENGINE OIL				
1. Oil Quantity Indication System	B	2	1	(M)Except for ER operations, one may be inoperative provided: a) Oil tank is filled to the maximum recommended capacity at each refueling, b) There is no evidence of above normal oil consumption or leakage, and c) Associated low oil pressure warning light operates normally.
1) Oil Quantity Indicator Test Switch	C	1	0	(M)May be inoperative provided: a) Oil tanks are filled to the maximum recommended capacity at each refueling, b) There is no evidence of above normal oil consumption or leakage, and c) Engine low oil pressure warning lights operate normally.
2. Oil Filter Bypass Warning Systems	C	2	1	(M)One may be inoperative provided: a) Malfunction is in the warning system, and b) Oil filter is inspected for presence of contaminants once each flight day.

4. Oil Low Pressure Warning Systems	B	2	0	May be inoperative provided the associated oil quantity indication operates normally.
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80 STARTING

80-1 Starter Valve Open Indications (O)

80-2 Engine Starter Auto Cutout

80-3 Starter Valves (M)(O)

1. Systems & Sequence Number Item	2. Category			
		3. Number Installed		
		4. Number Required For Despatch		5. Remarks or Exceptions
80 STARTING				
1. Starter Valve Open Indications	C	2	1	(O)One may be inoperative provided it is checked after engine start that associated valve is closed.
2. Engine Starter Auto Cutout	C	2	0	May be inoperative provided flight crew manually selects Start Switch OFF at 46% N2. NOTE: Refer to DDG 80-2 for Operations Note.
3. Starter Valves	C	2	1	(M)(O)One may be inoperative provided: a) Modified Main Engine Controls or production equivalent have been incorporated, b) Associated start valve light operates normally, and c) Manual override start procedures are used.

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ATA 21 AIR CONDITIONING

21-1 AIR CONDITIONING PACKS

NOTE: For an inoperative air conditioning pack, the associated pack airflow shutoff valve may be deactivated closed per MEL 21-2 Maintenance procedure.

OPERATIONS (O)

ONE PACK INOP (Pressurized)

1. Limit altitude to FL 250.
2. Only one galley 4B food cart chiller (if installed) may be used in-flight.
3. ER operations are not allowed.
4. Position the associated pack switch to OFF. To maintain isolated bleed sources, position the isolation valve switch to CLOSE.
5. Use APU (if operable) bleed for take-off to supply bleed air and operating pack in HIGH mode. This provides increased air flow when flaps are extended (takeoff and landing). APU bleed for landing is recommended. The following procedure can be used to accomplish this.

NOTE: When dispatching with the operating pack supplied by engine bleed air for takeoff, VMCG should be determined based on AC packs OFF. Takeoff performance should be based on AC packs ON/AUTO.

A. Right Pack Inoperative:

Use the supplementary procedure OM-B 12.2.14 “No Engine Bleed Takeoff and Landing Procedure”. The right pack switch is to remain OFF and the isolation valve switch CLOSED.

B. Left Pack Inoperative:

- 1) Prior to takeoff or landing, position engine no. 1 bleed air switch to OFF, right pack switch to AUTO (left pack should be OFF), isolation valve switch to OPEN, engine no. 2 bleed air switch to OFF and APU bleed air switch to ON.
- 2) After takeoff or landing, position the APU bleed air switch to OFF, engine no. 2 bleed air switch to ON, isolation valve switch to CLOSE and engine no. 1 bleed air switch to ON.

TWO PACKS INOP (Un-pressurized)

Cargo compartments should remain empty or contain only ballast.

NOTE: As ballast must be used only dry shingle, coarse round gravel or pebbles of an average diameter of 12-15 mm packed in canvas or hessian (with an inner plastic bag) effectively closed bags.

1. Limit altitude to 10,000 ft. for passenger flights. Non-passenger flights above 10,000 ft. require flight crew to be on oxygen.
2. Except for ditching, maintain outflow valve in the full open position.
3. To avoid passenger discomfort, limit climb and descent rates to 500 FPM.
4. With pack deactivated and the isolation valve switch in the AUTO position, the isolation valve will remain closed when the associated pack switch is in the ON or AUTO/HIGH position. If the pack has not been deactivated and the affected pack switch is in the OFF position, the isolation valve will open when the isolation valve switch is in the AUTO position. To maintain isolated bleed sources, position the isolation valve switch to CLOSE.
5. The following steps can be taken to improve both passenger cabin and crew compartment temperatures:
 - A. If possible, pre-condition the cabin to a low temperature prior to dispatch. A low initial cabin temperature will result in a lower peak temperature.
 - B. Maintain the highest allowable flight altitude.
 - C. Minimize cabin heat by pulling the shades down and turning off unnecessary lights.
 - D. Position Gasper Fan/Re-circulation Fan switches as follows: Re-circulation Fan(s) - AUTO.
 - E. Because of reduced ventilation rate (approximately 1/6 of normal), consideration should be given to flight duration and passenger load so that excessive cabin temperatures may be avoided. Estimated stabilized temperatures at the end of 30 minutes of flight are shown in the following tables:

TAT °C	NO. OF PASS	PASS. CABIN		CREW CABIN	
		TEMPERATURE		TEMPERATURE	
		°F	°C	°F	°C
-1	0	45	7	70	21
-1	100	75	24	75	24
10	0	65	18	85	29
10	100	85	29	95	35
21	0	85	29	100	38
21	100	95	35	105	40
32	0	105	40	120	49
32	100	105	40	120	49

6. Prolonged operation at TAT colder than 10°C may cause freezing of unheated water systems located in the aft lower lobe.
7. Operation at TAT hotter than 32°C is not recommended due to the resulting high temperatures in the passenger and crew cabins.

MAINTENANCE (M)

TWO PACKS INOP (Un-pressurized)

1. Manually position outflow valve full open.
2. Advise dispatch for un-pressurized flight. Maximum altitude for flight planning will be affected.

21-2 PACK AIRFLOW/ SHUT-OFF VALVES

NOTE: MEL 21-1 restrictions for inoperative pack(s) must be observed if pack airflow shut-off valve is deactivated closed.

OPERATIONS (O)

1. For dispatch with one Pack Airflow/Shut-Off Valve inoperative (pressurized), use MEL 21-1 One Pack Inoperative (Pressurized) Operations procedure.
2. For dispatch with both Pack Airflow/Shut-Off Valves inoperative, use MEL 21-1 Two Packs Inoperative (Un-pressurized) Operations procedure.

MAINTENANCE (M)

Deactivate and close the affected pack airflow shut-off valve(s).

1. Remove pressure from the pneumatic system.

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2. Gain access to the inoperative pack shut-off valve located in the air conditioning bay.
3. Disconnect, cap and stow the electrical connector(s) D488 (left pack) and/or D492 (right pack).
4. If the pack airflow shut-off valve limit switch has failed in the OPEN position:
 - A. Disconnect the electrical connector(s) D486 (left pack) and/or D490 (right pack), jumper pin 1 to pin 3, and verify continuity to airplane ground at pin 3.
 - B. Cap and stow the electrical connector(s) D486 (left pack) and/or D490 (right pack).
5. Push in the manual control shaft. If already in, pull out and push back in to verify that the assembly is in.
6. For both shut-off valves inoperative (Un-pressurized Flight) only, manually position outflow valve full open.
7. Advise dispatch. Maximum altitude for flight planning will be affected.

21-3 PACK TRIP WARNING SYSTEMS

NOTE: MEL 21-1 restrictions for inoperative pack(s) must be observed.

OPERATIONS (O)

1. For dispatch with one Pack Trip Warning System inoperative (pressurized), use MEL 21-1 One Pack Inoperative (Pressurized) Operations procedure.
2. For dispatch with both Pack Trip Warning Systems inoperative, use MEL 21-1 Two Packs Inoperative (Un-pressurized) Operations procedure.

MAINTENANCE (M)

Use MEL 21-1 Maintenance procedure for one or two packs inoperative, as applicable.

21-4 PACK TURBOFANS

OPERATIONS (O)

NOTE: The turbine air supply valve is activated electrically when the associated pack is turned on and the air ground safety sensor or the flap limit switch is activated.

When flaps are extended, position affected pack switch(es) to OFF.

ONE PACK AFFECTED

Use APU (if operable) bleed for take-off to supply bleed air and operating pack in HIGH mode. This provides increased airflow when flaps are extended (takeoff and landing). APU bleed for landing is recommended. See DDG 21-1 **ONE PACK INOP** (Pressurized) step 5.

When the engine bleed is used for take-off and/or landing with affected pack switch in OFF position, the isolation valve will be open when isolation valve switch is in AUTO position. To maintain isolated bleed sources, place the isolation valve switch to CLOSE.

NOTE: When dispatching with the operating pack supplied by engine bleed air for takeoff, VMCG should be determined based on AC packs OFF. Takeoff performance should be based on AC packs ON/AUTO.

TWO PACKS AFFECTED

Accomplish supplementary procedure OM-B 12.2.13 “**Unpressurized Takeoff and Landing**” with both PACK switches in OFF position.

After takeoff place PACK switches to AUTO before switching the respective BLEED air switch to ON.

Before landing position PACK switches to OFF before switching the respective BLEED air switch to OFF.

21-5 Pack Ram Air Systems**OPERATIONS (O)**

NOTE: Dispatching with one pack inoperative (MEL 21-1) and the other pack's ram air system inoperative (ram air inlet door in the FLIGHT OPEN position) may lead to icing in the operating pack's water separator, affecting pack performance.

With the ram air modulating system deactivated, the AIR COND light will illuminate during Master Caution recall and will extinguish when reset.

When operating on wet runways or runways with standing water with the ram air inlet door inoperative in the FLIGHT OPEN position, place affected pack(s) to OFF position during takeoff and landing.

ONE PACK AFFECTED

Use APU (if operable) bleed for take-off to supply bleed air and operating pack in HIGH mode. This provides increased air flow when flaps are

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extended (takeoff and landing). APU bleed for landing is recommended. See DDG 21-1 **ONE PACK INOP** (Pressurized) step 5.

When the engine bleed is used for take-off and/or landing with affected pack switch in OFF position, the isolation valve will be open when isolation valve switch is in AUTO position. To maintain isolated bleed sources, place the isolation valve switch to CLOSE.

NOTE: When dispatching with the operating pack supplied by engine bleed air for takeoff, VMCG should be determined based on AC packs OFF. Takeoff performance should be based on AC packs ON/AUTO.

TWO PACKS AFFECTED

Accomplish supplementary procedure OM-B 12.2.13 “**Unpressurized Takeoff and Landing**” with both PACK switches in OFF position.

After takeoff place PACK switches to AUTO before switching the respective BLEED air switch to ON.

Before landing position PACK switches to OFF before switching the respective BLEED air switch to OFF.

For each pack ram air system affected, the following performance penalties can be used to account for the increased drag associated with; (1) the ram inlet door inoperative in the FLIGHT OPEN position, (2) the exhaust louvers inoperative in the full open position.

MODEL	ENROUTE CLIMB		FUEL MILEAGE	
	INLET DOOR	EXHAUST LOUVERS	INLET DOOR	EXHAUST LOUVERS
-500	218kgs	64 kgs	1.2%	0.4%

MAINTENANCE (M)

RAM AIR MODULATING SYSTEM INOPERATIVE

1. Gain access to the ram air actuator located adjacent to the ram air exit.
2. Disconnect, cap and stow the electrical connector to the ram air actuator.
3. Remove attaching bolt and separate actuator shaft rod end bearing from torque shaft quadrant arm. Re-install and secure bolt in torque shaft quadrant arm.
4. By hand, rotate torque shaft quadrant and cable system to align rig pin holes (1/4 inch diameter) for the FLIGHT OPEN position. Refer to following drawing.

5. Insert a bolt (NAS6704U10 or equivalent) through the rig pin hole in the pulley and thread it into the nut plate (NAS1068-A4) on the support assembly.
6. Secure the actuator shaft rod end bearing to the attached bolt at the end of the torque shaft quadrant arm using safety wire.
7. Close and secure access panels.

RAM AIR EXHAUST LOUVER ASSEMBLY INOPERATIVE

1. Gain access to the ram air exhaust modulation louver assembly.
2. Remove exhaust louver actuating shaft from the torque shaft quadrant at the outboard universal joint. Tape shaft down to prevent vibration.
3. Align the rig pin hole and boss and install a bolt (AN4H7A or equivalent) through the arm rigging pin hole into the rigging pin boss.
4. Secure the bolt in place by running safety wire through the drilled head bolt and then around the actuating arm.
5. Close and secure access panels.

21-6 Pack Turbofan Valves**OPERATIONS (O)**

NOTE: The turbine air supply valve is activated electrically when the associated pack is turned on and the air ground safety sensor or the flap limit switch is activated.

When flaps are extended, position affected pack switch(es) to OFF.

ONE PACK AFFECTED

Use APU (if operable) bleed for take-off to supply bleed air and operating pack in HIGH mode. This provides increased air flow when flaps are extended (takeoff and landing). APU bleed for landing is recommended. See DDG 21-1 **ONE PACK INOP** (Pressurized) step 5.

When the engine bleed is used for take-off and/or landing with affected pack switch in OFF position, the isolation valve will be open when isolation valve switch is in AUTO position. To maintain isolated bleed sources, place the isolation valve switch to CLOSE.

NOTE: When dispatching with the operating pack supplied by engine bleed air for takeoff, VMCG should be determined based on AC packs OFF. Takeoff performance should be based on AC packs ON/AUTO.

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TWO PACKS AFFECTED

Accomplish supplementary procedure OM-B 12.2.13 “**Unpressurized Takeoff and Landing**” with both PACK switches in OFF position.

After takeoff place PACK switches to AUTO before switching the respective BLEED air switch to ON.

Before landing position PACK switches to OFF before switching the respective BLEED air switch to OFF.

MAINTENANCE (M)

1. Gain access to the valve. Right valve is located in the right equipment bay at the forward end where the valve duct connects to the right pack cold air supply duct. The left valve is located in the left equipment bay inboard of the turbofan.
2. Disconnect and stow the turbofan valve solenoid electrical connector.
3. Push in the solenoid manual override plunger. If already in, pull out and push back in to verify that the plunger is in the closed position.

21-8 Air Mix Valves

NOTE: MEL 21-1 restrictions for inoperative pack(s) must be observed.

OPERATIONS (O)

1. For dispatch with one Air Mix Valve inoperative (pressurized), use MEL 21-1 One Pack Inoperative (Pressurized) Operations Procedure.
2. For dispatch with both Air Mix Valves inoperative, use MEL 21-1 Two Packs Inoperative (Un-pressurized) Operations Procedure.

MAINTENANCE (M)

Use MEL 21-1 Maintenance procedure for one or two packs inoperative, as applicable.

21-10 Cabin Rate of Climb Indicator**OPERATIONS (O)**

1. Limit altitude to 10,000 ft. for passenger flights. Non-passenger flights above 10,000 ft. require flight crew to be on oxygen.
2. Except for ditching, maintain outflow valve in the full open (Analog System) or 25% open (Digital System) position as applicable.
3.
 - A. Only one A/C Pack may be used in-flight.
When dispatching with the operating pack supplied by engine bleed air for takeoff, VMCG should be determined

- based on AC packs OFF. Takeoff performance should be based on AC packs ON/AUTO.
- B. Only one galley 4B food cart chiller (if installed) may be used in-flight.
4. To avoid passenger discomfort, limit climb and descent rates to 500 FPM.

MAINTENANCE (M)

Configure airplane for un-pressurized flight.

1. Manually position the outflow valve in the full/partial open position as applicable.
 - A. For Analog System, position the outflow valve in the full open position as follows:
 - 1) Place the Pressurization Mode Selector in the AC MAN or DC MAN position.
 - 2) Hold the VALVE toggle switch in the OPEN position until valve position indicator indicates full open.
 - B. For Digital System (DCPCS), position the outflow valve in the 25% open position as follows:
 - 1) Place the Pressurization Mode Selector in the MAN position.
 - 2) Hold the VALVE toggle switch in the OPEN position until valve position indicator indicates 25% open.
2. Open and collar P6-4 Panel Air Conditioning Overboard Exhaust Valve Reconfiguration Control circuit breaker.
3. Advise dispatch. Maximum altitude for flight planning will be affected.

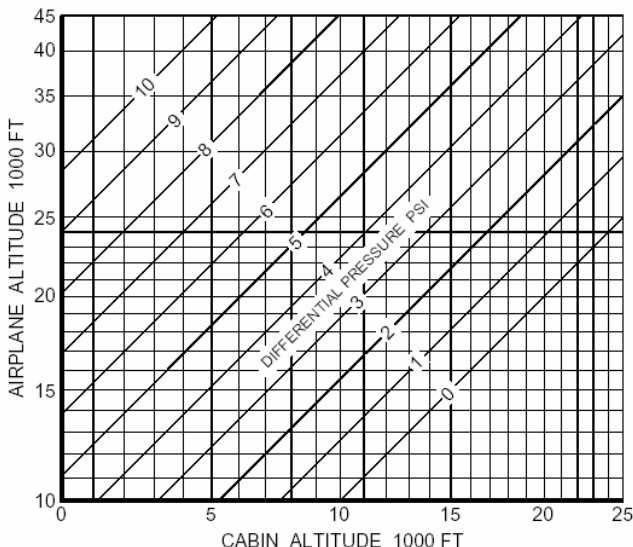
21-12 Cabin Altitude Indicator**OPERATIONS (O)**

1. Limit altitude to 10,000 ft. for passenger flights. Non-passenger flights above 10,000 ft. require flight crew to be on oxygen.
2. Except for ditching, maintain outflow valve in the full open (Analog System) or 25% open (Digital System) position as applicable.
3.
 - A. Only one A/C Pack may be used in-flight.

When dispatching with the operating pack supplied by engine bleed air for takeoff, VMCG should be determined based on AC packs OFF. Takeoff performance should be based on AC packs ON/AUTO.

- B. Only one galley 4B food cart chiller (if installed) may be used in-flight.
- 4. To avoid passenger discomfort, limit climb and descent rates to 500 FPM.

NOTE: The following chart can be used to find Cabin Altitude.



MAINTENANCE (M)

Configure airplane for un-pressurized flight.

1. Manually position the outflow valve in the full/partial open position as applicable.
 - A. For Analog System, position the outflow valve in the full open position as follows:
 - 1) Place the Pressurization Mode Selector in the AC MAN or DC MAN position.
 - 2) Hold the VALVE toggle switch in the OPEN position until valve position indicator indicates full open.
 - B. For Digital System (DCPCS), position the outflow valve in the 25% open position as follows:
 - 1) Place the Pressurization Mode Selector in the MAN position.
 - 2) Hold the VALVE toggle switch in the OPEN position until valve position indicator indicates 25% open.
2. Open and collar P6-4 Panel Air Conditioning Overboard Exhaust Valve Reconfiguration Control circuit breaker.

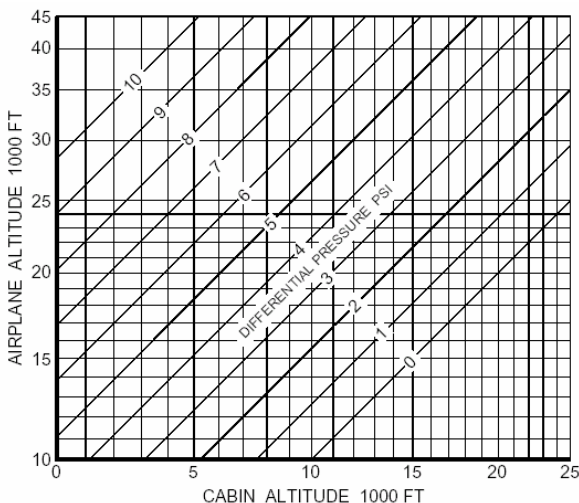
3. Advise dispatch. Maximum altitude for flight planning will be affected.

21-13 Cabin Differential Pressure Indicator

OPERATIONS (O)

1. Limit altitude to 10,000 ft. for passenger flights. Non-passenger flights above 10,000 ft. require flight crew to be on oxygen.
2. Except for ditching, maintain outflow valve in the full open (Analog System) or 25% open (Digital System) position as applicable.
3.
 - A. Only one A/C Pack may be used in-flight.
When dispatching with the operating pack supplied by engine bleed air for takeoff, VMCG should be determined based on AC packs OFF. Takeoff performance should be based on AC packs ON/AUTO.
 - B. Only one galley 4B food cart chiller (if installed) may be used in-flight.
4. To avoid passenger discomfort, limit climb and descent rates to 500 FPM.

NOTE: The below mentioned chart can be used to find differential pressure.



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MAINTENANCE (M)

Configure airplane for un-pressurized flight.

1. Manually position the outflow valve in the full/partial open position as applicable.
 - C. For Analog System, position the outflow valve in the full open position as follows:
 - 1) Place the Pressurization Mode Selector in the AC MAN or DC MAN position.
 - 2) Hold the VALVE toggle switch in the OPEN position until valve position indicator indicates full open.
 - D. For Digital System (DCPCS), position the outflow valve in the 25% open position as follows:
 - 1) Place the Pressurization Mode Selector in the MAN position.
 - 2) Hold the VALVE toggle switch in the OPEN position until valve position indicator indicates 25% open.
2. Open and collar P6-4 Panel Air Conditioning Overboard Exhaust Valve Reconfiguration Control circuit breaker.
3. Advise dispatch. Maximum altitude for flight planning will be affected.

21-14 Cabin Pressure Control System

NOTE: Some DCPCS faults indicated by an AUTO FAIL Light are recoverable. Momentarily re-position the Pressurization Mode Selector to MAN and then back to AUTO. If the AUTO FAIL Light remains extinguished with the Pressurization Mode Selector in AUTO, the fault has been corrected and the controller is operating normally.

OPERATIONS (O)**ANALOG CONTROL SYSTEM**

- A. Normal operation of manual modes may be confirmed as follows:
 - 1) Select MAN AC on the Pressurization Mode Selector.
 - 2) Select MAN DC on the Pressurization Mode Selector.
 - a. By appropriate use of the VALVE toggle switch, observe that the outflow valve position indicator moves to full open, to full closed and then back to full open.
 - 3) If valve position indicator fails to respond in either MAN AC or MAN DC, dispatch must be in accordance with MEL 21-15 for un-pressurized flight.
- B. For pressurized flight when STBY Mode is inoperative, modify the following flight crew Non-Normal Procedures as follows:

- 1) **DOOR ANNUNCIATOR:** If MAIN CARGO light illuminates or if EQUIP, FWD/AFT CARGO or AIRSTAIR light illuminates and pressurization is not normal:
 - a. Following descent to 13,000 feet or MEA (whichever is higher), set LAND ALT to 13,000 feet if MEA is not above 13,000 feet. If MEA is above 13,000 feet, set pressurization mode selector to MAN and adjust outflow valve to increase cabin altitude to MEA.
 - 2) **SMOKE REMOVAL:** If pack(s) are ON and smoke source is confirmed to be in the cockpit or main cabin:
 - a. Increase ventilation rate by setting LAND ALT to 10,000 feet.
 - 3) **ARCING/DELAMINATED/SHATTERED OR CRACKED WINDOW:**
 - a. If Window 3 is NOT affected; Set LAND ALT to 10,000 feet.
 - b. If Window 3 is affected; Set LAND ALT to 13,000 feet.
- C. For un-pressurized flight, refer to MEL 21-15 (Outflow Valve) and accomplish the un-pressurized flight Operations (O) Procedures.

DIGITAL CABIN PRESSURE CONTROL SYSTEM (DCPCS)

- A. For operation with one automatic mode inoperative:
- 1) Normal operation of manual mode may be confirmed as follows:
 - a. Select MAN on the Pressurization Mode Selector.
 - b. By appropriate use of the VALVE toggle switch, observe that the outflow valve position indicator moves to full open, to full closed and then back to full open.
- B. For un-pressurized flight, refer to MEL 21-15 (Outflow Valve) and accomplish the un-pressurized flight Operations (O) Procedures.

MAINTENANCE (M)

For un-pressurized flight, refer to MEL 21-15 (Outflow Valve) and accomplish the un-pressurized flight Maintenance (M) Procedures.

21-15 Main Outflow Valve

OPERATIONS (O)

NOTE: For Analog System, pressurized flight allowed for cargo-only flights. Ensure aircraft is de-pressurized prior to landing.

NOTE: For pressurized flight with the Digital System installed, if AUTO mode is inoperative, operate Cabin Pressurization Controller in ALTN mode for automatic cabin pressure control.

UNPRESSURIZED FLIGHT

1. Limit altitude to 10,000 ft. for passenger flights. Non-passenger flights above 10,000 ft. require flight crew to be on oxygen.

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2. To avoid passenger discomfort, limit climb and descent rates to 500 FPM.
3. Extended over-water flight is not permitted.
4.
 - A. Only one A/C Pack may be used in-flight.
When dispatching with the operating pack supplied by engine bleed air for takeoff, VMCG should be determined based on AC packs OFF. Takeoff performance should be based on AC packs ON/AUTO.
 - B. Only one galley 4B food cart chiller (if installed) may be used in-flight.

MAINTENANCE (M)

UNPRESSURIZED FLIGHT

1. Manually position the outflow valve in the full/partial open position as applicable.
 - A. For Analog System, position (if required) the outflow valve in the full open position as follows.
 - 1) Place the Pressurization Mode Selector in the AC MAN or DC MAN position.
 - 2) Hold the VALVE toggle switch in the OPEN position until valve position indicator indicates full open.
 - B. For Digital System (DCPCS), position the outflow valve in the 25% open position as follows.
 - 1) Place the Pressurization Mode Selector in the MAN position.
 - 2) Hold the VALVE toggle switch in the OPEN position until valve position indicator indicates 25% open.
 - 3) For Manual Mode inoperative, the following procedure can be used to position the outflow valve to 25% open.
 - a. Set parking brake. Make sure that all personnel are cleared from engine danger area.
 - b. Start both engines and allow them to stabilize for two minutes. Advance thrust levers as necessary to ensure that N1 is greater than 60% and N2 is greater than 89%.
 - c. Monitor outflow valve position as it closes using the position indicator. Open PRESSURIZATION CONTROL - AUTO 1, PRESSURIZATION CONTROL - AUTO 2 circuit breakers when outflow valve reaches appropriate position.
 - d. Retard thrust levers and shut down both engines.

- C. If outflow valve cannot be positioned to either the full open (Analog System) or 25% open (Digital System) position as applicable, remove valve per AMM 21-31-11. Stow electrical connectors.
2. Open and collar the following P-6 Panel outflow valve circuit breakers:
 - A. For Analog System: MANUAL AC, MANUAL DC, AUTO AC, AUTO DC, STBY AC and STBY DC.
 - B. For Digital System: PRESSURIZATION CONTROL - MAN, PRESSURIZATION CONTROL - AUTO 1, PRESSURIZATION CONTROL - AUTO 2, PRESSURIZATION CONTROL - IND and PRESSURIZATION CONTROL - LCD LTG.
3. Advise dispatch. Maximum altitude for flight planning will be affected.

21-16 Pressure Relief Valves

OPERATIONS (O)

1. Limit altitude to 10,000 ft. for passenger flights. Non-passenger flights above 10,000 ft. require flight crew to be on oxygen.
2. Except for ditching, maintain outflow valve in the full open (Analog System) or 25% open (Digital System) position as applicable.
3.
 - A. Only one A/C Pack may be used in-flight.
When dispatching with the operating pack supplied by engine bleed air for takeoff, VMCG should be determined based on AC packs OFF. Takeoff performance should be based on AC packs ON/AUTO.
 - B. Only one galley 4B food cart chiller (if installed) may be used in-flight.
4. To avoid passenger discomfort, limit climb and descent rates to 500 FPM.

MAINTENANCE (M)

PRESSURIZED FLIGHT

Boeing is not aware of any reliable way to secure a safety relief valve in the closed position. If one valve is inoperative and pressurized flight is desired, install a blanking plate per the following instructions.

1. Remove the aft bulkhead liner in the aft cargo compartment.
2. Remove the pressure relief valve (AMM 21-32-21). Retain the clamp and the gasket.

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3. Make a blanking plate from 0.125 to 0.1875 inch 2024 T3 aluminum to seal the pedestal. Make certain holes to accept locating pins and ambient sense tube are drilled through blanking plate.
4. Apply lubricant to both sides of the gasket.
5. Install the gasket, plate, and clamp on the pedestal.
6. Put an airtight cap on the ambient sense tube.
7. Install the aft bulkhead liner in the aft cargo compartment.

UNPRESSURIZED FLIGHT

1. Manually position the outflow valve in the full/partial open position as applicable.
 - A. For Analog System, position (if required) the outflow valve in the full open position as follows.
 - 1) Place the Pressurization Mode Selector in the AC MAN or DC MAN position.
 - 2) Hold the VALVE toggle switch in the OPEN position until valve position indicator indicates full open.
 - B. For Digital System (DCPCS), position the outflow valve in the 25% open position as follows.
 - 1) Place the Pressurization Mode Selector in the MAN position.
 - 2) Hold the VALVE toggle switch in the OPEN position until valve position indicator indicates 25% open.
 - 3) For Manual Mode inoperative, the following procedure can be used to position the outflow valve to 25% open.
 - a. Set parking brake. Make sure that all personnel are cleared from engine danger area.
 - b. Start both engines and allow them to stabilize for two minutes. Advance thrust levers as necessary to ensure that N1 is greater than 60% and N2 is greater than 89%.
 - c. Monitor outflow valve position as it closes using the position indicator. Open PRESSURIZATION CONTROL - AUTO 1, PRESSURIZATION CONTROL - AUTO 2 circuit breakers when outflow valve reaches appropriate position.
 - d. Retard thrust levers and shut down both engines.
 - C. If outflow valve cannot be positioned to either the full open (Analog System) or 25% open (Digital System) position as applicable, remove valve per AMM 21-31-11. Stow electrical connectors.
2. Open and collar the following P-6 Panel outflow valve circuit breakers:
 - A. For Analog System: MANUAL AC, MANUAL DC, AUTO AC, AUTO DC, STBY AC and STBY DC.
 - B. For Digital System: PRESSURIZATION CONTROL - MAN, PRESSURIZATION CONTROL - AUTO 1, PRESSURIZATION

CONTROL - AUTO 2, PRESSURIZATION CONTROL - IND and
PRESSURIZATION CONTROL - LCD LTG.

3. Advise dispatch. Maximum altitude for flight planning will be affected.

21-19 Passenger Cabin Temperature Control System

NOTE: MEL 21-1 restrictions for an inoperative pack must be observed if the right pack cannot be used.

OPERATIONS (O)

If the right pack cannot be used, use MEL 21-1 One Pack Inoperative (Pressurized) Operations Procedure.

21-21 Flight Deck Temperature Control System

NOTE: MEL 21-1 restrictions for an inoperative pack must be observed if the left pack cannot be used.

OPERATIONS (O)

If the left pack cannot be used, use MEL 21-1 One Pack Inoperative (Pressurized) Operations Procedure.

21-22 Forward Outflow Valve

OPERATIONS (O)

1. If both packs are operative, valve may be open or closed with no altitude restriction.
2. If valve is inoperative open and only one pack operative, limit airplane altitude to FL 200 or below.

NOTE: If desired, increased air flow can be obtained when flaps are extended (takeoff and landing) if the APU is used instead of engine bleed to supply bleed air to the operating pack. See MEL 21-1 One Pack Inoperative Operations Procedure.

21-25 Water Separator Anti-Icing Systems

NOTE: MEL 21-1 restrictions for inoperative pack(s) must be observed.

OPERATIONS (O)

1. For dispatch with one water separator anti-icing system inoperative (pressurized), use MEL 21-1 One Pack Inoperative (Pressurized) Operations Procedure.

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2. For dispatch with both water separator anti-icing systems inoperative, use MEL 21-1 Two Packs Inoperative (Un-pressurized) Operations Procedure.

MAINTENANCE (M)

Use MEL 21-1 Maintenance procedure for one or two packs inoperative, as applicable.

21-26 Ground Preconditioned Air Connection Check Valve**OPERATIONS (O)**

1. Limit altitude to 10,000 ft. for passenger flights. Non-passenger flights above 10,000 ft. require flight crew to be on oxygen.
2. Except for ditching, maintain outflow valve in the full open (Analog System) or 25% open (Digital System) position as applicable.
3.
 - A. Only one A/C Pack may be used in-flight.
When dispatching with the operating pack supplied by engine bleed air for takeoff, VMCG should be determined based on AC packs OFF. Takeoff performance should be based on AC packs ON/AUTO.
 - B. Only one galley 4B food cart chiller (if installed) may be used in-flight.
4. To avoid passenger discomfort, limit climb and descent rates to 500 FPM.

MAINTENANCE (M)

Configure airplane for un-pressurized flight:

1. Manually position the outflow valve in the full/partial open position as applicable.
 - A. For Analog System, position (if required) the outflow valve in the full open position as follows.
 - 1) Place the Pressurization Mode Selector in the AC MAN or DC MAN position.
 - 2) Hold the VALVE toggle switch in the OPEN position until valve position indicator indicates full open.
 - B. For Digital System (DCPCS), position the outflow valve in the 25% open position as follows.
 - 1) Place the Pressurization Mode Selector in the MAN position.
 - 2) Hold the VALVE toggle switch in the OPEN position until valve position indicator indicates 25% open.
 - 3) For Manual Mode inoperative, the following procedure can be used to position the outflow valve to 25% open.

- a. Set parking brake. Make sure that all personnel are cleared from engine danger area.
 - b. Start both engines and allow them to stabilize for two minutes. Advance thrust levers as necessary to ensure that N1 is greater than 60% and N2 is greater than 89%.
 - c. Monitor outflow valve position as it closes using the position indicator. Open PRESSURIZATION CONTROL - AUTO 1, PRESSURIZATION CONTROL - AUTO 2 circuit breakers when outflow valve reaches appropriate position.
 - d. Retard thrust levers and shut down both engines.
- C. If outflow valve cannot be positioned to either the full open (Analog System) or 25% open (Digital System) position as applicable, remove valve per AMM 21-31-11. Stow electrical connectors.
2. Open and collar the following P-6 Panel outflow valve circuit breakers:
- A. For Analog System: MANUAL AC, MANUAL DC, AUTO AC, AUTO DC, STBY AC and STBY DC.
 - B. For Digital System: PRESSURIZATION CONTROL - MAN, PRESSURIZATION CONTROL - AUTO 1, PRESSURIZATION CONTROL - AUTO 2, PRESSURIZATION CONTROL - IND and PRESSURIZATION CONTROL - LCD LTG.
3. Advise dispatch. Maximum altitude for flight planning will be affected.

21-27 Electrical/Electronic Equipment Cooling Blowers

OPERATIONS NOTE

Verify that the operative fan is selected and the EQUIP COOLING OFF light is extinguished.

For EFIS equipped airplanes, if the EQUIP COOLING OFF light illuminates during flight (both supply fans or both exhaust fans inoperative), continued flight beyond 90 minutes can result in loss of essential avionics.

21-37 OUTFLOW VALVE HEATER GASKET

The Outflow Valve Heater Gasket is not installed on airplanes equipped with the Digital Cabin Pressure Control System.

OPERATIONS NOTE

To prevent possible icing from causing outflow valve restriction on flights longer than two hours, the following procedure may be used:

1. The following steps may be performed prior to takeoff to reduce in-flight workload:

Cabin Rate Selector..... MAXIMUM INCR

Cabin Altitude Selector SET 500 FEET HIGHER THAN
ANTICIPATED OR INDICATED
CABIN ALTITUDE

2. Following one hour of flight, and at 20 to 30 minute intervals in level flight cruise, verify normal outflow valve operation:

Pressurization Mode Selector.....STANDBY

Position mode selector to STANDBY and observe a normal response of the cabin rate of climb.

Pressurization Mode Selector.....AUTO

Following stabilization, position mode selector back to AUTO and observe a normal response of the cabin rate of climb.

21-38 OUTFLOW VALVE POSITION INDICATOR**OPERATIONS (O)**

If procedures call for the outflow valve to be placed in the full open or closed position, hold the outflow valve toggle switch to OPEN or CLOSE for approximately 40 seconds.

MAINTENANCE (M)

Perform the following test to verify that the outflow valve actuators are operating normally:

ANALOG CABIN PRESSURE CONTROL SYSTEM

1. Provide electrical power (AMM 24-22-00).
2. Verify that the AUTOMATIC AC and DC, STANDBY AC and DC and MAN AC and DC circuit breakers on the P6 Panel are closed.
3. Position the FLT-GRD switch on pressurization control panel to FLT.
4. Verify visually that the outflow valve is in the fully opened position.
5. Position the mode selector switch to DC MAN.
 - A. Verify that the MANUAL light illuminates.

- B. Position and hold the outflow valve toggle switch to CLOSED for approximately 10 seconds and verify visually that the outflow valve is fully closed.
- C. Position and hold the outflow valve toggle switch to OPEN for approximately 10 seconds and verify visually that the outflow valve is fully opened.
6. Position the mode selector switch to AC MAN.
 - A. Verify that the MANUAL light illuminates.
 - B. Position and hold the outflow valve toggle switch to CLOSED for approximately 10 seconds and verify visually that the outflow valve is fully closed.
 - C. Position and hold the outflow valve toggle switch to OPEN for approximately 10 seconds and verify visually that the outflow valve is fully opened.
7. Position the FLT-GRD switch to GRD.
8. If no longer required, remove electrical power from airplane (AMM 24-22-00).

DIGITAL CABIN PRESSURE CONTROL SYSTEM

1. Provide electrical power (AMM 24-22-00).
2. Verify that P-6 Panel PRESSURIZATION CONTROL - MAN, PRESSURIZATION CONTROL - AUTO 1, PRESSURIZATION CONTROL - AUTO 2, PRESSURIZATION CONTROL - IND and PRESSURIZATION CONTROL - LCD LTG circuit breakers are closed.
3. Verify visually that the outflow valve is in the fully opened position.
4. Position the mode selector switch to MAN.
 - A. Verify that the MANUAL light illuminates.
 - ~~B.~~ Position and hold the outflow valve toggle switch to CLOSED for approximately 30 seconds and verify visually that the outflow valve
5. Position the mode selector switch to AUTO.
 - A. Verify that the MANUAL light extinguishes.
 - B. Verify visually that the aft outflow valve has moved to the fully opened position.
6. If no longer required, remove electrical power from airplane (AMM 24-22-00).

21-40 Equipment Cooling Automatic Flow Control Valve/Overboard Exhaust Valve

Rev.: 007

NOTE: With the valve in the closed position, to ensure adequate equipment cooling while on the ground:

1. Operate one pack using APU bleed air when the airplane is at the gate,
2. Operate both packs using engine bleed during ground taxi operations.

Turn recirculation fan(s) (if installed) on during all ground operations.

OPERATIONS (O)

VALVE INOPERATIVE OPEN:

1. Limit altitude to 10,000 ft. for passenger flights. Non-passenger flights above 10,000 ft. require flight crew to be on oxygen.
2. Except for ditching, maintain outflow valve in the full open (Analog System) or 25% open (Digital System) position as applicable.
3.
 - A. Only one A/C Pack may be used in-flight.
When dispatching with the operating pack supplied by engine bleed air for takeoff, VMCG should be determined based on AC packs OFF. Takeoff performance should be based on AC packs ON/AUTO.
 - B. Only one galley 4B food cart chiller (if installed) may be used in-flight.
4. To avoid passenger discomfort, limit climb and descent rates to 500 FPM.

MAINTENANCE (M)

Configure airplane for un-pressurized flight:

1. Manually position the outflow valve in the full/partial open position as applicable.
 - A. For Analog System, position (if required) the outflow valve in the full open position as follows.
 - 1) Place the Pressurization Mode Selector in the AC MAN or DC MAN position.
 - 2) Hold the VALVE toggle switch in the OPEN position until valve position indicator indicates full open.
 - B. For Digital System (DCPCS), position the outflow valve in the 25% open position as follows.
 - 1) Place the Pressurization Mode Selector in the MAN position.
 - 2) Hold the VALVE toggle switch in the OPEN position until valve position indicator indicates 25% open.
 - 3) For Manual Mode inoperative, the following procedure can be used to position the outflow valve to 25% open.

- a. Set parking brake. Make sure that all personnel are cleared from engine danger area.
 - b. Start both engines and allow them to stabilize for two minutes. Advance thrust levers as necessary to ensure that N1 is greater than 60% and N2 is greater than 89%.
 - c. Monitor outflow valve position as it closes using the position indicator. Open PRESSURIZATION CONTROL - AUTO 1, PRESSURIZATION CONTROL - AUTO 2 circuit breakers when outflow valve reaches appropriate position.
 - d. Retard thrust levers and shut down both engines.
- C. If outflow valve cannot be positioned to either the full open (Analog System) or 25% open (Digital System) position as applicable, remove valve per AMM 21-31-11. Stow electrical connectors.
2. Open and collar the following P-6 Panel outflow valve circuit breakers:
 - A. For Analog System: MANUAL AC, MANUAL DC, AUTO AC, AUTO DC, STBY AC and STBY DC.
 - B. For Digital System: PRESSURIZATION CONTROL - MAN, PRESSURIZATION CONTROL - AUTO 1, PRESSURIZATION CONTROL - AUTO 2, PRESSURIZATION CONTROL - IND and PRESSURIZATION CONTROL - LCD LTG.
3. Advise dispatch. Maximum altitude for flight planning will be affected.

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ATA 22 AUTOFLIGHT

22-2 Autopilot Disengaged Warning System

OPERATIONS (O)

When operating with both Autopilot Disengaged Warning Lights inoperative, refer to the Remarks and Exceptions in MEL 22-1 pertaining to inoperative autopilots.

22-3 YAW DAMPER

OPERATIONS (O)

Do not exceed flaps 30 during landing if crosswinds exceed 30 knots.

If the yaw damper circuit breakers (P6-2 or P18-1 Panel) are pulled on airplanes with the Rudder Pressure Reducer System installed, the Rudder Pressure Reducer is also disabled and the following minimum maneuvering speeds should be used during approach maneuvering (do not deviate from the airspeeds specified in Boeing Operations Manual Non-Normal Procedures).

Flap Position	Minimum Maneuvering Speeds (KIAS)		
		Gross Weight	
	Up to 53,070 Kgs (117,000 Lbs)	53,070 Kgs (117,000 Lbs) to 62,823 Kgs (138,500 Lbs)	Above 62,823 Kgs (138,500 Lbs)
0	220	230	240
1	200	210	220
5	190	200	210
10	170	180	190
15	150	160	170
25	140	150	160

MAINTENANCE (M)

For airplanes which have SB 737-27A1206 (or production equivalent) incorporated, the Rudder Pressure Reducer System must be verified to operate normally unless the yaw damper is deactivated by pulling the yaw damper circuit breakers. To verify that the Rudder Pressure Reducer System is operating normally, perform the Rudder Pressure Reducer test using YDC BITE (AMM 22-12-01).

If dispatching with yaw damper deactivated, place yaw damper switch to OFF and pull the yaw damper circuit breakers on the P6-2 or P18-1 Panel.

22-4 Autothrottle System**MAINTENANCE NOTE**

If desired, the following procedure may be used to deactivate the autothrottle system. (applicable only to airplanes with a separate Smiths autothrottle installation):

Open and collar P18-1 Panel autothrottle circuit breakers AUTOTHROTTLE DC and AUTOTHROTTLE AC.

22-5 MACH TRIM SYSTEMS**OPERATIONS (O)****BOTH MACH TRIM SYSTEMS INOPERATIVE:**

Do not exceed the following speed: .74M (both systems inoperative).

ONE MACH TRIM SYSTEM INOPERATIVE

Verify the remaining Mach Trim System and MACH TRIM FAIL light operate normally:

- A. Press and release a system annunciator panel on the lightshield. MACH TRIM FAIL light, FLT CONT annunciator and MASTER CAUTION light will illuminate.
- B. Press and release a MASTER CAUTION light on the lightshield. MACH TRIM FAIL light, FLT CONT annunciator and MASTER CAUTION light will extinguish.
- C. Illumination of the affected lights when recalled and extinguishing when reset verifies that the remaining Mach Trim System and the MACH TRIM FAIL light operate normally.

MAINTENANCE (M)

Verify that the elevator trailing edge is in the correct position for flight with both Mach Trim Systems inoperative.

NOTE: An operable MACH TRIM ACTUATOR and Mach Trim System are required to position the elevator trailing edge if it is out of alignment. An inoperable actuator or accessory box must be replaced. Dispatch with both Mach Trim Systems inoperative is not allowed if the elevator trailing edge is not aligned with the index mark on the fuselage.

- A. Apply electrical power to the airplane and hydraulic power to the flight controls.
- B. Position stabilizer to: 3 units of trim.
- C. Jiggle the control column to place the elevators in the detent position.
- D. Visually check that the elevator trailing edge is aligned within 0.06 inches of the index mark on the fuselage.
- E. Open and collar the MACH TRIM AC and DC circuit breakers (P6-2 / P18-1 Panels).
- F. Restore airplane to its required configuration.
- G. Inform dispatch.

**22-6 SP-300 FLIGHT AND APPROACH MODE
ANNUNCIATIONS****OPERATIONS NOTE**

Individual systems may not be used when associated annunciator is inoperative

**22-7 DUAL ANGLE OF ATTACK SENSORS/STALL WARNING
SYSTEM SENSORS/ALPHA VANES****OPERATIONS NOTE**

Operate associated autopilot only in the Control Wheel Steering mode.

MAINTENANCE (M)

Deactivate and observe the MEL provisions for the following affected equipment.

- 1. SP-177 Autopilot: Deactivate the right Stall Warning System (if installed) per MEL 27-13 Maintenance Procedures.
- 2. SP-300 Autopilot: The following affected systems must be deactivated and considered inoperative for dispatch.
 - A. Digital Stall Warning System - MEL 27-13
 - B. Autothrottle System (Left Sensor) - MEL 22-4
 - C. Auto Slat System -MEL 27-12

22-8 AUTOTHROTTLE DISENGAGE LIGHTS

OPERATIONS NOTE

Autothrottle may be used with one light inoperative except when landing minimums are dependent upon its use. Do not use the autothrottle with both lights inoperative.

22-9 Speed Trim Fail Light System

MAINTENANCE (M)

Verify that both speed trim systems operate normally.

1. Use DFCS BITE (AMM 22-03-10).
 - A. Perform DFCS BITE using FMCS CDU selecting - DFCS CURRENT STATUS for speed trim on Channels A and B.
 - B. Verify BITE diagnostic indicating failed flight control module (light assembly).
 - C. Verify other speed trim and stab trim BITE tests pass.
2. Advise flight crews that both systems have been tested.

22-10 SPEED TRIM SYSTEM

OPERATIONS (O)

Verify that remaining speed trim system and SPEED TRIM FAIL light operate normally as follows:

1. Press and release a system annunciator panel on the light shield. SPEED TRIM FAIL light, FLT CONT annunciator and MASTER CAUTION light will illuminate.
2. Press and release a MASTER CAUTION light on the light shield. SPEED TRIM FAIL light, FLT CONT annunciator and MASTER CAUTION light will extinguish.

Illumination of the affected lights when recalled and extinguishing when reset verifies that the remaining speed trim system and the SPEED TRIM FAIL light operate normally.

22-11 STAB OUT OF TRIM LIGHT

OPERATIONS (O)

When operating with the STAB OUT OF TRIM Light inoperative, refer to the Remarks and Exceptions in MEL 22-1 pertaining to inoperative autopilots.

22-15 Mode Control Panel Switches / Paddles**OPERATIONS (O)**

When operating with both Autopilot CMD Engage Switches inoperative, refer to the Remarks and Exceptions in MEL 22-1 pertaining to inoperative autopilots.

MAINTENANCE NOTE

Autothrottle Arm Switch: The autothrottle system may be deactivated per MEL 22-4 Maintenance Note.

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ATA 23 COMMUNICATIONS

23-2 PASSENGER ADDRESS SYSTEM

OPERATIONS (O)

Normal procedures:

- Inform Cabin Crew that the Passenger Address system is inoperative.
- Instruct Cabin Crew to inform passengers orally.
- Instruct Cabin Crew on the emergency procedures following below.

Emergency procedures:

- Three (3) chimes on the C/C-call system shall be used to call Cabin Crew to the flight deck to be instructed on the emergency.
- Two (2) chimes on the C/C-call system shall be instruction to take the emergency stations and establish interphone with the flight deck.
- Flashing with Fasten belts sign: “Brace for impact”.

23-3 Communication Systems (VHF)

On airplanes with ACARS installed that do not have the optional Voice Mode Protection (VMP) or ACARS Over AVLK (Aviation VHF Link Control), VHF-3 cannot be used for ATC voice communications when ACARS is operational. For these airplanes, the following applies: If VHF-3 can be tuned with ACARS deactivated, it may be used for dispatch credit if ACARS is deactivated. If VHF-3 cannot be tuned with ACARS deactivated, VHF-3 must be switched with an inoperative VHF-1 or VHF-2 transceiver to be used for dispatch credit. Dispatch is allowed with ACARS inoperative per MMEL item 23-9.

MAINTENANCE NOTE

ACARS may be deactivated by opening and collaring the ACARS AC and DC circuit breakers.

23-4 CREWMEMBER INTERPHONE SYSTEM**OPERATIONS (O)**

Flight Deck to Cabin, Cabin to Flight Deck, Cabin to Cabin:

- a) Both flight crew and cabin crew should be appropriately briefed to establish an alternate and emergency procedure to provision access to the flight deck/cabin.
- b) Ensure that the PA System is operating normally from the Flight Deck and the Forward Cabin Crew station.

Flight Deck to Ground:

Use flight interphone for communications with ground crew during ground handling operations (jack is available at the external power receptacle). If communications still cannot be established, alternate communications procedures, such as visual signals shall be used. These procedures include hand signals for "ok to start engine", "gear pins out", "ok to taxi", "shut down", etc.

23-9 ACARS SYSTEM**OPERATIONS (O)**

Airlines must establish company policies for dispatch with the ACARS system inoperative.

23-13 Flight Crew Audio Selector/ Control Panels**OPERATIONS (O)**

For the captain's audio selector/control panel inoperative, position AUDIO transfer switch to CAPT ON OBS.

The captain must use the primary observer's audio selector/control panel. For the first officer's audio selector/control panel inoperative, position AUDIO transfer switch to F/O ON OBS. The first officer must use the primary observer's audio selector/control panel.

23-15 PRE-RECORDED PASSENGER ANNOUNCEMENT SYSTEM**OPERATIONS (O)**

Each operator must provide alternate procedures to be used when the pre-recorded passenger announcement system is inoperative.

23-16 PUSH-TO-TALK (PTT) SWITCHES**MAINTENANCE (M)**

Where applicable, verify that the affected PTT switch has electrically failed open by listening for sidetone during a trial transmission without using PTT switch. If sidetone is heard, then PTT switch has failed in the closed (HOT MIC) position. The Control Wheel PTT switch can be deactivated by disconnecting, capping and stowing the GROUND (BLK/BRN) wire connected to the switch (AMM 23-51-41: Control Wheel PTT Switch Removal/Installation). Verify that R/T and/or I/C communications can be established using the associated Audio Selector Panel PTT switch.

23-19 Alerting System (Audio/Visual)**OPERATIONS (O)**

The operator must develop alternate procedures for Cabin Crew alerting that may be based on the use of remaining operative functions of the alerting system or on use of the Passenger Address System. Prior to flight, the pilot in command should brief cabin crewmembers on the alternate procedures to be used.

23-21 COCKPIT DOOR/AIRCRAFT CABIN SURVEILLANCE SYSTEMS**OPERATIONS (O)**

Cabin crew is briefed additionally for the procedures used to enter the cockpit.

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ATA 24 ELECTRICAL POWER

24-1 Engine Driven Generator Systems

OPERATIONS (O)

1. Use the APU generator to power the bus associated with the inoperative engine driven generator system. For full electrical load, APU average inflight fuel flow rate is 50 kgs per hour.
2. Observe APU Ops limitations and apply Alt. restriction as applicable.
Refer to OMB B737 1.7.1.
3. If APU fuel heater is not installed, fuel temperature must be at or above 0 deg. C.
- A. Maintain fuel temperature above 0 deg. C as outlined in MEL 73-2.

OR

- B. Limit flight duration to the time required for the fuel to cool to 0 deg. C as shown below.

TIME INSIDE TABLE IS IN HOURS

ALT 1000 FT	ISA -20 deg C				ISA -10 deg C			
	Start fuel tank temperature				Start fuel tank temperature			
	10°C	20°C	30°C	40°C	10°C	20°C	30°C	40°C
30	.4	.5	.7	.8	.5	.7	.8	1.0
25	.4	.6	.7	.9	.5	.8	1.0	1.2
20	.4	.6	.8	1.0	.7	1.0	1.2	1.4
15	.5	.8	1.1	1.2	1.3	1.7	2.1	2.3
10	1.1	1.6	1.9	2.1	NL	NL	NL	NL
ALT 1000 FT	ISA				ISA+10 deg C			
	Start fuel tank temperature				Start fuel tank temperature			
	10°C	20°C	30°C	40°C	10°C	20°C	30°C	40°C
30	.7	.9	1.1	1.2	1.1	1.3	1.5	1.7
25	.9	1.3	1.6	1.8	NL	NL	NL	NL
20	1.5	2.0	2.3	2.5	NL	NL	NL	NL
15	NL	NL	NL	NL	NL	NL	NL	NL
10	NL	NL	NL	NL	NL	NL	NL	NL

NL (No Limit) - Fuel does not cool to 0°C.

Example: Temperature = ISA -10°C, Altitude = 20000 Ft. and

Starting Fuel Tank Temperature = 20°C. Time to Cool to 0°C = 1.0 Hour

NOTE: The APU fuel heater is designed to fail open and (if installed) can be assumed to be functional. If the heater has failed open and the fuel boost pumps are off, some of the incoming fuel can vaporize causing gradual wear and deterioration of the APU fuel pump. However, all deterioration stops when the fuel boost pumps are turned on. Therefore, the APU will not deteriorate in flight if the fuel heater has failed open. Based on this discussion, the FAA has agreed that it is not necessary to confirm the operation of the APU fuel heater, provided a check is made to ensure that the APU can operate under loaded conditions within its defined limits.

MAINTENANCE (M)

1. Check for proper oil level on both engine driven generator systems and the APU on daily basis (AMM 12-13-21 and 12-13-31).

NOTE: The CSD may be operated without oil for up to 50 hours in the disconnected mode.

2. Disconnect the generator drive as follows:
 - A. Supply electrical power (AMM 24-22-00).
 - B. Momentarily place the affected Generator Switch (GEN 1 or GEN 2) switch to ON and then center.
 - C. Start the associated engine and operate at idle power (AMM 71-00-00).

NOTE: DO NOT DISCONNECT THE CSD UNLESS THE ENGINE SPEED IS AT OR ABOVE THE MINIMUM IDLE.

- D. Operate DISCONNECT switch for the affected generator as follows:
 - 1) If DISCONNECT switch guard has lockwire installed, remove the lockwire.
 - 2) Lift the DISCONNECT switch guard.

NOTE: DO NOT PUSH THE DISCONNECT SWITCH FOR MORE THAN 3 SECONDS.

- 3) Push the DISCONNECT switch momentarily.
3. Verify that the generator drive has disconnected.
 - A. Verify that the LOW OIL PRESSURE light is illuminated.
 - B. Position AC Meters Selector to the affected generator position.
 - C. Press and hold the RESID VOLTS button.
 - D. Verify that AC voltmeter shows less than 5 volts.
 - E. Release the RESID VOLTS button.

4. Verify that the Manual Trip (MT) light on the Electrical Power Annunciator Panel (M238) has illuminated for the affected generator.
5. Shut down the engine (AMM 71-00-00).
6. Lower switch guard and install lockwire (if previously installed).
7. Remove lamps from the following affected generator lights and placard light covers - INOP:
 - A. Generator Drive LOW OIL PRESSURE or DRIVE light.
 - B. Generator Drive HIGH OIL TEMP light.
 - C. GEN OFF BUS light.
8. Confirm APU operation:
Operate the APU under a loaded condition and observe that APU operates within defined limits (Ref.: AMM 49-11-00 APU POWER PLANT - A/T, Test of APU Operation - LOADED CONDITION).

CAUTION: IF THE ENGINE OPERATES WITH THE CSD DISCONNECTED FOR MORE THAN 50 HOURS, THE CSD INPUT SHAFT BALL BEARING ASSEMBLY SHOULD BE REMOVED AND SHOP INSPECTED FOR WEAR.

24-2 APU Generator System

MAINTENANCE (M)

Both engine driven generator systems' oil quantity is to be checked during daily check.

24-8 AC Volts Indication

OPERATIONS (O)

The AC volts indication must operate normally when the AC Meters Selector is in the STBY PWR position.

Perform a test of the Standby Power System (Reference OM-B 12.6.4 "Standby Power Test").

24-12 GEN OFF BUS Lights**OPERATIONS NOTE**

The associated AC ammeter can be used to determine when the generator is not supplying the generator bus.

24-17 DC AMMETER INDICATION**OPERATIONS (O)**

The DC ammeter does not indicate current in the STBY PWR and BAT BUS positions.

1. DC AMPS indication must operate normally when the DC Meters Selector is in the BAT position.
2. Perform a test of the Standby Power System (Reference Boeing Operations Manual Supplementary Normal Procedures, "Standby Power Test").
3. Monitoring of the TR's for dual autopilot approach availability prior to engagement (isolated sources) will not be possible if the DC Meters Selector TR positions do not operate.

24-18 DC Volts Indication**OPERATIONS (O)**

The DC Volts indication must operate normally when the DC Meters Selector is in the STBY PWR position.

1. Perform a test of the Standby Power System (Reference OM-B 12.6.4 "Standby Power Test").

24-19 APU GEN OFF BUS Light**OPERATIONS NOTE**

1. With the ACMeter Selector positioned to APU GEN, the frequency meter can be used to confirm proper APU generator rotational speed.
2. With the APU GEN selected ON, the appropriate generator AC ammeter can be used to confirm that the APU generator is supplying a generator bus.

ATA 25 EQUIPMENT/FURNISHINGS

25-3 FLIGHT ATTENDANT SEAT ASSEMBLY (SINGLE OR DUAL POSITION)

OPERATIONS (O)

Flight attendant(s) displaced by inoperative seat(s) occupies either an adjacent flight attendant seat or the passenger seat which is as close to or closer than the nearest seated passenger to the associated exit.

The preference shall be given to the aisle seats of the first and the last passenger rows.

CC1 shall occupy an operative seat of the forward flight attendant seat assembly.

MAINTENANCE (M)

Flight Attendant Seat(s): Remove or secure the inoperative seat in the stowed position.

25 5 CARGO COMPARTMENT RESTRAINT COMPONENTS

MAINTENANCE (M)

1. Deactivation procedures for most cargo restraint or cargo guiding equipment are either obvious (e.g. inoperative container stop needs to be released to retracted position or removed to prevent interference with cargo loading) or unnecessary (e.g., a damaged end stop can be left as is). With the exception of the restrictions below, no other procedures are provided.
2. Refer to the Weight and Balance Manual for cargo loading limits when operating with restraint components missing or inoperative. A missing or broken restraint may reduce the allowable size and weight of cargo that requires tie-down restraint.

25-6 PASSENGER SEAT(S)**OPERATIONS (O)**

Prior to all takeoffs and landings, Cabin Crew will verify that baggage is not stowed under seats with broken restraining bars.

MAINTENANCE (M)

SEAT INOPERATIVE SECURED IN UPRIGHT POSITION:

Refer to the seat manufacturer's information for securing seat in upright position.

SEAT INOPERATIVE OTHER THAN UPRIGHT POSITION:

1. Secure seat in breakover position with a strap or rope such that seat can not be moved during flight.

OR

2. If seat is stuck in the recline position:
 - A. Verify that emergency exit is not blocked.
 - B. Block off the row of seats aft of inoperative seat and placard the entire row DO NOT OCCUPY.

FOR INOPERATIVE ELECTRICAL/ELECTRONIC SYSTEMS/COMPONENT(S):

Deactivate the associated component(s).

25-16 LOWER CARGO COMPARTMENT LINING PANELS**OPERATIONS (O)**

Verify that the associated compartment remains empty or contains only ballast, empty cargo handling equipment (ballast may be loaded in ULDs).

NOTE: As ballast must be used only dry shingle, coarse round gravel or pebbles of an average diameter of 12-15 mm packed in canvas or hessian (with an inner plastic bag) effectively closed bags.

MAINTENANCE (M)

Ensure that any items in the associated cargo compartment are properly secured to prevent damage to airplane system components exposed by the damaged or missing lining panel(s).

25-17 Emergency Medical Equipment**OPERATIONS (O)**

Each inoperative or incomplete FAK must be sealed and clearly labelled to identify the missing or inoperative components, as appropriate.

25-21 Flight Crew Seats**MAINTENANCE (M)**

1. For an inoperative recline mechanism, ensure the seat is secured in a position acceptable to the affected crewmember by performing a functional test to verify the seat back cannot be moved. Also verify that full travel of the seat on its track is not impaired.
2. For an inoperative vertical adjustment mechanism, perform a functional test to verify the seat cannot be moved in a vertical direction. If necessary, secure the seat in a fixed vertical position by disconnecting the vertical adjustment operating cable or removing the vertical adjustment pushrod mechanism, as appropriate.
3. Secure an inoperative armrest in the up position or remove from seat.

25-22 GALLEY/LAVATORY WASTE RECEPTACLE ACCESS DOORS/COVERS**OPERATIONS (O)**

Ensure that sufficient galley/lavatory waste receptacles are available to accommodate all waste that may be generated on the flight.

MAINTENANCE (M)

Secure the inoperative access door/cover in a manner that will prevent waste from being deposited in the compartment.

25-24 Overhead Storage Bin(s)/Cabin and Galley Storage**MAINTENANCE (M)**

Secure the compartment closed using appropriate procedures. An empty compartment may be secured closed without its door if compartment can be secured closed in a manner which prevents its use, such as with nonflammable tape marked DO NOT USE.

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ATA 26 Fire Protection

26-2 ENGINE OVERHEAT AND FIRE DETECTION SYSTEMS

OPERATIONS (O)

An inoperative loop may exist if the overheat and fire protection panel check in the OM-B, ch 2, Normal Procedures, 2.3.2.5 “Flight Deck Setup Procedure/Checklist”, is not positive. If the check is not positive, deselect the inoperative loop on the affected engine and retest the system by accomplishing the Fire and Overheat System Test with an Inoperative Loop in the OM-B, ch 12, Supplementary Procedures. If a positive test cannot be achieved with A or B loop deselected, the system is inoperative and dispatch is not allowed.

26-3 PORTABLE FIRE EXTINGUISHERS

MAINTENANCE (M)

1. Stow the out-of-service extinguisher in a place (possibly in a bag) where it will not be used by mistake until it can be removed from the airplane.
2. Ensure required distribution of serviceable extinguishers is maintained throughout the airplane.

26-4 WHEEL WELL FIRE DETECTION SYSTEM

OPERATIONS (O)

1. After takeoff, avoid the possibility of retracting an overheated wheel by monitoring brake temperature indications prior to retraction or leave the landing gear extended for 10 minutes unless engine inoperative climb performance and/or ice accumulation on landing gear (MEL 26-4 Note) is a consideration.
2. To account for delayed gear retraction, increase trip fuel and time by 363 kg. and 2 minutes respectively.

MAINTENANCE (M)

NOTE: The following procedure is provided for deactivating a system giving a false fire warning.

1. Deactivate Warning Light by removing the two light bulbs from the Wheel Well Overheat Light Indicator (aft electronic control panel).
2. Disconnect the fire bell from the wheel well overheat system as follows.
 - A. Disconnect the wire from D4520 pin #3 and #4 (E3-2 electrical shelf).
 - B. Cap and stow the disconnected wire.

3. Just prior to engine start, check that brakes are cool to the touch.

26-5 APU FIRE EXTINGUISHER DISCHARGE DISCS

MAINTENANCE (M)

Perform inspection check of appropriate fire bottle(s) per AMM 26-22-11.

26-8 APU FIRE DETECTION SYSTEM

OPERATIONS (O)

NOTE: If the APU DET INOP light fails to illuminate during "Ovht/Inop" or "Fault/Inop" test, but APU fire warning switch illuminates during fire test, APU fire detection system is operating normally, and APU may be used provided fire warning test is conducted before each APU start.

MAINTENANCE NOTE

For an inoperative single loop, the APU FIRE DETECTION circuit breaker C403 may be opened and collared to prevent nuisance/false warnings. With the C403 circuit breaker opened, the Master Caution light and OVHT/DET system annunciator light will not illuminate when performing the Fault/Inop test.

26-9 ENGINE/APU FIRE EXTINGUISHER TEST SYSTEM (EXT TEST) (SQUIB TEST)

OPERATIONS (O)

If the APU squib light is inoperative, procedures must not require use of APU, and APU must not be started. ER operations are prohibited.

MAINTENANCE (M)

Prepare the airplane for flight with the squib test system inoperative:

CAUTION: THE P6-2 CIRCUIT BREAKER PANEL CONTAINS HIGH VOLTAGE/CURRENTS THAT CAN CAUSE INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT. TO PREVENT INJURY, RESTRICT PERSONNEL FROM FIRE BOTTLE AREA WHILE PERFORMING TEST.

1. Fabricate a squib test lamp with pigtail leads terminating in size #8 lugs or alligator clips, using lamp P/N 116-565-1042-001 or equivalent (28 Volt, 40 Milliamp) in suitable holder.
2. Verify that squib circuit is operative.
 - A. For Engines:

- A.1. Open all four engine fire extinguisher circuit breakers on P6-2 Circuit Breaker Panel as identified in the appropriate ENGINE SQUIB TEST TABLE.
- A.2. Gain access to the P6-2 Circuit Breaker Panel.
- A.3. Connect the test lamp across the terminals of the appropriate circuit breaker for the inoperative test light circuit to be tested.
- A.4. Pull out the Engine Fire Handle switch for the suspect system by depressing the override button. Rotate the Engine Fire Handle to one side to confirm squib circuit continuity.
- A.5. Test lamp illuminated indicates intact squib.
- A.6. Rotate the engine fire handle back to center position and push down to stow it.
- A.7. Remove test lamp from the circuit breaker.
- A.8. Close all four circuit breakers.
- B. For APU:
 - B.1. Open the APU fire extinguisher circuit breaker on P6-2 Circuit Breaker Panel.
 - B.2. Gain access to the P6-2 Circuit Breaker Panel.
 - B.3. Connect the test lamp across the terminals of the APU fire extinguisher circuit breaker for the inoperative test light circuit to be tested.
 - B.4. Pull out the APU Fire Handle Switch for the suspect system by depressing the override button. Rotate the APU Fire Handle to one side to confirm squib circuit continuity.
 - B.5. Test lamp illuminated indicates intact squib.
 - B.6. Rotate the APU fire handle back to center position and push down to stow it.
 - B.7. Remove test lamp from the circuit breaker.
 - B.8. Close the circuit breaker.

ENGINE SQUIB TEST TABLE**Dual Outlet Dual Cartridge Bottle**

Bottle	Squib No.	Squib Plug No.	C/B Open and Test Lamp Connections
Left	1	D582, Pin 4	Across C296 Left Ext Bottle
Left	1	D582, Pin 6	Across C1021 Left Ext Bottle
Left	2	D1322, Pin 4	Across C296 Left Ext Bottle
Left	2	D1322, Pin 6	Across C1021 Left Ext Bottle
Right	1	D584, Pin 4	Across C297 Right Ext Bottle
Right	1	D584, Pin 6	Across C1022 Right Ext Bottle
Right	2	D1324, Pin 4	Right 2 Across C297 Right Ext Bottle
Right	2	D1324, Pin 6	Across C1022 Right Ext Bottle

26-12 WING-BODY OVERHEAT DETECTOR SYSTEM (LEFT)**OPERATIONS (O)**

Reference MEL 21-1 for information when an air conditioning pack is not used.

1. Use of the APU for pneumatic air supply and/or electrical power is not permitted except for engine start.
2. Following engine start, operate the airplane with isolation valve CLOSE, APU OFF, left engine bleed and pack OFF and right pack using the right engine bleed air.
3. Do not dispatch into known or forecast icing conditions.

MAINTENANCE NOTE

Reference MEL 21-1 for information when an air conditioning pack is not used.

26-13 WING-BODY OVERHEAT DETECTOR SYSTEM (RIGHT)**OPERATIONS (O)**

Reference MEL 21-1 for information when an air conditioning pack is not used.

1. Following engine start, operate the airplane with isolation valve CLOSE, right engine bleed and pack OFF and left pack using the left engine bleed.
2. Increased air flow will occur when flaps are extended (takeoff and landing) if the APU is used instead of engine bleed to supply bleed air to the left pack. With the pack switch in AUTO, the pack will operate in the high flow mode when the APU is used as the bleed source. The pack switch for the operating pack is not allowed to be in HIGH for takeoff and landing with the engine bleed on. Do not use APU bleed at altitudes above 17,000 feet.
3. Do not dispatch into known or forecast icing conditions.

MAINTENANCE NOTE

Reference MEL 21-1 for information when an air conditioning pack is not used.

26-15 LAVATORY FIRE EXTINGUISHER SYSTEMS**OPERATIONS (O)**

NOTE: If the associated lavatory smoke detector operates normally, no additional procedures are required.

1. If the associated lavatory smoke detector is inoperative, ensure that the affected lavatory is kept locked and is not entered except to inspect it.
2. Flight attendants should be aware of the location of the nearest portable fire extinguisher.

MAINTENANCE (M)

For an inoperative lavatory smoke detection system:

1. Empty waste receptacles.
2. Lock lavatory door using exterior locking feature.

26-16 LAVATORY SMOKE DETECTION SYSTEMS**OPERATIONS (O)**

1. Ensure that the affected lavatory is kept locked and is not entered except to inspect it.
2. Flight attendants should be aware of the location of the nearest portable fire extinguisher.

MAINTENANCE (M)

For an inoperative lavatory smoke detection system:

1. Empty waste receptacles.
2. Lock lavatory door using exterior locking feature.

For an inoperative lavatory smoke detector SELF TEST switch:

Perform the lavatory smoke detector system test on the associated smoke detector using an appropriate smoke source per AMM 26-14-00.

26-18 WING-BODY OVERHEAT TEST SYSTEM**MAINTENANCE (M)**

Verify the integrity of the Wing-Body Overheat Test System as follows:

1. Apply heat from an appropriate heat source to an operable detector.
Note that the substitute test heat device must not produce heat greater than 232°C. This temperature limit should be observed in event fuel vapors exist in the area.
2. Observe appropriate warning response in the flight deck.

26-19 LOWER CARGO COMPARTMENT FIRE DETECTION/SUPPRESSION SYSTEMS

NOTE: One detector in either detector loop (A or B) in each cargo compartment may be inoperative with no loading restrictions. MEL loading restrictions apply if the Cargo Electronics Unit (CEU) is inoperative or both loops (A and B) in a cargo compartment have one or more detectors inoperative.

OPERATIONS (O)

Cargo compartments should remain empty or contain only ballast.

NOTE: As ballast must be used only dry shingle, coarse round gravel or pebbles of an average diameter of 12-15 mm packed in canvas or hessian (with an inner plastic bag) effectively closed bags.

If a Cargo Fire Panel FWD or AFT warning light fails to illuminate during system test, one or more detection loops for the associated cargo compartment is inoperative. To determine the specific inoperative loop(s):

1. Position the Cargo Fire Panel FWD and AFT DET SELECT Switch to A.
2. Press and hold Cargo Fire Panel TEST switch.
3. Verify that the following indications occur within 4 seconds.
 - A. Fire Bell sounds.
 - B. Both Master FIRE WARN lights illuminate.
 - C. Cargo Fire Panel FWD and AFT warning lights illuminate.
 - D. Cargo Fire Panel DISCH light illuminates.
 - E. Cargo Fire Panel EXT FWD and EXT AFT lights illuminate.
4. If one or more smoke detectors in Loop A is inoperative, the Cargo Fire Panel DETECTOR FAULT light will illuminate and the associated FWD or AFT warning light will remain extinguished for the cargo compartment with the inoperative detector.
5. Release the Cargo Fire Panel TEST switch. The DETECTOR FAULT light remains illuminated if a loop failure in either the forward or aft cargo compartment. Otherwise all indications will clear within half a second.
6. Position Cargo Fire Panel FWD and AFT DET SELECT switch to B and repeat the above test (Steps 2 through 5).

7. Position Cargo Fire Panel DET SELECT switch(es) as required for flight. One detection loop (A or B) must operate normally in each cargo compartment or MEL loading restrictions must be observed.

MAINTENANCE (M)

For inoperative DISCH or EXT light(s), the following tests can be used to determine system operational status.

1. Fabricate a 28 VDC circuit test lamp with pigtail leads terminating in pin contacts in a suitable holder. Lamp P/N 116-565-1042-001 (28 volt, 40 milliamps) or equivalent is suggested, but any suitable lamp or a digital multimeter may be used.
2. Remove Cargo Fire Control Panel and disconnect the electrical connector D12760 from panel.
3. For Inoperative DISCH light, verify that the associated bottle(s) have adequate charge.
 - A. Connect test lamp or digital multimeter between the airplane side of connector D12760, Pin 48 (+28 volt source for Bottle No. 1) and Pin 28 (pressure switch ground).
 - B. If the test lamp remains extinguished or digital multimeter indicates an open circuit during Steps 3A and 3B, the associated bottle has adequate charge.
4. For Inoperative EXT light(s), verify that the associated squib circuit operates normally.

CAUTION: TO PREVENT INJURY, RESTRICT PERSONNEL FROM EXTINGUISHER BOTTLE AREA DURING SQUIB CIRCUIT TEST. LIMIT CURRENT TO 40 MILLIAMPS MAXIMUM DURING TEST. USE ONLY TEST LAMP P/N 116-565-1042-001 (28 volt, 40 milliamps) OR EQUIVALENT. DO NOT USE A MULTIMETER.

- A. Using the D12760 connector pin numbers shown in the table below, connect test lamp between the appropriate pin numbers on airplane side of connector D12760.
- B. If the test lamp illuminates, the squib circuit is intact.

CARGO FIRE BOTTLE SQUIB TEST TABLE				
Bottle	Squib	Squib Plug Pin No.	TEST LAMP CONNECTION	
			Pin No. (+28 Vdc Source)	Pin No. (Ground Path)
1	FWD	D12794	D12760, Pin 48	D12760, Pin 26
1	AFT	D12796	D12760, Pin 48	D12760, Pin 24

5. Remove test lamp and re-installed Cargo Fire Control Panel.

For an inoperative extinguisher bottle pressure switch (REFER TO AMM 26-23-01):

1. Remove the extinguisher bottle per the Airplane Maintenance Manual.
2. Per the Airplane Maintenance Manual, weigh the extinguisher bottle on a scale that is accurate to within +/- 0.1 pound and confirm the bottle weight is within 0.25 pounds of the service weight stamped on the bottle nameplate.
3. Reinstall the bottle per the Airplane Maintenance Manual.
4. Cap and stow the affected bottle's pressure switch electrical connector.

ATA 27 FLIGHT CONTROLS

27-4 LEADING EDGE FLAP/SLAT POSITION LIGHT SYSTEMS

OPERATIONS (O)

1. With forward panel lights inoperative, use the leading edge position information placard.
2. With indications for one leading edge slat inoperative on both the forward and annunciator panels:
 - A. Verify leading edge position for the inoperative indication before each takeoff and landing.
 - B. Limit airspeed to **300 KIAS at/below FL 200** or **.65 Mach above FL 200**. Refer to the Airplane Flight Manual Cruise Maneuvering Capability chart for information on maintaining minimum maneuvering speeds.

MAINTENANCE (M)

NOTE: When dispatching with forward panel light(s) inoperative, verify that the Leading Edge Device Annunciator Panel "TRANSIT" lights illuminate properly when leading edge devices are in motion by cycling the flaps. If a Leading Edge Device Annunciator Panel FLAP "TRANSIT" light fails to illuminate, then it must also be considered inoperative. Dispatch is not allowed if a Leading Edge Device Annunciator Panel FLAP "TRANSIT" light fails to illuminate properly and forward panel light(s) are inoperative.

WITH FORWARD PANEL AND/OR ANNUNCIATOR PANEL LIGHTS INOPERATIVE:

1. Remove bulbs from affected lights (forward panel), and placard as indicated above.
2. Use the following information to develop a placard near the annunciator panel to indicate the correct Leading Edge position information;
 - A. Flap Positions 1 thru 5 - All slats in "EXT" position, L.E. Flaps extended.
 - B. Flap Positions 10 thru 40 - All slats in "FULL EXT" position, L.E. Flaps extended.
3. Determine, which flap position(s) produces the faulty indication.
4. At the flap position, which produces the faulty indication, verify that the leading edge devices are in the proper position and then use the following procedure to confirm operation of both Stall Warning Systems.

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NOTE: If the faulty indication occurs at more than one flap position, repeat Step 4 at Flaps 0, Flaps 1 and Flaps 10, or until it becomes necessary to open the Stall Warning Asymmetry Mode circuit breaker.

- A. Verify that Hydraulic System B pressure is between 2900 and 3100 PSI.
 - B. Press Stall Warning Test Switches No. 1 and No. 2 and check that the stick shakers operate normally.
 - C. If both stick shakers fail to operate normally, open and collar the Stall Warning Asymmetry Mode circuit breaker on the P18-2 Panel and then repeat test in Step B.
5. If the stick shaker tests are normal the airplane may be dispatched.

27-7 AUTO SPEED BRAKE SYSTEM

OPERATIONS (O)

1. Prior to takeoff, ensure that speed brake lever is in full down detent.
2. Verify that the increase in landing field length for manual speed brakes has been accounted for.
3. Manually deploy speed brakes on landing prior to application of reverse thrust.
4. The autobrakes will not disarm when the speed brake lever is stowed. Auto brakes may be disarmed by positioning AUTO BRAKE select switch to OFF, applying brakes manually or advancing the thrust levers.

MAINTENANCE (M)

Prepare the airplane for flight with the auto speed brake system inoperative:

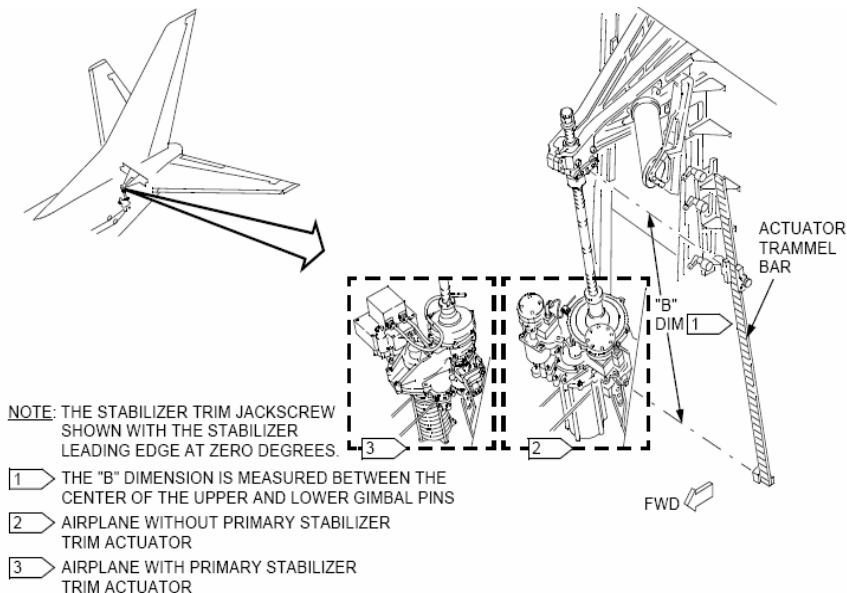
1. Verify manual speed brake operation.
2. Open and collar the following circuit breaker (panel P6): AUTO SPEED BRAKE
3. Advise Dispatch.

27-10 FEEL DIFF PRESS Light**MAINTENANCE (M)**

Verify that feel system is operative as follows:

1. Provide elevator Systems A and B hydraulic power (AMM 27-31-00). Ensure personnel are clear of horizontal tail and are aware that hydraulic systems are to be pressurized.
2. Use STAB TRIM switch to set the stabilizer at the following trim position: 3 units
3. Set the FLT CONTROL A and B switches to OFF.
4. Verify that horizontal stabilizer B dimension (see picture bellow) is at 41.57 ± 0.01 inches.
5. Set Mach trim actuator at null position (AMM 27-31-00).
6. Check for pressure leakage in feel pitot system as follows:
 - A. Seal drain hole in each feel pitot tube located on fin.
 - B. Remove drain plugs from System A and B pitot lines, located below feel computer.
 - C. Attach pressure gage lines from air pressure regulator to pitot System A and B drain lines, located below feel computer.

CAUTION: DO NOT RAISE TEST PRESSURE ABOVE 6 PSI (474 KNOTS) AT ANY TIME DURING TEST.



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- D. Attach regulated air pressure line from air pressure regulator to both pitot tubes on fin and pressurize pitot system to 5.0 ± 0.1 psi (437 ± 4 knots).
 - E. Cut off pressure source by turning shutoff valve in air pressure regulator to off.
 - F. Pressure shall not drop more than 0.3 psi (12 knots) during a 2-minute period.
 - G. Reduce pitot pressure to zero.
- 7. Check that FLT CONTROL A and B switches are ON.
 - 8. Using air pressure regulator, pressurize pitot system to the psi value listed: Pitot Pressure 2.47 ± 0.05 psi, Speed 315 ± 3 knots

CAUTION: DO NOT RAISE TEST PRESSURE ABOVE 6 PSI AT ANY TIME DURING TEST.

- 9. Apply masking tape on tail cone along direction of right elevator trailing edge travel.

NOTE: Elevator travel measuring tool may be used in lieu of tape method.

- 10. Shake captain's control column lightly fore and aft to ensure that system is centered, and release.

NOTE: Ensure that control columns are not disturbed from this position during the next step.

- 11. Mark actual elevator trailing edge neutral position on masking tape.
- 12. Position FLT CONTROL B switch to OFF, leave FLT CONTROL A switch ON.
- 13. Using pull-type spring scale applied to the center of the control wheel, move captain's control column slowly to the indicated elevator positions (control column aft for elevator up and control column forward for elevator down), checking that force to hold column is as listed:

Elevation Position	Column Force
1.20 ± 0.05 inches up	42.5 ± 4.5 lbs
1.20 ± 0.05 inches down	45.0 ± 4.5 lbs

NOTE: Jiggle control column prior to each reading.

- 14. Position FLT CONTROL A switch to OFF and FLT CONTROL B switch to ON.
- 15. Perform test Step 13.
- 16. Restore airplane to Normal.
 - A. Ensure that all tools used during testing are removed.

- B. Remove all masking tape.
- C. Remove seals from drain holes in each vertical fin pitot tube.
- D. Remove pressure gage lines from Systems A and B drain lines located below feel computer.
- E. Install drain plug on Systems A and B drain lines located below feel computer.
- F. Remove regulated air pressure lines from both vertical fin pitot tubes.
- G. Close all circuit breakers opened during testing.
- H. Close access door 3701.
- I. Restore airplane to normal hydraulic configuration (AMM 27-31-00)
- J. Remove electrical power if no longer required.

27-11 Auto Slat Fail Light System

MAINTENANCE (M)

Verify that the auto slat LRU's located on the E1 Electronic Shelf do not have any autoslat faults stored (AMM 27-32-00).

- 1. If equipped with AUTO SLAT COMPUTERS, verify that no amber fault lights are illuminated on the front of each Auto Slat Computer.
- 2. If equipped with STALL MANAGEMENT COMPUTERS:
 - A. Push the ON/OFF button on the front of each Stall Management Computer.
 - B. Check that the display on each computer reads TEST IN PROGRESS and then SYSTEM OK.
 - C. Push the ON/OFF button to exit BITE.

27- 12 AUTO SLAT SYSTEMS**OPERATIONS (O)**

Verify that remaining auto slat system and AUTO SLAT FAIL light operate normally:

1. Press and release a system annunciator panel on the lightshield. AUTO SLAT FAIL light, FLT CONT annunciator and MASTER CAUTION light will illuminate.
2. Press and release a MASTER CAUTION light on the lightshield. AUTO SLAT FAIL light, FLT CONT annunciator and MASTER CAUTION light will extinguish.

Illumination of the affected lights when recalled and extinguishing when reset verifies that remaining auto slat system and the AUTO SLAT FAIL light operate normally.

MAINTENANCE NOTE

The Auto Slat System may be deactivated by opening and collaring the associated P6-2 Panel Auto Slat DC circuit breaker.

27-13 STALL WARNING SYSTEMS

OPERATIONS (O)

To verify that the remaining Stall Warning System is operating normally, press the associated Stall Warning Test Switch and check that the appropriate stick shaker operates. With one Stall Warning System operating normally, the airplane may be dispatched.

MAINTENANCE (M)

Stall Warning System No. 1 may be deactivated by opening and collaring the P18-2 Panel circuit breaker labeled; STALL WARNING 1 DC or SMC 1 CMPTR DC. If the Captain's PLI, lower barber pole or lower amber band symbols are displaying erroneous data, open/collar P18-2 Panel circuit breakers labeled; STALL WARNING 1 AC or SMC 1 SNSR EXC AC.

Stall Warning System No. 2 may be deactivated by opening and collaring the P6-1 Panel circuit breaker labeled; STALL WARNING 2 DC or SMC 2 CMPTR DC. If the First Officer's PLI, lower barber pole or lower amber band symbols are displaying erroneous data, open/collar P6-1 Panel circuit breakers labeled; STALL WARNING 2 AC or SMC 2 SNSR EXC AC.

NOTE: On airplanes equipped with either the Stall Management Computer or the Stall Management Yaw Damper Computer, opening the SMC CMPTR DC, SMC SNSR EXC AC or SMYD SNSR EXC AC circuit breaker will deactivate:

- (1) The associated Auto Slat System (see MEL 27-12),
- (2) The associated PLI (see MEL 34-38),
- (3) The associated upper/lower barber poles, upper/lower amber bands (see MEL 34-2 and/or 34-39).

To verify that the remaining Stall Warning System is operating normally, press the associated Stall Warning Test Switch and check that the appropriate stick shaker operates. With one Stall Warning System operating normally, the airplane may be dispatched.

If both Stall Warning Systems fail to test:

1. If Hydraulic System B is not pressurized, pressurize the system and test the Stall Warning Systems. If one system operates normally, the airplane may be dispatched.
2. If Hydraulic System B pressure is normal and both systems do not test properly:
 - A. Open and collar the Stall Warning Asymmetry Mode circuit breaker on the P18-2 Panel and repeat the stall warning test.
 - B. If one system operates normally, the airplane may be dispatched.

NOTE: The Digital Stall Warning Systems on EFIS equipped airplanes are considered to be operating normally provided they activate the stick shaker upon testing even though sub-functions Pitch Limit Indication (PLI), Flap and Alpha data for Ground Proximity System, Mach/Airspeed Limit Warning or Reference Speeds for EFIS speed displays may be inoperative.

27-19 RUDDER PRESSURE REDUCER (RPR) SYSTEM

OPERATIONS (O)

With the Rudder Pressure Reducer System deactivated, the following minimum maneuvering speeds should be used during approach maneuvering (do not deviate from the airspeeds specified in Boeing Operations Manual Non-Normal Procedures).

Flap Position	Minimum Maneuvering Speeds (KIAS)		
	Gross Weight		
	Up to 53,070 Kgs	53,070 Kgs to 62,823 Kgs	Above 62,823 Kgs
0	220	230	240
1	200	210	220
5	190	200	210
10	170	180	190
15	150	160	170
25	140	150	160

MAINTENANCE (M)

For airplanes, which have a Rudder Pressure Reducer (RPR) System installed via Boeing Service Bulletin 737-27A1206, 737-27-1252, 737-27-1255 or production equivalent, deactivate the Rudder Pressure Reducer System as follows.

1. Position the stab trim in an airplane nose up position.
2. Position the control stand STAB TRIM MAIN ELEC and AUTOPILOT Cutout Switches to CUTOFF.
3. Placard the Stab Trim Control Wheels INOP - DO NOT MOVE.
4. Re-position the manual control lever to the HIGH position as follows.
 - A. Remove the manual control lever retaining bolt.
 - B. Rotate the manual control lever to the HIGH position.

- C. Re-install the manual control lever retaining bolt, including nut lockwire.
5. Return airplane to it's normal configuration, i.e., remove placards, re-position cutout switches and stab trim.
- In order to verify that the RPR valve is providing high pressure output, confirm the following:
1. With the hydraulic system A off and flight controls system A on, the yaw damper coupler (YDC) bite display indicates 0 to 500 psi for the RPR transducer output and the flight control low pressure light is on.
 2. With the hydraulic system A on and flight controls system A on, the YDC bite display indicates 2200 to 3500 psi for the RPR transducer output and the flight control low pressure light is off.
 3. With the hydraulic system A on and flight controls system A on, the YDC bite can drive the flight control system A low pressure light on.

27-21 STBY RUD ON light

OPERATIONS (O)

1. Verify that rudder operates normally on hydraulic system A and B using the following procedure:
 - A. Pressurize hydraulic systems A and B.
 - B. Set FLT CONTROL A switch ON and FLT CONTROL B switch OFF.
 - C. Verify normal rudder pedal forces by pushing captain's left rudder pedal forward (while holding tiller to prevent tire scrub) until it touches the stop and hold.
 - D. Have ground observer confirm that rudder travels left.
 - E. Release left rudder pedal and verify normal rudder pedal forces by pushing the captain's right rudder pedal forward (while holding tiller to prevent tire scrub) until it touches the stop and hold.
 - F. Have ground observer confirm that rudder travels right.
 - G. Release captain's right rudder pedal.
 - H. Have ground observer confirm that rudder returns to neutral.
 - I. Set FLT CONTROL B switch ON and FLT CONTROL A switch OFF.
 - J. Repeat steps C through H above.
2. Verify that the standby hydraulic pump is operating normally by either:
 - A. Verifying that the standby hydraulic pump can be heard turning on when either FLT CONTROL A or B switches are placed in the STBY RUD position.

OR

 - B. With one FLT CONTROL switch placed in the STBY RUD position (other FLT CONTROL switch OFF), repeat steps C through H above.
3. Return FLT CONTROL switches to normal position for flight.

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MAINTENANCE (M)

Pull and collar the FORCE FIGHT MON circuit breaker on the P6-2 panel. If the STBY RUN ON light is inoperative ON, verify light extinguishes after pulling circuit breaker.

ATA 28 FUEL

28-1 FUEL BOOST PUMPS (MAIN TANKS)

OPERATIONS (O)

NOTE: Flight Manual limitations concerning lateral fuel imbalance must be observed. Plan fuel load to allow for the appropriate minimum fuel. Range and/or payload restrictions may result.

The minimum fuel requirements for affected boost pump will assure that the operative boost pump and suction feed inlet remain submerged during rotation to high nose up attitudes during takeoff or go around. In the event the second boost pump in a tank fails, the engine will operate satisfactorily on suction feed. With both tank 1 boost pumps inoperative, APU operation may become unreliable at altitudes above **25,000** feet.

MAINTENANCE NOTE

1. Turn affected pump switch (overhead panel) OFF and open/collar circuit breaker (P6-3 or P91/92 Panel) for the affected pump.
2. Notify Dispatch, fuel required will increase.

28-2 FUEL BOOST PUMPS (CENTER TANK)

OPERATIONS (O)

1. Verify that the zero fuel weight and balance limitations have been accounted for. Adjust the zero fuel weight of the airplane by including the weight of center tank fuel, or adjust the maximum zero fuel weight by subtracting the weight of center tank fuel.
2. Fuel usage configuration for takeoff should be to close the crossfeed selector and turn all operating main tank fuel boost pumps ON. The operating center tank fuel boost pump should be OFF. After takeoff, turn operating center tank fuel boost pump ON and open the crossfeed selector.
3. When center tank low pressure light illuminates, turn operating center tank fuel boost pump OFF and close the crossfeed selector.

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MAINTENANCE NOTE

1. Turn affected pump switch (overhead panel) OFF and open/collar circuit breaker (P6-3 or P91/92 Panel) for the affected pump.
2. Notify Dispatch. Fuel planning should have main tank fuel quantities adequate to reach an alternate destination if the remaining center tank pump fails in-flight.

28-3 FUEL BOOST PUMP LOW PRESSURE WARNING LIGHTS**OPERATIONS (O)**

When dispatching with one or both center tank pump lights inoperative, turn center tank fuel pumps OFF when both the Master Caution light and the FUEL system annunciator light illuminate as a result of center tank fuel depletion.

MAINTENANCE NOTE

When dispatching with one or both center tank pump low pressure lights inoperative and center tank fuel is to be used, the Master Caution lights and FUEL system annunciator light must illuminate when center tank fuel is depleted. Confirmation that the Master Caution lights and FUEL system annunciator light are functioning properly prior to dispatch can be done using the following procedure:

1. Turn both left and right center tank pump switches on the fuel control panel off and open/collar the associated circuit breakers for both pumps on the P6-3 or P91/92 panel.
2. Turn on the left and right center tank fuel pump switches on the fuel control panel.
3. Check that Master Caution lights and FUEL system annunciator light illuminate.
4. Turn both left and right center tank pump switches on the fuel control panel off and close the associated circuit breakers for both pumps on the P6-3 or P91/92 panel.

28-4 APU FUEL VALVE**MAINTENANCE (M)**

Deactivate the APU fuel shutoff valve.

1. Open and collar the following circuit breakers:
 - 1) On the P6 panel, APU CONT
 - 2) EE Bay, on the M280, APU Control Unit
2. Locate valve on the left wing rear spar in the wheel well.
3. Remove, cap and stow the electrical connector.
4. If necessary, use the manual override handle to close valve.

5. Lockwire manual override handle in closed position.

28-5 CROSSFEED VALVE OPEN LIGHT

MAINTENANCE (M)

Verify that the crossfeed valve operates normally per Fuel Crossfeed Valve Test (AMM28-22-00, Engine Fuel Feed System - Adjustment/Test).

Disregard the test steps that check the illumination of the Crossfeed VALVE OPEN light.

28-6 FLIGHT DECK FUEL QUANTITY INDICATORS **(MAIN TANKS)**

OPERATIONS (O)

To prevent the possibility of erroneous fuel quantity information with fuel quantity indicator(s) inoperative the Fuel Summation Unit (FSU) should be deactivated before the flight (see (M) actions below).

FMC will not be provided with the total fuel on board / airplane gross weight data and consequently the reference speeds, fuel remaining and VNAV mode are inoperative.

NOTE: With FMC software Update 7.5 and higher installed, pilots could manually enter the current fuel on board via the FMC Performance Page. Periodic manual updating is required for information to remain valid.

The following procedures are established to manage fuel with one main tank fuel quantity indicator inoperative to assure correct fuelling before the flight, adequate inflight fuel consumption and balance and fuel remaining data after the flight.

Before the flight.

Depending on fuel required and turn around time available one of the following refuelling methods should be used.

1a. When block fuel is not limited:

- re-fuel to full wing tanks

1b. When block fuel is limited for operational reason to less than full wing tanks (9000kg) capacity, apply crossfeed re-fuel procedure:

- refuel unreadable tank to full;
- refuel the readable tank up to predetermined value
(Predetermined = Total required – 4500kg)

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- transfer required amount from unreadable tank into readable tank to have half and a half (see OMB, 12.12.4).
2. Fuel quantity indicator reliability check.
- Normal fuel order/receipt procedure - crosscheck with the fuel supplied (trucks' gage readings);
 - Dripstick measurement procedure (is mandatory for departures from Base only).

Inflight

Fuel remaining inflight is the fuel quantity confirmed before departure minus fuel used by engines and APU.

- Fuel used by engines is obtained from the engine fuel flow indicator recall option;
- Fuel used by APU is 80 kg/hrs.

After the flight

Fuel remaining in the tank with the fuel quantity indicator inoperative could be determined as a difference between fuel confirmed for departure and fuel used during the flight.

MAINTENANCE (M)

The Digital Sunburst Fuel Quantity Indicators are considered to be operating normally with ERR Codes as follows:

Smiths indicators - 1, 3, and 6 displayed, and

Simmons indicators (YL-BBB only) - 1, 3, 5, and 7 displayed.

FUEL SUMMATION UNIT DEACTIVATION:

1. Open the QTY and EP GND FUELING circuit breakers on P6 panel.
2. Gain access to the rear of the FSU on the P23 panel by loosening the four mounting screws.
3. Disconnect, cap and stow the FSU electrical connector D2472 or D3224.
4. Close the QTY and EP GND FUELING circuit breakers on P6 panel.

FUEL SERVICING:

Reference AMM 12-11 procedures for fuel servicing when the fuel quantity indicating system does not operate. Dripstick measurement procedure is mandatory to depart from Base only.

28-7 FLIGHT DECK FUEL QUANTITY INDICATOR (CENTER TANK)

NOTE: Inoperative flight deck fuel quantity indications may also affect refueling control panel quantity indications. Refer to MEL 28-12 for inoperative refueling control panel quantity indications.

OPERATIONS (O)

To prevent the possibility of erroneous fuel quantity information with fuel quantity indicator(s) inoperative the Fuel Summation Unit (FSU) should be deactivated before the flight (see (M) actions below).

FMC will not be provided with the total fuel on board / airplane gross weight data and consequently the reference speeds, fuel remaining and VNAV mode are inoperative.

NOTE: With FMC software Update 7.5 and higher installed, pilots could manually enter the current fuel on board via the FMC Performance Page. Periodic manual updating is required for information to remain valid.

The following procedures are established to manage fuel with the center tank fuel quantity indicator inoperative to assure correct fuelling before the flight.

1. Full CENTER tank is required.
Fill the CENTER tank full.
2. Not full center tank is required.
 - Ensure center tank is empty (use crossfeed re-fuel procedure if required (see OMB, 12.12.4)).
 - Fuel the wings tanks full first,
 - Calculate total fuel via fuel uplift to ensure that fuel track gauges are correct (use Fuelling Record free space to prove it),
 - Fuel the center tank using track gauges as a reference.

NOTE: If there is an uncertainty exists about the fuel track gauges indication, maintenance procedure VERIFY FUEL QUANTITY IN CENTER TANK is required.

MAINTENANCE (M)

The Digital Sunburst Fuel Quantity Indicators are considered to be operating normally with ERR Codes as follows:
Smiths indicators - 1, 3, and 6 displayed, and

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Simmons indicators (YL-BBB only) - 1, 3, 5, and 7 displayed.

FUEL SUMMATION UNIT DEACTIVATION:

- 1) Open the QTY and EP GND FUELING circuit breakers on P6 panel.
- 2) Gain access to the rear of the FSU on the P23 panel by loosening the four mounting screws.
- 3) Disconnect, cap and stow the FSU electrical connector D2472 or D3224.
- 4) Close the QTY and EP GND FUELING circuit breakers on P6 panel.

VERIFY FUEL QUANTITY IN CENTER TANK:

NOTE: This procedure is required if it is impossible to refuel the center tank using method described in Operations (O).

Use fuel transfer from the main tank to the center tank. Reference AMM 12-11-04 procedures for fuel servicing when the fuel quantity indicating system does not operate.

28-9 FUEL QUANTITY TOTALIZER

NOTE: On airplanes with FMCS installed, the fuel quantity indicators provide signals to a Fuel Summation Unit (FSU), which calculates total fuel. Total fuel information is then transmitted to the FMC where it is used to determine the airplane gross weight. To prevent the possibility of erroneous fuel quantity information being used by the FMC to calculate gross weight, the FSU should be deactivated. With FMC software Update 7.5, 8.5 or 10.x installed, Flight Crews may manually enter current fuel on board via the FMC Performance Page to calculate reference speeds or fuel remaining at destination. Periodic manual updating is required for information to remain valid.

OPERATIONS NOTE

If the Fuel Summation Unit has been deactivated, the FMC will not display information that uses the airplane gross weight. The automatic flight VNAV mode will not be available and the Speed Tape (if installed) will not display information that uses the FMC gross weight.

NOTE: On airplanes with FMC software Update 7.5, 8.5 or 10.x installed, if VNAV capability is desired during approach, enter current fuel on board into the FMC at top of descent.

28-10 PRESSURE FUELING SYSTEM

MAINTENANCE (M)

For pressure fueling system inoperative, individual components of the system, which operate normally can be used to develop refueling procedure (AMM 12-11-00/301). Overwing fueling procedure can be used.

For fueling manifold check valve inoperative, verify that the fueling shutoff valve(s) operates normally:

1. During refueling, observe that the valve position light illuminates/extinguishes normally when opening/closing the associated fueling shutoff valve.
2. After refueling nozzle is disconnected, visually check for fuel leakage.

For fueling shutoff valve(s) or float switch(es) inoperative:

1. Verify that fuel load for the associated tank does not exceed the tank capacity.
2. Manually open fuel shutoff valve(s).

CAUTION: overfill protection is inoperative. The pressure fuelling system will not stop the refuel operation at a set fuel quantity. Stop the fuelling source at the desired quantity for the associated tank.

3. Refuel the associated tank, stopping the fuelling source at the desired fuel quantity.
4. Manually close the fuel shutoff valve(s).

28-12 REFUELING CONTROL PANEL QUANTITY INDICATORS

OPERATIONS (O)

Corresponding fuel quantity indicator on the pilot's center instrument panel is **operable**.

Refuel using fuel quantity indicators on the pilot's center instrument panel.

Corresponding fuel quantity indicator on the pilot's center instrument panel is **inoperative**.

See DDG 28-6 Flight Deck Fuel Quantity Indications (Main tanks) or DDG 28-7 Flight Deck Fuel Quantity Indications (Center tank).

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MAINTENANCE (M)

Corresponding fuel quantity indicator on the pilot's center instrument panel is **inoperative**.

If the main tank fuel quantity indicator(s) are inoperative, verify fuel quantity. Reference AMM 12-11-00 procedures, Fuel Servicing - Refuel Operation When the Fuel Quantity Indicating System Does Not Operate. Dripstick measurement procedure is mandatory to depart from Base only.

28-16 FUEL MEASURING STICKS/DRIPSTICKS**MAINTENANCE (M)**

If fuel leakage is detected, verify that the leakage does not exceed acceptable limits (AMM 28-11-00).

28-17 FUEL SCAVENGE SYSTEM**OPERATIONS (O)**

With the fuel scavenge shutoff valve inoperative open, the number 1 main fuel tank forward boost pump must remain off. Use MEL 28-1 Operations procedure for a main tank forward boost pump inoperative.

28-22 FUEL/SPAR VALVE CLOSED Lights**MAINTENANCE (M)**

Verify that the affected valve operates normally per Engine Fuel Shutoff Valve Test (AMM 28-22-00, Engine Fuel Feed System - Adjustment/Test). Disregard the test steps that check the illumination of the associated FUEL VALVE CLOSED light.

28-23 FUEL SUMMATION UNIT (FSU)

NOTE: On airplanes with FMCS installed, the fuel quantity indicators provide signals to a Fuel Summation Unit (FSU), which calculates total fuel. Total fuel information is then transmitted to the FMC where it is used to determine the airplane gross weight. To prevent the possibility of erroneous fuel quantity information being used by the FMC to calculate gross weight, the FSU should be deactivated. With FMC software Update 7.5, 8.5 or 10.x installed, Flight Crews may manually enter current fuel on board via the FMC Performance Page to calculate reference speeds or fuel remaining at destination. Periodic manual updating is required for information to remain valid.

OPERATIONS (O)

With the Fuel Summation Unit deactivated, the FMC will not display information that uses the airplane gross weight. On airplanes without FMC Software Update 7.5, 8.5 or 10.x, VNAV mode will not be available and the Speed Tape (if installed) will not display information that uses the FMC gross weight.

NOTE: On airplanes with FMC Software Update 7.5, 8.5 or 10.x installed, if VNAV capability is desired during approach, enter current fuel on board into the FMC before top of descent.

MAINTENANCE (M)**FUEL SUMMATION UNIT DEACTIVATION:**

1. Open the QTY and EP GND FUELING circuit breakers on P6 panel.
2. Gain access to the rear of the FSU on the P23 panel by loosening the four mounting screws.
3. Disconnect, cap and stow the FSU electrical connector D2472 or D3224.
4. Close the QTY and EP GND FUELING circuit breakers on P6 panel.

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ATA 29 HYDRAULIC POWER

29-3 SYSTEM PRESSURE INDICATIONS (A AND B)

OPERATIONS (O)

System A Pressure Verification:

Verify that System A FLT CONTROL LOW PRESSURE extinguishes when hydraulic system is pressurized.

System B Pressure Verification:

1. With Systems A and B depressurized, verify that the brake pressure indicator shows less than 2800 psi. If not, apply brakes and pressure should drop.
2. Pressurize System B hydraulics with ELEC 1 and select the flight control and spoiler switches OFF.
3. Verify that System B FLT CONTROL LOW PRESSURE extinguishes when hydraulic system is pressurized.
4. Verify that the brake pressure increases to between 2800 psi and 3200 psi .
5. Restore airplane to its required configuration.

29-4 SYSTEM A PUMP LOW PRESSURE INDICATION SYSTEMS

OPERATIONS (O)

ENG 1 LOW PRESSURE light inoperative:

1. Dry motor or start No. 1 engine.
2. Position ENG 1 hydraulic pump switch ON, ELEC 2 hydraulic pump switch OFF, and flight control and spoiler switches OFF.
3. Verify that the system pressure is between 2800 psi and 3200 psi.
4. Restore airplane to its required configuration.

ELEC 2 LOW PRESSURE light inoperative:

1. Power Generator Bus No. 2.
2. Position ELEC 2 hydraulic pump switch ON, ENG 1 hydraulic pump switch OFF.
3. Verify that the system pressure is between 2800 psi and 3200 psi.
4. Restore airplane to its required configuration.

MAINTENANCE NOTE

If the associated pressure switch is inoperative, cap and stow electrical connector.

29-5 SYSTEM B PUMP LOW PRESSURE INDICATION SYSTEMS**OPERATIONS (O)****ELEC 1 LOW PRESSURE Light inoperative:**

1. Power Generator Bus No. 1.
2. Position ELEC 1 hydraulic pump switch ON, ENG 2 hydraulic pump switch OFF, and flight control and spoiler switches OFF.
3. Verify that the system B pressure is between 2800 psi and 3200 psi.
4. Restore airplane to its required configuration.

ENG 2 LOW PRESSURE Light inoperative:

1. Dry motor or start No. 2 engine.
2. Position ENG 2 hydraulic pump switch ON, ELEC 1 hydraulic pump switch OFF, and flight control and spoiler switches OFF.
3. Verify that the system B pressure is between 2800 psi and 3200 psi.
4. Restore airplane to its required configuration.

MAINTENANCE NOTE

If the associated pressure switch is inoperative, cap and stow electrical connector.

29-9 Hydraulic Quantity Low Level Light (Standby System)**MAINTENANCE (M)**

With flaps/leading edge devices retracted, spoilers down, and all control surfaces in neutral position, verify that Hydraulic System B gauge or indication indicates more than “RFL” or “RF”, as applicable (6.4 U.S. gallons).

29-10 System A Pumps**MAINTENANCE NOTE**

To avoid damage to steering components or towing equipment, install nose gear steering lockout pin in steering depressurization valve when airplane is to be pushed back or towed with engines operating.

29-11 System A Quantity Indication (Flight Deck)**MAINTENANCE (M)**

Make sure that Hydraulic System A Reservoir quantity is adequate.

1. Verify that spoilers are down, all flight controls are in neutral position, and thrust reversers are stowed.
2. Verify fluid quantity by checking the hydraulic quantity indicator mounted on the System A reservoir, visible from the fluid filling station located in the right main gear well. If quantity is low, service per AMM 12-12-0.

To check that System A pressure indication and pump low pressure lights operate normally:

1. Position ELEC 2 hydraulic pump switch ON, ENG 1 hydraulic pump switch OFF, and flight control and spoiler switches OFF.
2. Verify that system A pressure is between 2800 psi and 3200 psi and that ELEC 2 hydraulic pump LOW PRESSURE light extinguishes.
3. Position ELEC 2 hydraulic pump switch OFF and ENG 1 hydraulic pump switch ON.
4. Dry motor or start engine No. 1.
5. Verify that system A pressure is between 2800 psi and 3200 psi and that ENG 1 hydraulic pump LOW PRESSURE light extinguishes.
6. Restore airplane to its required configuration.

29-12 Standby System Low Pressure Light**MAINTENANCE (M)**

NOTE: Steps 1 through 6 are to be done prior to engine start.

1. Verify that the LOW QUANTITY light illuminates when LIGHTS test switch is positioned to TEST.
2. Get ground clearance to extend leading edge flaps.
3. Position ALTERNATE FLAPS Master Switch to ARM.
4. Momentarily position ALTERNATE FLAPS Position Switch to DOWN. Verify that aft overhead LE DEVICES annunciator panel lights indicate all leading edge devices are fully extended within approximately one minute.
5. Return both ALTERNATE FLAPS Master and Position Switches to OFF.
6. Turn Hydraulic System B ELEC 1 pump ON and verify that LOW PRESSURE light extinguishes. Leave pump on until L.E. flaps are up.

7. After engine start, verify that Hydraulic System B engine pump LOW PRESSURE light extinguishes.

29-13 Hydraulic Reservoir Pressurization System Sources

MAINTENANCE (M)

1. Disconnect the pressurization supply line of the inoperative pneumatic source at the reservoir pressurization module or the restrictor cross fitting, as installed, located in the wheel well. Install a cap on the reservoir pressurization module or the restrictor cross fitting, as installed. Also install a cap on the disconnected pressurization supply line.
2. Pressurize pneumatic manifold (AMM 36-05-00).
3. Verify that the hydraulic reservoir air pressure gauge(s) located on the forward wheel well bulkhead indicates the same pressure as the pneumatic duct pressure indicator on the forward overhead panel.

29-15 System B Quantity Indicator (Flight Deck)

MAINTENANCE (M)

Make sure that Hydraulic System B Reservoir quantity is adequate

1. Verify that flaps/leading edge devices are retracted, spoilers are down, all flight controls are in neutral position, and thrust reversers are stowed.
2. Verify fluid quantity by checking hydraulic quantity indicator mounted on the system B reservoir, visible from the fluid filling station located in the right main gear well. If quantity is low, service per AMM 12- 12-0.

To check that system B pressure indication and pump low pressure lights operate normally:

1. Position ELEC 1 hydraulic pump switch ON, ENG 2 hydraulic pump switch OFF, and flight control and spoiler switches OFF.
2. Verify that system B pressure is between 2800 psi and 3200 and that ELEC 1 hydraulic pump LOW PRESSURE light extinguishes.
3. Position ELEC 1 hydraulic pump switch OFF and ENG 2 hydraulic pump switch ON.
4. Dry motor or start engine No. 2.
5. Verify that system B pressure is between 2800 psi and 3200 and that ENG 2 hydraulic pump LOW PRESSURE light extinguishes.
6. Restore airplane to its required configuration.

ATA 30 ICE AND RAIN PROTECTION

30-1 WING ANTI-ICE VALVES

OPERATIONS (O)

NOTE: Disconnecting the wing anti-ice valve's electrical connector will cause the associated wing anti-ice VALVE OPEN light to illuminate bright.

When the left Wing Anti-ice Valve is failed open, do not use APU bleed air for air conditioning purposes on the ground. APU may only be used for engine start.

When the right Wing Anti-ice Valve is failed open, APU bleed air may be used for air conditioning purposes on the ground using only the left AC pack and with the isolation valve closed.

The appropriate engine bleed thrust limits to be used with the valve failed open are the normal limits for wing anti-ice ON. No wing anti-ice on decrements are published for takeoff, consequently the engine bleed to the affected manifold must be off for takeoff. Position the isolation valve switch to CLOSE to maintain isolated bleed sources. The isolation valve switch must remain in the CLOSE position, until the associated manifold can be pressurized by turning the engine bleed on (see temperature restrictions).

When dispatching with a single engine bleed on for takeoff due to one wing anti-ice valve failed open, (airplane pressurized), VMCG should be determined based on AC packs OFF. Takeoff performance should be based on AC packs ON/AUTO.

The location of the wing anti-ice valve relative to the engine exhaust area prohibits personnel from accessing the valve when the associated engine is running. Therefore, to ensure sufficient air for engine start, only one valve may be inoperative open. APU or ground air can be used to start one engine and the second engine (associated with open valve) then can be started by crossbleed from the first.

MAINTENANCE (M)

NOTE: Disconnecting the wing anti-ice valve's electrical connector will cause the associated wing anti-ice VALVE OPEN light to illuminate bright.

1. The wing anti-ice shutoff valves are located outboard of the engine in the leading edge of the wing. Access to the valves is through panels in the bottom of the wing leading edge. Personnel should not access valve

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- when the associated engine is running because of the position of the valve relative to the engine exhaust area.
2. For dispatch with valve(s) closed, accomplish the following prior to engine start:
 - A. Open ENG & WING VALVE ANTI-ICE circuit breaker for affected engine on P18 panel.
 - B. Remove access panel (AMM 12-30-00).
 - C. Disconnect, cap and stow electrical connector.
 - D. Manually move the valve to the CLOSED position by using the position indicator.
 - E. Install access panel (AMM 12-30-00).
 - F. Close ENG & WING VALVE ANTI-ICE circuit breaker.
 3. For dispatch with left valve open, accomplish the following:
 - A. Establish communications with flight deck.
 - B. When using APU bleed air, perform the following:
 - 1) Accomplish Steps 2A through 2D.
 - 2) After personnel have been cleared from engine hazard area, inform flight deck that RIGHT (No. 2) engine may be started.
 - 3) After RIGHT (No. 2) engine has been started, request flight deck to depressurize left pneumatic duct (close isolation and APU bleed air valves).
 - 4) After flight deck reports left pneumatic duct depressurized, manually move valve to OPEN position by using position indicator.
 - 5) Accomplish Steps 2E and 2F.
 - 6) After personnel have been cleared from engine hazard area, inform flight deck that LEFT (No. 1) engine may be started (using engine crossbleed).
 - C. When using ground service air, perform the following:
 - 1) Accomplish Steps 2A through 2C.
 - 2) Manually move valve to the OPEN position by using the position indicator.
 - 3) Accomplish Steps 2E and 2F.
 - 4) After personnel have been cleared from engine hazard area, inform flight deck that RIGHT (No. 2) engine may be started (Isolation valve closed) and then the LEFT (No. 1) engine (using engine crossbleed).
 4. For dispatch with right valve open, accomplish the following:
 - A. Establish communications with flight deck.
 - B. When using APU bleed air, perform the following:
 - 1) Accomplish Steps 2A through 2C.
 - 2) Manually move valve to the OPEN position by using the position indicator.
 - 3) Accomplish Steps 2E and 2F.

- 4) After personnel have been cleared from engine hazard area, inform flight deck that LEFT (No. 1) engine may be started (Isolation valve closed) and then the RIGHT (No. 2) engine (using crossbleed start).
- C. When using ground service air, perform the following:
 - 1) Accomplish Steps 2A through 2D.
 - 2) After personnel have been cleared from engine hazard area, inform flight deck that LEFT (No. 1) engine may be started.
 - 3) After LEFT (No. 1) engine has been started, disconnect ground air and request flight deck to depressurize right pneumatic duct (close isolation valve).
 - 4) After flight deck reports right pneumatic duct depressurized, manually move valve to OPEN position by using position indicator.
 - 5) Accomplish Steps 2E and 2F.
 - 6) After personnel have been cleared from engine hazard area, inform flight deck that RIGHT (No. 2) engine may be started (using engine crossbleed).

30-2 WING ANTI-ICE VALVE POSITION LIGHTS

MAINTENANCE (M)

Verify that associated wing anti-ice valve operates normally.

1. Deactivate the leading edge slats (AMM 27-81-00).
2. Gain access to valve.
3. Position the WING ANTI-ICE switch to the GRD TEST or ON position.
4. Observe that position indicator on the valve indicates OPEN.
5. Position the WING ANTI-ICE switch to the OFF position.
6. Observe that position indicator on the valve indicates CLOSED.
7. Restore airplane to desired configuration, activate the leading edge slats (AMM 27-81-00).

30-3 ENGINE AND NOSE COWL ANTI-ICE VALVES**OPERATIONS (O)**

NOTE: Dispatching with an engine and nose cowl anti-ice valve inoperative open will cause the associated COWL VALVE OPEN light to illuminate bright.

For a valve inoperative CLOSED:

- A. Operate with associated engine anti-ice switch OFF.
- B. Do not operate in icing conditions.

1. For a valve inoperative OPEN:

- A. Operate with associated engine anti-ice switch OFF.
- B. Apply adjustments to N1 limits and performance limited weights. Observe maximum operating temperature restrictions.
- C. In-flight, maintain a minimum of 60% N1 on the affected engine in icing conditions.
- D. During ground operations with the APU running, turn the engine bleed OFF whenever the affected engine is not running.
- E. Apply a fuel mileage decrement of 1.3%

MAINTENANCE (M)

NOTE: Dispatching with an engine and nose cowl anti-ice valve inoperative open will cause the associated COWL VALVE OPEN light to illuminate bright.

1. ONE VALVE INOPERATIVE CLOSED:

- A. Open fan duct cowl and thrust reverser (AMM 78-31-00).
- B. Check valve position indicator to verify valve is closed. If necessary, manually position valve to closed and locked by:
 - 1) For Whittaker valve, lock shutoff valve in the closed position by manually wrenching flats labeled OP-MID-CL to CL (closed) position and insert quick-release pin into lock hole in the valve cover. The torque required to move the valve butterfly will not exceed 25 in-lb.
 - 2) For AlliedSignal valve, lock shutoff valve in the closed position by loosening the retaining screw on the manual locking assembly, wrench the hex shaft to the CLOSED position, slide the assembly up the shaft until it fits into the recess in the cover plate, then re-tighten the retaining screw.
- C. Close fan duct cowl and thrust reverser (AMM 78-31-00)

2. ONE VALVE INOPERATIVE OPEN:

- A. Open fan duct cowl and thrust reverser (AMM 78-31-00).

B. The cowl anti-ice valve consists of a shutoff valve and a pressure regulator valve. Secure cowl antiice valve open as follows:

- 1) Pressure regulator valve in FULL OPEN position:
 - a. For Whittaker valve, lock pressure regulator in the open position by manually wrenching flats labeled OP-CL to OP (open) position and replace the closed position adjustment setscrew with a locking screw. The torque required to move the valve butterfly will not exceed 25 in-lb. ONCE THE PRESSURE REGULATING VALVE IS DEACTIVATED BY REMOVING THE CLOSE POSITION SET SCREW AND INSTALLING THE LOCK SCREW, THE VALVE MUST BE REMOVED FOR CMM ADJUSTMENT PRIOR TO REACTIVATNG THE VALVE.

NOTE: Airplanes with forward mount/thrust reverser hinge vibration isolators installed require the valve clamps to be loosened and the valve hardware removed. The valve should then be rotated until the closed position adjustment setscrew can be removed and replaced with a locking screw. After the locking screw is installed, the valve must be re-aligned and the hardware and clamps re-installed.

- b. For Allied Signal valve, lock pressure regulator in the open position by loosening the retaining screw on the manual locking assembly, wrench the hex shaft to OPEN position, slide the assembly up the shaft until it fits into the recess in the cover plate, then re-tighten the retaining screw.
 - 2) Shutoff valve in MID or PARTIAL OPEN position:
 - a. For Whittaker valve, lock shutoff valve in mid-position by manually wrenching flats labeled OP-MID-CL to MID (mid) position and insert a quick-release pin into lock hole in the valve cover. The torque required to move the valve butterfly will not exceed 25 inlb.
 - b. For AlliedSignal valve, lock shutoff valve in partial open position by loosening the retaining screw on the manual locking assembly, wrench the hex shaft to partial open position (**NOTE:** The arrow on the manual locking assembly should line up with the white indicator between the OPEN and CLOSED position), slide the assembly up the shaft until it fits into the recess in the cover plate, then re-tighten the retaining screw.
 - 3) Disconnect, cap and stow electrical connector from pressure switch.

C. Close off the 9th stage bleed air supply by manually wrenching High Stage Valve to the CLOSE position, then loosen the position indicator screw, slide the lock up into the recess in the cover plate, and re-tighten the position indicator screw.

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- | D. Close fan duct cowl and thrust reverser (AMM 78-31-00)

30-4 ENGINE AND NOSE COWL ANTI-ICE VALVE POSITION LIGHTS OR TAI INDICATIONS

OPERATIONS (O)

Verify proper operation of the engine and nose cowl anti-ice valve before each departure:

- 1 Start the associated engine.
- 2 Wait for the engine to stabilize at idle.
- 3 Verify that the engine and APU bleed air switches are in the OFF position.
- 4 Verify that the ENG ANTI-ICE switch is in the OFF position.
- 5 Monitor the EGT:
 - A. Wait for the EGT to stabilize and record the temperature.
CAUTION: LIMIT COWL TAI OPERATION TO 30 SECONDS MAXIMUM.
 - B. Put the engine anti-ice switch in the ON position.
 - C. Wait for the EGT to stabilize and record the temperature.
 - D. Position engine anti-ice switch to OFF.
 - E. Wait for the EGT to stabilize and record the temperature.
2. Verify that the following changes occurred:
 - A. The EGT increased by a minimum of 15 degrees C when the ENG ANTI-ICE switch was put in the ON position.
 - B. The EGT returned to the original idle temperature when the ENG ANTI-ICE switch was put in the OFF position.
3. Shut down the engine if required.

30-5 PITOT/STATIC PROBE HEATERS

OPERATIONS NOTE

1. With No.1 Auxiliary Pitot Static (Lower) probe heater inoperative:
 - A. Do not operate in known or forecast icing conditions.
 - B. On airplanes equipped with static source selector, operate with the affected static source selector in the ALTERNATE position.
2. With No.2 Auxiliary Pitot Static probe heater inoperative:
 - A. On airplanes with Flap Load Limiter inputs from No.1 and No.2 Auxiliary Pitot Static probes, do not operate in known or forecast icing conditions unless dispatch is based on Flap Load Limiter System inoperative (MEL Item 27-8).
 - B. On airplanes with the Standby Pneumatic Airspeed/Altimeter input from the No. 2 Auxiliary Pitot

- Static probe, do not operate in known or forecast icing conditions.
- C. On airplanes equipped with static source selector, operate with the affected static source selector in the ALTERNATE position.
3. With a Captain's or First Officer's Pitot Static (Upper) probe heater inoperative, operations are limited to day VMC, do not operate in visible moisture or in known or forecast icing conditions.

30-7 TOTAL AIR TEMPERATURE PROBE HEATER

OPERATIONS (O)

With static air temperature available, the following table may be used to determine TAT.

TOTAL AIR TEMPERATURE (°C) vs STATIC AIR TEMPERATURE (°C)

TAT (°C)											
SAT (°C)	M.5 0	M.6 0	M.7 0	M.7 2	M.7 4	M.7 6	M.7 8	M.8 0	M.8 2	M.8 4	M.8 6
40	56	62	69	70							
35	51	57	64	65	66	68	70				
30	45	52	58	59	61	63	65	67	68	70	
25	40	47	52	54	56	57	59	61	63	64	66
20	35	41	47	48	50	51	53	55	57	58	60
15	30	36	42	43	44	46	48	49	51	53	55
10	24	31	36	37	38	40	43	44	46	47	49
5	19	25	31	32	33	35	37	38	40	41	43
0	13	20	25	26	28	29	31	33	34	36	38
-5	8	14	20	21	22	24	26	27	29	30	32
-10	3	9	14	15	17	19	20	22	23	25	26
-15	-2	3	9	10	11	13	14	16	17	19	21
-20	-7	-2	3	4	6	7	9	10	12	13	15
-25	-12	-7	-3	-1	0	2	3	5	6	8	9
-30	-18	-12	-8	-7	-5	-4	-2	-1	1	2	4
-35	-23	-17	-13	-12	-10	-9	-8	-7	-5	-4	-2
-40	-28	-23	-18	-17	-16	-15	-13	-12	-11	-9	-7

30-9 PITOT, PITOT/STATIC AND TEMPERATURE PROBE HEATER LIGHTS

MAINTENANCE (M)

Verify that probe heater operates normally.

1. Station ground observer at associated probe heater, establish communications.
2. Ensure covers are removed from all air data probes and vanes.
3. Supply external power to airplane (AMM 24-22-00).
4. For airplanes with non-aspirated TAT probes with air/ground logic for probe heater power, verifying TAT probe heater operation requires that first, the Ground Sensing switch located on the E11 shelf be pressed to simulate “air” mode.
5. Position the associated PITOT STATIC HEAT switch to the ON position. For aspirated TAT probes, momentarily press/hold TAT TEST switch when verifying the TAT probe heater.
6. Verify that heat radiation can be detected from associated probe, indicating that heater is functioning. DO NOT TOUCH PROBE.

CAUTION: DO NOT PLACE HAND ON PROBE. TEMPERATURES ARE HIGH ENOUGH TO CAUSE BURNS. DO NOT LEAVE HEATER ON LONGER THAN REQUIRED. HEATER LIFE MAY BE UNNECESSARILY SHORTENED.

7. Position the associated PITOT STATIC HEAT switch to the OFF position.
8. Restore airplane electrical system to normal.

30-11 ELECTRICALLY HEATED WINDSHIELDS

OPERATIONS NOTE

With No. 1 window heat inoperative, operate with the Windshield Air (pneumatic anti-fogging system) on when window heat is required.

30-13 WINDSHIELD WIPER SYSTEM(S)

MAINTENANCE NOTE

If blade obstructs forward vision:

1. Remove bolt securing arm to converter shaft and remove wiper arm.
2. Install wiper arm in PARK position. To locate arm for PARK position, install arm on converter shaft so that blade will be parallel to window seal when a 2 to 3 pound force is applied to blade attach point.
3. Secure wiper arm to converter shaft with attaching bolt and lockwire.

30-17 COWL ANTI-ICE LIGHTS

NOTE: If dispatching with the associated cowl anti-ice valve locked open, MEL 30-3 restrictions for a cowl anti-ice valve inoperative locked open must be observed.

OPERATIONS (O)

For dispatch with associated cowl anti-ice valve locked open, refer to MEL 30-3 Operations Procedure.

MAINTENANCE (M)

For dispatch with associated cowl anti-ice valve locked open, refer to MEL 30-3 Maintenance Procedure.

30-18 ALPHA VANE HEATER LIGHT SYSTEMS**MAINTENANCE (M)**

With alpha vane heater light inoperative, check associated heater as follows:

1. Station ground observer at associated vane heater, establish communications.
2. Ensure covers are removed from all probe and vane heads.
3. Supply electrical power to airplane.
4. Position the associated PITOT STATIC HEAT switch to the ON position.
5. Check that heat radiation can be detected from associated vane, indicating that heater is functioning. DO NOT TOUCH VANE.

CAUTION: DO NOT PLACE HAND ON VANE. TEMPERATURES ARE HIGH ENOUGH TO CAUSE BURNS. DO NOT LEAVE HEATER ON LONGER THAN REQUIRED. HEATER LIFE MAY BE UNNECESSARILY SHORTENED.

6. Position the associated PITOT STATIC HEAT switch to the OFF position.
7. Restore airplane electrical system to normal.

30-19 DRAIN MAST HEATERS**MAINTENANCE (M)**

With a drain mast heater inoperative close the associated water supply shutoff valves (lavatory, galley or fountain). Deactivate both drain mast heaters by opening and collaring the following circuit breakers on the P-18 panel: DRAIN MAST HEATER - GROUND and DRAIN MAST HEATER - AIR

NOTE: There is no procedure available for independently deactivating a single drain mast heater for dispatch.

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ATA 31 INDICATING/RECORDING

31-2 Flight Data Recorder System (FDR)

MAINTENANCE NOTE

The following procedure may be used to confirm whether or not DFDAU faults affect the mandatory function of the FDR or only the ACMS function.

1. Position the Flight Recorder Test Switch to the TEST position.
2. If the Flight Recorder System OFF Light extinguishes, the fault does not affect the mandatory function of the FDR but does affect the ACMS function (see MEL Item 31-7).
3. If the Flight Recorder System OFF light remains illuminated, the fault does affect the mandatory function of the FDR (MEL Item 31-2).

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ATA 32 LANDING GEAR

32-2 ANTISKID SYSTEM

NOTE: Antiskid system has two circuit breakers (C/B's); one for Inboard (INBD) and one for Outboard (OUTBD) wheel brakes. If only one of the two antiskid channels is inoperative, the other channel may be left on to provide antiskid protection for the INBD or OUTBD wheels. Any channel that is inoperative must be turned off to ensure full manual braking capability.

OPERATIONS (O)

- 1) Place antiskid switch to OFF if maintenance action has not been performed.
- 2) Reduced thrust takeoff using the assumed temperature method is not permitted.
- 3) Turn Autobrake System (if installed) OFF.
- 4) Advise dispatch. Payload may be affected due to takeoff and landing runway length requirements.
- 5) Adjust takeoff and landing gross weight limits as required for antiskid inoperative.
- 6) Extend speed brakes manually since automatic extension system may not be operative with antiskid inoperative.
- 7) Use antiskid inoperative braking procedure:
 - ensure that the nose wheels are on the ground and the speedbrakes are extended before applying the brakes
 - initiate wheel braking using very light pedal pressure and increase pressure as ground speed decreases
 - apply steady pressure and DO NOT PUMP the pedals.

MAINTENANCE NOTE

- 1) Verify power is available to both the inboard and outboard antiskid channels and the antiskid switch is on.
- 2) Gain access to the antiskid control unit in the electronics bay E3-2.
- 3) Conduct a BITE check of the antiskid control unit by placing the wheel selector switch in the position shown in the table, pressing the test switch indicated, and observing the LED response. Any response other than the normal response requires maintenance action as shown.

NOTE: Verify that wheel chocks are in place, as the above BITE check will require that the parking brake be released (OFF) temporarily.

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- 4) Verify correct circuit breaker was pulled by repeating Step 3 after opening circuit breaker. The powered channel will have responses as shown in the table. No LED's will illuminate for components in the un-powered channel.
- 5) Install a collar on the open circuit breaker and install a placard near the antiskid switch, ANTISKID INOP - ON.
- 6) Repeat Step 3 daily until aircraft is repaired in order to detect subsequent failures.

TEST SWITCH	WHEEL SELECT	NORMAL LED INDICATION	NON-NORMAL INDICATION ACTION
VALVE	LO	Center Green LED	Open CB C195, Outboard Antiskid
VALVE	LI	Center Green LED	Open CB C196, Inboard Antiskid
VALVE	RI	Center Green LED	Open CB C196, Inboard Antiskid
VALVE	R0	Center Green LED	Open CB C195, Outboard Antiskid
VALVE	PB (Parking Brake SET)	Center Green LED	See DDG Item 32-3
VALVE	PB (Parking Brake OFF)	Center Green LED	See DDG Item 32-3
VALVE	L ALT	Center Green LED	See DDG Item 32-10
VALVE	R ALT	Center Green LED	See DDG Item 32-10
XDCR	LO	Right Green LED	Open CB C195, Outboard Antiskid
XDCR	LI	Right Green LED	Open CB C196, Inboard Antiskid
XDCR	RI	Right Green LED	Open CB C196, Inboard Antiskid
XDCR	R0	Right Green LED	Open CB C195, Outboard Antiskid

32-3 PARKING BRAKE VALVE**OPERATIONS (O)**

NOTE: The parking brake operates normally with the parking brake valve inoperative closed.

- 1) Verify that the antiskid system is deactivated:
- 2) Antiskid and auto brake switches are in the OFF position.
- 3) Verify that the auto brake switch is OFF.
- 4) Observe AFM limitations for dispatch with antiskid system inoperative.
- 5) Use antiskid inoperative braking procedure
 - ensure that the nose wheels are on the ground and the speedbrakes are extended before applying the brakes;
 - initiate wheel braking using very light pedal pressure and increase pressure as ground speed decreases;
 - apply steady pressure and DO NOT PUMP the pedals.
- 6) Extend speed brakes manually.

MAINTENANCE (M)

- 1) Deactivate the parking brake valve in the closed position:
 - A. Check that landing gear ground lock pins are properly installed.
 - B. With electrical power on airplane and wheels chocked, release the parking brake.
 - C. Open P6-3 panel ANTISKID FAIL & PARKING BRAKE or LANDING GEAR PARKING BRAKE circuit breaker.
 - D. Deactivate antiskid system: Place antiskid switch to OFF position.
 - E. Gain access to the parking brake valve and disconnect and stow electrical connector at valve.
 - F. Manually position override lever on the valve to the fully closed (POS 2) position.
 - G. Close P6-3 panel ANTISKID FAIL & PARKING BRAKE or LANDING GEAR PARKING BRAKE circuit breaker.
- 2) With the parking brake released and antiskid deactivated, verify that the ANTISKID INOP light is on.
- 3) Position auto brake switch to OFF position.
- 4) Restore the airplane to its required configuration.
- 5) Notify dispatch that the antiskid, auto spoilers and auto brake systems are inoperative.

32-4 PARKING BRAKE LIGHT**MAINTENANCE (M)**

- 1) Check that landing gear ground lock pins are properly installed.
- 2) With electrical power on the airplane and wheels chocked, set and release the parking brake.
- 3) Verify that the parking brake shutoff valve (located on the wheel well aft bulkhead) moves to the closed position (POS 2) when the parking brake is set and moves to the open position (POS 1) when the parking brake is released. These results indicate that the parking brake valve is operating normally.
- 4) The ANTISKID INOP light may illuminate when the parking brake is set. Check that ANTISKID INOP light extinguishes when parking brake is released. If ANTISKID INOP light does not extinguish when parking brake is released, refer to MEL 32-2, Antiskid System.
- 5) Remove landing gear ground lock pins prior to dispatch.

32-6 LANDING GEAR WARNING AND INDICATING SYSTEM

NOTE: Some airplanes (YL-BBF, BBG, BBH) have an additional gear indicating system that is located on the overhead panel. Dispatch requires that the center panel system and either the overhead panel system or the viewing system operate normally.

NOTE: Airplanes (YL-BBF, BBG, BBH) with the auxiliary landing gear indication system toggle switch installed on the E-11 shelf or the P5 overhead panel may dispatch with the primary downlock sensors inoperative provided the toggle switch is placed in the SECONDARY position and the viewing system operates normally. This configuration provides the required center instrument panel indications, with the second independent system being the viewing system (the center instrument panel is a repeater of the aft overhead panel). Airplanes with the auxiliary landing gear indication system toggle switch installed on the E-11 shelf or the P5 overhead panel may dispatch with the secondary downlock sensors inoperative provided the toggle switch is placed in the PRIMARY position and the viewing system operates normally. This configuration provides the required center instrument panel indications, with the second independent system being the viewing system, while preventing nuisance landing gear configuration aural warnings on approach (the aft overhead panel is a repeater of the center instrument panel).

32-7 AUTOMATIC BRAKE SYSTEM**MAINTENANCE (M)**

If AUTO BRAKE DISARM or INOP light extinguishes with auto brake select switch in OFF, dispatch is allowed with the auto brake select switch in the OFF position without any further deactivation procedures. If AUTO BRAKE DISARM or INOP light illuminates with auto brake select switch in the OFF position, perform the following additional procedures:

DIGITAL AUTO BRAKE SYSTEM:

1. Depressurize hydraulic system B (AMM 29-15-00).
2. Open and collar the following P6-3 Panel auto brake control circuit breaker(s): Autobrakes Cont.
3. In main gear wheel well on the ceiling, locate the auto brake valve module V122 and deactivate system by one of the two following methods:
 - A. METHOD 1
 - 1) Disconnect, cap and stow electrical connectors from auto brake valve module.
 - 2) Remove the auto brake valve module and cap the supply pressure line.
 - 3) Connect the brake pressure line and the return line with a 3/8 inch section of tubing or flexible hose (prevents hydraulically locking the brake shuttle valves in the brakes off position).
 - B. METHOD 2
 - 1) Disconnect, cap and stow electrical connectors from auto brake valve module.
 - 2) To ensure that alternate source selector valve remains pressurized, remove the "TEE" at the supply pressure port on the valve module and replaced with a 90 degree "ELBOW" fitting (BACE21BL0604J, BACE21AR0604J, or equivalent). Cap the supply pressure port on the valve module (MS21914-6, BACC14AD-6 or equivalent).
4. Re-pressurize the hydraulic systems (AMM 29-15-00) and check vicinity of auto brake valve for leaks.

32-8 RUDDER PEDAL NOSE WHEEL STEERING SYSTEM

NOTE: Dispatch is only allowed with the rudder pedal nose wheel steering not operating (electrical rotary actuator inoperative in the disengage position). The rotary actuator cannot be manually positioned.

OPERATIONS (O)

Flight crew should be informed that the crew member with access to the tiller will be flying and the following procedures used:

NOTE: Pilots must use caution when using the nose wheel steering tiller (wheel) above 20 knots to avoid over-controlling the nose wheels resulting in possible loss of directional control.

Takeoff:

The crew member with access to the tiller should steer the airplane by manipulating the steering wheel control until the rudder becomes effective between 40 and 60 kts. The crew member not flying should assist by keeping the wings level and applying a light forward pressure on the control column until the tiller is no longer required for steering.

Landing:

The crew member with access to the tiller should use the rudder and steering wheel control as required during the landing roll. The crew member not flying should assist by keeping the wings level and a forward pressure on the control column.

MAINTENANCE (M)

1. Open and collar P6-3 Panel circuit breaker LANDING GEAR NOSE GEAR AIR/GND or P6-2 Panel circuit breaker NOSE GEAR AIR/GND and wait at least 10 seconds.
2. Open and collar P6-3 Panel circuit breaker LANDING GEAR NOSE GEAR STEER or P6-2 Panel circuit breaker NOSE GEAR STEER.
3. Close P6-3 Panel circuit breaker LANDING GEAR NOSE GEAR AIR/GND or P6-2 Panel circuit breaker NOSE GEAR AIR/GND
4. Operate the rudder pedal steering and verify that the nose gear does not turn.
5. Operate rudder pedals and verify that the rudder operates normally.
6. Operate the tiller and verify that the nose gear steering operates normally.

32-10 ALTERNATE ANTISKID VALVES**MAINTENANCE (M)**

If the alternate antiskid valve is inoperative, verify manual braking is available on the affected wheels with the alternate brake system.

1. Check that landing gear ground lock pins are properly installed.
2. Provide electrical power (AMM 24-22-00).
3. Verify that: switch is ON.
4. Verify that wheel chocks are in place.
5. Depressurize Hydraulic System B and provide Hydraulic System A pressure (AMM 29-15-00).
6. Depress and release brake pedals several times. Observe brake wear indicator pins for movement to insure that all brakes are operating normally.
7. If brakes do not operate normally, turn ANTISKID switch OFF.
 - A. Depress and release brake pedals several times. Observe brake wear indicator pins for movement to insure that all brakes are operating normally.
 - B. If all brakes operate normally, notify dispatch that antiskid is inoperative and observe AFM limitations for antiskid inoperative (see MEL Item 32-2).

NOTE: If any brake remains inoperative, the airplane cannot be dispatched.

32-11 BRAKE TEMPERATURE MONITOR SYSTEM**OPERATIONS (O)**

Observe AFM Maximum Quick Turnaround Weight limitations

32-12 NOSE WHEEL STEERING SWITCH**MAINTENANCE (M)**

Verify that the landing gear transfer valve operates normally.

1. Pressurize Hydraulic System A (AMM 29-15-00).
2. Perform the Landing Gear Transfer Valve Operational Test (AMM 32-31-71).
3. Depressurize Hydraulic System A (AMM 29-15-00).
4. Place Nose Wheel Steering switch to NORM position.

OPERATIONS NOTE

Nose wheel steering will not be available if Hydraulic System A power is lost.

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32-13 HYDRAULIC BRAKE PRESSURE INDICATOR**MAINTENANCE (M)**

- 1) Chock wheels and release parking brakes.
- 2) Depressurize Hydraulic Systems A and B (AMM 29-15-00).
- 3) Apply and release brakes 10 times with approximately 3 seconds between each application. Check that operative brake indicator pressure is within limits after 10 applications (AMM 12-15-11 or wheel well placard).
- 4) Pressurize Hydraulic Systems A and B (AMM 29-15-00) and verify that operative brake indicator is approximately 3000 psi.
- 5) Set parking brakes.
- 6) Depressurize Hydraulic Systems A and B (AMM 29-15-00).

32-19 MAIN LANDING GEAR UPLOCK SPRINGS**OPERATIONS (O)**

After takeoff, leave landing gear lever in the UP position for the duration of flight until gear extension is required.

MAINTENANCE (M)

Remove the affected main landing gear uplock spring (AMM 32-00-00/901).

ATA 33 LIGHTS

33-2 CABIN INTERIOR ILLUMINATION

OPERATIONS NOTE

For the Boeing designed photoluminescent proximity lighting system installed, a maximum of 10% of the indirect ceiling fluorescent lights may be inoperative provided opposite and adjacent lights are operative. In addition, a maximum of 50% of the sidewall fluorescent lights may be inoperative provided no more than two adjacent lights are inoperative and opposite lights are operative.

33-3 PASSENGER NOTICE SYSTEM ("NO SMOKING/FASTEN SEAT BELT/RETURN TO SEAT") SIGNS

OPERATIONS (O)

Passenger Address System shall be used to notify passengers when seat belts must be fastened, smoking is prohibited and passengers should return to cabin from the lavatories.

MAINTENANCE (M)

1. **If required, tapes or ropes of conspicuous contrasting colors shall** be installed to block access to unusable seats prior to boarding passengers.
2. Conspicuous signs or placards shall be placed in appropriate locations to indicate seats, which are not to be occupied by passengers or cabin crew.
3. For an individual sign inoperative, an observer with normal vision should sit in the passenger seat(s), which is normally serviced by the sign and determine if both a "NO SMOKING" and "FASTEN SEAT BELT" sign can be read from the seat(s). In tests conducted at Boeing for the FAA, a sign was considered "readily legible" if enough of the sign could be seen to identify it. Example: "NO SMOK" and "FASTEN SEAT B" would be considered readily legible.

33-7 WING ILLUMINATION LIGHTS

OPERATIONS (O)

- a) Flight crew can determine the presence of icing conditions by viewing the accumulations of ice on the windscreen wiper arm, cockpit window frame.
- b) If ice is detected during the flight leave icing conditions as soon as possible.

33-8 LANDING LIGHTS

MAINTENANCE (M)

With the outboard landing light(s) extend/retract motor inoperative, compare the light position with the operative light's position or use AMM 33-42-11 Outboard Landing Lights - Adjustment/Test to determine if the light is extended in the proper position for the corresponding planned landing flap position. If light is not in the proper extended position, the light (lamp) is considered to be inoperative.

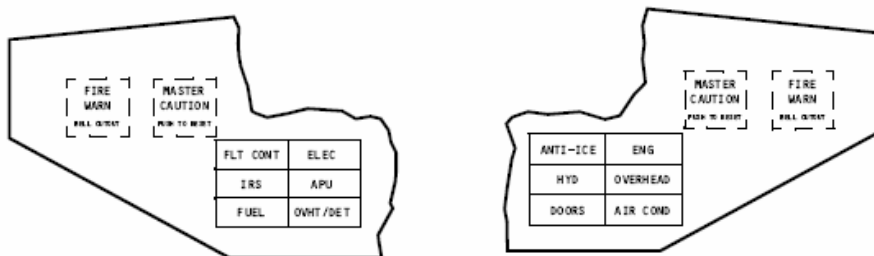
OPERATIONS NOTE

The retractable landing lights may be inoperative in the extended position with no operational restrictions. The fuel burn is increased by 1.0 percent for each extended light.

33-16 SYSTEM ANNUNCIATOR LIGHTS, LEFT AND RIGHT (PILOT'S LIGHT SHIELD)

OPERATIONS (O)

1. Check that associated system indicator light(s) on overhead panel is operating normally.
2. If the MASTER CAUTION light illuminates with none of the annunciator lights illuminated, it can be assumed that the system with the placard LIGHT INOP is affected.
3. Just prior to descent, check the associated panel for any light indications associated with the inoperative system annunciator light(s).



MASTER CAUTION SYSTEM ANNUNCIATOR LIGHTS

33-17 FLIGHT DECK MASTER LIGHTS TEST AND INDIVIDUAL LIGHT'S PRESS-TO-TEST FEATURES

OPERATIONS (O)

1. If master test feature fails to illuminate a light(s), press the affected light(s) and confirm push-to-test feature causes the bulb(s) to illuminate.
2. If individual push-to-test feature also fails to illuminate a light(s), perform an appropriate operational or system test and verify the affected light illuminated as intended.

33-18 WHEEL WELL LIGHTS

NOTE: Refer to the Marker next to the inoperative light in the wheel well for identification. The Inspection Flood Lights have Markers containing the word "INSPECTION". Some airplanes have an additional gear indicating system that is located on the overhead panel. Dispatch requires that the nose gear Inspection Flood Light be operative unless this additional gear indicating system is installed and operates normally.

33-19 FLOOR PROXIMITY EMERGENCY ESCAPE PATH MARKING SYSTEM

OPERATIONS NOTE

1. The following are the minimum dispatch requirements for the Boeing designed **incandescent** system:
 - A. All floor aisle marker lights with arrows must be operative.
 - B. The most forward and farthest aft floor aisle marker lights must be operative.
 - C. Every other floor aisle marker light must be operative (no two adjacent marker lights may be inoperative).
 - D. Sidewall exit indicators must have two of the five lamps operating.
2. The following are the minimum dispatch requirements for the Boeing **photoluminescent** proximity lighting system:
 - A. Sidewall exit indicators must have three of the five lamps operating.
 - B. A maximum of 12.7 sm (5 inches) of any 183 sm (72-inch) length of photoluminescent strip may be inoperative.

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ATA 34 NAVIGATION

34-1 MACH/AIRSPEED INDICATIONS

OPERATIONS (O)

When operating with an inoperative airspeed cursor or missing or inoperative external airspeed bugs the EFIS speed tape shall be used to observe airspeed targets and limits.

34-5 TOTAL AIR TEMPERATURE INDICATION

OPERATIONS NOTE

With static air temperature available, the following table may be used to determine TAT:

TOTAL AIR TEMPERATURE (°C) vs STATIC AIR TEMPERATURE (°C)

TAT, °C												
SAT, °C	M .50	M .60	M .68	M .70	M .72	M .74	M .76	M .78	M .80	M .82	M .84	M .86
+40	56	62	69	70								
+35	51	57	64	65	66	68	70					
+30	45	52	58	59	61	63	65	67	68	70		
+25	40	47	52	54	56	57	59	61	63	64	66	68
+20	35	41	47	48	50	51	53	55	57	58	60	63
+15	30	36	42	43	44	46	48	49	51	53	55	57
+10	24	31	36	37	38	40	43	44	46	47	49	51
+5	19	25	31	32	33	35	37	38	40	41	43	45
0	13	20	25	26	28	29	31	33	34	36	38	40
-5	8	14	20	21	22	24	26	27	29	30	32	34
-10	3	9	14	15	17	19	20	22	23	25	26	28
-15	-2	3	9	10	11	13	14	16	17	19	21	23
-20	-7	-2	3	4	6	7	9	10	12	13	15	17
-25	-12	-7	-3	-1	0	2	3	5	6	8	9	11
-30	-18	-12	-8	-7	-5	-4	-2	-1	1	2	4	6
-35	-23	-17	-13	-12	-10	-9	-8	-7	-5	-4	-2	0
-40	-28	-23	-18	-17	-16	-15	-13	-12	-11	-9	-7	-6

34-11 NON-STABILIZED MAGNETIC COMPASS

OPERATIONS (O)

Flight crew must insure that the planned routes comply with the MEL limitations.

34-13 DISTANCE MEASURING EQUIPMENT SYSTEMS

MAINTENANCE NOTE

To prevent an inoperative DME from sending invalid position updates to the FMC, DME position updating on the FMC can be inhibited by setting the DME UPDATE field on the FMC CDU NAV OPTIONS page 2/2 to OFF (Applicable to airplanes with FMC software Update 10.x installed). Alternatively the affected DME may be deactivated by opening and collaring the associated DME circuit breaker on the P6 or P18 panel. On airplanes with DME receivers that support agility tuning, the FMC will perform DME/DME position updates using a single operative DME.

34-17 VHF Navigation Systems (VOR/ILS)

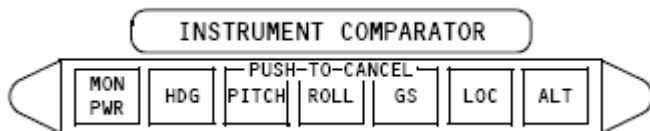
OPERATIONS (O)

When dispatching with Auto Tune function inoperative, use manual tuning of VHF navigation radios.

34-19 INSTRUMENT COMPARATOR OR WARNING SYSTEM

MAINTENANCE NOTE

1. Advise dispatch that approach minimums maybe affected.



NOTE: Some comparators do not have the ALT annunciator light.

34-20 RADIO ALTIMETER SYSTEMS

NOTE 1: The Rudder Pressure Reducer valve (SB 737-27A1206) will remain in the high pressure state if; (1) there is no valid radio altimeter signal, (2) there is disagreement between two operating radio altimeters.

NOTE 2: For the purposes of the Maintenance and Operations procedures below, Rockwell Collins FCC Operational Program Software (OPS) part numbers are considered to be equivalent to Honeywell FCC OPS part number 2212-HNP-03B-05 and later.

OPERATIONS (O)

1. For GPWS systems that receive data from only one radio altimeter, see MEL 34-26 for GPWS inoperative limitations if the number 1 radio altimeter is inoperative.
2. Insure that weather minimums or operating procedures are not dependent upon its use.
3. With radio altimeter(s) inoperative, do not use the associated autopilot or autothrottle for approach and landing.
4. With FCC Operational Program Software (OPS) 2212-HNP-03B-05 or later installed, if the remaining radio altimeter fails, the AFDS (both sides) will limit the bank angle to a maximum of 8 degrees in all roll modes. Use of the Autopilot/Flight Director System (AFDS) is at the discretion of the flight crew, since the AFDS may not command sufficient bank angle to execute proper departure and/or approach maneuvers or make en-route course changes within airspace limitations.

MAINTENANCE (M)

For an inoperative Receiver/Transmitter:

Open and collar associated P6-1/P18-1 panel Radio Altimeter circuit breaker to deactivate the inoperative radio altimeter.

When Radio Altimeter indications are inoperative, to verify that the associated receiver/transmitter is operating normally, refer to the applicable Airplane Maintenance Manual section (AMM 34-48-00) for troubleshooting and system test procedures.

34-25 ALTITUDE ALERTING SYSTEM**OPERATIONS (O)**

NOTE: An operable Altitude Alerting System is required for RVSM operations.

1. Determine that at least one autopilot is operating normally and that altitude hold is operating normally.
2. Use the autopilot and altitude hold for all operations for which it is appropriate.
3. Cross-check Captain's and First Officer's altitude displays upon reaching and departing assigned altitude. Periodically cross-check altitude indications when maintaining an assigned altitude.
4. Pilot Monitoring should call out approaching and departing assigned altitudes.
5. Flight Deck Crew must be aware that the usual alerts for altitude deviations will not occur.

34-26 Terrain Awareness and Warning System (TAWS)**OPERATIONS (O)**

When Ground Proximity Warning System **MEL 34-26 (1), (a), (b)** and/or Terrain System **MEL 34-26 (2)** are inoperative the following shall be taken into consideration:

- The automation shall be used to full extend as described in OM-A, 8.0.6.9.
- Priority shall be given to precision approaches.

d) Advisory Callouts

Advisory Callouts (Radio Altitude callouts, DH) are announced by PM:

- at 500 ft Radio Height – **500**
- at DH - **Minimum**
- at 50, 40, 30, 20, 10 ft Radio Heights – **50, 40, 30, 20, 10**

e) Windshear Warning and Flight Guidance Mode (Reactive)

During pre-flight preparation review windshear avoidance, precautions and recovery procedures as described in OM-B 2.5.5.

In flight close monitor flight parameters and accomplish Windshear Escape Maneuver as stated in QRH Non-Normal Maneuvers if windshear conditions are encountered.

The following conditions are indications of windshear encounters:

- uncontrolled changes from normal steady state flight conditions below 1000 feet AGL, in excess of any of the following:
 - 15 knots indicated airspeed
 - 500 fpm vertical speed
 - 5° pitch attitude
 - 1 dot displacement from the glideslope
 - unusual thrust lever position for a significant period of time.

34-32 INSTRUMENT TRANSFER SWITCHING SYSTEM

OPERATIONS (O)

Check that associated instruments function properly from isolated sources.

34-35 INERTIAL REFERENCE SYSTEM(S) (IRS)

NOTE: This item provides relief for Inertial Reference System, which includes the associated Digital/Analog Adapter (DAA). With an inoperative DAA, the FMC Auto-tune for the associated VHF Navigation Unit will not operate. With the left DAA inoperative, the yaw damper should be positioned OFF (roll attitude not available) and FMC VNAV will be inoperative (fuel summation for gross weight not available).

1. Use the remaining IRS for both attitude, heading and vertical speed (on EFIS airplanes) indications. The MEL does not allow VSI's to be inoperative.
2. Verify remaining IRS is operating normally by observing attitude and heading flags on pilot's and copilot's ADI, HSI, VSI and RDMI are out of view.
3. Flight is restricted to day VMC.
4. Verify that Standby Magnetic Compass operates normally.
5. Verify Standby Horizon Indicator operates normally.
6. When dispatching with one IRU inoperative, do not use the autopilots in any mode.
7. Do not use TO/GA mode of Flight Director.
8. For non-scanning DME installations with a DAA inoperative, select AUTO on the VHF NAV control panel with the operative DAA for en-route FMC position updating using agility DME tuning.
9. If left DAA is inoperative, operate with yaw damper OFF. Note that FMC VNAV will not be available.

34-36 FLIGHT MANAGEMENT COMPUTER SYSTEM (FMCS)**OPERATIONS NOTE**

In order to conduct polar operations, the HDG REF switch must be installed, and one FMC, one CDU, and GPS-L must be operational for dispatch.

OPERATIONS (O)

Dispatch with inoperative or expired Navigation Database:

- A. Enter flight plan into FMCS (waypoints, etc.) using standard FMCS procedures.
- B. Cross check FMCS waypoints using current flight crew navigation charts.
- C. Manually tune and identify approach navigation radios.

OPERATIONS (O) -2 –3

Where a failure or degradation results in the aircraft being unable to meet the B-RNAV functionality and accuracy requirements before departure, the MCC shall remove the designator “R” in Item 10 of the flight plan. Subsequently, for a flight for which a flight plan has been submitted, old flight plan shall be cancelled and an appropriate new flight plan shall be submitted. For a flight operating based on a repetitive flight plan (RPL), the RPL shall be cancelled, and an appropriate new flight plan shall be submitted.

MAINTENANCE NOTE

An inoperative FMC may be deactivated by opening and collaring the FMCS CMPTR No. 1 or No. 2 circuit breaker on the P6 or P18 panel, as appropriate.

34-40 TRAFFIC COLLISION AND AVOIDANCE SYSTEM (TCAS)**OPERATIONS (O)**

Observe operative indications and advisories. Respond as appropriate.

MAINTENANCE (M)

For dispatch with the complete TCAS system inoperative, deactivate and secure the system by opening and collaring the TCAS Circuit Breaker.

34-49 Right IRS DC Power Supply System**OPERATIONS (O)**

If Left IRS DC FAIL light illuminates during flight, assume that both IRS DC FAIL lights are illuminated. Refer to IRS DC FAIL Non-Normal Procedures.

ATA 35 OXYGEN

35-2 PASSENGER SERVICE UNITS (PSUS)

OPERATIONS(O)

Automatic Deploy System Inoperative:

1. Be prepared to deploy passenger masks manually using the PASS OXYGEN Switch or Actuation/Reset Handle (if installed).
2. Flight altitude is limited to **FL 300**.

MAINTENANCE (M)

Automatic Deploy System Inoperative:

1. Check passenger oxygen manual deploy system per AMM 35-21-00, A/T (bottle system) or 35-22-00, A/T (chemical oxygen).
2. With only the automatic deploy system inoperative, placard near PASS OXYGEN Switch - PASS OXY - AUTO MODE INOP
3. Notify dispatch. Flight planning may be affected.

Door Latch(es) Inoperative Unlatched:

1. Verify that related generator has not been expended. Color band will be black if generator has been expended and generator must be replaced.
2. Tape door closed. Fashion the tape such that a non adhesive “handle”, approximately 4 inches long, is left pendant. This “handle” will be used in case of need by the passenger to strip the securing tape down, thus allowing the door to fall open.
3. Notify dispatch. Flight planning may be affected.

Passenger Service Unit Inoperative:

1. Close the inoperative door and secure it using adhesive tape.
2. Rope, tie, tape or otherwise block the seats with the inoperative units against passenger use. Do likewise if inoperative unit is in a lavatory.
3. Placard the blocked off seats or lavatory - NOT TO BE OCCUPIED.

35-3 OXYGEN PRESSURE INDICATORS

OPERATIONS (O)

When dispatching with the overpressure discharge indication disk damaged or missing, verify that oxygen pressure is adequate for dispatch by observing system pressure using the flight deck crew and passenger (if installed) oxygen pressure indicator on the aft overhead panel or using the pressure indicator on the external service panel (if installed) or oxygen cylinder.

MAINTENANCE (M)

1. Check all cylinder pressure indicators prior to each takeoff.
2. Ensure supply is above minimum required for flight. See Boeing Flight Planning and Performance Manual, Flight Planning Section, for minimum dispatch bottle pressure.

35-4 PORTABLE OXYGEN DISPENSING UNITS (BOTTLE AND MASK)

MAINTENANCE (M)

1. Until it can be removed from the airplane at the next available maintenance base, stow out of service units in a location where they will not be used by mistake and remove or obscure locator placards for the inoperative units.
2. Ensure required distribution of serviceable units is maintained throughout the airplane.

35-5 PASSENGER OXYGEN SYSTEM

OPERATIONS(O)

1. Plan flight over route with minimum en-route altitudes (MEA) equal to or lower than **14,000** feet.
2. Maximum flight altitude shall not exceed **FL 250**.
3. Prior to flight, the pilot in command shall brief cabin crew on the alternate emergency procedures that will be used.

MAINTENANCE (M)

1. Notify dispatch. Flight planning may be affected.
2. Ensure, that there is portable oxygen units for at least 10 percent of the passengers.

ATA 36 PNEUMATIC

36-1 MANIFOLD ISOLATION SHUTOFF VALVE

MAINTENANCE (M)

NOTE: The airplanes must have modified Main Engine Controls (MEC's) installed on both engines for dispatch with the isolation valve inoperative closed. Modified MEC's are P/N 9368M57P12 and higher (P12 and up) on CFM56-3-B1 engines and P/N 9387M15P03 and higher (P03 and up) on CFM56-3B-2 engines. All CFM56-3C-1 engines have modified MEC's installed.

Deactivate the bleed air isolation valve.

1. Position both Engine Bleed Switches to OFF.
2. Position both Pack Switches to OFF.
3. Gain access to the valve through the left air conditioning equipment bay door. If necessary remove the air conditioning duct segment located in front of keel beam access hole.
4. Remove, cap and stow the connector from bleed air isolation valve.
5. Manually move valve to the closed position using the manual override handle.

NOTE: With the isolation valve closed, two separate air sources (i.e. the APU and a ground source) must be used to start the engines. To avoid having to use two sources, the isolation valve may be manually opened for a cross-bleed start and then manually closed after the engines are started.

36-2 GROUND PNEUMATIC CONNECTOR CHECK VALVE

NOTE 1: With the ground pneumatic connector check valve inoperative closed, engines can not be started from ground source. Use APU as air source for starting engines.

NOTE 2: With the ground pneumatic connector check valve inoperative open, the right engine can only be started using a ground pneumatic source. Following engine start and prior to removal of the ground pneumatic source, the right pneumatic duct must be depressurized. With the right pneumatic duct depressurized the right pack will be unusable.

MAINTENANCE (M)**VALVE INOPERATIVE OPEN:**

1. Use a ground pneumatic source for starting the right engine.
2. Prior to removing the ground pneumatic source, verify with flight crew that the right pneumatic duct is depressurized (right engine bleed OFF and isolation valve CLOSE).
3. Advise dispatch. Ground pneumatic source will be required at down line stations if right engine is shutdown.

OPERATIONS NOTE

Operate the left pack using the left engine bleed or APU bleed with isolation valve CLOSE. Increased air flow will occur when flaps are extended (takeoff and landing) if the APU is used instead of engine bleed to supply bleed air to the operating pack. With the pack switch in AUTO, the pack will operate in the high flow mode when the APU is used as the bleed source. The pack switch is not allowed to be in HIGH for takeoff and landing. Refer to the NO ENGINE BLEED TAKEOFF AND LANDING PROCEDURE. At altitudes above **17,000** feet, operate with the APU bleed air OFF and the left pack using the left engine bleed.

1. Following engine start, depressurize the right pneumatic duct prior to removing the ground pneumatic source (right engine bleed OFF and isolation valve CLOSE).
2. Operate airplane with right bleed OFF, right pack OFF and isolation valve CLOSE.
3. With right pack unusable, maximum altitude is **FL 250**.

NOTE: When dispatching with a single engine bleed on for takeoff (airplane pressurized), VMCG should be determined based on AC packs OFF. Takeoff performance should be based on AC packs ON/AUTO.

36-3 PRE-COOLER CONTROL VALVES

OPERATIONS (O)

NOTE 1: Operating two air conditioning packs with one engine bleed is not recommended. Use of the APU bleed air is limited to **17,000** feet. One air conditioning pack will be unusable when dispatching with; (1) the right engine bleed unusable, (2) the left engine bleed unusable and flight altitude greater than **17,000** feet, or (3) both engine bleeds unusable.

NOTE 2: When dispatching with a single engine bleed on for takeoff (airplane pressurized), VMCG should be determined based on AC packs OFF. Takeoff performance should be based on AC packs ON/AUTO.

1. Do not dispatch into known or forecast icing conditions.
 2. For left engine bleed unusable:
 - A. At altitudes **17,000** feet and below, operate the left pack using the APU bleed air, the right pack using the right engine bleed and the isolation valve CLOSE.
 - B. At altitudes above **17,000** feet, operate with the APU bleed air OFF.
 - 1) Limit altitude to **FL 250**.
 - 2) Operate the left pack using the right engine bleed, the right pack OFF and isolation valve OPEN.
 3. For right engine bleed unusable:
 - A. Limit altitude to **FL 250**.
 - B. Operate the left pack using the left engine bleed, right pack OFF, and isolation valve CLOSE.
- NOTE:** At altitudes **17,000** feet and below, increased air flow will occur when flaps are extended (takeoff and landing) and the APU is used instead of engine bleed to supply bleed air to the operating pack. Refer to Chapter 12 of Part B, NO ENGINE BLEED TAKEOFF AND LANDING PROCEDURE.
4. For both engine bleeds unusable:
 - A. Limit altitude to **17,000** feet.
 - B. Operate the left pack using APU bleed and isolation valve CLOSE. Refer to Chapter 12 of Part B, NO ENGINE BLEED TAKEOFF AND LANDING PROCEDURE.

MAINTENANCE (M)

Deactivate precooler control valve in full open position.

- A. Deactivate the leading edge slats in the retracted position (AMM 27-81-00/201).
- B. Deactivate the associated thrust reverser (AMM 78-31-00/201).
- C. Gain access to the precooler control valve by opening the appropriate fan cowl panel (AMM 71-11-02/201) and thrust reverser (AMM 78-31-00/201).
- D. Disconnect the supply pressure connection to the valve.
- E. Install a cap on both the valve side and the pressure line side and stow the pressure line.
- F. Verify that visual position indicator on the valve indicates that the valve is in the full open position.
- G. Close fan cowl panel (AMM 71-11-02/201) and thrust reverser (AMM 78-31-00/201).
- H. Activate the thrust reverser (AMM 78-31-00/201).
- I. Activate the leading edge slats (AMM 27-81-00/201).

36-4 PNEUMATIC PRESSURE INDICATION SYSTEMS**OPERATIONS (O)**

For engine starts, the Flight Crew normally uses the Pneumatic Pressure Indication System to verify the minimum recommended pneumatic pressure for engine start.

With an inoperative Pneumatic Pressure Indication System, confirmation of minimum recommended pneumatic pressure is not required for engine start.

For verification of start valve closure the Flight Crew can verify that the engine start valve has closed by noting that the START VALVE OPEN lights have extinguished.

36-5 ENGINE BLEED AIR SHUTOFF VALVES (PRSOV)**OPERATIONS (O)**

NOTE 1: Operating two air conditioning packs with one engine bleed is not recommended. Use of the APU bleed air is limited to **17,000** feet. One air conditioning pack will be unusable when dispatching with; (1) the right engine bleed inoperative, (2) the left engine bleed inoperative and flight altitude greater than **17,000** feet, or (3) both engine bleeds inoperative.

NOTE 2: When dispatching with a single engine bleed on for takeoff (airplane pressurized), VMCG should be determined based on AC packs OFF. Takeoff performance should be based on AC packs ON/AUTO.

1. Do not dispatch into known or forecast icing conditions.
2. For left engine bleed inoperative:
 - A. At altitudes **17,000** feet and below, operate the left pack using the APU bleed air, the right pack using the right engine bleed and the isolation valve CLOSE.
 - B. At altitudes above **17,000** feet, operate with the APU bleed air OFF.
 - 1) Limit altitude to **FL 250**.
 - 2) Operate the left pack using the right engine bleed, the right pack OFF and isolation valve OPEN.
3. For right engine bleed inoperative:
 - A. Limit altitude to **FL 250**.
 - B. Operate the left pack using the left engine bleed, right pack OFF, and isolation valve CLOSE.

NOTE: At altitudes **17,000** feet and below, increased air flow will occur when flaps are extended (takeoff and landing) and the APU is used instead of engine bleed to supply bleed air to the operating pack. Refer to Chapter 12 of Part B, NO ENGINE BLEED TAKEOFF AND LANDING PROCEDURE.

4. For both engine bleeds inoperative:
 - A. Limit altitude to **17,000** feet.
 - B. Operate the left pack using APU bleed and isolation valve CLOSE. Refer to Chapter 12 of Part B, NO ENGINE BLEED TAKEOFF AND LANDING PROCEDURE.

MAINTENANCE (M)

Lock the associated engine bleed air valve in the closed position.

- A. Deactivate the leading edge slats in the retracted position (AMM 27-81-00/201).
- B. Deactivate the associated thrust reverser (AMM 78-31-00/201).
- C. Gain access to the engine bleed air valve by opening the appropriate fan cowl panel (AMM 71-11-02/201) and thrust reverser (AMM 78-31-00/201).
- D. Lock the engine bleed air valve in the CLOSED position.
 - 1) Turn the override nut to align the position indicator with the CLOSED position.
 - 2) Loosen the lock screw/knob bolt and push in locking knob to lock valve in closed position.
 - 3) Retighten lock screw/knob bolt.
- E. Close fan cowl panel (AMM 71-11-02/201) and thrust reverser (AMM 78-31-00/201).
- F. Activate the thrust reverser (AMM 78-31-00/201).
- G. Activate the leading edge slats (AMM 27-81-00/201).

36-6 DUAL BLEED LIGHT SYSTEM**OPERATIONS (O)**

Prior to takeoff verify that the APU bleed valve is closed using the following procedure:

1. Place manifold isolation valve switch in CLOSE position.
2. With APU running, turn OFF left pack and engine bleed.
3. Turn OFF APU bleed.
4. Observe that left pneumatic duct pressure decreases to 10 PSI or less.

36-8 ENGINE BLEED TRIP OFF LIGHTS**OPERATIONS (O)**

NOTE 1: Operating two air conditioning packs with one engine bleed is not recommended. Use of the APU bleed air is limited to **17,000** feet. One air conditioning pack will be unusable when dispatching with; (1) the right engine bleed unusable, (2) the left engine bleed unusable and flight altitude greater than **17,000** feet, or (3) both engine bleeds unusable.

NOTE 2: When dispatching with a single engine bleed on for takeoff (airplane pressurized), VMCG should be determined based on AC packs. Takeoff performance should be based on AC packs ON/AUTO.

1. Do not dispatch into known or forecast icing conditions.
2. For left engine bleed unusable:
 - A. At altitudes **17,000** feet and below, operate the left pack using the APU bleed air, the right pack using the right engine bleed and the isolation valve CLOSE.
 - B. At altitudes above **17,000** feet, operate with the APU bleed air OFF.
 - 1) Limit altitude to **FL 250**.
 - 2) Operate the left pack using the right engine bleed, the right pack OFF and isolation valve OPEN.
3. For right engine bleed unusable:
 - A. Limit altitude to **FL 250**.
 - B. Operate the left pack using the left engine bleed, right pack OFF, and isolation valve CLOSE.

NOTE: At altitudes **17,000** feet and below, increased air flow will occur when flaps are extended (takeoff and landing) and the APU is used instead of engine bleed to supply bleed air to the operating pack. Refer to Chapter 12 of Part B, NO ENGINE BLEED TAKEOFF AND LANDING PROCEDURE.

4. For both engine bleeds unusable:
 - A. Limit altitude to **17,000** feet.
 - B. Operate the left pack using APU bleed and isolation valve CLOSE. Refer to Chapter 12 of Part B, NO ENGINE BLEED TAKEOFF AND LANDING PROCEDURE.

36-9 HIGH STAGE VALVES**MAINTENANCE (M)**

Lock the high stage valve closed.

1. Make sure each engine start lever is in the CUTOFF position.
2. Remove pressure from the pneumatic system.
3. Open fan cowl and thrust reverser (AMM 78-31-00).
4. Manually lock closed the high stage valve.
 - A. Manually wrench the high stage valve to the CLOSE position.
 - B. Loosen the position indicator screw.
 - C. Slide the lock into the recess in the cover plate.
 - D. Tighten the position indicator screw.
5. Close fan cowl and thrust reverser (AMM 78-31-00).

ATA 38 WATER/WASTE

38-1 Potable Water Systems

MAINTENANCE (M)

1. For inoperative individual components:
 - A. Deactivate or isolate inoperative components.
 - B. Verify associated system components do not have leaks.

NOTE: Due to the wide variety of galley, lavatory and drinking fountain installations and various component failure possibilities, operators must develop procedures tailored to their specific installations.

2. For an inoperative potable water system:
 - A. Drain potable water system (-500 AMM 38-11-00/301).
 - B. Establish procedures to ensure the potable water system is not serviced.

OPERATIONS NOTE

Each operator should establish alternate procedures for use in the event that the potable water system is inoperative and drained.

38-2 Lavatory Waste Systems (Including Wheelchair Accessible Lavatories)

MAINTENANCE (M)

1. For inoperative individual components:
 - A. Deactivate or isolate inoperative components.
 - B. Verify associated system components do not have leaks.

NOTE: Due to the wide variety of lavatory installations and various component failure possibilities, operators must develop procedures tailored to their specific installations.

2. For an inoperative lavatory waste system:
 - A. Deactivate or isolate inoperative components.
 - B. Verify associated system components do not have leaks.

NOTE: Due to the wide variety of lavatory installations and various component failure possibilities, operators must develop procedures tailored to their specific installations.

- C. Secure the associated lavatory door closed.

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ATA 49 AIRBORNE AUXILIARY POWER

49-1 AUXILIARY POWER UNIT (APU)

OPERATIONS (O)

NOTE: Aircraft may be operated with the APU removed in accordance with the AMM provided the resulting changes in weight and balance are accounted for.

Perform a visual inspection of the tailcone area and adjacent control surfaces to confirm that there is no evidence of heat damage or delamination.

MAINTENANCE (M)

Both engine driven generator systems' oil quantity is to be checked during daily check.

MAINTENANCE NOTE

NOTE: Unsuccessful APU start may be the result of an inoperative APU Fuel Valve. Reference MEL 28-4 for appropriate relief when dispatching with an inoperative APU Fuel Valve.

1. Advise Dispatch. Ground operation at downline stations may be affected.
2. Aircraft may be operated with the APU removed (AMM 49-11-00, APU Power Plant - Maintenance Practices - requires APU Deletion Tool Kit C49001 or F80136).

49-2 APU ANNUNCIATOR LOW OIL PRESSURE AND OVER SPEED LIGHTS

MAINTENANCE NOTE

APU Auto Shutdown may be checked by starting and shutting down the APU normally.

49-3 APU AUTO SHUTDOWN SYSTEM

MAINTENANCE (M)

1. Verify that no abnormal annunciator lights illuminate when starting and shutting down the APU normally.
2. When using the APU for ground operations, monitor APU indications continuously. If APU Annunciator light (LOW OIL PRESSURE, HIGH OIL TEMP/FAULT or OVER SPEED) or Master

Caution System Annunciator light (APU) illuminates, SHUTDOWN APU IMMEDIATELY.

49-4 APU ANNUNCIATOR LOW OIL QUANTITY/ MAINT LIGHT

MAINTENANCE (M)

If the APU is to be used, check APU oil quantity once each flight day.

NOTE: On **GTCP36-280** and APS-2000 model APU's, FADEC may be used to determine if a low oil quantity condition exists.

49-5 APU EGT INDICATOR

OPERATIONS (O)

NOTE: There are no operational procedures for the APU Exhaust Temperature Indicator inoperative on APU Models **GTCP36-280**, APS-2000 and AS 131-9B.

For APU models **GTCP85-129**:

1. Inform Dispatch. Passengers may not be loaded until APU has been shutdown.
2. Electrical load on the APU should be limited to the minimum required for engine start.
3. Start No. 2 Engine only, using APU.
4. Shut down APU.
5. Load passengers.
6. Start No. 1 engine using cross bleed.

49-6 APU INLET DOOR

NOTE: The Model APS-2000 APU air inlet door must operate normally for using the APU. For APU Models **GTCP36-280** and AS 131-9B, APU air inlet door may be inoperative in the full open position and the APU operated normally. The starting sequence for APU Model **GTCP85-129** is dependent on the APU air inlet door moving from the close to the full open position. With the APU air inlet door actuator inoperative, the following maintenance procedure will enable the APU to be started.

OPERATIONS (O)

Starting the Model **GTCP85-129** APU requires Maintenance action. Do not turn the APU off unless the APU is no longer required or Maintenance is available. The Model **GTCP36-280** APU does not require Maintenance action for starting.

The following performance penalties can be used to account for the increased drag resulting from the APU inlet door being inoperative in the open position (either fully or partially open) and the APU not running. Fuel burn will be increased by 2.8%.

MODEL	TAKEOFF & LANDING CLIMB	ENROUTE CLIMB
-500	254 KG	512 KG

MAINTENANCE NOTE

If APU Models **GTCP36-280** and **GTCP85-129** air inlet door is not in the full open position and APU use is required, position air inlet door full open as follows:

1. Open stabilizer trim access door 3701 to gain access to the APU air inlet door actuator.
2. Deactivate air inlet door.
 - A. Disconnect the electrical connector from inlet door actuator.
 - B. Install a cap on the electrical connector.
 - C. Attach the electrical harness together with cap chain to airplane structure using the braid.
 - D. Install a cap on the actuator receptacle.
 - E. Attach the cap chain to the receptacle attachment screw.
3. Open air inlet door.
 - A. Disconnect the two pushrods from the actuator arms.
 - B. Remove the bolt and the washer from the actuator arm.
 - C. Remove the actuator arm.
 - D. Move the arm until it is in the full open position, which is 12 degrees inboard from actuator centerline.
 - E. Install the arm on the shaft.
 - F. Install the bolt and the washer on the actuator arm.
 - G. Repeat steps 3A thru 3F for the other actuator arm.
 - H. Attach the two pushrods to the actuator arms.
 - I. If the door is not in the open position, adjust the door per AMM 49-15-00 APU Power Plant - Adjustment/Test.

Starting procedure for Model **GTCP85-129** APU with air inlet door inoperative in the full open position:

1. Check that Battery Switch is ON.
2. Open stabilizer trim access door 3701 to gain access to the APU air inlet door switch.
3. Remove plug D1246 from the air inlet door switch S284 and jumper pins 1 and 2 of plug D1246.
4. Position APU Switch to START and release to ON.
5. Remove jumper from pins 1 and 2 of plug D1246.
6. Reconnect plug D1246 to switch S284 (APU will begin to start).
7. Close stabilizer trim access door.

49-7 APU BLEED AIR SYSTEM**MAINTENANCE (M)**

The following procedures are used to determine if the bleed air valve is open or closed.

MODELS **GTCP36-280**, **GTCP85-129** and APS-2000:

1. Start the APU and allow time for APU EGT to stabilize.
2. One minute after EGT has stabilized, position the APU Bleed Air switch ON.
3. Check duct pressure:
 - A. NO PRESSURE (Less than or equal to 10 psi) - Valve is failed closed. Position APU Bleed Air switch OFF. Ensure, that valve is closed by disconnecting and stowing APU bleed air valve electrical connector D474.
 - B. INDICATION OF PRESSURE (Greater than 10 psi) - Position APU Bleed Air switch OFF. No drop in duct pressure indicates valve failed open. Manual closing of valve not feasible. APU must be considered inoperative.
4. Shut down APU.
5. Advise dispatch since ground operation at downline stations may be affected.

49-8 APU DC FUEL BOOST PUMP**MAINTENANCE NOTE**

Open/collar circuit breaker (P6-4 or P6-5 Panel) for the affected pump.

49-9 APU SURGE CONTROL SYSTEM

NOTE 1: MEL Item 49-9 is not applicable to the following APU's; (1) Model **GTCP36-280**, (2) APS2000 APIC Part No. 170101-106C and subsequent, (3) APS2000 with Surge Bleed Valve removed per APIC Service Bulletin 170101-49-69.

NOTE 2: FL250 restriction is not applicable to APS2000 Performance Improved (P.I.) APU's (APIC Part No. 170101-106B and subsequent or those that have equivalent performance improvement upgrades as identified in APIC SIL T-47C1-22).

MAINTENANCE NOTE

To configure Model APS-2000 APU Surge Bleed Valve closed, reference APIC SIL SPS 155.

49-13 APU FUEL HEATER

NOTE: The APU fuel heater is designed to fail open and can be assumed to be functional. If the heater has failed open and the fuel boost pumps are off, some of the incoming fuel can vaporize causing gradual wear and deterioration of the APU fuel pump. However, all deterioration stops when the fuel boost pumps are turned on. Therefore, the APU will not deteriorate in flight if the fuel heater has failed open.

MAINTENANCE (M)

Verify APU operates normally by operating the APU under a loaded condition and observing that APU operates within defined limits (AMM 49-11-00 APU POWER PLANT - A/T, Test of APU Operation - LOADED CONDITION).

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ATA 52 DOORS

52-3 Door Warning Light System

MAINTENANCE (M)

1. Visually inspect the affected door(s) to insure that door is closed and locked.

52-5 Left Main Cabin Door Pressure Stop Fittings

NOTE: This item provides dispatch relief for only the forward main entry door and aft main entry door on the left side of the airplane. A door pressure stop consists of two mating stop fittings, one being attached to the door and the other attached to the fuselage. Either or both stop fittings may be broken or missing at a single door pressure stop location.

OPERATIONS (O)

NOTE: Do not exceed the maximum pressure differential (**6.0** or **3.4** psi). The following altitude restrictions will allow a cabin altitude of **8,000** feet to be maintained.

For maximum pressure differential of **6.0** psi, limit flight altitude to **27,000** feet or lower.

For maximum pressure differential of **3.4** psi, limit flight altitude to **17,000** feet or lower.

1. For Analog Cabin Pressure Control system:
 - A. Operate pressurization system in Standby (STBY) mode.
 - B. To ensure that maximum pressure differential is not exceeded, select cabin altitude in accordance with the appropriate Differential Pressure Schedule.
2. For Digital Cabin Pressure Control system:
 - A. Select a landing altitude of **8,000** ft. MSL on the cabin pressure control panel. Cabin altitude will ascend to slightly less than **8,000** ft. during climb to cruise altitude.

NOTE: Actual landing airport altitude may be selected if flight altitude is limited to; (1) **13,000** feet for **6.0** psi differential, (2) **7,000** feet for **3.4** psi differential.

- B. Monitor differential pressure indicator during climb to ensure maximum pressure differential of **6.0** psi or **3.4** psi is not exceeded.

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3. Select actual landing airport altitude after initiating descent. For the analog system, landing altitude is selected in the cabin altitude window. If required to hold during descent, it may be necessary to increase the landing altitude in accordance with the appropriate Differential Pressure Schedule.
4. Lower cabin altitudes may be obtained by appropriate selection of flight altitude and cabin/landing altitude in accordance with the appropriate Differential Pressure Schedule.

FLIGHT ALTITUDE (FT)	CABIN ALTITUDE (FT) (3.4 PSI PRESSURE DIFFERENTIAL)	CABIN ALTITUDE (FT) (6.0 PSI PRESSURE)
7000	0	
8000	800	
9000	1600	
10000	2400	
11000	3200	
12000	4000	
13000	4700	
14000	5400	100
15000	6100	800
16000	7000	1400
17000	7700	2000
18000	8300	2700
19000		3300
20000		3900
21000		4500
22000		5000
23000		5600
24000		6200
25000		6700
26000		7300
27000		7800
28000		8300

MAINTENANCE (M)

Visually inspect remaining fittings for possible defects on affected door(s), body frames and sills (if installed).

52-6 Lower Cargo Doors Pressure Stop Fittings

NOTE: A door pressure stop consists of two mating stop fittings, one being attached to the door and the other attached to the fuselage. For pressurized flight, either or both stop fittings may be broken or missing at a single door pressure stop location. The number installed shown above is the number of stop locations. For un-pressurized flight, either or both stop fittings may be missing at two door pressure stop locations.

OPERATIONS

For un-pressurized flight, use MEL 21-15 Operations Procedures.

MAINTENANCE (M)

1. For one broken or missing pressure stop fitting on each door or frame:
 - A. Visually inspect remaining fittings for possible defects on affected door, body frames and sills.
 - B. Inspection is repeated within **25** flights.
 - C. Repairs are completed within **50** flights.
2. For two broken or missing pressure stop fittings on each door or frame:
 - A. Configure airplane for un-pressurized flight by using the manual mode of the Cabin Pressure Control System to position the outflow valve to the full open position. Hold outflow valve toggle switch in the OPEN position for 10 seconds (Analog System) or 30 seconds (Digital System).

52-7 Entry/Service Door Hold-Open Latch Assemblies**MAINTENANCE NOTE**

Operators should select an appropriate procedure/tool to release the hold open latch that meets their operating requirements.

52-9 Lower Cargo Doors Door Balance Mechanism**MAINTENANCE (M)**

Operators should select an appropriate procedure/tool to hold the cargo door open.

52-14 Lower Cargo Doors Hold Open Mechanism**MAINTENANCE (M)**

Operators should select an appropriate procedure/tool to hold the cargo door open.

52-17 Boeing/C&D Aerospace Enhanced Flight Deck Security Door Automatic Locking System**OPERATIONS (O)****Boeing/C&D Aerospace Enhanced Flight Deck Security Door Automatic Locking System**

Deadbolt is used to lock the cockpit door. RP shall lock the cockpit door positioning the Deadbolt to "Locked - key operable" after Cabin Crew report "Passengers on board". The service interphone system shall be used by Cabin Crew to gain the access to the flight deck. PM is responsible for the cockpit door operation in flight. In case of pilot incapacitation the key (if available) is used by Cabin Crew to open the cockpit door. If the key is not available to prevent the situation when a pilot leaves the flight deck and the remaining pilot becomes incapacitated, another Cabin Crew member should be present in the flight deck. If forced entry danger exists PM or RP shall position the Deadbolt to "Locked - key inoperable" position.

1) Flight Deck Access Panel System (Keypad, Door Chime)

The service interphone system shall be used by Cabin Crew to gain the access to the flight deck. To prevent the situation when a pilot leaves the flight deck and the remaining pilot becomes incapacitated, another Cabin Crew member should be present in the flight deck.

a) LEDs

The door chime, bell and sound of the lock shall be used to determine the condition of the cockpit door.

b) Door Bell Mode

The service interphone system shall be used by Cabin Crew to gain the access to the flight deck.

4) Flight Deck Door Lock Control Selector

The service interphone system shall be used by Cabin Crew to gain the access to the flight deck. PM or RP opens the flight deck door manually by turning the door handle. To prevent the situation when a pilot leaves the flight deck and the remaining pilot becomes incapacitated, another Cabin Crew member should be present in the flight deck.

- NOTE:** 1) If the keypad has been deactivated, make sure the Flight Deck Access System switch is in the OFF position (guard extended) when flight deck door is closed and the flight deck not occupied.
- 2) The key (if available) is located in the wallet under the forward flight attendant seat assembly. The key is not available on YL-BBD.

MAINTENANCE (M)

1. For deactivating the automatic locking system:
 - A. Position Flight Deck Access System switch OFF (guard extended).

NOTE: LOCK FAIL light will remain illuminated when the Flight Deck Access System switch is in the OFF position (guard extended).

2. For deactivating the keypad:
 - A. Open the circuit breaker for the flight deck door lock.
 - B. Remove the keypad.
 - C. Disconnect the electrical connector from the keypad.
 - D. Install the keypad.
 - E. Close the circuit breaker for the flight deck door lock.

NOTE: When flight deck door is closed with the flight deck not occupied, make sure the Flight Deck Access System switch is in the OFF position (guard extended).

3. For verifying automatic lock controls are operating normally:
 - A. With the flight deck door open, supply electrical power on the airplane (AMM 24-22-00/201).
 - B. Position Flight Deck Access System switch NORM (guard closed).
 - C. Position the Flight Deck Door Lock selector AUTO.
 - D. Verify the electric strike is in the locked position (solenoid pin in the electric strike will be extended up such that you can not rotate the strike).
 - E. Enter keypad access code and verify the door chime sounds.
 - F. Position the Flight Deck Door Lock selector DENY.
 - G. Before the DENY time delay has expired, enter the keypad access code and verify the door chime does not sound.

- H. Position and hold Flight Deck Door Lock selector UNLKD.
 - I. Verify the electric strike is in the unlocked position (solenoid pin in the electric strike will retract down such that you can rotate the strike).
 - J. Position the Flight Deck Door Lock selector AUTO.
 - K. Verify the electric strike is in the locked position (solenoid pin in the electric strike will be extended up such that you can not rotate the strike).
4. For verifying automatic lock is operating normally:
- A. With the flight deck door open, supply electrical power on the airplane (AMM 24-22-00/201).
 - B. Position Flight Deck Access System switch NORM (guard closed).
 - C. Verify the electric strike is in the locked position (solenoid pin in the electric strike will be extended up such that you can not rotate the strike).
 - D. Position Flight Deck Access System switch OFF (guard extended).
 - E. Verify the electric strike is in the unlocked position (solenoid pin in the electric strike will retract down such that you can rotate the strike).
 - F. Position Flight Deck Access System switch NORM (guard closed).
 - G. Verify the electric strike is in the locked position (solenoid pin in the electric strike will be extended up such that you can not rotate the strike).

ATA 73 ENGINE FUEL & CONTROL

73-4 Fuel Filter Differential Pressure Warning Systems

OPERATIONS NOTE

If the remaining FILTER BYPASS light illuminates, assume both engine fuel filters have an impending bypass condition.

MAINTENANCE (M)

1. Verify that the malfunction is in the fuel filter bypass warning system by using one of the following methods:
 - A. If the FILTER BYPASS light illuminates with the engine not operating, the fuel filter bypass warning system is faulty.
 - B. Do the Fuel Filter Bypass Warning System Test (AMM 73-34-00).
2. Replace fuel filter with a new filter (AMM 73-11-02). Except for ER operations, one flight is permitted prior to filter replacement provided that fuel drained from filter housing drain plug is free of visible, gross contamination.

73-7 Power Management Control (PMC) Systems

NOTE: Operation with the PMC OFF or inoperative is prohibited on CFM56-3C-1 engines (all thrust ratings) with the Turbine Clearance Control (TCC) Timers deactivated.

OPERATIONS (O)

1. Operate airplane with both PMC's OFF
2. Reduced thrust takeoff using the assumed temperature method is not permitted.
3. Apply PMC OFF operating procedure in accordance with OMB 12.7.4 and subsequent performance adjustments in accordance with QRH PI 14/24.

73-8 Power Management Control (PMC) INOP Lights

NOTE: Operation with the PMC OFF or inoperative is prohibited on CFM56-3C-1 engines (all thrust ratings) with the Turbine Clearance Control (TCC) Timers deactivated.

OPERATIONS (O)

1. Apply PMC OFF performance adjustments.
2. Operate airplane with both PMC's OFF.
3. Reduced thrust takeoff using the assumed temperature method is not permitted.
4. When the CFM56-3 Series engine is operated at 22,000 Lbs. takeoff thrust, the FMC computed takeoff N1 settings will be invalid under certain conditions of temperature and pressure altitude. Refer to the PMC OFF TAKEOFF AND CLIMB Supplementary Normal Procedures for determining correct FMC N1 power settings.

ATA 74 IGNITION

74-1 Ignition Systems

OPERATIONS (O)

Normal operation of the operable ignition system may be confirmed as follows:

1. Position ignition switch to IGN R for starting the associated engine.
2. After engine start, position ignition switch to IGN BOTH.

MAINTENANCE (M)

1. **Right Ignition System(s).**
 - A. If Boeing 737 Service Bulletin “ELECTRICAL POWER SUPPLY - ALTERNATE DISPATCH WITH INOPERATIVE RIGHT HAND IGNITION” (SB 737-74-1001 and subsequent) is installed, the following steps can be used to connect the LEFT igniter to the AC Standby Bus.
 - 1) Open fan cowl on affected engine.
 - 2) Remove cap from dummy storage receptacle.
 - 3) Remove power supply connector from left hand ignition exciter (upper unit) and install it on the dummy stowage receptacle.
 - 4) Remove power supply connector from engine right hand exciter (lower unit) and install it on the engine left hand exciter (upper unit).
 - 5) Install cap from dummy stowage receptacle on the engine right hand (lower unit) power supply connector port.
 - 6) Close fan cowl.
 - B. If Boeing 737 Service Bulletin “ELECTRICAL POWER SUPPLY - ALTERNATE DISPATCH WITH INOPERATIVE RIGHT HAND IGNITION” (SB 737-74-1001 and subsequent) is not installed, the Operator must establish an approved alternate configuration that connects the LEFT igniter to the AC Standby Bus.

NOTE: Changes made to connect the left igniter to the AC Standby Bus must meet the requirements in the Standard Practices, Chapter 20 of the 737 Maintenance Manual.

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ATA 75 BLEED AIR

75-2 High Pressure Turbine Clearance Control (HPTCC) Timer(s)

MAINTENANCE (M)

Deactivate HPTCC Timer per CFMI SB 72-574.

OPERATIONS NOTE

Refer to MMEL Item 73-7 for operations with the HPTCC Timer inoperative or deactivated and the PMC OFF.

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ATA 77 ENGINE INDICATING

77-3 N2 Tachometers

NOTE 1: The N2 tachometer generator for the number 1 engine must operate normally for dispatch because it provides a signal to the landing gear transfer valve to identify when the number 1 engine has lost power. Verification that the N2 tachometer generator is operating normally (when N2 tachometer indicator is inoperative) can be done by:

- 1) Checking the AVM Analyzer (M1240) for corresponding fault code regarding N2 Tach signal loss or
- 2) Observing that the engine start switch automatically moves to OFF during the engine start.

If the number 1 engine tachometer generator is inoperative, it must be replaced or switched with an operative tachometer generator prior to dispatch.

NOTE 2: N2 indication failures may also affect engine starter auto cutout. Refer to MEL 80-2.

OPERATIONS (O)

GROUND STARTING:

NOTE: This procedure is based on the use of the same air source to start both engines. While starting the engine with the inoperative N2, position the bleed air switch for the engine with the operative N2 to OFF. After engine start check that both bleed air switches are in the ON position.

1. Start the engine with the operative N2 indicator first.
2. Note the time required to attain N2 RPM for moving the start lever to IDLE and N1 RPM at that time.
3. Note N1 RPM at starter cutout.
4. Start the engine with the inoperative N2 indicator.
 - A. Check that approximately the same N1 RPM is attained in the same length of time as on the first engine. If N1 RPM is significantly lower, allow N1 RPM to stabilize.
 - B. Move the start lever to IDLE.
 - C. If tachometer generator is inoperative, manually move the start switch to OFF at N1 RPM noted for first engine starter cutout. If tachometer generator is operative, check that starter cutout occurs at approximately the same N1 RPM noted for first engine starter cutout.
5. Monitor N1, fuel flow, EGT and oil pressure for normal indications and limitations.

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ABORTED START:

Use existing procedures with N1 RPM except when re-engaging the starter. Allow N1 RPM to decrease to 4% N1 before moving the start switch to GRD.

INFLIGHT STARTING:

1. When a windmilling engine start is to be made, use existing procedure.
2. When an inflight start requires a starter assist, use existing procedure except:

NOTE: Do not use starter assist unless the engine has been shut down at least 45 seconds.

- A. At 15% N1 move the start lever to IDLE (or 10 seconds after start switch is positioned to GRD).
- B. At 25% N1 move the start switch to OFF.
3. Monitor N1, fuel flow, EGT and oil pressure for normal indications and limitations.

77-10 LOW IDLE LIGHT**MAINTENANCE (M)**

Verify the idle control system operates normally.

1. Check that the ENGINE IDLE CONTROL circuit breaker C794 (P6 panel) is closed.
2. Start both engines and allow them to stabilize for two minutes.
3. Push and hold the ground sensing switch S2 on the E11 landing gear logic shelf. Verify that the speed of both engines increases to high idle (approximately 28% N1).
4. Release the ground sensing switch S2 on the E11 landing gear logic shelf. Verify that the speed of both engines decreases after approximately four seconds.
5. Shut down both engines.
6. If erroneous indications persist, the LOW IDLE Light may be deactivated.
 - A. Remove wire W036-792-22 (-500) from pin 8 of connector D2952 (P5-65 Engine Module).
 - B. Cap and stow the removed wire.

ATA 78 ENGINE EXHAUST

78-1 Thrust Reverser Systems

OPERATIONS (O)

NOTE: Thrust reverser deactivation per AMM can result in the illumination of the Master Caution and ENG annunciation when performing a Master Caution recall. This warning is caused by nuisance signals from the deactivated thrust reverser. If ENG annunciator is not accompanied by other associated lights (ENG #1 PMC FAIL, ENG #2 PMC FAIL, LOW IDLE and REVERSER fault of the second engine) it may be disregarded.

For Inoperative Thrust Reverser:

Use normal reverse thrust procedures and technique with one operating reverse. If directional control becomes a problem during deceleration, return the thrust lever to the reverse idle detent.

Aircraft performance

Take-off

On dry runways there are no aircraft performance penalties.

On wet, low friction, contaminated runways use ToDc computer program selecting option “reverser inoperative”.

Landing

On dry and wet runways there are no aircraft performance penalties.

On low friction and contaminated runways use QRH, Performance In-flight – Advisory information, Normal Configuration Landing Distance Tables (CFM 56-3_18.5K – PI.12.1, CFM 56-3_20K - PI.22.1) values corrected for reverser inoperative.

To obtain LDR - actual landing distance from the tables shall be multiplied by coefficient 1.67.

MAINTENANCE (M)

1. Deactivate and secure the affected thrust reverser (AMM 78-00-00/901).

NOTE: Opening THRUST REVERSER CONT circuit breaker per AMM will prevent the Flight Data Recorder from receiving oil pressure signal (engine operating) from affected engine. With the thrust reverser secured closed, one or both sync locks may be inoperative provided the sync lock is verified to be in the locked position.

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2. Prevent movement of the reverse thrust handle by any appropriate means (e.g. lockwire the thrust reverser handle to the appropriate forward thrust lever).

78-2 REVERSER UNLOCKED LIGHTS**MAINTENANCE (M)**

1. Deactivate and secure the affected thrust reverser using MEL 78-1 Maintenance procedures.

78-7 REVERSER Lights (Aft Overhead Panel)**MAINTENANCE (M)**

Deactivate and secure the affected thrust reverser using MEL 78-1 Maintenance procedures.

OPERATIONS NOTE

Use MEL 78-1 Operations Procedures.

ATA 79 ENGINE OIL

79-1 Oil Quantity Indication System

MAINTENANCE (M)

Service affected oil system and verify that there is no evidence of oil leakage or above normal consumption.

1. Check sight gauges on oil tank (if installed) and replenish engine oil if necessary or remove filler cap and fill tank to lip of filler port.
2. Check airplane flight log and maintenance records to make sure oil consumption is within limits.

79-2 Oil Filter Bypass Warning Systems

MAINTENANCE (M)

Verify the cause of malfunction and inspect oil filter for contamination.

- A. Verify that clogging indicator (red pop-up) on scavenge oil filter is not visible.
- B. Check of the scavenge oil filter clogging indicator once each flight day.

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ATA 80 STARTING

80-1 Starter Valve Open Indications

OPERATIONS (O)

Check that the associated start valve is closed after engine start.

1. Use normal start procedures except for the following:
 - A. Prior to selecting starter switch to GRD position note the duct pressure.
 - B. As start switch moves to OFF verify that duct pressure increases to the pre-start value.
2. If duct pressure does not return to pre-start value accomplish the START VALVE OPEN procedure (see Operations Manual Non-Normal Procedures). In this case, dispatch is not allowed under the provisions of this MEL item.

80-2 Engine Starter Auto Cutout

NOTE: This item provides relief for the start switch holding solenoid not releasing at the N2 cutout speed and/or the solenoid not holding the start switch in the GRD position.

OPERATIONS NOTE

1. Position engine start switch to GRD and hold if required.
2. Position engine start switch to OFF at the following N2 speed: 46% N2 RPM.

80-3 Starter Valves**OPERATIONS (O)**

Perform normal start procedure with following additions:

1. When positioning associated engine start switch to GRD position, instruct ground crew to open start valve.
2. Inform ground crew when N2 is rotating.
3. Instruct ground crew to close the start valve when N2 RPM indicates the following RPM: 46% N2 RPM.
4. Verify that start switch moves to OFF and, for the, verify that duct pressure increases to the pre-start value.

If an in-flight engine start is necessary, a crossbleed start will not be available on the associated engine. Ensure that airspeed is sufficient for a windmill start.

MAINTENANCE (M)

Use manual override start procedures.

Observe engine ground safety precautions and use Start the Engine Procedure (Manual Override of the Starter Air Valve) (AMM 71-00-00).

NOTE: Airplanes must have modified Main Engine Controls (MEC's) installed on both engines for dispatch with the start valve inoperative. Modified MEC's are P/N 9368M57P12 and higher (P12 and up) on CFM56-3-B1 engines and P/N 9387M15P03 and higher (P03 and up) on CFM56-3B-2 engines. All CFM56-3C-1 engines have modified MEC's installed.

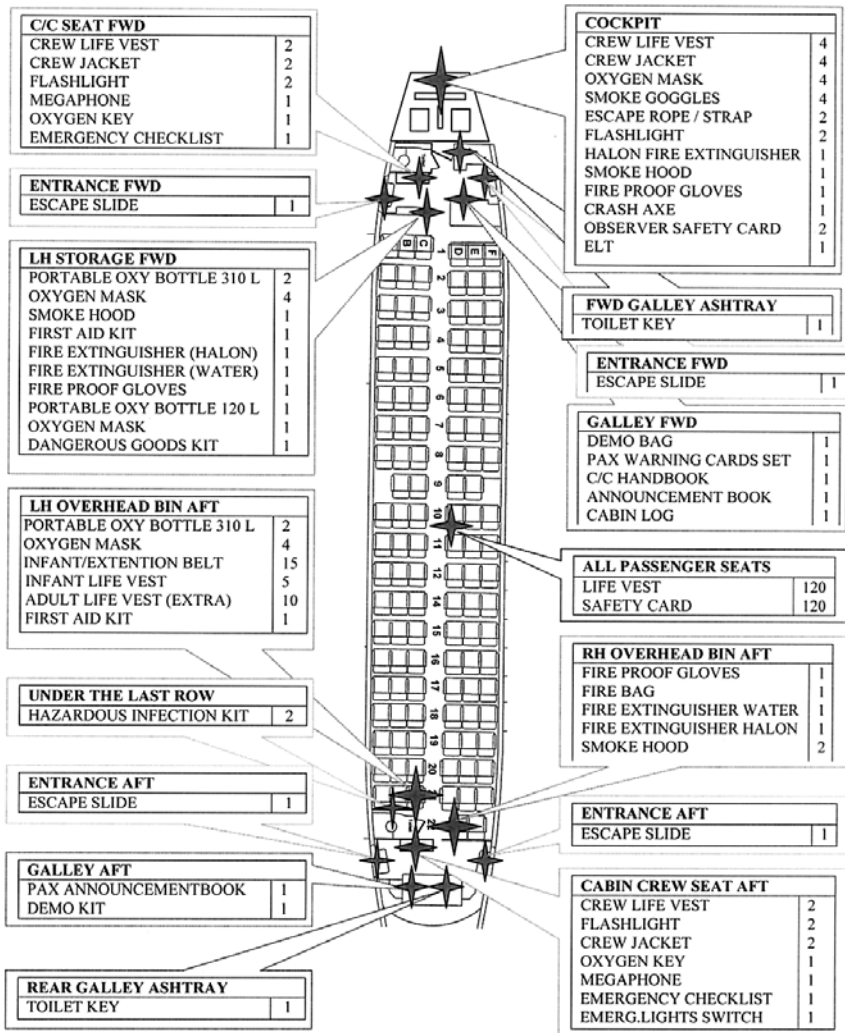
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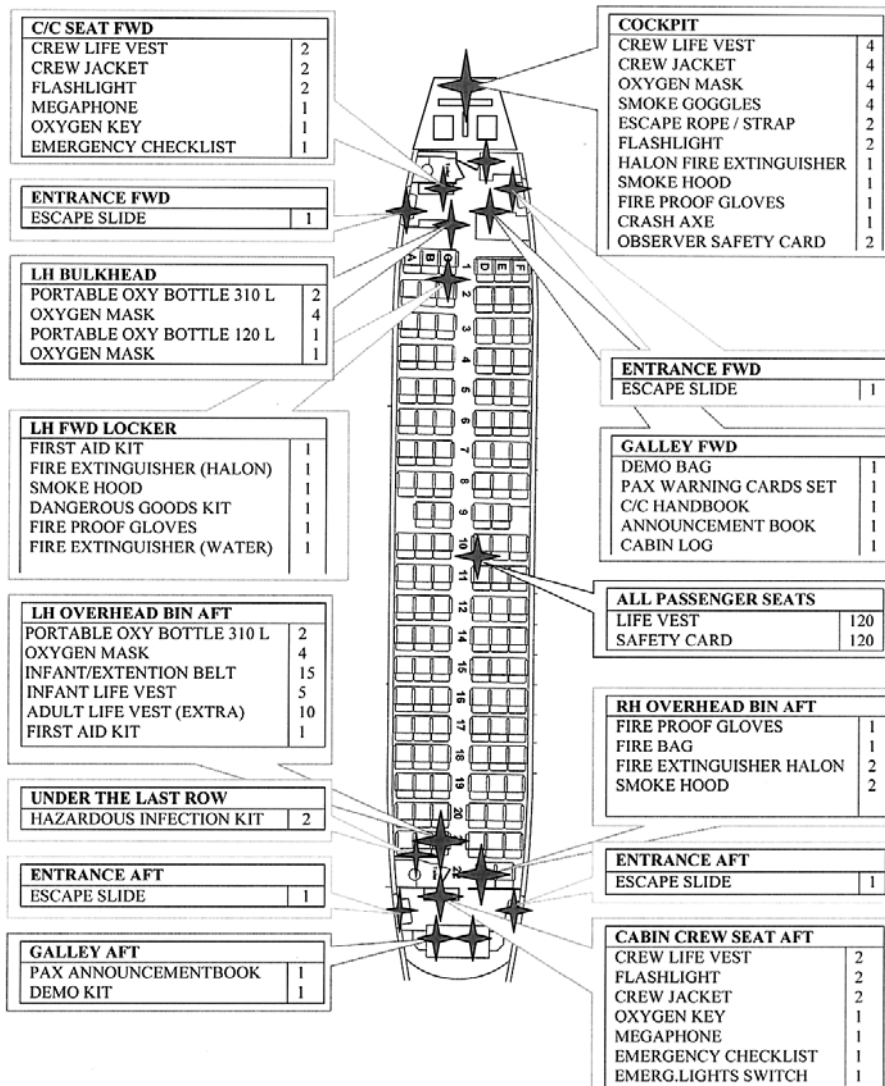
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10.1 EMERGENCY EQUIPMENT LOCATION AND QUANTITY

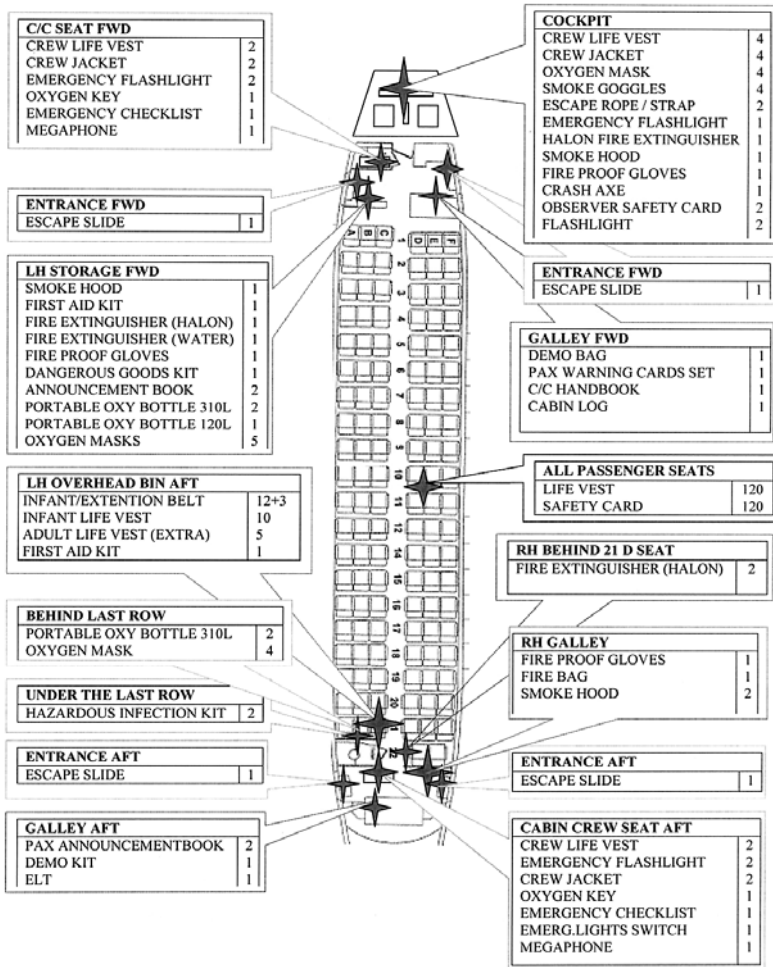
YL-BBA, YL-BBB



YL-BBD, YL-BBE



YL-BBF, YL-BBG, YL-BBH



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10.2 EMERGENCY EXITS

Emergency exits are the both cockpit sliding windows, four entry/service doors and two overwing escape hatches located in the passenger cabin.

1. Cockpit Sliding Windows

Emergency evacuation can be accomplished through the cockpit sliding windows. The RH window has provisions for exterior access as well. An escape strap is attached to a compartment above each cockpit sliding window.

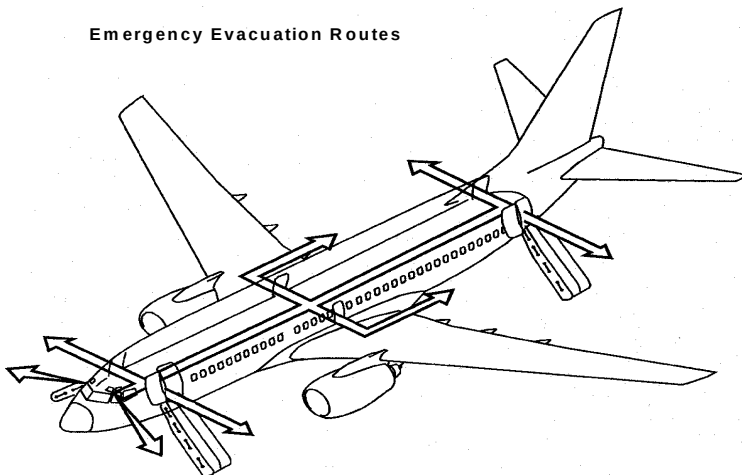
2. Overwing Escape Hatches

Two escape hatches are located in the passenger cabin over the wings. The hatches can be opened from either the inside or the outside of the airplane by a spring-loaded handle at the top of the hatch. There are two lifelines attached to each hatch frame.

3. Cabin Doors

The aircraft is fitted with four entry/service doors, which can serve as emergency exits:

- A passenger entry door on the forward LH side.
- A service door on the forward RH side.
- A passenger entry door on the aft LH side.
- A service door on the aft RH side.



4.Flight deck door

During evacuation from cockpit via the flight deck door there are emergency egress provided. Pull the release pins inward and decompression panels can be removed and emergency egress path achieved once it is unable to open the flight deck door or it is blocked.

5.Cut in areas

There are four cut in areas marked on the fuselage, two on the front and two on the rear fuselage to provide emergency egress from cabin if there is no escape possible.

10.3 EMERGENCY LIGHTING

General

The independent battery powered emergency lighting system illuminates the emergency exits and the emergency evacuation routes. It consists of:

Exterior lights: Integral Slide Lights

Escape Slide Lighting at outside at overwing areas

Exterior Emergency Lighting at overwing areas

Interior lights: Exit Lights

One above all doors, overwing exits and in cabin ceiling fwd and aft.

Exit Locator Signs

One at each exit area in forward, center and aft cabin ceiling.

Aisle Lights

One in every other bullnose of the stowage bins throughout cabin.

Exit Indicators

One adjacent to each exit near floor level.

Floor Proximity Lights

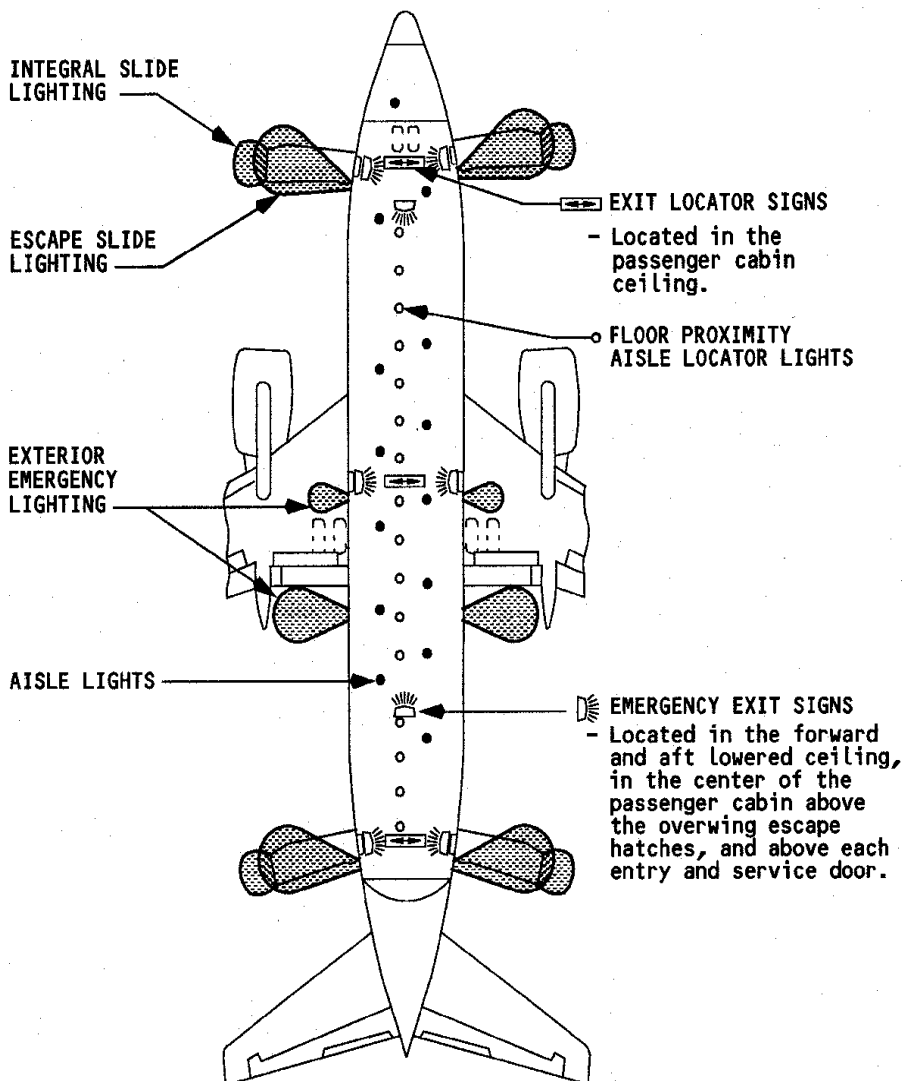
Incorporated in the cabin aisle (green/red bulbs path or self luminescent path).

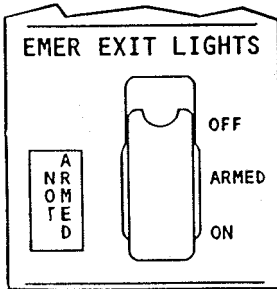
The Floor Proximity Lights provide for an illuminated path alongside the cabin floor, with colored markings or self-luminescent lines indicating exit areas. Together with the Exit Indicator Lights adjacent to each exit near floor level, the path should guide passengers to the emergency exits.

Operation

Fully charged independent batteries supply light for at least 20 minutes.

The lighting system will illuminate automatically (loss of normal electric power and "ARMED" selected) or manually ("ON" selected on either of both panels).



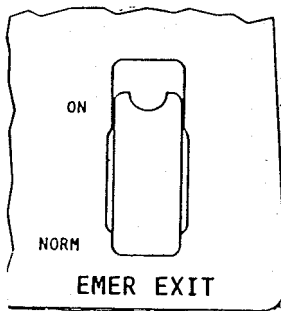
Cockpit Forward Overhead Panel:

OFF – Prevents activation of the emergency lights system.

ARMED – Illuminates all interior and exterior emergency lights automatically if there is a loss of power on DC bus No.1.

ON – Illuminates all emergency lights. The MASTER CAUTION lights and OVERHEAD annunciator illuminate.

NOT ARMED LIGHT (amber) - Indicates the Emergency Exit Lights Switch is not in the ARMED position.

AFT Flight Attendant Panel:

ON – Illuminates all interior and exterior emergency lights. Bypasses cockpit control.

NORM – Emergency lights OFF unless activated by the cockpit switch.

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10.4 EMERGENCY LOCATOR TRANSMITTER

10.4.1 General

The Emergency Locator Transmitter is an integrated aircraft device that turns on automatically upon heavy impact (crash landing, ditching) and transmits distress radio signals on international distress frequencies of 121.5, 243.0 MHz and 406.025 MHz to the (Cospas/Sarsat) to alert and guide search and rescue activities.

The ELT operates from its own internal battery pack (minimum capacity of 48 hours) and is fitted with an impact switch, which automatically activates the transmitter. Manual activation should be accomplished to back up automatic operation.

NOTE: To prevent unnecessary search and rescue actions, inform ATC immediately if the ELT has been switched on inadvertently. The ELT may block communications on 121.5 MHz when it is activated do not activate ELT manually until all possible communications have been completed.

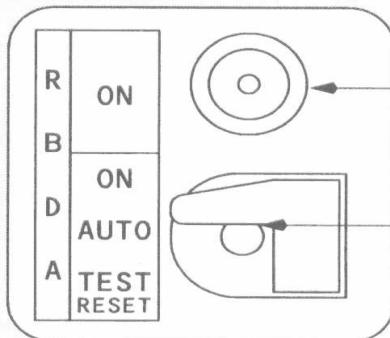
10.4.2 ELT A06: YL- BBD, BBE

Automatic operation

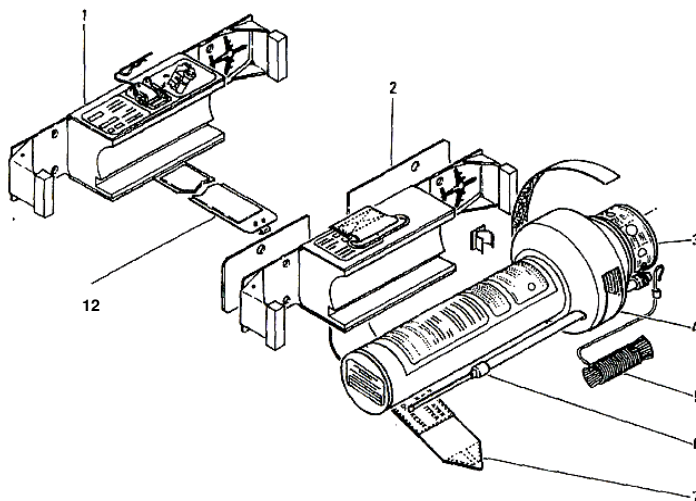
For normal operation, the ELT switch panel of which is integrated in rear galley ceiling shall be guarded in AUTO position. The ELT will then activate automatically on impact.

Manual operation

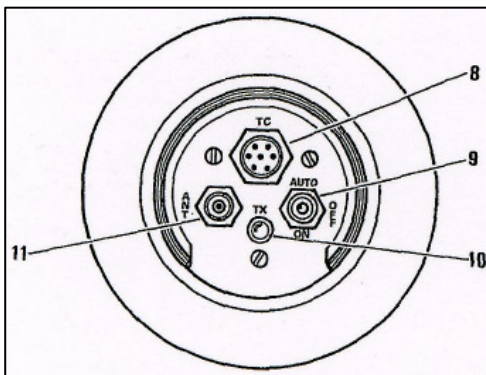
In the event of crash landing ON may be selected to back up the automatic activation provided at AUTO.



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10.4.3 ELT A06: YL-BBF, BBG, BBH

1. Bracket assy
2. Bracket assy
3. Cylinder housing
4. Float
5. Lanyard
6. Antenna
7. Strap
8. Remote control unit connector
9. Auto/off/on switch
10. Tx indicator light (indicating beacon activation)
11. Antenna connector
12. Strap



Electronic assy front face

TO BE OPERATIONAL, THE BEACON MUST BE IN "AUTO" POSITION ONCE IT HAS BEEN CORRECTLY INSTALLED IN ITS BRACKET

It is responsibility of C/C#2 to take the beacon along with the other necessary equipment when evacuating in emergency.

The ELT A06 can be activated in two MODES:

- automatic when the acceleration sensor is triggered,
- manual.

AUTOMATIC ACTIVATION

The acceleration sensor has detected an impact sufficient to trigger it. The indicator light (10) and the aural indicator indicate beacon activation.

MANUAL ACTIVATION

There are two cases in which a distress signal may be triggered MANUALLY:

- The acceleration sensor (G switch) has not been triggered but a distress signal must be sent (injured passengers, aircraft out of OPERATION...),
- The aircraft is on the ground and must be evacuated.

(1) First case, from the Remote Control in flight deck (where applicable)

(2) Second case, from the beacon

Place the beacon's switch in the OFF position (pull the switch and place it in the central OFF position).

Unscrew the antenna coaxial cable to disconnect it from the connector ANT (11).

Disconnect the remote control cable from the connector TC (8) (IF PRESENT).

Remove the beacon from its bracket assy (1) or (2) by removing the cotter pin and then raising the latch (12) or by undoing the strap (7) velcro following the bracket used.

Connect the portable antenna to the beacon by screwing it into its connector ANT (11).

Place the beacon switch (9) in the ON position.

The indicator light (10) and the aural indicator indicate beacon activation. The actual distress signal will be transmitted after 150 s. This state will be displayed by flashing on indicator light: 1 S ON, 1.5 s OFF.

Place the beacon upright in an obstacle-free area. If on a lake or at sea, attach the beacon to the life raft by means of the lanyard (5) and allow it float.

C. Beacon shutdown

In the event of a false maneuver or untimely operation, carry out the shutdown of the beacon

The beacon is shutdown by switching the beacon's AUTO/OFF/ON toggle switch (9) to OFF (pull and slide to OFF).

10.4.4 Personal Locator Beacon (PBL): YL-BBA, BBB

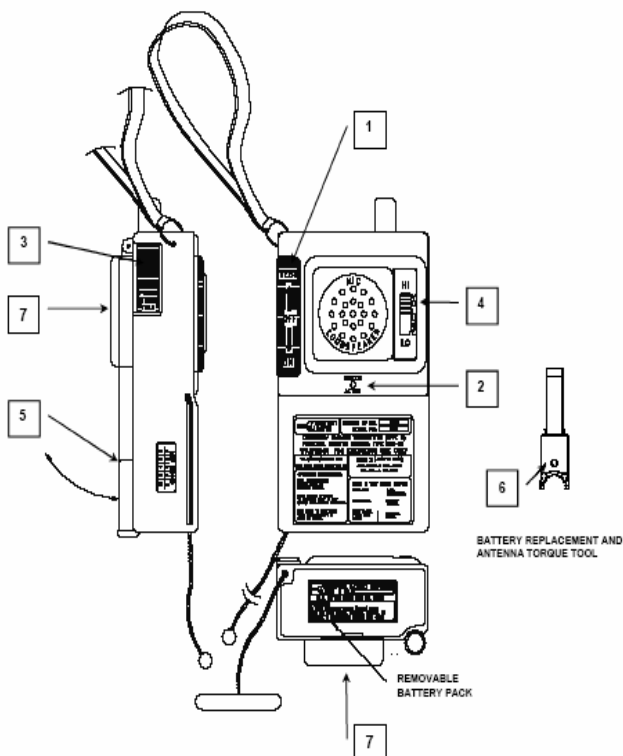
Portable multi function Personal Locator Beacon (PLB)

Automatic operation

No means of automatic activation provided

Manual operation

PLB will be attached to panel behind F/O seat and it has its own power supply. It is necessary to slide the power switch to ON or pull the lanyard to activate the PBL. In addition 121.5/243 MHz transceiver provided to communicate with rescuers (range 3-5 miles).



- 1) Power switch. Place ON to activate the PLB.
- 2) Beacon Active indicator flashes to indicate transmitting.
- 3) PRESS TO TALK key. Allows responding to rescuers once the signal is received by build in transceiver.
- 4) HI/LO volume switch.
- 5) Telescopic antenna. Used to ensure best propagation.

6) Microphone, loudspeaker.

Emergency call:

- MAYDAY-MAYDAY-MAYDAY
- THIS IS
- WE HAVE CRASHED NEAR
- AND NEED HELP
- OVER

Listen - - - (If no answer repeat call at least every 5 min).

If contact can not be established after several attempts, move to a higher location.

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10.5 INSTRUCTION FOR USE OF EMERGENCY EQUIPMENT

10.5.1 General

The aircraft is equipped with fire fighting, oxygen, first aid, emergency evacuation and emergency lightning equipment. All these items are placed throughout the cabin, readily available for use in an emergency.

The emergency lightning system provides aircraft illumination, when all other electrical power sources have failed.

10.5.2 Flight deck

Each flight crewmember's station is provided with a life vest, smoke goggles, torch, and quick-donning oxygen mask supplied with gaseous oxygen from the main oxygen system bottle.

A smoke hood is stowed behind the F/O seat.

A portable fire extinguisher is attached to the aft bulkhead immediately to the rear of the First Officer's station. A fire axe is attached to the left hand gangway's panel behind the Captain's seat or in cockpit's wardrobe.

An emergency evacuation rope is installed above each Nr2 window. The flight deck door is provided with an emergency exit feature, which permits the release and removal of the two blowout panels from the door.

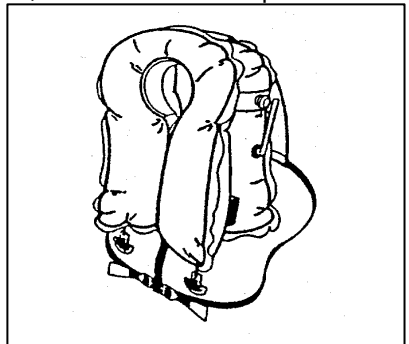
10.5.3 Crew Life Vests (red)

The life vests is a CO₂ inflated, heat sealed, two chamber configuration equipped with oral inflators, a battery powered water activated light, and strips of scotch lite.

The inflator is operated by pulling the "jerk to inflate" handle.

Secondary inflation can be accomplished through the oral inflator if the primary inflation system fails to operate, or if additional pressure is required.

1. Put vest and straps over head.
2. Pull straps lightly around waist.
3. Jerk red handles for inflation outside the aircraft (use flexible tubes for oral inflation if necessary).
4. Pull battery strap at night.
The battery is water activated.



10.5.4 Oxygen Systems

Flight crew oxygen system

General

The Flight Crew Oxygen System consists of quick-donning, diluter-demand masks/regulators located with one at each crew station and one at each observer seat. Oxygen is supplied by a single cylinder. The oxygen pressure is displayed on the indicator located on the aft overhead panel when the battery switch is ON. Oxygen is available to the regulator when oxygen shutoff valve is open.

Operation

To use the mask, squeeze the red Release Levers with the thumb and forefinger and remove from stowage. Squeezing the Release Levers inflates the mask harness and activates oxygen and built in microphone. Place the mask over the head and release the levers. The harness contracts to fit the mask to head and face.

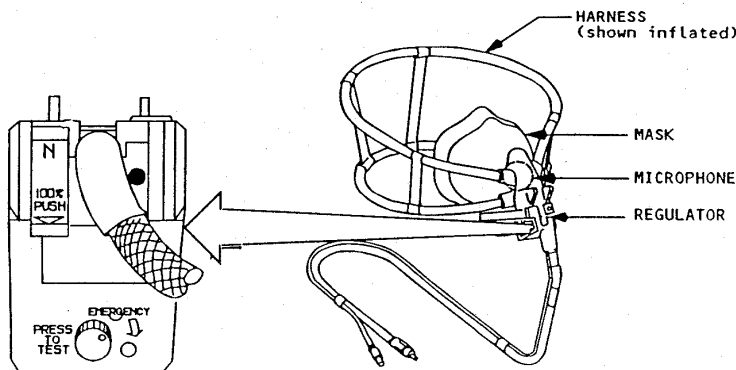
NORMAL/100% Switch:

- N (normal) – supplies air/oxygen mixture on demand (ratio depends on cabin altitude).
- 100% – supplies 100% oxygen on demand.

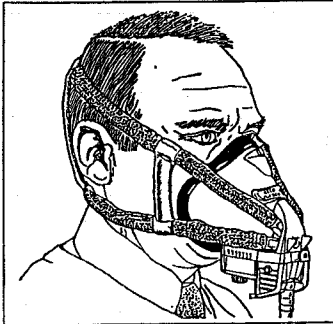
EMERGENCY/Test Selector:

Rotate – supplies 100% oxygen under positive pressure at all cabin altitudes.

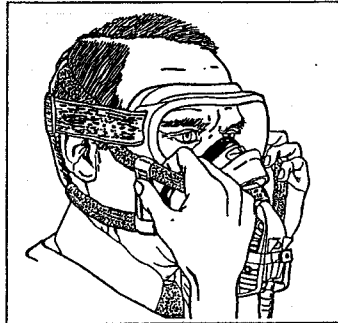
PRESS TO TEST – tests positive pressure supply to regulator.



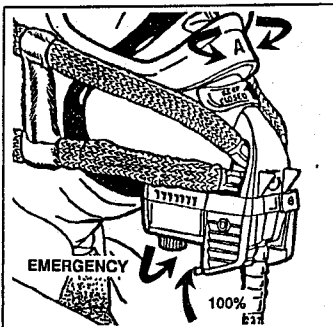
Smoke Goggles



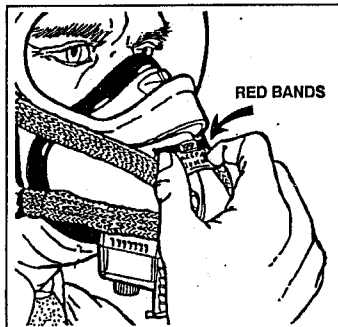
- 1 PUT MASK-REGULATOR ON HEAD.
Readjust prescription glasses, if necessary.



- 2 PLACE SMOKE GOGGLES ON HEAD.
Pull upper tube of harness and reposition it over the lower side of goggles frame. Push goggles downwards.



- 3 SET REGULATOR CONTROLS ON "100%" and "EMERGENCY".
Depress "100%" flipper. Turn "EMERGENCY" knob counter-clockwise.



- 4 OPEN VENT VALVE, so that red bands are visible.

Adjust goggles nose bridge shape to fit tightly against mask shell by pressing each side of the bridge inward. (See a figure 3). Readjust headband tension if necessary.

On YL-BBD and YL-BBE the pilots' goggles are attached to oxygen masks, which are stowed in masks' compartment.

Passenger Oxygen System

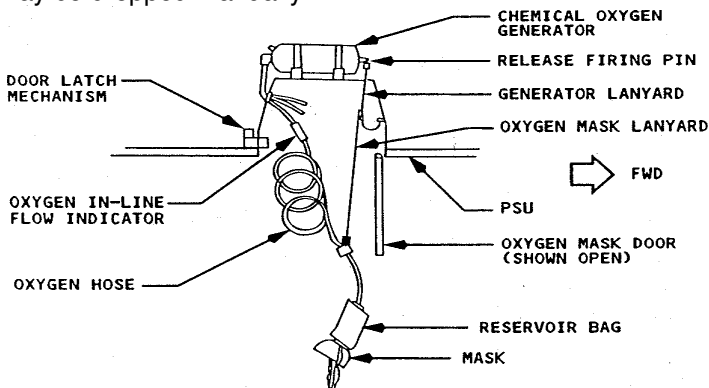
General

The Passenger Oxygen System is supplied by individual chemical oxygen generators located at each Passenger Service Unit (PSU).

Operation

The system is activated automatically by a pressure switch at a cabin altitude of approximately 14000 ft or when the Passenger Oxygen Switch on the aft overhead panel is positioned to ON. When the system is activated, the PASS OXY ON light illuminates and OVERHEAD illuminates on the Master Caution System.

Activating the system causes the masks to drop from the stowage compartments. Pulling one mask down causes all masks in that unit to come down and 100% oxygen flows to all masks. Oxygen flows for approximately 12 minutes and cannot be shut off. If the passenger oxygen is activated and a PSU oxygen mask compartment does not open, the masks may be dropped manually.



WARNING: When using passenger oxygen, the "NO SMOKING" sign should be strictly observed. Once the generator is activated, the flow of oxygen is constant, whether or not the mask is being worn.

WARNING: Do not use passenger oxygen with cabin altitude below 14,000 ft when smoke or abnormal heat source is present. The use of passenger oxygen does not prevent the passengers from inhaling smoke. Air inhaled is a mixture of oxygen and cabin air.

Smoke Hood (PBE)**a) Dräger Smoke Hood****General information:**

Smoke Hood OXYCREW is a self-contained Protective Breathing Equipment (PBE) for use on aircraft board by the flight and cabin crew in the scenario of smoke, in-flight fire. The independence of a portable (chemical oxygen) breathing system offers maximum freedom to combat smaller fires on board.

The smoke hood (OXYCREW) consist of heat protecting hood with a closed-circuit breathing system which comprises a chemical oxygen generator and an oral-nasal mask with integrated speech transmitter. All of which are stored in a vacuum package and box.

Start-up:

The smoke hood is equipped with a starter cartridge, which supplies oxygen for about 1 min immediately and independent of respiration as soon as the user activates the starter cartridge. During the commencement of respiration the carbon dioxide used with the smoke hood is a highly reactive substance for producing oxygen through the duration of use within few exhalations into mask.

Communication:

The wearer of the smoke hood can communicate with an unprotected person at a distance of 4 m. Intercom and megaphone also can be used. This is made possible by a speech transmitter which is fitted to the mask.

Vision:

To provide a large field of vision to the user the design of the hood includes a large visor. Additional ventilation tube prevents the visor and glasses from fogging. The hood ventilation provides a small over-pressure in the hood to avoid harmful smoke entering the hood.

Duration:

The duration is a minimum of 20 min, according to the workload profile. If necessary, it is possible to restart an already doffed unit. 2-3 exhalations into the breathing mask commence the re-activation.

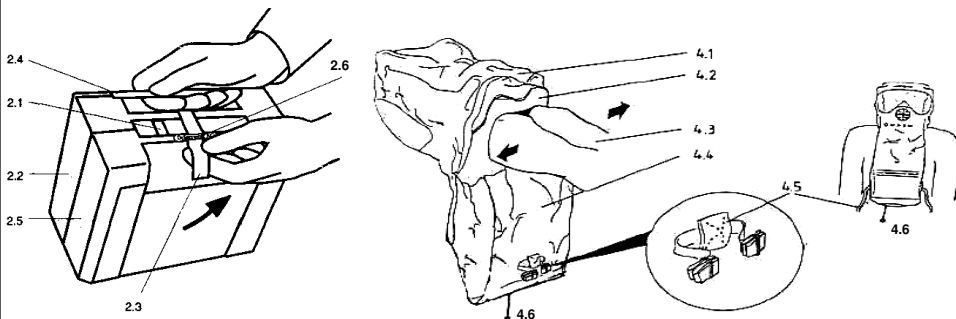
End of use:

The use of the smoke hood can be terminated any time within duration time by doffing the hood. After doffing the generation of oxygen will slow down rapidly. The end of duration is recognizable by increasing breathing resistance, visor misting and hood collapsing.

CHECK:

- Presence.
- Seal at the locking clamp without damages.
- Box is closed not damaged and the indicator is yellow and not broken.

2.1 Serviceability indicator	2.4 Handle	4.1 Hood	4.4 Breathing bag protection
2.2 Box	2.5 Box	4.2 Neck seal	4.5 Belt
2.3 Locking clamp	2.6 Seal	4.3 Opening for the neck	4.6 Lanyard for activation

**OPERATION:**

- Open the locking clamp.
- Open the box.
- Take the OXYCREW out of its box.

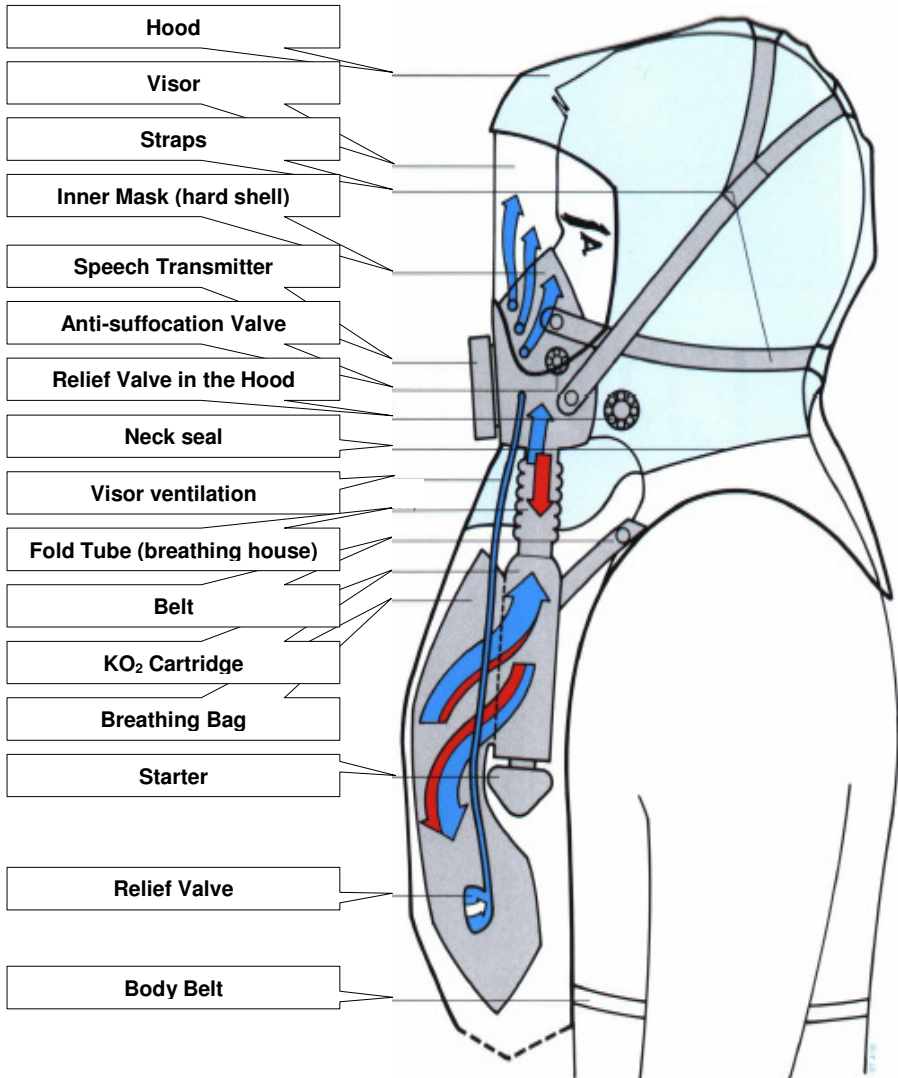
The OXYCREW is stowed in a sealed bag, which has to be opened by the red tear strap of the bag. After opening the bag, the folded OXYCREW has to be pulled out, unfolded and donned.

- Don the OXYCREW.
 - Put both hands into the hood and widen the elastic bands and the neck seal with the back of your hands.
 - Pull the hood over your head from behind. Keep your hands between head and elastic straps until the mask covers your mouth and nose.
 - Pull down the lanyard to activate the starter candle.
 - Fasten the equipment around your hip with the belt that has been attached to the breathing bag protection.
- Check the fit of the inner mask.

Move the mask until a suitable position has been found.

- End of the operating time.
 - Increased inspiration resistance.

- The anti-suffocation valve opens and the user inhales the air from hood.
- Go to safe place and take off the equipment.



CAUTION:

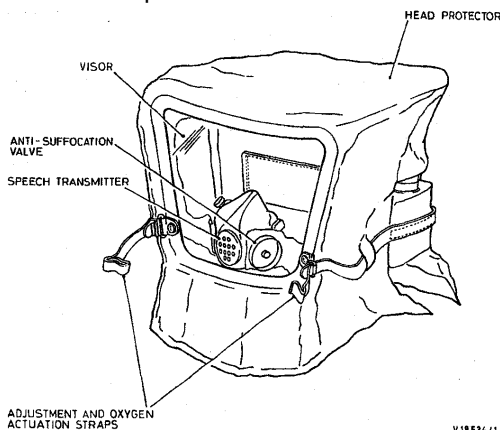
- The neck seal must not be damaged when putting on the mask. Be careful with sharp objects.
- Plait-like hairstyles and neck-places must not be placed in the sealing area they have to be positioned above the neck seal.
- Avoid physical effort. With a lower respiration frequency the OXYCREW protection will last longer.
- During the operation the air will be warmed up. This is due to chemical reaction.
- A slightly salty or dusty taste may occur which may derive from particles in the cartridge and which will not impair the performance of the OXYCREW.

b) Puritan-Bennet Aero Systems Co. (PBE)**General**

Protective breathing smoke hoods are provided for use by the flight crew and cabin crew in a flame or smoke laden atmosphere. The smoke hood is constructed from flame and heat retardant material. It has an integral speech transmitter and a manually activated self-generating oxygen supply adequate for approximately 15 minutes of breathing.

Operation

- (a) Remove container from stowage position.
- (b) Break container seal, open container and remove vacuum foil.
- (c) Remove hood container and pull hood harness over the head. The head harness is not adjusted.
- (d) Operate the chemical oxygen generator by pulling the lanyard.
- (e) If required secure tapes around the waist.



Portable Oxygen

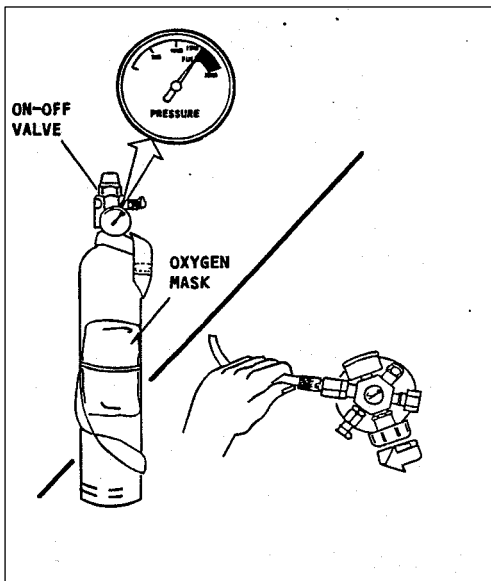
General

Portable oxygen cylinders are stowed in the passenger cabin. These cylinders are fitted with a disposable mask and can be used for therapeutic purposes or as walkaround units. The cylinders are pressurized to 1800 psi.

Each oxygen cylinder has two outlets (low 2 lit/min, high 4 lit/min). Both outlets can be used at the same time.

Operation

1. Remove mask from plastic bag.
2. Open dust cover and insert and attach bayonet fitting.
3. Rotate ON-OFF valve fully counterclockwise.
4. Place mask over nose and mouth.



10.5.5 Portable Fire Extinguishers

BCF Halon Fire Extinguisher

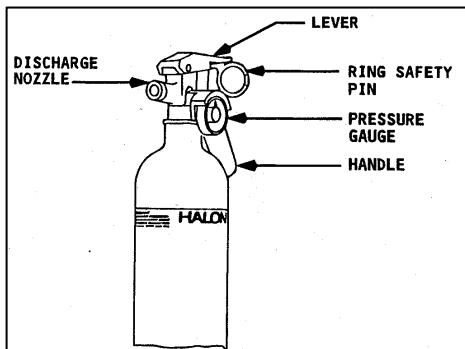
General

The BCF extinguisher contains a liquefied gas agent under pressure. The pressure gage is provided. A safety pin with a pull ring prevents accidental trigger movement. When released, the liquefied gas agent vaporizes and extinguishes the fire. The extinguisher is effective on all types of fire, but primarily on electrical, fuel and grease fires.

CAUTION: For electrical fires, remove the power source as soon as possible. Avoid discharging directly on persons due to possibility of suffocation. Do not get too close to the fire as the discharge stream may scatter the fire. Keep away from the fire's fuel source and avoid breathing vapors, fumes and heated smoke as much as possible.

Operation

1. Pull ring pin from lever and handle.
2. Hold extinguisher upright with one hand under the handle and the thumb on top of the lever.
3. Direct the nozzle towards the base of the fire source from a distance of six feet.
4. Squeeze the lever downward with thumb and spray at the base of flame in quick side-to-side motion to suppress the fire.
5. Remaining glow is extinguished with water (soda water etc.).



WARNING: If a fire extinguisher is to be discharged in the F/D, then all crewmembers are to wear oxygen masks and use 100% oxygen with emergency selected.

Water Fire Extinguisher

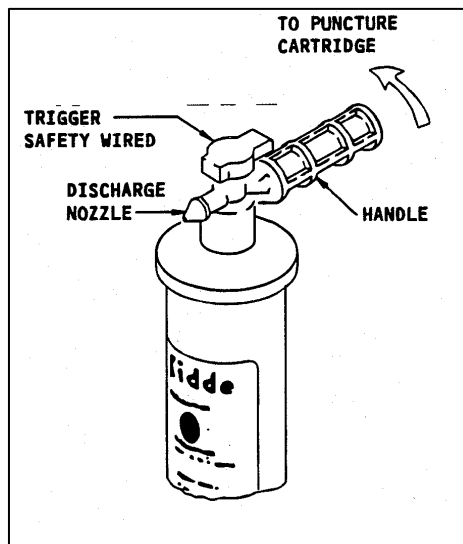
General

Use for fires ordinary combustible materials (fabrics, paper, etc.) where the quenching and cooling effects of quantities of water are of first importance.

CAUTION: Do not use on electrical or grease-type fires.

Operation

1. Turn handle clockwise as far as possible (charging bottle with CO₂).
2. Direct at base of flame, hold bottle erect – press trigger to discharge.



10.5.6 Flight Deck Escape Ropes

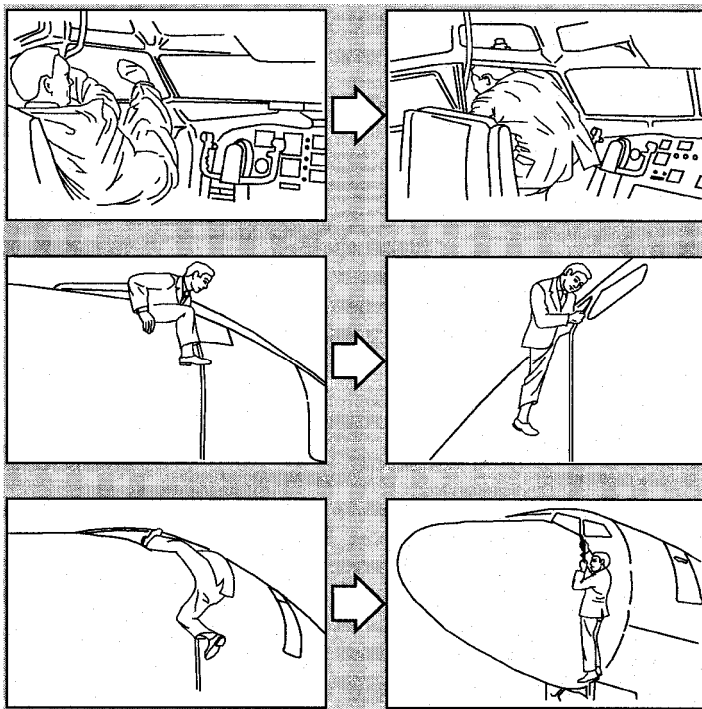
General

Webbing type escape ropes are installed above each No.2 Flight Deck window. Each escape rope can be thrown out the sliding window and used by a crewmember for escape. The right hand window has provisions for exterior access as well.

Operation

- Open the window
- Open the escape strap compartment
- Throw the strap out the window
- Sit on the window sill with upper body outside
- Exit in accordance with the following illustration.

CAUTION: Ensure the escape strap is securely fastened to the airplane.



10.5.7 Emergency Escape Slides

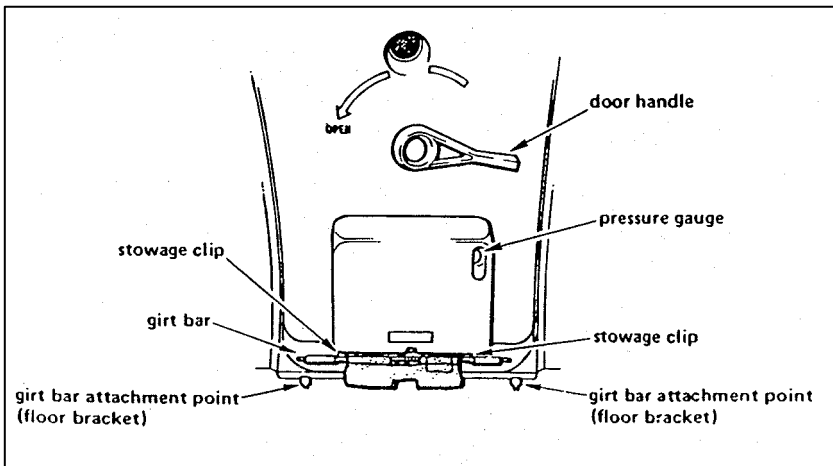
General

If the situation dictates, the emergency escape slides is used for evacuation either on ground or water.

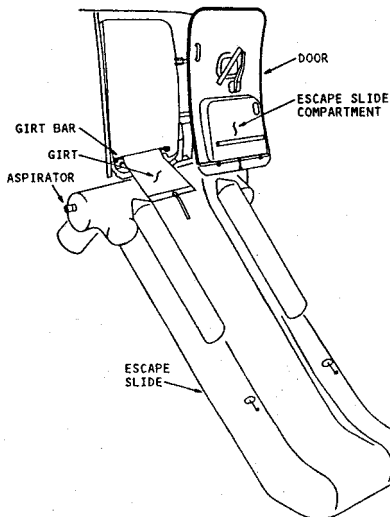
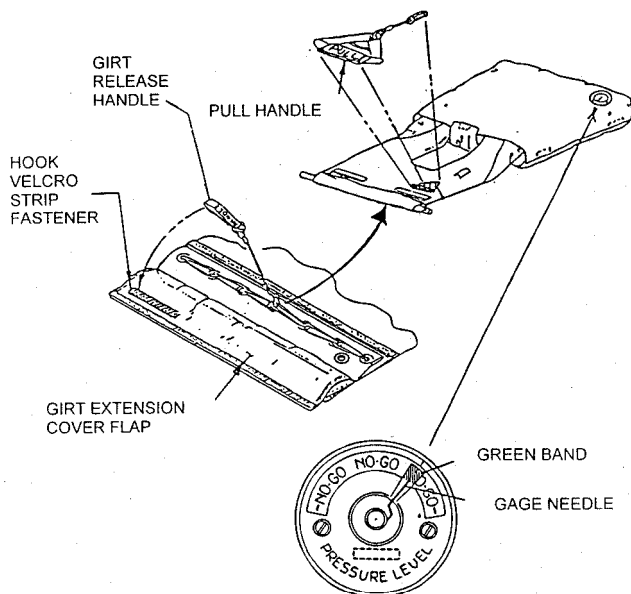
The slide incorporates a retainer bar, which is normally stowed in special stowage hooks on the compartment cover. Before taxiing this bar is removed from the hooks and fastened to the floor brackets located on the floor of the airplane.

Operation

With the bar in fastened position, the slide will eject when the door is opened and will inflate automatically in 5 seconds. If the automatic inflation fails, a red handle marked PULL, must be pulled to achieve proper inflation. White handle marked PULL, located under the girt extension cover flap, is provided to release the slide from the aircraft in case of ditching.



Should a malfunction prevent the slide from inflating or should a puncture deflate the slide then direct passengers to another useable exit, however the slide can still be used as an apron slide.



10.5.8 Overwing Emergency Exits and Straps

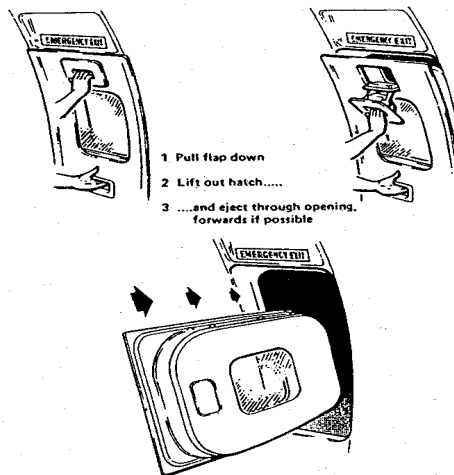
General

Two escape exit doors are located in the passenger cabin over the wings. These are plug type doors and are held in place by mechanical locks and airplane cabin pressure. The overwing emergency exit door can be opened from the inside or from outside of the airplane by a spring-loaded handle at the top of the hatch.

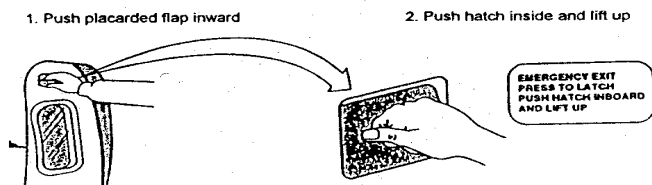
Operation

For emergency evacuation remove the exit door and place so as not to obstruct exit (throw out onto the wing, place on the seat arm rests, place in any other suitable location as indicated by the condition)

WARNING: Do not open doors in flight in preparation for an emergency evacuation.



Opening from outside:



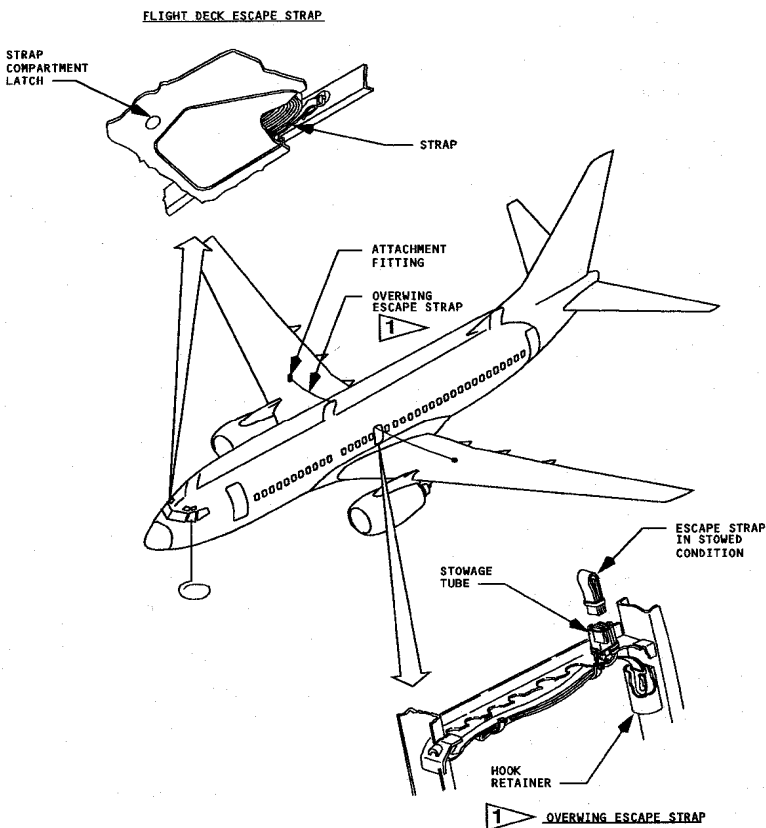
Overwing Escape Straps

General

The escape strap, installed above each overwing emergency exit, can be used as a handhold in a ditching emergency for passengers to walk out on the wing.

Operation

The overwing escape hatches must be removed to expose the straps. One end of the strap is attached to the hatch frame. The remainder of the strap is stowed in a tube extending into the cabin ceiling. To use, the strap is pulled free from its stowage and attached to a ring on the top surface of the wing.



▷ As Installed

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11 EMERGENCY PROCEDURES

General

This section provides brief description of emergency situations, preparation for emergencies and evacuation procedures to follow in case of emergency.

Purpose

The purpose of this procedure is to provide guidelines to Flight and Cabin Crew to handle emergency situations and to arrange quick and efficient evacuation, in order to reduce injuries, and save lives of crew and passengers.

Scope

Besides Flight Crews, this procedure also applies to the Cabin Crew, operating airBaltic B737 aircraft.

Responsibilities

Crewmember

- Shall know and able to fulfill his particular duties in case of emergency;
- Report immediately about abnormalities during the flight using communication principles and standard phraseology to possible extent;
- In case of other crewmembers incapacitation take the command in acc with the chain of command order (OMA, 1.5.2).

Commander

Apply all his rights and authority to the extent required to handle and direct all emergencies in accordance with the written procedures using all available means and resources.

11.1 TYPES OF EMERGENCY SITUATIONS

Emergency situations that may necessitate evacuations have been divided into two categories:

Planned: Captain tells the crew the nature of the emergency. The crew has time to clearly and positively brief passengers on the situation and what the passengers are expected to do for their own safety and that of their fellow travelers.

Unplanned: Situation happens during taxi, take-off, or landing. The crew has no time to co-ordinate a course of action with the Captain. Cabin Crew cannot count on the pilots for instructions and assistance in passenger evacuation. Remember - 90% of emergency situations are unplanned!

11.2 PLANNED EMERGENCY

The Cabin Crew co-ordinates with the Commander to determine the details of the emergency and any special instructions, such as signal for when to assume impact position. If time is limited, condense your activities as necessary to accomplish the more important items first and quickly. If more extensive time is available, it is advisable to accomplish the briefing and preparations in steps. This will enable you to make more frequent contact with passengers and to give them something to do periodically. Verbal contacts exert a great influence during emergencies. However, you must keep yourself under complete control and act and speak decisively in a clear, calm tone of voice.

In providing initial information to passengers, they should be given general information, such as the nature of the emergency, the system you will use in issuing further instructions, the passenger re-seating, and the type of landing expected. Speak to passengers in a calm, reassuring tone.

In a planned emergency the cabin is prepared according to nine points:

- 1) Crew Co-ordination;**
- 2) Passenger briefing;**
- 3) Passenger relocation;**
- 4) Able-body person briefing;**
- 5) Describe Brace Position;**
- 6) Inform Brace signal;**
- 7) Secure cabin and galley;**
- 8) Report to the Commander;**
- 9) CC preparation.**

11.3 PLANNED EMERGENCY LANDING

11.3.1 Crew Co-ordination

Declaring emergency the Commander / pilot shall request the Cabin crew call the cockpit by 3 high/low chimes or via PA system by using the “**Cabin Crew to cockpit**” announcement. CC will proceed to flight deck immediately for instructions. In case of smoke / fire the CC should establish the intercom communications first to clarify the situation and whether they are allowed to open the cockpit door.

Commander shall advise Cabin Crew of Emergency following the “TEST” example below:

- T** - Type of Emergency
- E** - Exits to be used
- S** - Bracing Signal/Evacuation Signal
- T** - Time to Prepare
 - Repeat information back
 - Synchronize watches
 - Confirm pax re-seating required

11.3.2 Passenger Briefing

Turn all cabin lighting to BRIGHT and brief passengers:
(read emergency announcement)

Crash protection - the below mentioned items are important in order to get the best possible protection against the G-forces that may arise during the landing:

- Ensure that pax remove sharp objects, false teeth and loosen their ties and open their shirt collars,
- Women pax should remove high-heeled shoes before landing in order to be able to brace for impact with the whole foot on the floor and not to damage the slide when evacuating,
- Distribute blankets and pillows for padding.
- if time permits instruct pax to dress according to weather outside and to wear gloves if available

11.3.3 Passenger Relocation

Reseating passengers without Commander's permission is permitted if the original Weight and Balance is not disturbed. Cabin Crew is supposed to relocate following passengers:

- Able-bodied passengers.
- Pregnant women.
- Passengers with movement difficulties (assign ABP's to such persons).
- Passengers with children.

11.3.4 Able-Bodied Passenger (ABP) Briefing

Three assistants should be selected for EACH cabin door with slide and two assistants for EACH overwing hatch. Cabin Crew to go to each exit and brief the ABP assigned to the exit on:

- Check for fire/obstruction, assign alternate exits;
- Exit operation;
- Commands to be given;
- Assist passengers out and away from the aircraft;

The following is an outline of specific duties for each assistant:

Assistant Number One:

- Come to this door (hatch) when the command '**Evacuate, Evacuate**' is heard. If exit is blocked, redirect passengers to the alternate exit using the command:
- **"Exit blocked, go that way"**.
- Rotate door handle in direction of the arrow (open the hatch)
- Ensure that door is locked against fuselage (throw the hatch cover outside or put the cover in place not obstructing the exit)
- Pull red inflation loop (if slide fails to inflate automatically).
- After slide has inflated, begin evacuating passengers, using the commands **"Open seatbelts"**, **"Open exits"**, **"Come this way"**, **"Get out"** and **"Jump and slide."**
- After all passengers have evacuated, move away from the aircraft.

Assistants Numbers Two and Three:

- Hold passengers back while door (hatch) is being opened using the command “**Stand back.**”
- Assistant Number Two will be the first down the slide and will stand at the bottom to assist passengers, directing them away from the aircraft using the command “**Get away.**”
- Assistant Number Three will be the second down the slide and will also stand at the bottom to assist passengers, directing them away from the aircraft using the command “**Get away.**”

11.3.5 Description of Brace Positions

Brace Positions are intended to give passengers and crew some protection against neck and spinal injuries during sudden deceleration. Brace Positions should be used any time there is the remotest possibility of sudden stops, or loss of directional control during an emergency landing.

- a. Forward Facing Passenger Seat with a Seat Immediately in Front.
Instruct passengers to:
 - Place feet flat on floor
 - Cross your wrists and place them on the seat back in front of you
 - Lean forward, rest your forehead on your wrists.
- b. Forward Facing Passenger Seat With No Seat in Front
Instruct passengers to:
 - Place feet flat on floor
 - Bend over with your face in your lap
 - Clasp your elbows under your knees
- c. Small Children - A child large enough to be securely belted in a seat can use the standard Brace Position with an adult seated next to them. Have the parent put one hand on the child's back, to be sure the child does not sit up at the time of impact, and the other arm on the seat back in front with the head resting on arm. Coats or other soft items can be padded behind them to take up the slack of the seat belt.
- d. Infants - The safest place for an infant to be is in an approved car type restraint. If it is not available, give instructions as follows:
 - Instruct the passenger to wrap the infant in padding,
 - Fasten with an infant seat belt,
 - Hold the infant on passenger knee further from aisle, supporting infant's head with one hand,
 - Lean forward, rest forehead on wrist.

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e. Pregnant Women - Should be padded to protect her as much as possible from the deceleration forces with the seat belt fastened below her extended abdomen. Lean forward resting forehead on wrists.

f. Cabin Crew Jump Seat:

Aft C/C Jump Seat

Bracing in upright position, protecting head with arms (hands should be clasped together behind the neck with elbows brought as far forward as possible), feet slightly spread apart and moved backwards, resting the head against the headrest.

Forward C/A Jump Seat

Bracing in upright position, protecting head with arms (hands should be clasped together behind the neck with elbows brought as far forward as possible), feet slightly spread apart and moved backwards, head forward with chin against the chest

11.3.6 Information of Brace Signal

Cabin Crew will check that all passengers can get in a Brace Position. Cabin Crew should demonstrate the Brace Position so passengers.

Two minutes before touchdown (1000') Commander via PA system gives **"Take up emergency landing positions"** - CC has to be seated with full harness fitted.

Shortly before touchdown (30 sec or 200'altitude) Commander via PA system gives **"Brace, brace"** or flashing seat belt signs signal. Passengers shall take the Brace Position, upon hearing the brace signal and the command from the Cabin Crew **"Bend over, head down"**

Passengers should remain in the "brace" position during and after landing till the command **"Evacuate"** or **"Remain seated"** is received.

OTE: Remember that two or more impact shocks may occur before the aircraft will stop.

11.3.7 Secure the Cabin and Galley

Cabin Crew will secure the cabin and galley by:

- Checking all galley for loose and unsecured items;
- Switching off the galley power;
- Stowing loose objects from the cabin in the overhead lockers, under the seats, and in toilets,
- Stowing loose waste-bags in the toilets and lock them.

11.3.8 Report to Commander

Cabin Crew will notify the Commander when the cabin is ready and proceed with the following:

- Reconfirm the Brace Signal.
- Turn lights off - (inform passengers beforehand)
- Time permitting, reassure passengers.

11.3.9 Cabin Crew Preparation

Cabin Crew to assume Brace Position when Bracing Signal is given by Commander:

- Shout: **“Bend over, head down!”**
- Continue commands until the cockpit command **“Evacuate”**, **“Remain seated”** is received, or evacuation is inevitable.

11.4 PLANNED DITCHING

- 1) Prepare for ditching according to QRH “DITCHING” checklist. Do not plan to use both aft doors for evacuation;
- 2) Instruct each passenger on use of life vests:
 - life vest is located under each passenger seat;
 - Infant life vests, to be used on infants only.
- 3) Prepare yourself - put on your life vest.

NOTE: Remember that two or more impact shocks may occur before the aircraft will stop.

CAUTION: It is prohibited to inflate life vest inside the aircraft. Only infant life vests and adult life vests used for children shall be inflated in the cabin.

Open exits and leave your seat only when aircraft has completely stopped.

- 4) Evacuation:

Proceed to assigned ditching stations, launch rafts and evacuate the airplane as soon as practicable.

CAUTION: Open emergency exits if they are above water level.

11.5 UNPLANNED EMERGENCY

Emergencies, emergency landing, or other abnormal conditions do not always dictate the need for an emergency evacuation.

If conditions are such that an evacuation appears necessary, the first crewmember aware of this situation shall immediately advise the Commander. The Commander will evaluate the situation and, if necessary - initiate the evacuation.

COMMANDER WILL ORDER THE CABIN TO EITHER EVACUATE OR REMAIN SEATED.

In case of Unplanned Emergency the three steps to remember are:

- 1) Evaluate**
- 2) Instruct**
- 3) Evacuate**

11.6 UNPLANNED EMERGENCY LANDING

11.6.1 Evacuation Procedure

Upon impact:

- 1) Assume Brace Position.**
- 2) Shout: "Bend over, head down"**
- 3) Remain seated until aircraft has come to a complete stop (keep seatbelt fastened and shoulder harness on).**
- 4) Evaluate situation quickly, await command from the cockpit, or initiate evacuation;**
 - Shout: '**Open seat belts**'.
 - Determine if escape route is usable.
 - If exit is unusable, go immediately to an alternate.
 - Direct passengers to another exit, as well.
 - Shout: "**Exit blocked, go that way**" (redirecting pax with hands.)

5) Operate assigned exits, and start passenger evacuation.

- Shout: **'Come this way, come this way'**
- Evacuate passengers and hold on so passengers do not push you out.
- Keep instructions simple. In a smoke filled cabin, your voice may be the only point of reference for passengers, and they can follow this sound to the exit.
- Shout **"Follow my voice, come this way"**
- Keep low in a smoke filled cabin.
- Use flashlight signaling to the exit.
- Shout, **"Follow the light, come this way"**.

11.7 UNPLANNED DITCHING

Upon impact:

- 1) Assume Brace Position.
- 2) Shout: **"Bend over, head down"**
- 3) After the aircraft has come to a complete stop, shout: **"Open seat belts"** while assessing conditions.
- 4) Knowing you are in water shout: **"Put on your life vest!"**. Put on your crew life vest while shouting commands.
- 5) Evacuate all passengers into water, keep in group, arms interlocked.
- 6) Do not permit passengers to re-enter aircraft.

11.8 EVACUATION PROCEDURES

11.8.1 Duties of Commander (LP)

- 1) Complete the items according to QRH “PASSENGER EVACUATION” checklist for Captain.
- 2) Direct and assist the passengers in evacuation as condition dictates.
- 3) Check that all passengers and crew has been evacuated.
- 4) Bring the flashlight and fire extinguisher and evacuate.
- 5) Provide first aid and assistance to passengers and crew.

11.8.2 Duties of Co-Pilot (RP)

- 1) Complete the items according to QRH “PASSENGER EVACUATION” checklist for First Officer.
- 2) Bring the flashlight and axe evacuate.
- 3) Direct and assist the passengers in evacuation as condition dictates.

Provide first aid and assistance to passengers and crew.

11.8.3 All Crew

- 1) Initiate Evacuation - if evacuation is necessary command will be given by the Commander.

An evacuation may be initiated by the C/A in the following situations:

- Severe structural damage;
 - Smoke and fire;
 - No command from the cockpit;
 - Ditching.
- 2) Assess Conditions - Try to ascertain what type of emergency you are having and what exits may or may not be usable. Continue to assess conditions throughout the evacuation, both inside and outside the aircraft.
 - 3) Activate Exit - Check for fire/obstructions before opening exit, activate the exit, and call passengers in your direction.

- 4) Evacuation Commands - Try to use positive commands, such as "**Come this way**", "**Jump and slide**". These are easier to understand and easier to accept.

Avoid using negative commands such as "~~UNFASTEN SEATBELTS~~", "~~DON'T WAIT~~", "~~DON'T HESITATE~~".

Do not touch passengers during an evacuation. Touching passengers as they leave causes each passenger to pause for your "permission to go" and delays the evacuation.

GET PASSENGERS OUT ANY WAY YOU CAN! If a passenger should freeze in the doorway, get behind the passenger, buckle his knees, seat on the floor and push out.

- 5) Incapacitated Passengers - Passengers who would have difficulty evacuating the A/C in case of an emergency should be seated as near as possible to the exits but not in an emergency exit row.
- 6) Unusable Exits - You must do two things in case of unusable exit: Redirect, and tell why you are redirecting. This will avoid confusion and facilitate the evacuation. For example: "**Exit blocked, fire outside (no slide)**", point the direction and give command "**Go that way**".
- 7) Crew Evacuation - Check to see that all passengers have evacuated, collect any required emergency equipment and evacuate.

Once out of the aircraft, don't go back.

11.9 AFTER EVACUATION

All Crew:

- 1) Assemble passengers at a safe distance away from aircraft (> 100 m).
- 2) Make a head count of all passengers and crew members.
- 3) Administer all possible first aid.
- 4) Post a guard to make sure no mail, baggage, cargo, or parts of the a/c are disturbed.
- 5) Make sure airBaltic authorities are notified and remain available to answer questions.
- 6) Make no comment to the media. Refer them to the Public Relations office.
- 7) Report of Emergency - The crew must file a report of the emergency as soon as possible. The report should include, as a minimum:
 - Time crew boarded aircraft.
 - Equipment checked.
 - Narrative report of sector flown.
 - Time emergency was first noticed.
 - Steps taken by Crew to prepare for emergency.
 - Actual evacuation.
 - Passenger reaction.
 - Everything done for passengers by Crew until released by the CAA or the Company.

In general, everything should be included from the time the crew boarded the aircraft until the time they were released. The report must be given to MCC Duty Officer.

11.10 ORDERS AT EMERGENCY

FROM	TO	PERFORMED THROUGH	ORDER
Cockpit	Cabin Crew	P/A System or 3 HI/LOW chimes	"CABIN CREW TO COCKPIT"
Cockpit	Cabin Crew	P/A System	"TAKE UP EMERGENCY LANDING POSITIONS"
Cockpit	Cabin Crew	Flashing with "Fasten Seat Belt" sign repeatedly	"BRACE, BRACE"
Cabin Crew	Cabin	Shouting	"BEND OVER, HEAD DOWN"
Cockpit	Cabin Crew	P/A System	"EVACUATE, EVACUATE" "REMAIN SEATED"
Cabin Crew	Cabin	Shouting	"OPEN SEAT BELTS" "OPEN EXITS" "COME THIS WAY", "GET OUT" "JUMP AND SLIDE" If exit unusable – "EXIT BLOCKED" "GO THAT WAY"

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12 AIRCRAFT SYSTEMS

12.0 GENERAL

Aircraft systems description is given in MOM, Volume 2.

This section contains procedures that are accomplished as required rather than routinely performed on each flight. Mentioned procedures may be required because of unscheduled maintenance or as a result of a procedure referenced in a Non-Normal Checklist.

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12.1 AIRPLANE GENERAL

12.1.1 Water System Draining

The system may be drained either by pressure or by pressure of gravity.

Pressure draining:

APU ON

APU bleed switch ON

This will pressures the water tank. If APU is not usable, an external pneumatic cart may be used positioning the Isolation Valve switch OPEN. The tank may also be pressurized through a valve on the external servicing panel.

Water Heaters OFF

CAUTION: Failure to do this could cause damage to the heaters when the water is drained.

Tank drain valve OPEN

Shutoff/Drain valve DRAIN

When water stops draining from outlets:

Tank drain valve CLOSE

Shutoff/Drain valve ON

Allow 2 minutes for pressure to stabilize. To exhaust residual water, turn each water faucet, galley water drain shutoff valve and coffee maker drain for 2 minutes, and than close. Depressurize the water tank by deactivating the air pressure source.

Gravity Draining:

Water Heaters OFF

Fill and Overflow valve OPEN

Tank Drain valve..... OPEN

Shutoff/Drain valve DRAIN

When water stops flowing from the outlets:

Fill and Overflow valve CLOSE

Tank Drain valve..... CLOSE

Shutoff/Drain valve ON

12.1.2 Forward Airstair Operation

12.1.2.1 Limitations

- 1. Operation of airstair in winds exceeding 40 knots is not recommended.
- 2. Do not move airplane with stair extended.

12.1.2.2 Airstairs Extension

Control Handle..... Push Button to Extend Handle
Forward Entry Door..... Open to Cocked Position

When operating the airstair from the interior control panel, the forward entry door must be open to the cocked position. Safety circuits prevent airstair operation if the entry door is closed.

Control Switch.....EXTEND

NOTE: For interior standby operation, the battery switch must be ON* and 115V AC power available.

* Airplanes delivered prior to November 1991.

Hold until extension is complete.

The STAIRS OPERATING light illuminates during extension until the airstair is fully extended.

NOTE: The STAIRS OPERATING light will not illuminate with loss of AC power.

Control switch..... Release
Handrail ExtensionsEngage
Release latch and pull inboard and up, extend and engage on supports at sides of forward entry doorway.

12.1.2.3 Airstairs Retraction

Handrail ExtensionsDisengage
Disengage from door supports, depress latch at base of forward extension to permit retraction within upper segment of handrail. Slide right and left extensions down along upper rails. Stowing in appropriate stowage points provides circuit continuity for energizing retract relay.

CAUTION: Use of the standby control switch bypasses all safety circuits. Airstair handrail extensions must be stowed or substantial damage could result.

Control switch..... RETRACT

Hold until retraction is complete.

The STAIRS OPERATING light illuminates during retraction until the airstair door is fully closed.

NOTE: The STAIRS OPERATING light will not illuminate with loss of AC power.

Control switch..... Release

12.1.2.4 Exterior Control

To Extend

Control Handle..... Push Button to Extend Handle

Control Handle..... Rotate to Extend

Hold control handle in position until entire extension cycle is complete.

Control Handle..... Release

Handrail Extensions..... Engage

Release latch and pull inboard and up, extend and engage on supports at sides of forward entry door.

To Retract

Handrail Extensions..... Disengage

Disengage from door supports, depress latch at base of forward extension to permit retraction within upper segment of handrail. Slide right and left extensions down along upper rails. Stowing in appropriate stowage points provides circuit continuity for energizing retract relay.

CAUTION: Use of the standby control switch bypasses all safety circuits. Airstair handrail extensions must be stowed or substantial damage could result.

Control Handle..... Rotate to Retract

When airstair is retracted and airstair door is fully closed, release and stow handle.

12.1.3 Boeing/C&D Aerospace Enhanced Flight Deck Security Door Automatic Locking System

12.1.3.1 Operational Check

Make sure that an operational check of the Flight Deck Access System has been accomplished once each flight of the day.

1. Visually check that the Flight Deck Access System (FDAS) switch on the chime module is in the NORM (guard closed) position.
2. Make sure the flight compartment door is open.
3. Do these steps to make sure the chime module speaker operates:
 - a) Make sure the FLT DK DOOR rotary switch is in the AUTO position.
 - b) Enter the access code in the keypad and press the ENT key.
 - c) Make sure the chime module sounds appropriately.
 - d) Make sure the AUTO UNLK light comes on.
 - e) Put the FLT DECK DOOR switch to the DENY position.
 - f) Make sure the AUTO UNLK light goes off.
 - g) Put the FLT DK DOOR switch to the UNLKD position.
 - h) Put the FDAS switch on the chime module to the OFF position.
 - i) Make sure the LOCK FAIL Light comes on.
 - j) Put the FDAS switch to the NORM position.
4. From the flight deck side of the door:
 - a) Close and lock the flight compartment door.
 - b) Push on the door to make sure it is locked.

12.1.4 Oxygen Mask Microphone Test

Airplanes with the Mask-Boom switch on the ASP

MASK-BOOM switch MASK

Flight interphone transmitter selector switch Push

RESET/TEST Push and hold

EMERGENCY/TEST selector Push and hold

Push-to-Talk switch I/C

Simultaneously push the Push-to-Talk switch, EMERGENCY/TEST selector and the RESET/TEST switch.

Verify oxygen flow sound is heard through the flight deck loudspeaker.

Push-to-Talk switch Release

EMERGENCY/TEST selector Release

RESET/TEST Release

MASK-BOOM switch BOOM

Airplanes without the Mask-Boom switch on the ASP

Flight interphone transmitter selector switch Push

TEST-RESET switch Push and hold

EMERGENCY/TEST selector Push and hold

Push-to-Talk switch INT or I/C

Simultaneously push the Push-to-Talk switch, EMERGENCY/TEST selector and the TEST-RESET switch.

Verify oxygen flow sound is heard through the flight deck loudspeaker.

Push-to-Talk switch Release

EMERGENCY/TEST selector Release

TEST-RESET switch Release

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12.2 AIR SYTEMS

12.2.1 Wing-Body Overheat Test

Wing-body OVHT TEST switch.....Push

Hold for a minimum of 5 seconds.

Both WING-BODY OVERHEAT lights – illuminated.

MASTER CAUTION – illuminated.

AIR COND system annunciator – illuminated

Wing-body OVHT TEST switch..... Release

Both WING-BODY OVERHEAT lights – extinguished.

MASTER CAUTION lights – extinguished.

AIR COND system annunciator – extinguished.

12.2.2 External Air Cart Use

CAUTION: The BAT switch should always be on when using the airplane air conditioning system since the protective circuits are DC. This ensures protection in the event of loss of AC power.

Note: For engine start with a ground air source, see 12.7.5 of this chapter.

APU BLEED air switch..... OFF

ISOLATION VALVE switch..... OPEN

RECIRC FAN switch.....AUTO

PACK switch(es)..... AUTO or HIGH

The operation of two packs from one air source is permitted provided the external air cart can maintain 20 psi minimum with both packs operating.

Cabin temperature selectors.....AUTO

Set for desired temperature.

Duct pressure20 psi min.

If external air cannot hold 20 psi minimum and the APU is operating:

ISOLATION VALVE switch..... AUTO

Rev.: NEW

APU BLEED air switch..... ON
APU supplies left pack and external air source supplies right pack.

12.2.3 Ground Air Conditioning Cart Use

Before connecting ground air conditioning cart:

PACK switches.....OFF

Allows cart to operate at maximum efficiency.

After disconnecting ground air conditioning cart:

PACK switches..... As required

12.2.4 Using the APU for Heating (on the ground)

Under extremely cold conditions, both packs may be used for more rapid heating.

ISOLATION VALVE switchOPEN

During right pack operation only, under cold conditions, if the left PACK TRIP OFF light illuminates, position the recirculation fan OFF until the cabin temperature stabilizes.

12.2.5 Isolated Pack Operation during Engine Start

To improve cabin air quality between starting the first and second engine:

CAUTION: Moving engine BLEED air switches while a starter is engaged can damage the starter.

Engine No. 2Start

After engine No. 2 stabilized:

ISOLATION VALVE switch..... CLOSE

Right PACK switch..... AUTO

Duct pressureStabilized
Engine No. 1Start
After engine No. 1 stabilized:
ISOLATION VALVE switchAUTO

12.2.6 Auto Trip and Standby Check (Airplanes with CPCS)

Pack switches..... OFF
Pressurization mode selectorAUTO
FLT/GND switch GRD
Cabin Altitude indicator500 feet above field elevation
Captain and First Officer altimeters.....Set
Cabin Rate selector.....Index
Verify pressurization mode lights extinguish and the Outflow Valve
Position indicator is at OPEN.
FLT/GND switch..... FLT
Verify Outflow Valve Position indicator moves toward CLOSE.
Pressurization mode selector..... Check
Verify the AUTO FAIL and STANDBY lights illuminated and the Outflow
Valve Position indicator moves toward OPEN.
Cabin Altitude indicator 500 feet below field elevation
Verify the Outflow Valve Position indicator moves toward CLOSE.
FLT/GND switch..... GRD
Verify the AUTO FAIL and STANDBY lights extinguished and the
Outflow Valve Position indicator moves toward OPEN.
FLT/GND switch.....FLT
Verify Outflow Valve Position indicator moves toward CLOSE.

12.2.7 Auto Trip and Manual Check (Airplanes with CPCS)

Note: This test must be performed immediately after the Auto Trip and Standby Check to test excessive pressurization rates. If the initial CHECK input has cleared (approximately 30 seconds) the AUTO FAIL and STANDBY lights do not illuminate.

Pack switches..... OFF

Pressurization mode selector.....AUTO
 AUTO FAIL light – illuminated
 STAND BY light – illuminated

Pressurization mode selector.....MAN AC
 AUTO FAIL light – extinguished
 STANDBY light – extinguished
 MANUAL light – illuminated

Outflow valve switch.....Hold OPEN
 Verify Valve Position indicator moves towards OPEN.

Outflow valve switch.....Hold CLOSE
 Verify Valve Position indicator moves towards CLOSE.

Pressurization mode selector.....MAN DC
 MANUAL light – illuminated

Outflow valve switch.....Hold OPEN
 Verify Valve Position indicator moves towards OPEN.

Outflow valve switch.....Hold CLOSE
 Verify Valve Position indicator moves towards CLOSE.

FLT/GRD switch..... GRD

Pressurization mode selector.....AUTO
 Verify Valve Position indicator moves towards OPEN.
 MANUAL light – extinguished.

12.2.8 Pressurization System Manual Mode Test *

(Airplane with DCPCS)

Pack switches..... OFF

Pressurization mode selector.....MAN
 AUTO FAIL and ALTN lights – extinguished.
 MANUAL light – illuminated.

Outflow valve switchCLOSE
 Verify Valve Position indicator moves toward CLOSE.

Outflow valve switch..... OPEN
Verify Valve Position indicator moves toward OPEN.

Pressurization mode selectorAUTO
Verify Valve Position indicator moves toward OPEN.
MANUAL light - extinguished.

12.2.9 Standby Mode Operation (Airplanes with CPCS)

Before start:

Pressurization mode selector..... STBY
Standby light – illuminated.

Cabin Altitude indicatorSet
CAB ALT - takeoff field elevation minus 200 feet.

Cabin Rate selector.....Index

FLT/GRD switch GRD
Verify the Outflow Valve Position indicator is full OPEN.

After Start:

Air Conditioning Pack switchesAUTO

FLT/GRD switchFLT

After takeoff:

Cabin Altitude indicatorSet
Check the placard below the pressurization module for the cabin altitude corresponding to the planned flight altitude. Reset CAB ALT to this altitude.

Cabin Rate selector..... Adjust
Maintain normal proportional climb rate.

Cruise:

Cabin Altitude indicator..... Reset
Reset CAB ALT using the placard for flight altitude changes greater than 1000 feet.

Before descent:

Cabin Altitude indicator..... Set

CAB ALT – landing field elevation minus 200 feet

Descent:

Cabin Rate selector..... Adjust

Maintain normal proportional descent rate (300-500 fpm.)

After landing:

FLT/GRD switchGRD

12.2.10 Manual Mode Operation

(Airplane with CPCS) This condition is indicated by the cabin altitude, rate of climb and differential pressure not responding to the standby mode inputs to the pressurization controller. The AUTO FAIL and/or STANDBY lights may be illuminated.

(Airplane with DCPCS) Dual channel failure of the automatic system requires manual operation of cabin pressurization. This condition is indicated the AUTO FAIL, MASTER CAUTION and AIR COND Annunciator illumination.

CAUTION: Switch actuation to the manual mode cause an immediate response by the outflow valve. Full range of motion of the outflow valve can take up to 20 seconds.

Pressurization mode selector.....MAN
MANUAL light – illuminated.

CABIN/FLIGHT ALTITUDE placard.....CHECK
Determine the desired cabin altitude.

If a higher cabin altitude is desired:

Outflow valve switch (momentarily)..... OPEN
Verify the outflow valve position indicator moves right, cabin altitude climbs at the desired rate, and differential pressure decreases.
Repeat as necessary.

If a lower cabin altitude is desired:

Outflow valve switch (momentarily)..... CLOSE
Verify the outflow valve position indicator moves left, cabin altitude descends at the desired rate, and differential pressure increases.
Repeat as necessary.

During Descent:

Thrust lever changes should be made as slowly as possible to prevent excessive pressure bumps.

Outflow valve switch (momentarily)..... CLOSE
During descent, intermittently position the outflow valve switch toward CLOSE, observing cabin altitude decrease as the airplane descends.

Before entering the landing pattern, slowly position the outflow valve to full open to depressurize the airplane. Verify differential pressure is zero.

12.2.11 Pressurization Control Operation - Landing at Alternate Airport**At top of descent:**

CAB ALT indicator (CPCS).....SET
Set CAB ALT to new destination airport elevation minus 200 feet.
LAND ALT indicatorReset
Reset to new destination field elevation.

12.2.12 Automatic Pressurization Control - Landing Airport Elevation Above 6000 Feet**Flights less than one hour:**

Use Normal Procedures.

Note: (Airplanes with CPCS) On very short flights where large changes in cabin altitude are required, it may be necessary to use the standby mode and increase the cabin rate of climb to achieve the desired cabin altitude in the time available.

Rev.: NEW

Flights more than one hour:

Use Normal Procedures except as modified below.

Prior to takeoff:

LAND ALT indicator.....6000 feet

CAB ALT indicator (CPCS)..... 6000 feet

At initial descent or approximately 20 minutes prior to landing:

LAND ALT indicator..... Destination field elevation

CAB ALT indicator (CPCS)..... Reset

Reset CAB ALT to destination airport elevation minus 200 feet.

12.2.13 Unpressurized Takeoff and Landing

When making a no engine bleed takeoff or landing with the APU inoperative:

Takeoff

PACK switches.....AUTO

ISOLATION VALVE switch..... CLOSE

Engine BLEED air switches.....OFF

Airplanes with CPCS (set additionally):

CAB ALT indicator..... Set 2000 feet above field elevation

Cabin rate selector..... Index

Pressurization mode selector STBY

FLT/GRD switch FLT

After Takeoff

Note: If engine failure occurs, do not position engine BLEED air switches ON until reaching 1500 feet or until obstacle clearance height has been attained.

At not less than 400 feet, and prior to 2000 feet above field elevation:

Engine No. 2 BLEED air switchON

When CABIN rate of CLIMB indicator stabilizes:

Engine No. 1 BLEED air switchON

ISOLATION VALVE switchAUTO

Airplanes with CPCS (set additionally):

Pressurization mode selectorAUTO

Landing

When below 10,000 feet:

Airplanes with CPCS:

CAB ALT indicator.....1500 feet above field elevation

Cabin rate selector.....Index

Pressurization mode selector..... STBY

When starting final approach turn:

Engine BLEED switches..... OFF

Avoid high rates of descent for passenger comfort.

Airplanes with DCPCS:

When starting final approach turn:

Engine BLEED air switches..... OFF

Avoid high rates of descent for passenger comfort.

12.2.14 No Engine Bleed Takeoff and Landing

When making a no engine bleed takeoff or landing with the APU operating.

Takeoff

NOTE: If anti-ice is required for taxi, configure for a "No Engine Bleed Takeoff" just prior to takeoff.

NOTE: If anti-ice is not required for taxi, configuration for a "No Engine Bleed Takeoff" may be accomplished just after engine start.

Rev.: NEW

Right PACK switch AUTO
ISOLATION VALVE switch..... CLOSE
Left PACK switch.....AUTO
Engine No. 1 BLEED air switch.....OFF
APU BLEED air switch.....ON
Engine No. 2 BLEED air switchOFF

After Takeoff

NOTE: If engine failure occurs, do not position engine BLEED air switches ON until reaching 1500 feet or until obstacle clearance is assured.

Engine No. 2 BLEED air switch..... ON
APU BLEED air switch.....OFF
When CABIN rate of CLIMB indicator stabilizes:
Engine No. 1 BLEED air switch..... ON
ISOLATION VALVE switch..... AUTO

Landing

If additional go-around thrust is desired, below 10,000 feet, configure the pressurization system for a no engine bleed landing:

Right PACK switch AUTO
ISOLATION VALVE switch..... CLOSE
Left PACK switch.....AUTO
Engine No. 1 BLEED air switchOFF
APU BLEED air switch.....ON
Engine No. 2 BLEED air switch OFF

12.3 ANTI-ICE OPERATION

Requirements for use of anti-ice and operational procedures for engine and wing anti-ice are contained in section Adverse Weather Operations, Normal Procedures in Part B.

12.3.1 Window Heat System Tests

12.3.1.1 Overheat Test

The overheat test simulates an overheat condition to check overheat warning function of the window heat system.

WINDOW HEAT switchesON

WINDOW HEAT TEST switch..... OVHT

OVERHEAT lights - On

ON lights – Extinguish (lights extinguish after approximately 1 minute).

MASTER CAUTION – On

ANTI-ICE system annunciator – On

WINDOW HEAT switches.....Reset

Position the WINDOW HEAT switches OFF, then ON.

12.3.1.2 Power Test

The power test verifies operation of the window heat system. The test may be accomplished when any of the window heat ON lights is extinguished and the associated WINDOW HEAT switch is ON.

WINDOW HEAT switches ON

Note: Do not power test when all ON lights are illuminated

WINDOW HEAT TEST switch..... PWR

The controller is forced to full power, bypassing normal temperature control. Overheat protection is still available.

WINDOW HEAT ON lightsilluminated

If any ON light remains extinguished, the window heat system is inoperative. Observe the maximum airspeed limit of 250 kts below 10,000 feet.

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12.4 AUTOMATIC FLIGHT

No procedures exist.

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12.5 COMMUNICATION

12.5.1 Cockpit Voice Recorder Test

On airplanes with monitor indicator:

Test switch.....Push

After a slight delay:

Monitor indicator.....Green band
A tone may be heard through a headset plugged into the
headset jack.

Test switch..... Release

On airplanes with STATUS light:

Test switch.....Push

After a slight delay:

STATUS light.....On
A tone may be heard through a headset plugged into the
headset jack.

Test switch.....Release

On airplanes with TEST switch:

Test switch.....Push

A tone may be heard through a headset plugged into the
headset jack.

Test switch..... Release

12.5.2 Use of the ACARS VHF (VHF#3) for communication

- 1. ACARS controlled from CDU
It is not possible to use VHF#3 for communication.
- 2. ACASR controlled from the touch-screen panel on the aft electronic panel

To activate ACARS VOICE MODE complete the following steps:

MAIN_SYSTEM_MENU

▶ ACARS

▶ DFDAU

Select ACARS

ACARS_MAIN_MENU

▶ PRE-FLIGHT

▶ IN-FLIGHT

▶ OOOI-TIMES

▶ SITUATIONS

▶ MESSENGES

▶ MISCELLANEOUS

MAIN NOCOM

VOX

Select VOX

VOICE_MODE

TUNED FREQ

121.20

ALTER FREQ

120.10

▶ EXIT VOICE

DATA MSG

WAITING

MENU

1 2 3

4 5 6

7 8 9

← 0 →

CLR

ENT

- 1) Select desired ALTER FREQ and press ENT
- 2) Use VNF#3 on the audio panel for communication
- Note:** in 30 sec ACARS display reverts to ACARS MAIN MENU
- 3) To exit VOICE MODE select EXIT VOICE

Note: VHF#3 does not have 8.33 kHz channel spacing

capability.

Only aircraft equipped with at least **two sets** of 8.33 kHz radios are allowed to operate in the ICAO European Region above FL245.

Non-8.33 kHz equipped flights are:

- Not permitted unless exempted by States over-flown
- Subject to Initial Flight Plan Processing System (IFPS) flight plan rejection or warning notification, if planned to enter the airspace of 8.33 kHz Mandatory Carriage without exemption

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12.6 ELECTRICAL

12.6.1 General

Primary electrical power is provided by two engine driven generators, which supply three-phase, 115 volt, 400 Hz AC. Each generator supplies its own bus system in normal operation and can also supply essential loads of the opposite side bus system when one generator is inoperative.

Transformer rectifier (TR) units and battery supply DC power. The battery also provides backup power for the AC and DC standby systems.

The APU operates a generator and can supply power to both AC generator busses on the ground or one AC generator bus in flight.

There are two basic principles of operation for the electrical system:

- There is no paralleling of the AC sources of power;
- The source of power being connected to a generator bus automatically disconnects an existing source.

The electrical power system may be categorized into three main divisions: the AC power system, the DC power system, and the standby power system.

12.6.2 Electrical Power Up

The following procedure is accomplished to permit safe application of electrical power.

BATTERY switchGuard closed
STANDBY POWER switchGuard closed

Verify that the STANDBY PWR OFF light is extinguished.

ALTERNATE FLAPS master switchGuard closed
Windshield WIPER selector(s)OFF
ELECTRIC HYDRAULIC PUMPS switchesOFF
LANDING GEAR lever.....DN

Verify that the green landing gear indicator lights are illuminated.

Verify that red landing gear indicator lights are extinguished.

WEATHER RADAROFF

If external power is needed:

Verify that the GND POWER AVAILABLE light is illuminated.

GRD POWER switchON

Verify that the BUS OFF lights are extinguished.

Verify that the TRANSFER BUS OFF lights are extinguished.

Verify that the STANDBY PWR OFF light is extinguished.

If APU power is needed:

Verify that the engine No.1, APU and the engine No.2 fire switches are in. Alert ground personnel before the personnel before the following test is accomplished.

OVERHEAT DETECTOR switchesnormal
TEST switch.....hold to FAULT/INOP

Verify that the MASTER CAUTION lights are illuminated.

Verify that the OVHT/DET annunciator is illuminated.

Verify that the FAULT is illuminated.

If the fault light fails to illuminate, the fault motoring system is inoperative.

Verify that the APU DET INOP light is illuminated.

Do not operate the APU, if APU DET INOP fails to illuminate.

TEST switch.....hold to OVHT/FIRE

Verify that the fire warning bell sounds.

Verify that the master FIRE WARN lights are illuminated.

Verify that the MASTER CAUTION lights are illuminated.

Verify that the OVHT/DET annunciator is illuminated.

Master FIRE WARNING light – Push.

Verify that the master FIRE WARN lights are extinguished.

Verify that the fire warning bell cancels.

Verify engine Nr1,APU ,and engine Nr2 fire switches stay illuminated.

Verify that the ENG 1 OVERHEAT and ENG 2 OVERHEAT lights stay illuminated.

Extinguisher TEST switch chkd

TEST switch..... position to 1 and hold

Verify that the three green extinguisher test lights are illuminated.

TEST switch..... release

Verify that the three green extinguisher test lights are extinguished.

Repeat for test position 2.

APU.....start and on bus

When the APU GEN OFF BUS light is illuminated:

APU GENERATOR bus switches ON

Verify that the BUS OFF lights are extinguished.

Verify that the TRANSFER BUS OFF lights are extinguished.

Verify that the APU MAINT light is extinguished.

Verify that the APU LOW OIL PRESSURE light is extinguished.

Verify that the APU FAULT light is extinguished.

Verify that the APU OVERSPEED light is extinguished.

Wheel well fire warning system test

TEST switch hold to OVHT/FIRE

Verify that the fire warning bell sounds, master FIRE WARN lights,
MASTER CAUTION lights and OVHT/DET annunciator illuminate.

Fire warning BELL CUTOUT switch push

Verify that the master FIRE WARN lights are extinguished.

Verify that the fire warning bell cancels.

Verify that the WHEEL WELL fire warning light is illuminated.

12.6.3 Electrical Power Down

The procedure assumes the Secure procedure is complete.

If APU was operating:

It is recommended that the APU be operated for one full minute with
no pneumatic load prior to shut down.

APU switch and/or GRD POWER switch OFF

If APU was operating:

Delay approximately 20 seconds after APU shut down for the APU
door to close to assure the APU will start on the next flight.

BATTERY switch OFF

12.6.4 Standby Power Test

Battery switch ON

AC-DC meter selectors STBY PWR

APU GEN No. 2 switch or GRD PWR switchOFF

Turn OFF appropriate switch depending on power source in use.
Removes power from TR 3.

STANDBY POWER switch OFF

Check STANDBY PWR OFF light illuminated.

AC-DC voltmeters Zero

STANDBY POWER switchBAT

Check STANDBY PWR OFF Light extinguished

AC-DC voltmeters Check

AC voltmeter 115 +/- 5 volts
DC voltmeter 26 +/- 4 volts

Frequency meter Check

Check frequency meter for normal indication: 400 +/- 10 CPS.

STANDBY POWER switchAUTO

APU GEN No. 2 switch or GRD PWR switch ON

12.7 ENGINES, APU

12.7.1 Battery start (with APU bleed or ground air available)

Prior to a battery start, accomplish the exterior safety inspection and the flight deck safety inspection. Accomplish interior/exterior inspections if required except for items requiring electrical or hydraulic power.

Accomplish the following flight deck setup checklist items:

Fault/Inop detection.....	Check
Fire/Overheat warning.....	Check
Extinguishers.....	Check
APU (bleed air source if available)	Start
Flap Lever	Set
Position the FLAP lever to agree with the FLAPS position indicator.	
Emergency equipment	Check
Circuit breakers	Check
Flight recorder	Set
Crash axe	Stowed
Oxygen & interphone	Check
Standby power	BAT
GALLEY power.....	ON
EMER EXIT LIGHTS.....	ARMED
Passenger signs.....	Set
HYD PUMP switches	ON
Air conditioning & pressurization.....	1 Pack, bleeds ON, set
Parking brake	Set

NOTE: The wheels should be chocked in case the brake pressure has bled down.

Cleared for Start:

PACK switchesOFF
ANTICOLLISION light switch ON
Ignition select switch IGN-R

Engine Start:

Engine No. 1 should be started first.

Engine No. 1 start Accomplish

NOTE: Only N1, N2, EGT and fuel flow indications are displayed.

Generator No. 1 switch ON

IRS mode selectorsNAV

FMC/CDU Set IRS position

WARNING: If engine No. 1 was started using a ground air source, to minimize the hazard to ground personnel, the external air should be disconnected and engine No. 2 started using the engine cross bleed start procedure.

Engine No. 2 start Accomplish

Generator No. 2 switch ON

After Start:

Complete the flight deck setup check by checking the following items:

MACH AIRSPEED WARNING test switches Push

STALL WARNING TEST switches Push

REVERSER lights Check

PMC switches ON

Passenger oxygen switch NORMAL

Crew oxygen..... Check

When "AFTER START" checklist is complete ensure that:

IRS alignment Complete & no flags

The airplane is ready for taxi. Refer to the normal checklists for subsequent checks.

12.7.2 Engine Cross bleed Start

Prior to using this procedure, ensure that the area to the rear is clear.

Engine BLEED air switches ON
APU BLEED air switch OFF
PACK switches OFF
ISOLATION VALVE switch AUTO

Ensures bleed air supply for engine start.

Engine thrust lever
(operating engine) Advance thrust lever until bleed
duct pressure indicates 30 PSI
Non-operating engine Start

Use normal start procedures with crossbled air.

After starter cutout, adjust thrust on both engines, as required.

12.7.3 High Altitude Airport Start Procedure (above 8400 feet)

For airplanes certified for operation at high altitude airports, accomplish the following:

Ignition select switch Both
Engine start Accomplish

- The minimum start pressure is 30 psi minus 0.5 psi for each 1000 feet above sea level.
- An indication of N1 rotation a minimum of 20% N2 are required prior to introducing fuel to the engine.
- The engine start switch must be held to the GRD position until N2 RPM reaches 50%.

Engine acceleration will be much slower than during starts at lower altitudes.

CAUTION: Do not attempt to re-engage the starter above 20% N2 if it is inadvertently allowed to cut out at 46% N2.

NOTE: Fuel fogging from the engine exhaust may occur during a normal high altitude airport start.

12.7.4 PMC off Takeoff and Climb

12.7.4.1 Performance (AFM, App 2)

Gross weights and speeds for PMC ON performance shall be adjusted as follows.

a) Normal take-off.

For Gross weights corrections use appropriate tables in QRH ch.PI.14 (18,5K) and ch.PI.24 (20K) for the appropriate limiting factor.

NOTE: If V MCG is a limiting factor (V), refer AFM, App.2, section 4.8.

V1/VR/V2 speeds remains unchanged - no corrections are required.

V MCG should be corrected as follows:

- Pressure Altitude below 3 000' – plus 6 Kts;
- Pressure Altitude above 3 000' – plus 4 Kts;

b) Improved Climb take-off.

No weights/speeds adjustments are required (all from the GWCs tables for PMC ON directly).

12.7.4.2 Power Setting

a) Take-off

Full thrust shall be used.

N1 shall be determined from the tables in QRH:

- 18,5 K engines - ch.PI.14,
- 20K engines - ch.PI.24 (until higher PTOW is needed, make appropriate PTOW calculations and use 18.5 K thrust rating tables PI.14 instead).

Set thrust manually or with autothrottle by 60 knots.

- If AT is inoperative - consider additional time required for power setting (take off from brakes or later brakes release);
- If AT is operative - insert appropriate (lower) OAT into FMC until you get desired N1 for take-off via FMC.

N1 RPM will increase as speed increases during takeoff (up to 7% depending on temperature and pressure altitude), but DO NOT reduce thrust during takeoff unless engine parameters exceed other limits.

b) After takeoff

Thrust levers (if required) Adjust

The N1 setting should be monitored throughout the climb and cruise, and the thrust levers reset as necessary.

For Max Climb and Go-Around with both PMC's Off, use PMC On % N1.

12.7.5 Starting with Ground Air Source (AC electrical power available)

Engine No. 1 must be started first.

When cleared to start:

APU BLEED air switch OFF

Engine No. 1 start Accomplish

Use normal start procedures.

WARNING: To minimize the hazard to ground personnel, the external air should be disconnected, and engine No. 2 started using the Engine Crossbleed Start procedure.

12.7.6 APU Start

12.7.6.1 Limitations

1. Not more than one in-flight start attempt on Battery power only
2. APU starter limitations: if there are multiple aborted start attempts, one minute cooling is required between the first and second start attempt, five minutes cooling is required between the second and third start attempt. A wait of one hour is required after the third start attempt.

12.7.6.2 APU start procedure

APU Switch..... START

Momentarily position APU switch to START and release to ON.

Check LOW OIL PRESSURE light illuminates, then extinguishes.

Check APU GEN OFF BUS light illuminates.

- NOTE:**
- 1) The start cycle may take as long as 135 seconds.
 - 2) With at least one generator operating, subsequent start attempts should be made at succeeding lower altitudes until a satisfactory start is accomplished.
 - 3) If extended APU operation is required on the ground and fuel is loaded in the center tank, place the left center tank fuel pump switch ON to prevent a fuel imbalance before takeoff.

CAUTION: Do not operate the center tank fuel pumps with the flight deck unattended.

- 4) Whenever the APU is operating and AC electrical power is on the airplane busses, extended service life of the APU fuel control unit can be realized by operating at least one fuel boost pump to supply fuel under pressure to the APU.

12.8 Fire Protection

12.8.1 Fire and Overheat System Test with an Inoperative Loop

To determine the specific inoperative loop:

OVHTDET switches.....A

Test switch..... OVHT/FIRE

If the FAULT light remains extinguished and both ENG OVERHEAT lights and engine fire warning switches illuminate, loop A is good.

If the FAULT light illuminates and one of the ENG OVERHEAT lights and corresponding engine fire warning switch remain extinguished, there is a fault in loop A of the detection system of that engine.

OVHTDET switches.....B

Test switch.....OVHT/FIRE

If the FAULT light remains extinguished and both ENG OVERHEAT lights and engine fire warning switches illuminate, loop B is good.

If the FAULT light illuminates and one of the ENG OVERHEAT lights and corresponding engine fire warning switch remain extinguished, there is a fault in loop B of the detection system of that engine.

OVHT DET switches.....As required
Select the good loop for each engine (NORMAL if both loops tested good).

Test switch.....OVHT/FIRE

If the test is successful, leave the fire panel in this configuration for flight.

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12.9 FLIGHT CONTROLS

12.9.1 Flight Controls check

This is a check of normal flight control functions and is not a complete check of the flight control system. Two people are required; both on interphone.

FLIGHT DECK ACTION	GROUND RESPONSE
Electrical power (APU or external) - On bus	
System A and B electric hydraulic pump switches - OFF	
Rudder trim – turn left. Verify left rudder pedals move forward.	
Rudder trim – turn right. Verify right rudder pedals move forward.	
Rudder trim – zero, pedals centered. CAUTION: If the rudder pedals are not centered, investigate the cause before applying any hydraulic power.	
Aileron trim - Turn left. Verify control wheel turns to left.	
Aileron trim - Turn right. Verify control wheel turns to right.	
Aileron trim – Zero.	
Control column – Forward.	"ELEVATOR DOWN, TABS UP"

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FLIGHT DECK ACTION	GROUND RESPONSE
Control column - Aft	"ELEVATOR UP. TABS DOWN"
Control column - Neutral	
Request hydraulic clearance	"CLEAR FOR HYDRAULIC PRESSURE, WING AND CONTROL AREAS CLEAR"
System A and B electric hydraulic pump switches – ON. Verify System A and B pressure indicators and brake pressure indicator read 2800 psi minimum.	
Parking brake - set	
Nose gear steering wheel - Hold Control wheel – Left Control column – Forward Rudder pedal - Left	"LEFT AILERON UP, TAB DOWN; LEFT FLIGHT SPOILERS UP; RIGHT AILERON DOWN, TAB UP; RUDDER LEFT; ELEVATORS DOWN, TABS UP"
Nose gear steering wheel - Hold Control wheel – Right Control column – Aft Rudder pedal - Right	"LEFT AILERON DOWN, TAB UP; RIGHT FLIGHT SPOILERS UP; RIGHT AILERON UP, TAB DOWN; RUDDER RIGHT; ELEVATORS UP, TABS DOWN"
Flight controls - Neutral	
Alternate flaps master switch - ARM	
Flap lever - Position 1 Verify no flap movement	
Alternate flaps position switch - hold DOWN until flap position indicator indicates 1	"FLAPS MOVING DOWN"

FLIGHT DECK ACTION	GROUND RESPONSE
Flap position indicator - flaps 1. Verify aft overhead leading edge devices annunciator panel indicates all green (FULL EXTEND) with no amber lights illuminated. Verify LE FLAPS TRANSIT light remains illuminated	"ALL LEADING EDGE DEVICES FULLY EXTENDED"
Alternate flaps master switch - OFF Verify Aft overhead leading edge devices annunciator panel indicates all leading edge flaps full extended and all leading edge slats in extend position Verify LE FLAPS EXT light illuminated	"LEADING EDGE FLAPS FULLY EXTENDED, ALL LEADING EDGE SLATS RETRACTED TO EXTEND POSITION"
Speed brake lever - UP	"ALL SPOILERS UP"
Speed brake lever - DOWN	"ALL SPOILERS DOWN"
Stabilizer trim switches - NOSE DOWN	"STABILIZER LEADING EDGE MOVING UP"
Stabilizer trim switches - NOSE UP	"STABILIZER LEADING EDGE MOVING DOWN"
With stabilizer still moving: Stabilizer trim cutout switches – CUTOUT. Verify trim motor stops.	

Rev.: NEW

FLIGHT DECK ACTION	GROUND RESPONSE
Stabilizer trim cutout switches – NORMAL. Verify trim motor resumes. Control column – Forward. Verify trim motor stops. Column actuated stab trim override – OVERRIDE. Verify trim motor resumes.	
Stabilizer trim switches - Trim into green band	
Column actuated stab trim override – NORMAL Switch guard - Close	
Request clearance to flaps 30	"FLAPS CLEAR"
Flap lever - Position 30	"FLAPS MOVING DOWN"
Flap lever - UP	"FLAPS MOVING UP"
Parking Brake - As desired Electrical power - As desired	

12.10 FLIGHT INSTRUMENTS

12.10.1 Altimeter Difference

Note: If flight in RVSM airspace is planned, use the RVSM table in the LIMITATIONS section.

This procedure is accomplished when there is a noticeable difference between the altimeters. Accomplish this procedure in stabilized level flight or on the ground.

Altimeters Set

The reference barometric setting for this check is field barometric pressure or standard barometric pressure (29.92 in Hg or 1013 mb) as appropriate.

Perform the following for all altimeters:

- First rotate the Baro Set knob clockwise to a higher barometric setting than the reference.
- Then rotate the Baro Set knob counterclockwise back to the reference barometric setting.

Altimeters Crosscheck

If in-flight difference between Captain and First Officer altitude display is more then 200 feet and it is not possible to identify which altimeter is indicating the correct altitude:

ATC Notify

Tech Log Complete

Complete Tech Log upon arrival if the difference between altimeters is more then in the table below.

ALTITUDE	ELEC/ELEC	ELEC/STBY
Sea level	50 feet	50 feet
5,000 feet	50 feet	80 feet
10,000 feet	60 feet	120 feet
15,000 feet	70 feet	see note
20,000 feet	80 feet	see note
25,000 feet	100 feet	see note

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30,000 feet	120 feet	see note
35,000 feet	140 feet	see note
40,000 feet	160 feet	see note

NOTE: Above 10,000 feet and .4 Mach, position error causes the tolerance to diverge rapidly and direct crosscheck becomes inconclusive. Between 10,000 feet and 29,000 feet, differences greater than 400 feet should be suspect and verified by ground maintenance checks. Between 29,000 feet and the maximum operating altitude, differences greater than 500 feet should be suspect and verified by ground maintenance checks.

12.11 FLIGHT MANAGEMENT, NAVIGATION

12.11.1 Transponder Test

Transponder switchTEST

Check that the FAIL light illuminates and PASS is displayed in the ATC code indicator.

Verify "TCAS SYSTEM TEST - OK" aural sounds.

Aural Alerts	Definition
"TCAS SYSTEM TEST FAIL"	Test failed. Maintenance required.
"TCAS SYSTEM TEST OK"	Test complete. System operable.

12.11.2 Weather Radar Test

EHSI mode selector Expanded scale mode except PLAN

TESTON

WXR (EHSI control panel) ON

Verify test pattern consists of the following colors:

- Green;
- Yellow;
- Red;
- Magenta.

Verify no fault messages are present.

12.11.3 IRS Fast Realignment

Prior to commencing this procedure the airplane must be parked and not moved until the procedure is completed and the ALIGN lights extinguished.

FMC/CDU POS INIT page Select

Enter the correct present position (PPOS) into the scratch pad. Use the most accurate PPOS available.

IRS mode selector ALIGN

Observe ALIGN light illuminates steadily.

FMC/CDU POS INIT pageSelect

Press line select key (LSK) 4R when box prompts appear. Confirm that the box prompts are replaced by the entered present position. If ALIGN light flashes then re-enter the same position into the scratch pad even if it is already displayed under the SET IRS POS line. Press LSK 4R. (Box prompts are not required for present position re-entry.)

IRS mode selector NAV

Observe ALIGN light extinguished within 30 seconds.
If ALIGN light continues to flash, then refer to the section on IRS ALIGN light flashing.

NOTE: If time permits it is preferable to perform a full alignment of the IRS. A more precise alignment will result.

If the mode selector is accidentally switched to OFF or ATT, position mode selector to OFF, wait for ALIGN light(s) to extinguish, then perform full alignment procedure.

12.11.4 IRS High Latitude Alignment

This procedure should be followed when aligning the IRS systems at latitudes greater than 70° 12.0 and less than 78° 15.0.

IRS mode selectors.....ALIGN

Position Initialization page Set

Enter present position on SET IRS POS line using the most accurate latitude and longitude available.

The IRS mode selectors must be in ALIGN for a minimum of 17 minutes.

IRS mode selectors..... NAV

12 .11.5 IRS Align Lights Flashing

When an ALIGN light is flashing, one or more of the following conditions exist:

- The IRS present position has not been entered;
- Position entry was attempted before the IRS's entered the ALIGN mode;
- The entered PPOS may not be within the required accuracy tolerance;
- The data entered on the CDU scratch pad may not have been received by the IRS.

CDU Message: ENTER IRS POSITION

CORRECTIVE ACTION: Check and re-enter the correct PPOS into the CDU Scratch Pad and again line select the "SET IRS POS" line (4R).

NOTE: Pressing Line Select Key 4R without first re-entering the PPOS into the Scratch Pad, will not send the displayed data to the IRS. Also, the PPOS data can be entered by overwriting the data currently displayed in the "SET IRS POS" line; Box prompts are not required.

If repeated attempts to enter the correct PPOS through the CDU are unsuccessful, enter the PPOS directly into the IRS Display Unit.

12.11.6 Special IRS Entries

12.11.6.1 Present Position Entry

IRS mode selectorNAV
ALIGN lights must be illuminated (steady or flashing).

IRS display selectorPPOS
LatitudeENTER

Key-in latitude in the data display, beginning with N or S, and then press the ENT Key (the Cue Lights extinguish).

LongitudeENTER

Key-in longitude in the data display, beginning with E or W, and then press the ENT key (the cue lights extinguish). Observe that proper latitude and longitude are displayed and that the ALIGN light is not flashing.

12.11.6.2 Heading (Update) Entry

NOTE: Due to IRS drift rate when in the ATT mode, periodic heading updates are required.

IRS mode selectorATT

If the FAULT light illuminates when in NAV, select ATT. If the FAULT and ALIGN lights are extinguished after 30 seconds in ATT, then attitude and heading are available (initial magnetic heading must be entered in order to have heading information).

|12.11.6.3 Heading - Enter Through CDU

FMC/CDU POS INIT pageSelect

Enter the correct heading into the CDU scratch pad then press line select key 5R. Verify entered heading appears on line 5R. Select HDG on the IRS display selector and verify that the entered heading is displayed on the ISDU, RDML's and HSL's.

|12.11.6.4 Heading - Enter Through ISDU

IRS display selectorHDG

Press the H key to initiate a heading entry.

Key-in present magnetic heading. Press the ENT key (the cue lights extinguish). Observe proper heading displayed on the RDML's and HSL's.

12.11.7 Inadvertent Selection of Attitude Mode (while on the ground)

Inadvertent selection of the attitude mode may be due to physically overpowering the switch during turn-on, or the result of a faulty switch where the flight crew cannot accurately determine which mode is selected. If the ATT position is selected inadvertently when switching to NAV, the IRS must be turned off, and after the ALIGN lights extinguish, a full alignment must be initiated.

12.11.8 FMC Navigation Check

If the IRS NAV ONLY, VERIFY POSITION or UNABLE REQUIRED NAV PERFORMANCE - RNP message is displayed in the CDU scratch pad, or course deviation is suspected, accomplish the following as necessary to ensure navigation accuracy:

- Ensure that one VOR is operating in the AUTO tuning mode so that the FMC can update its position if nav aids are available.
- Check the NAV STATUS page to ensure that radio updating is occurring. In some cases, it may be necessary to switch both VOR's to the AUTO mode to achieve radio updating.
- Determine the actual airplane position using raw data from the VHF navigation or ADF radios and compare that position with the FMC position. (Use the FIX page.)

If radio nav aids are unavailable, compare the FMC position with the IRS positions using the POS REF page of the FMC CDU. If the two IRS

positions are in agreement and the FMC position is significantly different, the FMC position is probably unreliable. The POS SHIFT page may be used to shift the FMC position to one of the IRS positions. This is accomplished by line selecting the IRS or radio position and then pressing the EXEC Key.

Confirm actual position with ATC radar or visual reference points if available.

Navigate using the most accurate information available. The possibilities are:

- LNAV (continue to monitor FMC position using VOR/ADF raw data displays on the non-flying pilot's EHSI).

CAUTION: Navigating in the LNAV mode with an unreliable FMC position may result in significant navigation errors.

- Conventional VOR/ADF procedures.
- Radar vectors from ATC.
- Dead reckoning from last known position.
- Use of visual references.

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12.12 FUEL

12.12.1 Fuel Balancing

Maintain main tank No. 1 and No. 2 fuel balance within limitations. Random fuel imbalance must not exceed 453 kg for taxi, takeoff, flight or landing.

NOTE: Fuel pump pressure should be supplied to the engines at all times. Above 30,000 feet, without fuel pump pressure, thrust deterioration or engine flameout may occur.

If the center tank contains fuel:

Center tank fuel pump switchesOFF

Crossfeed selector Open

Fuel pump switches (low tank).....OFF

When quantities are balanced:

Fuel pump switches (main tank)ON

Center tank fuel pump switchesON

Crossfeed selector Close

If the center tank contains no fuel:

Crossfeed selector Open

Fuel pump switches (low tank).....OFF

When quantities are balanced:

Fuel pump switchesON

Crossfeed selector Close

12.12.2 Refuelling

12.12.2.1 Fuel Load Distribution

Main tanks No. 1 and No. 2 should normally be serviced equally until full. Additional fuel is loaded into the center tank until the desired fuel load is reached.

NOTE: Main tanks No. 1 and No. 2 must be scheduled to be full if the center tank contains more than 453 kilograms of fuel.

With less than 453 kilograms of center tank fuel, partial main tank fuel may be loaded provided the effects of balance have been considered.

12.12.2.2 Fuel Pressure

Apply from a truck or fuel pit. A nozzle pressure of 50 psi provides approximately 1136 liters per minute.

12.12.2.3 Normal Refueling

When a full fuel load is required, the fuel shutoff system closes the fueling valves automatically when the tanks are full. When a partial fuel load is required, the fuel quantity indicators are monitored and the fueling valves are closed by manually positioning the fueling valve switches to CLOSED when the desired fuel quantity is aboard the airplane.

12.12.2.4 Refueling with Battery Only

When the APU is inoperative and no external power source is available, refueling can be accomplished as follows:

Battery switch ON

Standby power switch..... BAT

The battery operates the entire fueling system normally, including the gages and fuel shutoff system. The only limitation during this type of operation is the battery life.

12.12.2.5 Refueling with No AC or DC Power Source Available

When it becomes necessary to refuel with the APU inoperative, the aircraft battery depleted, and no external power source available, refueling can still be accomplished:

Fueling hose nozzleAttached to the refueling receptacle

Fueling valves..... Open for the tanks to be refueled

NOTE: Main tanks No. 1 and No. 2, and the center tank refueling valves each have a red override button that must be pressed and held while fuel is being pumped into the tank. Releasing the override button allows the spring in the valve to close the valve.

Caution must be observed not to overfill a tank, since there is no automatic fuel shutoff during manual operation. When the desired amount of fuel has been pumped into the tanks, the refueling valves for the respective tanks can be released. Main tanks No. 1 and No. 2 may also be refueled through filler ports over the wing. It is not possible to refuel the center tank externally.

12.12.3 Refuelling with One Engine Running

An inoperative APU and lack of suitable ground starting equipment could present a situation in which no other practical alternative is available for dispatch of the airplane than to refuel with an engine running.

If a B-737 is to be fueled with an engine running, several factors should be considered in addition to those precautions used in normal fueling operations. Consideration should be given to any factor, which might result in fuel or fuel vapors coming in contact with a source of ignition. Possible ignition sources include an operating jet engine, operating ground equipment, hot brakes or even a recently shut down engine.

To minimize the probability of fuel spillage, pressure fueling shall be used. Use of reduced fueling pressures will minimize the probability of a ruptured fueling hose or connection, which could direct a stream or spray of fuel toward an ignition source. Fuelling to a level less than full tank capacity as a precaution against over-filling and fuel spillage, is recommended and a must if the automatic fuel shut off is unserviceable.

Qualified flight crew and/or maintenance personnel must be present on the flight deck at all times an engine is operating.

The airport authorities shall be informed and the airport fire brigade shall be present during fueling.

Passengers are not allowed on board during fueling.

Because of the location of the pressure fueling station, the No. 2 engine should not be operated during fueling, this might necessitate alternating between running engine No. 2, No. 1 and No. 2 for respectively deplaning fueling and boarding the passengers.

12.12.4 Ground Transfer of Fuel

General

Fuel can be transferred from one tank to another by using the appropriate fuel pumps and crossfeed valve in the cockpit as well as wing located defueling valve and fueling valves on the fuelling panel. Prerequisites:

- 1) AC power shall be available;
- 2) All fuel system circuit breakers on the P6 panel shall be closed.
- 3) One person shall be in the cockpit to monitor the fuel quantity, fuel pumps operation and low pressure indication in the applicable tank.

WARNING: To avoid fuel vapors ignition and or explosion immediately set the applicable fuel pump switch (es) to OFF when:

- LOW PRESSURE light comes on and stays on;
- Fuel quantity for that fuel tank does not decrease.

Fuel transfer from tank N1 to tank N2 or to CENTER tank

N1 tank fuel pump switches ON
Crossfeed selectorOPEN
Open the refueling panel and defuelling panel access
Manual defuelling valveOPEN
N2 or CENTER tank fueling valve switchOPEN

The N2 or CENTER tank fuel quantity indicators show an increase in fuel.
The N1 tank indicator shows a decrease in fuel.

When the required amount of fuel has been transferred, the switch is closed at the fueling panel.

N2 or CENTER tank fueling valve switchCLOSE
Manual defuelling valve (right wing)CLOSE
Close the refueling panel and defuelling panel access
Crossfeed selector CLOSE
N1 tank fuel pump switchesOFF

Fuel transfer from tank N2 to tank N1 or to CENTER tank

Procedure is identical to the procedure written above.

12.12.5 Refuelling with Fuel Gauge Malfunction

Floatstick Set desired quantity
Slide floatstick until desired quantity is level with lower wing skin.

Fuel..... Load
Load fuel until floatstick begins to move up.

Fuel quantity Recheck after 5 minutes

Floatstick Stow

12.12.6 Defuelling

Defuelling can be accomplished by using appropriate fuel pumps, the defuelling valve and the crossfeed valve.

NOTE: Electrical AC power must be available.

Fuel Hose Attach to receptacle

Manual defueling valve Open

Crossfeed Selector Open

Appropriate FUEL PUMP switch (es) ON

Defueling valve Monitor

When remaining quantity is correct:

Appropriate FUEL PUMP switch (es) OFF

Manual defueling valve Closed

Crossfeed selector Close

Fuel Hose Remove from receptacle

Refueling access door Close

12.12.7 Fuel Crossfeed Valve Check

Crossfeed selector Open
Verify Crossfeed VALVE OPEN light illuminates bright and then dim.

Crossfeed selector Close
Verify Crossfeed VALVE OPEN light illuminates bright and then extinguishes.

12.12.8 Fuel Quantity Indicators Test

NOTE: With a fuel quantity indicator inoperative, a zero fuel quantity input will be sent to the fuel summation unit causing a possible FMC gross weight error.

Fuel quantity test switch Push and hold
Hold until the fuel quantity indicators drive to zero and "ERR 0" is displayed.

NOTE: Do not push the QTY TEST switch when the airplane is being fueled. This will cause inaccurate indications at the external fueling panel.

Fuel quantity test switch Release

Releasing the test switch initiates a self-test. The fuel quantity indicators display:

- "ERR 4" for approximately two seconds (early versions of indicators.)
- All segments for two seconds
- Blank for two seconds
- Stored error codes (if any) for two seconds each
- Indicator full scale value for up to two seconds
- Actual fuel quantity.

12.13 HYDRAULICS

No procedures exist.

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12.14 LANDING GEAR

12.14.1 Brake Cooling

If the BRAKE TEMPERATURE light has illuminated, consult the Brake Cooling schedule found in QRH section PI “Advisory Information”. Verify tire inflation visually, after the brakes have cooled, to determine the condition of the wheel fuse plug.

12.14.2 Brake Temperature System Check

- Brake temperature test switch Push and hold
Hold until all brake temperature indicator pointers show greater than 5 units. Check that the BRAKE TEMP light illuminates when any of the pointer first exceed 5 units.
- Brake temperature test switch Release
All brake temperature indicator pointers should return to the original setting. Check that the BRAKE TEMP light extinguishes when the last of the brake temperature indicator pointers decrease below 4 units.

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12.15 WARNING SYSTEMS

No procedures exist.

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