

LEGACY

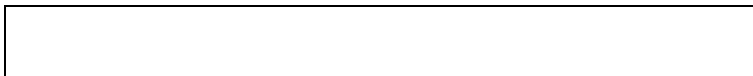


AIRPLANE FLIGHT MANUAL

EMPRESA BRASILEIRA DE AERONÁUTICA S.A.

This manual is applicable to the EMB-135BJ airplanes all models equipped with AE3007A1E engines, operating under FAA certification.

NOTE: THE EMB-135BJ MODEL HAS THE COMMERCIAL DESIGNATION OF LEGACY.



AFM-135/1540
October 23, 2002



AIRPLANE FLIGHT MANUAL

GENERAL

SECTION 1

GENERAL

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INTRODUCTION

This Airplane Flight Manual (AFM) meets the certification requirements of FAR 25 and provides the approved information necessary to safely operate the EMB-135BJ Legacy.

For additional information, please contact:

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REVISIONS

EMBRAER may revise this manual periodically as required to update information or provide information not available at the time of printing. Revised data may result from EMBRAER approved airplane modifications or from improved techniques gained through operational experience. Changes to the text are indicated by a vertical line in the outside margin of the page.

Relocated or rearranged text or illustrations will be indicated by a vertical line adjacent to the page number.

A Log of Revisions is placed at the beginning of this Manual.

The basic issue date of this Manual is presented on the title page. The revisions to the basic Manual will be numbered sequentially (Rev. 1, 2, 3 etc...). This also applies to pages revised by an earlier revision.

TEMPORARY REVISIONS

Temporary revisions may be issued when the need arises. The temporary revision will be clearly identified and will be replaced as soon as possible. Temporary revisions will not be included in the List of Effective Pages nor in the Log of Revisions.

LIST OF EFFECTIVE PAGES

A List of Effective Pages for all the sections is located at the beginning of this Manual. This list presents the issuance date of each page and it is revised with the Manual. Its purpose is to verify that the Manual is current.

ORGANIZATION

This Airplane Flight Manual is divided into seven Sections, as follows:

- Section 1 - General
- Section 2 - Limitations
- Section 3 - Emergency and Abnormal Procedures
- Section 4 - Normal Procedures
- Section 5 - Performance
- Supplements
- Appendices

The Sections and their use are explained below.

SECTION 1 - GENERAL

This Section contains general information pertaining to the Manual, such as the revision rules, its organization and a definition of terms.

SECTION 2 - LIMITATIONS

This Section contains airworthiness certification limitations. The limitations restrict airplane operation in accordance with the airworthiness certificate.



SECTION 3 - EMERGENCY AND ABNORMAL PROCEDURES

This Section contains the recommended actions in the event of failures.

SECTION 4 - NORMAL PROCEDURES

This Section contains the specific EMB-135BJ LEGACY normal procedures to be followed in a normal day-by-day operation.

SECTION 5 - PERFORMANCE

This section contains performance data for enroute, landing and go-around phases.

SUPPLEMENTS

Supplements are incorporated into the AFM. They provide the required information for the airplane operation, related to a specific engine installation or when optional systems and equipment not provided with the standard airplane are also installed. They may be incorporated when a specific operational information is applicable to the airplane as well (e.g. ferry flights, special operation etc...). Supplements may modify or complement the limitations, procedures or performance data of the basic AFM.

APPENDICES

Appendices may be incorporated in the AFM to provide additional information for the operation of the airplane, in a format that may not be the same as the basic AFM.

DEFINITION OF TERMS

The following definitions apply to the terms below:

WARNING: OPERATING PROCEDURES, TECHNIQUES AND OTHER RELATED INFORMATION WHICH MAY RESULT IN PERSONAL INJURY OR LOSS OF LIFE, IF NOT FOLLOWED.

CAUTION: OPERATING PROCEDURES, TECHNIQUES AND OTHER RELATED INFORMATION WHICH MAY RESULT IN DAMAGE OR DESTRUCTION OF EQUIPMENT, IF NOT FOLLOWED.

NOTE: Operating procedures, techniques and other related information which are considered essential to emphasize.

ABBREVIATIONS AND ACRONYMS USED

ABBREVIATIONS OR ACRONYMS	MEANING
°C	Degree Celsius
°F	Degree Fahrenheit
ft	Feet
g	Gravity Acceleration
h	Hour
Hz	Hertz
in.Hg	Inches of Mercury
kg	Kilogram
km	Kilometer
kt	Knot
lb	Pounds
m	Meter
mb	Milibar
min	Minute
mm	Milimeter
nm	Nautical Mile
pph	Pounds per Hour
psi	Pound per Square Inch
sec	Second
ΔGust	Increase in airspeed due to gust.
A	Ampere
AC	Alternating Current
ACOC	Air Cooled Oil Cooler
ADC	Air Data Computer
ADF	Automatic Direction Finder
AFM	Airplane Flight Manual
AGL	Above Ground Level
AHC	Attitude and Heading Computer
AHRS	Attitude and Heading Reference System
Ail	Aileron
ALC	APU Line Contactor
ALT	Altitude
ALTN	Alternate
AOA	Angle of Attack
AP	Autopilot

ABBREVIATIONS OR ACCRONYMS	MEANING
APU	Auxiliary Power Unit
ATC	Air Traffic Control
ATS	Air Turbine Starter
ATT	Attitude
ATTCS	Automatic Takeoff Thrust Control System
AUX	Auxiliary
AWU	Aural Warning Unit
BC	Battery Contactor
BCU	Brake Control Unit
BIT	Built In Test
CDL	Configuration Deviation List
CG	Center of Gravity
CMC	Central Maintenance Computer
COMM	Communication
CON	Continuous
CPAM	Cabin Pressure Acquisition Module
CR	Cruise
CRZ	Cruise
CVR	Cockpit Voice Recorder
DAU	Data Acquisition Unit
DC	Direct Current, Digital Controller
DFDR	Digital Flight Data Recorder
DH	Decision Height
DME	Distance Measurement Equipment
EADI	Electronic Attitude Director Indicator
EFIS	Electronic Flight Instrument System
EGT	Exhaust Gas Temperature
EHSI	Electronic Horizontal Situation Indicator
EICAS	Engine Indication and Crew Alerting System
ELT	Emergency Locator Transmitter
FADEC	Full Authority Digital Electronic Control
FAR	Federal Aviation Regulation
FCOC	Fuel Cooled Oil Cooler
FDRS	Flight Data Recorder System
FMS	Flight Management System
G/S, GS	Glide Slope
GI	Ground Idle
GMT	Greenwich Mean Time
GPS	Global Positioning System

ABBREVIATIONS OR ACCRONYMS	MEANING
GPWS	Ground Proximity Warning System
HDG	Heading
HF	High Frequency
HGS	Head-up Guidance System
IAC	Instrução de Aviação Civil
IAS	Indicated Airspeed
IC	Integrated Computer
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IPS	Inches Per Second
IRS	Inertial Reference System
IRU	Inertial Reference Unit
ISA	International Standard Atmosphere
ITT	Interturbine Temperature
KCAS	Calibrated Airspeed in Knots
KEAS	Equivalent Airspeed in Knots
Khz	Kilohertz
KIAS	Indicated Airspeed in Knots
LOC	Localizer
M	Mach
MAC	Mean Aerodynamic Chord
MAN	Manual
MAX	Maximum
MB	Marker Beacon
MEA	Minimum Enroute Altitude
MFD	Multifunction Display
Mhz	Megahertz
MIN	Minimum
MMEL	Master Minimum Equipment List
M _{MO}	Maximum Operating Mach
MSU	Mode Select Unit
NAV	Navigation
NPRM	Notice of Proposed Rule Making
PAX	Passenger
PBE	Protective Breathing Equipment
PC	Personal Computer
PFD	Primary Flight Display
PMA	Permanent Magnet Alternator

ABBREVIATIONS OR ACCRONYMS	MEANING
RA	Radio Altimeter
RMI	Radio Magnetic Indicator
RMU	Radio Management Unit
RPM	Revolution Per Minute
RVR	Runway Visual Range
SAT	Static Air Temperature
SL	Sea Level
SPS	Stall Protection System
STAB	Stabilizer
TAS	True Airspeed
TAT	Total Air Temperature
TCAS	Traffic and Collision Avoidance System
TDR	Transponder
TLA	Thrust Lever Angle
V	Volt
V ₁	Decision Speed
V ₂	Takeoff Safety Speed
VA	Volt-Ampere
V _A	Design Maneuvering Speed
V _{EF}	Critical Engine Failure Speed
V _{FE}	Maximum Flaps Extended Speed
VFR	Visual Flight Rules
VHF	Very High Frequency
V _{LE}	Maximum Landing Gear Extended Speed
VLF	Very Low Frequency
V _{LO}	Maximum Landing Gear Operating Speed
V _{LOF}	Lift Off Speed
VLV	Valve
V _{MCA}	Air Minimum Control Speed
V _{MCG}	Ground Minimum Control Speed
V _{MO}	Maximum Operating Speed
VOR	VHF Omnidirectional Range
V _R	Rotation Speed
V _{REF}	Landing Reference Speed
V _{REF XX}	Landing Reference Speed associated to the flap setting XX



ABBREVIATIONS OR ACCRONYMS	MEANING
VS V _{SR} WB	Vertical Speed Reference Stall Speed Weight and Balance

SERVICE BULLETIN TABLE

SB	SUBJECT
SB 145LEG-00-0007	Reconfiguration for 41000 ft Operational Ceiling
SB 145LEG-21-0007	Installation of the Ozone Converters
SB 145LEG-27-0010	Replacement of the Stall Protection Computer
SB 145LEG-28-0010	Increase in the Capacity of the Forward Auxiliary Fuel Tanks
SB 145LEG-34-0007	New Air Data Computer (ADC)
SB 145LEG-73-0003	Incorporates FADEC B7.6 Version on AE3007A1P
SB 145LEG-73-0004	Incorporates FADEC B7.6 Version on AE3007A1E
SB 145LEG-73-0005	Incorporates FADEC B8.0 Version on AE3007A1P
SB 145LEG-73-0006	Incorporates FADEC B8.0 Version on AE3007A1E

**AIRPLANE
FLIGHT
MANUAL**



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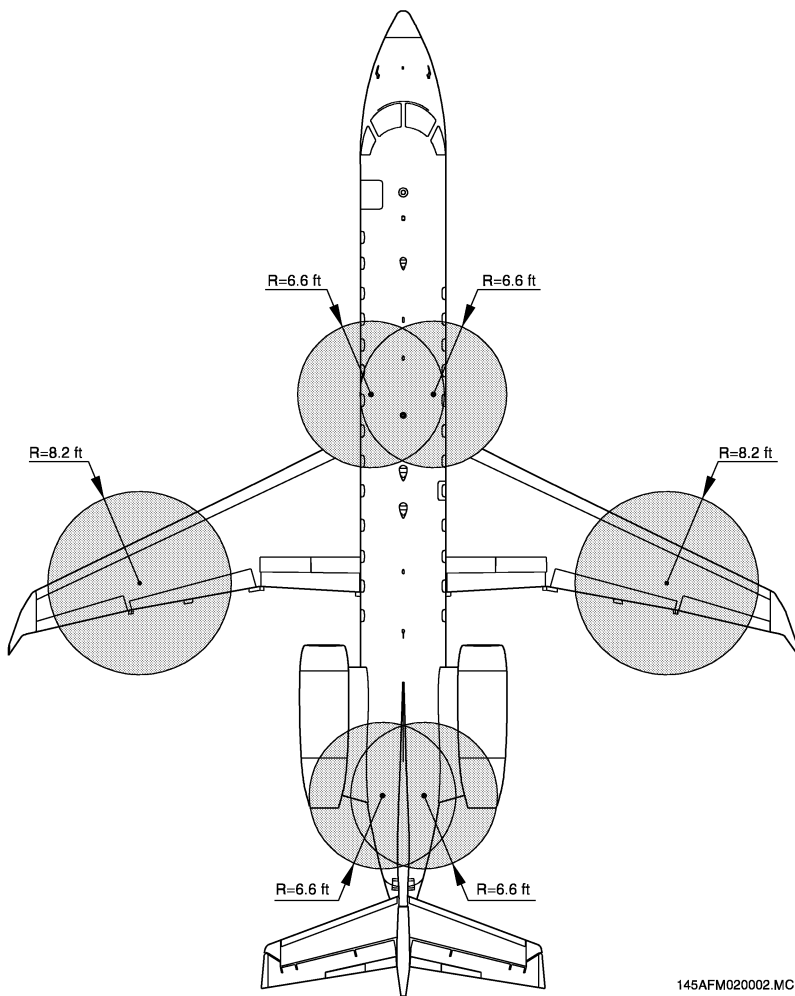
LIMITATIONS

INTRODUCTION

This airplane must be operated in accordance with the limitations presented in this Section. These limitations also apply to operations in accordance with an approved Supplement or Appendix to this AFM, except as altered by such Supplement or Appendix.

OPERATIONAL LIMITATIONS

This airplane may not be operated after June 30, 2004, unless the pressure refueling panel has been modified in accordance with the terms of Exemption No. 7909.



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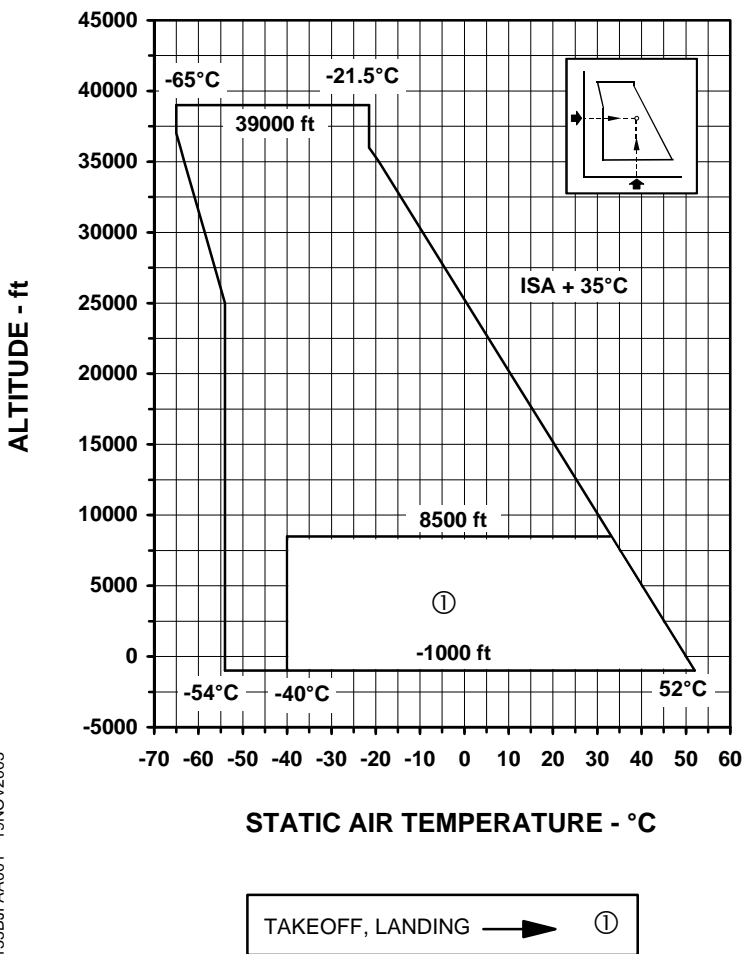
CAUTION: DURING REFUELING OPERATION KEEP THE SHADOW AREAS IN THE FIGURE FREE OF VEHICLE AND EQUIPMENT.

CTA APPROVED
OCTOBER 23, 2002

AFM-135/1540 - FAA

OPERATIONAL ENVELOPE

AIRPLANES PRE-MOD. SB 145LEG-00-0007

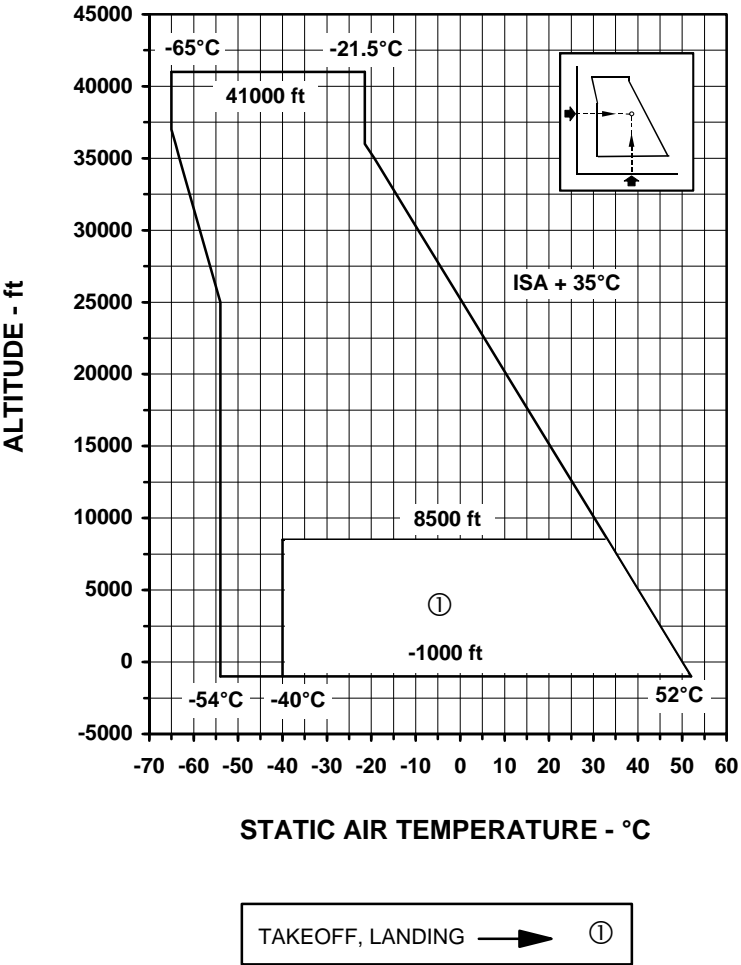


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NOTE: - In the event of a landing -40°C, the airplane may not takeoff without further maintenance inspection.
- Minimum Total Air Temperature above 25000 ft is -45°C.



AIRPLANES POST-MOD. SB 145LEG-00-0007 OR EQUIPPED WITH AN EQUIVALENT MODIFICATION FACTORY INCORPORATED



NOTE: - In the event of a landing below -40°C, the airplane may not takeoff without further maintenance inspection.
- Minimum Total Air Temperature above 25000 ft is -45°C.

WEIGHT

AIRPLANE MODEL	MAXIMUM WEIGHT (lb)			
	Max. Ramp Weight (MRW)	Max. Takeoff Weight (MTOW)	Max. Landing Weight (MLW)	Max. Zero Fuel Weight (MZFW)
S/N up to 591 and Pre-Mod. SB 145LEG-28-0010	49096	48942	40786	35274
S/N 625 and on or Post-Mod. SB 145LEG-28-0010	49758	49604	40786	35274

To comply with the performance and operating limitations of the regulations, the maximum allowable takeoff and landing operational weights may be equal to, but not greater than design limits.

The takeoff weight (weight at brake release or at start of takeoff run) is the lowest among MTOW and the following weights, presented in the applicable engine supplement:

- Maximum takeoff weight for altitude and temperature determined from Maximum Takeoff Weight - Climb Limited chart.
- Maximum takeoff weight, as limited by runway length and determined from Maximum Takeoff Weight - Field Length Limited chart.
- Maximum takeoff weight, as limited by brake energy and determined from Maximum Takeoff Weight - Brake Energy Limited chart.
- Maximum takeoff weight, as limited by obstacle clearance, enroute, and landing operating requirements.

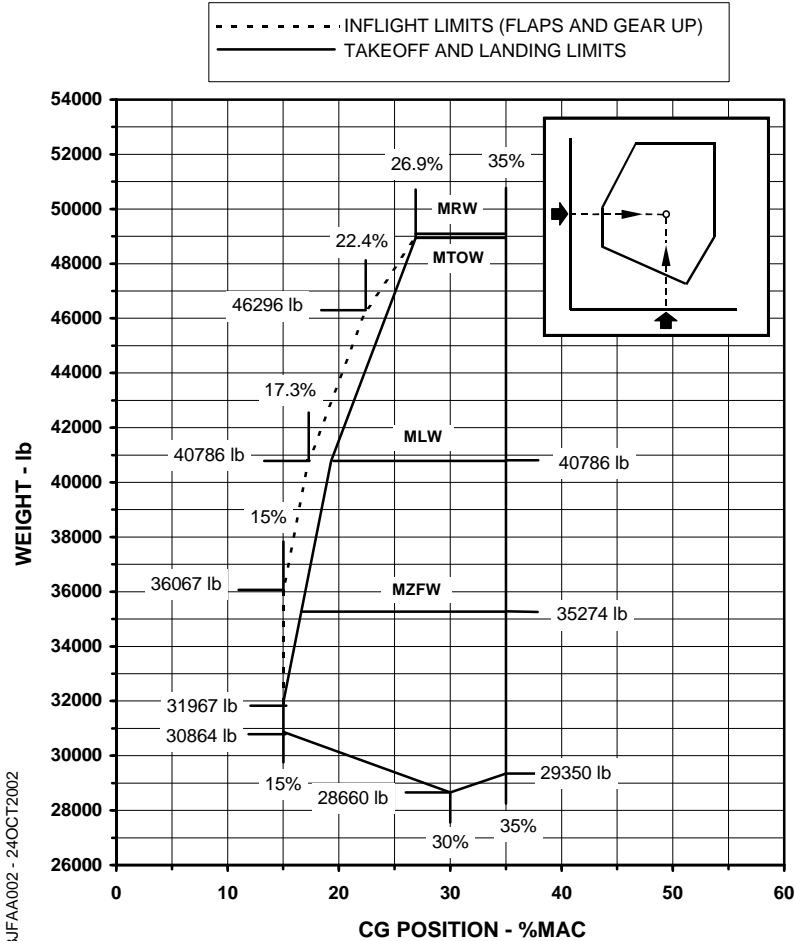
The landing weight is the lowest among MLW and the following weights, presented in the applicable engine supplement:

- Maximum approach and landing weight for altitude and temperature determined from Maximum Landing Weight - Climb Limited charts.
- Maximum landing weight, as limited by runway length and determined from Maximum Landing Weight - Field Length Limited chart.



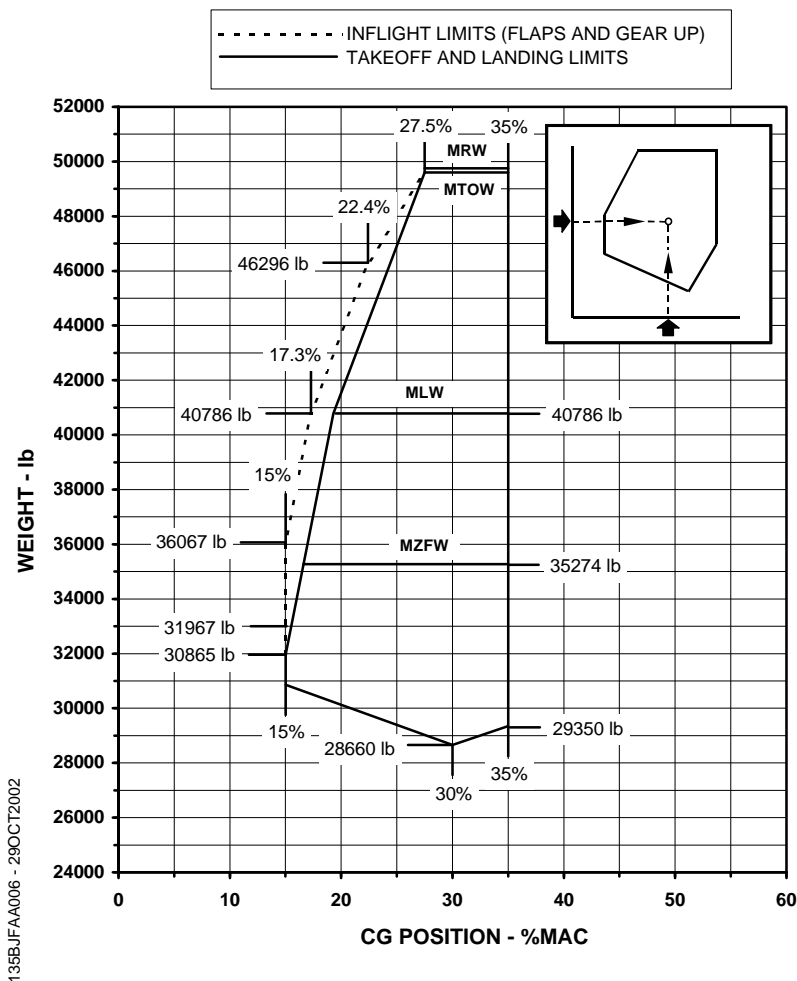
CENTER OF GRAVITY ENVELOPE

EMB-135BJ S/N UP TO 591 AND PRE-MOD. SB 145LEG-28-0010
(TAKEOFF WITH FLAPS 9°)



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**EMB-135BJ S/N 625 AND ON OR POST-MOD. SB 145LEG-28-0010
(TAKEOFF WITH FLAPS 9°)**





LOADING

The airplane must be loaded in accordance with the information contained in the Weight and Balance Manual (WB-135/1562).

NOTE: The RH side mid-cabin divider must not be installed if the closest divan seat position to the divider is occupied for taxi, takeoff and landing.

AIRSPEEDS

LANDING GEAR OPERATION/EXTENDED SPEED (V_{LO} AND V_{LE})

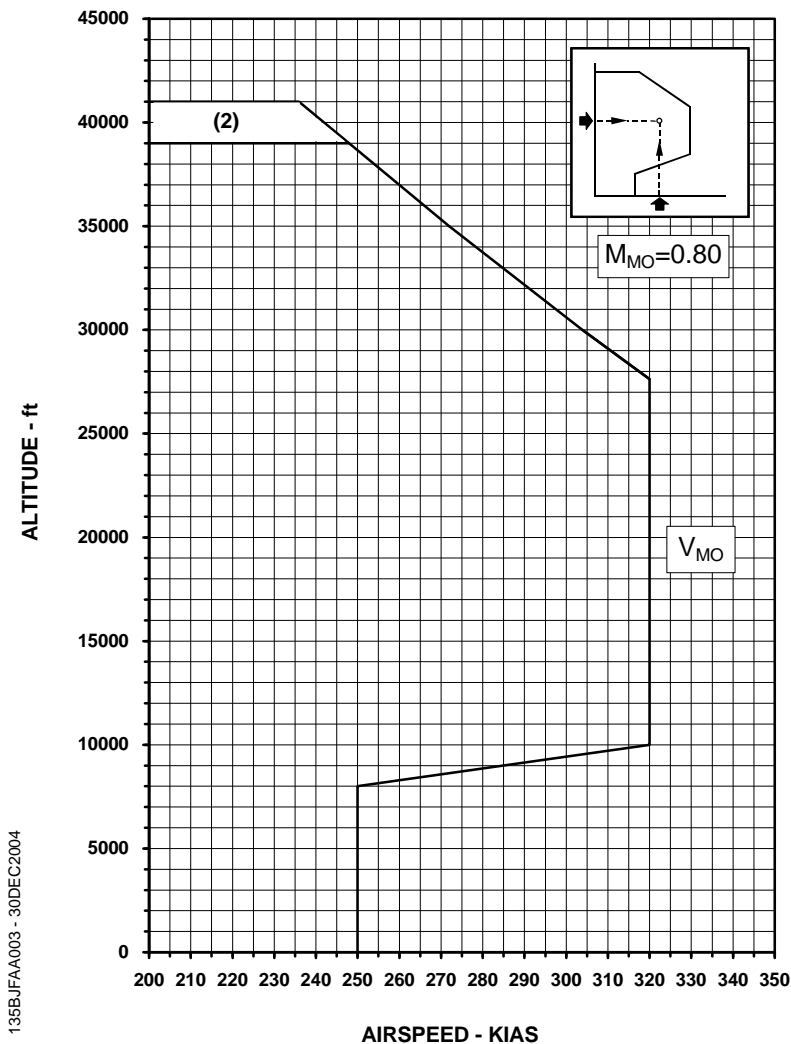
V_{LO} for retraction	200 KIAS
V_{LO} for extension.....	250 KIAS
V_{LE}	250 KIAS

- NOTE:** - V_{LO} is the maximum speed at which the landing gear can be safely extended and retracted.
- V_{LE} is the maximum speed at which the airplane can be safely flown with the landing gear extended and locked.

MINIMUM CONTROL SPEED

Refer to the applicable engine supplement associated with the takeoff flaps for V_{MCA} , V_{MCG} and V_{MCL} values.

MAXIMUM OPERATING SPEED (1)



NOTE: 1) The V_{MO}/M_{MO} may not be deliberately exceeded in any regime of flight (climb, cruise or descent).

2) Only applicable to airplanes Post-Mod. SB 145LEG-00-0007 or equipped with an equivalent modification factory incorporated.



MANEUVERING SPEED (V_A)

V_A200 KIAS

NOTE: Maneuvers that involve angle of attack near the stall or full application of rudder, elevator, and aileron controls should be confined to speeds below V_A. In addition, the maneuvering flight load factor limits, presented in this Section, should not be exceeded.

MAXIMUM FLAP EXTENDED SPEED (V_{FE})

Flaps 9°250 KIAS
Flaps 22°200 KIAS
Flaps 22° (In icing conditions and
yaw damper disengaged)180 KIAS
Flaps 45°145 KIAS

TAILWIND

Maximum Takeoff and Landing Tailwind Component...10 kt

KINDS OF OPERATION

This airplane may be flown day and night in the following conditions, when the appropriate equipment and instruments required by airworthiness and operating regulations are approved, installed and in an operable condition:

- Visual (VFR);
- Instrument (IFR);
- Icing conditions.

MINIMUM CREW

Minimum Flight Crew.....PILOT AND
COPILOT

MANEUVERING FLIGHT LOAD FACTORS

These corresponding accelerations limit the bank angle during turns and limit the pull-up maneuvers.

LOAD FACTOR LIMIT	FLAPS UP	FLAPS DOWN (9°, 22° and 45°)
Positive	2.51 g	2.00 g
Negative	-1.00 g	0 g

RUNWAY

Runway Slope -2% TO +2%
Runway Surface Type PAVED

FUEL

USABLE FUEL

EMB-135BJ S/N UP TO 591 AND PRE-MOD. SB 145LEG-28-0010

TANK		USABLE FUEL	TOTAL
WING TANK		844.9 US Gal (5703.4 lb)	1689.64 US Gal (11406.76 lb)
FUS 1 (Left side)	FWD 1	279 US Gal limited to 1764 lb	496 US Gal limited to 3219 lb
	AFT 1	217 US Gal limited to 1455 lb	
FUS 1 (Right side)	FWD 2	279 US Gal limited to 1764 lb	496 US Gal limited to 3219 lb
	AFT 2	217 US Gal limited to 1455 lb	

EMB-135BJ S/N 625 AND ON OR POST-MOD. SB 145LEG-28-0010

TANK		USABLE FUEL	TOTAL
WING TANK		844.9 US Gal (5703.4 lb)	1689.64 US Gal (11406.76 lb)
FUS 1 (Left side)	FWD 1	294 US Gal limited to 1984 lb	511 US Gal limited to 3461 lb
	AFT 1	217 US Gal limited to 1477 lb	
FUS 2 (Right side)	FWD 2	294 US Gal limited to 1984 lb	511 US Gal limited to 3461 lb
	AFT 2	217 US Gal limited to 1477 lb	



UNUSABLE FUEL

TANK		UNUSABLE FUEL	TOTAL
WING TANK (All electric fuel pumps operating)		5.8 US Gal (39 lb)	11.6 US Gal (78 lb)
WING TANK (Any electric fuel pump inoperative)		Up to 54 US Gal (364.5 lb)	Up to 108 US Gal (729 lb)
FUS 1 (Left side)	FWD 1	3.6 US Gal (24 lb)	8.2 US Gal (55 lb)
	AFT 1	4.6 US Gal (31 lb)	
FUS 2 (Right side)	FWD 2	3.6 US Gal (24 lb)	8.2 US Gal (55 lb)
	AFT 2	4.6 US Gal (31 lb)	

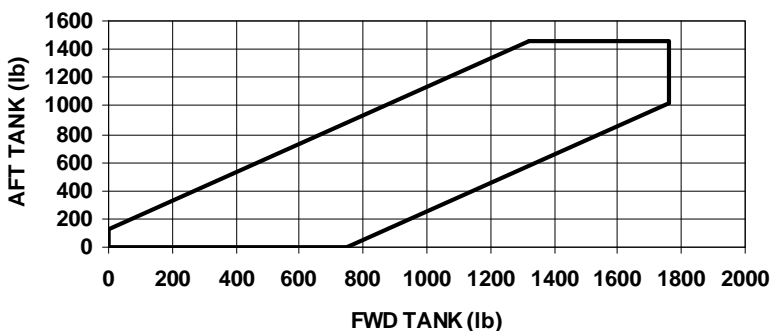
- NOTE:** - When the EICAS fuel quantity is zero in level flight, any fuel remaining in the tanks can not be used safely in flight.
- The unusable fuel values above have been determined for an adopted fuel density of 6.751 lb/US Gal.
 - When performing pressure refueling, the usable fuel quantity in each tank may be reduced by 13.2 US Gal maximum.

FUEL TANKS MAXIMUM PERMITTED IMBALANCE

The maximum permitted imbalance between the wing tanks is 800 lb. For the maximum permitted imbalance between the FWD tank and AFT tank of each system, see the following load charts applicable to your airplane:

AIRPLANES S/N UP TO 591 AND PRE-MOD. SB 145LEG-28-0010

FUSELAGE TANKS LOAD CHART I

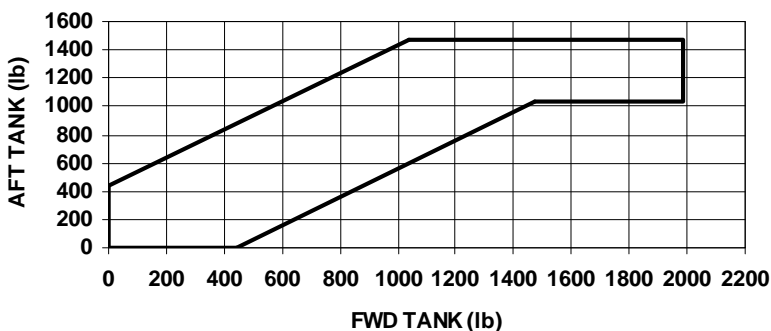


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NOTE: The fuselage tanks fuel load must be within the closed area of the chart.

AIRPLANES S/N 625 AND ON OR POST-MOD. SB 145LEG-28-0010

FUSELAGE TANKS LOAD CHART II



135B J AOM112002B - 18SEP 2003

NOTE: The fuselage tanks fuel load must be within the closed area of the chart.



FUEL SPECIFICATION

Brazilian Specification	QAV1
ASTM Specification	D1655-JET A AND JET A-1
American Specification	MIL-T-83133A- JP8

FUEL TANK TEMPERATURE

Minimum	-40°C
Maximum	52°C

NOTE: If fuel does not contain an icing inhibitor, the temperature of fuel leaving FCOC must be above 4°C (refer to FUEL LOW TEMPERATURE Procedure).

AUXILIARY POWER UNIT

OPERATIONAL LIMITS

APU Model	T-62T-40C14	
PARAMETER	MIN	MAX
ALTITUDE FOR START	-	30000 ft
OPERATION ALTITUDE	-	39000 ft (3)
ROTOR SPEED	-	108% (1)
EGT:	-	-
START	-	884°C
CONTINUOUS	-	680°C (2)

- NOTE:** 1) The APU will be automatically shut down at 104% rotor speed.
- 2) The APU EGT may be exceeded up to 717°C for 5 minutes maximum.
- 3) Above 37000 ft APU bleed usage is not allowed.
- 4) Minimum battery temperature for APU start is -20°C.

APU STARTER LIMITS

Cooling period between each starting attempt:

Between Three Consecutive Attempts..... 1 MINUTE OFF

Between Two Series of

Three Consecutive Attempts 30 MINUTES OFF



POWER PLANT

OPERATIONAL LIMITS

Refer to the applicable Supplement.

STARTER LIMITS

Dry Motoring Continuous Operation	5 MINUTES ON, 20 MINUTES OFF
Starting Cycle:	
First to Fourth Cycles	1 MINUTE ON, 1 MINUTE OFF
Fifth Cycle	1 MINUTE ON, 20 MINUTES OFF

AUTOMATIC TAKEOFF THRUST CONTROL SYSTEM (ATTCS)

ATTCS must be operative to select ALT T/O-1, T/O or E T/O modes. Airplanes equipped with EICAS 18.5 or previous versions must perform a Thrust Assurance Check at least once a week by selecting T/O RSV mode (pushing Thrust Levers toward MAX) and checking engine parameters. Airplanes equipped with EICAS 19 or later approved versions do not require the Thrust Assurance Check.

THRUST REVERSER

Thrust reversers are intended for use during rejected takeoff or landing only. Do not attempt a go-around procedure after deployment of the thrust reversers following a landing.

ENGINE WARM-UP

Prior to takeoff, the engines must be allowed to run at low thrust to stabilize the engine temperatures before takeoff thrust is adjusted. After start, the engines must run at idle or taxi thrust during at least 4 minutes for cold engines or 2 minutes for warm engines.

- NOTE:** - To increase N2 above 83% the engine oil temperature must be at 40°C minimum. Instead of this limit, it is acceptable to either run the engine for at least 8 minutes or complete a static run-up to 88% N2, stabilize, and check to ensure that oil pressure is equal or less than 83 psi.
- The engine is considered cold if it has been shutdown for more than 90 minutes.

ENGINE COOL-DOWN

The engines must run for at least 1 minute at idle or taxi thrust before shutdown.

ICE AND RAIN PROTECTION

OPERATION IN ICING CONDITIONS

Maximum Temperature for Anti-Icing Operation..... 10°C

Minimum Temperature for Manual Anti-Icing Operation.... -40°C

Holding configuration:

Landing Gear UP

Flaps UP

Minimum Airspeed 200 KIAS

NOTE: - There is no temperature limitation for anti-icing system automatic operation.

- Use Static Air Temperature (SAT) on ground or for takeoff operations and Total Air Temperature (TAT) for operations in flight.
- Icing conditions may exist whenever the Static Air Temperature (SAT) on the ground or for takeoff, or Total Air Temperature (TAT) in flight, is 10°C or below and visible moisture in any form is present (such as clouds, fog with visibility of one mile or less, rain, snow, sleet, and ice crystals).
- Icing conditions may also exist when the SAT on the ground and for takeoff is 10°C or below when operating on ramps, taxi ways, or runways where surface snow, ice, standing water, or slush may be ingested by the engines, or freeze on engines, nacelles, or engine sensor probes.

CAUTION: • ON GROUND, DO NOT RELY ON VISUAL ICING EVIDENCE OR ICE DETECTOR ACTUATION TO TURN ON THE ANTI-ICING SYSTEM. USE THE TEMPERATURE AND VISUAL MOISTURE CRITERIA AS SPECIFIED ABOVE. DELAYING THE USE OF THE ANTI-ICING SYSTEM UNTIL ICE BUILD-UP IS VISIBLE FROM THE COCKPIT MAY RESULT IN ICE INGESTION AND POSSIBLE ENGINE DAMAGE OR FLAME-OUT.

- DO NOT USE APU BLEED AS PNEUMATIC SOURCE FOR ANTI-ICING SYSTEM.



WINDSHIELD WIPER OPERATION (IF APPLICABLE)

Maximum Airspeed for Windshield Wiper Operation 170 KIAS

FLIGHT CONTROLS

APPROACH AND LANDING FLAPS

Flaps 45° operation is not allowed in icing conditions and after ice encounter, except for airplanes S/N 145686, 145770 and on or Post-Mod. SB 145LEG-27-0010.

ELECTRICAL

- Maximum Load on Main Generator.....400 A
- Maximum Load on APU Generator:
 - Up to 30000 ft.....400 A
 - Above 30000 ft300 A
- Maximum Battery Temperature.....70°C

PNEUMATIC, AIR CONDITIONING AND PRESSURIZATION

PRESSURIZATION

AIRPLANES PRE-MOD. SB 145LEG-00-0007

- Maximum differential pressure 8.1 psi
- Maximum differential overpressure 8.4 psi
- Maximum differential negative pressure-0.3 psi

AIRPLANES POST-MOD. SB 145LEG-00-0007 OR EQUIPPED WITH AN EQUIVALENT MODIFICATION FACTORY INCORPORATED

- Maximum differential pressure 8.4 psi
- Maximum differential overpressure 8.6 psi
- Maximum differential negative pressure-0.3 psi



FLIGHT CONTROLS

FLAPS

Maximum Altitude for Flap Extension 20000 ft

PITCH TRIM

Maximum Airspeed after Takeoff/During Climb
without Retrimming..... 160 KIAS

ELECTROMECHANICAL GUST LOCK

Each time electromechanical gust lock lever is set to unlocked position elevator movement must be checked. This check must be performed at least 10 seconds after positioning the gust lock lever to the unlocked position by moving the control column from the full up stop to the full down stop and back to the full up stop position.



NAVIGATION AND COMMUNICATION EQUIPMENT

RADAR

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

HF

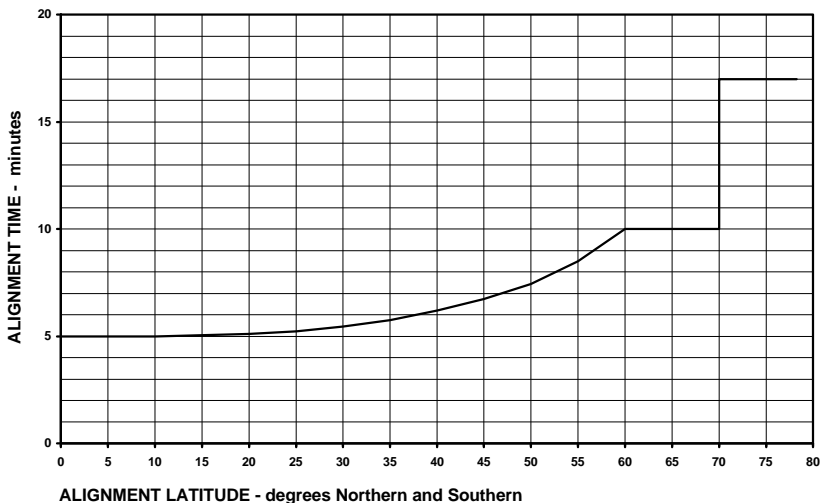
Do not rely on ADF indications shown on PFD while transmitting in HF.

INERTIAL REFERENCE SYSTEM (IRS)

Airplane must not be moved until all attitude and heading information presented on PFD is valid.

Alignment Limitations:

- Maximum latitude for alignment 78.25° Northern and Southern
- IRS alignment will complete only after a valid airplane present position (latitude and longitude) is received.
- Time to Alignment:



- The airplanes may not be operated within the North and South magnetic polar cut-out regions below:

MAGNETIC CUT-OUT REGIONS	LATITUDE	LONGITUDE
North	Between 70°N and 82°N	Between 90°W and 120°W
	North of 82°N	Between 0° and 180°W/E
South	Between 60°S and 82°S	Between 120°E and 160°E
	South of 82°S	Between 0° and 180°W/E

NOTE: Within the magnetic polar cut-out regions IRS heading data is not available.

ENHANCED GROUND PROXIMITY WARNING SYSTEM (EGPWS)

The following limitations are applicable to the Enhanced Ground Proximity Warning System (EGPWS):

- The Allied-Signal Enhanced Ground Proximity Warning System Pilot's Guide, Document Number 060-4241-000, March 1997 edition (or later revision of the manual) or FAA accepted Operating Manual, must be immediately available to the flight crew.
- Allied-Signal Application Software version 202 and Configuration Software version 202 or later must be installed.
- Navigation is not to be predicated on the use of the Terrain Awareness Display.
- The EGPWS data base, displays, and alerting algorithms currently do not account for man made obstructions.
- Pilot's should inhibit the Terrain Awareness Alerting and Display function by pressing the TERRAIN SYS OVRD button when within 15 nm of takeoff, approach, or landing at an airport when any of the following conditions apply:
 - The airport has no approved instrument approach procedure.
 - The longest runway is less than 1070 m in length.
 - The airport is not included in the Allied Signal data base.
- Terrain Display must be inhibited when using QFE altimeter settings (not applicable to the software version 216 and on).



- Pilots are authorized to deviate from their current Air Traffic Control (ATC) clearance to the extent necessary to comply with an EGPWS warning.
- The Terrain Display is intended to be used as a situational tool only and may not provide the accuracy and/or fidelity on which to solely base terrain avoidance maneuvering.
- In the event that accuracy of the airplane position data from the FMS becomes inadequate for navigation (Dead Reckoning Mode), the Terrain Awareness Alerting and Display functions must be inhibited. This will not affect the basic GPWS functions (modes 1 to 7). If the FMS is restored after a period of inadequacy, the Terrain Awareness may be enabled by pressing again the TERRAIN SYS OVRD button.
- In case of a conflict between the terrain alerts and an auto-popped-up picture, pilots must check the sweeping marker movement on the horizontal line below the terrain picture. If the marker is frozen, the MFD terrain indication must be deselected on MFD bezel panel.
- In case of a conflict between the terrain alerts and an auto-popped-up picture, pilots must check the MFD 2 terrain information. If the terrain picture bus fail is not annunciated (TERR amber annunciation), the MFD 2 must be used as terrain picture reference.

INTEGRATED STANDBY INSTRUMENT SYSTEM (ISIS)

Maximum duration of ISIS when operating on batteries only is 40 minutes.

NOTE: The maximum duration of battery power can be extended to 45 minutes if the Pitot 3 Sensor Heating Button is turned off when not operating in icing conditions.

Airplane must not be moved during power-up initialization.
Do not cage attitude in turning flight.

INSTRUMENT LANDING SYSTEM (ILS)

This limitation applies to airplanes equipped with Mod. L of the Honeywell Primus II NV-850 Navigation Receiver Module P/N 7510134-831; which is part of the Honeywell Primus II RNZ-851 Integrated Navigation Unit P/N 7510100-831, -832, -833 and -834.

When crossing the Outer Marker on glideslope, the altitude must be verified with the value on the published procedure.

For airplanes with a single operating glideslope receiver, the approach may be flown using normal procedures no lower than Localizer Only Minimum Descent Altitude (MDA).

For airplanes with two operating glideslope receivers, the airplane may be flown to the published minimums for the approach using normal procedures if both glideslope receivers are tuned to the approach and both crew members are monitoring the approach using independent data and displays.



AUTOPILOT

The following limitations are applicable to the Autopilot:

Minimum Engagement Height After Takeoff 500 ft

Autopilot coupled approaches approved down to 200 ft AGL.

Malfunction altitude loss:

- Cruise up to 80 ft
- Maneuver up to 100 ft
- ILS Approach..... 15 ft

Descent below Minimum Descent Altitude on a non precision approach with autopilot engaged is prohibited.

Single engine go-around with autopilot engaged is prohibited.

Approach mode selection during Localizer capture is allowed only when airplane is inbound.

NOTE: Coupled go-around height loss may be 40 ft.

Maximum Operation Altitude with Yaw

Damper Disengaged (Mach > 0.7) 35000 ft

OZONE CONCENTRATION

The tables below show the airplane altitude limitations due to ozone concentration in atmosphere.

- NOTE:** - Airplanes Post-Mod. SB 145LEG-21-0007 or equipped with an equivalent modification factory incorporated are not subjected to this limitation.
- These tables are based on FAA ADVISORY CIRCULAR N° 120.38
 - The tables show altitude limitations calculated for constant ozone concentration, cabin stabilized at 8000 ft, and both recirculation fans turned on.
 - For conditions other than those specified in item 2 above, an optimized flight plan must be approved by regulatory agencies.
 - For longitudes, the following apply:
 - W = Western
 - E = Eastern
 - Reference = 100°W longitude

NORTH AMERICA - MAXIMUM OZONE CRITERIA

FLIGHT LEVEL	JAN		FEB		MAR		APR		MAY		JUN	
LATITUDE	W	E	W	E	W	E	W	E	W	E	W	E
80°N	-	320	-	320	-	310	-	310	-	300	-	320
75°N	-	320	-	320	-	320	-	310	-	310	-	320
70°N	-	340	-	320	-	320	-	320	-	310	-	330
65°N	350	340	330	320	320	320	320	320	320	320	330	330
60°N	370	350	340	330	330	330	320	320	320	320	340	330
55°N	390	360	370	340	340	340	320	330	320	320	340	350
50°N	400	370	400	360	360	340	320	330	330	330	350	360
45°N	-	390	-	370	370	360	340	340	340	360	370	390
40°N	400	-	360	380	370	390	380	360	400	390	-	-
35°N	-	-	-	-	-	-	-	-	-	-	-	-

FLIGHT LEVEL	JUL		AUG		SEP		OCT		NOV		DEC	
LATITUDE	W	E	W	E	W	E	W	E	W	E	W	E
80°N	-	330	-	380	-	390	-	380	-	340	-	340
75°N	-	340	-	390	-	380	-	380	-	360	-	350
70°N	-	340	-	400	-	390	-	380	-	380	-	350
65°N	340	350	390	400	400	400	380	390	400	380	370	360
60°N	340	360	400	-	-	-	390	400	400	390	380	380
55°N	350	380	400	-	-	-	-	-	400	400	400	390
50°N	360	400	-	-	-	-	-	-	-	400	-	-
45°N	-	-	-	-	-	-	-	-	-	-	-	-
40°N	-	-	-	-	-	-	-	-	-	-	-	-
35°N	-	-	-	-	-	-	-	-	-	-	-	-

NORTH AMERICA - TWA OZONE CRITERIA

NOTE: Values below are the altitude limitations which the airplane is allowed to fly more than 3 continuous hours.

FLIGHT LEVEL	JAN		FEB		MAR		APR		MAY		JUN	
LATITUDE	W	E	W	E	W	E	W	E	W	E	W	E
80°N	-	270	-	250	-	250	-	250	-	250	-	250
75°N	-	270	-	270	-	250	-	250	-	250	-	250
70°N	-	290	-	270	-	260	-	250	-	250	-	270
65°N	310	290	290	250	300	270	290	250	250	250	300	270
60°N	320	290	310	270	300	290	270	250	250	250	310	270
55°N	330	290	320	290	310	290	250	270	250	250	310	290
50°N	330	310	350	290	310	290	250	270	270	270	310	310
45°N	330	310	330	310	310	310	270	290	290	290	310	310
40°N	330	330	310	310	310	310	310	310	310	310	330	330
35°N	370	350	370	350	330	350	350	330	370	330	390	370
30°N	-	-	-	-	-	390	-	-	-	370	-	400
25°N	-	-	-	-	-	-	-	-	-	390	-	-
20°N	-	-	-	-	-	-	-	-	-	-	-	-

FLIGHT LEVEL	JUL		AUG		SEP		OCT		NOV		DEC	
LATITUDE	W	E	W	E	W	E	W	E	W	E	W	E
80°N	-	250	-	290	-	290	-	290	-	290	-	290
75°N	-	270	-	310	-	310	-	290	-	290	-	290
70°N	-	270	-	320	-	310	-	310	-	290	-	290
65°N	290	290	330	330	330	310	320	310	330	290	310	300
60°N	290	310	330	330	330	330	320	310	330	290	320	310
55°N	300	310	330	330	350	330	330	330	330	310	330	310
50°N	310	310	330	330	370	330	350	350	330	330	350	330
45°N	320	330	350	350	-	370	370	350	350	330	350	330
40°N	-	350	-	390	-	-	-	370	390	350	350	330
35°N	-	390	-	-	-	-	-	-	-	390	-	370
30°N	-	-	-	-	-	-	-	-	-	-	-	-
25°N	-	-	-	-	-	-	-	-	-	-	-	-
20°N	-	-	-	-	-	-	-	-	-	-	-	-

SOUTH AMERICA - MAXIMUM OZONE CRITERIA

FLIGHT LEVEL	JAN		FEB		MAR		APR		MAY		JUN	
LATITUDE	W	E	W	E	W	E	W	E	W	E	W	E
80°S	-	330	-	380	-	390	-	380	-	340	-	340
75°S	-	340	-	390	-	380	-	380	-	360	-	350
70°S	-	340	-	400	-	390	-	380	-	380	-	350
65°S	340	350	390	400	400	400	380	390	400	380	370	360
60°S	340	360	400	-	-	-	390	400	400	390	380	380
55°S	350	380	400	-	-	-	-	-	400	400	400	390
50°S	360	400	-	-	-	-	-	-	-	400	-	-
45°S	-	-	-	-	-	-	-	-	-	-	-	-
40°S	-	-	-	-	-	-	-	-	-	-	-	-
35°S	-	-	-	-	-	-	-	-	-	-	-	-

FLIGHT LEVEL	JUL		AUG		SEP		OCT		NOV		DEC	
LATITUDE	W	E	W	E	W	E	W	E	W	E	W	E
80°S	-	320	-	320	-	310	-	310	-	300	-	320
75°S	-	320	-	320	-	320	-	310	-	310	-	320
70°S	-	340	-	320	-	320	-	320	-	310	-	330
65°S	350	340	330	320	320	320	320	320	320	320	330	330
60°S	370	350	340	330	330	330	320	320	320	320	340	330
55°S	390	360	370	340	340	340	320	330	320	320	340	350
50°S	400	370	400	360	360	340	320	330	330	330	350	360
45°S	-	390	-	370	370	360	340	340	340	360	370	390
40°S	400	-	360	380	370	390	380	360	400	390	-	-
35°S	-	-	-	-	-	-	-	-	-	-	-	-

SOUTH AMERICA - TWA OZONE CRITERIA

NOTE: Values below are the altitude limitations which the airplane is allowed to fly more than 3 continuous hours.

FLIGHT LEVEL	JAN		FEB		MAR		APR		MAY		JUN	
LATITUDE	W	E	W	E	W	E	W	E	W	E	W	E
80°S	-	250	-	290	-	290	-	290	-	290	-	290
75°S	-	270	-	310	-	310	-	290	-	290	-	290
70°S	-	270	-	320	-	310	-	310	-	290	-	290
65°S	290	290	330	330	330	310	320	310	330	290	310	300
60°S	290	310	330	330	330	330	320	310	330	290	320	310
55°S	300	310	330	330	350	330	330	330	330	310	330	310
50°S	310	310	330	330	370	330	350	350	330	330	350	330
45°S	320	330	350	350	-	370	370	350	350	330	350	330
40°S	-	350	-	390	-	-	-	370	390	350	350	330
35°S	-	390	-	-	-	-	-	-	-	390	-	370
30°S	-	-	-	-	-	-	-	-	-	-	-	-
25°S	-	-	-	-	-	-	-	-	-	-	-	-
20°S	-	-	-	-	-	-	-	-	-	-	-	-

FLIGHT LEVEL	JUL		AUG		SEP		OCT		NOV		DEC	
LATITUDE	W	E	W	E	W	E	W	E	W	E	W	E
80°S	-	270	-	250	-	250	-	250	-	250	-	250
75°S	-	270	-	270	-	250	-	250	-	250	-	250
70°S	-	290	-	270	-	260	-	250	-	250	-	270
65°S	310	290	290	250	300	270	290	250	250	250	300	270
60°S	320	290	310	270	300	290	270	250	250	250	310	270
55°S	330	290	320	290	310	290	250	270	250	250	310	290
50°S	330	310	350	290	310	290	250	270	270	270	310	310
45°S	330	310	330	310	310	310	270	290	290	290	310	310
40°S	330	330	310	310	310	310	310	310	310	310	330	330
35°S	370	350	370	350	330	350	350	330	370	330	390	370
30°S	-	-	-	-	-	390	-	-	-	370	-	400
25°S	-	-	-	-	-	-	-	-	-	390	-	-
20°S	-	-	-	-	-	-	-	-	-	-	-	-

JAPAN - MAXIMUM OZONE CRITERIA

FLIGHT LEVEL	JAN	FEB	MAR	APR	MAY	JUN
LATITUDE						
43°N	350	340	340	350	340	400
36°N	400	-	380	390	-	-
32°N	-	-	-	-	-	-

FLIGHT LEVEL	JUL	AUG	SEP	OCT	NOV	DEC
LATITUDE						
43°N	-	-	-	-	-	380
36°N	-	-	-	-	-	-
32°N	-	-	-	-	-	-

JAPAN - TWA OZONE CRITERIA

NOTE: Values below are the altitude limitations which the airplane is allowed to fly more than 3 continuous hours.

FLIGHT LEVEL	JAN	FEB	MAR	APR	MAY	JUN
LATITUDE						
43°N	290	290	300	310	270	310
36°N	330	310	310	320	330	390
32°N	-	-	390	370	-	-

FLIGHT LEVEL	JUL	AUG	SEP	OCT	NOV	DEC
LATITUDE						
43°N	350	-	350	350	350	310
36°N	-	-	-	-	-	390
32°N	-	-	-	-	-	-

AUSTRALIA - MAXIMUM OZONE CRITERIA

FLIGHT LEVEL	JAN	FEB	MAR	APR	MAY	JUN
LATITUDE						
43°S	-	-	-	-	-	380
36°S	-	-	-	-	-	-
32°S	-	-	-	-	-	-

FLIGHT LEVEL	JUL	AUG	SEP	OCT	NOV	DEC
LATITUDE						
43°S	350	340	340	350	340	400
36°S	400	-	380	390	-	-
32°S	-	-	-	-	-	-

AUSTRALIA - TWA OZONE CRITERIA

NOTE: Values below are the altitude limitations which the airplane is allowed to fly more than 3 continuous hours.

FLIGHT LEVEL	JAN	FEB	MAR	APR	MAY	JUN
LATITUDE						
43°S	350	-	350	350	350	310
36°S	-	-	-	-	-	390
32°S	-	-	-	-	-	-

FLIGHT LEVEL	JUL	AUG	SEP	OCT	NOV	DEC
LATITUDE						
43°S	290	290	300	310	270	310
36°S	330	310	310	320	330	390
32°S	-	-	390	370	-	-

WESTERN EUROPE - MAXIMUM OZONE CRITERIA

FLIGHT LEVEL	JAN	FEB	MAR	APR	MAY	JUN
LATITUDE						
52°N	390	350	350	330	350	380
47°N	400	370	360	350	370	370
39°N	-	-	390	350	360	-

FLIGHT LEVEL	JUL	AUG	SEP	OCT	NOV	DEC
LATITUDE						
52°N	400	-	-	-	-	400
47°N	-	-	-	-	-	-
39°N	-	-	-	-	-	-

WESTERN EUROPE - TWA OZONE CRITERIA

NOTE: Values below are the altitude limitations which the airplane is allowed to fly more than 3 continuous hours.

FLIGHT LEVEL	JAN	FEB	MAR	APR	MAY	JUN
LATITUDE						
52°N	330	310	310	270	290	310
47°N	330	320	310	310	310	310
39°N	390	350	330	310	310	330

FLIGHT LEVEL	JUL	AUG	SEP	OCT	NOV	DEC
LATITUDE						
52°N	320	350	350	370	350	330
47°N	330	370	390	390	370	330
39°N	390	-	-	-	-	350

AFRICA - MAXIMUM OZONE CRITERIA

FLIGHT LEVEL	JAN	FEB	MAR	APR	MAY	JUN
LATITUDE						
52°S	400	-	-	-	-	400
47°S	-	-	-	-	-	-
39°S	-	-	-	-	-	-

FLIGHT LEVEL	JUL	AUG	SEP	OCT	NOV	DEC
LATITUDE						
52°S	390	350	350	330	350	380
47°S	400	370	360	350	370	370
39°S	-	-	390	350	360	-

AFRICA - TWA OZONE CRITERIA

NOTE: Values below are the altitude limitations which the airplane is allowed to fly more than 3 continuous hours.

FLIGHT LEVEL	JAN	FEB	MAR	APR	MAY	JUN
LATITUDE						
52°S	320	350	350	370	350	330
47°S	330	370	390	390	370	330
39°S	390	-	-	-	-	350

FLIGHT LEVEL	JUL	AUG	SEP	OCT	NOV	DEC
LATITUDE						
52°S	330	310	310	270	290	310
47°S	330	320	310	310	310	310
39°S	390	350	330	310	310	330



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EMERGENCY AND ABNORMAL PROCEDURES

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AIRPLANE FLIGHT MANUAL

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INTRODUCTION

The emergency and abnormal procedures contained in this manual have been developed by the airplane manufacturer and approved by the certification authority for use in the operation of this airplane.

This Section provides the emergency and abnormal procedures to be performed in case of a system malfunction or failure, in order to protect passengers and/or crew from serious harm and to maintain the airworthiness of the airplane.

Some procedures require a landing at the nearest suitable airport. Such information is provided with the intent of establishing that the flight should be terminated at the pilot's discretion. It is the pilot's responsibility to use good judgement concerning the time and place to land, as well as to evaluate factors such as airplane condition, weather, etc...

However, it is emphasized that for fire or smoke that cannot be positively located and extinguished, an immediate descent, landing and passenger evacuation should be performed.

The procedures are presented as follows:

- The actions contained in a box are immediate actions. They must be performed expeditiously and from memory to minimize hazards. The other actions should be performed as soon as the condition permits.
- All the actions must be performed in the order given.

Procedures contained herein assume:

- Airplane systems are operating normally prior to the failure.
- Normal procedures have been properly accomplished.
- System controls are in normal condition prior to initiation of the associated procedure.
- Aural warnings are silenced as applicable. Master Warning/Caution lights are reset as soon as the failure is recognized.
- Oxygen masks and smoke goggles are donned when cabin altitude is excessive or ambient air is contaminated.
- Crew communication is established when required.
- Circuit breakers are checked.



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EMERGENCY PROCEDURES

AIR CONDITIONING SMOKE

Suspect Bleed CLOSE

Crossbleed OPEN

If procedure does not eliminate smoke, change bleed source supplying the air conditioning (including APU bleed).

SMOKE EVACUATION and

CABIN FIRE OR SMOKE Procedures AS REQUIRED

WARNING: IF IN ICING CONDITIONS, REFER TO SINGLE ENGINE OR SINGLE BLEED OPERATION IN ICING CONDITIONS PROCEDURE.

BAGGAGE COMPARTMENT SMOKE

EICAS WARNING: BAGG SMOKE

EICAS CAUTION BAGG ACCESS OPN	NOT DISPLAYED
Baggage Fire Extinguishing Button	PRESS

Diversion CONSIDER

Altitude MAINTAIN

Maintain the current flight level as long as possible.

Alternate Airport IDENTIFY

Commence the diversion to land at the nearest suitable airport.

NOTE: - The extinguishing agent duration is approximately 75 minutes.
- Advise ground crew of possible presence of Halon vapors and smoke trapped in the compartment.



CABIN FIRE OR SMOKE

Crew Oxygen Masks	DON, SELECT 100%
Smoke Goggles or PBE	DON
Recirculation Fan	OFF
Crew Communication	ESTABLISH

Diversion.....CONSIDER
Fire or Smoke SourceIDENTIFY

AIR CONDITIONING SMOKE

Procedure.....AS REQUIRED

ELECTRICAL SYSTEM FIRE OR

SMOKE Procedure.....AS REQUIRED

SMOKE EVACUATION

Procedure (if necessary)ACCOMPLISH

Determine and extinguish any source of fire or smoke within the cabin.
After conducting the fire or smoke procedures, even though smoke
has dissipated, land at the nearest suitable airport, unless it can be
visually verified that the fire has been extinguished.

ELECTRICAL SYSTEM FIRE OR SMOKE

If smoke source can be determined:

Electrical Power to Associated Equipment OFF

If smoke source cannot be determined:

Shed Buses OFF

If smoke does not stop or decrease after a reasonable time, cut power to Central DC Bus as follows:

Bus Ties OFF

APU Generator OFF

Battery 2 OFF

If smoke does not stop or decrease after a reasonable time, cut power to DC Bus 1 and Essential DC Bus 1 as follows:

Fuel Pumps 1B AND 2A OR
 2C

Battery 2 AUTO

Battery 1 OFF

Generators 1 and 3 OFF

If smoke does not stop or decrease after a reasonable time, restore power to the previously deenergized buses and cut power to DC Bus 2 and Essential DC Bus 2 as follows:

Generators 1 and 3 ON

Battery 1 AUTO

Fuel Pumps 1A OR 1C AND
 2B

Battery 2 OFF

Generators 2 and 4 OFF

If smoke does not stop or decrease after a reasonable time, restore power to the previously deenergized buses and cut power to Backup Buses as follows:

Generators 2 and 4 ON

Battery 2 AUTO

APU Generator AS REQUIRED

Bus Ties AUTO

Shed Buses AUTO

Backup Battery OFF

Land at the nearest suitable airport.

SMOKE EVACUATION

Procedure (if necessary) ACCOMPLISH



LAVATORY SMOKE (IF APPLICABLE)

EICAS WARNING: LAV SMOKE

Lavatory Flush and Light

- CBs (Located in Line E)PULL
- CABIN FIRE OR SMOKE ProcedureAS REQUIRED

SMOKE EVACUATION

- Cockpit Door.....CLOSE
- Recirculation FanOFF
- Gasper FanOFF
- Pressurization Manual Controller1 O'CLOCK
- Wait 15 seconds.
- Pressurization Mode Selector.....MAN
- Pressurization Manual ControllerAS REQUIRED
- Passenger Oxygen.....AS REQUIRED

To evacuate the smoke faster:

- Pressurization Manual ControllerUP
- Packs 1 and 2OFF
- Bleeds (engine or APU).....OPEN
- Emergency Descent.....AS REQUIRED
- AltitudeMEA OR
10000 ft,
WHICHEVER
IS HIGHER

Recover cabin pressure as soon as smoke has been cleared.

BLEED LEAK

EICAS WARNING: BLD 1 (2) LEAK or BLD APU LEAK

Crossbleed	CLOSE
Associated Bleed and APU Bleed	CLOSE
Altitude	MAX 25000 ft MINIMUM MEA
Icing Conditions	EXIT/AVOID

Wait 3 minutes.

If the message remains on, but the associated advisory message on EICAS (BLD 1 or 2 VLV CLSD) indicates the valve is closed:

Opposite Bleed	CLOSE
Associated Bleed	OPEN

Wait 3 minutes.

If the message still remains:

Associated Bleed	CLOSE
Altitude	MEA OR 10000 ft WHICHEVER IS HIGHER

If the message remains on and is associated with a failed engine bleed valve (BLD 1 or 2 VLV FAIL caution message):

Associated Thrust Lever	IDLE
-------------------------------	------

Wait 3 minutes.

If the message still remains:

Associated Engine (or APU)	SHUTDOWN
----------------------------------	----------

BLEED OVERTEMPERATURE

EICAS WARNING: BLD 1 (2) OVTEMP

Crossbleed	OPEN
Cross-side Bleed	OPEN
Associated Bleed	CLOSE
Altitude	MAX 25000 ft MINIMUM MEA

WARNING: IF IN ICING CONDITIONS, REFER TO SINGLE ENGINE OR SINGLE BLEED OPERATION IN ICING CONDITIONS PROCEDURE.



EMERGENCY DESCENT

Cabin Crew	NOTIFY
Fasten Belts	ON
Thrust Levers	IDLE
Speed Brakes	OPEN
Airspeed	250 KIAS
Landing Gear	DOWN
Minimum Enroute Altitude	CHECK

CAUTION: THIS PROCEDURE ASSUMES THAT THE INTEGRITY OF THE STRUCTURE IS NOT AFFECTED. IF STRUCTURAL DAMAGE IS SUSPECTED, USE THE FLIGHT CONTROLS WITH CAUTION AVOIDING HIGH MANEUVERING LOADS AND REDUCING AIRSPEED AS APPROPRIATE.

NOTE: It is recommended that descent be initiated by a turn with a bank angle of 30°.

RAPID CABIN DEPRESSURIZATION

Aural Warning: CABIN

Crew Oxygen Masks	DON
Crew Communication	ESTABLISH
Emergency Descent	AS REQUIRED

Passenger Oxygen	AS REQUIRED
Altitude	MEA OR 10000 ft, WHICHEVER IS HIGHER

APU FIRE

EICAS WARNING: APU FIRE

Aural Warning: BELL

APU Fuel Shutoff Valve	CLOSE
APU Master Knob	OFF
APU FUEL SOV CLSD message on EICAS	CONFIRM
If the valve is not confirmed closed and the fire message remains:	
Right Electric Fuel Pumps.....	OFF
Crossfeed.....	OFF
Initiate a descent to 25000 ft or MEA, whichever is higher.	
After 30 seconds, if the APU FIRE message remains displayed on EICAS:	
APU Fire Extinguishing Button.....	PRESS
Land at the nearest suitable airport.	

WARNING: DO NOT ATTEMPT TO RESTART APU.

APU OVERTEMPERATURE

APU Bleed	CLOSE
Wait 10 seconds.	
If EGT still in red or yellow range:	
APU Fuel Shutoff Valve	CLOSE
APU Master Knob	OFF



DITCHING

WARNING: THE EMB-135BJ WAS NOT TESTED FOR DITCHING. BELOW ARE THE RECOMMENDED PROCEDURES, WHICH HAVE BEEN DEVELOPED BASED ON PREVIOUS EXPERIENCE.

ATC/Cabin Crew	NOTIFY
Transponder	7700
ELT	ON
Emergency Lights.....	ON
Passengers	PREPARE FOR DITCHING
Cabin (below 10000 ft)	DEPRESSURIZE
If necessary, inhibit EGPWS (J8) and Aural Warning System (B4 and E30) by pulling their circuit breakers.	

When reaching 1000 ft:

Air Conditioning 1 and 2 OFF
Engine Bleeds CLOSE

Approach configuration:

If in icing conditions:

Landing Gear.....UP
Flaps.....22°

If it is not possible to achieve the selected flap position, maintain airspeed according to the following:

FLAPS POSITION	MINIMUM AIRSPEED
0 to 8°	$V_{REF\ 45} + 30\text{ KIAS}$
9° to 21°	$V_{REF\ 45} + 10\text{ KIAS}$
22°	$V_{REF\ 45} + 5\text{ KIAS}$

If not in icing conditions:

Landing Gear.....UP
Flaps.....45°

If it is not possible to achieve the selected flap position, maintain airspeed according to the following:

FLAPS POSITION	MINIMUM AIRSPEED
0 to 8°	$V_{REF\ 45} + 30\text{ KIAS}$
9° to 21°	$V_{REF\ 45} + 10\text{ KIAS}$
22° to 44°	$V_{REF\ 45} + 5\text{ KIAS}$
45°	$V_{REF\ 45}$



AIRPLANE FLIGHT MANUAL

EMERGENCY PROCEDURES

The final path should be made with airplane straight and level. Yaw angles should be limited to one ball of sideslip. If possible, ditching should be made parallel to the line of the wave crests.

Before touchdown:

Rate of Descent LESS THAN
180 ft/min
Attitude 4° NOSE UP

Upon water contact:

Start/Stop Selectors STOP
EMERGENCY EVACUATION Procedure ACCOMPLISH

**WARNING: AIRPLANE EVACUATION MUST BE DONE THROUGH
THE OVERWING EMERGENCY EXITS ONLY. DO NOT
OPEN REMAINING DOORS.**

Before leaving the airplane:

Batteries OFF

EMERGENCY EVACUATION

Parking Brake (if necessary) APPLY
Cabin DEPRESSURIZE
Fire Extinguishing Handles PULL
APU Fuel Shutoff Valve CLOSE
APU and Engine Fire Extinguishing
Bottles (if necessary) DISCHARGE
Electric Fuel Pumps OFF
Electric Hydraulic Pumps OFF
Cabin Crew NOTIFY
Emergency Lighting ON
Evacuation INITIATE

NOTE: Cockpit door blow-out panels may be broken to be used as an alternative way to leave cockpit.

ATC NOTIFY

Before leaving the airplane:

Batteries OFF



FORCED LANDING

This procedure is recommended for landings with all engines inoperative or for landings in unprepared surfaces. Landing on unprepared surfaces is not recommended. However, if specific circumstances render such landing inevitable, accomplish the procedures below.

- ATC and Cabin CrewNOTIFY
- Transponder7700
- ELTON
- Emergency Lights.....ON
- PassengerPREPARE FOR
FORCED
LANDING
- Cabin (below 10000 ft)DEPRESSURIZE
- When committed to land:

If in icing conditions:

- Landing Gear.....AS REQUIRED
- Flaps.....22°

If it is not possible to achieve the selected flap position, maintain airspeed according to the following:

FLAPS POSITION	MINIMUM AIRSPEED
0 to 8°	$V_{REF\ 45} + 30\text{ KIAS}$
9° to 21°	$V_{REF\ 45} + 10\text{ KIAS}$
22°	$V_{REF\ 45} + 5\text{ KIAS}$

If not in icing conditions:

- Landing Gear.....AS REQUIRED
- Flaps.....45°

If it is not possible to achieve the selected flap position, maintain airspeed according to the following:

FLAPS POSITION	MINIMUM AIRSPEED
0 to 8°	$V_{REF\ 45} + 30\text{ KIAS}$
9° to 21°	$V_{REF\ 45} + 10\text{ KIAS}$
22° to 44°	$V_{REF\ 45} + 5\text{ KIAS}$
45°	$V_{REF\ 45}$



AIRPLANE FLIGHT MANUAL

EMERGENCY PROCEDURES

If necessary, inhibit EGPWS (J8) and Aural Warning System (B4 and E30) by pulling their circuit breakers.

If crash is unavoidable, just before touchdown:

Fire Extinguishing Handles	PULL
APU Fuel Shutoff Valve	CLOSE
Batteries	OFF

When the airplane comes to a complete stop:

EMERGENCY EVACUATION

Procedure	ACCOMPLISH
-----------------	------------

In case of fire:

Fire Extinguishing Handles	PULL AND ROTATE AS REQUIRED
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MAIN DOOR OPEN

EICAS WARNING: MAIN DOOR OPN

Fasten Seat Belts ON

Check doors pictorial indication on MFD Takeoff Page. If message is confirmed or if MFD is not available:

Door Internal Lock Indicator (red marks) CHECK

If the door is confirmed locked:

Continue flight normally.

If the door internal lock indicators are not aligned or it is not possible to maintain the pressurization, proceed:

Altitude MEA OR
10000 ft,
WHICHEVER
IS HIGHER
Cabin DEPRESSURIZE

Land at the nearest suitable airport.

BATTERY OVERTEMPERATURE

EICAS WARNING: BATT 1 (2) OVTEMP

Associated Battery.....OFF

Check that the associated BATT OFF BUS message is on.
 If the associated BATT OFF BUS message is not on, land at the nearest suitable airport.

ELECTRIC ESSENTIAL TRANSFER FAILURE

EICAS WARNING: ELEC ESS XFR FAIL

If no generator is available:

LOSS OF ALL GENERATORS

Procedure ACCOMPLISH

If the message remains:

Bus Ties OFF

If the message still remains:

Shed Buses OFF

Turn off equipment not essential for the flight. Begin with the equipment connected to DC Buses 1 and 2 (Circuit Breaker Panel rows D, E, F, G, H).

Land at the nearest suitable airport.

LOSS OF ALL GENERATORS

EICAS CAUTION: GEN 1, 2, 3, 4 OFF BUS and APU GEN OFF BUS

Airspeed MAXIMUM
250 KIAS
Altitude MEA OR
10000 ft,
WHICHEVER
IS HIGHER
Essential Power ON
Crew Oxygen AS REQUIRED
Passenger Oxygen AS REQUIRED
Emergency Lights OFF

If required, turn on Emergency Lights before landing.

Land at the nearest suitable airport.

CAUTION: • MULTIPLY THE UNFACTORED LANDING DISTANCE
FOR 1.58.

- BATTERY DURATION IS 40 MINUTES.

NOTE: - The nose landing doors will open if DC Bus 2 is off, therefore the pilot should expect noise increase.
- The following warning messages will be presented: SPS 1-2 INOP and ICE COND-A/I INOP.
- The following caution messages will be presented: STICK PUSHER FAIL, SPS ADVANCED, GPWS INOP, WINDSHEAR INOP, CHECK PFD 1, IC BUS FAIL, APU GEN OFF BUS, GEN 1-2-3-4 OFF BUS, DC BUS 1-2 OFF, SHED BUS 1-2 OFF, 115 VAC BUS OFF, EMERG LT NOT ARMD, E1-2 CTL A-B FAIL, ENG 1-2 REV FAIL, LG AIR/GND FAIL, FLAP FAIL, SPOILER FAIL, PITOT 1-2 INOP, W/S 1-2 HEAT FAIL, TAT 1-2 HEAT INOP, STAB A/ICE FAIL, A/ICE SW OFF, WG 1-2 A/ICE FAIL, E1-2 A/ICE FAIL, AOA 1-2 HEAT INOP, ICE DET 1-2 FAIL and ICE DETECTORS FAIL.



ATTCS NO MARGIN

EICAS WARNING: E1 (2) ATTCS NO MRGN

During takeoff, below V_1 : REJECTED TAKEOFF Procedure..... ACCOMPLISH

Report to the maintenance personnel. Another takeoff is not permitted.

CAUTION: BRAKES TEMPERATURE MUST BE CHECKED AFTER REJECTED TAKEOFFS.

DUAL ENGINE FAILURE

EICAS WARNING: ENG 1-2 OUT

Airspeed	MINIMUM 260 KIAS
Altitude	MAX 25000 ft
Oxygen Mask (if required).....	DON
ENGINE AIRSTART Procedure	ACCOMPLISH

CAUTION: IF APU HAS BEEN USED TO START THE ENGINES, DO NOT ALTERNATE THE FADECS AFTER START.

NOTE: If APU is not available, only equipment supplied by the Essential DC Bus 1 and 2 will be available. Engine windmilling should drive engine driven pumps and supply hydraulic pressure.

If neither engine can be restarted:

FORCED LANDING Procedure ACCOMPLISH



ENGINE ATTCS FAILURE

EICAS WARNING: ATTCS FAIL

Thrust LeversMAX

Maintenance is required and another takeoff is not permitted.

ENGINE FIRE, SEVERE DAMAGE OR SEPARATION

EICAS WARNING: ENG 1 (2) FIRE

LIGHT: Engine Fire Handle

Aural Warning: BELL (in case of fire)

Identify the affected engine.

Thrust Lever	IDLE
Start/Stop Selector	STOP
Fire Extinguishing Handle	PULL (DO NOT ROTATE)

If the fire indication remains displayed after 30 seconds:

Fire Extinguishing Handle (1st shot) ROTATE

If fire indication remains displayed after 30 seconds:

Fire Extinguishing Handle (2nd shot) ROTATE

Crossfeed OFF

Associated Fuel Pumps OFF

Associated Bleed CLOSE

Associated Generators OFF

APU (if available) START

APU Generator ON

Confirm that the fuel shutoff valve has closed (E1 or E2 FUEL SOV CLSD advisory message on EICAS).

If ITT remains high:

ENGINE DRY MOTORING Procedure AS REQUIRED

In flight:

Land at the nearest suitable airport.

On ground:

EMERGENCY EVACUATION Procedure AS REQUIRED

WARNING: • DO NOT ATTEMPT TO RESTART ENGINE.

- **IF IN ICING CONDITIONS, REFER TO SINGLE ENGINE OR SINGLE BLEED OPERATION IN ICING CONDITIONS PROCEDURE.**

- NOTE:** - If in flight below 9700 ft, the air conditioning pack valves will close automatically. The APU may be used as pneumatic source by closing the remaining engine bleed valve.
- Engine will not shutdown with the Start/Stop Selector unless associated Thrust Lever is first moved to IDLE. If STOP is selected before Thrust Lever is retarded to IDLE, momentarily cycle START/STOP Selector to RUN and back to STOP.

ENGINE LOW N1

EICAS WARNING: E1 (2) LOW N1

If during takeoff, below V_1 :

REJECTED TAKEOFF Procedure ACCOMPLISH

If during takeoff, above V_1 and associated with an engine flameout:

TAKEOFF WITH ENGINE FAILURE Procedure ACCOMPLISH

If during takeoff, above V_1 not associated with an engine flameout or during flight:

Associated FADEC RESET

If low thrust remains:

Associated FADEC ALTN

If engine flames out:

Thrust Lever IDLE

Start/Stop Selector STOP

ENGINE AIRSTART Procedure ACCOMPLISH

ENGINE OIL LOW PRESSURE

EICAS WARNING: E1 (2) OIL LOW PRESS

Oil Pressure Indication CHECK

If flight conditions permit, reduce N2 below 88%, and monitor oil temperature and oil quantity indication.

Monitor oil pressure for the remainder of the flight. If oil pressure is in the red range:

Associated Thrust Lever IDLE

If oil pressure is still in the red range:

PRECAUTIONARY ENGINE

SHUTDOWN Procedure ACCOMPLISH

ENGINE REVERSER FAILURE

EICAS CAUTION: ENG1 (2) REV FAIL

If during takeoff, below V_1 : REJECTED TAKEOFF Procedure.....	ACCOMPLISH
---	------------

Associated Thrust Lever	IDLE
Airspeed	MAXIMUM 200 KIAS

PRECAUTIONARY ENGINE
 SHUTDOWN Procedure (if required) ACCOMPLISH
 Land at the nearest suitable airport.

WARNING: DO NOT SET THRUST LEVER OUT OF IDLE.

REJECTED TAKEOFF (AT OR BELOW V_1)

Thrust Levers	IDLE OR MAX REVERSE
---------------------	------------------------

Brakes	APPLY MAXIMUM
Directional Control.....	MAINTAIN

Immediately after stopping:
 PRECAUTIONARY ENGINE SHUTDOWN or
 ENGINE FIRE, SEVERE DAMAGE OR
 SEPARATION Procedure AS REQUIRED



TAKEOFF WITH ENGINE FAILURE ABOVE V_1

Maximum Takeoff Thrust	CHECK
At V_R rotate the airplane.	
With positive rate of climb:	
Landing Gear	UP
Airspeed	V_2

NOTE: The airplane must be rotated to 14° (for flaps 9°).

Maintain V_2 up to the level off altitude. If maneuvering is required, maintain a maximum bank of 15° .

When reaching the level off height:

For takeoff with flaps 9° :

At $V_2 + 15$ KIAS	FLAPS UP
Airspeed	ACCELERATE TO FINAL SEGMENT SPEED

After flaps are retracted:

PRECAUTIONARY ENGINE SHUTDOWN or
ENGINE FIRE, SEVERE DAMAGE OR
SEPARATION Procedure AS REQUIRED

After a maximum of 5 minutes at T/O-1 or T/O RSV:

Thrust Rating AS REQUIRED



AILERON/ROLL TRIM RUNAWAY

Control roll attitude manually with control wheels and rudder.

Quick Disconnect Button.....	PRESS AND
	HOLD
Aileron Systems 1 and 2	OFF

Roll Trim Circuit Breaker (F22)	PULL
---------------------------------------	------

Quick Disconnect Button.....	RELEASE
------------------------------	---------

Airspeed	MAXIMUM
	250 KIAS

If necessary, turn on one aileron hydraulic system at a time to identify the failed system. Prepare to overcome the roll generated by the failed aileron system. Continue the flight with the failed aileron system off. If the failure is confirmed in one aileron system, the roll trim system may be used as required. Perform a long final approach.



INADVERTENT SPOILER OPENING IN FLIGHT

EICAS CAUTION: SPOILER FAIL (may be presented)

Speed Brake.....CLOSE

Speed Brake Circuit Breaker (F13)PULL

Ground Spoiler Outboard

Circuit Breaker (F14)PULL

Ground Spoiler Inboard

Circuit Breaker (F20)PULL

If any panel is jammed closed, open or is floating:

Approach and landing configuration:

Landing GearDOWN

Flaps22°

Airspeed $V_{REF\ 45} + 10\text{ KIAS}$

Do not reduce engine thrust during flare to avoid abrupt lateral and directional corrections before touchdown.

CAUTION: • IN CASE OF PANEL JAMMED CLOSED OR FLOATING, TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.50.

- IN CASE OF PANEL JAMMED OPEN, TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.45.

JAMMEDAILERON

Aileron Disconnect	PULL
Autopilot	OFF
Airspeed	MAXIMUM 200 KIAS

NOTE: Roll rate with aileron disconnected is lower than with full system.

After control is regained:

If the copilot's aileron is operative, roll trim and artificial feel are available.

If the pilot's aileron is operative, roll trim and artificial feel are not available. Do not make sudden and large aileron inputs. Do not increase bank angle above 20°.

In either case, autopilot must not be reengaged.

If both ailerons are jammed, use rudder to control the airplane.

Avoid landing at airports with anticipated turbulence or crosswind.

Approach and landing configuration:

If in icing conditions:

Landing Gear	DOWN
Flaps	22°
Airspeed.....	V _{REF 45} + 15 KIAS

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.55.

If not in icing conditions:

Landing Gear	DOWN
Flaps	45°
Airspeed.....	V _{REF 45} + 5 KIAS

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.13.



JAMMED ELEVATOR

EICAS WARNING: SPS 1-2 INOP (may be presented)
EICAS CAUTION: STICK PUSHER FAIL

Elevator Disconnect	PULL
Autopilot.....	OFF
Airspeed	MAXIMUM
	200 KIAS
Pitch Trim	AS REQUIRED
Avoid landing at airports with anticipated turbulence or crosswind.	

Approach and landing configuration:

Landing Gear.....	DOWN
Flaps.....	22°
Airspeed	V _{REF 45} +
	10 KIAS

If both elevators are jammed, pitch trim may be used to land the airplane.

If left elevator is jammed, Stick Pusher will not be available.

Depending on the jammed elevator position, the remaining elevator power to flare the airplane will be reduced.

Do not reengage autopilot.

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.45.

JAMMED RUDDER

Command rudder through yaw trim. If not possible:

Rudder System 2.....	OFF
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If still jammed:

Rudder System 2.....	ON
Rudder System 1.....	OFF

If rudder control through pedals is not restored:

Airspeed	MAXIMUM
	200 KIAS



AIRPLANE FLIGHT MANUAL

EMERGENCY
PROCEDURES

CONTINUED FROM PREVIOUS PAGE

Avoid landing at airports with anticipated turbulence or crosswind.

Approach and landing configuration:

If in icing conditions:

Landing Gear DOWN
Flaps 22°
Airspeed $V_{REF\ 45} + 15$ KIAS

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.55.

If not in icing conditions:

Landing Gear DOWN
Flaps 45°
Airspeed $V_{REF\ 45} + 5$ KIAS

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.42.

If required, use asymmetric thrust to trim the airplane and do not reduce engine thrust during flare in order to avoid abrupt lateral and directional corrections before touchdown.

During approach, the pilot not flying must keep the Steering Disengage Button pressed to avoid inadvertent nose wheel deflection once on ground.

When the airplane is firmly on ground, use the Steering Handle to control the airplane still keeping the Steering Disengage Button pressed and then reduce the engine thrust to IDLE.

If necessary, use differential braking to steer the airplane.

NOTE: The Steering handle is effective even with the Steering Disengage Button pressed.



PITCH TRIM INOPERATIVE

EICAS WARNING: PTRIM MAIN INOP, PTRIM BACKUP INOP

EICAS CAUTION: AUTO TRIM FAIL

If at least one message is presented without pressing any Pitch Trim Switch:

Affected Pitch Trim System OFF

Continue the flight with the remaining Pitch Trim System.

If both Pitch Trim Systems become inoperative:

Pitch Trim Main System OFF

Pitch Trim Back Up System OFF

Consider landing at the nearest suitable airport.

If message is presented when pressing any Pitch Trim Switch:

Airspeed REDUCE

Airspeed reduction alleviates control column forces and may permit Pitch Trim command to be recovered.

If Pitch Trim command is reestablished continue the flight with the remaining Pitch Trim System.

NOTE: - Do not engage the Autopilot if the Main Pitch Trim System is inoperative.

- If only one segment of the Pitch Trim Switch is pressed, the TRIM aural warning message will be generated.

WARNING: IF PITCH TRIM COMMAND IS NOT REESTABLISHED, DO NOT OPEN SPEEDBRAKE.

If pitch trim command is not reestablished and the airplane presents a NOSE UP tendency:

Airspeed REDUCE

If it is necessary to reduce airspeed below 180 KIAS (or 200 KIAS in icing conditions), extend flaps to 9° (at 20000 ft maximum).

If it is necessary to reduce airspeed below 160 KIAS, extend flaps to 22°.

NOTE: Turning the airplane and extending the landing gear helps to maintain minimum airspeed with unwanted pitch up tendency.

Pitch Trim Command CHECK ALL
SWITCHES

If pitch trim is recovered, retrim the airplane and proceed with flight normally.

CONTINUES ON NEXT PAGE

CTA APPROVED
REVISION 3

If pitch trim is not recovered:

Consider landing at the nearest suitable airport.

Approach and landing configuration:

Landing Gear DOWN
 Flaps 22°
 Airspeed $V_{REF\ 45} + 10\text{ KIAS}$

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.45.

If pitch trim command is not reestablished and the airplane presents a NOSE DOWN tendency:

Airspeed REDUCE

Below 250 KIAS:

Flaps (at 20000 ft maximum) 9°

Below 180 KIAS:

Flaps 22°

Approach and landing configuration:

Landing Gear DOWN

NOTE: Gear extension should be delayed as long as possible.

Flaps 22°
 Airspeed $V_{REF\ 45} + 25\text{ KIAS}$

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.75.



PITCH TRIM RUNAWAY

EICAS WARNING: AUTOPILOT FAIL (may be presented)
EICAS CAUTION: AUTO TRIM FAIL (may be presented)

Below V1:	
Takeoff	REJECT
Above V1 or in flight:	
Quick Disconnect Button	PRESS AND HOLD

NOTE: Do not change flap setting.

At a safe altitude:

Pitch Trim Main System	OFF
Pitch Trim Back Up System	OFF
Quick Disconnect Button	RELEASE

WARNING: DO NOT OPEN THE SPEED BRAKE.

If control column forces are excessive, try to recover airplane control by turning one system on and trimming the airplane as necessary. Initiate with the Backup System. Leave the failed system off.

Autopilot.....AS REQUIRED

If neither system is operative:

PITCH TRIM INOPERATIVE Procedure.....	ACCOMPLISH
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AIRPLANE FUEL LOAD

EICAS WARNING: CHECK ACFT LOAD or FUEL XFER CRITICAL

Thrust Levers REDUCE TO
 LONG RANGE
 SET

Fuselage Transfer System CHECK STATUS

If fuel transfer from Fuselage Transfer System is observed on MFD Fuel Page proceed with flight normally.

NOTE: The EICAS Warning will remain presented while any wing tank quantity is below 1000 kg and total fuselage tanks quantity is above 800 kg.

If system is inoperative:

Check remaining fuel and consider diversion.

Avoid rapid manouvers and flying in severe turbulence conditions.

Before touchdown:

Rate of Descent MAXIMUM
 450 ft/min

Touch smoothly the runway surface. Reduce the engine thrust only after the touchdown.

FUEL LOW LEVEL

EICAS WARNING: FUEL 1 (2) LO LEVEL

Thrust Levers REDUCE TO
 LONG RANGE
 SET

Level the airplane and check both fuel quantities.

If fuel quantity is sufficient, complete the flight normally.

If fuel quantity is not sufficient, avoid pitch attitudes in excess of 10° nose down or 12° nose up attitude, uncoordinated maneuvers and negative g's.

CROSSFEED OPERATION

Procedure AS REQUIRED

Land at the nearest suitable airport.



LANDING GEAR/LEVER DISAGREE

EICAS WARNING: LG/LEVER DISAGREE

Airspeed MAXIMUM
200 KIAS
Landing Gear CYCLE

If the message persists:

In a retraction:

Landing Gear DOWN
Continue flight with landing gear down.

Airspeed MAXIMUM
250 KIAS

Land at the nearest suitable airport. Leave and avoid icing conditions.

In an extension:

ABNORMAL LANDING GEAR

EXTENSION Procedure ACCOMPLISH

ANTI-ICING INOPERATIVE IN ICING CONDITIONS

EICAS WARNING: ICE COND-A/I INOP with any or all Anti-icing System EICAS CAUTION

Below V_1 : TAKEOFF REJECT

On the ground, whenever the message is displayed, do not takeoff and perform the test below:

Thrust Levers IDLE
 Ice Detection Override Knob AUTO
 Ice Detection Test Knob..... 1, THEN 2

Test knob must be held for 5 seconds in each test position.

For each side separately, check that OPEN inscriptions in the anti-icing buttons flash alternately and that ICE DET 1 (or 2) FAIL caution message and ICE CONDITION advisory message are displayed on the EICAS.

If any OPEN inscription does not flash do not takeoff. Report to the maintenance personnel.

If the message ICE COND-A/I INOP persists do not takeoff. Report to the maintenance personnel.

If the message ICE COND-A/I INOP disappears within 60 seconds:
 TAKEOFF ACCOMPLISH

In flight:

Ice Detection Override Knob ALL
 If necessary, refer to the specific anti-icing system failure.
 If the message persists, exit and avoid icing conditions.



AUTOPILOT FAILURE

EICAS WARNING: AUTOPILOT FAIL

Aural Warning: AUTOPILOT (only below 2500 ft radio altitude, when autopilot is disconnected)

Autopilot.....DISENGAGE

Trim airplane as required.

NOTE: If associated with autopilot hardover a sudden deviation from the expected flight path may occur.

STALL PROTECTION INOPERATIVE

EICAS WARNING: SPS 1 (2) INOP

Associated Stall Protection System OFF

Avoid skidding the airplane.

If in icing conditions:

Add 15 KIAS to go-around speed.

Approach and landing configuration:

Landing Gear	DOWN
Flaps	22°
Airspeed.....	$V_{REF\ 45} + 15\text{ KIAS}$

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.55.

If not in icing conditions:

Add 5 KIAS to go-around speed.

Approach and landing configuration:

Landing Gear	DOWN
Flaps	45°
Airspeed.....	$V_{REF\ 45} + 5\text{ KIAS}$

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.13.



STICK PUSHER FAILURE

EICAS WARNING: SPS 1-2 INOP
EICAS CAUTION: STICK PUSHER FAIL

Control ColumnPUSH
FORWARD TO
NEUTRAL

Stall Protection is not available.

Airspeed1.2 V_{SR}
MINIMUM

TAKEOFF CONFIGURATION WARNING

EICAS WARNING: NO TAKEOFF CONFIG
Aural Warning: Voice Messages TAKEOFF-BRAKES, TAKEOFF-
FLAPS, TAKEOFF-SPOILERS TAKEOFF-TRIM or
TAKEOFF-FUEL

Do not takeoff. Airplane configuration.....CORRECT



ABNORMAL PROCEDURES

AIR CONDITIONING, PNEUMATICS AND PRESSURIZATION

APU BLEED VALVE FAIL

EICAS CAUTION: APU BLD VLV FAIL

If valve failed closed:

Engine Bleed..... AS REQUIRED

If valve failed open and a duct leak exists:

APU..... SHUTDOWN

BLEED LOW TEMPERATURE

EICAS CAUTION: BLD 1 (2) LOW TEMP

If temperature indication on MFD (ECS and Pneumatic Page) is in the green range or the pointer is out of view, disregard the message. Monitor the bleed temperature and report to the maintenance personnel.

If the pointer on MFD indicates low temperature (white range):

Associated Thrust Lever ADVANCE

Adjust associated Thrust Lever until the message disappears or until the pointer of the failed side reaches the green range or the remaining pointer.

If the message persists or if the MFD is not available:

Associated Bleed CLOSE

Altitude MAX 25000 ft
MINIMUM MEA

WARNING: IF IN ICING CONDITIONS, REFER TO SINGLE ENGINE OR SINGLE BLEED OPERATION IN ICING CONDITIONS PROCEDURE.

If the message persists, avoid or exit icing conditions.

NOTE: Ice Detection Override Knob must be set to ALL during at least 2 minutes either after exiting icing conditions or after ICE CONDITION advisory message has disappeared.



BLEED VALVE CLOSED

EICAS ADVISORY: BLD 1 (2) VLV CLSD

If required and situation permitting:

Associated Pack.....OFF THEN ON
Associated Bleed.....OPEN

If it is not possible to open bleed valve:

BLEED VALVE FAILURE Procedure.....ACCOMPLISH

BLEED VALVE FAILURE

EICAS CAUTION: BLD 1 (2) VLV FAIL

If BLD 2 VLV CLSD message is also displayed on the EICAS:

Crossbleed.....OPEN
Altitude.....MAX 25000 ft
MINIMUM MEA

If BLD 1 VLV CLSD message is also displayed on the EICAS:

If APU is not serviceable:

Crossbleed.....OPEN
Altitude.....MAX 25000 ft
MINIMUM MEA

If APU is serviceable:

Crossbleed.....CLOSE
APU.....START
APU Bleed.....OPEN
Altitude.....MAX 37000 ft
MINIMUM MEA

**WARNING: IF IN ICING CONDITIONS, REFER TO SINGLE
ENGINE OR SINGLE BLEED OPERATION IN ICING
CONDITIONS PROCEDURE.**

If BLD 1(2) VLV CLSD message is not displayed on the EICAS:

Monitor the system for the remainder of the flight.



CROSSBLEED FAILURE

EICAS CAUTION: CROSS BLD FAIL

If the valve has failed open, associated to a duct leakage or engine overtemperature:

Both Engine Bleeds.....	CLOSE
APU Bleed.....	CLOSE
Altitude	MAXIMUM MEA OR 10000 ft
Icing Conditions	EXIT/AVOID

CROSSBLEED SELECTED OFF

EICAS CAUTION: CROSS BLD SW OFF

Crossbleed Knob..... AUTO

ELECTRONIC BAY OVERTEMPERATURE

EICAS CAUTION: ELEKBAY OVTEMP

Turn off the redundant system and equipment unessential for the present phase of flight.

The following equipment is installed in the forward electronic compartment:

- ADC
- Transponder Mode S
- Integrated Communication Unit
- Aural Warning Computer
- FMS
- IRS
- Passenger Address
- Integrated Navigation Unit
- Inverters
- Dimmers
- Backup Battery

If the message remains, maintain a cross-check between main and standby instruments. In case a disagreement arises, assume the main instruments indication is unreliable and land at the nearest suitable airport.



HIGH STAGE VALVE FAILURE

EICAS CAUTION: HS VLV 1 (2) FAIL

Monitor bleed temperature.

If the bleed temperature is too high:

BLEED OVERTEMPERATURE

Procedure.....AS REQUIRED

If the bleed temperature is too low:

BLEED LOW TEMPERATURE

Procedure.....AS REQUIRED

**WARNING: IF IN ICING CONDITIONS, REFER TO SINGLE
ENGINE OR SINGLE BLEED OPERATION IN ICING
CONDITIONS PROCEDURE.**

HIGH ALTITUDE LANDING AND TAKEOFF FUNCTION

EICAS CAUTION: HI ALT LDG-T/O

NOTE: The use of the High Altitude function is prohibited.

If message is displayed:

HIGH ALT Button on MFD.....PRESS

PACK OVERHEAT

EICAS CAUTION: PACK 1 (2) OVHT

Associated Temperature & Mode SelectorAUTO/FULL
COLD

Cabin TemperatureMONITOR

Associated Pack.....RESET

If message remains:

Associated Temperature & Mode
SelectorMANUAL/
FULL COLD

Cabin TemperatureMONITOR

Associated Pack.....RESET

If the message still remains:

Associated Pack.....OFF
AltitudeMAX 25000 ft
MINIMUM MEA

CONTINUES ON NEXT PAGE



AIRPLANE FLIGHT MANUAL

ABNORMAL PROCEDURES

If both packs have been shutoff:

Altitude MEA OR
10000 ft,
WHICHEVER
IS HIGHER
Pressurization Mode Selector MAN
Pressurization Manual Controller AS REQUIRED
If required:
Pressurization Manual Controller FULL UP

NOTE: At least one bleed source, engines or APU, must be kept open.

PACK OVERLOAD

EICAS CAUTION: PACK 1 (2) OVLD

Associated Temperature & Mode Selector 12 O'CLOCK
Associated Pack OFF, THEN ON

If the message remains on:

Associated Pack OFF
Altitude MAX 25000 ft
MINIMUM MEA
Associated Engine Bleed OPEN

If both packs have been shutoff:

Altitude MEA OR
10000 ft,
WHICHEVER
IS HIGHER
Pressurization Mode Selector MAN
Pressurization Manual Controller AS REQUIRED
If required:
Pressurization Manual Controller FULL UP

NOTE: At least one bleed source, engines or APU, must be kept open.



PACK VALVE CLOSED

EICAS ADVISORY: PACK 1 (2) VLV CLSD

If required and situation permitting:

Associated Pack OFF, THEN ON

If it is not possible to open pack valve:

Altitude MAX 25000 ft
MINIMUM MEA

If both packs are closed:

Altitude MEA OR
10000 ft
WHICHEVER
IS HIGHER

PACK VALVE FAILURE

EICAS CAUTION: PACK 1 (2) VLV FAIL

If valve failed closed (pack valve closed advisory message is on):

Altitude MAX 25000 ft
MINIMUM MEA

If valve failed open and it is necessary to turn off associated air conditioning system:

Crossbleed CLOSE
Associated Bleed CLOSE
APU Bleed (if left pack failed) CLOSE
Altitude MAX 25000 ft
MINIMUM MEA

WARNING: IF IN ICING CONDITIONS, REFER TO SINGLE ENGINE OR SINGLE BLEED OPERATION IN ICING CONDITIONS PROCEDURE.

If both packs have been shutoff:

Altitude MEA OR
10000 ft,
WHICHEVER
IS HIGHER

Pressurization Mode Selector MAN

Pressurization Manual Controller AS REQUIRED

If required:

Pressurization Manual Controller FULL UP

NOTE: At least one bleed source, engines or APU, must be kept open.

CTA APPROVED
OCTOBER 23, 2002

REVISION 1 – DECEMBER 11, 2002

PRESSURIZATION AUTOMATIC SYSTEM FAILURE/ CABIN DEPRESSURIZATION

EICAS CAUTION: PRESN AUTO FAIL (may be presented)

Pressurization Manual Controller	11 O'CLOCK POSITION
Pressurization Mode Selector	MAN
Pressurization Manual Controller	AS REQUIRED

If unsuccessful:

Altitude	MEA OR 10000 ft, WHICHEVER IS HIGHER
Pressurization Manual Controller	FULL DOWN
Pressurization Mode Selector	AUTO
Pressurization Dump Button	PRESS

RAM AIR VALVE FAILURE

EICAS CAUTION: RAM AIR VLV FAIL

Air Conditioning System	MONITOR
-------------------------------	---------

If the PACK 1 (2) OVLD or PACK 1 (2) OVHT caution message appears:

Associated Pack	OFF
Altitude	MAX 25000 ft MINIMUM MEA

If both packs have been shutoff:

Altitude	MEA OR 10000 ft, WHICHEVER IS HIGHER
Pressurization Mode Selector	MAN
Pressurization Manual Controller	AS REQUIRED

If necessary:

Pressurization Manual Controller	FULL UP
--	---------

At least one bleed source, engines or APU, must be kept open.

LOSS OF PRESSURIZATION INDICATION

AIRPLANES PRE-MOD. SB 145LEG-00-0007

Use the remaining indications to maintain cabin altitude below 10000 ft, according to the table below:

AIRPLANE ALTITUDE (ft)	CABIN ALTITUDE (ft)	DIFFERENTIAL PRESSURE (psi)
10000	800	4.2
11000	1100	4.4
12000	1300	4.7
13000	1500	4.9
14000	1700	5.2
15000	2000	5.4
16000	2200	5.6
17000	2400	5.8
18000	2600	6.0
19000	2800	6.2
20000	3100	6.4
21000	3300	6.6
22000	3500	6.7
23000	3800	6.8
24000	4000	7.0
25000	4200	7.1
26000	4500	7.2
27000	4700	7.4
28000	4900	7.5
29000	5200	7.6
30000	5400	7.7
31000	5600	7.8
32000	5900	7.8
33000	6200	7.9
34000	6400	8.0
35000	6700	8.0
36000	7000	8.0
37000	7300	8.1
38000	7700	8.1
39000	8000	8.1

**AIRPLANES POST-MOD. SB 145LEG-00-0007 OR EQUIPPED WITH
AN EQUIVALENT MODIFICATION FACTORY INCORPORATED**

Use the remaining indications to maintain cabin altitude below 10000 ft, according to the table below:

AIRPLANE ALTITUDE (ft)	CABIN ALTITUDE (ft)	DIFFERENTIAL PRESSURE (psi)
10000	600	4.3
11000	900	4.5
12000	1100	4.8
13000	1300	5.0
14000	1500	5.3
15000	1700	5.5
16000	1900	5.7
17000	2100	6.0
18000	2300	6.2
19000	2500	6.4
20000	2700	6.6
21000	3000	6.7
22000	3200	6.9
23000	3400	7.0
24000	3600	7.2
25000	3800	7.3
26000	4000	7.5
27000	4200	7.6
28000	4500	7.7
29000	4700	7.8
30000	4900	7.9
31000	5100	8.0
32000	5400	8.1
33000	5600	8.1
34000	5800	8.2
35000	6100	8.2
36000	6400	8.3
37000	6700	8.3
38000	7100	8.3
39000	7400	8.3
40000	7700	8.3
41000	8000	8.4



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AUXILIARY POWER UNIT

APU AUTOMATIC SHUTDOWN

EICAS CAUTION: APU FAIL

If shutdown occurs with APU running:

Do not try to restart the APU.

Report to the maintenance personnel.

If shutdown occurs during APU start cycle and provided there is no obvious safety hazard:

APU START Procedure **AS REQUIRED**

If APU fails to restart, two more APU start attempts may be accomplished. If attempts are unsuccessful, report to maintenance personnel.

NOTE: Refer to APU STARTER LIMITS in AFM Limitations section between start attempts.

APU OIL LOW PRESSURE/OIL HIGH TEMPERATURE

EICAS CAUTION: APU OIL LO PRESS or APU OIL HI TEMP

If the APU is not essential for the flight:

APU **SHUTDOWN**

If APU is essential, monitor APU EGT and RPM.

If the APU EGT enters the red or amber range, apply the APU OVERTEMPERATURE Procedure.

If RPM enters red range:

APU **SHUTDOWN**



DOORS, MISCELLANEOUS

BAGGAGE/ACCESS DOOR OPEN

EICAS CAUTION: BAGGAGE DOOR OPN or ACCESS DOORS OPN

Avoid rapid maneuvers.

If it is not possible to maintain the pressurization, proceed:

Altitude	MEA OR 10000 ft, WHICHEVER IS HIGHER
Pressurization.....	MONITOR

EMERGENCY EXIT OPEN

EICAS CAUTION: EMERG EXIT OPEN

Fasten BeltsON

Verify door handle pushed in and remove passengers from the seats near the associated emergency exit.

If emergency exit is not confirmed locked or it is not possible to maintain the pressurization:

Altitude	MEA OR 10000 ft, WHICHEVER IS HIGHER
Cabin Pressure.....	MONITOR



IMPAIRED OR CRACKED WINDSHIELD

Associated Windshield Heating OFF

If only the outer layer (glass) is cracked, no action is required.

If not, proceed as follows:

Cockpit Door CLOSE
Altitude MEA OR
BELOW
10000 ft,
WHICHEVER
IS HIGHER
Cabin $\Delta P = 1$ psi SET

NOTE: Pressurization Manual Controller must be used to reach and maintain cabin altitude steady while descending.

Airspeed MAXIMUM
250 KIAS

Smoke Goggle DON

In case both windshields are impaired:

Cabin (below 10000 ft) DEPRESSURIZE
Airspeed MAX 140 KIAS
MINIMUM V_{REF}

Check no loose objects in the cockpit.

If necessary:

Direct Vision Window REMOVE
Landing must be made by looking through Direct Vision Window.

NOTE: Intercommunication will be impossible with window removed.

INTERNAL BAGGAGE ACCESS DOOR OPEN

EICAS CAUTION: BAGG ACCESS OPN

Check doors pictorial on MFD Takeoff Page. If message is confirmed or if MFD is not available:

Door CLOSE AND
LOCK



OVERWEIGHT LANDING

Approach and landing configuration:

If in icing conditions:

- Landing Gear.....DOWN
- Flaps.....22°
- Airspeed $V_{REF\ 45} + 10\text{ KIAS}$

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.45.

If not in icing conditions:

- Landing Gear.....DOWN
- Flaps.....45°
- Airspeed $V_{REF\ 45}$

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.06.

Before touchdown:

- Rate of DescentMAXIMUM
300 ft/min

Touch smoothly the runway surface. Reduce the engine thrust only after the touchdown.

After stopping:

- Maintenance Personnel.....REPORT



ELECTRICAL EMERGENCY ABNORMAL TRANSFER

EICAS CAUTION: ELEC EMERG ABNORM

Essential Power OFF
APU Generator ON

CAUTION: IF APU GENERATOR IS NOT AVAILABLE OR IF THE MESSAGE REMAINS, BATTERY DURATION WILL BE 40 MINUTES.

Land at the nearest suitable airport.

EMERGENCY LIGHTS NOT ARMED

EICAS CAUTION: EMERG LT NOT ARMD

Emergency Lighting Selector ARM
If unsuccessful, check that Attendant Emergency Light Control Button is set to NORM.

ESSENTIAL BUS OFF OR SHED BUS OFF

EICAS CAUTION: ESS BUS 1 (2) OFF or SHED BUS 1 (2) OFF

Check Essential Buses.

If message is confirmed and shed buses or only one essential bus is off, monitor the system for the remainder of the flight.

If both essential buses are off:

Bus Ties OFF
If DC Bus 1 is energized (PFD 1 and MFD 2 energized):
 Battery 1 OFF
If DC Bus 2 is energized (PFD 2 and MFD 1 energized):
 Battery 2 OFF

GENERATOR BEARING FAILURE

EICAS ADVISORY: GEN 1 (2, 3, 4) BRG FAIL

Report to the maintenance personnel.



GENERATOR OFF BUS

EICAS CAUTION: GEN 1 (2, 3, 4) OFF BUS or APU GEN OFF BUS

Affected Generator OFF, THEN ON

If the generator does not reset:

APU Generator AS REQUIRED

CAUTION: • IF ALL GENERATORS ARE OFF BUS, CABIN WILL
DEPRESSURIZE. REFER TO LOSS OF ALL
GENERATORS PROCEDURE.

- BATTERY DURATION IS 40 MINUTES.

GENERATOR OVERLOAD

EICAS CAUTION: GEN 1 (2, 3, 4) OVLD or APU GEN OVLD

Shed Buses OFF

If the message remains:

Electrical Load (on affected generator) REDUCE

If APU generator is not affected and any generator is overloaded:

APU Generator ON



ENGINE

ABNORMAL ENGINE START

Either on ground or in flight, abort engine start immediately when:

- Fuel flow higher than 800 pph prior to light-up (ITT rise).

CAUTION: EXCESSIVE FUEL FLOW GREATER THAN 800 PPH PRIOR TO LIGHT-UP CAN CAUSE OVERTEMPERATURE, ENGINE DAMAGE OR AN ENGINE FIRE.

- No light-up in 10 seconds after the first fuel flow indication.

NOTE: The start should not be aborted if fuel flow drops to zero pph immediately after light-up.

- ITT rises rapidly toward start limit.
- ITT approaches start limit.
- N2 remains steady or decreases for more than 5 seconds.
- Any unusual noise or vibration occurs.
- Engine instruments indicate abnormal conditions.
- Visible burning on the exhaust pipe.
- Oil pressure does not reach at least 34 psi after the engine reaches stabilized idle.

To abort start:	
Associated Thrust Lever	IDLE
Start/Stop Selector	STOP

If fire occurs or engine does not shutdown:

- Fire Extinguishing HandlePULL
- ENGINE DRY MOTORING Procedure.....ACCOMPLISH



CHECK ENGINE PERFORMANCE

EICAS ADVISORY: CHECK A1P (A1E) PERF

Associated Engine Performance..... CHECK

ENGINE ABNORMAL VIBRATION

Associated Thrust Lever REDUCE TO
KEEP VIBRATION
WITHIN LIMITS

CAUTION: CONTINUOUS VIBRATION ABOVE LIMITS MAY
DAMAGE THE ENGINE.

If vibration indication remains out of limits:

PRECAUTIONARY ENGINE

SHUTDOWN Procedure..... ACCOMPLISH



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ENGINE AIRSTART

Affected engine:

One Electric Fuel Pump (A or B).....	ON
Ignition.....	AUTO
Start/Stop Selector	STOP
Engine Bleed.....	CLOSE
Thrust Lever	IDLE
Airspeed and Altitude	REFER TO AIRSTART ENVELOPE

Perform an assisted start or windmilling, as required:

CAUTION: IN ICING CONDITIONS DO NOT USE APU BLEED START,
TO AVOID LOSS OF ANTI-ICE SYSTEM PERFORMANCE.

Assisted Start:

Crossbleed Start:

N2 (operating engine)	ABOVE 80%
Crossbleed.....	AUTO OR

OPEN

Engine Bleed (operating engine)	OPEN
---------------------------------------	------

For AE3007A1E engines only:

N2 (inoperative engine)	BELOW 56%
-------------------------------	-----------

Start/Stop Selector	START, THEN RUN
---------------------------	--------------------

Engine Indication	MONITOR
-------------------------	---------

Check ignition. Check ITT and N2 rising. Observe limits.

Abort start immediately if an Abnormal Engine Start is detected.

NOTE: For AE3007A1E engines only, if the engine airstart was unsuccessful, reset the FADEC of the inoperative engine and reattempt engine airstart.

APU bleed start:

APU.....	START
----------	-------

APU Bleed	OPEN
-----------------	------

Crossbleed.....	AUTO OR OPEN
-----------------	-----------------

Engine Bleed (operating engine)	CLOSE
---------------------------------------	-------

For AE3007A1E engines only:

N2 (inoperative engine)	BELOW 56%
-------------------------------	-----------

Start/Stop Selector	START, THEN RUN
---------------------------	--------------------

CONTINUES ON NEXT PAGE



CONTINUED FROM PREVIOUS PAGE

Engine Indication.....MONITOR
Check ignition. Check ITT and N2 rising. Observe limits.
Abort start immediately if an Abnormal Engine Start is detected.

NOTE: For AE3007A1E engines only, if the engine airstart was unsuccessful, reset the FADEC of the inoperative engine and reattempt engine airstart.

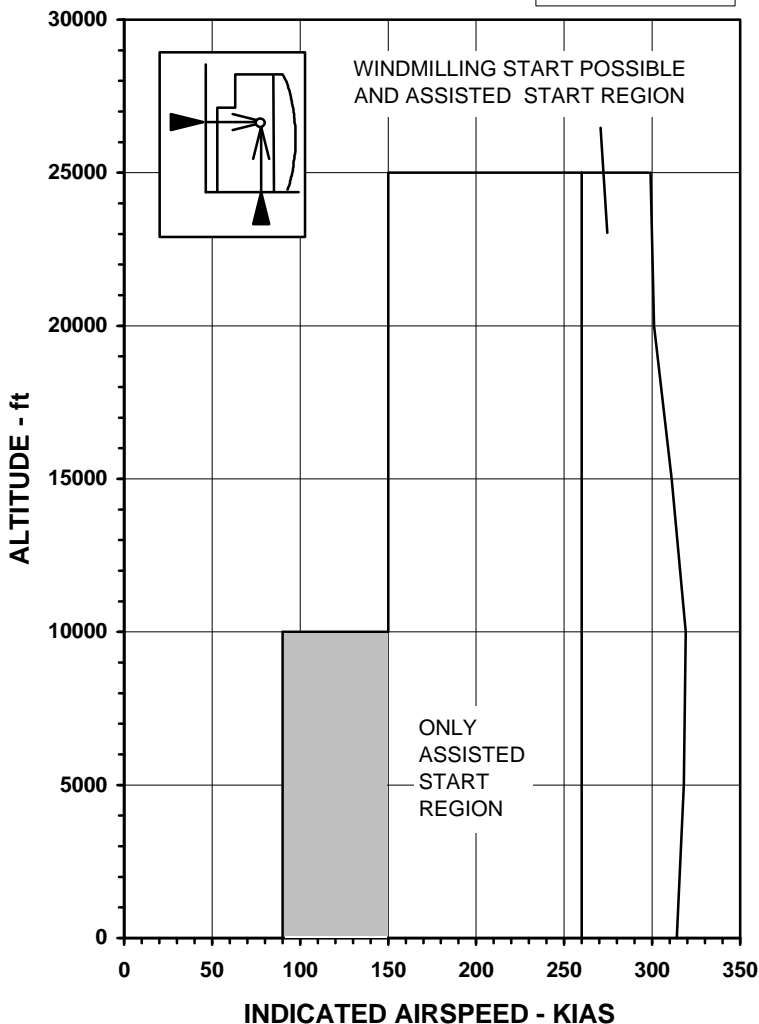
Windmilling Start:
AirspeedABOVE
260 KIAS
Minimum N210%
For AE3007A1E engines only:
N2 (inoperative engine)BELOW 56%
Start/Stop SelectorSTART, THEN
RUN
ITT and N2MONITOR
Observe limits. Abort start immediately if an Abnormal Engine Start is detected.

- NOTE:** - Windmilling start will be slower than an assisted start.
- For AE3007A1E engines only, if the engine airstart was unsuccessful, reset the FADEC of the inoperative engine and reattempt engine airstart.
 - Windmilling start with N2 above 30% and increasing, the loss of altitude may be minimized, by reducing airspeed.
 - Engine windmilling start should be performed while N2 is decreasing down to 10%. With N2 below 10% airstart will not be successful.
 - Residual ITT above 210°C may result in hot or hung start.
 - ITT peaks may occur during windmilling starts above 10000 ft with airspeed below 290 knots. In this case, the engine may operate above the ITT limit, up to 850°C, for a maximum of 5 seconds. Abort the start if the engine remains operating above the ITT limit for more than 5 seconds.

After start:
Affected Engine Bleed.....AS REQUIRED
CrossbleedAUTO
APU BleedAS REQUIRED

ENGINE AIRSTART ENVELOPE

AE3007 ENGINES



145CTA57 -25JUL2000

NOTE: Shaded area may be below 1.23 V_{SR} .



ENGINE ATS SHUTOFF VALVE OPEN

EICAS CAUTION: E1 (2) ATS SOV OPN

Associated Bleed.....CLOSE

CrossbleedCLOSE

Exit and avoid icing conditions.

WARNING: IF IN ICING CONDITIONS, REFER TO SINGLE
ENGINE OR SINGLE BLEED OPERATION IN ICING
CONDITIONS PROCEDURE.

ENGINE CONTROL FAILURE

EICAS CAUTION: E1 (2) CTL FAIL (may be presented)

CAUTION: DO NOT MANUALLY ALTERNATE ASSOCIATED
FADECs.

Verify the associated FADEC in control.

Associated FADEC.....RESET

If FADEC alternates automatically:

Avoid quick movements of the associated Thrust Lever.

NOTE: Thrust Lever movements may cause surge or an
uncommanded engine shutdown.

If the associated engine thrust is no longer controllable:

PRECAUTIONARY ENGINE

SHUTDOWN procedure.....AS REQUIRED

If FADEC does not alternate automatically:

Engine control is recovered. Continue the flight.

ENGINE DRY MOTORING

Dry motor the engine for a minimum of 30 seconds to clear it of unburned fuel prior to attempting another start.

FADEC Control Knob ALTN

Check alternation of FADEC-in-control indication on the EICAS.

CAUTION: IF FADEC DOES NOT ALTERNATE, DO NOT PROCEED WITH THE ENGINE DRY MOTORING AND REPORT TO THE MAINTENANCE PERSONNEL.

One Electric Fuel Pump ON

Turn on one electric fuel pump to prevent engine fuel pump from running dry.

Ignition OFF

Check IGN OFF indication on EICAS display.

Start/Stop Selector START

After 30 seconds:

Start/Stop Selector STOP

Electric Fuel Pump OFF

Ignition Selector AUTO

ENGINE FAILURE

Remaining Engine Thrust Rating CON

Altitude MAX 25000 ft

MINIMUM MEA

ENGINE AIRSTART Procedure AS REQUIRED

WARNING: IF IN ICING CONDITIONS, REFER TO SINGLE ENGINE OR SINGLE BLEED OPERATION IN ICING CONDITIONS PROCEDURE.

NOTE: If in flight below 9700 ft, the air conditioning pack valves will close automatically. The APU may be used as pneumatic source by closing the remaining engine bleed valve.

ENGINE FUEL FILTER IMPENDING BYPASS

EICAS ADVISORY: E1 (2) FUEL IMP BYP

If only one engine fuel filter is affected:

Continue the flight and report to the maintenance personnel.

If both engine fuel filters are affected:

Land at the nearest suitable airport.



ENGINE LIMITS EXCEEDANCE

EICAS ADVISORY: E1 (2) EXCEEDANCE

Do not takeoff.

Report to the maintenance personnel.

ENGINE NO TAKEOFF DATA

EICAS CAUTION: ENG NO TO DATA

Enter takeoff data before takeoff.

ENGINE NOT DISPATCHABLE

EICAS CAUTION: E1 (2) NO DISP

Report to the maintenance personnel.

ENGINE OIL FILTER IMPENDING BYPASS

EICAS ADVISORY: E1 (2) OIL IMP BYP

Continue the flight and report to the maintenance personnel.

ENGINE OIL HIGH PRESSURE

Oil Pressure, oil temperature,
oil level, engine vibrationMONITOR
If oil temperature, and/or oil level, and/or engine vibration, exceeds
normal operation range:
Associated ProcedureACCOMPLISH
Report to the maintenance personnel.

ENGINE OIL HIGH TEMPERATURE

Associated Thrust Lever.....REDUCE
Reduce thrust lever and maintain the temperature within limits.
If oil temperature remains high, above 25000 ft:
AltitudeMAX 25000 ft
MINIMUM MEA
Monitor oil temperature for the remainder of the flight.
If limits cannot be maintained, perform a precautionary engine
shutdown to prevent engine damage.



ENGINE OIL LOW LEVEL

Monitor oil pressure for the remainder of the flight.

Consider performing a precautionary engine shutdown in order to preserve oil quantity so that engine may be restarted prior to landing.

ENGINE OIL LOW PRESSURE

If flight conditions permit, reduce N2 below 88%, and monitor oil temperature.

ENGINE OUT

EICAS CAUTION: ENG1 (2) OUT

If during takeoff, below V_1 :

REJECTED TAKEOFF Procedure..... ACCOMPLISH

If during takeoff, above V_1 and associated with an engine flameout:

TAKEOFF WITH ENGINE

FAILURE Procedure..... ACCOMPLISH

If in flight:

PRECAUTIONARY ENGINE

SHUTDOWN Procedure..... ACCOMPLISH

ENGINE AIRSTART Procedure..... AS REQUIRED

ENGINE OVERTEMPERATURE

Associated Thrust Lever REDUCE

If the condition remains:

Associated Bleed CLOSE

Altitude MAX 25000 ft
MINIMUM MEA

If the conditions remains:

PRECAUTIONARY ENGINE SHUTDOWN or

ENGINE FIRE, SEVERE DAMAGE OR

SEPARATION Procedure..... ACCOMPLISH



ENGINE REFERENCE ANTI-ICE DISAGREE

EICAS CAUTION: ENG REF A/I DISAG

Check ice protection system selection against takeoff data entered.

ENGINE SHORT DISPATCHABLE

EICAS ADVISORY: E1 (2) SHORT DISP

Report to the maintenance personnel for dispatchability analysis.

ENGINE THRUST REVERSER DISAGREE

EICAS CAUTION: ENG1 (2) REV DISAGREE

On ground:

During takeoff:
Before V_1 , abort takeoff.

During landing:
Affected Thrust Lever..... IDLE

In flight:

N1..... CHECK

If N1 is decreasing:

Associated Thrust Lever IDLE
Airspeed MAXIMUM
200 KIAS

PRECAUTIONARY ENGINE

SHUTDOWN Procedure..... ACCOMPLISH
Land at the nearest suitable airport.

NOTE: When aborting takeoff or during landing run, if reverser thrust is required, do not move affected Thrust Lever below IDLE, to allow opposite engine acceleration in reverse thrust.

FADEC NOT DISPATCHABLE

EICAS CAUTION: FADEC ID NO DISP

Report to the maintenance personnel.

LOSS OF ENGINE INDICATIONS

CONDITION: Loss of Thrust Mode, ITT, N1 and N2 indications.

If engine is operative but the indications are lost, proceed:

Associated FADEC RESET

If engine indications are still not available:

Associated FADEC ALTN

If engine indications are still not available:

Monitor the remaining engine indications.

PRECAUTIONARY ENGINE

SHUTDOWN Procedure AS REQUIRED

ONE ENGINE INOPERATIVE APPROACH AND LANDING

Inoperative Engine Thrust Lever IDLE

Landing Gear DOWN

Thrust Rating..... TAKEOFF
 MODE

When landing is assured:

Flaps 22°

Airspeed..... $V_{REF 45} +$
 10 KIAS

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING
 DISTANCE, MULTIPLY THE UNFACTORED LANDING
 DISTANCE FOR FLAPS 45° BY 1.44.

ONE ENGINE INOPERATIVE GO-AROUND

Quick Disconnect Button..... PRESS

Go Around Button PRESS

Operative Engine Thrust Lever MAX

NOTE: Do not set inoperative engine thrust lever out of idle.

Rotate to go-around attitude (10° nose up).

Flaps 9°

With positive rate of climb:

Landing Gear UP

Minimum Airspeed APPROACH
 CLIMB SPEED

At level off height, proceed as for TAKEOFF WITH ENGINE FAILURE
 Procedure.

NOTE: - Limiting bank angle to 5° towards operative engine improves
 climb performance.

- During the GO-AROUND procedure, the DON'T SINK aural
 warning may sound. In this case monitor the sink rate and
 follow the GO-AROUND guidance.



PRECAUTIONARY ENGINE SHUTDOWN

Associated Thrust Lever.....IDLE
Associated Start/Stop Selector.....STOP

NOTE: Engine will not shutdown with the START/STOP Selector unless associated Thrust Lever is first moved to IDLE. If STOP is selected before Thrust Lever is retarded to IDLE, momentarily cycle START/STOP Selector to RUN and back to STOP.

If engine shutdown does not occur:

Fire Extinguishing HandlePULL (DO NOT ROTATE)
Remaining Engine Thrust RatingCON
Verify N2 and ITT decreasing below IDLE values.
APUSTART
APU Bleed.....AS REQUIRED
CrossbleedAS REQUIRED

WARNING: IF IN ICING CONDITIONS, REFER TO SINGLE ENGINE OR SINGLE BLEED OPERATION IN ICING CONDITIONS PROCEDURE.

NOTE: If in flight below 9700 ft, the air conditioning pack valves will close automatically. The APU may be used as pneumatic source by closing the remaining engine bleed valve.

THRUST LEVER FAILURE

EICAS CAUTION: ENG1 (2) TLA FAIL

Associated FADEC.....RESET

If Thrust Lever command is not available:

Associated FADEC.....ALTN

If thrust lever still does not respond thrust can be partially controlled through the Thrust Rating Buttons.

PRECAUTIONARY ENGINE

SHUTDOWN ProcedureAS REQUIRED



AIRPLANE FLIGHT MANUAL

ABNORMAL
PROCEDURES

THRUST LEVER STOP FAILURE

EICAS ADVISORY: E1 (2) IDL STP FAIL

Be careful when reducing engines near IDLE.

CAUTION: NEVER SET THRUST LEVERS BELOW IDLE INFLIGHT.

FIRE PROTECTION

FIRE DETECTION FAILURE

EICAS CAUTION: E1 (2) FIREDET FAIL or APU FIREDET FAIL

If E1 (2) FIREDET FAIL message appears simultaneously with engine failure:

ENGINE FIRE, SEVERE

DAMAGE OR SEPARATION ProcedureACCOMPLISH

Engine or APUMONITOR

If fire or overheat is suspected:

ENGINE FIRE, SEVERE DAMAGE
OR SEPARATION

or APU FIRE ProcedureACCOMPLISH

FIRE EXTINGUISHING INOPERATIVE

EICAS CAUTION: E1 (2) EXBTBLA INOP, E1 (2) EXBTBLB INOP,
APU EXBTBL INOP or BAGG EXBTBL INOP (if
installed)

On Engines:

Only one discharge will be available from the remaining bottle, to
protect both engines against fire.

On APU:

Consider shutting APU down (or not starting it) if bleed extraction or
electrical generation is not essential.

On Baggage Compartment:

In flight:

If associated with the BAGG SMOKE message, land at the
nearest suitable airport.

On ground:

Report to the maintenance personnel.

FLIGHT CONTROLS

AILERON SYSTEM INOPERATIVE

EICAS CAUTION: AIL SYS 1 (2) INOP

Associated Aileron System OFF

Airspeed MAXIMUM
250 KIAS

If the remaining system fails:

Remaining Aileron System..... OFF

Quick Disconnect Button.....PRESS

Aileron is operating under mechanical reversion mode. Expect greater aileron control force. If required, both pilot should act together to control airplane. Avoid landing at airports with anticipated turbulence or crosswind. Perform a long final approach.

Approach and landing configuration:

Landing Gear DOWN

Flaps 22°

Airspeed..... $V_{REF\ 45} + 10\text{ KIAS}$

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.45.

FLAP LOW ACTUATION SPEED

EICAS ADVISORY: FLAP LOW SPEED

Anticipate flap actuation.

FLAP SYSTEM FAILURE

EICAS CAUTION: FLAP FAIL

Flaps may be at intermediate positions. Maintain airspeed according to the following:

FLAPS POSITION	MAXIMUM AIRSPEED
1° to 9°	250 KIAS
10° to 22°	180 KIAS
23° to 45°	145 KIAS

When landing maintain airspeed according to the following:

FLAPS POSITION	MINIMUM AIRSPEED
0 to 8°	$V_{REF\ 45} + 30$ KIAS
9° to 21°	$V_{REF\ 45} + 10$ KIAS
22° to 44°	$V_{REF\ 45} + 5$ KIAS
45°	$V_{REF\ 45}$

CAUTION: • IF FLAP FAILED BETWEEN 22° AND 45° POSITION EXIT OR AVOID ICING CONDITIONS.

- TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.70 WHEN LANDING WITH FLAPS BETWEEN ZERO AND 8°.
- TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.40 WHEN LANDING WITH FLAPS BETWEEN 9° AND 21°.
- TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.20 WHEN LANDING WITH FLAPS BETWEEN 22° AND 44°.

NOTE: - Depending on the flap position, EGPWS warnings may sound. If necessary, inhibit EGPWS by pulling its circuit breaker (J8).

- If flap indication on EICAS is not available, use flap position marks on the wing.

GUST LOCK FAILURE

LIGHT: GUST LOCK (amber)

On ground:

Do not takeoff.

Report to the maintenance personnel.

In flight:

Do not push control column full Nose Down.

Avoid flying in turbulence conditions.

Consider diversion.

Avoid landing at airports with anticipated turbulence or crosswind.

Report to the maintenance personnel.

PITCH TRIM SWITCH INOPERATIVE

EICAS CAUTION: PTRIM CPT SW FAIL, PTRIM F/O SW FAIL,
PTRIM BKP SW FAIL

On ground:

Deenergize the airplane and energize it again.

If message remains:

Report to the maintenance.

In flight:

Use another serviceable switch.

RUDDER HARDOVER PROTECTION FAILURE

EICAS CAUTION: RUD HDOV PROTFAIL

On ground:

Do not takeoff.

In flight:

Hardover protection is not available.

Report to the maintenance personnel.

RUDDER OVERBOOST

EICAS CAUTION: RUDDER OVERBOOST

Rudder System 2 OFF

If the message disappears:

Continue flight with rudder system 2 off.

Below 135 KIAS:

Rudder System 2 ON

If message remains:

Rudder System 2 ON

Rudder System 1 OFF

Continue flight with the rudder system 1 off.

Below 135 KIAS:

Rudder System 1 ON

RUDDER SYSTEM INOPERATIVE

EICAS CAUTION: RUDDER SYS 1 (2) INOP or RUDDER SYS 1-2 INOP

If only one rudder system is affected:

Affected Rudder System OFF

If RUDDER SYS 1-2 INOP message is displayed:

Rudder System 2 OFF

If RUDDER SYS 1-2 INOP message is still displayed:

Rudder System 1 OFF

CAUTION: IF THE MESSAGE IS PRESENTED FOLLOWING A
RUDDER RUNAWAY, DO NOT TURN ON THE
SYSTEMS.

Both Rudder Systems ON

If RUDDER SYS 1-2 INOP message is still displayed:

Expect greater rudder pedal force. If required, both pilots should act together to control the airplane. Consider the use of aileron to help in yaw control, and asymmetric thrust to control the airplane.

Avoid landing at airports with anticipated turbulence, gusts or crosswind.

If landing in icing conditions:

Landing Gear DOWN

Flaps 22°

Airspeed $V_{REF 45} + 10$ KIAS

CAUTION: TO DETERMINE THE MINIMUM SUITABLE
LANDING DISTANCE, MULTIPLY THE
UNFACTORED LANDING DISTANCE FOR
FLAPS 45° BY 1.45.

RUDDER/YAW TRIM RUNAWAY

Quick Disconnect Button.....	PRESS AND HOLD
Rudder Systems 1 and 2.....	OFF

Yaw Trim Circuit Breaker (F12) PULL
 Quick Disconnect Button..... RELEASE

Strongly push pedal opposite to the side of the uncommanded yaw, while applying ailerons to control roll.

If necessary, turn on one rudder system at a time to identify the failed system. Prepare to overcome the yaw generated by the failed system. Continue the flight with the failed system off.

If both systems remains inoperative:

Expect greater rudder pedals force. Both pilots should act together to control the airplane, if required. Consider the use of aileron to help in yaw control, and asymmetric thrust to trim the airplane.

Do not use yaw trim system for the remainder of the flight.

Avoid landing at airports with anticipated turbulence or crosswind.

Land at the nearest suitable airport.

CAUTION: DO NOT TRY TO RESET THE RUDDER SYSTEMS.

SPEED BRAKE LEVER DISAGREE

EICAS CAUTION: SPBK LVR DISAGREE

Speed Brake Lever CLOSE



FUEL

APU FUEL LOW PRESSURE

EICAS CAUTION: APU FUEL LO PRESS

Select another right electric fuel pump (2A, 2B or 2C) on the associated tank.

If message remains, repeat the procedure.

Report to maintenance personnel.

APU FUEL SHUTOFF VALVE CLOSED

EICAS ADVISORY: APU FUEL SOV CLSD

If valve is open and APU is running normally, disregard the message.

Report to maintenance personnel.

APU FUEL SHUTOFF VALVE FAILED

EICAS CAUTION: APU FUEL SOV INOP

Check that APU Fuel Shutoff Button is not pressed.

If valve remains closed and it is not possible to restart the APU:

APU Master Knob.....OFF

If APU is running normally, disregard the message. Report to the maintenance personnel.

ENGINE FUEL SHUTOFF VALVE CLOSED

EICAS ADVISORY: E1 (2) FUEL SOV CLSD

Fire Extinguishing Handle.....CHECK IN

If valve is open and engine is running normally, disregard the message. Report to the maintenance personnel.

If valve remains closed and it is not possible to restart the affected engine:

PRECAUTIONARY ENGINE

SHUTDOWN ProcedureACCOMPLISH

Land at the nearest suitable airport.

ENGINE FUEL SHUTOFF VALVE FAILURE

EICAS CAUTION: E1 (2) FUEL SOV INOP

Engine Fuel Indications **MONITOR**

If the message has been presented during a fire procedure:

Crossfeed **OFF**

Associated Fuel Pumps **OFF**

If valve is confirmed closed during normal operation (fuel flow decreasing to zero):

Fire Extinguishing Handle **CHECK IN**

If valve remains closed and it is not possible to restart the affected engine, land at the nearest suitable airport.

PRECAUTIONARY ENGINE

SHUTDOWN Procedure **ACCOMPLISH**

If engine is running normally, disregard the message.

FUEL CROSSFEED FAILURE

EICAS CAUTION: FUEL XFEED FAIL

Fuel Imbalance **MONITOR**

Asymmetric Thrust **AS REQUIRED**

FUEL CROSSFEED MISCOMMAND

EICAS CAUTION: FUEL XFEED MISCMD

Crossfeed Selector Knob **OFF**

Fuel Imbalance **CHECK**

Crossfeed Selector Knob **AS REQUIRED**

Check crossfeed selector knob properly positioned to correct wing fuel imbalance.

FUEL CROSSFEED OPEN

EICAS ADVISORY: FUEL XFEED OPEN

If not required, close crossfeed.



FUEL LOW PRESSURE

EICAS CAUTION: E1 (2) FUEL LO PRESS

Select another electric fuel pump on the associated tank.

If all pumps in one tank are inoperative:

AltitudeMAX 25000 ft
MINIMUM MEA

NOTE: If required, Crossfeed may be open above 25000 ft.

Avoid rapid thrust lever movements and set minimum required thrust.

FUEL LOW TEMPERATURE

EICAS CAUTION: FUEL TANK LO TEMP or E1 (2) FUEL LO TEMP

WARNING: IF FUEL TANK LO TEMP MESSAGE IS PRESENTED, IN ANY CASE, OR E1 (2) FUEL LO TEMP IS PRESENTED WITHOUT ICING INHIBITOR, ENGINE FLAMEOUT MAY OCCUR.

On ground:

Low temperature in the engine (E1 or E2 FUEL LO TEMP):

Before takeoff, check that fuel icing inhibitor has been added to the fuel.

Low temperature in the tank (FUEL TANK LO TEMP):

Check tank temperature. If message is confirmed or if MFD is not available, do not takeoff.

In flight:

Descend to lower altitude and monitor engine indications as long as the message remains.

If the low temperature is in the tank (FUEL TANK LO TEMP) and MFD is available, tank temperature may be checked on the MFD Fuel Page, before descending.



FUEL TANK VENTILATION VALVE OPEN

EICAS CAUTION: FUEL TK VENT OPEN

On ground:
Do not takeoff.

In flight:

While there is fuel in aft auxiliary fuel tanks:

Altitude	MAX 25000 ft MINIMUM MEA
Airspeed	MAXIMUM 300 KIAS

Avoid pitch attitudes in excess of 5° nose up attitude, uncoordinated maneuvers and negative g's.
Report to maintenance personnel.

FUEL TRANSFER SYSTEM CHECK

EICAS CAUTION: FUEL XFER CHECK

Fuselage Tank Transfer Knob FUS 1 or FUS 2

FUEL TRANSFER SYSTEM INOPERATIVE

EICAS CAUTION: FUEL XFER 1 (2) INOP

On ground:
Do not takeoff. Report to the maintenance personnel.

In flight:

Forward Pump Selector Button..... ALTERNATE

If message persists:

Altitude ABOVE 20000 ft

If message persists:

Fuselage Tank Transfer Knob ALTERNATE
FUS TK

Fuel Quantity..... MONITOR

Check remaining fuel quantity available and consider diversion.



FUSELAGE FUEL IMBALANCE

EICAS CAUTION: FUSELAGE FUEL IMB

If fuselage fuel imbalance is confirmed:

Fuselage Tank Transfer KnobOFF

Check MFD Fuel page for auxiliary tanks total quantity.

If any left side auxiliary tanks quantity decreases:

Fuselage Tank Transfer KnobFUS 1

If any right side auxiliary tanks quantity decreases:

Fuselage Tank Transfer KnobFUS 2

If auxiliary tanks quantity remains steady:

Fuselage Tank Transfer KnobOFF

REFUELING COMPARTMENT DOOR OPEN

EICAS CAUTION: FUELING DOOR OPN

On ground:

Check the door for positive locking before takeoff. If the message remains, repair is required before takeoff.

In flight:

Report to the maintenance personnel.

SUSPECTED FUEL LEAK

If FMS Fuel Remaining quantity is less than 660 lb above the MFD Total Fuel indication:

If left wing presents lower level:

Crossfeed Selector LOW1

If right wing presents lower level:

Crossfeed Selector LOW2

Set engines at the same N1 and compare the Fuel Flow indications.

If a discrepancy is noticed and is consistent with the imbalance (high fuel flow X and low level X), a fuel leakage may be occurring after the fuel flow sensor.

Consider shutting down the engine on the same side of the presumed fuel leak in order to minimize fuel loss.

Land at the nearest suitable airport.

If no discrepancy is noticed, when the desired balance is achieved:

Crossfeed Selector OFF

Monitor Total Fuel Indication in MFD Fuel Page with FMS Fuel Remaining information.

If FMS Fuel Remaining quantity is more than 660 lb above the MFD Total Fuel indication, a fuel leakage may be occurring before the fuel flow sensor. Proceed as follows:

Crossfeed Selector OFF

Throttle on Low Level Wing IDLE

Affected Engine Fire Handle PULL (DO NOT ROTATE)

Land at the nearest suitable airport.



WING FUEL IMBALANCE

EICAS CAUTION: WING FUEL IMBALANCE

If wing fuel imbalance is confirmed:

CROSSFEED OPERATION

Procedure.....ACCOMPLISH

WING TANKS OVERFLOW

EICAS CAUTION: FUEL XFER OVERFLOW

Fuselage Tank Transfer Knob.....OFF

When required:

Fuselage Tank Transfer KnobFUS 1 or FUS 2

Wing Fuel Tank Quantity.....MONITOR

Monitor wing fuel quantity and turn Fuselage Tank Transfer Knob OFF when wing fuel reaches 5290 lb.

Report to the maintenance personnel.

HYDRAULICS, LANDING GEAR & BRAKES

ABNORMAL LANDING GEAR EXTENSION

Landing Gear Lever DOWN

Gear Electrical Override..... DOORS

Wait 3 seconds:

Gear Electrical Override..... GEAR

Landing Gear Indication..... CHECK

If any of the gear is not locked down:

Landing Gear Lever UP

Gear Electrical Override..... NORMAL

Wait 10 seconds.

Free Fall Lever ACTUATE

Actuate the free fall lever up to full uplock position.

Landing Gear Lever DOWN

Landing Gear Indication..... CHECK

If the failure persists:

Free Fall Lever..... CYCLE

Cycle the free fall lever as long as necessary, but limited to 10 times, to lower the landing gear. Wait 20 seconds, with the lever in the uplock position, between each cycle. Verify lever at full uplock position after cycling.

If the failure still persists:

PARTIAL OR GEAR UP

LANDING Procedure..... ACCOMPLISH



BOTH HYDRAULIC SYSTEMS FAILURE

EICAS CAUTION: HYD SYS 1-2 FAIL, RUDDER SYS 1-2 INOP,
AIL SYS 1-2 INOP

EICAS ADVISORY: E1-2 HYD PUMP FAIL

AirspeedMAXIMUM
250 KIAS

- Check hydraulic systems fluid quantity:
 - If any hydraulic system fluid quantity is in green range:
 - Associated Electric Hydraulic PumpON
 - If any hydraulic system fluid quantity is in amber range:
 - Associated Electric Hydraulic PumpOFF

CAUTION: DO NOT OPEN THE SPEED BRAKE.

If one system can be recovered, complete the appropriate procedure for one hydraulic system failure.

- If both systems remain inoperative:
 - Quick Disconnect ButtonPRESS
 - Both Electric Hydraulic PumpsOFF

NOTE: The nose landing gear doors will open, therefore the pilot should expect noise increase.

ABNORMAL LANDING GEAR
EXTENSION ProcedureACCOMPLISH

Use rudder for directional control on the ground.
Rudder and aileron are operating under mechanical reversion mode. Expect greater rudder pedals and control wheels control forces. Both pilots should act together to control the airplane, if required. Pilots should minimize the use the of rudder pedals to control lateral oscillations. Ailerons are better suitable to control yaw tendency. Also consider the use of asymmetric thrust to help in yaw control.

Land at the nearest suitable airport. Avoid landings at airports with anticipated crosswind or turbulence. Perform a long final approach.

- Approach and landing configuration:
 - Landing GearDOWN
 - Flaps22°
 - AirspeedV_{REF 45} +
10 KIAS

CONTINUES ON NEXT PAGE



CONTINUED FROM PREVIOUS PAGE

EMERGENCY BRAKE

TECHNIQUE Procedure ACCOMPLISH
Do not attempt to taxi.

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING
DISTANCE, MULTIPLY THE UNFACTORED LANDING
DISTANCE FOR FLAPS 45° BY 2.67.

BRAKE DEGRADED

EICAS CAUTION: BRAKE DEGRADED

Apply brakes normally.

Brake effectiveness may be reduced and braking asymmetry may be
felt.

Approach and landing configuration:

If in icing conditions:

Landing Gear DOWN
Flaps 22°
Airspeed $V_{REF\ 45} +$
10 KIAS

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING
DISTANCE, MULTIPLY THE UNFACTORED LANDING
DISTANCE FOR FLAPS 45° BY 1.71.

If not in icing conditions:

Landing Gear DOWN
Flaps 45°
Airspeed $V_{REF\ 45}$

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING
DISTANCE, MULTIPLY THE UNFACTORED LANDING
DISTANCE FOR FLAPS 45° BY 1.20.

During landing run:

Thrust Levers (if available) REVERSE



BRAKES INOPERATIVE

EICAS CAUTION: BRK OUTBD (INBD) INOP

If one pair of brakes is inoperative, apply brakes normally through the pedals.

If both pair of brakes are inoperative:

EMERGENCY BRAKING

TECHNIQUE ProcedureACCOMPLISH

In case of one or both pairs inoperative:

If in icing conditions:

Landing Gear.....DOWN

Flaps.....22°

AirspeedV_{REF 45} +
10 KIAS

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING
DISTANCE, MULTIPLY THE UNFACTORED LANDING
DISTANCE FOR FLAPS 45° BY 2.18.

If not in icing conditions:

Landing Gear.....DOWN

Flaps.....45°

AirspeedV_{REF 45}

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING
DISTANCE, MULTIPLY THE UNFACTORED LANDING
DISTANCE FOR FLAPS 45° BY 1.49.

During landing run:

Thrust LeversREVERSE

BRAKES OVERHEAT

EICAS CAUTION: BRAKE OVERHEAT

If during landing and runway length is enough:

Brake Pressure REDUCE

Use of full reverse thrust is recommended.

If after takeoff:

Lower landing gear for cooling as soon as possible.

Airspeed BELOW
 200 KIAS

Retract gear when brakes temperature is at green range.

If MFD is not available, retract gear after message is removed.

Airspeed AS REQUIRED

When on ground, park the airplane as soon as possible.

Before next takeoff:

Brakes Temperature CHECK AT
 GREEN
 RANGE

If Brakes Temperature Monitoring System is not available:

Quick Turn Around Chart CHECK

Wheel Thermal Plugs CHECK

NOTE: A positive way to check Wheel Thermal Plugs is to verify that none of tires is flat.

EMERGENCY BRAKING TECHNIQUE

Pull the emergency brake handle carefully and continuously until the first airplane reaction. Use the parking brake light as a reference for brake application. Modulate brake application until the airplane achieve the desired deceleration.

In case of airplane skidding, release the handle and pull it again as required.

NOTE: Anti-skid protection is not available for emergency/parking brake.



EMERGENCY/PARKING BRAKE HANDLE DISAGREE

INDICATION: BRAKE ON light illuminated with Emergency/Parking Brake handle not actuated.

Park the airplane as soon as possible.
Do not takeoff. Report to the maintenance personnel.

EMERGENCY/PARKING BRAKE LOW PRESSURE

EICAS CAUTION: EMRG BRK LO PRES

If necessary to use the emergency/parking brake, apply it in advance.
When parking the airplane, use wheel blocks.

GEAR LEVER CANNOT BE MOVED TO UP AFTER TAKEOFF

Wait 10 seconds to verify if the LG AIR/GND FAIL message is displayed.

If the message is presented, do not move Landing Gear Lever. Flight may be continued at pilot's discretion.

If the message is not presented:

Downlock Release ButtonPRESS

Landing Gear LeverUP

Landing Gear Lever will be released, permitting gear retraction.

HYDRAULIC ENGINE PUMP FAILURE

EICAS ADVISORY: E1 (2) HYD PUMP FAIL

Altitude.....AT OR BELOW
37000 ft

Continue flight monitoring associated hydraulic system.

Refer to HYDRAULIC SYSTEM 1 (2) FAILURE Procedure, if necessary.



HYDRAULIC PUMP SELECTED OFF

EICAS ADVISORY: HYD PUMP SELEC OF

Electric Hydraulic Pumps AUTO

HYDRAULIC SHUTOFF VALVE CLOSED

EICAS ADVISORY: E1 (2) HYDSOV CLSD

If valve is not intentionally closed:

Engine Pump Shutoff Button..... CHECK NOT
PRESSED

If button is not pressed and message persists, report to the maintenance personnel.



HYDRAULIC SYSTEM 1 FAILURE

EICAS CAUTION: HYD SYS 1 FAIL, RUDDER SYS 1 INOP or
AIL SYS 1 INOP
EICAS ADVISORY: E1 HYD PUMP FAIL

Check hydraulic system fluid quantity:

If hydraulic system fluid quantity is in green range:
Electric Hydraulic Pump 1 ON

If hydraulic system fluid quantity is in amber range:
Electric Hydraulic Pump 1 OFF

If hydraulic power is not recovered:
Airspeed MAXIMUM
250 KIAS
Electric Hydraulic Pump 1 OFF

NOTE: As the nose landing gear doors will open, the pilot should expect a noise increasing during flight.

For landing gear extension:
ABNORMAL LANDING GEAR
EXTENSION Procedure..... ACCOMPLISH

Do not actuate left Thrust Reverser.
Approach and landing configuration:

If in icing conditions:
Landing Gear DOWN
Flaps 22°
Airspeed $V_{REF\ 45} + 10$ KIAS

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 2.38.

If not in icing conditions:
Landing Gear DOWN
Flaps 45°
Airspeed $V_{REF\ 45}$

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.64.

Use rudder and differential braking for directional control on ground.

HYDRAULIC SYSTEM 2 FAILURE

EICAS CAUTION: HYD SYS 2 FAIL, RUDDER SYS 2 INOP or
 AIL SYS 2 INOP

EICAS ADVISORY: E2 HYD PUMP FAIL

Check hydraulic system fluid quantity:

If hydraulic system fluid quantity is in green range:

Electric Hydraulic Pump 2..... ON

If hydraulic system fluid quantity is in amber range:

Electric Hydraulic Pump 2..... OFF

If hydraulic power is not recovered:

Airspeed..... MAXIMUM
 250 KIAS

Electric Hydraulic Pump 2..... OFF

Do not actuate right Thrust Reverser.

CAUTION: DO NOT OPEN THE SPEED BRAKE.

Approach and landing configuration:

If in icing conditions:

Landing Gear DOWN

Flaps 22°

Airspeed..... $V_{REF\ 45} +$
 10 KIAS

CAUTION: TO DETERMINE THE MINIMUM SUITABLE
 LANDING DISTANCE, MULTIPLY THE
 UNFACTORED LANDING DISTANCE FOR FLAPS
 45° BY 2.27.

If not in icing conditions:

Landing Gear DOWN

Flaps 45°

Airspeed..... $V_{REF\ 45}$

CAUTION: TO DETERMINE THE MINIMUM SUITABLE
 LANDING DISTANCE, MULTIPLY THE
 UNFACTORED LANDING DISTANCE FOR FLAPS
 45° BY 1.56.

NOTE: The Emergency/Parking Brake will be available only with the
 accumulator charge.



HYDRAULIC SYSTEM LOW QUANTITY

EICAS ADVISORY: HYD1 (2) LO QTY

Continue flight monitoring associated hydraulic system.

NOTE: Do not open the Speed Brake if the hydraulic system 2 is affected.

HYDRAULIC SYSTEM 1 (2) FAILURE Procedure.....AS REQUIRED

HYDRAULIC SYSTEM OVERHEAT

EICAS CAUTION: HYD SYS 1 (2) OVHT

- Associated Engine Hydraulic PumpSHUTOFF
- Associated Electric Hydraulic Pump.....OFF
- AirspeedMAXIMUM
250 KIAS

Activate affected system as follows:15 minutes-OFF. ONE minute-ON for the remainder of the flight. System should remain OFF in flight if not required. ON for approaching and landing. OFF after reaching taxi speed.

LANDING GEAR AIR/GROUND SYSTEM FAILURE

EICAS CAUTION: LG AIR/GND FAIL

If not in icing conditions:

Icing Conditions AVOID

Approach and landing configuration:

Landing Gear DOWN

Flaps 45°

Airspeed $V_{REF\ 45}$

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.34.

If in icing conditions:

Anti-icing system MONITOR

If any anti-ice valve does not open or anti-ice failure messages appear, leave and avoid icing conditions.

After exiting icing conditions, proceed as follows:

Maximum Bank Angle 30°

Minimum Airspeed for Flaps up or 9° 190 KIAS

Approach and landing configuration:

Flaps 22°

Airspeed $V_{REF\ 45} + 10\ KIAS$

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.73.

Report to the maintenance personnel.

NOTE: - Thrust Reversers, and Ground Spoiler, may not be available. Depending on the failed condition, Ground Idle may not be selectable. Refer to the associated abnormal procedures.

- If message is presented on ground, one pair of brakes (below 10 kt ground speed) and Steering may not be available. Refer to the associated abnormal procedures.



PARTIAL OR GEAR UP LANDING

EICAS WARNING: LG/LEVER DISAGREE

Burn fuel to reduce touchdown speed.

Passengers/crew PREPARE FOR
EMERGENCY
LANDING AND
EVACUATION
PROCEDURE

Prior to approach:

Inhibit EGPWS (J8) and Aural Warning System (B4 and E30) by
pulling their circuit breakers.

Emergency Lights ON

Electric Hydraulic Pumps OFF

Engine Bleed OFF

Pressurization Dump Button PRESS

If in icing conditions:

Flaps 22°

If not in icing conditions:

Flaps 45°

Landing Gear AS REQUIRED

NOTE: The decision to land with all gear up or with any gear
extended is left to pilots. The choice of configuration is
based on the number of gear available, airplane load
distribution, controllability and conditions of the landing field.

Landing Briefing PERFORM

Apply thrust reverser (if installed) at touchdown. Ground spoilers, thrust
reverser, steering and normal brakes will not operate if any main gear
is up.

Rudder is available to maintain runway centerline during initial landing
phase.

Maintain wings level as long as possible and use brakes and steering
(if available) for directional control.

After the airplane comes to a complete stop:

Start/Stop Selector STOP

Electric Fuel Pumps OFF

Fire Extinguishing Handles PULL AND
ROTATE

EMERGENCY EVACUATION

Procedure ACCOMPLISH



STEERING SYSTEM INOPERATIVE OR UNCOMMANDED SWERVING ON GROUND

EICAS CAUTION: STEER INOP (may be presented)

Control the airplane using rudder command and differential brakes.
Steering Handwheel DO NOT USE

If unable to control the airplane, as an additional action:

Steering Disengagement Button PRESS
Consider the use of differential thrust reverser if serviceable.



ICE & RAIN PROTECTION, OXYGEN

ANTI-ICING LOW CAPACITY

EICAS WARNING: ICE COND-A/I INOP
EICAS CAUTION: A/ICE LOW CAPACITY

Thrust LeverADVANCE
Advance Thrust Lever to at least 55% N1 and wait for 5 seconds.
If the message remains and the Wing and/or Stabilizer Anti-Icing
Failure message is displayed, then:
Associated System Anti-Icing Failure ProcedurePERFORM

ANTI-ICING ON WITHOUT ICING CONDITIONS

EICAS CAUTION: NO ICE-A/ICE ON

Ice Detection Override KnobAUTO
If the message persists, check the overhead panel and turn off all
unnecessary anti-icing system.
If the message persists and is associated with Wing or Stabilizer Anti-
Icing System:
AltitudeMAX 25000 ft
MINIMUM MEA
APUSTART
APU BleedOPEN
CrossbleedOPEN
Engine BleedsCLOSE

ANTI-ICING SWITCH OFF

EICAS CAUTION: A/ICE SW OFF
Turn on all anti-icing system buttons.

AOA SENSOR HEATING FAILURE

EICAS CAUTION: AOA 1 (2) HEAT INOP

Maintain airspeed according to the following:

FLAPS POSITION	MINIMUM AIRSPEED
UP	$V_{REF\ 45} + 20\text{ KIAS}$
9°	$V_{REF\ 45} + 5\text{ KIAS}$
22°	$V_{REF\ 22}$
45°	$V_{REF\ 45}$

CLEAR ICE DETECTED

EICAS CAUTION: CLR ICE 1 (2)

LIGHT: CLR ICE 1(2)

Do not takeoff.

Airplane de-icing is required.

If there is no clear ice on the wing surface, disregard the message.

Report to the maintenance.

CLEAR ICE DETECTION SYSTEM FAILURE

EICAS CAUTION: CLR/I INOP 1 (2)

Check physically if wing surface is free of clear ice before each flight.

If clear ice is found, de-ice the airplane.



ENGINE ANTI-ICING FAILURE

EICAS WARNING: ICE COND-A/I INOP
EICAS CAUTION: E1 (2) A/ICE FAIL

- Thrust LeversADVANCE
- If the message persists:
 - Ice Detection Override KnobALL
- If the message persists:
 - Engine Air Inlet Anti-Icing Button.....CYCLE
- If the message persists:
 - Icing ConditionsAVOID/EXIT
 - Two minutes after exiting icing conditions:
 - Ice Detection Override Knob.....AUTO

NOTE: Ice Detection Override Knob must be set to ALL for at least 2 minutes either after exiting icing conditions or after ICE CONDITION advisory message has disappeared. In such condition caution message NO ICE-A/I ON may be presented and must be disregarded.

- Engine VibrationMONITOR
- If vibration increases, advance thrust levers, one at a time, to obtain 60% N1 minimum for 5 seconds, and then return to the former setting.
- If vibration increases to unacceptable values or engine parameters indicate abnormal values, exit icing conditions.

ENGINE ANTI-ICING OVERPRESSURE

EICAS ADVISORY: ENG A/ICE OVERPRES

Continue the flight and report to the maintenance personnel.

ICE DETECTOR FAIL

EICAS CAUTION: ICE DET 1 (2) FAIL or ICE DETECTORS FAIL

Use visual cues (ice accretion on windshield and windshield wipers) and temperature criteria to determine whether icing conditions exist.

When flying in icing conditions:

Ice Detection Override Knob ALL

After positively exiting icing conditions:

Ice Detection Override Knob AUTO

NOTE: - Icing conditions may exist inflight when Total Air Temperature (TAT) is 10°C or below and visible moisture in any form is present (such as clouds, fog with visibility of one mile or less, rain, snow, sleet, and ice crystals).

- Ice Detection Override Knob must be kept at ALL for at least 2 minutes either after exiting icing conditions or after ICE CONDITION advisory message has disappeared. In such condition, caution message NO ICE-A/ICE ON may be presented, and must be disregarded.

CREW/PASSENGER OXYGEN LOW PRESSURE

EICAS CAUTION: CREW (PAX) OXY LO PRESS

Check oxygen pressure on the MFD ECS page. If message is confirmed or if MFD is not available:

Altitude MEA OR
 10000 ft,
 WHICHEVER
 IS HIGHER

PITOT SENSORS HEATING FAILURE

EICAS CAUTION: PITOT 1 (2, 3) INOP

Information on the instruments supplied by the affected system may be unreliable. Cross-check and do not use the affected system if a disagreement is found.

If the Pitot 3 is the affected one, standby instruments and pressurization system may be affected.

If necessary:

ADC Button (Reversionary Panel) PRESS

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**SINGLE ENGINE OR SINGLE BLEED OPERATION IN
ICING CONDITIONS**

Crossbleed	OPEN
Altitude.....	MEA OR BELOW 15000 ft, WHICHEVER IS HIGHER

- Above 15000 ft:
 Anti-icing system performance decreases.
 If it is not possible to descend below 15000 ft, failure messages may be presented. In this case, exit icing conditions and refer to the appropriate approach and landing procedure.
- Below 15000 ft:
 If an anti-icing system failure message is presented, refer to the associated anti-icing system failure procedure.

STABILIZER ANTI-ICING FAILURE

EICAS WARNING: ICE COND-A/I INOP

EICAS CAUTION: STAB A/ICE FAIL

Ice Detection Override Knob ALL
 Thrust Levers ADVANCE
 If failure persists:
 Stabilizer Anti-Icing Button CYCLE
 If failure persists:
 Stabilizer Anti-Icing Button OFF
 Avoid or exit icing conditions.
 After exiting icing conditions:
 Ice Detection Override Knob AUTO
 Maximum Bank Angle 30°
 Minimum Airspeed for
 Flaps up or 9° 190 KIAS
 Landing configuration:
 Flaps 22°
 Airspeed $V_{REF\ 45} + 15\text{ KIAS}$

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.55.

If associated with Wing Anti-Icing System failure and if in icing conditions or if there is any uncertainty as to whether the wing surfaces are clear of ice prior to approach and landing, proceed:

Landing configuration:
 Flaps 22°
 Airspeed $V_{REF\ 45} + 30\text{ KIAS}$

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.85.



TAT SENSORS HEATING FAILURE

EICAS CAUTION: TAT 1(2) HEAT INOP

TAS and SAT indication may be unreliable.

WINDSHIELD HEATING FAILURE

EICAS CAUTION: W/S 1 (2) HEAT FAIL

Associated Windshield Heating.....OFF

If the message disappears, system may be turned on again after 15 seconds.

If message persists:

Continue normal flight.

NOTE: After landing, prepare for loss of systems supplied by the electrical source associated with the failed windshield heating.

For Windshield 2 failure, after landing proceed:

Shed Buses.....OFF

For Windshield 1 failure, after landing proceed:

Bus Ties.....OFF

Generators 1 and 3.....OFF

If both windshield heatings fail and windshields become impaired, refer to IMPAIRED OR CRACKED WINDSHIELD Procedure.



WING ANTI-ICE ASYMMETRY

EICAS WARNING: ICE COND-A/I INOP
EICAS CAUTION: WG A/ICE ASYMMETRY

Wing Anti-Icing OFF
Maximum Bank Angle 30°
Minimum Airspeed for Flaps up or 9° 190 KIAS
Avoid or exit icing conditions.

With Wing Anti-Icing System inoperative in icing conditions or if there is any uncertainty as to whether the wing surfaces are clear of ice prior to approach and landing, proceed:

Landing configuration:

Flaps 22°
Airspeed $V_{REF\ 45} + 30$ KIAS

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.85.



WING ANTI-ICING FAILURE

EICAS WARNING: ICE COND-A/I INOP

EICAS CAUTION: WG A/ICE FAIL

Ice Detection Override KnobALL
Thrust LeversADVANCE

If failure persists:

Wing Anti-Icing Button.....CYCLE

If failure persists:

Wing Anti-Icing Button.....OFF

Avoid or exit icing conditions.

After exiting icing conditions:

Ice Detection Override KnobAUTO

Maximum Bank Angle30°

Minimum Airspeed for

Flaps up or 9°190 KIAS

If in icing conditions or if there is any uncertainty as to whether the wing surfaces are clear of ice prior to approach and landing, proceed:

Landing configuration:

Flaps22°

Airspeed $V_{REF 45} + 30$ KIAS

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.85.

NAVIGATION, FLIGHT INSTRUMENTS, AUTOPILOT

AILERON OUT OF TRIM

EICAS CAUTION: AP AIL MISTRIM

If the message is displayed more than 10 seconds, proceed:

Control Wheel HOLD FIRMLY

Quick Disconnect Button..... PRESS

Roll Trim AS REQUIRED

Return the airplane to an in-trim condition, by trimming in the direction as requested by the EICAS indication.

Autopilot AS REQUIRED

AUTOPILOT TRIM FAILED

EICAS CAUTION: AUTO TRIM FAIL

Control Column HOLD FIRMLY

Quick Disconnect Button..... PRESS AND
 HOLD

Pitch Trim AS REQUIRED

Return the airplane to an in-trim condition, by trimming in the direction as requested by the EICAS indication.

Autopilot AS REQUIRED

CENTRAL MAINTENANCE COMPUTER FAILURE

EICAS ADVISORY: CMC FAIL

Report to the maintenance personnel.

CHECK IC SOFTWARE

EICAS CAUTION: CHECK IC1 (2) SW

Do not takeoff and report to the maintenance personnel.

DAU AIRPLANE ID MISCOMPARE

EICAS CAUTION: DAU AC ID MISCMP

Do not takeoff.

Report to the maintenance personnel.

DAU FAILURE

EICAS CAUTION: DAU 1 (2) A FAIL or

EICAS ADVISORY: DAU 1 (2) (B) FAIL

For DAU 1 A FAIL caution message, proceed:

DAU 1 Reversion.....ON

NOTE: The following indications and messages will not be available:

- Indications: Engine 1 oil (temperature, pressure and level), Battery 1 temperature, fuel tank temperature, roll trim position, cabin temperature, Bleed 1 temperature.
- Messages: BLEED 1 OVTEMP, E1 FUEL LO TEMP, FUEL TANK LO TEMP.

For DAU 2 A FAIL caution message, proceed:

DAU 2 Reversion.....ON

NOTE: The following indications and messages will not be available:

- Indications: Engine 2 oil (temperature, pressure and level), Battery 2 temperature, Hydraulic quantity 1 and 2, yaw trim position, cockpit temperature, Bleed 2 temperature.
- Messages: BLEED 2 OVTEMP, E2 FUEL LO TEMP, HYD 1 LO QTY, HYD 2 LO QTY.

If both channels of DAU 1 have failed, the messages and indications associated with the following systems will not be available:

- All messages and indications: Oxygen, Steering, Pressurization, Landing Gear, Roll Trim, and the message EMERG LIGHT NOT ARMED.
- Some messages and indications: Doors, Stall Protection, Electrical, Fire Protection, Fuel, APU, Power Plant, Thrust Reverser, Flap, Spoiler, Brakes, Air Conditioning, Ice And Rain Protection, Hydraulic.

If both channels of DAU 2 have failed, the messages and indications associated with the following systems will not be available:

- All messages and indications: Smoke, Hydraulic, Rudder, Yaw Trim.
- Some messages and indications: Doors, Stall Protection, Electrical, Fire Protection, Fuel, APU, Power Plant, Thrust Reverser, Flap, Spoiler, Brakes, Air Conditioning, Ice And Rain Protection.

For DAU 1 (2) B FAIL advisory message, report to the maintenance personnel.

DAU MISCOMPARE

EICAS CAUTION: DAU 1-2 ENG MISCOMP or DAU 1-2 SYS MISCOMP or DAU 1-2 WRN MISCOMP

Associated DAU Reversion..... ON

NOTE: For each miscompare message and each side, check the following parameters before and after the reversion:

- Engine: N1, N2, ITT.
- System: Battery voltage and temperature, takeoff temperature, hydraulic pressure, oxygen pressure.
- Warning: all warning messages, if any.

DAU REVERSION

EICAS ADVISORY: DAU 1 (2) REVERSION

If the reversionary condition is not required, press the associated DAU Reversionary Button to remove it.

DISPLAY FAILURE

EICAS CAUTION: CHECK PFD 1 (2) message is presented if PFD is the failed display.

If PFD failed:

Associated MFD Selector Knob PFD

If EICAS failed:

MFD Selector Knob (as required) EICAS

If all main panel displays failed:

Exit or avoid icing conditions.

RMU AS REQUIRED

Use RMU to access power plant or navigation data.

Land at the nearest suitable airport.

DISPLAY FAN FAILURE

EICAS ADVISORY: DU 1 (2, 3, 4, 5) FAN FAIL

An overheat condition may arise in the associated display. In this case, it will be shut down automatically. Use reversionary capabilities.

FDAU FAIL

EICAS ADVISORY: FDAU FAIL

Report to the maintenance personnel for dispatchability analysis.

FD LATERAL MODE FAILURE

EICAS CAUTION: LATERAL MODE OFF

At crew discretion, re-select the affected Flight Director or select the other.

NOTE: This message will also be presented if the crew turns the Flight Director off. In this case, the message must be disregarded.

FD VERTICAL MODE FAILURE

EICAS CAUTION: VERTICAL MODE OFF

At crew discretion, re-select the affected Flight Director or select the other.

NOTE: This message will also be presented if the crew turns the Flight Director off. In this case, the message must be disregarded.

FLIGHT DATA RECORDER FAILURE

EICAS CAUTION: DFDR FAIL

Report to the maintenance personnel.

IC AIR/GROUND CONDITION SIGNAL INOPERATIVE

EICAS CAUTION: IC1 (2) WOW INOP

Do not take off.

IC CONFIGURATION FAILURE

EICAS ADVISORY: IC1 (2) CONFIG FAIL

Report to the maintenance personnel for dispatchability analysis.

IC FAILURE/IC BUS FAILURE

EICAS CAUTION: IC BUS FAIL message may be presented

The following features will be inoperative:

- EICAS messages miscompare monitoring,
- Takeoff speeds synchronization,
- Check List Display synchronization, and
- Flight Director mode synchronization.

SG Button (affected side)..... PRESS

IC FAN FAILURE

EICAS ADVISORY: IC 1 (2) FAN FAIL

An overheat condition may arise in the associated IC. In this case, turn the IC off by pulling its respective circuit breaker (C3 or D32).

IC OVERHEAT

EICAS CAUTION: IC 1 (2) OVERHEAT

Turn off the associated IC by pulling its circuit breaker (C3 or D32).

IC'S CONFIGURATION MISMATCH

EICAS CAUTION: CHK IC CONFIG or

EICAS ADVISORY: CONFIG MISMATCH

Do not take off.

IRS ALIGNMENT

EICAS ADVISORY: IRS 1 (2) ALN

IRU Mode Select Switch CHECK NAV

This message is only presented during alignment phase or while the IRU mode select switch is set at ALIGN position.

IRS ALIGNMENT FAULT

EICAS CAUTION: IRS 1 (2) ALN FAULT

Check and reenter present position. If necessary, reenter present position once again.



IRS ATTITUDE MODE

EICAS ADVISORY: IRS 1 (2) ATT MODE

On ground:

IRU Mode Select Switch.....OFF

Wait until POWER-OFF phase is finished (MSU annunciator lights extinguished).

IRU Mode Select Switch.....NAV

IRS EXCESSIVE MOTION

EICAS ADVISORY: IRS 1 (2) EXC MOTION

Make sure the airplane is completely stationary.

The IRU will restart a full alignment 30 seconds after the motion is stopped.

IRS FAIL

EICAS CAUTION: IRS 1 (2) FAIL

During power on or alignment phases:

IRU Mode Select Switch OFF

Wait until POWER-OFF phase is finished (MSU annunciator lights extinguished).

IRU Mode Select Switch NAV

In flight:

Reversionary Panel IRS Button PRESS

If cross-side IRU is not available:

IRU Mode Select Switch ATT

Maintain wings level and constant airspeed until IRS 1 (2) ALN message is no longer displayed and attitude is recovered (approximately 20 seconds).

Magnetic Heading ENTER

CAUTION: FOR IRS IN ATTITUDE MODE, NAVIGATION AND ATTITUDE OUTPUTS ARE NOT AS ACCURATE AS IN THE NAV MODE. MAGNETIC HEADING MUST BE ENTERED AND UPDATED PERIODICALLY FROM THE BEST AVAILABLE ALTERNATIVE SOURCE, THROUGH THE FMS CDU.

NOTE: The Autopilot is available if the IRS 1 (2) ATT MODE message is displayed and the IRS 1 (2) ALN message is extinguished.

IRS NO MAGNETIC HEADING

EICAS ADVISORY: IRS 1 (2) NO MAG HDG

This message is presented when IRS is in attitude mode.

Enter Magnetic Heading.

IRS NO PRESENT POSITION

EICAS ADVISORY: IRS 1 (2) NO PPOS

Enter Present Position.



IRS ON BATTERY

EICAS ADVISORY: IRS 1 (2) ON BATT

Associated IRU will operate for 40 minutes.

IRS OVERHEAT

EICAS CAUTION: IRS 1 (2) OVERHEAT

Operate affected IRU until completion of the flight.

If MSU FAULT annunciator is lighted, IRS 1 (2) FAIL message is presented or inertial data ceases to be transmitted by IRU:

Associated IRS Reversionary ButtonPRESS

Affected IRU Mode Select SwitchOFF

NOTE: The Autopilot is not available.

If IRU is OFF, the airplane is near the end of the flight and additional attitude reference is necessary:

IRU Mode Select SwitchATT

CAUTION: FOR IRS IN ATTITUDE MODE, NAVIGATION AND ATTITUDE OUTPUTS ARE NOT AS ACCURATE AS IN THE NAV MODE. MAGNETIC HEADING MUST BE ENTERED AND UPDATED PERIODICALLY FROM THE BEST AVAILABLE ALTERNATIVE SOURCE, THROUGH THE FMS CDU.

IRS/MSU FAILURE ANNUNCIATION

LIGHT	OPERATION PHASE		
	POWER ON	ALIGNMENT	IN FLIGHT
ALIGN	<ul style="list-style-type: none"> – No light: – Check IRS CB's. – Set mode select switch to ALIGN or NAV. – Press MSU Test switch. Annunciator bulb must be replaced if the other MSU annunciators do light. 	<ul style="list-style-type: none"> – Flashes immediately after entry: – Check and reenter latitude or longitude. – Reenter same latitude or longitude. – Flashes at the end of alignment: – Enter latitude. – Check and reenter latitude. – Allow additional time for alignment. 	<ul style="list-style-type: none"> – Flashes: – Select the remaining IRU by pressing the IRS Button on the associated reversionary panel. – If necessary set mode select switch to ATT.
FAULT	<ul style="list-style-type: none"> – Set mode select switch to OFF for at least 3 sec. Then set mode select switch back to ALIGN or NAV. – If the annunciator remains lighted, call the maintenance personnel. 	<ul style="list-style-type: none"> – Associated with ALIGN annunciation: – Recheck coordinates and reenter latitude. – Allow additional time for alignment. – Try new alignment. Set mode select switch to OFF for at least 3 sec, then to ALIGN, and enter present position. – If on ground, call the maintenance personnel. 	<ul style="list-style-type: none"> – Select the remaining IRU by pressing the IRS Button on the associated reversionary panel. – If necessary set mode select switch to ATT.
ON BATT	<ul style="list-style-type: none"> – Check IRS CB's. – If the annunciator remains lighted, call the maintenance personnel. 	<p>*****</p>	<ul style="list-style-type: none"> – The IRU operates on backup DC power and will operate for 30 minutes.



IRS/MSU FAILURE ANNUNCIATION (Continued)

LIGHT	OPERATION PHASE		
	POWER ON	ALIGNMENT	IN FLIGHT
BATT FAIL	– Call the maintenance personnel.	*****	*****
NO AIR	– Call the maintenance personnel.	*****	– Operate IRU until completion of flight. – If fault annunciator is ON or inertial data ceases to be transmitted by IRU, select the remaining IRU and set mode select switch for affected IRU to OFF. If IRU is OFF, the airplane is near the end of the flight and additional attitude reference is needed, set mode select switch to ATT.

MESSAGE MISCOMPARISON

Verify which message is being presented on EICAS.
Copilot’s MFD Selector KnobEICAS
Compare the messages displayed on the copilot’s MFD with the ones presented on the EICAS to check which is the discrepant message.
Analyze the situation to check whether the discrepant message is spurious or not, and take the appropriate corrective action.

NAV/FLIGHT INSTRUMENTS FAILURE

ANNUNCIATOR/ FAILURE	LOCATION	ACTION
ATT FAIL (red)	PFD	Use cross-side attitude by pressing the IRS Button on associated reversionary panel or use standby attitude indicator.
"X" (red) over IAS tape		Use cross-side airspeed by pressing the ADC button on associated reversionary panel or use standby airspeed indicator.
"X" (red) over altitude tape		Use cross-side altitude by pressing the ADC button on associated reversionary panel or use standby altimeter.
"X" (red) over course scale		Select another sensor.
VS (red)		Use cross-side vertical speed by pressing the ADC button on associated reversionary panel.
ROL, PIT, ATT, IAS, or ALT (amber)		Compare data with Standby Indicator. For altitude compare the PFD altimeters setting also. If required, use cross-side data by pressing the appropriate button on associated reversionary panel.
RA (amber)		Compare both radio altimeter indications. If required, consider only the lower indication. Otherwise, disregard Radio Altitude.
RA1 (2) (amber)	PFD MFD	Radio altimeter automatic reversion has occurred. No action is required.
PFD or EICAS Blank or "X"(red)		Use the MFD Knob to present the required information on MFD.
HDG FAIL (red)		Use cross-side heading by pressing the IRS button on associated reversionary panel or use RMU or standby attitude indicator.
HDG (amber)		Compare data with the Magnetic Compass. After identifying the failed side, use cross-side data by pressing the IRS button on associated reversionary panel.
MENU INOP (amber)	MFD	Report to the maintenance personnel.

(Continued)

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NAV/FLIGHT INSTRUMENTS FAILURE (CONTINUED)

ANNUNCIATOR/ FAILURE	LOCATION	ACTION
ATT: CAGE (amber)	ISIS	Press the CAGE push button in order to recover attitude indication. Caging the ISIS in flight will result in loss of attitude indication for up to 10 seconds and the amber message ATT 10s will be presented during this time. Until attitude indication is available again use the primary indication source.
ATT, ALT, SPD, M, HDG (red)		Use the primary indication source. Report to the maintenance personnel.

RADIO ALTIMETER FAIL

EICAS ADVISORY: RAD ALT 1 (2) FAIL or
RAD ALT FAIL

If one Radio altimeter is lost (RAD ALT 1 (2) FAIL is presented):

Automatic reversionCONFIRM

Automatic reversion may be confirmed through the RA1 (2)
amber annunciator presented on both PFDs.



STABILIZER OUT OF TRIM

EICAS CAUTION: AP ELEV MISTRIM

Control Column **HOLD FIRMLY**

Quick Disconnect Button..... **PRESS AND
HOLD**

Pitch Trim **AS REQUIRED**

Return the airplane to an in-trim condition, by trimming in the direction as requested by the EICAS indication.

Autopilot **AS REQUIRED**

YAW DAMPER FAILURE

EICAS CAUTION: YAW DAMPER FAIL

Yaw Damper **DISENGAGE**

Autopilot may be reengaged at pilot's discretion. If after reengagement the failure persists, continue the flight with autopilot disengaged.



WARNING SYSTEMS

ERRONEOUS STALL PROTECTION ACTUATION

Immediately and simultaneously:

Quick Disconnect ButtonPRESS
Both Stall Protection SystemsCUTOUT
Avoid skidding the airplane.

If in icing conditions:

Add 15 KIAS to go-around speed to prevent stall protection from being actuated.

Approach and landing configuration:

Landing GearDOWN
Flaps22°
Airspeed $V_{REF 45} + 15$ KIAS

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.55.

If not in icing conditions:

Add 5 KIAS to go-around speed to prevent stall protection from being actuated.

Approach and landing configuration:

Landing GearDOWN
Flaps45°
Airspeed $V_{REF 45} + 5$ KIAS

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.13.

ADVANCED STALL PROTECTION

EICAS CAUTION: SPS ADVANCED

If altitude is above 25000 ft:

Airspeed ABOVE 150 KIAS

If in icing conditions:

Add 15 KIAS to go-around speed to prevent stall protection from being actuated.

Approach and landing configuration:

Landing Gear DOWN

Flaps 22°

Airspeed $V_{REF\ 45} + 15\text{ KIAS}$

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.55.

If not in icing conditions:

Add 5 KIAS to go-around speed to prevent stall protection from being actuated.

Approach and landing configuration:

Landing Gear DOWN

Flaps 45°

Airspeed $V_{REF\ 45} + 5\text{ KIAS}$

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS 45° BY 1.13.

STICK PUSHER JAMMING

EICAS CAUTION: STICK PUSHER FAIL

Elevator Disconnection Handle PULL

Copilot must fly the airplane.

Avoid landings at airports with anticipated turbulence or crosswinds.



EGPWS INOPERATIVE

EICAS CAUTION: GPWS INOP or TERRAIN INOP

Monitor any trend toward terrain contact, excessive sink rate, marginal flight path and airplane configuration.

AURAL WARNING FAILURE

EICAS CAUTION: AURAL WARN FAIL

Monitor airplane instruments.

WINDSHEAR DETECTION INOPERATIVE

EICAS CAUTION: WINDSHEAR INOP

Avoid windshear.



SECTION 4

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INTRODUCTION

The normal procedures contained in this manual have been developed and recommended by the manufacturer and approved by the certification authorities for use during the operation of the EMB-135BJ Legacy.

Indented explanations (lines beginning further from the margin than the others) may follow a main item regarded as not being self-explanatory or lacking further details.

- * Items marked with an asterisk are to be performed at least once a day, by flight crew or maintenance personnel, at operators discretion.



EXTERNAL SAFETY INSPECTION

Wheel Chocks..... IN PLACE

NOSE SECTION

Access Doors and Panels..... SECURED
Sensors, Pitot Tubes and Static Ports CONDITION,
NO
OBSTRUCTION
Windshield Wiper..... CONDITION
Air Inlets NO
OBSTRUCTION
Radome..... SECURED
Nose Gear..... CHECK
Wheels and Tires CONDITION
Tires CHECK
PRESSURE
Check tire pressure within the gray range (84 ± 2 psi).
Gear Struts/Wheelwell/Doors CONDITION,
NO LEAKS
Shock Absorber Extension..... CHECK
Ground Locking Pin REMOVED
Gear Lockup Hook UNLOCKED
Static Discharger..... CONDITION
Landing and Taxi Lights..... CONDITION
Hydraulic Compartment (right side) NO LEAKS
Oxygen Disc..... CHECK
Check oxygen overpressure green disc in place.



FUSELAGE

Access Doors and Panels	SECURED
Fueling Compartment Door (right side)	SECURED
Inspection Lights	CONDITION
Air Inlets and Outlets	NO OBSTRUCTION
* Fuel Tanks Draining	PERFORM
Red Beacon	CONDITION
Antennas	CONDITION
Ram Air Inlet	NO OBSTRUCTION
Fluid Drain Holes	NO LEAKS
* Emergency/Parking Brake Hydraulic Accumulator	DISCHARGE AND CHECK

WINGS

Landing Lights	CONDITION
Emergency Lights	CONDITION
Wing Leading Edge	CONDITION
Access Doors and Panels	SECURED
Direct Measuring Sticks	PUSHED IN
Fluid Drain Holes	NO LEAKS
Air Inlets, Outlets and Vents	NO OBSTRUCTION
Vortilons and Vortex Generators	NUMBER AND CONDITION
Marking, Navigation and Strobe Lights	CONDITION
Static Dischargers	NUMBER AND CONDITION
Flight Control Surfaces and Fairings	CONDITION
Main Gear	CHECK
Wheels and Tires	CONDITION
Tires	CHECK PRESSURE
Check tire pressure within the gray range (160 ± 4 psi).	
Gear Struts/Wheelwell	CONDITION, NO LEAKS
Shock Absorber Extension	CHECK
Ground Locking Pin	REMOVED
Brake Wear Indicator	CHECK
Gear Lockup Hook	UNLOCKED



AIRPLANE FLIGHT MANUAL

NORMAL
PROCEDURES

TAIL CONE SECTION

Air Inlets and Outlets.....	NO OBSTRUCTION
Antennas	CONDITION
Access Doors and Panels.....	SECURED
Pylons.....	CONDITION
Engines	CHECK
Check engines for leaks and obstructions in the air inlets.	
Thrust Reverser Doors.....	FLUSH WITH NACELLE
Horizontal Stabilizer	CONDITION
Flight Control Surfaces.....	CONDITION
Static Dischargers	NUMBER AND CONDITION
APU	CONDITION
Pressurization Static Ports	NO OBSTRUCTION
Fluid Drain Holes.....	NO LEAKS

INTERNAL SAFETY INSPECTION

COCKPIT

Airplane Manuals and Documents ON BOARD
 Cockpit Emergency Equipment CHECK
 Protective Breathing Equipment CHECK
 Gear Pins, Covers and Chocks ON BOARD
 GPU or APU AS REQUIRED
 Batteries CHECK/AS
 REQUIRED

- * Batteries Voltage CHECK
 If battery voltage is below 24.0 V, report to maintenance personnel
 or try to recharge the affected battery by using the APU Generator
 for at least 30 minutes.

- * Backup Battery CHECK
 Release the Backup Battery Button momentarily and check if ISIS
 remains operating normally.

Internal and External Lights AS REQUIRED
 For daylight operation, Overhead Panel Lighting Control Knob must
 be off.

Overhead, Main and Control Pedestal

Panels CHECK
 Check all controls in their normal position. All buttons (except
 GPU, if applicable) must not be illuminated. Button guards must
 be stowed.

Fuel Quantity and Fuel Used CHECK AND
 SET

Fire Extinguishing Handles PUSHED IN

APU Fire Extinguishing Button GUARDED,
 NOT
 ILLUMINATED

Baggage Fire Extinguishing Button GUARDED,
 NOT
 ILLUMINATED

Crew / Pax Oxygen Pressure CHECK

Check MFD ECS Page for crew/passenger minimum pressure,
 according to the tables below:

CREW OXYGEN	Minimum Pressure
Pilot and Copilot	1087 psi
Pilot, Copilot and Observer	1495 psi

CONTINUED FROM PREVIOUS PAGE

PAX OXYGEN	Minimum Pressure
Aircraft equipped with one cylinder	1730 psi
Aircraft equipped with two cylinders (optional)	1250 psi

Crew Oxygen Masks and Goggles.....	CHECK
Passenger Oxygen Selector Knob.....	AUTO
Landing Gear Lever	DOWN
Aileron and Elevator Disconnect Handles.....	PUSHED IN
Gust Lock	AS REQUIRED
Speed Brake Lever	CLOSE
Thrust Levers	IDLE
Emergency/Parking Brake Handle.....	PULL
Radar	OFF
Flap Selector Lever	ZERO
Landing Gear Electrical Override Switch.....	NORMAL AND LOCKED
Free Fall Lever	FULL DOWN
Free Fall Compartment.....	CLOSED

PASSENGER CABIN

Cabin Emergency Equipment	CHECK
Protective Breathing Equipment	
Indicator	GREEN
Emergency Exits	CLOSED AND
	LATCHED
Emergency Exit Locking Pin (if applicable)	REMOVED
Overwing Fueling Caps	SECURED
Passenger Seats and Belts	CONDITION
Galley and Toilet	CONDITION
Baggage Compartment Access	
Door Indication System	CHECK
Baggage Compartment Access Door	CLOSED AND
	LOCKED
Pocket Door	OPEN AND
	LOCKED
Curtains	STOWED



APU START

- Internal Safety InspectionPERFORM
- BatteriesAUTO
- Backup BatteryON
- Avionics MastersOFF
- One Fuel PumpON
- CrossfeedON, IF USING
A LEFT FUEL
PUMP
- * Fire Detection SystemTEST
- APU MasterON, WAIT 3
SECONDS,
START, THEN
ON
- Monitor APU EGT and RPM increasing within limits.
- APU GeneratorAS REQUIRED
- APU BleedAS REQUIRED

APU SHUTDOWN

- APU Stop ButtonPRESS
- Monitor APU EGT decreasing and RPM reaching zero.
- Fuel PumpsAS REQUIRED
- APU Master Knob.....OFF

BEFORE START

- Internal and External
Safety InspectionsCOMPLETE
- BatteriesAUTO
- Seat, Pedals and Seat Belts.....ADJUST
- Cockpit Voice Recorder.....TEST
- Bus TiesAUTO
- Shed BusesAS REQUIRED
- AC PowerON
- Backup BatteryON
- Avionics MastersON
- Emergency Lights.....ARM
- Fuselage Tank Transfer SystemCHECK

CONTINUES ON NEXT PAGE



AIRPLANE FLIGHT MANUAL

NORMAL
PROCEDURES

CONTINUED FROM PREVIOUS PAGE

- * Fire Detection System TEST
- Ignition AUTO
- Takeoff Data SET
- Start/Stop Selector STOP
- Aileron ON
- Rudder ON
- Engine Hydraulic Pumps Shutoff BUTTONS
GUARDED AND
NOT PRESSED
- * Electric Hydraulic Pumps TEST
- One Electric Hydraulic Pump ON/THEN
AUTO
- Hydraulic Pressure Indication on MFD CHECK
- Check hydraulic pressure within 2900 ± 200 psi.
- Repeat procedure for the remaining pump.
- Electric Hydraulic Pumps OFF
- No Smoking and Fasten Belts ON
- Sensors Heating ON
- Recirculation Fans AS REQUIRED
- Gasper Fan AS REQUIRED
- Crossbleed OPEN
- If APU is running and APU Bleed is open:
- Air Conditioning Packs OPEN
- Temperature and Mode Control AS REQUIRED
- Flight Guidance Controller AS REQUIRED
- Autopilot Disconnection CHECK
- Autopilot Engage Button PRESS
- Quick Disconnect Button PRESS
- Check that autopilot has disengaged.
- Display Control Panel AS REQUIRED
- IRS CHECK
- Clocks SET
- Reversionary Panel CHECK
NORMAL
- Digital Audio Panel SET
- Primary Flight Display SET
- V₁, V_R and V₂ on Multi
- Function Display SET
- Standby Instruments SET
- ELT ARM
- EICAS CHECK
- Radio Management Units SET

CONTINUES ON NEXT PAGE

CTA APPROVED
ORIGINAL



CONTINUED FROM PREVIOUS PAGE

- EICAS Reversionary PanelNORMAL
- Tuning Backup Control HeadSET
- Weather RadarSET
- Pitch Trim Cutout ButtonsGUARDED
AND NOT
ILLUMINATED
- HF (if installed)SET
- TrimsCKD/SET

Actuate the pilot and copilot's Pitch Trim Switches and the backup pitch trim switch nose up and then nose down for at least three seconds to check the trim timer and correct actuation on the EICAS. Set the pitch trim to the units required for takeoff. Set the roll and yaw trims to zero.

PITCH TRIM UNITS	8	7	6	5	4
CG POSITION (%)	LESS THAN 25	27	30	32	35

- Pressurization.....SET
- If flying to an airport above 8000 ft:
 Pressurization8000 ft

NOTE: In airports with pressure altitude between 8000 and 8500 ft, the cabin altitude displayed in EICAS will be amber.

- Manual ControllerFULL DOWN
- Stall Protection SystemTEST

NOTE: Before testing the SPS, wait 40 seconds for power-up built in test to finish.
TEST button must be released at the first stick shaker actuation signal.

- SPS Cutout Buttons.....GUARDED
AND NOT
ILLUMINATED
- Passenger BriefingPERFORM

CLEARED TO START

- Doors and WindowsCLOSE
- Red Beacon.....ON
- External Lights.....AS REQUIRED
- Air Conditioning and
 Pneumatic SystemAS REQUIRED



ENGINE START

One Fuel Pump ON
Crossfeed AS REQUIRED

NOTE: Alternate fuel pumps on each engine starting.

Associated Start/Stop Selector START, THEN
RUN

Engine Parameters MONITOR

Observe limits. Abort start immediately if an Abnormal Engine Start is detected.

NOTE: 1) Starts are faster if ITT is below 210°C.

2) Light-ups at 28% N2 will be achieved with systems meeting minimum performance requirements. If light-ups are occurring below 28%, the airplane should be scheduled for maintenance to avoid disruptions to passenger service.

Repeat the procedure for the other engine.

If any starting limit is exceeded prior to aborting a start, do not attempt further starts and report to the maintenance personnel.



AFTER START

- FADEC Control KnobsRESET, THEN
ALTN
- GPU ButtonOFF
- GPU.....DISCONNECT
Disconnect the GPU only after to release the GPU Button. If not,
spurious EICAS messages may be presented.
- APUAS REQUIRED
- Takeoff Data.....CHECK
Check the ATTCS annunciation on EICAS.
- Electric Hydraulic PumpsAUTO
- Windshield HeatingAS REQUIRED
- Ice ProtectionAS REQUIRED

CAUTION: ICE DETECTION OVERRIDE KNOB MUST NOT BE SET
TO ALL ON GROUND, EXCEPT DURING TEST.

WARNING: IF ICING CONDITIONS EXIST OR ARE FORECAST,
REFER TO OPERATION IN ICING CONDITIONS
PROCEDURE.

- Air Conditioning and
Pneumatic SystemSET
- Flaps.....TAKEOFF
SETTING
- Flight ControlsCHECK

NOTE: Rudder must be checked thru full travel in both directions. For
each direction, check that the EICAS message RUD SYS 1-2
INOP is not presented when pedal is at the stop.



TAXI

Ground Equipment	CLEARED
Wheel Chocks	REMOVED
Taxi Lights	ON
Steering	CHECK
Takeoff Configuration	CHECK

BEFORE TAKEOFF

Passenger Announcement	PERFORM
Takeoff Briefing	PERFORM
PC Power System	OFF
Crossfeed	OFF
Fuselage Tank Transfer Knob	OFF
Go Around Button	PRESS
Thrust Rating	CHECK
Brakes Temperature	CHECK AT GREEN RANGE

CAUTION: TAKEOFF MUST NOT BE PERFORMED IF BRAKES
TEMPERATURE ARE NOT IN THE GREEN RANGE.

CLEARED INTO POSITION

Gust Lock	UNLOCK
Landing Lights	AS REQUIRED
Strobe Lights	ON
Transponder	ON



TAKEOFF

Thrust LeversTHRUST SET
Check green ATTCS indication presented on EICAS.

- NOTE:** - If the runway is considered to be limiting, a static takeoff must be accomplished. In this case, release brakes after engine has reached the target N1.
- For rolling takeoffs, performance data is valid from the point where takeoff thrust is achieved.
 - During takeoff run, pedals should be used to steer the airplane.

Engine Parameters.....MONITOR

At V_R , rotate the airplane to 14° (for flaps 9°).

With positive rate of climb:

Landing Gear.....UP

Minimum Airspeed V_2

If maneuvering is required, maintain a minimum airspeed of $V_2 + 10$ KIAS with a maximum bank of 25°.

At level off height altitude:

For takeoff with flaps 9°:

At $V_2 + 15$ KIASFLAPS UP

AFTER TAKEOFF

Pitch TrimAS REQUIRED

Keep the airplane trimmed to avoid excessive loads on the Horizontal Stabilizer Actuator (HSA). The airplane should be trimmed before 160 KIAS. Failure to accomplish the above procedure may lead to an inoperative trim condition not associated with any EICAS message.

Air Conditioning and

Pneumatic SystemAS REQUIRED

APUAS REQUIRED

Internal and External Lights.....AS REQUIRED

Windshield HeatingAS REQUIRED

Autopilot/Flight DirectorAS REQUIRED

Altimeter and Standby AltimeterSET AND X
CHECK

Thrust Rating.....CLB

CLIMB

Fasten Belts AS REQUIRED

CRUISE

Thrust Rating.....	CRZ
Radar	AS REQUIRED
Fuselage Tank Transfer Knob	FUS 1 or FUS 2
Turn system on only if there is fuel in auxiliary tanks.	
At or above 10000 ft:	
PC Power System	ON

DESCENT

Fasten Belts	ON
Windshield Heating	ON
Flight Instruments, Navigation and Radios	SET AND X CHECK
Speed Brake	AS REQUIRED
Pressurization	CHECK
If landing in an airport above 8000 ft, set the destination airport altitude.	
NOTE: When landing in airports with pressure altitude between 8000 and 8500 ft, the cabin altitude displayed in EICAS will become amber during approach.	
Below 10000 ft:	
PC Power System	OFF
Pocket Door	OPEN AND LOCKED
Curtains	STOWED
Passenger Announcement	PERFORM



APPROACH

If necessary to increase rate of descent:

- Flaps.....9°
- Speed Brake.....OPEN
- Crossfeed.....OFF
- Fuselage Tank Transfer Knob.....OFF
- APUAS REQUIRED
- Air Conditioning and
Pneumatic SystemSET
- Internal and External Lights.....AS REQUIRED
- No Smoking.....ON
- AltimeterSET AND X
CHECK
- AP Speed on Multi Function DisplaySET V_{REF}
- Thrust Rating.....T/O

NOTE: The VAPP mode should be selected only on final approach segment, below 2500 ft AGL. Therefore, the outbound segment should be flown using any other mode.



BEFORE LANDING

Speed Brake	CLOSE
Landing Lights	AS REQUIRED
Autopilot	AS REQUIRED
SPD Button (Flight Guidance Controller)	SET
	APPROACH
	CLIMB SPEED
Yaw Damper	OFF
Landing Gear	DOWN AND
	CHECK
Flaps	LANDING
	SETTING

GO-AROUND

Go Around Button	PRESS
Thrust Levers	MAX
Rotate or verify that autopilot rotates the airplane to 10° nose up.	
Flaps	9°
With positive rate of climb:	
Landing Gear	UP
Minimum Airspeed	APPROACH
	CLIMB SPEED

At the level off height, proceed as in a normal takeoff.

- NOTE:** - For coupled Go-Around the altitude loss may be 40 ft.
- During the GO-AROUND procedure, the DON'T SINK aural warning may sound. In this case monitor the sink rate and follow the GO-AROUND guidance.



LANDING

- Airspeed $V_{REF\ XX}$
- Thrust Levers IDLE OR
REVERSE
- If reverse has been used, select IDLE at 50 KIAS.
- Brakes AS REQUIRED

NOTE: During landing run, pedals should be used to steer the airplane.

AFTER LANDING

Internal and External Lights	AS REQUIRED
APU	AS REQUIRED
Windshield Heating	AS REQUIRED
Turn windshield heating off if not required to defog or deice the windshield.	
Air Conditioning and Pneumatic System	AS REQUIRED
Transponder	STBY
Flaps	UP
Radar	STBY
Pressurization	CHECK

ENGINE SHUTDOWN

Emergency/Parking Brake	APPLY
Thrust Levers	IDLE
Overhead, Main and Control Pedestal Panels	AS REQUIRED
Electrical Power	SET
Internal and External Lights	AS REQUIRED
Fuel Pumps	AS REQUIRED
APU	AS REQUIRED
Electric Hydraulic Pumps	OFF
Ice Protection System	OFF
Air Conditioning and Pneumatic System	SET
Start/Stop Selector	STOP

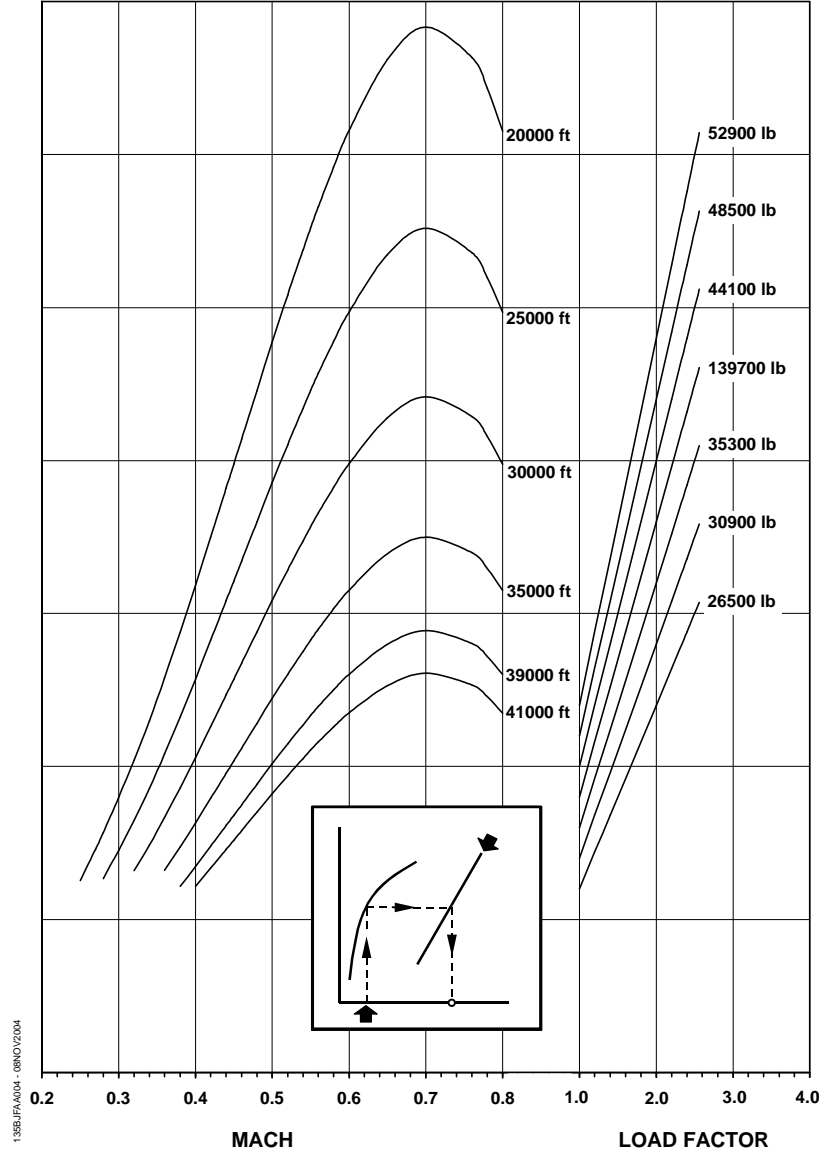
NOTE: Engine will not shutdown with the Start/Stop Selector unless associated Thrust Lever is first moved to IDLE. If STOP is selected before Thrust Lever is retarded to IDLE, momentarily cycle START/STOP Selector to RUN and back to STOP.

LEAVING THE AIRPLANE

IRS	OFF
Gust Lock	LOCKED
Radar	OFF
Internal and External Lights	OFF
GPU and APU	OFF
Main and Backup Batteries	OFF



BUFFET ONSET ENVELOPE



TURBULENT AIR PENETRATION

Flight through severe turbulence must be avoided, if possible.
 If not possible, reduce altitude to increase buffet margin.
 The recommended procedures for turbulent air penetration are:

1. AIRSPEED

At or below 10000 ft	200 KIAS
Above 10000 ft	250 KIAS/ 0.63 M, WHICHEVER IS LOWER

Severe turbulence will cause large and often rapid variations in indicated airspeed. Do not chase the airspeed.

2. ATTITUDE

Maintain wings level and proper pitch attitude. Use attitude indicator as the primary instrument. In extreme drafts, large attitude changes may occur. Do not use sudden large control inputs.

3. PITCH TRIM

Maintain control of the airplane with the elevators. After establishing the trim setting for penetration speed, do not change pitch trim.

4. ALTITUDE

Large altitude variations are possible in severe turbulence. Sacrifice altitude in order to maintain the desired attitude. Do not chase altitude.

5. THRUST SETTING

Make an initial thrust setting for the target airspeed. Change thrust setting only in case of extreme airspeed variation.

In case of inadvertent negative-g condition, reduce thrust levers.

NOTE: Do not extend flaps except for approach and landing.



CROSSFEED OPERATION

NOTE: Crossfeed must be OFF during takeoff and landing.

If wing fuel imbalance is verified (no fuel leak suspected):

AttitudeWINGS
LEVELED

Compare Total Fuel indication in MFD Fuel Page with FMS Fuel Remaining information.

If FMS Fuel Remaining quantity is lower than MFD Total Fuel indication, disregard FMS Fuel Remaining information and monitor fuel quantities.

If left wing presents lower level:

Crossfeed Selector.....LOW1

If right wing presents lower level:

Crossfeed Selector.....LOW2

Monitor fuel imbalance. When the desired balance is achieved:

Crossfeed Selector.....OFF

Monitor Total Fuel Indication in MFD Fuel Page with FMS Fuel Remaining information.

ENHANCED GROUND PROXIMITY WARNING

Aural Warning: Voice Messages: PULL UP, SINK RATE, TERRAIN TERRAIN PULL UP, CAUTION TERRAIN, OBSTACLE OBSTACLE PULL UP, CAUTION OBSTACLE, DON'T SINK DON'T SINK, TOO LOW TERRAIN, TOO LOW GEAR, TOO LOW FLAPS, GLIDE SLOPE and BANK ANGLE voice messages may be generated, but are not associated with EGPWS EICAS message.

When an EGPWS alert occurs, use the flight controls and thrust as necessary to correct the airplane attitude, flight path and configuration according to the voice message presented to provide terrain clearance.

CAUTION: THE TERRAIN DISPLAY IS INTENDED TO BE USED AS A SITUATIONAL TOOL ONLY AND MAY NOT PROVIDE THE ACCURACY AND/OR FIDELITY ON WHICH TO SOLELY BASE TERRAIN AVOIDANCE MANEUVERING DECISIONS.



WINDSHEAR PREVENTION/RECOVERY

Aural Warning: WINDSHEAR voice message is generated if WDSHEAR red indication is presented (EGPWS warning may also be activated).

Thrust Levers	MAX
Go-around Buttons	PRESS

Rotate the airplane smoothly to minimize altitude loss. Flight guidance on EADI must be followed.

NOTE: Pitch attitude may be well above normal angles.

Maintain airplane configuration. Do not change gear and flap position until terrain clearance is assured.

TRAFFIC AND COLLISION AVOIDANCE

Aural Warning: According to the Traffic Advisory (TA) and Resolution Advisory (RA) associated.

The pilot must not initiate evasive maneuvers using information from the traffic display or the voice message only, without visually sighting the traffic. The traffic display and advisories are intended for assistance in visually locating the traffic.

Compliance with TCAS resolution advisory is required unless the pilot considers it unsafe to do so. Maneuvers which are in the opposite direction of the RA are extremely hazardous, especially RAs involving altitude crossing, and are prohibited unless it is visually determined to be the only means to assure safe separation.

OPERATION IN ICING CONDITIONS

The procedures below complement or change the remaining procedures presented in this Section. For emergency and abnormal procedures related to operation in icing conditions, refer to Section 3.

- NOTE:** - Icing conditions may exist whenever the Static Air Temperature (SAT) on the ground or for takeoff, or Total Air Temperature (TAT) inflight, is 10°C or below and visible moisture in any form is present (such as clouds, fog with visibility of one mile or less, rain, snow, sleet, and ice crystals).
- Icing conditions may also exist when the SAT 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, nacelles, or engine sensor probes.
 - Notwithstanding ice detector monitoring, the crew remains responsible for monitoring icing conditions and for manual activation of the ice protection system if icing conditions are present and the ice detection system is not activating the ice protection system.
 - The clear ice detection system will sense clear ice accumulation only in the inboard area of the upper wing surface. It does not detect the presence of frost or snow and it is unable to sense ice accumulations on other parts of the wing or airplane. The operator must ensure that the airplane surfaces are free of frost, snow and ice accumulation prior to takeoff.



BEFORE START

Clear ice detection test:

Anti-Icing Buttons (Engine,Wing and Stabilizer) ... **PRESSED**
Ice Detection Override Knob **AUTO**
Ice Detection Test Knob **1**

Test knob must be held at least 3 seconds in position 1.

Check that CLR ICE 1, CLR ICE 2, CLR/I INOP 1 and CLR/I INOP 2 caution messages are displayed on the EICAS

NOTE: When the Ice Detection Test Knob is selected to 1, the ICE DET 1 FAIL and BLD 1 LOW TEMP caution messages and ICE CONDITION advisory message are displayed on EICAS.

NOTE: SPS/ICE SPEEDS message will remain displayed after icing encounter. Before next takeoff the message must be removed by testing the Stall Protection System.

AFTER START

Ice Detection Override Knob**ENG**
Crossbleed**AUTO**

CAUTION: BOTH ENGINE BLEEDS MUST BE OPEN, IN ORDER TO ASSURE BLEED AIR FLOW THROUGH THE LEADING EDGES. APU BLEED MUST NOT BE USED.



BEFORE TAKEOFF

*** Ice Protection Test:**

NOTE: The ice protection test may be carried out completely on the ground, or in 2 separate phases (first phase on the ground and second phase in flight), depending on weather conditions and crew discretion. For takeoffs, when icing conditions exist or are anticipated for takeoff or climb, the tests in paragraph A must be performed.

On ground, if engine vibration increases, advance thrust levers, one at a time, to obtain at least 60% N1 for 5 seconds and then return to the former setting.

A - When actual icing conditions exist or are anticipated for takeoff and climb, proceed:

Ice Detection Override Knob ALL
Thrust Levers 83% N2
Ice Detection Test Knob 1, THEN 2

Test knob must be held at least 10 seconds in each test position but no more than 15 seconds.

For each side separately, check that OPEN inscriptions in the buttons are illuminated and that, ICE DET 1 (or 2) FAIL and BLD 1 (or 2) LOW TEMP caution messages and ICE CONDITION advisory message are displayed on EICAS. The CROSS BLD OPEN advisory message may also be displayed.

NOTE: When the Ice Detection Test Knob is selected to 1, the CLR ICE 1, CLR ICE 2, CLR/I INOP 1 and CLR/I INOP 2 caution messages are displayed on the EICAS and the lights CLR ICE 1 and CLR ICE 2 illuminate; when the Ice Detection Test Knob is selected to 2, none of those caution messages are displayed on the EICAS.

Thrust Levers IDLE
Ice Detection Override Knob ENG

CAUTION: ICE DETECTION OVERRIDE KNOB MUST NOT BE SET TO "ALL" ON GROUND, EXCEPT DURING TEST.

CONTINUES ON NEXT PAGE

CONTINUED FROM PREVIOUS PAGE

B - For flight when no actual icing conditions exist or are anticipated for takeoff and climb, proceed:

Before engines start, perform the on ground test:

APU Bleed.....CLOSE
Engine Bleed.....CLOSE
Anti-Icing Buttons (Engine,
Wing and Stabilizer).....PRESSED
Ice Detection Override Knob.....AUTO
Ice Detection Test Knob.....1, THEN 2

Test knob must be held at least 10 seconds in each test position.

For each side separately, check that ICE DET 1 (or 2) FAIL and BLD 1 (or 2) LOW TEMP caution messages and ICE CONDITION advisory message are displayed on EICAS.

NOTE: When the Ice Detection Test Knob is selected to 1, the CLR ICE 1, CLR ICE 2, CLR/I INOP 1 and CLR/I INOP 2 caution messages are displayed on the EICAS and the lights CLR ICE 1 and CLR ICE 2 illuminate; when the Ice Detection Test Knob is selected to 2, none of those caution messages are displayed on the EICAS.

During climb, perform the inflight test:

Engine Bleeds.....OPEN
Thrust Lever.....THRUST SET
Altitude.....FROM 2000 TO
23000 ft
TAT.....LESS THAN
10°C
Ice Detection Override Knob.....ALL FOR 20
SECONDS

Check that OPEN inscriptions in the buttons are illuminated and NO ICE-A/ICE ON caution message is displayed on EICAS. The CROSS BLD OPEN advisory message may also be displayed.

Ice Detection Override Knob.....AUTO (AFTER
20 SECONDS)

NOTE: The ice protection test must be fully accomplished before entering icing conditions and before reaching 23000 ft.



AIRPLANE FLIGHT MANUAL

NORMAL
PROCEDURES

AFTER TAKEOFF

Ice Protection Test (if applicable)..... COMPLETE

CLIMB

Ice Detection Override Knob..... AUTO

CRUISE

Engine Parameters MONITOR

If engine vibration increases, advance thrust levers, one at a time, to obtain 60% N1 minimum for 5 seconds, and then return to the former setting.

If ITT increases beyond limits, reduce thrust levers as required to maintain ITT within limits.

If vibration and/or buffeting occurs, reduce the airspeed as required down to 200 KIAS to eliminate the vibration and/or buffeting.

HOLDING

Landing Gear UP
Flaps UP
Minimum Airspeed 200 KIAS

DESCENT

When flying in icing conditions at high speeds or after flying in icing conditions, if vibration and/or buffeting occurs, reduce the airspeed as required down to 200 KIAS to eliminate the vibration and/or buffeting.

CAUTION: EVEN SMALL ACCUMULATIONS OF ICE ON THE WING LEADING EDGE MAY CHANGE THE STALL CHARACTERISTICS OR THE STALL PROTECTION SYSTEM WARNING MARGIN.

APPROACH

If necessary to increase rate of descent:

Flaps 9°
Speed Brake OPEN



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SECTION 5

PERFORMANCE

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INTRODUCTION

The performance information given in this Section is not related to the engine model. For performance information related to a specific engine model, refer to its respective Supplement, which make part of the basic AFM.

The performance data are based on the following conditions:

- Pertinent power less installation, air bleed, and accessory losses.
- Full temperature accountability within the operational limits for which the airplane is certified.
- The wind correction grids are factored in compliance with the regulations, and represent the headwind/tailwind components measured at 10 m height.
- Humidity has no appreciable effect on the power of the engines, therefore, it has not been considered in the performance data.
- All takeoff and landing based on paved runways.
- Anti-skid and ground spoilers are considered to be operative.

The performance information is not valid if:

- The airplane gross weight exceeds the appropriate maximum allowable limits.
- Any of the limitations in Section 2 is not observed.
- A reading from any graph is obtained by extrapolation (i.e. using values of parameters outside the range given on the graph).

NOTE: In the case of headwind components, the airplane may be operated in reported components greater than 30 kt, but the effect of only 30 kt may be taken.

Tire speed limits are not applicable to this specific airplane.

DEFINITIONS

AIRSPEED

INDICATED AIRSPEED - KIAS

It is the reading on the airspeed indicator (knots), as installed in the airplane, uncorrected for static source position error. Zero instrument error is assumed.

CALIBRATED AIRSPEED - KCAS

It is the indicated airspeed (knots), corrected for static source position error.

TRUE AIRSPEED - TAS

It is the equivalent airspeed corrected for atmospheric density effects.

CRITICAL ENGINE FAILURE SPEED - V_{EF}

It is the speed at which, if one engine fails, the failure is recognized at V_1 .

1-G STALL SPEED - V_{S1G}

Is the minimum speed at which the lift provided by the wing is capable of supporting the weight of the airplane.

REFERENCE STALL SPEED - V_{SR}

It is stall speed used as the reference in determining the various airplane speeds. V_{SR} may not be less than V_{S1G} .

**TAKEOFF DECISION SPEED - V_1**

It is the speed at which, following a failure of one engine at V_{EF} , the decision to continue the takeoff results in:

- a takeoff distance to a height of 35 ft at V_2 speed, that will not exceed the available takeoff distance.
- or the distance to bring the airplane to a full stop that will not exceed the accelerate-stop distance available.

V_1 must not be greater than the rotation speed (V_R).

ROTATION SPEED - V_R

It is the speed at which rotation is initiated during the takeoff, to attain the takeoff safety speed at or before a height of 35 ft above runway surface.

TAKEOFF SAFETY SPEED - V_2

The target speed to be attained at a 35 ft height, during a takeoff with an engine failure. One schedule for Takeoff Speed - V_2 is presented as follows:

- Flap 9° - This speed is equal to 1.18 V_S .

AIR MINIMUM CONTROL SPEED - V_{MCA}

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 operating at takeoff power. The value presented represents the most critical combination of power, weight, and center of gravity.

GROUND MINIMUM CONTROL SPEED - V_{MCG}

The minimum speed on the ground at which the takeoff can be continued, utilizing aerodynamic controls alone, when one engine suddenly becomes inoperative and the remaining engine is operating at takeoff power. The value presented represents the most critical combination of power, weight, and center of gravity.

LANDING REFERENCE SPEED - $V_{REF\ XX}$

The speed at a 50 ft height in a normal landing. This speed is equal to $1.23 V_{SR}$ (for flaps 22° and 45°) in the landing configuration (gear down and specific landing flaps XX).

MANEUVERING SPEED - V_A

The maximum speed at which application of full available aileron or rudder will not overstress the airplane.

Maneuver involving pitching control must not exceed the limit load factor defined in Section 2 - Limitations.

MINIMUM CONTROL SPEEDS DURING LANDING AND APPROACH - V_{MCL}

V_{MCL} is the minimum control speed during landing and approach with all engines operating, when the critical engine is suddenly made inoperative.

FINAL TAKEOFF SEGMENT SPEED - V_{FS}

It is the speed to be achieved during final segment, with landing gear up and flaps retracted.



METEOROLOGICAL

INTERNATIONAL STANDARD ATMOSPHERE - ISA

As accepted by the International Civil Aviation Organization.

STATIC AIR TEMPERATURE - SAT

Outside air temperature as indicated on the MFD.

TRUE OUTSIDE AIR TEMPERATURE

The free air static (ambient) temperature.

WIND VELOCITY

The actual wind velocity at a 10 m (32.8 ft) height, reported from the tower and corrected by the wind component chart to a headwind or tailwind component parallel to the flight path.

TAKEOFF

The takeoff path assumes failure of one engine at V_{EF} and extends from a standing start to a point in the takeoff at which the airplane is at least 1500 ft above the takeoff surface and has achieved the enroute configuration and final segment speed. The takeoff path is divided into segments related to the distinct changes in the configuration, power, and speed.

Some of the terms used in the takeoff path are defined below.

TAKEOFF DISTANCE

The greater of the distance from the start of the takeoff to the point at which the airplane is 35 ft above the takeoff surface, with a failure of one engine at V_{EF} ; or 115 percent of the distance with all engines operating, from the start of the takeoff to a point 35 ft above the takeoff surface.

SCREEN HEIGHT

The altitude to be attained above the takeoff surface at the end of takeoff distance (35 ft for dry runways and 15 ft for wet runways).

TAKEOFF RUN

The greater of the distance from the start of the takeoff to a point equidistant between liftoff and the point at which the airplane is 35 ft above the takeoff surface, with a failure of one engine at V_{EF} ; or 115 percent of the distance from the start of the takeoff to a point equidistant between liftoff and the point at which the airplane is 35 ft above the takeoff surface, with all engines operating.

ACCELERATE-STOP DISTANCE

The horizontal distance traversed from brake release to the point at which the airplane comes to a complete stop on a takeoff during which the pilot elects to stop at V_1 . The accelerate-stop distance must not exceed the length of the runway plus the length of the stopway.

**CLEARWAY**

An obstacle free area beyond the end of the runway which can be taken into account for takeoff distance calculation.

STOPWAY

An area extending beyond the end of the runway which may be used in decelerating the airplane in case of a refused takeoff.

WET RUNWAY

A runway is considered to be wet when it is covered by water which depth does not exceed 3 mm.

PAVED RUNWAY

A surface such as concrete or tarmac.

NET TAKEOFF FLIGHT PATH

The net flight path is the gross (actual) path diminished by the gradient required by regulation.

TAKEOFF FLIGHT PATH

The takeoff flight path begins 35 ft above the takeoff surface at the end of the takeoff distance and extends to a point at which the airplane is at least 1500 ft above the takeoff surface and has achieved the enroute configuration and final segment speed, whichever occurs last.

REFERENCE ZERO

This is the reference to which the coordinates of the various points in the takeoff are referred to. It is defined as the end of the takeoff distance and 35 ft below the flight path at this point.

LEVEL OFF HEIGHT

The height at which the third segment is performed (400 ft minimum).

FIRST SEGMENT

Extends from the end of the takeoff distance to the point at which the landing gear is fully retracted, using takeoff power and takeoff flaps, at a constant V_2 speed.

SECOND SEGMENT

Extends from the gear-up point to the level off height (400 ft minimum), using takeoff power and takeoff flaps at a constant V_2 .

THIRD SEGMENT

The horizontal distance required to accelerate, at constant altitude, using takeoff power to the final segment speed while retracting flaps.

FINAL SEGMENT

Extends from the end of the third segment to a gross height of at least 1500 ft, with flaps up, maximum continuous power, and at final segment speed.

NOTE: The flight path data given in the charts contained in this manual is such that all heights have been reduced by 35 ft for convenience in use; the obstacle height should, therefore, be compared directly with the flight path.

GROSS CLIMB GRADIENT

The ratio, expressed as a percentage of the change in geometric height divided by the horizontal distance (both in the same unit) travelled in a given time. The gradients shown on the charts are true gradients, i.e., they are derived from geometric (not pressure) rates of climb.



NET CLIMB GRADIENT

The demonstrated gross gradient reduced by 0.8% during takeoff phase and 1.1% enroute.

GROSS HEIGHT

The geometric height attained using gross climb gradient in a given time.

NET HEIGHT

The geometric height attained using net climb gradient in a given time. Net height is used to determine a net flight which will clear any obstacle by at least 35 ft to comply with the regulations.

ENROUTE AND LANDING

ENROUTE CLIMB

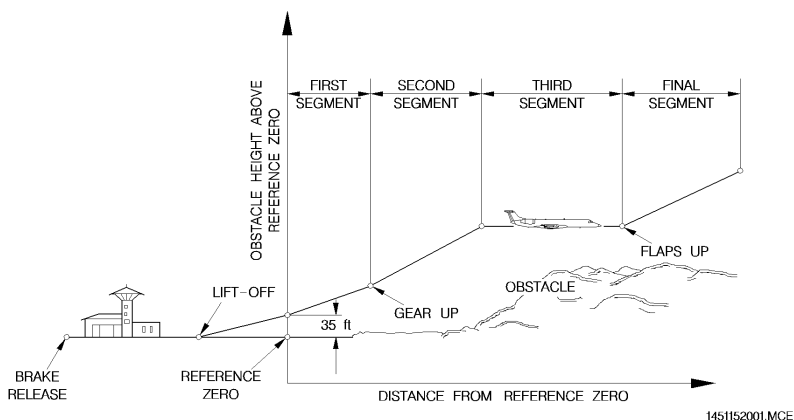
Climb with flaps up, landing gear retracted, maximum continuous power on one engine, and at the adopted enroute climb speed.

APPROACH CLIMB

Climb from a missed or aborted approach, with approach flaps, gear up, and takeoff power on one engine, at the maximum landing weight, and at the adopted approach climb speed.

LANDING CLIMB

Climb from an aborted landing with landing flaps, landing gear extended, and takeoff power on both engines.



TAKEOFF PROFILE



DEMONSTRATED CROSSWIND

The maximum demonstrated crosswind component for takeoff and landing is 30 kts measured at tower height of 10 m (32.8 ft). The demonstration was made with both engines operating on a dry runway and using V_{REF} plus half the maximum gust intensity. This value is not considered to be limiting.

NOISE LEVELS

The following Effective Perceived Noise Levels (EPNL's) comply with FAR Part 36, Appendix C Amendment 24, Stage 3 noise limits. The tests and analysis procedures used to obtain these noise levels are essentially equivalent to those required by the ICAO Annex 16, Volume 1, Chapter 3.

These values are stated for reference conditions of standard atmosphere pressure at sea level, 25°C ambient temperature, 70% relative humidity, and zero wind.

Takeoff and sideline noise levels were established for the EMB-135BJ - Legacy equipped with two Rolls-Royce AE3007A1P engines at the maximum takeoff weight of 48942 lb or 49604 lb, and for the airplane equipped with two Rolls-Royce AE3007A1E engines at the maximum takeoff weight of 49604 lb, V₂ climb speed, flaps 9°, and all engines with maximum takeoff power setting.

Approach noise levels were established from a 3° glide slope at the maximum landing weight of 40786 lb, V_{REF}, and flaps 45°.

No power cutback procedure was used.

No determination has been made by the Airworthiness Authority that the noise levels in this manual are or should be acceptable or unacceptable for operation at, into, or out of any airport.

AE3007A1P Engines with MTOW = 48942 lb

NOISE LEVEL IN EPNdb		
CONDITION	ACTUAL	MAXIMUM ALLOWABLE
Sideline	85.3	94
Takeoff	80.0	89
Approach	91.3	98

AE3007A1P Engines with MTOW = 49604 lb

NOISE LEVEL IN EPNdb		
CONDITION	ACTUAL	MAXIMUM ALLOWABLE
Sideline	85.3	94
Takeoff	80.6	89
Approach	91.3	98

AE3007A1E Engines with MTOW = 49604 lb

NOISE LEVEL IN EPNdb		
CONDITION	ACTUAL	MAXIMUM ALLOWABLE
Sideline	86.8	94
Takeoff	79.7	89
Approach	91.3	98

CTA APPROVED

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REVISION 1 – DECEMBER 11, 2002



WIND COMPONENTS

The wind correction grids are factored according to the regulations, and represent the headwind/tailwind components measured at 10 m (32.8 ft) height.

Correction to wind velocity and direction into headwind/tailwind and crosswind is given in the Wind Component chart.

USE

Enter the chart with the reported wind velocity and the relative angle to the runway, to read the wind component parallel to the runway and the crosswind.

EXAMPLE

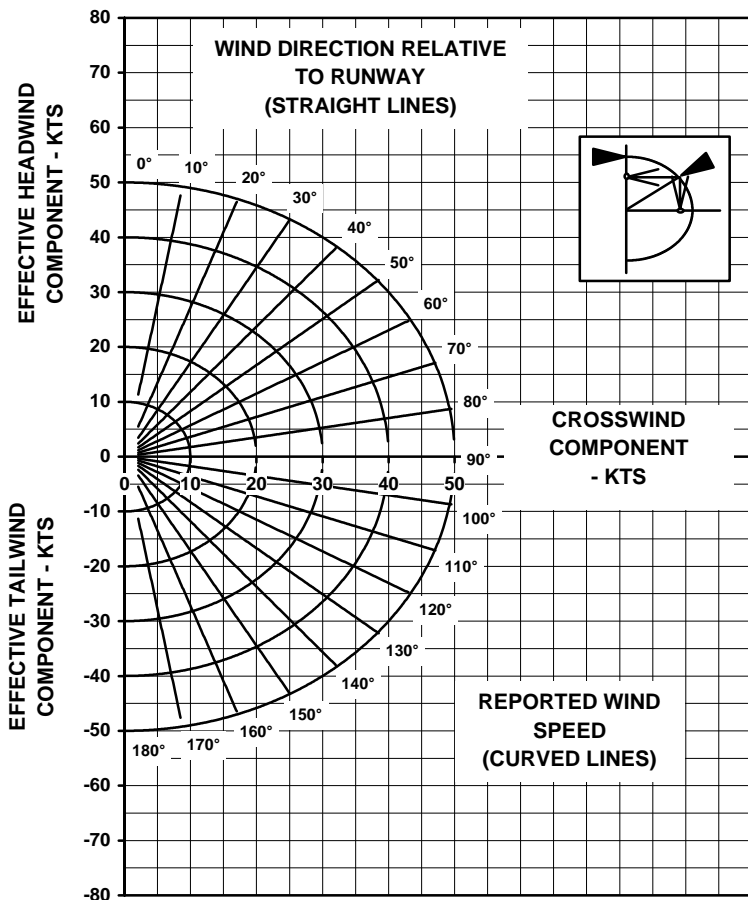
Given:

Wind velocity20 kt
Wind direction60°

Determine:

Wind component parallel to the runway10 kt
Crosswind.....17.5 kt

WIND COMPONENT



145CTA50 - OUT 01, 1996



POSITION ERROR CORRECTIONS

The corrections to be applied to indicated airspeed or altitude in order to eliminate the effect of location of the static port on instrument reading are shown in the Airspeed and in the Altitude Position Error Correction charts.

A set of Airspeed and Altitude Position Error Correction charts is presented for Standby Pitots.

Since all airspeeds and altitudes in this section are presented as indicated values, no correction need to be made when reading from the charts.



AIRSPEED POSITION ERROR CORRECTION CHARTS

USE

Enter the appropriate chart with indicated airspeed, considering the appropriate configuration, to read the airspeed correction. The calibrated airspeed will be the sum of the indicated airspeed and airspeed correction.

EXAMPLE

Given:

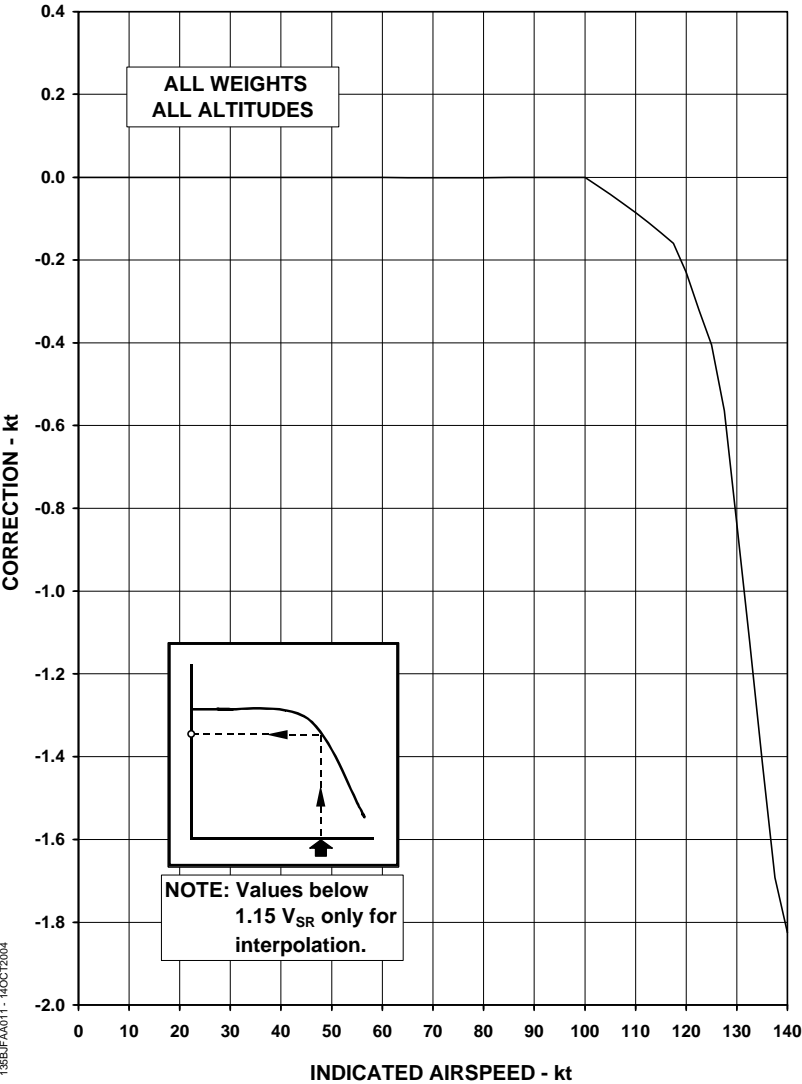
Standby Pitot
Standby Airspeed Indicator
Indicated Airspeed 150 KIAS
Gear DOWN
Flaps 22°
Weight..... 48000 lb

Determine:

Airspeed correction 1.2 kt
Calibrated Airspeed 151.2 KCAS



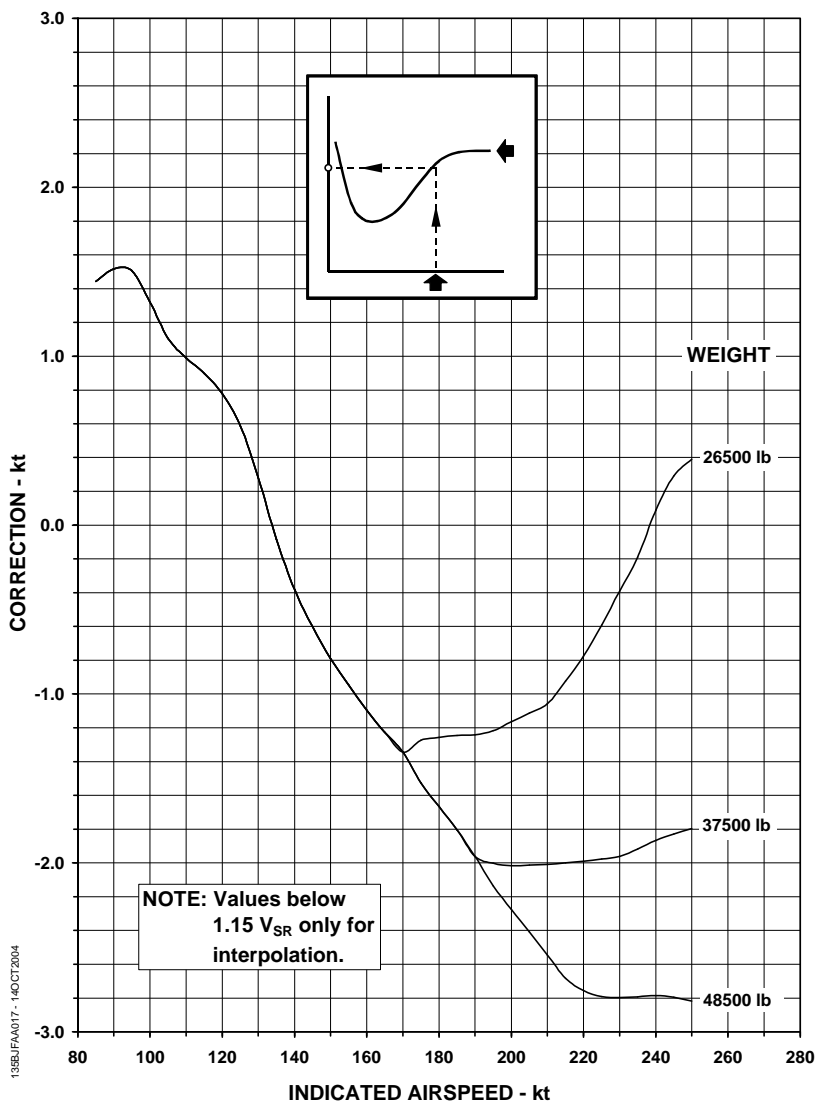
AIRSPEED POSITION ERROR CORRECTION
STANDBY PITOT
GROUND EFFECT - FLAPS 9° AND 22°



135BJFA011 - 14OCT2004

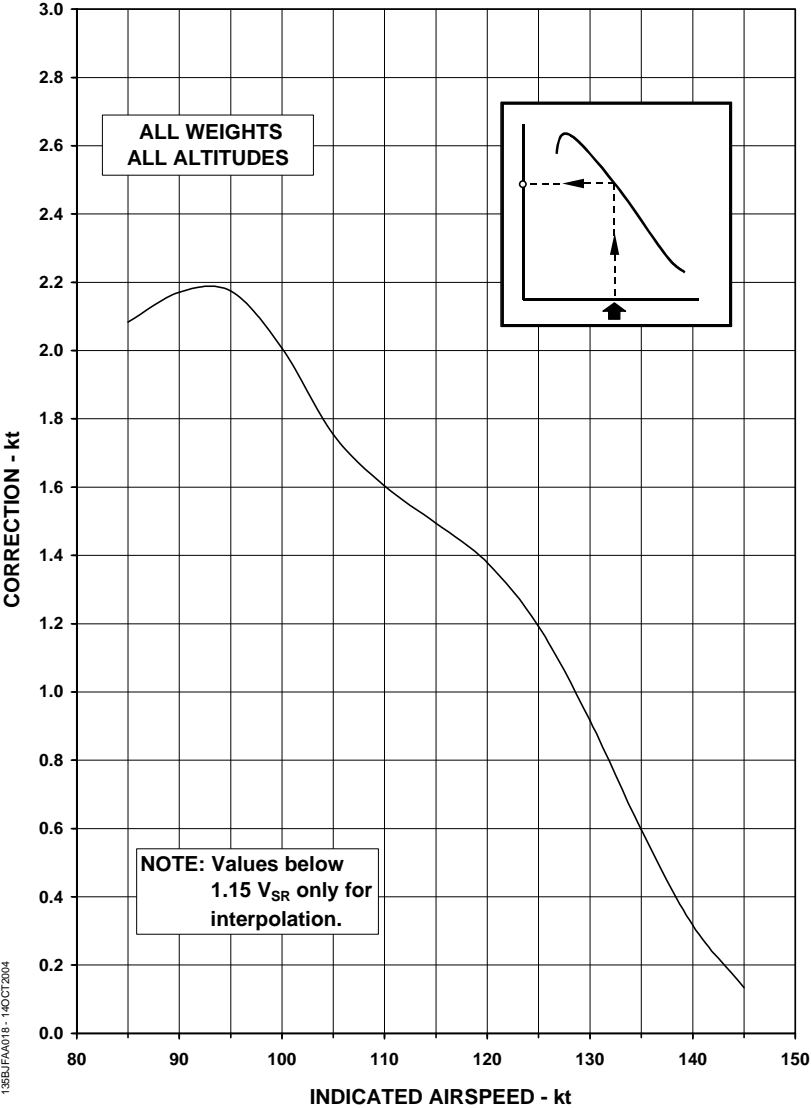
**AIRSPEED POSITION ERROR CORRECTION
STANDBY PITOT**

GEAR DOWN - FLAPS 9° AND 22°



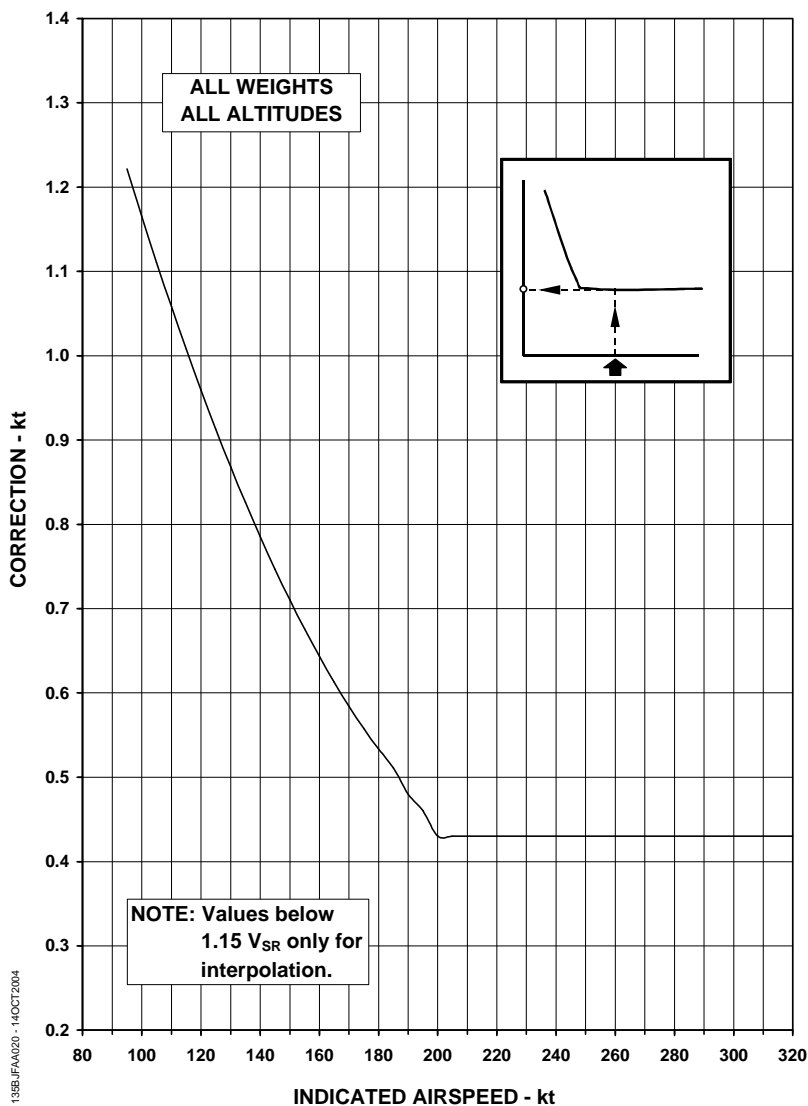


AIRSPEED POSITION ERROR CORRECTION
STANDBY PITOT
GEAR DOWN - FLAPS 45°



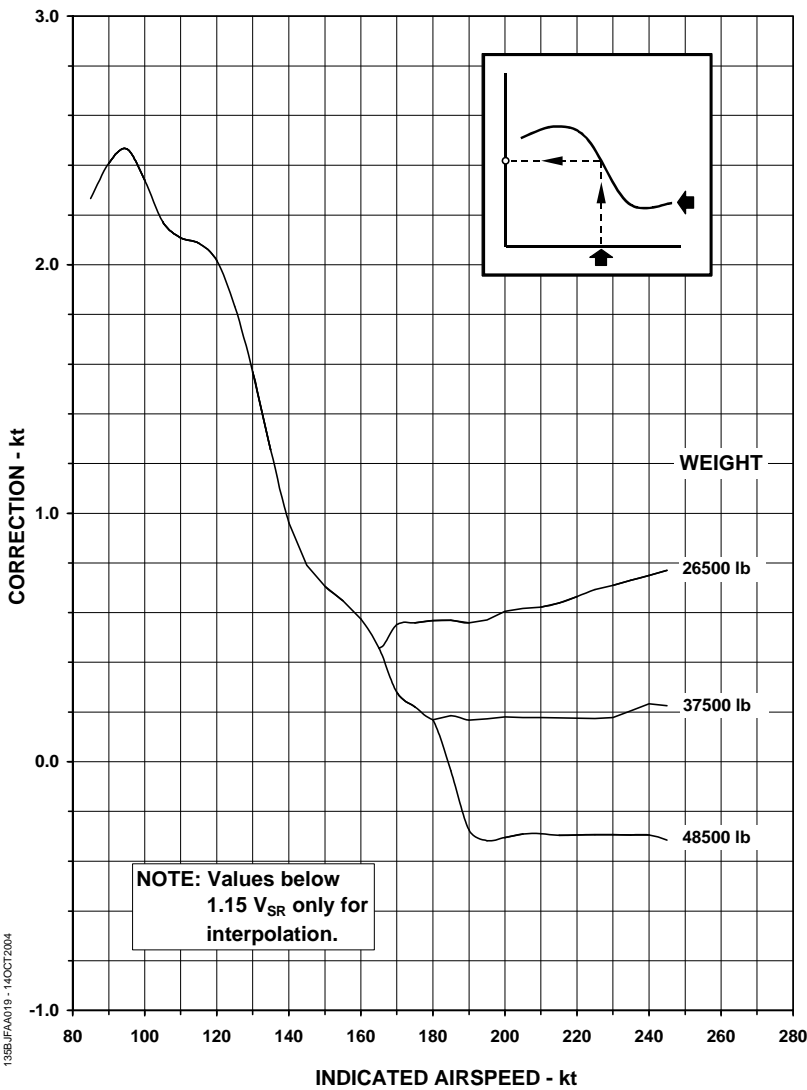
138BJFAA018 - 14OCT2004

AIRSPEED POSITION ERROR CORRECTION
STANDBY PITOT
GEAR UP - FLAPS UP





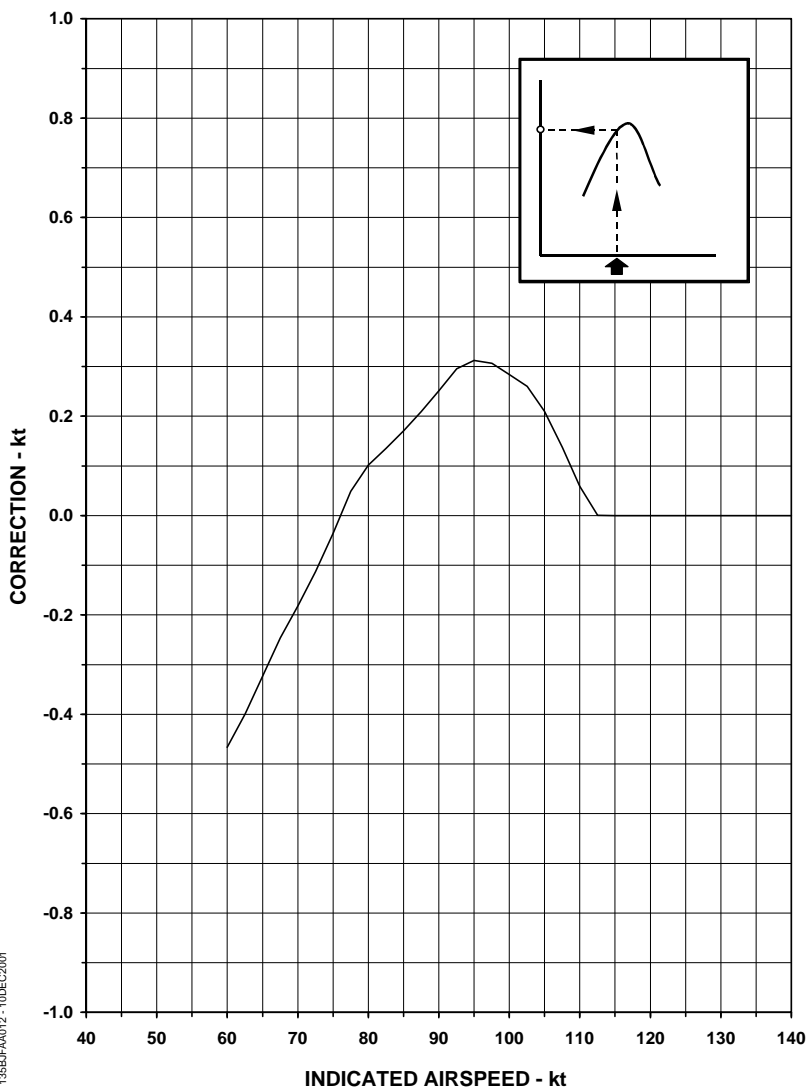
AIRSPEED POSITION ERROR CORRECTION
STANDBY PITOT
GEAR UP - FLAPS 9° AND 22°



135B-JFAA019 - 14OCT2014

**AIRSPEED POSITION ERROR CORRECTION
PILOT'S AND COPILOT'S PITOTS**

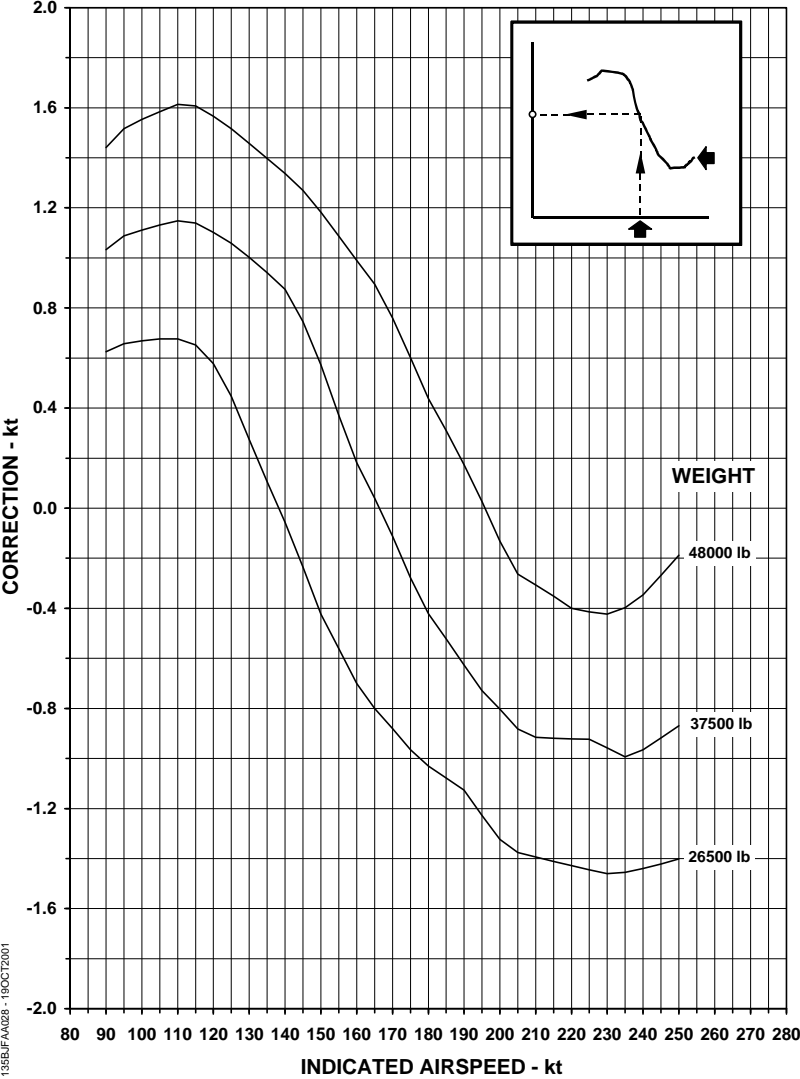
GROUND EFFECT - FLAPS 9°, 18° AND 22°



135BJFA012 - 10DEC2001

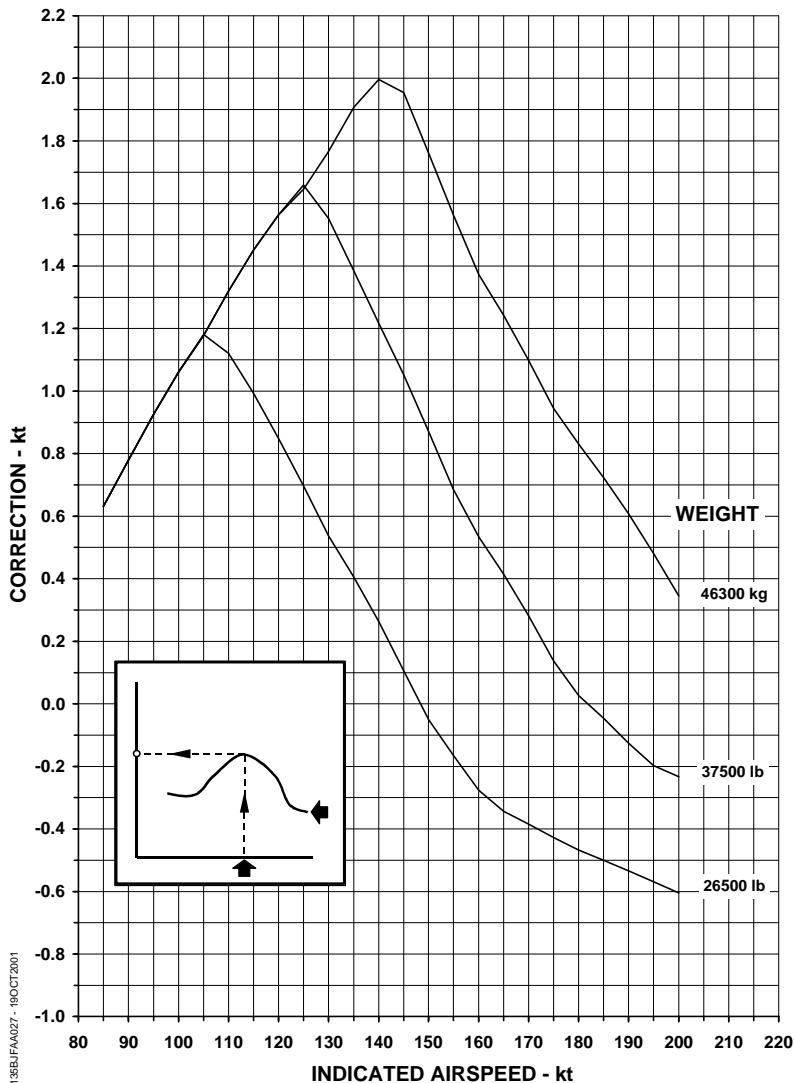


AIRSPED POSITION ERROR CORRECTION
PILOT'S AND COPILOT'S PITOTS
GEAR DOWN - FLAPS 9°



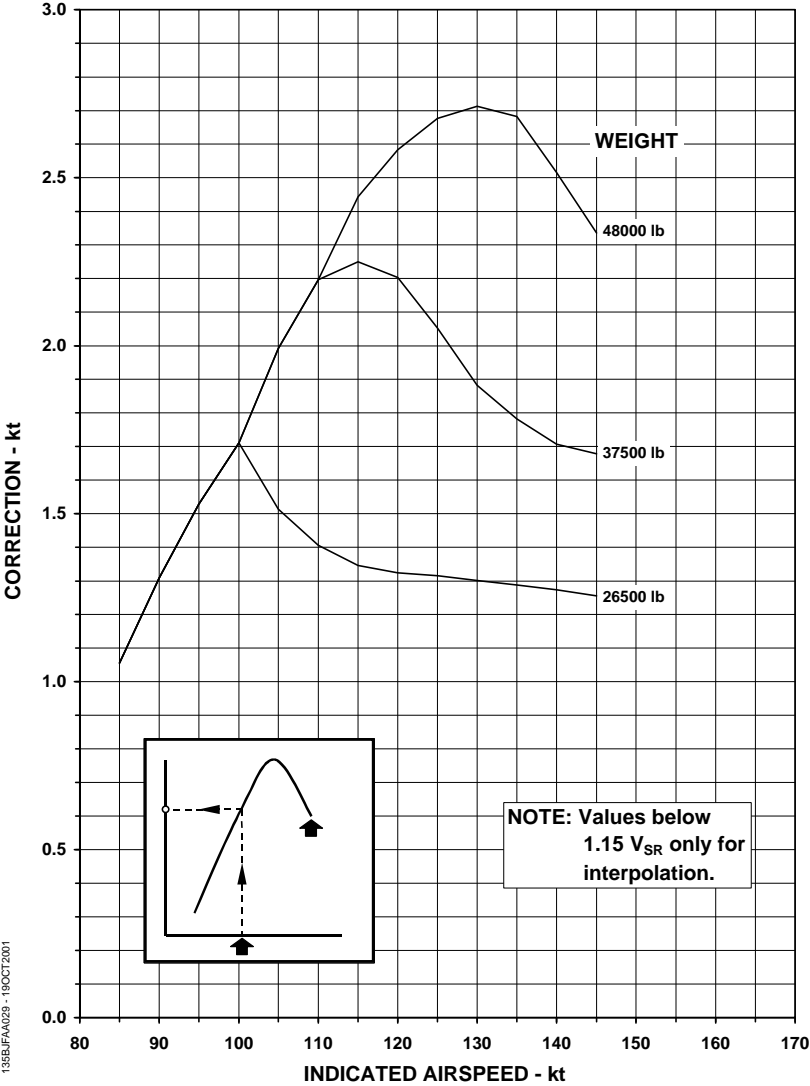
CTA APPROVED
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AIRSPED POSITION ERROR CORRECTION
PILOT'S AND COPILOT'S PITOTS
GEAR DOWN - FLAPS 22°



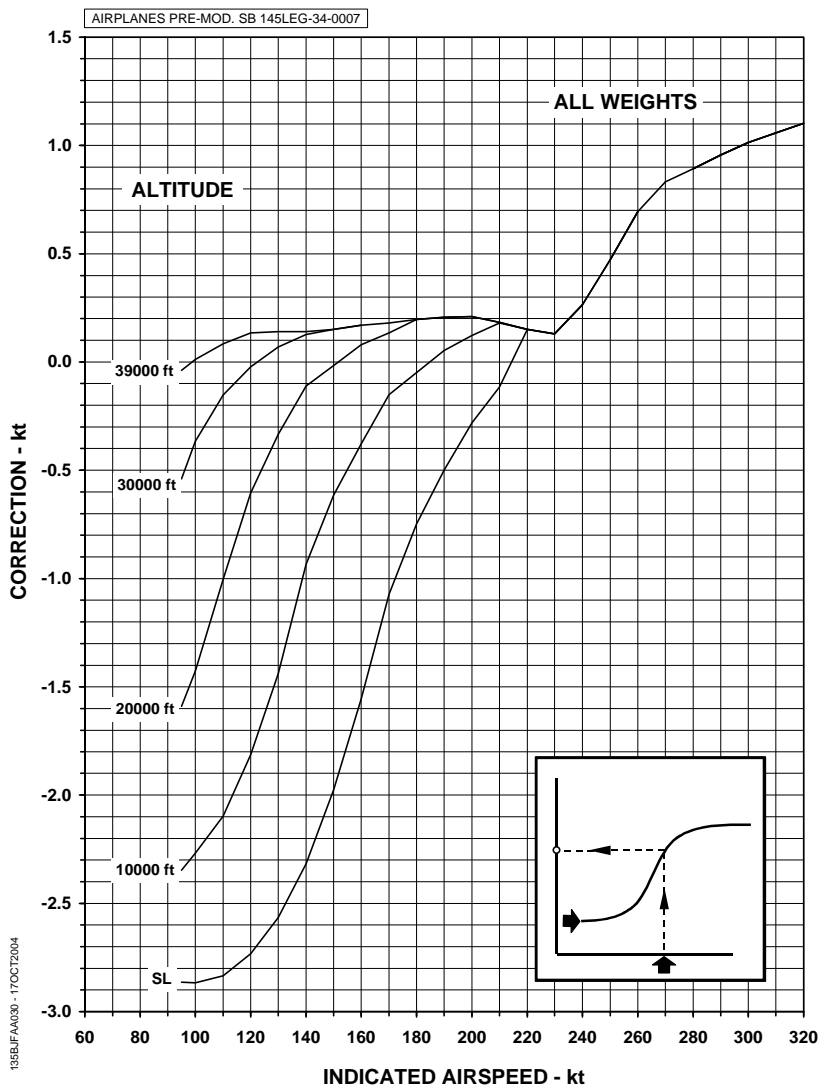


AIRSPPEED POSITION ERROR CORRECTION
PILOT'S AND COPILOT'S PITOTS
GEAR DOWN - FLAPS 45°



135BJFAJ029 - 19OCT2001

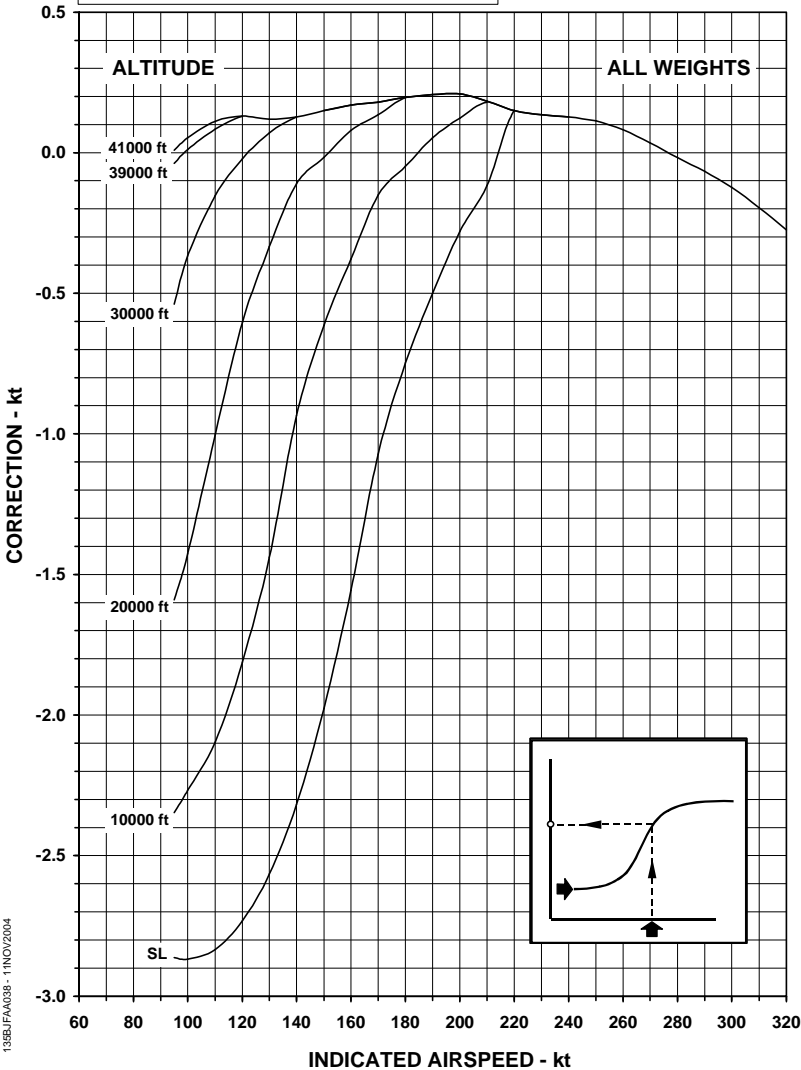
AIRSPED POSITION ERROR CORRECTION
PILOT'S AND COPILOT'S PITOTS
GEAR UP - FLAPS UP





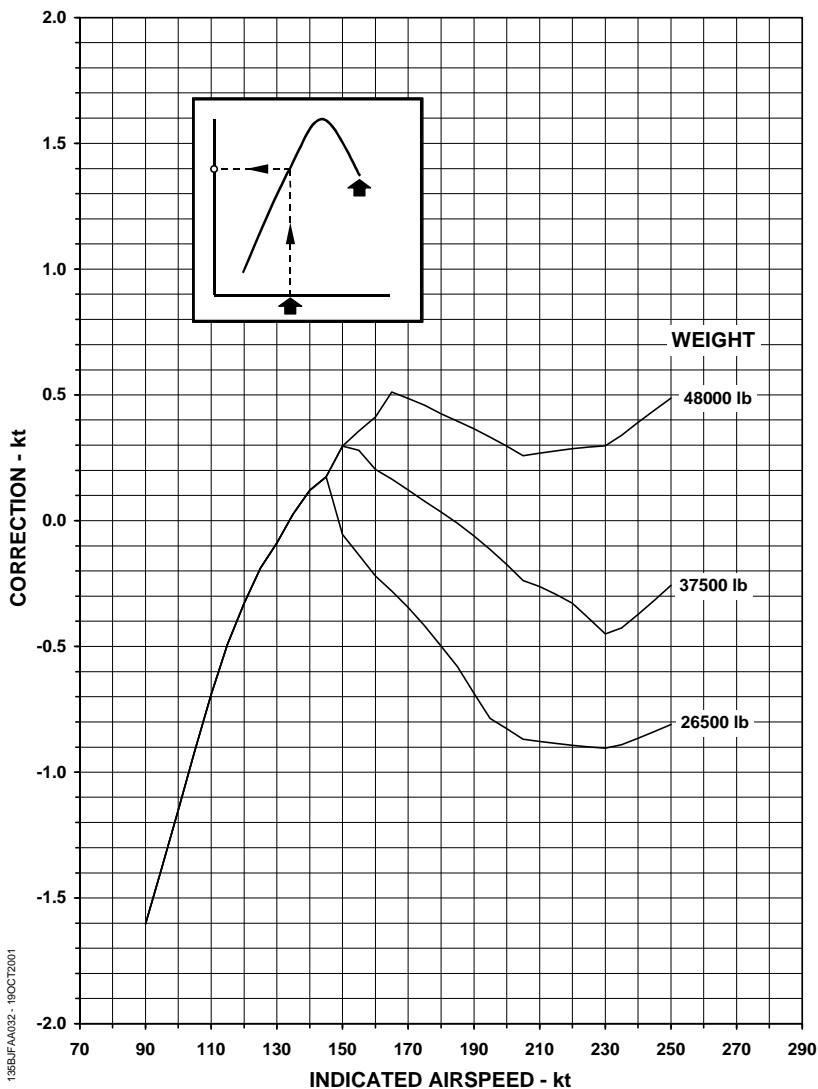
AIRSPPEED POSITION ERROR CORRECTION
PILOT'S AND COPILOT'S PITOTS
GEAR UP - FLAPS UP

AIRPLANES POST-MOD. SB 145LEG-34-0007 OR EQUIPPED WITH
AN EQUIVALENT MODIFICATION FACTORY INCORPORATED



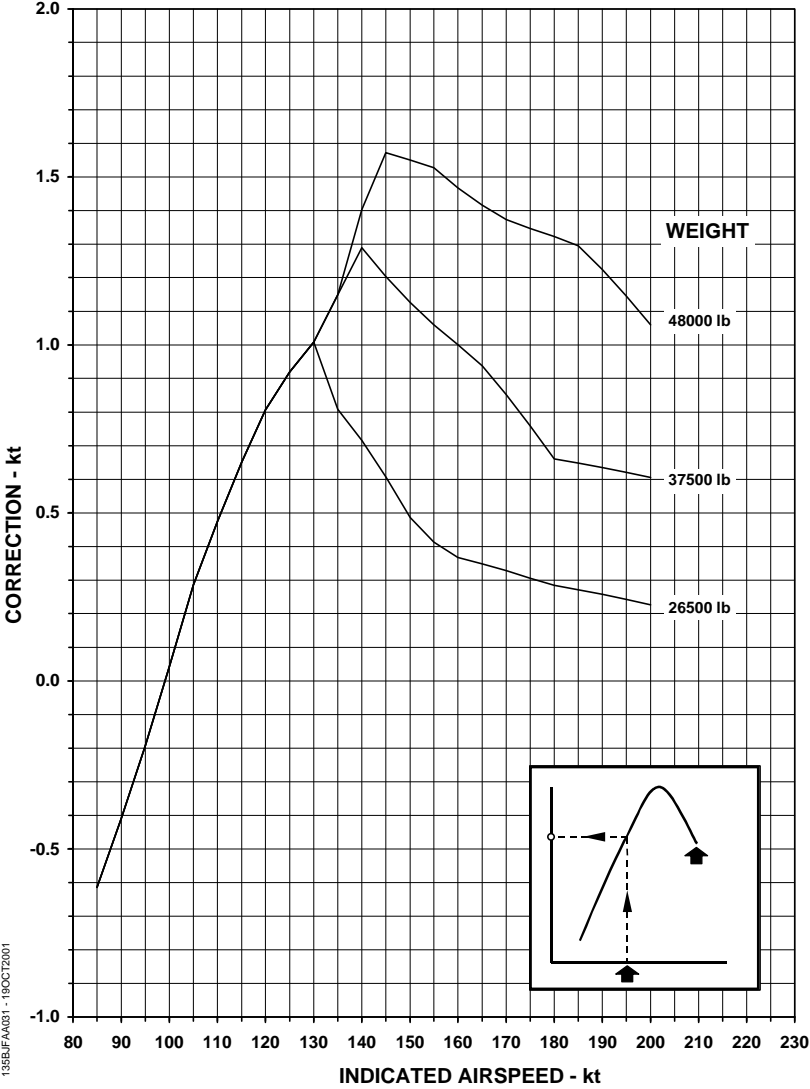
135BJFAA038 - 11NOV2004

AIRSPED POSITION ERROR CORRECTION
PILOT'S AND COPILOT'S PITOTS
GEAR UP - FLAPS 9°





AIRSPEED POSITION ERROR CORRECTION
PILOT'S AND COPILOT'S PITOTS
GEAR UP - FLAPS 22°





AIRPLANE FLIGHT MANUAL

PERFORMANCE

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ALTITUDE POSITION ERROR CORRECTIONS CHARTS

USE

Enter the appropriate chart with indicated airspeed, the indicated pressure altitude, and weight (when applicable) considering the appropriate airplane configuration and pitot (standby, or pilot and copilot), to read the altimetric correction. The true pressure altitude will be the indicated pressure altitude minus the altimetric correction.

EXAMPLE

Given:

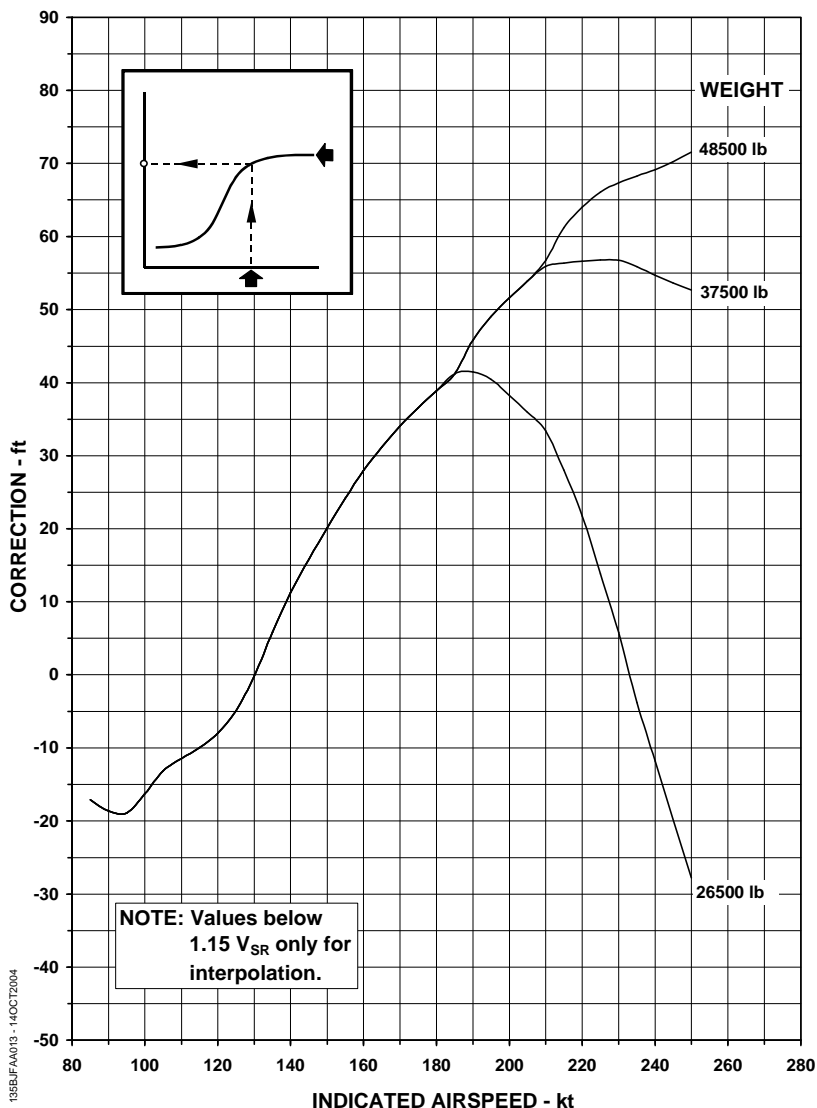
Standby Pitot
Standby Altimeter
Indicated Airspeed.....245 KIAS
Weight.....48000 lb
Flaps.....22°
Gear.....DOWN
Altitude.....20000 ft

Determine:

Altimetric correction.....25 ft
True Pressure Altitude.....20025 ft

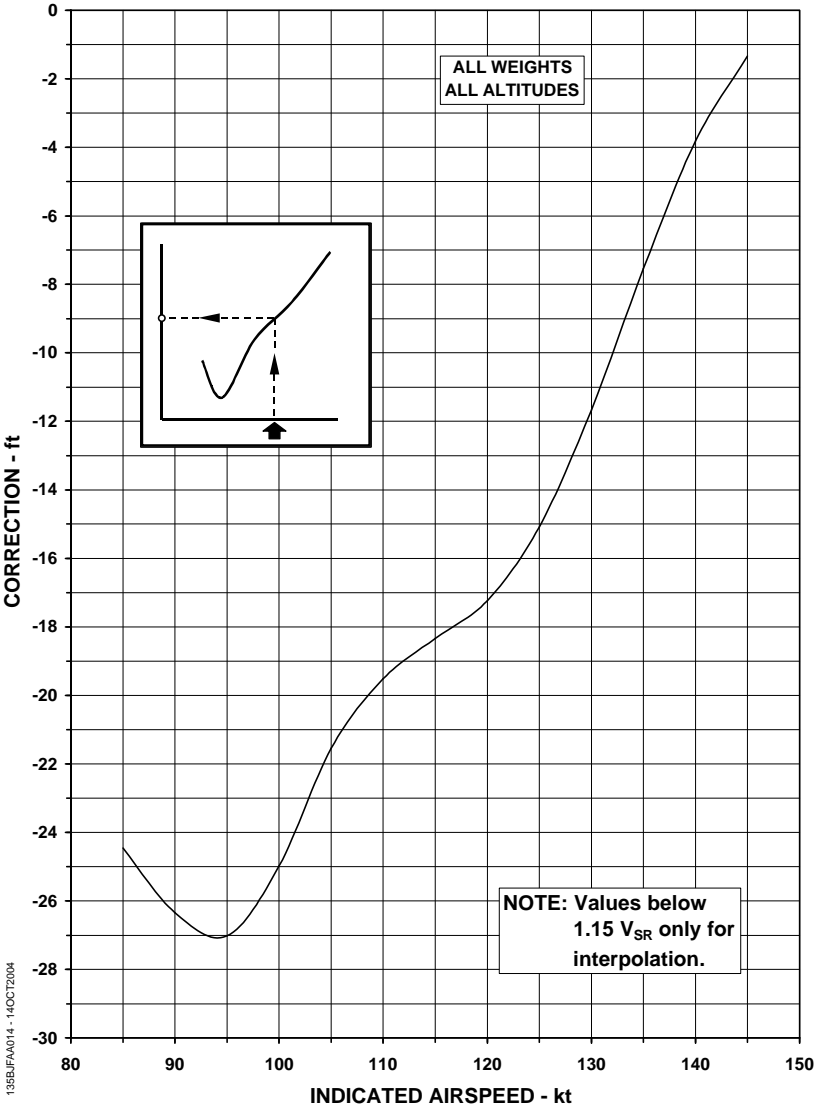
**ALTITUDE POSITION ERROR CORRECTION
STANDBY PITOT**

GEAR DOWN - FLAPS 9° AND 22°



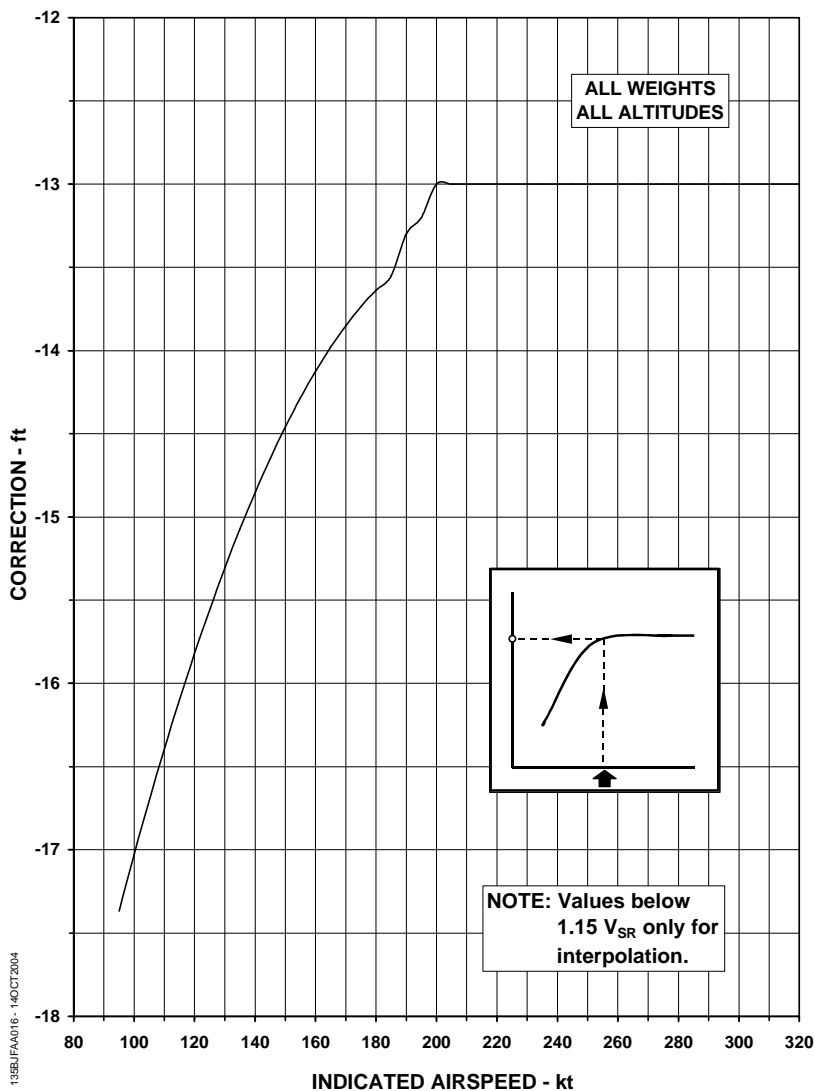


**ALTITUDE POSITION ERROR CORRECTION
STANDBY PITOT**
GEAR DOWN - FLAPS 45°



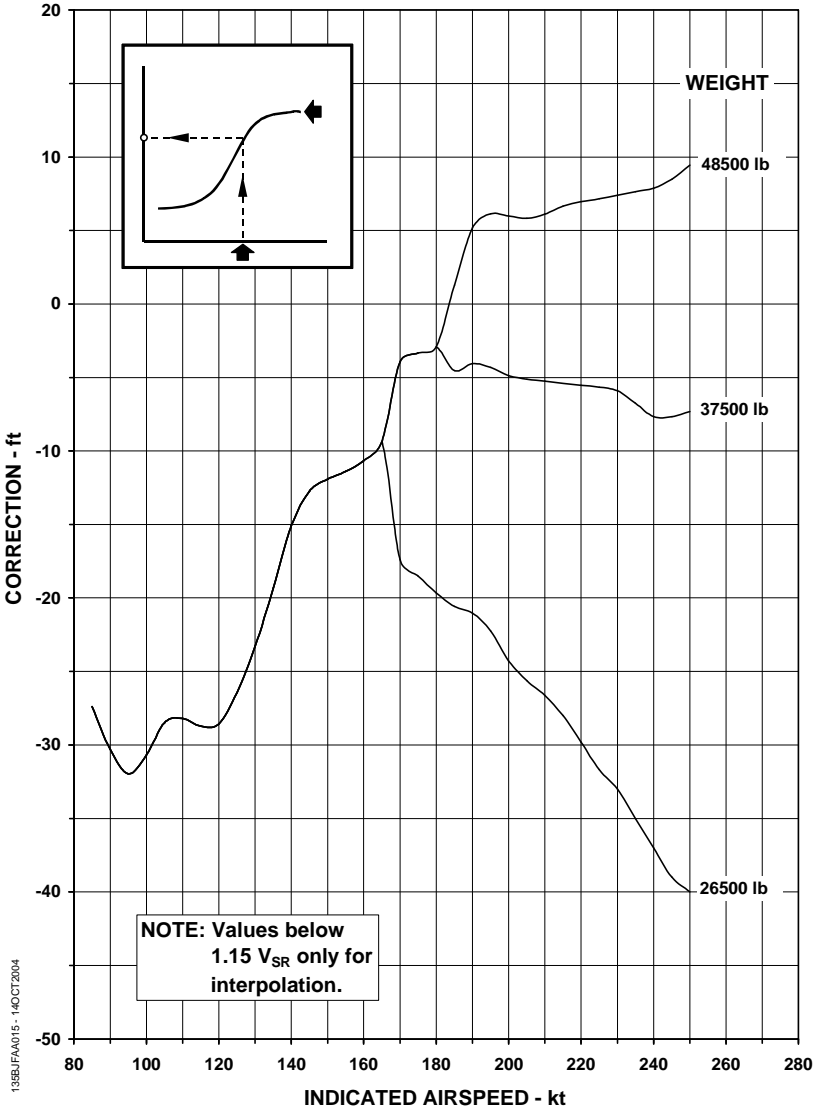
135BJFA014 - 14OCT2004

ALTITUDE POSITION ERROR CORRECTION
STANDBY PITOT
GEAR UP - FLAPS UP



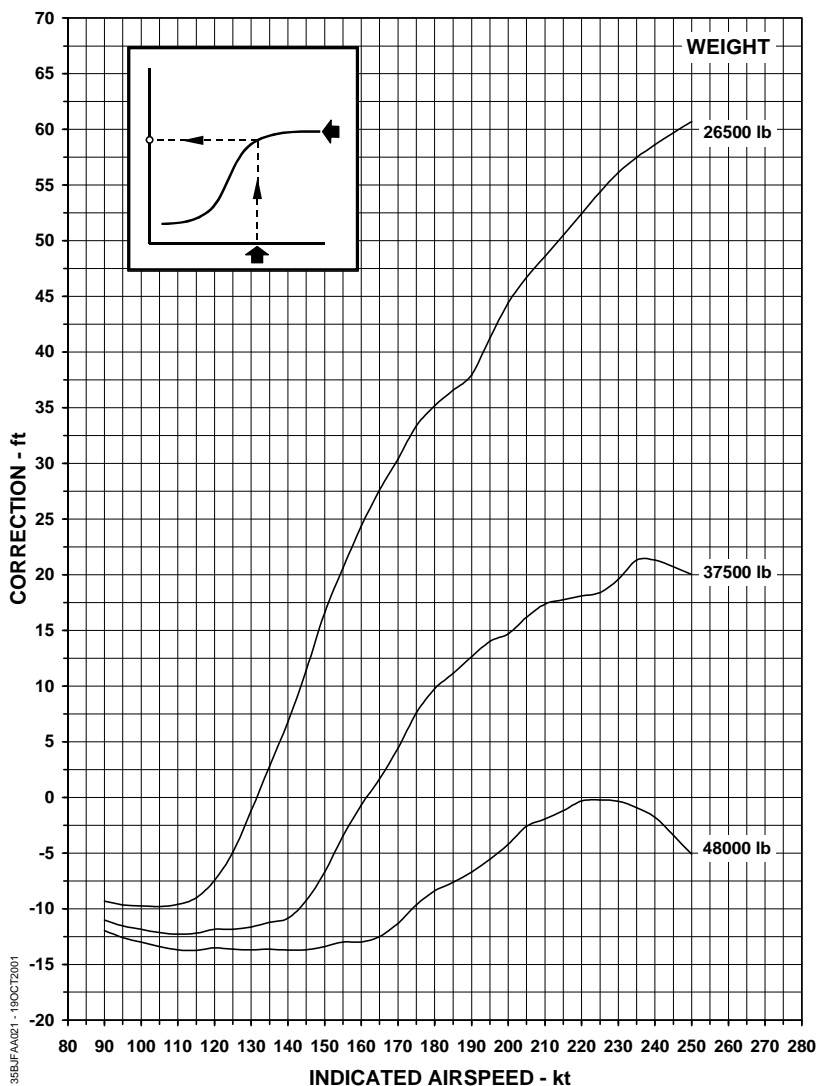


ALTITUDE POSITION ERROR CORRECTION
STANDBY PITOT
GEAR UP - FLAPS 9° AND 22°



135B/FAA015 - 14OCT2004

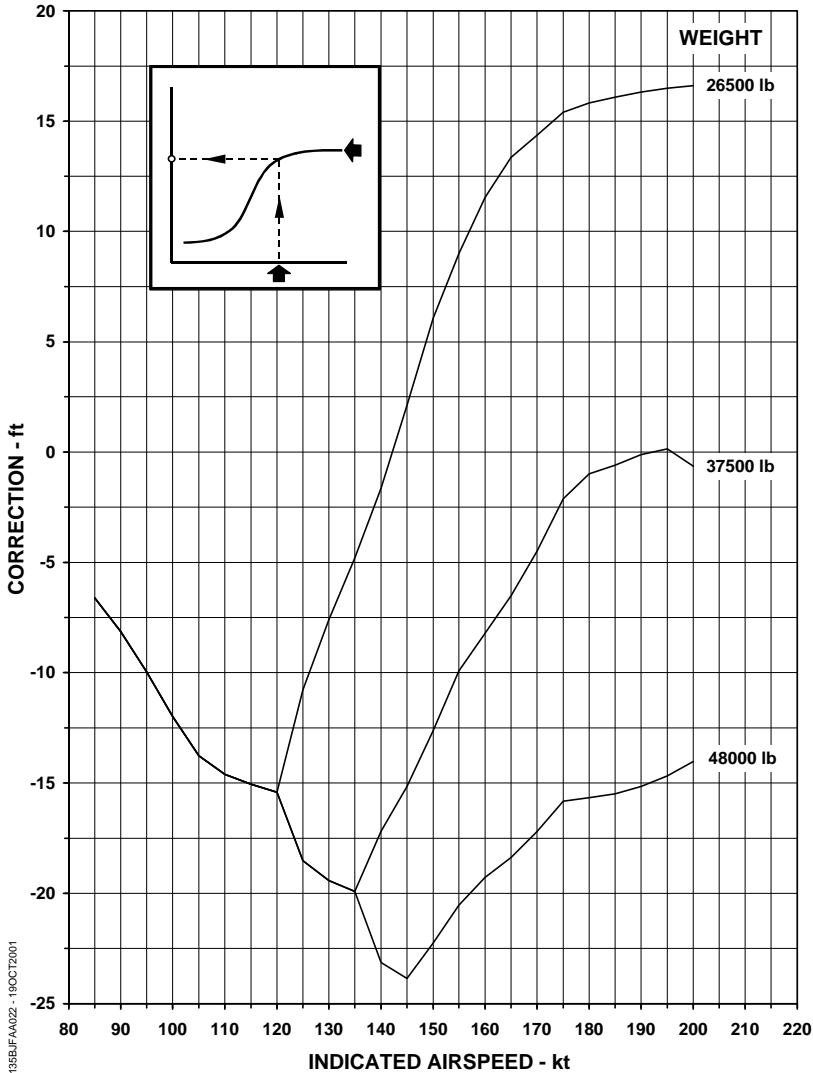
ALTITUDE POSITION ERROR CORRECTION
PILOT'S AND COPILOT'S PITOTS
GEAR DOWN - FLAPS 9°



13B6JFA021 - 19OCT2001



ALTITUDE POSITION ERROR CORRECTION
PILOT'S AND COPILOT'S PITOTS
GEAR DOWN - FLAPS 22°

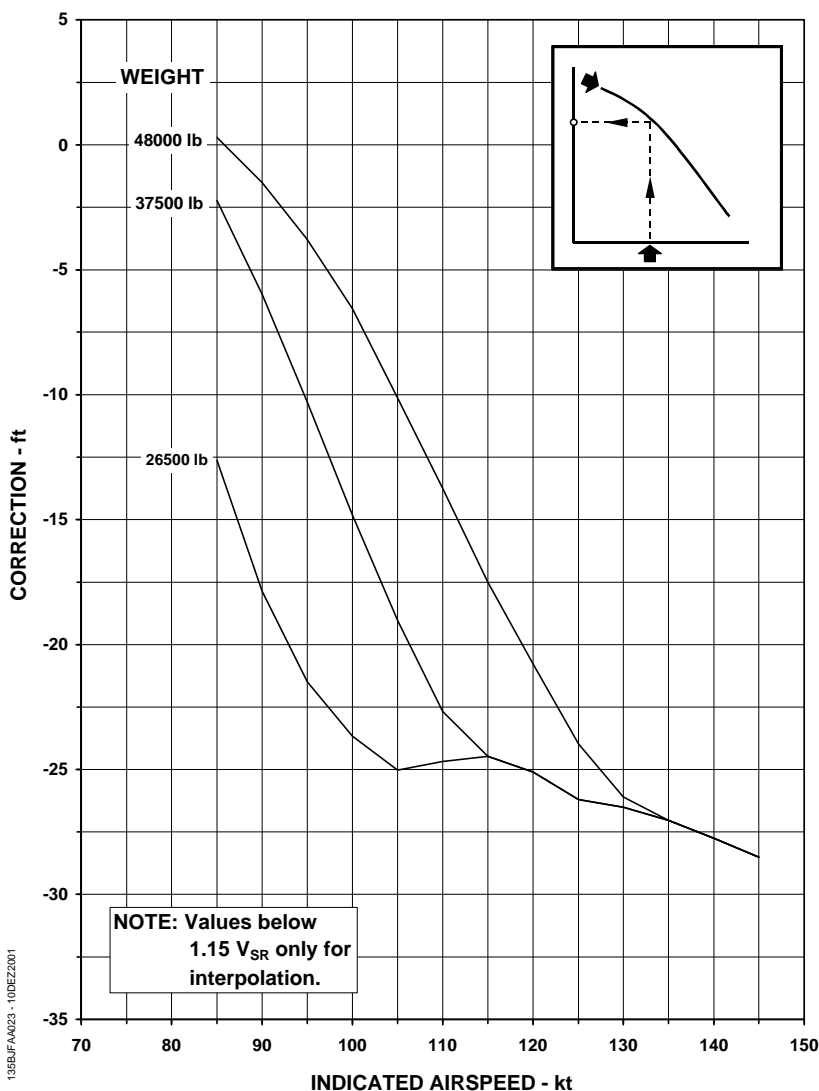


135B1FAA022 - 19OCT2001

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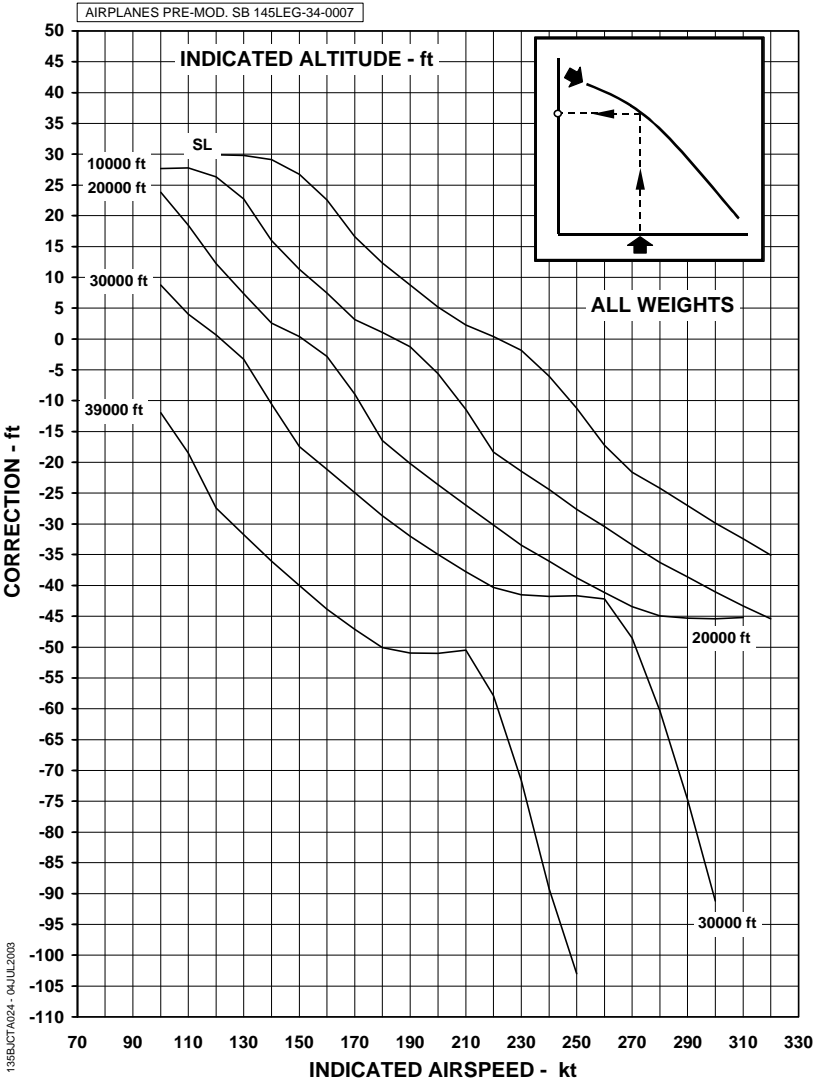
**ALTITUDE POSITION ERROR CORRECTION
PILOT'S AND COPILOT'S PITOTS**

GEAR DOWN - FLAPS 45°



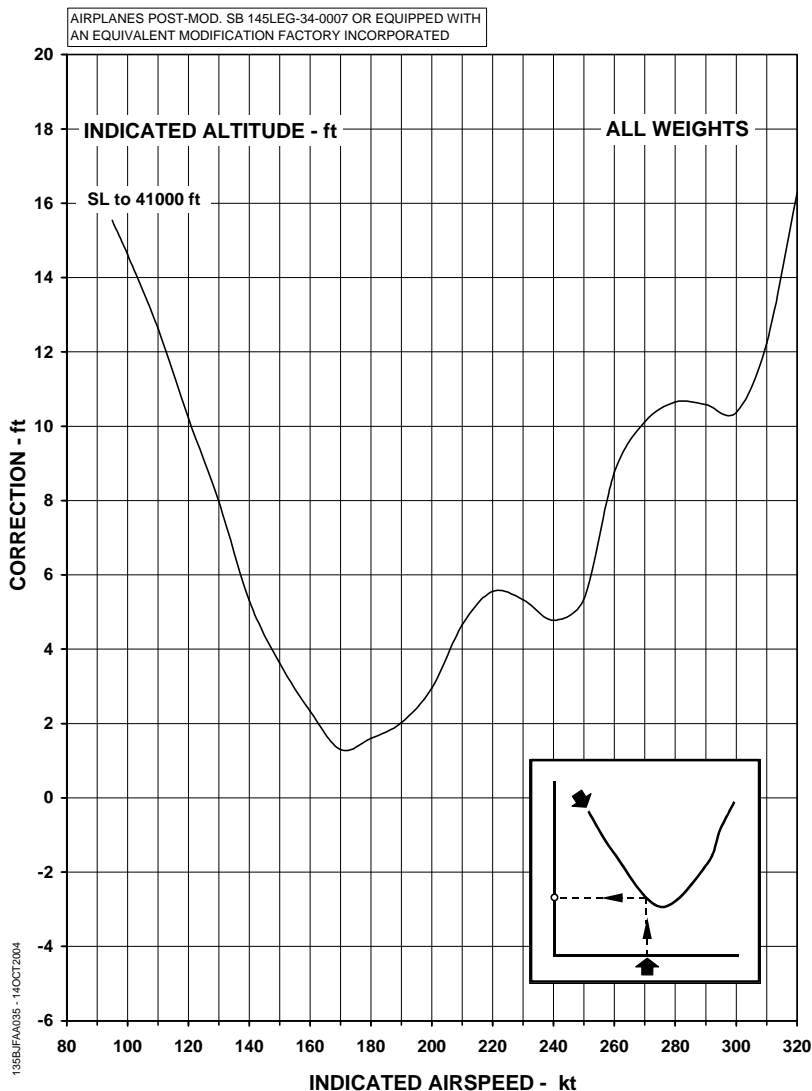


ALTITUDE POSITION ERROR CORRECTION
PILOT'S AND COPILOT'S PITOTS
GEAR UP - FLAPS UP



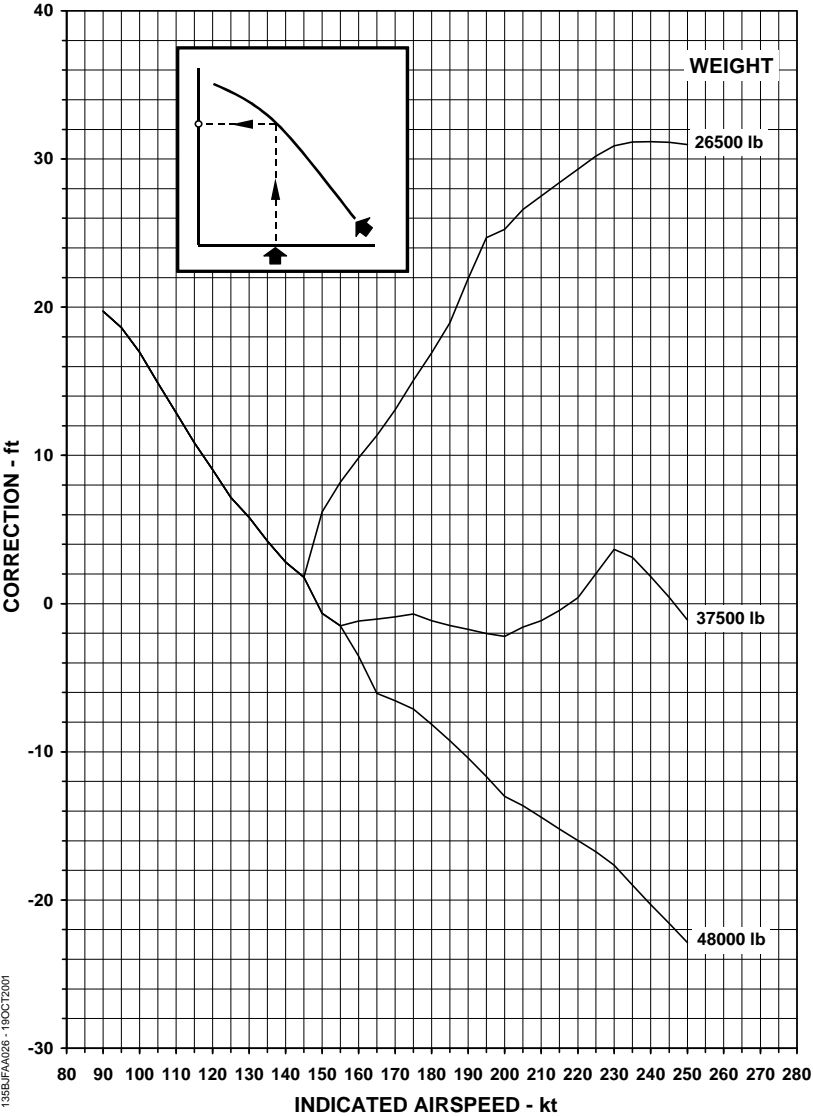
135B/CTA024 - 04JUL2003

ALTITUDE POSITION ERROR CORRECTION
PILOT'S AND COPILOT'S PITOTS
GEAR UP - FLAPS UP





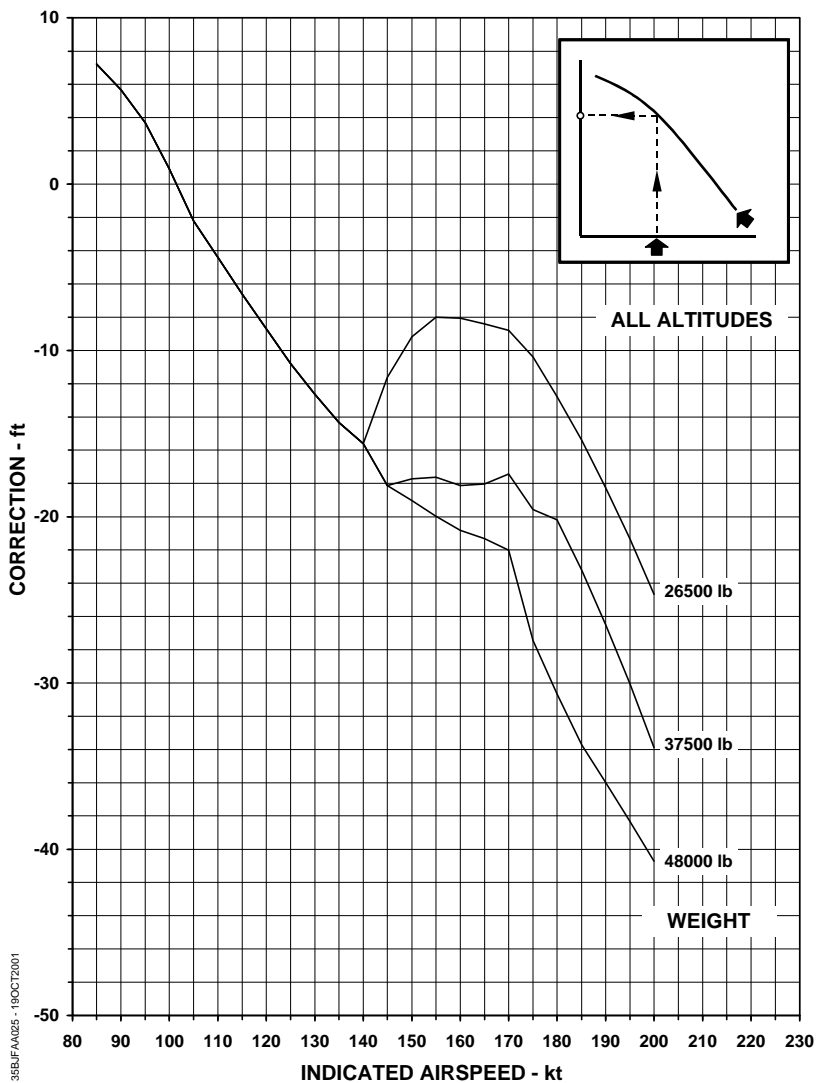
ALTITUDE POSITION ERROR CORRECTION
PILOT'S AND COPILOT'S PITOTS
GEAR UP - FLAPS 9°



135BJFAA26 - 19OCT2001

**ALTITUDE POSITION ERROR CORRECTION
PILOT'S AND COPILOT'S PITOTS**

GEAR UP - FLAPS 22°



135B/FAA025 - 19OCT2001



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AIRPLANE FLIGHT MANUAL

PERFORMANCE

SPEEDS IN THE STALL

The stalling speed is shown in the Stalling Speed Chart. Stalling speeds, with zero thrust in accordance with Airworthiness Requirements, are the reference for the various handling speeds herein presented. This chart is provided in terms of knots of calibrated airspeed for various weights and airplane configurations.



STALL SPEED CHART

USE

Enter the chart with airplane gross weight and airplane configuration and read the airspeed.

EXAMPLE

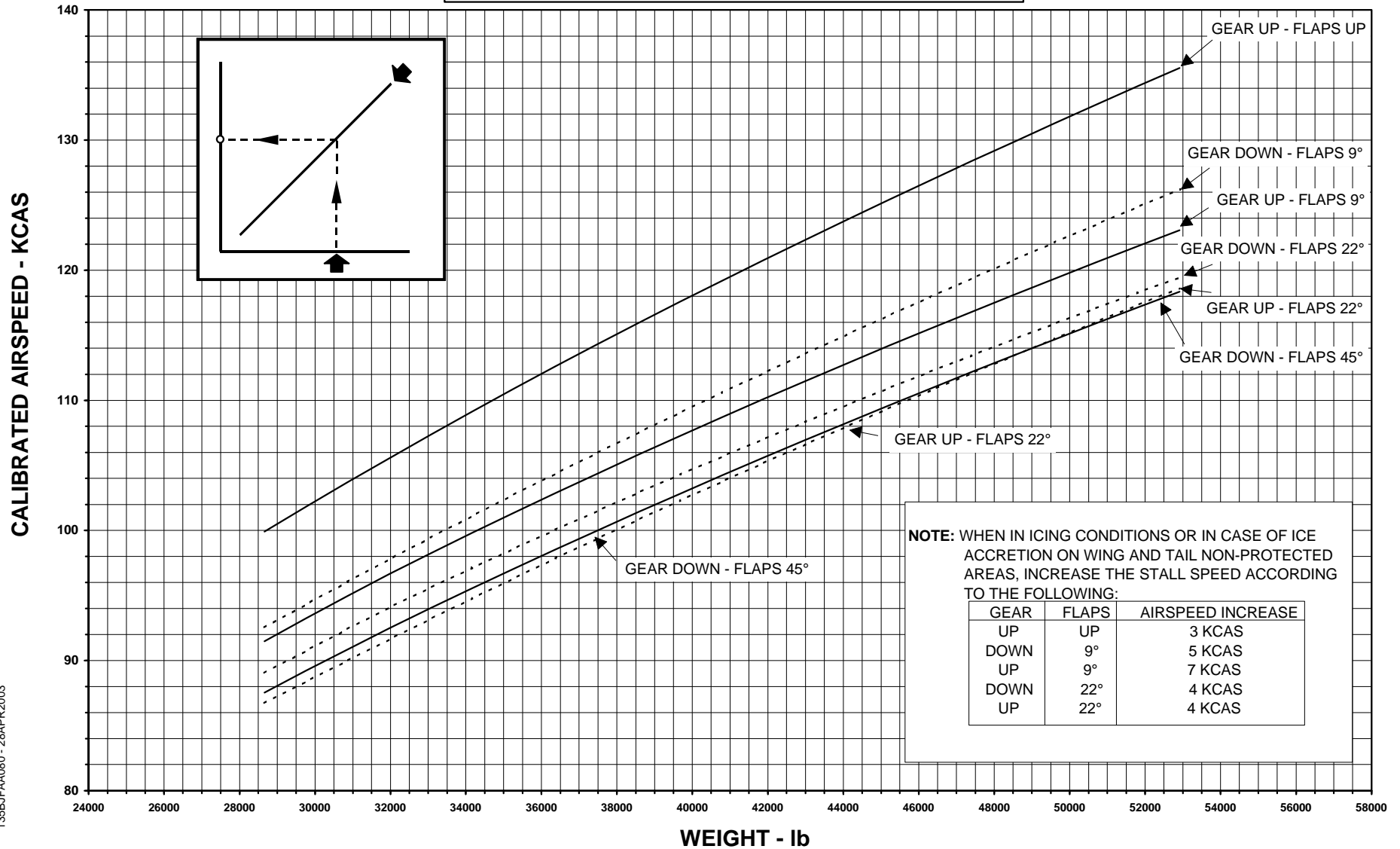
Given:

Configuration FLAPS 9° AND
GEAR DOWN
Airplane gross weight 48000 lb

Determine:

Stall Speed 120 KCAS

STALL SPEED (STICK PUSHER SPEED) ZERO THRUST - FORWARD CG



135BJFAA080 - 28APR2003

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